

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: BR2-5-01

Contract: 25-113-01

Boring Location: Sta. 273+25.21, 109' Rt. C.L.

Boring Surface Elev.: + 41.55

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split-Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.00'	To:	43.00'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
1/23/2008		8	6	2.0	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 1 1 1	Saturated soft brown clayey silt w/some fine sand, trace of coarse sand.	A-4(7)	
2.5		2	2.0' 2.0'	1 3 4 5	15" RECOVERY Saturated loose brown fine to coarse sand w/some silt and gravel.	A-2-4(0)	
5		3	4.0' 4.0'	1 5 7 9	8" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt and gravel.	A-2-4(0)	
7.5		4	6.0' 6.0'	9 16 28 20	12" RECOVERY Saturated dense brown fine to coarse sand and gravel w/some silt.	A-2-4(0)	
10		5	8.0' 8.0'	6 9 14 15	14" RECOVERY Saturated medium dense brown fine to coarse sand w/trace of silt and gravel.	A-3	
		6	10.0' 10.0'	17 18 24 25	18" RECOVERY Saturated dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
12.5		7	12.0' 12.0'	4 7 14 16	24" RECOVERY Saturated medium dense brown fine to coarse sand w/trace of silt and gravel.	A-3	

Remarks: Mud Rotary @ 43 ft.

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0'	4	18" RECOVERY	A-3	
			14.0'	8 13 15	Saturated medium dense brown fine to coarse sand w/trace of gravel and silt.		
17.5		9	16.0'	12	14" RECOVERY	A-2-4(0)	
			16.0'	12 18 25	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.		
20		10	18.0'	19	18" RECOVERY	A-2-4(0)	
			18.0'	19 28 34 29	Saturated very dense brown fine to coarse sand w/some silt, trace of gravel.		
22.5			20.0'		18" RECOVERY		
25		11	24.0'	3	18" RECOVERY	A-3	
			24.0'	7 9 10	Saturated medium dense brown fine to coarse sand w/trace of silt.		
27.5			26.0'		13" RECOVERY		
30		12	29.0'	5	18" RECOVERY	A-2-4(0)	
			29.0'	4 8 8	Saturated medium dense brown fine sand w/ some silt and coarse sand.		
32.5			31.0'		17" RECOVERY		
35		13	34.0'	3	18" RECOVERY	A-2-4(0)	
			34.0'	3 8 7	Saturated medium dense brown fine sand w/ some coarse sand and silt.		
37.5			36.0'		14" RECOVERY		

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Boring No.: BR2-5-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	6 8 10 11	Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
			41.0'		17" RECOVERY		
42.5							
45		15	44.0'	6 6 8 9	Saturated medium dense dark green fine sand w/some coarse sand, trace of gravel.	A-3	Glauconite
			46.0'		18" RECOVERY		
47.5							
50		16	49.0'	9 13 14 13	Saturated medium dense dark green fine sand w/trace of silt and coarse sand.	A-3	Glauconite
			51.0'		17" RECOVERY		
52.5							
55		17	54.0'	7 10 14 14	Saturated medium dense dark green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Glauconite
			56.0'		21" RECOVERY		
57.5							
60		18	59.0'	9 15 20 30	Saturated dense dark green fine sand w/some coarse sand and silt, trace of gravel and organic matter.	A-2-4(0)	Glauconite
			61.0'		22" RECOVERY		

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Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5							
65		19	64.0'	19 28 44 50	Saturated very dense dark green fine to coarse sand w/some silt, trace of organic matter. 19" RECOVERY	A-2-4(0)	Glauconite
67.5			66.0'				
70		20	69.0'	17 18 31 47	Saturated dense dark green silty fine to coarse sand w/trace of gravel and organic matter. 22" RECOVERY	A-2-4(0)	Glauconite - Quartz Seam @ 69.0'.
72.5			71.0'				
75		21	73.0'	19 29 29	Saturated very dense dark green clayey fine sand w/some coarse sand and organic matter, trace of gravel. 24" RECOVERY	A-2-4(0)	Glauconite
77.5			75.0'		Boring Terminated at 75 feet.		
80							
82.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Sand



Silty sand

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Notes:

1. Exploratory borings were drilled on 1/23/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
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.

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F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: BR2-5-02

Contract: 25-113-01

Boring Location: Sta. 273+78.60, 29' Rt. C.L.

Boring Surface Elev.: + 38.84

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split-Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.00'	To:	24.00'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
1/23/2008		8'	6'	6.2'	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Gary Truver Sr.
Helpers: Jeff Hillerbrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	W/H W/H 1 6	No Sieve Analysis - Indication of saturated brown organic sandy silt.		
2.5		2	2.0' 2.0'	3 5 7 5	8" RECOVERY Saturated medium dense reddish brown fine to coarse sand w/some silt.	A-2-4(0)	
5		3	4.0' 4.0'	3 6 7 5	10" RECOVERY Saturated medium dense reddish brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
7.5		4	6.0' 6.0'	3 8 14 22	15" RECOVERY Saturated medium dense reddish brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
10		5	8.0' 8.0'	12 12 14 18	4" RECOVERY Saturated medium dense reddish brown fine to coarse sand w/some silt.	A-2-4(0)	
		6	10.0' 10.0'	7 10 14 17	16" RECOVERY Saturated medium dense reddish brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
12.5		7	12.0' 12.0'	3 9 13 18	24" RECOVERY Saturated medium dense brownish green fine to coarse sand w/trace of silt.	A-3	

Remarks: Mud Rotary @ 24.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0' 14.0'	3 7 15 20	24" RECOVERY Saturated medium dense brownish green fine to coarse sand w/trace of silt and gravel.	A-3	
17.5		9	16.0' 16.0'	13 18 25 35	24" RECOVERY Saturated dense brownish green fine to coarse sand w/some silt.	A-2-4(0)	Glauconite
20		10	18.0' 18.0'	9 10 16 23	24" RECOVERY Saturated medium dense greenish brown fine to coarse sand w/some silt.	A-2-4(0)	
22.5		U-1	21.0' 23.0'		18" RECOVERY Saturated greenish brown fine to coarse sand w/ trace of silt 19" RECOVERY	A-3	Press Sample - Shelby Tube
25		11	24.0' 24.0'	8 17 23 24	Saturated dense greenish brown fine to coarse sand w/trace of silt.	A-3	
27.5			26.0'		24" RECOVERY		
30		12	29.0' 29.0'	6 10 11 14	Saturated medium dense greenish brown fine sand w/some silt and coarse sand.	A-2-4(0)	Glauconite
32.5			31.0'		18" RECOVERY		
35		13	34.0' 34.0'	9 12 13 17	Saturated medium dense greenish brown fine sand w/some coarse sand, trace of silt.	A-3	Glauconite
37.5			36.0'		19" RECOVERY		

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Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	7 7 16 14	Saturated medium dense dark gray fine sand w/trace of coarse sand and silt. 24" RECOVERY	A-3	Glauconite
42.5			41.0'				
45		15	44.0'	12 19 23 34	Saturated dense dark gray fine sand w/some silt, trace of coarse sand and organic matter. 20" RECOVERY	A-2-4(0)	
47.5			46.0'				
50		16	49.0'	12 17 19 48	Saturated dense dark gray fine sand w/some silt, trace of coarse sand and organic matter. 24" RECOVERY	A-2-4(0)	
52.5			51.0'				
55		17	54.0'	11 16 23 28	Saturated dense dark gray fine sand w/some silt and coarse sand, trace of gravel and organic matter. 24" RECOVERY	A-2-4(0)	
57.5			56.0'				
60		18	59.0' 59.3'	50/4"	Saturated very dense dark gray fine to coarse sand w/some silt, trace of organic matter and gravel. 4" RECOVERY	A-2-4(0)	

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Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5							
65		19	64.0' 65.8'	20 27 47 50/4"	Saturated very dense dark gray silty fine to coarse sand w/trace of organic matter and gravel. 22" RECOVERY	A-2-4(0)	
67.5							
70		20	69.0' 70.4'	24 34 50/5"	Saturated hard dark gray clayey silt w/some coarse sand and organic matter, trace of fine sand and gravel. 15" RECOVERY	A-4(7)	
72.5							
75		21	74.0' 75.3'	20 42 50/3"	Saturated very dense dark gray clayey fine sand w/some coarse sand, trace of gravel and organic matter. 15" RECOVERY	A-2-6(0)	
77.5					Boring Terminated at 75.3 feet.		
80							
82.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Sand



Silty sand



Silt

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Notes:

1. Exploratory borings were drilled on 1/23/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
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.

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F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: BR2-5-03

Contract: 25-113-01

Boring Location: Sta. 275+23.63, 83' Rt. C.L.

Boring Surface Elev.: +43.07

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split-Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0'	To:
					16.0'

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
1/22/2008		4.0'	4.0'	2.0'	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Dan Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 W/H W/H 6	No Sieve Analysis - Indication of brown silty sand.		
2.5		2	2.0'	5 7 6 6	3" RECOVERY Wet medium dense light brown coarse to fine sand w/some gravel and silt.	A-1-b	
5		3	4.0'	2 4 4 6	12" RECOVERY Saturated loose brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
7.5		4	6.0'	3 6 8 9	13" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
10		5	8.0'	5 9 14 20	18" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
12.5		6	10.0'	5 9 10 12	15" RECOVERY Saturated medium dense brown fine to coarse sand w/trace of gravel.	A-3	
		7	12.0'	6 8 8 12	17" RECOVERY Saturated medium dense brown fine to coarse sand w/trace of silt and gravel.	A-3	

Remarks: Mud Rotay @ 16 ft.

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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Contract: 25-113-01

Boring No.: BR2-5-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0' 14.0'	4 9 9 13	20" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
17.5		9	16.0' 16.0'	6 9 11 13	19" RECOVERY Saturated medium dense brown fine to coarse sand w/trace of silt and gravel.	A-3	
20		10	18.0' 18.0'	4 8 10 11	18" RECOVERY Saturated medium dense brown fine to coarse sand w/trace of silt and gravel.	A-3	
22.5			20.0'		18" RECOVERY		
25		11	24.0' 24.0'	3 8 11 12	Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
27.5			26.0'		20" RECOVERY		
30		12	29.0' 29.0'	6 7 9 9	Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
32.5			31.0'		18" RECOVERY		
35		13	34.0' 34.0'	6 6 7 10	Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
37.5			36.0'		19" RECOVERY		

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Contract: 25-113-01

Boring No.: BR2-5-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	5 8 8 10	Saturated medium dense dark brown fine sand w/some coarse sand, trace of silt.	A-3	GTA - pH sample
			41.0'		17" RECOVERY		
42.5		14A	41.0'	9 11 13 16	22" RECOVERY		
45		15	44.0'	4 8 8 12	Saturated medium dense dark green fine sand w/trace of silt and coarse sand.	A-3	Glaucinite
47.5		15A	46.0'	5 11 16 17	14" RECOVERY		GTA - pH sample
			48.0'		16" RECOVERY		
50		16	49.0'	7 10 11 14	Saturated medium dense dark green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Glaucinite
52.5			51.0'		22" RECOVERY		
55		17	54.0'	7 9 13 17	Saturated medium dense dark green fine sand w/some silt, trace of coarse sand, gravel and organic matter.	A-2-4(0)	Glaucinite
57.5			56.0'		22" RECOVERY		
60		18	59.0'	11 23 36 57	Saturated very dense dark green fine to coarse sand w/some silt, trace of gravel and organic matter.	A-2-4(0)	Glaucinite
			61.0'		22" RECOVERY		

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Contract: 25-113-01

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Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5							
65		19	64.0'	12 12 13 13	Saturated medium dense dark green silty fine to coarse sand w/trace of organic matter. 19" RECOVERY	A-2-4(0)	Glauconite
67.5			66.0'				
70		20	69.0'	14 19 21 21	Saturated dense dark green fine to coarse sand w/some silt, trace of organic matter and gravel. 22" RECOVERY	A-2-4(0)	Glauconite
72.5			71.0'				
75		21	73.0' 73.6'	49 50/1"	Saturated very dense dark green silty fine to coarse sand w/some gravel, trace of organic matter. 6" RECOVERY	A-2-5(0)	Glauconite
77.5					Boring Terminated at 73.6 feet.		
80							
82.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Sand



Silty sand

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Notes:

1. Exploratory borings were drilled on 1/22/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
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.

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F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: BR2-5-04

Contract: 25-113-01

Boring Location: Sta. 272+60.80, 28' Rt. C.L.

Boring Surface Elev.: 44.04

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split-Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	34.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/26/2008		8	6	4.6	39.4
						44.0
						44.0
						44.0

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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;		Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	4 2 2 3	Wet very loose brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
2.5		2	2.0' 2.0'	2 5 5 7	10" RECOVERY Wet loose brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
5		3	4.0' 4.0'	6 12 12 12	16" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
7.5		4	6.0' 6.0'	9 15 15 15	16" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
10		5	8.0' 8.0'	8 11 13 12	16" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
		6	10.0' 10.0'	7 11 15 14	18" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
12.5		7	12.0' 12.0'	3 8 11 12	16" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	

Remarks: Mud Rotary @ 34 ft.

Reviewed By: Maureen Kelly

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: 25-113-01

Boring No.: BR2-5-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0' 14.0'	3 7 9 11	14" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
17.5		9	16.0' 16.0'	7 11 15 20	16" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
20		10	18.0' 18.0'	6 9 15 12	14" RECOVERY Saturated medium dense brown silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
22.5		U-1	20.0' 20.0'		14" RECOVERY Saturated medium dense brown silty fine to coarse sand.	A-2-4(0)	Press Sample - Shelby Tube
25		11	24.0' 24.0'	6 8 13 14	23" RECOVERY Saturated medium dense brown silty fine sand w/some coarse sand.	A-2-4(0)	
27.5			26.0' 26.0'		15" RECOVERY		
30		12	29.0' 29.0'	4 6 10 11	Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
32.5			31.0' 31.0'		18" RECOVERY		
35		13	34.0' 34.0'	5 8 8 10	Saturated medium dense green fine sand w/ some silt and coarse sand.	A-2-4(0)	Glauconite
37.5			36.0' 36.0'		16" RECOVERY		

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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: 25-113-01

Boring No.: BR2-5-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	6 8 12 13	Saturated medium dense green fine sand w/ some silt and coarse sand.	A-2-4(0)	Glaucanite
			41.0'		18" RECOVERY		
42.5							
45		15	44.0'	6 6 7 9	Saturated medium dense dark green fine sand w/trace of coarse sand and silt.	A-3	Glaucanite
			46.0'		16" RECOVERY		
47.5							
50		16	49.0'	11 11 17 17	Saturated medium dense dark green fine sand w/trace of silt, coarse sand and organic matter.	A-3	Glaucanite
			51.0'		20" RECOVERY		
52.5							
55		17	54.0'	9 10 14 15	Saturated medium dense dark green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	Glaucanite
			56.0'		21" RECOVERY		
57.5							
60		18	59.0'	9 11 16 21	Saturated medium dense dark green fine sand w/some silt, trace of coarse sand, organic matter and gravel.	A-2-4(0)	Glaucanite
			61.0'		22" RECOVERY		

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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: 25-113-01

Boring No.: BR2-5-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5							
65		19	64.0'	20 29 34 39	Saturated very dense dark green silty fine sand w/some coarse sand and organic matter.	A-2-4(0)	Glauconite
			66.0'		18" RECOVERY		
67.5							
70		20	69.0'	13 16 20 29	Saturated dense dark green silty fine sand w/ some coarse sand and organic matter, trace of gravel.	A-2-4(0)	Glauconite
			71.0'		24" RECOVERY		
72.5							
75		21	74.0'	18 17 23 23	Saturated dense dark green clayey fine sand w/some coarse sand and organic matter, trace of gravel.	A-2-4(0)	Glauconite
			76.0'		20" RECOVERY		
					Boring Terminated at 76 feet.		
77.5							
80							
82.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Sand

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Notes:

1. Exploratory borings were drilled on 1/26/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
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

Boring No.: BR2-5-05

Contract: 25-113-01

Boring Location: Sta. 271+96.94, 67' Lt. C.L.

Boring Surface Elev.: 42.0

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split-Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	35.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/15/2008		8	6	4.5 ft.	37.5 42.0 42.0 42.0

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Wayne Hurd
Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 2 3	No Sieve Analysis - Indication of brown silty sand.		
2.5		2	2.0' 2.0'	3 4 3 4	7" RECOVERY Wet loose orange fine to coarse sand w/some silt and gravel.	A-2-4(0)	
5		3	4.0' 4.0'	3 4 5 7	15" RECOVERY Saturated loose orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
7.5		4	6.0' 6.0'	7 7 12 12	18" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	Clay lenses.
10		5	8.0' 8.0'	5 7 9 11	22" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	Clay lenses.
12.5		6	10.0' 10.0'	5 9 11 16	16" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	Clay lenses.
		7	12.0' 12.0'	4 8 12 15	16" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	

Remarks: Mud Rotary @ 35 ft.

Reviewed By: Maureen Kelly

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: 25-113-01

Boring No.: BR2-5-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0'	6	14" RECOVERY	A-2-4(0)	
			14.0'	9 13 13	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.		
17.5		9	16.0'	6	13" RECOVERY	A-2-4(0)	
			16.0'	8 10 12	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.		
20		10	18.0'	4	14" RECOVERY	A-2-4(0)	
			18.0'	7 10 13	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.		
22.5			20.0'		12" RECOVERY		
25		11	24.0'	6	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			24.0'	8 12 15			
27.5			26.0'		17" RECOVERY		
30		12	29.0'	6	Saturated medium dense green fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
			29.0'	9 10 11			
32.5			31.0'		20" RECOVERY		
35		13	34.0'	5	Saturated medium dense grayish green fine sand w/some coarse sand and silt.	A-2-4(0)	Glauconite
			34.0'	10 13 17			
37.5			36.0'		22" RECOVERY		

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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: 25-113-01

Boring No.: BR2-5-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	5 6 6 7	Saturated medium dense grayish green fine sand w/some coarse sand and silt.	A-2-4(0)	Glaucanite
			41.0'		16" RECOVERY		
42.5							
		15	43.0'	7 11 12 17	Saturated medium dense grayish green fine sand w/some coarse sand, trace of silt.	A-3	Glaucanite
45			45.0'		20" RECOVERY		
47.5							
		16	48.0'	9 13 15 15	Saturated medium dense dark green fine sand w/some silt, trace of gravel.	A-2-4(0)	Glaucanite
50			50.0'		14" RECOVERY		
52.5							
		17	53.0'	8 10 12 15	Saturated medium dense dark green fine sand w/some silt, trace of gravel.	A-2-4(0)	Glaucanite
55			55.0'		22" RECOVERY		
57.5							
		18	58.0'	10 16 26 36	Saturated dense dark green fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	Glaucanite
60			60.0'		19" RECOVERY		

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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: 25-113-01

Boring No.: BR2-5-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5							
		19	63.0'	10 14 20 23	Saturated dense dark green fine to coarse sand w/some silt.	A-2-4(0)	Glauconite
65			65.0'		20" RECOVERY		
67.5							
		20	68.0'	7 13 20 30	Saturated dense dark green silty fine to coarse sand.	A-2-4(0)	Glauconite
70			70.0'		21" RECOVERY		
72.5							
		21	73.0'	13 30 50/4"	Saturated hard dark green clayey fine sandy silt w/some coarse sand and organic matter, trace of gravel.	A-4(0)	
			74.3'		13" RECOVERY		
75					Boring Terminated at 74.3 feet.		
77.5							
80							
82.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Sand



Silty sand



Silt

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Notes:

1. Exploratory borings were drilled on 1/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
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

Boring No.: BR2-5-06

Contract: 25-113-01

Boring Location: Sta. 273+60.94, 19' Lt. C.L.

Boring Surface Elev.: + 41.16

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split-Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	35.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
1/21/2008		10	14	3.0'	

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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: Dan Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 1 1 1	Wet very loose brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
2.5		2	2.0'	1 5	18" RECOVERY Wet loose brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
		2A	3.0'	6 5	8" RECOVERY Wet medium dense light brown fine to coarse sand w/some gravel and silt.	A-2-4(0)	
5		3	4.0'	5 8 8 5	9" RECOVERY Wet medium dense light brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
7.5		4	6.0'	6 6 6 16	10" RECOVERY Saturated medium dense light brown fine sand w/some coarse sand, silt and gravel.	A-2-4(0)	
		5	8.0'	5 9 10 13	19" RECOVERY Saturated medium dense light brown fine to coarse sand w/some gravel, trace of silt.	A-3	
10		6	10.0'	11 14 17 19	19" RECOVERY Saturated dense brown fine to coarse sand w/some gravel and silt.	A-2-4(0)	
12.5		7	12.0'	10 15 12 14	20" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt and gravel.	A-2-4(0)	

Remarks: Mud rotary @ 35.0 ft.

Reviewed By: Maureen Kelly

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: 25-113-01

Boring No.: BR2-5-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0' 14.0'	6 19 15 11	12" RECOVERY Saturated dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
17.5		9	16.0' 16.0'	6 15 19 13	19" RECOVERY Saturated dense brown fine to coarse sand w/ some silt.	A-2-4(0)	
20		10	18.0' 18.0'	2 4 10 11	24" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
22.5			20.0'		18" RECOVERY		
25		11	24.0' 24.0'	5 8 10 10	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
27.5			26.0'		16" RECOVERY		
30		12	29.0' 29.0'	11 10 9 11	Saturated medium dense gray green fine sand w/some silt and coarse sand.	A-2-4(0)	
32.5			31.0'		18" RECOVERY		
35		13	34.0' 34.0'	5 10 11 12	Saturated medium dense dark green fine sand w/some silt and coarse sand.	A-2-4(0)	Glauconite
37.5			36.0'		20" RECOVERY		

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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: 25-113-01

Boring No.: BR2-5-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	4 9 13 13	Saturated medium dense dark green fine sand w/trace of silt and coarse sand. 15" RECOVERY	A-3	Glaucanite
42.5			41.0'				
45		15	44.0'	8 12 17 23	Saturated medium dense dark green fine sand w/trace of silt and coarse sand. 20" RECOVERY	A-3	Glaucanite
47.5			46.0'				
50		16	49.0'	6 13 17 18	Saturated medium dense dark green fine sand w/some silt, trace of coarse sand. 24" RECOVERY	A-3	Glaucanite
52.5			51.0'				
55		17	54.0'	7 13 16 21	Saturated medium dense dark green fine sand w/some silt, trace of coarse sand, organic matter and gravel. 21" RECOVERY	A-2-4(0)	Glaucanite
57.5			56.0'				
60		18	59.0' 59.4'	50/5"	Saturated very dense dark green fine to coarse sand w/some silt, trace of organic matter and gravel. 5" RECOVERY	A-2-4(0)	Glaucanite

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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: 25-113-01

Boring No.: BR2-5-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5							
65		19	64.0'	14 24 37 50/5"	Saturated very dense dark green silty fine to coarse sand w/trace of organic matter.	A-2-4(0)	Glauconite
			65.9'		19" RECOVERY		
67.5							
70		20	69.0'	22 29 29 50	Saturated very hard dark green clayey fine sandy silt w/some coarse sand and organic matter, trace of gravel.	A-4(0)	Glauconite
			71.0'		24" RECOVERY		
72.5							
75		21	73.0' 73.3'	50/4"	Saturated very dense green silty fine to coarse sand w/trace of gravel and organic matter. 3.5" RECOVERY	A-2-4(0)	Glauconite
					Boring Terminated at 73.3 feet.		
77.5							
80							
82.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Sand



Silt

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Notes:

1. Exploratory borings were drilled on 1/22/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
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

Boring No.: BR2-5-07

Contract: 25-113-01

Boring Location: Sta. 274+70.49, 29' Lt. C.L.

Boring Surface Elev.: + 45.0

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split-Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	20.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
1/21/08		12.0'	10.0'	5.5'	

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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver Sr.
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	2 2 3 3	Wet firm brown coarse to fine sandy silt w/ trace of gravel.	A-4(0)	
2.5		2	2.0' 2.0'	2 3 3 2	18" RECOVERY Wet loose brown silty fine to coarse sand w/ trace of gravel.	A-2-4(0)	
5		3	4.0' 4.0'	2 5 7 9	10" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
7.5		4	6.0' 6.0'	10 14 15 17	14" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
10		5	8.0' 8.0'	6 9 13 14	17" RECOVERY Saturated medium dense brown fine to coarse sand w/trace of silt and gravel.	A-3	
		6	10.0' 10.0'	7 12 18 26	16" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
12.5		7	12.0' 12.0'	1 8 12 17	24" RECOVERY Saturated medium dense brown fine to coarse sand w/trace of silt and gravel.	A-3	

Remarks: Mud rotary @ 20.0'

Reviewed By: Maureen Kelly

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: 25-113-01

Boring No.: BR2-5-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0'	2	24" RECOVERY Saturated medium dense brown fine to coarse sand w/trace of silt.	A-3	
			14.0'	5 17 18			
17.5		9	16.0'	10	20" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			16.0'	13 14 23			
20		10	18.0'	5	18" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
			18.0'	10 17 23			
22.5			20.0'		15" RECOVERY		
25		11	24.0'	10	Saturated medium dense reddish brown fine to coarse sand w/some silt.	A-2-4(0)	
			24.0'	13 15 18			
27.5			26.0'		24" RECOVERY		
30		12	29.0'	7	Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			29.0'	10 11 12			
32.5			31.0'		17" RECOVERY		
35		13	34.0'	7	Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
			34.0'	10 9 10			
37.5			36.0'		16" RECOVERY		

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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: 25-113-01

Boring No.: BR2-5-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	8 12 13 15	Saturated medium dense greenish brown fine sand w/some silt and gravel.	A-2-4(0)	Glaucanite
			41.0'		15" RECOVERY		
42.5							
45		15	44.0'	9 7 10 12			GTA - pH testing
			46.0'		15" RECOVERY		
47.5							
50		16	49.0'	8 11 17 17	Saturated medium dense dark gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Glaucanite
			51.0'		18" RECOVERY		
52.5							
55		17	54.0'	8 11 13 19	Saturated medium dense dark gray fine sand w/some silt, trace of gravel.	A-2-4(0)	Glaucanite
			56.0'		17" RECOVERY		
57.5							
60		18	59.0'	9 13 14 26	Saturated medium dense dark gray silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	Glaucanite
			61.0'		24" RECOVERY		

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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: 25-113-01

Boring No.: BR2-5-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5							
65		19	64.0'	25 35 40 45	Saturated very dense dark gray fine to coarse sand w/some silt.	A-2-4(0)	Glauconite
			66.0'		24" RECOVERY		
67.5							
70		20	69.0'	15 22 35 37	Saturated very hard dark grayish green fine sandy silt w/some coarse sand and organic matter, trace of gravel.	A-4(0)	Glauconite
			71.0'		20" RECOVERY		
72.5							
75		21	74.0'	11 16 36 35	Saturated very dense dark gray silty fine to coarse sand w/some organic matter.	A-2-4(0)	Glauconite
			76.0'		24" RECOVERY		
					Boring Terminated at 76 feet.		
77.5							
80							
82.5							

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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

Boring No.: BR2-5-08

Contract: 25-113-01

Boring Location: Sta. 274+30.68, 94' Rt. C.L.

Boring Surface Elev.: +40.23

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split-Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	18.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
1/17/2008		8.0	6.0	4.0	

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.;		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;		Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver Sr.
Helpers: Jeff Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	W/H W/H W/H W/H	No Sieve Analysis - Indication of dark brown organic silty sand.		
2.5		2	2.0'	4 5 5 6	3" RECOVERY Saturated loose green fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
5		3	4.0'	5 8 11 14	14" RECOVERY Saturated medium dense reddish brown fine to coarse sand w/some silt.	A-2-4(0)	
7.5		4	6.0'	5 26 35 42	12" RECOVERY Saturated very dense reddish brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
10		5	8.0'	11 16 21 28	24" RECOVERY Saturated dense reddish brown fine to coarse sand w/some silt.	A-2-4(0)	
		6	10.0'	10 16 36 27	24" RECOVERY Saturated very dense reddish brown fine to coarse sand w/some silt.	A-2-4(0)	
12.5		7	12.0'	6 12 19 28	24" RECOVERY Saturated dense reddish brown fine to coarse sand w/some silt.	A-2-4(0)	

Remarks: Mud rotary @ 18.0 ft.

Reviewed By: Maureen Kelly

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: 25-113-01

Boring No.: BR2-5-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0'	4	10" RECOVERY	A-2-4(0)	
			14.0'	5 19 29	Saturated medium dense brown fine to coarse sand w/some silt.		
17.5		9	16.0'	4	16" RECOVERY	A-2-4(0)	
			16.0'	8 12 14	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.		
20		10	18.0'	4	16" RECOVERY	A-3	
			18.0'	8 12 15	Saturated medium dense reddish brown fine sand w/some coarse sand, trace of silt.		
22.5			20.0'		24" RECOVERY		
25		11	23.0'	7	Saturated medium dense reddish brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			25.0'	11 11 13			
27.5							
30		12	28.0'	7	Saturated medium dense greenish brown fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
			30.0'	8 13 13			
32.5							
35		13	33.0'	4	Saturated medium dense green fine sand w/ some silt and coarse sand.	A-2-4(0)	
			35.0'	6 12 18			
37.5							

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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: 25-113-01

Boring No.: BR2-5-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	38.0'	6 10 16 18	Saturated medium dense greenish brown fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Glaucanite
40			40.0'		19" RECOVERY		
42.5							
		15	43.0'	7 13 21 24	Saturated dense green fine sand w/trace of silt and coarse sand.	A-3	Glaucanite
45			45.0'		19" RECOVERY		
47.5							
		16	49.0'	4 16 20 25	Saturated dense dark green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Glaucanite
50			51.0'		24" RECOVERY		
52.5							
		17	54.0'	11 18 22 25	Saturated dense dark green fine sand w/some silt, trace of coarse sand and gravel.	A-2-4(0)	Glaucanite
55			56.0'		24" RECOVERY		
57.5							
		18	59.0' 59.5'	34 50/0"	Saturated very dense dark green fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	Glaucanite
60					6" RECOVERY		

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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: 25-113-01

Boring No.: BR2-5-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5							
65		19	64.0'	13 18 22 28	Saturated dense dark green silty fine to coarse sand.	A-2-4(0)	Glauconite
			66.0'		18" RECOVERY		
67.5							
70		20	69.0'	14 18 28 46	Saturated very hard dark green clayey fine sandy silt w/some organic matter and coarse sand, trace of gravel.	A-4(0)	Glauconite
			71.0'		20" RECOVERY		
72.5							
75		21	74.0' 74.5'	95	Saturated very dense dark green fine to coarse sand and gravel w/some silt, trace of organic matter.	A-2-4(0)	Glauconite
					6" RECOVERY		
					Boring Terminated at 74.5 feet.		
77.5							
80							
82.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Sand

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Notes:

1. Exploratory borings were drilled on 1/22/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
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

Boring No.: BR2-5-08

Contract: 25-113-01

Boring Location: Sta. 274+30.68, 94' Rt. C.L.

Boring Surface Elev.: +40.23

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split-Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	18.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
1/17/2008		8.0	6.0	4.0	

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 Sr.
Helpers: Jeff Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	W/H W/H W/H W/H	No Sieve Analysis - Indication of dark brown organic silty sand.		
2.5		2	2.0'	4 5 5 6	3" RECOVERY Saturated loose green fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
5		3	4.0'	5 8 11 14	14" RECOVERY Saturated medium dense reddish brown fine to coarse sand w/some silt.	A-2-4(0)	
7.5		4	6.0'	5 26 35 42	12" RECOVERY Saturated very dense reddish brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
10		5	8.0'	11 16 21 28	24" RECOVERY Saturated dense reddish brown fine to coarse sand w/some silt.	A-2-4(0)	
		6	10.0'	10 16 36 27	24" RECOVERY Saturated very dense reddish brown fine to coarse sand w/some silt.	A-2-4(0)	
12.5		7	12.0'	6 12 19 28	24" RECOVERY Saturated dense reddish brown fine to coarse sand w/some silt.	A-2-4(0)	

Remarks: Mud rotary @ 18.0 ft.

Reviewed By: Maureen Kelly

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: 25-113-01

Boring No.: BR2-5-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0'	4	10" RECOVERY	A-2-4(0)	
			14.0'	5 19 29	Saturated medium dense brown fine to coarse sand w/some silt.		
17.5		9	16.0'	4	16" RECOVERY	A-2-4(0)	
			16.0'	8 12 14	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.		
20		10	18.0'	4	16" RECOVERY	A-3	
			18.0'	8 12 15	Saturated medium dense reddish brown fine sand w/some coarse sand, trace of silt.		
22.5			20.0'		24" RECOVERY		
25		11	23.0'	7	Saturated medium dense reddish brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			25.0'	11 11 13			
27.5							
30		12	28.0'	7	Saturated medium dense greenish brown fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
			30.0'	8 13 13			
32.5							
35		13	33.0'	4	Saturated medium dense green fine sand w/ some silt and coarse sand.	A-2-4(0)	
			35.0'	6 12 18			
37.5							

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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: 25-113-01

Boring No.: BR2-5-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	38.0'	6 10 16 18	Saturated medium dense greenish brown fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Glaucanite
40			40.0'		19" RECOVERY		
42.5							
		15	43.0'	7 13 21 24	Saturated dense green fine sand w/trace of silt and coarse sand.	A-3	Glaucanite
45			45.0'		19" RECOVERY		
47.5							
		16	49.0'	4 16 20 25	Saturated dense dark green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Glaucanite
50			51.0'		24" RECOVERY		
52.5							
		17	54.0'	11 18 22 25	Saturated dense dark green fine sand w/some silt, trace of coarse sand and gravel.	A-2-4(0)	Glaucanite
55			56.0'		24" RECOVERY		
57.5							
		18	59.0' 59.5'	34 50/0"	Saturated very dense dark green fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	Glaucanite
60					6" RECOVERY		

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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: 25-113-01

Boring No.: BR2-5-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5							
65		19	64.0'	13 18 22 28	Saturated dense dark green silty fine to coarse sand. 18" RECOVERY	A-2-4(0)	Glauconite
67.5			66.0'				
70		20	69.0'	14 18 28 46	Saturated very hard dark green clayey fine sandy silt w/some organic matter and coarse sand, trace of gravel. 20" RECOVERY	A-4(0)	Glauconite
72.5			71.0'				
75		21	74.0' 74.5'	95	Saturated very dense dark green fine to coarse sand and gravel w/some silt, trace of organic matter. 6" RECOVERY Boring Terminated at 74.5 feet.	A-2-4(0)	Glauconite
77.5							
80							
82.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Sand



Silty sand



Silt

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Notes:

1. Exploratory borings were drilled on 1/21/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
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

Boring No.: BR2-5-09

Contract: 25-113-01

Boring Location: Sta. 272+30.65, 31' Lt. C.L.

Boring Surface Elev.: +42.75

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split-Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	35.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
1/21/2008		10.0	8.0	4.0	

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.;		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;		Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Wayne Hurd
Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	2 2 2 1	Wet very loose orange silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
2.5		2	2.0' 2.0'	1 1 2 5	19" RECOVERY Wet very loose orange silty fine to coarse sand w/some gravel.	A-2-4(0)	
5		3	4.0' 4.0'	4 4 4 5	10" RECOVERY Saturated loose orange silty fine to coarse sand.	A-2-4(0)	
7.5		4	6.0' 6.0'	5 6 8 9	18" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
10		5	8.0' 8.0'	5 6 7 7	16" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
12.5		6	10.0' 10.0'	6 10 11 12	16" RECOVERY Saturated medium dense brown silty fine to coarse sand.	A-2-4(0)	
		7	12.0' 12.0'	2 5 6 8	16" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	

Remarks: Mud rotary @ 35.0 ft.

Reviewed By: Maureen Kelly

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: 25-113-01

Boring No.: BR2-5-09

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0' 14.0'	4 5 8 11	16" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
17.5		9	16.0' 16.0'	5 9 10 11	18" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
20		10	18.0' 18.0'	5 6 7 8	17" RECOVERY Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
22.5			20.0'		16" RECOVERY		
25		11	23.5' 23.5'	5 6 8 12	Saturated medium dense brown fine sand w/ some coarse sand and silt. 15" RECOVERY	A-2-4(0)	
27.5			25.5'				
30		12	28.0' 28.0'	6 7 7 10	Saturated medium dense brown fine sand w/ some coarse sand and silt. 15" RECOVERY	A-2-4(0)	
32.5			30.0'				
35		13	33.5' 33.5'	5 7 9 11	Saturated medium dense brownish green fine sand w/some silt and coarse sand. 20" RECOVERY	A-2-4(0)	Glauconite
37.5			35.5'				

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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: 25-113-01

Boring No.: BR2-5-09

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	38.5'	4 6 8 9	Saturated medium dense dark green fine sand w/some coarse sand, trace of gravel.	A-3	Glauconite
			40.5'		19" RECOVERY		
42.5							
45		15	43.5'	5 9 12 16	Saturated medium dense dark green fine sand w/some silt, trace of gravel.	A-2-4(0)	Glauconite
			45.5'		20" RECOVERY		
47.5							
50		16	48.5'	5 9 13 20	Saturated medium dense dark green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Glauconite
			50.5'		22" RECOVERY		
52.5							
55		17	53.5'	5 7 10 11	Saturated medium dense dark green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Glauconite
			55.5'		17" RECOVERY		
57.5							
60		18	58.0'	10 13 16 25	Saturated medium dense dark green fine sand w/some silt, coarse sand and gravel.	A-2-4(0)	Glauconite
			60.0'		19" RECOVERY		

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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: 25-113-01

Boring No.: BR2-5-09

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5							
		19	63.0'	17 25 35 50/5"	Saturated very dense dark green silty fine to coarse sand w/trace of organic matter.	A-2-4(0)	
65			64.9'		22" RECOVERY		
67.5							
		20	68.0'	12 17 23 39	Saturated dense dark green fine to coarse sand w/some silt and organic matter, trace of gravel.	A-2-4(0)	Glauconite
70			70.0'		23" RECOVERY		
72.5							
		21	73.0'	12 16 31 50/2"	Saturated dense dark green silty fine sand w/ some coarse sand, gravel, clay and organic matter.	A-2-4(0)	Glauconite
75			74.7'		18" RECOVERY		
					Boring Terminated at 74.7 feet.		
77.5							
80							
82.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Sand

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Notes:

1. Exploratory borings were drilled on 1/22/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
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.: BR2-10-01

Contract: 25-113-01

Boring Location: Sta. 424+54, 62' Lt. C.L.

Boring Surface Elev.: + 71.25

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: **To:**
From Depth of: 0.0' **To:** 24.0'

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
10/21/2009		12.0	10.0	9.6	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	101	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Gary Truver sr.

Helpers: K. Kershaw

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	10/21/09	1	1.0' 2.0'	2 3	Wet firm brown clayey silt w/some fine sand, trace of coarse sand. 12" RECOVERY	A-4(3)	Topsoil - 12"
		2	2.0'	3 8 9 8	Wet medium dense brownish orange silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
3.75			4.0'		18" RECOVERY		
		3	4.0'	3 4 3 6	Wet loose tan silty fine sand w/trace of coarse sand. 18" RECOVERY	A-2-4(0)	
			6.0'		18" RECOVERY		
		4	6.0'	8 6 7 5	Wet medium dense tan fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
7.5			8.0'		20" RECOVERY		
		5	8.0'	2 3 3 3	Saturated loose tan silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			10.0'		16" RECOVERY		
		6	10.0'	3 3 3 4	Saturated loose tan silty fine sand w/some coarse sand, trace of fine gravel.	A-2-4(0)	
11.25			12.0'		24" RECOVERY		
		7	12.0'	1 1 2 1	Saturated very loose white fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			14.0'		24" RECOVERY		
15		8	14.0'	W/H 1 3 3	Saturated very loose white coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			16.0'		24" RECOVERY		
		9	16.0'	1 2 2 4	Saturated very loose white fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			18.0'		24" RECOVERY		
18.75		10	18.0' 19.0'	4 7	Saturated medium dense white coarse to fine sand and fine gravel w/some silt.	A-1-b	
		10A	19.0' 20.0'	7 8	12" RECOVERY	A-2-6(0)	
					Saturated medium dense brownish orange and green mottled clayey fine sand and fine gravel w/trace of coarse sand. 12" RECOVERY		

Remarks: Mud Rotary @ 24.0'

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 S.R. 1
Contract: 25-113-01

Boring No.: BR2-10-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
22.5							
		11	24.0'	9 7 9 10	Saturated medium dense green fine to coarse sand w/some silt, trace of fine gravel. 19" RECOVERY	A-2-4(0)	Mud Rotary @ 24.0'.
26.25			26.0'				
		12	29.0'	4 5 7 12	Saturated medium dense brownish orange and green mottled silty fine sand w/trace of coarse sand. 22" RECOVERY	A-2-4(0)	Glauconit
30			31.0'				
		13	34.0'	6 12 15	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter. 24" RECOVERY	A-2-4(0)	Glauconit
33.75			36.0'				
		14	39.0'	6 10 11 18	Saturated medium dense green fine sand w/trace of silt, coarse sand and organic matter. 21" RECOVERY	A-3	Glauconit
37.5			41.0'				
		15	44.0'	15 18 21 27	Saturated dense green fine sand w/some coarse sand and silt, trace of fine gravel and organic matter. 20" RECOVERY	A-2-4(0)	Glauconit
41.25			46.0'				
		16	49.0'	9 19 32 37	Saturated very dense green fine to coarse sand w/some silt, trace of fine gravel and organic matter. 24" RECOVERY	A-2-4(0)	Glauconit
45			51.0'				
		17	54.0'	11 20 35 50/2"	Saturated very dense green organic silty fine sand w/some coarse sand, trace of fine gravel. 24" RECOVERY	A-2-5(0)	Glauconit
48.75			56.0'				
52.5							
56.25							

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-10-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
60		18	59.0' 59.5'	78	Saturated very dense green silty fine to coarse sand w/some fine gravel, trace of organic matter. 6" RECOVERY	A-2-4(0)	Glauconit
63.75		19	64.0' 66.0'	11 16 30 45	Saturated dense gray silty fine sand w/some coarse sand, trace of fine gravel and organic matter. 24" RECOVERY	A-2-4(0)	
67.5		20	69.0' 71.0'	15 23 44 50/3"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel and shell fragments. 22" RECOVERY	A-2-4(0)	
71.25		21	74.0' 75.0'	22 50	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel. 12" RECOVERY	A-2-4(0)	
75		22	79.0' 80.5'	17 36 50	Saturated very dense gray fine sand w/some coarse sand, trace of silt. 18" RECOVERY	A-3	
78.75		23	84.0' 85.5'	27 39 63	Saturated very dense gray fine sand w/some coarse sand and silt, trace of fine gravel. 18" RECOVERY	A-2-4(0)	
82.5		24	89.0' 90.5'	26 38 65	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel. 18" RECOVERY	A-2-4(0)	
86.25							
90							

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-10-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
93.75							
		25	94.0'	15 21 34 40	Saturated very dense gray fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
			96.0'		24" RECOVERY		
97.5							
		26	99.0'	13 23 42 44	Saturated very dense gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			101.0'		24" RECOVERY		
101.25					End of Boring		
105							
108.75							
112.5							
116.25							
120							
123.75							
127.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Clayey sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/21/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is an 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
Contract: 25-113-01

Boring No.: BR2-10-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
22.5					No Sample Recovery 0" RECOVERY		
		11	23.0' 25.0'	4 6 9 13			
26.25					Saturated medium dense brown clayey fine sand w/some coarse sand, trace of fine gravel and organic matter. 20" RECOVERY		
		12	28.0' 30.0'	5 6 7 9		A-2-6(1)	
30					Saturated medium dense brown clayey fine sand w/trace of coarse sand and organic matter. 23" RECOVERY		
		13	33.0' 35.0'	5 8 8 10		A-2-6(1)	
33.75					Saturated medium dense green clayey fine sand w/trace of coarse sand and organic matter. 22" RECOVERY		
		14	38.0' 40.0'	5 7 8 13		A-2-6(0)	Glauconit
37.5					Saturated medium dense green fine sand w/trace of silt, coarse sand and organic matter. 23" RECOVERY		
		15	43.0' 45.0'	9 10 15 19		A-3	Glauconit
41.25					Saturated medium dense green fine to coarse sand w/some silt, trace of fine gravel and organic matter. 21" RECOVERY		
		16	48.0' 50.0'	10 11 11 17		A-2-4(0)	Glauconit
45					Saturated medium dense green silty fine to coarse sand w/trace of organic matter and fine gravel. 20" RECOVERY		
	10/30/09	17	53.0' 55.0'	7 10 12 16		A-2-4(0)	Glauconit
48.75							
52.5							
56.25							

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DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-10-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
60		18	58.0'	65/5"	Saturated very dense gray silty fine to coarse sand w/trace of fine gravel and organic matter. 5" RECOVERY	A-2-4(0)	
			60.0'				
63.75		19	63.0'	13 13 23 50/4"	Saturated dense gray clayey fine sand w/some coarse sand, trace of fine gravel and organic matter. 22" RECOVERY	A-2-6(0)	
			65.0'				
67.5		20	68.0'	16 25 44 50/5"	Saturated very dense gray silty fine sand w/some coarse sand, trace of organic matter. 23" RECOVERY	A-2-4(0)	
			70.0'				
71.25		21	73.0'	27 34 50/5"	Saturated very dense gray silty fine sand w/some coarse sand, trace of organic matter and fine gravel. 17" RECOVERY	A-2-4(0)	
			75.0'				
78.75		22	78.0'	43 50/5"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter and fine gravel. 11" RECOVERY	A-2-4(0)	
			80.0'				
82.5		23	83.0'	28 39 50/5"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 17" RECOVERY	A-2-4(0)	
			85.0'				
86.25		24	88.0'	22 34 50	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 18" RECOVERY	A-2-4(0)	
			90.0'				
90							

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-10-02






Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
93.75		25	93.0'	20 23 29 36	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 24" RECOVERY	A-2-4(0)	
			95.0'				
97.5							
		26	98.0'	15 17 26 30	Saturated dense gray fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			100.0'		24" RECOVERY		
101.25					End of Boring		
105							
108.75							
112.5							
116.25							
120							
123.75							
127.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols

	Low plasticity clay
	Poorly graded clayey silty sand
	Clayey sand
	Silty sand
	Poorly graded sand with silt

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Notes:

1. Exploratory borings were drilled on 10/29/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an 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.: BR2-10-03

Contract: 25-113-01

Boring Location: Sta. 426+06, 62' Lt. C.L.

Boring Surface Elev.: + 72.74

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.

Casing Size: 3 1/4"
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 18.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
10/22/2009		14.0	12.0	10.8	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	100	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	10/22/09	1	0.5'	2 2 3	Wet soft brown clayey fine sandy silt w/some coarse sand and fine gravel.	A-4(1)	Topsoil - 6".
			2.0'		8" RECOVERY		
		2	2.0'	4 4 5 5	Wet stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(0)	
3.75			4.0'		12" RECOVERY		
		3	4.0'	4 4 5 5	Wet medium dense brown fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
			6.0'		14" RECOVERY		
		4	6.0'	4 4 5 5	Wet loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
7.5			8.0'		18" RECOVERY		
		5	8.0'	4 4 5 5	Wet loose brown coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
			10.0'		16" RECOVERY		
		6	10.0'	3 4 5 5	Saturated loose tan fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
11.25			12.0'		20" RECOVERY		
		7	12.0'	3 3 4 4	Saturated loose tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			14.0'		16" RECOVERY		
		8	14.0'	4 4 5 4	Saturated loose orange coarse to fine sand w/some fine gravel and silt.	A-1-b	
15			16.0'		13" RECOVERY		
		9	16.0'	2 3 4 4	Saturated loose gray coarse to fine sand w/some fine gravel and silt.	A-1-b	
			18.0'		16" RECOVERY		
		10	18.0'	3 4 5 12	Saturated loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	Mud Rotary @ 18.0'.
18.75			20.0'		12" RECOVERY		

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 S.R. 1
Contract: 25-113-01

Boring No.: BR2-10-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
22.5							
		11	23.0'	3 4 4 7	Saturated loose green fine to coarse sand w/some silt.	A-2-4(0)	Glauconit
			25.0'		20" RECOVERY		
26.25							
		12	28.0'	5 4 7 7	Saturated medium dense green fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	Glauconit
			30.0'		21" RECOVERY		
30							
		13	33.0'	4 5 7 8	Saturated medium dense green fine sand w/some silt, trace of gravel and organic matter.	A-2-4(0)	Glauconit
			35.0'		19" RECOVERY		
33.75							
		14	38.0'	4 5 7 9	Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matter.	A-2-4(0)	Glauconit
			40.0'		20" RECOVERY		
37.5							
		15	43.0'	6 6 10 11	Saturated medium dense green fine sand w/some coarse sand and silt, trace of organic matter.	A-2-4(0)	Glauconit
			45.0'		20" RECOVERY		
41.25							
		16	48.0'	6 7 10 13	Saturated medium dense green silty fine sand w/some coarse sand, trace of organic matter and fine gravel.	A-2-4(0)	Glauconit
			50.0'		19" RECOVERY		
45							
		17	53.0'	2 6 5 7	Saturated medium dense grayish green silty fine sand w/some coarse sand and organic matter, trace of fine gravel.	A-2-4(0)	Glauconit
			55.0'		16" RECOVERY		
48.75							
52.5							
56.25							

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-10-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
60		18	58.0'	27 50/4"	Saturated very dense grayish green silty fine to coarse sand w/trace of fine gravel and organic matter. 10" RECOVERY	A-2-4(0)	Glauconit
63.75		19	63.0'	14 16 28 50/5"	Saturated dense gray fine sand w/some silt and coarse sand. 24" RECOVERY	A-2-4(0)	
67.5		20	68.0'	15 16 34 55	Saturated dense gray fine sand w/some silt and coarse sand. 24" RECOVERY	A-2-4(0)	
71.25		21	73.0'	19 25 41 50/5"	Saturated very dense gray silty fine to coarse sand w/trace of gravel and organic matter. 23" RECOVERY	A-2-4(0)	
75		22	78.0'	24 40 50/4"	Saturated very dense gray silty fine sand w/some coarse sand, trace of fine gravel. 16" RECOVERY	A-2-4(0)	
82.5		23	83.0'	22 31 41 45	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel. 24" RECOVERY	A-2-4(0)	
86.25	10/23/09	24	88.0'	18 30 37 44	Saturated very dense gray fine sand w/some silt and coarse sand. 24" RECOVERY	A-2-4(0)	
90			90.0'				

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-10-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
93.75		25	93.0'	21 26 26 36	Saturated very dense gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			95.0'		24" RECOVERY		
97.5							
		26	98.0'	13 16 25 50/5"	Saturated dense gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			100.0'		24" RECOVERY		
101.25					End of Boring		
105							
108.75							
112.5							
116.25							
120							
123.75							
127.5							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand
with silt

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/22/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an 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.: BR2-10-04

Contract: 25-113-01

Boring Location: Sta. 426+10, 62' Rt. C.L.

Boring Surface Elev.: + 73.21

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4"	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 24.0

Water Level Readings		Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
		10/26/2009		14.0	12.0	12.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	100	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	10/26/09	1	1.0'	3		A-6(10)	Topsoil - 10"
			2.0'	3		Wet firm brown clay w/some fine sand, trace of coarse sand. 9" RECOVERY	
3.75		2	2.0'	3 5 8		A-4(2)	
			4.0'	8		Wet stiff brown clayey fine sandy silt w/some fine gravel and coarse sand. 16" RECOVERY	
		3	4.0'	10 11		A-2-4(0)	
			6.0'	11		Wet loose tan silty fine sand and fine gravel w/some coarse sand. 12" RECOVERY	
7.5		4	6.0'	8 9 9 7		A-1-b	
			8.0'	7		Wet medium dense tan coarse sand w/some silt and fine sand, trace of fine gravel. 17" RECOVERY	
		5	8.0'	2 3 3 4		A-1-b	
			10.0'	4		Wet loose tan coarse to fine sand w/some silt, trace of fine gravel. 13" RECOVERY	
11.25		6	10.0'	4 5 5 6		A-1-b	
			12.0'	6		Wet loose tan coarse to fine sand w/some silt, trace of fine gravel. 16" RECOVERY	
		7	12.0'	4 5 5 6		A-1-b	
			14.0'	6		Wet loose tan coarse sand w/some fine sand, fine gravel and silt. 14" RECOVERY	
15		8	14.0'	5 4 4 3		A-1-b	
			16.0'	3		Wet loose tan coarse sand w/some fine sand and fine gravel, trace of silt. 17" RECOVERY	
		9	16.0'	3 5 5 7		A-1-b	
			18.0'	7		Wet loose tan coarse sand w/some fine sand and fine gravel, trace of silt. 20" RECOVERY	
18.75		10	18.0'	6 4 17 13		A-1-b	
			20.0'	13		Wet medium dense tan coarse to fine sand and fine gravel w/some silt. 5" RECOVERY	

Remarks: Mud Rotary @ 24.0'

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 S.R. 1
Contract: 25-113-01

Boring No.: BR2-10-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
22.5							
		11	24.0'	4 6 6 8	Wet medium dense green clayey fine to coarse sand w/trace of fine gravel and organic matter.	A-2-7(3)	Mud Rotary @ 24.0'.
26.25			26.0'		8" RECOVERY		
		12	28.0'	6 7 9 9	Wet medium dense brownish green clayey fine sand w/some coarse sand, trace of organic matter.	A-2-6(1)	
30			30.0'		19" RECOVERY		
		13	33.0'	6 10 12 15	Saturated medium dense brownish green silty fine sand w/some coarse sand, trace of organic matter.	A-2-4(0)	
33.75			35.0'		23" RECOVERY		
		14	38.0'	8 8 9 12	Saturated medium dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Glauconit
37.5			40.0'		21" RECOVERY		
		15	43.0'	7 9 12 17	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	Glauconit
45			45.0'		21" RECOVERY		
		16	48.0'	10 9 12 13	Saturated medium dense green silty fine sand w/some coarse sand, trace of gravel and organic matter.	A-2-4(0)	Glauconit
48.75			50.0'		19" RECOVERY		
		17	53.0'	8 8 10 11	Saturated medium dense green silty fine sand w/some coarse sand, trace of gravel and organic matter.	A-2-4(0)	Glauconit
52.5			55.0'		24" RECOVERY		
56.25							

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-10-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks																																																																																																											
		18	58.0'	50/5"	Saturated dense green fine to coarse sand w/some silt and fine gravel, trace of organic matter. 5" RECOVERY	A-2-4(0)	Glaucinit																																																																																																											
60			60.0'							19	63.0'	21 22 50	Saturated very dense gray silty fine to coarse sand w/trace of fine gravel and organic matter. 18" RECOVERY	A-2-4(0)		63.75			65.0'				20	68.0'	17 23 50/5"	Saturated very dense gray silty fine sand w/some coarse sand, trace of fine gravel and organic matter. 17" RECOVERY	A-2-4(0)		67.5			70.0'				21	73.0'	21 41 50/5"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel and organic matter. 17" RECOVERY	A-2-4(0)		71.25			75.0'				22	78.0'	35 50/3"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 9" RECOVERY	A-2-4(0)		75			80.0'				23	83.0'	35 36 50/4"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel and organic matter. 16" RECOVERY	A-2-4(0)		78.75			85.0'				24	88.0'	22 35 50	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 17" RECOVERY	A-2-4(0)		82.5	10/29/09		90.0'										86.25																90				
		19	63.0'	21 22 50	Saturated very dense gray silty fine to coarse sand w/trace of fine gravel and organic matter. 18" RECOVERY	A-2-4(0)																																																																																																												
63.75			65.0'							20	68.0'	17 23 50/5"	Saturated very dense gray silty fine sand w/some coarse sand, trace of fine gravel and organic matter. 17" RECOVERY	A-2-4(0)		67.5			70.0'				21	73.0'	21 41 50/5"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel and organic matter. 17" RECOVERY	A-2-4(0)		71.25			75.0'				22	78.0'	35 50/3"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 9" RECOVERY	A-2-4(0)		75			80.0'				23	83.0'	35 36 50/4"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel and organic matter. 16" RECOVERY	A-2-4(0)		78.75			85.0'				24	88.0'	22 35 50	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 17" RECOVERY	A-2-4(0)		82.5	10/29/09		90.0'										86.25																90																	
		20	68.0'	17 23 50/5"	Saturated very dense gray silty fine sand w/some coarse sand, trace of fine gravel and organic matter. 17" RECOVERY	A-2-4(0)																																																																																																												
67.5			70.0'							21	73.0'	21 41 50/5"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel and organic matter. 17" RECOVERY	A-2-4(0)		71.25			75.0'				22	78.0'	35 50/3"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 9" RECOVERY	A-2-4(0)		75			80.0'				23	83.0'	35 36 50/4"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel and organic matter. 16" RECOVERY	A-2-4(0)		78.75			85.0'				24	88.0'	22 35 50	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 17" RECOVERY	A-2-4(0)		82.5	10/29/09		90.0'										86.25																90																														
		21	73.0'	21 41 50/5"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel and organic matter. 17" RECOVERY	A-2-4(0)																																																																																																												
71.25			75.0'							22	78.0'	35 50/3"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 9" RECOVERY	A-2-4(0)		75			80.0'				23	83.0'	35 36 50/4"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel and organic matter. 16" RECOVERY	A-2-4(0)		78.75			85.0'				24	88.0'	22 35 50	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 17" RECOVERY	A-2-4(0)		82.5	10/29/09		90.0'										86.25																90																																											
		22	78.0'	35 50/3"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 9" RECOVERY	A-2-4(0)																																																																																																												
75			80.0'							23	83.0'	35 36 50/4"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel and organic matter. 16" RECOVERY	A-2-4(0)		78.75			85.0'				24	88.0'	22 35 50	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 17" RECOVERY	A-2-4(0)		82.5	10/29/09		90.0'										86.25																90																																																								
		23	83.0'	35 36 50/4"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel and organic matter. 16" RECOVERY	A-2-4(0)																																																																																																												
78.75			85.0'							24	88.0'	22 35 50	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 17" RECOVERY	A-2-4(0)		82.5	10/29/09		90.0'										86.25																90																																																																					
		24	88.0'	22 35 50	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 17" RECOVERY	A-2-4(0)																																																																																																												
82.5	10/29/09		90.0'													86.25																90																																																																																		
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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-10-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
93.75		25	93.0'	42 50/4"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 6" RECOVERY	A-2-4(0)	
			95.0'				
97.5							
		26	98.0'	25 31 50/5"	Saturated very dense gray silty fine sand w/trace of coarse sand and organic matter. 19" RECOVERY	A-2-4(0)	
			100.0'				
101.25					End of Boring		
105							
108.75							
112.5							
116.25							
120							
123.75							
127.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



Clayey sand

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Notes:

1. Exploratory borings were drilled on 10/26/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an 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: 25-113-01
Boring Location: Sta. 452+93.36, 67' Rt. C.L.

Boring No.: BR2-1-01

Boring Surface Elev.: 64.40

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140			Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 26.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/4/08		10.0'	8.0'	7.3'	57.1 64.4 64.4 64.4

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 74.5 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;

3 Dia. U-Sample Boring: Ft.
 No. of U-Samples: ;
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	1.0'	4 7	Wet stiff brown clayey silt w/ some coarse sand, trace of fine sand and gravel. 10" RECOVERY	A-4(6)	9" Topsoil.
2.49		2	2.0'	16 18 19 22	Wet dense brown silty coarse to fine sand, trace of gravel. 20" RECOVERY	A-2-4(0)	
4.98		3	4.0'	3 9 9 9	Wet medium dense brown silty coarse to fine sand, trace of gravel. 20" RECOVERY	A-2-4(0)	
7.47		4	6.0'	9 9 11 12	Wet medium dense light brown coarse sand w/ some silt, fine sand, and gravel. 24" RECOVERY	A-1-b	
9.96		5	8.0'	1 3 7 8	Saturated loose light brown silty fine sand w/ some coarse sand, trace of gravel. 14" RECOVERY	A-2-4(0)	
12.45		6	10.0'	10 8 9 6	Saturated medium dense light brown coarse to fine sand w/ some gravel, trace of gravel. 24" RECOVERY	A-1-b	
		7	12.0'	2 3 8 9	Saturated medium dense light brown coarse sand w/ some gravel, trace of fine sand and silt. 20" RECOVERY	A-1-b	
		8	14.0'	2 5 9 9	Saturated medium dense light brown coarse sand and gravel w/ some silt, trace of fine	A-1-b	

Remarks: Mud Rotary at 26.0'

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: 25-113-01

Boring No.: BR2-1-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
					sand.		
			16.0'		10" RECOVERY		
		9	16.0'	7 9 9 13	Saturated medium dense light brown coarse sand and gravel w/ some fine sand and silt.	A-1-b	
17.43			18.0'		18" RECOVERY		
		10	18.0'	7 8 9 11	Saturated medium dense brown-green clayey fine sand, trace of coarse sand.	A-2-6(2)	
19.92			20.0'		12" RECOVERY		
		U-1	20.0'		Saturated medium dense brown-green clayey fine sand, trace coarse sand.	A-4(1)	Press Sample - Shelby Tube.
			22.0'		16" RECOVERY		
22.41							
		11	24.0'	4 8 10 12	Saturated medium dense green-brown silty fine sand, trace of coarse sand.	A-2-4(0)	
24.9			26.0'		18" RECOVERY		
27.39							
		12	29.0'	5 7 11 13	Saturated medium dense green-brown clayey fine sand, trace of coarse sand.	A-2-6(0)	glaucinitic
29.88			31.0'		14" RECOVERY		
32.37							
		13	34.0'	4 7 8 9	Saturated medium dense green clayey fine sand w/ some coarse sand.	A-2-6(0)	
34.86			36.0'		20" RECOVERY		
37.35							

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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: 25-113-01

Boring No.: BR2-1-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	1 4 6 10	Saturated loose gray clayey fine sand w/ some coarse sand, trace of gravel and organic matter.	A-2-6(0)	
			41.0'		16" RECOVERY		
42.33		U-2	42.0'		Saturated dense green clayey fine to coarse sand w/ some gravel	A-4(6)	Press Sample - Shelby Tube.
			43.0'		7" RECOVERY		
44.82		15	44.0'	27 37 50/4"	Saturated very dense green organic silty fine to coarse sand, trace of gravel.	A-2-5(0)	glauconitic
			45.5'		8" RECOVERY		
47.31							
49.8		16	49.0'	7 15 17 50	Saturated dense green clayey fine to coarse sand, trace of gravel.	A-2-4(0)	glauconitic
			51.0'		18" RECOVERY		
52.29							
54.78		17	54.0'	7 11 12 13	Saturated very stiff gray clayey fine sandy silt, trace of gravel and seashell fragments.	A-4(1)	
			56.0'		12" RECOVERY		
57.27							
59.76		18	59.0'	10 27 50/5"	Saturated very dense gray silty fine sand w/ some coarse sand, trace of gravel and seashell fragments.	A-2-4(0)	
			60.5'		14" RECOVERY		

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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: 25-113-01

Boring No.: BR2-1-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
64.74		19	64.0' 65.5'	17 27 50/5"	Saturated very dense gray silty fine sand w/ some coarse sand, trace of gravel. 17" RECOVERY	A-2-4(0)	
67.23							
69.72		20	69.0' 70.5'	11 27 43 50/1"	Saturated very dense green and gray silty fine sand, trace of coarse sand and gravel. 14" RECOVERY	A-2-4(0)	
72.21							
74.7		21	73.0' 74.8'	29 36 36 50/1"	Saturated very dense gray silty fine sand w/ some coarse sand. 18" RECOVERY Boring terminated at 74.6 feet.	A-2-4(0)	
77.19							
79.68							
82.17							
84.66							

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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: 25-113-01
Boring Location: Sta. 453+84.49, 29' Lt. C.L.

Boring No.: BR2-1-02

Boring Surface Elev.: 65.00

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140			Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Reference:

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To:	31.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/5/08		12.0'	10.0'	8.9'	56.1 65.0 65.0 65.0

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 75.3 Ft.;
 No. of 2 in. Dia. Shelby Tubes: 3
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 No. of U-Samples: 3
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	1 2 3	Wet firm brown clayey silt, trace of fine to coarse sand and gravel.	A-4(5)	8" Topsoil.
			2.0'		18" RECOVERY		
2.49		2	2.0'	3 4 15 17	Wet very stiff brown and light brown clayey silt w/ some fine sand, trace of coarse sand and gravel.	A-4(4)	
			4.0'		12" RECOVERY		
4.98		3	4.0'	5 10 16 13	Wet very stiff gray and brown fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
			6.0'		20" RECOVERY		
7.47		4	6.0'	14 13 15 17	Wet medium dense brown coarse sand w/ some silt, fine sand, and gravel.	A-1-b	
			8.0'		18" RECOVERY		
9.96		5	8.0'	4 5 7 9	Wet medium dense light brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			10.0'		20" RECOVERY		
		6	10.0'	10 10 12 12	Saturated medium dense light brown gravel and coarse sand w/ some fine sand and silt.	A-1-b	
			12.0'		16" RECOVERY		
12.45		7	12.0'	4 5 5 7	Saturated loose light brown coarse to fine sand w/ some gravel and silt.	A-1-b	
			14.0'		17" RECOVERY		
		8	14.0'	7 8	Saturated medium dense light brown gravel	A-1-a	

Remarks: Mud Rotary at 31.0'

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: 25-113-01

Boring No.: BR2-1-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94				3 4	and coarse sand, trace of silt and fine sand.		
			16.0'		8" RECOVERY		
		9	16.0'	6 8 8	Saturated medium dense light brown coarse sand w/ some gravel and fine sand, trace of silt.	A-1-b	
17.43			18.0'		24" RECOVERY		
		10	18.0'	10 10 11 13	Saturated medium dense light brown coarse to fine sand, trace of gravel and silt.	A-1-b	
19.92			20.0'		24" RECOVERY		
22.41							
		11	24.0'	7 2 3 3	Saturated loose brown and green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
24.9			26.0'		8" RECOVERY		
		U-1	27.0'		Saturated medium dense fine sand w/ some silt.	A-4(5)	Press Sample - Shelby Tube.
27.39			29.0'		22" RECOVERY		
		12	29.0'	4 8 11 13	Saturated medium dense green and brown clayey fine sand, trace of coarse sand.	A-2-6(0)	glaucinitic
29.88			31.0'		16" RECOVERY		
32.37							
		13	34.0'	8 12 14 17	Saturated medium dense dark gray and green clayey fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
34.86			36.0'		20" RECOVERY		
37.35							

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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: 25-113-01

Boring No.: BR2-1-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	3 8 14 15	Saturated medium dense dark gray and green fine to coarse sand w/ some silt, trace of gravel and organic matter. 16" RECOVERY	A-2-4(0)	
42.33			41.0'				
44.82		15	44.0'	14 27 50/5"	Saturated very dense green organic silty fine to coarse sand, trace of gravel. 15" RECOVERY	A-2-4(0)	glaucinitic
47.31			45.5'				
49.8		16	49.0'	27 50/2"	Saturated very dense gray and green coarse to fine sand w/ some silt, trace of gravel, organic matter, and clay. 8" RECOVERY	A-2-4(0)	glaucinitic
52.29			50.0'				
54.78		17	54.0'	7 17 17 18	Saturated dense gray clayey fine sand w/ some coarse sand, trace of gravel. 18" RECOVERY	A-2-6(0)	
57.27			56.0'				
59.76		18	59.0'	6 12 19 21	Saturated dense gray fine sand w/ some coarse sand and silt, trace of gravel and seashell fragments. 18" RECOVERY	A-2-4(0)	
			61.0'				
		PH-1	61.0'	17 27	Visual Description: Saturated very dense fine		Sample brought to GTA lab

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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: 25-113-01

Boring No.: BR2-1-02







Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25			63.0'	36 50/3"	sand w/ some coarse sand and silt. 21" RECOVERY		for pH testing.
64.74		19	64.0' 65.5'	16 43 50/2"	Saturated very dense gray fine sand w/ some coarse sand and silt, trace of gravel. 14" RECOVERY	A-2-4(0)	
67.23							
69.72		20	69.0' 70.5'	27 34 50/5"	Saturated very dense gray fine sand w/ some silt and coarse sand. 17" RECOVERY	A-2-4(0)	
72.21							
74.7		21	74.0' 75.2'	17 34 50/2"	Saturated very dense gray fine sand w/ some silt and coarse sand, trace of gravel. 14" RECOVERY	A-2-4(0)	
77.19					Boring terminated at 75.2 feet.		
79.68							
82.17							
84.66							

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KEY TO SYMBOLS

Symbol Description

Strata symbols

	Low plasticity clay
	Silt
	Silty sand
	Well graded gravel with silt
	Well graded sand with silt
	Clayey sand

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Notes:

1. Exploratory boring was drilled on 3/5/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were 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 SPT 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: 25-113-01
Boring Location: Sta. 454+63.32, 33' Rt. C.L.

Boring No.: BR2-1-03

Boring Surface Elev.: 64.95

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
 S-Sampler:
 U-Sampler: Ball 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
Hollow Stem Auger: Inches

Reference:
From Depth of:
From Depth of: 0.0' **To:** 35.0'

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date			16.0'	14.0'	12.0'	53.0
3/5/08						65.0
						65.0
						65.0

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 73.9 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 No. of: 3 Dia. U-Sample Boring: Ft.
 Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	2 2 2	Moist soft light brown clayey silt, trace of fine to coarse sand.	A-4(10)	8" Cultivated Soil.
			2.0'		12" RECOVERY		
2.49		2	2.0'	5 7 9 8	Moist very stiff light brown clayey fine sandy silt w/ some coarse sand and gravel.	A-4(2)	
			4.0'		18" RECOVERY		
4.98		3	4.0'	5 9 19 22	Moist very stiff white coarse to fine sandy silt w/ some clay, trace of gravel.	A-4(0)	
			6.0'		19" RECOVERY		
7.47		4	6.0'	21 18 17 13	Wet dense white coarse to fine sand w/ some silt and gravel.	A-1-b	
			8.0'		19" RECOVERY		
9.96		5	8.0'	3 16 16 15	Wet dense light brown coarse to fine sand w/ some gravel and silt.	A-1-b	
			10.0'		16" RECOVERY		
		6	10.0'	14 16 13 6	Wet medium dense light brown gravel and coarse sand w/ some silt and fine sand.	A-1-b	
			12.0'		15" RECOVERY		
12.45		7	12.0'	9 8 10 7	Saturated medium dense light brown gravel w/ some coarse to fine sand and silt.	A-1-a	
			14.0'		12" RECOVERY		
		8	14.0'	3 5	Saturated medium dense light brown gravel	A-1-b	

Remarks: Mud Rotary at 35.0'

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: BR2-1-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94				6 3	w/ some coarse to fine sand and silt.		
			16.0'		12" RECOVERY		
		9	16.0'	3 6 6 6	Saturated medium dense light brown coarse sand and gravel w/ some fine sand, trace of silt.	A-1-b	
17.43			18.0'		16" RECOVERY		
		10	18.0'	4 5 6 6	Saturated stiff brown fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
			20.0'		7" RECOVERY		
19.92							
22.41							
		U-1	24.0'		Saturated stiff brown low plasticity clay, trace of fine to coarse sand.	A-4(6)	Press Tube - Shelby Tube.
24.9			26.0'		24" RECOVERY		
27.39							
		11	29.0'	2 5 5 9	Saturated loose brown silty fine sand, trace of coarse sand.	A-2-4(0)	
29.88			31.0'		13" RECOVERY		
32.37							
		12	34.0'	4 7 10 12	Saturated medium dense green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	glauconitic
34.86			36.0'		18" RECOVERY		
37.35							

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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: 25-113-01

Boring No.: BR2-1-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks																																																																																																																									
		13	38.0'	6 6 5	Saturated medium dense green silty fine to coarse sand, trace of gravel and organic matter. 21" RECOVERY	A-2-5(0)	glaucconitic																																																																																																																									
39.84			40.0'													42.33										14	43.0'	12 20 30 33	Saturated dense green silty fine to coarse sand w/ some gravel and organic matter, trace of clay. 24" RECOVERY	A-2-5(0)	glaucconitic	44.82			45.0'										47.31										15	48.0' 48.5'	50/4"	Saturated very dense green silty coarse to fine sand and gravel, trace of seashells. 4" RECOVERY	A-1-b	glaucconitic	49.8													52.28										16	53.0'	10 13 20 26	Saturated dense green and gray clayey fine sand w/ some coarse sand, trace of gravel. 24" RECOVERY	A-2-4(0)	glaucconitic	54.78			55.0'										57.27										17	58.0'	19 33 50	Saturated very dense green and gray silty fine sand w/ some coarse sand, trace of gravel. 18" RECOVERY	A-2-4(0)	glaucconitic	59.76			59.5'						
42.33																																																																																																																																
		14	43.0'	12 20 30 33	Saturated dense green silty fine to coarse sand w/ some gravel and organic matter, trace of clay. 24" RECOVERY	A-2-5(0)	glaucconitic																																																																																																																									
44.82			45.0'													47.31										15	48.0' 48.5'	50/4"	Saturated very dense green silty coarse to fine sand and gravel, trace of seashells. 4" RECOVERY	A-1-b	glaucconitic	49.8													52.28										16	53.0'	10 13 20 26	Saturated dense green and gray clayey fine sand w/ some coarse sand, trace of gravel. 24" RECOVERY	A-2-4(0)	glaucconitic	54.78			55.0'										57.27										17	58.0'	19 33 50	Saturated very dense green and gray silty fine sand w/ some coarse sand, trace of gravel. 18" RECOVERY	A-2-4(0)	glaucconitic	59.76			59.5'																																			
47.31																																																																																																																																
		15	48.0' 48.5'	50/4"	Saturated very dense green silty coarse to fine sand and gravel, trace of seashells. 4" RECOVERY	A-1-b	glaucconitic																																																																																																																									
49.8																52.28										16	53.0'	10 13 20 26	Saturated dense green and gray clayey fine sand w/ some coarse sand, trace of gravel. 24" RECOVERY	A-2-4(0)	glaucconitic	54.78			55.0'										57.27										17	58.0'	19 33 50	Saturated very dense green and gray silty fine sand w/ some coarse sand, trace of gravel. 18" RECOVERY	A-2-4(0)	glaucconitic	59.76			59.5'																																																																
52.28																																																																																																																																
		16	53.0'	10 13 20 26	Saturated dense green and gray clayey fine sand w/ some coarse sand, trace of gravel. 24" RECOVERY	A-2-4(0)	glaucconitic																																																																																																																									
54.78			55.0'													57.27										17	58.0'	19 33 50	Saturated very dense green and gray silty fine sand w/ some coarse sand, trace of gravel. 18" RECOVERY	A-2-4(0)	glaucconitic	59.76			59.5'																																																																																													
57.27																																																																																																																																
		17	58.0'	19 33 50	Saturated very dense green and gray silty fine sand w/ some coarse sand, trace of gravel. 18" RECOVERY	A-2-4(0)	glaucconitic																																																																																																																									
59.76			59.5'																																																																																																																													

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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: 25-113-01

Boring No.: BR2-1-03







Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
		18	63.0'	21 36 60/5"	Saturated very dense green and gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	glauconitic
64.74			64.5'		16" RECOVERY		
67.23							
		19	68.0'	10 33 60/4"	Saturated very dense green and gray silty fine sand w/ some coarse sand.	A-2-4(0)	glauconitic
69.72			69.5'		10" RECOVERY		
72.21							
		20	73.0'	26 60/5"	Saturated very dense green and gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	glauconitic
			73.9'		10" RECOVERY		
74.7					Boring terminated at 73.9 feet.		
77.19							
79.68							
82.17							
84.66							

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KEY TO SYMBOLS

Symbol Description

Strata symbols

	Low plasticity clay
	Silty low plasticity clay
	Silty sand
	Silty gravel
	Well graded sand
	Poorly graded clayey silty sand

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Notes:

1. Exploratory boring was drilled on 3/5/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were 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 SPT 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: 25-113-01
Boring Location: Sta. 455+55.12, 66' Lt. C.L.

Boring No.: BR2-1-04

Boring Surface Elev.: 65.91

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0'	To: 35.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/6/08		14.0'	12.0'	10.0'	55.9
						65.9
						65.9
						65.9

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 74.3 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;

No. of: 3
Core Drilling in Rock: Ft.

Dia. U-Sample Boring: Ft.
U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	2 2 3	Moist firm light brown clayey silt w/ some fine sand, trace of coarse sand and gravel.	A-4(8)	8" Cultivated Soil.
			2.0'		10" RECOVERY		
2.49		2	2.0'	4 5 5 13	Moist stiff light brown clayey coarse to fine sandy silt w/ some gravel.	A-4(0)	
			4.0'		16" RECOVERY		
4.98		3	4.0'	7 8 10 8	Moist medium dense white coarse sand w/ some silt and fine sand, trace of gravel.	A-1-b	
			6.0'		18" RECOVERY		
7.47		4	6.0'	13 11 11 10	Wet medium dense white coarse sand and gravel w/ some silt and fine sand.	A-1-b	
			8.0'		19" RECOVERY		
9.96		5	8.0'	4 6 6 7	Wet medium dense white coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			10.0'		16" RECOVERY		
		6	10.0'	6 8 10 11	Saturated medium dense light brown clayey gravel w/ some fine to coarse sand.	A-2-4(0)	
			12.0'		14" RECOVERY		
12.45		7	12.0'	13 16 13 14	Saturated medium dense light brown gravel and coarse sand w/ some silt and fine sand.	A-1-b	
			14.0'		18" RECOVERY		
		8	14.0'	4 10	Saturated medium dense light brown gravel	A-1-a	

Remarks: Mud Rotary at 35.0'

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: 25-113-01

Boring No.: BR2-1-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94				13 14	w/ some coarse to fine sand and silt.		
			16.0'		11" RECOVERY		
		9	16.0'	7 9 7 7	Saturated medium dense light brown gravel and coarse to fine sand w/ some silt.	A-1-b	
17.43			18.0'		14" RECOVERY		
		10	18.0'	9 6 10 11	Saturated medium dense brown silty fine sand w/ some coarse sand and gravel.	A-2-4(0)	
19.92			20.0'		12" RECOVERY		
22.41							
		11	24.0'	WR 2 6 7	Saturated loose brown fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
24.9			26.0'		13" RECOVERY		
		U-1	27.0'		Saturated loose dark green clayey fine sand.	A-4(8)	Press Sample - Shelby Tube.
27.39			29.0'		24" RECOVERY		
		12	29.0'	10 14 13 13	Saturated very stiff brown fine sandy clay, trace of coarse sand.	A-6(3)	
29.88			31.0'		16" RECOVERY		
32.37							
		13	34.0'	4 6 5 6	Saturated stiff green fine sandy silt w/ some coarse sand, trace of organic matter and gravel.	A-4(0)	glauconitic
34.86			36.0'		18" RECOVERY		
37.35							

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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: 25-113-01

Boring No.: BR2-1-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	38.0'	3 4 6 8	Saturated loose green silty fine to coarse sand, trace of gravel and organic matter.	A-2-4(0)	glaucinitic
39.84			40.0'		21" RECOVERY		
42.33							
		15	43.0'	14 13 28 27	Saturated dense green silty coarse to fine sand w/ some gravel and organic matter.	A-2-4(0)	glaucinitic
44.82			45.0'		20" RECOVERY		
47.31							
		16	48.0'	13 16 16 14	Saturated dense green silty fine to coarse sand, trace of gravel and organic matter.	A-2-4(0)	glaucinitic
49.8			50.0'		20" RECOVERY		
52.29							
		17	53.0'	6 10 16 24	Saturated medium dense gray and green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
54.78			55.0'		24" RECOVERY		
57.27							
		18	58.0'	16 31 50	Saturated very dense gray and green fine sand w/ some coarse sand and silt.	A-2-4(0)	
59.76			59.5'		18" RECOVERY		
		PH-2			Visual Description: Saturated very dense gray and green fine to coarse sand w/ some silt and gravel.		Sample brought to GTA lab for pH testing.

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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: 25-113-01

Boring No.: BR2-1-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
		19	63.0'	25 45 50/4"	Saturated very dense gray and green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			64.5'		16" RECOVERY		
64.74							
67.23							
		20	68.0'	32 40 50/3"	Saturated very dense light gray and green fine sand w/ some silt and coarse sand.	A-2-4(0)	
			69.5'		15" RECOVERY		
69.72							
72.21							
		21	73.0'	20 55	Saturated very dense gray and green fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
			74.0'		12" RECOVERY		
74.7					Boring terminated at 74.0 feet.		
77.19							
79.68							
82.17							
84.66							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand



Poorly graded clayey
silty sand



Silty gravel



Poorly graded sand
with silt



Poorly graded sand
with clay

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/6/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were 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 SPT blow counts are uncorrected.

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

A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01
Boring Location: Sta. 444+47.45, 84' Rt. C.L.
Boring Surface Elev.: 59.70

Boring No.: BR2-2-01

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

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

Reference:
From Depth of: **To:**
From Depth of: 0.0' **To:** 46.0'

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
3/3/08		10.0'	8.0'	6.5'	53.2 59.7 59.7 59.7

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 74.4 **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: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	1 1 3	Wet loose brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	4" Topsoil.
2.49		2	2.0' 2.5'	3 3 3	Wet firm brown clayey silt w/ some fine to coarse sand, trace of gravel. 10" RECOVERY	A-4(2)	
			4.0'		6" RECOVERY		
4.98		3	4.0'	1 2 2	Wet very loose black silty coarse to fine sand w/ some gravel and organic matter.	A-2-4(0)	
			6.0'		10" RECOVERY		
7.47		4	6.0'	4 6 8	Saturated medium dense black and gray coarse sand and gravel w/ some silt and fine sand, trace of organic matter.	A-1-b	
			8.0'		13" RECOVERY		
9.96		5	8.0'	2 3 8 8	Saturated loose brown silty fine sand w/ some coarse sand.	A-2-4(0)	
			10.0'		18" RECOVERY		
12.45		6	10.0'	4 6 6	Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
			12.0'		16" RECOVERY		
		7	12.0'	6 10 13 27	Saturated medium dense brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
			14.0'		17" RECOVERY		
		8	14.0'	WOH 10	Saturated medium dense brown and green	A-3	

Remarks: Mud Rotary at 46.0'

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: BR2-2-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94				15 15	fine sand w/ some coarse sand, trace of silt.		
			16.0'		17" RECOVERY		
		9	16.0'	20 25 30 35	Saturated very dense brown and green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	glaucanitic
17.43			18.0'		14" RECOVERY		
		10	18.0'	4 8 14 16	Saturated medium dense brown and green fine sand w/ some silt and coarse sand.	A-2-4(0)	glaucanitic
			20.0'		18" RECOVERY		
19.92							
22.41							
		11	24.0'	6 8 12 16	Saturated medium dense green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	glaucanitic
24.9			26.0'		16" RECOVERY		
27.39							
		12	29.0'	6 6 8 12	Saturated medium dense green silty fine to coarse sand, trace of organic matter and gravel.	A-2-4(0)	glaucanitic
29.88			31.0'		18" RECOVERY		
32.37							
		U-1	34.0'		No recovery.		Press Sample - Shelby Tube.
34.86			36.0'		0" RECOVERY		
37.35							

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

A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: BR2-2-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		13	39.0'	15 20 25 49	Saturated dense green fine to coarse sand w/ some silt and organic matter, trace of gravel.	A-2-4(0)	glaucanitic
			41.0'		22" RECOVERY		
42.33							
44.82		14	44.0'	9 11 11 11	Saturated medium dense green clayey fine sand w/ some coarse sand, trace of gravel and organic matter.	A-2-4(0)	glaucanitic
			46.0'		20" RECOVERY		
7.31							
49.8		15	48.0'	8 10 25 23	Saturated dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	glaucanitic
			50.0'		15" RECOVERY		
52.29							
54.78		16	53.0'	16 38 50/3"	Saturated very dense green and gray fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	glaucanitic
			55.0'		16" RECOVERY		
57.27							
59.76		17	58.0'	18 30 50/3"	Saturated very dense green and gray fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	glaucanitic
			60.0'		15" RECOVERY		

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

A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: BR2-2-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
		18	63.0'	23 35 50/6 70/5"	Saturated very dense green and gray fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	glauconitic
64.74			65.0'		20" RECOVERY Visual Description: Saturated very dense green and gray fine sand w/ some coarse sand and silt.		Sample brought to GTA lab for pH testing.
		PH-1					
67.23							
		19	68.0'	12 23 34 43	Saturated very dense green and gray fine sand w/ some coarse sand and silt.	A-2-4(0)	glauconitic
69.72			70.0'		24" RECOVERY		
72.21							
		20	73.0'	23 30 50/5"	Saturated very dense green and gray fine sand w/ some coarse sand, trace of silt and gravel.	A-3	glauconitic
74.7			74.4'		10" RECOVERY		
					Boring terminated at 74.4 feet.		
77.19							
79.68							
82.17							
84.66							

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KEY TO SYMBOLS

Symbol Description

Standard symbols



Silty sand



Silty low plasticity
clay



Poorly graded sand
with silt

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Notes:

1. Exploratory boring was drilled on 3/3/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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 SPT blow counts are uncorrected.

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

A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01
Boring Location: Sta. 446+98.37, 79° Lt. C.L.
Boring Surface Elev.: 61.65

Boring No.: BR2-2-02

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

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

Reference:
From Depth of: **To:**
From Depth of: 0.0' **To:** 36.0'

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
3/3/08		12.0'	10.0'	8.8'	52.9 61.7 61.7 61.7

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 74.8 **Ft.;** 3 **Dia. U-Sample Boring:** **Ft.**
 No. of 2 in. Dia. Shelby Tubes: **;** **No. of:** **U-Samples:** **Ft.**
 2 1/2 in. Dia. Contin. Sample Boring: **Ft.;** **Core Drilling in Rock:** **Ft.**

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	2 4 4 7	Wet firm brown clayey coarse sandy silt w/ some fine sand and gravel.	A-4(1)	8" Cultivated Soil.
			2.0'		10" RECOVERY		
2.49		2	2.0'	5 10 12 14	Wet very stiff gray clayey silt, trace of fine to coarse sand and gravel.	A-4(6)	
			4.0'		18" RECOVERY		
		3	4.0'	9 9 6 6	Wet medium dense gray silty coarse to fine sand, trace of gravel.	A-2-4(0)	
4.98			6.0'		20" RECOVERY		
		4	6.0'	15 28 17 7	Wet dense gray-brown silty fine to coarse sand and gravel.	A-2-4(0)	
7.47			8.0'		12" RECOVERY		
		5	8.0'	12 50/3"	Saturated very dense brown coarse sand w/ some gravel, fine sand, and silt.	A-1-b	
			10.0'		2" RECOVERY		
9.96		6	10.0'	27 5 5 7	Saturated loose brown silty gravel.		No sieve analysis
			12.0'		5" RECOVERY		
12.45		7	12.0'	7 8 8 13	Saturated medium dense brown-gray fine sand w/ some coarse sand and silt.	A-2-4(0)	

Remarks: Mud Rotary at 36.0'

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: 25-113-01

Boring No.: BR2-2-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	6 6 10 10	24" RECOVERY Saturated medium dense green fine sand w/ some silt and coarse sand.	A-2-4(0)	glaucousitic
17.43		U-1	16.0' 16.0'		18" RECOVERY Saturated dark green fine sand with a trace of gravel and silt.	A-2-4(0)	Press Sample - Shelby Tube.
19.92		9	18.0' 18.0'	3 5 8 10	24" RECOVERY Saturated medium dense green-gray silty fine sand w/ some coarse sand.	A-2-4(0)	glaucousitic
22.41			20.0'		24" RECOVERY		
24.9		10	24.0' 26.0'	5 5 8 14	Saturated medium dense gray fine sand, trace of coarse sand and silt. 24" RECOVERY	A-3	glaucousitic
27.39							
29.88		11	29.0' 31.0'	3 5 11 12	Saturated medium dense green silty fine sand w/ some coarse sand. 20" RECOVERY	A-2-4(0)	glaucousitic
32.37							
34.86		12	34.0' 36.0'	8 12 7 11	Saturated medium dense green silty fine to coarse sand, trace of gravel and organic matter. 18" RECOVERY	A-2-4(0)	glaucousitic
37.35							

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

A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: BR2-2-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		13	39.0'	27 22 50/4"	Saturated very dense green organic silty fine to coarse sand w/ some gravel.	A-2-4(0)	glaucinitic
42.33			41.0'		12" RECOVERY		
44.82		14	44.0'	27 50/4"	Saturated very dense green silty fine to coarse sand, trace of gravel and organic matter.	A-2-5(0)	glaucinitic
47.31			46.0'		10" RECOVERY		
49.8		15	49.0'	8 12 27 28	Saturated dense green-gray silty fine sand w/ some coarse sand, trace of gravel, organic matter, and clay.	A-2-4(0)	
52.29			51.0'		18" RECOVERY		
54.78		16	54.0'	6 19 23 30	Saturated dense gray silty fine sand w/ some coarse sand.	A-2-4(0)	
57.27			56.0'		16" RECOVERY		
59.76		17	59.0'	5 23 50/5"	Saturated very dense gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	

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

A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: BR2-2-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		10" RECOVERY		
62.25							
		18	64.0'	17 37 50/5"	Saturated very dense gray fine sand w/ some silt and coarse sand.	A-2-4(0)	
64.74			66.0'		8" RECOVERY		
67.23							
		19	69.0'	20 27 50/4"	Saturated very dense gray fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
69.72			71.0'		12" RECOVERY		
72.21							
		20	74.0' 74.8'	37 50/3"	Saturated very dense gray silty fine sand w/ some coarse sand.	A-2-4(0)	
74.7					8" RECOVERY		
					Boring terminated at 74.8		
77.19							
79.68							
82.17							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



Poorly graded sand

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Notes:

1. Exploratory boring was drilled on 3/3/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75.
2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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 SPT blow counts are uncorrected.

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

A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: BR2-2-03

Contract: 25-113-01

Boring Location:

Boring Surface Elev.: 56.90

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 41.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/4/08		16.0'	14.0'	12.0'	44.9 56.9 56.9 56.9

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	74.5	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	1 1 2	Wet soft brown clayey coarse sandy silt w/ some fine sand, trace of gravel and organic matter.	A-4(1)	3" Topsoil.
2.49		2	2.0' 2.5'	1 2 3 4	Wet loose brown silty coarse to fine sand w/ some gravel, trace of organic matter. 14" RECOVERY	A-1-b	
			4.0'		16" RECOVERY		
4.98		3	4.0'	1 2 1 2	Wet very loose green clayey fine sand w/ some coarse sand and gravel.	A-2-7(3)	
			6.0'		11" RECOVERY		
7.47		4	6.0'	2 4 6 8	Wet stiff green and brown fine sandy clay, trace of coarse sand.	A-7-6(9)	
			8.0'		16" RECOVERY		
9.96		5	8.0'	WOH 3 7 8	Wet loose brown fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			10.0'		14" RECOVERY		
		6	10.0'	5 6 7	Wet medium dense brown silty fine sand, trace of coarse sand.	A-2-4(0)	
			12.0'		16" RECOVERY		
12.45		U-1	12.0'		Saturated medium dense green and brown clayey fine sand.	A-4(1)	Press Sample - Shelby Tube.
			13.0'		12" RECOVERY		
		7	14.0'	1 5	Saturated medium dense green fine sand w/ glauconitic	A-2-4(0)	

Remarks: Mud Rotary at 41.0'

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: BR2-2-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94				9 11	some silt, trace of coarse sand.		
			16.0'		11" RECOVERY		
		8	16.0'	11 17 23 24	Saturated dense green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	glaucanitic
17.43			18.0'		13" RECOVERY		
		9	18.0'	7 8 12 13	Saturated medium dense green fine sand w/ some silt, trace of coarse sand and organic matter.	A-2-4(0)	glaucanitic
19.92			20.0'		16" RECOVERY		
22.41							
		10	24.0'	18 12 15 20	Saturated medium dense green fine sand w/ some coarse sand and silt, trace of gravel and organic matter.	A-2-4(0)	glaucanitic
24.9			26.0'		21" RECOVERY		
27.39							
		11	29.0'	8 13 17 21	Saturated medium dense green fine to coarse sand w/ some silt, trace of gravel and organic matter.	A-2-4(0)	glaucanitic
29.88			31.0'		17" RECOVERY		
32.37							
		12	34.0'	17 33 50/2"	Saturated very dense green-gray organic clayey fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	glaucanitic
34.86			36.0'		14" RECOVERY		
37.35							

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

A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: BR2-2-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		13	39.0'	23 50/3"	Saturated very dense green-gray fine to coarse sand w/ some silt and gravel, trace of organic matter and clay.	A-2-4(0)	glaucinitic
			41.0'		9" RECOVERY		
42.33							
44.82		14	43.0'	17 23 50/5"	Saturated very dense green-gray fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	glaucinitic
			45.0'		18" RECOVERY		
47.31							
49.8		15	48.0'	12 24 28 50/5"	Saturated dense gray-green fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	glaucinitic
			50.0'		22" RECOVERY		
52.29							
54.78		16	53.0'	24 50/6	Saturated very dense gray-green silty fine sand w/ some coarse sand.	A-2-4(0)	glaucinitic
			55.0'		12" RECOVERY		
57.27							
59.76		17	58.0'	45 50/2"	Saturated very dense gray-green fine sand w/ some coarse sand, trace of silt.	A-3	glaucinitic
			60.0'		7" RECOVERY		

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

A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: BR2-2-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
		18	63.0'	22 39 50/4"	Saturated very dense gray-green fine sand w/ some silt and coarse sand.	A-2-4(0)	glauconitic
64.74			65.0'		14" RECOVERY		
67.23							
		19	68.0'	32 50/4"	Saturated very dense gray-green fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	glauconitic
69.72			70.0'		10" RECOVERY		
72.21							
		20	73.0'	23 40 50/6"	Saturated very dense gray-green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	glauconitic
74.7			74.5'		16" RECOVERY		
					Boring terminated at 74.5 feet.		
77.19							
79.68							
82.17							
84.66							

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Standard symbols



Silt



Silty sand



Clayey sand



Low plasticity
clay



Poorly graded sand
with silt



Poorly graded sand

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AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/4/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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 SPT blow counts are uncorrected.

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

A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01
Boring Location: Sta. 447+40.27, 79' Lt. C.L.

Boring No.: BR2-2-04

Boring Surface Elev.: 62.81

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4 **Inches** **From Depth of:** 0.0' **To:** 29.0'
Hollow Stem Auger:

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/6/08		10.0'	8.0'	6.9'	55.9 62.8 62.8 62.8

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 75.4 **Ft.;** 3 **Dia. U-Sample Boring:** **Ft.**
 No. of 2 in. Dia. Shelby Tubes: **Ft.;** **No. of U-Samples:** **Ft.**
 2 1/2 in. Dia. Contin. Sample Boring: **Ft.;** **Core Drilling in Rock:** **Ft.**

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	1 1 2 3	Wet firm brown clayey silt w/ some gravel and coarse sand, trace of fine sand.	A-4(2)	9" Cultivated Soil.
2.49		2	2.0' 2.5'	6 16 18 17	Wet hard brown clayey fine to coarse sand w some silt and gravel. 17" RECOVERY	A-4(0)	
		3	4.0' 4.0'	16 30 27 19	Wet very dense brown silty coarse sand w/ some fine sand, trace of gravel. 17" RECOVERY	A-1-b	
4.98		4	6.0' 6.0'	16 18 22 18	Wet to saturated dense light brown silty coarse sand w/ some fine sand, trace of gravel. 18" RECOVERY	A-1-b	
7.47		5	8.0' 8.0'	18 23 27 27	Saturated dense light brown coarse sand and gravel w/ some silt and fine sand. 16" RECOVERY	A-1-b	cobble lodged in shoe of spoon
9.96		6	10.0' 10.0'	8 9 9 13	Saturated medium dense light brown gravel and coarse sand w/ some fine sand and silt. 20" RECOVERY	A-1-b	
12.45		7	12.0' 12.0'	3 3 4 5	Saturated loose brown coarse sand and gravel w/ some fine sand, trace of silt. 24" RECOVERY	A-1-b	
		8	14.0' 14.0'	27 19	Saturated medium dense brown coarse to fine 24" RECOVERY	A-1-b	

Remarks: Mud Rotary at 29.0'

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: BR2-2-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94				5 4	sand w/ some gravel and silt.		
			16.0'		18" RECOVERY		
		9	16.0'	5 5 6 8	Saturated medium dense green-brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
17.43			18.0'		24" RECOVERY		
		U-1	18.0'		Saturated dark green fine sand with a trace of silt.	A-4(10)	Press Sample - Shelby Tube.
			20.0'		21" RECOVERY		
19.92		10	20.0'	6 9 11 13	Saturated medium dense brown silty fine sand, trace of coarse sand.	A-2-4(0)	
			22.0'		24" RECOVERY		
22.41							
		11	24.0'	6 6 10 13	Saturated medium dense brown-green silty fine sand, trace of coarse sand.	A-2-4(0)	
24.9			26.0'		14" RECOVERY		
27.39							
		12	29.0'	3 4 9 9	Saturated medium dense brown-gray silty fine sand w/ some coarse sand.	A-2-4(0)	
29.88			31.0'		14" RECOVERY		
32.37							
		13	34.0'	3 5 7 9	Saturated medium dense gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	
34.86			36.0'		15" RECOVERY		
37.35							

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

A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: BR2-2-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	6 17 24 23	Saturated hard gray fine sandy silt w/ some coarse sand and organic matter, trace of gravel, clay, & seashell fragments	A-4(0)	glaucinitic
			41.0'		18" RECOVERY		
42.33							
44.82		15	44.0'	16 50/3"	Saturated very dense gray-green silty fine to coarse sand w/ some gravel.	A-2-4(0)	glaucinitic
			46.0'		6" RECOVERY		
47.31							
49.8		16	49.0'	10 18 27 34	Saturated dense gray clayey fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			51.0'		24" RECOVERY		
52.29							
54.78		17	54.0'	4 16 19 32	Saturated dense gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			56.0'		19" RECOVERY		
57.27							
59.76		18	59.0'	14 13 37 50/3"	Saturated dense gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			61.0'		16" RECOVERY		
		PH-2	61.0'	30 50/3"	Visual Description: Saturated dense gray		Sample brought to GTA lab

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

A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: BR2-2-04







Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25					clayey fine sand w/ some coarse sand.		for pH testing.
			63.0'		9" RECOVERY		
64.74		19	64.0'	27 50/4"	Saturated very dense gray fine sand w/ some silt and coarse sand.	A-2-4(0)	
			66.0'		9" RECOVERY		
67.23							
69.72		20	69.0'	31 50/5"	Saturated very dense gray silty fine sand.	A-2-4(0)	
			71.0'		11" RECOVERY		
72.21							
74.7		21	74.0'	16 32 50/5"	Saturated very dense gray fine sand w/ some silt and coarse sand.	A-2-4(0)	
			75.4'		16" RECOVERY		
77.19					Boring terminated at 75.4 feet.		
79.68							
82.17							
84.66							

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KEY TO SYMBOLS

Symbol Description

Strata symbols

	Silty low plasticity clay
	Poorly graded clayey silty sand
	Silty sand
	Well graded sand with silt
	Poorly graded sand with clay
	Clayey sand

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Notes:

1. Exploratory boring was drilled on 3/6/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75.
2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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 SPT blow counts are uncorrected.

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

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

Boring No.: BR2-2-05

Contract: 25-113-01

Boring Location: Sta. 484+49.70, 71' Rt. C.L.

Boring Surface Elev.: + 61.4

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 10.0	

Water Level Readings					
Date 12/18/2009	Time	Depth of Hole 8.0	Depth of Casing 6.0	Depth of Water 2.6	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 101.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: J. Lafferty/T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/18/09	1	0.5'	1 2 3	Wet loose grayish orange clayey coarse to fine sand w/some fine gravel and silt. 14" RECOVERY	A-2-4(0)	Topsoil - 6".
3		2	2.0'	2 2 2 2	Saturated very loose black organic clayey coarse to fine sand w/some fine gravel and silt. 9" RECOVERY	A-2-6(0)	
		3	4.0'	WH 2 2 2	Saturated very loose green clayey fine to coarse sand w/some silt, trace of fine gravel. 17" RECOVERY	A-2-7(1)	
6		4	6.0'	2 3 4 6	Saturated loose green silty fine to coarse sand. 16" RECOVERY	A-2-4(0)	
		5	8.0'	3 7 11 18	Saturated medium dense green silty fine sand w/some coarse sand. 19" RECOVERY	A-2-4(0)	
9		6	10.0'	10 19 26 40	Saturated dense green fine sand w/some silt and coarse sand. 20" RECOVERY	A-2-4(0)	Mud Rotary @ 10.0'.
12		7	12.0'	3 19 17 28	Saturated dense green fine sand w/trace of coarse and, silt and fine gravel. 23" RECOVERY	A-3	
		8	14.0'	8 13 17 23	Saturated medium dense green fine sand w/some silt, trace of coarse sand. 18" RECOVERY	A-2-4(0)	
15		9	16.0'	11 13 19 18	Saturated dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	

Remarks: Mud Rotary @ 10.0 Feet.

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-2-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		21" RECOVERY		
		10	18.0'	9 13 17 20	Saturated medium dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			20.0'		22" RECOVERY		
21							
24							
		11	24.0'	7 10 14 15	Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter.	A-2-4(0)	
			26.0'		20" RECOVERY		
27							
30		12	29.0'	7 11 16 16	Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter.	A-2-4(0)	
			31.0'		19" RECOVERY		
33							
36		13	34.0'	7 10 12 9	Saturated medium dense green organic silty fine to coarse sand.	A-2-4(0)	
			36.0'		20" RECOVERY		
39							
	12/22/09	14	39.0'	36 50/3"	Saturated very dense gray silty fine to coarse sand w/trace of fine gravel and organic matter.	A-2-4(0)	
			41.0'		9" RECOVERY		
42							
45	12/23/09	15	44.0'	7 11 19 23	Saturated medium dense gray silty fine to coarse sand.	A-2-4(0)	

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

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-2-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		23" RECOVERY		
48							
		16	49.0'	11 19 17 20	Saturated dense gray fine sand w/some coarse sand and silt, trace of shell fragments.	A-2-4(0)	
51			51.0'		22" RECOVERY		
54							
		17	54.0'	10 11 18 23	Saturated medium dense gray fine sand w/some coarse sand and silt, trace of organic matter and shell fragments.	A-2-4(0)	
			56.0'		22" RECOVERY		
57							
60		18	59.0'	18 29 50/4"	Saturated very dense gray fine sand w/some coarse sand and silt, trace of organic matter.	A-2-4(0)	
			61.0'		15" RECOVERY		
63							
		19	64.0'	17 32 36 32	Saturated very dense gray fine sand w/some silt and coarse sand, trace of shell fragments.	A-2-4(0)	
66			66.0'		21" RECOVERY		
69							
		20	69.0'	11 29 33 36	Saturated very dense gray fine sand w/some coarse sand, trace of silt and shell fragments.	A-3	
			71.0'		20" RECOVERY		
72							

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

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-2-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75	1/4/10	21	74.0'	18 25 23 34	Saturated dense gray fine sand w/some silt and coarse sand. 23" RECOVERY	A-2-4(0)	
			76.0'				
78							
81		22	79.0'	11 14 17 29	Saturated dense gray fine sand w/some silt, trace of coarse sand. 24" RECOVERY	A-2-4(0)	
			81.0'				
84							
87		23	84.0'	12 17 22 29	Saturated dense gray fine sand w/some silt, trace of coarse sand. 23" RECOVERY	A-2-4(0)	
			86.0'				
90		24	89.0'	17 29 45 50/3"	Saturated very dense gray fine sand w/some coarse sand and silt. 20" RECOVERY	A-2-4(0)	
			91.0'				
93							
96		25	94.0'	12 16 20 30	Saturated dense gray fine sand w/some silt, trace of coarse sand. 23" RECOVERY	A-2-4(0)	
			96.0'				
99							
		26	99.0'	12 15 20 42	Saturated dense gray silty fine sand w/trace of coarse sand. 24" RECOVERY	A-2-4(0)	
			101.0'				
102					End of Boring		

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Clayey sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 12/18/2009 using a 3 1/4- inch diameter continuous flight power 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 Mainline, Maryland State Line to S.R. 1

Boring No.: BR2-2-06

Contract: 25-113-01

Boring Location: Sta. 487+19.10, 72' Rt. C.L.

Boring Surface Elev.: + 61.6

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: 15.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
1/6/2010		10.0	8.0	3.8	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	100.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/6/10	1	0.5'	2 2 2	Wet soft brown fine gravelly silt w/some clay and coarse to fine sand.	A-4(0)	Topsoil - 6".
			2.0'		10" RECOVERY		
3		2	2.0'	3 4 5 6	Saturated loose gray fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
			4.0'		6" RECOVERY		
6		3	4.0'	1 2 3 4	Saturated loose greenish brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			6.0'		10" RECOVERY		
		4	6.0'	3 4 5 5	Saturated stiff brown fine sandy silt w/some coarse sand.	A-4(0)	
			8.0'		14" RECOVERY		
9		5	8.0'	5 7 6 6	Saturated medium dense brown silty fine sand w/some coarse sand.	A-2-4(0)	
			10.0'		16" RECOVERY		
12		6	10.0'	4 3 6 6	Saturated stiff greenish brown fine sandy silt w/trace of coarse sand.	A-4(0)	
			12.0'		10" RECOVERY		
		7	12.0'	3 4 9 11	Saturated stiff green fine sandy silt w/trace of coarse sand.	A-4(0)	
			14.0'		10" RECOVERY		
15		8	14.0'	3 8 10 13	Saturated very stiff green fine sandy silt w/trace of coarse sand.	A-4(0)	
			16.0'		15" RECOVERY		
		9	16.0'	11 13 15 18	Saturated medium dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	

Remarks: Mud Rotary @ 15.0 Feet

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-2-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		17" RECOVERY		
		10	18.0'	6 8 10 12	Saturated medium dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			20.0'		16" RECOVERY		
21							
24		11	23.0'	6 11 15 16	Saturated medium dense green fine sand w/some coarse sand and silt.	A-2-4(0)	
			25.0'		18" RECOVERY		
27							
		12	28.0'	9 9 17 19	Saturated medium dense green fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
30			30.0'		18" RECOVERY		
33							
		13	33.0'	5 7 12 17	Saturated very stiff green fine sandy silt w/some coarse sand and fine gravel.	A-4(0)	
			35.0'		17" RECOVERY		
36							
39		14	38.0'	50	Saturated very dense green silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			40.0'		6" RECOVERY		
42							
		15	43.0'	17 22 50/5"	Saturated very dense gray silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
45			45.0'		16" RECOVERY		

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

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-2-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48							
		16	48.0'	11 21 50/5"	Saturated very dense gray fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
			50.0'		17" RECOVERY		
51							
		17	53.0'	29 41 50/4"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
54			55.0'		16" RECOVERY		
57							
		18	58.0'	40 50/3"	Saturated very dense gray fine sand w/some silt and coarse sand.	A-2-4(0)	
			60.0'		9" RECOVERY		
60							
63							
	1/8/10	19	63.0'	50/5"	Saturated very dense gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			65.0'		5" RECOVERY		
66							
		20	68.0'	25 39 50	Saturated very dense gray fine sand w/some silt and coarse sand.	A-2-4(0)	
69			70.0'		18" RECOVERY		
72							
		21	73.0'	36 50/5"	Saturated very dense gray 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 Mainline, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-2-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75			75.0'		9" RECOVERY		
78		22	78.0'	21 25 50	Saturated very dense gray silty fine sand w/trace of coarse sand.	A-2-4(0)	
81			80.0'		17" RECOVERY		
84		23	83.0'	18 19 23 47	Saturated dense gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
87			85.0'		24" RECOVERY		
90		24	88.0'	23 32 50	Saturated very dense gray fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
93			90.0'		18" RECOVERY		
96		25	93.0'	18 20 25 40	Saturated dense gray fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
99			95.0'		24" RECOVERY		
102		26	98.0'	23 33 50/3"	Saturated very dense gray silty fine sand w/trace of coarse sand.	A-2-4(0)	
			100.0'		15" RECOVERY		
					End of Boring		

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Well graded sand
with silt



Silty sand

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/6/2010 using a 3 1/4- inch diameter continues flight power 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 recomendations 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 Mainline, Maryland State Line to S.R. 1

Boring No.: BR2-2-07

Contract: 25-113-01

Boring Location: Sta. 486+07.92, 64' Lt. C.L.

Boring Surface Elev.: + 60.0

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.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 15.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
12/17/2009		8.0	6.0	4.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	101	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/17/09	1	0.5'	4 7 10	Moist medium dense brown fine gravelly coarse sand w/some fine sand and silt.	A-1-b	Topsoil - 4".
			2.0'		8" RECOVERY		
3		2	2.0'	18 19 19 15	Saturated dense orange silty coarse sand w/some fine sand and fine gravel.	A-1-b	
			4.0'		16" RECOVERY		
		3	4.0'	9 8 8 11	Saturated medium dense orange fine gravelly coarse sand w/some fine sand and silt.	A-1-b	
6			6.0'		14" RECOVERY		
		4	6.0'	12 10 12 18	Saturated medium dense orange fine gravelly fine to coarse sand w/some silt.	A-1-b	
			8.0'		16" RECOVERY		
9		5	8.0'	5 4 5 6	Saturated stiff brown fine sandy clay w/trace of coarse sand.	A-6(1)	
			10.0'		11" RECOVERY		
		6	10.0'	8 10 9 13	Saturated very stiff brown fine sandy clay w/some coarse sand.	A-6(2)	
12			12.0'		16" RECOVERY		
		7	12.0'	6 6 9 10	Saturated medium dense brown silty fine sand w/some coarse sand.	A-2-4(0)	
			14.0'		14" RECOVERY		
15		8	14.0'	3 6 7 9	Saturated medium dense brown clayey fine sand w/some coarse sand, trace of silt.	A-2-6(0)	
			16.0'		16" RECOVERY		
		9	16.0'	4 6 8 9	Saturated medium dense brown clayey fine sand w/some coarse sand, trace of silt.	A-2-4(0)	

Remarks: Mud Rotary @ 15.0 Feet

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-2-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		16" RECOVERY		
		10	18.0'	4 5 8 8	Saturated medium dense brown clayey fine sand w/trace of coarse sand and silt.	A-2-4(0)	
			20.0'		17" RECOVERY		
21							
24							
		11	24.0'	5 8 9 15	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			26.0'		15" RECOVERY		
27							
30		12	29.0'	7 12 14 16	Saturated medium dense green fine to coarse sand w/some silt, trace of fine gravel and organic matter.	A-2-4(0)	
			31.0'		20" RECOVERY		
33							
	12/18/09	13	34.0'	5 6 5 4	Saturated medium dense green silty fine to coarse sand w/trace of fine gravel and organic matter.	A-2-4(0)	
36			36.0'		16" RECOVERY		
39							
		14	39.0'	25 50/4"	Saturated very dense green silty fine to coarse sand w/some fine gravel, trace of organic matter.	A-2-4(0)	
			41.0'		10" RECOVERY		
42							
45		15	44.0'	19 37 50/4"	Saturated very dense green silty fine to coarse sand.	A-2-4(0)	

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

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-2-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		16" RECOVERY		
48							
		16	49.0'	10 16 22 26	Saturated dense gray silty fine sand w/some coarse sand.	A-2-4(0)	
51			51.0'		24" RECOVERY		
54							
		17	54.0'	13 13 19 21	Saturated dense gray fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
			56.0'		23" RECOVERY		
57							
60		18	59.0'	23 26 42 40	Saturated very dense gray fine sand w/some silt and coarse sand.	A-2-4(0)	
			61.0'		24" RECOVERY		
63							
		19	64.0'	25 50	Saturated very dense gray fine sand w/some silt and coarse sand.	A-2-4(0)	
			66.0'		12" RECOVERY		
66							
69							
		20	69.0'	22 36 50	Saturated very dense gray fine sand w/some silt and coarse sand.	A-2-4(0)	
			71.0'		18" RECOVERY		
72							

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

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-2-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75		21	74.0'	25 32 50	Saturated very dense gray fine sand w/some silt and coarse sand. 18" RECOVERY	A-2-4(0)	
			76.0'				
78							
81	12/22/09	22	79.0'	16 42 50	Saturated very dense gray fine sand w/some silt and coarse sand. 16" RECOVERY	A-2-4(0)	
			81.0'				
84							
87		23	84.0'	16 22 32 33	Saturated very dense gray fine sand w/some silt, trace of coarse sand. 23" RECOVERY	A-2-4(0)	
			86.0'				
90							
93		24	89.0'	20 6 31 40	Saturated very dense gray fine sand w/some silt, trace of coarse sand. 20" RECOVERY	A-2-4(0)	
			91.0'				
96							
99		25	94.0'	19 26 30 30	Saturated very dense gray fine sand w/some silt, trace of coarse sand. 23" RECOVERY	A-2-4(0)	
			96.0'				
102							
		26	99.0'	19 26 36 40	Saturated very dense gray silty fine sand w/trace of coarse sand.	A-2-4(0)	
			101.0'		23" RECOVERY		
					End of Boring		

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Clayey sand



Poorly graded clayey
silty sand

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Notes:

1. Exploratory borings were drilled on 12/17/2009 using a 3 1/4- inch diameter continuous flight power 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

Boring No.: BR2-3-01

Contract: 25-113-01

Boring Location: Sta. 409+95.39, 67' Lt. C.L.

Boring Surface Elev.: 68.21

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To:	31.0'

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/5/08			8.0'	6.0'	6.5'	61.7 68.2 68.2 68.2

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	75.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: William Sharp
Helpers: A. Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	1.0'	2 3	Wet firm gray clayey silt w/ some fine to coarse sand, trace of gravel. 12" RECOVERY	A-4(4)	9" Cultivated Soils.
2.49		2	2.0'	4 14 12 13	Wet medium dense gray coarse to fine sand w/ some silt and gravel. 17" RECOVERY	A-1-b	
4.98		3	4.0'	4 7 5	Saturated medium dense orange and brown coarse sand w/ some fine sand and silt, trace of gravel. 18" RECOVERY	A-1-b	
7.47		4	6.0'	3 3 3	Saturated loose gray coarse to fine sand w/ some silt, trace of gravel. 16" RECOVERY	A-1-b	
9.96		5	8.0'	1 3 4 5	Saturated loose orange and brown coarse sand w/ some fine sand and silt. 20" RECOVERY	A-1-b	
12.45		6	10.0'	5 6 11 13	Saturated medium dense orange and brown coarse to fine sand w/ some silt. 11" RECOVERY	A-2-4(0)	
		7	12.0'	6 10 13 24	Saturated medium dense orange and brown coarse to fine sand and gravel, trace of silt. 10" RECOVERY	A-1-b	
		8	14.0'	8 11 20 19	Saturated dense orange and brown coarse sand and gravel w/ some fine sand and silt.	A-1-b	

Remarks: Mud Rotary at 31.0'

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: 25-113-01

Boring No.: BR2-3-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		10" RECOVERY		
		9	16.0'	9 6 9 12	Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
17.43			18.0'		13" RECOVERY		
		10	18.0'	1 6 10 9	Saturated medium dense green and brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	glaucinitic
			20.0'		16" RECOVERY		
19.92							
22.41							
		11	24.0'	3 6 8 12	Saturated medium dense dark green and brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	glaucinitic
24.9			26.0'		16" RECOVERY		
		U-1	27.0'		No recovery.		Press Sample - Shelby Tube.
27.39			28.5'		0" RECOVERY		
		12	29.0'	4 4 6 7	Saturated loose dark green fine to coarse sand, trace of silt.	A-3	glaucinitic
29.88			31.0'		18" RECOVERY		
32.37							
		13	34.0'	5 8 10 11	Saturated medium dense dark green fine sand w/ some silt and coarse sand.	A-2-4(0)	glaucinitic
34.86			36.0'		18" RECOVERY		
37.35							

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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: 25-113-01

Boring No.: BR2-3-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	4 7 7 11	Saturated medium dense dark green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	glaucanitic
			41.0'		20" RECOVERY		
42.33							
44.82		15	44.0'	4 6 9 13	Saturated medium dense dark green fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	glaucanitic
			46.0'		20" RECOVERY		
47.31							
49.8		16	49.0'	6 6 6 5	Saturated medium dense dark green fine sand w/ some coarse sand, silt, and gravel.	A-2-4(0)	glaucanitic
			51.0'		16" RECOVERY		
52.29							
54.78		17	54.0'	12 15 27 50/5"	Saturated dense dark green clayey fine sand w/ some coarse sand and gravel, trace of seashells.	A-2-6(0)	glaucanitic
			56.0'		24" RECOVERY		
57.27							
59.76		18	59.0' 59.5'	50/4"	Saturated very dense dark green silty fine to coarse sand w/ some gravel, trace of organic matter and seashells.	A-2-4(0)	glaucanitic
					3" RECOVERY		

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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: 25-113-01

Boring No.: BR2-3-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
64.74		19	64.0'	10 14 25 36	Saturated dense dark gray silty fine sand w/ some coarse sand, trace of gravel and seashells.	A-2-4(0)	Sample brought to GTA lab for pH testing.
			66.0'		24" RECOVERY		
67.23		20	66.0'	18 21 50	Visual Description: Saturated dense dark gray silty fine sand w/ some coarse sand, trace of gravel and seashells.		
			67.5'		14" RECOVERY		
69.72		21	69.0'	12 21 33 50/4"	Saturated very dense dark gray silty fine sand w/ some coarse sand, trace of gravel and seashells.	A-2-4(0)	
			71.0'		20" RECOVERY		
72.21							
74.7		22	74.0'	21 50	Saturated very dense green fine sand w/ some silt and coarse sand, trace of gravel and seashells.	A-2-4(0)	glaucinitic
			75.0'		10" RECOVERY		
77.19					Boring terminated at 75.0 feet.		
79.68							
82.17							
84.66							

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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



Clayey sand

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Notes:

1. Exploratory boring was drilled on 3/5/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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 SPT 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

Boring No.: BR2-3-02

Contract: 25-113-01

Boring Location: Sta. 411+42.58, 79' Rt. C.L.

Boring Surface Elev.: 70.76

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	34.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/7/08		10.0'	8.0'	7.8'	63.0 70.8 70.8 70.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	75.9	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	2 3 5	Wet firm brown silt w/ some fine sand and clay, trace of coarse sand and gravel.	A-4(3)	5" Topsoil.
			2.0'		14" RECOVERY		
2.49		2	2.0'	5 6 11 13	Wet very stiff brown clayey silt w/ some fine to coarse sand, trace of gravel.	A-4(4)	
			4.0'		20" RECOVERY		
4.98		3	4.0'	3 6 6 8	Wet medium dense brown clayey coarse to fine sand, trace of gravel.	A-2-4(0)	
			6.0'		18" RECOVERY		
7.47		4	6.0'	14 14 8 9	Wet medium dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
9.96		5	8.0'	3 5 5 5	Saturated loose light brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			10.0'		20" RECOVERY		
		6	10.0'	6 6 7 8	Saturated medium dense brown fine to coarse sand w/ some silt.	A-2-4(0)	
			12.0'		24" RECOVERY		
12.45		7	12.0'	1 1 2 3	Saturated very loose light brown fine to coarse sand w/ some silt.	A-2-4(0)	
			14.0'		24" RECOVERY		
		8	14.0'	1 2	Saturated loose light brown coarse to fine	A-2-4(0)	

Remarks: Mud Rotary at 34.0'

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: 25-113-01

Boring No.: BR2-3-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94				4 6	sand w/ some silt.		
			16.0'		24" RECOVERY		
		9	16.0'	6 6 8 14	Saturated medium dense light brown fine to coarse sand, trace of silt.	A-3	No Sieve Analysis.
17.43			18.0'		24" RECOVERY		
		10	18.0'	30 50/3"	Visual Description: Saturated medium dense light brown fine to coarse sand w/ some gravel, trace of silt.		
			19.0'		5" RECOVERY		
19.92							
22.41							
		11	24.0'	6 5 8 8	Saturated medium dense green and brown fine to coarse sand w/ some silt.	A-2-4(0)	
24.9			26.0'		14" RECOVERY		
27.39		U-1	27.0'		Saturated medium dense green and brown clayey fine to coarse sand.	A-2-6(0)	Press Sample - Shelby Tube.
			29.0'		23" RECOVERY		
		12	29.0'	10 15 17 24	Saturated dense brown and green silty fine to coarse sand.	A-2-4(0)	
29.88			31.0'		24" RECOVERY		
32.37							
		13	34.0'	5 6 6 6	Saturated medium dense gray and green fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
34.86			36.0'		10" RECOVERY		
37.35							

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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: 25-113-01

Boring No.: BR2-3-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	3 4 7 7	Saturated medium dense gray fine sand w/ some silt and coarse sand.	A-2-4(0)	
			41.0'		18" RECOVERY		
42.33							
44.82		15	44.0'	9 9 15 14	Saturated medium dense green and gray fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			46.0'		14" RECOVERY		
47.31							
49.8		16	49.0'	6 7 13 17	Saturated medium dense green and gray fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			51.0'		16" RECOVERY		
52.29							
54.78		17	54.0'	6 16 20 37	Saturated dense gray fine sand w/ some coarse sand, gravel, and silt, trace of organic matter.	A-2-4(0)	
			56.0'		18" RECOVERY		
57.27							
59.76		18	59.0'	18 22 27 37	Saturated hard gray fine sandy silt w/ some organic matter and coarse sand, trace of clay and gravel.	A-6(3)	
			61.0'		24" RECOVERY		

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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

Boring No.: BR2-3-02

Contract: 25-113-01


Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
64.74		19	64.0'	29 50/3"	Visual Description: Saturated very dense gray fine to coarse sand w/ some silt. 6" RECOVERY No Sample Recovery 0" RECOVERY		Sample brought to GTA lab for pH testing.
		PH-1	65.0'	50/2"			
			65.0' 65.5'				
67.23							
69.72		20	69.0' 69.5'	50/2"	Visual Description: Saturated very dense gray clayey sand w/ gravel. 2" RECOVERY		No Sieve Analysis.
72.21							
74.7		21	74.0'	10 15 37 50/5"	Saturated very dense gray silty fine sand w/ some coarse sand, trace of gravel. 23" RECOVERY	A-2-4(0)	
			75.9'				
77.19					Boring terminated at 75.9 feet.		
79.68							
82.17							
84.66							


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KEY TO SYMBOLS


Symbol Description


Strata symbols


 Silty low plasticity clay

 Low plasticity clay

 Clayey sand

 Silty sand

 Poorly graded sand with silt

 Poorly graded sand with clay

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Notes:

1. Exploratory boring was drilled on 3/7/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75.
2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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 SPT 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

Boring No.: BR2-3-03

Contract: 25-113-01

Boring Location: Sta. 410+48.86, 79' Rt. C.L.

Boring Surface Elev.: 70.13

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	41.0'

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date						
3/3/08			8.0'	6.0'	6.4'	63.7 70.1 70.1 70.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	74.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver, Sr.
Helpers: A. Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	1.0'	3 4	Wet loose brown coarse to fine sand w/ some silt, trace of gravel. 12" RECOVERY	A-1-b	9" Cultivated Soils.
2.49		2	2.0'	3 5 6 7	Wet medium dense brown fine to coarse sand w/ some silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
4.98		3	4.0'	5 8 8 7	Wet medium dense brown fine to coarse sand, trace of silt and gravel. 18" RECOVERY	A-3	
7.47		4	6.0'	6 5 4 3	Saturated stiff brown fine to coarse sandy silt w/ some clay. 15" RECOVERY	A-4(0)	
9.96		5	8.0'	3 3 3 4	Saturated loose brown silty coarse to fine sand. 17" RECOVERY	A-2-4(0)	
12.45		6	10.0'	6 5 7 6	Saturated medium dense light brown silty fine to coarse sand. 20" RECOVERY	A-2-4(0)	
		7	12.0'	3 3 7 7	Saturated loose brown fine sand w/ some coarse sand and silt, trace of gravel. 19" RECOVERY	A-2-4(0)	
		8	14.0'	2 3 5 8	Saturated loose brown fine to coarse sand w/ some silt.	A-2-4(0)	

Remarks: Mud Rotary at 41.0'

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: 25-113-01

Boring No.: BR2-3-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		20" RECOVERY		
		9	16.0'	14 18 35 36	Saturated very dense brown coarse to fine sand and gravel w/ some silt.	A-1-b	
17.43			18.0'		18" RECOVERY		
		10	18.0'	18 15 21 27	Saturated dense red-brown clayey fine to coarse sand, trace of gravel.	A-2-6(0)	
19.92			20.0'		11" RECOVERY		
22.41							
		11	24.0'	7 10 11 14	Saturated medium dense brown and red-brown fine to coarse sand w/ some silt.	A-2-4(0)	
24.9			26.0'		15" RECOVERY		
27.39							
		12	29.0'	7 10 13 14	Saturated medium dense dark green and brown fine to coarse sand w/ some silt.	A-2-4(0)	
29.88			31.0'		17" RECOVERY		
32.37							
		13	34.0'	6 11 15 15	Saturated very stiff dark green fine sandy silt w/ some coarse sand.	A-4(0)	glaucinitic
34.86			36.0'		16" RECOVERY		
37.35							

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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: 25-113-01

Boring No.: BR2-3-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	7 10 13 19	Saturated medium dense dark green fine sand w/ some coarse sand, trace of silt.	A-3	glaucinitic
			41.0'		21" RECOVERY		
42.33							
44.82		15	44.0'	9 10 13 19	Saturated medium dense gray and green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	glaucinitic
			46.0'		20" RECOVERY		
47.31							
49.8		16	49.0'	6 10 13 18	Saturated medium dense gray and green fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	glaucinitic
			51.0'		22" RECOVERY		
52.29							
54.78		17	54.0'	4 6 9 10	Saturated medium dense gray and green silty fine to coarse sand, trace of gravel and seashells.	A-2-4(0)	glaucinitic
			56.0'		21" RECOVERY		
57.27							
59.76		18	59.0'	18 50	Saturated hard dark gray and green fine sandy silt w/ some organic matter, trace of coarse sand, gravel, clay, and seashells.	A-4(0)	
			60.0'		12" RECOVERY		

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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: 25-113-01

Boring No.: BR2-3-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
64.74		19	64.0' 65.0'	35 50/4"	Saturated very dense dark gray and green silty fine to coarse sand, trace of gravel and seashells. 12" RECOVERY	A-2-4(0)	
67.23							
69.72		20	69.0' 70.5'	16 35 50/5"	Saturated very dense dark gray and green silty fine to coarse sand, trace of gravel and seashells. 17" RECOVERY	A-2-4(0)	
72.21							
74.7		21	73.0' 74.0'	21 60	Saturated very dense gray silty fine sand w/ some coarse sand, trace of gravel. 12" RECOVERY Boring terminated at 74.0 feet.	A-2-4(0)	
77.19							
79.68							
82.17							
84.66							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand



Poorly graded clayey
silty sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/3/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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 SPT 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

Boring No.: BR2-3-04

Contract: 25-113-01

Boring Location: Sta. 410+89.10, 67' Lt. C.L.

Boring Surface Elev.: 68.33

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0'	To:
					30.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/1/08		6.0'	4.0'	4.5'	63.8 68.3 68.3 68.3

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	74.3	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: William Sharp
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	1.0'	3 3	Wet firm gray and orange mottled clayey coarse sandy silt w/ some fine sand, trace of gravel.	A-4(1)	10" Cultivated Soils.
2.49		2	2.0'	5 6 8 6	8" RECOVERY Wet medium dense gray silty coarse to fine sand w/ some gravel.	A-1-b	
4.98		3	4.0'	3 4	16" RECOVERY Wet loose gray and brown coarse to fine sand w/ some silt.	A-1-b	
7.47		4	6.0'	1 2 3 3	20" RECOVERY Saturated loose gray coarse to fine sand w/ some silt.	A-1-b	
9.96		5	8.0'	2 3 4 5	24" RECOVERY Saturated loose gray and orange coarse to fine sand w/ some silt.	A-1-b	
12.45		6	10.0'	2 3 4 6	21" RECOVERY Saturated loose orange coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
		7	12.0'	1 4 5 7	20" RECOVERY Saturated loose orange coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
		8	14.0'	5 8 11 10	22" RECOVERY Saturated medium dense orange coarse sand w/ some gravel and fine sand, trace of silt.	A-1-b	

Remarks: Mud Rotary at 30.0'

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: 25-113-01

Boring No.: BR2-3-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		19" RECOVERY		
		9	16.0'	3 5 6 9	Saturated medium dense orange coarse sand w/ some fine sand and gravel, trace of silt.	A-1-b	
17.43			18.0'		19" RECOVERY		
		10	18.0'	3 6 7 11	Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
19.92			20.0'		19" RECOVERY		
22.41							
		11	23.0'	1 4 7 9	Saturated medium dense brown fine to coarse sand w/ some silt.	A-2-4(0)	
24.9			25.0'		17" RECOVERY		
		U-1	25.0		Saturated medium dense brown clayey fine to coarse sand, trace of gravel.	A-2-7(1)	Press Sample - Shelby Tube.
			27.0'		24" RECOVERY		
27.39							
		12	28.0'	3 4 4 7	Saturated loose brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
29.88			30.0'		19" RECOVERY		
32.37							
		13	33.0'	2 6 7 7	Saturated medium dense dark green fine sand w/ some silt and coarse sand, trace of organic matter.	A-2-4(0)	
34.86			35.0'		15" RECOVERY		
37.35							
		14	38.0'	4 5	Saturated medium dense dark green fine sand	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: 25-113-01

Boring No.: BR2-3-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				6 10	w/ some silt and coarse sand.		
39.84			40.0'		24" RECOVERY		
42.33							
		15	43.0'	1 3 4 5	Saturated loose dark green fine sand w/ some silt, trace of coarse sand and organic matter.	A-2-4(0)	
44.82			45.0'		21" RECOVERY		
47.31							
		16	48.0'	4 6 8 9	Saturated medium dense dark green fine to coarse sand w/ some silt, trace of gravel and organic matter.	A-2-4(0)	
49.8			50.0'		17" RECOVERY		
52.29							
		17	53.0'	4 17 25 39	Saturated dense dark green clayey fine sand w/ some coarse sand, gravel, and organic matter.	A-2-4(0)	glauconitic
54.78			55.0'		23" RECOVERY		
57.27							
		18	58.0' 58.5'	50	Saturated very dense dark green silty fine to coarse sand, trace of gravel, organic matter, clay, and seashells.	A-2-5(0)	glauconitic
59.76					6" RECOVERY		

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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: 25-113-01

Boring No.: BR2-3-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
		19	63.0'	7 17 22 29	Saturated dense dark gray silty fine sand w/ some coarse sand, trace of gravel and organic matter.	A-2-4(0)	
64.74			65.0'		24" RECOVERY		
67.23							
		20	68.0'	10 20 30 43	Saturated dense dark gray fine sand w/ some silt and coarse sand, trace of gravel and organic matter.	A-2-4(0)	
69.72			70.0'		22" RECOVERY		
72.21							
		21	73.0'	12 22 50/4"	Saturated very dense green fine sand w/ some silt and coarse sand, trace of gravel and organic matter.	A-2-4(0)	glaucinitic
74.7			74.5'		14" RECOVERY Boring terminated at 74.3 feet.		
77.19							
79.68							
82.17							
84.66							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Well graded sand
with silt



Poorly graded sand



Clayey sand

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Notes:

1. Exploratory boring was drilled on 3/1/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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 SPT blow counts are uncorrected.

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

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

Boring No.: BR2-3-05

Contract: 25-113-01

Boring Location: Sta. 410+78, 74', Lt. C.L.

Boring Surface Elev.: + 68.4

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.

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

From Depth of:
From Depth of: 0.0
To:
To: 24.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
11/4/2009		8.0	6.0	3.8	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	100	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	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
	11/4/09	1	0.5'	2 5 6	Wet firm grayish orange mottled clayey coarse sandy silt w/some fine sand, trace of fine gravel.	A-4(1)	Cultivated Soil - 8".
		2	2.0'	7 13 13 15	Wet medium dense grayish orange mottled silty fine to coarse sand w/ trace of fine gravel.	A-2-4(0)	
3.75		3	4.0'	4 4 7 8	Saturated medium dense grayish orange coarse to fine sand w/some silt.	A-1-b	
		4	6.0'	2 2 2	Saturated medium dense orange coarse to fine sand w/some silt.	A-2-4(0)	
7.5		5	8.0'	5 13 12 12	Saturated very loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
		6	10.0'	6 11 14 14	Saturated medium dense orange coarse sand w/some fine sand and fine gravel, trace of silt.	A-1-b	
11.25		7	12.0'	11 12 14 19	Saturated medium dense orange coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	
		8	14.0'	11 10 10 9	Saturated medium dense brown fine gravel and coarse to fine sand w/ some silt.	A-2-4(0)	
15		9	16.0'	6 8 12 10	Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
		10	18.0'		Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
18.75			20.0'				

Remarks: Mud Rotary @ 24.0 feet

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

F.A. Project: US 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-3-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
22.5							
		11	24.0'	6 7 11 10	Saturated medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
26.25			26.0'		22" RECOVERY		
		12	29.0'	7 12 21 28	Saturated dense brown silty fine sand w/some coarse sand.	A-2-4(0)	
30			31.0'		16" RECOVERY		
		13	34.0'	5 7 12 13	Saturated medium dense green fine sand w/some coarse sand and silt, trace of organic matter.	A-2-4(0)	Glauconit
33.75			36.0'		19" RECOVERY		
		14	39.0'	7 5 8 9	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	Glauconit
37.5			41.0'		21" RECOVERY		
	11/5/09	15	44.0'	6 7 12 12	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	Glauconit
45			46.0'		21" RECOVERY		
		16	49.0'	16 12 12 13	Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter.	A-2-4(0)	
48.75			51.0'		18" RECOVERY		
		17	54.0'	25 32 46 50/4"	Saturated hard gray fine sandy clay w/some coarse sand and organic matter.	A-6(1)	
52.5			56.0'		24" RECOVERY		
56.25							

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

F.A. Project: US 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-3-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
60		18	59.0'	50/5"	Saturated dense gray silty fine to coarse sand w/trace of fine gravel and organic matter. 5" RECOVERY	A-2-4(0)	
			61.0'				
63.75							
		19	64.0'	14 14 28 32	Saturated dense gray fine to coarse sand w/trace of silt, fine gravel and organic matter. 24" RECOVERY	A-3	
			66.0'				
67.5							
		20	69.0'	14 22 38 50	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 24" RECOVERY	A-2-4(0)	
			71.0'				
71.25							
		21	74.0'	27 50/5"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 11" RECOVERY	A-2-4(0)	
			76.0'				
75							
		22	79.0'	24 50/5"	Saturated very dense gray fine sand w/some coarse sand and silt, trace of organic matter. 10" RECOVERY	A-2-4(0)	
			81.0'				
78.75							
		23	84.0'	5 32 50	Saturated hard gray silt w/some fine sand, trace of coarse sand and organic matter. 18" RECOVERY	A-4(0)	
			86.0'				
82.5							
		24	89.0'	25 50/5"	Saturated very dense gray fine sand w/some coarse sand, trace of silt and organic matter. 11" RECOVERY	A-3	
			91.0'				
90							

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AUGUST 2015

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

F.A. Project: US 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-3-05


Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
93.75							
		25	94.0'	16 22 25 43	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 21" RECOVERY	A-2-4(0)	
			96.0'				
97.5							
		26	99.0'	18 23 27 44	Saturated dense gray fine sand w/some silt, trace of coarse sand and organic matter. 24" RECOVERY	A-2-4(0)	
			101.0'				
101.25					End of Boring		
105							
108.75							
112.5							
116.25							
120							
123.75							
127.5							


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KEY TO SYMBOLS


Symbol Description


Strata symbols

 Silty low plasticity clay

 Silty sand

 Poorly graded sand with silt

 Well graded sand with silt

 Clayey sand

 Silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 11/4/2009 using a 3 1/4- inch diameter continuous flight power 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

Boring No.: BR2-4-01

Contract: 25-113-01

Boring Location: Sta. 307+19.68, 89' Lt. C.L.

Boring Surface Elev.: 64.00

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	29.0'

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date			12.0'	10.0'	9.7'	54.3
3/5/08						64.0
						64.0
						64.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	76.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;		Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Billy Holden
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	11 7 7 7	Moist stiff brown clayey fine sandy silt w/ some coarse sand and gravel.	A-4(2)	
			2.0'		19" RECOVERY		
2.49		2	2.0'	7 7 8 9	Moist medium dense brown and orange fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
			4.0'		18" RECOVERY		
4.98		3	4.0'	2 4 8 7	Wet medium dense light brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
			6.0'		16" RECOVERY		
7.47		4	6.0'	9 9 9 8	Wet medium dense light brown fine to coarse sand w/ some clay, trace of gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
9.96		5	8.0'	3 3 3 2	Wet loose light brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
			10.0'		18" RECOVERY		
		6	10.0'	2 2 2 2	Wet very loose light brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			12.0'		16" RECOVERY		
12.45		7	12.0'	2 3 3 2	Saturated loose light brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	

Remarks: Mud Rotary at 29.0'

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: 25-113-01

Boring No.: BR2-4-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	4 4 3 4	14" RECOVERY Saturated loose light brown coarse to fine sand w/ some gravel and silt.	A-1-b	
17.43		9	16.0' 16.0'	3 5 4 2	14" RECOVERY Saturated loose light brown coarse sand w/ some gravel, fine sand, and silt.	A-1-b	
19.92		10	18.0' 18.0' 20.0'	3 5 5 6	18" RECOVERY Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel. 24" RECOVERY	A-2-4(0)	
22.41							
24.9		11	24.0' 26.0'	4 6 10 11	Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
27.39							
29.88		12	28.0' 30.0'	7 9 11 14	Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
32.37							
34.86		13	34.0' 36.0'	9 11 12 14	Saturated medium dense brown and green silty fine sand w/ some coarse sand. 20" RECOVERY	A-2-4(0)	
37.35							

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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: 25-113-01

Boring No.: BR2-4-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	8 8 11 12	Saturated medium dense brown and green fine sand w/ some silt and coarse sand.	A-2-4(0)	
			41.0'		16" RECOVERY		
42.33							
44.82		15	44.0'	10 10 12 14	Saturated medium dense brown and green silty fine sand w/ some coarse sand.	A-2-4(0)	
			46.0'		20" RECOVERY		
47.31							
49.8		16	49.0'	9 12 14 13	Saturated medium dense brown and green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			51.0'		18" RECOVERY		
52.29							
54.78		17	54.0'	7 11 11 14	Saturated medium dense brown and green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			56.0'		16" RECOVERY		
57.27							
59.76		18	59.0'	12 19 26 23	Saturated dense dark gray and green silty fine sand, trace of coarse sand.	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: 25-113-01

Boring No.: BR2-4-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		18" RECOVERY		
62.25							
		19	64.0'	12 13 17 20	Saturated medium dense dark gray and green silty fine sand, trace of coarse sand.	A-2-4(0)	
64.74			66.0'		18" RECOVERY		
67.23							
		20	69.0'	10 12 16 21	Saturated medium dense dark gray and green silty fine sand, trace of coarse sand.	A-2-4(0)	
69.72			71.0'		22" RECOVERY		
72.21							
		21	74.0'	15 19 27 50	Saturated dense dark gray and green silty fine sand w/ some coarse sand and gravel, trace of organic matter.	A-2-4(0)	
74.7			76.0'		24" RECOVERY		
					Boring terminated at 76.0 feet.		
77.19							
79.68							
82.17							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded clayey
silty sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/4/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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 SPT 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

Boring No.: BR2-4-01A

Contract: 25-113-01

Boring Location: Sta 307+19.38, 89' Lt. C.L.

Boring Surface Elev.: + 64.57

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split-Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4"	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 98.0	

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/27/2009		53.0'	51.0'	13.0'	
3/28/2009		53.0'	51.0'	10.9'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	100.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: David Burt

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
52.5	3/27/09	1	51.0'	3 5 7 9	Wet medium dense dark grayish green silty fine sand w/trace of coarse sand and gravel.	A-2-4(0)	Glauconitic
			53.0'		24" RECOVERY		
56							
59.5							
63		2	61.0'	9 13 20 77	Wet dense dark grayish green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	Glauconitic
			63.0'		23" RECOVERY		
66.5							
70							

Remarks: Blank augered 51.0'.

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: 25-113-01

Boring No.: BR2-4-01A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		3	71.0'	17 30 49 50/4"	Wet very dense dark grayish green fine sand w/some silt, trace of coarse sand and organic matter. 22" RECOVERY	A-2-4(0)	Glauconitic
73.5			73.0'				
		4	74.0'	14 24 31 50/4"	Wet very dense dark grayish green silty fine sand w/some gravel and coarse sand, trace of organic matter. 22" RECOVERY	A-2-4(0)	Glauconitic
77			76.0'				
		5	81.0'	47 51 50/3"	Wet very dense dark grayish green fine to coarse sand w/some silt, trace of organic matter and gravel. 14" RECOVERY	A-2-4(0)	Glauconitic
80.5			82.5'				
		6	84.0'	15 21 33 59	Wet very dense dark gray silty fine to coarse sand w/some organic matter, trace of gravel. 24" RECOVERY	A-2-4(0)	
84			86.0'				
		7	89.0'	38 36 56 50/1"	Wet very dense dark gray clayey fine sand w/ some coarse sand and gravel, trace of organic matter. 19" RECOVERY	A-2-6(0)	
87.5			90.6'				
		8	94.0'	10 10 24 40	Wet dense dark gray silty fine sand w/some coarse sand, trace of organic matter and gravel. 24" RECOVERY	A-2-4(0)	
91			96.0'				
		9	98.0'	13 18 38 50/4"	Wet very dense gray and white fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
94.5			99.8'		End of Boring 22" RECOVERY		
98							
101.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 3/24/2009 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

Boring No.: BR2-4-02

Contract: 25-113-01

Boring Location: Sta. 307+12.33, at C.L.

Boring Surface Elev.: 64.00

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	To:
	Hollow Stem Auger:		From Depth of:	To:

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/6/08		16.0'	14.0'	14.0'	50.0 64.0 64.0 64.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	76.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Billy Hurd
Helpers: W. Hurd

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	5 5 4 6	Moist stiff brown clayey silt w/ some fine to coarse sand, trace of gravel.	A-4(3)	
			2.0'		22" RECOVERY		
2.49		2	2.0'	5 7 14 14	Moist medium dense brown fine to coarse sand w/ some clay, trace of gravel.	A-2-4(0)	
			4.0'		20" RECOVERY		
4.98		3	4.0'	5 14 12 8	Moist medium dense brown silty fine to coarse sand.	A-2-4(0)	
			6.0'		20" RECOVERY		
7.47		4	6.0'	10 11 12 11	Moist medium dense brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
			8.0'		24" RECOVERY		
9.96		5	8.0'	4 6 5 5	Moist medium dense brown coarse to fine sand w/ some silt.	A-1-b	
			10.0'		22" RECOVERY		
12.45		6	10.0'	3 3 3 2	Wet loose brown silty fine sand w/ some coarse sand.	A-2-4(0)	
			12.0'		20" RECOVERY		
		7	12.0'	2 2 4 4	Wet loose brown silty fine to coarse sand w/ some 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: 25-113-01

Boring No.: BR2-4-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	2 2 3 2	15" RECOVERY Saturated loose brown coarse sand w/ some gravel and silt, trace of fine sand.	A-1-b	
17.43		9	16.0' 16.0'	3 3 3 4	16" RECOVERY Saturated loose brown coarse sand w/ some silt, trace of fine sand and gravel.	A-1-b	
19.92		10	18.0' 18.0'	1 2 1 2	24" RECOVERY Saturated very loose brown fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
22.41			20.0'		24" RECOVERY		
24.9		11	24.0'	5 11 13 11	Saturated medium dense brown and green silty fine to coarse sand w/ some gravel.	A-2-4(0)	
27.39			26.0'		18" RECOVERY		
29.88		12	29.0'	6 10 14 18	Saturated medium dense brown and green fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
32.37			31.0'		18" RECOVERY		
34.86		13	34.0'	10 10 15 17	Saturated medium dense brown and green fine sand w/ some coarse sand and silt.	A-2-4(0)	
37.35			36.0'		20" RECOVERY		

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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: 25-113-01

Boring No.: BR2-4-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	7 8 8 9	Saturated medium dense brown and green fine sand w/ some silt and coarse sand.	A-2-4(0)	
			41.0'		18" RECOVERY		
42.33							
44.82		15	44.0'	7 8 9 11	Saturated medium dense brown and green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			46.0'		20" RECOVERY		
47.31							
49.8		16	49.0'	9 13 14 14	Saturated medium dense green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			51.0'		20" RECOVERY		
52.29							
54.78		17	54.0'	6 9 11 12	Saturated medium dense dark green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			56.0'		20" RECOVERY		
57.27							
59.76		18	59.0'	11 19 23 26	Saturated dense dark green silty fine sand, trace of coarse sand.	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: 25-113-01

Boring No.: BR2-4-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		20" RECOVERY		
62.25							
		19	64.0'	11 16 18 23	Saturated dense dark gray and green silty fine sand, trace of coarse sand.	A-2-4(0)	
64.74			66.0'		20" RECOVERY		
67.23							
		20	69.0'	9 13 18 20	Saturated dense dark gray and green silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
69.72			71.0'		20" RECOVERY		
72.21							
		21	74.0'	18 18 29 35	Saturated dense dark gray and green silty fine sand w/ some gravel and coarse sand, trace of organic matter.	A-2-4(0)	
74.7			76.0'		16" RECOVERY		
					Boring terminated at 76.0 feet.		
77.19							
79.68							
82.17							

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/6/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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 SPT 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

Boring No.: BR2-4-03

Contract: 25-113-01

Boring Location: Sta. 307+09.51, 89' Rt. C.L.

Boring Surface Elev.: 64.00

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 29.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/7/08		12.0'	10.0'	10.0'	54.0
						64.0
						64.0
						64.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	75.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Billy Hurd
Helpers: W. Hurd

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	2 3 5 6	Wet firm light brown clayey silt w/ some fine to coarse sand, trace of gravel.	A-4(2)	
			2.0'		18" RECOVERY		
2.49		2	2.0'	7 6 6 8	Wet stiff light brown clayey fine sandy silt w/ some coarse sand and gravel.	A-4(0)	
			4.0'		18" RECOVERY		
4.98		3	4.0'	5 8 7 7	Wet medium dense light brown silty coarse to fine sand, trace of gravel.	A-1-b	
			6.0'		20" RECOVERY		
7.47		4	6.0'	6 7 7 8	Wet medium dense light brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			8.0'		24" RECOVERY		
9.96		5	8.0'	5 6 5 3	Wet medium dense light brown coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
			10.0'		24" RECOVERY		
12.45		6	10.0'	1 2 1 1	Saturated very loose light brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			12.0'		16" RECOVERY		
		7	12.0'	1 1 1 1	Saturated very loose light brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	

Remarks: Mud Rotary at 29.0'

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: 25-113-01

Boring No.: BR2-4-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	1 1 1 1	22" RECOVERY Saturated very loose light brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
17.43		9	16.0' 16.0'	1 1 2 3	24" RECOVERY Saturated very loose light brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
19.92		10	18.0' 18.0'	2 3 3 3	24" RECOVERY Saturated loose light brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
22.41			20.0'		24" RECOVERY		
24.9		11	24.0'	22 18 18 14	Saturated dense light brown fine to coarse sand w/ some gravel and silt.	A-1-b	
27.39			26.0'		22" RECOVERY		
29.88		12	29.0'	13 11 9 8	Saturated medium dense brown and green coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
32.37			31.0'		20" RECOVERY		
34.86		13	34.0'	10 9 11 10	Saturated medium dense brown and green fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
37.35			36.0'		20" RECOVERY		

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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: 25-113-01

Boring No.: BR2-4-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	10 12 12 14	Saturated medium dense brown and green silty fine sand w/ some coarse sand.	A-2-4(0)	
			41.0'		22" RECOVERY		
42.33							
44.82		15	44.0'	9 10 13 15	Saturated medium dense brown and green fine sand w/ some silt and coarse sand.	A-2-4(0)	
			46.0'		18" RECOVERY		
47.31							
49.8		16	49.0'	9 11 14 18	Saturated medium dense brown and green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			51.0'		22" RECOVERY		
52.29							
54.78		17	54.0'	8 10 11 10	Saturated medium dense brown and green to dark gray and green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			56.0'		22" RECOVERY		
57.27							
59.76		18	59.0'	8 10 10 14	Saturated medium dense dark gray and green fine sand w/ some silt, trace of coarse sand.	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: 25-113-01

Boring No.: BR2-4-03


Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		22" RECOVERY		
62.25							
		19	64.0'	7 11 15 20	Saturated very stiff dark gray and green fine sandy silt, trace of coarse sand.	A-4(0)	
64.74			66.0'		24" RECOVERY		
67.23							
		20	69.0'	7 10 14 16	Saturated medium dense dark gray and green fine sand w/ some gravel and coarse sand, trace of silt and organic matter.	A-3	
69.72			71.0'		24" RECOVERY		
72.21							
		21	74.0'	19 50	Saturated very dense dark gray and green fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	
74.7			75.0'		12" RECOVERY		
					Boring terminated at 75.0 feet.		
77.19							
79.68							
82.17							


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
KEY TO SYMBOLS


Symbol Description


Strata symbols

 Silty low plasticity clay

 Clayey sand

 Silty sand

 Poorly graded sand with silt

 Poorly graded sand

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Notes:

1. Exploratory boring was drilled on 3/7/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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 SPT 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

Boring No.: BR2-4-03A

Contract: 25-113-01

Boring Location: Sta. 307+09.51, 89' Rt. C.L.

Boring Surface Elev.: + 63.32

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split-Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4"	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 98.0	

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/24/2009		53.0'	51.0'	13.0'	
3/25/2009		53.0'	51.0'	10.9'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	100.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: David Burt

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
52.5	3/24/09	1	51.0'	6 8 8 9	Wet medium dense green silty fine sand w/ trace of coarse sand and gravel.	A-2-4(0)	Glauconitic
			53.0'		22" RECOVERY		
56							
59.5							
63		2	61.0'	11 11 16 18	Wet medium dense green fine sand w/some silt, trace of coarse sand and gravel.	A-2-4(0)	Glauconitic
			63.0'		24" RECOVERY		
66.5							
70							

Remarks: Blank augered to 51.0'.

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: 25-113-01

Boring No.: BR2-4-03A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		3	71.0'	11 16 18 22	Wet dense greenish gray fine sand w/some silt, trace of coarse sand and gravel.	A-2-4(0)	Glauconitic
73.5			73.0'		24" RECOVERY		
77							
80.5							
		4	81.0'	40 50/4"	Wet very dense greenish gray silty fine to coarse sand w/trace of gravel.	A-2-4(0)	Glauconitic
			83.0'		10" RECOVERY		
84							
		5	84.0'	8 14 26 47	Wet dense greenish gray fine sand w/some silt, coarse sand and organic matter, trace of gravel.	A-2-4(0)	Glauconitic
			86.0'		24" RECOVERY		
87.5							
		6	89.0'	13 15 35 46	Wet dense greenish gray clayey fine to coarse sand w/trace of organic matter and gravel.	A-2-6(0)	Glauconitic
			91.0'		24" RECOVERY		
91							
94.5		7	94.0'	16 33 50/4"	Wet very dense greenish gray silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	Glauconitic
			95.5'		16" RECOVERY		
98							
		8	98.0'	28 48 50/3"	Wet very dense greenish gray fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	Glauconitic
			99.3'		15" RECOVERY		
					End of Boring		
101.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Clayey sand

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Notes:

1. Exploratory borings were drilled on 3/27/2009 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 SR-1

Boring No.: BR2-4-04

Contract: 25-113-01

Boring Location: STA. 347+49 65' Lt. C.L.

Boring Surface Elev.: + 64.53

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 24.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/3/11		24.0	24.0	13.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	100.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
25.9	1/3/11	1	24.0'	9 8 8	Saturated medium dense orangish brown fine to coarse sand w some fine gravel and silt. 18" RECOVERY	A-2-4(0)	Asphalt - 8". Blank augered to 24.0' per boring request sheet.
29.6		2	29.0' 31.0'	12 12 14 15	Saturated medium dense orangish brown fine sand w/some coarse sand and silt, trace of fine gravel. 18" RECOVERY	A-2-4(0)	
33.3		3	34.0' 36.0'	8 10 11	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of fine gravel. 17" RECOVERY	A-2-4(0)	
40.7		4	39.0' 41.0'	9 9 10	Saturated medium dense orangish green fine sand w/some silt and coarse sand. 20" RECOVERY	A-2-4(0)	
44.4		5	44.0'	10 10	Saturated medium dense green fine sand w/	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301 Maryland State Line to SR-1
Contract: 25-113-01

Boring No.: BR2-4-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'	12 12	some silt, trace of coarse sand. 19" RECOVERY		
48.1							
		6	49.0'	6 8 9 9	Saturated medium dense green fine sand w/ some silt, trace of coarse sand and fine gravel. 22" RECOVERY	A-2-4(0)	
			51.0'				
51.8							
		7	54.0'	9 8 8 8	Saturated medium dense green fine sand w/ trace of silt, coarse sand and fine gravel. 15" RECOVERY	A-3	
			56.0'				
55.5							
59.2							
		8	59.0'	8 10 12 14	Saturated medium dense green fine sand w/ trace of coarse sand and silt. 22" RECOVERY	A-3	
			61.0'				
62.9							
	1/4/11	9	64.0'	7 13 21 23	Saturated dense green fine sand w/some silt, trace of coarse sand. 20" RECOVERY	A-2-4(0)	
			66.0'				
66.6							
		10	69.0'	7 13 16 25	Saturated medium dense green fine sand w/ some silt, trace of coarse sand and fine gravel. 21" RECOVERY	A-2-4(0)	
			71.0'				
70.3							
74							
		11	74.0'	14 32 50/5"	Saturated very dense green fine sand w/some fine gravel, coarse sand and silt, trace of shell fragments. 16" RECOVERY	A-2-4(0)	
			76.0'				
77.7							
		12	79.0'	21	Saturated very dense green fine to coarse sand	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 SR-1
Contract: 25-113-01

Boring No.: BR2-4-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
81.4			81.0'	36 41 50/3"	w/some silt, trace of fine gravel and shell fragments. 20" RECOVERY		
85.1		13	84.0' 86.0'	16 21 29 39	Saturated hard green fine sandy clay w/some coarse sand and silt, trace of fine gravel and shell fragments. 22" RECOVERY	A-6(1)	
88.8							
92.5		14	89.0' 91.0'	50/4"	Saturated dense green silty fine to coarse sand w/some fine gravel, trace of shell fragments. 4" RECOVERY	A-2-4(0)	
96.2		15	94.0' 96.0'	31 39 45 50/1"	Saturated very dense gray silty fine sand w/ some coarse sand, trace of fine gravel and shell fragments. 19" RECOVERY	A-2-4(0)	
99.9		16	98.0' 100.0'	24 41 50/2"	Saturated very dense gray silty fine sand w/ some coarse sand, trace of fine gravel. 14" RECOVERY	A-2-4(0)	
103.6					End of Boring		
107.3							
111							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt



Clayey sand

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Notes:

1. Exploratory borings were drilled on January 3, 2011 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: U.S. 301 Maryland State Line to SR-1

Boring No.: BR2-4-05

Contract: 25-113-01

Boring Location: STA 348+00.0' C.L.

Boring Surface Elev.: + 65.15

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 24.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 1/3/11	Time	24.0	24.0	14.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	100.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
25.9	1/3/11	1	24.0'	5 6 9 11	Wet medium dense orange coarse sand w/ some fine sand, fine gravel and silt. 15" RECOVERY	A-1-b	Topsoil - 6". Blank augered to 24.0' then started sampling. Mud Rotary @ 24.0'.
29.6		2	29.0'	10 8 8 10	Wet medium dense brownish green silty fine to coarse sand w/trace of fine gravel. 16" RECOVERY	A-2-4(0)	
33.3			31.0'				
37		3	34.0'	8 11 9 10	Wet very stiff brownish green fine sandy silt w/trace of coarse sand and fine gravel. 18" RECOVERY	A-4(0)	
40.7			36.0'				
44.4		4	39.0'	8 9 10 12	Wet very stiff brownish green fine sandy silt w/trace of coarse sand. 17" RECOVERY	A-4(0)	
			41.0'				
		5	44.0'	7 9	Wet medium dense brownish green fine sand	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301 Maryland State Line to SR-1
Contract: 25-113-01

Boring No.: BR2-4-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'	11 12	w/some silt, trace of coarse sand. 21" RECOVERY		
48.1							
		6	49.0'	7 8 12 14	Wet medium dense brownish green fine sand w/some silt, trace of coarse sand. 21" RECOVERY	A-2-4(0)	
			51.0'				
51.8							
		7	54.0'	6 8 12 14	Wet medium dense green fine sand w/trace of silt and coarse sand. 19" RECOVERY	A-3	
			56.0'				
55.5							
		8	59.0'	8 12 17 22	Wet medium dense green fine sand w/trace of coarse sand and silt. 24" RECOVERY	A-3	
			61.0'				
59.2							
		9	64.0'	9 15 17 21	Wet dense green fine sand w/some silt and coarse sand. 22" RECOVERY	A-2-4(0)	
			66.0'				
62.9							
		10	69.0'	8 10 16 20	Wet medium dense green fine sand w/some silt, trace of coarse sand and fine gravel. 21" RECOVERY	A-2-4(0)	
			71.0'				
66.6							
		11	74.0'	15 25 61	Wet very dense green fine to coarse sand w/ some fine gravel and silt, trace of organic matter. 16" RECOVERY	A-2-4(0)	
			76.0'				
70.3							
74							
77.7							
	1/4/11	12	79.0'	14	Wet dense green fine to coarse sand w/some	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 SR-1
Contract: 25-113-01

Boring No.: BR2-4-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
81.4			81.0'	18 29 35	silt, trace of fine gravel. 20" RECOVERY		
85.1		13	84.0' 86.0'	20 22 42 50/3"	Wet very dense green clayey fine sand w/ some coarse sand and silt, trace of fine gravel. 18" RECOVERY	A-2-4(0)	
88.8							
92.5		14	89.0' 91.0'	42 50/4"	Wet very dense green clayey fine to coarse sand w/some silt and fine gravel. 10" RECOVERY	A-2-5(0)	
96.2		15	94.0' 96.0'	12 20 42 50/4"	Wet very dense gray silty fine sand w/some coarse sand, trace of fine gravel. 20" RECOVERY	A-2-4(0)	
99.9		16	98.0' 100.0'	16 21 30 50/4"	Wet very dense gray silty fine to coarse sand w/trace of fine gravel. 20" RECOVERY	A-2-4(0)	
103.6					End of Boring		
107.3							
111							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on January 3, 2011 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: U.S. 301 Maryland State Line to SR-1

Boring No.: BR2-4-06

Contract: 25-113-01

Boring Location: STA. 347+89 65' Rt. C.L.

Boring Surface Elev.: + 64.94

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: 24.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
1/4/11		24.0	24.0	13.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	100.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
25.9	1/4/11	1	24.0'	6 6 10 12	Wet medium dense orange fine gravelly coarse sand w/trace of fine sand and silt. 12" RECOVERY	A-1-b	Topsoil - 8". Blank augered to 24.0' then started sampling. Mud Rotary @ 24.0'.
29.6		2	29.0'	7 10 10 13	Wet medium dense brown fine to coarse sand w/some silt. 17" RECOVERY	A-2-4(0)	
33.3			31.0'				
37		3	34.0'	10 18 18 21	Wet dense brown fine sand w/some coarse sand and silt, trace of fine gravel. 20" RECOVERY	A-2-4(0)	
40.7			36.0'				
44.4		4	39.0'	9 10 12 13	Wet medium dense brownish green fine sand w/some coarse sand and silt. 19" RECOVERY	A-2-4(0)	
			41.0'				
		5	44.0'	10 11	Wet medium dense brownish green fine sand	A-3	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301 Maryland State Line to SR-1
Contract: 25-113-01

Boring No.: BR2-4-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'	16 18	w/some coarse sand, trace of silt. 22" RECOVERY		
48.1							
		6	49.0'	10 10 10 14	Wet medium dense brownish green fine sand w/some silt, trace of coarse sand. 20" RECOVERY	A-2-4(0)	
			51.0'				
51.8							
	1/5/11	7	54.0'	4 7 8 11	Wet medium dense green fine sand w/some silt, trace of coarse sand. 19" RECOVERY	A-2-4(0)	
			56.0'				
55.5							
		8	59.0'	8 9 12 16	Wet medium dense green fine sand w/trace of coarse sand, silt and fine gravel. 20" RECOVERY	A-3	
			61.0'				
59.2							
		9	64.0'	8 15 23 27	Wet dense green fine sand w/some silt, trace of coarse sand. 21" RECOVERY	A-2-4(0)	
			66.0'				
62.9							
		10	69.0'	11 13 18 23	Wet dense green fine sand w/some silt, trace of coarse sand. 21" RECOVERY	A-2-4(0)	
			71.0'				
70.3							
		11	74.0'	28 50/3"	Wet very dense greenish gray fine sand w/ some fine gravel and silt, trace of coarse sand and shell fragments. 9" RECOVERY	A-2-4(0)	
			76.0'				
74							
		12	79.0'	18	Wet hard green coarse sandy silt w/some fine	A-4(0)	
77.7							

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

F.A. Project: U.S. 301 Maryland State Line to SR-1
Contract: 25-113-01

Boring No.: BR2-4-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
81.4			81.0'	23 28 44	sand, trace of fine gravel. 22" RECOVERY		
85.1		13	84.0' 86.0'	16 28 38 44	Wet very dense green silty fine to coarse sand w/some fine gravel, trace of shell fragments. 22" RECOVERY	A-2-4(0)	
88.8							
92.5		14	89.0' 91.0'	50/4"	Wet dense gray fine sandy fine gravel w/some coarse sand and silt, trace of shell fragments.	A-1-b	
96.2		15	94.0' 96.0'	18 27 50/5"	Wet very dense gray silty fine sand w/some coarse sand, trace of fine gravel and shell fragments. 16" RECOVERY	A-2-4(0)	
99.9		16	98.0' 100.0'	20 25 50 50/2"	Wet very dense gray fine sand w/some coarse sand and silt, trace of fine gravel and shell fragments. 17" RECOVERY	A-2-4(0)	
103.6					End of Boring		
107.3							
111							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded sand



Silty sand



Poorly graded sand
with silt



Silt

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Notes:

1. Exploratory borings were drilled on January 4, 2011 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01
Boring Location: Sta. 275+23.63, 83.00' Rt. C.L.
Boring Surface Elev.: + 42.63

Boring No.: BR2-5-03A

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split-Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Reference:

Casing Size: 3 1/4"	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 24.0	

Water Level Readings					
Date 3/5/2009	Time	Depth of Hole 24.0	Depth of Casing 24.0	Depth of Water 3.0	Elev. of Water

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 95.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 Dia. U-Sample Boring: Ft.
 No. of U-Samples:
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/5/09	1	49.0'	5 9 11 13	No Sieve Analysis - pH sample retained by GTA. 21" RECOVERY		
			51.0'				
52.5							
56							
59.5		2	59.0'	7 11 12 18	No Sieve Analysis - pH sample retained by GTA. 20" RECOVERY		
			61.0'				
63							
66.5							

Remarks: Mud Rotary @ 24.0 feet. Sampling started at 49.0 feet.

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: 25-113-01

Boring No.: BR2-5-03A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks	
70		3	69.0'	10 16 21 23	Wet dense greenish gray fine to coarse sand w/some silt, trace of gravel. 21" RECOVERY	A-2-4(0)		
			71.0'		No Sieve Analysis - pH sample retained by GTA. 20" RECOVERY			
			4	71.0'	12 15 25 20			
73.5				73.0'				
	3/6/09	5	74.0' 75.2'	14 42 50/2"	Wet very dense gray clayey gravel and fine sand w/some coarse sand. 14" RECOVERY	A-2-7(0)		
77								
		6	79.0'	10 14 24 33	Wet dense gray clayey fine sand w/some coarse sand, trace of gravel. 24" RECOVERY	A-2-4(0)		
80.5			81.0'		No Sieve Analysis - pH sample retained by GTA. 24" RECOVERY			
		7	81.0'	8 11 25 33				
			83.0'					
84		8	84.0'	15 18 28 38	Wet dense gray clayey fine sand w/some coarse sand, trace of gravel. 24" RECOVERY	A-2-4(0)		
			86.0'					
87.5								
		9	89.0'	13 23 40 50/4"	Wet very dense gray fine sand w/some coarse sand and silt, trace of gravel. 22" RECOVERY	A-2-4(0)		
91			91.0'					
		10	94.0' 95.0'	35 50	Wet very dense gray silty fine sand w/some coarse sand, trace of gravel. 12" RECOVERY	A-2-4(0)		
94.5					End of Boring			
98								
101.5								

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Clayey sand



Poorly graded clayey
silty sand

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Notes:

1. Exploratory borings were drilled on 3/5/2009 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: 25-113-01
Boring Location: Sta. 271+96.94, 67.00' Lt. C.L.
Boring Surface Elev.: + 42.67

Boring No.: BR2-5-05A

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split-Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Reference:

Casing Size: 3 1/4"	Inches	From Depth of:	0.0	To:	14.0
Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
2/27/2009		14.0	14.0	Dry	
3/5/2009		50.0	14.0	4.4	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 95.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 Dia. U-Sample Boring: Ft.
 No. of U-Samples: ;
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/4/09	1	49.0'	7 10 13 18	No Sieve Analysis - pH sample retained by GTA.		
			51.0'		20" RECOVERY		
52.5							
56							
59.5		2	59.0'	9 11 17 31	No Sieve Analysis - pH sample retained by GTA.		
			61.0'		24" RECOVERY		
63							
66.5							

Remarks: Mud Rotary @ 14.0 feet. Sampling started at 49.0 feet.

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: 25-113-01

Boring No.: BR2-5-05A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
70		3	69.0'	5 10 16 24	wet medium dense gray silty fine to coarse sand w/some organic matter, trace of gravel. 24" RECOVERY	A-2-4(0)	
			71.0'				
		4	71.0'	16 29 41 59/5"	No Sieve Analysis - pH sample retained by GTA. 22" RECOVERY		
73.5			73.0'				
		5	74.0'	10 17 22 27	Wet hard gray organic clayey fine sandy silt w/some coarse sand, trace of gravel. 24" RECOVERY	A-4(0)	
			76.0'				
77							
		6	79.0'	15 20 26 50/5"	Wet dense gray silty fine sand w/some coarse sand, trace of organic matter and gravel. 23" RECOVERY	A-2-4(0)	
80.5			81.0'				
		7	81.0'	12 13 24 50/3"	No Sieve Analysis - pH sample retained by GTA. 20" RECOVERY		
			83.0'				
84							
		8	84.0'	11 18 24 50/4"	Wet dense gray silty fine sand w/some coarse sand, trace of gravel. 22" RECOVERY	A-2-4(0)	
			86.0'				
87.5							
		9	89.0'	14 20 37 50/5"	Wet very dense gray fine sand w/some coarse sand and silt, trace of gravel. 23" RECOVERY	A-2-4(0)	
			91.0'				
91							
		10	94.0' 95.0'	20 50	Wet very dense gray fine sand w/some silt and coarse sand, trace of gravel. 12" RECOVERY	A-2-4(0)	
94.5							
					End of Boring		
98							
101.5							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Clayey sand

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Notes:

1. Exploratory borings were drilled on 2/27/2009 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

Boring No.: BR2-7-01

Contract: 25-113-01

Boring Location: Sta. 264+95.39, 284' Lt. C.L.

Boring Surface Elev.: 38.30

Reference:

Wt. of Casing Hammer:		Lbs.		Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.		Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.		O.D. of Sampler: 2		IN.
S-Sampler:		O.D.		O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.		O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.		O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 25.0'	

Water Level Readings					
Date 3/2/08	Time	Depth of Hole 6.0'	Depth of Casing 4.0'	Depth of Water 3.2'	Elev. of Water
					35.1
					38.3
					38.3
					38.3

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 73.3	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	Ft.;		No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;		Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Billy Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	2 2 1	Wet very loose brown silty fine to coarse sand w/ some gravel.	A-2-4(0)	4" Forest Duff.
			2.0'		5" RECOVERY		
2.49		2	2.0'	2 3 3 4	Saturated loose brown fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
			4.0'		11" RECOVERY		
4.98		3	4.0'	4 6 6 6	Saturated medium dense brown fine to coarse sand, trace of silt and gravel.	A-3	
			6.0'		16" RECOVERY		
		4	6.0'	5 6 6 7	No Sample Recovery.		
7.47			8.0'		0" RECOVERY		
		5	8.0'	5 7 9 11	Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-3	
			10.0'		18" RECOVERY		
9.96		6	10.0'	6 9 10 13	Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			12.0'		24" RECOVERY		
12.45		7	12.0'	1 3 8 12	Saturated medium dense brown fine to coarse sand, trace of silt.	A-3	
			14.0'		15" RECOVERY		
		8	14.0'	3 5	Saturated medium dense brown fine to coarse	A-3	

Remarks: Mud Rotary at 25.0'

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: 25-113-01

Boring No.: BR2-7-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94				8 10	sand, trace of silt and gravel.		
			16.0'		18" RECOVERY		
		9	16.0'	6 8 11 12	Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
17.43			18.0'		24" RECOVERY		
		10	18.0'	5 8 10 11	Saturated medium dense light brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
19.92			20.0'		15" RECOVERY		
22.41							
		U-1	23.0'		Saturated medium dense light brown and green fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	Press Sample - Shelby Tube.
24.9			25.0'		24" RECOVERY		
		11	25.0'	8 9 10 13	Saturated medium dense green fine to coarse sand, trace of silt.	A-3	glaucous.
			27.0'		24" RECOVERY		
27.39							
		12	28.0'	8 10 14 14	Saturated medium dense green fine sand w/ some coarse sand and silt.	A-2-4(0)	glaucous
29.88			30.0'		18" RECOVERY		
32.37							
		13	33.0'	9 10 14 15	Saturated medium dense green fine sand w/ some silt and coarse sand.	A-2-4(0)	glaucous
34.86			35.0'		20" RECOVERY		
37.35							

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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: 25-113-01

Boring No.: BR2-7-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	38.0'	8 11 13 13	Saturated medium dense gray and green fine sand w/ some coarse sand and silt.	A-2-4(0)	Sample brought to GTA lab for pH testing.
39.84		PH-1	40.0'		12" RECOVERY Visual Description: Saturated medium dense gray and green fine sand w/ some coarse sand and silt.		
			42.0'		12" RECOVERY		
42.33							
		15	43.0'	8 13 15 14	Saturated medium dense gray and green fine sand, trace of silt and coarse sand.	A-3	
			45.0'		14" RECOVERY		
44.82							
47.31							
		16	48.0'	9 12 14 16	Saturated medium dense gray fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			50.0'		14" RECOVERY		
49.8							
52.29							
		17	53.0'	9 13 17 13	Saturated medium dense gray fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			55.0'		18" RECOVERY		
54.78							
57.27							
		18	58.0'	15 18 19 21	Saturated dense dark brown (black) silty fine sand w/ some coarse sand and organic matter, trace of gravel.	A-2-4(0)	
			60.0'		20" RECOVERY		
59.76							

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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: 25-113-01

Boring No.: BR2-7-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
		19	63.0'	17 17 17 24	Saturated dense black and green fine to coarse sand w/ some silt and organic matter, trace of clay.	A-2-4(0)	glaucinitic
64.74			65.0'		19" RECOVERY		
67.23							
		20	68.0'	18 30 28 41	Saturated very dense black and green fine to coarse sand w/ some silt and organic matter, trace of gravel.	A-2-4(0)	glaucinitic
69.72			70.0'		22" RECOVERY		
72.21							
		21	73.0' 73.5'	50/4"	Saturated very dense green and gray silty fine to coarse sand, trace of gravel. 4" RECOVERY Boring terminated at 73.3 feet.	A-2-4(0)	glaucinitic
74.7							
77.19							
79.68							
82.17							
84.66							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt



Poorly graded sand

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Notes:

1. Exploratory boring was drilled on 3/2/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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 SPT 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

Boring No.: BR2-7-02

Contract: 25-113-01

Boring Location: Sta. 266+53.75, 281' Lt. C.L.

Boring Surface Elev.: 38.00

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 46.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/1/08	Time	6.0'	4.0'	4.0'	34.0
					38.0
					38.0
					38.0

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 73.3 Ft.;
 No. of 2 in. Dia. Shelby Tubes: 3 No. of U-Sample Boring: Ft.
 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	1 1 2	Wet very loose brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	5" Topsoil
			2.0'		13" RECOVERY		
2.49		2	2.0'	1 2 2 4	Wet very loose brown clayey coarse to fine sand, trace of gravel.	A-2-6(1)	
			4.0'		20" RECOVERY		
4.98		3	4.0'	3 5 5 5	Saturated loose brown and orange fine to coarse sand, trace of silt.	A-3	
			6.0'		20" RECOVERY		
7.47		4	6.0'	3 4 4 5	Saturated loose brown and orange fine to coarse sand, trace of silt.	A-3	
			8.0'		21" RECOVERY		
9.96		5	8.0'	8 10 10 13	Saturated medium dense brown and orange fine to coarse sand, trace of silt and gravel.	A-3	
			10.0'		19" RECOVERY		
		6	10.0'	10 13 16 18	Saturated medium dense brown and orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			12.0'		23" RECOVERY		
12.45		7	12.0'	8 5 7 9	Saturated medium dense brown and orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			14.0'		17" RECOVERY		
		8	14.0'	3 5	Saturated loose brown and orange fine to	A-2-4(0)	

Remarks: Mud Rotary at 46.0'

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: 25-113-01

Boring No.: BR2-7-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94				5 6	coarse sand w/ some silt.		
			16.0'		18" RECOVERY		
		9	16.0'	7 7 15 18	Saturated medium dense brown and orange clayey fine sand w/ some coarse sand.	A-2-6(0)	
17.43			18.0'		21" RECOVERY		
		10	18.0'	8 9 15 19	Saturated medium dense brown and orange fine to coarse sand w/ some silt.	A-2-4(0)	
19.92			20.0'		21" RECOVERY		
22.41							
		11	24.0'	5 6 8 11	Saturated medium dense brown and orange fine to coarse sand w/ some silt.	A-2-4(0)	
24.9			26.0'		20" RECOVERY		
27.39							
		12	28.0'	5 9 13	Saturated medium dense green and brown fine sand w/ some silt and coarse sand.	A-2-4(0)	glauconitic
29.88			30.0'		22" RECOVERY		
32.37							
		13	34.0'	13 14 17 20	Saturated dense green fine sand w/ some coarse sand, trace of silt.	A-3	glauconitic
34.86			36.0'		19" RECOVERY		
37.35							

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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: 25-113-01

Boring No.: BR2-7-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	8 13 27 50/4"	Saturated dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	glauconitic
			41.0'		17" RECOVERY		
42.33							
44.82		15	44.0'	8 13 17 20	Saturated medium dense green fine sand, trace of coarse sand and silt.	A-3	glauconitic
			46.0'		20" RECOVERY		
47.31							
49.8		16	48.0'	5 9 9 11	Saturated medium dense green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	glauconitic
			50.0'		23" RECOVERY		
52.29							
54.78		17	53.0'	9 10 15 21	Saturated medium dense green fine sand w/ some silt, trace of coarse sand and organic matter.	A-2-4(0)	glauconitic
			55.0'		23" RECOVERY		
57.27							
59.76		18	58.0'	16 19 30 38	Saturated dense green silty fine sand w/ some coarse sand, trace of gravel, organic matter, and seashells.	A-2-4(0)	glauconitic
			60.0'		22" RECOVERY		

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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: 25-113-01

Boring No.: BR2-7-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
		19	63.0'	19 22 32 50/3"	Saturated very dense green fine to coarse sand w/ some clay and organic matter, trace of gravel and seashells.	A-2-4(0)	glaucinitic
64.74			65.0'		21" RECOVERY		
67.23							
		20	68.0'	13 30 50/4"	Saturated very dense green silty fine to coarse sand w/ some organic matter, trace of gravel and seashells.	A-2-4(0)	glaucinitic
69.72			69.5'		16" RECOVERY		
72.21							
		21	73.0' 73.5'	50/4"	Saturated very dense green clayey fine sand and gravel w/ some organic matter, trace of coarse sand and seashells.	A-2-4(0)	glaucinitic
74.7					4" RECOVERY Boring terminated at 73.3 feet.		
77.19							
79.68							
82.17							
84.66							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Clayey sand



Poorly graded sand



Poorly graded sand
with silt



Poorly graded clayey
silty sand

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AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/1/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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 SPT 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

Boring No.: BR2-7-03

Contract: 25-113-01

Boring Location: Sta. 264+64, 242' Lt.

Boring Surface Elev.: +40.11

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split-Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4"	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 22.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/20/2009		6.0	4.0	5.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	100.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/20/09	1	0.5'	1 3 3	Moist firm brown fine sandy silt w/some clay and coarse sand, trace of gravel.	A-4(0)	Topsoil - 4".
			2.0'		14" RECOVERY		
2.5		2	2.0'	2 2	Moist soft brown fine sandy silt w/some clay and coarse sand, trace of gravel.	A-4(0)	
			3.0'		12" RECOVERY		
		2A	3.0'	2 2	Moist very loose brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			4.0'		12" RECOVERY		
		3	4.0'	1 1 7 4	Wet loose grayish black fine to coarse sand w/some silt and gravel, trace of organic matter.	A-2-4(0)	
5			6.0'		15" RECOVERY		
		4	6.0'	5 4 9 10	Wet medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
7.5			8.0'		16" RECOVERY		
		5	8.0'	4 7 8 12	Wet medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			10.0'		18" RECOVERY		
		6	10.0'	9 12 17 23	Wet medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			12.0'		21" RECOVERY		
12.5		7	12.0'	2 6 10 10	Wet medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
			14.0'		19" RECOVERY		
		8	14.0'	5 8	Wet medium dense brown fine to coarse sand	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: 25-113-01

Boring No.: BR2-7-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				9 11	w/some silt, trace of gravel.		
			16.0'		17" RECOVERY		
		9	16.0'	5 6 10 12	Wet medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
17.5			18.0'		15" RECOVERY		
		10	18.0'	4 9 12 14	Wet medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
20			20.0'		18" RECOVERY		
22.5							
		11	24.0'	4	Wet medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	Mud Rotary @ 22.0'.
25		11A	24.5'	9 11 13	6" RECOVERY	A-2-4(0)	
			24.5'		Wet medium dense grayish green fine sand w/some coarse sand and silt.		
			26.0'		12" RECOVERY		
27.5							
		12	29.0'	5 9 10 14	Wet medium dense greenish brown silty fine sand w/some coarse sand.	A-2-4(0)	
30			31.0'		20" RECOVERY		
32.5							
		13	34.0'	7 9 10 12	Wet medium dense green fine sand w/some silt and coarse sand.	A-2-4(0)	
35			36.0'		21" RECOVERY		
37.5							

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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: 25-113-01

Boring No.: BR2-7-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	6 8 10 12	Wet medium dense greenish gray fine sand w/ some coarse sand, trace of silt and organic matter.	A-3	
			41.0'		20" RECOVERY		
42.5							
45		15	44.0'	8 11 16 16	Wet medium dense greenish gray fine sand w/ some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			46.0'		19" RECOVERY		
47.5							
50		16	49.0'	6 9 13 14	Wet medium dense greenish gray fine sand w/ trace of silt, coarse sand and organic matter.	A-3	
			51.0'		19" RECOVERY		
52.5							
55		17	54.0'	5 9 13 14	Wet medium dense greenish gray fine sand w/ some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			56.0'		21" RECOVERY		
57.5							
60		18	59.0'	6 8 17 17	Wet medium dense green fine to coarse sand w/some silt, trace of gravel and organic matter.	A-2-4(0)	Glauconitic
			61.0'		20" RECOVERY		

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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: 25-113-01

Boring No.: BR2-7-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5							
65	2/23/09	19	64.0'	13 22 33 40	Wet very dense green fine to coarse sand w/ some silt, trace of organic matter.	A-2-4(0)	
67.5			66.0'		21" RECOVERY		
70		20	69.0'	8 14 15 24	Wet medium dense gray fine to coarse sand w/some silt, trace of organic matter.	A-2-4(0)	
72.5			71.0'		24" RECOVERY		
75		21	74.0'	9 16 50	Wet hard grayish green clayey fine sandy silt w/some coarse sand and organic matter, trace of gravel.	A-4(1)	
77.5			75.5'		18" RECOVERY		
80		22	79.0'	13 22 40 50/5"	Wet very dense grayish green clayey fine sand w/some coarse sand, trace of gravel.	A-2-6(0)	
82.5			81.0'		22" RECOVERY		
85		23	84.0'	11 18 34 41	Wet very dense gray silty fine sand w/some coarse sand, trace of gravel.	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: 25-113-01

Boring No.: BR2-7-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			86.0'		24" RECOVERY		
87.5							
	2/24/09	24	89.0'	12 17 28 50/5"	Wet dense gray silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
90							
			91.0'		23" RECOVERY		
92.5							
		25	94.0'	21 50/5"	Wet very dense gray silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
95			95.0'		11" RECOVERY		
97.5							
		26	99.0'	25 50	Wet very dense gray fine sand w/some silt and coarse sand.	A-2-4(0)	
100			100.0'		12" RECOVERY		
					End of Boring		
102.5							
105							
107.5							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Clayey sand

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Notes:

1. Exploratory borings were drilled on 2/20/2009 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

Boring No.: BR2-7-04

Contract: 25-113-01

Boring Location: Sta. 265+89, 154' Lt.

Boring Surface Elev.: + 38.20

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split-Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4"	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 24.0	

Water Level Readings					
Date 2/26/2009	Time	Depth of Hole 4.0	Depth of Casing 2.0	Depth of Water 3.4	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	100.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/26/09	1	0.5'	1 2	Moist very loose tan clayey coarse to fine sand w/some gravel.	A-2-4(0)	Forrest Duff - 3".
			2.0'		18" RECOVERY		
2.5		2	2.0'	3 5 7	Wet loose orange fine to coarse sand w/some silt.	A-2-4(0)	
			4.0'		16" RECOVERY		
		3	4.0'	4 6 8 7	Wet medium dense orange fine to coarse sand w/some silt.	A-2-4(0)	
5			6.0'		20" RECOVERY		
		4	6.0'	6 12 18 24	Wet medium dense orange fine to coarse sand w/some silt.	A-2-4(0)	
7.5			8.0'		16" RECOVERY		
		5	8.0'	6 9 10 9	Wet medium dense orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
10		6	10.0'	5 5 8 12	Wet medium dense orange silty fine to coarse sand.	A-2-4(0)	
			12.0'		16" RECOVERY		
12.5		7	12.0'	4 6 9 10	Wet medium dense orange silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			14.0'		17" RECOVERY		
		8	14.0'	6 9	Wet medium dense orange silty fine to coarse	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: 25-113-01

Boring No.: BR2-7-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15			15.0'		sand w/trace of gravel. 10" RECOVERY		
		8A	15.0'	11 12	Wet medium dense greenish brown fine to coarse sand w/some silt. 10" RECOVERY	A-2-4(0)	
			16.0'				
		9	16.0'	4 9 12 14	Wet medium dense greenish brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
17.5							
			18.0'		18" RECOVERY		
		10	18.0'	6 8 8 12	Wet medium dense greenish brown fine to coarse sand w/some silt.	A-2-4(0)	
20			20.0'		20" RECOVERY		
22.5							
		11	24.0'	4 7 9 10	Wet medium dense greenish brown fine to coarse sand w/some silt.	A-2-4(0)	Mud Rotary @ 24.0'.
25							
			26.0'		21" RECOVERY		
27.5							
		12	29.0'	4 6 7 9	Wet medium dense greenish brown fine sand w/some coarse sand and silt.	A-2-4(0)	
30							
			31.0'		19" RECOVERY		
32.5							
		13	34.0'	6 9 11 14	Wet medium dense green fine sand w/some coarse sand, trace of silt.	A-3	Glauconitic
35							
			36.0'		21" RECOVERY		
37.5							

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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: 25-113-01

Boring No.: BR2-7-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	5 6 8 9	Wet medium dense green fine sand w/trace of silt and coarse sand.	A-3	Glauconitic
			41.0'		21" RECOVERY		
42.5							
45		15	44.0'	7 10 11 14	Wet medium dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Glauconitic
			46.0'		22" RECOVERY		
47.5							
50		16	49.0'	6 9 13 14	Wet medium dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Glauconitic
			51.0'		22" RECOVERY		
52.5							
55		17	54.0'	5 9 12 16	Wet medium dense green fine sand w/trace of silt and coarse sand.	A-3	Glauconitic
			56.0'		23" RECOVERY		
57.5							
60		18	59.0'	12 17 25 31	Wet dense green fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	Glauconitic
			61.0'		22" RECOVERY		

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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: 25-113-01

Boring No.: BR2-7-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5							
65		19	64.0'	10 18 20 25	Wet dense green fine to coarse sand w/some clay, trace of gravel.	A-2-4(0)	Glauconitic
67.5			66.0'		23" RECOVERY		
70		20	69.0'	10 23 40 50	Wet very dense green fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	Glauconitic
72.5			71.0'		23" RECOVERY		
75		21	74.0' 75.0'	35 50/3*	Wet very dense gray silty fine sand and gravel w/some coarse sand.	A-2-4(0)	
77.5					9" RECOVERY		
80	2/27/09	22	79.0'	10 17 35 50	Wet very dense gray clayey fine sand and gravel w/some coarse sand.	A-2-4(0)	
82.5			81.0'		24" RECOVERY		
85		23	84.0'	10 14 23 40	Wet dense gray fine sand w/some coarse sand and clay, trace of gravel.	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: 25-113-01

Boring No.: BR2-7-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			86.0'		24" RECOVERY		
87.5							
		24	89.0'	12 23 43 50/3"	Wet very dense gray fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
90							
			91.0'		19" RECOVERY		
92.5							
		25	94.0'	34 50	Wet very dense gray fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
95			95.0'		12" RECOVERY		
97.5							
		26	99.0'	20 50	Wet very dense gray fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
100			100.0'		12" RECOVERY		
					End of Boring		
102.5							
105							
107.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Poorly graded sand
with silt



Silty sand



Clayey sand

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Notes:

1. Exploratory borings were drilled on 2/26/2009 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

Boring No.: BR2-8-01

Contract: 25-113-01

Boring Location: Sta. 262+32.32, 76' Lt. C.L.

Boring Surface Elev.: 46.57

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	29.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/12/08		12.0'	10.0'	9.2'	37.4
						46.6
						46.6
						46.6

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	77.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;		Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Billy Holden
Helpers: A. Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	1.0'	3 3	Moist loose orange-brown clayey fine to coarse sand, trace of gravel. 12" RECOVERY	A-2-4(0)	9" Cultivated Soil
2.49		2	2.0'	3 4 5 5	Moist loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
4.98		3	4.0'	8 9 12	Moist medium dense orange-brown gravel and fine sand w/ some coarse sand and silt. 7" RECOVERY	A-1-b	
7.47		4	6.0'	10 9 7 9	Wet medium dense red-brown fine to coarse sand w/ some silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
9.96		5	8.0'	4 9 15 20	Saturated medium dense red-brown fine to coarse sand w/ some silt. 10" RECOVERY	A-2-4(0)	
12.45		6	10.0'	14 19 15 19	Saturated dense red-brown fine to coarse sand w/ some silt. 19" RECOVERY	A-2-4(0)	
		7	12.0'	3 2 10 13	Saturated medium dense red-brown fine to coarse sand, trace of silt. 13" RECOVERY	A-3	
		8	14.0'	10 24 26 33	Saturated dense red-brown silty fine to coarse sand.	A-2-4(0)	

Remarks: Mud Rotary at 29.0'

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: 25-113-01

Boring No.: BR2-8-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		16" RECOVERY		
		9	16.0'	23 33 34 38	Saturated very dense red-brown fine to coarse sand, trace of silt and gravel.	A-3	
17.43			18.0'		12" RECOVERY		
		10	18.0'	8 17 24 35	Saturated dense red-brown silty fine to coarse sand.	A-2-4(0)	
19.92			20.0'		17" RECOVERY		
22.41							
		11	24.0'	8 10 13 20	Saturated medium dense red-brown silty fine to coarse sand.	A-2-4(0)	
24.9			26.0'		20" RECOVERY		
		U-1	27.0'		Saturated medium dense red-brown clayey fine sand.	A-2-6(0)	Press Sample - Shelby Tube.
27.39			28.5'		18" RECOVERY		
		12	29.0'	7 14 18 24	Saturated dense red-brown fine to coarse sand w/ some silt.	A-2-4(0)	
29.88			31.0'		16" RECOVERY		
32.37							
		13	34.0'	15 17 19 19	Saturated dense red-brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
34.86			36.0'		16" RECOVERY		
37.35							

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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: 25-113-01

Boring No.: BR2-8-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	10 10 15 15	Saturated medium dense red-brown fine to coarse sand w/ some silt.	A-2-4(0)	
			41.0'		18" RECOVERY		
42.33							
44.82		15	44.0'	5 8 10 11	Saturated medium dense gray-green fine sand w/ some silt and coarse sand.	A-2-4(0)	glaucinitic
			46.0'		18" RECOVERY		
		PH-1	46.0'	11 14 18 21	Visual Description: Saturated medium dense gray-green fine sand w/ some silt and coarse sand.		Sample brought to GTA lab for pH testing.
47.31			48.0'		15" RECOVERY		
49.8		16	49.0'	6 7 10 12	Saturated medium dense green fine sand w/ some silt and coarse sand.	A-2-4(0)	glaucinitic
			51.0'		24" RECOVERY		
52.29							
54.78		17	54.0'	6 8 8 8	Saturated medium dense dark green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	glaucinitic
			56.0'		17" RECOVERY		
57.27							
59.76		18	59.0'	8 10 14 13	Saturated medium dense dark green silty fine sand, trace of coarse sand and organic matter.	A-2-4(0)	glaucinitic
			61.0'		24" RECOVERY		

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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: 25-113-01

Boring No.: BR2-8-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
64.74		19	64.0'	9 11 13 19	Saturated medium dense dark green fine sand w/ some silt, trace of coarse sand and organic matter. 24" RECOVERY	A-2-4(0)	glaucousitic
67.23			66.0'				
69.72		20	69.0'	16 22 29 34	Saturated very dense dark green silty fine sand w/ some coarse sand, trace of organic matter and gravel. 15" RECOVERY	A-2-4(0)	glaucousitic
72.21			71.0'				
74.7		21	74.0'	19 30 33 46	No Sample Recovery		
77.19			76.0'		0" RECOVERY		
79.68					Boring terminated at 77.0 feet.		Rods could not be advanced any further.
82.17							
84.66							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Clayey sand

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Notes:

1. Exploratory borings were drilled on 2/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were 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 SPT 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.: BR2-8-01A

Contract: 25-113-01

Boring Location: Sta. 262+32.32, 76' Lt.

Boring Surface Elev.: +46.57

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split-Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4"	Inches	From Depth of:	0.0	To:	24.0
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/19/2009		24.0	24.0	Dry	
	2/19/09		22.5		10.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	84.5	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/17/09	1	49.0'	6 6 10 11	Wet medium dense greenish brown fine sand w/some coarse sand and silt.	A-2-4(0)	Mud Rotary @ 24.0'.
51		2	51.0'	5 8 10 12	18" RECOVERY No Sieve Analysis - pH sample retained by GTA.		
			53.0'		20" RECOVERY		
54							
57							
60		3	59.0'	6 10 12 15	Wet medium dense green fine sand w/some silt, trace of organic matter and gravel.	A-2-4(0)	Glauconitic
		4	61.0'	8 10 21 22	20" RECOVERY No Sieve Analysis - pH sample retained by GTA.		
63			63.0'		16" RECOVERY		

Remarks: Mud Rotary @ 24.0 Feet.

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 S.R. 1
Contract: 25-113-01

Boring No.: BR2-8-01A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
69	2/19/09	5	69.0'	16 21 40 36	Wet very dense green fine sand w/some silt and coarse sand, trace of organic matter and gravel. 20" RECOVERY	A-2-4(0)	Glaucanitic
			71.0'				
72		6	71.0'	18 35 69	No Sieve Analysis - pH sample retained by GTA. 17" RECOVERY		
			72.5'				
75		7	74.0'	19 24 42 58	Wet very dense green silty fine sand w/some coarse sand and organic matter. 22" RECOVERY	A-2-4(0)	Glaucanitic
			76.0'				
78							
		8	79.0'	18 30 45 50/4"	Wet very dense green silty fine to coarse sand w/some organic matter. 21" RECOVERY	A-2-4(0)	Glaucanitic
			81.0'				
81		9	81.0'	20 24 31 38	No Sieve Analysis - pH sample retained by GTA. 23" RECOVERY		
			83.0'				
84		10	84.0'	50/4"	No Sample Recovery - Lost tip of spoon. 0" RECOVERY		
			84.5'				
					End of Boring		
87							
90							
93							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/17/2009 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

Boring No.: BR2-8-02

Contract: 25-113-01

Boring Location: Sta. 263+36.43, 60' Lt. C.L.

Boring Surface Elev.: 43.00

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0'	To: 74.4'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/2/08		8.0'	6.0'	4.3'	38.7
					43.0
					43.0
					43.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	74.4	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;		Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Billy Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 1 1 1	Wet very loose black organic silty coarse to fine sand, trace of gravel. (Fill)	A-2-4(0)	3" Topsoil
2.49		2	2.0'	W/R W/R 1 1	13" RECOVERY Wet very loose black silty fine to coarse sand, trace of gravel and organic matter. (Fill)	A-2-4(0)	
4.98		3	4.0'	W/R W/R W/R W/R	12" RECOVERY Saturated very loose gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	
7.47		4	6.0'	3 5 6 10	14" RECOVERY Saturated medium dense gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	
9.96		5	8.0'	3 5 6 6	16" RECOVERY Saturated medium dense orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
12.45		6	10.0'	5 8 9 8	13" RECOVERY Saturated medium dense orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
		7	12.0'	3 4 7 10	17" RECOVERY Saturated medium dense orange fine to coarse sand w/ some silt, trace of 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: 25-113-01

Boring No.: BR2-8-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	3 5 7 10	16" RECOVERY Saturated medium dense orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
17.43		9	16.0' 16.0'	8 12 16 21	12" RECOVERY Saturated medium dense orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
19.92		10	18.0' 18.0'	7 7 18 18	9" RECOVERY Saturated medium dense brown-gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	
22.41			20.0'		18" RECOVERY		
24.9		11	24.0'	1 5 19 13	Saturated medium dense brown-gray fine to coarse sand w/ some silt.	A-2-4(0)	
27.39			26.0'		17" RECOVERY		
29.88		12	29.0'	5 8 15 16	Saturated medium dense brown-gray fine sand w/ some coarse sand and silt.	A-2-4(0)	
32.37			31.0'		18" RECOVERY		
34.86		13	34.0'	8 12 13 18	Saturated medium dense dark gray fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
37.35			36.0'		18" RECOVERY		

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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: 25-113-01

Boring No.: BR2-8-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	6 10 14 16	Saturated medium dense dark gray fine sand w/ some coarse sand and silt.	A-2-4(0)	
			41.0'		20" RECOVERY		
42.33							
44.82		15	44.0'	8 12 12 12	Saturated medium dense dark gray fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			46.0'		20" RECOVERY		
47.31							
49.8		16	49.0'	13 16 22 19	Saturated dense green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	glaucopititic
			51.0'		20" RECOVERY		
52.29							
54.78		17	54.0'	12 18 18 19	Saturated dense green silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	glaucopititic
			56.0'		12" RECOVERY		
57.27							
59.76		18	59.0'	12 26 24 40	Saturated dense green fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	glaucopititic

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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: 25-113-01

Boring No.: BR2-8-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		13" RECOVERY		
62.25							
		19	64.0'	24 37 38 50/5"	Saturated very dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	glaucinitic
64.74			66.0'		16" RECOVERY		
67.23							
		20	69.0'	22 23 50	No Sample Recovery		Trap Broke - Lost Sample.
69.72			70.5'		0" RECOVERY		
72.21							
		21	73.0'	22 25 50/5"	Saturated hard green clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	glaucinitic
			74.5'		13" RECOVERY		
74.7					Boring terminated at 74.4 feet.		
77.19							
79.68							
82.17							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt



Poorly graded clayey
silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/2/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were 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 SPT 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

Boring No.: BR2-8-03

Contract: 25-113-01

Boring Location: Sta. 264+68.79, 67' Rt. C.L.

Boring Surface Elev.: 43.62

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	18.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/25/08		10.0'	8.0'	6.8'	36.8 43.6 43.6 43.6

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	75.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Gary Truver, Sr.
Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	2 3 4 4	Wet loose brown fine to coarse sand and gravel w/ some clay.	A-2-4(0)	3" Topsoil
2.49		2	2.0'	5 5 7 10	7" RECOVERY Wet medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
4.98		3	4.0'	4 10 20 20	8" RECOVERY Wet medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
7.47		4	6.0'	24 24 34 38	14" RECOVERY Saturated very dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
9.96		5	8.0'	8 10 26 32	24" RECOVERY Saturated dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
12.45		6	10.0'	15 20 22 28	15" RECOVERY Saturated dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
		7	12.0'	3 5 9 17	24" RECOVERY Saturated medium dense brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	

Remarks: Mud Rotary at 18.0'

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: 25-113-01

Boring No.: BR2-8-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	10 13 13 27	12" RECOVERY Saturated medium dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
17.43		9	16.0' 16.0'	17 22 30 33	20" RECOVERY Saturated very dense red-brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
19.92		10	18.0' 18.0'	8 8 12 14	24" RECOVERY Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
22.41			20.0'		20" RECOVERY		
24.9		11	24.0'	9 13 10 18	Saturated medium dense brown silty fine to coarse sand.	A-2-4(0)	
27.39			26.0'		20" RECOVERY		
29.88		12	29.0'	13 17 21 22	Saturated dense brown and red-brown fine sand w/ some coarse sand, trace of silt.	A-3	
32.37			31.0'		24" RECOVERY		
34.86		13	34.0'	11 13 17 23	Saturated medium dense brown and green fine sand w/ some coarse sand and silt.	A-2-4(0)	
37.35			36.0'		18" RECOVERY		

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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: 25-113-01

Boring No.: BR2-8-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		PH-2	38.0'	12 20 24 30	Visual Description: Saturated dense green and gray fine to coarse sand w/ some silt.		Sample brought to GTA lab for pH testing.
39.84			40.0'		18" RECOVERY		
		14	41.0'	12 10 17 25	Saturated medium dense green and gray fine to coarse sand w/ some silt.	A-2-4(0)	
42.33			43.0'		24" RECOVERY		
		15	44.0'	10 14 21 29	Saturated dense green and gray fine sand w/ some silt and coarse sand.	A-2-4(0)	
44.82			46.0'		24" RECOVERY		
					DRAFT		
47.31					NOT FOR BIDDING		
		16	49.0'	8 9 12 14	Saturated medium dense gray fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
49.8			51.0'		15" RECOVERY		
		U-1	51.5'		Saturated medium dense gray fine sand w/ some silt.	A-2-4(0)	Press Sample - Shelby Tube.
52.29			53.5'		23" RECOVERY		
		17	53.5'	10 23 26 29	Saturated dense gray silty fine sand, trace of coarse sand.	A-2-4(0)	
54.78			55.5'		22" RECOVERY		
					AUGUST 2015		
57.27							
		18	59.0'	17 24 28 40	Saturated very dense green and gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	glaucanitic
59.76							

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

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: BR2-8-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		18" RECOVERY		
62.25							
		19	64.0'	17 20 17 20	Saturated dense green and gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	glaucinitic
64.74			66.0'		18" RECOVERY		
67.23							
		20	69.0'	15 20 22 27	Saturated dense green and gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	glaucinitic
69.72			71.0'		24" RECOVERY		
72.21							
		21	73.0'	20 29 30 58	Saturated very dense green and gray fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	glaucinitic
74.7			75.0'		24" RECOVERY		
					Boring terminated at 75.0 feet.		
77.19							
79.68							
82.17							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/25/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were 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 SPT 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.: BR2-8-03A

Contract: 25-113-01

Boring Location: Sta. 264+68.79, 67' Rt.

Boring Surface Elev.: +43.62

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split-Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4"	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 19.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/24/2009		19.0	19.0	Dry	
	2/25/2009		10.3		5.6	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	100.5	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/25/09	1	49.0'	6 8 11 13	No Sieve Analysis - pH sample retained by GTA.		Mud Rotary @ 19.0'.
51			51.0'		19" RECOVERY		
54							
57							
60		2	59.0'	5 10 13 19	No Sieve Analysis - pH sample retained by GTA.		
			61.0'		21" RECOVERY		
63							

Remarks: Mud Rotary @ 19.0 Feet.

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 S.R. 1
Contract: 25-113-01

Boring No.: BR2-8-03A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
69		3	69.0'	8 14 21 30	Wet dense grayish green silty fine to coarse sand w/some organic matter.	A-2-4(0)	Glauconitic
			71.0'		21" RECOVERY		
72		4	71.0'	11 18 30 37	No Sieve Analysis - pH sample retained by GTA.		
			73.0'		20" RECOVERY		
75		5	74.0'	8 15 17 27	Wet dense grayish green silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			76.0'		23" RECOVERY		
78							
81		6	79.0'	12 14 24 34	Wet dense grayish green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	1/2 of sample sent to GTA for pH testing.
			81.0'		23" RECOVERY		
84		7	84.0'	12 18 30 50/5"	Wet dense gray clayey fine to coarse sand w/ trace of gravel.	A-2-4(0)	Driller washed past 81.0' - 83.0' pH sample.
			86.0'		23" RECOVERY		
87							
90		8	89.0'	10 23 50	Wet very dense gray silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
			90.5'		18" RECOVERY		
93							

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: BR2-8-03A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		9	94.0'	11 28 43 50	Wet very dense gray fine sand w/some silt and coarse sand.	A-2-4(0)	
96			96.0'		22" RECOVERY		
99							
		10	99.0'	24 43 50/3"	Wet very dense gray fine sand w/some silt and coarse sand.	A-2-4(0)	
			100.5'		15" RECOVERY		
					End of Boring		
102							
105							
108							
111							
114							
117							
120							

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Clayey sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/24/2009 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

Boring No.: BR2-8-04

Contract: 25-113-01

Boring Location: Sta. 261+99.23, 67' Rt. C.L.

Boring Surface Elev.: 40.96

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0'	To: 24.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/8/08		10.0'	8.0'	6.0'	35.0 41.0 41.0 41.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	74.9	Ft.;	No. of: 3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	Core Drilling in Rock:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:					

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	2 3 3 3	Wet loose brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	8" Cultivated Soil
2.49		2	2.0'	2 4 6 2	20" RECOVERY Wet stiff dark brown and gray fine to coarse sandy silt, trace of gravel and clay.	A-4(0)	
4.98		3	4.0'	2 3 3 3	12" RECOVERY Wet loose brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
7.47		4	6.0'	3 4 5 7	18" RECOVERY Saturated loose brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
9.96		5	8.0'	3 5 8 10	24" RECOVERY Saturated medium dense brown silty fine to coarse sand.	A-2-4(0)	
12.45		6	10.0'	3 7 8 10	17" RECOVERY Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
		7	12.0'	1 7 8 9	20" RECOVERY Saturated medium dense brown fine to coarse sand w/ some silt.	A-2-4(0)	

Remarks: Mud Rotary at 24.0'

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: 25-113-01

Boring No.: BR2-8-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	2 3 5 7	24" RECOVERY Saturated loose brown fine to coarse sand w/ some silt.	A-2-4(0)	
17.43		9	16.0' 16.0'	6 8 9 12	18" RECOVERY Saturated medium dense red-brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
19.92		10	18.0' 18.0'	3 8 9 10	24" RECOVERY Saturated medium dense red-brown fine to coarse sand w/ some silt.	A-2-4(0)	
22.41			20.0'		24" RECOVERY		
24.9		11	24.0'	7 8 10 13	Saturated medium dense red-brown fine to coarse sand w/ some silt.	A-2-4(0)	
27.39		U-1	26.0' 26.0'		24" RECOVERY Saturated medium dense reddish brown fine sand, trace of silt	A-3	Press Sample - Shelby Tube.
29.88		12	28.0' 29.0'	5 8 9 12	24" RECOVERY Saturated medium dense red-brown fine sand w/ some coarse sand, trace of silt.	A-3	
32.37			31.0'		24" RECOVERY		
34.86		13	34.0' 34.0'	10 11 12 14	Saturated medium dense red-brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
37.35			36.0'		19" RECOVERY		

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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: 25-113-01

Boring No.: BR2-8-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	5 8 10 11	Saturated medium dense gray and brown fine sand w/ some coarse sand, trace of silt.	A-3	
			41.0'		20" RECOVERY		
42.33							
44.82		15	44.0'	5 7 8 10	Saturated medium dense gray fine sand w/ some coarse sand, trace of gravel.	A-3	
			46.0'		19" RECOVERY		
47.31							
49.8		16	49.0'	4 5 6 7	Saturated medium dense gray fine sand w/ some coarse sand, trace of silt.	A-3	
			51.0'		17" RECOVERY		
52.29							
54.78		17	54.0'	5 8 12 15	Saturated very stiff green and gray fine sandy silt, trace of coarse sand.	A-4(0)	glaucanitic
			56.0'		24" RECOVERY		
57.27							
59.76		18	59.0'	13 19 21 31	Saturated dense green and gray fine sand w/ some coarse sand, trace of silt, gravel, and organic matter.	A-3	glaucanitic

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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: 25-113-01

Boring No.: BR2-8-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		24" RECOVERY		
62.25							
		19	64.0'	12 16 31 46	Saturated dense dark gray and green silty fine to coarse sand w/ some organic matter, trace of gravel.	A-2-4(0)	
64.74			66.0'		24" RECOVERY		
67.23							
		20	69.0'	10 17 30 50/5"	Saturated dense dark gray and green clayey fine sand w/ some coarse sand and organic matter.	A-2-4(0)	glaucinitic
69.72			71.0'		20" RECOVERY		
72.21							
		21	73.0'	15 15 31 50/5"	Saturated dense dark gray and green fine to coarse sand w/ some organic matter and silt, trace of gravel.	A-2-4(0)	
74.7			75.0'		18" RECOVERY		
					Boring terminated at 74.9 feet.		
77.19							
79.68							
82.17							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded clayey
silty sand



Poorly graded sand
with silt



Clayey sand

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Notes:

1. Exploratory borings were drilled on 2/8/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were 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 SPT 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

Boring No.: BR2-8-05

Contract: 25-113-01

Boring Location: Sta. 263+53.27, 44' Rt. C.L.

Boring Surface Elev.: 36.60

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
	Hollow Stem Auger:		From Depth of:	0.0'	To:	73.6'

Water Level Readings						
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water	
3/2/08		4.0'	2.0'	1.5'	35.1	
					36.6	
					36.6	
					36.6	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	73.6	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;		Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	W/H W/H W/H W/H	Saturated soft dark brown organic silt.		No sieve analysis
2.49		2	2.0'	W/H W/H W/H W/H	5" RECOVERY Saturated very loose gray silty fine sand w/ some gravel, coarse sand, and organic matter.	A-2-4(0)	
4.98		3	4.0'	2 2 2 5	10" RECOVERY Saturated very loose brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
7.47		4	6.0'	2 1 1 2	18" RECOVERY Saturated very loose brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
9.96		5	8.0'	5 5 6 9	24" RECOVERY Saturated medium dense brown silty fine to coarse sand.	A-2-4(0)	
12.45		6	10.0'	4 5 9 13	16" RECOVERY Saturated medium dense brown silty fine to coarse sand.	A-2-4(0)	
		7	12.0'	5 6 8 8	24" RECOVERY Saturated medium dense brown silty fine to coarse sand.	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: 25-113-01

Boring No.: BR2-8-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		U-1	14.0' 14.0'		22" RECOVERY Saturated medium dense brown fine sand, trace of silt.	A-3	Press Sample - Shelby Tube.
			15.7'		20" RECOVERY		
17.43		8	16.0'	8 10 12 13	Saturated medium dense brown fine to coarse sand w/ some silt.	A-2-4(0)	
			18.0'		23" RECOVERY		
19.92		9	18.0'	8 8 9 12	Saturated medium dense brown fine to coarse sand w/ some silt.	A-2-4(0)	
			20.0'		18" RECOVERY		
22.41							
24.9		10	24.0'	8 10 10 14	Saturated medium dense green and brown silty fine to coarse sand.	A-2-4(0)	
			26.0'		18" RECOVERY		
27.39							
29.88		11	29.0'	9 10 15 18	Saturated medium dense brown and green silty fine sand w/ some coarse sand.	A-2-4(0)	
			31.0'		24" RECOVERY		
32.37							
34.86		12	34.0'	5 10 12 13	Saturated medium dense green and brown silty fine to coarse sand.	A-2-4(0)	
			36.0'		22" RECOVERY		
37.35							

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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: 25-113-01

Boring No.: BR2-8-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		13	39.0'	6 7 13 14	Saturated medium dense gray and green silty fine sand w/ some coarse sand.	A-2-4(0)	
			41.0'		20" RECOVERY		
42.33							
44.82		14	44.0'	4 8 12 18	Saturated medium dense gray and green silty fine sand, trace of coarse sand.	A-2-4(0)	
			46.0'		24" RECOVERY		
47.31							
49.8		15	49.0'	6 10 18 21	Saturated medium dense gray and green silty fine sand, trace of coarse sand.	A-2-4(0)	
			51.0'		20" RECOVERY		
52.29							
54.78		16	54.0'	9 20 35 50/3"	Saturated very dense gray and green fine to coarse sand, trace of silt and gravel.	A-3	
			56.0'		21" RECOVERY		
57.27							
59.76		17	59.0'	13 15 24 33	Saturated hard dark green fine sandy silt w/ some coarse sand, trace of gravel.	A-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: 25-113-01

Boring No.: BR2-8-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		20" RECOVERY		
62.25							
		18	64.0'	9 16 27 50/4"	Saturated hard green and gray clayey fine to coarse sandy silt.	A-4(0)	
64.74			66.0'		20" RECOVERY		
67.23							
		19	69.0'	12 14 27 30	Saturated dense gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	
69.72			71.0'		24" RECOVERY		
72.21							
		20	73.0' 73.7'	27 50/2"	Saturated very dense gray fine to coarse sand w/ some silt, trace of gravel. 7" RECOVERY	A-2-4(0)	
74.7					Boring terminated at 73.8 feet.		
77.19							
79.68							
82.17							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/2/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were 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 SPT 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

Boring No.: BR2-8-06

Contract: 25-113-01

Boring Location: Sta. 265+07.35, 67' Lt. C.L.

Boring Surface Elev.: 40.76

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	20.0'

Water Level Readings						
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water	
2/21/08		8.0'	6.0'	5.4'	35.4	
					40.8	
					40.8	
					40.8	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	73.8	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:				Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver, Sr.
Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	3 4 3	Wet firm brown clayey fine to coarse sandy silt w/ some gravel.	A-4(0)	4" Topsoil
			2.0'		10" RECOVERY		
2.49		2	2.0'	3 2 4 6	Wet loose brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
			4.0'		18" RECOVERY		
4.98		3	4.0'	4 6 9 13	Saturated medium dense red-brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			6.0'		18" RECOVERY		
7.47		4	6.0'	14 18 22 32	Saturated dense red-brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			8.0'		18" RECOVERY		
9.96		5	8.0'	7 12 9 9	Saturated medium dense red-brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			10.0'		18" RECOVERY		
		6	10.0'	17 30 40 46	Saturated very dense red-brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			12.0'		24" RECOVERY		
12.45		7	12.0'	6 11 10 17	Saturated medium dense red-brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			14.0'		18" RECOVERY		
		8	14.0'	9 10	Saturated medium dense brown silty fine to	A-2-4(0)	

Remarks: Mud Rotary at 20.0'

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: 25-113-01

Boring No.: BR2-8-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94				17 20	coarse sand, trace of gravel.		
			16.0'		19" RECOVERY		
		9	16.0'	13 26 33 38	Saturated very dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
17.43			18.0'		24" RECOVERY		
		10	18.0'	6 9 9 9	Saturated medium dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
19.92			20.0'		16" RECOVERY		
22.41		U-1	22.0'		Saturated medium dense brown clayey fine sand.	A-2-6(0)	Press Sample - Shelby Tube.
			24.0'		24" RECOVERY		
24.9		11	24.0'	6 11 15 17	Saturated medium dense brown and gray fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
			26.0'		15" RECOVERY		
27.39							
29.88		12	29.0'	5 9 13 17	Saturated medium dense gray and brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			31.0'		20" RECOVERY		
32.37							
34.86		13	34.0'	10 11 12 15	Saturated medium dense gray and green fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	glauconitic
			36.0'		24" RECOVERY		
37.35							

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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: 25-113-01

Boring No.: BR2-8-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	8 13 17 21	Saturated medium dense gray and green fine sand w/ some coarse sand and silt.	A-2-4(0)	glaucinitic
			41.0'		18" RECOVERY		
42.33							
44.82		15	44.0'	7 7 10 13	Saturated medium dense gray and green fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	glaucinitic
			46.0'		20" RECOVERY		
47.31							
49.8		16	49.0'	12 15 17 18	Saturated dense dark gray fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			51.0'		20" RECOVERY		
52.29							
54.78		17	54.0'	9 12 13 15	Saturated medium dense dark gray silty fine sand, trace of coarse sand.	A-2-4(0)	
			56.0'		24" RECOVERY		
57.27							
59.76		18	59.0'	14 28 34 50	Saturated very dense dark green silty fine sand w/ some coarse sand and gravel.	A-2-4(0)	glaucinitic
			61.0'		18" RECOVERY		

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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: 25-113-01

Boring No.: BR2-8-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
64.74		19	64.0'	15 25 31 50	Saturated very dense dark green silty fine to coarse sand, trace of gravel.	A-2-4(0)	glaucousitic
			66.0'		24" RECOVERY		
67.23							
69.72		20	69.0'	15 25 50 50/3"	Saturated hard dark green fine to coarse sandy silt, trace of gravel.	A-4(0)	glaucousitic
			71.0'		18" RECOVERY		
72.21							
74.7		21	73.0'	34 50/3"	Saturated hard dark green fine sandy silt w/ some coarse sand and organic matter, trace of gravel and clay.	A-4(0)	
			74.0'		9" RECOVERY		
					Boring terminated at 73.8 feet.		
77.19							
79.68							
82.17							
84.66							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with clay

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Notes:

1. Exploratory borings were drilled on 2/21/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were 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 SPT 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.: C2-1-01

Contract: 25-113-01

Boring Location: Sta. 481+85 124 L.T. C.L.

Boring Surface Elev.: + 57.89

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 30	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 12/14/09	Time	10.0	8.0	4.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	30.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: J. Laffery

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/14/09	1	0.5'	2 2 5	Saturated firm black organic coarse sandy clayey silt w/some fine sand and fine gravel.	A-4(3)	Topsoil - 5".
			2.0'		18" RECOVERY		
2.5		2	2.0'	5 5 7 9	Saturated medium dense gray coarse sand and fine gravel w/some silt and fine sand.	A-1-b	
			4.0'		11" RECOVERY		
		3	4.0'	2 4 4 5	Saturated loose orangish green clayey fine sand w/some coarse sand, trace of silt.	A-2-4(0)	
5			6.0'		20" RECOVERY		
		4	6.0'	2 4 5 5	Saturated loose orangish green clayey fine sand w/some coarse sand, trace of silt.	A-2-6(0)	
7.5			8.0'		21" RECOVERY		
		5	8.0'	3 5 5 8	Saturated loose orangish green clayey fine sand w/trace of coarse sand, silt and fine gravel.	A-2-6(0)	
10			10.0'		20" RECOVERY		
		6	10.0'	3 6 7 12	Saturated medium dense green silty fine sand w/some coarse sand.	A-2-4(0)	
			12.0'		17" RECOVERY		
12.5		7	12.0'	3 7 7 12	Saturated medium dense green silty fine sand w/some coarse sand.	A-2-4(0)	
			14.0'		19" RECOVERY		
		8	14.0'	7 9	Saturated medium dense green silty fine sand w/some coarse sand.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: C2-1-01

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				10 12			
			16.0'		18" RECOVERY		
		9	16.0'	9 12 12 13	Saturated medium dense green silty fine sand w/trace of coarse sand.	A-2-4(0)	
17.5							
			18.0'		18" RECOVERY		
		10	18.0'	7 7 11 10	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
20			20.0'		20" RECOVERY		
22.5							
		11	23.0'	7 8 10 10	Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter.	A-2-4(0)	
25			25.0'		20" RECOVERY		
27.5							
		12	28.0'	6 7 9 9	Saturated medium dense black clayey fine to coarse sand w/trace of silt, fine gravel and organic matter.	A-2-4(0)	
30			30.0'		18" RECOVERY		
					End of Boring		
32.5							
35							
37.5							

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

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

Boring No.: C2-1-02

Contract: 25-113-01

Boring Location: Sta. 482+85 24 R.T. C.L.

Boring Surface Elev.: + 60.0

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 30	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 12/11/09	Time	10.0	8.0	3.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	30	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/11/09	1	1.0'	4 4	Saturated loose tan silty fine gravelly coarse sand w/some fine sand, trace of organic matter. 10" RECOVERY	A-2-4(0)	Topsoil - 9"
2.5		2	2.0'	2 3 5 6	Saturated loose tannish orange silty coarse sand w/some fine sand, trace of fine gravel. 19" RECOVERY	A-1-b	
		3	4.0'	5 6 6 7	Saturated medium dense orange coarse sand w/some silt, fine sand and fine gravel. 18" RECOVERY	A-1-b	
5		4	6.0'	7 6 5 8	Saturated medium dense orange coarse sand w/some fine gravel and fine sand, trace of silt. 16" RECOVERY	A-1-b	
		5	8.0'	4 5 6 6	Saturated medium dense orangish green clayey fine sand w/some coarse sand, trace of silt. 20" RECOVERY	A-2-7(2)	
7.5		6	10.0'	4 5 6 8	Saturated medium dense orangish green clayey fine sand w/some coarse sand, trace of silt. 21" RECOVERY	A-2-4(0)	
		7	12.0'	8 13 10 13	Saturated very stiff orangish green fine sandy clay w/some coarse sand and silt. 20" RECOVERY	A-6(2)	
10		8	14.0'	6 7 8 6	No Sieve Analysis - Indication of saturated stiff green clay w/some sand.		
12.5	12/14/09		14.0'				

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: C2-1-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		3" RECOVERY		
		9	16.0'	5 7 10	Saturated stiff orangish green fine sandy clay w/trace of fine gravel and silt.	A-6(1)	
17.5							
			18.0'		22" RECOVERY		
		10	18.0'	5 5 9	Saturated medium dense green silty fine sand w/trace of coarse sand.	A-2-4(0)	
20			20.0'		18" RECOVERY		
22.5							
		11	23.0'	7 8 15	Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matter.	A-2-4(0)	
25			25.0'		20" RECOVERY		
27.5							
		12	28.0'	8 12 13 15	Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter.	A-2-4(0)	
30			30.0'		20" RECOVERY		
					End of Boring		
32.5							
35							
37.5							

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

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

Boring No.: C2-1-03

Contract: 25-113-01

Boring Location: Sta. 483+87 163 R.T. C.L.

Boring Surface Elev.: + 61.00

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.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 30.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
12/10/09		10.0	8.0	1.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	30.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/10/09	1	1.0'	2 3	Moist loose brown coarse sand w/some fine gravel and silt, trace of fine sand. 7" RECOVERY	A-1-b	Topsoil - 9".
2.5		2	2.0'	2 3 2 4	Saturated loose brown coarse sand w/some fine sand, fine gravel and silt. 18" RECOVERY	A-1-b	
		3	4.0'	2 5 5	Saturated medium dense brown coarse sand w/some fine sand and silt, trace of fine gravel. 20" RECOVERY	A-1-b	
5		4	6.0'	3 4 3 3	Saturated loose brown silty coarse sand w/some fine gravel and fine sand. 17" RECOVERY	A-1-b	
		5	8.0'	6 2 3 3	Saturated firm greenish brown fine sandy clay w/some coarse sand and silt, trace of fine gravel. 14" RECOVERY	A-6(1)	
10		6	10.0'	7 7 7 9	Saturated stiff greenish brown fine sandy clay w/some coarse sand and silt, trace of fine gravel. 10" RECOVERY	A-6(2)	
		7	12.0'	6 4 4 5	Saturated firm orangish green fine sandy clay w/some coarse sand and silt. 15" RECOVERY	A-7-6(3)	
12.5		8	14.0'	3 5 7 6	Saturated medium dense orangish green clayey fine sand w/trace of coarse sand, fine gravel and silt.	A-2-6(1)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: C2-1-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
					20" RECOVERY		
		9	16.0'	4 9 12 12	Saturated very stiff green fine sandy silt w/trace of coarse sand.	A-4(0)	
17.5							
		10	18.0'	4 8 9 9	20" RECOVERY		
			18.0'		Saturated medium dense green silty fine sand w/trace of coarse sand.	A-2-4(0)	
20							
			20.0'		22" RECOVERY		
22.5							
		11	24.0'	10 10 13 20	23" RECOVERY		
25					Saturated medium dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			26.0'				
27.5							
		12	28.0'	6 8 11 12	20" RECOVERY		
					Saturated medium dense green fine sand w/some coarse sand and silt, trace of fine gravel and organic matter.	A-2-4(0)	
30							
			30.0'		20" RECOVERY		
32.5					End of Boring		
35							
37.5							

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

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

Boring No.: C2-1-04

Contract: 25-113-01

Boring Location: Sta. 481+02 107 L.T. C.L.

Boring Surface Elev.: + 59.50

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 35.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 12/11/09	Time	10.0	8.0	3.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	35.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/11/09	1	0.5'	1 2	No Sieve Analysis - Indication of saturated soft tan sandy silt w/some clay.		Topsoil - 6".
			2.0'		9" RECOVERY		
2.5		2	2.0'	8 13 13 13	Saturated medium dense brown coarse sand w/some fine sand, fine gravel and silt.	A-1-b	
			4.0'		18" RECOVERY		
		3	4.0'	4 7 7 4	Saturated medium dense orange coarse sand w/some silt and fine sand, trace of fine gravel.	A-1-b	
5			6.0'		20" RECOVERY		
		4	6.0'	3 4 5 3	Saturated loose tannish orange fine gravel and coarse sand w/some fine sand, trace of silt.	A-1-b	
7.5			8.0'		18" RECOVERY		
		5	8.0'	5 5 3 6	Saturated loose orangish green silty fine sand w/some coarse sand and fine gravel.	A-2-4(0)	
			10.0'		16" RECOVERY		
10		6	10.0'	3 3 6 7	Saturated loose orangish green clayey fine sand w/some coarse sand, trace of silt.	A-2-6(0)	
			12.0'		17" RECOVERY		
12.5		7	12.0'	8 8 9 10	Saturated very stiff orangish green fine sandy clay w/some silt, trace of coarse sand.	A-7-6(5)	
			14.0'		20" RECOVERY		
		8	14.0'	4 3	Saturated loose green clayey fine sand w/some coarse sand, trace of silt.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: C2-1-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				4 6			
			16.0'		22" RECOVERY		
		9	16.0'	4 3 7 7	Saturated loose orangish green silty fine sand w/some coarse sand.	A-2-4(0)	
17.5			18.0'		16" RECOVERY		
		10	18.0'	6 5 4 6	Saturated stiff orangish green fine sandy silt w/trace of coarse sand.	A-4(0)	
20			20.0'		20" RECOVERY		
22.5							
		11	23.0'	6 7 8 7	Saturated medium dense green fine sand w/some coarse sand, trace of silt and organic matter.	A-3	
25			25.0'		20" RECOVERY		
27.5							
		12	28.0'	9 10 10 11	Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter.	A-2-4(0)	
30			30.0'		21" RECOVERY		
32.5							
		13	33.0'	69 7 8 7	Saturated medium dense green silty fine to coarse sand w/some organic matter, trace of fine gravel.	A-2-4(0)	
35			35.0'		21" RECOVERY		
					End of Boring		
37.5							

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: C2-1-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				4 5	silt.		
			16.0'		19" RECOVERY		
		9	16.0'	5 9 11	Saturated very stiff greenish orange fine sandy clay w/some silt, trace of coarse sand.	A-7-6(6)	
17.5			18.0'		17" RECOVERY		
		10	18.0'	9 10 9 10	Saturated medium dense orangish green clayey fine sand w/trace of coarse sand, fine gravel and silt.	A-2-7(2)	
20			20.0'		23" RECOVERY		
22.5							
		11	24.0'	7 8 7 7	Saturated medium dense green silty fine sand w/trace of coarse sand.	A-2-4(0)	
25			26.0'		23" RECOVERY		
27.5							
		12	28.0'	7 9 10 11	Saturated medium dense green clayey fine sand w/some coarse sand, trace of organic matter.	A-2-6(0)	
30			30.0'		22" RECOVERY		
					End of Boring		
32.5							
35							
37.5							

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

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

Boring No.: C2-2-01

Contract: 25-113-01

Boring Location: Sta. 302+18 372 R.T. C.L.

Boring Surface Elev.: + 37.1

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: 0.0
From Depth of: 0.0
To: 31.0
To:

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
12/10/09		10.0	8.0	2.7	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	31.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/10/09	1	0.0'	1 3 5 4	Saturated loose brown silty coarse to fine sand w/some fine gravel, trace of clay.	A-1-b	Topsoil - 2".
2.5		2	2.0' 2.0'	3 4 3 3	19" RECOVERY No Sieve Analysis - Indication of saturated loose brown silty sand w/ some clay.		
5		3	4.0' 4.0'	W/H 1 2 2	6" RECOVERY Saturated very loose green clayey fine to coarse sand w/trace of fine gravel and silt.	A-2-6(0)	
7.5		4	6.0' 6.0'	2 3 2 5	14" RECOVERY Saturated loose brown clayey fine to coarse sand w/trace of silt.	A-2-4(0)	
10		5	8.0' 8.0'	2 2 4 4	16" RECOVERY saturated loose brown clayey fine to coarse sand w/trace of silt.	A-2-6(0)	
12.5		6	10.0' 10.0'	2 5 9 12	17" RECOVERY Saturated medium dense brownish green silty fine to coarse sand.	A-2-4(0)	
		7	12.0' 12.0'	5 9 13 16	18" RECOVERY Saturated medium dense brownish green fine to coarse sand w/some silt.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: C2-2-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0' 14.0'	5 10 12 17	18" RECOVERY Saturated medium dense brownish green fine to coarse sand w/some silt.	A-2-4(0)	
17.5		9	16.0' 16.0'	7 12 18 28	19" RECOVERY Saturated medium dense brownish green fine to coarse sand w/some silt.	A-2-4(0)	
20	12/11/09	10	18.0' 18.0'	10 14 17 19	12" RECOVERY Saturated dense brownish green fine to coarse sand w/some silt.	A-2-4(0)	
22.5			20.0'		22" RECOVERY		
25		11	24.0' 24.0'	9 11 13 24	Saturated medium dense brownish green fine to coarse sand w/some silt.	A-2-4(0)	
27.5			26.0'		15" RECOVERY		
30		12	29.0' 29.0'	8 12 23 31	Saturated dense brownish green fine to coarse sand w/some silt.	A-2-4(0)	
32.5			31.0'		16" RECOVERY		
35					End of Boring		
37.5							

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

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

Boring No.: C2-2-02

Contract: 25-113-01

Boring Location: Sta. 302+40 464 R.T. C.L.

Boring Surface Elev.: + 37.03

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					31.0

Water Level Readings		Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
		12/10/19		10.0	8.0	1.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	31.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/10/09	1	0.0'	W/H 1 W/R W/R	Saturated soft brown clayey silt w/some fine sand, trace of coarse sand and fine gravel.	A-5(7)	Forrest Duff - 2"
2.5		2	2.0'	1 W/R W/R	10" RECOVERY Saturated very loose black organic fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
5		3	4.0'	W/R 2 3	16" RECOVERY Saturated very loose blackish gray coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
7.5		4	6.0'	2 2 2	16" RECOVERY Saturated very loose greenish brown silty fine to coarse sand w/trace of fine gravel and organic matter.	A-2-4(0)	
10		5	8.0'	2 3 5 6	12" RECOVERY Saturated loose greenish brown fine to coarse sand w/some silt.	A-2-4(0)	
		6	10.0'	6 7 11 13	16" RECOVERY Saturated medium dense greenish brown silty fine to coarse sand.	A-2-4(0)	
12.5		7	12.0'	4 7 10 13	14" RECOVERY Saturated medium dense greenish brown fine to coarse sand w/some silt.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: C2-2-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0' 14.0'	3 6 11 14	19" RECOVERY Saturated medium dense greenish brown fine to coarse sand w/some silt.	A-2-4(0)	
17.5		9	16.0' 16.0'	7 10 18 19	17" RECOVERY Saturated medium dense green fine to coarse sand w/some silt.	A-2-4(0)	
20		10	18.0' 18.0'	5 7 12 15	10" RECOVERY Saturated medium dense green fine to coarse sand w/some silt.	A-2-4(0)	
22.5			20.0'		18" RECOVERY		
25		11	24.0' 26.0'	7 9 13 19	Saturated medium dense green fine to coarse sand w/trace of silt. 18" RECOVERY	A-3	
27.5							
30		12	29.0' 31.0'	8 11 18 30	Saturated medium dense brownish green fine sand w/some coarse sand and silt. 16" RECOVERY	A-2-4(0)	
32.5					End of Boring		
35							
37.5							

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

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

Boring No.: CBR2-1

Contract: 25-113-01

Boring Location: Sta. 266+50 39 L.T. C.L.

Boring Surface Elev.: +49.36

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 10.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	8/20/09		10.0	8.0	Dry	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/20/09	1	0.0'	3 3 4 4	Moist loose brown clayey fine sandy fine gravel w/some coarse sand and silt.	A-2-4(0)	Topsoil - 3".
2.5		2	2.0'	9 11 14 18	18" RECOVERY Moist medium dense brown coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	
5		3	4.0'	4 4 8 9	17" RECOVERY Moist medium dense orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
7.5		4	6.0'	6 10 11 10	19" RECOVERY Moist medium dense orange fine to coarse sand w/some fine gravel and silt.	A-2-4(0)	
10		5	8.0'	10 14 13 16	17" RECOVERY Moist medium dense brown fine to coarse and w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		20" RECOVERY End of Boring		
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Well graded sand
with silt



Silty sand

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Notes:

1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 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.: CBR2-10

Contract: 25-113-01

Boring Location: Sta. 355+00 45 L.T. C.L.

Boring Surface Elev.: + 63.76

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	10.0
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/14/09		10.0	8.0	7.6	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/14/09	1	0.5'	6 4 4	Moist loose brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	Topsoil - 6".
			2.0'		12" RECOVERY		
2.5		2	2.0'	3 3 2	Moist loose brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	4 7 7 5	Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
5			6.0'		18" RECOVERY		
		4	6.0'	5 3 2 1	Saturated loose brown coarse to fine sand w/some silt.	A-2-4(0)	
			8.0'		18" RECOVERY		
		5	8.0'	1 1 2 2	Saturated very loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
10			10.0'		17" RECOVERY		
					End of Boring		
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 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.: CBR2-11

Contract: 25-113-01

Boring Location: Sta. 20+00 30 L.T. C.L.

Boring Surface Elev.: + 68.30

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/8/10		10.0	8.0	4.8	

Pay Quantities:

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

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/8/10	1	0.0'	3 5 3 3	Wet firm gray clayey silt w/some fine sand, trace of coarse sand and fine gravel.	A-4(2)	
2.5		2	2.0'	10 10 10 10	11" RECOVERY Wet stiff gray fine sandy silt w/trace of coarse sand.	A-4(0)	
5		3	4.0'	6 5 8 4	20" RECOVERY Saturated medium dense tan silty coarse to fine sand w/some fine gravel, trace of clay.	A-2-4(0)	
7.5		4	6.0'	5 7 5 5	21" RECOVERY Saturated medium dense tan fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
10		5	8.0'	3 7 7 7	20" RECOVERY Saturated medium dense tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		19" RECOVERY End of Boring		
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/08/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 ATV.
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 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.: CBR2-12

Contract: 25-113-01

Boring Location: Sta. 30+00.5 L.T. C.L.

Boring Surface Elev.: + 71.30

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 10.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/8/10		10.0	8.0	4.7	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/8/10	1	0.5'	4 4 5	Wet firm brown clayey silt w/trace of fine to coarse sand.	A-4(7)	Topsoil - 5".
			2.0'		14" RECOVERY		
2.5		2	2.0'	9 10 10 9	Wet very stiff brownish orange clayey coarse to fine sandy silt w/trace of fine gravel.	A-4(0)	
			4.0'		20" RECOVERY		
		3	4.0'	3 7 7 6	Saturated medium dense tan clayey fine sand w/some coarse sand, trace of fine gravel and silt.	A-2-6(0)	
5			6.0'		20" RECOVERY		
		4	6.0'	7 7 8 7	Saturated medium dense orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
7.5			8.0'		21" RECOVERY		
		5	8.0'	4 4 4 3	Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
10			10.0'		22" RECOVERY		
					End of Boring		
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/08/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 ATV.
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 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.: CBR2-13

Contract: 25-113-01

Boring Location: Sta. 40+00 0 C.L.

Boring Surface Elev.: + 69.10

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To: 10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/8/10		10.0	8.0	4.6	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/8/10	1	0.5'	2 3 4	Wet firm brown clayey fine to coarse sandy silt w/trace of fine gravel.	A-4(1)	Topsoil - 5".
			2.0'		14" RECOVERY		
2.5		2	2.0'	11 19 14 16	Wet dense orange silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			4.0'		19" RECOVERY		
		3	4.0'	4 2 8 6	Saturated loose orange silty coarse to fine sand w/trace of fine gravel.	A-1-b	
5			6.0'		21" RECOVERY		
		4	6.0'	3 5 5	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
7.5			8.0'		22" RECOVERY		
		5	8.0'	6 6 7 7	Saturated medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
10			10.0'		20" RECOVERY		
					End of Boring		
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/08/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 ATV.
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 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.: CBR2-14

Contract: 25-113-01

Boring Location: Sta. 50+00 0 C.L.

Boring Surface Elev.: + 63.40

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/8/10		10.0	8.0	5.0	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/8/10	1	0.5'	4 1 2	Wet firm brown clayey silt w/trace of fine to coarse sand.	A-4(7)	Topsoil - 5".
			2.0'		13" RECOVERY		
2.5		2	2.0'	3 5 8	Wet stiff brown fine gravelly clay w/some fine sand, trace of coarse sand and silt.	A-6(3)	
			4.0'		18" RECOVERY		
		3	4.0'	6 10 9 10	Saturated medium dense brown fine gravelly coarse sand w/some fine sand and silt.	A-1-b	
5			6.0'		20" RECOVERY		
		4	6.0'	7 8 3 4	Saturated medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
7.5			8.0'		21" RECOVERY		
		5	8.0'	3 5 8 6	Saturated medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		20" RECOVERY		
					End of Boring		
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/08/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 ATV.
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 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.: CBR2-15

Contract: 25-113-01

Boring Location: Sta. 60+00.5 L.T. C.L.

Boring Surface Elev.: + 65.70

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/8/10		10.0	8.0	4.7	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/8/10	1	0.5'	1 2	Wet soft brownish orange silt w/some clay, trace of fine to coarse sand.	A-4(3)	Topsoil - 4".
			2.0'		14" RECOVERY		
2.5		2	2.0'	8 12 18 14	Wet medium dense brown fine gravelly fine to coarse sand w/some silt.	A-1-b	
			4.0'		20" RECOVERY		
		3	4.0'	8 12 13 15	Saturated medium dense brown fine gravelly coarse sand w/trace of fine sand and silt.	A-1-b	
5			6.0'		20" RECOVERY		
		4	6.0'	14 10 8 7	Saturated medium dense brown fine gravelly coarse sand w/some fine sand and silt.	A-1-b	
7.5			8.0'		22" RECOVERY		
		5	8.0'	10 11 11 15	Saturated medium dense brown fine gravelly coarse sand w/trace of fine sand and silt.	A-1-b	
10			10.0'		19" RECOVERY		
					End of Boring		
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/08/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
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 recomendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows 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.: CBR2-2

Contract: 25-113-01

Boring Location: Sta. 269+00 0 C.L.

Boring Surface Elev.: + 51.32

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: 3/14
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 10.0

Water Level Readings
Date 8/21/09
Time

Depth of Hole 10.0
Depth of Casing 8.0
Depth of Water Dry
Elev. of Water

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/21/09	1	0.5'	3 5 8	Moist firm brown fine sandy silty clay w/some coarse sand.	A-6(7)	Topsoil - 5".
			2.0'		12" RECOVERY		
2.5		2	2.0'	8 7 8 7	Moist medium dense brown fine gravelly coarse to fine sand w/some silt.	A-1-b	
			4.0'		15" RECOVERY		
		3	4.0'	5 7 8 8	Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
5			6.0'		20" RECOVERY		
		4	6.0'	13 25 35 21	Moist very dense brown fine gravelly fine to coarse sand w/some silt.	A-2-4(0)	
7.5			8.0'		16" RECOVERY		
		5	8.0'	9 11 13	Moist medium dense brown fine to coarse sand w/some fine gravel and silt.	A-2-4(0)	
10			10.0'		13" RECOVERY		
					End of Boring		
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/21/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 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.: CBR2-3

Contract: 25-113-01

Boring Location: Sta. 271+50 39 R.T. C.L.

Boring Surface Elev.: +61.25

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	
	Hollow Stem Auger:		From Depth of:		To:	10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	8/20/09		10.0	8.0	Dry	
						61.3
						61.3
						61.3

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/20/09	1	0.5'	6 6 7	Moist medium dense brown silty coarse to fine sand w/trace of fine gravel.	A-1-b	Topsoil - 4".
			2.0'		15" RECOVERY		
2.5		2	2.0'	8 8 7 7	Moist medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			4.0'		17" RECOVERY		
		3	4.0'	5 11 10 9	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
5			6.0'		16" RECOVERY		
		4	6.0'	7 8 13 10	Moist medium dense orange fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
7.5			8.0'		16" RECOVERY		
		5	8.0'	5 5 5	Moist loose orange fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
10			10.0'		23" RECOVERY		
					End of Boring		
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 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.: CBR2-4

Contract: 25-113-01

Boring Location: Sta. 307+00 44 L.T. C.L.

Boring Surface Elev.: + 64.11

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	8/19/09		10.0	8.0	Dry	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/19/09	1	0.5'	10 13 10	Moist very stiff brown silt w/some fine gravel, clay and fine to coarse sand.	A-4(0)	Topsoil - 4".
			2.0'		15" RECOVERY		
2.5		2	2.0'	8 9 13 9	Moist medium dense brown silty fine gravelly fine to coarse sand.	A-2-4(0)	
			4.0'		14" RECOVERY		
		3	4.0'	4 9 10 9	Moist medium dense orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
5			6.0'		18" RECOVERY		
		4	6.0'	7 11 9 9	Moist medium dense orange silty coarse to fine sand.	A-2-4(0)	
7.5			8.0'		20" RECOVERY		
		5	8.0'	7 11 6 8	Moist medium dense orange coarse to fine sand w/some silt.	A-2-4(0)	
10			10.0'		21" RECOVERY		
					End of Boring		
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 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.: CBR2-5

Contract: 25-113-01

Boring Location: Sta. 310+00 34 R.T. C.L.

Boring Surface Elev.: + 65.30

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	8/21/09		10.0	8.0	Dry	

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

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/21/09	1	0.5'	3 3	Moist firm brown clayey silt w/some fine to coarse sand.	A-4(2)	Topsoil - 5".
			2.0'		12" RECOVERY		
2.5		2	2.0'	4 6 7 6	Moist medium dense brown clayey coarse to fine sand w/trace of silt and fine gravel.	A-2-6(0)	
			4.0'		17" RECOVERY		
5		3	4.0'	4 7 6 8	Moist medium dense brown silty coarse to fine sand.	A-2-4(0)	
			6.0'		18" RECOVERY		
7.5		4	6.0'	5 5 5 6	Moist loose brown silty coarse to fine sand.	A-2-4(0)	
			8.0'		20" RECOVERY		
10		5	8.0'	3 1 3 2	Saturated very loose brown silty fine to coarse sand.	A-2-4(0)	
			10.0'		20" RECOVERY		
					End of Boring		
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/21/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 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.: CBR2-6

Contract: 25-113-01

Boring Location: Sta. 347+00 45 L.T. C.L.

Boring Surface Elev.: + 61.92

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To: 10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/9/09		10.0	8.0	7.2	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/9/09	1	0.5'	4 5 4		A-6(2)	Topsoil - 5".
			2.0'		18" RECOVERY		
2.5		2	2.0'	8 9 10 12		A-2-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	8 9 10 9		A-1-b	
5			6.0'		16" RECOVERY		
		4	6.0'	8 9 7 9		A-1-b	
7.5			8.0'		19" RECOVERY		
		5	8.0'	4 3 2 2		A-1-b	
10			10.0'		17" RECOVERY		
					End of Boring		
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/09/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 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.: CBR2-7

Contract: 25-113-01

Boring Location: Sta. 349+00 33 R.T. C.L.

Boring Surface Elev.: + 65.23

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	10.0
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/9/09		10.0	8.0	Dry	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/9/09	1	0.5'	3 5 6	Moist firm brown fine to coarse sandy clay w/trace of silt and fine gravel.	A-6(1)	Topsoil - 5".
			2.0'		8" RECOVERY		
2.5		2	2.0'	5 6 5	Moist medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	9 9 14 20	Moist medium dense tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
5			6.0'		14" RECOVERY		
		4	6.0'	12 16 14 17	Moist medium dense tan coarse sand w/some silt and fine sand, trace of fine gravel.	A-1-b	
7.5			8.0'		22" RECOVERY		
		5	8.0'	6 4 3 3	Wet loose grayish brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		18" RECOVERY		
					End of Boring		
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/09/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 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.: CBR2-8

Contract: 25-113-01

Boring Location: Sta. 351+00 45 L.T. C.L.

Boring Surface Elev.: + 64.75

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	10.0
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/14/09		10.0	8.0	8.1	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/14/09	1	0.5'	6 4 4	Moist stiff brown fine to coarse sandy silt w/some clay, trace of fine gravel.	A-4(0)	Topsoil - 5".
			2.0'		10" RECOVERY		
2.5		2	2.0'	3 5 7 7	Moist medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			4.0'		16" RECOVERY		
		3	4.0'	3 5 8 26	Moist medium dense brown silty fine sand w/some coarse sand, trace of fine gravel.	A-2-4(0)	
5			6.0'		12" RECOVERY		
		4	6.0'	4 6 7 8	Moist medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
7.5			8.0'		18" RECOVERY		
		5	8.0'	5 6 6 7	Wet medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		16" RECOVERY		
					End of Boring		
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 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.: CBR2-9

Contract: 25-113-01

Boring Location: Sta. 353+00 33 R.T. C.L.

Boring Surface Elev.: + 65.15

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	
	Hollow Stem Auger:		From Depth of:		To:	10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/2/09		10.0	8.0	Dry	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/2/09	1	0.5'	3 3 5	Moist loose brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	Topsoil - 5".
			2.0'		16" RECOVERY		
2.5		2	2.0'	2 2 2	Moist very loose brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	3 4 5 5	Moist loose orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
5			6.0'		19" RECOVERY		
		4	6.0'	6 4 5	Moist loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
7.5			8.0'		22" RECOVERY		
		5	8.0'	5 6 6 6	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		22" RECOVERY		
					End of Boring		
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/02/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 45 ATV.
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 recomendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows are uncorrected.

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/8/2009 using a 3 1/4- inch diameter continuous flight power 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.

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/9/2009 using a 3 1/4- inch diameter continues flight power 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 S.R. 1

Boring No.: IB2-10-03

Contract: 25-113-01

Boring Location: Sta. 377+50 260 R.t. C.L.

Boring Surface Elev.: + 61.3

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/9/09		10	8.0	6.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/9/09	1	1.0'	8 9	Moist medium dense gray silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	Cultivated Soils 12".
2			2.0'		6" RECOVERY		
		2	2.0'	4 6 6 5	Moist medium dense gray coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			4.0'		15" RECOVERY		
4		3	4.0'	7 10 9 9	Moist medium dense brown silty coarse sand w/some fine sand and fine gravel.	A-2-4(0)	USDA Classification: Clay Loam
			6.0'		11" RECOVERY		
		4	6.0'	5 6 6 5	Saturated medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		16" RECOVERY		
8		5	8.0'	4 4 3 3	Saturated loose orange coarse to fine sand w/some fine gravel and silt.	A-1-b	
			10.0'		14" RECOVERY		
10					End of Boring		
12							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/9/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: IB2-10-04

Contract: 25-113-01

Boring Location: Sta. 377+50 365 R.t. C.L.

Boring Surface Elev.: + 59.8

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/10/09		10.0	8.0	6.4	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.0'	1 3 4 5	Moist firm gray clayey coarse to fine sandy silt w/trace of fine gravel.	A-4(0)	Forrest Duff - 2"
2		2	2.0' 2.0'	8 12 16 16	14" RECOVERY Moist medium dense tan coarse sand w/some silt, fine sand and fine gravel.	A-1-b	USDA Classification: Loamy Sand
4		3	4.0' 4.0'	8 12 11 11	21" RECOVERY Moist medium dense tan coarse to fine sand w/some silt and fine gravel.	A-1-b	
6		4	6.0' 6.0'	8 9 8 8	18" RECOVERY Saturated medium dense orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
8		5	8.0' 8.0'	2 2 1 2	21" RECOVERY Saturated very loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		19" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: IB2-10-05

Contract: 25-113-01

Boring Location: Sta. 378+62 260 R.t. C.L.

Boring Surface Elev.: + 66.4

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/10/09		10	8.0	5.8	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.5'	3 3 3	Moist firm gray fine gravelly silt w/some fine to coarse sand and clay.	A-4(0)	Forrest Duff - 4"
2		2	2.0'	5 6 7 8	18" RECOVERY Moist stiff gray clayey coarse sandy silt w/some fine sand and fine gravel.	A-4(0)	
4		3	4.0'	8 9 8	24" RECOVERY Moist medium dense brown coarse to fine sand w/some silt and fine gravel.	A-1-b	USDA Classifica : Loamy Sand
6		4	6.0'	4 6 5 5	12" RECOVERY Wet medium dense brown fine gravelly coarse to fine sand w/some silt.	A-1-b	
8		5	8.0'	3 4 4 3	20" RECOVERY Wet loose brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
10			10.0'		24" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4- inch diameter continuous flight power 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.

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: IB2-10-07

Contract: 25-113-01

Boring Location: Sta. 378+65 382 R.t. C.L.

Boring Surface Elev.: + 59.6

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/10/09		10.0	8.0	6.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.0'	1 1 1 6	Moist soft gray fine sandy silt w/some coarse sand and clay, trace of fine gravel.	A-4(0)	Forrest Duff - 2". USDA Classifica : Loam
2		2	2.0' 2.0'	13 11 12 13	Moist very stiff gray fine sandy silt w/some coarse sand, fine gravel and clay.	A-4(0)	
4		3	4.0' 4.0'	6 9 12 11	Moist medium dense orange coarse to fine sand w/some silt and fine gravel.	A-1-b	
6		4	6.0' 6.0'	8 7 7 6	Saturated medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
8		5	8.0' 8.0'	4 2 5 2	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: IB2-11-01

Contract: 25-113-01

Boring Location: Sta. 383+34 190 L.t. C.L.

Boring Surface Elev.: + 59.6

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 7/9/10	Time	10.0	8.0	5.2	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T.Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/9/09	1	0.5'	6 6 4	Moist loose gray silty fine to coarse sand w/trace of fine gravel and clay.	A-2-4(0)	Cultivated Soil - 7". USDA classificat
2		2	2.0' 2.0'	6 6 6	9" RECOVERY Moist medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	: Sandy Loam
4		3	4.0' 4.0'	4 5 8 8	17" RECOVERY Wet medium dense orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
6		4	6.0' 6.0'	4 3 3 2	15" RECOVERY Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
8		5	8.0' 8.0'	2 3 4 3	17" RECOVERY Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		18" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/9/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: IB2-11-02

Contract: 25-113-01

Boring Location: Sta 348+57190 L.t. C.L.

Boring Surface Elev.: + 60.2

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To: 8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/27/10		10.0	8.0	4.0	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/27/10	1	0.5'	2 2 5	Wet soft gray silt w/some fine to coarse sand, fine gravel and clay.	A-4(1)	Topsoil - 8".
2			2.0'		15" RECOVERY		
		2	2.0'	7 7 9 10	Wet medium dense gray silty fine gravelly fine sand w/some coarse sand, trace of clay.	A-2-4(0)	
4			4.0'		18" RECOVERY		
		3	4.0'	3 4 4 2	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6			6.0'		17" RECOVERY		
		4	6.0'	2 3 4 3	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
8			8.0'		14" RECOVERY		
		5	8.0'	1 1 2 2	Saturated very loose orange fine to coarse sand w/some silt.	A-2-4(0)	
10			10.0'		18" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/27/2010 using a 3 1/4- inch diameter continuous flight power 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.: IB2-12-01

Contract: 25-113-01

Boring Location: Sta. 397+50 220 R.t. C.L.

Boring Surface Elev.: + 60.0

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/27/09		10.0	8.0	3.6	

Pay Quantities:

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

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/27/10	1	0.5'	2 3 3	Moist firm gray coarse sandy silt w/some fine sand, fine gravel and clay.	A-4(0)	Topsoil - 5".
2		2	2.0' 2.0'	6 7 7 6	12" RECOVERY Saturated medium dense gray coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
4		3	4.0' 4.0'	2 3 3 3	18" RECOVERY Saturated loose grayish brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6		4	6.0' 6.0'	2 3 3 3	16" RECOVERY Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
8		5	8.0' 8.0'	2 5 4 3	10" RECOVERY Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		12" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/27/2010 using a 3 1/4- inch diameter continuous flight power 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.: IB2-12-02

Contract: 25-113-01

Boring Location: Sta. 398+82 220 R.t. C.L.

Boring Surface Elev.: + 61.9

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.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0 **To:** 8.0
To:

Water Level Readings
Date **Time**
7/15/10

Time

Depth of Hole
10

Depth of Casing
8.0

Depth of Water
5.7

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: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/15/09	1	0.0'	2 4 5 7	Moist stiff brown silt w/some fine to coarse sand, trace of fine gravel.	A-4(0)	Forrest Duff - 2"
2			2.0'		14" RECOVERY		
		2	2.0'	6 13 10 9	Moist medium dense orange clayey coarse to fine sand w/trace of silt and fine gravel.	A-2-4(0)	USDA Classification: Sandy Loam
4			4.0'		19" RECOVERY		
		3	4.0'	4 6 7 6	Wet medium dense orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
6			6.0'		18" RECOVERY		
		4	6.0'	4 4 5 4	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
8			8.0'		5" RECOVERY		
		5	8.0'	1 3 2 3	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		22" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/15/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: IB2-13-01

Contract: 25-113-01

Boring Location: Sta. 400+50 215 R.t. C.L.

Boring Surface Elev.: + 62.8

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	140	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/15/09		10.0	8.0	7.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;	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: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/15/09	1	0.0'	3 4 5 5	Moist stiff brown clayey silt w/some coarse to fine sand, trace of fine gravel.	A-4(1)	Forrest Duff - 2"
2		2	2.0' 2.0'	7 9 10 8	17" RECOVERY Moist medium dense brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
4		3	4.0' 4.0'	5 7 8 7	18" RECOVERY Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA Classifica : Loamy Sand
6		4	6.0' 6.0'	4 3 7 7	17" RECOVERY Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
8		5	8.0' 8.0'	3 3 3 5	16" RECOVERY Saturated loose brown coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
10			10.0'		18" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/15/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: IB2-13-02

Contract: 25-113-01

Boring Location: Sta. 401+50 225 R.t. C.L.

Boring Surface Elev.: + 70.26

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/15/09		10.0	8.0	7.8	

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.
 U-Samples: Ft.
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/15/09	1	0.0'	3 4 6 6	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(3)	Forrest Duff - 2"
2		2	2.0' 2.0'	5 6 6	18" RECOVERY Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA Classification: Loamy Sand
4		3	4.0' 4.0'	7 9 9 9	18" RECOVERY Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6		4	6.0' 6.0'	5 5 5	20" RECOVERY Saturated medium dense brown coarse to fine sand w/some silt, trace of gravel.	A-1-b	
8		5	8.0' 8.0'	1 2 2 2	17" RECOVERY Saturated very loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		13" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/15/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: IB2-3-01

Contract: 25-113-01

Boring Location: Sta. 313+00, 350' Lt. C.L.

Boring Surface Elev.: + 50.7

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 8.0

Water Level Readings		Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
		8-20-2009		10.0	8.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/20/09	1	1.0'	5 6	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 11" RECOVERY	A-4(2)	Topsoil - 10".
2		2	2.0'	5 13 14 10	Moist medium dense brown fine to coarse sand w/some silt and fine gravel. 15" RECOVERY	A-2-4(0)	
4		3	4.0'	4 3 6 8	Moist stiff tan fine sandy clay w/some coarse sand and fine gravel, trace of silt. 20" RECOVERY	A-6(2)	
6		4	6.0'	13 18 23 20	Moist dense brown fine gravelly coarse sand w/some fine sand, trace of silt. 17" RECOVERY	A-1-b	
8		5	8.0'	10 11 13 9	Moist medium dense brown coarse sandy fine gravel w/some fine sand and silt. 15" RECOVERY	A-1-b	USDA Classification: Loamy Sand
10			10.0'		End of Boring		
12							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Clayey sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 45.
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.: IB2-3-02

Contract: 25-113-01

Boring Location: Sta. 313+50, 275' Lt. C.L.

Boring Surface Elev.: + 56.9

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					8.0

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
8/19/2009		10.0	8.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/19/09	1	0.0'	2 6 4 8	Moist stiff brown clayey silt w/some fine sand, trace of coarse sand.	A-4(6)	USDA Classification: Silt Loam
2		2	2.0'	8 30 20 10	12" RECOVERY Moist dense brown fine gravelly coarse to fine sand w/some silt.	A-1-b	
4		3	4.0'	12 18 19 12	16" RECOVERY Moist dense tan coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	
6		4	6.0'	13 20 12 10	14" RECOVERY Moist dense brown coarse sand w/some fine sand, fine gravel and silt.	A-1-b	
8		5	8.0'	10 12 11 10	19" RECOVERY Moist medium dense brown coarse sand w/some fine sand and fine gravel, trace of silt.	A-1-b	
10			10.0'		18" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
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.: IB2-3-03

Contract: 25-113-01

Boring Location: Sta. 314+00, 200' Lt. C.L.

Boring Surface Elev.: + 56.2

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	8/19/2010		8.0	8.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/19/09	1	1.0'	7 9	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(2)	Topsoil - 10".
2			2.0'		9" RECOVERY		
		2	2.0'	8 13 18 14	Moist dense brown silty fine to coarse sand w/some clay, trace of fine gravel.	A-2-4(0)	
			4.0'		19" RECOVERY		
4		3	4.0'	13 14 10 14	Moist medium dense tan fine gravelly coarse to fine sand w/some silt.	A-1-b	
			6.0'		14" RECOVERY		
		4	6.0'	12 10 8 10	Moist medium dense tan coarse to fine sand w/some fine gravel and silt.	A-1-b	
			8.0'		18" RECOVERY		
8		5	8.0'	5 6 6 5	Moist medium dense tan fine to coarse sand w/trace of silt.	A-3	USDA Classification: Sand
			10.0'		19" RECOVERY		
10					End of Boring		
12							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 45.
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.

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 45.
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.: IB2-3-06

Contract: 25-113-01

Boring Location: Sta. 315+25, 195' Lt. C.L.

Boring Surface Elev.: + 52.5

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	8/19/2010		10.0	8.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
2	8/19/09	1	1.0'	6 8	Moist stiff brown silty fine sandy clay w/trace of coarse sand. 10" RECOVERY	A-6(5)	Topsoil - 10".
4		2	2.0'	10 22 23 13	Moist dense brown fine to coarse sand w/some silt and fine gravel. 18" RECOVERY	A-2-4(0)	
6		3	4.0'	11 7 9 10	Moist medium dense brown fine to coarse sand w/some silt, trace of fine gravel. 15" RECOVERY	A-2-4(0)	
8		4	6.0'	13 14 14 9	Moist medium dense tan coarse to fine sand w/some silt and fine gravel. 21" RECOVERY	A-1-b	
10		5	8.0'	5 6 6 5	Moist medium dense tan fine to coarse sand w/some silt, trace of fine gravel. 16" RECOVERY	A-2-4(0)	USDA Classification: Loamy Sand
12			10.0'		End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 45.
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.: IB2-5-02

Contract: 25-113-01

Boring Location: Sta. 343+56, 200' Lt. C.L.

Boring Surface Elev.: + 59.8

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: 8.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
8/18/2009		10.0	8.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/18/09	1	0.5'	2 3 4	Moist firm brown clayey silt w/some fine sand, trace of coarse sand.	A-4(6)	Topsoil - 5". USDA Classifica : Silt Loam
2		2	2.0'	6 7	10" RECOVERY Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(1)	
		2A	3.0'	14 10	11" RECOVERY Moist medium dense brown fine gravelly fine to coarse sand w/some silt.	A-1-b	
4		3	4.0'	4 11 10 10	11" RECOVERY Moist medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6		4	6.0'	8 10 11 10	19" RECOVERY Moist medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
8		5	8.0'	6 4 3 2	18" RECOVERY Wet loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
10			10.0'		20" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/18/2009 using a 3 1/4- inch diameter continuous flight power 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.: IB2-5-03

Contract: 25-113-01

Boring Location: Sta. 344+26, 260' Lt. C.L.

Boring Surface Elev.: + 60.7

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	
	Hollow Stem Auger:		From Depth of:		To:	8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	8/18/2010		10.0	8.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/18/09	1	1.0'	8 9	Moist stiff brown silty clay w/some fine to coarse sand, trace of fine gravel.	A-6(5)	Topsoil - 10".
2			2.0'		8" RECOVERY		
		2	2.0'	18 20 20 40	Moist dense brown coarse to fine sand w/some silt and fine gravel.	A-1-b	
			4.0'		18" RECOVERY		
4		3	4.0'	5 8 8 8	Moist medium dense brown coarse sand w/some silt and fine sand, trace of fine gravel.	A-1-b	
			6.0'		16" RECOVERY		
		4	6.0'	8 8 7 5	Moist medium dense orange coarse sand w/some fine sand and silt.	A-1-b	
			8.0'		17" RECOVERY		
8		5	8.0'	3 2 2 3	Moist very loose orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	USDA Classification: Loamy Sand
			10.0'		20" RECOVERY		
10					End of Boring		
12							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/18/2009 using a 3 1/4- inch diameter continuous flight power 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.: IB2-5-04

Contract: 25-113-01

Boring Location: Sta. 344+91, 195 Lt. C.L.

Boring Surface Elev.: + 61.4

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	8/18/2009		10.0	8.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/18/09	1	0.5'	5 7 8	Moist stiff brown fine sandy clay w/some coarse sand, trace of fine gravel and silt.	A-6(1)	Topsoil - 4"
2		2	2.0'	8 11 8 10	14" RECOVERY Moist medium dense brown silty fine to coarse sand w/some fine gravel.	A-2-4(0)	
4		3	4.0'	6 8 10 9	19" RECOVERY Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6		4	6.0'	5 5 6 4	19" RECOVERY Moist medium dense brown coarse to fine sand w/some silt.	A-1-b	
8		5	8.0'	4 5 4 3	20" RECOVERY Moist loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA Classification: Loamy Sand
10			10.0'		20" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/18/2009 using a 3 1/4- inch diameter continues flight power 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.: IB2-7-01

Contract: 25-113-01

Boring Location: Sta. 349+55, 250' Lt. C.L.

Boring Surface Elev.: + 61.8

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 7/7/2009	Time	10.0	10.0	9.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/7/09	1	0.5'	4 2 2	Moist loose brown silty coarse sand w/some fine gravel and fine sand.	A-1-b	Cultivated Soil - 5".
2		2	2.0'	2 3 4 5	12" RECOVERY Moist loose brown coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
4		3	4.0'	6 12 21 21	16" RECOVERY Moist dense brown coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
6		4	6.0'	19 16 17 17	16" RECOVERY Moist dense brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
8		5	8.0'	9 11 7 5	21" RECOVERY Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA Classification: Loamy Sand
10			10.0'		21" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: IB2-7-02

Contract: 25-113-01

Boring Location: Sta. 350+47, 175' Lt. C.L.

Boring Surface Elev.: + 61.8

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					8.0

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
7/7/2009		10.0	10.0	9.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/7/09	1	1.0'	3 3	Moist firm brown clayey silt w/some fine to coarse sand.	A-4(5)	Cultivated Soil - 9".
2			2.0'		12" RECOVERY		
		2	2.0'	4 4 4 4	Moist loose brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			4.0'		16" RECOVERY		
4		3	4.0'	5 3 3 5	Moist loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			6.0'		20" RECOVERY		
		4	6.0'	6 3 2 2	Moist loose orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	USDA Classification: Sandy Loam
			8.0'		21" RECOVERY		
8		5	8.0'	3 1 2 2	Wet very loose orange coarse to fine sand w/some silt.	A-2-4(0)	
			10.0'		16" RECOVERY		
10					End of Boring		
12							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: IB2-7-03

Contract: 25-113-01

Boring Location: Sta. 351+32, 245' Lt. C.L.

Boring Surface Elev.: + 60.6

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:
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:** 8.0
To:

Water Level Readings
Date **Time**
7/7/2009

Depth of Hole **Depth of Casing** **Depth of Water** **Elev. of Water**
10.0 10.0 9.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.; Dia. U-Sample Boring: Ft.
No. of 2 in. Dia. Shelby Tubes: ; No. of U-Samples: Ft.
2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/7/09	1	0.5'	3 2 3	Wet firm brown clayey silt w/some fine sand, trace of coarse sand.	A-4(4)	Cultivated Soil - 5". USDA Classification: Silt Loam
2		2	2.0' 2.0'	6 6 6	10" RECOVERY Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
4		3	4.0' 4.0'	8 7 6 7	15" RECOVERY Wet medium dense orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
6		4	6.0' 6.0'	7 7 5 7	19" RECOVERY Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
8		5	8.0' 8.0'	5 4 5 5	20" RECOVERY Wet loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		18" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: IB2-8-01

Contract: 25-113-01

Boring Location: Sta. 361+00, 190' Lt. C.L.

Boring Surface Elev.: + 61.0

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3-1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			10.0	8.0	7.8	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	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	7/7/09	1	1.0'	3 4	Wet firm orange clay w/some silt, coarse to fine sand and fine gravel.	A-6(6)	Cultivated Soil - 12".
2			2.0'		9" RECOVERY		
3		2	2.0'	6 12 14 12	Wet medium dense brown fine gravelly coarse to fine sand w/some silt.	A-1-b	USDA Classification: Loam
4			4.0'		14" RECOVERY		
5		3	4.0'	7 12 11 16	Wet medium dense brownish orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6			6.0'		18" RECOVERY		
7		4	6.0'	11 8 7 8	Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
8			8.0'		21" RECOVERY		
9		5	8.0'	2 2 3 3	Wet loose orange silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
10			10.0'		18" RECOVERY		
11					End of Boring		
12							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: IB2-8-02

Contract: 25-113-01

Boring Location: Sta. 362+50 190 L.t. C.L.

Boring Surface Elev.: + 60.2

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	8.0
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/7/09		10	8	6.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	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
	7/7/09	1	1.0'	3 4	Moist firm gray clayey silt w/some coarse to fine sand and fine gravel.	A-4(2)	Cultivated Soil - 12".
2			2.0'		10" RECOVERY		
		2	2.0'	6 12 12 10	Moist medium dense yellowish brown coarse sand w/some fine gravel, fine sand and silt.	A-1-b	
4			4.0'		12" RECOVERY		
		3	4.0'	5 6 6 7	Moist medium dense yellow silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	USDA Classification: Sandy Loam
6			6.0'		20" RECOVERY		
		4	6.0'	6 5 5 4	Wet loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
8			8.0'		24" RECOVERY		
		5	8.0'	2 3 2 2	Wet loose orange coarse to fine sand w/some silt.	A-1-b	
10			10.0'		18" RECOVERY		
					End of Boring		
12							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: IB2-9-01

Contract: 25-113-01

Boring Location: Sta. 372+00 180 L.t. C.L.

Boring Surface Elev.: + 64.5

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:		IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/8/09		10	8.0	8.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/8/09	1	0.5'	3 2 4	Moist firm brown clayey silt w/some fine to coarse sand, trace of fine gravel.	A-4(4)	Cultivated Soil - 5". USDA Classification: Loam
2		2	2.0' 2.0'	5 6 5 6	14" RECOVERY Moist medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
4		3	4.0' 4.0'	7 7 7 7	16" RECOVERY Moist medium dense orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
6		4	6.0' 6.0'	5 6 5 6	17" RECOVERY Moist medium dense orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
8		5	8.0' 8.0'	5 2 4 3	23" RECOVERY Moist loose orange coarse sand w/some fine gravel and fine sand, trace of silt.	A-1-b	
10			10.0'		16" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/8/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: IB2-9-02

Contract: 25-113-01

Boring Location: Sta. 373+25 180 L.t. C.L.

Boring Surface Elev.: + 64.6

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:		IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/8/09		10.0	8.0	8.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/8/09	1	0.5'	3 6 5	Moist stiff brown silty fine sandy clay w/some coarse sand, trace of fine gravel.	A-6(4)	Cultivated Soil - 5".
2		2	2.0'	4 6 6 4	12" RECOVERY Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
4		3	4.0'	7 8 8 10	16" RECOVERY Moist medium dense orange coarse sand w/some fine sand, silt and fine gravel.	A-1-b	
6		4	6.0'	7 5 6 5	17" RECOVERY Moist medium dense orange coarse sand w/some silt, trace of fine gravel and fine sand.	A-1-b	USDA Classification: Sand
8		5	8.0'	5 4 5 3	16" RECOVERY Moist loose tan coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
10			10.0'		14" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/8/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: IB2-9-03

Contract: 25-113-01

Boring Location: Sta. 374+75 180 L.t. C.L.

Boring Surface Elev.: + 65.3

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: **To:**
From Depth of: 0.0 **To:** 8.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/8/09		10.0	8.0	9.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/8/09	1	0.5'	4 4 4	Moist firm brown clayey silt w/some fine to coarse sand.	A-4(2)	Cultivated Soil - 5".
2		2	2.0' 2.0'	4 7 7	10" RECOVERY Moist medium dense brown clayey fine to coarse sand w/trace of silt and fine gravel.	A-2-4(0)	
4		3	4.0' 4.0'	8 10 10 9	21" RECOVERY Moist medium dense brown silty fine to coarse sand w/some fine gravel.	A-2-4(0)	
6		4	6.0' 6.0'	8 6 10 9	18" RECOVERY Moist medium dense orange silty coarse to fine sand w/trace of fine gravel.	A-1-b	
8		5	8.0' 8.0'	4 4 3 4	20" RECOVERY Moist loose orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	USDA Classification: Sand
10			10.0'		16" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Clayey sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/8/2009 using a 3 1/4- inch diameter continuous flight power 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: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-06

Contract: 25-113-01

Boring Location: Sta. 327+00, 80' Lt. C.L.

Boring Surface Elev.: + 60.4

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	
	Hollow Stem Auger:		From Depth of:		To:	8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	8/19/09		10.0	8.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/19/09	1	1.0'	6 10	Moist stiff brown clayey coarse sandy silt w/some fine sand, trace of fine gravel.	A-4(3)	Topsoil - 10".
3		2	2.0'	9 8 9	Moist medium dense brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
		3	4.0'	6 5 5	Moist medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
6		4	6.0'	5 6 7 7	Moist medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
		5	8.0'	5 6 7 4	Moist medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
9			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4-inch diameter continuous flight power 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-07

Contract: 25-113-01

Boring Location: Sta. 332+00, 80' Rt. C.L.

Boring Surface Elev.: + 61.7

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					8.0

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
8/19/09		10.0	8.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/19/09	1	0.5'	5 5 9	Moist stiff brown clayey silt w/some fine to coarse sand, trace of fine gravel. 12" RECOVERY	A-4(3)	Topsoil - 6".
3		2	2.0'	6 8 9 9	Moist medium dense orange silty coarse to fine sand. 16" RECOVERY	A-2-4(0)	
		3	4.0'	4 6 6 6	Moist medium dense orange coarse to fine sand w/some silt. 19" RECOVERY	A-1-b	
6		4	6.0'	4 4 7 6	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel. 22" RECOVERY	A-2-4(0)	
		5	8.0'	8 8 8 9	Moist medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
9			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4-inch diameter continuous flight power 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-08

Contract: 25-113-01

Boring Location: Sta. 337+00, 80' Lt. C.L.

Boring Surface Elev.: + 66.5

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	8/18/09		10.0	8.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/18/09	1	0.5'	5 7 8	Moist medium dense brown clayey coarse sandy fine gravel w/some fine sand, trace of silt. 9" RECOVERY	A-2-4(0)	Topsoil - 4".
3		2	2.0'	6 7 7 10	Moist medium dense brown silty coarse to fine sand. 21" RECOVERY	A-2-4(0)	
		3	4.0'	4 9 7 6	Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel. 19" RECOVERY	A-1-b	
6		4	6.0'	11 10 7 6	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel. 21" RECOVERY	A-1-b	
		5	8.0'	5 4 5 5	Moist loose orange fine to coarse sand w/some silt, trace of fine gravel. 20" RECOVERY	A-2-4(0)	
9			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/18/2009 using a 3 1/4-inch diameter continuous flight power 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-10

Contract: 25-113-01

Boring Location: Sta. 347+00

Boring Surface Elev.: + 64.5

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/7/09		10.0	8.0	Dry	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 Dia. U-Sample Boring: Ft.
 U-Samples: Ft.
 Core Drilling in Rock: 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
3	7/7/09	1	1.0'	8 6	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 10" RECOVERY	A-4(2)	Cultivated Soil - 12"
		2	2.0'	2 4 7 7	Moist medium dense brown clayey fine sand w/some coarse sand and silt, trace of fine gravel. 15" RECOVERY	A-2-4(0)	USDA Classification: Sandy Loam
		3	4.0'	4 9 4 2	Moist loose orange coarse to fine sand w/some silt, trace of fine gravel. 16" RECOVERY	A-1-b	
6		4	6.0'	2 3 4 1	Moist loose orange silty coarse to fine sand w/trace of fine gravel. 20" RECOVERY	A-2-4(0)	
		5	8.0'	2 1 1 1	Moist very loose orange coarse to fine sand w/some silt. 19" RECOVERY	A-1-b	
9			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4-inch diameter continuous flight power 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-11

Contract: 25-113-01

Boring Location: Sta. 352+00, 80' Rt. C.L.

Boring Surface Elev.: + 62.9

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 7/7/09	Time	10.0	8.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 10.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	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
	7/7/09	1	1.0'	4 3	No Sieve Analysis - Indication of moist loose brown silty sand. 2" RECOVERY		Topsoil - 12".
3		2	2.0'	2 5 6 3	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA Classification: Loamy Sand
		3	4.0'	4 7 7 5	19" RECOVERY Moist medium dense yellow silty coarse to fine sand.	A-2-4(0)	
6		4	6.0'	7 6 7 4	18" RECOVERY Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
		5	8.0'	5 3 3 3	19" RECOVERY Wet loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
9			10.0'		24" RECOVERY End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4-inch diameter continuous flight power 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-12

Contract: 25-113-01

Boring Location: Sta. 357+00, 80' Lt. C.L.

Boring Surface Elev.: + 65.24

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/7/09		10.0	8.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	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
3	7/7/09	1	1.0'	3 4	Moist firm brown clayey fine to coarse sandy silt w/trace of fine gravel. 12" RECOVERY	A-4(0)	Cultivated Soil - 8"
		2	2.0'	3 3 2 3	Moist loose brown silty fine to coarse sand w/trace of fine gravel and clay. 18" RECOVERY	A-2-4(0)	USDA Classification: Sandy Loam
6	7/7/09	3	4.0'	5 5	Moist medium dense yellow coarse sand w/some fine sand and silt, trace of fine gravel. 18" RECOVERY	A-1-b	
		4	6.0'	5 8 8 8	Moist medium dense orange coarse sand w/some fine sand, fine gravel and silt. 16" RECOVERY	A-1-b	
9	7/7/09	5	8.0'	7 7 6 6	Moist medium dense orange silty coarse to fine sand w/trace of fine gravel. 24" RECOVERY	A-2-4(0)	
			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4-inch diameter continous flight power 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 recomendations 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: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-13

Contract: 25-113-01

Boring Location: Sta. 362+00, 108' Rt. C.L.

Boring Surface Elev.: + 66.56

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/9/09		10.0	8.0	2.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/9/09	1	0.0'	2 3 4 4	Moist loose orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	USDA Classification: Loamy Sand
			2.0'		20" RECOVERY		
3		2	2.0'	4 3 1	Wet loose orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
			4.0'		12" RECOVERY		
		3	4.0'	3 2 1 2	Wet very loose orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
6			6.0'		17" RECOVERY		
		4	6.0'	4 3 3 4	Wet loose orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
			8.0'		16" RECOVERY		
9		5	8.0'	4 6 5 6	Wet medium dense brown coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
			10.0'		15" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/9/2009 using a 3 1/4-inch diameter continuous flight power 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-14

Contract: 25-113-01

Boring Location: Sta. 367+00, 80' Lt. C.L.

Boring Surface Elev.: + 62.44

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 7/8/09	Time	10.0	8.0	7.8	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 Dia. U-Sample Boring: Ft.
 No. of U-Samples: ;
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/8/09	1	0.5'	3 4 5	Wet firm brown clayey silt w/some fine sand, trace of coarse sand and fine gravel. 13" RECOVERY	A-4(4)	Topsoil - 5".
3		2	2.0'	10 8 12 13	Wet medium dense orange coarse to fine sand w/some silt and fine gravel. 18" RECOVERY	A-1-b	
		3	4.0'	8 12 13 15	Wet medium dense orange coarse sand w/some fine sand, silt and fine gravel. 16" RECOVERY	A-1-b	
6		4	6.0'	13 10 9 9	Wet medium dense orange fine gravelly coarse sand w/some silt, trace of fine sand. 8" RECOVERY	A-1-b	USDA Classification: Sand
9		5	8.0'	3 2 4 4	Saturated loose orange coarse to fine sand w/some silt. 17" RECOVERY	A-2-4(0)	
			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/8/2009 using a 3 1/4-inch diameter continuous flight power 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-15

Contract: 25-113-01

Boring Location: Sta. 372+00, 80' Rt. C.L.

Boring Surface Elev.: + 63.18

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 7/8/09	Time	10.0	8.0	8.0	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 Dia. U-Sample Boring: Ft.
 No. of U-Samples: ;
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/8/09	1	0.5'	4 3 4	Moist firm brown silty fine andy clay w/some coarse sand.	A-6(4)	
			2.0'		13" RECOVERY		
3		2	2.0'	6 7 8 8	Moist medium dense orange coarse sand w/some silt and fine sand, trace of fine gravel.	A-1-b	USDA Classification: Loamy Sand
			4.0'		18" RECOVERY		
		3	4.0'	6 8 9 8	Moist medium dense orange coarse sand w/some fine gravel, fine sand and silt.	A-1-b	
6			6.0'		16" RECOVERY		
		4	6.0'	5 4 3 4	Moist loose orange coarse sand w/some fine sand, fine gravel and silt.	A-1-b	
			8.0'		17" RECOVERY		
9		5	8.0'	2 2 1 3	Wet very loose brown coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
			10.0'		16" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/8/2009 using a 3 1/4-inch diameter continuous flight power 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-16

Contract: 25-113-01

Boring Location: Sta. 377+00, 80' Lt. C.L.

Boring Surface Elev.: + 64.42

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/10/09		10.0	8.0	9.4	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.5'	2 3 4	Wet firm brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 17" RECOVERY	A-4(4)	Cultivated Soil - 5".
3		2	2.0'	4 4 4 4	Wet firm brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 16" RECOVERY	A-4(0)	
		3	4.0'	4 6 9 10	Wet medium dense orange silty fine to coarse sand w/trace of fine gravel. 17" RECOVERY	A-2-4(0)	
6		4	6.0'	18 16 13 17	Wet medium dense orange silty coarse sand w/some fine sand, trace of fine gravel. 20" RECOVERY	A-1-b	USDA Classification: Sandy Loam
9		5	8.0'	3 4 6 5	Wet loose orange coarse sand w/some fine sand and silt, trace of fine gravel. 15" RECOVERY	A-1-b	
			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4-inch diameter continuous flight power 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-17

Contract: 25-113-01

Boring Location: Sta. 382+00, 80' Rt. C.L.

Boring Surface Elev.: + 59.32

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/9/09		10.0	8.0	5.3	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/9/09	1	0.5'	5 7 8	Moist stiff gray coarse to fine sandy silt w/trace of clay and fine gravel.	A-4(0)	Topsoil - 3".
			2.0'		17" RECOVERY		
3		2	2.0'	5 6 5	Moist stiff gray fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(0)	USDA Classification: Sandy Clay
			4.0'		17" RECOVERY		
		3	4.0'	6 7 9 4	Wet medium dense orange coarse sand w/some silt, trace of fine sand and fine gravel.	A-1-b	Loam
6			6.0'		15" RECOVERY		
		4	6.0'	4 5 5 4	Saturated loose orange coarse sand w/some silt, trace of fine sand and fine gravel.	A-1-b	
			8.0'		14" RECOVERY		
9		5	8.0'	4 5 4 4	Saturated loose orange coarse sand w/some fine sand, fine gravel and silt.	A-1-b	
			10.0'		18" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/9/2009 using a 3 1/4-inch diameter continuous flight power 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-18

Contract: 25-113-01

Boring Location: Sta. 387+00, 81' Lt. C.L.

Boring Surface Elev.: + 61.55

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings					
Date 7/13/09	Time	Depth of Hole 10.0	Depth of Casing 8.0	Depth of Water 6.4	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 10.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5'	5 4 5	Moist stiff brown fine sandy silt w/some coarse sand and clay, trace of fine gravel.	A-4(1)	Cultivated Soil - 5".
			2.0'		16" RECOVERY		
3		2	2.0'	8 10	Moist very stiff grayish brown fine sandy silt w/some coarse sand and clay, trace of fine gravel.	A-4(0)	
		2A	3.0'	11 11	9" RECOVERY	A-1-b	USDA Classification: Loamy Sand
		3	4.0'	5 10 11 9	Moist medium dense orange coarse sand w/some silt and fine gravel, trace of fine sand.	A-1-b	
6			6.0'		12" RECOVERY		
		4	6.0'	6 8 8 10	Moist medium dense orange coarse sand w/some silt, fine sand and fine gravel.	A-1-b	
			8.0'		18" RECOVERY		
9		5	8.0'	5 3 2 2	Saturated medium dense orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
			10.0'		17" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 using a 3 1/4-inch diameter continuous flight power 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-19

Contract: 25-113-01

Boring Location: Sta. 392+00, 80' Rt. C.L.

Boring Surface Elev.: + 62.00

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To: 8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/14/09		10.0	8.0	6.8	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/14/09	1	0.5'	5 7 4	Moist medium dense brown silty coarse to fine sand w/some clay, trace of fine gravel. 16" RECOVERY	A-2-4(0)	Cultivated Soil - 5".
3		2	2.0'	7 7 5 3	Moist medium dense gray coarse to fine sand w/some silt, trace of fine gravel. 19" RECOVERY	A-1-b	USDA Classification: Loamy Sand
		3	4.0'	7 3 2 2	Wet loose gray coarse to fine sand w/some silt, trace of fine gravel. 15" RECOVERY	A-1-b	
6		4	6.0'	3 3 3 3	Saturated loose brown coarse sand w/some fine sand, trace of silt and fine gravel. 16" RECOVERY	A-1-b	
		5	8.0'	3 2 2 2	Saturated very loose orange silty coarse to fine sand w/trace of fine gravel. 18" RECOVERY	A-2-4(0)	
9			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4-inch diameter continuous flight power 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-20

Contract: 25-113-01

Boring Location: Sta. 397+00, 80' Lt. C.L.

Boring Surface Elev.: + 63.38

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/14/09		10.0	8.0	7.3	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/14/09	1	0.5'	3 7 6 6	Moist stiff brown clayey silt w/some fine to coarse sand, trace of fine gravel. 16" RECOVERY	A-4(4)	Cultivated Soil - 6".
3		2	2.0'	8 14 14 14	Moist medium dense brown coarse sand w/some silt, fine sand and fine gravel. 20" RECOVERY	A-1-b	
		3	4.0'	3 7 6 4	Moist stiff brown coarse to fine sandy silt w/trace of fine gravel. 19" RECOVERY	A-4(0)	USDA Classification: Sandy Clay
6		4	6.0'	3 2 2 2	Wet very loose brown coarse to fine sand w/some silt, trace of fine gravel. 19" RECOVERY	A-1-b	Loam
		5	8.0'	1 1 2 2	Saturated very loose orange fine to coarse sand w/some silt, trace of fine gravel. 18" RECOVERY	A-2-4(0)	
9			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4-inch diameter continues flight power 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-21

Contract: 25-113-01

Boring Location: Sta. 402+00, 80' Rt. C.L.

Boring Surface Elev.: + 62.10

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/14/09		10.0	8.0	7.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/14/09	1	0.5'	3 7 5	Moist stiff brown silt w/some clay and fine gravel, trace of coarse to fine sand.	A-4(1)	Cultivated Soil - 5". USDA
			2.0'		14" RECOVERY		
3		2	2.0'	3 3 1 2	Moist very loose orange silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	Classifica : Clay
			4.0'		19" RECOVERY		
		3	4.0'	3 1 1 3	Wet very loose orange silty fine sand w/some coarse sand.	A-2-4(0)	
6			6.0'		13" RECOVERY		
		4	6.0'	3 2 2 3	Wet very loose orange silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			8.0'		18" RECOVERY		
9		5	8.0'	3 2 3 3	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		16" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4-inch diameter continues flight power 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 recomendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows are uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-22

Contract: 25-113-01

Boring Location: Sta. 407+00, 80' Lt. C.L.

Boring Surface Elev.: + 63.5

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 7/14/09	Time	10.0	8.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 10.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/14/09	1	0.5'	7 7 9	Moist stiff brown coarse sandy silt w/some fine sand and clay, trace of fine gravel. 16" RECOVERY	A-4(0)	Cultivated Soil - 6".
3		2	2.0'	9 7 6	Moist medium dense orange silty coarse to fine sand w/trace of fine gravel. 20" RECOVERY	A-2-4(0)	USDA Classification: Sandy Loam
		3	4.0'	5 5 4	Wet loose brown silty fine to coarse sand w/trace of fine gravel. 15" RECOVERY	A-2-4(0)	
6		4	6.0'	2 4 4	Saturated loose brown fine to coarse sand w/some silt, trace of fine gravel. 19" RECOVERY	A-2-4(0)	
		5	8.0'	3 3 2	Saturated loose orange fine to coarse sand w/some silt. 18" RECOVERY	A-2-4(0)	
9			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4-inch diameter continues flight power 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-23

Contract: 25-113-01

Boring Location: Sta. 412+00, 80' Rt. C.L.

Boring Surface Elev.: + 66.24

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/14/09		10.0	8.0	7.5	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 Dia. U-Sample Boring: Ft.
 No. of U-Samples: ;
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/14/09	1	0.5'	5 4 4	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 17" RECOVERY	A-4(1)	Cultivated Soil - 5".
3		2	2.0'	4 7 8 9	Moist stiff orange fine sandy silt w/some coarse sand and clay. 21" RECOVERY	A-4(0)	
		3	4.0'	5 9 10 11	Moist medium dense brown coarse to fine sand w/some silt and fine gravel. 17" RECOVERY	A-1-b	USDA Classification: Loamy Sand
6		4	6.0'	8 6 6 6	Wet medium dense brown coarse to fine sand w/some silt. 22" RECOVERY	A-1-b	
		5	8.0'	2 3 3 3	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel. 19" RECOVERY	A-1-b	
			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4-inch diameter continuous flight power 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR 1

Boring No.: IT2-1-40

Contract: 25-113-01

Boring Location: Sta. 497+00, 80' Lt. C.L.

Boring Surface Elev.: + 66.23

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					8.0

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
12/1/10		8.0	6.0	6.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/1/09	1	1.0'		Wet brown clayey silt w/some fine to coarse sand, trace of fine gravel.	A-4(7)	Hand Auger
			2.0'		12" RECOVERY		
3		2	2.0'		Wet tan silty fine sand w/some coarse sand, trace of fine gravel.	A-2-4(0)	Topsoil - 9".
			4.0'		24" RECOVERY		Hand Auger
		3	4.0'		Wet orange clayey silt w/some fine to coarse sand and fine gravel.	A-4(0)	Hand Auger
			5.0'		12" RECOVERY		
6		4	5.0'		Saturated orangish tan coarse sand w/some fine sand, fine gravel and silt.	A-1-b	Hand Auger
			6.0'		12" RECOVERY		
		5	6.0'		Saturated tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	Hand Auger
			8.0'		24" RECOVERY		
9					End Of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded clayey
silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/1/2009 using a 3 1/4-inch diameter continuous flight power 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR 1

Boring No.: ITS2-1-01

Contract: 25-113-01

Boring Location: Sta. 345+00 67 R.T. C.L.

Boring Surface Elev.: + 61.74

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: 29.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
12/17/10		10.0	8.0	9.2	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	31.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/17/09	1	0.5'	2 2 3	Wet soft brown fine sandy silt w/some coarse sand, trace of fine gravel. 6" RECOVERY	A-4(0)	Topsoil - 8".
3		2	2.0'	8 9 8 10	Wet medium dense brown coarse to fine sand w/trace of fine gravel and silt. 20" RECOVERY	A-1-b	
		3	4.0'	5 9 9 9	Wet medium dense orange fine to coarse sand w/some silt, trace of fine gravel. 15" RECOVERY	A-2-4(0)	
6		4	6.0'	11 8 7 5	Wet medium dense orange fine to coarse sand w/some silt. 18" RECOVERY	A-2-4(0)	
		5	8.0'	3 5 8 8	Wet medium dense orange fine to coarse sand w/some silt, trace of fine gravel. 15" RECOVERY	A-2-4(0)	
		6	10.0'	4 7 6 6	Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel. 16" RECOVERY	A-1-b	
12		7	12.0'	2 2 3 3	Wet loose orange fine to coarse sand w/some silt, trace of fine gravel. 6" RECOVERY	A-2-4(0)	
		8	14.0'	1 1 2 2	Wet very loose orange fine to coarse sand w/some silt, trace of fine gravel. 6" RECOVERY	A-2-4(0)	
15		9	16.0'	2 2 2 5	Wet very loose orange fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: US 301 Maryland State Line to SR 1
Contract: 25-113-01

Boring No.: ITS2-1-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		16" RECOVERY		
		10	18.0'	3 6 10 20	Wet medium dense orange coarse to fine sand w/some silt and fine gravel.	A-1-b	
			20.0'		15" RECOVERY		
21							
24							
		11	24.0'	10 14 15 15	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			26.0'		17" RECOVERY		
27							
30		12	29.0'	7 9 10 14	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			31.0'		19" RECOVERY		
					End of Boring		
33							
36							
39							
42							
45							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Poorly graded sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/17/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
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 recomendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows are uncorrected.

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

F.A. Project: U.S. 301 Maryland State Line to SR-1

Boring No.: ITS2-1-02

Contract: 25-113-01

Boring Location: STA. 345+50 18' Rt. C.L.

Boring Surface Elev.: + 62.0

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: 30.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
9/29/10		12.0	12.0	10.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	30.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/29/10	1	0.5'	8 13 14	Moist very stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 12" RECOVERY	A-4(2)	Topsoil - 5".
		2	2.0'	12 24 30 28	Moist very dense brown fine to coarse sand and fine gravel w/some silt. 10" RECOVERY	A-1-b	
3.6		3	4.0'	9 10 9 8	Moist medium dense orange fine to coarse sand w/some silt. 20" RECOVERY	A-2-4(0)	
		4	6.0'	7 8 8 8	Moist medium dense orange coarse to fine sand w/some silt. 14" RECOVERY	A-2-4(0)	
7.2		5	8.0'	4 4 4 5	Moist loose orange silty fine to coarse sand w/trace of fine gravel. 18" RECOVERY	A-2-4(0)	
		6	10.0'	4 8 8 8	Moist medium dense orange coarse sand w/ some fine gravel, fine sand and silt. 14" RECOVERY	A-1-b	
10.8		7	12.0'	3 5 5 4	Wet loose orange fine to coarse sand w/some silt, trace of fine gravel. 20" RECOVERY	A-2-4(0)	
		8	14.0'	2 3 4 3	Wet loose orange fine to coarse sand w/some silt, trace of fine gravel. 18" RECOVERY	A-2-4(0)	
14.4		9	16.0'	5 6 7	Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel. 15" RECOVERY	A-1-b	
18		10	18.0'	4 3 6 7	Wet loose orange fine sand w/some silt and coarse sand, trace of fine gravel. 18" RECOVERY	A-2-4(0)	
			20.0'				

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301 Maryland State Line to SR-1
Contract: 25-113-01

Boring No.: ITS2-1-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21.6							
		11	23.0'	5 7 14 17	Wet medium dense brownish green fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
25.2			25.0'		18" RECOVERY		
		12	28.0'	7 9 11 14	Wet medium dense greenish brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
28.8			30.0'		18" RECOVERY		
					End of Boring		
32.4					<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;">AUGUST 2015</div>		
36							
39.6							
43.2							
46.8							
50.4							
54							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 29, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-004

Contract: 25-113-01

Boring Location: Sta. 260+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 50.54'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/18/2008	Time	10.0'	8.0'	Dry'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/18/08	1	0.8'	4 3 4	Wet firm brown clayey fine sandy silt w/ some coarse sand, trace of gravel. 15" RECOVERY	A-4(1)	9" of cultivated soil.
3		2	2.0'	3 4 4 11	Wet firm brown clayey fine sandy silt w/ some coarse sand, trace of gravel. 17" RECOVERY	A-4(3)	
		3	4.0'	6 7 10 11	Wet medium dense brown fine to coarse sand w/ some gravel and silt. 16" RECOVERY	A-2-4(0)	
6		4	6.0'	12 14 17 15	Wet dense orange-brown fine to coarse sand and gravel w/ some silt. 16" RECOVERY	A-1-b	
		5	8.0'	16 25 29 33	Wet very dense orange-brown silty fine to coarse sand, trace of gravel. 9" RECOVERY	A-2-4(0)	
9			10.0'		Boring terminated at 10.0 feet.		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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

Boring No.: R2-006

Contract: 25-113-01

Boring Location: Sta. 279+93.08, 129' Lt. C.L.

Boring Surface Elev.: + 54.64'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/18/2008	Time	14.0'	12.0'	11.3'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	Ft.;			U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:				Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/18/08	1	0.5'	6 8 9	Moist very stiff brown clayey fine to coarse sandy silt, trace of gravel. 17" RECOVERY	A-4(1)	7" of cultivated soil.
3		2	2.0'	6 7 6 3	Moist medium dense brown fine to coarse sand w/ some clay, trace of gravel. 19" RECOVERY	A-2-4(0)	
		3	4.0'	5 9 7 13	Moist medium dense brown silty coarse to fine sand, trace of gravel. 18" RECOVERY	A-2-4(0)	
6		4	6.0'	14 16 14 14	Moist medium dense light brown coarse to fine sand w/ some silt and gravel. 16" RECOVERY	A-1-b	
9		5	8.0'	9 12 10 10	Moist medium dense light brown coarse to fine sand w/ some gravel and silt. 19" RECOVERY	A-1-b	
		6	10.0'	9 6 5 6	Wet medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel. 19" RECOVERY	A-1-b	
12		7	12.0'	5 6 7 5	Saturated medium dense orange-brown coarse sand w/ some gravel, trace of fine sand and silt. 19" RECOVERY	A-1-b	
		8	14.0'	3 4 5 6	Saturated loose orange-brown coarse to fine sand w/ some gravel, trace of silt. 22" RECOVERY	A-1-b	
15			16.0'		Boring terminated at 16.0 feet.		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were 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

Boring No.: R2-007

Contract: 25-113-01

Boring Location: Sta. 285+00.00, 122' Lt. C.L.

Boring Surface Elev.: + 56.98'

Reference:

Wt. of Casing Hammer:	Lbs.	Average Fall:	IN.
Wt. of Sample Hammer: 140	Lbs.	Average Fall: 30	IN.
Type of: D-Sampler: Split Barrel	O.D.	O.D. of Sampler: 2	IN.
S-Sampler:	O.D.	O.D. of Samp. Tube:	IN.
U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube: 3	IN.
Core Bit:	O.D.	O.D. of Rock Core:	IN.

Casing Size: 3 1/4	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of: 0.0'	To: 16.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/18/2008		14.0'	12.0'	12.4'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/18/08	1	1.0'	2	Moist soft brown clayey silt w/ some coarse to fine sand, trace of gravel.	A-4(2)	11" of cultivated soil.
			2.0'	2			
3		2	2.0'	3	Moist loose brown silty coarse sand w/ some fine sand, trace of gravel.	A-1-b	
				3			
				3			
			4.0'		16" RECOVERY		
6		3	4.0'	2	Moist loose brown silty coarse to fine sand, trace of gravel.	A-1-b	
				3			
				2			
				4			
			6.0'		17" RECOVERY		
9		4	6.0'	3	Moist loose brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
				2			
				3			
				4			
			8.0'		19" RECOVERY		
12		5	8.0'	3	Moist loose brown coarse sand w/ some fine sand, gravel, and silt.	A-1-b	
				3			
				2			
				3			
			10.0'		16" RECOVERY		
15		6	10.0'	3	Wet loose brown coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
				3			
				3			
				1			
			12.0'		18" RECOVERY		
		7	12.0'	1	Saturated very loose orange-brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
				1			
				1			
				1			
			14.0'		17" RECOVERY		
		8	14.0'	1	Saturated loose orange-brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
				2			
				3			
				3			
			16.0'		19" RECOVERY		
					Boring terminated at 16.0 feet.		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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

Boring No.: R2-008

Contract: 25-113-01

Boring Location: Sta. 290+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 59.29'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings					
Date 3/18/2008	Time	Depth of Hole 10.0'	Depth of Casing 8.0'	Depth of Water Dry	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 10.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;			No. of U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/18/08	1	1.0'	2 3	Wet firm brown clayey fine sandy silt w/ some coarse sand, trace of gravel. 12" RECOVERY	A-4(2)	10" of cultivated soil.
3		2	2.0'	6 10 9 8	Wet medium dense orange-brown silty fine sand w/ some coarse sand, trace of gravel. 17" RECOVERY	A-2-4(0)	
		3	4.0'	4 5 7 10	Wet medium dense orange-brown silty fine sand w/ some coarse sand, trace of gravel. 19" RECOVERY	A-2-4(0)	
6		4	6.0'	9 9 9 7	Wet medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
		5	8.0'	4 5 5 7	Wet loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 20" RECOVERY	A-2-4(0)	
9			10.0'		Boring terminated at 10.0 feet.		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-008A

Contract: 25-113-01

Boring Location: Sta. 330+60, 10' Lt. C.L.

Boring Surface Elev.: + 59.1

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					14.0

Water Level Readings		Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
		8/19/2009		16.0	14.0	13.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	35.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/19/09	1	0.5'	4 8 9	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(3)	Topsoil - 5".
			2.0'		12" RECOVERY		
2.5		2	2.0'	19 17 14 11	Moist dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			4.0'		19" RECOVERY		
		3	4.0'	3 5 8 11	Moist medium dense brown silty fine sand w/some coarse and, trace of fine gravel.	A-2-4(0)	
5			6.0'		14" RECOVERY		
		4	6.0'	8 8 8 7	Moist medium dense orange fine to coarse and w/some silt, trace of fine gravel.	A-2-4(0)	
7.5			8.0'		21" RECOVERY		
		5	8.0'	4 7 7 9	Moist medium dense orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		20" RECOVERY		
10		6	10.0'	4 4 4 4	Wet loose tan silty coarse to fine sand.	A-2-4(0)	USDA Classification: Sandy Loam
			12.0'		17" RECOVERY		
12.5		7	12.0'	3 4 3 4	Saturated loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			14.0'		22" RECOVERY		
		8	14.0'	1 1	Saturated very loose brown fine sand w/some coarse sand and silt, trace	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-008A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				2 2	of fine gravel.		
			16.0'		16" RECOVERY		
		9	16.0'	2 4 8 11	Saturated medium dense brown fine sand w/some coarse sand, silt and fine gravel.	A-2-4(0)	
17.5			18.0'		17" RECOVERY		
		10	18.0'	12 16 16 21	Saturated dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
20			20.0'		16" RECOVERY		
22.5							
		11	24.0'	3 4 8 12	Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
25			26.0'		16" RECOVERY		
27.5							
		12	29.0'	8 11 14 19	Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
30			31.0'		18" RECOVERY		
32.5							
		13	33.0'	16 16 20 23	Saturated dense brown fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
35			35.0'		17" RECOVERY		
					End of Boring		
37.5							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 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.: R2-008B

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		18" RECOVERY		
					End of Boring		
17.5							
20							
22.5							
25							
27.5							
30							
32.5							
35							
37.5							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-009

Contract: 25-113-01

Boring Location: Sta. 295+00.00, 45'Lt. C.L.

Boring Surface Elev.: + 65.88'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/17/2008		10.0'	8.0'	Dry	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: 3 No. of U-Sample Boring: Ft.
 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/17/08	1	0.8'	3 4 4	Moist loose brown clayey fine sand and gravel w/ some coarse sand. 15" RECOVERY	A-2-4(0)	9" of cultivated soil.
3		2	2.0'	3 5 4 3	Moist loose red-brown silty fine to coarse sand, trace of gravel. 17" RECOVERY	A-2-4(0)	
		3	4.0'	2 1 1 2	Moist very loose orange-brown fine to coarse sand w/ some silt, trace of gravel. 15" RECOVERY	A-2-4(0)	
6		4	6.0'	2 3 2 4	Moist loose orange-brown silty coarse to fine sand, trace of gravel. 16" RECOVERY	A-2-4(0)	
		5	8.0'	3 2 2 3	Moist very loose orange-brown fine to coarse sand w/ some silt, trace of gravel. 16" RECOVERY	A-2-4(0)	
9			10.0'		Boring terminated at 10.0 feet.		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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

Boring No.: R2-010

Contract: 25-113-01

Boring Location: Sta. 300+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 66.03'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	10.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/17/2008		10.0'	8.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/17/08	1	1.0'	2	Moist soft brown clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(1)	10" of cultivated soil.
			2.0'		12" RECOVERY		
3		2	2.0'	3 4 5 5	Moist loose orange-brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
			4.0'		16" RECOVERY		
		3	4.0'	2 4 6 7	Moist loose orange-brown silty coarse to fine sand, trace of gravel.	A-1-b	
6			6.0'		18" RECOVERY		
		4	6.0'	6 6 7 6	Moist medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			8.0'		20" RECOVERY		
9		5	8.0'	3 2 3 4	Moist loose orange-brown coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
			10.0'		16" RECOVERY		
					Boring terminated at 10.0 feet.		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-010A

Contract: 25-113-01

Boring Location: Sta. 340+00, 50' Rt. C.L.

Boring Surface Elev.: + 65.8

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					33.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	8/18/2010		20.0	18.0	16.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	35.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/18/09	1	0.5'	7 9 11	Moist very stiff brown clayey fine sandy silt w/some coarse sand and fine gravel.	A-4(0)	Topsoil - 5".
			2.0'		9" RECOVERY		
2.5		2	2.0'	14 10 10 6	Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			4.0'		18" RECOVERY		
		3	4.0'	6 9 10 10	Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
5			6.0'		15" RECOVERY		
		4	6.0'	9 8 8 7	Moist medium dense tan coarse sand w/some silt and fine sand, trace of fine gravel.	A-1-b	
7.5			8.0'		19" RECOVERY		
		5	8.0'	3 3 3	Moist loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		15" RECOVERY		
10		6	10.0'	3 2 3 2	Moist loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			12.0'		18" RECOVERY		
12.5		7	12.0'	2 3 4 4	Moist loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			14.0'		20" RECOVERY		
		8	14.0'	2 4	Wet loose orange coarse to fine sand w/some silt.	A-1-b	USDA

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-010A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				3 3			Classifica : Sand
			16.0'		19" RECOVERY		
		9	16.0'	3 3 4 5	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
17.5							
			18.0'		20" RECOVERY		
		10	18.0'	3 4 5 5	Saturated loose brown fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
			20.0'		15" RECOVERY		
20							
22.5							
		11	24.0'	6 10 10 11	Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
25			26.0'		17" RECOVERY		
27.5							
		12	29.0'	6 10 12 17	Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
30			31.0'		18" RECOVERY		
32.5							
		13	33.0'	W/H 2 6 7	Saturated loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
35			35.0'		15" RECOVERY		
					End of Boring		
37.5							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/18/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-011

Contract: 25-113-01

Boring Location: Sta. 305+00.00, 119' Lt. C.L.

Boring Surface Elev.: + 61.58'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/17/2008	Time	12.0'	10.0'	10.0'	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 16.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 Dia. U-Sample Boring: Ft.
 U-Samples: Ft.
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/17/08	1	0.8'	5 3 3	Moist firm brown clayey silt w/ some fine to coarse sand, trace of gravel. 15" RECOVERY	A-4(4)	9" of cultivated soil.
3		2	2.0'	7 15 15 15	Moist medium dense orange-brown gravel and coarse sand w/ some fine sand and gravel. 16" RECOVERY	A-1-b	
		3	4.0'	6 7 7 7	Wet medium dense orange-brown silty coarse to fine sand. 17" RECOVERY	A-1-b	
6		4	6.0'	8 8 9 7	Wet medium dense orange-brown silty coarse to fine sand, trace of gravel. 19" RECOVERY	A-1-b	
		5	8.0'	9 5 5 6	Wet loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 20" RECOVERY	A-1-b	
9		6	10.0'	5 5 5 4	Saturated loose orange-brown silty coarse to fine sand. 17" RECOVERY	A-2-4(0)	
		7	12.0'	2 4 8 8	Saturated medium dense orange-brown coarse to fine sand and gravel w/ some silt. 16" RECOVERY	A-1-b	
12		8	14.0'	3 5 5 5	Saturated loose orange-brown coarse sand and gravel w/ some fine sand, trace of silt. 17" RECOVERY	A-1-b	
15			16.0'		Boring terminated at 16.0 feet.		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-011A

Contract: 25-113-01

Boring Location: Sta. 343+00, 40' Lt. C.L.

Boring Surface Elev.: + 60.1

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 35.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
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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.
 U-Samples: Ft.
 Core Drilling in Rock: Ft.

Boring Contractor:
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/19/09	1	0.5'	3 2 2	Moist loose brown silty coarse to fine sand.	A-1-b	Topsoil - 8". USDA Classifica : Sandy Loam
			2.0'		14" RECOVERY		
2.5		2	2.0'	2 2 2	Moist very loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			4.0'		15" RECOVERY		
		3	4.0'	4 7 8 13	Moist medium dense orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
5			6.0'		16" RECOVERY		
		4	6.0'	9 9 9 6	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
7.5			8.0'		21" RECOVERY		
		5	8.0'	3 4 4 4	Wet loose orange coarse to fine sand w/some silt.	A-1-b	
10			10.0'		19" RECOVERY		
		6	10.0'	2 2 3 2	Saturated loose brown fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			12.0'		20" RECOVERY		
12.5		7	12.0'	4 5 5 4	Saturated loose brown fine to coarse sand w/some fine gravel and silt.	A-2-4(0)	
			14.0'		12" RECOVERY		
		8	14.0'	1 2	Saturated loose brown coarse to fine sand w/some silt, trace of fine	A-1-b	

Remarks:

Reviewed By: _____ **Soils Supervisor:** _____

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-011A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				3 4	gravel.		
			16.0'		3" RECOVERY		
		9	16.0'	10 9 11 13	Saturated medium dense brown coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	
17.5			18.0'		5" RECOVERY		
		10	18.0'	8 9 13 13	Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
20			20.0'		15" RECOVERY		
22.5							
		11	24.0'	14 11 12 13	Saturated medium dense brown fine sand w/some coarse sand, silt and fine gravel.	A-2-4(0)	
25			26.0'		15" RECOVERY		
27.5							
		12	29.0'	8 9 14 13	Saturated medium dense grayish brown fine to coarse sand w/some silt.	A-2-4(0)	
30			31.0'		19" RECOVERY		
32.5							
		13	33.0'	8 14 13 15	Saturated medium dense brown fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
35			35.0'		16" RECOVERY		
					End of Boring		
37.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-012

Contract: 25-113-01

Boring Location: Sta. 310+00.00, 119' Rt. C.L.

Boring Surface Elev.: + 66.09'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0'	To:	
	Hollow Stem Auger:		From Depth of:		To:	16.0'

Water Level Readings		Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
		3/17/2008		16.0'	14.0'	12.7'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	No. of:	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	Core Drilling in Rock:		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:						

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/17/08	1	1.0'	2	Moist soft brown clayey fine sandy silt w/ some coarse sand.	A-4(3)	10" of cultivated soil.
			2.0'	2			
3		2	2.0'	6	12" RECOVERY Moist medium dense brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
			4.0'	10			
			4.0'	10			
			4.0'	11			
6		3	4.0'	5	15" RECOVERY Moist medium dense brown silty coarse to fine sand, trace of gravel.	A-1-b	
			6.0'	9			
			6.0'	12			
			6.0'	12			
9		4	6.0'	11	17" RECOVERY Moist medium dense light brown fine sand w/ some coarse sand and clay.	A-2-4(0)	
			8.0'	10			
			8.0'	13			
			8.0'	12			
			8.0'	6	16" RECOVERY Moist loose light brown silty fine to coarse sand.	A-2-4(0)	
			10.0'	4			
			10.0'	4			
			10.0'	6			
12		6	10.0'	3	18" RECOVERY Wet loose light brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
			12.0'	3			
			12.0'	3			
			12.0'	3			
			12.0'	2	19" RECOVERY Wet very loose light brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			14.0'	2			
			14.0'	1			
			14.0'	1			
15		8	14.0'	2	17" RECOVERY Wet very loose light brown fine to coarse sand w/ some gravel and silt.	A-1-b	
			16.0'	1			
			16.0'	3			
			16.0'	1	17" RECOVERY Boring terminated at 16.0 feet.		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded clayey
silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-012A

Contract: 25-113-01

Boring Location: Sta. 350+00 50 R.T. C.L.

Boring Surface Elev.: + 65.21

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					10.0

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
8/21/09		16.0	14.0	14.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	40.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/21/09	1	0.5'	2 2 2	Moist soft brown clayey fine sandy silt w/some coarse sand.	A-4(2)	Topsoil - 6".
			2.0'		12" RECOVERY		
2.5		2	2.0'	4 4 5 7	Moist loose brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			4.0'		16" RECOVERY		
		3	4.0'	4 7 7 7	Moist medium dense tan silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
5			6.0'		19" RECOVERY		
		4	6.0'	3 3 3 3	Moist loose tan coarse to fine sand w/some silt.	A-2-4(0)	
7.5			8.0'		20" RECOVERY		
		5	8.0'	3 4 5 4	Moist loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		20" RECOVERY		
10		6	10.0'	3 4 4 5	Moist loose tan coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	USDA Classification: Loamy Sand
			12.0'		22" RECOVERY		
12.5		7	12.0'	2 3 4 4	Saturated loose tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			14.0'		16" RECOVERY		
		8	14.0'	3 4	Saturated loose tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-012A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				4 3			
			16.0'		18" RECOVERY		
		9	16.0'	3 4 8 8	Saturated medium dense brown fine gravelly coarse to fine sand w/some silt.	A-1-b	
17.5			18.0'		18" RECOVERY		
		10	18.0'	4 4 4 3	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
20			20.0'		17" RECOVERY		
22.5							
		11	24.0'	6 8 12 12	Saturated medium dense orange fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
25			26.0'		10" RECOVERY		
27.5							
	8/24/09	12	29.0'	12 17 19 21	Saturated dense brown fine to coarse sand w/some silt.	A-2-4(0)	
30			31.0'		15" RECOVERY		
32.5							
		13	34.0'	4 7 10 10	Saturated medium dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
35			36.0'		17" RECOVERY		
37.5							

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-012A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	38.0'	5 9 9 11	Saturated medium dense brown fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
40			40.0'		18" RECOVERY		
					End of Boring		
42.5							
45							
47.5							
50							
52.5							
55							
57.5							
60							

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AUGUST 2015

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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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/21/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-013

Contract: 25-113-01

Boring Location: Sta. 315+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 65.11'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	10.0'

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date			10.0'	8.0'	Dry	
3/17/2008						

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:				Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/17/08	1	0.8'	1 3 3	Moist firm brown fine to coarse sandy clay, trace of gravel. 15" RECOVERY	A-4(1)	8" of cultivated soil.
3		2	2.0'	2 3 4 5	Moist loose red-brown clayey coarse to fine sand, trace of gravel. 17" RECOVERY	A-2-4(0)	
		3	4.0'	9 9 13 14	Moist medium dense red-brown silty coarse to fine sand, trace of gravel. 18" RECOVERY	A-1-b	
6		4	6.0'	12 11 10 8	Moist medium dense orange-brown fine to coarse sand w/ some silt and gravel. 19" RECOVERY	A-2-4(0)	
		5	8.0'	5 4 3 3	Moist loose light brown coarse to fine sand w/ some silt. 17" RECOVERY	A-1-b	
9			10.0'		Boring terminated at 10.0 feet.		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Poorly graded clayey
silty sand



Silty sand

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Notes:

1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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

Boring No.: R2-014

Contract: 25-113-01

Boring Location: Sta. 320+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 56.72'

Reference:

Wt. of Casing Hammer:	Lbs.	Average Fall:	IN.
Wt. of Sample Hammer: 140	Lbs.	Average Fall: 30	IN.
Type of: D-Sampler: Split Barrel	O.D.	O.D. of Sampler: 2	IN.
S-Sampler:	O.D.	O.D. of Samp. Tube:	IN.
U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube: 3	IN.
Core Bit:	O.D.	O.D. of Rock Core:	IN.

Casing Size: 3 1/4	Inches	From Depth of:	To:	
Hollow Stem Auger:		From Depth of: 0.0'	To:	10.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/17/2008		4.0'	2.0'	1.0'	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/17/08	1	0.0'	1 1 1 2	Wet very loose orange-brown coarse to fine sand w/ some silt.	A-1-b	
			2.0'		18" RECOVERY		
3		2	2.0'	2 2 2 3	Saturated very loose orange-brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			4.0'		18" RECOVERY		
		3	4.0'	3 2 4 4	Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
6			6.0'		20" RECOVERY		
		4	6.0'	3 4 6 6	Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
			8.0'		17" RECOVERY		
9		5	8.0'	4 6 8 6	Saturated medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			10.0'		17" RECOVERY		
					Boring terminated at 10.0 feet.		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-014A

Contract: 25-113-01

Boring Location: Sta. 360+00 45 R.T. C.L.

Boring Surface Elev.: 56.66

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 10.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	8/24/09		8.0	8.0	2.5	54.2 56.7 56.7 56.7

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	61.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/24/09	1	0.0'	2 2 2	Moist very loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA Classification: Sand
2.5		2	2.0' 2.0'	2 3 4	20" RECOVERY Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
5		3	4.0' 4.0'	2 3 5 7	16" RECOVERY Saturated loose orange fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
7.5		4	6.0' 6.0'	2 3 4	15" RECOVERY Saturated loose orange coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	
10		5	8.0' 8.0'	4 4 5 5	17" RECOVERY Saturated loose orange fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
12.5		6	10.0' 10.0'	16 13 5 5	14" RECOVERY Saturated medium dense brown fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
		7	12.0' 12.0'	6 5 5 8	10" RECOVERY No Sample Recovery		Gravel clogging spoon

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-014A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			14.0'		0" RECOVERY		
15		8	15.0'	15 25 27 25	Saturated very dense brown fine gravelly coarse sand w/some fine sand and silt.	A-1-b	
			17.0'		16" RECOVERY		
17.5		9	17.0'	15 19 15 19	Saturated dense brown fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
			19.0'		14" RECOVERY		
20		10	19.0'	13 13 11 11	Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			21.0'		10" RECOVERY		
22.5							
		11	24.0'	5 10 9	Saturated medium dense brownish green fine sand w/some silt and coarse sand.	A-2-4(0)	
25			26.0'		11" RECOVERY		
27.5							
		12	29.0'	5 6 10 13	Saturated medium dense green fine sand w/some silt and coarse sand.	A-2-4(0)	Mud Rotary @ 29.0'.
30			31.0'		16" RECOVERY		
32.5							
		13	34.0'	10 12 14 17	Saturated medium dense green fine sand w/trace of silt and coarse sand.	A-3	
35			36.0'		18" RECOVERY		
37.5							

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-014A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	11 11 18 20	Saturated medium dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			41.0'		18" RECOVERY		
42.5							
45		15	44.0'	12 15 19 22	Saturated dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			46.0'		21" RECOVERY		
47.5							
50		16	49.0'	8 12 16 16	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			51.0'		21" RECOVERY		
52.5							
55		17	54.0'	7 11 18 16	saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			56.0'		22" RECOVERY		
57.5							
60		18	59.0'	8 13 22 25	Saturated dense green fine sand w/some coarse sand and silt, trace of organic matter.	A-2-4(0)	
			61.0'		22" RECOVERY		

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-014A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
					End of Boring		
62.5							
65							
67.5							
70							
72.5							
75							
77.5							
80							
82.5							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt



Well graded sand

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/24/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-015

Contract: 25-113-01

Boring Location: Sta. 325+00.00, 135' Lt. C.L.

Boring Surface Elev.: + 60.16'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0'	To: 16.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/17/2008		8.0'	6.0'	5.4'	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 16.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;

3
 No. of U-Sample Boring: Ft.
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/17/08	1	0.0'	3 3 3 6	Wet firm gray clay, trace of fine to coarse sand and gravel.	A-6(10)	
			2.0'		18" RECOVERY		
3		2	2.0'	7 11 14 15	Wet very stiff gray silty clay, trace of fine to coarse sand and gravel.	A-6(12)	
			4.0'		19" RECOVERY		
		3	4.0'	9 21 15 16	Saturated dense orange-brown and gray coarse sand and gravel w/ some fine sand and silt.	A-1-b	
6		4	6.0'	7 8 7 7	Saturated medium dense light brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			8.0'		15" RECOVERY		
		5	8.0'	5 4 3 3	Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			10.0'		17" RECOVERY		
		6	10.0'	5 3 3 4	Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
12			12.0'		15" RECOVERY		
		7	12.0'	3 3 5 7	Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			14.0'		24" RECOVERY		
15		8	14.0'	7 5 6 6	Saturated medium dense orange-brown coarse to fine sand w/ some gravel, trace of silt.	A-1-b	
			16.0'		15" RECOVERY		
					Boring terminated at 16.0 feet.		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-015A

Contract: 25-113-01

Boring Location: Sta. 365+00 45 L.T. C.L.

Boring Surface Elev.: + 60.17

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To: 10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	8/25/09		10.0	8.0	7.3	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	51.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt/Cecil Velazco
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/25/09	1	0.0'	3 4 6 8	Wet stiff gray silty clay w/trace of fine to coarse sand and fine gravel.	A-6(11)	Topsoil - 3".
2.5		2	2.0'	8 10 18 30	20" RECOVERY Wet very stiff gray clayey silt w/some fine sand, trace of coarse sand and fine gravel.	A-4(3)	
5		3	4.0'	5 8 9 11	19" RECOVERY Saturated medium dense tan silty coarse to fine sand.	A-2-4(0)	USDA Classification: Loamy Sand
7.5		4	6.0'	6 6 6	14" RECOVERY Saturated medium dense tan coarse to fine sand w/some silt.	A-2-4(0)	
10		5	8.0'	6 5 5	17" RECOVERY Saturated loose brown coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
12.5	8/26/09	6	10.0'	3 4 5 7	19" RECOVERY Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
		7	12.0'	14 10 9 6	12" RECOVERY Saturated medium dense brown coarse to fine sand w/some fine gravel and silt.	A-1-b	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-015A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0' 14.0'	3 5 6	19" RECOVERY Saturated medium dense brown coarse asand w/some fine sand and fine gravel, trace of silt.	A-1-b	
17.5		9	16.0' 16.0'	6 4 5 4	21" RECOVERY Saturated loose brown fine gravelly coarse to fine sand w/trace of silt.	A-1-b	
20		10	18.0' 18.0'	13 5 8 12	24" RECOVERY Saturated medium dense brown fine to coarse sand w/some fine gravel and silt.	A-1-b	
22.5			20.0'		19" RECOVERY		
25		11	24.0' 26.0'	3 4 8	Saturated loose green fine sand w/some coarse sand and silt. 18" RECOVERY	A-2-4(0)	Mud Rotary @ 24.0'.
27.5							
30		12	29.0' 31.0'	3 5 7 10	Saturated medium dense green fine sand w/some coarse sand and silt. 21" RECOVERY	A-2-4(0)	
32.5							
35		13	34.0' 36.0'	6 6 7 9	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter. 20" RECOVERY	A-2-4(0)	
37.5							

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-015A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	4 5 6 11	Saturated stiff green fine sandy silt w/trace of coarse sand and organic matter.	A-4(0)	
42.5			41.0'		18" RECOVERY		
45		15	44.0'	6 7 11 14	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
47.5			46.0'		21" RECOVERY		
50		16	49.0'	5 8 10 12	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
52.5			51.0'		19" RECOVERY		
55					End of Boring		
57.5							
60							

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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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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/25/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-016

Contract: 25-113-01

Boring Location: Sta. 330+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 61.64'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/14/2008		8.0'	6.0'	4.9'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:				Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/14/08	1	0.8'	2 4 5	Wet loose brown silty fine to coarse sand, trace of gravel. 15" RECOVERY	A-2-4(0)	8" of cultivated soil.
3		2	2.0'	4 11 12 13	Wet medium dense orange-brown coarse to fine sand w/ some silt and gravel. 16" RECOVERY	A-1-b	
6		3	4.0'	9 9 8	Wet to saturated medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel. 17" RECOVERY	A-2-4(0)	
9		4	6.0'	5 4 4 4	Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 14" RECOVERY	A-1-b	
		5	8.0'	4 3 3 5	Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 19" RECOVERY	A-1-b	
12			10.0'		Boring terminated at 10.0 feet.		
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

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Notes:

1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-016A

Contract: 25-113-01

Boring Location: Sta. 370+00 50 R.T. C.L.

Boring Surface Elev.: + 62.11

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 29.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	8/27/09		10.0	8.0	7.4	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	61.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Cecil Velazco
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/27/09	1	0.5'	3 3 4	Moist firm brown clayey coarse sandy silt w/some fine sand, trace of fine gravel.	A-4(3)	Topsoil - 4".
			2.0'		16" RECOVERY		
2.5		2	2.0'	3 4 5 6	Moist loose brown silty coarse to fine sand w/trace of fine gravel.	A-1-b	
			4.0'		16" RECOVERY		
		3	4.0'	5 6 8 10	Moist medium dense brown coarse sand w/some fine sand, silt and fine gravel.	A-1-b	USDA Classification: Sand
5			6.0'		17" RECOVERY		
		4	6.0'	7 6 5 4	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
7.5			8.0'		19" RECOVERY		
		5	8.0'	3 3 4 3	Wet loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		18" RECOVERY		
10		6	10.0'	2 4 5 6	Wet loose brown coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
			12.0'		17" RECOVERY		
12.5		7	12.0'	5 2 3 4	Wet loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			14.0'		15" RECOVERY		
		8	14.0'	5 4	Wet loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-016A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				4 2			
			16.0'		10" RECOVERY		
		9	16.0'	2 2 2 4	Wet very loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
17.5							
			18.0'		18" RECOVERY		
		10	18.0'	4 5 6 5	Wet medium dense brown coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	
20			20.0'		14" RECOVERY		
22.5							
		11	24.0'	15 7 9 11	Wet medium dense brown fine sand w/some coarse sand, silt and fine gravel.	A-2-4(0)	
25			26.0'		21" RECOVERY		
27.5							
		12	29.0'	3 6 6 8	Wet medium dense brownish green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Mud Rotary @ 29.0'.
30			31.0'		18" RECOVERY		
32.5							
		13	34.0'	2 5 6 8	Saturated medium dense brownish green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
35			36.0'		23" RECOVERY		
37.5							

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-016A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	5 7 9 10	Saturated medium dense green fine sand w/trace of silt, coarse sand and organic matter.	A-3	
			41.0'		19" RECOVERY		
42.5							
45		15	44.0'	5 6 9 11	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			46.0'		21" RECOVERY		
47.5							
50		16	49.0'	5 8 8 14	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			51.0'		22" RECOVERY		
52.5							
55		17	54.0'	6 12 14 19	Saturated medium dense green fine sand w/trace of silt, coarse sand and organic matter.	A-3	
			56.0'		22" RECOVERY		
57.5							
60		18	59.0'	8 15 23 23	Saturated dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			61.0'		21" RECOVERY		
					End of Boring		

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AUGUST 2015

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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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/27/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-017

Contract: 25-113-01

Boring Location: Sta. 335+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 65.29'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/14/2008	Time	10.0'	8.0'	8.0'	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;

3
No. of U-Sample Boring: Ft.
Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/14/08	1	0.8'	2 3 4	Wet firm brown clayey silt w/ some fine sand, trace of coarse sand and gravel. 15" RECOVERY	A-4(6)	8" of cultivated soil.
3		2	2.0'	4 5 7 7	Wet stiff brown fine to coarse sandy silt w/ some clay, trace of gravel. 18" RECOVERY	A-4(0)	
		3	4.0'	5 6 7 11	Wet medium dense gray silty fine to coarse sand, trace of gravel. 17" RECOVERY	A-2-4(0)	
6		4	6.0'	11 11 10 7	Wet medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel. 20" RECOVERY	A-1-b	
9		5	8.0'	5 7 5 5	Wet medium dense light brown coarse sand w/ some gravel, fine sand, and silt. 15" RECOVERY	A-1-b	
12			10.0'		Boring terminated at 10.0 feet.		
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-017A

Contract: 25-113-01

Boring Location: Sta. 375+00 45 L.T. C.L.

Boring Surface Elev.: + 65.33

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 9.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	8/27/09		12	8.0	10.2	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	50.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Cecil Velazco/Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/27/09	1	0.5'	3 3 4	Wet firm brown clayey silt w/some fine to coarse sand.	A-4(4)	Topsoil - 4".
			2.0'		17" RECOVERY		
2.5		2	2.0'	2 2 1	Wet soft brown silt w/some coarse to fine sand, trace of fine gravel and clay.	A-4(0)	
			4.0'		14" RECOVERY		
		3	4.0'	3 3 4 3	Wet loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA Classification: Loamy Sand
5			6.0'		18" RECOVERY		
		4	6.0'	3 4 5 6	Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
7.5			8.0'		18" RECOVERY		
		5	8.0'	3 4 4 5	Saturated loose tan coarse to fine sand w/some fine gravel, fine sand and silt.	A-1-b	
10			10.0'		18" RECOVERY		
		6	10.0'	5 6 4 5	Saturated loose orange coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
			12.0'		17" RECOVERY		
12.5	8/31/09	7	12.0'	3 3 4 4	Saturated loose orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
			14.0'		15" RECOVERY		
		8	14.0'	2 2	Saturated loose orange coarse sand w/some fine sand, trace of silt and fine	A-1-b	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-017A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				3 5	gravel.		
			16.0'		17" RECOVERY		
		9	16.0'	3 3 6 10	Saturated loose brown coarse to fine sand w/some silt and fine gravel.	A-1-b	
17.5			18.0'		22" RECOVERY		
		10	18.0'	6 6 6 7	Saturated medium dense brown fine gravelly coarse to fine sand w/trace of silt.	A-1-b	
20			20.0'		14" RECOVERY		
22.5							
		11	23.0'	5 5 6 7	Saturated medium dense brown silty fine sand w/some coarse sand.	A-2-4(0)	
25			25.0'		18" RECOVERY		
27.5							
		12	28.0'	5 5 7 10	Saturated medium dense brown fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
30			30.0'		22" RECOVERY		
32.5							
		13	33.0'	4 5 6 7	Saturated medium dense brown clayey fine sand w/trace of coarse sand and silt.	A-2-6(1)	
35			35.0'		21" RECOVERY		
37.5							

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-017A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	38.0'	4 5 6 8	Saturated stiff green clayey fine sandy silt w/trace of coarse sand.	A-4(0)	
40			40.0'		20" RECOVERY		
42.5							
45		15	43.0'	5 6 7 8	Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matter.	A-2-4(0)	
47.5			45.0'		19" RECOVERY		
50		16	48.0'	7 9 12 20	Saturated medium dense green silty fine sand w/trace of coarse sand and organic matter.	A-2-4(0)	
52.5			50.0'		23" RECOVERY		
55					End of Boring		
57.5							
60							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt



Clayey sand



Poorly graded clayey
silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/27/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-018

Contract: 25-113-01

Boring Location: Sta. 340+00.00, 121' Rt. C.L.

Boring Surface Elev.: + 60.87'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	16.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/14/2008		8.0'	6.0'	5.1'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/14/08	1	0.5'	1 1 2	Wet soft brown coarse to fine sandy silt w/ some clay, trace of gravel. 15" RECOVERY	A-4(0)	7" of leaf litter/topsoil.
3		2	2.0'	2 2 7 16	Wet stiff gray clayey fine sandy silt w/ some coarse sand, trace of gravel. 19" RECOVERY	A-4(2)	
		3	4.0'	8 12 11 9	Wet medium dense orange-brown silty coarse to fine sand, trace of gravel. 16" RECOVERY	A-2-4(0)	
6		4	6.0'	4 4 5 6	Saturated loose orange-brown and gray coarse to fine sand w/ some silt, trace of gravel. 17" RECOVERY	A-2-4(0)	
		5	8.0'	4 5 4 4	Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 17" RECOVERY	A-1-b	
9		6	10.0'	5 3 3 4	Saturated loose orange-brown coarse sand w/ some fine sand and silt, trace of gravel. 17" RECOVERY	A-1-b	
		7	12.0'	4 2 4 3	Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 20" RECOVERY	A-2-4(0)	
12		8	14.0'	5 5 8 9	Saturated medium dense orange-brown silty fine to coarse sand, trace of gravel. 16" RECOVERY	A-2-4(0)	
15			16.0'		Boring terminated at 16.0 feet.		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Clayey sand



Silty sand

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NOT FOR BIDDING
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Notes:

1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were 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.: R2-018A

Contract: 25-113-01

Boring Location: Sta. 380+00 40 L.T. C.L.

Boring Surface Elev.: + 65.57

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3/14	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 9.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	8/31/10		10.0	8.0	7.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	35.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/31/09	1	0.0'	2 2 2 2	Wet soft gray silt w/some clay and fine sand, trace of coarse sand and fine gravel.	A-4(1)	Topsoil - 3".
2.5		2	2.0' 2.0'	2 2 2 2	16" RECOVERY Wet firm brown clayey coarse sandy silt w/some fine sand, trace of fine gravel.	A-4(0)	
5		3	4.0' 4.0'	6 9 15 15	16" RECOVERY Wet medium dense tan coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
7.5		4	6.0' 6.0'	13 17 16 15	14" RECOVERY Wet dense tan coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	USDA Classification: Loamy Sand
10		5	8.0' 8.0'	5 6 7 4	19" RECOVERY Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	Mud Rotary @ 9.0'.
		6	10.0' 10.0'	4 4 5 7	15" RECOVERY Wet loose orange silty coarse sand w/trace of fine sand and fine gravel.	A-2-4(0)	
12.5		7	12.0' 12.0'	6 5 5 5	17" RECOVERY Wet loose orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-018A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0' 14.0'	4 4 7 10	13" RECOVERY Wet medium dense orange coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
17.5		9	16.0' 16.0'	7 8 8 17	16" RECOVERY Wet medium dense orange fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
20		10	18.0' 18.0'	3 10 12 10	15" RECOVERY Wet medium dense orange fine to coarse sandy fine gravel w/some silt.	A-1-b	
22.5			20.0'		10" RECOVERY		
25		11	23.0' 25.0'	3 4 4 6	Wet loose green silty fine sand w/trace of coarse sand. 16" RECOVERY	A-2-4(0)	
27.5							
30		12	28.0' 30.0'	3 4 5 7	Wet stiff green fine sandy silt w/trace of coarse sand. 17" RECOVERY	A-4(0)	
32.5							
35		13	33.0' 35.0'	3 4 5 7	Saturated loose green silty fine sand w/some coarse sand. 22" RECOVERY	A-2-4(0)	
37.5					End of Boring		

DRAFT
NOT FOR BIDDING
AUGUST 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
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/31/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-019

Contract: 25-113-01

Boring Location: Sta. 345+35.76, 119' Lt. C.L.

Boring Surface Elev.: + 60.00'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 14.0'	

Water Level Readings					
Date 3/14/2008	Time	Depth of Hole 6.0'	Depth of Casing 4.0'	Depth of Water 2.0'	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 14.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	Ft.;		No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;		Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/14/08	1	0.8'	4 3 5	Wet firm gray clay w/ some coarse to fine sand, trace of gravel. 15" RECOVERY	A-6(7)	10" of cultivated soil.
		2	2.0'	6 9	Wet stiff gray clayey coarse sandy silt w/ some fine sand, trace of gravel. 12" RECOVERY	A-4(3)	
3		2A	3.0'	12 23	Saturated dense gray coarse sand w/ some silt, trace of gravel and fine sand. 9" RECOVERY	A-1-b	
		3	4.0'	6 8 10 7	Saturated medium dense orange-brown coarse sand w/ some silt, trace of fine sand and gravel. 17" RECOVERY	A-1-b	
6		4	6.0'	3 3 3 3	Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY	A-1-b	
		5	8.0'	2 3 3 5	Saturated loose orange-brown coarse sand w/ some fine sand and silt, trace of gravel. 15" RECOVERY	A-1-b	
9		6	10.0'	5 4 6 5	Saturated loose orange-brown coarse sand w/ some fine sand and silt, trace of gravel. 16" RECOVERY	A-1-b	
		7	12.0'	7 7 6 7	Saturated medium dense orange-brown coarse sand w/ some fine sand, trace of silt and gravel. 18" RECOVERY	A-1-b	
15			14.0'		Boring terminated at 14.0 feet (due to excessive heave).		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were 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

Boring No.: R2-020

Contract: 25-113-01

Boring Location: Sta. 349+99.87, 33' Rt. C.L.

Boring Surface Elev.: + 62.97'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings					
Date 3/14/2008	Time	Depth of Hole 8.0'	Depth of Casing 6.0'	Depth of Water 4.8'	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of	U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/14/08	1	0.8'	1 2 3	Wet soft brown clayey coarse to fine sandy silt, trace of gravel. 15" RECOVERY	A-4(0)	9" of cultivated soil.
3		2	2.0'	1 2 2 2	Wet very loose brown coarse sand w/ some silt and fine sand, trace of gravel. 15" RECOVERY	A-1-b	
		3	4.0'	6 7 10 9	Wet medium dense brown coarse sand w/ some gravel, silt, and fine sand. 17" RECOVERY	A-1-b	
6		4	6.0'	6 4 5 6	Saturated loose orange-brown coarse sand w/ some silt and fine sand, trace of gravel. 17" RECOVERY	A-1-b	
		5	8.0'	4 4 4 4	Saturated loose orange-brown coarse sand w/ some silt and fine sand, trace of gravel. 18" RECOVERY	A-1-b	
9			10.0'		Boring terminated at 10.0 feet.		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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

Boring No.: R2-021

Contract: 25-113-01

Boring Location: Sta. 355+00.00, 119' Lt. C.L.

Boring Surface Elev.: + 63.74'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	16.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/14/2008		10.0'	8.0'	7.0'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/14/08	1	0.8'	2 3 2	Moist loose brown silty fine to coarse sand, trace of gravel. 15" RECOVERY	A-2-4(0)	9" of cultivated soil.
3		2	2.0'	1 2 2 2	Moist very loose brown silty fine to coarse sand, trace of gravel. 19" RECOVERY	A-2-4(0)	
		3	4.0'	1 2 1 1	Wet very loose brown silty fine to coarse sand, trace of gravel. 13" RECOVERY	A-2-4(0)	
6		4	6.0'	1 1/12" 1	Wet very loose gray fine to coarse sand w/ some silt, trace of gravel. 16" RECOVERY	A-2-4(0)	
		5	8.0'	1 1 3 3	Saturated soft orange fine to coarse sandy silt, trace of gravel. 16" RECOVERY	A-4(0)	
9		6	10.0'	3 3 2 3	Saturated loose orange-brown coarse sand, trace of fine sand, gravel, and silt. 17" RECOVERY	A-1-b	
12		7	12.0'	2 4 3 4	Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 15" RECOVERY	A-2-4(0)	
		8	14.0'	3 4 2 6	Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
15			16.0'		Boring terminated at 16.0 feet.		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Silt



Poorly graded sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were 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

Boring No.: R2-022

Contract: 25-113-01

Boring Location: Sta. 375+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 66.04'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings					
Date 3/13/2008	Time	Depth of Hole 8.0'	Depth of Casing 6.0'	Depth of Water 5.1'	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 10.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:				No. of U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Dan Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/13/08	1	1.0'	1	12" RECOVERY Wet soft brown clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	11" of cultivated soil.
			2.0'	1			
			2.0'	3			
3		2	2.0'	3	16" RECOVERY Wet loose brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
				5			
				6			
		3	4.0'	5	17" RECOVERY Wet medium dense brown coarse to fine sand w/ some silt and gravel.	A-1-b	
			4.0'	6			
				6			
6		4	6.0'	5	18" RECOVERY Saturated medium dense brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			6.0'	7			
				5			
		5	8.0'	5	11" RECOVERY Saturated loose brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
9				5			
				5			
			10.0'		11" RECOVERY		
					Boring terminated at 10.0 feet.		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-022A

Contract: 25-113-01

Boring Location: Sta. 415+00 50 L.T.C.L.

Boring Surface Elev.: + 65.87

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 35.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/1/10		10.0	8.0	8.4	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	35.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/1/09	1	0.5'	2 2 3	Moist soft brown clayey fine gravelly fine sandy silt w/some coarse sand.	A-4(0)	Topsoil - 8".
			2.0'		9" RECOVERY		
2.5		2	2.0'	3 4 5	Moist loose brown silty fine to coarse sand w/some clay, trace of fine gravel.	A-2-4(0)	
			4.0'		17" RECOVERY		
5		3	4.0'	2 3 3 2	Moist loose brown coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	USDA Classification: Loamy Sand
			6.0'		18" RECOVERY		
		4	6.0'	1 1 1	Wet very loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
7.5			8.0'		16" RECOVERY		
		5	8.0'	1 2 2	Wet very loose tan fine to coarse sand w/some silt.	A-2-4(0)	
10			10.0'		16" RECOVERY		
		6	10.0'	2 2 3 3	Wet loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			12.0'		18" RECOVERY		
12.5		7	12.0'	1 2 1 1	No Sample Recovery		Trap Broke
			14.0'		0" RECOVERY		
		8	14.0'	1 1	Wet very loose tan silty fine sand w/trace of coarse sand.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-022A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				1 2			
			16.0'		20" RECOVERY		
		9	16.0'	2 2 3	Wet very loose brown fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
17.5							
			18.0'		18" RECOVERY		
		10	18.0'	1 1 2	Wet very loose brown fine sand w/some silt and coarse sand.	A-2-4(0)	
20			20.0'		17" RECOVERY		
22.5							
		11	24.0'	4 5 6	Wet medium dense tan coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
25			26.0'		16" RECOVERY		
27.5							
		12	29.0'	5 3 6 9	Wet loose brown fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
30			31.0'		16" RECOVERY		
32.5							
		13	33.0'	6 6 7	Wet medium dense brown fine gravelly fine to coarse sand w/trace of silt.	A-1-b	
35			35.0'		6" RECOVERY		
					End of Boring		
37.5							

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/01/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
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 recomendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows are uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-023

Contract: 25-113-01

Boring Location: Sta. 380+55.51, 265' Rt. C.L.

Boring Surface Elev.: + 67.00'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	16.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
4/1/2008		10.0'	8.0'	7.0'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Gary Truver Sr.
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	4/1/08	1	0.5'	3 3 3	Wet firm brown clayey silt w/ some fine to coarse sand, trace of gravel. 16" RECOVERY	A-4(3)	8" of cultivated soil.
3		2	2.0'	8 12 15 12	Wet very stiff orange-brown clayey fine sandy silt, trace of coarse sand. 23" RECOVERY	A-4(0)	
		3	4.0'	4 4 5 8	Wet loose orange-brown silty fine sand w/ some coarse sand, trace of gravel. 15" RECOVERY	A-2-4(0)	
6		4	6.0'	9 10 9 10	Wet medium dense orange-brown silty fine to coarse sand, trace of gravel. 17" RECOVERY	A-2-4(0)	
		5	8.0'	3 6 6 6	Saturated medium dense orange-brown coarse sand w/ some silt and fine sand, trace of gravel. 13" RECOVERY	A-1-b	
9		6	10.0'	7 8 7 10	Saturated medium dense orange-brown coarse sand w/ some silt, gravel, and fine sand. 16" RECOVERY	A-1-b	
		7	12.0'	3 4 5 5	Saturated loose light brown coarse sand w/ some silt and fine sand, trace of gravel. 18" RECOVERY	A-1-b	
12		8	14.0'	6 6 9 9	Saturated medium dense light brown coarse to fine sand w/ some silt, trace of gravel. 15" RECOVERY	A-1-b	
15			16.0'		Boring terminated at 16.0 feet.		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 4/1/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a CME 55.
2. Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-023A

Contract: 25-113-01

Boring Location: Sta. 420+00 50 R.T. C.L.

Boring Surface Elev.: + 65.94

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: 30.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
9/1/09		10.0	8.0	6.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	30.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/1/09	1	0.5'	3 4 4	Wet firm brown fine sandy clay w/some coarse sand, fine gravel and silt.	A-6(2)	Topsoil - 5".
			2.0'		12" RECOVERY		USDA
2.5		2	2.0'	7 9 9	Wet medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	Classifica : Sandy Loam
			4.0'		18" RECOVERY		
		3	4.0'	5 12 9 7	Wet medium dense brown coarse sand w/some fine gravel, silt and fine sand.	A-1-b	
5			6.0'		14" RECOVERY		
		4	6.0'	4 7 5 5	Saturated medium dense brown coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
7.5			8.0'		19" RECOVERY		
		5	8.0'	3 3 4 3	Saturated loose brown coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
10			10.0'		13" RECOVERY		
		6	10.0'	3 3 3 4	Saturated very loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			12.0'		14" RECOVERY		
12.5		7	12.0'	2 2 2 2	Saturated very loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			14.0'		15" RECOVERY		
		8	14.0'	W/R 1	Saturated very loose brown fine sand w/some coarse sand and silt.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-023A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				1 2			
			16.0'		15" RECOVERY		
		9	16.0'	1 2 3 3	Saturated loose brown fine sand w/some silt and coarse sand.	A-2-4(0)	
17.5							
			18.0'		18" RECOVERY		
		10	18.0'	W/R W/R 1 2	Saturated very loose brown silty fine sand w/trace of coarse sand.	A-2-4(0)	
20			20.0'		17" RECOVERY		
22.5							
		11	24.0'	2 3 4 5	Saturated loose brown fine sand w/some fine gravel and coarse sand, trace of silt.	A-3	
25			26.0'		6" RECOVERY		
27.5							
		12	28.0'	6 6 8 6	Saturated medium dense brown fine gravelly coarse to fine sand w/trace of silt.	A-1-b	
30			30.0'		8" RECOVERY		
					End of Boring		
32.5							
35							
37.5							

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/01/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
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 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.: R2-023B

Contract: 25-113-01

Boring Location: Sta. 421+00 50 L.T. C.L.

Boring Surface Elev.: + 67.41

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Spoon	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 35.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/1/10		10.0	8.0	8.6	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	35.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/1/09	1	0.0'	11 21 19 19	Moist dense black fine gravel w/some coarse sand and silt, trace of fine sand.	A-1-a	
2.5		2	2.0'	9 11 11	14" RECOVERY Moist very stiff brown clayey fine sandy silt w/some fine gravel and coarse sand.	A-4(0)	
5		3	4.0'	6 7 7 8	16" RECOVERY Moist medium dense brown silty coarse to fine sand.	A-2-4(0)	USDA Classification: Loamy Sand
7.5		4	6.0'	5 7 7 6	16" RECOVERY Moist medium dense brown coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
10		5	8.0'	2 2 3 3	20" RECOVERY Wet loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
		6	10.0'	4 4 5 5	14" RECOVERY Wet loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
12.5		7	12.0'	1 1 1 1	14" RECOVERY Wet very loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-023B

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0' 14.0'	W/R 1 1 1	20" RECOVERY Wet very loose brown fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
17.5		9	16.0' 16.0'	1 2 2 3	21" RECOVERY Wet very loose tan fine sand w/some silt and coarse sand.	A-2-4(0)	
20		10	18.0' 18.0'	W/R 1 1 1	23" RECOVERY Wet very loose brown silty fine sand w/trace of coarse sand.	A-2-4(0)	
22.5			20.0'		23" RECOVERY		
25		11	24.0'	7 9 10 13	No Sample Recovery		Gravel blocking spoon
27.5			26.0'		0" RECOVERY		
30		12	29.0' 31.0'	9 5 7 5	10" RECOVERY Wet medium dense tan coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
32.5							
35		13	33.0' 35.0'	10 10 17 13	10" RECOVERY Wet medium dense tan coarse sandy fine gravel w/some fine sand, trace of silt.	A-1-a	
37.5					10" RECOVERY End of Boring		

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Clayey sand



Well graded sand
with silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/01/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-024

Contract: 25-113-01

Boring Location: Sta. 385+60.44, 2' Lt. C.L.

Boring Surface Elev.: + 68.76'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	10.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/13/2008		10.0'	8.0'	7.0'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:				Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Dan Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/13/08	1	1.0'	2 4	Wet firm brown clayey silt w/ some fine to coarse sand, trace of gravel.	A-4(5)	10" of cultivated soil.
			2.0'		12" RECOVERY		
3		2	2.0'	9 14 14 10	Wet medium dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	5 5 6 7	Wet medium dense brown silty fine to coarse sand.	A-2-4(0)	
6			6.0'		19" RECOVERY		
		4	6.0'	5 6 7 7	Wet to saturated medium dense brown silty fine sand, trace of coarse sand.	A-2-4(0)	
			8.0'		19" RECOVERY		
9		5	8.0'	5 6 6 7	Saturated medium dense light brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			10.0'		18" RECOVERY		
					Boring terminated at 10.0 feet.		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
3. Surveyed boring locations and elevations were 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: 25-113-01
Boring Location: Sta. 390+00.00, 123' Rt. C.L.
Boring Surface Elev.: + 65.11'

Boring No.: R2-025

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Reference:

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings					
Date 3/13/2008	Time	Depth of Hole 4.0'	Depth of Casing 2.0'	Depth of Water 1.9'	Elev. of Water

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 16.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;

3 Dia. U-Sample Boring: Ft.
 No. of U-Samples: ;
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Dan Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/13/08	1	1.0'	3	12" RECOVERY	A-4(0)	12" of cultivated soil.
			2.0'	4			
3		2	2.0'	9	18" RECOVERY	A-2-4(0)	
			2.0'	15			
			4.0'	15			
			4.0'	17			
6		3	4.0'	8	15" RECOVERY	A-2-4(0)	
			4.0'	12			
				11			
				13			
9		4	6.0'	8	18" RECOVERY	A-2-4(0)	
			6.0'	8			
				12			
				15			
12		5	8.0'	4	16" RECOVERY	A-1-b	
			8.0'	3			
				4			
				3			
15		6	10.0'	4	19" RECOVERY	A-2-4(0)	
			10.0'	3			
				3			
				3			
15		7	12.0'	2	20" RECOVERY	A-2-4(0)	
			12.0'	2			
				2			
				4			
15		8	14.0'	2	22" RECOVERY	A-2-4(0)	
			14.0'	3			
				10			
				10			
			16.0'		Boring terminated at 16.0 feet.		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-025A

Contract: 25-113-01

Boring Location: Sta. 430+00 50 R.T. C.L.

Boring Surface Elev.: + 64.62

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.


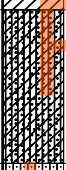
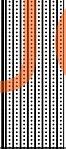
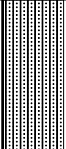
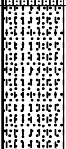
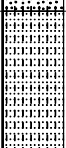
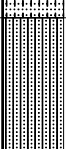
Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					25.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/2/09		10.0	8.0	4.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	25.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/2/09	1	0.0'	2 2 2 5	 Wet soft gray silty clay w/trace of fine to coarse sand.	A-6(10)	Topsoil - 2".
2.5		2	2.0'	10 15 20 22	 15" RECOVERY Wet dense gray fine to coarse sand w/some clay and silt, trace of fine gravel.	A-2-4(0)	USDA Classification: Loamy Sand
5		3	4.0'	7 8 9 9	 17" RECOVERY Saturated medium dense gray silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
7.5		4	6.0'	4 8 6 8	 18" RECOVERY Saturated medium dense tan coarse to fine sand w/some silt and fine gravel.	A-1-b	
10		5	8.0'	2 4 4 4	 18" RECOVERY Saturated loose brown fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
12.5		6	10.0'	3 5 5 6	 15" RECOVERY Saturated loose orange coarse sand w/some fine gravel and fine sand, trace of silt.	A-1-b	
		7	12.0'	7 27 18 23	 12" RECOVERY Saturated dense brown silty fine gravelly fine sand w/some coarse sand.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-025A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0' 14.0'	8 6 4 4	5" RECOVERY Saturated loose brown fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
17.5		9	16.0' 16.0'	5 9 11 13	7" RECOVERY Saturated medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
20		10	18.0' 18.0'	5 6 7 8	11" RECOVERY No Sample Recovery		
22.5			20.0'		0" RECOVERY		
25		11	23.0' 25.0'	4 5 5 8	14" RECOVERY Saturated loose green silty fine to coarse sand w/some fine gravel.	A-2-4(0)	
27.5					End of Boring		
30							
32.5							
35							
37.5							

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NOT FOR BIDDING
AUGUST 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
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/02/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
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 recomendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows are uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-026

Contract: 25-113-01

Boring Location: Sta. 395+00.00, 124' Lt. C.L.

Boring Surface Elev.: + 63.43'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date: 3/13/2008			4.0'	2.0'	0.6'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of:	U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Dan Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	WOH 1 1 1	Wet soft brown fine to coarse sandy clay w/ some organic matter, trace of gravel.	A-6(3)	
		2	2.0'	9	12" RECOVERY		
3		2	2.0'	12 11 9	Wet medium dense gray clayey coarse to fine sand, trace of gravel.	A-2-4(0)	
		3	4.0'	4 4 4 8	15" RECOVERY		
		3	4.0'	4 4 4 8	Saturated loose gray to orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
6		4	6.0'	3 5 8 8	16" RECOVERY		
		4	6.0'	3 5 8 8	Saturated medium dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
		5	8.0'	3 4 3 2	14" RECOVERY		
9		5	8.0'	3 4 3 2	Saturated loose orange coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
		6	10.0'	4 4 5 6	18" RECOVERY		
		6	10.0'	4 4 5 6	Saturated loose orange coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
12		7	12.0'	7 11 16 13	21" RECOVERY		
		7	12.0'	7 11 16 13	Saturated medium dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
		8	14.0'	8 6 5 7	18" RECOVERY		
15		8	14.0'	8 6 5 7	Saturated medium dense green fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	Glauconitic.
			16.0'		15" RECOVERY		
					Boring terminated at 16.0 feet.		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-026A

Contract: 25-113-01

Boring Location: Sta. 435+00 50 L.T. C.L.

Boring Surface Elev.: + 62.83

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To: 32.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/3/09		10.0	8.0	5.2	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	32.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/3/09	1	0.0'	1 2 3 4	Saturated firm gray clayey fine to coarse sandy silt.	A-4(1)	Topsoil - 3".
2.5		2	2.0'	3 11 12 17	15" RECOVERY Saturated medium dense gray clayey fine to coarse sand w/trace of silt.	A-2-4(0)	USDA Classification: Sandy Loam
		3	4.0'	3 6	19" RECOVERY Saturated stiff gray clayey fine sandy silt w some coarse sand.	A-4(0)	
5		3A	5.0'	5 6	10" RECOVERY Saturated medium dense brown silty fine to coarse sand.	A-2-4(0)	
		4	6.0'	2 8 7 7	8" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
7.5		5	8.0'	3 4 5	13" RECOVERY Saturated loose brown fine gravelly coarse to fine sand w/some silt.	A-1-b	
10		6	10.0'	5 6 5 7	12" RECOVERY Saturated medium dense brown fine gravelly coarse sand w/some fine sand and silt.	A-1-b	
12.5		7	12.0'	5 6 10 18	16" RECOVERY Saturated medium dense brown fine gravelly coarse sand w/some silt and fine sand.	A-1-b	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-026A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0' 14.0'	17 13 18 21	17" RECOVERY Saturated dense brown fine sandy fine gravel w/some coarse sand, trace of silt.	A-1-b	
17.5		9	16.0' 16.0'	8 10	9" RECOVERY Saturated medium dense brown fine gravelly fine to coarse sand w/some silt.	A-1-b	
20		9A	17.0' 17.0'	12 16	12" RECOVERY Saturated medium dense brown clayey fine to coarse sand w/trace of silt.	A-2-6(1)	
22.5		10	18.0' 18.0'	12 5 6 7	12" RECOVERY Saturated medium dense brown clayey fine to coarse sand w/trace of silt and fine gravel.	A-2-6(1)	
25			20.0'		12" RECOVERY		
27.5		11	24.0' 24.0'	7 8 10 11	Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter.	A-2-4(0)	
30			26.0'		19" RECOVERY		
32.5		12	28.0' 28.0'	8 16 16 16	No Sample Recovery		
35			30.0'		0" RECOVERY		
37.5		13	30.0' 30.0'	5 8 8 8	Saturated medium dense green fine sand w/some coarse sand and silt, trace of organic matter.	A-2-4(0)	
			32.0'		18" RECOVERY		
					End of Boring		

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/03/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-027

Contract: 25-113-01

Boring Location: Sta. 400+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 67.23'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	10.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/13/2008		8.0'	6.0'	4.4'	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 No. of U-Sample Boring: 3 Ft.
 Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Dan Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/13/08	1	0.5'	2 4 7	Wet stiff brown and gray mottled clayey silt, trace of fine to coarse sand. 15" RECOVERY	A-4(3)	8" of topsoil.
3		2	2.0'	7 14 17 16	Wet dense brown silty fine to coarse sand, trace of gravel. 14" RECOVERY	A-2-4(0)	
		3	4.0'	8 8 11 17	Wet very stiff gray and brown fine to coarse sandy silt w/ some clay, trace of gravel. 18" RECOVERY	A-4(0)	
6		4	6.0'	16 12 11 10	Saturated medium dense brown and light brown silty fine to coarse sand, trace of gravel. 20" RECOVERY	A-2-4(0)	
		5	8.0'	4 6 4 4	Saturated stiff brown and light brown fine to coarse sandy silt, trace of gravel. 24" RECOVERY	A-4(0)	
9			10.0'		Boring terminated at 10.0'.		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded clayey
silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
3. Surveyed boring locations and elevations were 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

Boring No.: R2-028

Contract: 25-113-01

Boring Location: Sta. 405+00.00, 138' Lt. C.L.

Boring Surface Elev.: + 66.17'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	16.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/13/2008		6.0'	4.0'	2.1'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;		Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Dan Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	WOH 2 4	Wet soft gray and brown clayey silt, trace of gravel and fine to coarse sand.	A-4(6)	
			2.0'		16" RECOVERY		
3		2	2.0'	12 16 13 15	Wet medium dense gray fine to coarse sand w/ some clay and gravel.	A-2-4(0)	
			4.0'		17" RECOVERY		
		3	4.0'	8 9 10 10	Saturated medium dense gray coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
6			6.0'		24" RECOVERY		
		4	6.0'	2 6 6 5	Saturated medium dense gray silty coarse to fine sand, trace of gravel.	A-2-4(0)	
			8.0'		16" RECOVERY		
9		5	8.0'	2 1 2 2	Saturated very loose brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			10.0'		21" RECOVERY		
		6	10.0'	1 1 1 2	Saturated very loose brown silty fine sand w/ some coarse sand.	A-2-4(0)	
12			12.0'		19" RECOVERY		
		7	12.0'	2 2 2 2	Saturated very loose brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			14.0'		20" RECOVERY		
15		8	14.0'	2 4 11 14	Saturated medium dense brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
			16.0'		24" RECOVERY		
					Boring terminated at 16.0 feet.		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-028A

Contract: 25-113-01

Boring Location: Sta. 445+00 50 L.T. C.L.

Boring Surface Elev.: + 67.83

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 36.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/3/09		10.0	8.0	6.5	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 36.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: Ft.;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 Dia. U-Sample Boring: Ft.
 U-Samples: Ft.
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/3/09	1	0.5'	6 3 3	Moist stiff brown clayey fine gravelly silt w/some coarse to fine sand.	A-4(1)	Topsoil - 5".
			2.0'		14" RECOVERY		
2.5		2	2.0'	5 8 8 15	Moist medium dense tan clayey coarse to fine sand w/some silt and fine gravel.	A-2-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	7 8 6 6	Moist medium dense tan clayey fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	USDA Classifica - Sandy Loam
5			6.0'		17" RECOVERY		
		4	6.0'	4 4 4 3	Saturated loose tan silty fine sand w/trace of coarse sand.	A-2-4(0)	
7.5			8.0'		18" RECOVERY		
		5	8.0'	1 2 1 2	Saturated very loose tan fine to coarse sand w/some silt.	A-2-4(0)	
			10.0'		19" RECOVERY		
10		6	10.0'	2 2 4 5	Saturated loose tan fine to coarse sand w/some silt.	A-2-4(0)	
			12.0'		18" RECOVERY		
12.5		7	12.0'	4 2 4 3	Saturated loose brown coarse to fine sand w/some fine gravel and silt.	A-1-b	
			14.0'		14" RECOVERY		
		8	14.0'	4 4	Saturated loose brown fine gravelly coarse sand w/some fine sand and	A-1-b	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-028A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				5 5	silt.		
			16.0'		16" RECOVERY		
		9	16.0'	2 3 5 6	Saturated loose brown coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	
17.5			18.0'		17" RECOVERY		
		10	18.0'	5 6 14 9	Saturated medium dense brown fine gravelly fine sand w/some coarse sand and silt.	A-2-4(0)	Mud Rotary @ 19.0'.
20			20.0'		8" RECOVERY		
22.5							
		11	24.0'	5 6 8 12	Saturated medium dense brown silty fine to coarse sand.	A-2-4(0)	
25			26.0'		17" RECOVERY		
27.5							
		12	29.0'	6 6 9 15	Saturated medium dense brown clayey fine sand w/some coarse sand and silt.	A-2-6(0)	
30			31.0'		20" RECOVERY		
32.5							
		13	34.0'	4 4 4 7	Saturated firm brown fine sandy clay w/trace of silt and fine gravel.	A-7-6(4)	
35			36.0'		22" RECOVERY		
					End of Boring		
37.5							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 9/03/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-029

Contract: 25-113-01

Boring Location: Sta. 415+00.00, 164' Rt. C.L.

Boring Surface Elev.: + 69.00'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0'	To:	16.0'
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings						
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water	
3/12/2008		10.0'	8.0'	6.3'		

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/12/08	1	1.0'	2	Wet soft light brown clayey silt, trace of fine to coarse sand and gravel.	A-4(5)	12" of cultivated soil.
			2.0'	2			
3		2	2.0'	3	9" RECOVERY	A-2-4(0)	
				9	Wet medium dense brown silty fine to coarse sand w/ some gravel.		
				12			
				14			
			4.0'		13" RECOVERY		
		3	4.0'	6	Wet medium dense orange silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
				9			
				9			
				10			
6			6.0'		13" RECOVERY		
		4	6.0'	6	Saturated medium dense orange silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
				7			
				6			
				6			
			8.0'		18" RECOVERY		
		5	8.0'	2	Saturated very loose orange coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
9				2			
				2			
				3			
			10.0'		22" RECOVERY		
		6	10.0'	3	Saturated loose orange coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
				2			
				3			
				3			
12			12.0'		14" RECOVERY		
		7	12.0'	3	Saturated loose orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
				2			
				3			
				3			
			14.0'		18" RECOVERY		
		8	14.0'	2	Saturated loose light brown fine to coarse sand, trace of silt and gravel.	A-3	
15				3			
				4			
				4			
			16.0'		16" RECOVERY		
					Boring terminated at 16.0 feet.		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 3/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-029A

Contract: 25-113-01

Boring Location: Sta. 455+00 50 R.T. C.L.

Boring Surface Elev.: + 68.13

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 59.5	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	10/23/09		10.0	8.0	4.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	59.5	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	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
	10/23/09	1	0.5'	2 2 2	Moist soft gray clayey fine to coarse sandy silt w/trace of fine gravel.	A-4(0)	Cultivated Soil - 6".
			2.0'		15" RECOVERY		
2.5		2	2.0'	4 10 8 9	Wet medium dense orangish gray silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			4.0'		21" RECOVERY		
5		3	4.0'	4 7 8 10	Saturated medium dense yellowish gray coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			6.0'		16" RECOVERY		
7.5		4	6.0'	4 4 3 3	Saturated loose yellowish gray coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		15" RECOVERY		
10		5	8.0'	1 1 2 3	Saturated very loose gray coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
			10.0'		18" RECOVERY		
12.5		6	10.0'	1 2 4 4	Saturated loose gray coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			12.0'		24" RECOVERY		
12.5		7	12.0'	1 2 2 2	Saturated very loose gray coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
			14.0'		17" RECOVERY		
		8	14.0'	1 3	Saturated loose orange coarse sand w/some fine sand and fine gravel,	A-1-b	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-029A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				2 3	trace of silt.		
			16.0'		21" RECOVERY		
		9	16.0'	7 6 8 6	Saturated medium dense orange fine gravelly coarse to fine sand w/trace of silt.	A-1-b	
17.5			18.0'		17" RECOVERY		
		10	18.0'	5 4 6 8	Saturated loose brown silty fine to coarse sand w/some fine gravel.	A-2-4(0)	
20			20.0'		15" RECOVERY		
22.5							
		11	24.0'	5 7 9 10	Saturated medium dense brown silty fine sand w/some coarse sand and fine gravel.	A-2-4(0)	
25			26.0'		18" RECOVERY		
27.5							
		12	29.0'	4 4 6 4	Saturated loose dark green fine sand w/some coarse sand and silt, trace of organic matter.	A-2-4(0)	Mud Rotary @ 29.0'.
30			31.0'		16" RECOVERY		
32.5							
		13	34.0'	7 7 12 11	Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matter.	A-2-4(0)	
35			36.0'		23" RECOVERY		
37.5							

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-029A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	9 9 12 16	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			41.0'		24" RECOVERY		
42.5							
45		15	44.0'	7 9 12 14	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			46.0'		24" RECOVERY		
47.5							
50		16	49.0'	9 9 11 15	Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter.	A-2-4(0)	
			51.0'		20" RECOVERY		
52.5							
55		17	54.0'	3 3 4 8	Saturated loose green silty fine sand w/some coarse sand and fine gravel, trace of organic matter.	A-2-4(0)	
			56.0'		20" RECOVERY		
57.5							
60		18	59.0' 59.5'	70	Saturated very dense green silty fine sand w/some coarse sand and fine gravel, trace of organic matter.	A-2-4(0)	
					6" RECOVERY		
					End of Boring		

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/23/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Truck.
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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-030

Contract: 25-113-01

Boring Location: Sta. 420+00.00, 43' Lt. C.L.

Boring Surface Elev.: + 70.90'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings					
Date 3/12/2008	Time	Depth of Hole 8.0'	Depth of Casing 6.0'	Depth of Water 4.6'	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 10.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;			No. of U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/12/08	1	1.0'	2 1	Wet soft brown fine to coarse sandy silt w/ some clay, trace of gravel.	A-4(0)	10" of cultivated soil.
			2.0'		10" RECOVERY		
3		2	2.0'	3 5 6 6	Wet stiff gray fine sandy clay w/ some coarse sand, trace of gravel.	A-6(2)	
			4.0'		19" RECOVERY		
		3	4.0'	2 7 12 14	Saturated medium dense gray clayey coarse to fine sand, trace of gravel.	A-2-4(0)	
6			6.0'		17" RECOVERY		
		4	6.0'	15 16 17 12	Saturated dense light brown silty coarse to fine sand w/ some gravel.	A-1-b	
			8.0'		21" RECOVERY		
9		5	8.0'	5 5 5	Saturated loose light brown coarse sand w/ some silt and fine sand, trace of gravel.	A-1-b	
			10.0'		17" RECOVERY		
					Boring terminated at 10.0 feet.		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Clayey sand



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-030A

Contract: 25-113-01

Boring Location: Sta. 460+00 43 L.T. C.L.

Boring Surface Elev.: + 70.24

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 61.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	10/26/10		10.0	8.0	6.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	61.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	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
	10/26/09	1	1.0'	2 2	Wet soft tan clayey fine sandy silt w/trace of coarse sand.	A-4(3)	Cultivated Soil - 10"
2.5		2	2.0'	4 8 8 6	11" RECOVERY Wet medium dense grayish tan silty fine gravelly coarse to fine sand.	A-1-b	
5		3	4.0'	4 4 6 6	18" RECOVERY Wet loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
7.5		4	6.0'	4 8 8 9	17" RECOVERY Saturated medium dense tan coarse sand w/some fine sand, silt and fine gravel.	A-1-b	
10		5	8.0'	3 3 4 5	21" RECOVERY Saturated loose gray coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
12.5		6	10.0'	8 3 3 2	17" RECOVERY Saturated loose tan fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
		7	12.0'	3 1 1 1	21" RECOVERY Saturated very loose tan fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
		8	14.0'	1 2 2 2	22" RECOVERY Saturated very loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-030A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		21" RECOVERY		
		9	16.0'	2 7 10 5	Saturated medium dense white fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
17.5							
			18.0'		19" RECOVERY		
		10	18.0'	5 6 8 10	Saturated medium dense silty fine to coarse sand.	A-2-4(0)	
20			20.0'		14" RECOVERY		
22.5							
		11	24.0'	6 6 6 9	Saturated medium dense tan silty fine to coarse sand.	A-2-4(0)	
25							
			26.0'		20" RECOVERY		
27.5							
		12	29.0'	7 7 7 10	Saturated medium dense green silty fine sand w/some coarse sand.	A-2-4(0)	
30							
			31.0'		24" RECOVERY		
32.5							
		13	34.0'	8 7 8 11	Saturated medium dense green silty fine sand w/some coarse sand.	A-2-4(0)	
35							
			36.0'		21" RECOVERY		
37.5							

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AUGUST 2015

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-030A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	5 6 8 9	Saturated medium dense green silty fine sand w/trace of coarse sand.	A-2-4(0)	
			41.0'		24" RECOVERY		
42.5							
45		15	44.0'	6 8 8 10	Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matter.	A-2-4(0)	
			46.0'		24" RECOVERY		
47.5							
50		16	49.0'	8 8 9 12	Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter.	A-2-4(0)	
			51.0'		20" RECOVERY		
52.5					End of Boring		
55							
57.5							
60							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

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Notes:

1. Exploratory borings were drilled on 10/26/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Truck.
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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-031

Contract: 25-113-01

Boring Location: Sta. 425+00.00, 130' Rt. C.L.

Boring Surface Elev.: + 73.30'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0'	To:	
	Hollow Stem Auger:		From Depth of:	0.0'	To:	16.0'

Water Level Readings		Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
		3/12/2008		12.0'	10.0'	9.5'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	No. of:	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	Core Drilling in Rock:		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:						

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/12/08	1	1.0'	2 3	Moist firm brown clayey fine sandy silt w/ some coarse sand.	A-4(2)	10" of cultivated soil.
3		2	2.0'	3 5 7 4	8" RECOVERY Moist stiff brown fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
		3	4.0'	4 5 7 7	18" RECOVERY Moist medium dense light brown clayey fine to coarse sand, trace of gravel.	A-2-4(0)	
6		4	6.0'	8 10 12 15	15" RECOVERY Wet very stiff gray fine to coarse sandy clay, trace of gravel.	A-6(2)	
		5	8.0'	5 9 9 7	21" RECOVERY Wet medium dense light brown fine to coarse sand w/ some clay and gravel.	A-2-4(0)	
9		6	10.0'	3 3 3 4	19" RECOVERY Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
		7	12.0'	3 3 3 4	15" RECOVERY Saturated loose light brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
12		8	14.0'	2 1 1 4	15" RECOVERY Saturated very loose light brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
			16.0'		20" RECOVERY Boring terminated at 16.0 feet.		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded clayey
silty sand



Clayey sand

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Notes:

1. Exploratory borings were drilled on 3/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were 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

Boring No.: R2-032

Contract: 25-113-01

Boring Location: Sta. 430+00.00, 152' Lt. C.L.

Boring Surface Elev.: + 68.00'

Reference:

Wt. of Casing Hammer:	Lbs.	Average Fall:	IN.
Wt. of Sample Hammer: 140	Lbs.	Average Fall: 30	IN.
Type of: D-Sampler: Split Barrel	O.D.	O.D. of Sampler: 2	IN.
S-Sampler:	O.D.	O.D. of Samp. Tube:	IN.
U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube: 3	IN.
Core Bit:	O.D.	O.D. of Rock Core:	IN.

Casing Size: 3 1/4	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of: 0.0'	To: 16.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/12/2008		10.0'	8.0'	7.6'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/12/08	1	1.0'	2 3	Wet firm brown clay, trace of fine to coarse sand and gravel.	A-6(10)	10" of cultivated soil.
			2.0'		10" RECOVERY		
3		2	2.0'	4 12 14 16	Wet medium dense light brown silty fine to coarse sand w/ some gravel.	A-2-4(0)	
			4.0'		15" RECOVERY		
		3	4.0'	4 5 10 10	Wet medium dense light brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
6			6.0'		16" RECOVERY		
		4	6.0'	5 7 6 6	Saturated medium dense light brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			8.0'		17" RECOVERY		
9		5	8.0'	2 2 3 3	Saturated very loose light brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			10.0'		17" RECOVERY		
		6	10.0'	2 3 3 5	Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
12			12.0'		15" RECOVERY		
		7	12.0'	2 2 1 1	Saturated very loose light brown coarse to fine sand w/ some silt and gravel.	A-1-b	
			14.0'		12" RECOVERY		
15		8	14.0'	8 13 13 11	Saturated medium dense light brown fine sand and gravel w/ some silt and coarse sand.	A-2-4(0)	
			16.0'		8" RECOVERY		
					Boring terminated at 16.0 feet.		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

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Notes:

1. Exploratory borings were drilled on 3/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-032A

Contract: 25-113-01

Boring Location: Sta. 50 L.T. C.L.

Boring Surface Elev.: + 68.81

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					46.0

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
10/29/09		10.0	8.0	7.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	46.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	10/29/09	1	0.5'	2 2 3	Wet firm brown clayey silt w/trace of fine to coarse sand.	A-4(7)	Topsoil - 7".
			2.0'		13" RECOVERY		
2.5		2	2.0'	8 12	Wet very stiff brownish orange clayey silt w/some fine sand, trace of coarse sand and gravel.	A-4(3)	
			3.0'		12" RECOVERY		
		2A	3.0'	14 9	Wet medium dense orange coarse to fine sand w/some fine gravel and silt.	A-1-b	
			4.0'		12" RECOVERY		
		3	4.0'	7 8 8 7	Wet medium dense brown coarse sand w/some silt and fine sand, trace of fine gravel.	A-1-b	
5			6.0'		20" RECOVERY		
		4	6.0'	5 4 4 3	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
7.5			8.0'		22" RECOVERY		
		5	8.0'	2 3 3 3	Saturated loose tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
10			10.0'		21" RECOVERY		
		6	10.0'	2 4 6 6	Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			12.0'		22" RECOVERY		
12.5		7	12.0'	1 1 2 3	Saturated very loose tan fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
			14.0'		20" RECOVERY		
		8	14.0'	6 3	Saturated loose tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	Mud

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-032A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				4 6			Rotary @ 14.0'.
			16.0'		20" RECOVERY		
		9	16.0'	8 8 8 10	Saturated medium dense orange fine to coarse sandy fine gravel w/some silt.	A-1-b	
17.5			18.0'		22" RECOVERY		
		10	18.0'	8 7 4 4	Saturated medium dense orange clayey fine to coarse sand w/some silt, trace of fine gravel.	A-2-7(2)	
20			20.0'		16" RECOVERY		
22.5							
		11	24.0'	4 4 7 9	Saturated medium dense green fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
25			26.0'		16" RECOVERY		
27.5							
		12	29.0'	8 8 8 11	No Sieve Analysis - Indication of saturated medium dense green silty sand.		
30			31.0'		2" RECOVERY		
32.5							
		13	34.0'	6 9 9 10	Saturated medium dense green fine sand w/some coarse sand, trace of silt and organic matter.	A-3	
35			36.0'		23" RECOVERY		
37.5							

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-032A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	6 8 13 16	Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matter.	A-2-4(0)	
			41.0'		23" RECOVERY		
42.5							
		15	44.0'	13 16 16 19	Saturated dense green fine sand w/some coarse sand and silt, trace of fine gravel and organic matter.	A-2-4(0)	
45			46.0'		24" RECOVERY		
					End of Boring		
47.5							
50							
52.5							
55							
57.5							
60							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt



Clayey sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/29/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Truck.
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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-033

Contract: 25-113-01

Boring Location: Sta. 433+21.61, 12' Lt. C.L.

Boring Surface Elev.: + 72.00'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	10.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/31/2008		12.0'	10.0'	9.0'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Gary Truver Sr.
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/31/08	1	0.5'	4 4 6	Moist stiff brown clayey silt w/ some fine to coarse sand, trace of gravel. 18" RECOVERY	A-4(4)	8" of cultivated soil.
3		2	2.0'	5 6 8 6	Moist medium dense orange-brown clayey coarse to fine sand w/ some gravel. 15" RECOVERY	A-2-4(0)	
		3	4.0'	5 6 10 13	Moist medium dense light brown coarse to fine sand w/ some silt and gravel. 16" RECOVERY	A-1-b	
6		4	6.0'	15 13 12 9	Moist medium dense light brown coarse sand and gravel w/ some silt and fine sand. 17" RECOVERY	A-1-b	
		5	8.0'	4 2 4 4	Wet loose light brown coarse to fine sand w/ some silt, trace of gravel. 17" RECOVERY	A-1-b	
9			10.0'		Boring terminated at 10.0 feet.		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand

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Notes:

1. Exploratory borings were drilled on 3/31/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-033A

Contract: 25-113-01

Boring Location: Sta. 475+00 50 L.T. C.L.

Boring Surface Elev.: + 67.82

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 41.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	10/30/09		10.0	8.0	7.4	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	41.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	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
	10/30/09	1	0.5'	3 5 6	Moist loose brown silty fine to coarse sand w/some fine gravel and silt.	A-2-4(0)	Cultivated Soil - 8".
			2.0'		10" RECOVERY		
2.5		2	2.0'	6 6 6 11	Moist medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			4.0'		13" RECOVERY		
5		3	4.0'	11 15 25 24	Saturated dense tan fine gravelly coarse sand w/some silt, trace of fine sand.	A-1-b	
			6.0'		18" RECOVERY		
7.5		4	6.0'	23 19 18 16	Saturated dense orange silty coarse sand w/some fine sand and fine gravel.	A-1-b	
			8.0'		20" RECOVERY		
10		5	8.0'	3 5 8 6	Saturated medium dense tannish orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			10.0'		21" RECOVERY		
		6	10.0'	2 4 6 8	Saturated loose orange coarse sand w/some fine sand, silt and fine gravel.	A-1-b	
			12.0'		22" RECOVERY		
12.5		7	12.0'	3 3 4 3	Saturated loose tan coarse sand w/some fine sand and fine gravel, trace of silt.	A-1-b	
			14.0'		20" RECOVERY		
		8	14.0'	10 6	Saturated medium dense tan silty coarse sand w/some fine gravel and fine	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-033A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				8 8	sand.		
			16.0'		10" RECOVERY		
		9	16.0'	14 9 8 11	Saturated medium dense brown clayey fine gravelly fine sand w/some coarse sand and silt.	A-2-6(0)	
17.5			18.0'		13" RECOVERY		
		10	18.0'	5 7 11 12	Saturated medium dense brown clayey fine sand w/some coarse sand and silt.	A-2-6(1)	Mud Rotary @ 18.0.
20			20.0'		20" RECOVERY		
22.5							
		11	24.0'	7 6 6 11	Saturated medium dense brown silty fine sand w/some coarse sand.	A-2-4(0)	
25			26.0'		22" RECOVERY		
27.5							
		12	29.0'	5 11 12 16	Saturated medium dense green clayey fine sand w/some silt, trace of coarse sand.	A-2-6(1)	
30			31.0'		15" RECOVERY		
32.5							
		13	34.0'	8 9 12 15	Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matter.	A-2-4(0)	
35			36.0'		23" RECOVERY		
37.5							

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-033A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	4 8 9	Saturated medium dense green silty fine to coarse sand w/trace or organic matter.	A-2-4(0)	
			41.0'		22" RECOVERY		
					End of Boring		
42.5							
45							
47.5							
50							
52.5							
55							
57.5							
60							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Clayey sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/30/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 ATV.
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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-034

Contract: 25-113-01

Boring Location: Sta. 439+68.81, 29' Lt. C.L.

Boring Surface Elev.: + 67.00'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	10.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/12/2008		10.0'	8.0'	7.7'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Dan Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/12/08	1	0.5'	1 2	Moist soft brown clay, trace of fine to coarse sand. 16" RECOVERY	A-6(11)	8" of topsoil.
3		2	2.0'	3 7 10 11	Moist medium dense light brown coarse sand w/ some clay, fine sand, and gravel. 10" RECOVERY	A-2-4(0)	
		3	4.0'	5 6 5 7	Wet medium dense orange and light brown clayey coarse sand w/ some fine sand and gravel. 15" RECOVERY	A-2-6(0)	
6		4	6.0'	5 6 8 7	Wet medium dense orange and light brown silty fine to coarse sand w/ some gravel. 20" RECOVERY	A-2-4(0)	
9		5	8.0'	4 7 9 6	Wet medium dense orange and light brown silty coarse sand w/ some organic matter, fine sand, and gravel. 17" RECOVERY	A-1-b	
			10.0'		Boring terminated at 10.0 feet.		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-034A

Contract: 25-113-01

Boring Location: Sta. 480+00 50 L.T. C.L.

Boring Surface Elev.: + 65.51

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To:
					36.0

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
11/2/09		10.0	8.0	7.7	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	36.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		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
	11/2/09	1	0.5'	3 3 4	Moist firm orange clayey coarse sandy silt w/some fine sand, trace of fine gravel.	A-4(1)	Topsoil - 8".
			2.0'		8" RECOVERY		
2.5		2	2.0'	6 4 5 6	Moist loose brown silty coarse sand w/some fine sand and fine gravel.	A-1-b	
			4.0'		8" RECOVERY		
		3	4.0'	3 3 4 4	Moist loose orange silty coarse sand w/some fine gravel and fine sand.	A-1-b	
5			6.0'		14" RECOVERY		
		4	6.0'	4 7 6 6	Saturated medium dense orange coarse to fine sand w/some silt and fine gravel.	A-1-b	
7.5			8.0'		17" RECOVERY		
		5	8.0'	3 3 2 3	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		20" RECOVERY		
10		6	10.0'	2 3 4 5	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			12.0'		24" RECOVERY		
12.5		7	12.0'	17 7 8 3	Saturated medium dense tan coarse sandy fine gravel w/some fine sand, trace of silt.	A-1-b	
			14.0'		14" RECOVERY		
		8	14.0'	3 4	No Sample Recovery		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-034A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				6 9			
			16.0'		0" RECOVERY		
		9	16.0'	3 4 7 9	Saturated medium dense brown clayey fine sand w/some coarse sand, fine gravel and silt.	A-2-6(1)	
17.5			18.0'		15" RECOVERY		
		10	18.0'	2 5 6 10	Saturated medium dense brown silty fine sand w/some coarse sand.	A-2-4(0)	Mud Rotary @ 18.0'.
20			20.0'		19" RECOVERY		
22.5							
		11	24.0'	6 5 7 7	Saturated medium dense brown clayey fine sand w/trace of coarse sand and silt.	A-2-7(2)	
25			26.0'		23" RECOVERY		
27.5							
		12	29.0'	6 7 8 10	Saturated medium dense brown clayey fine sand w/trace of coarse sand and silt.	A-2-6(1)	
30			31.0'		19" RECOVERY		
32.5							
		13	34.0'	7 8 10 15	Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter.	A-2-4(0)	
35			36.0'		21" RECOVERY		
					End of Boring		
37.5							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 11/02/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 ATV.
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 uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-035

Contract: 25-113-01

Boring Location: Sta. 444+00.00, 80' Lt. C.L.

Boring Surface Elev.: + 56.45'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	10.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/12/2008		6.0'	4.0'	3.0'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Dan Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/12/08	1	0.0'	1 2 5 5	Wet loose black clayey gravel and coarse sand w/ some organic matter and fine sand.	A-2-4(0)	
			2.0'		16" RECOVERY		
3		2	2.0'	2 4 3 4	Saturated loose black clayey organic gravel and fine sand w/ some coarse sand.	A-2-7(1)	
			4.0'		18" RECOVERY		
		3	4.0'	1 2 4 7	Saturated loose green silty fine sand w/ some coarse sand.	A-2-4(0)	
6			6.0'		16" RECOVERY		
		4	6.0'	2 7 7 10	Saturated medium dense green clayey fine sand, trace of coarse sand.	A-2-6(0)	
			8.0'		17" RECOVERY		
9		5	8.0'	2 10 10 13	Saturated medium dense green clayey fine sand w/ some coarse sand, trace of gravel.	A-2-6(1)	
			10.0'		21" RECOVERY		
					Boring terminated at 10.0 feet.		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were 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.: R2-035A

Contract: 25-113-01

Boring Location: Sta. 484+00 50 L.T. C.L.

Boring Surface Elev.: + 56.76

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 61.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 11/2/09	Time	10.0	8.0	2.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	61.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	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
	11/2/09	1	0.0'	1 2 3 3	Saturated loose black organic clayey fine to coarse sand w/some fine gravel and silt.	A-2-6(1)	Topsoil - 2".
2.5		2	2.0' 2.0'	4 5 6 7 8	18" RECOVERY Saturated loose black fine gravelly coarse to fine sand w/some silt, trace of organic matter.	A-1-b	
5		3	4.0' 4.0'	2 2 2 3	19" RECOVERY Saturated very loose green silty fine sand w/some coarse sand.	A-2-4(0)	
7.5		4	6.0' 6.0'	2 4 6 8	22" RECOVERY Saturated loose green silty fine sand w/some coarse sand.	A-2-4(0)	
10		5	8.0' 8.0'	3 7 8 10	18" RECOVERY Saturated medium dense green fine sand w/some silt and coarse sand.	A-2-4(0)	
12.5		6	10.0' 10.0'	7 10 20 18	19" RECOVERY Saturated medium dense green fine sand w/some silt and coarse sand.	A-2-4(0)	
		7	12.0' 12.0'	3 4 9 10	17" RECOVERY Saturated medium dense green fine sand w/some silt and coarse sand.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-035A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0' 14.0'	3 8 11 14	17" RECOVERY Saturated medium dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
17.5		9	16.0' 16.0'	8 12 20 24	18" RECOVERY Saturated dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
20		10	18.0' 18.0'	4 7 10 15	18" RECOVERY Saturated medium dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
22.5			20.0'		17" RECOVERY		
25		11	24.0' 24.0'	9 10 12 24	Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter.	A-2-4(0)	
27.5			26.0'		20" RECOVERY		
30		12	29.0' 29.0'	2 3 4 10	Saturated loose green silty fine to coarse sand w/trace of fine gravel and organic matter.	A-2-4(0)	
32.5			31.0'		19" RECOVERY		
35		13	34.0' 34.0'	25 50/5"	Saturated very dense green silty fine to coarse sand w/some fine gravel and organic matter, trace of shell fragments.	A-2-4(0)	
37.5			36.0'		11" RECOVERY		

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-035A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	12 31 50/5"	Saturated very dense gray silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
42.5			41.0'		17" RECOVERY		
45		15	44.0'	10 12 18 23	Saturated medium dense gray silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
47.5			46.0'		23" RECOVERY		
50	11/4/09	16	49.0'	9 11 13 30	Saturated medium dense gray fine sand w/some silt and coarse sand, trace of shell fragments.	A-2-4(0)	
52.5			51.0'		20" RECOVERY		
55		17	54.0'	23 35 50/5"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of shell fragments.	A-2-4(0)	
57.5			56.0'		14" RECOVERY		
60		18	59.0'	18 35 50	Saturated very dense gray fine sand w/some coarse sand and silt.	A-2-4(0)	
			61.0'		16" RECOVERY		

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-035A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
					End of Boring		
62.5							
65							
67.5							
70							
72.5							
75							
77.5							
80							
82.5							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 11/02/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
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 recomendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows 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.: R2-41

Contract: 25-113-01

Boring Location: Sta. 14+00 12 L.T. C.L.

Boring Surface Elev.: + 61.30

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: 25.0

Water Level Readings
Date 1/12/10
Time

Depth of Hole 10.0
Depth of Casing 8.0
Depth of Water 7.0
Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 25.0 Ft.;
No. of 2 in. Dia. Shelby Tubes: ;
2 1/2 in. Dia. Contin. Sample Boring: Ft.;
Dia. U-Sample Boring: Ft.
U-Samples: Ft.
Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/12/10	1	1.0'	8 9	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel. 8" RECOVERY	A-1-b	Topsoil - 10".
2.5		2	2.0'	7 8 7 6	Moist medium dense orange coarse sand w/some fine sand and silt, trace of fine gravel. 20" RECOVERY	A-1-b	
		3	4.0'	4 3 2	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel. 16" RECOVERY	A-1-b	
5		4	6.0'	2 2 1 2	Saturated very loose brown coarse to fine sand w/some silt. 15" RECOVERY	A-1-b	
		5	8.0'	W/R 1 3 2	Saturated very loose brown coarse to fine sand w/trace of silt and fine gravel. 12" RECOVERY	A-1-b	
10		6	10.0'	2 2 4 4	Saturated loose brown coarse to fine sand w/some silt. 12" RECOVERY	A-1-b	
		7	12.0'	2 3 6 5	Saturated loose brown coarse sand w/some fine sand and fine gravel, trace of silt. 17" RECOVERY	A-1-b	
12.5		8	14.0'	2 3 5 9	Saturated loose brown fine gravelly coarse sand w/trace of fine sand and silt.	A-1-b	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-41

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		16" RECOVERY		
		9	16.0'	8 7 8 10	Saturated medium dense brown coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	
17.5			18.0'		16" RECOVERY		
		10	18.0'	16 10 11 12	Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
20			20.0'		13" RECOVERY		
22.5							
		11	23.0'	4 9 11 15	Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
25			25.0'		16" RECOVERY		
					End of Boring		
27.5							
30							
32.5							
35							
37.5							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt



Poorly graded sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/12/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 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.: R2-041A

Contract: 25-113-01

Boring Location: Sta. 500+00 50 R.T. C.L.

Boring Surface Elev.: + 64.27

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 50.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 11/10/09	Time	10.0	8.0	9.2	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 50.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 Dia. U-Sample Boring: Ft.
 U-Samples: Ft.
 Core Drilling in Rock: 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
2.5	11/10/09	1	1.0'	3 3	Moist loose orange clayey fine gravelly fine to coarse sand w/some silt.	A-2-4(0)	Cultivated Soil - 10".
			2.0'		8" RECOVERY		
5		2	2.0'	10 15 12 11	Moist medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			4.0'		22" RECOVERY		
7.5		3	4.0'	4 8 10 12	Moist medium dense gray silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			6.0'		19" RECOVERY		
10		4	6.0'	8 6 5 5	Moist medium dense gray coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			8.0'		23" RECOVERY		
12.5		5	8.0'	4 5 5 4	Saturated loose grayish orange fine gravelly coarse sand w/some fine sand and silt.	A-1-b	
			10.0'		18" RECOVERY		
		6	10.0'	4 10 14 10	Saturated medium dense orange coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	
			12.0'		18" RECOVERY		
		7	12.0'	6 12 17 13	Saturated medium dense orange fine sandy fine gravel w/some coarse sand and silt.	A-1-b	
			14.0'		17" RECOVERY		
		8	14.0'	13 13 13 14	Saturated medium dense orange clayey fine sandy fine gravel w/some coarse sand and silt.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-041A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		7" RECOVERY		
		9	16.0'	9 8 9 11	Saturated very stiff orange fine sandy clay w/some coarse sand.	A-7-6(2)	
17.5			18.0'		10" RECOVERY		
		10	18.0'	8 3 7	Saturated loose brown clayey fine sand w/some coarse sand, trace of fine gravel and silt.	A-2-7(2)	Mud Rotary @ 18.0'.
20			20.0'		12" RECOVERY		
22.5			23.0'		20" RECOVERY		
		11	23.0'	5 5 8	Saturated medium dense brown clayey fine sand w/trace of coarse sand and silt.	A-2-6(1)	
25			25.0'		20" RECOVERY		
27.5			28.0'		17" RECOVERY		
		12	28.0'	5 6 7	Saturated medium dense green silty fine sand w/trace of coarse sand and organic matter.	A-2-4(0)	
30			30.0'		17" RECOVERY		
32.5			33.0'		22" RECOVERY		
		13	33.0'	4 4 8	Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter.	A-2-4(0)	
35			35.0'		22" RECOVERY		
37.5			38.0'		22" RECOVERY		
		14	38.0'	3 3	Saturated medium dense green silty fine to coarse sand w/trace of fine	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 S.R. 1
Contract: 25-113-01

Boring No.: R2-041A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				9 13	gravel and organic matter.		
40			40.0'		21" RECOVERY		
42.5							
		15	43.0'	44 50/3"	Saturated very dense green fine gravelly fine to coarse sand w/some silt, trace of organic matter and shell fragments.	A-2-4(0)	
45			45.0'		8" RECOVERY		
47.5							
		16	48.0'	10 10 30 42	Saturated dense gray silty fine to coarse sand w/trace of fine gravel and organic matter.	A-2-4(0)	
50			50.0'		24" RECOVERY		
					End of Boring		
52.5							
55							
57.5							
60							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand



Poorly graded sand
with silt



Poorly graded clayey
silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 11/10/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 45 ATV.
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 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.: R2-42

Contract: 25-113-01

Boring Location: Sta. 19+00 12 L.T. C.L.

Boring Surface Elev.: + 64.25

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 30.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/11/10		10.0	8.0	9.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	25.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/11/10	1	0.5'	8 10 7	Moist medium dense brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(1)	Topsoil - 8".
			2.0'		6" RECOVERY		
2.5		2	2.0'	6 9 8 13	Moist medium dense brown silty coarse to fine sand w/some fine gravel.	A-2-4(0)	
			4.0'		16" RECOVERY		
		3	4.0'	7 10 10 10	Moist medium dense tan silty coarse to fine sand w/some clay, trace of fine gravel.	A-2-4(0)	
5			6.0'		17" RECOVERY		
		4	6.0'	12 8 8 10	Moist medium dense tan coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
7.5			8.0'		21" RECOVERY		
		5	8.0'	4 4 5 6	Wet loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		15" RECOVERY		
10		6	10.0'	11 8 8 11	Wet medium dense orange coarse sandy fine gravel w/some fine sand, trace of silt.	A-1-b	
			12.0'		10" RECOVERY		
12.5		7	12.0'	6 8 9 12	Wet medium dense orange fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
			14.0'		15" RECOVERY		
		8	14.0'	3 5	Wet loose orange fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-42


Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				5 5	6" RECOVERY		
		9	16.0'	3 5 6 5	Wet medium dense orange coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
17.5			18.0'		10" RECOVERY		
		10	18.0'	2 2 5 7	Wet loose orange coarse sand w/some fine gravel and fine sand, trace of silt.	A-1-b	
20			20.0'		10" RECOVERY		
22.5							
		11	24.0'	5 12 15 12	Wet medium dense orange coarse sand w/some fine gravel and fine sand, trace of silt.	A-1-b	
25			26.0'		12" RECOVERY		
27.5							
		12	28.0'	10 11 11 14	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
30			30.0'		19" RECOVERY		
					End of Boring		
32.5							
35							
37.5							


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KEY TO SYMBOLS


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
Strata symbols


 Silty low plasticity clay

 Silty sand

 Poorly graded clayey silty sand

 Poorly graded sand with silt

 Well graded sand with silt

 Well graded sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/11/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
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 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.: R2-43

Contract: 25-113-01

Boring Location: Sta. 22+00 12 R.T. C.L.

Boring Surface Elev.: + 65.40

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: 20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
1/11/10		12.0	10.0	10.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	20.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation

Driller: Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
2.5	1/11/10	1	1.0'	4 4	Wet stiff brown fine sandy silt w/some clay, trace of coarse sand. 7" RECOVERY	A-4(0)	Cultivated Soil - 10".
		2	2.0'	3 7 8 7	Wet stiff brown fine sandy silt w/some coarse sand and clay, trace of fine gravel. 13" RECOVERY	A-4(0)	
5		3	4.0'	3 4 6 8	Wet loose brown silty fine to coarse sand w/trace of fine gravel. 13" RECOVERY	A-2-4(0)	
		4	6.0'	8 8 8 12	No Sample Recovery 0" RECOVERY		
10		5	8.0'	5 6 6 5	Wet medium dense brown coarse sand w/some fine sand and silt, trace of fine gravel. 17" RECOVERY	A-1-b	
		6	10.0'	4 6 4 5	Wet loose brown coarse to fine sand w/some silt, trace of fine gravel. 16" RECOVERY	A-1-b	
12.5		7	12.0'	4 6 5 7	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel. 16" RECOVERY	A-1-b	
		8	14.0'	3 3 3 5	Wet loose brown coarse to fine sand w/some silt, trace of fine gravel. 16" RECOVERY	A-1-b	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R2-43

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		19" RECOVERY		
		9	16.0'	5 6 8 10	Wet medium dense brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
17.5							
			18.0'		15" RECOVERY		
		10	18.0'	1 5 10 9	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
20			20.0'		2" RECOVERY		
					End of Boring		
22.5							
25							
27.5							
30							
32.5							
35							
37.5							

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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
with silt

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Notes:

1. Exploratory borings were drilled on 1/11/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
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 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.: SS2-1-01

Contract: 25-113-01

Boring Location: Sta. 315+50 75 L.T. C.L.

Boring Surface Elev.: + 52.14

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0	To:	31.0

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
12/11/09		14	12	11.7	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	31.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/11/09	1	1.0'	3 3	Moist firm brown silty clay w/some fine sand, trace of coarse sand.	A-6(6)	Topsoil - 10".
2.43		2	2.0'	3 17 28 21	12" RECOVERY Moist dense brown fine to coarse sandy fine gravel w/some silt.	A-1-b	
4.86		3	4.0'	5 10 11 12	16" RECOVERY Moist medium dense brown coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
7.29		4	6.0'	3 8 9 7	17" RECOVERY Moist medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
9.72		5	8.0'	4 4 4 4	19" RECOVERY Wet loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
12.15		6	10.0'	4 6 4 3	18" RECOVERY Saturated loose brown fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
14.58		7	12.0'	1 3 20 24	22" RECOVERY Saturated medium dense brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
		8	14.0'	4 10	10" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: SS2-1-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				10 14			
			16.0'		18" RECOVERY		
17.01		9	16.0'	9 12 23 24	Saturated dense brown fine to coarse sand w/some silt.	A-2-4(0)	
			18.0'		10" RECOVERY		
19.44		10	18.0'	8 13 13 15	Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			20.0'		19" RECOVERY		
21.87							
24.3		11	24.0'	5 6 13 19	Saturated medium dense brown fine to coarse sand w/trace of silt.	A-3	
			26.0'		10" RECOVERY		
26.73							
29.16		12	29.0'	4 8 11	Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
			31.0'		17" RECOVERY		
31.59					End of Boring		
34.02							
36.45							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/11/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 ATV.
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 uncorrected.

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

F.A. Project: U.S. 301 Maryland State Line to SR-1

Boring No.: SS2-1-02

Contract: 25-113-01

Boring Location: Sta. 310+00 80' Lt. C.L.

Boring Surface Elev.: + 52.2

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: 30.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/29/10		20.0	18.0	17.0	

Pay Quantities:
2 1/2 in. Dia. Dry Sample Boring: 30.0 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:
Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/29/10	1	0.5'	6 12 12	Moist very stiff brown clayey fine sandy silt w/some coarse sand, trace fine gravel.	A-4(1)	Topsoil - 7".
			2.0'		8" RECOVERY		
2.5		2	2.0'	12 12 14 22	Moist medium dense brown fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
			4.0'		15" RECOVERY		
		3	4.0'	8 14 15 21	Moist medium dense brown coarse to fine sand w/some silt, trace fine gravel.	A-2-4(0)	
5			6.0'		17" RECOVERY		
		4	6.0'	22 17 15 16	Moist dense brown coarse sand w/some fine sand and fine gravel, trace silt.	A-1-b	
7.5			8.0'		24" RECOVERY		
		5	8.0'	8 9 10 10	Moist medium dense orange coarse to fine sand w/trace silt and fine gravel.	A-3	
			10.0'		20" RECOVERY		
		6	10.0'	10 9	Moist medium dense orange coarse to fine sand w/some silt, trace fine gravel.	A-1-b	
			11.0'		12" RECOVERY		
		6A	11.0'	8 9	Saturated medium dense brown silty fine to coarse sand w/trace fine gravel.	A-2-4(0)	
			12.0'		8" RECOVERY		
12.5		7	12.0'	6 8 8 13	Saturated medium dense brownish green silty coarse to fine sand.	A-2-4(0)	
			14.0'		20" RECOVERY		
		8	14.0'	5 9	Saturated medium dense brownish green fine	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301 Maryland State Line to SR-1
Contract: 25-113-01

Boring No.: SS2-1-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				9 12	to coarse sand w/some silt.		
			16.0'		18" RECOVERY		
		9	16.0'	10 12 11 13	Saturated medium dense brownish green fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
17.5			18.0'		20" RECOVERY		
		10	18.0'	7 11 13 16	Saturated medium dense brownish green silty fine to coarse sand.	A-2-4(0)	
20			20.0'		21" RECOVERY		
22.5							
		11	23.0'	7 11 12 12	Saturated medium dense brownish green silty fine to coarse sand w/trace fine gravel.	A-2-4(0)	
25			25.0'		21" RECOVERY		
27.5							
		12	28.0'	5 9 10 13	Saturated medium dense brownish green silty fine to coarse sand.	A-2-4(0)	
30			30.0'		20" RECOVERY		
					End of Boring		
32.5							
35							
37.5							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 29, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 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.: SS2-2-01

Contract: 25-113-01

Boring Location: Sta. 389+00 75 R.T. C.L.

Boring Surface Elev.: + 64.63

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	12/8/10		10.0	8.0	6.8	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	30.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/8/09	1	0.5'	2 4 4	Moist firm brown clayey fine to coarse sandy silt w/trace of fine gravel.	A-4(0)	Topsoil - 7".
			2.0'		13" RECOVERY		
2.43		2	2.0'	5 6 6	Moist loose orangish tan clayey fine to coarse sand w/trace of fine gravel and silt.	A-2-4(0)	
			4.0'		20" RECOVERY		
4.86		3	4.0'	6 4 4 4	Wet loose brown coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
			6.0'		21" RECOVERY		
7.29		4	6.0'	3 4 4 4	Saturated loose brown coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
			8.0'		19" RECOVERY		
9.72		5	8.0'	2 2 2 1	Saturated very loose orange coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
			10.0'		17" RECOVERY		
		6	10.0'	2 3 3 4	Saturated loose orange coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	Mud Rotary @ 10.0'.
12.15			12.0'		23" RECOVERY		
		7	12.0'	2 3 3 4	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			14.0'		17" RECOVERY		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: SS2-2-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.58		8	14.0'	4 5 5	Saturated loose brown coarse sand w/some fine sand and fine gravel, trace of silt.	A-1-b	
			16.0'		19" RECOVERY		
17.01		9	16.0'	4 5 6 8	Saturated medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			18.0'		22" RECOVERY		
19.44		10	18.0'	4 6 7 7	Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			20.0'		20" RECOVERY		
21.87							
24.3		11	24.0'	6 7 8 14	Saturated medium dense brown coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	
			26.0'		16" RECOVERY		
26.73							
29.16		12	29.0'	10 11 10 9	Saturated medium dense orangish green silty fine sand w/some coarse sand, trace of fine gravel.	A-2-4(0)	
			31.0'		19" RECOVERY		
31.59					End of Boring		
34.02							
36.45							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/08/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
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 recomendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows are uncorrected.

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

F.A. Project: U.S. 301 Maryland State Line to SR-1

Boring No.: SS2-2-02

Contract: 25-113-01

Boring Location: STA. 397+00 78' Rt. C.L.

Boring Surface Elev.: + 60.7

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:		IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					30.0

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
10/6/10		12.0	12.0	8.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	30.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	10/6/10	1	0.5'	4 4 4	Moist firm gray coarse sandy silt w/some fine sand, trace clay and fine gravel.	A-4(0)	Topsoil - 6".
			2.0'		12" RECOVERY		
2.5		2	2.0'	4 5 5	Moist loose gray clayey coarse to fine sand w/some silt, trace fine gravel.	A-2-4(0)	
			4.0'		22" RECOVERY		
		3	4.0'	2 2 2	Wet very loose gray coarse to fine sand w/some silt, trace fine gravel.	A-2-4(0)	
5			6.0'		13" RECOVERY		
		4	6.0'	3 3 2	Saturated loose brown coarse to fine sand w/some silt.	A-2-4(0)	
7.5			8.0'		20" RECOVERY		
		5	8.0'	1 1 2	Saturated very loose brown coarse to fine sand w/some silt, trace fine gravel.	A-2-4(0)	
			10.0'		17" RECOVERY		
		6	10.0'	2 3 4 5	Saturated loose brown coarse to fine sand w/some silt.	A-1-b	
			12.0'		18" RECOVERY		
12.5		7	12.0'	1 1 4 4	Saturated loose brown fine gravelly coarse sand w/some fine sand, trace silt.	A-1-b	
			14.0'		14" RECOVERY		
		8	14.0'	3 3	Saturated loose brown fine to coarse sand w/	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301 Maryland State Line to SR-1
Contract: 25-113-01

Boring No.: SS2-2-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				2 4	some silt, trace fine gravel.		
			16.0'		15" RECOVERY		
		9	16.0'	3 3 7	Saturated loose brown coarse to fine sand w/ some silt, trace fine gravel.	A-2-4(0)	
17.5			18.0'		19" RECOVERY		
		10	18.0'	4 4 6 6	Saturated loose brown coarse sand w/some fine sand, fine gravel and silt.	A-1-b	
20			20.0'		4" RECOVERY		
22.5							
		11	23.0'	6 6 8 20	Saturated medium dense brown fine gravelly coarse sand w/some fine sand, trace silt.	A-1-b	
25			25.0'		6" RECOVERY		
27.5							
		12	28.0'	6 8 11 25	Saturated medium dense brown fine gravelly coarse sand w/some fine sand, trace silt.	A-1-b	
30			30.0'		10" RECOVERY		
					End of Boring		
32.5							
35							
37.5							

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Clayey sand



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on October 6, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 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.: SS2-3-01

Contract: 25-113-01

Boring Location: Sta. 446+00, 75' Rt.

Boring Surface Elev.: + 67.11

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split-Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4"	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To:
					43.0

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
4/7/2010		8.0	6.0	4.2	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	45.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: Jason Truver

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	4/7/10	1	0.5'	1 1 4	Wet soft brownish gray clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(2)	Topsoil - 6".
			2.0'		12" RECOVERY		
2.43		2	2.0'	3 0 9	Saturated medium dense brownish gray clayey fine sand w/some coarse sand, trace of silt and fine gravel.	A-2-4(0)	
			4.0'		24" RECOVERY		
4.86		3	4.0'	5 6 7 6	Saturated medium dense brownish gray clayey fine sand w/some coarse sand, trace of silt and fine gravel.	A-2-4(0)	
			6.0'		20" RECOVERY		
7.29		4	6.0'	4 4 7 6	Saturated medium dense brownish gray silty fine to coarse sand.	A-2-4(0)	
			8.0'		24" RECOVERY		
9.72		5	8.0'	3 3 4 4	Saturated loose brownish gray fine to coarse sand w/some silt.	A-2-4(0)	
			10.0'		22" RECOVERY		
12.15		6	10.0'	2 3 5 5	Saturated loose brown fine to coarse sand w/some silt.	A-2-4(0)	
			12.0'		24" RECOVERY		
		7	12.0'	1 2 2 4	Saturated very loose dark brown fine to coarse sand w/some silt.	A-2-4(0)	
			14.0'		24" RECOVERY		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: SS2-3-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.58		8	14.0'	1 2 7 11	Saturated loose dark brown silty coarse to fine sand.	A-2-4(0)	
			16.0'		19" RECOVERY		
17.01		9	16.0'	7 13 9 11	Saturated medium dense brown fine gravelly fine sand w/some coarse sand, trace of silt.	A-3	
			18.0'		13" RECOVERY		
19.44		10	18.0'	8 10 20 28	Saturated medium dense brown coarse to fine sandy fine gravel w/trace of silt.	A-1-b	
			20.0'		6" RECOVERY		
21.87							
24.3		11	24.0'	6 7 8 11	Saturated medium dense brown clayey fine to coarse sand w/trace of silt and fine gravel.	A-2-6(0)	
			26.0'		22" RECOVERY		
26.73							
29.16		12	28.0'	5 8 9 11	Saturated very stiff brown fine sandy clay w/some coarse sand, trace of silt.	A-7-6(3)	
			30.0'		24" RECOVERY		
31.59							
34.02							
36.45		13	34.0'	7 14 17 19	Saturated hard brown fine sandy clay w/some coarse sand, trace of silt.	A-7-6(3)	
			36.0'		19" RECOVERY		

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: SS2-3-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
38.88		14	38.0'	2 5 9 13	Saturated medium dense dark gray silty fine sand w/some coarse sand, trace of organic matter.	A-2-4(0)	
			40.0'		22" RECOVERY		
41.31							
43.74		15	43.0'	8 10 16 16	Saturated medium dense dark gray fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			45.0'		24" RECOVERY		
46.17					End of Boring		
48.6							
51.03							
53.46							
55.89							
58.32							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Clayey sand

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 4/07/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
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 uncorrected.

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

F.A. Project: U.S. 301 Maryland State Line to SR-1

Boring No.: SS2-3-02

Contract: 25-113-01

Boring Location: STA. 453+50 78' Rt. C.L.

Boring Surface Elev.: + 69.5

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 30.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	10/6/10		12.0	12.0	11.6	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	30.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	10/6/10	1	0.5'	2 2 3	Moist soft brown clayey fine sandy silt w/ some coarse sand, trace fine gravel.	A-4(0)	Topsoil - 7".
			2.0'		14" RECOVERY		
2.5		2	2.0'	4 7 10 11	Moist medium dense tan silty coarse to fine sand w/trace fine gravel.	A-2-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	12 12 10 11	Moist medium dense tan silty coarse to fine sand w/trace fine gravel.	A-1-b	
5			6.0'		20" RECOVERY		
		4	6.0'	10 9 7 9	Moist medium dense tan silty fine sand w/ some coarse sand, trace fine gravel.	A-2-4(0)	
7.5			8.0'		20" RECOVERY		
		5	8.0'	3 3 4 4	Saturated loose tan fine to coarse sand w/ some silt, trace fine gravel.	A-2-4(0)	
			10.0'		17" RECOVERY		
10		6	10.0'	3 4 3 3	Saturated loose tan fine to coarse sand w/ some silt, trace fine gravel.	A-2-4(0)	
			12.0'		10" RECOVERY		
12.5		7	12.0'	2 2 2 3	Saturated very loose tan coarse to fine sand w/some silt.	A-1-b	
			14.0'		18" RECOVERY		
		8	14.0'	1 1	Saturated very loose tan coarse to fine sand	A-1-b	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301 Maryland State Line to SR-1
Contract: 25-113-01

Boring No.: SS2-3-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				2 4	w/some silt, trace fine gravel.		
			16.0'		6" RECOVERY		
		9	16.0'	1 4 6 12	Saturated loose brown coarse sand w/some fine sand and fine gravel, trace silt.	A-1-b	
17.5			18.0'		8" RECOVERY		
		10	18.0'	7 13 15 13	Saturated medium dense brown coarse sandy fine gravel w/some fine sand and silt.	A-1-a	
20			20.0'		6" RECOVERY		
22.5							
		11	23.0'	8 6 11 12	Saturated medium dense brownish green silty fine to coarse sand.	A-2-4(0)	
25			25.0'		14" RECOVERY		
27.5							
		12	28.0'	5 6 9 11	Saturated medium dense brownish green silty fine sandy clay w/some coarse sand, trace fine gravel.	A-6(1)	
30			30.0'		18" RECOVERY		
					End of Boring		
32.5							
35							
37.5							

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on October 6, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 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.: SS2-4-01

Contract: 25-113-01

Boring Location: Sta. 484+00 75 L.T. C.L.

Boring Surface Elev.: + 57.36

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split-Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	12/8/09		4.0	4.0	2.6	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	30.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/8/09	1	0.5'	3 2 4	Saturated firm grayish black organic clay w/some coarse to fine sand and fine gravel, trace of silt.	A-6(3)	Topsoil - 4".
			2.0'		18" RECOVERY		
2.43		2	2.0'	2 3 4 4	Saturated loose grayish black coarse sand w/some fine gravel, coarse sand, organic matter and clay, trace of silt.	A-2-4(0)	
			4.0'		19" RECOVERY		
4.86		3	4.0'	8 2 3 3	Saturated loose grayish black coarse to fine sandy fine gravel w/trace of silt and organic matter.	A-1-b	
			6.0'		8" RECOVERY		
7.29		4	6.0'	9 9 10 10	Saturated medium dense gray fine gravelly coarse to fine sand w/trace of silt.	A-1-b	
			8.0'		18" RECOVERY		
9.72		5	8.0'	5 7 12 13	Saturated medium dense green clayey fine sand w/trace of coarse sand, silt and fine gravel.	A-2-4(0)	
			10.0'		20" RECOVERY		
12.15		6	10.0'	6 12 14 19	Saturated medium dense green silty fine sand w/some coarse sand.	A-2-4(0)	Mud Rotary @ 10.0'.
			12.0'		22" RECOVERY		
		7	12.0'	4 6 12 16	Saturated medium dense green silty fine sand w/some coarse sand, trace of fine gravel.	A-2-4(0)	
			14.0'		19" RECOVERY		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: SS2-4-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.58		8	14.0'	8 13 14 17	Saturated medium dense green silty fine sand w/trace of coarse sand.	A-2-4(0)	
			16.0'		17" RECOVERY		
17.01		9	16.0'	8 13 15 11	Saturated medium dense green fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
			18.0'		20" RECOVERY		
19.44		10	18.0'	3 8 9 9	Saturated medium dense green fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
			20.0'		16" RECOVERY		
21.87							
24.3		11	24.0'	7 11 17	Saturated medium dense green fine to coarse sand w/some silt, trace of fine gravel and organic matter.	A-2-4(0)	
			26.0'		19" RECOVERY		
26.73							
29.16		12	29.0'	8 12 12 13	Saturated medium dense green fine to coarse sand w/some silt, trace of fine gravel and organic matter.	A-2-4(0)	
			31.0'		20" RECOVERY		
31.59					End of Boring		
34.02							
36.45							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand
with silt



Well graded sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/8/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
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 recomendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows are uncorrected.

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

F.A. Project: U.S. 301 Maryland State Line to SR-1

Boring No.: SS2-5-01

Contract: 25-113-01

Boring Location: STA. 301+00 18' Lt. C.L.

Boring Surface Elev.: +49.5

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: 30.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
9/28/10		12.0	12.0	10.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	30.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/28/10	1	0.5'	6 10 9	Moist very stiff brown clayey fine sandy silt w/some coarse sand, trace fine gravel.	A-4(1)	Topsoil - 6".
			2.0'		16" RECOVERY		
2.5		2	2.0'	8 10 16 12	Moist medium dense brown silty fine sand w/some coarse sand, trace fine gravel.	A-2-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	8 6 7 7	Moist medium dense brownish green silty fine to coarse sand.	A-2-4(0)	
5			6.0'		17" RECOVERY		
		4	6.0'	6 6 9 22	Moist medium dense brownish green fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
7.5			8.0'		18" RECOVERY		
		5	8.0'	8 13 16 14	Saturated medium dense brownish green fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
			10.0'		18" RECOVERY		
10		6	10.0'	4 19 22 23	Saturated dense brownish green fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
			12.0'		19" RECOVERY		
		7	12.0'	11 13 18 21	Saturated dense brownish green fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
12.5			14.0'		21" RECOVERY		
		8	14.0'	9 19	Saturated dense brownish green fine to coarse	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301 Maryland State Line to SR-1
Contract: 25-113-01

Boring No.: SS2-5-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				20 32	sand w/some silt, trace fine gravel.		
			16.0'		17" RECOVERY		
		9	16.0'	18 24 26 39	Saturated dense brownish green fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
17.5			18.0'		14" RECOVERY		
		10	18.0'	7 14 15 14	Saturated medium dense brownish green silty fine to coarse sand.	A-2-4(0)	
20			20.0'		17" RECOVERY		
22.5							
		11	23.0'	8 8 12 12	No Sample Recovery		
25			25.0'		0" RECOVERY		
27.5							
		12	28.0'	12 16 23 27	Saturated dense brownish green fine to coarse sand w/trace silt and fine gravel.	A-3	
30			30.0'		17" RECOVERY		
					End of Boring		
32.5							
35							
37.5							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 28, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: U.S. 301 Maryland State Line to SR-1

Boring No.: SS2-5-02

Contract: 25-113-01

Boring Location: STA. 301+00 72' Lt. C.L.

Boring Surface Elev.: + 53.1

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:** 30.0
To:

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
9/28/10		18.0	18.0	14.3	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	30.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation

Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/28/10	1	0.0'	2 4 8 10	Moist medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	Topsoil - 3".
2.5		2	2.0' 2.0'	10 10 12 15	12" RECOVERY Moist medium dense orange fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
5		3	4.0' 4.0'	5 6 6 5	15" RECOVERY Moist medium dense orange fine sand w/some silt and coarse sand, trace fine gravel.	A-2-4(0)	
7.5		4	6.0' 6.0'	5 6 6 7	18" RECOVERY Moist medium dense orange fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
10		5	8.0' 8.0'	3 5 8 11	16" RECOVERY Moist medium dense orange fine gravelly coarse to fine sand w/trace silt.	A-1-b	
		6	10.0' 10.0'	6 12 18 16	17" RECOVERY No Sample Recovery		Gravel blocking spoon.
12.5		7	12.0' 12.0'	10 16 15 15	0" RECOVERY Moist dense brownish green fine to coarse sand w/some silt.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301 Maryland State Line to SR-1
Contract: 25-113-01

Boring No.: SS2-5-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0' 14.0'	8 10 10 14	20" RECOVERY Saturated medium dense brownish green fine to coarse sand w/some silt.	A-2-4(0)	
17.5		9	16.0' 16.0'	10 16 21 29	20" RECOVERY Saturated dense brownish green fine to coarse sand w/some silt.	A-2-4(0)	
20		10	18.0' 18.0'	13 12 17 23	16" RECOVERY Saturated medium dense brownish green fine to coarse sand w/some silt.	A-2-4(0)	
22.5			20.0'		21" RECOVERY		
25		11	23.0' 25.0'	11 12 18 20	Saturated medium dense brownish green silty fine sand. 20" RECOVERY	A-2-4(0)	
27.5							
30		12	28.0' 30.0'	12 16 25 16	Saturated dense brownish green silty fine to coarse sand. 18" RECOVERY	A-2-4(0)	
32.5					End of Boring		
35							
37.5							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 28, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 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.: SWM2-10-01

Contract: 25-113-01

Boring Location: Sta. 376+50, 310' RT C.L.

Boring Surface Elev.: + 61.62

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	
	Hollow Stem Auger:		From Depth of:		To:	12.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			14.0	12.0	7.8	

Pay Quantities:

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

Boring Contractor: Walton Corporation

Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/9/09	1	1.0'	6 5	Moist medium dense tan silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	Cultivated Soil - 9".
		2	2.0'	8 5 7	Moist loose brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
3			4.0'		11" RECOVERY		
		3	4.0'	11 16 12 11	Moist medium dense brown gravelly coarse sand w/some fine sand, trace of silt and clay.	A-1-b	USDA Classifica - Loamy Sand
6			6.0'		16" RECOVERY		
		4	6.0'	7 9 8 8	Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		20" RECOVERY		
9		5	8.0'	4 3 2 3	Saturated loose orange coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
			10.0'		18" RECOVERY		
		6	10.0'	2 2 4 4	Saturated loose orange coarse to fine sand w/some fine gravel and silt.	A-1-b	
12			12.0'		19" RECOVERY		
		7	12.0'	4 3 1 1	Saturated very loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			14.0'		23" RECOVERY		
15					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/9/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: SWM2-10-02

Contract: 25-113-01

Boring Location: Sta. 377+50, 310' RT C.L.

Boring Surface Elev.: + 60.48

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 12.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			14.0	12.0	7.0	

Pay Quantities:

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

Boring Contractor: Walton Corporation

Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.5'	10 6 6	Moist very stiff light gray fine to coarse sandy silt w/some clay, trace of fine gravel.	A-4(0)	Topsoil - 6".
			2.0'		12" RECOVERY		
3		2	2.0'	5 6 6 5	Moist medium dense grayish brown coarse sand w/some fine sand, fine gravel and silt.	A-1-b	
			4.0'		17" RECOVERY		
		3	4.0'	8 10 12 14	Moist medium dense grayish brown coarse sand w/some fine sand, silt and fine gravel, trace of clay.	A-1-b	USDA Classifica - Loamy Sand
6			6.0'		16" RECOVERY		
		4	6.0'	13 11 9 8	Moist medium dense grayish brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			8.0'		19" RECOVERY		
9		5	8.0'	5 4 2 2	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		22" RECOVERY		
		6	10.0'	4 3 2 1	Saturated loose orange coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
12			12.0'		20" RECOVERY		
		7	12.0'	1 W/H W/H 1	Saturated very loose tan silty fine sand w/trace of coarse sand.	A-2-4(0)	
			14.0'		17" RECOVERY		
15					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: SWM2-10-03

Contract: 25-113-01

Boring Location: Sta 379+00, 310' RT C.L.

Boring Surface Elev.: + 59.54

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 12.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			14.0	12.0	8.6	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.0'	3 3 3	Moist firm gray fine sandy silt w/some coarse sand and clay, trace of gravel.	A-4(0)	Forrest Duff - 3"
			2.0'		16" RECOVERY		
3		2	2.0'	12 10 9 10	Moist very stiff gray fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	8 9 6 5	Moist medium dense orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
6			6.0'		14" RECOVERY		
		4	6.0'	7 6 5 5	Wet medium dense orange fine to coarse sand w/some fine gravel, trace of silt and clay.	A-2-4(0)	USDA Classifica - Loamy Sand
			8.0'		15" RECOVERY		
9		5	8.0'	4 4 5 4	Wet loose orange fine to coarse sand w/some fine gravel and silt.	A-2-4(0)	
			10.0'		11" RECOVERY		
		6	10.0'	6 2 2 5	Wet very loose orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
12			12.0'		18" RECOVERY		
		7	12.0'	3 2 3 5	Wet loose orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			14.0'		8" RECOVERY		
15					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: SWM2-1-01

Contract: 25-113-01

Boring Location: Sta. 305+00, 220' RT C.L.

Boring Surface Elev.: + 50.68

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			16.0	14.0	11.9	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/20/09	1	0.5'	4 5 5	Moist loose brown silty coarse to fine sand w/some fine gravel. 15" RECOVERY	A-1-b	Topsoil - 6". USDA
3		2	2.0'	6 8 10 13	Moist medium dense brown gravelly coarse sand w/some fine sand, trace of silt. 14" RECOVERY	A-1-b	Classifica- - Sandy Loam
		3	4.0'	8 18 18 20	Moist dense brown gravelly coarse to fine sand w/some silt. 14" RECOVERY	A-1-b	
6		4	6.0'	11 14 17 19	Moist dense brown coarse to fine sand w/some silt, trace of fine gravel. 19" RECOVERY	A-2-4(0)	
		5	8.0'	3 6 8 8	Moist medium dense brown fine to coarse sand w/some silt. 16" RECOVERY	A-2-4(0)	
9		6	10.0'	8 11 13 13	Wet medium dense brown fine to coarse sand w/some silt. 20" RECOVERY	A-2-4(0)	
12		7	12.0'	1 9 13 14	Wet medium dense brown fine to coarse sand w/some silt. 18" RECOVERY	A-2-4(0)	
		8	14.0'	11 13 16 19	Wet medium dense brown fine to coarse sand w/some silt. 20" RECOVERY	A-2-4(0)	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: SWM2-1-02

Contract: 25-113-01

Boring Location: Sta. 306+00, 140' RT C.L.

Boring Surface Elev.: + 50.85

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: 14.0

Water Level Readings
Date

Time

Depth of Hole
16.0

Depth of Casing
14.0

Depth of Water
12.9

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: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/20/09	1	0.6'	9 11 10	Moist very stiff brown clayey fine sandy silt w/some coarse sand.	A-4(1)	Topsoil - 5".
3		2	2.0'	10	Moist medium dense orange coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
			2.1'	14 14 13			
6		3	4.0'	9	Moist medium dense orange gravelly fine to coarse sand w/trace of silt.	A-1-b	
			4.0'	14 12 15			
9		4	6.0'	10	Moist medium dense brown coarse to fine sand w/some silt and fine gravel.	A-2-4(0)	
			6.0'	10 10 14 13			
12		5	8.0'	4	Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			8.0'	8 12 10			
15		6	10.0'	9	Wet medium dense brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	USDA Classifica - Loamy Sand
			10.0'	8 8 5			
		7	12.0'	4	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			12.0'	5 9 11			
		8	14.0'	4	Wet medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
			14.0'	6 10 11			
			16.0'		End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Poorly graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: SWM2-1-03

Contract: 25-113-01

Boring Location: Sta. 308+00, 125' RT C.L.

Boring Surface Elev.: + 51.68

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: 14.0

Water Level Readings
Date

Time

Depth of Hole
16.0

Depth of Casing
14.0

Depth of Water
12.5

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: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/21/09	1	0.5'	3 4 9	Moist firm brown clayey silt w/some fine to coarse sand.	A-4(3)	Topsoil - 4".
			2.0'		15" RECOVERY		
3		2	2.0'	9 11 11 7	Moist medium dense brown fine to coarse sand w/some fine gravel and silt.	A-2-4(0)	
			4.0'		19" RECOVERY		
		3	4.0'	3 4 10 16	Moist medium dense brown clayey fine sand w/some coarse sand and fine gravel, trace of silt.	A-2-4(0)	
6			6.0'		17" RECOVERY		
		4	6.0'	14 11 9 9	Moist medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	6 8 10 13	Moist medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		17" RECOVERY		
		6	10.0'	14 11 13 13	Moist medium dense brown coarse to fine sand w/some silt.	A-2-4(0)	USDA Classifica - Loamy Sand
12			12.0'		22" RECOVERY		
		7	12.0'	8 12 11 15	Wet medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
			14.0'		20" RECOVERY		
15		8	14.0'	14 16 19 24	Wet dense brown fine to coarse sand w/some silt.	A-2-4(0)	
			16.0'		21" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/21/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: SWM2-11-01

Contract: 25-113-01

Boring Location: Sta. 383+10, 190' LT C.L.

Boring Surface Elev.: + 59.48

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			10.0	8.0	7.6	

Pay Quantities:

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

Boring Contractor: Walton Corporation

Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/9/09	1	0.5'	4 3 6	Moist firm gray clayey silt w/some fine to coarse sand and fine gravel.	A-4(1)	Cultivated Soil - 4".
			2.0'		15" RECOVERY		
3		2	2.0'	8 7 12 10	Moist medium dense brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			4.0'		22" RECOVERY		
		3	4.0'	6 6 7 8	Wet medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA Classification: Loamy Sand
6			6.0'		17" RECOVERY		
		4	6.0'	4 4 3 3	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	3 2 2 3	Saturated very loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		21" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/9/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: SWM2-11-02

Contract: 25-113-01

Boring Location: Sta. 384+90, 190' LT C.L.

Boring Surface Elev.: + 60.44

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
		10.0	8.0	6.0	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/9/09	1	0.5'	4 4 6	Moist firm gray fine sandy silt w/some coarse sand and clay, trace of fine gravel.	A-4(0)	Cultivated Soil - 4"
			2.0'		14" RECOVERY		
3		2	2.0'	6 6 6 6	Moist medium dense gray clayey coarse to fine sand w/some fine gravel and silt.	A-2-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	4 5 5 5	Wet loose gray coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	USDA Classification: Sand
6			6.0'		12" RECOVERY		
		4	6.0'	4 4 2 1	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		21" RECOVERY		
9		5	8.0'	2 4 2 1	Saturated loose brown fine to coarse sand w/some silt.	A-2-4(0)	
			10.0'		17" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded clayey
silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/9/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: SWM2-12-01

Contract: 25-113-01

Boring Location: Sta. 397+50, 220' RT C.L.

Boring Surface Elev.: + 60.00

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			12.0	10.0	3.8	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/14/09	1	0.0'	4 6 4 2	Moist stiff gray clayey coarse sandy silt w/some fine sand, trace of fine gravel.	A-4(0)	Cultivated Soil - 3".
			2.0'		16" RECOVERY		
3		2	2.0'	3 3 4 4	Wet loose gray coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA Classification: Loamy Sand
			4.0'		21" RECOVERY		
		3	4.0'	3 2 2 2	Saturated very loose gray coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
6			6.0'		17" RECOVERY		
		4	6.0'	3 3 3 5	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		14" RECOVERY		
9		5	8.0'	2 2 3 3	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		19" RECOVERY		
		6	10.0'	3 5 5 5	Saturated loose orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
12			12.0'		18" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: SWM2-12-02

Contract: 25-113-01

Boring Location: Sta. 398+75, 220' RT C.L.

Boring Surface Elev.: + 61.88

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: **To:**
From Depth of: 0.0 **To:** 10.0

Water Level Readings
Date **Time**

Depth of Hole
12.0

Depth of Casing
10.0

Depth of Water
6.4

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: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/15/09	1	0.0'	4 6 9 10	Moist stiff brown silt w/some fine to coarse sand, fine gravel and clay.	A-4(0)	Forest Duff - 2"
			2.0'		16" RECOVERY		
		2	2.0'	7 15 21 15	Moist dense orange coarse to fine sand w/some silt and fine gravel.	A-1-b	
3.5			4.0'		14" RECOVERY		
		3	4.0'	3 8 10 9	Wet medium dense orange coarse sand w/some fine sand, silt and fine gravel.	A-1-b	USDA Classification: Loamy Sand
			6.0'		17" RECOVERY		
7		4	6.0'	3 3 4 5	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		18" RECOVERY		
		5	8.0'	3 3 4 4	Saturated loose brown coarse to fine sand w/some silt.	A-1-b	
			10.0'		18" RECOVERY		
10.5		6	10.0'	4 5 6 7	Saturated medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			12.0'		20" RECOVERY		
					End of Boring		
14							
17.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/15/2009 using a 3 1/4-inch diameter continuous flight power 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 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.: SWM2-13-01

Contract: 25-113-01

Boring Location: Sta 400+50, 220' RT C.L.

Boring Surface Elev.: + 62.95

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 10.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			12.0	10.0	6.7	

Pay Quantities:

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

Boring Contractor: Walton Corporation

Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/15/09	1	0.0'	2 4 6 6	Moist loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	Forest Duff - 2"
			2.0'		15" RECOVERY		
3		2	2.0'	5 6 8	Moist medium dense orange silty coarse sand w/some fine sand, trace of fine gravel.	A-1-b	
			4.0'		15" RECOVERY		
		3	4.0'	5 7 6	Moist medium dense brown silty fine to coarse sand w/some fine gravel.	A-2-4(0)	
6			6.0'		17" RECOVERY		
		4	6.0'	4 5 4 4	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA Classification: Loamy Sand
			8.0'		18" RECOVERY		
9		5	8.0'	1 2 3	Saturated very loose brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
			10.0'		14" RECOVERY		
		6	10.0'	3 3 4 4	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
12			12.0'		16" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/15/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: SWM2-13-02

Contract: 25-113-01

Boring Location: Sta. 401+50, 275' RT C.L.

Boring Surface Elev.: + 61.39

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			12.0	10.0	6.1	

Pay Quantities:

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

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/2/09	1	0.0'	2 2 3 3	Moist firm gray fine to coarse sandy silt w/some clay, trace of fine gravel.	A-4(0)	Forest Duff - 2".
			2.0'		4" RECOVERY		USDA
3		2	2.0'	3 2 4 5	Moist loose orange silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	: Sandy Loam
			4.0'		22" RECOVERY		
		3	4.0'	2 3 3 4	Wet loose tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
6			6.0'		19" RECOVERY		
		4	6.0'	2 3 4 4	Wet loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		18" RECOVERY		
9		5	8.0'	1 2 4 3	Wet loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		16" RECOVERY		
		6	10.0'	2 2 3 3	Wet loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
12			12.0'		16" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/2/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 45.
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.: SWM2-13-03

Contract: 25-113-01

Boring Location: Sta. 402+90, 305' RT C.L.

Boring Surface Elev.: + 60.80

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			12.0	10.0	7.3	

Pay Quantities:

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

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/26/10	1	0.5'	2 2 2	Wet soft gray coarse to fine sandy silt w/trace of clay and fine gravel.	A-4(0)	Topsoil - 6".
			2.0'		10" RECOVERY		USDA
3		2	2.0'	7 7 8 6	Wet medium dense orangish tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	Classifica : Sandy Loam
			4.0'		17" RECOVERY		
		3	4.0'	2 4 4 5	Saturated loose orangish tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
6			6.0'		20" RECOVERY		
		4	6.0'	2 3 4 3	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		21" RECOVERY		
9		5	8.0'	2 4 4 5	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		22" RECOVERY		
		6	10.0'	2 4 5 4	Saturated loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
12			12.0'		20" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/26/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 45.
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.: SWM2-14-01

Contract: 25-113-01

Boring Location: Sta. 416+75, 185' RT C.L.

Boring Surface Elev.: + 63.85

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			10.0	8.0	5.7	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/1/09	1	0.5'	4 3 4	Moist firm brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 13" RECOVERY	A-4(3)	Cultivated Soil - 7".
3		2	2.0'	12 10 19 17	Moist medium dense brown clayey coarse to fine sand w/trace of silt and fine gravel. 24" RECOVERY	A-2-4(0)	
		3	4.0'	5 10 12 12	Moist medium dense tan coarse to fine sand w/some silt and fine gravel. 12" RECOVERY	A-1-b	USDA Classification: Loamy Sand
6		4	6.0'	5 8 7 9	Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel. 18" RECOVERY	A-1-b	
		5	8.0'	8 10 9 8	Wet medium dense orange coarse sand w/some fine sand, trace of silt and fine gravel. 24" RECOVERY	A-1-b	
9			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/1/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 45.
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.: SWM2-14-02

Contract: 25-113-01

Boring Location: Sta. 418+25, 185' RT C.L.

Boring Surface Elev.: + 64.18

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			10.0	8.0	5.2	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/1/09	1	0.5'	3 3 5	Wet firm gray clayey silt w/some fine sand, trace of coarse sand and fine gravel.	A-4(3)	Cultivated Soil - 6".
			2.0'		14" RECOVERY		
3		2	2.0'	9 19 20 17	Wet dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			4.0'		18" RECOVERY		
		3	4.0'	6 8 10 13	Wet medium dense tan coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	USDA Classification: Loamy Sand
6			6.0'		17" RECOVERY		
		4	6.0'	6 9 12 10	Wet medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		17" RECOVERY		
9		5	8.0'	7 6 4 5	Wet loose brownish tan coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
			10.0'		17" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/1/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 45.
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.: SWM2-15-01

Contract: 25-113-01

Boring Location: Sta. 437+60, 190' RT C.L.

Boring Surface Elev.: + 73.23

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			10.0	8.0	Dry	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/1/09	1	0.5'	1 1 3	Wet soft brown clayey fine sandy silt w/some coarse sand. 12" RECOVERY	A-4(3)	Cultivated Soil - 7".
3		2	2.0'	3 4 7 9	Wet stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 14" RECOVERY	A-4(2)	
		3	4.0'	4 7 7 4	Wet medium dense tan silty coarse to fine sand w/some fine gravel. 15" RECOVERY	A-1-b	
6		4	6.0'	3 2 2 4	Wet very loose tan coarse to fine sand w/some silt, trace of fine gravel. 12" RECOVERY	A-2-4(0)	
		5	8.0'	1 2 2 3	Wet very loose orange silty fine to coarse sand w/trace of fine gravel. 16" RECOVERY	A-2-4(0)	USDA Classification: Loamy Sand
9			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/1/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 45.
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.: SWM2-15-02

Contract: 25-113-01

Boring Location: Sta. 439+00, 195' RT C.L.

Boring Surface Elev.: + 67.34

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			10.0	8.0	7.3	

Pay Quantities:

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

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/1/09	1	0.5'	2 2 3	Wet soft brown fine to coarse sandy clay w/some fine gravel and silt.	A-6(1)	Cultivated Soil - 7".
			2.0'		10" RECOVERY		
3		2	2.0'	2 3 3 2	Wet loose brown silty fine to coarse sand.	A-2-4(0)	
			4.0'		17" RECOVERY		
		3	4.0'	3 2 2 1	Wet very loose brown coarse to fine sand w/some silt.	A-2-4(0)	
6			6.0'		16" RECOVERY		
		4	6.0'	2 2 2 2	Wet very loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			8.0'		19" RECOVERY		
9		5	8.0'	4 3 2 2	Wet loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA Classification: Loamy Sand
			10.0'		17" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/1/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 45.
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.: SWM2-16-01

Contract: 25-113-01

Boring Location: Sta. 441+50, 135' Rt. C.L.

Boring Surface Elev.: + 66.9

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	4/7/10		6.0	8.0	3.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: Jason Truver

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/1/09	1	0.5'	2 4 4	Moist firm tan fine to coarse sandy silt w/trace of fine gravel and clay.	A-4(0)	Topsoil - 7".
			2.0'		11" RECOVERY		
3		2	2.0'	8 14 13 9	Moist medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			4.0'		19" RECOVERY		
		3	4.0'	5 4 7 8	Moist medium dense tan silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	USDA Classifica Loamy Sand
6			6.0'		19" RECOVERY		
		4	6.0'	11 9 9 10	Moist medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		22" RECOVERY		
9		5	8.0'	4 3 4 6	Saturated loose orange coarse sand w/some silt and fine sand, trace of fine gravel.	A-1-b	
			10.0'		21" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 4/7/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
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 recomendations 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.: SWM2-17-01

Contract: 25-113-01

Boring Location: Sta. 461+30, 145' Rt. C.L.

Boring Surface Elev.: + 69.7

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 12/4/2009	Time	6.0	4.0	2.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/4/09	1	0.5'	2 2 3	Wet firm brown clayey silt w/some fine sand and fine gravel, trace of coarse sand.	A-4(3)	Topsoil - 6".
			2.0'		14" RECOVERY		
3		2	2.0'	7 12 14 16	Saturated medium dense brown coarse to fine sand w/some fine gravel and silt.	A-1-b	
			4.0'		21" RECOVERY		
		3	4.0'	12 9 9	Saturated medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	USDA Classification: Loamy Sand
6			6.0'		19" RECOVERY		
	12/7/09	4	6.0'	7 9 9 8	Saturated medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	6 8 9 7	Saturated medium dense tan silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			10.0'		20" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/4/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 45.
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.: SWM2-17-02

Contract: 25-113-01

Boring Location: Sta. 463+00, 145' Rt. C.L.

Boring Surface Elev.: + 70.1

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	12/4/2009		6.0	4.0	3.7	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/4/09	1	0.5'	3 3 4	Wet firm brown silt w/trace of fine to coarse sand, fine gravel and clay.	A-4(2)	Topsoil - 6".
			2.0'		13" RECOVERY		
3		2	2.0'	4 6 9 9	Wet stiff brownish orange clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(1)	USDA Classification: Loam
			4.0'		20" RECOVERY		
		3	4.0'	8 17 12 15	Wet medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6			6.0'		21" RECOVERY		
		4	6.0'	12 12 9 8	Wet medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			8.0'		19" RECOVERY		
9		5	8.0'	5 6 8 9	Wet medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		20" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/4/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 45.
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: US 301 Maryland State Line to SR-1

Boring No.: SWM2-17-03

Contract: 25-113-01

Boring Location: STA. 463+31 141' Lt. C.L.

Boring Surface Elev.: + 69.0

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 12.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/23/10		12.0	12.0	8.4	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/23/10	1	0.5'	10 12 14	Moist very stiff brown clayey silt w/some fine sand, trace coarse sand and fine gravel.	A-4(4)	Topsoil - 7" 10 YR - 6/6
			2.0'		11" RECOVERY		
3		2	2.0'	13 22 28 30	Moist dense brown silty fine to coarse sand w/some fine gravel.	A-2-4(0)	10 YR - 6/6
			4.0'		16" RECOVERY		
		3	4.0'	11 16 16 14	Moist dense brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	10 YR - 6/6
6			6.0'		20" RECOVERY		
		4	6.0'	15 13 14 12	Moist medium dense brown coarse sand w/some fine sand, fine gravel and silt.	A-1-b	10 YR - 6/6 USDA Classification : Loamy Sand
			8.0'		20" RECOVERY		
9		5	8.0'	4 4 5 4	Wet loose tan silty coarse to fine sand w/some fine gravel.	A-1-b	10 YR - 7/2
			10.0'		18" RECOVERY		
		6	10.0'	3 4 5 4	Wet loose tan coarse sand w/some fine sand, fine gravel and silt.	A-1-b	10 YR - 7/2
12			12.0'		16" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 23, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 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.: SWM2-18-01

Contract: 25-113-01

Boring Location: Sta. 459+00, 245' Lt. C.L.

Boring Surface Elev.: + 70.2

Reference:

Wt. of Casing Hammer:	Lbs.	Average Fall:	IN.
Wt. of Sample Hammer: 140	Lbs.	Average Fall: 30	IN.
Type of: D-Sampler: Split Barrel	O.D.	O.D. of Sampler: 2	IN.
S-Sampler:	O.D.	O.D. of Samp. Tube:	IN.
U-Sampler:	O.D.	O.D. of Samp. Tube:	IN.
Core Bit:	O.D.	O.D. of Rock Core:	IN.

Casing Size: 3 1/4	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of: 0.0	To: 10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	12/7/2009		6.0	4.0	3.4	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/7/09	1	0.5'	2 2 3	Wet firm brown clayey silt w/some fine sand, trace of coarse sand and fine gravel. 12" RECOVERY	A-4(6)	Topsoil - 6".
3		2	2.0'	7 9 8 5	Wet medium dense brown silty coarse to fine sand w/trace of fine gravel. 21" RECOVERY	A-2-4(0)	USDA Classification: Sandy Loam
		3	4.0'	3 5 6 6	Saturated medium dense tan silty coarse to fine sand w/trace of fine gravel. 22" RECOVERY	A-1-b	
6		4	6.0'	4 4 7 8	Saturated medium dense tan coarse to fine sand w/some silt, trace of fine gravel. 19" RECOVERY	A-1-b	
		5	8.0'	2 3 2 3	Saturated loose orange coarse sand w/some fine sand and silt, trace of fine gravel. 19" RECOVERY	A-1-b	
9		6	10.0'	2 3 3 2	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel. 22" RECOVERY	A-1-b	
12			12.0'		End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/7/2009 using a 3 1/4- inch diameter continues flight power 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 recomendations 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.: SWM2-18-02

Contract: 25-113-01

Boring Location: Sta. 460+75, 285' Lt. C.L.

Boring Surface Elev.: + 70.2

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					10.0

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
12/7/2009		10.0	8.0	6.2	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/7/09	1	0.5'	1 2 3	Wet firm brown clayey silt w/some fine to coarse sand and fine gravel.	A-4(4)	Topsoil - 7".
			2.0'		13" RECOVERY		
3		2	2.0'	5 6 6 8	Wet stiff grayish orange clayey fine to coarse sandy silt w/trace of fine gravel.	A-4(0)	USDA Classification: Sandy Loam
			4.0'		23" RECOVERY		
		3	4.0'	6 7 7 8	Saturated stiff grayish orange fine sandy clay w/some coarse sand and silt, trace of fine gravel.	A-6(1)	
6			6.0'		21" RECOVERY		
		4	6.0'	9 10 11 9	Saturated medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		18" RECOVERY		
9		5	8.0'	2 2 3 3	Saturated loose tan coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
			10.0'		18" RECOVERY		
		6	10.0'	3 3 4 6	Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
12			12.0'		22" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/7/2009 using a 3 1/4- inch diameter continuous flight power 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.: SWM2-18-03

Contract: 25-113-01

Boring Location: Sta. 462+50, 315' Lt. C.L.

Boring Surface Elev.: + 68.7

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 10.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	12/7/2009		8.0	6.0	4.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/7/09	1	0.5'	3 2 3	Wet firm brown clayey fine gravelly silt w/some coarse to fine sand. 14" RECOVERY	A-4(1)	Topsoil - 7".
3		2	2.0'	3 5 7 6	Saturated medium dense brown coarse sand w/some silt and fine sand, trace of fine gravel. 18" RECOVERY	A-1-b	USDA Classification: Loamy Sand
		3	4.0'	3 2 4 2	Saturated loose brown coarse sand w/some fine sand and silt, trace of fine gravel. 18" RECOVERY	A-1-b	
6		4	6.0'	2 2 2 3	Saturated very loose tan coarse to fine sand w/some silt, trace of fine gravel. 17" RECOVERY	A-1-b	
		5	8.0'	3 2 3 3	Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel. 21" RECOVERY	A-1-b	
9		6	10.0'	3 3 3 3	Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel. 22" RECOVERY	A-1-b	
12			12.0'		End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/7/2009 using a 3 1/4- inch diameter continuous flight power 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.: SWM2-19-01

Contract: 25-113-01

Boring Location: Sta. 469+00, 350' Lt. C.L.

Boring Surface Elev.: + 68.9

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: 10.0

Water Level Readings
Date 12/1/2009
Time

Depth of Hole 8.0
Depth of Casing 6.0
Depth of Water 5.0
Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 12.0
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: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/1/09	1	0.5'	2 3 4	Moist firm brown fine to coarse sandy silt w/some clay, trace of fine gravel. 12" RECOVERY	A-4(0)	Topsoil - 7".
3		2	2.0'	5 5 6 5	Moist medium dense orangish tan coarse to fine sand w/some fine gravel, clay and silt. 18" RECOVERY	A-2-4(0)	USDA Classification: Sandy Loam
		3	4.0'	6 7 7 8	Saturated medium dense orangish tan fine sand w/some silt and fine gravel. 20" RECOVERY	A-2-4(0)	
6		4	6.0'	4 7 7 5	Saturated medium dense tan coarse to fine sand w/some fine gravel and silt. 20" RECOVERY	A-1-b	
		5	8.0'	2 3 3 2	Saturated loose tan coarse sand w/some fine gravel, fine sand and silt. 18" RECOVERY	A-1-b	
9		6	10.0'	3 3 3 5	Saturated loose tan coarse to fine sand w/trace of fine gravel and silt. 19" RECOVERY	A-1-b	
12			12.0'		End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/1/2009 using a 3 1/4- inch diameter continuous flight power 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.

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/1/2009 using a 3 1/4-inch diameter continuous flight power 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 blows 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.: SWM2-19-03

Contract: 25-113-01

Boring Location: Sta. 472+50, 300' Lt. C.L.

Boring Surface Elev.: + 65.5

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 10.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 12/1/2009	Time	6.0	4.0	3.2	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/1/09	1	0.5'	3 5 3	Moist firm brown clayey fine gravelly fine sand w/some coarse sand and silt. 16" RECOVERY	A-2-4(0)	Topsoil - 6".
3		2	2.0'	5 10 6 9	Moist medium dense orangish tan silty coarse to fine sand w/some fine gravel. 22" RECOVERY	A-1-b	USDA Classification: Sandy Laom
		3	4.0'	3 5 6 4	Saturated medium dense tan coarse to fine sand w/some silt and fine gravel. 20" RECOVERY	A-1-b	
6		4	6.0'	5 5 6 6	Saturated medium dense tan coarse sand w/some silt and fine gravel. 22" RECOVERY	A-1-b	
		5	8.0'	2 2 2 3	Saturated very loose tan fine sand w/some silt, trace of coarse sand. 19" RECOVERY	A-2-4(0)	
9		6	10.0'	3 4 4 7	Saturated loose tan silty fine and w/some fine gravel, trace of coarse sand. 18" RECOVERY	A-2-4(0)	
12			12.0'		End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/1/2009 using a 3 1/4- inch diameter continuous flight power 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.: SWM2-19-04

Contract: 25-113-01

Boring Location: Sta. 474+00, 295' Lt. C.L.

Boring Surface Elev.: + 64.5

Reference:

Wt. of Casing Hammer:	Lbs.	Average Fall:	IN.
Wt. of Sample Hammer: 140	Lbs.	Average Fall: 30	IN.
Type of: D-Sampler: Split Barrel	O.D.	O.D. of Sampler: 2	IN.
S-Sampler:	O.D.	O.D. of Samp. Tube:	IN.
U-Sampler:	O.D.	O.D. of Samp. Tube:	IN.
Core Bit:	O.D.	O.D. of Rock Core:	IN.

Casing Size: 3 1/4	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of: 0.0	To: 10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	12/4/2009		8.0	6.0	4.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/4/09	1	0.5'	2 2 6	Wet firm grayish orange clayey silt w/trace of fine to coarse sand.	A-4(8)	Topsoil - 6".
			2.0'		17" RECOVERY		
		2	2.0'	1 12	Wet stiff grayish orange clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(1)	USDA
			3.0'				Classifica
3.5		2A	3.0'	12 14	9" RECOVERY	A-1-b	Loam
			4.0'				
		3	4.0'	2 6 6	Saturated medium dense gray silty coarse to fine sand w/some fine gravel.	A-1-b	
			4.0'		12" RECOVERY		
			6.0'		Saturated loose gray coarse to fine sand w/some silt and fine gravel.		
			6.0'		20" RECOVERY		
7		4	6.0'	6 4 3 2	Saturated loose tan coarse sand w/some fine sand, silt and fine gravel.	A-1-b	
			8.0'		20" RECOVERY		
		5	8.0'	2 2 3 3	Saturated loose tan silty fine sand w/trace of coarse sand.	A-2-4(0)	
			10.0'		19" RECOVERY		
10.5		6	10.0'	3 3 7 8	Saturated loose tan fine sand w/some fine gravel, silt and coarse sand.	A-2-4(0)	
			12.0'		18" RECOVERY		
					End of Boring		
14							
17.5							

Remarks:

Reviewed By: Hnay Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/4/2009 using a 3 1/4-inch diameter continuous flight power 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 blows 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.: SWM2-2-01

Contract: 25-113-01

Boring Location: Sta. 307+75, 240' LT C.L.

Boring Surface Elev.: + 50.23

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: 14.0

Water Level Readings
Date

Time

Depth of Hole
16.0

Depth of Casing
14.0

Depth of Water
12.1

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: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	8/21/09	1	0.5'	4 5 6	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 14" RECOVERY	A-4(0)	Topsoil - 4". USDA
		2	2.0'	8 7 8	Moist medium dense brown coarse to fine sand w/some fine gravel, trace of silt. 15" RECOVERY	A-1-b	Classifica- - Sandy Loam
6		3	4.0'	7 9 10 11	Moist medium dense brown coarse to fine sand w/some fine gravel, trace of silt. 16" RECOVERY	A-1-b	
		4	6.0'	5 8 10 8	Moist medium dense orange fine to coarse sand w/some silt, trace of fine gravel. 20" RECOVERY	A-2-4(0)	
9		5	8.0'	3 4 4 3	Moist loose orange coarse to fine sand w/trace of fine gravel and silt. 17" RECOVERY	A-1-b	
		6	10.0'	4 8 13 9	Moist medium dense brown fine to coarse sand w/some silt, trace of fine gravel. 15" RECOVERY	A-2-4(0)	
12		7	12.0'	8 12 18 23	Wet medium dense brown fine to coarse sand w/trace of silt. 20" RECOVERY	A-3	
		8	14.0'	17 19 22 21	Wet dense brown fine to coarse sand w/some silt, trace of fine gravel. 15" RECOVERY	A-2-4(0)	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Well graded sand
with silt



Poorly graded sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/21/2009 using a 3 1/4- inch diameter continues flight power 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 recomendations 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.: SWM2-2-02

Contract: 25-113-01

Boring Location: Sta. 309+25, 230' LT C.L.

Boring Surface Elev.: + 50.98

Reference:

Wt. of Casing Hammer:	Lbs.	Average Fall:	IN.
Wt. of Sample Hammer: 140	Lbs.	Average Fall: 30	IN.
Type of: D-Sampler: Split Barrel	O.D.	O.D. of Sampler: 2	IN.
S-Sampler:	O.D.	O.D. of Samp. Tube:	IN.
U-Sampler:	O.D.	O.D. of Samp. Tube:	IN.
Core Bit:	O.D.	O.D. of Rock Core:	IN.

Casing Size: 3 1/4	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of: 0.0	To: 14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			16.0	14.0	13.0	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/20/09	1	0.5'	3 6 8	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 14" RECOVERY	A-4(2)	TOPsoil - 5".
3		2	2.0'	9 13 11 8	Moist medium dense tan fine to coarse sand w/some silt, trace of fine gravel. 16" RECOVERY	A-2-4(0)	
		3	4.0'	6 8 11 19	Moist medium dense tan coarse to fine sand w/some silt, trace of fine gravel. 17" RECOVERY	A-2-4(0)	
6		4	6.0'	11 14 13 11	Moist medium dense brown coarse to fine sand w/some fine gravel, trace of silt. 21" RECOVERY	A-1-b	
		5	8.0'	4 7 7 6	Moist medium dense orange coarse sand w/some fine sand and fine gravel, trace of silt. 17" RECOVERY	A-1-b	
9		6	10.0'	10 9 7 7	Moist medium dense brown fine to coarse sand w/some silt and clay, trace of fine gravel. 16" RECOVERY	A-2-4(0)	USDA Classifica - Sandy Loam
12		7	12.0'	3 9 9 11	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel. 19" RECOVERY	A-2-4(0)	
		8	14.0'	9 9 9 12	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel. 20" RECOVERY	A-2-4(0)	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded sand
with silt



Well graded sand



Well graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: SWM2-21-01

Contract: 25-113-01

Boring Location: Sta. 476+00, 250' Lt. C.L.

Boring Surface Elev.: + 64.8

Reference:

Wt. of Casing Hammer:	Lbs.	Average Fall:	IN.
Wt. of Sample Hammer: 140	Lbs.	Average Fall: 30	IN.
Type of: D-Sampler: Split Barrel	O.D.	O.D. of Sampler: 2	IN.
S-Sampler:	O.D.	O.D. of Samp. Tube:	IN.
U-Sampler:	O.D.	O.D. of Samp. Tube:	IN.
Core Bit:	O.D.	O.D. of Rock Core:	IN.

Casing Size: 3 1/4	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of: 0.0	To: 8.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	12/4/2009		6.0	4.0	3.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/4/09	1	1.0'	2 2	Wet soft brown clayey silt w/trace of fine to coarse sand. 12" RECOVERY	A-4(5)	Topsoil - 9"
3		2	2.0'	8 10 10 10	Wet medium dense grayish orange silty coarse to fine sand w/trace of fine gravel. 22" RECOVERY	A-1-b	USDA Classification: Sandy Loam
		3	4.0'	5 4 5 6	Saturated loose grayish orange coarse to fine sand w/some silt, trace of fine gravel. 22" RECOVERY	A-1-b	
6		4	6.0'	5 6 5 8	Saturated medium dense tan coarse to fine sand w/some silt, trace of fine gravel. 18" RECOVERY	A-1-b	
		5	8.0'	3 3 5 7	Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel. 20" RECOVERY	A-1-b	
9			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/4/2009 using a 3 1/4- inch diameter continuous flight power 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.: SWM2-21-02

Contract: 25-113-01

Boring Location: Sta. 477+10, 230' Lt. C.L.

Boring Surface Elev.: + 65.6

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					10.0

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
1/26/2010		12.0	10.0	8.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/26/10	1	1.0'	3 3	Wet firm brown silt w/some clay, trace of fine to coarse sand.	A-4(4)	Topsoil - 9"
2.5		2	2.0'	12 14 10 8	12" RECOVERY Wet medium dense blackish brown silty fine gravelly coarse to fine sand.	A-2-4(0)	USDA Classification: Sandy Loam
		3	4.0'	1 3 3 3	19" RECOVERY Saturated loose orangish tan coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
5		4	6.0'	4 5 6 7	15" RECOVERY Saturated medium dense tan fine gravelly coarse sand w/some fine sand and silt.	A-1-b	
7.5		5	8.0'	3 6 6 7	15" RECOVERY Saturated medium dense tan coarse to fine sand w/some silt and fine gravel.	A-1-b	
10		6	10.0'	4 8 11 8	19" RECOVERY Saturated medium dense brown coarse sand w/some fine gravel, fine sand and silt.	A-1-b	
12.5			12.0'		17" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/26/2010 using a 3 1/4-inch diameter continuous flight power 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 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.: SWM2-21-02A

Contract: 25-113-01

Boring Location: Sta. 477+10, 230' Lt. C.L.

Boring Surface Elev.: + 65.2

Reference:

Wt. of Casing Hammer:	Lbs.	Average Fall:	IN.
Wt. of Sample Hammer:	Lbs.	Average Fall:	IN.
Type of: D-Sampler:	O.D.	O.D. of Sampler:	IN.
S-Sampler:	O.D.	O.D. of Samp. Tube:	IN.
U-Sampler:	O.D.	O.D. of Samp. Tube:	IN.
Core Bit:	O.D.	O.D. of Rock Core:	IN.

Casing Size:	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of:	To:

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	12/1/2009		8.0		4.7	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/1/09	1	1.0'		Wet brown clayey silt w/trace of fine to coarse sand.	A-4(9)	Hand Auger
2.5		2	2.0'		12" RECOVERY Wet tan silty coarse to fine sand w/some fine gravel.	A-1-b	Topsoil - 9". Hand Auger
			4.0'		24" RECOVERY		USDA
5		3	4.0'		Wet orange silty fine gravelly coarse sand w/some fine sand.	A-1-b	Classification: Sandy Loam
			5.0'		12" RECOVERY		Hand Auger
		4	5.0'		Saturated orangish tan coarse sand w/some fine sand, silt and fine gravel.	A-1-b	Hand Auger
			6.0'		12" RECOVERY		Hand Auger
7.5		5	6.0'		Saturated tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	Hand Auger
			8.0'		24" RECOVERY		Hand Auger
10					End of Boring		
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/1/2009 using a hand auger.
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.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-21-03

Contract: 25-113-01

Boring Location: STA. 476+58 350 Lt. C.L.

Boring Surface Elev.: + 62.7

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To: 10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/24/10		6.0	6.0	5.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/24/10	1	0.5'	6 9 9	Moist stiff tan fine sandy silt w/some coarse sand, fine gravel and clay. 14" RECOVERY	A-4(0)	Topsoil - 5". 2.5 YR - 6/2
3		2	2.0'	9 12 13 11	Moist medium dense tan silty coarse to fine sand and fine gravel. 18" RECOVERY	A-2-4(0)	2.5 YR - 6/2
		3	4.0'	8 9 9 5	Wet medium dense brown coarse to fine sand w/some silt, trace clay and fine gravel. 16" RECOVERY	A-2-4(0)	2.5 YR - 6/6 USDA Classification : Sandy Loam
6		4	6.0'	8 7 5 6	Wet medium dense brown coarse to fine sand w/some fine gravel and silt. 18" RECOVERY	A-1-b	10 YR - 6/6
		5	8.0'	9 7 6 5	Wet medium dense tan coarse sandy fine gravel w/some fine sand, trace silt. 5" RECOVERY	A-1-a	2.5 YR - 7/3
			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 24, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-21-04

Contract: 25-113-01

Boring Location: STA. 478+74 319' Lt. C.L.

Boring Surface Elev.: + 60.6

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/23/10		4.0	4.0	3.6	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/23/10	1	0.5'	8 9 10	Moist very stiff gray clayey silt w/some coarse to fine sand, trace fine gravel. 15" RECOVERY	A-4(4)	Topsoil - 4". 5 YR - 5/1
3		2	2.0'	7 6 7 7	Moist medium dense gray coarse to fine sandy fine gravel w/some silt, trace clay. 4" RECOVERY	A-1-b	5 YR - 4/1 USDA Classification : Loamy Sand
		3	4.0'	9 7 7 6	Wet medium dense gray fine gravelly coarse sand w/some fine sand and silt. 13" RECOVERY	A-1-b	2.5 YR - 7/1
6		4	6.0'	3 3 7 7	Wet loose gray coarse sand w/some fine gravel and fine sand, trace silt. 14" RECOVERY	A-1-b	2.5 YR - 7/1
9			8.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 23, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-21-05

Contract: 25-113-01

Boring Location: STA. 480+73 160' Lt. C.L.

Boring Surface Elev.: + 59.3

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: 8.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
9/24/10		4.0	4.0	3.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/24/10	1	0.5'	10 18 20	Moist medium dense tan silty coarse sand w/ some fine sand and fine gravel, trace clay. 10" RECOVERY	A-2-4(0)	Topsoil - 4". 10YR - 5/3 USDA Classification : Sandy
3		2	2.0'	8 7 7 6	Moist medium dense tan coarse to fine sand w/some silt, trace fine gravel. 16" RECOVERY	A-1-b	Loam 7.5YR - 7/2
		3	4.0'	10 8 10 10	Saturated medium dense orange coarse to fine sand w/some fine gravel and silt. 12" RECOVERY	A-1-b	10YR - 6/8
6		4	6.0'	14 13 9 5	Saturated medium dense orange fine sandy fine gravel w/some coarse sand and silt. 12" RECOVERY	A-1-b	10YR - 6/8
			8.0'		End of Boring		
9							
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 24, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 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.: SWM2-22-01

Contract: 25-113-01

Boring Location: Sta. 488+25, 235' Rt. C.L.

Boring Surface Elev.: + 55.6

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: **To:**
From Depth of: 0.0 **To:** 10.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
1/22/2010		10.0	8.0	5.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/22/10	1	0.0'	1 1 6 12	Wet loose orange clayey coarse sand w/some fine sand, fine gravel and silt.	A-2-4(0)	USDA Classification: Sandy Loam
2.5		2	2.0'	4 5 6 8	19" RECOVERY Saturated medium dense orangish brown fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	USDA Classification: Loamy Sand
5		3	4.0'	1 2 3 3	18" RECOVERY Saturated firm green clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-5(1)	
7.5		4	6.0'	4 5 6 8	13" RECOVERY Saturated stiff brownish green fine sandy clay w/some coarse sand and silt.	A-7-6(5)	
10		5	8.0'	4 6 8 11	18" RECOVERY Saturated medium dense green silty fine sand w/some coarse sand.	A-2-4(0)	
12.5		6	10.0'	6 7 9 12	18" RECOVERY Saturated very stiff green fine sandy clay w/some silt, trace of coarse sand.	A-6(1)	
			12.0'		16" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/22/2010 using a 3 1/4-inch diameter continuous flight power 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 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.: SWM2-22-01A

Contract: 25-113-01

Boring Location: Sta. 488+25, 235' Rt. C.L.

Boring Surface Elev.: + 55.6

Reference:

Wt. of Casing Hammer:	Lbs.	Average Fall:	IN.
Wt. of Sample Hammer:	Lbs.	Average Fall:	IN.
Type of: D-Sampler:	O.D.	O.D. of Sampler:	IN.
S-Sampler:	O.D.	O.D. of Samp. Tube:	IN.
U-Sampler:	O.D.	O.D. of Samp. Tube:	IN.
Core Bit:	O.D.	O.D. of Rock Core:	IN.

Casing Size:	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of:	To:

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	11/30/2009		8.0		0.6	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	11/30/09	1	0.5'		Wet orangish gray clayey coarse sandy silt w/some fine sand, trace of fine gravel and organic matter. 12" RECOVERY	A-4(2)	Topsoil - 6".
		2	1.5'		Saturated gray coarse sand w/some fine sand, silt and fine gravel. 6" RECOVERY	A-1-b	Hand Auger
2.5		3	2.0'		Saturated tan coarse to fine sandy fine gravel w/trace of silt. 12" RECOVERY	A-1-b	Hand Auger
		4	3.0'		No Sample		USDA Classification: Loamy Sand
5			3.0'				Hand Auger
							Hand Auger
7.5							Hand Auger
			8.0'		End of Boring 0" RECOVERY		
10							
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 11/30/2009 using a hand auger.
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.

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

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

Boring No.: SWM2-22-02

Contract: 25-113-01

Boring Location: Sta. 489+25, 235' Rt. C.L.

Boring Surface Elev.: + 57.9

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 10.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/22/2010		6.0	4.0	2.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corpoartion
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/22/10	1	0.0'	2 4 4 6	Wet firm tan fine sandy silt w/some fine gravel and coarse sand.	A-4(0)	USDA Classifica : Sandy Clay
			2.0'		14" RECOVERY		
3		2	2.0'	3 6 12 13	Saturated medium dense tan fine gravelly fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Loam USDA Classifica : Sandy Clay
			4.0'		18" RECOVERY		
		3	4.0'	4 18 9 11	Saturated medium dense orange coarse sandy fine gravel w/some fine sand and silt.	A-1-b	Loam
6			6.0'		17" RECOVERY		
		4	6.0'	4 11 14 9	Saturated medium dense brown clayey fine gravel w/some coarse to fine sand, trace of silt.	A-2-6(0)	
			8.0'		16" RECOVERY		
9		5	8.0'	2 2 4 8	Saturated loose green silty fine sand w/some coarse sand, trace of fine gravel.	A-2-4(0)	
			10.0'		18" RECOVERY		
		6	10.0'	7 9 11 13	Saturated very stiff green fine sandy clay w/some coarse sand and silt.	A-6(3)	
12			12.0'		15" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/22/2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
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 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.: SWM2-22-02A

Contract: 25-113-01

Boring Location: Sta. 489+25, 235' Rt. C.L.

Boring Surface Elev.: + 57.9

Reference:

Wt. of Casing Hammer:	Lbs.	Average Fall:	IN.
Wt. of Sample Hammer:	Lbs.	Average Fall:	IN.
Type of: D-Sampler:	O.D.	O.D. of Sampler:	IN.
S-Sampler:	O.D.	O.D. of Samp. Tube:	IN.
U-Sampler:	O.D.	O.D. of Samp. Tube:	IN.
Core Bit:	O.D.	O.D. of Rock Core:	IN.

Casing Size:	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of:	To:

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	11/30/2009		4.0		0.9	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	11/30/09	1	0.5'		Moist gray coarse sandy fine gravel w/some fine sand and silt.	A-1-b	Topsoil - 6"
			1.5'		12" RECOVERY		Hand Auger
		2	1.5'		Saturated tan fine to coarse sandy fine gravel w/trace of silt.	A-1-b	Hand Auger
2.5			2.5'		12" RECOVERY		Hand Auger
		3	2.5'		Saturated grayish orange silty fine sand w/trace of coarse sand and fine gravel.	A-2-4(0)	USDA Classification: Sand
			4.0'		18" RECOVERY		Hand Auger
5					End of Boring		
7.5							
10							
12.5							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 11/30/2009 using a hand auger.
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.

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

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

Boring No.: SWM2-23-01

Contract: 25-113-01

Boring Location: Sta. 498+75, 175' Rt. C.L.

Boring Surface Elev.: + 64.2

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 8.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/26/2010		10.0	8.0	6.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/26/10	1	0.5'	2 2 2	Wet soft brown clayey silt w/some fine gravel, trace of coarse to fine sand. 10" RECOVERY	A-4(5)	Topsoil - 8".
3		2	2.0'	2 3 2	Wet firm brown silty clay w/some fine gravel, trace of coarse to fine sand. 11" RECOVERY	A-6(6)	
		3	4.0'	3 4 6	Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel. 15" RECOVERY	A-1-b	USDA Classification: Sand
6		4	6.0'	4 4 3 5	Saturated loose orangish tan coarse to fine sand w/some silt, trace of fine gravel. 7" RECOVERY	A-1-b	
		5	8.0'	6 5 6	Saturated medium dense tan coarse to fine sand w/some silt, trace of fine gravel. 21" RECOVERY	A-1-b	
9			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Well graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/26/2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
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 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.: SWM2-23-02

Contract: 25-113-01

Boring Location: Sta. 499+75, 175' Rt. C.L.

Boring Surface Elev.: + 62.7

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					8.0

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
1/26/2010		10.0	8.0	7.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/26/10	1	0.5'	2 2 4	Wet firm brown silty clay w/ some coarse to fine sand, trace of fine gravel.	A-6(6)	Topsoil - 8".
			2.0'		10" RECOVERY		USDA
3		2	2.0'	6 8 7 6	Wet medium dense brown coarse to fine sand w/ some silt, trace of fine gravel.	A-2-4(0)	Classifica : Loam
			4.0'		20" RECOVERY		
		3	4.0'	2 2 2 4	Saturated very loose tan coarse to fine sand w/ some silt, trace of fine gravel.	A-1-b	
6			6.0'		15" RECOVERY		
		4	6.0'	2 2 3 4	Saturated loose tan coarse to fine sand w/ some silt and fine gravel.	A-1-b	
			8.0'		22" RECOVERY		
9		5	8.0'	4 6	Saturated loose orange fine gravelly coarse to fine sand w/ some silt.	A-1-b	
			9.0'		10" RECOVERY		
		5A	9.0'	6 8	Saturated stiff orange clayey fine sandy silt w/ some coarse sand and fine gravel.	A-4(0)	
			10.0'		8" RECOVERY		
12					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/26/2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
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 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.: SWM2-24-01

Contract: 25-113-01

Boring Location: Sta. 408+10, 335' Rt. C.L.

Boring Surface Elev.: + 62.1

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 10.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 12/7/2009	Time	6.0	4.0	2.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/7/09	1	0.5'	1 2 2	Wet soft grayish orange fine sandy silt w/some clay, trace of coarse sand and fine gravel. 13" RECOVERY	A-4(1)	Topsoil - 6".
3		2	2.0'	3 7 6 5	Saturated medium dense grayish orange silty coarse to fine sand w/trace of fine gravel. 17" RECOVERY	A-2-4(0)	USDA Classification: Sandy Loam
		3	4.0'	3 3 4	Saturated loose grayish orange silty coarse to fine sand w/trace of fine gravel. 8" RECOVERY	A-2-4(0)	
6		4	6.0'	2 3 3 2	Saturated loose brown silty fine to coarse sand w/trace of fine gravel. 13" RECOVERY	A-2-4(0)	
		5	8.0'	2 3 2 2	Saturated loose brown coarse sand w/some fine sand and silt, trace of fine gravel. 5" RECOVERY	A-1-b	
9		6	10.0'	2 3 2 2	Saturated loose brown coarse sand w/some silt, trace of fine sand and fine gravel. 6" RECOVERY	A-1-b	
12			12.0'		End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/7/2009 using a 3 1/4-inch diameter continuous flight power 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 blows 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.: SWM2-24-02

Contract: 25-113-01

Boring Location: Sta. 409+40, 310' Rt. C.L.

Boring Surface Elev.: + 62.70

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 10.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	12/7/2009		6.0	4.0	3.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/7/09	1	0.5'	3 3 5	Wet firm orangish tan coarse sandy silt w/some fine sand and clay, trace of fine gravel.	A-4(0)	Topsoil - 6".
			2.0'		13" RECOVERY		
3		2	2.0'	3 8 10	Saturated very stiff orangish tan clayey fine sandy silt w/trace of coarse sand.	A-4(0)	USDA Classification: Sandy Loam
			4.0'		20" RECOVERY		
		3	4.0'	8 11 8 9	Saturated medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6			6.0'		18" RECOVERY		
		4	6.0'	2 5 4 4	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		20" RECOVERY		
9		5	8.0'	2 2 2 2	Saturated very loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		22" RECOVERY		
		6	10.0'	2 3 4 3	Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
12			12.0'		22" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/7/2009 using a 3 1/4-inch diameter continuous flight power 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 blows are uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-24-03

Contract: 25-113-01

Boring Location: STA. 412+47 237' Rt. C.L.

Boring Surface Elev.: + 64.7

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: 12.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
9/24/10		12.0	12.0	7.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/24/10	1	0.5'	13 10 10	Moist very stiff brown clayey fine sand w/ trace coarse sand and fine gravel. 7" RECOVERY	A-4(1)	Topsoil - 8". 10 YR - 7/6
3		2	2.0'	11 11 9	Moist very stiff brown coarse sandy silt w/ some fine sand. 15" RECOVERY	A-4(0)	10 YR - 7/6
		3	4.0'	8 10 10 9	Moist medium dense orange coarse to fine sand w/some silt, trace fine gravel. 20" RECOVERY	A-1-b	7.5 YR - 6/8
6		4	6.0'	7 7 6 7	Moist medium dense orange coarse to fine sand w/some silt, trace fine gravel and clay. 18" RECOVERY	A-1-b	7.5 YR - 6/8 USDA Classification : Loamy Sand
9		5	8.0'	3 4 4 3	Wet loose brown coarse sand w/some fine sand and silt, trace fine gravel. 15" RECOVERY	A-1-b	10 YR - 5/8
		6	10.0'	4 4 7 7	Wet medium dense brown coarse sand w/ some fine sand and silt, trace fine gravel. 18" RECOVERY	A-1-b	10 YR - 5/8
12			12.0'		End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silt



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 24, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-25-01

Contract: 25-113-01

Boring Location: STA. 424+43 212' Rt. C.L.

Boring Surface Elev.: + 70.2

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					12.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/21/10		12.0	12.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/21/10	1	0.5'	116 12 16	Moist very stiff brown silt w/some fine to coarse sand and clay, trace fine gravel.	A-4(1)	Topsoil - 7" 10 YR - 6/6
			2.0'		10" RECOVERY		
3		2	2.0'	13 10 13 15	Moist medium dense brown coarse to fine sand w/some silt, trace fine gravel.	A-2-4(0)	7.5 YR - 7/8
			4.0'		14" RECOVERY		
		3	4.0'	6 16 16 16	Moist dense tan coarse to fine sand w/trace silt and fine gravel.	A-1-b	10 YR - 8/8
6			6.0'		16" RECOVERY		
		4	6.0'	15 10 9 11	Moist medium dense tan fine to coarse sand w/some silt, trace clay and fine gravel.	A-2-4(0)	10 YR - 8/8 USDA Classification : Loamy Sand
			8.0'		21" RECOVERY		
9		5	8.0'	4 4 5	Moist loose brown fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	10 YR 6/8
			10.0'		17" RECOVERY		
		6	10.0'	7 4 5 6	Wet loose brown fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	10 YR - 6/8
12			12.0'		19" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 21, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-25-02

Contract: 25-113-01

Boring Location: STA. 428+39 210' Rt. C.L.

Boring Surface Elev.: + 66.7

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 12.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/21/10		12.0	12.0	7.7	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/21/10	1	1.0'	13 11	Moist very stiff brown clayey fine sandy silt w/some coarse sand, trace fine gravel.	A-4(0)	Topsoil - 9". 7.5 YR - 6/8
		2	2.0'	10 8 8 5	9" RECOVERY Moist medium dense orange coarse to fine sand w/some silt, trace fine gravel.	A-2-4(0)	7.5 YR - 5/8
3		3	4.0'	3 4 4 4	18" RECOVERY Moist loose brown coarse to fine sand w/some silt.	A-1-b	7.5 YR - 4/6
6		4	6.0'	3 2 3 3	17" RECOVERY Wet loose brown coarse to fine sand w/some silt, trace clay and fine gravel.	A-1-b	7.5 YR - 4/6 USDA Classification : Loamy Sand
9		5	8.0'	3 3 4 3	18" RECOVERY Wet loose brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	7.5 YR - 5/8
12		6	10.0'	3 4 4 4	15" RECOVERY Wet loose brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	7.5 YR - 5/8
15			12.0'		16" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 21, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-26-01

Contract: 25-113-01

Boring Location: STA. 477+61 181' Rt. C.L.

Boring Surface Elev.: + 68.8

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					12.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/24/10		12.0	12.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/24/10	1	0.5'	9 15 16	Moist medium dense brown coarse to fine sand w/some silt, trace fine gravel. 6" RECOVERY	A-1-b	Topsoil - 6". 10YR - 6/6
3		2	2.0'	14 16 18 21	Moist dense brown silty coarse to fine sand w/trace fine gravel. 18" RECOVERY	A-2-4(0)	10YR - 5/6
		3	4.0'	6 7 8 6	Moist medium dense brown coarse sand w/some silt, fine sand and fine gravel. 20" RECOVERY	A-1-b	10YR - 7/6
6		4	6.0'	6 5 4 4	Moist loose brown coarse to fine sand w/some silt and fine gravel. 18" RECOVERY	A-1-b	10YR - 6/8
9		5	8.0'	3 2 1 2	Moist very loose brown coarse sand w/some fine sand, fine gravel and silt, trace clay. 14" RECOVERY	A-1-b	10YR - 6/8 USDA Classification : Loamy Sand
		6	10.0'	2 2	Wet very loose brown coarse sand w/some fine sand and silt, trace fine gravel. 9" RECOVERY	A-1-b	10YR - 6/8
		6A	11.0'	2 2	Wet very loose orange fine sand w/some silt, trace coarse sand and fine gravel. 8" RECOVERY	A-2-4(0)	10YR - 5/8
12			12.0'		End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 24, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-26-02

Contract: 25-113-01

Boring Location: STA. 478+49 381' Rt. C.L.

Boring Surface Elev.: + 66.3

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					12.0

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
9/24/10		12.0	12.0	9.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/24/10	1	0.5'	10 10 15	Moist very stiff brown silt w/some fine gravel, trace fine to coarse sand.	A-4(0)	Topsoil - 5". 10 YR - 6/6
			2.0'		8" RECOVERY		
3		2	2.0'	12 20 21 17	Moist dense brown silty coarse to fine sand w/some fine gravel.	A-2-4(0)	10 YR - 6/6
			4.0'		15" RECOVERY		
		3	4.0'	9 10 11 12	Moist medium dense brown fine gravelly coarse sand w/some fine sand and silt.	A-1-b	10 YR - 6/8
6			6.0'		18" RECOVERY		
		4	6.0'	11 12 8 9	Moist medium dense tan coarse sand w/some fine gravel, fine sand and silt, trace clay.	A-1-b	10 YR - 7/6 USDA Classification : Loamy Sand
			8.0'		18" RECOVERY		
9		5	8.0'	4 5 5 4	Wet loose brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	10 YR - 6/6
			10.0'		19" RECOVERY		
		6	10.0'	3 3 4 6	Wet loose brown coarse sand w/some fine sand and silt, trace fine gravel.	A-1-b	10 YR - 6/6
12			12.0'		15" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 24, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-26-03

Contract: 25-113-01

Boring Location: STA. 480.38 217 Rt. C.L.

Boring Surface Elev.: + 67.0

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: 12.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
9/24/10		12.0	12.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/24/10	1	0.5'	8 11 16	Moist medium dense brown coarse sand and fine gravel w/some fine sand and silt. 7" RECOVERY	A-1-b	Topsoil - 5". 10YR - 6/6
3		2	2.0'	19 22 23 27	Moist dense brown fine gravelly fine sand w/some silt, trace coarse sand. 16" RECOVERY	A-2-4(0)	10YR - 5/6
		3	4.0'	17 13 9 8	Moist medium dense brown silty coarse sand w/some fine sand and fine gravel. 21" RECOVERY	A-1-b	10YR - 4/4
6		4	6.0'	12 13 10 11	Moist medium dense brown coarse sand w/some fine sand, fine gravel and silt, trace clay. 22" RECOVERY	A-1-b	10YR - 5/8 USDA Classification : Loamy Sand
9		5	8.0'	5 10 5 4	Moist medium dense brown fine to coarse sand w/some silt, trace fine gravel. 15" RECOVERY	A-2-4(0)	10YR - 6/4
		6	10.0'	7 6 5 6	Moist medium dense orangish brown coarse to fine sand w/trace silt and fine gravel. 18" RECOVERY	A-1-b	10YR - 5/4
12			12.0'		End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 24, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-26-04

Contract: 25-113-01

Boring Location: STA. 482+73 159' Rt. C.L.

Boring Surface Elev.: + 65.5

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To: 12.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/23/10		12.0	12.0	8.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/23/10	1	0.0'	13 18 28 30	Moist hard brown clayey coarse to fine sandy silt w/some fine gravel. 18" RECOVERY	A-4(0)	10 YR - 7/3
3		2	2.0'	12 18 18 13	Moist dense brown silty coarse to fine sand w/some fine gravel. 17" RECOVERY	A-1-b	10 YR - 6/8
6		3	4.0'	9 14 16 18	Moist medium dense brown coarse sand w/ some fine sand, fine gravel and silt. 19" RECOVERY	A-1-b	10 YR - 6/8
9		4	6.0'	8 5 4 3	Moist loose brown coarse to fine sand w/some silt and fine gravel, trace clay. 19" RECOVERY	A-2-4(0)	10 YR - 6/8 USDA Classification : Loamy Sand
12		5	8.0'	2 3 5 9	Wet loose brown coarse to fine sand w/some silt, trace fine gravel. 15" RECOVERY	A-1-b	10 YR - 6/8
		6	10.0'	7 14 14 16	Wet medium dense brown coarse sandy fine gravel w/some fine sand and silt. 4" RECOVERY	A-1-b	10 YR - 6/8
15			12.0'		End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 23, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-27-01

Contract: 25-113-01

Boring Location: STA. 419+16 242' Lt. C.L.

Boring Surface Elev.: + 70.0

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To: 12.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/21/10		12.0	12.0	9.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/21/10	1	0.0'	21 29 18 14	Moist hard brown clayey silt w/some fine gravel and fine to coarse sand.	A-4(0)	10YR - 3/6
			2.0'		19" RECOVERY		
3		2	2.0'	18 12	Moist very stiff brown clayey fine sandy silt w/some coarse sand, trace fine gravel.	A-4(1)	10YR - 3/6
		2A	3.0'		11" RECOVERY		
			3.0'	13 17	Moist medium dense orange silty fine to coarse sand w/trace clay and fine gravel.	A-2-4(0)	10YR - 6/8 USDA Classification : Sandy
		3	4.0'	5 5 5 6	12" RECOVERY	A-2-4(0)	Loam 10YR - 6/8
6			6.0'		17" RECOVERY		
		4	6.0'	12 11 15 12	Moist medium dense orange coarse sand w/ some fine sand and silt, trace fine gravel.	A-1-b	10YR - 6/8
			8.0'		20" RECOVERY		
9		5	8.0'	5 3 3 5	Wet loose brown coarse sand w/some fine sand and silt, trace fine gravel.	A-1-b	10YR - 7/6
			10.0'		10" RECOVERY		
		6	10.0'	6 5 5 5	Wet loose brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	10YR - 7/6
12			12.0'		19" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 21, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-27-02

Contract: 25-113-01

Boring Location: STA. 420+12 230' Lt. C.L.

Boring Surface Elev.: + 67.6

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 12.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/21/10		12.0	12.0	8.8	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/21/10		0.0'		No Sampling		Gravel/Asphalt - 24".
			2.0'		0" RECOVERY		
3		1	2.0'	14 13 14 9	Moist very stiff gray clayey silt w/some fine to coarse sand, trace fine gravel.	A-4(2)	7.5YR - 4/1
			4.0'		17" RECOVERY		
		2	4.0'	6 8 14 19	Wet very stiff brown silt w/some fine to coarse sand and clay, trace fine gravel.	A-4(3)	7.5YR - 5/2 USDA Classification : Silt Loam
6			6.0'		18" RECOVERY		
		3	6.0'	18 15 15 13	Wet medium dense brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	10YR - 4/6
			8.0'		19" RECOVERY		
9		4	8.0'	6 8 7 8	Wet medium dense brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	10YR - 6/8
			10.0'		16" RECOVERY		
		5	10.0'	6 6 5 7	Wet medium dense brown fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	10YR - 5/8
12			12.0'		16" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 21, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-27-03

Contract: 25-113-01

Boring Location: STA. 421+20 524 Lt. C.L.

Boring Surface Elev.: + 66.97

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: 10.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
12/17/10		8.0	8.0	7.7	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 10.0

No. of 2 in. Dia. Shelby Tubes:

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

Ft.;
Ft.;

No. of: Dia. U-Sample Boring:
Core Drilling in Rock: U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/17/10	1	0.5'	4 5 5	Wet firm brown clayey silt w/some fine to coarse sand, trace of fine gravel. 7" RECOVERY	A-4(4)	Topsoil - 6".
3		2	2.0'	6 7 7 8	Wet medium dense brown silty fine to coarse sand w/trace of fine gravel. 18" RECOVERY	A-2-4(0)	
		3	4.0'	3 4 6 3	Wet loose brown silty fine sand w/trace of coarse sand. 15" RECOVERY	A-2-4(0)	
6		4	6.0'	3 3 2 3	Saturated loose brown silty fine sand w/trace of coarse sand. 15" RECOVERY	A-2-4(0)	USDA Classification : Loamy Sand
9		5	8.0'	2 2 3	Saturated very loose brown fine to coarse sand w/some silt, trace of fine gravel. 16" RECOVERY	A-2-4(0)	
			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on December 17, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-27-04

Contract: 25-113-01

Boring Location: STA. 422+92 677 Lt. C.L.

Boring Surface Elev.: + 67.09

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 10.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	12/17/10		10.0	10.0	7.7	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/17/10	1	0.5'	3 3 3	Wet firm brown silty clay w/trace of coarse to fine sand and fine gravel. 8" RECOVERY	A-6(11)	Topsoil - 8".
3		2	2.0'	6 6 7 8	Wet stiff brown clayey coarse sandy silt w/ some fine sand, trace of fine gravel. 14" RECOVERY	A-4(0)	
		3	4.0'	4 9 7 8	Wet medium dense brown silty fine to coarse sand. 20" RECOVERY	A-2-4(0)	
6		4	6.0'	5 5 5 4	Saturated loose brown fine to coarse sand w/ some silt, trace of fine gravel and clay. 16" RECOVERY	A-2-4(0)	USDA Classification : Loamy Sand
9		5	8.0'	1 3 5 4	Saturated loose brown fine to coarse sand w/ some silt, trace of fine gravel. 14" RECOVERY	A-2-4(0)	
			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on December 17, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-28-01

Contract: 25-113-01

Boring Location: Sta. 298+69 285 Rt. C.L.

Boring Surface Elev.: + 61.2

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: 12.0

Water Level Readings
Date 9/22/10
Time

Depth of Hole 12.0

Depth of Casing 12.0

Depth of Water Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 12.0
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: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/22/10	1	0.5'	9 9 10	Moist very stiff brown fine sandy silt w/some coarse sand and clay. 11" RECOVERY	A-4(0)	Topsoil - 7". 10 YR - 4/6 USDA Classification : Loam
3		2	2.0'	8 8 8 7	Moist medium dense brown silty fine sand w/ some coarse sand and clay. 16" RECOVERY	A-2-4(0)	7.5 YR - 5/6
		3	4.0'	5 10 11 11	Moist medium dense brown silty fine to coarse sand w/trace fine gravel. 18" RECOVERY	A-2-4(0)	7.5 YR - 5/6
6		4	6.0'	11 7 8 7	Moist medium dense orange silty fine sand w/ some coarse sand, trace fine gravel. 19" RECOVERY	A-2-4(0)	10 YR - 5/6
		5	8.0'	3 5 6 6	Moist medium dense orange coarse to fine sand w/some silt, trace fine gravel. 17" RECOVERY	A-2-4(0)	10 YR 5/6
9		6	10.0'	6 8 9 7	Moist medium dense brown fine to coarse sand w/some silt, trace fine gravel. 19" RECOVERY	A-2-4(0)	10 YR - 5/6
12			12.0'		End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 22, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-28-02

Contract: 25-113-01

Boring Location: STA. 298+89 154' Rt. C.L.

Boring Surface Elev.: + 60.7

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					12.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/22/10		12.0	12.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/22/10	1	0.5'	9 9 10	Moist very stiff brown coarse to fine sandy silt w/some clay, trace fine gravel. 9" RECOVERY	A-4(0)	Topsoil - 8". 10 YR - 6/8
3		2	2.0'	11 9 10 11	Moist medium dense brown silty fine to coarse sand. 18" RECOVERY	A-2-4(0)	10 YR - 6/8
		3	4.0'	9 6 5 7	Moist medium dense brown coarse to fine sand w/some silt, trace fine gravel. 15" RECOVERY	A-1-b	10 YR - 6/8
6		4	6.0'	12 7 6 6	Moist medium dense brown fine to coarse sand w/some fine gravel and silt. 20" RECOVERY	A-2-4(0)	10 YR - 6/8
9		5	8.0'	4 4 5 6	Wet loose brown coarse to fine sand w/some silt, trace clay. 16" RECOVERY	A-2-4(0)	10 YR - 6/8 USDA Classification : Loamy Sand
		6	10.0'	9 7 7 5	Wet medium dense orange silty coarse to fine sand w/trace fine gravel. 18" RECOVERY	A-2-4(0)	7.5 YR - 5/8
12			12.0'		End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 22, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-29-01

Contract: 25-113-01

Boring Location: STA. 298+41 273' Rt. C.L.

Boring Surface Elev.: + 52.6

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 12.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/22/10		12.0	12.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/22/10	1	0.5'	7 14 16	Moist very stiff brown clayey fine sandy silt w/some coarse sand. 7" RECOVERY	A-4(0)	Topsoil - 8". 7.5 YR - 5/6
3		2	2.0'	15 15 15	Moist medium dense brown coarse to fine sand w/some silt. 15" RECOVERY	A-2-4(0)	10 YR - 6/8
		3	4.0'	9 11 12 10	Moist very stiff brown fine sandy silt w/some coarse sand, trace clay. 20" RECOVERY	A-4(0)	10 YR - 6/8
6		4	6.0'	12 9 13 8	Moist medium dense brown silty coarse to fine sand w/trace fine gravel. 15" RECOVERY	A-2-4(0)	10 YR - 6/8
		5	8.0'	9 10 10 10	Moist medium dense brown coarse to fine sand w/some silt, trace fine gravel and clay. 16" RECOVERY	A-2-4(0)	5 YR - 5/6 USDA Classification : Loamy Sand
9		6	10.0'	7 9 10 10	Moist medium dense brown coarse sand w/ some fine sand and fine gravel, trace silt. 15" RECOVERY	A-1-b	5 YR - 5/6
12			12.0'		End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 22, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-29-02

Contract: 25-113-01

Boring Location: STA. 299+26 185 Rt. C.L.

Boring Surface Elev.: +49.9

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: 12.0

Water Level Readings
Date 9/22/10
Time

Time

Depth of Hole
12.0

Depth of Casing
12.0

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 12.0
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: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/22/10	1	1.0'	15 23	Moist very stiff brown coarse to fine sandy clay w/some silt, trace fine gravel.	A-6(3)	Topsoil - 9" 10 YR - 6/6
		2	2.0'	11 13 20 27	8" RECOVERY Moist dense brown coarse sand and fine gravel w/some fine sand and silt.	A-1-b	10 YR - 6/6
3			4.0'		10" RECOVERY		
		3	4.0'	6 8 8 11	Moist medium dense brown coarse to fine sand and fine gravel w/some silt.	A-1-b	5 YR - 4/6
6			6.0'		18" RECOVERY		
		4	6.0'	10 9 11 16	Wet medium dense brown fine to coarse sand w/some clay, trace silt.	A-2-4(0)	5 YR - 4/6 USDA Classification : Loamy Sand
			8.0'		18" RECOVERY		
9		5	8.0'	6 9 12 15	Wet medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	5 YR - 5/6
			10.0'		20" RECOVERY		
		6	10.0'	7 9 9 12	Wet medium dense brown silty coarse to fine sand.	A-2-4(0)	5 YR - 5/6
12			12.0'		20" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 22, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-30-01

Contract: 25-113-01

Boring Location: STA. 56+90 242' Rt. C.L.

Boring Surface Elev.: + 62.9

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: 12.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
9/23/10		12.0	12.0	8.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/23/10	1	0.5'	6 14 20	Moist very stiff gray clayey fine gravelly silt w/trace fine to coarse sand. 10" RECOVERY	A-4(3)	Topsoil - 6". 2.5 YR - 7/1
3		2	2.0'	18 20 18 18	Moist dense brown coarse to fine sand and fine gravel w/some silt. 14" RECOVERY	A-1-b	7.5 YR - 5/8
		3	4.0'	11 14 15 11	Sample Missing		7.5 YR - 6/4
6		4	6.0'	11 12 15 15	Moist medium dense brownish tan coarse to fine sand w/some fine gravel and clay, trace silt. 18" RECOVERY	A-2-6(0)	7.5 YR - 6/4 USDA Classification : Sandy Loam
9		5	8.0'	1 3 4 6	Saturated firm brownish green fine sandy clay w/some silt and coarse sand, trace fine gravel. 20" RECOVERY	A-7-6(8)	10 YR - 4/2
		6	10.0'	5 5 4 5	Saturated stiff brownish green fine sandy clay w/some silt and coarse sand, trace fine gravel. 9" RECOVERY	A-7-6(4)	10 YR - 4/2
12			12.0'		End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 23, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-30-02

Contract: 25-113-01

Boring Location: STA. 59+25 223' Rt. C.L.

Boring Surface Elev.: + 64.1

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 12.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/23/10		12.0	12.0	7.4	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/23/10	1	0.5'	5 5 9	Wet stiff gray silty clay w/trace fine sand and fine gravel. 10" RECOVERY	A-6(23)	Topsoil - 6". 7.5 YR - 7/1
3		2	2.0'	7 7 12 16	Wet very stiff gray clayey silt w/some fine gravel, trace fine to coarse sand. 14" RECOVERY	A-4(5)	7.5 YR - 7/1
6		3	4.0'	12 18 16 18	Wet dense grayish brown fine gravelly coarse sand w/some fine sand, trace silt and clay. 18" RECOVERY	A-1-b	10 YR - 6/2 USDA Classification : Sand
9		4	6.0'	14 15 18 18	Wet dense brown coarse sand w/some fine sand, fine gravel and silt. 17" RECOVERY	A-1-b	10 YR - 6/3
12		5	8.0'	4 6 6 6	Wet medium dense gray coarse to fine sand w/some silt and fine gravel. 16" RECOVERY	A-1-b	10 YR - 6/2
		6	10.0'	6 16 9 7	Wet medium dense gray fine to coarse sand and fine gravel w/some silt. 12" RECOVERY	A-1-b	10 YR - 6/2
15			12.0'		End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 23, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 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.: SWM2-3-01

Contract: 25-113-01

Boring Location: Sta. 313+50, 310' LT C.L.

Boring Surface Elev.: + 51.14

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: 16.0

Water Level Readings
Date

Time

Depth of Hole
16.0

Depth of Casing
14.0

Depth of Water
10.7

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: B. Holden

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/24/09	1	0.5'	4 5 4	Moist stiff brown fine sandy silt w/some clay and coarse sand, trace of gravel.	A-4(1)	Topsoil - 3".
			2.0'		18" RECOVERY		
3.5		2	2.0'	5 7 10 11	Moist medium dense brown coarse to fine sand w/some gravel and silt.	A-1-b	
			4.0'		18" RECOVERY		
		3	4.0'	6 7 9 13	Moist stiff brown coarse sandy silt w/some clay and gravel, trace of fine sand.	A-4(0)	
			6.0'		22" RECOVERY		
7		4	6.0'	13 14 20 22	Moist dense brown coarse to fine sand w/trace of silt and gravel.	A-1-b	
			8.0'		22" RECOVERY		
		5	8.0'	9 12 10 14	Moist medium dense dark brown clayey fine to coarse sand w/trace of gravel.	A-2-4(0)	
			10.0'		17" RECOVERY		
10.5		6	10.0'	11 12 14 18	Wet medium dense dark brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			12.0'		22" RECOVERY		
		7	12.0'	10 14 18 20	wet dense dark brown clayey fine to coarse sand w/trace of gravel.	A-2-4(0)	
14			14.0'		23" RECOVERY		
		8	14.0'	8 13 17 23	Wet medium dense dark brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			16.0'		24" RECOVERY		
		9	16.0'	8 12 17 22	Wet medium dense dark brown fine to coarse sand w/some silt.	A-2-4(0)	
17.5			18.0'		24" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded clayey
silty sand



Well graded sand
with silt



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/24/2009 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
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 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.: SWM2-3-01A

Contract: 25-113-01

Boring Location: Sta. 313+50, 310' LT C.L.

Boring Surface Elev.: + 51.14

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: 16.0

Water Level Readings
Date

Time

Depth of Hole
16.0

Depth of Casing
14.0

Depth of Water
12.4

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: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/20/09	1	1.0'	6 7	Moist stiff brown silty clay w/trace of fine to coarse sand and fine gravel. 9" RECOVERY	A-6(10)	Topsoil - 10".
		2	2.0'	8 16 16 18	Moist hard brown fine to coarse sandy silt w/trace of fine gravel.	A-4(0)	USDA Classifica- - Silty Loam
3.5			4.0'		14" RECOVERY		
		3	4.0'	6 6 14 17	Moist medium dense brown silty coarse to fine sand w/some fine gravel.	A-1-b	
			6.0'		15" RECOVERY		
7		4	6.0'	11 11 13 14	Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		20" RECOVERY		
		5	8.0'	11 13 14 12	Moist medium dense brown fine gravelly coarse sand w/some silt and fine sand.	A-1-b	
			10.0'		17" RECOVERY		
10.5		6	10.0'	13 7 9 10	Wet medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			12.0'		16" RECOVERY		
		7	12.0'	9 9 12 12	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
14			14.0'		19" RECOVERY		
		8	14.0'	9 9 15 17	Wet medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
			16.0'		19" RECOVERY		
		9	16.0'	9 16 19 24	Wet dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
17.5			18.0'		23" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
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 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.: SWM2-3-02

Contract: 25-113-01

Boring Location: Sta. 314+10, 225' LT C.L.

Boring Surface Elev.: + 51.50

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 16.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			18.0	16.0	13.0	

Pay Quantities:

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

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: Bill Holden

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/24/09	1	0.5'	2 2 3	Moist firm brown clayey silt w/some fine sand, trace of coarse sand and gravel.	A-4(5)	Topsoil - 3"
		2	2.0'	6 8 8 10	Moist medium dense brown silty fine to coarse sand w/some gravel.	A-2-4(0)	
4		3	4.0'	9 9 11 13	Moist medium dense brown silty gravel and coarse to fine sand.	A-2-4(0)	
		4	6.0'	9 10 8 9	Moist medium dense coarse sand w/some fine sand, silt and gravel.	A-1-b	
8		5	8.0'	5 5 2 2	Moist loose brown coarse to fine sand w/trace of clay and gravel.	A-2-4(0)	
		6	10.0'	3 2 2 3	Wet very loose brown fine to coarse sand w/some silt.	A-2-4(0)	
12		7	12.0'	4 5 5 6	Wet loose brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
		8	14.0'	9 11 12 11	Wet medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
16		9	16.0'	10 12 14 20	wet medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			18.0'		End of Boring		
20							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/24/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 45.
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.: SWM2-3-02A

Contract: 25-113-01

Boring Location: Sta. 314+10, 225' LT C.L.

Boring Surface Elev.: + 51.50

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.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 16.0

Water Level Readings
Date

Time

Depth of Hole
18.0

Depth of Casing
16.0

Depth of Water
11.9

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: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/20/09	1	1.0' 2.0'	5 7	Moist stiff brown silty clay w/some fine to coarse sand, trace of fine gravel.	A-6(6)	Topsoil - 10"
		2	2.0'	6 8 10 13	8" RECOVERY Moist very stiff brown fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(0)	
4		3	4.0' 4.0'	15 21 21 17	16" RECOVERY Moist dense brown fine gravelly coarse to fine sand w/trace of silt.	A-1-b	
		4	6.0'	13 16 14 13	10" RECOVERY Moist medium dense brownish tan coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
8		5	8.0' 8.0'	5 6 7 7	18" RECOVERY Moist medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
		6	10.0'	4 5 6 4	12" RECOVERY Wet medium dense tan fine to coarse sand w/trace of silt and clay.	A-2-4(0)	USDA Classifica - Sand
12		7	12.0'	3 6 8 5	18" RECOVERY Wet medium dense tan fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
		8	14.0'	6 13 10 14	12" RECOVERY Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
16		9	16.0'	9 18 32 34	16" RECOVERY Wet very dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			18.0'		23" RECOVERY		
20					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
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 recomendations 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.: SWM2-3-03

Contract: 25-113-01

Boring Location: Sta. 315+75, 200 LT' C.L.

Boring Surface Elev.: + 52.10

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: 16.0

Water Level Readings
Date

Time

Depth of Hole
18.0

Depth of Casing
16.0

Depth of Water
12.1

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: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/20/09	1	1.0' 2.0'	6 7	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(4)	Topsoil - 10"
		2	2.0'	6 8 12 14	11" RECOVERY Moist medium dense brown clayey fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
4		3	4.0' 4.0'	5 6 7 8	20" RECOVERY Moist firm tan fine sandy silt w/some coarse sand and clay.	A-4(0)	
		4	6.0'	8 10 13 13	15" RECOVERY Moist medium dense orange fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
8		5	8.0' 8.0'	8 7 7 6	18" RECOVERY Moist medium dense tan fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
		6	10.0'	8 6 7 9	18" RECOVERY Wet medium dense brown fine to coarse sand w/trace of clay, silt and fine gravel.	A-2-4(0)	USDA Classifica - Loamy Sand
12		7	12.0'	6 11 12 13	12" RECOVERY Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
		8	14.0'	8 10 13 17	18" RECOVERY Wet medium dense brown fine to coarse sand w/trace of silt.	A-3	
16		9	16.0'	8 22 32 44	23" RECOVERY Wet hard brown fine sandy silt w/some coarse sand.	A-4(0)	
			18.0'		24" RECOVERY End of Boring		
20							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt



Silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
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 recomendations 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: US 301 Maryland State Line to SR-1

Boring No.: SWM2-3-04

Contract: 25-113-01

Boring Location: STA. 318+74 152' Lt. C.L.

Boring Surface Elev.: + 54.8

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	
	Hollow Stem Auger:		From Depth of:		To:	12.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/20/10		12.0	12.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/20/10	1	0.5'	14 12 15	Moist very stiff brown clayey silt w/some fine sand, trace coarse sand and fine gravel. 8" RECOVERY	A-4(4)	Topsoil - 6". 7.5YR - 6/6
3		2	2.0'	23 27 19 13	Moist dense brown coarse to fine sand w/ some silt, trace fine gravel. 14" RECOVERY	A-1-b	7.5YR - 6/8
		3	4.0'	5 12 12 9	Moist medium dense brown fine to coarse sand w/some silt, trace fine gravel. 15" RECOVERY	A-2-4(0)	10YR - 4/6
6		4	6.0'	10 10 8 10	Moist very stiff brownish gray fine sandy silt w/some coarse sand and fine gravel, trace clay. 18" RECOVERY	A-4(0)	10YR - 6/2
9		5	8.0'	6 9 8 9	Moist medium dense tan silty fine to coarse sand w/trace fine gravel. 16" RECOVERY	A-2-4(0)	10YR - 7/4
		6	10.0'	10 8 7 5	Moist medium dense orange fine to coarse sand w/trace silt, clay and fine gravel. 8" RECOVERY	A-2-4(0)	10YR - 6/8 USDA Classification : Sand
12			12.0'		End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 20, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-3-05

Contract: 25-113-01

Boring Location: STA. 323+56 142' Lt. C.L.

Boring Surface Elev.: + 56.7

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: 12.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
9/22/10		12.0	12.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/22/10	1	0.5'	9 11 15	Moist very stiff brown clayey fine sandy silt w/some coarse sand.	A-4(3)	Topsoil - 7". 7.5YR - 5/6 USDA Classification : Loam
			2.0'		11" RECOVERY		
3		2	2.0'	8 10 12 14	Moist medium dense brown fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	7.5YR - 6/8
			4.0'		15" RECOVERY		
		3	4.0'	8 18 20 20	Moist dense brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	7.5YR - 6/8
6			6.0'		16" RECOVERY		
		4	6.0'	12 8 9 10	Moist medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	7.5YR - 6/8
			8.0'		22" RECOVERY		
9		5	8.0'	4 8 7 7	Moist medium dense silty fine to coarse sand w/trace fine gravel.	A-2-4(0)	7.5YR - 6/8
			10.0'		17" RECOVERY		
		6	10.0'	5 5 5 4	Moist loose brown fine to coarse sand w/some silt.	A-2-4(0)	7.5YR - 6/8
12			12.0'		18" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 22, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-3-05*

Contract: 25-113-01

Boring Location: STA. 323+56 142' Lt. C.L.

Boring Surface Elev.: + 57.0

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To: 15.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	12/17/10		15.0	15.0	12.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	15.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/17/10	1	0.5'	4 3 4	Wet firm brown clayey fine sandy silt w/some coarse sand. 8" RECOVERY	A-4(3)	Topsoil - 8".
3		2	2.0'	4 4 6 6	Wet loose brown silty fine to coarse sand w/ trace of fine gravel. 16" RECOVERY	A-2-4(0)	
6		3	4.0'	9 13 11 12	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel. 15" RECOVERY	A-1-b	
9		4	6.0'	12 10 9 9	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel. 18" RECOVERY	A-2-4(0)	
12		5	8.0'	6 7 6 6	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel. 20" RECOVERY	A-2-4(0)	
15		6	10.0'	6 6 6 6	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel. 18" RECOVERY	A-2-4(0)	
		7	12.0'	3 3 3	Wet loose brown fine to coarse sand w/some silt, trace of clay. 15" RECOVERY	A-2-4(0)	USDA Classification : Sand
		8	13.5'	6 6 6	Wet medium dense brown coarse to fine sand w/some fine gravel, trace of silt. 10" RECOVERY	A-1-b	
			15.0'		End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on December 17, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-3-06

Contract: 25-113-01

Boring Location: STA. 314+02 134' Lt. C.L.

Boring Surface Elev.: + 50.3

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 12.0

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date						
9/20/10			10.0	10.0	9.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/20/10	1	0.5'	15 12 13	Moist very stiff brown fine sandy silt w/some coarse sand, fine gravel and clay. 9" RECOVERY	A-4(0)	Topsoil - 8". 7.5 YR - 6/6
3		2	2.0'	10 12 14 13	Moist medium dense brown fine to coarse sand w/some silt, trace fine gravel. 18" RECOVERY	A-2-4(0)	7.5 YR - 5/3
		3	4.0'	5 7 6 6	Moist medium dense orange silty fine to coarse sand w/some fine gravel. 18" RECOVERY	A-2-4(0)	10 YR - 6/8
6		4	6.0'	5 5 4 3	Moist loose orange fine to coarse sand w/trace silt, clay and fine gravel. 18" RECOVERY	A-2-4(0)	10 YR - 6/8 USDA Classification : Sand
9		5	8.0'	1 1 2	Moist very loose orange fine to coarse sand w/trace silt and fine gravel. 16" RECOVERY	A-3	10 YR - 6/8
		6	10.0'	1 4	Wet loose orange fine to coarse sand w/some silt, trace fine gravel. 6" RECOVERY	A-2-4(0)	10 YR - 6/8
		6A	11.0'	8 9	Wet medium dense brown silty fine to coarse sand w/trace fine gravel. 12" RECOVERY	A-2-4(0)	7.5 YR - 4/4
12			12.0'		End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 20, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-31-01

Contract: 25-113-01

Boring Location: STA. 22+27 98' Rt. C.L.

Boring Surface Elev.: + 67.4

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: 12.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
9/23/10		12.0	12.0	8.2	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/23/10	1	0.5'	8 12 13	Moist very stiff tan silt w/ some clay, trace fine to coarse sand.	A-4(6)	Topsoil - 8". 10 YR - 7/6 USDA Classification : Silt
			2.0'		9" RECOVERY		
3		2	2.0'	11 17 11 8	Moist medium dense tan clayey fine sand and fine gravel w/some silt and coarse sand.	A-2-4(0)	Loam 10 YR - 7/6
			4.0'		18" RECOVERY		
		3	4.0'	7 9 10 7	Moist medium dense tan clayey fine sand w/ some silt and fine gravel, trace coarse sand.	A-2-4(0)	10 YR - 6/6
6			6.0'		13" RECOVERY		
		4	6.0'	7 6 7 7	Wet medium dense brown silty fine to coarse sand w/trace fine gravel.	A-2-4(0)	7.5 YR - 6/8
			8.0'		18" RECOVERY		
9		5	8.0'	3 4 4 5	Wet loose tan silty fine to coarse sand w/trace fine gravel.	A-2-4(0)	10 YR - 7/6
			10.0'		19" RECOVERY		
		6	10.0'	5 5 4 3	Wet loose brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	7.5 YR - 5/8
12			12.0'		18" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 23, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-31-02

Contract: 25-113-01

Boring Location: STA. 23+25 140' Rt. C.L.

Boring Surface Elev.: + 69.2

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	
	Hollow Stem Auger:		From Depth of:		To:	12.0

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
9/22/10		12.0	12.0	8.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/22/10	1	0.5'	9 10 12	Moist very stiff brown fine sandy silt w/some clay and coarse sand, trace fine gravel.	A-4(0)	Topsoil - 7". 7.5 YR - 6/3 USDA Classification : Loam
			2.0'		8" RECOVERY		
3		2	2.0'	8 10 10 8	Moist medium dense brown silty fine sand w/ some coarse sand, trace fine gravel.	A-2-4(0)	7.5 YR - 6/3
			4.0'		14" RECOVERY		
		3	4.0'	8 7 8 7	Moist medium dense brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	7.5 YR - 6/6
6			6.0'		15" RECOVERY		
		4	6.0'	5 3 3 3	Moist loose brown fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	7.5 YR - 5/8
			8.0'		17" RECOVERY		
9		5	8.0'	2 4 6 5	Wet loose brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	5 YR - 5/8
			10.0'		17" RECOVERY		
		6	10.0'	6 10 10 12	Wet medium dense brown silty fine to coarse sand w/trace fine gravel.	A-2-4(0)	5 YR - 5/8
12			12.0'		18" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 22, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-33-01

Contract: 25-113-01

Boring Location: STA. 6+43 281' Rt. C.L.

Boring Surface Elev.: + 62.04

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 10.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	12/17/10		8.0	8.0	3.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/17/10	1	0.5'	2 3 7	Moist firm gray fine sandy silt w/some coarse sand and clay, trace of fine gravel. 12" RECOVERY	A-4(0)	Topsoil - 6".
3		2	2.0'	13 10 7 11	Moist medium dense gray silty fine to coarse sand w/trace of fine gravel. 18" RECOVERY	A-2-4(0)	
		3	4.0'	3 6 6 7	Wet medium dense gray coarse to fine sand w/some silt, trace of fine gravel and clay. 16" RECOVERY	A-2-4(0)	USDA Classification : Loamy Sand
6		4	6.0'	4 6 5 5	Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel. 18" RECOVERY	A-1-b	
		5	8.0'	6 6 8 9	Wet medium dense orange fine to coarse sand w/some silt. 12" RECOVERY	A-2-4(0)	
9			10.0'		End of Boring		
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on December 17, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is an ATV 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 blows 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.: SWM2-4-01

Contract: 25-113-01

Boring Location: Sta. 317+75, 240 RT' C.L.

Boring Surface Elev.: + 47.87

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	
	Hollow Stem Auger:		From Depth of:		To:	14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			16.0	14.0	6.0	

Pay Quantities:

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

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: Bill Holden

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/24/09	1	0.5'	5 5	Moist loose brown silty fine to coarse sand w/some gravel.	A-2-4(0)	Topsoil - 3".
			2.0'		18" RECOVERY		
		2	2.0'	6 6 7	Moist medium dense brown coarse to fine sand w/some silt, trace of gravel.	A-2-4(0)	
4			4.0'		23" RECOVERY		
		3	4.0'	4 6 7	Moist medium dense brown silty coarse to fine sand w/trace of gravel.	A-1-b	
			6.0'		21" RECOVERY		
		4	6.0'	5 4 3 3	Wet loose brown coarse to fine sand w/some silt, trace of gravel.	A-1-b	
8			8.0'		23" RECOVERY		
		5	8.0'	2 2 2 2	Wet very loose brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			10.0'		24" RECOVERY		
		6	10.0'	2 6 9 11	Wet medium dense dark brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
12			12.0'		24" RECOVERY		
		7	12.0'	1 8 8 10	Wet medium dense dark brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			14.0'		24" RECOVERY		
		8	14.0'	5 7 12 10	Wet medium dense dark brown fine to coarse sand w/some silt.	A-2-4(0)	
16			16.0'		24" RECOVERY		
					End of Boring		
20							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/24/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 45.
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.: SWM2-4-01A

Contract: 25-113-01

Boring Location: Sta. 317+75, 240' RT C.L.

Boring Surface Elev.: +47.87

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: 14.0

Water Level Readings
Date

Time

Depth of Hole
16.0

Depth of Casing
14.0

Depth of Water
5.1

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: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/19/09	1	1.0'	4 4	Moist loose brown fine gravelly fine to coarse sand w/some silt, trace of clay.	A-2-4(0)	Topsoil - 10"
		2	2.0'	4 4 3 3	12" RECOVERY Moist loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	USDA Classifica - Loamy Sand
3			4.0'		17" RECOVERY		
		3	4.0'	4 5 4 3	Wet loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6			6.0'		13" RECOVERY		
		4	6.0'	3 5 3 3	Saturated loose tan coarse to fine and w/some silt, trace of fine gravel.	A-1-b	
			8.0'		18" RECOVERY		
9		5	8.0'	3 3 1 3	Saturated very loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		15" RECOVERY		
		6	10.0'	3 3 8 12	Saturated medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
12			12.0'		22" RECOVERY		
		7	12.0'	16 23 12 16	Saturated dense tan coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
			14.0'		24" RECOVERY		
15		8	14.0'	10 13 13 15	Saturated medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			16.0'		24" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
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 recomendations 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.: SWM2-4-02

Contract: 25-113-01

Boring Location: Sta. 319+20, 240' RT C.L.

Boring Surface Elev.: + 50.54

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 14.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			16.0	14.0	8.5	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/19/09	1	0.0'	2 3 5 10	Moist firm brown fine to coarse sandy silt w/trace of fine gravel.	A-4(0)	
			2.0'		14" RECOVERY		
3		2	2.0'	7 8 7	Moist medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			4.0'		17" RECOVERY		
		3	4.0'	3 3 4 3	Wet loose brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
6			6.0'		19" RECOVERY		
		4	6.0'	5 4 4 5	Wet loose brown coarse to fine sand w/trace of fine gravel, silt and clay.	A-1-b	USDA Classifica - Sand
			8.0'		16" RECOVERY		
9		5	8.0'	3 3 5	Saturated loose brown coarse sand w/some fine sand and fine gravel, trace of silt.	A-1-b	
			10.0'		24" RECOVERY		
		6	10.0'	4 3 2 1	Saturated loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
12			12.0'		15" RECOVERY		
		7	12.0'	1 2 2 4	Saturated very loose brownish tan fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
			14.0'		23" RECOVERY		
15		8	14.0'	3 6 8 16	Saturated medium dense brown silty fine sand w/trace of coarse sand and fine gravel.	A-2-4(0)	
			16.0'		24" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
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 recomendations 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.: SWM2-5-02

Contract: 25-113-01

Boring Location: Sta. 345+00, 225' LT C.L.

Boring Surface Elev.: + 61.56

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: 14.0

Water Level Readings
Date

Time

Depth of Hole
16.0

Depth of Casing
14.0

Depth of Water
12.0

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: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/18/09	1	0.5'	3 5 4	Moist firm brown clayey silt w/some fine to coarse sand.	A-4(5)	Topsoil - 5".
			2.0'		14" RECOVERY		
3		2	2.0'	8 11 10 11	Moist medium dense brown coarse to fine sand w/some silt and fine gravel.	A-1-b	
			4.0'		19" RECOVERY		
		3	4.0'	4 10 9 7	Moist medium dense brown silty coarse sand w/some fine sand, trace of fine gravel.	A-1-b	
6			6.0'		18" RECOVERY		
		4	6.0'	6 5 7 6	Moist medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		23" RECOVERY		
9		5	8.0'	2 2 2 3	Moist very loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		19" RECOVERY		
		6	10.0'	2 1 2 3	Wet very loose brown coarse to fine sand w/trace of silt, clay and fine gravel.	A-1-b	USDA Classifica - Sand
12			12.0'		11" RECOVERY		
		7	12.0'	1 2 1 2	Wet very loose orange fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
			14.0'		20" RECOVERY		
15		8	14.0'	6 7 8 7	Wet medium dense orange fine sand w/some silt, coarse sand and fine gravel.	A-2-4(0)	
			16.0'		20" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/18/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 45.
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: US 301 Maryland State Line to SR-1

Boring No.: SWM2-5-03

Contract: 25-113-01

Boring Location: STA. 344+62 166' Lt. C.L.

Boring Surface Elev.: + 60.9

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	12.0
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings						
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water	
9/20/10		10.0	10.0	8.5		

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/20/10	1	1.0'	24 28	Moist hard brown clayey silt w/some fine to coarse sand, trace fine gravel.	A-4(2)	Topsoil - 12". 7.5YR - 6/6
		2	2.0'	28 23 17 13	Moist dense brown fine gravelly coarse to fine sand w/some silt.	A-1-b	USDA Classification : Loam 7.5YR - 5/6
3			4.0'		16" RECOVERY		
		3	4.0'	5 6 5 5	Moist medium dense brown coarse to fine sand w/some silt.	A-1-b	10YR - 7/8
6			6.0'		17" RECOVERY		
		4	6.0'	5 5 5 5	Moist loose brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	10YR - 7/8
			8.0'		20" RECOVERY		
9		5	8.0'	2 6 7 5	Moist medium dense brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	10YR - 6/8
			10.0'		18" RECOVERY		
		6	10.0'	5 4 5 4	Wet loose brown coarse to fine sand w/some silt.	A-1-b	10YR - 6/8
12			12.0'		18" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 20, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-5-04

Contract: 25-113-01

Boring Location: STA. 346+90 166' Lt. C.L.

Boring Surface Elev.: + 64.4

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: 12.0

Water Level Readings

Date
9/20/10

Time

Depth of Hole
12.0

Depth of Casing
12.0

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 12.0

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: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/20/10	1	0.5'	14 16 16	Moist very stiff brown clayey silt w/some fine to coarse sand. 10" RECOVERY	A-4(4)	Topsoil - 6". 7.5 YR - 6/6 USDA Classification : Loam
		2	2.0'	7 12	Moist very stiff brown clayey fine sandy silt w/some coarse sand and fine gravel. 10" RECOVERY	A-4(1)	7.5 YR - 6/6
3		2A	3.0'	14 11	Moist medium dense brown clayey coarse to fine sand w/some silt, trace fine gravel. 8" RECOVERY	A-2-4(0)	7.5 YR - 6/8
		3	4.0'	7 9 12 10	Moist medium dense orange silty coarse to fine sand w/trace fine gravel. 16" RECOVERY	A-1-b	7.5 YR - 5/8
6		4	6.0'	10 9 11 12	Moist medium dense orange coarse sand w/some fine sand and silt, trace fine gravel. 19" RECOVERY	A-1-b	7.5 YR - 5/8
		5	8.0'	5 7 6 5	Moist medium dense orange coarse to fine sand w/some silt. 16" RECOVERY	A-1-b	7.5 YR - 5/8
9		6	10.0'	5 4 2 2	Moist loose orange coarse to fine sand w/some silt, trace fine gravel. 18" RECOVERY	A-1-b	7.5 YR - 5/8
12			12.0'		End of Boring		
15							

Remarks:





Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

	Low plasticity clay
	Clayey sand
	Poorly graded clayey silty sand
	Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 20, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 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.: SWM2-7-01

Contract: 25-113-01

Boring Location: Sta. 349+75, 210' LT C.L.

Boring Surface Elev.: + 62.13

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 12.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			14.0	12.0	10.0	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/7/09	1	0.5'	4 3 4	Moist loose brown silty coarse sand w/some fine sand, trace of fine gravel.	A-2-4(0)	Cultivated Soil - 5".
			2.0'		14" RECOVERY		
3		2	2.0'	4 4 3 4	Moist loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			4.0'		17" RECOVERY		
		3	4.0'	8 11 12 11	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6			6.0'		16" RECOVERY		
		4	6.0'	19 12 11 10	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		19" RECOVERY		
9		5	8.0'	4 6 7 10	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		16" RECOVERY		
		6	10.0'	4 6 8 2	Wet medium dense orange coarse to fine sand w/some silt.	A-2-4(0)	
12			12.0'		21" RECOVERY		
		7	12.0'	7 10 10 10	Wet medium dense orange fine sand w/some coarse sand, clay and silt.	A-2-4(0)	USDA Classifica - Sandy Loam
			14.0'		16" RECOVERY		
15					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: SWM2-7-02

Contract: 25-113-01

Boring Location: Sta. 351+00, 210' LT C.L.

Boring Surface Elev.: + 60.65

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 12.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			14.0	12.0	9.8	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/7/09	1	1.0'	2 3	Moist firm brown clayey coarse sandy silt w/some fine sand, trace of fine gravel.	A-4(0)	Cultivated Soil - 10"
3		2	2.0'	4 4 3 3	8" RECOVERY Moist loose orange silty coarse to fine sand.	A-1-b	
		3	4.0'	3 4 4	18" RECOVERY Moist loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6		4	6.0'	3 2 3 2	19" RECOVERY Moist loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
		5	8.0'	3 3 4	18" RECOVERY Wet loose orange coarse to fine sand w/some clay and silt, trace of fine gravel.	A-2-4(0)	USDA Classification - Sandy Loam
9		6	10.0'	8 6 6 4	12" RECOVERY Saturated medium dense orange fine gravelly coarse sand w/some fine sand and silt.	A-1-b	
12		7	12.0'	6 5 5 6	16" RECOVERY Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
15			14.0'		16" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continuous flight power 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: US 301 Maryland State Line to SR-1

Boring No.: SWM2-7-03

Contract: 25-113-01

Boring Location: STA. 349+09 353' Rt. C.L.

Boring Surface Elev.: + 64.7

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					12.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/20/10		12.0	12.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/20/10	1	1.0'	10 16	Moist very stiff brown clayey fine to coarse sandy silt w/trace fine gravel.	A-4(0)	Topsoil - 9" 7.5 YR - 4/6
		2	2.0'	10 9 10 11	8" RECOVERY Moist medium dense brown clayey fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	10 YR - 5/6
3		3	4.0'	6 7 10 10	15" RECOVERY Moist medium dense brown coarse sand w/ some fine sand, silt and fine gravel.	A-1-b	10 YR - 6/8
6		4	6.0'	10 9 10 8	18" RECOVERY Moist medium dense brown coarse to fine sand and fine gravel w/some silt.	A-1-b	10 YR - 6/8
9		5	8.0'	3 5 7 7	17" RECOVERY Moist medium dense orange fine to coarse sand w/some silt, trace clay and fine gravel.	A-2-4(0)	7.5 YR - 5/8 USDA Classification : Loamy Sand
		6	10.0'	9 7 6 5	18" RECOVERY Moist medium dense orange coarse sand w/ some fine sand and silt, trace fine gravel.	A-1-b	7.5 YR - 5/8
12			12.0'		20" RECOVERY End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 20, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-7-04

Contract: 25-113-01

Boring Location: STA. 351+23 272' Rt. C.L.

Boring Surface Elev.: + 62.5

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: 12.0

Water Level Readings

Date
9/20/10

Time

Depth of Hole
12.0

Depth of Casing
12.0

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 12.0

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: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/20/10	1	0.5'	8 11 10	Moist very stiff brown coarse to fine sandy clay w/some silt, trace fine gravel. 10" RECOVERY	A-6(2)	Topsoil - 8" 10 YR - 6/8
3		2	2.0'	11 7 6 4	Moist medium dense brown coarse sand w/ some fine sand and silt, trace fine gravel. 18" RECOVERY	A-1-b	10 YR - 6/6
		3	4.0'	3 3 3	Moist loose tan coarse to fine sand w/some silt, trace fine gravel. 16" RECOVERY	A-1-b	10 YR - 7/4
6		4	6.0'	3 2 2 2	Moist very loose tan coarse to fine sand w/ some silt and fine gravel, trace clay. 16" RECOVERY	A-1-b	10 YR - 7/4 USDA Classification : Loamy Sand
9		5	8.0'	1 2 1 1	Wet very loose tan coarse to fine sand w/ some silt, trace fine gravel. 14" RECOVERY	A-1-b	10 YR - 8/1
		6	10.0'	2 2 2 3	Wet very loose tan coarse to fine sand w/ some silt, trace fine gravel. 17" RECOVERY	A-1-b	10 YR - 8/1
12			12.0'		End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 20, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-7-05

Contract: 25-113-01

Boring Location: STA. 356+11 189' Lt. C.L.

Boring Surface Elev.: + 62.0

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: 12.0

Water Level Readings
Date 9/20/10
Time

Depth of Hole 10.0
Depth of Casing 10.0
Depth of Water 8.7
Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 12.0
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: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/20/10	1	0.5'	7 6 8	Moist stiff brown silt w/some clay, trace coarse to fine sand and fine gravel. 10" RECOVERY	A-4(3)	Topsoil - 8" 10 YR - 6/6
3		2	2.0'	8 9 10 13	Wet very stiff brown clayey silt w/trace fine to coarse sand. 18" RECOVERY	A-4(8)	10 YR - 6/6
		3	4.0'	10 17 17 16	Wet dense brown fine to coarse sand w/some silt, trace fine gravel. 16" RECOVERY	A-2-4(0)	7.5 YR - 7/8
6		4	6.0'	12 10 11 12	Wet medium dense orange coarse to fine sand w/some silt, trace clay. 21" RECOVERY	A-1-b	7.5 YR - 6/8 USDA Classification : Loamy Sand
9		5	8.0'	5 6 6 6	Wet medium dense orange coarse to fine sand w/some silt, trace fine gravel. 17" RECOVERY	A-1-b	7.5 YR - 6/8
		6	10.0'	6 4 4 4	Wet loose orange coarse to fine sand w/some silt, trace fine gravel. 20" RECOVERY	A-1-b	7.5 YR - 6/8
12			12.0'		End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 20, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-7-06

Contract: 25-113-01

Boring Location: STA. 362+79 222' Rt. C.L.

Boring Surface Elev.: + 55.3

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 6.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/21/10		6.0	6.0	2.4	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	6.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/21/10	1	0.0'	1 2 2 1	Wet very loose orange fine to coarse sand w/ some silt, trace clay and fine gravel.	A-2-4(0)	7.5YR - 5/8 USDA Classification : Loamy Sand
			2.0'		20" RECOVERY		
3		2	2.0'	1 1 2 2	Saturated very loose orange coarse to fine sand w/some silt, trace fine gravel.	A-1-b	7.5YR - 5/8
			4.0'		15" RECOVERY		
		3	4.0'	1 1 1 1	Saturated very loose brown coarse to fine sand w/some silt.	A-1-b	7.5YR - 5/6
6			6.0'		17" RECOVERY		
					End of Boring		
9							
12							
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 21, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 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.: SWM2-8-01

Contract: 25-113-01

Boring Location: Sta. 361+10, 190' LT C.L.

Boring Surface Elev.: + 60.69

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 10.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			12.0	10.0	7.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	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
3	7/7/09	1	1.0'	3 4	Moist firm orange silty clay w/some coarse to fine sand, trace of fine gravel.	A-6(9)	Cultivated Soil - 12"
		2	2.0'	14 12 14 11	12" RECOVERY Moist medium dense orange gravelly coarse sand w/some fine sand and silt.	A-1-b	
6	7/7/09	3	4.0'	6 10 9 10	15" RECOVERY Moist medium dense orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
		4	6.0'	8 3 5 5	17" RECOVERY Wet firm orange coarse to fine sandy silt w/some clay.	A-4(0)	USDA Classifica - Sandy Clay
9	7/7/09	5	8.0'	3 2 2 2	19" RECOVERY Saturated loose orangish brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	Loam
		6	10.0'	5 5 3 5	16" RECOVERY Saturated loose orangish brown coarse sand w/trace of fine sand, silt and fine gravel.	A-1-b	
12	7/7/09		12.0'		24" RECOVERY End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: SWM2-8-02

Contract: 25-113-01

Boring Location: Sta. 363+50' 190' LT C.L.

Boring Surface Elev.: + 60.13

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	
	Hollow Stem Auger:		From Depth of:		To:	10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			12.0	10.0	7.2	

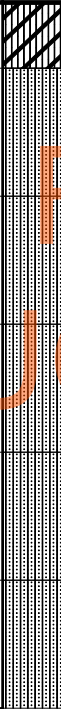
Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;	No. of U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	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
	7/7/09	1	1.0'	3 3		A-4(2)	Cultivated Soil - 10"
		2	2.0'	3 4 5 5		Moist firm gray clayey silt w/some coarse to fine sand, trace of fine gravel. 12" RECOVERY	
3			4.0'				
		3	4.0'	4 5 6 3	Moist loose grayish orange coarse to fine sand w/some silt, trace of fine gravel. 19" RECOVERY	A-2-4(0)	
6			6.0'				
		4	6.0'	4 4 6 5	Wet loose orange fine to coarse sand w/trace of silt and clay. 19" RECOVERY	A-2-4(0)	USDA Classifica - Loamy Sand
			8.0'				
9		5	8.0'	2 2 1 2	Saturated very loose orange coarse to fine sand w/some silt. 15" RECOVERY	A-2-4(0)	
			10.0'				
		6	10.0'	2 2 2 4	Saturated very loose orange coarse to fine sand w/some silt, trace of fine gravel. 20" RECOVERY	A-1-b	
12			12.0'				
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: SWM2-9-01

Contract: 25-113-01

Boring Location: Sta. 372+00, 180' LT C.L.

Boring Surface Elev.: + 64.55

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: 12.0

Water Level Readings
Date

Time

Depth of Hole
14.0

Depth of Casing
12.0

Depth of Water
10.7

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: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/8/09	1	0.5'	4 3 3	Moist firm brown clayey coarse sandy silt w/some fine sand, trace of fine gravel.	A-4(1)	Cultivated Soil - 5".
			2.0'		17" RECOVERY		
3		2	2.0'	5 6 6	Moist medium dense brown silty coarse sand w/some fine sand, trace of fine gravel.	A-1-b	
			4.0'		18" RECOVERY		
		3	4.0'	3 8 5	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
6			6.0'		18" RECOVERY		
		4	6.0'	4 3 2	Moist loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		18" RECOVERY		
9		5	8.0'	4 2 3 3	Wet loose orange coarse sand w/trace of silt, fine sand and fine gravel.	A-1-b	
			10.0'		15" RECOVERY		
		6	10.0'	3 2 3	Wet very loose orange coarse sand w/some fine sand, trace of silt, fine gravel and clay.	A-1-b	USDA Classifica - Sand
12			12.0'		20" RECOVERY		
		7	12.0'	4 2 3 3	Wet loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			14.0'		18" RECOVERY		
15					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/8/2009 using a 3 1/4- inch diameter continuous flight power 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 S.R. 1

Boring No.: SWM2-9-02

Contract: 25-113-01

Boring Location: Sta. 374+50, 180' LT C.L.

Boring Surface Elev.: + 65.12

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 12.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
			14.0	12.0	11.0	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/8/09	1	0.5'	3 5 6	Moist stiff brown silty clay w/some fine to coarse sand, trace of fine gravel.	A-6(6)	Cultivated Soil - 8".
			2.0'		9" RECOVERY		
3		2	2.0'	10 10 10	Moist medium dense gray silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			4.0'		16" RECOVERY		
		3	4.0'	8 7 7 7	Moist medium dense tan silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
6			6.0'		15" RECOVERY		
		4	6.0'	7 6 6 7	Moist medium dense orange coarse sand w/some silt and fine sand, trace of fine gravel.	A-1-b	
			8.0'		20" RECOVERY		
9		5	8.0'	8 7 4 4	Moist medium dense tan coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
			10.0'		13" RECOVERY		
		6	10.0'	4 4 5 5	Saturated loose tan coarse to fine sand w/trace of silt, fine gravel and clay.	A-1-b	USDA Classifica- Sand
12			12.0'		20" RECOVERY		
		7	12.0'	3 3 3 4	Saturated loose tan coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
			14.0'		17" RECOVERY		
15					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/8/2009 using a 3 1/4- inch diameter continuous flight power 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: US 301 Maryland State Line to SR-1

Boring No.: SWM2-9-03

Contract: 25-113-01

Boring Location: STA. 368+90 205' Lt. C.L.

Boring Surface Elev.: + 63.6

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 12.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/21/10		0.0	12.0	9.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/21/10	1	0.5'	7 9 11	Moist very stiff brown clayey fine sandy silt w/some coarse sand. 15" RECOVERY	A-4(4)	Topsoil - 6". 7.5 YR - 6/0
3		2	2.0'	12 16 13 12	Moist medium dense brown coarse to fine sand w/some silt, trace fine gravel. 16" RECOVERY	A-1-b	7.5 YR - 6/8
		3	4.0'	5 7 9 11	Moist medium dense brown coarse sand w/ some fine sand, fine gravel and silt. 16" RECOVERY	A-1-b	7.5 YR - 6/8 USDA Classification : Loamy Sand
6		4	6.0'	7 7 7 8	Moist medium dense brown coarse sand w/ some silt, fine sand and fine gravel. 18" RECOVERY	A-1-b	7.5 YR - 6/8
9		5	8.0'	1 3 2 3	Moist loose brown coarse sand w/some fine sand and silt, trace fine gravel. 15" RECOVERY	A-1-b	7.5 YR - 5/8
		6	10.0'	2 2 3 3	Wet loose brown coarse to fine sand w/some silt, trace fine gravel. 18" RECOVERY	A-2-4(0)	7.5 YR - 5/8
12			12.0'		End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 21, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-9-04

Contract: 25-113-01

Boring Location: STA. 370+62 141' Lt. C.L.

Boring Surface Elev.: + 64.2

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 12.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/21/10		12.0	12.0	9.7	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/21/10	1	0.0'	2 6 6 8	Moist stiff brown clayey silt w/some fine sand, trace coarse sand and fine gravel.	A-4(3)	7.5 YR - 6/8
			2.0'		7" RECOVERY		
3		2	2.0'	13 11 16 15	Moist medium dense brown silty coarse to fine sand w/some fine gravel.	A-2-4(0)	7.5 YR - 6/8
			4.0'		17" RECOVERY		
		3	4.0'	6 8 9 10	Moist medium dense brown coarse sand w/ some fine gravel, trace fine sand, silt and clay.	A-1-b	7.5 YR - 6/8 USDA Classification : Sand
6			6.0'		15" RECOVERY		
		4	6.0'	8 7 8 8	Moist medium dense brown coarse sand w/ some fine sand and silt, trace fine gravel.	A-1-b	7.5 YR - 6/8
			8.0'		19" RECOVERY		
9		5	8.0'	5 4 3 2	Moist loose brown coarse sand w/some fine sand and silt, trace fine gravel.	A-1-b	7.5 YR - 5/8
			10.0'		14" RECOVERY		
		6	10.0'	4 4 3 3	Moist loose brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	7.5 YR - 5/8
12			12.0'		17" RECOVERY		
					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on September 21, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked to 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 uncorrected.