STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-3-07

Contract: 25-113-01

Boring Location: Sta. 720+42.99, 5' Lt. C.L.

Boring Surface Elev.: 30.00 **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:** 54.0'

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
4/2/08		14.0'	12.0'	11.2'	18.8
					30.0
					30.0
					30.0

Pay Quantities:
2 1/2 in. Dia. Dry Sample Boring: 100.0 **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: Dave Burt
Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	4 4 8	Visual Description: Wet firm brown clayey silt w/ sand.		No sieve analysis; ; Topsoil - 6"; fill material.
			2.0'		2" RECOVERY		
2.49		2	2.0'	4 5 5 7	No Sample Recovery		
			4.0'		0" RECOVERY		
		3	4.0'	3 6 14 12	Wet very stiff brown coarse to fine sandy silt, trace of gravel.	A-4(0)	Fill material.
4.98			6.0'		12" RECOVERY		
		4	6.0'	4 5 5 8	Wet loose brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	Fill material.
7.47			8.0'		18" RECOVERY		
		5	8.0'	3 4 4 4	Wet loose brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
9.96			10.0'		15" RECOVERY		
		6	10.0'	2 4 4 4	Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
			12.0'		24" RECOVERY		
12.45		7	12.0'	5 5 6 7	Saturated medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
			14.0'		24" RECOVERY		
		8	14.0'	12 5	Saturated medium dense orange-brown fine to	A-2-4(0)	

Remarks: Mud Rotary at 54.0'

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 **Boring No.:** BR1-3-07
Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94				6 12	coarse sand w/ some silt, trace of gravel.		
			16.0'		13" RECOVERY		
		9	16.0'	8 7 8 9	Saturated medium dense orange-brown coarse to fine sand and gravel.	A-1-b	
17.43							
			18.0'		24" RECOVERY		
		10	18.0'	14 9 14 16	Saturated medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
19.92							
			20.0'		24" RECOVERY		
22.41							
		11	24.0'	26 20 16 12	Saturated dense brown coarse to fine sand w/ some silt and gravel.	A-1-b	
24.9							
			26.0'		20" RECOVERY		
27.39							
		12	29.0'	15 5 14 17	Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
29.88							
			31.0'		12" RECOVERY		
32.37							
		13	34.0'	14 8 11 9	Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
34.86							
			36.0'		16" RECOVERY		
37.35							

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F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-3-07
Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	39.0'	12 7 3 10	Saturated loose brown fine sand w/ some coarse sand, trace of silt.	A-3	
39.84			41.0'		14" RECOVERY		
42.33		15	44.0'	11 13 13 16	Saturated medium dense gray-brown silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
44.82			46.0'		24" RECOVERY		
47.31		16	49.0'	5 9 11 13	Saturated medium dense gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
49.8			51.0'		21" RECOVERY		
		U-1	51.0'		Saturated gray silty clayey fine to coarse sand with a trace of gravel.	A-2-4(0)	Press Sample - Shelby Tube.
52.29			52.8'		22" RECOVERY		
54.78		17	54.0'	4 4 5 8	Saturated stiff gray clayey fine sandy silt, trace of coarse sand and gravel.	A-4(0)	
57.27			56.0'		24" RECOVERY		
59.76		18	59.0'	5 10 15 18	Saturated very stiff gray clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
			61.0'		20" RECOVERY		

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F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-3-07
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' – 66.0'	5 7 8 10	Saturated medium dense gray clayey fine sand w/ some coarse sand. 19" RECOVERY	A-2-4(0)	
67.23		20	69.0' – 71.0'	4 9 11 13	Saturated very stiff gray fine sandy silt w/ some clay, trace of coarse sand and gravel. 20" RECOVERY	A-4(0)	
72.21		21	74.0' – 76.0'	12 12 15 16	Saturated medium dense gray silty fine sand, trace of coarse sand. 18" RECOVERY	A-2-4(0)	
77.19		22	79.0' – 81.0'	10 11 15 17	Saturated very stiff gray fine sandy silt w/ some clay, trace of organic matter, gravel, and coarse sand. 24" RECOVERY	A-4(0)	
82.17		23	84.0'	8 11 15 19	Saturated very stiff dark green fine sandy silt, trace of organic matter, coarse sand, and	A-4(0)	Glauconitic.
84.66							

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DIVISION OF HIGHWAYS

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-3-07
Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			86.0'		gravel. 19" RECOVERY		
87.15							
89.64		24	89.0' 91.0'	8 12 21 24	Saturated hard dark green fine sandy silt, trace of organic matter and coarse sand. 15" RECOVERY	A-4(0)	Glauconitic.
92.13							
94.62		25	94.0' 96.0'	7 10 15 19	Saturated very stiff dark green fine sandy silt w/ some organic matter, trace of coarse sand. 20" RECOVERY	A-4(0)	Glauconitic.
97.11							
99.6		26	98.0' 100.0'	10 13 16 19	Saturated medium dense dark green silty fine sand, trace of organic matter rand coarse sand. 19" RECOVERY	A-2-4(0)	Glauconitic.
102.09					Boring terminated at 100.0 feet.		
104.58							
107.07							

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silt
	Silty sand
	Poorly graded sand with silt
	Poorly graded clayey silty sand
	Clayey sand

Notes:

1. Exploratory boring was drilled on 4/2/2008 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. Boring elevation was obtained from Figure A-2, Structure BR1-3 Exploration 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 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.:** BR1-3-08

Contract: 25-113-01

Boring Location: Sta. 718+66.33, 89' Rt. C.L.

Boring Surface Elev.: 30.00 **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:** 74.0'

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/31/08		14.0'	12.0'	10.0'	20.0
					30.0
					30.0
					30.0

Pay Quantities:
2 1/2 in. Dia. Dry Sample Boring: 100.0 **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: Dave Burt
Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	2 7 8	Wet stiff brown clayey coarse sandy silt w/ some fine sand, trace of gravel.	A-4(1)	Topsoil - 3"; fill material.
			2.0'		18" RECOVERY		
2.49		2	2.0'	14 19 22 24	Wet hard brown and dark brown clayey coarse to fine sandy silt, trace of gravel.	A-4(0)	Fill material.
			4.0'		20" RECOVERY		
		3	4.0'	8 12 20 17	Wet hard brown clayey coarse to fine sandy silt, trace of gravel.	A-4(1)	Fill material.
4.98			6.0'		18" RECOVERY		
		4	6.0'	9 7 4 4	Wet medium dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	Fill material.
7.47			8.0'		16" RECOVERY		
		5	8.0'	1 2 3 4	Wet loose light brown coarse to fine sand, trace of gravel and silt.	A-1-b	
9.96			10.0'		12" RECOVERY		
		6	10.0'	2 4 6 8	Saturated loose light brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			12.0'		24" RECOVERY		
12.45		7	12.0'	2 2 4 5	Saturated loose orange-brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			14.0'		18" RECOVERY		
		8	14.0'	7 4	Saturated loose orange-brown fine to coarse	A-2-4(0)	

Remarks: Mud Rotary at 74.0'

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 **Boring No.:** BR1-3-08
Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94			16.0'	6 6	sand w/ some silt, trace of gravel. 12" RECOVERY		
17.43		9	16.0' 18.0'	8 10 10 17	Saturated medium dense orange-brown fine to coarse sand w/ some gravel and silt. 24" RECOVERY	A-2-4(0)	
19.92		10	18.0' 20.0'	12 10 12 17	Saturated medium dense orange-brown fine to coarse sand w/ some silt, trace of gravel. 24" RECOVERY	A-2-4(0)	
22.41							
24.9		11	24.0' 26.0'	10 20 22 25	Saturated dense orange-brown silty fine sand w/ some gravel and coarse sand. 17" RECOVERY	A-2-4(0)	
27.39							
29.88		12	29.0' 31.0'	5 10 13 15	Saturated medium dense fine sand w/ some silt and coarse sand, trace of gravel. 24" RECOVERY	A-2-4(0)	
32.37							
34.86		13	34.0' 36.0'	9 11 13 14	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt and gravel. 15" RECOVERY	A-3	
37.35							

STATE OF DELAWARE
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F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-3-08
Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	39.0'	8 16 13 15	Saturated medium dense brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
39.84			41.0'		24" RECOVERY		
42.33							
		15	44.0'	12 22 20 20	Saturated dense gray silty fine sand, trace of coarse sand.	A-2-4(0)	
44.82			46.0'		14" RECOVERY		
47.31							
		16	49.0'	8 15 22 26	Saturated dense gray silty fine sand, trace of coarse sand.	A-2-4(0)	
49.8			51.0'		24" RECOVERY		
52.29							
		17	54.0'	9 10 11 17	Saturated medium dense gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
54.78			56.0'		24" RECOVERY		
57.27							
		18	59.0'	9 4 11 21	Saturated medium dense gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
59.76			61.0'		24" RECOVERY		

STATE OF DELAWARE
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DIVISION OF HIGHWAYS

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-3-08
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' – 66.0'	9 10 13 22	Saturated medium dense gray clayey fine sand w/ some coarse sand. 24" RECOVERY	A-2-4(0)	
67.23							
69.72		20	69.0' – 71.0'	4 6 9 9	Saturated medium dense gray clayey fine sand w/ some coarse sand, trace of gravel. 24" RECOVERY	A-2-4(0)	
72.21		U-1	72.0' – 73.3'		Saturated gray fine sand w/ some silt, trace of gravel. 15" RECOVERY	A-4(0)	Press Sample - Shelby Tube.
74.7		21	74.0' – 76.0'	7 9 13 17	Saturated medium dense gray clayey fine sand, trace of coarse sand. 24" RECOVERY	A-2-6(0)	
77.19							
79.68		22	79.0' – 81.0'	6 7 14 16	Saturated very stiff gray clayey fine sandy organic silt, trace of coarse sand and gravel. 20" RECOVERY	A-4(0)	
82.17							
84.66		23	84.0'	6 12 16 17	Saturated very stiff gray clayey fine sandy silt, trace of organic matter, coarse sand, and	A-4(1)	

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-3-08
Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			86.0'		gravel. 24" RECOVERY		
87.15							
89.64		24	89.0' 91.0'	10 24 34 47	Saturated very dense dark gray silty fine sand, trace of coarse sand and organic matter. 17" RECOVERY	A-2-4(0)	
92.13							
94.62		25	94.0' 96.0'	14 16 15 15	Saturated hard dark gray fine sandy silt, trace of organic matter, coarse sand, and gravel. 16" RECOVERY	A-4(0)	
97.11							
99.6		26	98.0' 100.0'	17 15 23 20	Saturated hard dark gray fine sandy silt, trace of organic matter, coarse sand, and gravel. 18" RECOVERY	A-4(0)	
102.09					Boring terminated at 100.0 feet.		
104.58							
107.07							

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Low plasticity clay
	Clayey sand
	Silty sand
	Well graded sand with silt
	Poorly graded sand with silt
	Poorly graded clayey silty sand

Notes:

1. Exploratory boring was drilled on 3/31/2008 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. Boring elevation was obtained from Figure A-2, Structure BR1-3 Exploration 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 SPT 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.:** IT1-89

Contract: 25-113-01

Boring Location: STA. 97+38 13' Lt. C. L.

Boring Surface Elev.: + 45.45 **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:**		**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
2/15/11		10.0	10.0	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:**

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

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: K. Kershaw

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/15/11	1	1.5' 2.0'	7	No Sieve Analysis - Indication of wet firm brown sandy clay.		Topsoil - 6". Fill - 12".
2.53		2	2.0'	7 7 4 5	6" RECOVERY	A-4(2)	
			4.0'		Wet stiff brown silt w/some fine to coarse sand and clay, trace of fine gravel. 24" RECOVERY		
5.06		3	4.0'	2 1 2 4	Wet soft brown clayey silt w/some fine to coarse sand, trace of fine gravel.	A-4(3)	
			6.0'		14" RECOVERY		
7.59		4	6.0' 7.5'	5 7 12	Wet stiff brown clayey silt w/some fine sand, trace of coarse sand. 12" RECOVERY	A-4(6)	
		4A	7.5' 8.0'	21	Wet dense brown silty coarse to fine sand w/ some fine gravel.	A-2-4(0)	
		5	8.0'	6 12 13 10	6" RECOVERY	A-2-4(0)	
10.12			10.0'		Wet medium dense brown silty fine to coarse sand. 24" RECOVERY		
					End of Boring		
12.65							
15.18							

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

Notes:

1. **Exploratory borings were drilled on February 15, 2011 using 3 1/4 inch diameter continuous flight power auger. Rig is 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: US 301 Maryland State Line to SR-1 **Boring No.:** IT1-90

Contract: 25-113-01

Boring Location: STA. 102+41 7' Lt. C.L.

Boring Surface Elev.: + 46.21 **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

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/14/11		10.0	10.0	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:**

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
	2/14/11	1	0.5'	6 4 4	Moist loose brown silty fine to coarse sand w/ some fine gravel.	A-2-4(0)	Topsoil - 7".
			2.0'		13" RECOVERY		
2.53		2	2.0'	5 6 3 3	Moist stiff brown fine to coarse sandy silt w/ trace of fine gravel.	A-4(0)	
			4.0'		20" RECOVERY		
5.06		3	4.0'	3 3 7 9	Moist loose brown silty fine to coarse sand w/ some clay, trace of fine gravel.	A-2-4(0)	
			6.0'		17" RECOVERY		
7.59		4	6.0'	3 7 12 10	Moist medium dense brown silty fine sand w/ some coarse sand, trace of fine gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
10.12		5	8.0'	10 11 12 13	Moist medium dense tannish orange coarse to fine sand w/some fine gravel and silt.	A-1-b	
			10.0'		20" RECOVERY		
12.65					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

Notes:

1. **Exploratory borings were drilled on February 14, 2011 using 3 1/4 inch diameter continuous flight power auger. Rig is 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: US 301 Maryland State Line to SR-1 **Boring No.:** IT1-91

Contract: 25-113-01

Boring Location: STA. 106+70 13' Lt. C.L.

Boring Surface Elev.: + 52.0 **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:**	10.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/14/11		10.0	10.0	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:**	
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
	2/14/11	1	0.5'	4 10 9	Moist stiff brown fine sandy silt w/some coarse sand, fine gravel and clay.	A-4(0)	Topsoil - 6".
			2.0'		14" RECOVERY		
2.53		2	2.0'	11 10 12 6	Moist medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			4.0'		19" RECOVERY		
		3	4.0'	6 8 9 5	Moist medium dense brown silty fine sand w/ some coarse sand, trace of fine gravel.	A-2-4(0)	
5.06			6.0'		19" RECOVERY		
		4	6.0'	6 8 10 12	Wet very stiff tan silty clay w/trace of fine sand.	A-6(15)	
7.59			8.0'		20" RECOVERY		
		5	8.0'	7 7 6 7	Wet stiff tan silty clay w/trace of fine sand.	A-6(12)	
10.12			10.0'		22" RECOVERY		
					End of Boring		
12.65							

Remarks:

Reviewed By: Hany Fekry **Soils Supervisor:** Randy Ferguson

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Poorly graded clayey silty sand
	Silty sand
	Low plasticity clay

Notes:

1. Exploratory borings were drilled on February 14, 2011 using 3 1/4 inch diameter continuous flight power auger. Rig is 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: US 301 Maryland State Line to SR-1 **Boring No.:** IT1-92

Contract: 25-113-01

Boring Location: STA. 112+49 13' Lt. C.L.

Boring Surface Elev.: + 58.3 **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:** 10.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/14/11		10.0	10.0	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:**	
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
	2/14/11	1	0.5'	11 14 17	Moist medium dense brown fine gravelly coarse sand w/some fine sand and silt.	A-1-b	Topsoil - 6".
			2.0'		16" RECOVERY		
2.53		2	2.0'	14 15 11 8	Moist medium dense orangish brown fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
			4.0'		20" RECOVERY		
5.06		3	4.0'	5 7 6 6	Moist medium dense brown coarse sand w/ some fine gravel, trace of fine sand and silt.	A-1-b	
			6.0'		21" RECOVERY		
7.59		4	6.0'	7 6 5 4	Moist medium dense brown fine gravelly coarse sand w/some fine sand and silt.	A-1-b	
			8.0'		18" RECOVERY		
10.12		5	8.0'	4 5 5 3	Moist loose brown fine gravelly coarse sand w/some silt, trace of fine sand.	A-1-b	
			10.0'		19" RECOVERY		
12.65					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

Notes:

1. Exploratory borings were drilled on February 14, 2011 using 3 1/4 inch 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: US 301 Maryland State Line to SR-1 **Boring No.:** IT1-93

Contract: 25-113-01

Boring Location: STA. 119+32 13' Lt. C.L.

Boring Surface Elev.: + 56.55 **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:** 10.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/14/11		10.0	10.0	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:**	
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
	2/14/11	1	0.5'	3 5 6	Moist loose orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	Topsoil - 7".
			2.0'		14" RECOVERY		
2.53		2	2.0'	4 5 6 6	Moist medium dense orangish brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			4.0'		19" RECOVERY		
5.06		3	4.0'	5 4 5 3	Moist loose brownish orange coarse to fine sand w/trace of fine gravel, silt and clay.	A-1-b	USDA Classification : Loamy Sand
			6.0'		18" RECOVERY		
7.59		4	6.0'	2 4 6 7	Moist loose brownish orange coarse to fine sand w/some fine gravel and silt.	A-1-b	
			8.0'		20" RECOVERY		
10.12		5	8.0'	3 7 6 7	Moist medium dense orangish brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		19" RECOVERY		
12.65					End of Boring		

Remarks:

Reviewed By: Hany Fekry **Soils Supervisor:** Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand

Notes:

1. **Exploratory borings were drilled on February 14, 2011 using 3 1/4 inch diameter continuous flight power auger. Rig is 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: US 301 Maryland State Line to SR-1 **Boring No.:** IT1-94

Contract: 25-113-01

Boring Location: STA. 125+20 13' Lt. C.L.

Boring Surface Elev.: + 46.1 **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

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/11/11		10.0	10.0	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:**	
2 1/2 in. Dia. Contin. Sample Boring:		**Ft.;**	**Core Drilling in Rock:**		**Ft.**

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: K. Kershaw

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/11/11	1	1.0'	5 6	Wet stiff brown clayey silt w/some coarse sand, trace of fine sand.	A-4(6)	Topsoil - 10".
			2.0'		8" RECOVERY		
2.53		2	2.0'	7 14 14 8	Wet medium dense brown coarse to fine sand w/some fine gravel and silt.	A-1-b	
			4.0'		18" RECOVERY		
		3	4.0'	3 6 7 10	Wet medium dense brown coarse to fine sand w/some fine gravel and silt, trace of clay.	A-2-4(0)	USDA Classification : Loamy Sand
5.06			6.0'		18" RECOVERY		
		4	6.0'	10 8 9 8	Wet medium dense orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
7.59			8.0'		24" RECOVERY		
		5	8.0'	3 5 6 6	Wet medium dense orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
10.12			10.0'		20" RECOVERY		
					End of Boring		
12.65							

Remarks:

Reviewed By: Hany Fekry **Soils Supervisor:** Randy Ferguson

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Low plasticity clay
	Silty sand

Notes:

1. Exploratory borings were drilled on February 11, 2011 using 3 1/4 inch diameter continuous flight power auger. Rig is 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: US 301 Maryland State Line to SR-1 **Boring No.:** IT1-95

Contract: 25-113-01

Boring Location: STA. 130+97 13' Lt. C.L.

Boring Surface Elev.: + 35.57 **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:**	10.0	

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/11/11		10.0	10.0	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:		**;**	**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: K. Kershaw

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/11/11	1	0.5'	3 3 5	Moist loose brown coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	Topsoil - 8".
			2.0'		15" RECOVERY		
2.53		2	2.0'	7 7 7 7	Moist medium dense brown fine gravelly coarse sand w/some fine sand and silt.	A-1-b	
			4.0'		22" RECOVERY		
		3	4.0'	4 7 7 7	Moist medium dense brown coarse sand w/ some fine gravel, trace of fine sand, silt and clay.	A-1-b	USDA Classification : Sand
5.06			6.0'		17" RECOVERY		
		4	6.0'	12 7 8 8	Saturated medium dense brown coarse sand w/some fine sand, fine gravel and silt.	A-1-b	
7.59			8.0'		16" RECOVERY		
		5	8.0'	1 1 2 4	Saturated very loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
10.12			10.0'		22" RECOVERY		
					End of Boring		
12.65							

Remarks:

Reviewed By: Hany Fekry **Soils Supervisor:** Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

Poorly graded sand with silt

Silty sand

Notes:

1. **Exploratory borings were drilled on February 11, 2011 using 3 1/4 inch diameter continuous flight power auger. Rig is 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: US 301 Maryland State Line to SR-1 **Boring No.:** IT1-96

Contract: 25-113-01

Boring Location: STA. 141+01 95' Lt. C.L.

Boring Surface Elev.: + 25.65 **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
2/14/11		5.0	5.0	4.7	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 5.0 **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: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/14/11	1	1.0'		Moist brown clayey fine gravelly silt w/some coarse to fine sand.	A-4(0)	Topsoil - 8".
			2.0'		12" RECOVERY		Hand Auger
2.53		2	2.0'		Moist brownish orange coarse to fine sandy silt w/trace of clay.	A-4(0)	Hand Auger
			3.0'		12" RECOVERY		
		3	3.0'		Saturated brownish orange coarse sandy silt w/some fine sand, trace of fine gravel and clay.	A-4(0)	Hand Auger
			4.0'		12" RECOVERY		
		4	4.0'		Saturated brownish orange silt w/some fine sand, trace of coarse sand, fine gravel and clay.	A-4(0)	
5.06			5.0'		12" RECOVERY		
7.59					End of Boring		
10.12							
12.65							

Remarks: Hand Auger

Reviewed By: Hany Fekry **Soils Supervisor:** Randy Ferguson

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Poorly graded clayey silty sand
	Silt

Notes:

1. Exploratory borings were drilled on February 14, 2011 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.:** IT1-97

Contract: 25-113-01

Boring Location: STA. 142+69 95' Lt. C.L.

Boring Surface Elev.: + 26.29 **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:		**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
2/11/11		10.0	10.0	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:		**;**	**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: K. Kershaw

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/11/11	1	0.5'	7 8 9	Moist medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	Topsoil - 8".
			2.0'		10" RECOVERY		
2.53		2	2.0'	7 11 8 7	Moist medium dense dark brown coarse to fine sand w/some fine gravel and silt.	A-1-b	
			4.0'		14" RECOVERY		
		3	4.0'	5 3 3 4	Moist loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
5.06			6.0'		18" RECOVERY		
		4	6.0'	3 4 4 4	Saturated loose brown coarse to fine sand w/ some silt, trace of fine gravel.	A-1-b	
7.59			8.0'		24" RECOVERY		
		5	8.0'	3 6 7 9	Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-3	
10.12			10.0'		24" RECOVERY		
					End of Boring		
12.65							

Remarks:

Reviewed By: Hany Fekry **Soils Supervisor:** Randy Ferguson

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silty sand
	Poorly graded sand with silt

Notes:

1. Exploratory borings were drilled on February 11, 2011 using 3 1/4 inch diameter continuous flight power auger. Rig is 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.:** R1-104

Contract: 25-113-01

Boring Location: STA. 90+00 0' C.L.

Boring Surface Elev.: + 50.78 **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
2/15/11		10	10	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:**
2 1/2 in. Dia. Contin. Sample Boring: **Ft.;** **Core Drilling in Rock:** **Ft.**

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: K. Kershaw

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/15/11	1	1.0'	7 6	No Sieve Analysis - Indication of moist medium dense clayey sand.		Topsoil - 6". Fill - 6".
			2.0'		6" RECOVERY		
3		2	2.0'	7 8 13 10	Moist medium dense orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			4.0'		19" RECOVERY		
		3	4.0'	3 4 4 6	Moist loose orange silty coarse sand w/some fine sand, trace of fine gravel.	A-2-4(0)	
6			6.0'		16" RECOVERY		
		4	6.0'	7 4 6 3	Moist loose orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
			8.0'		20" RECOVERY		
9		5	8.0'	3 3 8 9	Moist medium dense orange coarse sand w/ some fine sand and fine gravel, trace of silt.	A-1-b	
			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	
	Silty sand
	Poorly graded sand with silt

Notes:

1. Exploratory borings were drilled on February 15, 2011 using 3 1/4 inch 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.:** R1-105

Contract: 25-113-01

Boring Location: STA. 100+00 0' C.L.

Boring Surface Elev.: + 44.71 **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
2/15/11		10.0	10.0	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:**
2 1/2 in. Dia. Contin. Sample Boring: **Ft.;** **Core Drilling in Rock:** **Ft.**

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: K. Kershaw

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/15/11	1	1.5' 2.0'	8	Wet firm brown clayey silt w/trace of fine to coarse sand and fine gravel.	A-4(5)	Topsoil - 6". Fill - 12".
		2	2.0'	15 15 16 13	6" RECOVERY	A-4(0)	
3					Wet hard brown coarse to fine sandy silt w/ trace of fine gravel and clay.		
			4.0'		18" RECOVERY		
		3	4.0'	4 2 3 4	Wet firm brown clayey silt w/some coarse sand, trace of fine sand and fine gravel.	A-4(3)	
6			6.0'		18" RECOVERY		
		4	6.0'	4 4 6 14	Wet stiff brown silty coarse sandy clay w/ some fine sand and fine gravel.	A-6(2)	
			8.0'		10" RECOVERY		
9		5	8.0'	24 20 17 13	Wet dense brown fine to coarse sand and fine gravel w/some silt.	A-1-b	
			10.0'		24" RECOVERY		
					End of Boring		
12							
15							
18							

Remarks:

Reviewed By: Hany Fekry **Soils Supervisor:** Randy Ferguson

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Low plasticity clay
	Silt
	Silty low plasticity clay
	Clayey sand
	Silty sand

Notes:

1. Exploratory borings were drilled on February 15, 2011 using 3 1/4 inch 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.:** R1-106

Contract: 25-113-01

Boring Location: STA. 110+00 0' C.L.

Boring Surface Elev.: + 55.30 **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
2/14/11		10	10	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:**	
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
	2/14/11	1	0.5'	7 8 9	Moist stiff brownish orange fine sandy fine gravelly clay w/some silt.	A-6(1)	Topsoil - 7".
			2.0'		16" RECOVERY		
3		2	2.0'	5 7 11 10	Wet medium dense brownish orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			4.0'		20" RECOVERY		
6		3	4.0'	5 5 7 9	Wet medium dense brownish orange clayey coarse sand w/some fine sand and silt, trace of fine gravel.	A-2-6(1)	
			6.0'		21" RECOVERY		
		4	6.0'	8 9 7 6	Wet very stiff brown fine sandy silt w/trace of fine gravel.	A-4(0)	
			8.0'		18" RECOVERY		
9		5	8.0'	6 6 6 8	Wet 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

 Clayey sand

 Silty sand

 Silt

Notes:

1. Exploratory borings were drilled on February 16, 2011 using 3 1/4 inch 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.:** R1-107

Contract: 25-113-01

Boring Location: STA. 4005+00 25' Lt. C.L.

Boring Surface Elev.: + 39.71 **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
2/24/11		10.0	10.0	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:**

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
	2/24/11		0.0'		No Sampling		Asphalt - 8". Concrete - 7".
			2.0'		0" RECOVERY		
3		1	2.0'	1 1 4 8	Wet loose brown silty fine to coarse sand w/ trace of fine gravel.	A-2-4(0)	
			4.0'		16" RECOVERY		
		2	4.0'	5 7 10 7	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6			6.0'		19" RECOVERY		
		3	6.0'	6 6 7 11	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		20" RECOVERY		
9		4	8.0'	9 10 11 9	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		22" 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

Notes:

1. Exploratory borings were drilled on February 24, 2011 using 3 1/4 inch 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.:** R1-108

Contract: 25-113-01

Boring Location: STA. 124+00 60' Lt. C.L.

Boring Surface Elev.: + 47.90 **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:		**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
2/16/11		10.0	10.0	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:**
2 1/2 in. Dia. Contin. Sample Boring: **Ft.;** **Core Drilling in Rock:** **Ft.**

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: K. Kershaw

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/16/11		0.0'		No Sampling		Asphalt - 8". Concrete - 8".
			2.0'		0" RECOVERY		
3		1	2.0'	5 5	Moist stiff brown clayey silt w/some fine to coarse sand, trace of fine gravel.	A-4(2)	
			3.0'		12" RECOVERY		
		1A	3.0'	6 6	Moist medium dense brown silty fine sand w/ some coarse sand, trace of fine gravel.	A-2-4(0)	
			4.0'		10" RECOVERY		
		2	4.0'	4 5 6 8	Moist medium dense brown coarse sand w/ some fine sand and silt, trace of fine gravel.	A-1-b	
6			6.0'		16" RECOVERY		
		3	6.0'	9 10 11 9	Moist medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			8.0'		17" RECOVERY		
9		4	8.0'	8 7 7 6	Moist medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
			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 low plasticity clay
	Silty sand

DRAFT

NOT FOR BIDDING

AUGUST 2015

Notes:

1. Exploratory borings were drilled on February 16, 2011 using 3 1/4 inch 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.:** R1-109

Contract: 25-113-01

Boring Location: STA. 115+00 55' Lt. C.L.

Boring Surface Elev.: + 52.63 **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
2/16/11		10.0	10.0	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:**

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
	2/16/11		0.0'		No Sampling		Asphalt - 7". Concrete - 8".
			2.0'		0" RECOVERY		
3		1	2.0'	4 6 9 8	Moist stiff brown fine to coarse sandy silt w/ trace of fine gravel.	A-4(0)	
			4.0'		8" RECOVERY		
		2	4.0'	4 5 3 5	Wet firm brown silt w/some fine to coarse sand.	A-4(0)	
6			6.0'		18" RECOVERY		
		3	6.0'	6 6 9 9	Wet stiff orange fine to coarse sandy silt w/ trace of fine gravel.	A-4(0)	
			8.0'		18" RECOVERY		
9		4	8.0'	4 6 7 6	Wet stiff orange fine sandy silt w/some coarse sand.	A-4(0)	
			10.0'		20" RECOVERY		
12					End of Boring		
15							

Remarks:

Reviewed By: Hany Fekry **Soils Supervisor:** Randy Ferguson

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silty sand
	Silt
	Poorly graded clayey silty sand

Notes:

1. Exploratory borings were drilled on February 16, 2011 using 3 1/4 inch 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: US 301 Maryland State Line to SR-1 **Boring No.:** R1-074

Contract: 28-113-01

Boring Location: Sta. 313+00 0' C.L.

Boring Surface Elev.: + 32.79 **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
7/16/10		16.0	14.0	11.6	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	**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: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/16/10	1	0.5'	5 10 7	Moist medium dense brown silty coarse to fine sand w/trace fine gravel.	A-2-4(0)	Topsoil - 4".
			2.0'		12" RECOVERY		
3.3		2	2.0'	10 13 14 13	Moist very stiff brown silt w/some clay, coarse to fine sand and fine gravel.	A-4(0)	
			4.0'		20" RECOVERY		
		3	4.0'	4 10 12 13	Moist medium dense gray silty coarse to fine sand w/some fine gravel and clay.	A-2-4(0)	
			6.0'		18" RECOVERY		
6.6		4	6.0'	24 24 20 18	Moist dense tan coarse to fine sand w/some silt, trace fine gravel.	A-2-4(0)	
			8.0'		18" RECOVERY		
		5	8.0'	7 5 6 6	Moist medium dense brown fine to coarse sand and fine gravel w/some silt.	A-1-b	
9.9			10.0'		12" RECOVERY		
		6	10.0'	3 3 4 5	Wet loose brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	
			12.0'		20" RECOVERY		
		7	12.0'	3 2 2 3	Wet very loose brown coarse sand w/some fine sand and silt, trace fine gravel.	A-1-b	
13.2			14.0'		17" RECOVERY		
		8	14.0'	3 4 4 6	Wet loose brown coarse sand w/some fine sand, trace silt and fine gravel.	A-1-b	
			16.0'		16" RECOVERY		
16.5					End of Boring		

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

Notes:

1. Exploratory borings were drilled on July 16, 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 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.:** R1-084

Contract: 28-113-01

Boring Location: Sta. 115+00 0' C.L.

Boring Surface Elev.: + 59.36 **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:** 20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/27/10		20.0	18.0	Dry	

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: **;** **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
	7/27/10	1	0.5' – 2.0'	4 7 10	Moist stiff brown silt w/some fine to coarse sand, trace fine gravel and clay. 12" RECOVERY	A-4(0)	Topsoil - 6".
3.6		2	2.0' – 4.0'	8 8 9 7	Moist stiff brown coarse sandy silt w/some fine sand, trace fine gravel and clay. 14" RECOVERY	A-4(0)	
		3	4.0' – 6.0'	3 3 4 5	Wet firm brown clayey silt w/trace fine to coarse sand and fine gravel. 18" RECOVERY	A-4(4)	
7.2		4	6.0' – 8.0'	5 4 6 7	Wet stiff tan fine sandy silt w/some coarse sand, fine gravel and clay. 19" RECOVERY	A-4(0)	
10.8		5	8.0' – 10.0'	4 6 6 10	Wet medium dense tan coarse sand w/some fine sand and silt, trace fine gravel. 17" RECOVERY	A-1-b	
14.4		6	14.0' – 16.0'	4 5 8 8	Wet medium dense tan coarse to fine sand w/ some silt, trace fine gravel. 18" RECOVERY	A-1-b	
18		7	18.0' – 20.0'	5 7 6 5	Wet medium dense tan fine to coarse sand w/ some silt, trace fine gravel. 17" RECOVERY	A-2-4(0)	
					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

Notes:

1. Exploratory borings were drilled on July 27, 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 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.:** R1-085

Contract: 28-113-01

Boring Location: Sta. 128+00 0' C.L.

Boring Surface Elev.: + 48.89 **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:** 20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/27/10		20.0	18.0	16.4	

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: **;** **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
	7/27/10	1	0.5'	12 20 15	Moist hard brown fine sandy silt w/some coarse sand, trace clay and fine gravel.	A-4(0)	Topsoil - 4".
			2.0'		12" RECOVERY		
		2	2.0'	18 23 13 11	Moist dense brown clayey coarse to fine sand and fine gravel w/trace silt.	A-2-4(0)	
3.6			4.0'		18" RECOVERY		
		3	4.0'	4 6 8 9	Moist medium dense orange silty coarse sand w/some fine sand, trace fine gravel.	A-1-b	
			6.0'		15" RECOVERY		
		4	6.0'	14 7 10 7	Moist medium dense tan coarse sand w/some silt and fine sand, trace fine gravel.	A-1-b	
7.2			8.0'		21" RECOVERY		
		5	8.0'	3 5 5 7	Moist loose orange coarse sand w/some fine sand and silt, trace fine gravel.	A-1-b	
			10.0'		16" RECOVERY		
10.8							
14.4		6	14.0'	6 7 7 7	Moist medium dense brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	
			16.0'		18" RECOVERY		
18							
		7	18.0'	7 8 9 8	Wet medium dense tan coarse to fine sand w/ trace silt and fine gravel.	A-1-b	
			20.0'		14" 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
	Poorly graded sand with silt
	Well graded sand with silt

Notes:

1. Exploratory borings were drilled on July 27, 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 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.:** R1-086

Contract: 28-113-01

Boring Location: Sta. 85+00 20' Rt. C.L.

Boring Surface Elev.: + 40.52 **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:**	20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/27/10		20.0	18.0	11.0	

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:		**;**	**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
	7/27/10	1	1.0' 2.0'	4 7	Moist firm brown coarse to fine sandy silt w/ trace fine gravel and clay. 10" RECOVERY	A-4(0)	Topsoil - 10".
3.6		2	2.0' 4.0'	4 4 4 4	Moist loose tan coarse sand w/some fine sand and silt, trace fine gravel. 17" RECOVERY	A-1-b	
		3	4.0' 6.0'	4 6 5 7	Moist medium dense tan coarse sand w/some fine sand and silt, trace fine gravel. 18" RECOVERY	A-1-b	
7.2		4	6.0' 8.0'	8 6 7 6	Moist medium dense tan coarse to fine sand w/some silt, trace fine gravel. 18" RECOVERY	A-1-b	
10.8		5	8.0' 10.0'	4 4 5 5	Saturated loose tan coarse to fine sand w/trace silt and fine gravel. 15" RECOVERY	A-1-b	
14.4		6	14.0' 16.0'	4 6 6 8	Saturated medium dense brown coarse to fine sand w/some fine gravel and silt. 12" RECOVERY	A-1-b	
18		7	18.0' 20.0'	10 12 5 5	Saturated medium dense brown coarse to fine sandy fine gravel w/some silt. 3" RECOVERY	A-1-b	
					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

Notes:

1. Exploratory borings were drilled on July 27, 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 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.:** R1-087

Contract: 28-113-01

Boring Location: Sta. 95+00 10' Rt. C.L.

Boring Surface Elev.: + 46.22 **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
7/27/10		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:**	
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
	7/27/10	1	0.5'	4 5 7	Wet stiff brown silt w/some fine to coarse sand, trace fine gravel and clay.	A-4(1)	Topsoil - 6".
			2.0'		12" RECOVERY		
2.6		2	2.0'	5 5 5 5	Wet stiff brown fine sandy silt w/some coarse sand, trace clay.	A-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	3 5 7 7	Wet medium dense brown silty fine gravel and coarse to fine sand.	A-1-b	
5.2			6.0'		15" RECOVERY		
		4	6.0'	8 5 3 4	Wet loose orange coarse to fine sand w/some silt, trace fine gravel.	A-2-4(0)	
7.8			8.0'		19" RECOVERY		
		5	8.0'	3 3 3 3	Wet loose orange fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
			10.0'		12" RECOVERY		
10.4					End of Boring		
13							

Remarks:

Reviewed By: Hany Fekry **Soils Supervisor:** Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silt

Silty sand

Notes:

1. **Exploratory borings were drilled on July 27, 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 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.:** R1-088

Contract: 28-113-01

Boring Location: Sta. 105+00 10' Rt. C.L.

Boring Surface Elev.: + 49.09 **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
7/27/10		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:**

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
	7/27/10	1	1.0'	6 3	Moist stiff brown fine to coarse sandy silt w/ some clay.	A-4(0)	Topsoil - 9".
			2.0'		12" RECOVERY		
2.6		2	2.0'	3 6 7 10	Wet stiff brown silt w/some fine sand, trace coarse sand and clay.	A-4(2)	
			4.0'		15" RECOVERY		
		3	4.0'	7 8 12 14	Wet very stiff brown silt w/trace fine to coarse sand and clay.	A-4(2)	
5.2							
			6.0'		14" RECOVERY		
		4	6.0'	7 7 12 13	Wet very stiff brown silt w/some fine sand, trace clay.	A-4(1)	
7.8							
			8.0'		20" RECOVERY		
		5	8.0'	3 7 8 10	Wet stiff brown silt w/some fine sand and clay.	A-4(3)	
			10.0'		18" RECOVERY		
10.4					End of Boring		
13							

Remarks:

Reviewed By: Hany Fekry **Soils Supervisor:** Randy Ferguson

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Poorly graded clayey silty sand
	Silty low plasticity clay
	Silt

Notes:

1. Exploratory borings were drilled on July 27, 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 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.:** R1-089

Contract: 28-113-01

Boring Location: Sta. 83+00 0' C.L.

Boring Surface Elev.: + 80.85 **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:** 10.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/20/10		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:**
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
	7/20/10	1	0.5'	5 9 12	Wet very stiff brown clayey silt w/trace fine to coarse sand.	A-4(8)	Topsoil - 8".
			2.0'		11" RECOVERY		
2.6		2	2.0'	9 8 9 7	Wet very stiff brown silt w/some fine sand, trace coarse sand.	A-4(0)	
			4.0'		16" RECOVERY		
		3	4.0'	7 8 12 16	Wet very stiff orange fine sandy silt w/some coarse sand and fine gravel.	A-4(0)	
5.2			6.0'		20" RECOVERY		
		4	6.0'	12 9 10 10	Wet medium dense orange silty coarse to fine sand w/trace fine gravel.	A-2-4(0)	
7.8			8.0'		21" RECOVERY		
		5	8.0'	10 9 8 9	Wet medium dense orange silty fine sand w/ some coarse sand.	A-2-4(0)	
			10.0'		20" RECOVERY		
10.4					End of Boring		
13							

Remarks:

Reviewed By: Hany Fekry **Soils Supervisor:** Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silt

Silty sand

Notes:

1. **Exploratory borings were drilled on July 20, 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 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.:** R1-090

Contract: 28-113-01

Boring Location: Sta. 120+00 60 Lt. C.L.

Boring Surface Elev.: + 55.10 **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:**	25.0	

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/28/10		25.0	23.0	22.0	

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:		**;**	**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
	7/28/10	1	1.0'	6 8	Moist stiff brown coarse sandy silt w/some fine sand and fine gravel, trace clay.	A-4(0)	Asphalt - 6".
			2.0'		10" RECOVERY		
		2	2.0'	9 11 9 11		A-4(0)	
3.4					Moist very stiff orange coarse sandy fine gravelly silt w/some fine sand and clay.		
			4.0'		14" RECOVERY		
		3	4.0	5 8 8 6	Moist medium dense orange fine gravelly coarse sand w/some silt, trace fine sand.	A-1-b	
			6.0'		12" RECOVERY		
		4	6.0'	5 6 7 6	Moist medium dense orange silty fine sand w/ some coarse sand and fine gravel.	A-2-4(0)	
6.8							
			8.0'		21" RECOVERY		
		5	8.0'	4 6 7 7	Moist medium dense brown silty coarse to fine sand w/trace fine gravel.	A-1-b	
10.2							
			10.0'		18" RECOVERY		
13.6							
		6	14.0'	5 6 6 5	Moist medium dense tan fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
			16.0'		16" RECOVERY		
17							
		7	19.0'	3 4 7	Wet medium dense tan fine 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: US 301 Maryland State Line to SR-1 **Boring No.:** R1-090
Contract: 28-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
20.4			21.0'	8	coarse sand and fine gravel. 14" RECOVERY		
23.8		8	23.0' 25.0'	4 4 5 6	Wet loose tan coarse to fine sand w/some silt, trace fine gravel. 17" RECOVERY	A-1-b	
27.2					End of Boring		
30.6							
34							
37.4							
40.8							
44.2							
47.6							
51							

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silty sand
	Poorly graded clayey silty sand
	Poorly graded sand with silt

Notes:

1. Exploratory borings were drilled on July 28, 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 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.:** R1-091

Contract: 28-113-01

Boring Location: Sta. 125+00 60' Rt. C.L.

Boring Surface Elev.: + 45.62 **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
7/27/10		25.0	23.0	14.7	

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:**
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
	7/27/10	1	0.0'	3 5 4 5	Moist stiff brown silt w/some coarse to fine sand.	A-4(0)	
			2.0'		12" RECOVERY		
		2	2.0'	7 8 8 9	Moist medium dense brownish orange silty coarse to fine sand w/some fine gravel.	A-2-4(0)	
3.4			4.0'		19" RECOVERY		
		3	4.0'	6 8 9 10	Moist medium dense tan coarse to fine sand w/some silt, trace fine gravel.	A-1-b	
			6.0'		16" RECOVERY		
6.8		4	6.0'	7 7 7 7	Moist medium dense tan coarse to fine sand w/some silt, trace fine gravel.	A-1-b	
			8.0'		16" RECOVERY		
		5	8.0'	5 5 8 7	Moist medium dense tan coarse to fine sand w/some silt, trace fine gravel.	A-2-4(0)	
10.2			10.0'		19" RECOVERY		
13.6		6	14.0'	5 5 5 5	Wet loose brown coarse to fine sand w/some silt and fine gravel.	A-1-b	
			16.0'		15" RECOVERY		
17		7	18.0'	7 5 5	Wet loose brown coarse to fine sand w/some	A-1-b	

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 **Boring No.:** R1-091
Contract: 28-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			20.0'	4	silt, trace fine gravel. 19" RECOVERY		
20.4							
23.8		8	23.0' 25.0'	7 23 26 18	Wet dense brown coarse sandy fine gravel w/ some fine sand and silt. 14" RECOVERY	A-1-b	
27.2					End of Boring		
30.6							
34							
37.4							
40.8							
44.2							
47.6							
51							

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silt
	Silty sand
	Poorly graded sand with silt

Notes:

1. Exploratory borings were drilled on July 27, 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 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.:** R1-092

Contract: 28-113-01

Boring Location: Sta. 130+00 0' C.L.

Boring Surface Elev.: + 36.84 **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:**		**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
7/27/10		10.0	8.0	5.5	

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: **;** **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
	7/27/10	1	0.5'	2 3 5	Moist loose brown coarse to fine sand w/some fine gravel and silt.	A-1-b	Topsoil - 6".
			2.0'		18" RECOVERY		
2.6		2	2.0'	6 8 9 11	Moist medium dense brown coarse sand w/ some fine gravel and silt, trace fine sand.	A-1-b	
			4.0'		19" RECOVERY		
		3	4.0'	4 6 6 7	Wet medium dense brown fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
5.2			6.0'		17" RECOVERY		
		4	6.0'	5 6 7 9	Wet medium dense brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	
7.8			8.0'		19" RECOVERY		
		5	8.0'	4 5 5 6	Wet loose brown coarse to fine sand w/trace silt and fine gravel.	A-1-b	
			10.0'		15" RECOVERY		
10.4					End of Boring		
13							

Remarks:

Reviewed By: Hany Fekry **Soils Supervisor:** Randy Ferguson

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silty sand
	Well graded sand with silt

Notes:

1. Exploratory borings were drilled on July 27, 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 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.:** R1-093

Contract: 28-113-01

Boring Location: Sta. 135+00 50' Lt. C.L.

Boring Surface Elev.: + 29.89 **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:** 10.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/26/10		10.0	8.0	4.0	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/26/10	1	1.0'	21 17	Moist dense gray silty fine gravel w/some coarse to fine sand, trace clay.	A-2-4(0)	Asphalt - 8".
			2.0'		8" RECOVERY		
2.6		2	2.0'	7 5 6 7	Wet stiff gray silt w/some clay, trace fine to coarse sand and fine gravel.	A-4(2)	
			4.0'		20" RECOVERY		
		3	4.0'	5 3 3 3	Wet loose gray silty coarse to fine sand and fine gravel.	A-1-b	
5.2			6.0'		17" RECOVERY		
		4	6.0'	4 6 16 17	Wet medium dense orange coarse to fine sand w/some fine gravel and silt.	A-1-b	
7.8			8.0'		18" RECOVERY		
		5	8.0'	9 13 16 17	Wet medium dense orangish brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	
			10.0'		20" RECOVERY		
10.4					End of Boring		
13							

Remarks:

Reviewed By: Hany Fekry **Soils Supervisor:** Randy Ferguson

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silty sand
	Silty low plasticity clay

Notes:

1. Exploratory borings were drilled on July 26, 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 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.:** R1-094

Contract: 28-113-01

Boring Location: Sta. 301+00 0' C.L.

Boring Surface Elev.: + 34.55 **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:**	20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/21/10		20.0	18.0	3.0	

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:		**;**	**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
	7/21/10	1	0.5'	3 5 7	Moist loose brown coarse sand w/some fine gravel and silt, trace fine sand.	A-1-b	Topsoil - 5".
			2.0'		16" RECOVERY		
		2	2.0'	6 3 2 2	Moist loose brown fine gravelly coarse sandy w/some silt and fine sand.	A-1-b	
3.6			4.0'		22" RECOVERY		
		3	4.0'	1 3 3 5	Saturated loose tan fine gravelly coarse to fine sand w/some silt.	A-1-b	
			6.0'		15" RECOVERY		
		4	6.0'	9 7 13 16	Saturated medium dense brownish orange coarse to fine sand w/some silt and fine gravel.	A-1-b	
7.2			8.0'		21" RECOVERY		
		5	8.0'	3 5 7 8	Saturated medium dense brownish orange coarse to fine sand w/some silt, trace fine gravel.	A-1-b	
			10.0'		17" RECOVERY		
10.8		6	10.0'	6 8 5 4	Saturated medium dense brownish orange fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
			12.0'		19" RECOVERY		
		7	12.0'	2 2 3 3	Saturated loose orange silty fine to coarse sand w/trace fine gravel.	A-2-4(0)	
			14.0'		15" RECOVERY		
14.4		8	14.0'	2 3 4 6	Saturated loose orange fine to coarse sand w/ some silt, trace fine gravel.	A-2-4(0)	
			16.0'		20" RECOVERY		
		9	16.0'	6 5 5 9	Saturated loose orange fine to coarse sand w/ some silt, trace fine gravel.	A-2-4(0)	
18			18.0'		16" RECOVERY		
		10	18.0'	6 8 7 8	Saturated medium dense brownish orange fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
			20.0'		18" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Hany Fekry **Soils Supervisor:** Randy Ferguson

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Poorly graded sand with silt
	Silty sand

Notes:

1. Exploratory borings were drilled on July 21, 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 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.:** R1-095

Contract: 28-113-01

Boring Location: Sta. 306+00 0' C.L.

Boring Surface Elev.: + 40.90 **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:		**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:**	20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/16/10		20.0	18.0	12.9	

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:		**;**	**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
	7/16/10	1	0.0'	2 6 7 9	Moist medium dense orange clayey coarse to fine sand w/some fine gravel and silt.	A-2-4(0)	Gravel - 3".
			2.0'		13" RECOVERY		
		2	2.0'	24 34 38 39	Moist very dense orange fine to coarse sand w/some clay, silt and fine gravel.	A-2-4(0)	
3.6			4.0'		20" RECOVERY		
		3	4.0'	9 13 13 15	Moist medium dense orange silty coarse to fine sand w/trace fine gravel.	A-1-b	
			6.0'		21" RECOVERY		
		4	6.0'	14 15 16 17	Moist dense brown silty coarse sand w/some fine sand, trace fine gravel.	A-1-b	
7.2			8.0'		21" RECOVERY		
		5	8.0'	6 8 8 6	Moist medium dense brown silty coarse sand w/some fine sand, trace fine gravel.	A-1-b	
			10.0'		20" RECOVERY		
10.8		6	10.0' 11.0'	7 19	Moist medium dense brown clayey coarse sand w/some fine sand, fine gravel and silt. 10" RECOVERY	A-2-4(0)	
		6A	11.0' 12.0'	50		A-2-4(0)	
		7	12.0'	5 14 7 7	Moist dense gray silty coarse sand and fine gravel w/some fine sand, trace clay. 6" RECOVERY	A-4(0)	
			14.0'		Wet very stiff gray fine sandy silt w/some coarse sand, clay and fine gravel.		
14.4		8	14.0'	2 4 2 4	18" RECOVERY	A-4(0)	
			16.0'		Wet firm gray clayey coarse to fine sandy silt w/some fine gravel. 15" RECOVERY		
		9	16.0'	5 10 16 19	Wet medium dense brownish gray clayey fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
18			18.0'		18" RECOVERY		
		10	18.0'	9 12 11 10	Wet medium dense brown fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
			20.0'		16" RECOVERY		

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 **Boring No.:** R1-095
Contract: 28-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
					End of Boring		
21.6							
25.2							
28.8							
32.4							
36							
39.6							
43.2							
46.8							
50.4							
54							

KEY TO SYMBOLS

Symbol Description

Strata symbols

Poorly graded clayey silty sand

Silty sand

Notes:

1. **Exploratory borings were drilled on July 16, 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 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.:** R1-096

Contract: 28-113-01

Boring Location: Sta. 311+00 0' C.L.

Boring Surface Elev.: + 37.05 **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:** 20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/16/10		20.0	18.0	13.8	

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: **;** **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
	7/16/10	1	0.5'	5 7 8	Moist medium dense brown silty coarse to fine sand w/trace fine gravel.	A-2-4(0)	Topsoil - 4".
			2.0'		15" RECOVERY		
		2	2.0'	10 16 17 18	Moist dense brown clayey coarse sand w/ some fine sand, fine gravel and silt.	A-2-4(0)	
3.6			4.0'		20" RECOVERY		
		3	4.0'	10 14 15 9	Moist medium dense brown silty coarse to fine sand w/trace fine gravel.	A-2-4(0)	
			6.0'		18" RECOVERY		
		4	6.0'	9 19 20 24	Moist dense brown coarse to fine sand w/ some silt and clay, trace fine gravel.	A-2-4(0)	
7.2			8.0'		21" RECOVERY		
		5	8.0'	14 18 20 17	Moist dense brown fine to coarse sand w/ some silt, trace fine gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
10.8		6	10.0'	10 10 10 5	Moist medium dense orange fine sand w/some silt, trace coarse sand and fine gravel.	A-2-4(0)	
			12.0'		20" RECOVERY		
		7	12.0'	4 7 10 10	Wet medium dense brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	
			14.0'		16" RECOVERY		
14.4		8	14.0'	4 5 6 5	Saturated medium dense brown coarse to dense sand w/some silt, trace fine gravel.	A-1-b	
			16.0'		18" RECOVERY		
		9	16.0'	2 4 5 7	Saturated loose brown coarse to fine sand w/ some silt, trace fine gravel.	A-1-b	
18			18.0'		20" RECOVERY		
		10	18.0'	2 2 5 3	Saturated loose brown coarse sand w/some fine sand, trace silt and fine gravel.	A-1-b	
			20.0'		14" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Hany Fekry **Soils Supervisor:** Randy Ferguson

KEY TO SYMBOLS

Symbol	Description

Strata symbols

	Silty sand
	Clayey sand
	Poorly graded clayey silty sand
	Poorly graded sand with silt

Notes:

1. Exploratory borings were drilled on July 16, 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 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.:** R1-097

Contract: 28-113-01

Boring Location: Sta. 140+00 50 Lt. C.L.

Boring Surface Elev.: + 25.89 **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:** 30.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/27/10		10.0	8.0	5.2	

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: **;** **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: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/27/10		0.0'				Asphalt - 5". Crushed Stone - 5".
			2.0'		0" RECOVERY		
		1	2.0'	13 14 15 19	No Sieve Analysis - Indication of moist medium dense gray silty sand.		
3.6			4.0'		2" RECOVERY		
		2	4.0'	4 8 9 10	Wet medium dense orange coarse sand w/ some fine sand and silt, trace fine gravel.	A-1-b	
			6.0'		17" RECOVERY		
		3	6.0'	12 14 7 9	Saturated medium dense orange fine gravelly coarse sand w/some fine sand, trace fine gravel.	A-1-b	
7.2			8.0'		21" RECOVERY		
		4	8.0'	5 7 7 9	Saturated medium dense orange silty fine to coarse sand w/trace fine gravel.	A-2-4(0)	
			10.0'		14" RECOVERY		
10.8							
14.4		5	14.0'	5 7 9 9	Saturated medium dense orangish brown fine sand w/some coarse sand and silt, trace fine gravel.	A-2-4(0)	
			16.0'		19" RECOVERY		
18							
		6	19.0'	4 6 8	Saturated medium dense orangish brown fine sand w/some silt and coarse sand, trace 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: US 301 Maryland State Line to SR-1 **Boring No.:** R1-097
Contract: 28-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			21.0'	7	gravel. 20" RECOVERY		
21.6							
25.2		7	24.0' 26.0'	4 6 11 11	Saturated medium dense orangish brown fine sand w/some coarse sand and silt, trace fine gravel. 18" RECOVERY	A-2-4(0)	
28.8		8	28.0' 30.0'	3 8 19 23	Saturated medium dense orangish brown fine sand w/some coarse sand, trace silt and fine gravel. 20" RECOVERY	A-3	
					End of Boring		
32.4							
36							
39.6							
43.2							
46.8							
50.4							
54							

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silty sand
	Well graded sand with silt
	Poorly graded sand with silt

Notes:

1. Exploratory borings were drilled on July 27, 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 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.:** SWM1-45-1

Contract: 25-113-01

Boring Location: STA. 95+58 211' Rt. C.L.

Boring Surface Elev.: + 38.34 **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:** 10.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/15/11		10.0	10.0	5.8	

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: Gary Truver
Helpers: K. Kershaw

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/15/11	1	0.5'	2 3 2	Moist firm brown fine sandy silt w/some coarse sand, fine gravel and clay.	A-4(0)	Topsoil - 8".
			2.0'		13" RECOVERY		
2.35		2	2.0'	4 7	Wet stiff brown clayey fine sandy silt w/some coarse sand and fine gravel.	A-4(0)	
			3.0'		12" RECOVERY		
		2A	3.0'	10 8	Wet medium dense brown fine gravelly fine to coarse sand w/some silt.	A-2-4(0)	
			4.0'		12" RECOVERY		
4.7		3	4.0'	4 8 15 17	Wet medium dense brown silty fine gravelly fine sand w/some coarse sand.	A-2-4(0)	
			6.0'		12" RECOVERY		
7.05		4	6.0'	10 11 17 19	Wet medium dense brown fine gravelly fine to coarse sand w/some silt.	A-1-b	
			8.0'		16" RECOVERY		
9.4		5	8.0'	12 13 13 15	Wet medium dense coarse sand w/some fine sand, trace of fine gravel and silt.	A-1-b	
			10.0'		16" RECOVERY		
11.75					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
	Well graded sand with silt

Notes:

1. Exploratory borings were drilled on February 15, 2011 using 3 1/4 inch diameter continuous flight power auger. Rig is 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: US 301 Maryland State Line to SR-1 **Boring No.:** SWM1-46-1

Contract: 25-113-01

Boring Location: STA. 102+37 116' Lt. C.L.

Boring Surface Elev.: + 45.2 **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
2/17/11		9.8		Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 9.8 **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: K. Kershaw

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/17/11	1	0.0'		Wet brown clayey silt w/some fine to coarse sand, trace of fine gravel.	A-4(5)	Hand Auger
			2.0'		24" RECOVERY		
2.35		2	2.0'		Wet brown clayey coarse sandy silt w/some fine sand, trace of fine gravel.	A-4(1)	Hand Auger
			3.5'		18" RECOVERY		
		3	3.5'		Wet brown fine sand and fine gravel w/some coarse sand, trace of silt and clay.	A-1-b	Hand Auger USDA Classification : Loamy Sand
4.7			5.5'		24" RECOVERY		
		4	5.5'		Wet brown silty fine sand w/some coarse sand, trace of fine gravel.	A-2-4(0)	Hand Auger
7.05							
9.4			10.0'		54" RECOVERY		
					End of Boring		
11.75							

Remarks: Hand Auger

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

Notes:

1. Exploratory borings were drilled on February 17, 2011 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.