

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

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

Boring No.: B-6-01

Contract: 25-113-01

Boring Location:

Boring Surface Elev.: + 54.26

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 26.0

Water Level Readings

Date
2/23/09

Time

Depth of Hole

8.0

Depth of Casing

8.0

Depth of Water

7.5

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 26.0

No. of 2 in. Dia. Shelby Tubes:

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

Ft.;

Ft.;

Dia. U-Sample Boring:

No. of U-Samples:

Core Drilling in Rock:

Ft.

Ft.

Boring Contractor: Walton Corporation

Driller: J. Truver

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/23/09	1	0.5'	1 1 2	Moist soft brown silt w/some fine to coarse sand, trace of gravel.	A-4(0)	Topsoil - 6".
			2.0'		14" RECOVERY		
3		2	2.0'	2 8 10 11	Moist medium dense brown gravel and coarse sand w/some fine sand, trace of silt.	A-1-b	
			4.0'		16" RECOVERY		
		3	4.0'	4 6 6 8	Moist medium dense brown coarse sand w/ some silt and fine sand, trace of gravel.	A-1-b	
6			6.0'		21" RECOVERY		
		4	6.0'	8 9 9 11	Wet medium dense brown coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
			8.0'		17" RECOVERY		
9		5	8.0'	3 4 5 5	Saturated loose greenish brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
			10.0'		20" RECOVERY		
		6	10.0'	4 4 6 8	Saturated loose brownish green silty fine sand w/trace of coarse sand.	A-2-4(0)	
12			12.0'		22" RECOVERY		
		7	12.0'	5 5 7 10	Saturated stiff brownish green fine sandy clay w/some coarse sand, trace of gravel.	A-7-6(6)	
			14.0'		21" RECOVERY		
15		8	14.0'	3 4 4 5	Saturated loose green fine to coarse sand w/ some silt, trace of organic matter and gravel.	A-2-4(0)	
			16.0'		20" RECOVERY		
		9	16.0'	3 4 5 5	Saturated loose green fine to coarse sand w/ some silt, trace of organic matter and gravel.	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: B-6-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		23" RECOVERY		
		10	18.0'	2 3 4	Saturated loose green silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			20.0'		20" RECOVERY		
21		11	20.0'	5 7 9 12	Saturated medium dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			22.0'		20" RECOVERY		
		12	22.0'	10 12 13 19	Saturated medium dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	
24			24.0'		21" RECOVERY		
		13	24.0'	13 50/4"	Saturated very dense green silty fine to coarse sand w/some gravel.	A-2-4(0)	
			26.0'		10" RECOVERY		
27					End of Boring.		
					<div style="font-size: 48px; color: orange; margin: 0;">DRAFT</div> <div style="font-size: 72px; color: orange; margin: 0;">NOT FOR BIDDING</div> <div style="font-size: 72px; color: orange; margin: 0;">AUGUST 2015</div>		
30							
33							
36							
39							
42							
45							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Well graded sand
with silt



Silty sand



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

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

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

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

Boring No.: B-6-02

Contract: 25-113-01

Boring Location:

Boring Surface Elev.: + 50.19

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 26.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/25/09		16.0	16.0	15.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	26.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation

Driller: J. Truver

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/25/09	1	0.0'	3 2 2 2	Moist soft brown clayey fine sandy silt w/ trace of coarse sand.	A-4(2)	
			2.0'		17" RECOVERY		
3		2	2.0'	3 5 7 8	Moist stiff brown clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
			4.0'		20" RECOVERY		
		3	4.0'	8 8 7 6	Moist medium dense brown silty gravel and fine sand w/some coarse sand.	A-2-4(0)	
6			6.0'		18" RECOVERY		
		4	6.0'	8 8 16 14	Moist medium dense brown gravel and coarse to fine sand w/some silt.	A-1-b	
			8.0'		22" RECOVERY		
9		5	8.0'	9 8 11 14	No Sample Recovery		
			10.0'		0" RECOVERY		
		6	10.0'	10 11 5 8	Wet medium dense brown gravel and fine sand w/some silt and coarse sand.	A-1-b	
12			12.0'		12" RECOVERY		
		7	12.0'	9 8 7 7	Wet medium dense brownish green clayey fine sand w/some coarse sand, trace of gravel.	A-2-6(1)	
			14.0'		20" RECOVERY		
15		8	14.0'	4 4 4 4	Saturated firm green clay w/some fine sand, trace of coarse sand and gravel.	A-7-5(25)	Glauconitic
			16.0'		23" RECOVERY		
		9	16.0'	5 6 6	Saturated stiff green fine sandy clay w/some	A-7-6(13)	Glauconitic

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: B-6-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	7	coarse sand, trace of gravel. 21" RECOVERY		
		10	18.0'	5 5 6 6	Saturated medium dense brown clayey coarse to fine sand w/trace of gravel. 20" RECOVERY	A-2-7(0)	
21		11	20.0'	5 7 7 9	Saturated medium dense brown silty coarse to fine sand w/trace of gravel. 20" RECOVERY	A-2-4(0)	
		12	22.0'	4 7 10 13	Saturated medium dense brown silty fine to coarse sand w/trace of gravel. 21" RECOVERY	A-2-4(0)	
24		13	24.0'	7 7 8 14	Saturated medium dense green silty fine sand w/some coarse sand, trace of gravel. 22" RECOVERY	A-2-4(0)	Glauconitic
27			26.0'		End of Boring		
30							
33							
36							
39							
42							
45							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Clayey sand



Elastic silt



High plasticity
clay

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/25/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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

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

Boring No.: B-6-03

Contract: 25-113-01

Boring Location:

Boring Surface Elev.: + 58.57

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 26.0

Water Level Readings

Date
2/25/09

Time

Depth of Hole
14.0

Depth of Casing
14.0

Depth of Water
12.3

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 26.0
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: J. Truver

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/25/09	1	0.5'	3 3 4	Moist stiff brown clayey silt w/trace of coarse to fine sand and gravel. 18" RECOVERY	A-4(6)	Topsoil - 6".
3		2	2.0'	4 5 5 9	Moist loose brown coarse to fine sand w/some silt, trace of gravel. 21" RECOVERY	A-1-b	
		3	4.0'	9 13 20 21	Moist dense brown coarse sand and gravel w/some silt and fine sand. 22" RECOVERY	A-1-b	
6		4	6.0'	9 17 9 16	Moist medium dense brown coarse sand and gravel w/some fine sand and silt. 20" RECOVERY	A-1-b	
		5	8.0'	5 9 8 6	Moist medium dense brown gravel and coarse sand w/some fine sand and silt. 17" RECOVERY	A-1-b	
		6	10.0'	6 8 9 11	Wet very stiff brown fine sandy clay w/trace of coarse sand. 20" RECOVERY	A-7-6(5)	
12		7	12.0'	2 3 4 6	Wet firm green fine sandy silt w/trace of coarse sand. 23" RECOVERY	A-4(0)	
		8	14.0'	3 4 5 5	Saturated loose green silty fine sand w/trace of coarse sand and gravel. 20" RECOVERY	A-2-4(0)	
15		9	16.0'	9 11 14 17	Saturated medium dense green clayey fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	Glauconitic

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: B-6-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		20" RECOVERY		
		10	18.0'	3 4 7 12	Saturated stiff green fine sandy clay w/trace of coarse sand and gravel.	A-7-5(16)	Glauconitic
			20.0'		21" RECOVERY		
21		11	20.0'	3 4 4 7	Saturated firm green fine sandy silt w/some coarse sand, trace of gravel.	A-5(0)	Glauconitic
			22.0'		22" RECOVERY		
		12	22.0'	5 7 7 14	Saturated medium dense brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
24			24.0'		19" RECOVERY		
		13	24.0'	10 14 17 17	Saturated dense green organic silty fine sand w/some coarse sand, trace of gravel.	A-2-5(0)	
			26.0'		22" RECOVERY		
27					End of Boring		
					<div style="font-size: 4em; color: orange; opacity: 0.5;">DRAFT</div> <div style="font-size: 8em; color: orange; opacity: 0.5;">NOT FOR BIDDING</div> <div style="font-size: 8em; color: orange; opacity: 0.5;">AUGUST 2015</div>		
30							
33							
36							
39							
42							
45							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded clayey
silty sand



Clayey sand



Elastic silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/25/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
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DIVISION OF HIGHWAYS**

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

Boring No.: B-7-01

Contract: 25-113-01

Boring Location:

Boring Surface Elev.: + 59.61

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 26.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/20/09		16.0	16.0	14.0	

Pay Quantities:
2 1/2 in. Dia. Dry Sample Boring: 26.0 Ft.;
No. of 2 in. Dia. Shelby Tubes: Ft.;
2 1/2 in. Dia. Contin. Sample Boring: Ft.;
Dia. U-Sample Boring: Ft.
U-Samples: Ft.
Core Drilling in Rock: Ft.

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/20/09	1	0.5'	2 2 3	Wet firm brown clayey silt w/trace of fine to coarse sand. 18" RECOVERY	A-4(5)	Topsoil - 6".
3		2	2.0'	2 2 2	Wet soft gray clayey silt w/some fine sand, trace of coarse sand. 20" RECOVERY	A-4(5)	
		3	4.0'	6 8 11 12	Wet medium dense brown silty fine to coarse sand w/some gravel. 20" RECOVERY	A-2-4(0)	
6		4	6.0'	6 6 8 7	Wet medium dense brownish green clayey fine sand and gravel w/trace of organic matter and coarse sand. 19" RECOVERY	A-2-4(0)	
		5	8.0'	4 4 5 5	Wet loose greenish brown silty fine sand w/some coarse sand and gravel. 20" RECOVERY	A-2-4(0)	
		6	10.0'	7 8 8 10	Wet medium dense greenish brown clayey fine to coarse sand w/trace of gravel. 22" RECOVERY	A-2-7(2)	
12		7	12.0'	8 8 8 10	Wet medium dense green silty fine to coarse sand w/trace of organic matter and gravel. 20" RECOVERY	A-2-4(0)	Glauconitic
		8	14.0'	2 3 3 6	Wet loose green fine to coarse sand w/some silt, trace of organic matter and gravel. 20" RECOVERY	A-2-4(0)	Glauconitic
15		9	16.0'	2 3 6 10	Saturated loose green fine to coarse sand w/some gravel and silt, trace of organic matter.	A-2-4(0)	Glauconitic

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: B-7-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		21" RECOVERY		
		10	18.0'	8 8 11 21	Saturated medium dense green coarse to fine sand w/some silt and gravel, trace of organic matter.	A-1-b	Glaucconitic
			20.0'		20" RECOVERY		
21		11	20.0'	5 8 19 21	Saturated medium dense green silty fine to coarse sand w/some gravel and organic matter.	A-2-4(0)	Glaucconitic
			22.0'		20" RECOVERY		
		12	22.0'	21 50/3"	Saturated very dense green fine to coarse sand and gravel w/some silt and organic matter.	A-1-b	Glaucconitic
24			24.0'		5" RECOVERY		
		13	24.0'	8 11 11	Saturated medium dense green fine to coarse sand w/some silt, trace of gravel and organic matter.	A-2-4(0)	Glaucconitic
			26.0'		22" RECOVERY		
27					End of Boring		
					<div style="font-size: 4em; color: orange; opacity: 0.5;">DRAFT</div> <div style="font-size: 8em; color: orange; opacity: 0.5;">NOT FOR BIDDING</div> <div style="font-size: 8em; color: orange; opacity: 0.5;">AUGUST 2015</div>		
30							
33							
36							
39							
42							
45							

KEY TO SYMBOLS

Symbol Description

Strata symbols

 Silty low plasticity clay

 Low plasticity clay

 Silty sand

 Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

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

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

Boring No.: B-7-02

Contract: 25-113-01

Boring Location:

Boring Surface Elev.: + 58.83

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 26.0

Water Level Readings

Date
2/25/09

Time

Depth of Hole
18.0

Depth of Casing
18.0

Depth of Water
17.9

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 26.0
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: J. Truver

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/25/09	1	0.5'	2 2 3	Moist firm brown fine sandy silt w/some coarse sand and clay, trace of gravel. 14" RECOVERY	A-4(0)	Topsoil - 6".
3		2	2.0'	3 4 4 4	Moist loose brown clayey coarse to fine sand w/trace of gravel. 20" RECOVERY	A-2-6(0)	
		3	4.0'	5 5 7 7	Moist medium dense brown coarse sand w/ some fine sand, silt and gravel. 22" RECOVERY	A-1-b	
6		4	6.0'	9 16 17 18	Moist dense brown coarse sand and gravel w/ some silt, trace of fine sand. 22" RECOVERY	A-1-b	
		5	8.0'	9 10 11 11	Moist medium dense brown gravel and coarse to fine sand w/some silt. 17" RECOVERY	A-1-b	
9		6	10.0'	8 8 9 13	Wet medium dense brown coarse to fine sand w/some silt, trace of gravel. 21" RECOVERY	A-1-b	
12		7	12.0'	14 16 18 30	Wet dense brown coarse sand and gravel w/ some silt and fine sand. 19" RECOVERY	A-1-b	
		8	14.0'	11 8	Wet very stiff brown fine to coarse sandy clay w/trace of gravel. 10" RECOVERY	A-7-6(5)	
15		8A	15.0'	9 7	Wet medium dense green clayey fine to coarse sand w/trace of organic matter and gravel. 10" RECOVERY	A-2-4(0)	Glauconitic
		9	16.0'	11 8 9 9		A-2-4(0)	Glauconitic

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: B-7-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		Wet medium dense green silty fine to coarse sand w/trace of gravel.		
		10	18.0'	8 8 10 11	23" RECOVERY	A-2-4(0)	Glauconitic
			20.0'		Saturated medium dense green silty fine to coarse sand w/trace of gravel.		
			22.0'		22" RECOVERY		
21		11	20.0'	8 11 13 18	Saturated medium dense green silty coarse to fine sand w/trace of gravel.	A-2-5(0)	Glauconitic
			22.0'		23" RECOVERY		
		12	22.0'	13 13 18 18	Saturated dense green silty fine to coarse sand w/trace of gravel.	A-2-5(0)	Glauconitic
24			24.0'		23" RECOVERY		
		13	24.0'	33 40 50/1"	Saturated very dense green coarse to fine sand w/some silt and gravel.	A-2-5(0)	Glauconitic
			26.0'		12" RECOVERY		
27					End of Boring		
					<div style="font-size: 48px; color: orange; margin: 0;">DRAFT</div> <div style="font-size: 72px; color: orange; margin: 0;">NOT FOR BIDDING</div> <div style="font-size: 72px; color: orange; margin: 0;">AUGUST 2015</div>		
30							
33							
36							
39							
42							
45							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Clayey sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/25/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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

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

Boring No.: B-7-03

Contract: 25-113-01

Boring Location:

Boring Surface Elev.: + 61.00

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 26.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/20/09		12.0	12.0	10.2	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	26.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: J. Truver

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/20/09	1	0.5'	1 2	Moist soft brown fine sandy silt w/some clay and coarse sand. 13" RECOVERY	A-4(0)	Topsoil - 7".
3		2	2.0'	2 3 4 3	Moist loose brown silty fine to coarse sand w/ trace of gravel. 21" RECOVERY	A-2-4(0)	
		3	4.0'	3 4 4 5	Moist loose brown silty fine sand w/some coarse sand, trace of gravel. 20" RECOVERY	A-2-4(0)	
6		4	6.0'	3 3 4 3	Wet loose brown silty fine sand w/some coarse sand, trace of gravel. 19" RECOVERY	A-2-4(0)	
9		5	8.0'	3 4 5 3	Wet loose brown coarse to fine sand and gravel w/trace of silt. 22" RECOVERY	A-1-b	
		6	10.0'	5 5 6 12	Wet medium dense brown gravel and coarse to fine sand w/some gravel. 20" RECOVERY	A-1-b	
12		7	12.0'	5 5 4 4	Wet loose brown coarse to fine sand and gravel w/some gravel. 22" RECOVERY	A-1-b	
		8	14.0'	2 2 4 3	Wet loose brown coarse to fine sand w/some silt, trace of gravel. 20" RECOVERY	A-1-b	
15		9	16.0'	5 5 6 7	Wet medium dense brown coarse sand and gravel w/some silt, trace of fine sand.	A-1-b	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: B-7-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		22" RECOVERY		
		10	18.0'	5 7 8 8	Saturated medium dense brownish green fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			20.0'		21" RECOVERY		
21		11	20.0'	3 4 8 11	Saturated medium dense brownish green clayey fine sand w/some coarse sand and gravel.	A-2-7(2)	
			22.0'		21" RECOVERY		
		12	22.0'	5 5 4 5	Saturated loose brown silty coarse to fine sand w/some gravel.	A-2-4(0)	
24			24.0'		21" RECOVERY		
		13	24.0'	3 5 4 4	Saturated loose brown fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
			26.0'		22" RECOVERY		
27					End of Boring		
					<div style="font-size: 4em; color: orange; opacity: 0.5;">DRAFT</div> <div style="font-size: 8em; color: orange; opacity: 0.5;">NOT FOR BIDDING</div> <div style="font-size: 8em; color: orange; opacity: 0.5;">AUGUST 2015</div>		
30							
33							
36							
39							
42							
45							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

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

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

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

Boring No.: BR1-09-01

Contract: 25-113-01

Boring Location: Sta. 545+13.38, 67' Rt. C.L.

Boring Surface Elev.: + 68.62'

Reference:

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

Casing Size: 3 1/4" **Inches** **From Depth of:** 0.0' **To:** 28.5'
Hollow Stem Auger: **From Depth of:**

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/9/2008	9:00 a.m.	12.0'	10.0'	10.7'	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 3 4 6	Moist firm reddish brown fine to coarse sandy silt w/trace of gravel.	A-4(0)	
			2.0'		24" RECOVERY		
3		2	2.0'	4 21 12 11	Moist dense reddish brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			4.0'		12" RECOVERY		
		3	4.0'	3 6 11 10	Moist medium dense reddish brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
6			6.0'		18" RECOVERY		
		4	6.0'	9 8 14 12	Moist medium dense reddish brown fine sand and gravel w/some silt, trace of coarse sand.	A-2-4(0)	
			8.0'		13" RECOVERY		
9		5	8.0'	3 3 3 7	Moist loose dark reddish brown coarse sand w/trace of gravel, silt and fine sand.	A-1-b	
			10.0'		18" RECOVERY		
		6	10.0'	11 10 12 6	Wet medium dense reddish brown coarse to fine sand and gravel w/trace of silt.	A-1-b	
12			12.0'		14" RECOVERY		
		7	12.0'	3 5 7 7	Saturated medium dense reddish brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			14.0'		19" RECOVERY		
15		8	14.0'	1 2 5 5	Saturated loose reddish brown fine to coarse sand w/trace of silt and gravel.	A-3	
			16.0'		24" RECOVERY		
		9	16.0'	5 8 12	Saturated medium dense reddish brown	A-1-b	

Remarks: Mud Rotary starting @ 30.5'

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-09-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	12	coarse to fine sand w/trace of silt and gravel. 24" RECOVERY		
		10	18.0'	7 3 4 7	Saturated loose brown fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
			20.0'				
21							
		11	23.0'	2 5 6 11	Saturated stiff reddish brown and green fine sandy clay w/trace of coarse sand and gravel.	A-7-6(4)	Glauconite
24			25.0'				
		U-1	26.5'		Saturated greenish gray fine sandy clay w/ some coarse sand and organic matter, trace of gravel.	A-7-6(6)	Press Sample - Shelby Tube.
27			28.5'		22" RECOVERY		
		12	28.5'	12 28 28 32	Saturated very dense dark gray and green fine sand w/some coarse sand and silt.	A-2-4(0)	Glauconite
30			30.5'		8" RECOVERY		
33							
		13	33.0'	10 16 21 39	Saturated medium dense green and dark gray silty fine to coarse sand w/some gravel.	A-2-4(0)	Glauconite
			35.0'		24" RECOVERY		
36							
		14	38.0'	26 36 36 37	Saturated very dense green and dark gray organic silty fine to coarse sand w/some gravel.	A-2-4(0)	Glauconite
39			40.0'		24" RECOVERY		
42							
		15	43.0'	7 14 19 20	Saturated dense gray and green fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	Glauconite
45			45.0'		24" RECOVERY		

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

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

Boring No.: BR1-09-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0' 48.7'	42 50/2"	Saturated very dense gray and dark green fine to coarse sand w/some silt, trace of gravel. 6" RECOVERY	A-2-4(0)	Glauconite
51							
54		17	53.0' 53.8'	39 50/3"	Saturated very dense gray and dark green fine sand w/some coarse sand and silt, trace of gravel. 9" RECOVERY	A-2-4(0)	Glauconite
57							
60		18	58.0' 58.8'	36 50/4"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of gravel. 5" RECOVERY	A-2-4(0)	
63							
66		19	63.0' 63.8'	40 50/4"	Saturated very dense gray fine sand w/some coarse sand and silt. 9" RECOVERY	A-2-4(0)	
69		20	68.0' 69.4'	41 47 50/5"	Saturated very dense gray fine sand w/some silt and coarse sand. 13" RECOVERY	A-2-4(0)	
72							
		21	73.0'	40			

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

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

Boring No.: BR1-09-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75			73.7'	50/2"	Saturated very dense gray fine sand w/some silt and coarse sand. 7" RECOVERY	A-2-4(0)	
78		22	78.0'	22 32 42 40	Saturated very dense gray fine sand w/some silt and coarse sand. 24" RECOVERY	A-2-4(0)	
81			80.0'				
84		23	83.0'	19 32 42 50/3"	Saturated very dense gray silty fine sand w/ trace of coarse sand. 21" RECOVERY	A-2-4(0)	
87			84.8'				
90		24	88.0'	25 40 50/3"	Saturated very dense gray fine sand w/some silt, trace of coarse sand. 11" RECOVERY	A-2-4(0)	
93			89.3'				
96		25	93.0'	14 29 30 50/3"	Saturated very dense gray silty fine sand w/ some coarse sand, trace of gravel. 21" RECOVERY	A-2-4(0)	
99			94.8'				
		26	98.0'	6 16 28 21	Saturated hard gray organic fine sandy silt w/ trace of coarse sand.	A-4(0)	
			100.0'		24" RECOVERY		
					Boring Terminated at 100 feet.		

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Sand



High plasticity
clay



Silty sand



Low plasticity
organic silts

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/10/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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

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

Boring No.: BR1-09-02

Contract: 25-113-01

Boring Location: Sta. 547+16.88, 61' Lt. C.L.

Boring Surface Elev.: +65.08'

Reference:

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

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

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

IN.
IN.
IN.
IN.
IN.

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

Inches

From Depth of: 0.0' **To:** 12.0'
From Depth of: **To:**

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
1/15/2008	9:00 a.m.	8.0'	6.0'	7.0'	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Wayne Patterson
Helpers: J. Hillenbrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 2 3 2	Wet firm brown clayey fine sandy silt w/trace of coarse sand and gravel.	A-4(2)	8" Topsoil & Root Mat
			2.0'		8" RECOVERY		
3		2	2.0'	6 9 9	Wet medium dense brown clayey fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			4.0'		24" RECOVERY		
		3	4.0'	3 6 6 7	Wet medium dense brown silty fine sand w/ some coarse sand.	A-2-4(0)	
6			6.0'		17" RECOVERY		
		4	6.0'	4 6 6 8	Wet medium dense brown silty fine sand w/ trace of coarse sand.	A-2-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	6 5 8 7	Saturated medium dense brown coarse to fine sand w/trace of silt and gravel.	A-1-b	
			10.0'		9" RECOVERY		
		6	10.0'	6 7 10 9	Saturated medium dense brown coarse to fine sand w/some gravel, trace of silt.	A-1-b	
12			12.0'		24" RECOVERY		
		7	12.0'	11 5 10 9	Saturated medium dense brown coarse to fine sand and gravel w/some silt.	A-1-b	
			14.0'		9" RECOVERY		
15		8	14.0'	6 5 7 10	Saturated medium dense brown coarse to fine sand w/some silt, trace of gravel.	A-1-b	
			16.0'		14" RECOVERY		
		9	16.0'	6 8 9	Saturated medium dense dark brown and	A-2-4(0)	Glauconite

Remarks: Mud Rotary started @ 12.0'

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-09-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	9	green silty coarse to fine sand w/trace of gravel. 10" RECOVERY		
		10	18.0'	7 8 7 9	Saturated medium dense green and brown clayey fine sand w/some coarse sand, trace of gravel. 18" RECOVERY	A-2-6(0)	Glauconite
21			20.0'				
24		11	23.0'	9 6 9 11	Saturated medium dense green and dark gray clayey fine sand w/some coarse sand. 14" RECOVERY	A-2-4(0)	Glauconite
			25.0'				
27							
30		12	28.0'	8 8 10 13	Saturated medium dense dark gray and green silty fine to coarse sand w/trace of gravel. 24" RECOVERY	A-2-5(0)	Glauconite
			30.0'				
33							
		13	33.0' 33.7'	29 50/2"	Saturated very dense greenish gray silty fine to coarse sand w/trace of gravel. 6" RECOVERY	A-2-5(0)	Glauconite
36							
39		14	38.0'	6 8 10 17	Saturated medium dense dark gray and green silty fine to coarse sand w/trace of organic matter and gravel. 24" RECOVERY	A-2-4(0)	Glauconite
			40.0'				
42							
		15	43.0'	9 20 25 32	Saturated dense gray and green fine to coarse sand w/some silt.	A-2-4(0)	Glauconite
45			45.0'		21" RECOVERY		

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

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

Boring No.: BR1-09-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0'	34 30 30 48	Saturated very dense green and gray fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	Glauconite
			50.0'		24" RECOVERY		
51							
54		17	53.0'	44 50/5"	Saturated very dense greenish gray fine sand w/some silt and coarse sand.	A-2-4(0)	Glauconite
			53.9'		9" RECOVERY		
57							
60		18	58.0'	40 50/3"	Saturated very dense green and gray fine sand w/some silt and coarse sand.	A-2-4(0)	Glauconite
			58.8'		8" RECOVERY		
63		19	63.0'	32 29 24 49	Saturated very dense greenish gray fine sand w/some silt and coarse sand, trace of gravel and shell fragments.	A-2-4(0)	
			65.0'		24" RECOVERY		
66							
69		20	68.0'	37 50/4"	Saturated very dense gray and green fine sand w/some silt and coarse sand.	A-2-4(0)	
			68.8'		10" RECOVERY		
72							
		21	73.0'	21			

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NOT FOR BIDDING
AUGUST 2015

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

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

Boring No.: BR1-09-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				33 49 49	Saturated very dense gray silty fine sand w/ trace of coarse sand.	A-2-4(0)	
75			75.0'		24" RECOVERY Boring Terminated at 75 feet.		
78							
81							
84							
87							
90							
93							
96							
99							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/16/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01
Boring Location: Sta. 545+14.61, 70' Rt. C.L.
Boring Surface Elev.: + 67.02'

Boring No.: BR1-09-03

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

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

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

IN.
IN.
IN.
IN.
IN.

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

Inches

From Depth of: 0.0'
From Depth of:

To: 30.0'
To:

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
1/10/2008	9:00 a.m.	10.0'	8.0'	8.5'	
1/11/2008	9:00 a.m.	12.0'	10.0'	11.6'	

Pay Quantities:

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	2 3 3 3	Wet firm brown fine to coarse sandy silt w/ some clay, trace of gravel.	A-4(0)	8" Topsoil
			2.0'		24" RECOVERY		
3		2	2.0'	2 3 7 5	Wet loose brown silty fine to coarse sand w/ trace of gravel.	A-2-4(0)	
			4.0'		14" RECOVERY		
		3	4.0'	4 6 8 8	Wet medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
6			6.0'		24" RECOVERY		
		4	6.0'	4 6 8 10	Wet medium dense brown coarse to fine sand w/some silt, trace of gravel.	A-1-b	
			8.0'		16" RECOVERY		
9		5	8.0'	6 9 10 10	Saturated medium dense brown coarse sand w/some silt and fine sand, trace of gravel.	A-1-b	
			10.0'		24" RECOVERY		
		6	10.0'	10 12 14 5	Saturated medium dense brown coarse to fine sand w/some gravel and silt.	A-1-b	
12			12.0'		11" RECOVERY		
		7	12.0'	2 10 9 8	Saturated medium dense brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			14.0'		12" RECOVERY		
15		8	14.0'	4 6 6 7	Saturated medium dense brown coarse to fine sand w/trace of silt and gravel.	A-1-b	
			16.0'		24" RECOVERY		
		9	16.0'	11 10 14	Saturated medium dense brown coarse sand	A-1-b	

Remarks: Mud Rotary started @ 30.0'.

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-09-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				15	and gravel w/some fine sand, trace of silt.		
18			18.0'		24" RECOVERY		
		10	18.0'	7 8 7 9	Saturated medium dense brown coarse to fine sand w/trace of silt and gravel.	A-1-b	
			20.0'		23" RECOVERY		
21							
24							
		11	24.0'	6 10 14 17	Saturated medium dense reddish brown silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			26.0'		24" RECOVERY		
27							
		12	28.0'	4 7 12 11	Saturated medium dense dark gray and green silty fine sand w/some coarse sand and organic matter.	A-2-4(0)	Glaucanite
30			30.0'		24" RECOVERY		
33							
		13	33.0' 33.8'	28 50/3"	Saturated very hard dark gray and green organic fine to coarse sandy silt w/trace of gravel.	A-5(0)	Glaucanite
					8" RECOVERY		
36							
39		14	38.0' 38.7'	34 50/2"	Saturated very dense dark green and gray organic silty fine to coarse sand w/trace of gravel and shell fragments.	A-2-5(0)	Glaucanite
					8" RECOVERY		
42							
		15	43.0'	15 20 26 35	Saturated dense dark gray and green silty fine to coarse sand w/trace of gravel.	A-2-4(0)	Glaucanite
45			45.0'		24" RECOVERY		

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

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

Boring No.: BR1-09-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0' 49.4'	16 30 50/5"	Saturated very dense gray and green fine sand w/some silt and coarse sand, trace of gravel. 17" RECOVERY	A-2-4(0)	Glauconite
51							
54		17	53.0' 53.8'	42 50/3"	Saturated very dense gray and green fine sand w/some silt and coarse sand. 8" RECOVERY	A-2-4(0)	Glauconite
57							
60		18	58.0' 59.5'	27 45 60	Saturated very dense gray and green fine sand w/some silt and coarse sand. 18" RECOVERY	A-2-4(0)	Glauconite
63		19	63.0' 63.8'	44 50/4"	Saturated very dense gray and green fine sand w/some coarse sand and silt. 7" RECOVERY	A-2-4(0)	
66							
69		20	68.0' 70.0'	24 54 52 57	Saturated very dense gray and green fine sand w/some silt and coarse sand. 24" RECOVERY	A-2-4(0)	
72							
		21	73.0'	34			

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

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

Boring No.: BR1-09-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75			73.8'	50/4"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of gravel. 8" RECOVERY	A-2-4(0)	
78		22	78.0'	17 24 30 35	Saturated very dense gray silty fine sand w/ trace of coarse sand. 24" RECOVERY	A-2-4(0)	
81			80.0'				
84		23	83.0'	26 40 48 50	Saturated very dense gray silty fine sand w/ trace of coarse sand and gravel. 24" RECOVERY	A-2-4(0)	
87			85.0'				
90		24	88.0'	24 27 38 43	Saturated very dense gray fine sand w/some silt, trace of coarse sand and shell fragments. 24" RECOVERY	A-2-4(0)	
93			90.0'				
96		25	93.0'	7 19 25 33	Saturated hard gray fine sandy silt w/trace of coarse sand. 24" RECOVERY	A-4(0)	
99			95.0'				
		26	98.0'	14 20 27 50	Saturated very dense gray silty fine sand w/ trace of coarse sand and organic matter. 24" RECOVERY	A-2-4(0)	
			100.0'				
					Boring Terminated at 100 feet.		

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Sand



Low plasticity
organic silts

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Notes:

1. Exploratory borings were drilled on 1/11/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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

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

Boring No.: BR1-09-04

Contract: 25-113-01

Boring Location: Sta. 546+43.38, 67' Rt. C.L.

Boring Surface Elev.: + 66.90'

Reference:

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

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

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

IN.
IN.
IN.
IN.
IN.

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

Inches

From Depth of: 0.0' **To:** 14.0'
From Depth of: **To:**

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
1/11/2008	9:00 a.m.	10.0'	8.0'	9.8'	
1/15/2008	9:00 a.m.	10.0'	8.0'	9.0'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 74.42' **Ft.;** **Dia. U-Sample Boring:** **Ft.**
No. of 2 in. Dia. Shelby Tubes: **;** **No. of:** **U-Samples:** **Ft.**
2 1/2 in. Dia. Contin. Sample Boring: **Ft.;** **Core Drilling in Rock:** **Ft.**

Boring Contractor: Walton Corporation
Driller: Wayne Hurd
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	2 2 3 2	Wet firm brown clayey fine sandy silt w/some coarse sand, trace of gravel.	A-4(1)	5" Topsoil
			2.0'		24" RECOVERY		
3		2	2.0'	3 4 6 5	Wet loose brown silty fine to coarse sand w/ trace of gravel.	A-2-4(0)	
			4.0'		21" RECOVERY		
		3	4.0'	2 5 5 4	Wet loose brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
6			6.0'		17" RECOVERY		
		4	6.0'	2 4	Wet loose light brown silty fine sand w/trace of coarse sand and gravel.	A-2-4(0)	
		4A	7.0'	6 6	9" RECOVERY Wet medium dense brown coarse sand and gravel w/some fine sand, trace of silt.	A-1-b	
		5	8.0'	4 4 4 5	10" RECOVERY Wet loose brown coarse sand w/trace of fine sand, silt and gravel.	A-1-b	
9			10.0'		16" RECOVERY		
		6	10.0'	5 7 7 8	Saturated medium dense brown coarse sand w/some gravel, silt and fine sand.	A-1-b	
12			12.0'		24" RECOVERY		
		7	12.0'	1 2	Saturated very loose brown coarse to fine sand w/some gravel, trace of silt.	A-1-b	
		7A	13.0'	3 6	11" RECOVERY Saturated loose light brown coarse to fine sand w/trace of silt and gravel.	A-1-b	
		8	14.0'	3 5 6 7	10" RECOVERY Saturated medium dense light brown coarse to fine sand and gravel w/trace of silt.	A-1-b	
15			16.0'		7" RECOVERY		
		9	16.0'	4 3 8	Saturated medium dense light brown coarse to	A-1-b	

Remarks: Mud Rotary started @ 14.0'.

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-09-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	6	fine sand and gravel w/trace of silt. 24" RECOVERY		
		10	18.0'	4 3 3 6	Saturated loose light brown coarse sand w/ some fine sand, trace of silt and gravel. 15" RECOVERY	A-1-b	
21			20.0'				
24		11	23.0'	3 3 7 5	Saturated stiff brown and green fine sandy clay w/some coarse sand and gravel. 13" RECOVERY	A-7-5(3)	
			25.0'				
27							
		12	28.0'	2 3 3 5	Saturated loose dark green silty fine to coarse sand w/trace of gravel. 22" RECOVERY	A-2-4(0)	Glauconite
30			30.0'				
33							
		13	33.0'	8 12 16 17	Saturated medium dense dark green silty fine to coarse sand w/trace of gravel. 24" RECOVERY	A-2-5(0)	Glauconite
			35.0'				
36							
		14	38.0'	20 25 45 50/2"	Saturated very dense dark green silty fine to coarse sand w/trace of gravel. 16" RECOVERY	A-2-5(0)	Glauconite
39			39.7'				
42							
		15	43.0'	3 5 6 7	Saturated medium dense dark green fine to coarse sand w/some silt, trace of gravel and organic matter. 23" RECOVERY	A-2-4(0)	Glauconite
45			45.0'				

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

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

Boring No.: BR1-09-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0'	5 6 8 12	Saturated medium dense dark green fine sand w/some coarse sand and silt, trace of gravel. 20" RECOVERY	A-2-4(0)	Glauconite
51			50.0'				
54		17	53.0'	7 17 22 23	Saturated dense dark green fine sand w/some coarse sand and silt, trace of gravel. 22" RECOVERY	A-2-4(0)	Glauconite
57			55.0'				
60		18	58.0'	30 50 50/3"	Saturated very dense dark green fine sand w/ some coarse sand, trace of silt. 14" RECOVERY	A-3	Glauconite
63			59.3'				
66		19	63.0'	35 50/4"	Saturated very dense dark green fine to coarse sand w/trace of silt and gravel. 10" RECOVERY	A-3	Glauconite
69			63.8'				
72		20	68.0'	27 49 50/5"	Saturated very dense dark green fine sand w/ some silt and coarse sand, trace of gravel. 16" RECOVERY	A-2-4(0)	
			69.4'				
		21	73.0'	30			

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

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

Boring No.: BR1-09-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				45 50/5"	Saturated very dense green and gray fine sand w/some silt, coarse sand and shell fragments.	A-2-4(0)	
75			74.4'		Boring Terminated at 74.3 feet. 16" RECOVERY		
78							
81							
84							
87							
90							
93							
96							
99							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Sand



High plasticity
clay

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Notes:

1. Exploratory borings were drilled on 1/15/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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

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

Boring No.: BR1-09-05

Contract: 25-113-01

Boring Location: Sta. 546+56.00, 36' Rt. C.L.

Boring Surface Elev.: + 66.29'

Reference:

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

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

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
1/15/2008	10:00 a.m.	12.0'	10.0'	10.08'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	74.33'	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of:	3"	U-Samples: 1
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling In Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: John Foley
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 3 3 4	Wet firm brown silt w/some fine sand and clay, trace of coarse sand and gravel.	A-4(2)	8" Topsoil
			2.0'		18" RECOVERY		
3		2	2.0'	2 4	Wet firm orange clay w/some coarse to fine sand, trace of gravel.	A-6(10)	
		2A	3.0'	5 8	9" RECOVERY	A-2-4(0)	
			4.0'		Wet medium dense reddish brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
		3	4.0'	2 9 8 9	9" RECOVERY		
			6.0'		Wet medium dense reddish brown silty fine sand w/some coarse sand, trace of gravel.		
6		4	6.0'	6 9 11 21	Wet medium dense light brown silty fine sand and gravel w/trace of coarse sand.	A-2-4(0)	
			8.0'		19" RECOVERY		
9		5	8.0'	2 8 7 11	Wet medium dense orange coarse sand w/ some gravel and silt, trace of fine sand.	A-1-b	
			10.0'		18" RECOVERY		
		6	10.0'	8 7 7 8	Saturated medium dense reddish brown coarse sand w/some fine sand, gravel and silt.	A-1-b	
12			12.0'		24" RECOVERY		
		7	12.0'	3 4 6 8	Saturated medium dense orange coarse to fine sand w/trace of silt and gravel.	A-1-b	
			14.0'		19" RECOVERY		
15		8	14.0'	8 4 7 7	Saturated medium dense brown coarse sand and gravel w/some fine sand, trace of silt.	A-1-b	
			16.0'		12" RECOVERY		
		9	16.0'	7 7 6	Saturated medium dense brown gravel and	A-1-b	

Remarks: Mud Rotary started @ 14.0'

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-09-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	5	coarse to fine sand w/some silt. 22" RECOVERY		
		10	18.0' 19.0'	30 9	Saturated dense light brown gravel w/some coarse to fine sand, trace of gravel. 9" RECOVERY	A-1-a	
		10A	19.0' 20.0'	7 4	Saturated medium dense brown fine to coarse sand and gravel w/some silt. 8" RECOVERY	A-2-4(0)	
21							
24		11	23.0' 25.0'	5 4 5 8	Saturated stiff dark green fine sandy clay w/ some coarse sand and gravel. 12" RECOVERY	A-7-6(3)	Glauconite
		U-1	25.0'		Saturated black fine sandy clay w/ trace medium sand sand. 24" RECOVERY	A-7-6(14)	Press Sample - Shelby Tube.
27			27.0'				
		12	28.0' 30.0'	1 3 4 5	Saturated loose dark green clayey fine sand w/some coarse sand, trace of gravel and organic matter. 24" RECOVERY	A-2-6(0)	Glauconite
30							
33							
		13	33.0' 35.0'	6 15 28 48	Saturated dense dark green silty fine to coarse sand w/trace of gravel. 17" RECOVERY	A-2-5(0)	Glauconite
36							
		14	38.0' 40.0'	18 14 11 10	Saturated medium dense dark green silty fine to coarse sand w/some gravel. 22" RECOVERY	A-2-5(0)	Glauconite
39							
42							
		15	43.0' 45.0'	3 5 7 9	Saturated medium dense dark green fine to coarse sand w/some silt, trace of gravel. 22" RECOVERY	A-2-4(0)	Glauconite
45							

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

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

Boring No.: BR1-09-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0'	7 7 11 12	Saturated medium dense dark green fine sand w/some coarse sand, trace of silt and gravel. 24" RECOVERY	A-3	Glauconite
51			50.0'				
54		17	53.0'	16 22 34 50/4"	Saturated very dense green and gray fine sand w/some coarse sand and silt. 17" RECOVERY	A-2-4(0)	Glauconite
57			54.8'				
60		18	58.0'	15 33 50/5"	Saturated very dense green and gray fine sand w/some coarse sand, trace of gravel. 17" RECOVERY	A-3	Glauconite
63			59.4'				
66		19	63.0'	32 47 50/4"	Saturated very dense green fine sand w/some coarse sand and silt. 14" RECOVERY	A-2-4(0)	
69			64.3'				
72		20	68.0'	22 40 47 50/4"	Saturated very dense green and gray fine sand w/some silt and coarse sand, trace of gravel. 16" RECOVERY	A-2-4(0)	
			69.8'				
		21	73.0'	31			

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

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

Boring No.: BR1-09-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				44 50/4"		Saturated very dense gray fine sand w/trace of silt and gravel.	A-2-4(0)
75			74.3'		Boring Terminated at 74.3 feet. 16" RECOVERY		
78							
81							
84							
87							
90							
93							
96							
99							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Low plasticity
clay



Silty sand



Sand



Gravel



High plasticity
clay

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Notes:

1. Exploratory borings were drilled on 1/16/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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

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

Boring No.: BR1-09-06

Contract: 25-113-01

Boring Location: Sta. 545+78.27, 29' Lt. C.L.

Boring Surface Elev.: +67.41'

Reference:

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

Casing Size:	3 1/4"	Inches	From Depth of:	0.0'	To:	30.5'
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
1/14/2008	9:00 a.m.	10.0'	8.0'	8.25'	

Pay Quantities:	2 1/2 in. Dia. Dry Sample Boring:	73.92	Ft.;	Dia. U-Sample Boring:	Ft.
	No. of 2 in. Dia. Shelby Tubes:		;	No. of U-Samples:	Ft.
	2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Gary truver Sr.
Helpers: J. Hillenbrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 3 4 5	Wet firm brown fine to coarse sandy silt w/ trace of clay and gravel.	A-4(0)	6" Topsoil
			2.0'		16" RECOVERY		
3		2	2.0'	5 6 6 6	Wet stiff brown fine sandy silt w/some coarse sand, trace of gravel.	A-4(0)	
			4.0'		14" RECOVERY		
		3	4.0'	2 6 6 7	Wet medium dense brown fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
6			6.0'		18" RECOVERY		
		4	6.0'	5 7 7 7	Wet medium dense brown fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	
			8.0'		17" RECOVERY		
9		5	8.0'	2 3 3 3	Saturated loose light brown fine sand w/some silt, trace of coarse sand and gravel.	A-2-4(0)	
			10.0'		24" RECOVERY		
		6	10.0'	2 10 9 8	Saturated medium dense brown fine to coarse sand and gravel w/some silt.	A-2-4(0)	
12			12.0'		12" RECOVERY		
		7	12.0'	2 6 6 8	Saturated medium dense brown silty coarse to fine sand w/some gravel.	A-2-4(0)	
			14.0'		10" RECOVERY		
15		8	14.0'	3 5 5 6	Saturated loose brown fine to coarse sand w/ some gravel, trace of silt.	A-1-b	
			16.0'		17" RECOVERY		
		9	16.0'	6 7 9	Saturated medium dense brown coarse to fine	A-1-b	

Remarks: Mud Rotary started @ 30.5'.

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-09-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	13	sand w/some gravel, trace of silt. 24" RECOVERY		
		10	18.0'	9 6 6 8	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel. 24" RECOVERY	A-1-b	
21			20.0'				
24		11	23.0'	10 11 13 13	Saturated very stiff greenish brown fine sandy clay w/some coarse sand, trace of gravel. 13" RECOVERY	A-7-6(4)	Glauconite
			25.0'				
27		U-1	26.5'		Saturated green brown clayey fine to coarse sand with a trace of gravel. 24" RECOVERY	A-2-7(2)	Press Sample - Shelby Tube.
			28.5'				
30		12	28.5'	6 8 10 13	Saturated very stiff greenish brown organic fine sandy clay w/some coarse sand, trace of gravel. 16" RECOVERY	A-7-6(2)	Glauconite
			30.5'				
33							
		13	33.0'	11 39 50/4"	Saturated very dense greenish gray organic silty fine to coarse sand w/trace of gravel. 14" RECOVERY	A-2-4(0)	Glauconite
			34.3'				
36							
39		14	38.0' 38.4'	85/5"	Saturated very dense greenish gray silty fine to coarse sand w/trace of gravel. 5" RECOVERY	A-2-4(0)	Glauconite
42							
		15	43.0'	32 39 50/2"	Saturated very dense greenish gray silty fine to coarse sand w/trace of gravel and organic matter. 14" RECOVERY	A-2-4(0)	Glauconite
			44.2'				
45							

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

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

Boring No.: BR1-09-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0' 49.5'	22 34 87	Saturated very dense gray fine sand w/some silt and coarse sand, trace of gravel. 16" RECOVERY	A-2-4(0)	
51							
54		17	53.0' 53.5'	57/6"	Saturated very dense gray fine sand w/some coarse sand and silt, trace of gravel. 4" RECOVERY	A-2-4(0)	
57							
60		18	58.0' 58.8'	42 50/3"	Saturated very dense gray fine sand w/some silt and coarse sand. 8" RECOVERY	A-2-4(0)	
63							
66		19	63.0' 63.8'	39 50/4"	Saturated very dense gray fine sand w/some coarse sand, trace of silt. 10" RECOVERY	A-3	
69		20	68.0' 69.4'	32 45 50/5"	Saturated very dense gray fine sand w/some silt and coarse sand. 14" RECOVERY	A-2-4(0)	
72							
		21	73.0'	40			

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

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

Boring No.: BR1-09-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			73.9'	50/5"	Saturated very dense gray fine sand w/some silt and coarse sand.	A-2-4(0)	
75					Boring Terminated at 73.8 feet. 10" RECOVERY		
78							
81							
84							
87							
90							
93							
96							
99							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Sand



Silty sand



High plasticity
clay



High plasticity
organic clays

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Notes:

1. Exploratory borings were drilled on 1/15/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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

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

Boring No.: BR1-10-01

Contract: 25-113-01

Boring Location: Sta. 496+34.89, 67' Lt. C.L.

Boring Surface Elev.: 49.12

Reference:

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

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

Water Level Readings					
Date 2/15/08	Time	Depth of Hole 6.0'	Depth of Casing 4.0'	Depth of Water 3.0'	Elev. of Water
					46.1
					49.1
					49.1
					49.1

Pay Quantities:

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	3 4 5 9	Wet stiff brown fine sandy silt w/ some coarse sand, trace of organic matter and gravel.	A-4(0)	4" Topsoil
2.49		2	2.0'	3 5	16" RECOVERY Wet stiff brown fine sandy silt w/ some coarse sand and gravel, trace of organic matter and clay.	A-4(0)	
		2A	3.0'	18 14	8" RECOVERY Saturated medium dense brown gravel and coarse sand w/ some silt, trace of fine sand.	A-1-a	
4.98		3	4.0'	4 5 4 5	6" RECOVERY Saturated loose tan coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
		4	6.0'	4 2 7 4	17" RECOVERY Saturated loose orange coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
7.47		5	8.0'	4 5 4 6	24" RECOVERY Saturated stiff brown fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(2)	
9.96		6	10.0'	5 5 8 8	16" RECOVERY Saturated medium dense brown clayey fine to coarse sand, trace of gravel.	A-2-7(1)	
12.45		U-1	12.0'		14" RECOVERY Saturated medium dense green clayey fine to coarse sand.	A-7-6(12)	Press Sample - Shelby Tube.

Remarks: Mud Rotary at 20.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-10-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		7	14.0'	2	23.5" RECOVERY		
14.94			14.0'	4	Saturated firm green fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(2)	
		7A	15.0'	4	10" RECOVERY		
			15.0'	5	Saturated loose green clayey fine to coarse sand, trace of gravel.	A-2-7(1)	
			16.0'		10" RECOVERY		
17.43		8	16.0'	2	Saturated firm dark green fine to coarse sandy clay w/ some organic matter, trace of gravel.	A-7-5(4)	
			16.0'	2			
			16.0'	4			
			16.0'	5			
			18.0'		16" RECOVERY		
		9	18.0'	16	Saturated hard dark green fine to coarse sandy organic silt, trace of gravel.	A-5(0)	
			18.0'	50/5"			
			19.0'		11" RECOVERY		
19.92							
22.41							
		10	24.0'	5	Saturated medium dense dark green silty fine to coarse sand, trace of organic matter and gravel.	A-2-4(0)	
24.9			24.0'	10			
			24.0'	16			
			24.0'	21			
			26.0'		20" RECOVERY		
27.39							
29.88		11	29.0'	10	Saturated dense dark green silty fine sand w/ some coarse sand, trace of gravel and organic matter.	A-2-4(0)	
			29.0'	17			
			29.0'	21			
			29.0'	25			
			31.0'		24" RECOVERY		
32.37							
34.86		12	34.0'	15	Saturated medium dense green silty fine sand w/ some coarse sand, trace of gravel and seashells	A-2-4(0)	
			34.0'	11			
			34.0'	14			
			34.0'	45			
			36.0'		21" RECOVERY		
37.35							

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

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

Boring No.: BR1-10-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		13	39.0'	17 40 41 48	Saturated very dense green silty fine sand w/ some coarse sand, trace of seashells	A-2-4(0)	
			41.0'		20" RECOVERY		
42.33							
44.82		14	44.0'	24 50/5"	Saturated very dense green fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			45.0'		8" RECOVERY		
47.31		PH-1	46.0'	10 35 30 38	Visual Description: Saturated very dense green fine sand w/ some coarse sand, trace of silt and gravel.		Sample brought to GTA lab for pH testing.
			48.0'		20" RECOVERY		
49.8		15	49.0'	21 40 39 41	Saturated very dense green fine sand w/ some silt and coarse sand.	A-2-4(0)	
			51.0'		22" RECOVERY		
52.29							
54.78		16	54.0'	30 31 22 37	Saturated very dense gray silty fine sand w/ some coarse sand.	A-2-4(0)	
			56.0'		24" RECOVERY		
57.27							
59.76		17	59.0'	24 27 31 50	Saturated very dense gray fine sand w/ some silt and coarse sand.	A-2-4(0)	

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DEPARTMENT OF TRANSPORTATION
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Contract: 25-113-01

Boring No.: BR1-10-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		24" RECOVERY		
62.25							
		18	64.0'	19 23 27 32	Saturated dense gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
64.74			66.0'		24" RECOVERY		
67.23							
		19	69.0'	19 20 40 48	Saturated very dense gray fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	
69.72			71.0'		24" RECOVERY		
72.21							
		20	74.0'	22 28 34 58	Saturated very dense gray fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
74.7			76.0'		24" RECOVERY		
					Boring terminated at 76.0 feet.		
77.19							
79.68							
82.17							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Clayey sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 2/15/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: BR1-10-02

Contract: 25-113-01

Boring Location: Sta. 497+54.91, 50' Lt. C.L.

Boring Surface Elev.: 40.68

Reference:

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

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

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/20/08		8.0'	6.0'	6.0'	34.7 40.7 40.7 40.7

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	75.8	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:				Core Drilling in Rock:	Ft.

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	3 3 3 3	Wet firm green-orange clayey fine sandy gravelly silt, trace of coarse sand.	A-4(2)	3" Topsoil
2.49		2	2.0'	3 4 3	8" RECOVERY Wet firm green-orange fine to coarse sandy clay, trace of gravel.	A-7-5(1)	
4.98		3	4.0'	5 6 7 7	15" RECOVERY Wet medium dense green fine to coarse sand w/ some silt, trace of gravel and organic matter.	A-2-4(0)	
7.47		4	6.0'	3 4 5 6	20" RECOVERY Saturated loose black silty fine to coarse sand, trace of gravel and organic matter.	A-2-4(0)	
9.96		5	8.0'	6 7 8	20" RECOVERY Saturated medium dense green silty organic fine to coarse sand w/ some gravel.	A-2-5(0)	
12.45		6	10.0'	10 12 13 16	16" RECOVERY Saturated medium dense green fine to coarse sandy silt, trace of gravel.	A-5(0)	
		U-1	12.0'		14" RECOVERY Saturated medium dense green clayey silty sand, trace of gravel.	A-7-5(3)	Press Sample - Shelby Tube.

Remarks: Mud Rotary at 46.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-10-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		7	14.0' 14.0'	17 52 50/4"	6.25" RECOVERY Saturated very dense green silty fine to coarse sand w/ some gravel and organic matter. 15" RECOVERY	A-2-4(0)	
17.43		8	16.0'	10 19 16 21	Saturated dense green and gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	
19.92		9	18.0' 18.0'	10 12 13 16	22" RECOVERY Saturated medium dense green and gray silty fine to coarse sand, trace of gravel, organic matter, and clay. 22" RECOVERY	A-2-4(0)	
22.41							
24.9		10	24.0'	8 10 15 22	Saturated medium dense green and gray fine to coarse sandy silt, trace of gravel.	A-4(0)	
27.39			26.0'		23" RECOVERY		
29.88		11	29.0' 30.5'	18 37 50/3"	Saturated very dense green and gray fine to coarse sand w/ some silt, trace of gravel. 14" RECOVERY	A-2-4(0)	
32.37							
34.86		12	34.0' 36.0'	13 24 40 50/3"	Saturated very dense green and gray fine sand w/ some silt and coarse sand. 21" RECOVERY	A-2-4(0)	
37.35							

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

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

Boring No.: BR1-10-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		13	39.0'	22 38 50/4"	Saturated very dense green and gray fine sand w/ some silt and coarse sand.	A-2-4(0)	
			40.5'		15" RECOVERY		
42.33							
44.82		14	44.0'	19 44 44 53	Saturated very dense green and gray fine sand w/ some silt and coarse sand.	A-2-4(0)	
			46.0'		20" RECOVERY		
47.31							
49.8		15	49.0'	39 51 50/4"	Saturated very dense green and gray fine sand w/ some silt and coarse sand.	A-2-4(0)	
			50.5'		16" RECOVERY		
52.29							
54.78		16	54.0'	19 26 35 38	Saturated very dense green and gray silty fine sand, trace of coarse sand.	A-2-4(0)	
			56.0'		22" RECOVERY		
57.27							
59.76		17	59.0'	35 50/5"	Saturated very dense gray and green fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	
			60.0'		10" RECOVERY		

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

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

Boring No.: BR1-10-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
64.74		18	64.0' 65.0'	26 50/5"	Saturated very dense gray fine sand w/ some silt, trace of coarse sand and gravel. 8" RECOVERY	A-2-4(0)	
67.23							
69.72		19	69.0' 71.0'	7 27 37 50/5"	Saturated very dense gray fine sand w/ some silt, trace of coarse sand and gravel. 15" RECOVERY	A-2-4(0)	
72.21							
74.7		20	74.0' 75.8'	22 25 39 50/4"	Saturated hard gray fine sandy silt, trace of coarse sand. 17" RECOVERY	A-4(0)	
77.19					Boring terminated at 75.9 feet.		
79.68							
82.17							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/20/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: BR1-10-03

Contract: 25-113-01

Boring Location: Sta. 498+58.38, 73' Rt. C.L.

Boring Surface Elev.: 45.94

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: 26.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/28/08		8.0'	6.0'	6.0'	39.9 45.9 45.9 45.9

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 75.4 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;

3
No. of
Core Drilling in Rock: Ft.

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

Boring Contractor: Walton Corporation
Driller: Cesar
Helpers: A. Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	2 3 4 6	Moist firm brown clayey silt w/ some gravel and fine to coarse sand.	A-4(2)	3" Topsoil
2.49		2	2.0'	8 9 11 12	18" RECOVERY Moist medium dense brown gravel and coarse sand w/ some silt and fine sand.	A-1-b	
4.98		3	4.0'	2 4 5 7	8" RECOVERY Wet loose dark green fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	
7.47		4	6.0'	10 12 12 14	14" RECOVERY Saturated medium dense dark green silty fine to coarse sand, trace of gravel.	A-2-4(0)	
9.96		5	8.0'	2 4 6 10	14" RECOVERY Saturated loose dark green fine to coarse sandy clay, trace of gravel.	A-7-5(3)	
12.45		6	10.0'	3 4 4 6	19" RECOVERY Saturated loose dark green silty fine to coarse sand, trace of gravel.	A-2-4(0)	
		7	12.0'	3 5 5 6	16" RECOVERY Saturated loose dark green silty fine to coarse sand, trace of gravel and seashells.	A-2-4(0)	

Remarks: Mud Rotary at 26.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-10-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	2 2 6 7	12" RECOVERY Saturated loose dark green silty coarse to fine sand w/ some gravel, trace of seashells.	A-2-5(0)	
17.43		9	16.0' 16.0'	8 11 17 20	16" RECOVERY Saturated medium dense dark green fine to coarse sand w/ some gravel and silt, trace of seashells.	A-2-4(0)	
19.92		10	18.0' 18.0'	11 17 10 11	14" RECOVERY Saturated medium dense dark green silty fine to coarse sand, trace of gravel and seashells.	A-2-4(0)	
22.41		U-1	20.0' 20.0'		16" RECOVERY Saturated medium dense dark green clayey fine to coarse sand w/ some silt.	A-2-4(0)	Press Sample - Shelby Tube.
24.9		11	24.0' 24.0'	5 4 6 6	24" RECOVERY Saturated loose gray silty fine to coarse sand, trace of gravel and seashells.	A-2-4(0)	
27.39			26.0'		21" RECOVERY		
29.88		12	29.0' 29.0'	6 7 10 15	Saturated medium dense gray fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
32.37			31.0'		18" RECOVERY		
34.86		13	34.0' 34.0'	11 25 30 49	Saturated very dense green silty fine sand w/ some coarse sand, trace of gravel and seashells.	A-2-4(0)	
37.35			36.0'		24" RECOVERY		

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

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

Boring No.: BR1-10-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	13 17 24 28	Saturated dense green fine sand w/ some silt and coarse sand, trace of gravel and seashells.	A-2-4(0)	
			41.0'		24" RECOVERY		
42.33							
44.82		15	44.0'	18 26 34 42	Saturated very dense green fine sand w/ some silty coarse sand, trace of gravel.	A-2-4(0)	
			46.0'		20" RECOVERY		
47.31							
49.8		16	49.0'	20 28 30 39	Saturated very dense green silty fine sand w/ some coarse sand.	A-2-4(0)	
			51.0'		24" RECOVERY		
52.29							
54.78		17	54.0'	21 26 40 50/3"	Saturated very dense green silty fine sand w/ some coarse sand.	A-2-4(0)	
			56.0'		21" RECOVERY		
57.27		PH-2	56.0'	19 36 50	Visual Description: Saturated very dense green silty fine sand w/ some coarse sand.		Sample brought to GTA lab for pH testing.
			57.5'		16" RECOVERY		
59.76		18	59.0'	13 18 30 50/5"	Saturated dense green fine sand w/ some silt and coarse sand.	A-2-4(0)	

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

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

Boring No.: BR1-10-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		23" RECOVERY		
62.25							
		19	64.0'	8 11 16 22	Saturated medium dense green and gray silty fine sand, trace of coarse sand.	A-2-4(0)	
64.74			66.0'		16" RECOVERY		
67.23							
		20	69.0'	13 16 30 48	Saturated dense green silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
69.72			71.0'		18" RECOVERY		
72.21							
		21	74.0'	13 19 50/5"	Saturated very dense green fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	
74.7			75.4'		17" RECOVERY		
					Boring terminated at 75.4 feet.		
77.19							
79.68							
82.17							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

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Notes:

1. Exploratory borings were drilled on 2/28/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: BR1-10-04

Contract: 25-113-01

Boring Location: Sta. 498+74.89, 67' Lt. C.L.

Boring Surface Elev.: 49.92

Reference:

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

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

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/25/08		6.0'	4.0'	3.5'	46.4
						49.9
						49.9
						49.9

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 74.9 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;

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

Boring Contractor: Walton Corporation
Driller: Johnny
Helpers: A. Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 3 3 3	Moist firm brown clayey gravelly silt w/ some fine to coarse sand.	A-4(1)	4" Topsoil
2.49		2	2.0'	4 8 8 6	4" RECOVERY Moist medium dense brown gravel w/ some coarse to fine sand, trace of silt.	A-1-a	
4.98		3	4.0'	7 13 17 8	6" RECOVERY Wet medium dense orange-brown gravel and coarse to fine sand w/ some silt.	A-1-b	
7.47		4	6.0'	7 9 12 17	12" RECOVERY Saturated medium dense green and brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
9.96		5	8.0'	10 7 5 7	12" RECOVERY Saturated stiff green fine to coarse sandy silt w/ some gravel.	A-4(0)	
12.45		U-1	10.0'		12" RECOVERY No recovery.		Press Sample - Shelby Tube.
		6	12.0'	2 2 2 5	0" RECOVERY Saturated very loose dark green silty fine to coarse sand, trace of gravel and clay.	A-2-4(0)	

Remarks: Mud Rotary at 25.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-10-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		7	14.0' 14.0'	8 17 25 33	16" RECOVERY Saturated dense dark green silty fine to coarse sand w/ some gravel, trace of seashells.	A-2-4(0)	
17.43		8	16.0' 16.0'	8 10 13 14	18" RECOVERY Saturated medium dense dark green silty fine to coarse sand w/ some gravel, trace of seashells.	A-2-5(0)	
19.92		9	18.0' 18.0' 19.5'	9 30 50/5"	18" RECOVERY Saturated very dense dark green silty gravel and fine to coarse sand, trace of seashells. 17" RECOVERY	A-1-b	
22.41							
24.9		10	23.5' 25.5'	8 9 15 21	Saturated medium dense dark green clayey fine to coarse sand, trace of gravel and seashells. 24" RECOVERY	A-2-4(0)	
27.39							
29.88		11	28.5' 30.5'	8 10 16 21	Saturated medium dense dark green silty fine to coarse sand, trace of gravel. 24" RECOVERY	A-2-4(0)	
32.37							
34.86		12	33.5' 35.5'	11 23 30 50/5"	Saturated very dense green fine sand w/ some coarse sand and silt, trace of gravel. 22" RECOVERY	A-2-4(0)	
37.35							

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**STATE OF DELAWARE
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Boring No.: BR1-10-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		13	38.5' 40.0'	18 39 50/5"	Saturated very dense green fine sand w/ some silty coarse sand, trace of seashells. 16" RECOVERY	A-2-4(0)	
42.33							
44.82		14	43.5' 45.0'	22 35 50/5"	Saturated very dense green silty fine sand w/ some coarse sand, trace of seashells. 16" RECOVERY	A-2-4(0)	
47.31							
49.8		15	48.5' 50.5'	15 21 45 50	Saturated very dense green fine sand w/ some silt and coarse sand, trace of gravel and seashells. 20" RECOVERY	A-2-4(0)	
52.29							
54.78		16	53.5' 55.5'	17 28 33 31	Saturated very dense green silty fine sand w/ some coarse sand, trace of seashells. 21" RECOVERY	A-2-4(0)	
57.27							
59.76		17	58.5' 60.5'	18 21 23 33	Saturated dense green fine sand w/ some coarse sand, trace of silt. 20" RECOVERY	A-3	

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

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

Boring No.: BR1-10-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
64.74		18	63.5'	11 14 35 50/5"	Saturated dense green silty fine sand, trace of coarse sand. 17" RECOVERY	A-2-4(0)	
67.23			65.5'				
69.72		19	68.5'	12 24 50/4"	Saturated very dense green fine sand w/ some silt, trace of coarse sand, gravel, and seashells. 15" RECOVERY	A-2-4(0)	
72.21			70.0'				
74.7		20	73.5'	18 34 50/5"	Saturated very dense green to olive-green silty fine sand, trace of coarse sand, gravel, and seashells. 12" RECOVERY	A-2-4(0)	
77.19			75.0'		Boring terminated at 74.9 feet.		
79.68							
82.17							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Well graded gravel
with silt



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 2/25/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: BR1-10-05

Contract: 25-113-01

Boring Location: Sta. 497+04.36, 67' Rt. C.L.

Boring Surface Elev.: 46.01

Reference:

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

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

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/19/08		6.0'	4.0'	2.6'	43.4
						46.0
						46.0
						46.0

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 75.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 5 4 7	Visual Description: Saturated stiff brown silty fine to coarse sand with some clay.		3" Topsoil No sieve analysis.
2.49		2	2.0'	12 25 35 33	3" RECOVERY Visual Description: Moist very dense brown poorly graded gravel w/ some silt.		No sieve analysis.
4.98		3	4.0'	5 9 9 9	2" RECOVERY Saturated medium dense green and dark brown silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
7.47		4	6.0'	8 10 17 13	18" RECOVERY Saturated medium dense dark green and brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
9.96		5	8.0'	2 3 4 6	24" RECOVERY Saturated loose dark green silty fine to coarse sand, trace of organic matter and gravel.	A-2-4(0)	
12.45		6	10.0'	3 4 5 7	20" RECOVERY Saturated loose dark green silty fine to coarse sand, trace of organic matter and gravel.	A-2-4(0)	
		7	12.0'	3 3 5 5	24" RECOVERY Saturated loose dark green silty fine to coarse sand w/ some gravel and organic matter, trace of clay.	A-2-4(0)	

Remarks: Mud Rotary at 16.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-10-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		U-1	14.0' 14.0'		24" RECOVERY Visual Description: Saturated medium dense green fine to coarse sand w/ some silt.		Press Sample - Shelby Tube. Lab testing not performed due to sample recovery.
		8	14.9' 14.9'	18 18 32 37	Saturated dense green silty organic fine to coarse sand, trace of gravel. 9" RECOVERY	A-2-5(0)	
17.43		9	16.9' 16.9'	17 21 50/5"	20" RECOVERY Saturated hard green fine to coarse sandy organic silt, trace of gravel.	A-5(0)	
19.92		10	18.9' 18.9' 19.9'	40 50/2"	13" RECOVERY Saturated very dense green silty coarse to fine sand w/ some gravel, trace of organic matter and seashells. 8" RECOVERY	A-2-4(0)	
22.41							
24.9		11	24.0'	8 9 12 13	Saturated medium dense greenish gray silty fine to coarse sand, trace of gravel and organic matter.	A-2-4(0)	
27.39			26.0'		20" RECOVERY		
29.88		12	29.0' 31.0'	9 12 27 23	Saturated dense gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
32.37					20" RECOVERY		
34.86		13	34.0' 35.5'	29 34 50/3"	Saturated very dense greenish gray silty fine sand w/ some coarse sand, trace of gravel and organic matter. 15" RECOVERY	A-2-4(0)	
37.35							

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**STATE OF DELAWARE
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DIVISION OF HIGHWAYS**

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

Boring No.: BR1-10-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0' 40.5'	16 34 50/4"	Saturated very dense greenish gray silty fine sand w/ some coarse sand, trace of organic matter. 16" RECOVERY	A-2-4(0)	
42.33							
44.82		15	44.0' 45.5'	22 35 50/5"	Saturated very dense greenish gray silty fine sand w/ some coarse sand, trace of gravel and organic matter. 15" RECOVERY	A-2-4(0)	
47.31							
49.8		16	49.0' 50.5'	16 34 50/5"	Saturated very dense greenish gray silty fine sand w/ some coarse sand, trace of organic matter. 16" RECOVERY	A-2-4(0)	
52.29							
54.78		17	54.0' 56.0'	16 39 49 49	Saturated very dense greenish gray silty fine sand w/ some coarse sand, trace of organic matter. 22" RECOVERY	A-2-4(0)	
57.27							
59.76		18	59.0'	19 22 25 39	Saturated hard greenish gray fine sandy silt, trace of coarse sand and organic matter.	A-4(0)	

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

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

Boring No.: BR1-10-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		22" RECOVERY		
62.25							
		19	64.0'	12 24 37 40	Saturated very dense gray silty fine sand, trace of coarse sand and organic matter.	A-2-4(0)	
64.74			66.0'		24" RECOVERY		
67.23							
		20	69.0'	20 24 31 42	Saturated very dense gray fine sand w/ some silt, trace of coarse sand, gravel, and organic matter.	A-2-4(0)	
69.72			71.0'		24" RECOVERY		
72.21							
		21	73.0'	16 28 38 46	Saturated very dense gray silty fine sand, trace of coarse sand and organic matter.	A-2-4(0)	
74.7			75.0'		24" RECOVERY		
					Boring terminated at 75.0 feet.		
77.19							
79.68							
82.17							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Poorly graded gravel
with clay



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/19/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: BR1-10-06

Contract: 25-113-01

Boring Location: Sta. 496+34.95, 30' Lt. C.L.

Boring Surface Elev.: 48.92

Reference:

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

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

Water Level Readings		Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
		2/14/08		10.0'	8.0'	6.5'	42.4 48.9 48.9 48.9

Pay Quantities:

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	3 3 3 4	Wet loose gray silty fine to coarse sand w/ some gravel, trace of organic matter.	A-2-4(0)	16" Cultivated Soils
2.49		2	2.0'	7 10 15 13	24" RECOVERY Wet medium dense brown coarse to fine sand and gravel w/ some silt.	A-1-b	
4.98		3	4.0'	3 7 5 10	19" RECOVERY Wet medium dense brown coarse sand w/ some fine sand, gravel, and silt.	A-1-b	
7.47		4	6.0'	5 4 3 4	15" RECOVERY Saturated loose brown fine to coarse sand and gravel w/ some silt.	A-1-b	
9.96		5	8.0'	3 4 4 6	12" RECOVERY Saturated firm brown fine to coarse sandy clay, trace of gravel.	A-7-5(9)	
12.45		6	10.0'	5 5 6 7	12" RECOVERY Saturated medium dense dark green fine to coarse sand, trace of silt, organic matter and gravel.	A-3	
		7	12.0'	3 2 5 4	14" RECOVERY Saturated loose dark green silty fine to coarse sand, trace of organic matter and gravel.	A-2-4(0)	

Remarks: Mud Rotary at 24.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-10-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		U-1	14.0' 14.0'		14" RECOVERY Saturated medium dense dark green fine to coarse sand w/ some silt.	A-2-4(0)	Press Sample - Shelby Tube.
17.43		8	16.0' 16.0'	5 7 9 11	24" RECOVERY Saturated medium dense dark green organic silty fine to coarse sand, trace of gravel.	A-2-5(0)	
19.92		9	18.0' 18.0'	7 6 10 11	16" RECOVERY Saturated medium dense dark green silty coarse to fine sand, trace of gravel and organic matter.	A-2-4(0)	
22.41			20.0'		22" RECOVERY		
24.9		10	24.0'	8 22 42 50/5"	Saturated very dense dark green silty fine to coarse sand, trace of organic matter, gravel, and seashells.	A-2-4(0)	
27.39			26.0'		23" RECOVERY		
29.88		11	29.0'	10 11 16 16	Saturated medium dense dark green silty fine sand w/ some coarse sand, trace of organic matter and gravel.	A-2-4(0)	
32.37			31.0'		19" RECOVERY		
34.86		12	34.0'	7 5 9 17	Saturated medium dense green silty fine sand w/ some coarse sand, trace of organic matter, gravel, and seashells.	A-2-4(0)	
37.35			36.0'		16" RECOVERY		

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

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

Boring No.: BR1-10-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		13	39.0' 40.0'	38 50/4"	Saturated very dense green fine sand w/ some silt and coarse sand, trace of organic matter. 7" RECOVERY	A-2-4(0)	
42.33							
44.82		14	44.0' 46.0'	14 14 28 39	Saturated dense green fine sand w/ some silt and coarse sand, trace of organic matter. 22" RECOVERY	A-2-4(0)	
47.31							
49.8		15	49.0' 50.0'	23 50/5"	Saturated very dense green fine sand w/ some silt and coarse sand, trace of organic matter and gravel. 18" RECOVERY	A-2-4(0)	
52.29							
54.78		16	54.0' 56.0'	18 21 31 35	Saturated very dense gray-green silty fine sand, trace of coarse sand and organic matter. 20" RECOVERY	A-2-4(0)	
57.27							
59.76		17	59.0'	18 21 28	Saturated dense gray-green silty fine sand w/ some coarse sand, trace of organic matter.	A-2-4(0)	

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

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

Boring No.: BR1-10-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		22" RECOVERY		
62.25							
		18	64.0'	4 9 11 12	Saturated medium dense gray-green silty fine sand, trace of coarse sand and organic matter.	A-2-4(0)	
64.74			66.0'		18" RECOVERY		
67.23							
		19	69.0'	10 13 17 22	Saturated very stiff gray-green fine sandy silt, trace of coarse sand, organic matter, and gravel.	A-4(0)	
69.72			71.0'		24" RECOVERY		
72.21							
		20	74.0'	10 15 23 32	Saturated dense green fine sand, trace of coarse sand, silt, gravel, and organic matter.	A-3	
74.7			76.0'		24" RECOVERY		
					Boring terminated at 76.0 feet.		
77.19							
79.68							
82.17							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Elastic silt



Poorly graded sand
with silt



Poorly graded sand

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Notes:

1. Exploratory borings were drilled on 2/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: BR1-10-07

Contract: 25-113-01

Boring Location: Sta. 498+51.31, 29' Rt. C.L.

Boring Surface Elev.: 48.57

Reference:

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

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

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/27/08		6.0'	4.0'	2.9'	45.7 48.6 48.6 48.6

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Cesar
Helpers: A. Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 3 4 3	Wet firm brown fine sandy silt w/ some clay, coarse sand, and gravel.	A-4(0)	4" Topsoil
			2.0'		15" RECOVERY		
2.49		2	2.0'	2 8 11 26	Wet medium dense brown gravel w/ some coarse to fine sand and silt.	A-1-a	
			4.0'		10" RECOVERY		
4.98		3	4.0'	12 6 4 6	Saturated loose brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			6.0'		13" RECOVERY		
7.47		4	6.0'	5 7 9 11	Saturated medium dense dark brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			8.0'		14" RECOVERY		
9.96		5	8.0'	4 7 9 8	Saturated medium dense orange-brown silty fine to coarse sand w/ some gravel.	A-2-4(0)	
			10.0'		12" RECOVERY		
12.45		6	10.0'	2 3 5 6	Saturated loose dark green silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			12.0'		16" RECOVERY		
		7	12.0'	2 2 2 6	Saturated very loose dark green silty coarse to fine sand, trace of gravel and clay.	A-2-4(0)	

Remarks: Mud Rotary at 25.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-10-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		U-1	14.0' 14.0'		14" RECOVERY Saturated medium dense dark green fine to coarse sand, trace of silt.	A-1-a	Press Sample - Shelby Tube.
17.43		8	16.0' 16.0'	7 17 28 47	19" RECOVERY Saturated dense dark green silty fine to coarse sand, trace of gravel and seashells.	A-2-4(0)	
19.92		9	18.0' 18.0'	16 21 50/5"	18" RECOVERY Saturated dense dark green silty fine to coarse sand w/ some gravel, trace of seashells.	A-2-5(0)	
22.41			20.0'		22" RECOVERY		
24.9		10	24.0'	5 5 8 10	Saturated medium dense dark green and gray clayey fine to coarse sand, trace of gravel.	A-2-4(0)	
27.39			26.0'		20" RECOVERY		
29.88		11	29.0'	2 6 6 12	Saturated medium dense green gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	
32.37			31.0'		17" RECOVERY		
34.86		12	34.0'	13 19 26 36	Saturated dense green fine sand w/ some silt and coarse sand, trace of gravel and seashells.	A-2-4(0)	
37.35			36.0'		21" RECOVERY		

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

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

Boring No.: BR1-10-07

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		13	39.0'	18 24 22 31	Saturated dense green fine sand w/ some silt and coarse sand, trace of seashells.	A-2-4(0)	
			41.0'		21" RECOVERY		
42.33							
44.82		14	44.0'	18 35 50	Saturated very dense green silty fine sand, trace of coarse sand.	A-2-4(0)	
			45.5'		16" RECOVERY		
47.31							
49.8		15	49.0'	19 36 44 50	Saturated very dense green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			51.0'		24" RECOVERY		
52.29							
54.78		16	54.0'	19 24 32 48	Saturated very dense green fine sand w/ some silt and coarse sand.	A-2-4(0)	
			56.0'		24" RECOVERY		
57.27							
59.76		17	59.0'	11 18 27 37	Saturated dense gray fine sand w/ some silt and coarse sand.	A-2-4(0)	

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

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

Boring No.: BR1-10-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		24" RECOVERY		
62.25							
		18	64.0'	10 11 17 24	Saturated medium dense gray silty fine sand, trace of coarse sand.	A-2-4(0)	
64.74			66.0'		20" RECOVERY		
67.23							
		19	69.0'	14 20 32 50/5"	Saturated very dense gray fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	
69.72			71.0'		22" RECOVERY		
72.21							
		20	74.0'	15 33 50/4"	Saturated very dense green fine sand w/ some silt and coarse sand, trace of gravel and seashells.	A-2-4(0)	
74.7			75.5'		14" RECOVERY		
					Boring terminated at 75.3 feet.		
77.19							
79.68							
82.17							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Clayey sand

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Notes:

1. Exploratory borings were drilled on 2/27/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: BR1-10-08

Contract: 25-113-01

Boring Location: Sta 636+69 63 R.T. C.L.

Boring Surface Elev.: + 46.99

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: 18.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	5/14/10		14.0	14.0	10.2	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	75.0	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: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	5/13/10	1	0.0'	2 2 3 4	Moist loose tan silty fine gravel w/some fine to coarse sand and clay.	A-1-b	Forrest Duff - 2"
			2.0'		6" RECOVERY		
3.2		2	2.0'	2 12 15	Moist medium dense tan fine gravel w/some silt and fine to coarse sand, trace of clay.	A-1-b	
			4.0'		17" RECOVERY		
		3	4.0'	18 18 17 8	Moist dense brown fine gravel w/some coarse sand, trace of fine sand and silt.	A-1-a	
			6.0'		11" RECOVERY		
6.4		4	6.0'	12 12 12 12	Wet very stiff green fine sandy clay w/some silt and coarse sand, trace of fine gravel.	A-6(1)	
			8.0'		4" RECOVERY		
		5	8.0'	2 3 5 6	Saturated loose green silty fine to coarse sand w/trace of fine gravel and organic matter.	A-2-4(0)	
9.6			10.0'		21" RECOVERY		
		6	10.0'	5 6 7	Saturated medium dense green clayey fine to coarse sand w/some silt, trace of fine gravel and organic matter.	A-2-4(0)	
			12.0'		24" RECOVERY		
12.8		7	12.0'	2 3 6 10	Saturated loose green silty fine to coarse sand w/trace of fine gravel.	A-2-5(0)	
			14.0'		24" RECOVERY		
		8	14.0'	6 7 11 21	Saturated medium dense green silty fine to coarse sand w/some fine gravel.	A-2-5(0)	
16			16.0'		21" RECOVERY		
		9	16.0'	31 42 50/5"	Saturated very dense green silty fine to coarse sand w/some fine gravel.	A-2-5(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 S.R. 1
Contract: 25-113-01

Boring No.: BR1-10-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
19.2		10	18.0' 18.0'	17 50/5"	17" RECOVERY Saturated very dense green silty coarse to fine sand w/some fine gravel.	A-2-4(0)	Mud Rotary @ 18.0'.
22.4			20.0'		11" RECOVERY		
25.6		11	24.0' 26.0'	5 8 12 14	Saturated medium dense gray clayey fine to coarse sand w/trace of silt and fine gravel. 24" RECOVERY	A-2-4(0)	
28.8							
32		12	29.0' 31.0'	6 11 17 33	Saturated medium dense gray fine sand w/some coarse sand and silt, trace of fine gravel and shell fragments. 21" RECOVERY	A-2-4(0)	
35.2		13	34.0' 36.0'	21 50/5"	Saturated very dense gray fine sand w/some coarse sand and silt, trace of fine gravel. 11" RECOVERY	A-2-4(0)	
38.4							
41.6		14	39.0' 41.0'	13 32 40 50	Saturated very dense gray fine sand w/some silt and coarse sand. 20" RECOVERY	A-2-4(0)	
44.8		15	44.0' 46.0'	16 36 50/5"	Saturated very dense gray fine sand w/some coarse sand and silt. 15" RECOVERY	A-2-4(0)	
48							

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

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

Boring No.: BR1-10-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		16	49.0'	17 30 32 41	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
51.2			51.0'		23" RECOVERY		
54.4		17	54.0'	16 41 50	Saturated very dense gray fine sand w/some coarse sand and silt.	A-2-4(0)	
			56.0'		22" RECOVERY		
57.6							
60.8		18	59.0'	9 21 28 35	Saturated dense gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			61.0'		22" RECOVERY		
64							
		19	64.0'	10 15 20 22	Saturated dense gray fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
			66.0'		21" RECOVERY		
67.2							
70.4		20	69.0'	13 26 46 44	Saturated very dense gray fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
			71.0'		21" RECOVERY		
73.6		21	73.0'	14 24 29 31	Saturated very dense gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			75.0'		22" RECOVERY		
					End of Boring		
76.8							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty clayey gravel



Silty gravel



Well graded gravel
with silt



Clayey sand



Silty sand

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Notes:

1. Exploratory borings were drilled on 5/13/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 Track.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows are uncorrected.

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

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

Boring No.: BR1-10-09

Contract: 25-113-01

Boring Location: Sta. 636+76 63 L.T. C.L.

Boring Surface Elev.: + 45.35

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 16.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
5/14/10		4.0	4.0	3.9	

Pay Quantities:

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	5/13/10	1	0.5'	4 4 6	Moist loose grayish orange fine sandy fine gravel w/some coarse sand and silt. 13" RECOVERY	A-1-b	Topsoil - 6".
3.2		2	2.0'	28 13 8 7	Wet medium dense brownish green fine sand w/some silt, coarse sand and fine gravel. 20" RECOVERY	A-2-4(0)	
		3	4.0'	8 12 10 10	Saturated medium dense green silty fine gravelly coarse to fine sand. 12" RECOVERY	A-1-b	
6.4		4	6.0'	6 6 8 9	Saturated medium dense green silty fine to coarse sand w/some clay, trace of fine gravel. 20" RECOVERY	A-2-4(0)	
9.6		5	8.0'	3 3 4 4	Saturated loose green silty fine to coarse sand w/some organic matter. 18" RECOVERY	A-2-4(0)	
		6	10.0'	5 6 7 10	Saturated medium dense greenish black organic silty fine to coarse sand w/some clay, trace of fine gravel. 19" RECOVERY	A-2-4(0)	
12.8		7	12.0'	4 7 10 12	Saturated medium dense greenish black silty fine to coarse sand w/some fine gravel. 19" RECOVERY	A-2-4(0)	
16		8	14.0'	4 8 11 22	Saturated medium dense greenish black silty fine to coarse sand w/some fine gravel. 20" RECOVERY	A-2-5(0)	
		9	16.0'	50/4"	No Sieve Analysis - Indication of saturated very dense blackish green silty sand w/trace of fine gravel. 4" RECOVERY		Mud Rotary @ 16.0'.
		10	18.0'	8			

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

Boring No.: BR1-10-09

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
19.2			20.0'	28 50/5"	Saturated very dense blackish green silty fine to coarse sand w/trace of fine gravel. 16" RECOVERY	A-2-4(0)	
22.4							
25.6							
28.8	5/14/10	11	23.0'	7 8 12 13	Saturated medium dense gray silty fine to coarse sand w/trace of fine gravel. 22" RECOVERY	A-2-4(0)	
32			25.0'				
35.2		12	28.0'	15 20 30 35	Saturated dense grayish green fine sand w/some silt and coarse sand, trace of fine gravel. 22" RECOVERY	A-2-4(0)	
38.4			30.0'				
41.6			33.0'	35 50/4"			
44.8		13	35.0'		Saturated very dense greenish gray fine sand w/some silt and coarse sand, trace of fine gravel. 10" RECOVERY	A-2-4(0)	
48			38.0'	15 28 42 50/2"			
		14	40.0'		Saturated very dense gray fine and w/some silt and coarse sand. 21" RECOVERY	A-2-4(0)	
			43.0'	24 42 50/3"			
		15	45.0'		Saturated very dense gray fine sand w/some coarse sand and silt, trace of fine gravel and shell fragments. 22" RECOVERY	A-2-4(0)	
			48.0'	17 30			
		16	48.0'		Saturated very dense gray fine sand w/some silt and coarse sand, trace of	A-2-4(0)	

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

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

Boring No.: BR1-10-09

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				33 37	fine gravel and shell fragments.		
			50.0'		21" RECOVERY		
51.2							
		17	53.0'	19 28 31 42	Saturated very dense gray fine sand w/some coarse sand and silt, trace of shell fragments.	A-2-4(0)	
54.4			55.0'		22" RECOVERY		
57.6							
		18	58.0'	15 21 27 29	Saturated dense gray fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
			60.0'		22" RECOVERY		
60.8							
		19	63.0'	15 18 28 21	Saturated dense gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
64			65.0'		22" RECOVERY		
67.2							
		20	68.0'	17 32 33 30	Saturated very dense gray fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
			70.0'		22" RECOVERY		
70.4							
		21	73.0'	15 20 20 21	Saturated dense gray silty fine sand w/trace of coarse sand and fine gravel.	A-2-4(0)	
73.6			75.0'		21" RECOVERY		
76.8					End of Boring		

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 5/13/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 ATV.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows are uncorrected.

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

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

Boring No.: BR1-10-10

Contract: 25-113-01

Boring Location: Sta 638+16 63 L.T. C.L.

Boring Surface Elev.: + 51.30

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: 18.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	5/15/10		8.0	8.0	4.2	

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

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: B. Munyan

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	5/14/10	1	1.0'	11	Moist very stiff brown silt w/some coarse to fine sand and fine gravel.	A-4(0)	Topsoil & Tree
			2.0'	12	12" RECOVERY		
3.2		2	2.0'	11	Moist medium dense brown fine gravelly coarse sand w/some silt and fine sand.	A-1-b	Roots - 12".
				9			
				5			
				6			
			4.0'		15" RECOVERY		
		3	4.0'	6	Moist medium dense brown fine sandy fine gravel w/some coarse sand and silt.	A-1-b	
				16			
				13			
				9			
			6.0'		16" RECOVERY		
6.4		4	6.0'	6	Wet medium dense brown silty fine sand w/some coarse sand, trace of fine gravel.	A-2-4(0)	
				7			
				6			
				11			
			8.0'		20" RECOVERY		
		5	8.0'	4	Saturated firm blackish orange fine to coarse sandy clay w/trace of fine gravel and silt.	A-7-5(2)	
				4			
				4			
				7			
9.6			10.0'		21" RECOVERY		
		6	10.0'	4	Saturated medium dense green fine to coarse sand w/some silt and organic matter, trace of fine gravel.	A-2-4(0)	
				7			
				6			
			12.0'		18" RECOVERY		
		7	12.0'	3	Saturated loose green silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
				3			
				4			
				5			
			14.0'		20" RECOVERY		
		8	14.0'	5	Saturated medium dense green silty fine to coarse sand w/some fine gravel.	A-2-5(0)	
				8			
				9			
			16.0'		20" RECOVERY		
16		9	16.0'	4	Saturated medium dense green silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
				8			
				11			
				10			
			18.0'		19" RECOVERY		
		10	18.0'	10	Saturated very dense green fine to coarse sand and fine gravel w/some	A-1-b	Mud
				16			
				45			

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

Boring No.: BR1-10-10

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
19.2			20.0'	50/5"	silt. 22" RECOVERY		Rotary @ 18.0'.
22.4							
25.6		11	24.0' 26.0'	10 11 10 11	Saturated medium dense green silty fine sand w/some coarse sand, fine gravel and clay. 22" RECOVERY	A-2-4(0)	
28.8							
32		12	29.0' 31.0'	6 9 13 17	Saturated medium dense green fine sand w/some silt and coarse sand, trace of fine gravel. 23" RECOVERY	A-2-4(0)	
35.2							
38.4		13	34.0' 36.0'	14 7 9 24	Saturated medium dense green fine sand w/some coarse sand and silt, trace of fine gravel and shell fragments. 20" RECOVERY	A-2-4(0)	
41.6							
44.8		14	39.0' 41.0'	28 50/4"	Saturated very dense green fine sand w/some coarse sand and silt. 11" RECOVERY	A-2-4(0)	
48							
		15	44.0' 46.0'	31 38 50/4"	Saturated very dense green fine sand w/some silt and coarse sand. 15" RECOVERY	A-2-4(0)	

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

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

Boring No.: BR1-10-10

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks																																																																																		
	5/15/10	16	49.0'	25 50/4"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel and shell fragments. 10" RECOVERY	A-2-4(0)																																																																																			
51.2			51.0'						5/15/10	17	54.0'	17 50/4"	Saturated very dense gray fine to coarse sand w/some silt, fine gravel and shell fragments. 9" RECOVERY	A-3		54.4	56.0'			5/15/10	18	59.0'	28 37 50/3"	Saturated very dense gray fine sand w/some silt and coarse sand. 13" RECOVERY	A-2-4(0)		57.6	61.0'			5/15/10	19	64.0'	23 36 50/3"	Saturated very dense gray silty fine sand w/trace of coarse sand. 14" RECOVERY	A-2-4(0)		60.8	66.0'			5/15/10	20	69.0'	21 38 33 44	Saturated very dense gray fine sand w/some silt, trace of coarse sand and fine gravel. 19" RECOVERY	A-2-4(0)		64	71.0'			5/15/10	21	74.0'	29 39 42 50/5"	Saturated very dense gray fine sand w/some silt, trace of coarse sand and fine gravel. 18" RECOVERY	A-2-4(0)		67.2	76.0'			5/15/10				End of Boring			70.4								73.6								76.8		
	5/15/10	17	54.0'	17 50/4"	Saturated very dense gray fine to coarse sand w/some silt, fine gravel and shell fragments. 9" RECOVERY	A-3																																																																																			
54.4			56.0'						5/15/10	18	59.0'	28 37 50/3"	Saturated very dense gray fine sand w/some silt and coarse sand. 13" RECOVERY	A-2-4(0)		57.6	61.0'			5/15/10	19	64.0'	23 36 50/3"	Saturated very dense gray silty fine sand w/trace of coarse sand. 14" RECOVERY	A-2-4(0)		60.8	66.0'			5/15/10	20	69.0'	21 38 33 44	Saturated very dense gray fine sand w/some silt, trace of coarse sand and fine gravel. 19" RECOVERY	A-2-4(0)		64	71.0'			5/15/10	21	74.0'	29 39 42 50/5"	Saturated very dense gray fine sand w/some silt, trace of coarse sand and fine gravel. 18" RECOVERY	A-2-4(0)		67.2	76.0'			5/15/10				End of Boring			70.4								73.6								76.8													
	5/15/10	18	59.0'	28 37 50/3"	Saturated very dense gray fine sand w/some silt and coarse sand. 13" RECOVERY	A-2-4(0)																																																																																			
57.6			61.0'						5/15/10	19	64.0'	23 36 50/3"	Saturated very dense gray silty fine sand w/trace of coarse sand. 14" RECOVERY	A-2-4(0)		60.8	66.0'			5/15/10	20	69.0'	21 38 33 44	Saturated very dense gray fine sand w/some silt, trace of coarse sand and fine gravel. 19" RECOVERY	A-2-4(0)		64	71.0'			5/15/10	21	74.0'	29 39 42 50/5"	Saturated very dense gray fine sand w/some silt, trace of coarse sand and fine gravel. 18" RECOVERY	A-2-4(0)		67.2	76.0'			5/15/10				End of Boring			70.4								73.6								76.8																								
	5/15/10	19	64.0'	23 36 50/3"	Saturated very dense gray silty fine sand w/trace of coarse sand. 14" RECOVERY	A-2-4(0)																																																																																			
60.8			66.0'						5/15/10	20	69.0'	21 38 33 44	Saturated very dense gray fine sand w/some silt, trace of coarse sand and fine gravel. 19" RECOVERY	A-2-4(0)		64	71.0'			5/15/10	21	74.0'	29 39 42 50/5"	Saturated very dense gray fine sand w/some silt, trace of coarse sand and fine gravel. 18" RECOVERY	A-2-4(0)		67.2	76.0'			5/15/10				End of Boring			70.4								73.6								76.8																																			
	5/15/10	20	69.0'	21 38 33 44	Saturated very dense gray fine sand w/some silt, trace of coarse sand and fine gravel. 19" RECOVERY	A-2-4(0)																																																																																			
64			71.0'						5/15/10	21	74.0'	29 39 42 50/5"	Saturated very dense gray fine sand w/some silt, trace of coarse sand and fine gravel. 18" RECOVERY	A-2-4(0)		67.2	76.0'			5/15/10				End of Boring			70.4								73.6								76.8																																														
	5/15/10	21	74.0'	29 39 42 50/5"	Saturated very dense gray fine sand w/some silt, trace of coarse sand and fine gravel. 18" RECOVERY	A-2-4(0)																																																																																			
67.2			76.0'						5/15/10				End of Boring			70.4								73.6								76.8																																																									
	5/15/10				End of Boring																																																																																				
70.4																																																																																									
73.6																																																																																									
76.8																																																																																									

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 5/14/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a CME 55 ATV.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows are uncorrected.

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

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

Boring No.: BR1-10-11

Contract: 25-113-01

Boring Location: Sta. 638+09 63 R.T. C.L.

Boring Surface Elev.: + 47.51

Reference:

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

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

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	5/14/10		8.0	8.0	4.6	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: B. Munyan

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	5/13/10	1	0.5'	4 4 6	Wet firm brown clayey silt w/some fine to coarse sand and fine gravel.	A-4(1)	Topsoil - 8".
			2.0'		16" RECOVERY		
3.2		2	2.0'	10 9 4 5	Saturated stiff greenish brown fine sandy clay w/some silt, trace of coarse sand and fine gravel.	A-7-6(10)	
			4.0'		14" RECOVERY		
		3	4.0'	4 6 7 13	Saturated stiff greenish brown fine sandy clay w/some silt and coarse sand, trace of fine gravel.	A-6(2)	
			6.0'		14" RECOVERY		
6.4		4	6.0'	7 10 11 12	Saturated medium dense greenish brown clayey fine to coarse sand w/ trace of fine gravel.	A-2-7(1)	
			8.0'		17" RECOVERY		
		5	8.0'	4 6 9 11	Saturated stiff green fine sandy clay w/some silt and coarse sand, trace of fine gravel.	A-7-6(6)	
9.6			10.0'		18" RECOVERY		
		6	10.0'	9 9 10	Saturated very stiff green clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(0)	
			12.0'		18" RECOVERY		
12.8		7	12.0'	7 8 10 11	Saturated medium dense green organic clayey fine to coarse sand w/trace of silt and fine gravel.	A-2-7(1)	
			14.0'		21" RECOVERY		
		8	14.0'	8 11 12 15	Saturated medium dense green organic silty fine to coarse sand w/trace of fine gravel.	A-2-5(0)	
16			16.0'		21" RECOVERY		
		9	16.0'	9 17 23 27	Saturated dense green organic silty fine to coarse sand w/some fine gravel.	A-2-5(0)	
			18.0'		22" RECOVERY		
		10	18.0'	10			

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

Boring No.: BR1-10-11

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
19.2			20.0'	20 29 27	Saturated dense green clayey fine to coarse sand w/some silt, fine gravel and organic matter. 22" RECOVERY	A-2-4(0)	Mud Rotary @ 18.0'.
22.4							
25.6							
28.8							
32							
29.0	5/14/10	12	29.0'	9 16 36 50/4"	Saturated very dense green fine sand w/some silt and coarse sand, trace of fine gravel. 22" RECOVERY	A-2-4(0)	
31.0							
34.0			34.0'	50/4"	Saturated very dense green fine to coarse sand w/trace of fine gravel and silt. 5" RECOVERY	A-3	
36.0							
38.4							
39.0			39.0'	26 21 41 50/3"	Saturated very dense green fine sand w/some silt, trace of coarse sand. 21" RECOVERY	A-2-4(0)	
41.0							
44.0			44.0'	37 49 50/4"	Saturated very dense green fine sand w/some silt and coarse sand. 16" RECOVERY	A-2-4(0)	
46.0							
48							

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

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

Boring No.: BR1-10-11

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		16	49.0'	22 31 50/5"	Saturated very dense green fine sand w/some silt and coarse sand.	A-2-4(0)	
51.2			51.0'		16" RECOVERY		
		17	54.0'	39 50/4"	Saturated very dense green fine sand w/some silt and coarse sand, trace of shell fragments.	A-2-4(0)	
54.4			56.0'		10" RECOVERY		
		18	59.0'	21 26 41 50/5"	Saturated very dense green fine sand w/some silt, trace of coarse sand and shell fragments.	A-2-4(0)	
57.6			61.0'		21" RECOVERY		
		19	64.0'	19 31 50/4"	Saturated very dense green fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
60.8			66.0'		15" RECOVERY		
		20	69.0'	27 41 50/5"	Saturated very dense green fine sand w/some silt, trace of coarse sand, fine gravel and shell fragments.	A-2-4(0)	
64			71.0'		16" RECOVERY		
		21	73.0'	28 50/4"	Saturated very dense green fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
67.2			75.0'		10" RECOVERY		
					End of Boring		
70.4							
73.6							
76.8							

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Silty sand



Silt



Clayey sand



Poorly graded sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 5/13/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows are uncorrected.

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

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

Boring No.: C1-2-1

Contract: 25-113-01

Boring Location: Sta. 555+50, C.L.

Boring Surface Elev.: + 60.43

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 29.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
4/7/2009		6.0	4.0	3.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	60.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: David Burt

Helpers: Hector

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	4/7/09	1	0.0'	2 3 5 8	Wet firm brown clayey silt w/ some coarse sand, trace of coarse sand and gravel.	A-4(3)	
			2.0'		18" RECOVERY		
3		2	2.0'	13 12 13 19	Wet very stiff brown fine to coarse sandy silt w/ some gravel and clay.	A-4(0)	
			4.0'		24" RECOVERY		
		3	4.0'	3 7 7 8	Wet medium dense tan coarse to fine sand, trace of silt and gravel.	A-1-b	
6			6.0'		21" RECOVERY		
		4	6.0'	7 7 7 11	Wet medium dense tan coarse to fine sand, trace of silt and gravel.	A-1-b	
			8.0'		24" RECOVERY		
9		5	8.0'	7 11 13 8	Wet medium dense brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			10.0'		21" RECOVERY		
		6	10.0'	7 6 7 11	Wet medium dense brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
12			12.0'		24" RECOVERY		
		7	12.0'	5 7 7 9	Wet medium dense brown coarse to fine sand, trace of gravel and silt.	A-1-b	
			14.0'		14" RECOVERY		
15		8	14.0'	4 3 4 7	Wet loose orange coarse sand w/ some fine sand, trace of silt and gravel.	A-1-b	
			16.0'		18" RECOVERY		
		9	16.0'	9 8 7	Wet medium dense orange coarse sand w/	A-1-b	

Remarks: Mud Rotary @ 29.0 Feet.

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: C1-2-1

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	9	some silt and fine sand, trace of gravel. 19" RECOVERY		
		10	18.0'	11 13 15 17	Wet medium dense orange coarse sand w/ some fine sand, trace of gravel and silt. 22" RECOVERY	A-1-b	
21			20.0'				
24							
		11	24.0'	7 8 7 14	Wet medium dense orange clayey coarse to fine sand and gravel. 17" RECOVERY	A-2-7(0)	
27			26.0'				
30		12	29.0'	25 34 50/4"	Wet very dense green organic silty fine to coarse sand w/ some gravel. 16" RECOVERY	A-2-4(0)	Mud Rotary @ 29.0'; glauconitic.
			30.5'				
33							
		13	34.0'	10 12 14 16	Wet medium dense green silty fine to coarse sand, trace of organic matter and gravel. 21" RECOVERY	A-2-4(0)	Glauconitic.
36			36.0'				
39							
		14	39.0'	11 17 29 40	Wet dense green fine to coarse sand w/ some silt, trace of organic matter and gravel. 20" RECOVERY	A-2-4(0)	Glauconitic.
42			41.0'				
45		15	44.0'	22 29 50/5"	Wet very dense green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	Glauconitic.

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

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

Boring No.: C1-2-1

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			45.5'		17" RECOVERY		
48							
		16	49.0' 50.0'	35 50	Wet very dense green fine sand w/ some coarse sand, trace of silt. 12" RECOVERY	A-3	Glauconitic.
51							
54							
		17	54.0' 55.0'	39 50/5"	Wet very dense green fine sand w/ some coarse sand and silt. 11" RECOVERY	A-2-4(0)	Glauconitic.
57							
		18	58.0' 59.5'	33 45 50/3"	Wet very dense green fine sand w/ some coarse sand and silt. 11" RECOVERY	A-2-4(0)	Glauconitic.
60					End of Boring		
63							
66							
69							
72							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Poorly graded sand
with silt



Silty sand



Poorly graded sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 4/7/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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

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

Boring No.: C1-2-2

Contract: 25-113-01

Boring Location: Sta. 555+00, 100' Rt. C.L.

Boring Surface Elev.: + 61.66

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 29.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/31/2009		6.0	4.0	3.7	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	60.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation

Driller: David Burt

Helpers: Hector

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/31/09	1	0.0'	2 2 2 3	Moist soft brown clay w/ some fine sand, trace of coarse sand and gravel.	A-6(6)	
			2.0'		13" RECOVERY		
3		2	2.0'	8 9 8 11	Moist very stiff brown clayey gravelly silt w/ some fine to coarse sand.	A-4(1)	
			4.0'		18" RECOVERY		
		3	4.0'	7 8 7 7	Moist medium dense gray coarse to fine sand w/ some gravel, trace of silt.	A-1-b	
6			6.0'		20" RECOVERY		
		4	6.0'	8 7 8 9	Moist medium dense brown coarse sand w/ some silt and fine sand, trace of gravel.	A-1-b	
			8.0'		18" RECOVERY		
9		5	8.0'	8 9 11 10	Moist medium dense brown coarse to fine sand w/ some silt and gravel.	A-1-b	
			10.0'		20" RECOVERY		
		6	10.0'	7 6 3 4	Wet stiff brown clayey coarse sandy silt w/ some fine sand and gravel.	A-4(0)	
12			12.0'		18" RECOVERY		
		7	12.0'	3 4 6 5	Wet loose brown silty coarse to fine sand, trace of gravel.	A-1-b	
			14.0'		18" RECOVERY		
15		8	14.0'	4 6 5 5	Wet medium dense brown coarse sand w/ some fine sand and gravel, trace of silt.	A-1-b	
			16.0'		19" RECOVERY		
		9	16.0'	6 7 9	Wet medium dense brown coarse sand w/	A-1-b	

Remarks: Mud Rotary @ 29.0 Feet.

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: C1-2-2

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	10	some fine sand and gravel, trace of silt. 19" RECOVERY		
		10	18.0'	15 13 12 11	Wet medium dense brown coarse sand w/ some gravel and fine sand, trace of silt. 24" RECOVERY	A-1-b	
21			20.0'				
24							
		11	24.0'	8 9 13 21	Wet medium dense green organic silty fine to coarse sand w/ some gravel. 19" RECOVERY	A-2-4(0)	
27			26.0'				
30		12	29.0' 30.0'	18 50/3"	Wet very dense green organic coarse to fine sand w/ some silt and gravel. 9" RECOVERY	A-1-b	Mud Rotary @ 29.0'.
33							
		13	34.0'	21 28 21 22	Wet dense green clayey fine to coarse sand, trace of gravel. 22" RECOVERY	A-2-4(0)	
36			36.0'				
39							
		14	39.0'	26 29 50/5"	Wet very dense green fine sand w/ some coarse sand and silt, trace of gravel. 17" RECOVERY	A-2-4(0)	
42			40.5'				
45		15	44.0' 45.0'	30 50/4"	Wet very dense green fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	

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

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

Boring No.: C1-2-2

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
					10" RECOVERY		
48							
		16	49.0'	36 41 50/4"	Saturated very dense green fine sand w/ some coarse sand and silt.	A-2-4(0)	
			50.5'		16" RECOVERY		
51							
54							
		17	54.0' 54.5'	50/4"	Saturated very dense green fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
					4" RECOVERY		
57							
		18	58.0'	36 41 50/5"	Saturated very dense green fine sand w/ some coarse sand and silt.	A-2-4(0)	
			59.5'		17" RECOVERY		
60					End of Boring		
63							
66							
69							
72							

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Well graded sand



Silty sand



Well graded sand
with silt



Poorly graded clayey
silty sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/31/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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

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

Boring No.: C1-2-3

Contract: 25-113-01

Boring Location: Sta. 555+00, C.L.

Boring Surface Elev.: + 61.55

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 4.0

Water Level Readings

Date
4/2/2009

Time

Depth of Hole

4.0

Depth of Casing

4.0

Depth of Water

3.1

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 60.0

No. of 2 in. Dia. Shelby Tubes:

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

Ft.;

Ft.;

Dia. U-Sample Boring:

No. of

Core Drilling in Rock:

Ft.

U-Samples:

Ft.

Boring Contractor: Walton Corporation

Driller: David Burt

Helpers: Hector

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	4/2/09	1	0.0'	1 1 2 5	Moist soft gray clayey silt, trace of fine to coarse sand and gravel.	A-4(6)	
			2.0'		18" RECOVERY		
3		2	2.0'	9 11 13 13	Moist very stiff gray clayey gravelly silt w/ some coarse to fine sand.	A-4(1)	
			4.0'		18" RECOVERY		
		3	4.0'	8 11 12 14	Moist medium dense tan and brown coarse sand w/ some fine sand, trace of silt.	A-1-b	
6			6.0'		19" RECOVERY		
		4	6.0'	10 25 15 10	Moist dense tan and brown coarse sand w/ some fine sand, gravel, and silt.	A-1-b	
			8.0'		20" RECOVERY		
9		5	8.0'	8 9 13 18	Moist medium dense brown and orange coarse sand w/ some fine sand and gravel, trace of silt.	A-1-b	
			10.0'		19" RECOVERY		
		6	10.0'	7 9 15 22	Moist medium dense brown and orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
12			12.0'		21" RECOVERY		
		7	12.0'	9 10 11 16	Moist medium dense brown and orange coarse to fine sand, trace of silt and gravel.	A-1-b	
			14.0'		18" RECOVERY		
15		8	14.0'	4 5 8 13	Moist medium dense brown and orange coarse sand w/ some fine sand, trace of silt and gravel.	A-1-b	Washed augers.
			16.0'		17" RECOVERY		
		9	16.0'	9 9 12	Moist medium dense brown and orange	A-1-b	

Remarks: Mud Rotary @ 4.0 Feet.

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: C1-2-3

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	17	coarse sand, trace of gravel, silt, and fine sand. 20" RECOVERY		
		10	18.0'	7 13 13 17	Moist medium dense brown coarse sand w/ some gravel, trace of fine sand and silt. 20" RECOVERY	A-1-b	
21			20.0'				
24							
		11	24.0'	3 4 4 5	Wet loose brown-orange clayey coarse to fine sand, trace of gravel. 19" RECOVERY	A-2-5(0)	Washed augers.
			26.0'				
27		U-1	26.0'				Press Sample - Shelby Tube
			28.0'				
		12	28.0'	5 18 50/4"	Wet very dense brown-green silty coarse to fine sand, trace of gravel. 24" RECOVERY	A-2-4(0)	
30			29.5'				
33							
		13	34.0'	5 9 10 16	Wet medium dense green silty fine to coarse sand, trace of organic matter and gravel. 19" RECOVERY	A-2-4(0)	Glauconitic.
36			36.0'				
39							
		14	39.0'	8 14 21 28	Wet dense green fine sand w/ some coarse sand and silt, trace of gravel and organic matter. 21" RECOVERY	A-2-4(0)	Glauconitic.
			41.0'				
42							
45		15	44.0'	13 12 16 19	Wet medium dense dark gray fine sand w/ some coarse sand and silt, trace of organic	A-2-4(0)	Glauconitic.

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

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

Boring No.: C1-2-3

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		matter and gravel. 24" RECOVERY		
48							
		16	49.0'	27 40 40 50	Wet very dense brown and red fine sand w/ some coarse sand, trace of silt.	A-3	
51			51.0'		21" RECOVERY		
54							
		17	54.0'	25 35 40 50/3"	Wet very dense light gray fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			56.0'		21" RECOVERY		
57							
		18	58.0'	27 39 50/4"	Wet very dense light gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			59.5'		16" RECOVERY		
60					End of Boring		
63							
66							
69							
72							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Well graded sand
with silt



Poorly graded sand
with silt



Silty sand

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AUGUST 2015

Notes:

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

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

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

Boring No.: C1-3-01

Contract: 25-113-01

Boring Location: Sta. 465+30, 100' Lt. C.L.

Boring Surface Elev.: + 58.89

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/27/2009		8.0	6.0	4.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	60.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: J. Truver
Helpers: J. Lafferty/D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/27/09	1	0.5'	3 3 4	Moist firm gray and orange clayey fine sandy gravelly silt w/ some coarse sand.	A-4(0)	Topsoil - 6".
			2.0'		16" RECOVERY		
3		2	2.0'	4 5 6 8	Moist medium dense orange silty fine sand, trace of coarse sand.	A-2-4(0)	
			4.0'		22" RECOVERY		
6		3	4.0'	5 8	Moist dense orange gravel w/ some fine to coarse sand, trace of silt.	A-1-a	
			5.0'		10" RECOVERY		
			6.0'		Wet dense orange-brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
		4	6.0'	5 6 5 8	Wet stiff green-brown fine sandy silt w/ some coarse sand.	A-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	3 4 4 5	Wet firm green-brown fine sandy silt, trace of coarse sand.	A-4(0)	
			10.0'		23" RECOVERY		
		6	10.0'	3 5 7 8	Wet stiff green-brown fine sandy silt, trace of coarse sand and gravel.	A-4(0)	
			12.0'		20" RECOVERY		
12		7	12.0'	4 5 6 11	Wet stiff green-brown fine sandy silt, trace of coarse sand.	A-4(0)	
			14.0'		21" RECOVERY		
15		8	14.0'	5 6 10 10	Wet very stiff orange-green fine sandy silt, trace of coarse sand.	A-4(0)	Mud Rotary @ 14.0.
			16.0'		20" RECOVERY		
		9	16.0'	3 5 7 8	Wet stiff orange-green fine sandy silt, trace of coarse sand.	A-4(0)	

Remarks: Mud Rotary @ 14.0 Feet.

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: C1-3-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18	3/4/09	10	18.0'	3 4 6 6	20" RECOVERY	A-4(0)	
			18.0'		Wet stiff brown-green fine sandy silt, trace of coarse sand.		
21			20.0'		22" RECOVERY		
24		11	24.0'	3 4 7 9	Wet medium dense green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	Glaucanitic.
			26.0'		21" RECOVERY		
27							
30		12	29.0'	4 6 11 12	Wet medium dense green fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	Glaucanitic.
			31.0'		24" RECOVERY		
33							
36		13	34.0'	10 12 13 23	Wet medium dense dark green silty fine to coarse sand w/ some gravel.	A-2-4(0)	Glaucanitic.
			36.0'		23" RECOVERY		
39							
42		14	39.0'	11 13 14 15	Wet medium dense dark green silty fine to coarse sand w/ some gravel.	A-2-4(0)	Glaucanitic.
			41.0'		24" RECOVERY		
45		15	44.0'	12 14 17 28	Wet dense dark gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	

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

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

Boring No.: C1-3-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		24" RECOVERY		
48							
		16	49.0'	10 11 23 27	Wet dense dark gray fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
51			51.0'		24" RECOVERY		
54							
		17	54.0' 55.0'	26 50/4"	Wet very dense dark gray fine sand w/ some silt and coarse sand. 10" RECOVERY	A-2-4(0)	
57							
		18	58.0' 59.0'	48 50/5"	Wet very dense dark gray fine sand w/ some coarse sand and silt. 11" RECOVERY	A-2-4(0)	
60					End of Boring		
63							
66							
69							
72							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Well graded gravel
with silt

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AUGUST 2015

Notes:

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

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

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

Boring No.: C1-3-02

Contract: 25-113-01

Boring Location: Sta. 465+30, C.L.

Boring Surface Elev.: + 58.00

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/5/2009		10.0	8.0	6.3	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	60.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: J. Truver

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/4/09	1	1.0'	3 3	Moist firm brown clayey silt w/ some fine sand, trace of gravel and coarse sand. 12" RECOVERY	A-4(3)	Cultivated Soil - 8".
		2	2.0'	7 7 8 10	Moist stiff gray-orange mottled clayey fine sandy silt, trace of coarse sand and gravel. 12" RECOVERY	A-4(2)	
3		3	4.0'	7 7 8 8	Wet stiff gray-orange mottled fine sandy clay w/ some coarse sand, trace of gravel. 8" RECOVERY	A-7-6(3)	
6		4	6.0'	5 6 8 8	Wet medium dense brown clayey fine sand w/ some coarse sand. 14" RECOVERY	A-2-4(0)	
9		5	8.0'	2 3 5 5	Wet firm brown fine sandy clay w/ some coarse sand, trace of gravel. 14" RECOVERY	A-6(2)	
12		6	10.0'	5 9 11 13	Wet medium dense brown clayey fine sand, trace of coarse sand. 10" RECOVERY	A-2-6(1)	
		7	12.0'	6 7 8 11	Wet stiff brown fine sandy clay, trace of coarse sand. 16" RECOVERY	A-6(1)	
15		8	14.0'	6 8 11 10	Wet very stiff brown fine sandy clay, trace of coarse sand. 16" RECOVERY	A-6(3)	Mud Rotary @ 14.0'.
		9	16.0'	5 6 6 9	Wet stiff brown fine sandy clay, trace of coarse sand.	A-6(1)	

Remarks: Mud Rotary @ 14.0 Feet.

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: C1-3-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/5/09	10	18.0'		19" RECOVERY	A-6(2)	
			18.0'	4 6 7 8	Wet stiff brown-green fine sandy clay, trace of coarse sand and gravel.		
21			20.0'		24" RECOVERY		
24							
		11	24.0'	6 8 9 11	Wet medium dense dark green clayey fine to coarse sand w/ some organic matter.	A-2-4(0)	
			26.0'		19" RECOVERY		
27							
		12	29.0'	3 4 4 3	Wet loose dark green fine to coarse sand w/ some silt, trace of organic matter and gravel.	A-2-4(0)	Glaucanitic.
30			31.0'		24" RECOVERY		
33							
		13	34.0'	18 21 36 38	Wet very dense dark green organic silty fine to coarse sand w/ some gravel.	A-2-5(0)	Glaucanitic.
36			36.0'		22" RECOVERY		
39							
		14	39.0'	19 18 28 19	Wet dense dark green silty fine to coarse sand, trace of organic matter and gravel.	A-2-4(0)	Glaucanitic.
42			41.0'		21" RECOVERY		
45							
		15	44.0'	11 18 26 24	Wet dense dark gray silty fine to coarse sand, trace of organic matter and gravel.	A-2-4(0)	
			46.0'		23" RECOVERY		

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

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

Boring No.: C1-3-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48							
51		16	49.0' 51.0'	16 28 38 50	Wet very dense dark gray fine to coarse sand w/ some silt, trace of organic matter, gravel, and seashell fragments. 24" RECOVERY	A-2-4(0)	
54		17	54.0' 54.5'	50/5"	Wet very dense dark gray fine sand w/ some coarse sand and silt, trace of organic matter and gravel. 5" RECOVERY	A-2-4(0)	
57		18	58.0' 58.5'	50/5"	Wet very dense dark gray fine sand w/ some coarse sand, trace of silt and organic matter. 5" RECOVERY	A-3	
60					End of Boring		
63							
66							
69							
72							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Clayey sand



Silty sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

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

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

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

Boring No.: CI-4-01

Contract: 25-113-01

Boring Location: Sta. 520+00, C.L.

Boring Surface Elev.: + 55.41

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 18.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/24/2009		10.0	8.0	5.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	60.0	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: J. Truver

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/24/09	1	0.5'	3 3 2	Moist loose gray and tan clayey fine to coarse sand, trace of gravel. 16" RECOVERY	A-2-4(0)	Topsoil - 5".
3		2	2.0'	9 10 11 10	Moist medium dense gray and brown gravel and coarse to fine sand w/ some clay. 20" RECOVERY	A-1-b	
		3	4.0'	9 7 6 5	Moist medium dense gray and brown coarse sand w/ some silt and fine sand, trace of gravel. 19" RECOVERY	A-1-b	
6		4	6.0'	3 4 4 7	Wet loose gray coarse sand w/ some silt, trace of fine sand and gravel. 22" RECOVERY	A-1-b	
9		5	8.0'	4 5 5 5	Wet loose brown silty fine to coarse sand and gravel. 17" RECOVERY	A-2-4(0)	Glauconitic.
12		6	10.0'	9 14 14 15	Wet medium dense green clayey fine sand w/ some coarse sand, trace of gravel. 17" RECOVERY		No sieve analysis; glauconitic.
		7	12.0'	6 6 7 7	Indication of wet stiff green sandy lean clay. 2" RECOVERY		
15		8	14.0'	3 5 6 6	Wet medium dense green fine to coarse sand w/ some silt, trace of gravel and organic matter. 21" RECOVERY	A-2-4(0)	Glauconitic.
		U-1	16.0'		Saturated black silty fine to coarse sand trace of gravel.	A-2-4(0)	Press Sample - Shelby Tube

Remarks: Mud Rotary at 18.0 Feet.

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: C1-4-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		24" RECOVERY		
		9	18.0'	7 19 20 21	Wet dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	Mud Rotary @ 18.0'; glauconitic.
			20.0'		23" RECOVERY		
21							
24							
		10	24.0'	40 37 50/3"	Wet very dense green fine to coarse sand w/ some silt and gravel.	A-2-4(0)	Glauconitic.
			25.5'		14" RECOVERY		
27							
30		11	29.0'	10 15 18 25	Wet dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	Glauconitic.
			31.0'		23" RECOVERY		
33							
36		12	34.0'	9 13 29 35	Wet dense gray fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	Glauconitic.
			36.0'		23" RECOVERY		
39							
42		13	39.0'	18 32 38 45	Wet very dense green fine sand w/ some coarse sand and silt.	A-2-4(0)	Glauconitic.
			41.0'		23" RECOVERY		
45		14	44.0'	17 20 22 22	Wet dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	

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

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

Boring No.: C1-4-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		23" RECOVERY		
48							
		15	49.0'	25 33 50/5"	Wet very dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
51			50.5'		17" RECOVERY		
54							
		16	54.0'	18 23 25 24	Wet dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			56.0'		23" RECOVERY		
57							
		17	58.0'	22 28 38 50	Wet very dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
60			60.0'		22" RECOVERY		
					End of Boring		
63							
66							
69							
72							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Clayey sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/24/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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

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

Boring No.: C1-5-01

Contract: 25-113-01

Boring Location: Sta. 520+00, 30' Rt. C.L.

Boring Surface Elev.: + 53.68

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	130	Lbs.	Average Fall:	40	IN.
Type of:	D-Sampler: Split Spoon	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To: 58.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
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Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	60.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	6/25/09	1	0.5'	4 5 5	Moist stiff brown clayey gravelly silt w/ some fine to coarse sand.	A-4(1)	Topsoil - 5".
			2.0'		10" RECOVERY		
3		2	2.0'	6 7 6 18	Moist stiff brown clayey gravelly silt w/ some fine sand, trace of coarse sand.	A-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	8 4 7 8	Moist medium dense tan coarse sand w/ some gravel and silt, trace of fine sand.	A-1-b	
6			6.0'		13" RECOVERY		
		4	6.0'	8 7 7 10	Wet medium dense orange coarse sand w/ some gravel, trace of silt and fine sand.	A-1-b	
			8.0'		19" RECOVERY		
9		5	8.0'	8 10 5 8	Wet medium dense brown gravel and fine sand w/ some silt and coarse sand.	A-1-b	
			10.0'		14" RECOVERY		
		6	10.0'	7 11 10 10	Wet very stiff green fine sandy clay, trace of coarse sand and gravel.	A-6(2)	
12			12.0'		16" RECOVERY		
		7	12.0'	3 3 5 7	Wet loose green silty fine to coarse sand, trace of gravel.	A-2-4(0)	Glauconitic.
			14.0'		18" RECOVERY		
15		8	14.0'	3 3 6 7	Wet loose greenish gray clayey fine sand w/ some coarse sand and gravel.	A-2-4(0)	Glauconitic.
			16.0'		20" RECOVERY		
		9	16.0'	8 10 19 17	Wet medium dense gray silty fine to coarse sand w/ some gravel.	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: C1-5-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		15" RECOVERY		
		10	18.0'	10 14 20 19	Wet dense gray silty fine to coarse sand w/ some gravel.	A-2-4(0)	
			20.0'		21" RECOVERY		
21							
24							
		11	24.0'	7 7 6 11	Wet medium dense gray fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
			26.0'		21" RECOVERY		
27							
30		12	29.0'	4 5 6 8	Wet medium dense gray fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			31.0'		22" RECOVERY		
33							
36		13	34.0'	11 14 33 50/4"	Wet dense gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			36.0'		21" RECOVERY		
39							
		14	39.0'	18 23 22 17	Wet dense gray fine sand, trace of coarse sand, gravel, and silt.	A-3	
			41.0'		23" RECOVERY		
42							
45		15	44.0'	13 16 16 23	Wet dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	

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

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

Boring No.: C1-5-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		20" RECOVERY		
48							
		16	49.0'	20 29 22 24	Wet very dense brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
51			51.0'		20" RECOVERY		
54		17	54.0'	12 10	Wet medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
		17A	55.0'	15 21	9" RECOVERY	A-2-4(0)	
			56.0'		Wet medium dense gray fine sand w/ some silt and coarse sand, trace of gravel.		
57					10" RECOVERY		
60		18	59.0'	20 26 39 50/4"	Wet very dense brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
			61.0'		19" RECOVERY		
					End of Boring		
63							
66							
69							
72							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Poorly graded sand
with silt



Silty sand



Clayey sand



Poorly graded sand

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Notes:

1. Exploratory borings were drilled on 6/25/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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

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

Boring No.: C1-5-02

Contract: 25-113-01

Boring Location: Sta 520+00, 60' Lt. C.L.

Boring Surface Elev.: + 41.30

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 18.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
6/25/2009		10.0	8.0	5.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	60.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	6/25/09	1	0.5'	3 4 5	Moist stiff tan clayey coarse sandy gravelly silt w/ some fine sand. 14" RECOVERY	A-4(0)	Topsoil - 4".
3		2	2.0'	6 4 6 7	Moist loose tan coarse to fine sand w/ some silt and gravel. 19" RECOVERY	A-1-b	
		3	4.0'	4 7 7 7	Moist medium dense tan coarse sand w/ some silt, fine sand, and gravel. 17" RECOVERY	A-1-b	
6		4	6.0'	17 15 11 6	Moist medium dense orange coarse sand and gravel w/ some fine sand and silt. 14" RECOVERY	A-1-b	
		5	8.0'	3 4 3 6	Wet firm brown fine sandy clay, trace of gravel and coarse sand. 17" RECOVERY	A-7-6(4)	
		6	10.0'	6 6 9 13	Wet stiff brownish-green fine sandy clay, trace of coarse sand and gravel. 21" RECOVERY	A-6(5)	
12		7	12.0'	3 5 6 11	Wet stiff green fine sandy clay, trace of coarse sand and gravel. 23" RECOVERY	A-7-6(7)	
		8	14.0'	3 6 6 6	Wet medium dense green silty fine to coarse sand. 19" RECOVERY	A-2-4(0)	
15		9	16.0'	4 4 4 6	Wet loose greenish-gray clayey fine to coarse sand w/ some gravel.	A-2-5(0)	

Remarks: Mud Rotary @ 18.0 Feet.

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: C1-5-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		17" RECOVERY		
		10	18.0'	4 6 12 29	Wet medium dense greenish-gray silty fine to coarse sand w/ some gravel.	A-2-4(0)	Mud Rotary @ 18.0'.
			20.0'		22" RECOVERY		
21							
24							
		11	24.0'	23 25 17 33	Wet dense gray fine to coarse sand and gravel w/ some silt.	A-1-b	
			26.0'		23" RECOVERY		
27							
30		12	29.0'	25 20 17 15	Wet dense gray fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			31.0'		22" RECOVERY		
33							
36		13	34.0'	10 20 26 45	Wet dense gray fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			36.0'		22" RECOVERY		
39							
42		14	39.0'	10 12 11 10	Wet medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			41.0'		23" RECOVERY		
45		15	44.0'	13 14 14 15	Wet medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	

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

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

Boring No.: C1-5-02

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		21" RECOVERY		
48							
		16	49.0'	14 16 25 19	Wet dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
51			51.0'		17" RECOVERY		
54							
		17	54.0'	12 18 22 32	Wet dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			56.0'		20" RECOVERY		
57							
60		18	59.0' 60.0'	29 50	Wet very dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
					9" RECOVERY End of Boring		
63							
66							
69							
72							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Clayey sand



Low plasticity
clay



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/25/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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

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

Boring No.: IT1-1

Contract: 28-113-01

Boring Location: Sta. 462+00, 87.00' Rt. C.L.

Boring Surface Elev.: + 62.1

Reference:

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

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

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	6/29/2009		14.0	14.0	7.6	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	6/29/09	1	0.5'	3 4 6	Moist stiff brown mottled clayey silt w/some gravel, trace of fine to coarse sand. 17" RECOVERY	A-4(5)	Topsoil - 5".
3		2	2.0'	7 9 11 10	Moist medium dense tan silty coarse to fine sand w/trace of gravel. 13" RECOVERY	A-2-4(0)	
		3	4.0'	4 8 8 9	Wet medium dense tan coarse to fine sand w/some silt and gravel, trace of clay. 18" RECOVERY	A-1-b	USDA Classifica - Sandy Loam.
6		4	6.0'	5 6 7 8	Wet medium dense tan silty fine to coarse sand w/trace of gravel. 17" RECOVERY	A-2-4(0)	
		5	8.0'	11 25 24 18	No Sample Recovery		
9		6	10.0'	8 20 9 11	Wet medium dense brown fine to coarse sand and gravel w/some silt. 6" RECOVERY	A-1-b	
		7	12.0'	8 6 7 9	Wet stiff brown fine sandy clay w/some coarse sand, trace of gravel. 16" RECOVERY	A-6(2)	
12		8	14.0'	7 7 8 12	Wet stiff brown fine sandy clay w/some coarse sand, trace of gravel. 13" RECOVERY	A-6(1)	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Clayey sand

DRAFT
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AUGUST 2015

Notes:

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

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

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

Boring No.: IT1-10

Contract: 28-113-01

Boring Location: Sta. 522+00, 120.00' Rt. C.L.

Boring Surface Elev.: + 57.34

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:	0.0	To:	
	Hollow Stem Auger:		From Depth of:	14.0	To:	14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/20/2009		8.0'	6.0'	7.3'	
	3/21/2009				6.9	

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

Boring Contractor: Walton Corporation
Driller: David
Helpers: Herberto

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/20/09	1	0.0'	2 3 5 5	Moist firm brownish gray clay w/some gravel, trace of fine to coarse sand.	A-6(6)	
			2.0'		16" RECOVERY		
3		2	2.0'	5 11 10 10	Moist medium dense grayish orange clayey gravel w/some fine to coarse sand.	A-2-4(0)	
			4.0'		17" RECOVERY		
6		3	4.0'	20 33 33 31	Moist very dense brownish black clayey gravel and coarse to fine sand.	A-2-4(0)	
			6.0'		19" RECOVERY		
		4	6.0'	22 11 20 14	Moist dense brown coarse sand w/some silt and fine sand, trace of gravel.	A-1-b	
			8.0'		18" RECOVERY		
9		5	8.0'	5 8 10 7	Wet medium dense brown silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
		6	10.0'	5 6 7 9	Wet medium dense orange fine sand w/some coarse sand and silt.	A-2-4(0)	
12			12.0'		18" RECOVERY		
		7	12.0'	3 3 3 4	Wet loose orange fine sand w/some silt, trace of coarse sand and gravel.	A-2-4(0)	
			14.0'		20" RECOVERY		
15		8	14.0'	4 6 6 10	Wet medium dense orange silty fine sand w/trace of coarse sand and gravel.	A-2-4(0)	
			16.0'		20" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

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Notes:

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

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

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

Boring No.: IT1-11

Contract: 28-113-01

Boring Location: Sta. 517+00, 87.00' Rt. C.L.

Boring Surface Elev.: + 58.0

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/14/2009		10.0	8.0	7.3	

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

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	7/14/09	1	0.5'	5 5 6	Moist stiff tan and gray clayey silt w/some fine sand, trace of coarse sand and gravel. 18" RECOVERY	A-4(4)	Cultivated Soil - 5"
		2	2.0'	5 9 8 12	Moist very stiff tan and gray fine sandy silt w/some coarse sand and clay, trace of gravel. 16" RECOVERY	A-4(0)	
6		3	4.0'	5 10 14 12	Moist medium dense tan silty coarse sand w/some fine sand and gravel. 13" RECOVERY	A-1-b	
		4	6.0'	10 10	Moist medium dense tan clayey coarse sand w/some silt and fine sand, trace of gravel. 12" RECOVERY	A-2-6(0)	
9		4A	7.0'	8 8	Moist medium dense brown coarse sand and gravel w/some fine sand, trace of silt. 9" RECOVERY	A-1-b	
		5	8.0'	7 13 10 12	Wet medium dense orange coarse sand w/some gravel and silt, trace of fine sand. 17" RECOVERY	A-1-b	
12		6	10.0'	3 8 12 9	Wet medium dense orangish green coarse sand w/trace of fine sand, silt and gravel. 24" RECOVERY	A-1-b	
		7	12.0'	4 8 7 6	Wet medium dense orange coarse sand w/some fine sand and gravel, trace of silt. 23" RECOVERY	A-1-b	
15		8	14.0'	7 9 10 15	Wet medium dense orange coarse to fine sand w/some silt, trace of gravel. 23" RECOVERY	A-1-b	
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

	Low plasticity clay
	Silty low plasticity clay
	Silty sand
	Clayey sand
	Well graded sand with silt
	Poorly graded sand with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-15

Contract: 28-113-01

Boring Location: Sta. 537+00, 87.00' Rt. C.L.

Boring Surface Elev.: + 67.0

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings
Date 7/14/2009
Time

Depth of Hole 14.0
Depth of Casing 12.0
Depth of Water 8.0
Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0 Ft.;
No. of 2 in. Dia. Shelby Tubes: ;
2 1/2 in. Dia. Contin. Sample Boring: Ft.;
Dia. U-Sample Boring: Ft.
U-Samples:
Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: David Burt
Helpers: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	5 3 4	Moist firm brown clayey silt w/trace of coarse to fine sand and gravel.	A-4(4)	
			2.0'		13" RECOVERY		
3		2	2.0'	9 11 12 15	Moist medium dense tan coarse to fine sand w/some silt, trace of gravel.	A-1-b	
			4.0'		16" RECOVERY		
		3	4.0'	10 13 16 15	Moist medium dense brownish tan silty coarse to fine sand w/trace of gravel and clay.	A-2-4(0)	USDA Classifica - Loamy Sand.
6			6.0'		15" RECOVERY		
		4	6.0'	13 10 10 9	Moist medium dense brownish tan coarse sand w/some fine sand and silt, trace of gravel.	A-1-b	
			8.0'		17" RECOVERY		
9		5	8.0'	4 5 4 5	Wet loose tan coarse to fine sand w/some silt, trace of gravel.	A-1-b	
			10.0'		16" RECOVERY		
		6	10.0'	6 7 8 9	Wet medium dense tan coarse to fine sand w/trace of gravel and silt.	A-1-b	
12			12.0'		24" RECOVERY		
		7	12.0'	4 8 8 5	Wet medium dense tan coarse sand and gravel w/trace of fine sand and silt.	A-1-b	
			14.0'		10" RECOVERY		
15		8	14.0'	9 7 7 8	Wet medium dense tan coarse sand w/some fine sand and gravel, trace of silt.	A-1-b	
			16.0'		20" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Well graded sand
with silt



Well graded sand

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-16

Contract: 28-113-01

Boring Location: Sta. 544+00, 130.00' Lt. C.L.

Boring Surface Elev.: + 67.9

Reference:

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

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

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
3/27/2009		12.0'	10.0'	10.0'	
3/28/2009				Dry	

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

Boring Contractor: Walton Corporation
Driller: David
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/27/09	1	0.0'	2 2 2 4	Moist soft brown clayey silt w/some fine to coarse sand, trace of gravel.	A-4(4)	
			2.0'		16" RECOVERY		
3		2	2.0'	4 9 13 16	Moist medium dense brown silty fine sand w/some coarse sand and gravel.	A-2-4(0)	
			4.0'		20" RECOVERY		
		3	4.0'	9 13 14 9	Moist medium dense brown silty fine to coarse sand w/some gravel and clay.	A-2-4(0)	
6			6.0'		21" RECOVERY		
		4	6.0'	13 10 7 8	Moist medium dense brown coarse to fine sand w/some silt, trace of gravel.	A-1-b	
			8.0'		22" RECOVERY		
9		5	8.0'	5 4 5 8	Wet loose brown coarse to fine sand w/some silt, trace of gravel.	A-1-b	
			10.0'		18" RECOVERY		
		6	10.0'	11 8 11 6	Wet medium dense brown coarse to fine sand and gravel w/trace of silt.	A-1-b	
12			12.0'		23" RECOVERY		
		7	12.0'	2 3 3 5	Wet loose brown silty fine to coarse sand w/some gravel.	A-2-4(0)	
			14.0'		20" RECOVERY		
15		8	14.0'	8 7 5 8	Wet medium dense brown fine to coarse sand w/some gravel and silt.	A-2-4(0)	
			16.0'		24" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-2

Contract: 28-113-01

Boring Location: Sta. 467+00, 108.00' Lt. C.L.

Boring Surface Elev.: + 61.5

Reference:

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

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

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
6/29/2009		14.0	14.0	7.7	

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: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	6/29/09	1	0.5'	5 5 7	Moist stiff tan mottled clayey silt w/some fine sand, trace of coarse sand and gravel. 16" RECOVERY	A-4(3)	Topsoil - 5".
3		2	2.0'	13 7 7 8	Moist medium dense tan mottled silty fine sand w/trace of gravel and coarse sand. 14" RECOVERY	A-2-4(0)	
		3	4.0'	5 5 7 8	Moist to wet medium dense orange silty fine sand w/some coarse sand and gravel. 18" RECOVERY	A-2-4(0)	
6		4	6.0'	4 5 6 5	Wet medium dense orange fine to coarse sand and gravel w/some silt. 14" RECOVERY	A-2-4(0)	
		5	8.0'	4 5 6 5	Wet stiff brown fine sandy silt w/some coarse sand, trace of gravel. 16" RECOVERY	A-4(0)	
9		6	10.0'	3 5 6 7	Wet stiff brown fine sandy clay w/some coarse sand. 17" RECOVERY	A-6(1)	
12		7	12.0'	5 5 6 9	Wet stiff brown fine sandy clay w/trace of coarse sand. 16" RECOVERY	A-6(2)	
		8	14.0'	6 7 9 11	Wet medium dense brown clayey fine sand w/trace of coarse sand. 15" RECOVERY	A-2-6(1)	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

 Silty low plasticity clay

 Silty sand

 Clayey sand

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NOT FOR BIDDING
AUGUST 2015

Notes:

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

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

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

Boring No.: IT1-21

Contract: 28-113-01

Boring Location: Sta. 568+00, 93.00' Rt. C.L.

Boring Surface Elev.: + 66.0

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: 14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/10/2009		12.0	10.0	9.7	

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: Dave Burt
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.5'	8 9 10	Moist very stiff gray clay w/some fine to coarse sand, trace of gravel.	A-6(8)	Cultivated Soil - 6".
			2.0'		17" RECOVERY		
3		2	2.0'	18 13 16 18	Moist very stiff gray clay w/trace of fine to coarse sand and gravel.	A-6(11)	
			4.0'		19" RECOVERY		
		3	4.0'	7 12 15 10	Moist very stiff grayish orange mottled fine sandy silt w/some clay, trace of coarse sand and gravel.	A-4(0)	USDA Classifica - Sandy Loam.
6			6.0'		18" RECOVERY		
		4	6.0'	9 12 10 9	Moist medium dense orange silty fine sand w/trace of coarse sand.	A-2-4(0)	
			8.0'		18" RECOVERY		
9		5	8.0'	4 5 6 7	Wet medium dense orange fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
		6	10.0'	13 14 15 14	Wet medium dense orange coarse to fine sand w/trace of silt and gravel.	A-1-b	
12			12.0'		9" RECOVERY		
		7	12.0'	5 5 6 6	Wet medium dense orange coarse sand w/some gravel and fine sand, trace of silt.	A-1-b	
			14.0'		21" RECOVERY		
15		8	14.0'	13 15 11 8	Wet medium dense orange coarse sand and gravel w/some fine sand, trace of silt.	A-1-b	
			16.0'		24" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt



Poorly graded sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-22

Contract: 28-113-01

Boring Location: Sta. 573+00, 101.00' Lt. C.L.

Boring Surface Elev.: + 64.2

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/13/2009		12.0	8.0	7.5	

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

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	7/13/09	1	0.5'	8 9 6	Moist very stiff gray clayey silt w/trace of fine to coarse sand. 16" RECOVERY	A-4(8)	Cultivated Soil - 8"
		2	2.0'	5 7 8 10	Moist stiff gray silt w/some clay, trace of fine to coarse sand. 16" RECOVERY	A-4(2)	
6		3	4.0'	5 6 7 5	Wet medium dense orange silty fine to coarse sand w/trace of gravel. 18" RECOVERY	A-2-4(0)	
		4	6.0'	4 4 6 13	Wet loose orange silty coarse sand w/some fine sand and gravel. 16" RECOVERY	A-1-b	
9		5	8.0'	4 8 7 8	Wet medium dense orange gravel and coarse sand w/some fine sand, trace of silt. 11" RECOVERY	A-1-a	
		6	10.0'	15 9 5 4	wet medium dense orange coarse sand and gravel w/some fine sand, trace of silt. 10" RECOVERY	A-1-b	
12		7	12.0'	3 4 4 6	Wet stiff orange gravelly clay w/some fine to coarse sand. 16" RECOVERY	A-7-6(5)	
		8	14.0'	7 8 10 5	Wet medium dense orange clayey fine to coarse sand w/some gravel. 12" RECOVERY	A-2-5(0)	Cemented sands.
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Well graded sand
with silt



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-23

Contract: 28-113-01

Boring Location: Sta. 578+00, 91.00' Rt. C.L.

Boring Surface Elev.: + 65.4

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/10/2009		14.0	12.0	11.5	

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

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.5'	4 3 3	Moist firm grayish orange mottled clay w/trace of fine to coarse sand.	A-6(14)	Cultivated Soil - 6".
			2.0'		14" RECOVERY		
3		2	2.0'	6 7 5 7	Moist stiff gray clayey silt w/trace of fine to coarse sand and gravel.	A-4(5)	
			4.0'		17" RECOVERY		
		3	4.0'	3 6 6 8	Moist medium dense orangish gray fine to coarse sand and gravel w/some silt, trace of clay.	A-2-4(0)	USDA Classifica - Loamy Sand.
6			6.0'		16" RECOVERY		
		4	6.0'	8 7 8 8	Moist medium dense orange fine to coarse sand and gravel w/some silt.	A-1-b	
			8.0'		9" RECOVERY		
9		5	8.0'	6 7 5 6	wet stiff orange fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(2)	
			10.0'		18" RECOVERY		
		6	10.0'	7 7 8 8	Wet stiff greenish orange fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(11)	
12			12.0'		12" RECOVERY		
		7	12.0'	9 9 7 6	Wet medium dense greenish brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			14.0'		16" RECOVERY		
15		8	14.0'	3 4 7 4	Wet medium dense greenish brown clayey fine sand w/some coarse sand and gravel.	A-2-7(2)	
			16.0'		18" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Elastic silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-24

Contract: 28-113-01

Boring Location: Sta. 583+00, 108.00' Lt. C.L.

Boring Surface Elev.: + 68.0

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: 14.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/13/2009		16.0	14.0	10.4	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5'	3 5 6	Moist stiff orange clayey fine sandy silt w/some coarse sand.	A-4(3)	Cultivated Soil - 6".
			2.0'		12" RECOVERY		
3		2	2.0'	9 12	Moist medium dense orange fine to coarse sand w/some silt.	A-2-4(0)	
			3.0'		11" RECOVERY		
		2A	3.0'	14 7	Moist medium dense orange fine to coarse sand w/some silt.	A-2-4(0)	
			4.0'		4" RECOVERY		
		3	4.0'	8 14	Moist very stiff orange silt w/some fine sand, trace of coarse sand and gravel.	A-4(0)	
			5.0'		7" RECOVERY		
6		3A	5.0'	12 6	Moist medium dense orange fine to coarse sand w/some silt, trace of clay.	A-2-4(0)	USDA Classification - Sand.
			6.0'		11" RECOVERY		
		4	6.0'	9 12 11 14	Moist medium dense orangish yellow mottled silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
			8.0'		16" RECOVERY		
9		5	8.0'	9 9 16 11	Moist medium dense orange coarse to fine sand and gravel w/some silt.	A-1-b	
			10.0'		17" RECOVERY		
		6	10.0'	9 4	No Sieve Analysis - Indication of wet medium dense orange coarse to fine sand and gravel w/some silt.		
			11.0'		6" RECOVERY		
		6A	11.0'	4 5	No Sieve Analysis - Indication of wet very stiff green sandy clay.		
12			12.0'		11" RECOVERY		
		7	12.0'	4 5 6 6	Wet stiff green fine to coarse sandy clay w/trace of gravel.	A-6(0)	
			14.0'		18" RECOVERY		
15		8	14.0'	3 4 9 4	Wet medium dense orangish green mottled clayey fine to coarse sand w/ some gravel.	A-2-7(0)	
			16.0'		14" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-25

Contract: 28-113-01

Boring Location: Sta. 587+00, 95.00' Rt. C.L.

Boring Surface Elev.: + 68.0

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:
					14.0

Water Level Readings		Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
		7/13/2009		14.0	12.0	10.4	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5'	4 4 4	Moist firm gray clayey silt w/some fine sand, trace of coarse sand.	A-4(4)	Cultivated Soil - 8".
			2.0'		12" RECOVERY		
3		2	2.0'	3 5 7 7	Moist stiff orange fine sandy silt w/some clay, trace of coarse sand.	A-4(1)	
			4.0'		18" RECOVERY		
		3	4.0'	4 5 9 7	Moist stiff orange fine sandy silt w/trace of coarse sand.	A-4(0)	
6			6.0'		24" RECOVERY		
		4	6.0'	8 12 17 13	Moist very stiff brownish gray mottled fine sandy silt and clay w/some coarse sand and gravel.	A-6(3)	USDA Classifica - Sandy Clay
			8.0'		24" RECOVERY		Loam.
9		5	8.0'	3 4 5 5	Moist stiff brown fine sandy clay w/some coarse sand, trace of gravel.	A-7-6(2)	
			10.0'		15" RECOVERY		
		6	10.0'	3 8 7 9	Wet stiff brown fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(18)	
12			12.0'		20" RECOVERY		
		7	12.0'	4 4 5 7	Wet loose orange silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			14.0'		18" RECOVERY		
15		8	14.0'	5 6 7 9	Wet medium dense orangish brown mottled silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			16.0'		18" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

 Silty low plasticity
clay

 Silty sand

 Clayey sand

 High plasticity
clay

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-26

Contract: 28-113-01

Boring Location: Sta. 593+00, 108.00' Lt. C.L.

Boring Surface Elev.: + 69.2'

Reference:

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

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

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time			Dry	
7/14/2009		16.0	14.0		

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/14/09	1	0.5'	4 5 4	Moist stiff brown clayey silt w/trace of fine to coarse sand. 17" RECOVERY	A-4(8)	Cultivated Soil - 5".
3		2	2.0'	3 4 6 10	Moist stiff brown silt w/some clay, trace of fine to coarse sand. 15" RECOVERY	A-4(2)	
		3	4.0'	3 5 8 7	Moist medium dense tan silty fine to coarse sand w/trace of clay and gravel. 18" RECOVERY	A-2-4(0)	USDA Classifica - Loamy Sand.
6		4	6.0'	8 10 11 13	Moist medium dense brownish orange silty fine sand w/some gravel and coarse sand. 18" RECOVERY	A-2-4(0)	
		5	8.0'	5 10 17 8	Wet very stiff brown coarse to fine sandy clay w/trace of gravel. 15" RECOVERY	A-7-5(3)	
9		6	10.0'	8 10 11 12	Wet very stiff brown fine sandy clay w/some coarse sand, trace of gravel. 17" RECOVERY	A-7-5(6)	
12		7	12.0'	3 4 3 3	Wet loose brown clayey coarse to fine sand w/trace of gravel. 19" RECOVERY	A-2-7(1)	
		8	14.0'	3 4 5 7	Wet loose brown clayey coarse to fine sand w/trace of gravel. 22" RECOVERY	A-2-7(1)	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-27

Contract: 28-113-01

Boring Location: Sta. 598+00, 96.00' Rt. C.L.

Boring Surface Elev.: + 72.1

Reference:

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

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

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

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
7/14/2009

Time

Depth of Hole
16.0

Depth of Casing
14.0

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: Jason Truver

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	7/14/09	1	0.5'	7 8 8	Moist very stiff brown clayey silt w/trace of fine to coarse sand. 15" RECOVERY	A-4(3)	Topsoil - 5".
		2	2.0'	11 11 14	Moist very stiff brown silt w/some fine sand, trace of clay and coarse sand. 18" RECOVERY	A-4(1)	
6	7/14/09	2A	3.5'	14	Moist medium dense brown silty fine sand w/some coarse sand. 6" RECOVERY	A-2-4(0)	
		3	4.0'	2 3 6 10	Wet stiff grayish orange mottled clay w/some fine sand, trace of coarse sand and gravel. 22" RECOVERY	A-6(6)	
9	7/14/09	4	6.0'	14 14 16 16	Moist very stiff grayish orange mottled fine sandy clay w/some coarse sand, trace of gravel. 20" RECOVERY	A-6(6)	
		5	8.0'	10 11 12 12	Moist medium dense white silty fine sand w/trace of clay and coarse sand. 20" RECOVERY	A-2-4(0)	USDA Classifica - Sandy Loam.
12	7/14/09	6	10.0'	4 8 8 8	Moist medium dense orangish gray coarse sand w/some silt and fine sand, trace of gravel. 16" RECOVERY	A-1-b	
		7	12.0'	14 22 26 11	Moist dense orangish tan coarse sand and gravel w/some silt and fine sand. 16" RECOVERY	A-1-b	
15	7/14/09	8	14.0'	18 20 14 16	Wet dense brownish red clayey coarse sand w/some fine sand and gravel. 19" RECOVERY	A-2-5(0)	
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silt



Silty sand



Low plasticity
clay

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-28

Contract: 28-113-01

Boring Location: Sta. 603+00, 119.00' Lt. C.L.

Boring Surface Elev.: + 75.4

Reference:

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

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

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 7/13/2009	Time	16.0	14.0	Dry	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5'	6 4 5	Moist stiff brown clayey silt w/trace of fine sand and gravel.	A-4(6)	Topsoil - 5".
			2.0'		14" RECOVERY		
3		2	2.0'	7 6 7 9	Moist stiff brown clayey silt w/trace of fine sand.	A-4(9)	
			4.0'		19" RECOVERY		
		3	4.0'	4 5 5 9	Moist stiff brown clayey silt w/some fine sand, trace of coarse sand.	A-4(6)	
6			6.0'		17" RECOVERY		
		4	6.0'	5 7 8 8	Moist stiff orangish gray mottled clay w/some fine to coarse sand, trace of gravel.	A-6(6)	
			8.0'		22" RECOVERY		
9		5	8.0'	5 7 8 12	Moist stiff orangish gray mottled fine to coarse sandy clay w/trace of gravel.	A-6(6)	
			10.0'		22" RECOVERY		
		6	10.0'	13 11 13 19	Moist very stiff orangish gray mottled fine to coarse sandy clay w/trace of gravel.	A-6(4)	
12			12.0'		20" RECOVERY		
		7	12.0'	6 10 10 11	Moist very stiff brownish green fine sandy clay w/some coarse sand and gravel.	A-7-5(4)	
			14.0'		15" RECOVERY		
15		8	14.0'	11 11 13 16	Moist very stiff brownish green fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(4)	
			16.0'		23" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-29

Contract: 28-113-01

Boring Location: Sta. 608+00, 89.00' Rt. C.L.

Boring Surface Elev.: + 76.97

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
7/14/2009

Time

Depth of Hole

16.0

Depth of Casing

14.0

Depth of Water

Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0

No. of 2 in. Dia. Shelby Tubes:

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

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: Jason Truver

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	7/14/09	1	0.5'	8 8 7	Moist stiff brown clayey silt w/some fine sand, trace of coarse sand. 13" RECOVERY	A-4(6)	Topsoil - 6".
		2	2.0'	7 8 8 10	Moist medium dense brown fine to coarse sand w/some silt. 21" RECOVERY	A-2-4(0)	
6		3	4.0'	2 2 3 3	Moist firm tan and gray clayey silt w/some fine sand, trace of coarse sand. 20" RECOVERY	A-4(6)	
		4	6.0'	4 6 6 8	Moist stiff tan and orange slightly mottled clay w/some fine sand, trace of coarse sand. 22" RECOVERY	A-6(14)	
9		5	8.0'	4 6 4 6	Moist stiff orange fine sandy silt w/some coarse sand, trace of gravel. 20" RECOVERY	A-4(0)	
		6	10.0'	5 5 7 6	Moist medium dense orange silty fine sand w/trace of coarse sand and gravel. 19" RECOVERY	A-2-4(0)	
12		7	12.0'	5	No Sieve Analysis - Indication of moist medium dense orangish gray mottled sand w/some clay. 3" RECOVERY	A-2-4(0)	
		7A	12.5'	8 8 9	Moist medium dense brown silty fine sand w/some coarse sand, trace of gravel. 16" RECOVERY	A-1-b	
15		8	14.0'	11 14 16 16	Moist medium dense brown coarse sand and gravel w/some fine sand, trace of silt. 19" RECOVERY		
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-3

Contract: 28-113-01

Boring Location: Sta. 472+00, 91.00' Rt. C.L.

Boring Surface Elev.: + 63.6

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
6/26/2009		12.0	10.0	9.8	

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

Boring Contractor: Walton Corporation

Driller: Dan Taylor

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	6/29/09	1	0.5'	2 2 3	Moist firm brown clayey silt w/some gravel and fine to coarse sand. 14" RECOVERY	A-4(2)	Topsoil - 5".
		2	2.0'	5 5 4 6	Moist loose orange silty fine sand w/some coarse sand, trace of gravel. 20" RECOVERY	A-2-4(0)	
6		3	4.0'	6 5 4 4	Moist loose orange coarse to fine sand w/some silt, trace of gravel and clay. 20" RECOVERY	A-2-4(0)	USDA Classifica - Loamy Sand.
		4	6.0'	4 4 7 4	Moist medium dense orange fine to coarse sand and gravel w/some silt. 18" RECOVERY	A-2-4(0)	
9		5	8.0'	2 3 4 5	Moist firm orange fine sandy clay w/some coarse sand. 21" RECOVERY	A-6(1)	
		6	10.0'	4 5 5 9	Wet stiff orange clayey fine sandy silt w/some coarse sand. 14" RECOVERY	A-4(0)	
12		7	12.0'	3 3 4 8	Wet firm brown fine sandy clay w/some coarse sand. 18" RECOVERY	A-6(2)	
		8	14.0'	5 5 8 8	Wet stiff brown clayey fine sandy silt w/trace of coarse sand. 11" RECOVERY	A-4(1)	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Clayey sand

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/26/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-30

Contract: 28-113-01

Boring Location: Sta. 613+00, 129.00' Lt. C.L.

Boring Surface Elev.: + 71.1

Reference:

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

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

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/13/2009		16.0	14.0	Dry	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5'	3 3 4	Moist firm brown clayey fine sandy silt w/some coarse sand, trace of gravel.	A-4(1)	Topsoil - 6".
			2.0'		13" RECOVERY		
3		2	2.0'	3 3 3 3	Moist firm brown clayey silt w/some fine to coarse sand, trace of gravel.	A-4(6)	
			4.0'		16" RECOVERY		
		3	4.0'	2 3 4 7	Moist firm brown silt w/some fine to coarse sand and clay, trace of gravel.	A-4(4)	USDA Classifica- - Loam.
6			6.0'		20" RECOVERY		
		4	6.0'	5 6 7 8	Moist medium dense brownish red silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	4 5 6 7	Wet medium dense brownish red silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			10.0'		14" RECOVERY		
		6	10.0'	7 9 9 10	Wet medium dense brownish red silty fine to coarse sand.	A-2-4(0)	
12			12.0'		21" RECOVERY		
		7	12.0'	3 2 3 2	Wet loose brownish gray mottled silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			14.0'		16" RECOVERY		
15		8	14.0'	4 6 6 5	Wet medium dense brownish gray mottled fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			16.0'		20" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-31

Contract: 28-113-01

Boring Location: Sta. 618+00, 210.00' Lt. C.L.

Boring Surface Elev.: + 87.8

Reference:

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

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

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time			Dry	
7/13/2009		16.0	14.0		

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5'	4 4 4	Moist firm brown clayey silt w/trace of fine to coarse sand and gravel. 14" RECOVERY	A-4(8)	Topsoil - 5".
3		2	2.0'	7 5 5 6	Moist stiff brown clayey silt w/trace of fine to coarse sand. 18" RECOVERY	A-4(8)	
		3	4.0'	5 5 7 8	Moist stiff brownish gray silt w/some clay and fine sand, trace of coarse sand and gravel. 19" RECOVERY	A-4(3)	
6		4	6.0'	5 5 7 8	Moist stiff brown silt w/some clay and fine sand, trace of coarse sand. 21" RECOVERY	A-4(4)	
		5	8.0'	7 5 7 7	Moist stiff brown clayey fine sandy silt w/some coarse sand and gravel. 17" RECOVERY	A-4(1)	
9		6	10.0'	7 9 9 11	Moist very stiff orange fine sandy silt w/some coarse sand and clay. 19" RECOVERY	A-4(0)	USDA Classifica - Sandy Loam.
12		7	12.0'	5 7 8 9	Moist medium dense orange silty fine sand w/some coarse sand, trace of gravel. 18" RECOVERY	A-2-4(0)	
		8	14.0'	8 11 13 13	Moist medium dense orange coarse to fine sand w/some silt, trace of gravel. 18" RECOVERY	A-1-b	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Clayey sand



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-32

Contract: 28-113-01

Boring Location: Sta. 619+00, 70.00' Rt. C.L.

Boring Surface Elev.: +76.25

Reference:

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

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

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/13/2009		16.0	14.0	Dry	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5'	4 2 2	Moist soft brown clayey fine sandy silt w/some coarse sand, trace of gravel.	A-4(2)	Topsoil - 5".
			2.0'		12" RECOVERY		
3		2	2.0'	5 5 5 6	Moist stiff brown clayey silt w/some coarse to fine sand, trace of gravel.	A-4(3)	
			4.0'		18" RECOVERY		
		3	4.0'	5 6 6 6	Moist medium dense brown clayey fine to coarse sand w/some gravel.	A-2-4(0)	
6			6.0'		19" RECOVERY		
		4	6.0'	5 6 6 7	Moist medium dense brown coarse to fine sand w/some silt, trace of clay and gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	5 4 7 6	Moist medium dense brown silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
		6	10.0'	4 6 9 10	Moist medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
12			12.0'		17" RECOVERY		
		7	12.0'	9 11 13 16	Moist medium dense brown silty gravel and fine sand w/some coarse sand.	A-1-b	
			14.0'		17" RECOVERY		
15		8	14.0'	13 10 17 18	Wet medium dense orangish black silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			16.0'		18" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-33

Contract: 28-113-01

Boring Location: Sta. 623+00, 90.00' Lt. C.L.

Boring Surface Elev.: + 76.4

Reference:

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

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

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 7/13/2009	Time	16.0	14.0	Dry	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5'	4 3 3	Moist firm brown clay w/trace of fine to coarse sand.	A-6(11)	Topsoil - 5".
3		2	2.0'	4 5 7 6	Moist stiff brown fine sandy silt w/some clay and coarse sand, trace of gravel.	A-4(2)	
		3	4.0'	4 5 6 6	Moist stiff tan clay w/some fine sand, trace of coarse sand and gravel.	A-6(13)	
6		4	6.0'	8 11 14 16	Moist very stiff orange fine sandy clay w/some coarse sand and gravel.	A-6(4)	
9		5	8.0'	5 6 6 8	Moist medium dense orange silty fine to coarse sand w/trace of clay and gravel.	A-2-4(0)	USDA Classifica - Sandy Loam
		6	10.0'	12 7 9 7	Moist medium dense tan coarse to fine sand w/some silt and gravel.	A-1-b	
12		7	12.0'	10 9 11 14	Moist medium dense tan coarse to fine sand w/some silt and gravel.	A-2-4(0)	
15		8	14.0'	17 19 21 26	Moist dense brown clayey coarse sand and gravel w/some fine sand.	A-2-6(0)	
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-34

Contract: 28-113-01

Boring Location: Sta. 623+00, 283.00' Rt. C.L.

Boring Surface Elev.: + 76.1

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/14/2009		16.0	14.0	Dry	

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

Boring Contractor: Walton Corporation

Driller: Jason Truver

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	7/14/09	1	0.5'	3 4 4	Moist firm brown clayey silt w/trace of fine to coarse sand. 14" RECOVERY	A-4(4)	Topsoil - 5".
		2	2.0'	5 7 9 9	Moist very stiff brown clayey silt w/trace of fine to coarse sand. 20" RECOVERY	A-4(7)	
6		3	4.0'	4 4 7 8	Moist medium dense orange clayey fine to coarse sand w/trace of gravel. 19" RECOVERY	A-2-6(0)	
		4	6.0'	3 6 7 8	Moist stiff orange fine to coarse sandy clay w/trace of gravel. 18" RECOVERY	A-6(5)	
9		5	8.0'	3 5 5 7	Moist loose orange silty fine sand w/trace of clay, coarse sand and gravel. 16" RECOVERY	A-2-4(0)	USDA Classifica - Sandy Loam
		6	10.0'	3 4 4 5	Moist loose orange silty fine sand. 18" RECOVERY	A-2-4(0)	
12		7	12.0'	6 7 7 8	Moist stiff orange fine sandy silt. 19" RECOVERY	A-4(0)	
		8	14.0'	16 13 11 6	Moist medium dense brownish red coarse to fine sand w/some silt and gravel. 13" RECOVERY	A-1-b	
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-35

Contract: 28-113-01

Boring Location: Sta. 628+00, 85.00' Rt. C.L.

Boring Surface Elev.: + 75.3

Reference:

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

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

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

IN.
IN.
IN.
IN.
IN.

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

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/14/2009		16.0	14.0	0.0	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	7/14/09	1	0.5'	3 3 4	Moist firm brown clayey silt w/trace of fine sand. 13" RECOVERY	A-4(7)	Topsoil - 5".
			2.0'	7 8 8 10	Moist very stiff brown clayey silt w/some fine sand, trace of coarse sand and gravel. 18" RECOVERY	A-4(4)	
6		3	4.0'	3 5 7 8	Moist medium dense orange clayey coarse to fine sand w/trace of gravel. 19" RECOVERY	A-2-6(0)	
			6.0'	9 11 9 10	Moist medium dense orange coarse sand w/some silt and fine sand, trace of gravel and clay. 21" RECOVERY	A-1-b	USDA Classifica - Sand
9		5	8.0'	4 6 5 5	Moist medium dense orange silty fine to coarse sand w/trace of gravel. 20" RECOVERY	A-2-4(0)	
			10.0'	6 9 11 13	Moist medium dense orange silty fine sand w/some coarse sand, trace of gravel. 16" RECOVERY	A-2-4(0)	
12		7	12.0'	14 14 18 14	Moist hard brownish red fine sandy clay w/some coarse sand, trace of gravel. 19" RECOVERY	A-7-5(6)	
			14.0'	11 13 11 10	Moist medium dense greenish red silty fine to coarse sand w/trace of gravel. 18" RECOVERY	A-2-4(0)	
15		8	16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-36

Contract: 28-113-01

Boring Location: Sta. 628+00, 458.00' Lt. C.L.

Boring Surface Elev.: + 77.3

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/15/2009		16.0	14.0	Dry	

Pay Quantities:

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

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	7/15/09	1	0.5'	3 4 4	Moist firm brown clayey silt w/trace of fine to coarse sand. 12" RECOVERY	A-4(9)	Topsoil - 7".
		2	2.0'	4 6 9 8	Moist stiff brown clayey silt w/trace of fine to coarse sand. 16" RECOVERY	A-4(9)	
6		3	4.0'	3 8 10 8	Moist very stiff brown coarse to fine snady clay w/trace of gravel. 20" RECOVERY	A-6(1)	
		4	6.0'	9 10 7 7	MOist medium dense brown clayey fine to coarse sand w/some silt, trace of gravel. 21" RECOVERY	A-2-4(0)	USDA Classifica - Sandy Loam
9		5	8.0'	4 5 6 6	Moist medium dense brown silty fine sand w/trace of coarse sand. 20" RECOVERY	A-2-4(0)	
		6	10.0'	9 6 9 15	Moist medium dense brown silty fine sand w/trace of coarse sand. 22" RECOVERY	A-2-4(0)	
12		7	12.0'	7 9 11 13	Moist medium dense brownish red clayey coarse to fine sand w/trace of gravel. 17" RECOVERY	A-2-5(0)	
		8	14.0'	7 8 6 8	Wet medium dense brownish red clayey coarse to fine sand w/trace of gravel. 20" RECOVERY	A-2-7(0)	
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/15/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-37

Contract: 28-113-01

Boring Location: Sta. 633+00, 89.00' Lt. C.L.

Boring Surface Elev.: + 70.6

Reference:

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

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

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 7/15/2009	Time	16.0	14.0	Dry	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	7/15/09	1	0.5'	5 4 4	Moist firm brown clayey silt w/trace of fine sand and gravel. 13" RECOVERY	A-4(8)	Topsoil - 5".
		2	2.0'	4 4 6 10	Moist stiff brown clayey silt w/trace of fine to coarse sand. 20" RECOVERY	A-4(9)	
6		3	4.0'	4 8 7 8	Moist stiff brownish green clay w/some gravel and fine to coarse sand. 18" RECOVERY	A-7-6(8)	
		4	6.0'	6 10 10 10	Moist very stiff brownish green silty fine sandy clay w/trace of coarse sand. 21" RECOVERY	A-7-6(10)	USDA Classifica - Clay
9		5	8.0'	6 7 7 8	Moist medium dense greenish orange clayey fine to coarse sand w/trace of gravel. 16" RECOVERY	A-2-7(0)	
		6	10.0'	7 8 14 11	Moist very stiff greenish orange clayey coarse sandy silt w/some fine sand and gravel. 22" RECOVERY	A-5(1)	
12		7	12.0'	3 5 4 8	Wet loose orange coarse to fine sand w/some silt, trace of gravel. 20" RECOVERY	A-1-b	
		8	14.0'	7 9 10 11	Wet medium dense orange clayey coarse to fine sand w/trace of gravel. 21" RECOVERY	A-2-7(0)	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/15/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-38

Contract: 28-113-01

Boring Location: Sta. 633+00, 436.00' Rt. C.L.

Boring Surface Elev.: + 74.5

Reference:

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

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

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/17/2009		16.0	14.0	Dry	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/17/09	1	0.5'	5 5 5	Moist stiff brown clayey silt w/trace of fine sand. 13" RECOVERY	A-4(10)	Topsoil - 7".
3		2	2.0'	5 7 8	Moist stiff brown clayey silt w/trace of fine to coarse sand. 14" RECOVERY	A-4(7)	
		3	4.0'	3 3 9	Moist stiff brown clayey fine andy silt w/some coarse sand, trace of gravel. 17" RECOVERY	A-4(2)	
6		4	6.0'	6 5 6 6	Moist medium dense orange coarse sand w/some silt and fine sand, trace of gravel. 18" RECOVERY	A-1-b	
		5	8.0'	3 6 8 15	Moist medium dense orange gravel and coarse to fine sand w/some silt, trace of clay. 19" RECOVERY	A-1-b	USDA Classifica - Loamy Sand
9		6	10.0'	15 20 25 20	Moist dense brown gravel and coarse sand w/some silt and fine sand. 12" RECOVERY	A-1-b	Pulverized gravel in tip of spoon.
12		7	12.0'	5 4 5 5	Wet stiff green coarse to fine sandy clay w/trace of gravel. 16" RECOVERY	A-7-5(4)	
		8	14.0'	3 7 5 4	Wet medium dense brown coarse to fine sand w/some silt, trace of gravel. 13" RECOVERY	A-1-b	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/17/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-39

Contract: 28-113-01

Boring Location: Sta. 638+00, 104.00' Rt. C.L.

Boring Surface Elev.: + 66.9

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/16/2009		16.0	14.0	Dry	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	7/16/09	1	0.5'	6 6 6	Moist stiff clayey silt w/some gravel, trace of fine to coarse sand. 12" RECOVERY	A-4(7)	Topsoil - 6".
		2	2.0'	6 8 9 11	Moist very stiff brown clayey silt w/trace of fine to coarse sand. 18" RECOVERY	A-4(9)	
6		3	4.0'	4 5 5 8	Moist stiff brownish orange mottled clayey silt w/trace of fine to coarse sand. 20" RECOVERY	A-4(7)	USDA Classification - Silt
		4	6.0'	7 21 12 14	Moist dense brown clayey gravel w/some coarse sand, trace of fine sand. 8" RECOVERY	A-1-b	Pulverized gravel in tip of spoon.
9		5	8.0'	3 5 7 10	Moist medium dense greenish orange clayey gravel and fine sand w/some silt and coarse sand. 17" RECOVERY	A-2-6(0)	
		6	10.0'	6 8 12 8	Moist medium dense orange coarse to fine sand and gravel w/some silt. 17" RECOVERY	A-1-b	
12		7	12.0'	3 3 3 4	Wet loose orange silty coarse to fine sand w/some gravel. 21" RECOVERY	A-2-4(0)	
		8	14.0'	12 9 6 21	Wet medium dense brown coarse sand and gravel w/some coarse sand and silt. 20" RECOVERY	A-1-b	
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Silty clayey gravel



Silty sand

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/16/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-4

Contract: 28-113-01

Boring Location: Sta. 477+00, 109.00' Lt. C.L.

Boring Surface Elev.: + 63.8

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
6/29/2009		12.0	10.0	7.6	

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

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	6/29/09	1	0.5'	3 3 3	Moist firm brown clayey silt w/trace of fine to coarse sand and gravel. 12" RECOVERY	A-4(4)	Topsoil - 6".
		2	2.0'	3 8 5 5	Moist stiff brownish orange mottled clayey silt w/some fine to coarse sand, trace of gravel. 12" RECOVERY	A-4(4)	USDA Classifica - Loam.
6		3	4.0'	4 8 11 16	Moist medium dense brown fine to coarse sand and gravel w/some clay. 13" RECOVERY	A-2-4(0)	
		4	6.0'	17 14 15 11	Moist medium dense brown fine to coarse sand and gravel w/some silt. 16" RECOVERY	A-1-b	
9		5	8.0'	6 34 21 13	wet very dense brownish orange gravel and coarse sand w/some silt and fine sand. 14" RECOVERY	A-1-b	
		6	10.0'	19 23 25 12	Wet dense brownish orange gravel and coarse sand w/some fine sand, trace of silt. 19" RECOVERY	A-1-b	
12		7	12.0'	14 15	Wet medium dense brownish orange gravel and coarse sand w/some fine sand, trace of silt. 10" RECOVERY	A-1-b	
		7A	13.0'	5 5	Wet very stiff brownish green clayey fine sandy silt w/some coarse sand, trace of gravel. 12" RECOVERY	A-4(1)	
15		8	14.0'	7 6 8 8	Wet stiff brownish green fine sandy clay w/trace of coarse sand. 16" RECOVERY	A-6(3)	
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt



Clayey sand

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NOT FOR BIDDING
AUGUST 2015

Notes:

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

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

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

Boring No.: IT1-40

Contract: 28-113-01

Boring Location: Sta. 638+00, 164.00' Lt. C.L.

Boring Surface Elev.: + 70.5

Reference:

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

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

Water Level Readings		Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
		7/16/2009		16.0	14.0	Dry	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/16/09	1	0.5'	7 5 7	Moist stiff brown clayey silt w/trace of fine sand. 11" RECOVERY	A-4(10)	Topsoil - 7".
3		2	2.0'	7 4 4 5	Moist firm brown silt w/some clay, trace of fine sand. 19" RECOVERY	A-4(4)	
		3	4.0'	3 7 7 13	Moist medium dense brown clayey gravel w/some coarse to fine sand. 16" RECOVERY	A-2-4(0)	
6		4	6.0'	11 12 13 18	Moist medium dense tan gravel and coarse to fine sand w/some silt, trace of clay. 14" RECOVERY	A-1-b	USDA Classifica - Sandy Loam
9		5	8.0'	4 10 8 9	Moist medium dense orangish green clayey fine sand w/some coarse sand and gravel. 13" RECOVERY	A-2-7(1)	
		6	10.0'	8 7 8 10	Moist medium dense orangish green clayey gravel and fine sand w/some coarse sand. 20" RECOVERY	A-2-7(1)	
12		7	12.0'	3 5 7 5	Wet medium dene orange silty coarse to fine sand and gravel. 16" RECOVERY	A-1-b	
15		8	14.0'	4 13 9 8	Wet medium dense orange silty coarse to fine sand and gravel. 13" RECOVERY	A-1-b	
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/16/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-41

Contract: 28-113-01

Boring Location: Sta. 643+00, 126.00' Lt. C.L.

Boring Surface Elev.: + 66.8

Reference:

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

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

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/16/2009		16.0	14.0	Dry	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/16/09	1	0.5'	5 6 6	Moist stiff brown clayey silt w/trace of fine to coarse sand. 15" RECOVERY	A-4(7)	Topsoil - 5".
3		2	2.0'	4 8 10 15	Moist very stiff brown clayey coarse sandy silt w/some fine sand and gravel. 17" RECOVERY	A-4(2)	USDA Classifica - Loam
		3	4.0'	8 23 13 12	No Sieve Analysis - Indication of moist dense brown silty sand w/trace of gravel. 3" RECOVERY		Piece of gravel in tip of spoon.
6		4	6.0'	13 10 13 12	No Sieve Analysis - Indication of moist medium dense brown silty sand w/trace of gravel. 2" RECOVERY		Piece of gravel in tip of spoon.
		5	8.0'	3 5 6 6	Wet medium dense orange fine to coarse sand w/some silt, trace of gravel. 15" RECOVERY	A-2-4(0)	
9		6	10.0'	6 5 6 6	Wet medium dense orange clayey coarse to fine sand w/some gravel. 17" RECOVERY	A-2-7(1)	
12		7	12.0'	3 5 7 7	Wet medium dense orange silty coarse to fine sand w/some gravel. 20" RECOVERY	A-1-b	
		8	14.0'	3 5 8 7	Wet medium dense orange silty coarse to fine sand w/some gravel. 22" RECOVERY	A-2-4(0)	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/16/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-42

Contract: 28-113-01

Boring Location: Sta. 648+00, 111.00' Rt. C.L.

Boring Surface Elev.: + 62.79

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: 14.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/16/2009		16.0	14.0	Dry	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	7/16/09	1	0.5'	17 18 22	Moist hard brown clayey gravelly silt w/trace of fine to coarse sand. 10" RECOVERY	A-4(1)	Topsoil - 6".
		2	2.0'	23 21 15 16	Moist dense brown clayey gravel w/some fine to coarse sand. 13" RECOVERY	A-2-4(0)	
6		3	4.0'	13 15 14 14	Moist medium dense orangish brown clayey gravel and fine sand w/some coarse sand. 16" RECOVERY	A-2-7(1)	
		4	6.0'	14 8 11 13	Wet medium dense orange clayey gravel and fine sand w/some coarse sand. 15" RECOVERY	A-2-7(0)	
9		5	8.0'	16 15 13 5	Wet very stiff orange coarse to fine sandy clay w/trace of gravel. 4" RECOVERY	A-7-5(2)	
		6	10.0'	4 4 7 8	Wet medium dense orange silty coarse to fine sand w/trace of gravel. 17" RECOVERY	A-2-4(0)	
12		7	12.0'	4 5 7 7	Wet medium dense orange silty coarse sand and gravel w/some fine sand. 10" RECOVERY	A-1-b	
		8	14.0'	6 5 7 7	Wet medium dense orange silty coarse to fine sand w/some gravel. 18" RECOVERY	A-2-4(0)	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/16/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-43

Contract: 28-113-01

Boring Location: Sta. 653+00, 100.00' Lt. C.L.

Boring Surface Elev.: + 64.8

Reference:

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

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

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/17/2009		16.0	14.0	Dry	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/17/09	1	0.5'	5 5	Moist stiff brown clayey silt w/trace of fine to coarse sand.	A-4(8)	Topsoil - 7".
			2.0'		12" RECOVERY		
3		2	2.0'	5 6 7 6	Moist stiff brown clayey silt w/some fine sand, trace of coarse sand and gravel.	A-4(6)	
			4.0'		20" RECOVERY		
		3	4.0'	3 4 5 7	Moist stiff brown silty clay w/some fine sand, trace of coarse sand and gravel.	A-6(9)	USDA Classifica - Clay Loam
6			6.0'		18" RECOVERY		
		4	6.0'	5 6 5	Wet stiff brown fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(7)	
			8.0'		17" RECOVERY		
9		5	8.0'	3 4 5	Wet stiff orangish green coarse sandy clay w/some fine sand, trace of gravel.	A-7-5(5)	
			10.0'		12" RECOVERY		
		6	10.0'	5 6 7 9	Wet medium dense orangish brown silty coarse sand w/some fine sand and gravel.	A-2-4(0)	
12			12.0'		18" RECOVERY		
		7	12.0'	3 5 5 8	Wet loose orangish brown silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			14.0'		19" RECOVERY		
15		8	14.0'	8 4 7 13	Wet medium dense brownish orange silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			16.0'		18" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/17/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-44

Contract: 28-113-01

Boring Location: Sta. 658+00, 98.00' Rt. C.L.

Boring Surface Elev.: + 56.2

Reference:

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

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

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/17/2009		16.0	14.0	Dry	

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: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/17/09	1	0.5'	6 6 8	Moist stiff brown clayey silt w/trace of fine to coarse sand and gravel.	A-4(7)	Topsoil - 5".
			2.0'		13" RECOVERY		
3		2	2.0'	5 7	Moist very stiff brown clayey silt w/some fine to coarse sand, trace of gravel.	A-4(4)	
		2A	3.0'	18 10	10" RECOVERY	A-1-b	
			4.0'		Moist medium dense brown coarse to fine sand w/some gravel and silt.	A-1-b	
		3	4.0'	7 8 7 9	12" RECOVERY	A-1-b	
			6.0'		18" RECOVERY		
6		4	6.0'	6 7 5 6	Moist medium dense brown fine to coarse sand w/some silt, trace of gravel and clay.	A-2-4(0)	USDA Classifica - Sand
			8.0'		18" RECOVERY		
9		5	8.0'	5 7 10 7	Moist medium dense brownish orange silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			10.0'		15" RECOVERY		
		6	10.0'	6 6 5 6	Wet medium dense brownish orange silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
12			12.0'		18" RECOVERY		
		7	12.0'	5 3 4 4	Wet loose orangish brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			14.0'		15" RECOVERY		
15		8	14.0'	3 4 5 6	Wet loose orangish brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			16.0'		20" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/17/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-45

Contract: 28-113-01

Boring Location: Sta. 663+00, 105.00' Lt. C.L.

Boring Surface Elev.: + 50.5

Reference:

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

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

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/17/2009		16.0	14.0	Dry	

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: Dave Burt
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/17/09	1	0.5'	11 12 12	Moist very stiff brown clayey silt w/trace of fine to coarse sand and gravel.	A-4(5)	Topsoil - 5".
			2.0'		13" RECOVERY		
3		2	2.0'	8 8 9 11	Moist very stiff orange fine sandy clay w/trace of coarse sand and gravel.	A-6(8)	
			4.0'		17" RECOVERY		
		3	4.0'	6 10 16 16 10	Moist medium dense brown coarse to fine sand w/some gravel and silt.	A-1-b	
6			6.0'		18" RECOVERY		
		4	6.0'	5 7 8 15	Moist medium dense orange fine to coarse sand w/some silt and gravel, trace of clay.	A-2-4(0)	USDA Classifica - Sand
			8.0'		16" RECOVERY		
9		5	8.0'	3 5 5 5	Wet loose brownish orange silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
		6	10.0'	4 5 4 5	Wet loose brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
12			12.0'		19" RECOVERY		
		7	12.0'	4 6 7 8	Wet medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			14.0'		23" RECOVERY		
15		8	14.0'	8 10 8 10	Wet medium dense brownish orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			16.0'		22" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/17/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-46

Contract: 28-113-01

Boring Location: Sta. 673+00, 98.00' Rt. C.L.

Boring Surface Elev.: + 61.6

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/21/2009		16.0	14.0	Dry	

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

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/21/09	1	1.0'	7 7	Moist stiff orange clayey silt w/trace of gravel and fine to coarse sand.	A-4(7)	Cultivated Soil - 12".
		2	2.0'	8 9 12 14	12" RECOVERY Moist very stiff orange gravelly clay w/some coarse sand, trace of fine sand.	A-6(3)	
3		3	4.0' 4.0'	16" RECOVERY 9	Moist medium dense orange clayey gravel and coarse sand w/trace of fine sand.	A-2-6(1)	
6		4	6.0' 6.0'	8 11 14 20	16" RECOVERY Moist medium dense orange clayey gravel w/some coarse sand, trace of fine sand.	A-2-6(0)	
9		5	8.0' 8.0'	9 9 8 9	12" RECOVERY MOist medium dense orange coarse to fine sand and gravel w/some silt.	A-1-b	
12		6	10.0' 10.0'	10 4 4 4	17" RECOVERY Moist loose orange silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
15		7	12.0' 12.0'	5 6 9 10	24" RECOVERY Moist medium dense orange coarse to fine sand and gravel w/some silt.	A-1-b	
		8	14.0' 14.0'	9 7 6 7	20" RECOVERY Moist medium dense orange coarse to fine sand w/some gravel, trace of silt.	A-1-b	
			16.0'		22" RECOVERY End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Clayey sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/21/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-47

Contract: 28-113-01

Boring Location: Sta. 678+00, 110.00' Lt. C.L.

Boring Surface Elev.: + 62.7

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/7/2009		16.0	14.0	Dry	

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

Boring Contractor: Walton Corporation

Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/6/09	1	0.5'	4 4 7	Moist stiff brown clay w/trace of fine to coarse sand and gravel. 12" RECOVERY	A-6(12)	Topsoil - 7".
3		2	2.0'	8 9 9 10	Moist very stiff brown clayey silt w/trace of fine to coarse sand. 16" RECOVERY	A-4(8)	
		3	4.0'	7 6 7 6	Moist stiff brown clay w/some fine to coarse sand, trace of gravel. 18" RECOVERY	A-6(7)	
6		4	6.0'	9 8 6 8	Moist stiff brown clay w/some fine to coarse sand and gravel. 17" RECOVERY	A-6(8)	
		5	8.0'	6 5 6 12	Moist medium dense brown silty coarse sand w/some fine sand, trace of gravel. 19" RECOVERY	A-1-b	
		6	10.0'	7 10 9 9	Moist medium dense brown coarse to fine sand w/some gravel and silt. 21" RECOVERY	A-1-b	
12		7	12.0'	8 10 9 10	Moist medium dense brown fine to coarse sand w/some silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
		8	14.0'	8 9 9 7	Moist medium dense brown fine to coarse sand w/some gravel and silt. 10" RECOVERY	A-2-4(0)	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/6/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Truck CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-48

Contract: 28-113-01

Boring Location: Sta. 683+00, 91.00' Rt. C.L.

Boring Surface Elev.: +44.7

Reference:

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

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

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/6/2009		16.0	14.0	Dry	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/6/09	1	0.5'	10 14 17	Moist medium dense gravel w/some fine to coarse sand and silt.	A-1-b	Cultivated Soil - 6".
			2.0'		14" RECOVERY		
3		2	2.0'	6 9 7 12	Moist medium dense orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			4.0'		16" RECOVERY		
		3	4.0'	6 5 7 6	Moist medium dense orange silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
6			6.0'		18" RECOVERY		
		4	6.0'	6 6 5 5	Moist medium dense orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			8.0'		14" RECOVERY		
9		5	8.0'	6 7 5	Moist medium dense orange coarse sand w/some fine sand, trace of silt, gravel and clay.	A-1-b	USDA Classifica - Sand
			10.0'		16" RECOVERY		
		6	10.0'	7 8 10 9	Moist medium dense orange coarse sand w/some fine sand and silt, trace of gravel.	A-1-b	
12			12.0'		15" RECOVERY		
		7	12.0'	9 10 14 10	Moist medium dense brown coarse sand and gravel w/some fine sand, trace of silt.	A-1-b	
			14.0'		14" RECOVERY		
15		8	14.0'	15 19 21 17	No Sample Recovery		Gravel blocking spoon.
			16.0'		0" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/6/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Truck CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-49

Contract: 28-113-01

Boring Location: Sta. 688+00, 91.00' Lt. C.L.

Boring Surface Elev.: + 33.9

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings
Date 7/6/2009
Time

Depth of Hole 16.0
Depth of Casing 14.0
Depth of Water 7.8
Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/6/09	1	0.5'	5 4 4	Moist loose brown coarse sand w/some clay, gravel and fine sand. 12" RECOVERY	A-2-4(0)	Topsoil - 4".
3		2	2.0'	6 6 6	Moist stiff brown clayey coarse sandy silt w/some gravel, trace of fine sand. 15" RECOVERY	A-4(1)	
		3	4.0'	4 4 4 7	Moist loose brown clayey coarse sand w/some gravel and fine sand. 18" RECOVERY	A-2-4(0)	
6		4	6.0'	16 19 22 14	Moist dense brown coarse sand w/some fine sand and silt, trace of gravel. 16" RECOVERY	A-1-b	
		5	8.0'	11 9 12 14	Wet medium dense brown silty coarse sand and gravel w/some fine sand. 14" RECOVERY	A-1-b	
9		6	10.0'	12 11 14 9	Wet medium dense brown coarse sand and gravel w/some fine sand and silt. 19" RECOVERY	A-1-b	
12		7	12.0'	6 6 3 4	Wet loose brown fine to coarse sand w/trace of silt and gravel. 15" RECOVERY	A-3	
		8	14.0'	6 5 14 12	Wet medium dense brown fine to coarse sand w/some gravel, trace of silt. 14" RECOVERY	A-3	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Clayey sand



Poorly graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/6/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-5

Contract: 28-113-01

Boring Location: Sta. 482+00, 86.00' Rt. C.L.

Boring Surface Elev.: + 59.5

Reference:

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

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

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 6/30/2009	Time	14.0	12.0	10.1	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	6/30/09	1	0.5'	3 4 5	Moist stiff brown clayey silt w/some gravel, trace of fine to coarse sand.	A-4(5)	Topsoil - 8".
			2.0'		9" RECOVERY		
3		2	2.0'	10 13 19 23	Moist hard grayish orange clayey silt w/trace of gravel.	A-4(9)	
			4.0'		19" RECOVERY		
		3	4.0'	4 12 13 11	Moist medium dense orange clayey coarse sand and gravel w/some fine sand, trace of silt.	A-2-4(0)	USDA Classifica - Sandy Loam.
6			6.0'		20" RECOVERY		
		4	6.0'	9 12 13 17	Moist medium dense tan silty fine sand w/some coarse sand.	A-2-4(0)	
			8.0'		14" RECOVERY		
9		5	8.0'	9 11 13	Wet medium dense orange coarse sand w/some gravel, silt and fine sand.	A-1-b	
			10.0'		17" RECOVERY		
		6	10.0'	5 6 6 7	Wet medium dense brown silty coarse sand w/some fine sand, trace of gravel.	A-2-4(0)	
12			12.0'		13" RECOVERY		
		7	12.0'	4 4 8 10	Wet stiff brownish green clayey fine sandy silt w/trace of coarse sand.	A-4(1)	
			14.0'		14" RECOVERY		
15		8	14.0'	7 7 8 8	Wet stiff brownish green fine sandy clay w/trace of coarse sand.	A-6(4)	
			16.0'		15" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

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

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

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

Boring No.: IT1-50

Contract: 28-113-01

Boring Location: Sta. 693+00, 88.00' Rt. C.L.

Boring Surface Elev.: +40.1

Reference:

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

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

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

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of: **To:**
From Depth of: 0.0 **To:** 14.0

Water Level Readings
Date **Time**
7/6/2009

Time

Depth of Hole
16.0

Depth of Casing
14.0

Depth of Water
14.0

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of: **Dia. U-Sample Boring:**
Core Drilling in Rock: **U-Samples:**

Ft.
Ft.

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/6/09	1	0.5'	4 3 2	Moist firm brown clayey coarse sandy silt w/trace of fine sand.	A-4(4)	Cultivated Soil - 6"
			2.0'		15" RECOVERY		
3		2	2.0'	4 5 5 5	Moist stiff brown coarse to fine sandy silt w/trace of gravel.	A-4(0)	
			4.0'		14" RECOVERY		
6		3	4.0'	7 5 5 3	Moist stiff brown fine sandy silt w/some coarse sand, trace of gravel.	A-4(0)	
			6.0'		16" RECOVERY		
9		4	6.0'	8 12 13 9	Moist medium dense brown coarse sand and gravel w/some fine sand, trace of silt.	A-1-b	
			8.0'		18" RECOVERY		
12		5	8.0'	15 11 10 13	Moist medium dense brown coarse sand w/some fine sand and clay, trace of silt.	A-1-b	USDA classificat - Loamy Sand
			10.0'		5" RECOVERY		
15		6	10.0'	16 13 10 10	Moist medium dense brown coarse sand w/some gravel, silt and fine sand.	A-1-b	
			12.0'		20" RECOVERY		
		7	12.0'	9 9 7 8	Moist medium dense brown coarse sand w/some fine sand, trace of silt and gravel.	A-1-b	
			14.0'		15" RECOVERY		
		8	14.0'	6 6 6 6	Wet medium dense brown coarse to fine sand w/trace of silt and gravel.	A-1-b	
			16.0'		17" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/6/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-51

Contract: 28-113-01

Boring Location: Sta. 698+00, 110.00' Lt. C.L.

Boring Surface Elev.: + 36.9

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings
Date 7/6/2009
Time

Depth of Hole 16.0
Depth of Casing 14.0
Depth of Water 11.5
Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	7/6/09	1	0.5'	3 4 3	Moist firm brown clayey silt w/some fine to coarse sand, trace of gravel. 13" RECOVERY	A-4(2)	Cultivated Soil - 4"
		2	2.0'	3 5 4 9	Moist stiff brown fine sandy silt w/some clay, coarse sand and gravel. 16" RECOVERY	A-4(0)	
6		3	4.0'	7 9 9 11	Moist medium dense brown fine sand w/some silt, coarse sand and gravel. 16" RECOVERY	A-2-4(0)	
		4	6.0'	11 14 17 19	Moist dense brown fine to coarse sand w/some clay and silt, trace of gravel. 21" RECOVERY	A-2-4(0)	USDA Classifica - Sandy Loam
9		5	8.0'	20 14 10 11	Moist medium dense brown gravel and fine sand w/some silt and coarse sand. 15" RECOVERY	A-1-b	
		6	10.0'	12 11 10 5	Wet medium dense brown coarse to fine sand w/some gravel, trace of silt. 14" RECOVERY	A-1-b	
12		7	12.0'	10 6 5 4	Wet medium dense tan fine to coarse sand w/trace of silt and gravel. 17" RECOVERY	A-3	
		8	14.0'	3 4 6 6	Wet loose tan coarse to fine sand w/trace of silt and gravel. 17" RECOVERY	A-1-b	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

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

 Poorly graded sand with silt

 Poorly graded sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/6/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-52

Contract: 28-113-01

Boring Location: Sta. 703+00, 53.00' Rt. C.L.

Boring Surface Elev.: +47.0

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings
Date 7/6/2009
Time

Depth of Hole 16.0
Depth of Casing 14.0
Depth of Water Dry
Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/6/09	1	0.5'	3 3 3	Moist firm brown clay w/some fine to coarse sand, trace of gravel. 10" RECOVERY	A-6(4)	Cultivated Soil - 7"
3		2	2.0'	2 2 2 2	Moist soft brown coarse to fine sandy silt w/trace of gravel. 15" RECOVERY	A-4(0)	
		3	4.0'	7 6 7 6	Moist medium dense brown silty fine to coarse sand w/trace of gravel. 13" RECOVERY	A-2-4(0)	
6		4	6.0'	5 6 7 6	Moist medium dense brown fine to coarse sand w/some silt, trace of clay and gravel. 16" RECOVERY	A-2-4(0)	USDA Classifica - Loamy Sand
		5	8.0'	8 7 6 7	Moist medium dense brown coarse sand w/some fine sand and silt. 15" RECOVERY	A-1-b	
		6	10.0'	8 8 7 9	Moist medium dense brown coarse sand w/trace of silt, fine sand and gravel. 20" RECOVERY	A-1-b	
12		7	12.0'	5 4 4 7	Moist loose brown coarse sand w/trace of fine sand, gravel and silt. 16" RECOVERY	A-1-b	
		8	14.0'	9 13 20 29	Moist dense brown gravel and coarse sand w/trace of fine sand and silt. 14" RECOVERY	A-1-b	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/6/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-53

Contract: 28-113-01

Boring Location: Sta. 708+00, 171.00' Lt. C.L.

Boring Surface Elev.: + 50.71

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: 14.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/6/2009		16.0	14.0	Dry	

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

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

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

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Poorly graded sand
with silt



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/6/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-54

Contract: 28-113-01

Boring Location: Sta. 712+90, 67.00' Rt. C.L.

Boring Surface Elev.: + 48.1

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
7/6/2009

Time

Depth of Hole

16.0

Depth of Casing

14.0

Depth of Water

Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0

No. of 2 in. Dia. Shelby Tubes:

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

Ft.;

Ft.;

Dia. U-Sample Boring:

No. of U-Samples:

Core Drilling in Rock:

Ft.

Ft.

Boring Contractor: Walton Corporation

Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/6/09	1	0.5'	4 3 5	Moist firm brown clayey silt w/some coarse sand, trace of fine sand and gravel. 13" RECOVERY	A-4(4)	Cultivated Soil - 6"
3		2	2.0'	4 5 6 6	Moist medium dense orange coarse to fine sand w/some gravel and silt. 21" RECOVERY	A-1-b	
		3	4.0'	6 6 15 11	Moist medium dense orange coarse to fine sand w/some silt and gravel, trace of clay. 17" RECOVERY	A-2-4(0)	USDA Classifica - Sandy Loam
6		4	6.0'	6 5 4 5	Moist loose orange coarse to fine sand w/some silt, trace of gravel. 20" RECOVERY	A-1-b	
		5	8.0'	5 4 3 4	MOist loose brown coarse to fine sand w/some silt, trace of gravel. 21" RECOVERY	A-2-4(0)	
9		6	10.0'	4 4 3 4	Moist loose brown fine to coarse sand w/some silt, trace of gravel. 19" RECOVERY	A-2-4(0)	
12		7	12.0'	5 5 4 4	Moist loose brown fine to coarse sand w/some silt, trace of gravel. 22" RECOVERY	A-1-b	
15		8	14.0'	4 4 4 4	Moist loose brown coarse to fine sand w/some silt, trace of gravel. 20" RECOVERY		
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/6/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-55

Contract: 28-113-01

Boring Location: Sta. 718+00, 274.00' Lt. C.L.

Boring Surface Elev.: + 38.07

Reference:

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

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

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 7/2/2009	Time	16.0	14.0	Dry	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/2/09	1	0.5'	4 5 6	Moist stiff brown clayey fine sandy silt w/trace of coarse sand.	A-4(0)	Cultivated Soil - 7".
			2.0'		15" RECOVERY		
3		2	2.0'	4 5 6	Moist medium dense brown silty fine sand w/some gravel, trace of coarse sand.	A-2-4(0)	
			4.0'		17" RECOVERY		
		3	4.0'	2 3 4 5	Moist loose brown fine to coarse sand w/some silt.	A-2-4(0)	
			6.0'		15" RECOVERY		
6		4	6.0'	2 3 2	Moist loose tan fine to coarse sand w/some silt, trace of clay.	A-2-4(0)	USDA Classifica - Sand
			8.0'		19" RECOVERY		
9		5	8.0'	2 2 3	Moist loose tan fine to coarse sand w/some silt.	A-2-4(0)	
			10.0'		18" RECOVERY		
		6	10.0'	3 3 3	Moist loose tan coarse to fine sand w/some silt, trace of gravel.	A-2-4(0)	
			12.0'		20" RECOVERY		
12		7	12.0'	4 5 4 4	Moist loose tan fine to coarse sand w/trace of silt and gravel.	A-3	
			14.0'		18" RECOVERY		
15		8	14.0'	3 4 4 5	Moist loose tan fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			16.0'		19" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Poorly graded sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/2/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-56

Contract: 28-113-01

Boring Location: Sta. 723+00, 177.00' Lt. C.L.

Boring Surface Elev.: + 30.0

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: 14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/2/2009		16.0	14.0	11.0	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/2/09	1	0.5'	5 7 8	Moist medium dense orange silty fine to coarse sand w/trace of gravel.	A-2-4(0)	Topsoil - 4".
			2.0'		12" RECOVERY		
3		2	2.0'	9 6 5 4	Moist medium dense orange fine to coarse sandw/some silt.	A-2-4(0)	
			4.0'		16" RECOVERY		
		3	4.0'	3 3 3 4	Moist loose tan fine to coarse sand w/some silt, trace of clay.	A-2-4(0)	USDA Classifica - Sand
6			6.0'		16" RECOVERY		
		4	6.0'	4 3 2 3	Moist loose tan fine sand w/some coarse sand and silt.	A-2-4(0)	
			8.0'		17" RECOVERY		
9		5	8.0'	6 6 6 6	Moist medium dense tan coarse sand and gravel w/some fine sand and silt.	A-1-b	
			10.0'		15" RECOVERY		
		6	10.0'	4 4 5 4	Wet loose tan coarse to fine sand w/some silt, trace of gravel.	A-1-b	
12			12.0'		20" RECOVERY		
		7	12.0'	6 6 5 4	Wet medium dense orange coarse to fine sand w/some gravel, trace of silt.	A-1-b	
			14.0'		16" RECOVERY		
15		8	14.0'	8 12 50/2"	Wet very dense orange coarse to fine sand and gravel w/trace of silt.	A-1-b	
			15.5'		8" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/2/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-57

Contract: 28-113-01

Boring Location: Sta. 728+00, 251.00' Lt. C.L.

Boring Surface Elev.: + 35.00

Reference:

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

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

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/2/2009		14.0	12.0	8.7	

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/2/09	1	0.5'	5	Moist firm brown silt w/some clay and fine sand, trace of coarse sand and gravel.	A-4(0)	Topsoil - 3"
		1A	1.5'	9		10" RECOVERY	
3		2	2.0'	8	Moist loose orange silty fine to coarse sand w/trace of gravel.	A-1-b	
			2.0'	7			
6		3	4.0'	12	Moist medium dense tan coarse to fine sand w/some silt, trace of gravel.	A-1-b	USDA Classifica - Sand
			4.0'	3	17" RECOVERY		
			4.0'	4	Moist loose tan coarse to fine sand w/some silt, trace of clay and gravel.		
9		4	6.0'	5	Moist loose orange coarse to fine sand w/trace of silt and gravel.	A-1-b	
			6.0'	4	14" RECOVERY		
			6.0'	3	18" RECOVERY		
12		5	8.0'	3	Wet very loose orange fine to coarse sand w/trace of silt and gravel.	A-3	
			8.0'	2	10" RECOVERY		
			8.0'	6	Wet medium dense orange fine to coarse sand and gravel w/some silt.		
15		6	10.0'	8	Wet medium dense brown fine sand w/some coarse sand, trace of gravel and silt.	A-3	
			10.0'	9	16" RECOVERY		
			10.0'	16	17" RECOVERY		
		7	12.0'	5	Wet loose brown fine sand w/some coarse sand, trace of silt and gravel.	A-3	
			12.0'	4	17" RECOVERY		
			12.0'	6	17" RECOVERY		
		8	14.0'	4	End of Boring		
			16.0'	5			
				4			

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/2/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-58

Contract: 25-113-01

Boring Location: Sta.110+09, Lt. C.L.

Boring Surface Elev.:

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
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Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/30/09	1	0.0'		No Sample Taken		Hand Auger - Topsoil
			1.0'		0" RECOVERY		
1.5		2	1.0'		Wet brown clay w/trace of fine to coarse sand.	A-6(11)	Hand Auger
			2.0'		12" RECOVERY		
		3	2.0'		Wet greenish brown clay w/trace of coarse to fine sand and gravel.	A-6(8)	Hand Auger
3			3.0'		12" RECOVERY		
		4	3.0'		Wet brownish gray clay w/some fine to coarse sand, trace of gravel.	A-6(8)	Hand Auger
			4.0'		12" RECOVERY		
4.5		5	4.0'		Wet brownish gray clay w/some gravel and fine sand, trace of coarse sand.	A-6(12)	Hand Auger
			5.0'		12" RECOVERY		
		6	5.0'		Wet brownish gray silty clay w/some gravel and fine sand, trace of coarse sand.	A-6(10)	Hand Auger
6			6.0'		12" RECOVERY		USDA Classification
		7	6.0'		Wet brownish gray clayey gravel w/some fine to coarse sand.	A-2-6(2)	- Clay Loam
			7.0'		12" RECOVERY		Hand Auger
7.5					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/30/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-59

Contract: 25-113-01

Boring Location: Sta. 717+96, Lt. C.L.

Boring Surface Elev.:

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
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Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5		1	1.0'		Wet gray silt w/some fine sand and clay, trace of coarse sand.	A-4(2)	Hand Auger
			2.0'		12" RECOVERY		
		2	2.0'		Wet gray clayey silt w/some fine sand, trace of coarse sand.	A-4(2)	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Wet brown silty fine to coarse sand w/some gravel.	A-2-4(0)	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Wet orange coarse to fine sand w/some silt, trace of gravel.	A-1-b	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		Wet orange silt w/some fine sand, trace of coarse sand.	A-4(0)	Hand Auger
			6.0'		12" RECOVERY		
6		6	6.0'		Wet orange coarse to fine sand w/some silt.	A-2-4(0)	Hand Auger
			7.0'		12" RECOVERY		
7.5		7	7.0'		Wet orange coarse sand w/some fine sand and silt, trace of gravel.	A-1-b	Hand Auger
			8.0'		12" RECOVERY		
					End of Boring		
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

 Silty low plasticity
clay

 Silty sand

 Silt

 Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/29/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-6

Contract: 28-113-01

Boring Location: Sta. 487+00, 107.00' Lt. C.L.

Boring Surface Elev.: + 59.40

Reference:

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

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

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
6/30/2009		14.0	12.0	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:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	6/30/09	1	0.5'	4 4 4	Moist firm brown fine to coarse sandy clay w/trace of gravel.	A-6(2)	Topsoil - 8".
			2.0'		11" RECOVERY		
3		2	2.0'	2 6 7 9	Moist medium dense brown silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			4.0'		19" RECOVERY		
		3	4.0'	4 8 7 11	Moist medium dense brown fine to coarse sand w/some silt and gravel, trace of clay.	A-2-4(0)	
6			6.0'		15" RECOVERY		
		4	6.0'	11 13 11 13	Moist medium dense orange coarse to fine sand and gravel w/some silt.	A-1-b	
			8.0'		20" RECOVERY		
9		5	8.0'	7 8 13 8	wet medium dense orange coarse sand and gravel w/trace of fine sand and silt.	A-1-b	
			10.0'		17" RECOVERY		
		6	10.0'	8 8 9 13	Wet medium dense orange coarse sand and gravel w/trace of fine sand and silt.	A-1-b	
12			12.0'		19" RECOVERY		
		7	12.0'	34 50/3"	Wet very dense brown coarse sand and gravel w/some fine sand, trace of silt.	A-1-b	
			14.0'		9" RECOVERY		
15		8	14.0'	13 5 5 5	Wet stiff brownish green fine sandy clay w/trace of coarse sand and gravel.	A-6(2)	
			16.0'		13" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Well graded sand



Well graded sand
with silt

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AUGUST 2015

Notes:

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

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

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

Boring No.: IT1-60

Contract: 25-113-01

Boring Location: Sta. 719+55, Rt C.L.

Boring Surface Elev.:

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

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/29/09	1	0.0'		No Sample Taken		Hand Auger Topsoil - 6".
1.5		2	1.0' 1.0'		0" RECOVERY Moist gray gravel and coarse sand w/some fine sand and silt.	A-1-b	Hand Auger
3		3	2.0' 2.0'		12" RECOVERY Wet gray clay w/some fine sand, trace of coarse sand.	A-6(12)	Hand Auger
4.5		4	3.0' 3.0'		12" RECOVERY Wet gray clayey fine sandy silt w/trace of coarse sand.	A-4(0)	Hand Auger
6		5	4.0' 4.0'		12" RECOVERY Wet gray silty fine sand w/trace of coarse sand.	A-2-4(0)	Hand Auger USDA Classifica
		6	5.0' 5.0'		12" RECOVERY Wet gray silty fine sand w/trace of coarse sand.	A-2-4(0)	- Loamy Sand. Hand Auger
		7	6.0' 6.0'		12" RECOVERY Wet gray silty fine sand w/some coarse sand.	A-2-4(0)	Hand Auger
7.5			7.0'		12" RECOVERY End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Low plasticity
clay



Silty low plasticity
clay

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/29/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-61

Contract: 25-113-01

Boring Location: 730+20, Lt. C.L.

Boring Surface Elev.:

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
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Pay Quantities:

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

Boring Contractor: Walton Corporation

Driller:

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/25/09	1	0.5'		Moist brown clayey silt w/trace of fine sand.	A-4(10)	Hand Auger
		2	1.0'		Moist gray clayey silt w/trace of fine to coarse sand.	A-4(8)	Topsoil - 6"
1.5			1.5'		6" RECOVERY		Hand Auger
			2.0'		12" RECOVERY		Hand Auger
		3	2.0'		Moist orange fine sandy silt w/some coarse sand and clay.	A-4(0)	Hand Auger
			3.0'		12" RECOVERY		
3		4	3.0'		Wet orange clayey silt w/some fine sand, trace of coarse sand.	A-4(3)	Hand Auger
			4.0'		12" RECOVERY		
4.5		5	4.0'		Wet orange clayey fine to coarse sand.	A-2-4(0)	Hand Auger
			5.0'		12" RECOVERY		USDA Classification
		6	5.0'		Wet orange clayey gravel w/some fine to coarse sand.	A-2-4(0)	- Sandy Loam.
			6.0'		12" RECOVERY		Hand Auger
6		7	6.0'		Saturated green fine sandy clay w/some gravel, trace of coarse sand.	A-7-6(8)	Hand Auger
			7.0'		12" RECOVERY		
7.5					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

	Low plasticity clay
	Silty low plasticity clay
	Poorly graded clayey silty sand
	Clayey sand
	Silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/25/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-62

Contract: 25-113-01

Boring Location: Sta. 728+728+84, Rt. C.L.

Boring Surface Elev.:

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
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Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/25/09		0.0'		No Sample Taken		Hand Auger Topsoil - 6".
1.5		1	1.0' 1.0'		0" RECOVERY Wet brown clayey silt w/trace of fine to coarse sand.	A-4(6)	Hand Auger
		2	2.0' 2.0'		12" RECOVERY Wet gray clayey silt w/trace of fine to coarse sand.	A-4(8)	Hand Auger
3		3	3.0' 3.0'		12" RECOVERY Wet gray clayey silt w/trace of fine to coarse sand.	A-4(7)	Hand Auger
		4	4.0' 4.0'		12" RECOVERY Wet orange clayey silt w/some fine sand, trace of coarse sand.	A-4(4)	Hand Auger
4.5		5	5.0' 5.0'		12" RECOVERY Wet orange clayey fine sandy silt w/some coarse sand.	A-4(2)	Hand Auger
6		6	6.0' 6.0'		12" RECOVERY Wet green silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	Hand Auger
		7	7.0' 7.0'		12" RECOVERY Wet green silty fine to coarse sand w/some gravel.	A-2-4(0)	Hand Auger
7.5			8.0'		12" RECOVERY End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/29/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-64

Contract: 25-113-01

Boring Location: Sta. 731+03, Rt. C.L.

Boring Surface Elev.:

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	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date					

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/29/09	1	0.0'		No Sample Taken		Hand Auger
			1.0'		0" RECOVERY		
1.5		2	1.0'		Wet brown clay w/trace of fine to coarse sand and gravel.	A-6(9)	Hand Auger
			2.0'		12" RECOVERY		
		3	2.0'		Wet brown clay w/some fine sand, trace of coarse sand and gravel.	A-6(8)	Hand Auger
3			3.0'		12" RECOVERY		
		4	3.0'		Wet brownish green clayey fine sandy silt w/some coarse sand and gravel.	A-4(1)	Hand Auger
			4.0'		12" RECOVERY		
4.5		5	4.0'		Wet brownish green silty fine sand w/some coarse sand and gravel.	A-2-4(0)	Hand Auger
			5.0'		12" RECOVERY		USDA Classification
		6	5.0'		Wet brown clayey silt w/trace of fine to coarse sand and gravel.	A-4(9)	- Sandy Loam.
6			6.0'		12" RECOVERY		Hand Auger
					End of Boring		
7.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/29/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-65

Contract: 25-113-01

Boring Location: Sta. 738+71, Lt. C.L.

Boring Surface Elev.:

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
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Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/22/09	1	0.0'		No Sample Taken		Hand Auger
1.5		2	1.0' 1.0'		12" RECOVERY Wet brown silt w/some fine sand and clay, trace of coarse sand.	A-4(3)	Hand Auger
3		3	2.0' 2.0'		12" RECOVERY Wet brown fine to coarse sand w/some silt.	A-2-4(0)	Hand Auger
4.5		4	3.0' 3.0'		12" RECOVERY Wet brown coarse to fine sand w/some silt.	A-2-4(0)	Hand Auger
6		5	4.0' 4.0'		12" RECOVERY Wet brown fine sandy silt w/some coarse sand and clay.	A-4(0)	Hand Auger
		6	5.0' 5.0'		12" RECOVERY Wet brown clayey silt w/some fine sand, trace of coarse sand.	A-4(6)	Hand Auger
7.5			6.0'		12" RECOVERY End of Boring		

Remarks:

Reviewed By: _____ **Soils Supervisor:** _____

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Low plasticity
clay

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Notes:

1. Exploratory borings were drilled on 9/22/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-66

Contract: 25-113-01

Boring Location: Sta. 739+70, Lt. C.L.

Boring Surface Elev.:

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
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Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/22/09	1	1.0'		Wet brown silt w/some fine sand and clay, trace of coarse sand.	A-4(1)	Hand Auger Topsoil - 6".
					12" RECOVERY		
3		2	2.0'		Wet brown clay w/some fine sand, trace of coarse sand and gravel.	A-6(8)	Hand Auger
					12" RECOVERY		
4.5		3	3.0'		Wet gray clayey silt w/trace of fine to coarse sand and gravel.	A-4(8)	Hand Auger
					12" RECOVERY		
6		4	4.0'		Wet gray fine sandy silt w/some coarse sand.	A-4(0)	Hand Auger
					12" RECOVERY		
		5	5.0'		Wet gray fine sandy silt w/some coarse sand and clay, trace of gravel.	A-4(0)	Hand Auger USDA Classifica
					12" RECOVERY		
		6	6.0'		Wet gray fine sandy silt w/some coarse sand and clay, trace of gravel.	A-4(0)	- Sandy Loam.
					12" RECOVERY		
7.5			7.0'		End of Boring		
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Silty sand



Poorly graded clayey
silty sand

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/22/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-67

Contract: 25-113-01

Boring Location: Sta. 739+11, Rt. C.L.

Boring Surface Elev.:

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
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Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5		1	1.0'		Wet brown clayey silt w/trace of fine to coarse sand.	A-4(4)	Hand Auger
			2.0'		12" RECOVERY		
		2	2.0'		Wet brown clay w/trace of fine to coarse sand.	A-6(11)	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Wet brown clay w/some fine sand, trace of coarse sand and gravel.	A-6(10)	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Wet brown clayey silt w/some fine sand, trace of coarse sand and silt.	A-4(3)	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		Wet brown fine sandy silt w/some coarse sand and clay.	A-4(0)	Hand Auger
6			6.0'		12" RECOVERY		USDA Classification - Sandy Loam.
					End of Boring		
7.5							
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Poorly graded clayey
silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/22/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-69

Contract: 25-113-01

Boring Location: Sta. 745+44, Rt. C.L.

Boring Surface Elev.:

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
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Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/22/09	1	1.0'		Wet gray clayey silt w/trace of fine to coarse sand and gravel.	A-4(7)	Hand Auger Topsoil - 6".
			2.0'		12" RECOVERY		
		2	2.0'		Wet gray clay w/trace of fine to coarse sand and gravel.	A-6(11)	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Wet gray clayey silt w/some fine sand, trace of coarse sand.	A-4(4)	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Wet gray clayey fine sandy silt w/some coarse sand, trace of gravel.	A-4(2)	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		Wet gray silty clay w/some fine sand, trace of coarse sand.	A-6(6)	Hand Auger USDA Classifica
			6.0'		12" RECOVERY		- Loam.
6		6	6.0'		Wet gray clay w/some fine sand, trace of coarse sand and gravel.	A-6(9)	Hand Auger
			7.0'		12" RECOVERY		
7.5		7	7.0'		Wet gray fine sandy clay w/trace of coarse sand and gravel.	A-6(10)	Hand Auger
			8.0'		12" RECOVERY		
					End of Boring		
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/22/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-7

Contract: 28-113-01

Boring Location: Sta. 503+00, 110.00' Lt. C.L.

Boring Surface Elev.: + 56.18

Reference:

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

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

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

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

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

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/26/2009		10.0'	8.0'	8.0'	

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

Boring Contractor: Walton Corporation

Driller: Jason Truver

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/26/09	1	0.5'	2 3 4	Moist firm brownish gray clayey silt w/trace of fine sand.	A-4(8)	Topsoil - 5".
			2.0'		14" RECOVERY		
3		2	2.0'	10 10 13 18	Moist very stiff brownish gray silt w/some clay and fine sand, trace of coarse sand.	A-4(3)	
			4.0'		18" RECOVERY		
6		3	4.0'	5 9 9 10	Moist medium dense brown coarse to fine sand w/some gravel and silt.	A-1-b	
			6.0'		22" RECOVERY		
9		4	6.0'	2 8 10 11	Moist medium dense brown coarse to fine sand w/some silt, trace of gravel.	A-1-b	
			8.0'		17" RECOVERY		
12		5	8.0'	11 10 13 11	Moist medium dense brown coarse sand w/some fine sand, trace of silt and gravel.	A-1-b	
			10.0'		18" RECOVERY		
15		6	10.0'	8 9 10 11	Moist medium dense brown gravel and coarse sand w/some fine sand, trace of silt.	A-1-b	
			12.0'		17" RECOVERY		
		7	12.0'	9 10 11 13	Wet medium dense brownish green fine to coarse sand w/some silt and gravel.	A-2-4(0)	
			14.0'		20" RECOVERY		
		8	14.0'	11 11 21 19	Wet dense greenish brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			16.0'		17" RECOVERY		
					End of Boring		

Remarks: GTA Inspector - J. Lafferty - Temporary Piezometer Set

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/26/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-71

Contract: 25-113-01

Boring Location: Sta. 750+73, Lt. C.L.

Boring Surface Elev.:

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
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Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/24/09	1	1.0'		Wet brown clayey silt w/some fine sand, trace of coarse sand.	A-4(4)	Hand Auger Topsoil - 6".
			2.0'		12" RECOVERY		
		2	2.0'		Wet brown silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Wet brown clayey fine to coarse sand w/trace of gravel.	A-2-4(0)	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Wet orange fine sandy silt w/trace of coarse sand and gravel.	A-4(0)	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		Wet orange silty fine sand w/some clay, trace of coarse sand.	A-2-4(0)	Hand Auger USDA
			6.0'		12" RECOVERY		Classifica
6		6	6.0'		Wet orange gravel and coarse sand w/some fine sand, trace of silt.	A-1-a	- Sandy Loam.
			7.0'		12" RECOVERY		Hand Auger
7.5		7	7.0'		Wet orange gravel w/some coarse to fine sand and clay.	A-1-b	Hand Auger
			8.0'		12" RECOVERY		
					End of Boring		
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Clayey sand



Well graded sand
with silt



Poorly graded clayey
silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/24/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-72

Contract: 25-113-01

Boring Location: 751+30, Rt. C.L.

Boring Surface Elev.:

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
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Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/23/09	1	0.0'		No Sample Taken		Hand Auger
1.5		2	1.0' 1.0'		12" RECOVERY Wet brown silt w/some fine to coarse sand and clay.	A-4(1)	Hand Auger
3		3	2.0' 2.0'		12" RECOVERY Wet brown clayey fine sandy silt w/some coarse sand.	A-4(2)	Hand Auger
4.5		4	3.0' 3.0'		12" RECOVERY Wet brown clay w/some fine sand, trace of coarse sand and gravel.	A-6(11)	Hand Auger
6		5	4.0' 4.0'		12" RECOVERY Wet brown fine sandy clay w/some coarse sand and silt, trace of gravel.	A-6(5)	Hand Auger USDA Classifica
		6	5.0' 5.0'		12" RECOVERY Wet brownish orange clayey fine to coarse sand w/some gravel.	A-2-6(0)	- Loam. Hand Auger
		7	6.0' 6.0'		12" RECOVERY Wet brownish orange silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	Hand Auger
7.5			7.0'		12" RECOVERY End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/23/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-73

Contract: 25-113-01

Boring Location: Sta. 752+95, Rt. C.L.

Boring Surface Elev.:

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
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Pay Quantities:

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

Boring Contractor: Walton Corporation

Driller:

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/23/09	1	1.0'		Wet brown clayey silt w/trace of fine to coarse sand and gravel.	A-4(8)	Hand Auger Topsoil - 8"
			2.0'		12" RECOVERY		
		2	2.0'		Wet brown clay w/trace of fine to coarse sand.	A-6(11)	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Wet brown clay silt w/trace of fine to coarse and gravel.	A-4(9)	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Wet brown clayey silt w/trace of fine to coarse sand.	A-4(5)	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		Wet brown fine sandy silt w/some coarse sand and clay.	A-4(0)	Hand Auger USDA
			6.0'		12" RECOVERY		Classifica
6		6	6.0'		Wet brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	- Loam. Hand Auger
			7.0'		12" RECOVERY		
7.5		7	7.0'		Wet brown silty fine sand w/trace of coarse sand.	A-2-4(0)	Hand Auger
			8.0'		12" RECOVERY		
					End of Boring		
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/23/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-74

Contract: 25-113-01

Boring Location: Sta. 762+00, Lt. C.L.

Boring Surface Elev.:

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	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date					

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/24/09	1	1.0'		Moist brown clayey gravel w/some fine to coarse sand.	A-2-6(0)	Hand Auger Topsoil - 6".
			2.0'		12" RECOVERY		
		2	2.0'		Wet brown clayey gravelly silt w/some fine sand, trace of coarse sand.	A-4(2)	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Wet brown clayey fine sand w/some coarse sand, trace of gravel.	A-2-6(0)	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Wet orange silty fine to coarse sand w/trace of gravel.	A-2-4(0)	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		Wet orange silty fine to coarse sand w/some clay, trace of gravel.	A-2-4(0)	Hand Auger
			6.0'		12" RECOVERY		
6		6	6.0'		Wet orange fine to coarse sand w/some silt.	A-2-4(0)	Hand Auger USDA Classifica - Loamy Sand.
			7.0'		12" RECOVERY		
7.5		7	7.0'		Wet orange fine to coarse sand w/some silt.	A-2-4(0)	Hand Auger
			8.0'		12" RECOVERY		
					End of Boring		
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/24/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-75

Contract: 25-113-01

Boring Location: Sta. 764+53, Rt. C.L.

Boring Surface Elev.:

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
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Pay Quantities:

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

Boring Contractor: Walton Corporation

Driller:

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/23/09	1	1.0'		Wet brown clayey silt w/trace of fine to coarse sand.	A-4(4)	Hand Auger
			2.0'		12" RECOVERY		
3		2	2.0'		Wet brown clayey silt w/trace of fine to coarse sand and gravel.	A-4(8)	Hand Auger
			3.0'		12" RECOVERY		
4.5		3	3.0'		Wet brown clay w/some fine sand, trace of coarse sand and gravel.	A-6(8)	Hand Auger
			4.0'		12" RECOVERY		
6		4	4.0'		Wet orange clayey fine to coarse and w/trace of gravel.	A-2-4(0)	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		Wet orange silty fine and w/some clay, trace of coarse sand.	A-2-4(0)	Hand Auger
			6.0'		12" RECOVERY		USDA Classifica
		6	6.0'		Wet orange silty fine asand w/trace of coarse sand.	A-2-4(0)	- Sandy Loam.
			7.0'		12" RECOVERY		Hand Auger
7.5					End of Boring		
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/23/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-76

Contract: 25-113-01

Boring Location: Sta. 765+72, Lt. C.L.

Boring Surface Elev.:

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
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Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/23/09	1	0.0'		No Sample Taken		Hand Auger
1.5		2	1.0' 1.0'		12" RECOVERY Wet brownish gray clayey silt w/trace of fine to coarse sand.	A-4(10)	Hand Auger
3		3	2.0' 2.0'		12" RECOVERY Wet brownish gray clayey silt w/trace of fine sand.	A-4(8)	Hand Auger
4.5		4	3.0' 3.0'		12" RECOVERY Wet brown clay w/trace of fine to coarse sand.	A-6(11)	Hand Auger
6		5	4.0' 4.0'		12" RECOVERY Wet brown clayey coarse to fine sandy silt w/some gravel.	A-4(0)	Hand Auger USDA Classifica
		6	5.0' 5.0'		12" RECOVERY Wet brown silty coarse to fine sand w/some gravel.	A-1-b	- Sandy Loam. Hand Auger
7.5			6.0'		12" RECOVERY End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Poorly graded clayey
silty sand



Silty sand

DRAFT
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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/23/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-78

Contract: 25-113-01

Boring Location: Sta. 788+46, Lt. C.L.

Boring Surface Elev.:

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
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Pay Quantities:

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

Boring Contractor: Walton Corporation

Driller:

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/28/09	1	1.0'		Wet brown clay w/trace of fine to coarse and.	A-6(10)	Hand Auger Topsoil - 6".
			2.0'		12" RECOVERY		
		2	2.0'		Wet brown clay w/trace of fine to coarse sand and gravel.	A-6(14)	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Wet brown silty gravel and fine asand w/some coarse sand.	A-2-4(0)	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Wet brown clayey fine sand and gravel w/trace of coarse sand.	A-2-4(0)	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		Wet brown fine sandy silt w/some clay, trace of coarse sand.	A-4(0)	Hand Auger USDA
6			6.0'		12" RECOVERY		Classifica
					End of Boring		- Sandy Loam.
7.5							
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/28/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-79

Contract: 25-113-01

Boring Location: Sta. 787+00, Rt. C.L.

Boring Surface Elev.:

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
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Pay Quantities:

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

Boring Contractor:
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/28/09	1	0.0'		No Sample Taken		Hand Auger - Topsoil
			1.0'		0" RECOVERY		
1.5		2	1.0'		Wet brown clay w/trace of fine to coarse sand.	A-6(12)	Hand Auger
			2.0'		12" RECOVERY		
		3	2.0'		Wet brown clay w/trace of fine to coarse sand.	A-6(11)	Hand Auger
3			3.0'		12" RECOVERY		
		4	3.0'		Wet brown clayey silt w/trace fine to coarse and gravel.	A-4(7)	Hand Auger
			4.0'		12" RECOVERY		
4.5		5	4.0'		Wet brown clayey gravel and coarse sand w/trace of silt and fine sand.	A-2-6(0)	Hand Auger
			5.0'		12" RECOVERY		
		6	5.0'		Wet brown gravel w/some coarse sand, trace of fine sand and silt.	A-1-a	Hand Auger
6			6.0'		12" RECOVERY		
					End of Boring		
7.5							

Remarks:

Reviewed By: _____ **Soils Supervisor:** _____

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded gravel
with clay



Well graded gravel
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/28/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-8

Contract: 28-113-01

Boring Location: Sta. 503+00, 100.00' Rt. C.L.

Boring Surface Elev.: + 56.06

Reference:

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

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

Water Level Readings					
Date 2/26/2009	Time	Depth of Hole 10.0'	Depth of Casing 8.0'	Depth of Water 8.7'	Elev. of Water

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

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/26/09	1	0.5'	2 2 3	Moist firm brownish gray silt w/some clay, trace of coarse sand.	A-4(4)	Topsoil - 5".
			2.0'		14" RECOVERY		
3		2	2.0'	8 7 13 14	Moist very stiff brownish gray silt w/some clay, trace of fine to coarse sand and gravel.	A-4(4)	
			4.0'		17" RECOVERY		
		3	4.0'	8 17 21 28	Moist dense brown silty gravel and fine to coarse sand.	A-1-b	
6			6.0'		15" RECOVERY		
		4	6.0'	8 11 13 13	Moist medium dense brown coarse to fine sand w/some silt, trace of gravel.	A-1-b	
			8.0'		22" RECOVERY		
9		5	8.0'	11 13 13 14	Wet medium dense brown coarse sand w/some fine sand and silt, trace of gravel.	A-1-b	
			10.0'		22" RECOVERY		
		6	10.0'	7 7 8 7	Wet medium dense brownish green coarse sand w/some silt, fine sand and gravel.	A-1-b	
12			12.0'		15" RECOVERY		
		7	12.0'	8 10 11 14	Wet very stiff greenish brown coarse to fine sandy silt w/trace of gravel.	A-4(0)	
			14.0'		14" RECOVERY		
15		8	14.0'	11 11 19 29	Wet medium dense greenish brown clayey fine to coarse sand w/trace of gravel.	A-2-4(0)	
			16.0'		14" RECOVERY		
					End of Boring		

Remarks: GTA Inspector - J. Lafferty

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silt



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/26/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-80

Contract: 25-113-01

Boring Location: Sta. 789+04, Rt. C.L.

Boring Surface Elev.:

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
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Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/28/09	1	1.0'		Wet brown clayey silt w/trace of gravel and fine to coarse sand.	A-4(5)	Hand Auger Topsoil - 6".
			2.0'		12" RECOVERY		
		2	2.0'		Wet brown clayey silt w/trace of gravel and fine to coarse sand.	A-4(9)	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Wet brown clayey silt w/trace of fine sand.	A-4(8)	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Wet brown fine to coarse sandy silt w/some clay, trace of gravel.	A-4(0)	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		Wet brown coarse sand w/some silt and fine sand, trace of clay and gravel.	A-1-b	Hand Auger USDA
			6.0'		12" RECOVERY		Classifica
					End of Boring		- Loamy Sand.
7.5							
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/28/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-83

Contract: 25-113-01

Boring Location: Sta. 836+24, Rt. C.L.

Boring Surface Elev.:

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

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/30/09	1	1.0'		Moist brown silty coarse to fine sand w/trace of gravel.	A-2-4(0)	Hand Auger Topsoil - 8".
			2.0'		12" RECOVERY		
		2	2.0'		Moist brown coarse to fine sand and gravel w/some silt.	A-1-b	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Moist brown fine to coarse sand and gravel w/some silt.	A-1-b	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Moist orange coarse to fine sand w/some silt, trace of gravel.	A-2-4(0)	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		MOist orange fine to coarse sand w/trace of silt, clay and gravel.	A-3	Hand Auger USDA Classifica
6			6.0'		12" RECOVERY		- Sand.
		6	6.0'		Moist orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	Hand Auger
			7.0'		12" RECOVERY		
7.5		7	7.0'		Moist orange fine to coarse sand w/trace of silt and gravel.	A-3	Hand Auger
			8.0'		12" RECOVERY		
					End of Boring		
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/30/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-84

Contract: 25-113-01

Boring Location:

Boring Surface Elev.:

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
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Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/29/09	1	0.0'		No Sample Taken		Hand Auger - Topsoil
			1.0'		0" RECOVERY		
1.5		2	1.0'		Wet brownish gray clayey silt w/trace of fine to coarse sand.	A-4(7)	Hand Auger
			2.0'		12" RECOVERY		
		3	2.0'		Wet brownish gray clayey silt w/trace of fine to coarse sand and gravel.	A-4(7)	Hand Auger
3			3.0'		12" RECOVERY		
		4	3.0'		Wet brownish gray clayey fine sandy silt w/trace of coarse sand and gravel.	A-4(2)	Hand Auger
			4.0'		12" RECOVERY		
4.5		5	4.0'		Wet brownish gray silty fine sand w/some clay, trace of coarse sand and gravel.	A-2-4(0)	Hand Auger USDA Classifica
			5.0'		12" RECOVERY		
		6	5.0'		Wet brownish orange coarse to fine sand w/some silt, trace of gravel.	A-1-b	- Sandy Loam. Hand Auger
6			6.0'		12" RECOVERY		
		7	6.0'		Wet brownish orange coarse sand w/some fine sand, trace of silt and gravel.	A-1-b	Hand Auger
			7.0'		12" RECOVERY		
7.5					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/29/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

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

Boring No.: IT1-9

Contract: 28-113-01

Boring Location: Sta. 519+50, 120.00' Lt. C.L.

Boring Surface Elev.: + 55.87

Reference:

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

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

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/20/2009		10.0'	8.0'	8.4'	
	3/21/2009				7.8'	

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

Boring Contractor: Walton Corporation
Driller: David
Helpers: Herberto & Hector

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/20/09	1	0.5'	3 7 15	Moist very stiff gray silt w/some clay and fine sand, trace of gravel and coarse sand.	A-4(2)	Topsoil - 3".
			2.0'		15" RECOVERY		
3		2	2.0'	18 16 13 9	Moist medium dense brown gravel and fine to coarse sand w/some silt.	A-1-b	
			4.0'		20" RECOVERY		
		3	4.0'	2 4 5 5	Wet stiff green fine sandy clay w/trace of coarse sand and gravel.	A-6(5)	
6			6.0'		19" RECOVERY		
		4	6.0'	8 9 10 8	Wet very stiff green fine sandy clay w/trace of coarse sand.	A-6(6)	
			8.0'		21" RECOVERY		
9		5	8.0'	2 4 4 5	Wet firm green fine sandy clay w/trace of coarse sand and gravel.	A-7-6(6)	
			10.0'		18" RECOVERY		
		6	10.0'	7 6 8 10	Wet stiff green fine sandy clay w/trace of coarse sand and gravel.	A-7-6(8)	
12			12.0'		19" RECOVERY		
		7	12.0'	4 4 5 6	Wet stiff green fine to coarse sandy clay w/trace of gravel.	A-7-5(1)	
			14.0'		21" RECOVERY		
15		8	14.0'	4 4 4 4	Wet loose black coarse to fine sand w/some silt, trace of gravel.	A-2-4(0)	
			16.0'		20" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Low plasticity
clay



Clayey sand

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Notes:

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

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

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

Boring No.: SSI-1

Contract: 25-113-01

Boring Location: STA. 753+50 80' Rt. C.L.

Boring Surface Elev.: + 76.74

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/4/11		20.0	20.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	60.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/4/11	1	0.5'	4 4 5	Wet firm brown clayey silt w/some fine sand, trace of coarse sand. 14" RECOVERY	A-4(6)	Topsoil - 7".
		2	2.0'	3 4 7 11	Wet stiff brown silt w/some fine sand, trace of coarse sand. 19" RECOVERY	A-4(2)	
3.5		3	4.0'	7 11 8 11	Wet medium dense brownish orange clayey coarse to fine sand w/some fine gravel, trace of silt. 17" RECOVERY	A-2-4(0)	
		4	6.0'	7 8 10 9	Wet medium dense brownish orange silty fine to coarse sand w/trace of fine gravel. 22" RECOVERY	A-2-4(0)	
7		5	8.0'	7 11 13 13	Wet medium dense brown silty fine sand w/ some coarse sand, trace of fine gravel. 21" RECOVERY	A-2-4(0)	
		6	10.0'	11 12 8 10	Wet medium dense brownish orange silty fine sand. 22" RECOVERY	A-2-4(0)	
10.5		7	12.0'	5 7 8 11	Wet medium dense tannish orange silty fine sand w/trace of coarse sand. 21" RECOVERY	A-2-4(0)	
14		8	14.0'	8 16 7 5	Wet medium dense brownish orange silty fine gravel and coarse sand w/some fine sand. 18" RECOVERY	A-2-4(0)	
		9	16.0'	7 9 10 10	Saturated medium dense brownish red clayey coarse to fine sand w/some fine gravel, trace of silt. 15" RECOVERY	A-2-5(0)	
17.5		10	18.0'	17 14 18 20	Saturated dense brownish red clayey coarse to fine sand w/trace of fine gravel and silt. 20" RECOVERY	A-2-5(0)	Mud Rotary @ 20.0'.
			20.0'				

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: SS1-1

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21							
24.5		11	24.0' 26.0'	4 4 5	Saturated loose orangish brown fine to coarse sand w/some silt, trace of fine gravel. 20" RECOVERY	A-2-4(0)	
28							
31.5		12	29.0' 31.0'	5 7 8 9	Saturated medium dense orangish brown fine to coarse sand w/some silt, trace of fine gravel. 22" RECOVERY	A-2-4(0)	
35		13	34.0' 36.0'	5 6 7 10	Saturated medium dense brownish orange fine to coarse sand w/some silt, trace of fine gravel. 22" RECOVERY	A-2-4(0)	
38.5							
42		14	39.0' 41.0'	11 14 15 18	Saturated medium dense orangish brown fine to coarse sand w/some silt. 23" RECOVERY	A-2-4(0)	
45.5		15	44.0' 46.0'	9 11 14 15	Saturated medium dense orangish brown fine sand w/some coarse sand, trace of silt. 22" RECOVERY	A-3	
49	2/7/11	16	49.0' 51.0'	8 10 15 19	Saturated medium dense orangish brown fine sand w/some coarse sand, trace of silt. 21" RECOVERY	A-3	
52.5							

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

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

Boring No.: SS1-1

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		17	54.0'	10 12 14 11	Saturated medium dense orangish brown fine sand w/some coarse sand, trace of silt.	A-3	
56			56.0'		22" RECOVERY		
		18	58.0'	10 11 13 12	Saturated medium dense orangish brown fine sand w/some coarse sand, trace of silt.	A-3	
59.5			60.0'		22" RECOVERY		
					End of Boring		
63							
66.5							
70							
73.5							
77							
80.5							
84							

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KEY TO SYMBOLS

Symbol Description

Strata symbols

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

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Notes:

1. Exploratory borings were drilled on February 4, 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 SR-1

Boring No.: SSI-2

Contract: 25-113-01

Boring Location: STA. 789+50 80' Lt. C.L.

Boring Surface Elev.: + 66.33

Reference:

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

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

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

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

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

From Depth of: **To:**
From Depth of: 0.0 **To:** 29.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/18/11		29.0	29.0	28.5	

Pay Quantities:
2 1/2 in. Dia. Dry Sample Boring: 61.0 **Ft.;**
No. of 2 in. Dia. Shelby Tubes: **No. of**
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
3.5	2/18/11	1	1.5'	4	Wet soft brown silty clay w/trace of fine sand. 6" RECOVERY	A-6(12)	Topsoil - 8".
		2	2.0' 2.0'	5 4 6 7		A-4(4)	
7		3	4.0' 4.0'	3 4 4 5	Wet firm brown silty clay w/trace of fine to coarse sand. 24" RECOVERY	A-6(13)	
		4	6.0'	6 15 15 15		A-2-4(0)	
10.5		5	8.0' 8.0'	6 13 11 8	Wet medium dense reddish brown silty coarse sand w/some fine sand and fine gravel. 18" RECOVERY	A-2-7(5)	
		6	10.0'	10 11 11 15		A-2-5(0)	
14		7	12.0'	8 13 9 8	Saturated medium dense reddish brown coarse sand and fine gravel w/some fine sand and silt. 19" RECOVERY	A-1-b	
		8	14.0'	2 5 10 10		A-2-4(0)	
17.5		9	16.0'	9 10 10 12	Saturated medium dense reddish brown coarse to fine sand w/some fine gravel and silt. 18" RECOVERY	A-1-b	
		10	18.0'	2 8 5 9		A-2-4(0)	
21			20.0'		22" RECOVERY		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: SS1-2

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
24.5		11	24.0'	4 6 9 9	Saturated medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			26.0'		24" RECOVERY		
28							
		12	29.0'	6 9 10 12	Saturated medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	Mud Rotary @ 29.0'.
			31.0'		24" RECOVERY		
31.5							
		13	34.0'	7 8 13 20	Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
			36.0'		24" RECOVERY		
35							
		14	39.0'	11 16 16 16	Saturated dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
			41.0'		24" RECOVERY		
38.5							
		15	44.0'	12 12 14 17	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			46.0'		24" RECOVERY		
42							
		16	49.0'	17 12 14 17	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			51.0'		24" RECOVERY		
45.5							
49							
52.5							

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

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

Boring No.: SS1-2

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		17	54.0'	8 9 10 14	Saturated medium dense brown fine sand w/ some coarse sand and silt. 24" RECOVERY	A-2-4(0)	
56			56.0'				
		18	59.0'	9 10 14 20	Saturated medium dense brown silty fine sand w/trace of coarse sand. 18" RECOVERY	A-2-4(0)	
59.5			61.0'				
					End of Boring		
63							
66.5							
70							
73.5							
77							
80.5							
84							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Clayey sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on February 18, 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 SR-1

Boring No.: SSI-3

Contract: 25-113-01

Boring Location: STA. 1807+15.0' C.L.

Boring Surface Elev.: +20.50

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 18.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/10/11		12.0	12.0	9.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	60.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Bill Holden

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/10/11	1	0.5'	5 4 5	Moist loose brown fine to coarse sand w/some silt, trace of fine gravel. 15" RECOVERY	A-2-4(0)	Topsoil - 7".
		2	2.0'	6 6 9 8	Moist medium dense brown coarse to fine sand w/some silt, clay and fine gravel. 14" RECOVERY	A-2-4(0)	
3.5		3	4.0'	5 8 9 6	Moist medium dense brownish orange coarse to fine sand w/some fine gravel and silt. 4" RECOVERY	A-1-b	
		4	6.0'	2 9 18 16	Moist medium dense brownish orange coarse to fine sand w/some silt and fine gravel. 15" RECOVERY	A-1-b	
		5	8.0'	10 37 36 30	Wet very dense brownish orange fine sand w/some silt, trace of coarse sand and fine gravel. 16" RECOVERY	A-2-4(0)	
10.5		6	10.0'	22 18 14 13	Wet dense brownish orange fine to coarse sand w/some silt, trace of fine gravel. 18" RECOVERY	A-2-4(0)	
		7	12.0'	4 3 4 6	Wet loose brownish green fine sand w/some coarse silt and silt, trace of fine gravel. 16" RECOVERY	A-2-4(0)	
14		8	14.0'	4 4 4 6	Wet loose brownish orange fine sand w/some coarse sand, trace of silt. 16" RECOVERY	A-3	
		9	16.0'	2 3 6 5	Wet loose orangish brown fine sand w/some coarse sand, trace of silt and fine gravel. 20" RECOVERY	A-3	
17.5		10	18.0'	4 4 4 5	Wet loose orange fine sand w/some coarse sand and silt. 18" RECOVERY	A-3	Mud Rotary @ 18.0'.
			20.0'				

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: SS1-3

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21							
24.5		11	24.0'	2 2 3 2	Saturated loose orange fine sand w/some coarse sand and silt.	A-2-4(0)	
			26.0'		21" RECOVERY		
28							
		12	29.0'	2 6 9 11	Saturated medium dense orange silty fine sand w/some coarse sand, trace of fine gravel.	A-2-4(0)	
			31.0'		22" RECOVERY		
31.5							
		13	34.0'	4 7 16 18	Saturated medium dense brown silty fine sand w/some coarse sand.	A-2-4(0)	
35			36.0'		22" RECOVERY		
38.5							
		14	39.0'	7 7 8 9	Saturated medium dense gray clayey fine sand w/trace of coarse sand, fine gravel and silt.	A-2-4(0)	
			41.0'		21" RECOVERY		
42							
		15	44.0'	6 7 11 12	Saturated very stiff gray clayey fine sandy silt w/trace of coarse sand and fine gravel.	A-4(0)	
45.5			46.0'		22" RECOVERY		
49							
		16	49.0'	6 7 11 8	Saturated medium dense gray silty fine sand w/trace of coarse sand.	A-2-4(0)	
			51.0'		20" RECOVERY		
52.5							

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

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

Boring No.: SS1-3

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		17	54.0'	7 9 11 12	 Saturated very stiff gray clayey fine sandy silt w/trace of coarse sand. 22" RECOVERY	A-4(1)	
56			56.0'				
		18	58.0'	12 10 15 16	 Saturated medium dense gray clayey fine sand w/some fine gravel, trace of silt, coarse sand and shell fragments. 22" RECOVERY	A-2-4(0)	
59.5			60.0'				
					End of Boring		
63							
66.5							
70							
73.5							
77							
80.5							
84							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded clayey
silty sand



Poorly graded sand
with silt



Clayey sand

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Notes:

1. Exploratory borings were drilled on February 10, 2011 using 3 1/4 inch continuous flight power auger. Rig is a truck 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 SR-1

Boring No.: SSI-4

Contract: 25-113-01

Boring Location: STA. 1807+15 90' Lt. C.L.

Boring Surface Elev.: +20.30

Reference:

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

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

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

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 19.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/7/11		12.0	12.0	8.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	60.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/7/11	1	0.5'	3 4 3	Moist loose orange coarse to fine sand w/ some silt and fine gravel. 6" RECOVERY	A-1-b	Topsoil - 8".
		2	2.0'	3 3 4 3	Moist loose orange coarse sand w/some fine sand and silt, trace of fine gravel. 16" RECOVERY	A-1-b	
3.5		3	4.0'	4 6 5 5	Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel. 15" RECOVERY	A-1-b	
		4	6.0'	6 6 7 6	Moist medium dense brown coarse sand w/ some fine sand, trace of silt and fine gravel. 17" RECOVERY	A-1-b	
7		5	8.0'	6 7 6 15	Moist medium dense brown fine gravelly coarse sand w/some fine sand, trace of silt. 14" RECOVERY	A-1-b	
		6	10.0'		No Sample 0" RECOVERY		
10.5		7	12.0'	6 7 6 6	Wet medium dense brown fine to coarse sand w/trace of silt and fine gravel. 14" RECOVERY	A-3	
14		8	14.0'	2 4 7 9	Wet medium dense brown fine sand w/some coarse sand and silt. 16" RECOVERY	A-2-4(0)	
		9	16.0'	6 8 11 12	Wet medium dense brown fine sand w/some coarse sand and silt. 16" RECOVERY	A-2-4(0)	
17.5		10	18.0'	5 6 7 7	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt and fine gravel. 16" RECOVERY	A-3	Mud Rotary @ 19.0'.
			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: U.S. 301 Maryland State Line to SR-1
Contract: 25-113-01

Boring No.: SS1-4

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21							
24.5		11	24.0'	2 4 4 6	Saturated loose brown fine sand w/some silt and coarse sand.	A-2-4(0)	
			26.0'		20" RECOVERY		
28							
		12	29.0'	5 7 9 14	Saturated medium dense brown silty fine sand w/some coarse sand, trace of fine gravel.	A-2-4(0)	
			31.0'		23" RECOVERY		
31.5							
		13	34.0'	9 11 16	Saturated medium dense brown clayey fine sand w/some silt and coarse sand.	A-2-4(0)	
			35.5'		18" RECOVERY		
35		13A	35.5'	13	Saturated medium dense gray clayey fine sand w/some coarse sand and silt.	A-2-4(0)	
			36.0'		6" RECOVERY		
38.5							
		14	39.0'	5 8 11 11	Saturated very stiff gray clayey fine sandy silt w/some coarse sand.	A-4(0)	
			41.0'		24" RECOVERY		
42							
		15	44.0'	5 7 7 10	Saturated medium dense gray silty fine sand w/trace of coarse sand.	A-2-4(0)	
45.5			46.0'		24" RECOVERY		
49							
		16	49.0'	10 12 12 18	Saturated medium dense gray silty coarse to fine sand.	A-2-4(0)	
			51.0'		22" RECOVERY		
52.5							

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

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

Boring No.: SS1-4

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		17	54.0'	5 11 16 17	Saturated very stiff gray fine sandy silt w/ trace of coarse sand. 24" RECOVERY	A-4(0)	
56			56.0'				
		18	58.0'	9 12 19 23	Saturated hard gray fine sandy silt w/some clay, trace of coarse sand, fine gravel and organic matter. 24" RECOVERY	A-4(0)	
59.5			60.0'				
					End of Boring		
63							
66.5							
70							
73.5							
77							
80.5							
84							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded sand
with silt



Silty sand



Poorly graded clayey
silty sand

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Notes:

1. Exploratory borings were drilled on February 7, 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 SR-1

Boring No.: SSI-5

Contract: 25-113-01

Boring Location: STA. 1820+50.0' C.L.

Boring Surface Elev.: +25.70

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 16.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/11/11		14.0	14.0	12.2	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	60.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Bill Holden

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/11/11	1	0.5'	11 16 15	Moist medium dense gray coarse sandy fine gravel w/some silt, trace of fine sand. 16" RECOVERY	A-1-a	Topsoil - 6".
		2	2.0'	12 19 22 17	Moist dense brownish orange fine to coarse sand w/some silt, trace of fine gravel. 20" RECOVERY	A-2-4(0)	
3.5		3	4.0'	8 8 10 10	Moist medium dense brownish orange silty coarse to fine sand w/trace of fine gravel. 17" RECOVERY	A-1-b	
		4	6.0'	12 22 16 19	Moist dense brown coarse sand w/some fine sand, fine gravel and silt. 19" RECOVERY	A-1-b	
7		5	8.0'	8 10 14 23	Moist very stiff tan silt w/some coarse to fine sand, fine gravel and clay. 16" RECOVERY	A-4(0)	
		6	10.0'	19 16 12 9	Wet medium dense brownish orange fine to coarse sand w/some silt and fine gravel. 18" RECOVERY	A-2-4(0)	
10.5		7	12.0'	9 5 6 7	Wet medium dense brownish orange silty fine sand w/some coarse sand. 20" RECOVERY	A-2-4(0)	
		8	14.0'	4 4 4 5	Wet loose brownish orange fine sand w/some coarse sand and silt. 20" RECOVERY	A-2-4(0)	
		9	16.0'	3 3 3 2	Wet loose brownish orange fine sand w/some coarse sand and silt. 22" RECOVERY	A-2-4(0)	Mud Rotary @ 16.0'.
14		10	18.0'	4 4 5 8	Wet loose brownish orange silty fine sand w/some coarse sand. 20" RECOVERY	A-2-4(0)	
17.5			20.0'				

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: SS1-5

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21							
24.5		11	24.0' 26.0'	3 4 5 7	Wet stiff gray clayey fine sandy silt w/trace of coarse sand and fine gravel. 23" RECOVERY	A-4(0)	
28							
31.5		12	29.0' 31.0'	4 5 4 7	Wet stiff gray fine sandy silt w/some clay, trace of coarse sand. 22" RECOVERY	A-4(0)	
35		13	34.0' 36.0'	4 6 6 8	Wet stiff gray fine sandy silt w/some clay, trace of coarse sand and fine gravel. 21" RECOVERY	A-4(0)	
38.5							
42		14	39.0' 41.0'	5 5 7 9	Wet medium dense gray silty fine sand w/ trace of coarse sand. 22" RECOVERY	A-2-4(0)	
45.5		15	44.0' 46.0'	5 7 8 9	Wet medium dense gray silty fine sand w/ some coarse sand. 22" RECOVERY	A-2-4(0)	
49		16	49.0' 51.0'	4 5 5 6	Wet stiff gray fine sandy silt w/some clay, trace of coarse sand and shell fragments. 20" RECOVERY	A-4(0)	
52.5							

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

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

Boring No.: SS1-5

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
56		17	54.0'	4 6 9 10	Wet stiff gray fine sandy clay w/some silt, trace of coarse sand, fine gravel and shell fragments. 22" RECOVERY	A-6(2)	
			56.0'				
59.5		18	58.0'	10 19 24 30	Wet hard green fine sandy silt w/some clay, trace of coarse sand. 20" RECOVERY	A-4(0)	
			60.0'				
63					End of Boring		
66.5							
70							
73.5							
77							
80.5							
84							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded sand
with silt



Silty sand



Poorly graded clayey
silty sand



Clayey sand

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Notes:

1. Exploratory borings were drilled on February 11, 2011 using 3 1/4 inch continuous flight power auger. Rig is a truck 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 SR-1

Boring No.: SSI-6

Contract: 25-113-01

Boring Location: STA. 1820+50 85' Lt. C.L.

Boring Surface Elev.: + 23.40

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 60.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/4/11		12.0	12.0	11.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	60.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/4/11	1	0.5'	4 5 8	Moist loose brown silty fine gravel and coarse sand w/some fine sand and clay. 8" RECOVERY	A-2-4(0)	Topsoil - 6".
		2	2.0'	5 8 8 6	Moist very stiff brown coarse to fine sandy silt w/some clay, trace of fine gravel. 15" RECOVERY	A-4(0)	
3.5		3	4.0'	6 9 9 7	Moist medium dense brown silty coarse to fine sand w/trace of fine gravel. 16" RECOVERY	A-1-b	
		4	6.0'	5 13 20 23	Moist dense brown silty coarse sand w/some fine sand and fine gravel. 18" RECOVERY	A-1-b	
7		5	8.0'	9 8 7 6	Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel. 18" RECOVERY	A-1-b	
		6	10.0'	6 5 5 6	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel. 20" RECOVERY	A-2-4(0)	
10.5		7	12.0'	6 8 7 7	Saturated medium dense brown fine sand w/some coarse sand and silt. 18" RECOVERY	A-2-4(0)	
14		8	14.0'	4 4 7 8	Saturated medium dense brown fine sand w/some coarse sand and silt. 16" RECOVERY	A-2-4(0)	
		9	16.0'	5 6 8 9	Saturated medium dense brown fine sand w/some coarse sand and silt. 14" RECOVERY	A-2-4(0)	
17.5		10	18.0'	5 7 8 8	Saturated medium dense brown fine sand w/some coarse sand and silt. 18" RECOVERY	A-2-4(0)	
			20.0'				

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: SS1-6

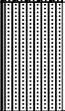
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21							
24.5		11	24.0'	4 6 6 5	Saturated medium dense brown silty fine sand w/some coarse sand.	A-2-4(0)	
			26.0'		15" RECOVERY		
28							
		12	29.0'	4 6 8 8	Saturated medium dense gray silty fine sand w/some coarse sand.	A-2-4(0)	
			31.0'		18" RECOVERY		
31.5							
		13	34.0'	5 6 6 8	Saturated medium dense gray silty fine sand w/trace of coarse sand.	A-2-4(0)	
35			36.0'		20" RECOVERY		
38.5							
	2/7/11	14	39.0'	4 6 7 12	Saturated medium dense gray silty fine sand w/trace of coarse sand and fine gravel.	A-2-4(0)	
			41.0'		24" RECOVERY		
42							
		15	44.0'	4 7 8 11	Saturated medium dense gray silty fine sand w/trace of coarse sand.	A-2-4(0)	
45.5			46.0'		22" RECOVERY		
49							
		16	49.0'	6 6 9 10	Saturated medium dense gray silty fine sand w/trace of coarse sand.	A-2-4(0)	
			51.0'		23" RECOVERY		
52.5							

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

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

Boring No.: SS1-6

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		17	54.0'	6 10 9 14	 Saturated very stiff gray clayey fine sandy silt w/trace of coarse sand and organic matter. 24" RECOVERY	A-4(1)	
56			56.0'				
		18	58.0'	6 12 16 18	 Saturated medium dense gray silty fine sand w/trace of coarse sand and organic matter. 24" RECOVERY	A-2-4(0)	
59.5			60.0'				
					End of Boring		
63							
66.5							
70							
73.5							
77							
80.5							
84							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Clayey sand

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Notes:

1. Exploratory borings were drilled on February 4, 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 SR-1

Boring No.: SSI-7

Contract: 25-113-01

Boring Location: STA. 1839+38 0' C.L.

Boring Surface Elev.: + 81.81

Reference:

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

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

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

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

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

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/16/11		14.0	14.0	Dry	

Pay Quantities:
2 1/2 in. Dia. Dry Sample Boring: 60.0 Ft.;
No. of 2 in. Dia. Shelby Tubes: Ft.;
2 1/2 in. Dia. Contin. Sample Boring: Ft.;
Dia. U-Sample Boring: Ft.
U-Samples: Ft.
Core Drilling in Rock: Ft.

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/16/11	1	0.0'	3 6 8 15	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel. 10" RECOVERY	A-1-b	Topsoil - 2". Fill
3.5		2	2.0'	8 16 50	Moist very dense orange fine to coarse sand w/some silt, trace of fine gravel. 12" RECOVERY	A-2-4(0)	Fill
		3	4.0'	10 31 30 29	Moist very dense orange fine to coarse sand w/some fine gravel and silt. 16" RECOVERY	A-2-4(0)	Fill
7		4	6.0'	31 42 50/5"	Moist very dense orange fine to coarse sand w/some silt, trace of fine gravel. 14" RECOVERY	A-2-4(0)	Fill
		5	8.0'	10 20 21 21	Moist dense orange fine to coarse sand w/some silt, trace of fine gravel. 17" RECOVERY	A-2-4(0)	Fill
10.5		6	10.0'	22 32 28 35	Moist very dense orange coarse to fine sand w/some silt and fine gravel. 8" RECOVERY	A-1-b	Fill
		7	12.0'	19 19 24 27	Moist dense orange fine sand w/some coarse sand, silt and fine gravel. 19" RECOVERY	A-2-4(0)	Fill
14		8	14.0'	14 23 32 26	Moist very dense orange coarse to fine sand w/some silt, trace of fine gravel. 20" RECOVERY	A-2-4(0)	Mud Rotary @ 14.0'. Fill
		9	16.0'	32 50/3"	Moist very dense orange fine to coarse sand w/some fine gravel and silt. 8" RECOVERY	A-2-4(0)	Fill
17.5		10	18.0'	20 16 23 27	Moist dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	Fill

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: SS1-7

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21			20.0'		20" RECOVERY		
24.5		11	24.0'	15 15 22 23	Moist medium dense brown silty coarse sand w/some fine sand and fine gravel.	A-2-4(0)	Fill
			26.0'		17" RECOVERY		
28							
		12	29.0'	12 14 20 12	Moist dense brown silty coarse to fine sand w/some fine gravel.	A-2-4(0)	Fill
			31.0'		17" RECOVERY		
31.5							
		13	34.0'	24 17 21 19	Moist dense brown silty fine gravel and coarse sand w/some fine sand.	A-2-4(0)	Fill
35			36.0'		16" RECOVERY		
		14	39.0'	13 10 10 9	Moist medium dense brown coarse to fine sand w/some silt and fine gravel.	A-1-b	Fill
			41.0'		14" RECOVERY		
42							
		15	44.0'	9 9 10 14	Wet medium dense orange silty fine sand w/ trace of coarse sand.	A-2-4(0)	
45.5			46.0'		15" RECOVERY		
		16	49.0'	6 9 12 11	Wet medium dense orange silty fine sand w/ trace of coarse sand and fine gravel.	A-2-4(0)	
			51.0'		12" RECOVERY		
52.5							

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

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

Boring No.: SS1-7

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		17	54.0'	9 11 14 16	Wet medium dense orange coarse to fine sand w/some silt and fine gravel.	A-1-b	
56			56.0'		15" RECOVERY		
		18	58.0'	10 11 14 19	Wet medium dense orange coarse sand w/ some fine sand and silt, trace of fine gravel.	A-1-b	
59.5			60.0'		18" RECOVERY		
					End of Boring		
63							
66.5							
70							
73.5							
77							
80.5							
84							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on February 16, 2011 using 3 1/4 inch continuous flight power auger. Rig is a truck 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 SR-1

Boring No.: SSI-8

Contract: 25-113-01

Boring Location: STA. 1839+38 80' Lt. C.L.

Boring Surface Elev.: + 79.20

Reference:

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

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

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	4/27/11		14.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	65.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	4/27/11		0.0'		No Sampling		Asphalt - 12". Stone - 24".
3.5		1	4.0' 4.0'	50/3"	0" RECOVERY No Sample Recovery		Augers clogged with stone. Pulled augers and cleaned and blank augered to 6'.
7		2	6.0' 6.0'	24 25 30 27	0" RECOVERY Moist very dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
		3	8.0' 8.0'	10 17 20 18	24" RECOVERY Moist dense brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
10.5		4	10.0' 10.0'	16 28 50/4"	20" RECOVERY Moist very dense brown coarse sand w/some fine sand, silt and fine gravel.	A-1-b	
		5	12.0' 12.0'	10 23 38 24	14" RECOVERY Moist very dense brown coarse to fine sand w/some silt and fine gravel.	A-1-b	
14		6	14.0' 14.0'	17 27 38 32	20" RECOVERY Moist very dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	Mud Rotary @ 14.0'.
		7	16.0' 16.0'	20 21 24 32	18" RECOVERY Moist dense brown coarse to fine sand w/ some silt, trace of fine gravel.	A-2-4(0)	
17.5		8	18.0' 18.0'	18 24 30 33	18" RECOVERY Moist very dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: SS1-8

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21			20.0'		16" RECOVERY		
24.5		9	23.0'	17 30 50/3"	Moist hard brown fine to coarse sandy silt w/ some clay and fine gravel.	A-4(0)	
28			25.0'		12" RECOVERY		
31.5		10	28.0'	18 20 14 16	Moist dense brown silty coarse to fine sand w/trace of fine gravel and clay.	A-2-4(0)	
35			30.0'		17" RECOVERY		
38.5		11	33.0'	9 10 14 14	Wet very stiff brown clayey silt w/trace of fine to coarse sand and fine gravel.	A-4(3)	
42			35.0'		17" RECOVERY		
45.5		12	38.0'	10 11 14 15	Wet medium dense orange coarse sand w/ some fine sand, silt and fine gravel.	A-1-b	
49			40.0'		16" RECOVERY		
52.5		13	43.0'	9 8 8 9	Wet medium dense orange silty fine sand w/ trace of coarse sand.	A-2-4(0)	
			45.0'		18" RECOVERY		
		14	48.0'	9 9 11 11	Wet medium dense orange silty fine sand w/ trace of coarse sand and fine gravel.	A-2-4(0)	
			50.0'		18" RECOVERY		

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

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

Boring No.: SS1-8

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		15	53.0'	11 16 18 14	Wet dense brown silty coarse to fine sand w/ some fine gravel.	A-2-4(0)	
			55.0'		14" RECOVERY		
56							
		16	58.0'	14 16 16 14	Wet dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			60.0'		14" RECOVERY		
59.5							
		17	63.0'	14 18 20 20	Wet dense orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			65.0'		14" RECOVERY		
					End of Boring		
66.5							
70							
73.5							
77							
80.5							
84							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded clayey
silty sand



Silt



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on April 27, 2011 using 3 1/4 inch continuous flight power auger. Rig is a truck 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 SR-1

Boring No.: SSI-9

Contract: 25-113-01

Boring Location: There is no geometry in this area. Station and offset not provided.

Boring Surface Elev.: + 67.78

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 18.0

Water Level Readings

Date
4/28/11

Time

Depth of Hole
18.0

Depth of Casing
18.0

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 65.0
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: Jason Truver

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	4/28/11	1	0.0'		No Sampling		Asphalt - 9". Crushed Stone - 18".
			2.5'		0" RECOVERY		
3.5		2	2.5'	10 10 12	Moist medium dense orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	10 10 11 11	Moist medium dense orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			6.0'		19" RECOVERY		
7		4	6.0'	20 19 21 24	Moist dense orange silty fine gravel and coarse to fine sand.	A-2-4(0)	
			8.0'		19" RECOVERY		
		5	8.0'	7 9 10 10	Saturated medium dense orange silty coarse to fine sand w/some fine gravel.	A-2-4(0)	
			10.0'		12" RECOVERY		
10.5		6	10.0'	19 22 32 25	Saturated very dense orange clayey coarse sand w/some fine sand and fine gravel, trace of silt.	A-2-4(0)	
			12.0'		22" RECOVERY		
		7	12.0'	7 13 22 29	Saturated dense orange coarse to fine sand w/some fine gravel and silt.	A-1-b	
14			14.0'		19" RECOVERY		
		8	14.0'	4 13 19 21	Saturated dense orange silty coarse to fine sand w/some fine gravel.	A-1-b	
			16.0'		21" RECOVERY		
		9	16.0'	18 22 29 25	Saturated very dense orangish brown silty coarse sand w/some fine gravel, fine sand and clay.	A-2-4(0)	
17.5			18.0'		22" RECOVERY		
		10	18.0'	16 26 32 30	Saturated very dense orange silty fine to coarse sand w/some fine gravel.	A-2-4(0)	Mud Rotary @ 18.0'.

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: SS1-9

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21			20.0'		20" RECOVERY		
24.5		11	24.0'	17 23 28 26	Saturated very dense orange silty coarse to fine sand w/some fine gravel. 18" RECOVERY	A-2-4(0)	
28			26.0'				
31.5		12	29.0'	13 17 28 23	Saturated dense orangish brown clayey fine gravel and coarse sand w/some fine sand and silt. 20" RECOVERY	A-2-4(0)	
35			31.0'				
35		13	34.0'	13 17 26 31	No Sieve Analysis - Indication of saturated dense tannish orange sandy clay. 8" RECOVERY		
38.5			36.0'				
42		14	39.0'	24 42 30 31	Saturated very dense orangish brown silty coarse to fine sand w/some fine gravel. 18" RECOVERY	A-2-4(0)	
45.5			41.0'				
45.5		15	44.0'	10 11	Saturated medium dense brownish gray silty fine sand w/trace of coarse sand. 12" RECOVERY	A-2-4(0)	
49		15A	45.0'	13 13	No Sieve Analysis - Indication of saturated very stiff gray organic sandy clay. 10" RECOVERY		
49			46.0'				
52.5		16	49.0'	10 11 7 8	Saturated very stiff gray silty clay w/some fine to coarse sand, trace of fine gravel. 11" RECOVERY	A-6(11)	
			51.0'				

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

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

Boring No.: SS1-9

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		17	54.0'	8 9 10 13	Saturated very stiff gray silty clay w/some fine sand, trace of coarse sand. 21" RECOVERY	A-6(11)	
56			56.0'				
		18	58.0'	10 13 15 21	Saturated medium dense tan coarse to fine sand w/trace of silt. 16" RECOVERY	A-1-b	
59.5			60.0'				
		19	63.0'	14 15 16 18	Saturated dense orange coarse to fine sand w/trace of silt. 18" RECOVERY	A-1-b	
63			65.0'				
					End of Boring		
66.5							
70							
73.5							
77							
80.5							
84							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded clayey
silty sand



Low plasticity
clay



Well graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on April 28, 2011 using 3 1/4 inch continuous flight power auger. Rig is a truck 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 SR-1

Boring No.: SS1-10

Contract: 25-113-01

Boring Location: There is no geometry in this area. Station and offset not provided.

Boring Surface Elev.: + 66.74

Reference:

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

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

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

IN.
IN.
IN.
IN.
IN.

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

From Depth of: **To:**
From Depth of: 0.0 **To:** 14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/17/11		14.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	60.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3.5	2/17/11	1	0.5'	10 14 25	Moist medium dense orange silty coarse to fine sand w/some clay, trace of fine gravel. 12" RECOVERY	A-2-4(0)	Topsoil - 4". Fill
			2.0'	22 31 27 32	Moist medium dense orange fine to coarse sand w/some silt and fine gravel. 15" RECOVERY	A-2-4(0)	Fill
7	2/17/11	3	4.0'	5 17 19 13	Moist dense brown silty coarse to fine sand w/trace of fine gravel. 16" RECOVERY	A-2-4(0)	Fill
			6.0'	18 22 26 34	Moist dense brown silty fine to coarse sand w/trace of fine gravel. 22" RECOVERY	A-2-4(0)	Fill
10.5	2/17/11	5	8.0'	5 18 22 27	Moist dense brown fine gravelly coarse sand w/some fine sand, trace of silt. 17" RECOVERY	A-1-b	Fill
			10.0'	18 14 19 22	Moist dense brown silty coarse sand w/some fine sand and fine gravel. 16" RECOVERY	A-2-4(0)	Fill
14	2/17/11	7	12.0'	15 17 20 19	Moist dense brown silty fine to coarse sand w/some fine gravel. 17" RECOVERY	A-2-4(0)	Fill
			14.0'	9 15 24 31	Moist dense brown coarse to fine sand w/some fine gravel and silt. 19" RECOVERY	A-1-b	Mud Rotary @ 14.0'. Fill
17.5	2/17/11	9	16.0'	24 27 31 19	Moist very dense brown fine gravel and coarse to fine sand w/some silt. 17" RECOVERY	A-1-b	Fill
			18.0'	31 31 40 55	Moist very dense brown silty coarse to fine sand w/some fine gravel. 16" RECOVERY	A-2-4(0)	Fill
	2/17/11	10	20.0'				

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: SS1-10

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21							
24.5		11	24.0' 26.0'	12 12 15 25	Moist medium dense brown coarse sandy clay w/some silt, fine sand and fine gravel. 16" RECOVERY	A-6(1)	Fill
28		12	29.0' 31.0'	50/4"	No Sample Recovery 0" RECOVERY		Fill
31.5							
35		13	34.0' 36.0'	12 12 18 39	Moist medium dense brown clayey coarse to fine sandy silt w/some fine gravel. 19" RECOVERY	A-4(0)	
38.5							
42		14	39.0' 41.0'	18 19 24 24	Wet dense green silty fine sand w/trace of coarse sand. 14" RECOVERY	A-2-4(0)	
45.5		15	44.0' 46.0'	8 9 10 12	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel. 16" RECOVERY	A-1-b	
49		16	49.0' 51.0'	10 10 13 14	Wet very stiff gray clayey silt w/some fine sand, trace of coarse sand. 20" RECOVERY	A-4(6)	
52.5							

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

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

Boring No.: SS1-10

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		17	54.0'	9 11 17 24	Wet medium dense tan coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
56			56.0'		16" RECOVERY		
		18	58.0'	6 11 13 20	Wet medium dense brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
59.5			60.0'		20" RECOVERY		
					End of Boring		
63							
66.5							
70							
73.5							
77							
80.5							
84							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt



Clayey sand



Poorly graded clayey
silty sand



Low plasticity
clay

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on February 17, 2011 using 3 1/4 inch continuous flight power auger. Rig is a truck 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 SR-1

Boring No.: SS1-11

Contract: 25-113-01

Boring Location: There is no geometry in this area. Station and offset not provided.

Boring Surface Elev.: + 36.99

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/18/11		18.0	18.0	16.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	60.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/18/11	1	0.0'	3 5 5 6	Moist loose orange fine gravel and coarse to fine sand w/some silt.	A-1-b	Topsoil - 2"
			2.0'		16" RECOVERY		
3.5		2	2.0'	10 14 14 10	Moist medium dense orange coarse sand and fine gravel w/some fine sand and silt.	A-1-b	
			4.0'		17" RECOVERY		
		3	4.0'	5 4 4	Wet loose orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			5.5'		8" RECOVERY		
		3A	5.5'	4	Wet stiff gray silty clay w/some fine sand,	A-6(10)	
7		4	6.0'	4 18 15 16	trace of coarse sand.	A-1-b	
			6.0'		6" RECOVERY		
			8.0'		Wet dense orange coarse to fine sand w/trace of silt and fine gravel.		
		5	8.0'	4 4 8 10	18" RECOVERY	A-4(7)	
			10.0'		Wet stiff gray clayey silt w/trace of fine to coarse sand.		
10.5		6	10.0'	10 20 21 18	15" RECOVERY	A-1-b	
			12.0'		Wet dense brown coarse to fine sand w/trace of silt and fine gravel.		
			12.0'		14" RECOVERY		
		7	12.0'	4 7 10 14	Wet medium dense brown coarse sand w/ some fine sand, trace of fine gravel and silt.	A-1-b	
14			14.0'		13" RECOVERY		
		8	14.0'	7 10 10 14	Wet medium dense brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	Mud Rotary @ 14.0'.
			16.0'		10" RECOVERY		
		9	16.0'	10 14 12 9	Wet medium dense brown coarse to fine sand w/some fine gravel and silt.	A-1-b	
17.5			18.0'		18" RECOVERY		
		10	18.0'	6 8 12 10	Saturated very stiff gray fine sandy clay w/ some coarse sand and silt.	A-6(8)	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: SS1-11

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21			20.0'		16" RECOVERY		
24.5		11	24.0'	7 7 11 10	Saturated very stiff gray silty clay w/trace of fine to coarse sand. 16" RECOVERY	A-6(16)	
28			26.0'				
31.5		12	29.0'	6 7 15 17	Saturated very stiff brown coarse sandy clay w/some fine sand and silt. 16" RECOVERY	A-6(5)	
35			31.0'				
35		13	34.0'	8 17 20 13	Saturated dense brown coarse to fine sand w/ some silt. 14" RECOVERY	A-1-b	
38.5			36.0'				
42		14	39.0'	12 13 14 14	Saturated medium dense brown coarse to fine sand w/trace of silt. 16" RECOVERY	A-1-b	
45.5			41.0'				
45.5		15	44.0'	8 10 14 15	Saturated medium dense brown coarse to fine sand w/trace of silt and fine gravel. 15" RECOVERY	A-1-b	
49			46.0'				
49		16	49.0'	9 8 15 16	Saturated medium dense green silty fine sand w/trace of coarse sand and organic matter. 19" RECOVERY	A-2-4(0)	
52.5			51.0'				

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

Boring No.: SS1-11

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		17	54.0'	6 6 10 14	Saturated very stiff green fine sandy silt w/ some organic matter, trace of coarse sand.	A-4(0)	
56			56.0'		20" RECOVERY		
		18	58.0'	5 8 11 11	Saturated very stiff green clayey fine sandy silt w/some organic matter, trace of coarse sand.	A-4(3)	
59.5			60.0'		24" RECOVERY		
					End of Boring		
63							
66.5							
70							
73.5							
77							
80.5							
84							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Low plasticity
clay



Poorly graded sand
with silt



Well graded sand
with silt



Silt

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Notes:

1. Exploratory borings were drilled on February 18, 2011 using 3 1/4 inch continuous flight power auger. Rig is a truck 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 SR-1

Boring No.: SS1-12

Contract: 25-113-01

Boring Location: There is no geometry in this area. Station and offset not provided.

Boring Surface Elev.: + 36.87

Reference:

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

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

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

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

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/21/11

Time

Depth of Hole
14.0

Depth of Casing
14.0

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 60.0

No. of 2 in. Dia. Shelby Tubes:

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

Ft.;

Ft.;

Dia. U-Sample Boring:

No. of:

Core Drilling in Rock:

U-Samples:

Ft.

Ft.

Boring Contractor: Walton Corporation

Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/21/11	1	0.0'	2 4 8 9	Moist stiff brown clayey silt w/some fine gravel and fine sand, trace of coarse sand.	A-4(1)	Topsoil - 3".
			2.0'		15" RECOVERY		
3.5		2	2.0'	6 10 10 7	Moist medium dense orange fine gravelly coarse sand w/trace of fine sand and silt.	A-1-b	
			4.0'		16" RECOVERY		
		3	4.0'	4 4 10 10	Wet medium dense gray silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			6.0'		8" RECOVERY		
7		4	6.0'	13 13 13 12	Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		20" RECOVERY		
		5	8.0'	5 7 10 7	Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		13" RECOVERY		
10.5		6	10.0'	5 10 11 12	Wet medium dense brown silty coarse to fine sand.	A-2-4(0)	
			12.0'		18" RECOVERY		
		7	12.0'	4 5 6 9	Wet stiff orange clay w/trace of coarse sand and silt.	A-7-6(28)	
14			14.0'		16" RECOVERY		
		8	14.0'	2 4 7 13	Wet stiff gray clayey silt w/trace of fine to coarse sand.	A-4(6)	Mud Rotary @ 14.0'.
			16.0'		16" RECOVERY		
		9	16.0'	8 10 11 9	Wet very stiff gray clay w/trace of fine to coarse sand and silt.	A-7-6(18)	
17.5			18.0'		16" RECOVERY		
		10	18.0'	13 13 10 9	Wet medium dense tan coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: SS1-12

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21			20.0'		15" RECOVERY		
24.5		11	24.0'	5 9 7 8	Wet medium dense tan coarse to fine sand w/ some silt, trace of fine gravel.	A-1-b	
			26.0'		13" RECOVERY		
28							
		12	29.0'	9 10 10 7	Wet medium dense brown coarse sand w/ some fine sand, trace of fine gravel and silt.	A-1-b	
			31.0'		8" RECOVERY		
31.5							
		13	34.0'	7 7 8 7	Wet medium dense tan coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
			36.0'		14" RECOVERY		
38.5							
		14	39.0'	10 10 13 9	Wet medium dense tan coarse to fine sand w/ trace of silt and fine gravel.	A-1-b	
			41.0'		10" RECOVERY		
42							
		15	44.0'	15 15 10 13	Wet very stiff brownish gray fine sandy clay w/some silt, trace of coarse sand and fine gravel.	A-6(5)	
			46.0'		18" RECOVERY		
45.5							
		16	49.0'	7 10 13 19	Saturated very stiff green fine sandy silt w/ trace of coarse sand and organic matter.	A-4(0)	
			51.0'		20" RECOVERY		
52.5							

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

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

Boring No.: SS1-12

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		17	54.0'	7 8 13 14	Saturated very stiff green fine sandy silt w/ some clay and organic matter. 24" RECOVERY	A-4(1)	
56			56.0'				
		18	58.0'	5 10 12 12	Saturated very stiff green clayey fine sandy silt w/some organic matter, trace of coarse sand. 24" RECOVERY	A-4(4)	
59.5			60.0'				
					End of Boring		
63							
66.5							
70							
73.5							
77							
80.5							
84							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Well graded sand
with silt



Silty sand



Poorly graded sand
with silt



Low plasticity
clay



Silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on February 21, 2011 using 3 1/4 inch continuous flight power auger. Rig is a truck 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 SR-1

Boring No.: HMI-1

Contract: 25-113-01

Boring Location: STA. 310+01 37' Rt. C.L.

Boring Surface Elev.: + 36.09

Reference:

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

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

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

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

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

From Depth of: **To:**
From Depth of: 0.0 **To:** 20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/10/11		10.0	10.0	7.7	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	60.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: K. Kershaw

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3.5	2/10/11	1	1.0'	6 5	Moist medium dense brown fine gravelly coarse sand w/some silt and fine sand.	A-1-b	Topsoil - 12".
		2	2.0'	6 7 12 10	12" RECOVERY Moist medium dense brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
7	2/10/11	3	4.0'	6 6 7 14	24" RECOVERY Moist medium dense brown silty coarse sand w/some fine sand and fine gravel.	A-1-b	
		4	6.0'	12 8 6 9	17" RECOVERY Wet stiff brown coarse to fine sandy silt w/ trace of fine gravel and clay.	A-4(0)	
10.5	2/10/11	5	8.0'	3 13 14 12	22" RECOVERY Saturated medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
		6	10.0'	10 5 6 6	16" RECOVERY Saturated medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
14	2/10/11	7	12.0'	2 2 3 4	20" RECOVERY Saturated firm gray silt w/some coarse sand, trace of fine sand, fine gravel and clay.	A-4(1)	
		8	14.0'	4 10 11 11	20" RECOVERY Saturated medium dense gray fine gravel and coarse to fine sand w/some silt.	A-1-b	
17.5	2/10/11	9	16.0'	6 9 9 7	16" RECOVERY Saturated medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
		10	18.0'	6 8 14 10	22" RECOVERY Saturated medium dense brown silty fine gravel and fine to coarse sand.	A-1-b	Mud Rotary @ 20.0'.
			20.0'		12" RECOVERY		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Feruson

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

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

Boring No.: HMI-1

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21							
24.5		11	24.0' 26.0'	11 15 17 24	Saturated dense orange fine sand w/some coarse sand and silt. 20" RECOVERY	A-2-4(0)	
28							
31.5		12	29.0' 31.0'	6 9 12 14	Saturated medium dense orange fine sand w/ some coarse sand and silt. 24" RECOVERY	A-2-4(0)	
35		13	34.0' 36.0'	8 12 16 24	Saturated medium dense brown fine sand w/ some coarse sand and silt. 24" RECOVERY	A-2-4(0)	
38.5							
42		14	39.0' 41.0'	9 12 17 19	Saturated medium dense brown fine sand w/ some coarse sand and silt. 24" RECOVERY	A-2-4(0)	
45.5		15	44.0' 46.0'	7 13 20 16	Saturated dense brown fine sand w/some coarse sand and silt. 24" RECOVERY	A-2-4(0)	
49		16	49.0' 51.0'	10 14 15 19	Saturated medium dense brown fine sand w/ some coarse sand and silt. 17" RECOVERY	A-2-4(0)	
52.5							

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

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

Boring No.: HMI-1

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		17	54.0'	10 16 25 25	Saturated dense brown silty fine sand w/trace of coarse sand.	A-2-4(0)	
56			56.0'		24" RECOVERY		
		18	58.0'	13 13 18 22	Saturated dense brown silty fine sand w/trace of coarse sand and fine gravel.	A-2-4(0)	
59.5			60.0'		21" RECOVERY		
					End of Boring		
63							
66.5							
70							
73.5							
77							
80.5							
84							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on February 10, 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 I-95

Boring No.: R1-001

Contract: 25-113-01

Boring Location: Sta. 460+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 64.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

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

Water Level Readings					
Date 2/20/08	Time	Depth of Hole 10.0'	Depth of Casing 8.0'	Depth of Water 8.2'	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 10.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;			U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;			Core Drilling in Rock:	Ft.

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	2 3 3 4	Wet firm brown clayey silt, trace of fine to coarse sand.	A-4(7)	Cultivated Soil - 12".
			2.0'		11" RECOVERY		
3		2	2.0'	4 7	Wet stiff brown clayey silt, trace of fine to coarse sand and gravel.	A-4(6)	
		2A	3.0'	11 13	11" RECOVERY	A-4(0)	
			4.0'		Wet very stiff orange clayey fine to coarse sandy silt w/ some gravel.		
		3	4.0'	8 9 10 11	7" RECOVERY	A-2-4(0)	
6			6.0'		Wet medium dense light brown silty coarse sand w/ some fine sand, trace of gravel.		
			6.0'		18" RECOVERY		
		4	6.0'	12 13 15 17	Wet medium dense light brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			8.0'		18" RECOVERY		
9		5	8.0'	6 7 6 10	Wet stiff light brown clayey fine to coarse sandy silt, trace of gravel.	A-4(0)	
			10.0'		18" RECOVERY		
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

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

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AUGUST 2015

Notes:

1. Exploratory boring was drilled on 2/20/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-002

Contract: 25-113-01

Boring Location: Sta. 465+00.00, 303' Lt. C.L.

Boring Surface Elev.: + 60.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/19/08		14.0'	12.0'	4.5'	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 16.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: 3 No. of U-Sample Boring: Ft.
 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	3 4 6	Wet stiff brown gravelly silt w/ some clay and fine sand, trace of coarse sand. 14" RECOVERY	A-4(0)	Cultivated Soil - 6".
3		2	2.0'	6 6 5 5	Wet medium dense light brown silty fine sand w/ some gravel, trace of coarse sand. 22" RECOVERY	A-2-4(0)	
		3	4.0'	2 2 4 10	Wet firm orange and light brown fine sandy silt, trace of gravel and coarse sand. 18" RECOVERY	A-4(0)	
6		4	6.0'	25 20 16 13	Wet dense orange gravel w/ some coarse to fine sand and silt. 10" RECOVERY	A-1-a	
		5	8.0'	6 8 8 7	Saturated medium dense orange gravel and coarse to fine sand w/ some silt. 15" RECOVERY	A-1-b	
9		6	10.0'	4 5 7 9	Saturated medium dense brown silty fine sand, trace of coarse sand. 19" RECOVERY	A-2-4(0)	
12		7	12.0'	7 9 9 10	Saturated very stiff brown fine sandy clay w/ some coarse sand, trace of gravel. 6" RECOVERY	A-6(1)	
		8	14.0'	1 5 6 7	Saturated medium dense brown silty fine sand, trace of coarse sand and gravel. 15" RECOVERY	A-2-4(0)	
15			16.0'		Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Clayey sand

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Notes:

1. Exploratory borings were drilled on 2/19/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-003

Contract: 25-113-01

Boring Location: Sta. 470+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 64.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/19/08		10.0'	8.0'	7.7'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	1.0'	2 4	Moist firm brown clayey silt w/ some fine sand, trace of coarse sand.	A-4(5)	Cultivated Soil - 12".
		2	2.0'	8	9" RECOVERY	A-4(0)	
3		2A	2.5'	9	Moist firm brown fine sandy silt w/ some coarse sand, trace of gravel.	A-2-4(0)	
			2.5'	6 6	6" RECOVERY		
		3	4.0'	6	Moist medium dense brown silty fine sand and gravel w/ some coarse sand.	A-1-b	
			4.0'	12 16 13	13" RECOVERY		
6		4	6.0'	8	Moist medium dense orange silty coarse to fine sand and gravel.	A-2-4(0)	
			6.0'	7 6 4	12" RECOVERY		
					Wet medium dense orange and brown coarse to fine sand w/ some silt, trace of gravel.		
			8.0'		18" RECOVERY		
9		5	8.0'	3 17 14 9	Wet dense orange gravel and coarse sand w/ some fine sand and silt.	A-1-b	
			10.0'		16" RECOVERY		
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 2/19/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All 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.: R1-004

Contract: 25-113-01

Boring Location: Sta. 475+00.00, 122' Lt. C.L.

Boring Surface Elev.: + 60.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	16.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/19/08		14.0'	12.0'	4.4'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	1.0'	3 6	Wet stiff gray clay, trace of fine to coarse sand.	A-6(11)	Cultivated Soil - 12".
			2.0'				
3		2	2.0'	10 17 19 21	9" RECOVERY Wet hard gray and brown silt w/ some clay, trace of gravel and fine to coarse sand.	A-4(1)	
			4.0'				
		3	4.0'	5 9 10 14	19" RECOVERY Saturated very stiff brown fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
6			6.0'				
		4	6.0'	14 14 15 14	10" RECOVERY Saturated medium dense brown gravel and fine sand w/ some coarse sand and silt.	A-1-b	
			8.0'				
9		5	8.0'	8 7 8 10	17" RECOVERY Saturated medium dense brown silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
			10.0'				
		6	10.0'	3 6 9 11	14" RECOVERY Saturated medium dense brown silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
12			12.0'				
		7	12.0'	4 6 8 8	18" RECOVERY Saturated stiff brown fine sandy clay, trace of coarse sand.	A-6(2)	
			14.0'				
15		8	14.0'	2 4 5 7	18" RECOVERY Saturated stiff brown fine sandy silt, trace of coarse sand.	A-4(0)	
			16.0'				
					20" RECOVERY Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Silty gravel



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 2/19/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-005

Contract: 25-113-01

Boring Location: Sta. 480+00.00, 118' Rt. C.L.

Boring Surface Elev.: + 64.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To:	16.0'

Water Level Readings					
Date 2/19/08	Time	Depth of Hole 14.0'	Depth of Casing 12.0'	Depth of Water 10.7'	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	Ft.;		No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;		Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.8'	4 5	Moist stiff brown clayey fine sandy silt, trace of coarse sand and gravel.	A-4(4)	Cultivated Soil - 10".
			2.0'		9" RECOVERY		
3		2	2.0'	8 11 11 11	Moist medium dense brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	4 8 10 9	Moist medium dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
6			6.0'		14" RECOVERY		
		4	6.0'	7 7 6 13	Moist medium dense light brown silty fine to coarse sand w/ some gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	3 8 16 22	Moist medium dense light brown gravel w/ some fine sand and silt, trace of coarse sand.	A-1-b	
			10.0'		5" RECOVERY		
		6	10.0'	3 6 10 11	Wet medium dense brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
12			12.0'		17" RECOVERY		
		7	12.0'	3 6 7 8	Saturated medium dense brown silty fine sand w/ some coarse sand.	A-2-4(0)	
			14.0'		15" RECOVERY		
15		8	14.0'	4 9 9 13	Saturated very stiff brown fine sandy silt, trace of coarse sand and gravel.	A-4(0)	
			16.0'		18" RECOVERY		
					Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Silty gravel

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/19/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All 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.: R1-006

Contract: 25-113-01

Boring Location: Sta. 485+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 65.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0'	To:	
Hollow Stem Auger:			From Depth of:		To:	10.0'

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date			10.0'	8.0'	Dry	
3 1/4						

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;

3
No. of U-Sample Boring: Ft.
Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.9'	3 4	Wet firm brown clay, trace of fine to coarse sand.	A-6(12)	Cultivated Soil - 11".
			2.0'		8" RECOVERY		
3		2	2.0'	2 6	Wet firm brown clayey fine sandy silt, trace of gravel.	A-4(4)	
			3.0'		8" RECOVERY		
		2A	3.0'	12 15	Wet medium dense brown coarse sand w/ some silt and gravel, trace of fine sand.	A-1-b	
			4.0'		8" RECOVERY		
		3	4.0'	3 6 11 13	Wet medium dense orange clayey coarse sand w/ some gravel and fine sand.	A-2-6(1)	
			6.0'		22" RECOVERY		
6		4	6.0'	11 14 17 16	Wet dense orange clayey coarse sand and gravel, trace of fine sand.	A-2-6(0)	
			8.0'		14" RECOVERY		
		5	8.0'	5 7 9 12	Wet medium dense brown gravel and fine sand w/ some silt and coarse sand.	A-1-b	
9			10.0'		17" RECOVERY		
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Clayey sand

DRAFT
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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/19/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All 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.: R1-007

Contract: 25-113-01

Boring Location: Sta. 490+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 61.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/19/08		10.0'	8.0'	9.1'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	1.0'	2	Moist soft brown fine sandy silt w/ some clay, trace of gravel.	A-4(1)	Cultivated Soil - 12".
			2.0'				
3		2	2.0'	2 5 5 5	9" RECOVERY Moist loose orange silty coarse to fine sand.	A-2-4(0)	
			4.0'		10" RECOVERY		
		3	4.0'	3 6 9 12	Moist medium dense orange coarse sand w/ some fine sand and gravel, trace of silt.	A-1-b	
6			6.0'		16" RECOVERY		
		4	6.0'	15 12 11 13	Moist medium dense orange coarse sand w/ some gravel, fine sand, and silt.	A-1-b	
			8.0'		18" RECOVERY		
9		5	8.0'	5 6 7 7	Wet medium dense orange coarse sand w/ some fine sand and gravel, trace of silt.	A-1-b	
			10.0'		13" RECOVERY		
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/19/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-008

Contract: 25-113-01

Boring Location: Sta. 495+00.00, 131' Lt. C.L.

Boring Surface Elev.: + 53.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings					
Date 2/19/08	Time	Depth of Hole 14.0'	Depth of Casing 12.0'	Depth of Water 4.0'	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.9'	2 3	Wet firm light brown fine sandy silt w/ some clay and coarse sand, trace of gravel. 10" RECOVERY	A-4(1)	Cultivated Soil - 11".
3		2	2.0'	5 6 11 11	Wet medium dense orange silty fine to coarse sand w/ some gravel. 19" RECOVERY	A-2-4(0)	
		3	4.0'	7 11 12 14	Wet medium dense orange and light brown gravel and coarse sand w/ some fine sand and silt. 19" RECOVERY	A-1-a	
6		4	6.0'	13 13 15 12	Wet medium dense brown gravel and coarse sand w/ some fine sand and silt. 17" RECOVERY	A-1-b	
		5	8.0'	5 5	Saturated loose light brown coarse sand w/ some gravel, trace of fine sand and silt. 11" RECOVERY	A-1-b	
9		5A	9.0'	5 11	Saturated medium dense brown silty fine sand, trace of coarse sand and gravel. 12" RECOVERY	A-2-4(0)	
		6	10.0'	3 3 6 8	Saturated stiff brown fine sandy silt w/ some coarse sand, trace of gravel. 13" RECOVERY	A-4(0)	
12		7	12.0'	2 10 5 8	Saturated stiff brown fine sandy clay w/ some coarse sand, trace of gravel. 16" RECOVERY	A-7-5(9)	
		8	14.0'	2 4 7 8	Saturated medium dense dark green clayey fine to coarse sand, trace of gravel. 20" RECOVERY	A-2-4(0)	
15			16.0'		Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/19/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-009

Contract: 25-113-01

Boring Location: Sta. 500+00.00, 129' Rt. C.L.

Boring Surface Elev.: + 50.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/18/08		14.0'	12.0'	3.9'	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 16.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 No. of U-Sample Boring: 3 Ft.
 Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.8' 2.0'	4 7	Wet stiff gray clayey silt, trace of fine to coarse sand. 12" RECOVERY	A-4(5)	Cultivated Soil - 10".
3		2	2.0'	9 10 11 12	Wet very stiff gray silt w/ some fine sand, trace of coarse sand and gravel. 17" RECOVERY	A-4(0)	
		3	4.0' 4.0'	3 4 5 6	Saturated stiff brown fine sandy silt, trace of gravel and coarse sand. 19" RECOVERY	A-4(0)	
6		4	6.0' 6.0'	3 5 5 6	Saturated loose brown silty fine sand w/ some coarse sand, trace of gravel. 16" RECOVERY	A-2-4(0)	
9		5	8.0' 8.0'	3 4 11 12	Saturated stiff brown fine sandy clay w/ some coarse sand, trace of gravel. 19" RECOVERY	A-7-6(11)	
		6	10.0' 10.0'	3 6 9 10	Saturated medium dense dark green silty fine to coarse sand, trace of gravel. 19" RECOVERY	A-2-4(0)	
12		7	12.0' 12.0'	2 3 4 4	Saturated loose dark green silty fine to coarse sand, trace of gravel. 24" RECOVERY	A-2-4(0)	
15		8	14.0' 14.0'	1 2 2 3	Saturated very loose dark green silty fine sand w/ some coarse sand, trace of gravel. 20" RECOVERY	A-2-5(0)	
			16.0'		Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

 Silty low plasticity
clay

 Silt

 Silty sand

 Low plasticity
clay

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-010

Contract: 25-113-01

Boring Location: Sta. 505+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 56.0'

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: Ball Sampler	O.D.	O.D. of Samp. Tube: 3	IN.
Core Bit:	O.D.	O.D. of Rock Core:	IN.

Casing Size: 3 1/4	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of: 0.0'	To: 10.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/18/08		10.0'	8.0'	6.8'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0		Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:			Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:				Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.8'	2 2	Wet soft light brown clay, trace of fine to coarse sand and gravel. 10" RECOVERY	A-6(11)	Cultivated Soil - 9".
		2	2.0'	3 7 11 16	Wet very stiff gray clay, trace of fine to coarse sand. 16" RECOVERY	A-6(17)	
3		3	4.0'	9 19	Wet very stiff gray silt w/ some fine sand, trace of coarse sand and gravel. 7" RECOVERY	A-4(0)	
		3A	5.0'	26 13	Wet dense brown gravel and silt w/ some fine to coarse sand. 10" RECOVERY	A-2-4(0)	
6		4	6.0'	15 14 16 15	Wet medium dense orange fine to coarse sand w/ some gravel, trace of silt. 17" RECOVERY	A-1-b	
		5	8.0'	8 8 12 17	Wet medium dense orange gravel and coarse sand w/ some silt and fine sand. 16" RECOVERY	A-1-b	
			10.0'		Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

	Low plasticity clay
	Silt
	Silty sand
	Poorly graded sand with silt
	Poorly graded clayey silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All 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.: R1-011

Contract: 25-113-01

Boring Location: Sta. 509+98.08, 45' Rt. C.L.

Boring Surface Elev.: + 59.0'

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: Split Barrel		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/18/08		10.0'	8.0'	Dry	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: 3 No. of U-Sample Boring: Ft.
 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.8'	3 4	Wet firm brown clayey silt w/ some coarse sand, trace of fine sand and gravel. 14" RECOVERY	A-4(6)	Cultivated Soil - 9".
3		2	2.0'	3 4 6 6	Wet loose brown coarse to fine sand w/ some silt, trace of gravel. 15" RECOVERY	A-1-b	
		3	4.0'	5 5 11 16	Wet medium dense brown silty fine to coarse sand, trace of gravel. 16" RECOVERY	A-2-4(0)	
6		4	6.0'	9 12 11 10	Wet medium dense brown silty coarse to fine sand w/ some gravel. 15" RECOVERY	A-2-4(0)	
9		5	8.0'	8 7 7 8	Wet medium dense brown coarse sand w/ some gravel, fine sand, and silt. 20" RECOVERY	A-1-b	
12					Boring terminated at 10.0 feet		
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All 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.: R1-012

Contract: 25-113-01

Boring Location: Sta. 515+00.00, 121' Lt. C.L.

Boring Surface Elev.: + 59.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	16.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/18/08		14.0'	12.0'	9.3'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.8'	2 3	Moist firm brown fine sandy silt w/ some clay and coarse sand.	A-4(1)	Cultivated Soil - 9".
			2.0'		15" RECOVERY		
3		2	2.0'	3 4 7 7	Moist stiff brown and gray fine sandy silt w/ some clay and coarse sand.	A-4(1)	
			4.0'		24" RECOVERY		
		3	4.0'	2	Moist soft brown clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(1)	
		3A	4.5'	5	6" RECOVERY	A-1-b	
			4.5'	8 13			
6			6.0'		Moist medium dense brown gravel and fine sand w/ some coarse sand and silt.	A-1-b	
		4	6.0'	13 11 12 10	18" RECOVERY		
			8.0'		Moist medium dense orange coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
			8.0'		19" RECOVERY		
9		5	8.0'	3 12 9 8	Moist medium dense orange gravel and coarse sand w/ some fine sand and silt.	A-1-b	
			10.0'		12" RECOVERY		
		6	10.0'	4 9 5 3	Wet medium dense orange fine to coarse sand and gravel w/ some silt.	A-1-b	
12			12.0'		18" RECOVERY		
		7	12.0'	W/R 2 2 5	Saturated very loose orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			14.0'		16" RECOVERY		
15		8	14.0'	5 4 6 6	Saturated loose orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			16.0'		18" RECOVERY		
					Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-013

Contract: 25-113-01

Boring Location: Sta. 520+00.00, 128' Rt. C.L.

Boring Surface Elev.: + 57.0'

Reference:

Wt. of Casing Hammer:		Lbs.		Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.		Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.		O.D. of Sampler: 2		IN.
S-Sampler:		O.D.		O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.		O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.		O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings					
Date 2/15/08	Time	Depth of Hole 14.0'	Depth of Casing 12.0'	Depth of Water 6.1'	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	Ft.;		No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;		Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.7'	2 3	Wet firm orange-brown silt w/ some fine to coarse sand, clay, and gravel.	A-4(0)	Cultivated Soil - 8".
3		2	2.0' 2.0'	3 7 9 12	Wet medium dense orange-brown clayey coarse sand w/ some fine sand and gravel. 13" RECOVERY	A-2-4(0)	
		3	4.0' 4.0'	23 24 30 19	Wet very dense light brown gravel and coarse sand w/ some fine sand and silt.	A-1-b	Large pieces of rock in spoon, high blow counts.
6		4	6.0'	13 10	Wet medium dense orange-brown gravel w/ some fine to coarse sand and silt. 2" RECOVERY	A-1-a	
		4A	7.0' 8.0'		Wet red-brown clayey coarse sand and gravel w/ some fine sand. 1" RECOVERY	A-2-4(0)	Auger cuttings from 4' to 6'; large gravel in spoon, poor recovery.
9		5	8.0'	2 4 4 5	Saturated loose orange-brown coarse sand w/ some fine sand, trace of silt. 12" RECOVERY	A-1-b	
		6	10.0'	1 3 4 4	Saturated loose orange-brown coarse to fine sand w/ some silt. 17" RECOVERY	A-1-b	
12		7	12.0'	1 2 1 3	Saturated very loose orange-brown coarse to fine sand w/ some silt. 18" RECOVERY	A-2-4(0)	
		8	14.0'	3 2 5 12	Saturated loose orange fine to coarse sand w/ some silt, trace of gravel. 20" RECOVERY	A-2-4(0)	
15			16.0'		19" RECOVERY		
					Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Clayey sand



Silty sand



Silty gravel



Poorly graded clayey
silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/15/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-014

Contract: 25-113-01

Boring Location: Sta. 525+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 60.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/20/08		10.0'	8.0'	4.1'	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: 3 No. of U-Sample Boring: Ft.
 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	1.0'	6 12	Wet very stiff gray clayey silt w/ some fine to coarse sand, trace of gravel.	A-4(4)	Cultivated Soil - 12".
		2	2.0'	9 14 20 25	11" RECOVERY Wet dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
3		3	4.0'	10 12 16 15	12" RECOVERY Saturated medium dense brown fine to coarse sand, trace of silt and gravel.	A-3	
		4	6.0'	16 17 18 16	15" RECOVERY Saturated dense brown and light brown gravel and coarse to fine sand w/ some silt.	A-1-b	
6		5	8.0'	8 9 10 10	20" RECOVERY Saturated medium dense orange coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
			10.0'		18" RECOVERY Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/20/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All 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.: R1-015

Contract: 25-113-01

Boring Location: Sta. 530+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 64.0'

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: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	10.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/20/08		10.0'	8.0'	7.5'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	1 2 3	Moist soft brown coarse sandy silt w/ some clay and fine sand, trace of gravel.	A-4(1)	Topsoil - 5".
			2.0'		10" RECOVERY		
3		2	2.0'	5 10 11 15	Moist medium dense orange coarse to fine sand w/ some silt and gravel.	A-1-b	
			4.0'		20" RECOVERY		
		3	4.0'	10 16 15 15	Moist dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			6.0'		19" RECOVERY		
6		4	6.0'	14 19 29 22	Wet hard orange and brown gravelly silt w/ some coarse to fine sand.	A-4(0)	
			8.0'		17" RECOVERY		
		5	8.0'	2 2 6 8	Saturated loose brown silty fine to coarse sand.	A-2-4(0)	
9			10.0'		16" RECOVERY		
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/20/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All 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.: R1-016

Contract: 25-113-01

Boring Location: Sta. 535+00.00, 130' Lt. C.L.

Boring Surface Elev.: + 63.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0'	To: 16.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/20/08		14.0'	12.0'	5.8'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;		Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	1 2	Wet soft light brown silt w/ some gravel and fine to coarse sand, trace of clay.	A-4(0)	Topsoil - 4"
			2.0'		12" RECOVERY		
3		2	2.0'	3 5	Wet loose light brown coarse sand w/ some silt, fine sand, and gravel.	A-1-b	
			3.0'		7" RECOVERY		
		2A	3.0'	11 22	Wet dense brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			4.0'		11" RECOVERY		
		3	4.0'	11 14 13 13	Wet medium dense brown coarse sand w/ some fine sand, silt, and gravel.	A-1-b	
			6.0'		18" RECOVERY		
6		4	6.0'	10 10 10 11	Saturated medium dense brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			8.0'		19" RECOVERY		
		5	8.0'	5 6 5 4	Saturated medium dense brown coarse to fine sand w/ some silt and gravel.	A-1-b	
9			10.0'		16" RECOVERY		
		6	10.0'	2 4 6 10	Saturated loose brown fine to coarse sand, trace of silt and gravel.	A-3	
			12.0'		18" RECOVERY		
12		7	12.0'	W/R 2 3 6	Saturated loose brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			14.0'		20" RECOVERY		
		8	14.0'	6 11 19 22	Saturated medium dense brown fine sand and gravel w/ some coarse sand, trace of silt.	A-3	
15			16.0'		17" RECOVERY		
					Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/20/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-017

Contract: 25-113-01

Boring Location: Sta. 540+00.00, 139' Rt. C.L.

Boring Surface Elev.: + 71.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To:	16.0'

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/12/08			14.0'	12.0'	10.1'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	Ft.;			No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:				Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.8'	3 6	Moist stiff brown clayey fine sandy silt w/ some coarse sand, trace of gravel. 13" RECOVERY	A-4(1)	Topsoil - 10".
		2	2.0'	6 12 16 16	Moist very stiff brown fine sandy silt w/ some coarse sand and gravel. 22" RECOVERY	A-4(0)	
3		3	4.0'	9 16 17 13	Moist hard brown fine sandy silt w/ some coarse sand, trace of gravel. 22" RECOVERY	A-4(0)	
		4	6.0'	12 15 12 6	Moist medium dense brown silty coarse to fine sand w/ some gravel. 19" RECOVERY	A-1-b	
6		5	8.0'	4 5 5 4	Moist loose light brown coarse sand w/ some gravel, fine sand, and silt. 14" RECOVERY	A-1-b	
		6	10.0'	5 5 6 4	Wet medium dense light brown coarse to fine sand w/ some gravel and silt. 13" RECOVERY	A-1-b	
12		7	12.0'	4 4 4 14	Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel. 24" RECOVERY	A-1-b	
		8	14.0'	7 5 6 5	Saturated medium dense light brown coarse sand and gravel w/ some fine sand, trace of silt. 5" RECOVERY	A-1-b	
15			16.0'		Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-018

Contract: 25-113-01

Boring Location: Sta. 550+00.00, 46' Lt. C.L.

Boring Surface Elev.: + 64.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0'	To:	
	Hollow Stem Auger:		From Depth of:	10.0'	To:	10.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/5/08		10.0'	8.0'	5.4'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:				Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.7'	4 8	Wet stiff gray clay, trace of fine to coarse sand.	A-6(14)	Forest Duff - 8".
3		2	2.0' 2.0'	14 16 22 14	Wet hard gray clayey fine sandy silt w/ some coarse sand, trace of gravel. 12" RECOVERY	A-4(1)	
		3	4.0' 4.0'	4 4 12 15	Wet medium dense orange and gray mottled silty fine sand w/ some gravel, trace of coarse sand. 18" RECOVERY	A-2-4(0)	
6		4	6.0' 6.0'	10 12 10 9	Saturated medium dense brown coarse to fine sand w/ some silt and gravel. 12" RECOVERY	A-1-b	
		5	8.0' 8.0'	3 7 8 9	Saturated medium dense brown coarse to fine sand, trace of silt and gravel. 18" RECOVERY	A-1-b	
9			10.0'		24" RECOVERY		
12					Boring terminated at 10.0 feet		
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/5/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-019

Contract: 25-113-01

Boring Location: Sta. 555+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 62.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	10.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/5/08		10.0'	8.0'	4.4'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.7'	1 4	Wet firm gray clay w/ some gravel and organic matter, trace of fine to coarse sand.	A-6(5)	Forest Duff - 8".
3		2	2.0' 2.0'	4 11 14 19	Wet very stiff gray and brown mottled clayey gravelly silt w/ some coarse to fine sand, trace of organic matter.	A-4(0)	
		3	4.0' 4.0'	3 6 9 9	16" RECOVERY 16" RECOVERY Saturated medium dense gray coarse sand w/ some silt and fine sand, trace of gravel.	A-1-b	
6		4	6.0' 6.0'	10 9 8 9	17" RECOVERY Saturated medium dense brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
9		5	8.0' 8.0'	5 9 10 13	17" RECOVERY Saturated medium dense brown coarse to fine sand w/ some silt and gravel.	A-1-b	
			10.0'		14" RECOVERY		
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/5/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-020

Contract: 25-113-01

Boring Location: Sta. 560+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 66.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	10.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/5/08		10.0'	8.0'	8.0'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;		Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.8'	3 5	Wet firm brown clayey silt w/ some fine sand, trace of coarse sand and gravel.	A-4(6)	Cultivated Soil - 10".
3		2	2.0' 2.1'	4 5 6 6	Wet medium dense brown clayey coarse to fine sand, trace of gravel. 14" RECOVERY	A-2-4(0)	
		3	4.0' 4.0'	6 9 12 12	Wet medium dense brown silty coarse to fine sand w/ some gravel. 23" RECOVERY	A-2-4(0)	
6		4	6.0' 6.0'	11 14 16 14	Wet medium dense brown coarse to fine sand w/ some silt and gravel. 19" RECOVERY	A-1-b	
9		5	8.0' 8.0'	13 14 12 6	Saturated very stiff brown clayey fine to coarse sandy silt, trace of gravel. 11" RECOVERY	A-4(0)	
			10.0'		Boring terminated at 10.0 feet 4" RECOVERY		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/5/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-021

Contract: 25-113-01

Boring Location: Sta. 565+00.00, 118' Rt. C.L.

Boring Surface Elev.: + 69.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	16.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/5/08		14.0'	12.0'	10.0'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	1.0'	2 4	Moist firm brown clayey silt w/ some fine sand, trace of coarse sand and gravel. 11" RECOVERY	A-4(4)	Cultivated Soil - 12".
3		2	2.0'	4 5 10 10	Moist stiff brown clayey gravelly coarse sandy silt w/ some fine sand. 22" RECOVERY	A-4(0)	
		3	4.0'	4 5 10 10	Moist medium dense brown and light brown silty fine to coarse sand, trace of gravel. 18" RECOVERY	A-2-4(0)	
6		4	6.0'	9 9 9 8	Moist medium dense orange silty fine to coarse sand, trace of gravel. 21" RECOVERY	A-2-4(0)	
		5	8.0'	3 5 4 3	Wet loose brown fine to coarse sand w/ some silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
		6	10.0'	3 5 6 5	Wet medium dense brown fine to coarse sand and gravel w/ some silt. 12" RECOVERY	A-1-b	
12		7	12.0'	4 5 19 10	Saturated medium dense brown coarse to fine sand w/ some silt, trace of gravel. 20" RECOVERY	A-1-b	
		8	14.0'	6 10 11 12	Saturated medium dense brown gravel and coarse sand w/ some fine sand and silt. 19" RECOVERY	A-1-b	
15			16.0'		Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/5/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-022

Contract: 25-113-01

Boring Location: Sta. 570+00.00, 108' Lt. C.L.

Boring Surface Elev.: + 69.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings					
Date 3/6/08	Time	Depth of Hole 14.0'	Depth of Casing 12.0'	Depth of Water 10.7'	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	Ft.;			U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	2 1 3	Moist soft brown and light brown silt w/ some fine to coarse sand and clay. 18" RECOVERY	A-4(2)	Forest Duff - 3".
3		2	2.0'	3 6 8 12	Moist medium dense light brown silty coarse to fine sand w/ some gravel. 18" RECOVERY	A-2-4(0)	
		3	4.0'	11 16 18 17	Moist hard light brown coarse sand w/ some silt and fine sand, trace of gravel. 19" RECOVERY	A-1-b	
6		4	6.0'	11 13 13 12	Wet medium dense brown silty coarse to fine sand w/ some gravel. 20" RECOVERY	A-1-b	
9		5	8.0'	6 9 5 6	Wet medium dense brown coarse to fine sand w/ some silt and gravel. 20" RECOVERY	A-1-b	
		6	10.0'	3 5 12 9	Wet medium dense orange coarse to fine sand and gravel w/ some silt. 17" RECOVERY	A-1-b	
12		7	12.0'	17 9	Wet medium dense orange coarse sand and gravel w/ some fine sand, trace of silt. 12" RECOVERY	A-1-b	
		7A	13.0'	7 8	Saturated medium dense brown clayey gravel and fine to coarse sand. 12" RECOVERY	A-2-7(1)	
		8	14.0'	10 4 6 5	Saturated stiff brown and green fine sandy clay w/ some coarse sand, trace of gravel. 15" RECOVERY	A-7-5(2)	
15			16.0'		Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/6/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-023

Contract: 25-113-01

Boring Location: Sta. 575+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 65.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To:	10.0'

Water Level Readings					
Date 3/5/08	Time	Depth of Hole 10.0'	Depth of Casing 8.0'	Depth of Water 6.3'	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.3'	3 7 9	Moist very stiff brown and orange coarse to fine sandy clay, trace of gravel.	A-6(1)	Forest Duff - 3".
			2.0'		20" RECOVERY		
3		2	2.0'	12 12 11 14	Moist medium dense brown coarse to fine sand w/ some silt and gravel.	A-1-b	
			4.0'		21" RECOVERY		
		3	4.0'	7 7 8 7	Wet medium dense brown fine to coarse sand, trace of silt and gravel.	A-3	
6			6.0'		24" RECOVERY		
		4	6.0'	6 7 10 14	Saturated medium dense brown fine sand w/ some coarse sand, silt, and gravel.	A-2-4(0)	
			8.0'		18" RECOVERY		
9		5	8.0'	4 7 7 9	Saturated stiff brown fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(9)	
			10.0'		16" RECOVERY		
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand



Elastic silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/5/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-024

Contract: 25-113-01

Boring Location: Sta. 580+00.00, 127' Lt. C.L.

Boring Surface Elev.: + 67.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	16.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/6/08		14.0'	12.0'	10.0'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;		Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.9' 2.0'	6 10	Moist very stiff gray and brown mottled clayey silt, trace of fine to coarse sand. 12" RECOVERY	A-4(6)	Cultivated Soil - 11".
3		2	2.0'	8 10 13 13	Moist medium dense brown fine sand w/ some clay and coarse sand, trace of gravel. 20" RECOVERY	A-2-4(0)	
		3	4.0' 4.0'	6 8 9 15	Moist medium dense light brown silty fine sand, trace of coarse sand and gravel. 16" RECOVERY	A-2-4(0)	
6		4	6.0' 6.0'	12 18 26 13	Moist dense light brown coarse to fine sand and gravel w/ some silt. 10" RECOVERY	A-1-b	
		5	8.0'	8 23 17 9	No Sample Recovery 0" RECOVERY		
		6	10.0'	4 8 14 11	Saturated very stiff brown and green fine to coarse sandy clay, trace of gravel. 19" RECOVERY	A-7-5(2)	
12		7	12.0'	7 9 12 13	Saturated very stiff green-gray fine to coarse sandy clay, trace of gravel. 21" RECOVERY	A-7-5(1)	
		8	14.0' 14.0'	8 11 4 3	Saturated medium dense green silty fine to coarse sand, trace of gravel. 24" RECOVERY	A-2-4(0)	
			16.0'		Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/5/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-025

Contract: 25-113-01

Boring Location: Sta. 585+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 70.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/6/08		10.0'	8.0'	Dry	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: 3 No. of U-Sample Boring: Ft.
 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.8'	3 3	Moist firm brown clayey silt w/ some fine sand, trace of coarse sand and gravel. 15" RECOVERY	A-4(5)	Cultivated Soils - 9".
3		2	2.0'	3 5 6 9	Moist stiff brown fine sandy silt w/ some coarse sand and clay. 16" RECOVERY	A-4(0)	
		3	4.0'	4 4 9 8	Moist stiff brown and gray mottled fine sandy silt w/ some coarse sand. 24" RECOVERY	A-4(0)	
6		4	6.0'	7 9 7 6	Moist very stiff light brown and gray fine to coarse sandy silt, trace of gravel. 15" RECOVERY	A-4(0)	
		5	8.0'	9 14 14 14	Moist medium dense light brown and gray silty fine to coarse sand, trace of gravel. 17" RECOVERY	A-2-4(0)	
9			10.0'		Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/6/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All 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.: R1-026

Contract: 25-113-01

Boring Location: Sta. 590+00.00, 45' Lt. C.L.

Boring Surface Elev.: +68.11'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/6/08			10.0'	8.0'	Dry	
						68.1
						68.1
						68.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:				Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks	
	3/6/08	1	1.0'	7	Wet stiff brown silt w/ some clay and fine sand, trace of coarse sand. 11" RECOVERY	A-4(3)	Cultivated Soil - 11".	
			2.0'	7				
3		2	2.0'	5	Wet very stiff brown fine sandy silt, trace of coarse sand. 21" RECOVERY	A-4(0)		
				11				
				13				
		3	4.0'	6	Wet stiff brown and gray clayey gravelly silt w/ some fine to coarse sand. 13" RECOVERY	A-4(1)		
			4.0'	5				
6		4	6.0'	7		Wet very stiff brown fine sandy clay w/ some coarse sand, trace of gravel. 22" RECOVERY	A-6(2)	
				9				
				13				
		5	8.0'	4	Wet very stiff brown fine sandy clay w/ some coarse sand, trace of gravel. 19" RECOVERY	A-7-5(2)		
9				8				
				11				
			10.0'	14				
					Boring terminated at 10.0 feet			
12								
15								

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silt



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/6/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-027

Contract: 25-113-01

Boring Location: Sta. 595+00.00, 131' Rt. C.L.

Boring Surface Elev.: + 72.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0'	To: 16.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/21/08		16.0'	14.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;		Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/21/08	1	0.0'	1 3 7 8	Wet stiff tan silt w/ some clay and fine sand, trace of coarse sand.	A-4(1)	Cultivated Soil - 11".
			2.0'		12" RECOVERY		
3		2	2.0'	6 5 9 9	Wet stiff brown fine sandy silt w/ some clay and coarse sand.	A-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	6 8 9 10	Wet very stiff orange and gray clayey silt w/ some fine to coarse sand, trace of gravel.	A-4(2)	
6			6.0'		16" RECOVERY		
		4	6.0'	8 10	Wet very stiff gray clay w/ some fine sand, trace of coarse sand and gravel.	A-6(10)	
			7.0'		12" RECOVERY		
		4A	7.0'	15 16	Wet dense gray clayey fine to coarse sand, trace of gravel.	A-2-4(0)	
			8.0'		6" RECOVERY		
9		5	8.0'	5 9 9 8	Wet medium dense gray silty fine sand w/ some coarse sand.	A-2-4(0)	
			10.0'		20" RECOVERY		
		6	10.0'	3 11	Wet stiff gray clayey fine sandy silt, trace of coarse sand and gravel.	A-4(3)	
			11.0'		5" RECOVERY		
12		6A	11.0'	15 14	Wet medium dense gray gravel w/ some coarse and fine sand and silt.	A-1-a	
			12.0'		9" RECOVERY		
		7	12.0'	16 49 27 19	Wet very dense brown gravel w/ some coarse sand and silt, trace of fine sand and rock fragments.	A-1-b	Chattering in auger drilling to 14 ft.
			14.0'		8" RECOVERY		
15		8	14.0'	4 9 7 10	Wet medium dense brown silty fine to coarse sand w/ some gravel, trace of cemented sands.	A-4(0)	
			16.0'		12" RECOVERY		
					Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 2/21/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-028

Contract: 25-113-01

Boring Location: Sta. 600+00.00, 45' Lt. C.L.

Boring Surface Elev.: +75.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 2/21/08	Time	10.0'	8.0'	Dry	75.0
					75.0
					75.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/21/08	1	0.0'	1 3 6 6	Wet stiff brown clayey silt w/ some fine sand, trace of coarse sand.	A-4(4)	Cultivated Soil - 11".
			2.0'		14" RECOVERY		
3		2	2.0'	8 7 8 8	Wet stiff brown fine sandy silt, trace of coarse sand and clay.	A-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	2 3 6 6	Wet stiff gray clayey silt w/ some fine sand, trace of coarse sand and gravel.	A-4(4)	
6			6.0'		20" RECOVERY		
		4	6.0'	6 9 13 14	Wet very stiff gray clay w/ some fine to coarse sand, trace of gravel.	A-6(5)	
			8.0'		22" RECOVERY		
9		5	8.0'	6 9 11 12	Wet medium dense gray silty coarse to fine sand, trace of gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 2/21/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-029

Contract: 25-113-01

Boring Location: Sta. 605.00.00, 122' Rt. C.L.

Boring Surface Elev.: + 77.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/21/08		16.0'	14.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/21/08	1	0.0'	2 3 6 9	Wet stiff brown clayey silt, trace of fine to coarse sand.	A-4(7)	Cultivated Soil - 11".
			2.0'		14" RECOVERY		
3		2	2.0'	10 15 17 20	Wet hard gray and brown silt w/ some clay, trace of fine to coarse sand.	A-4(3)	
			4.0'		24" RECOVERY		
		3	4.0'	4 7 11 11	Wet very stiff gray and brown clayey silt w/ some fine sand, trace of coarse sand.	A-4(3)	
6			6.0'		24" RECOVERY		
		4	6.0'	8 10	Wet very stiff brown fine sandy clay w/ some coarse sand.	A-6(4)	
			7.0'		10" RECOVERY		
		4A	7.0'	11 14	Wet medium dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			8.0'		10" RECOVERY		
9		5	8.0'	5 8 7 11	Wet medium dense orange clayey fine to coarse sand, trace of gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
		6	10.0'	8 13 14 11	Wet medium dense brown silty gravel and coarse sand w/ some fine sand.	A-1-b	
12			12.0'		14" RECOVERY		
		7	12.0'	9 16 16 12	Wet dense brown silty fine sand w/ some coarse sand and gravel.	A-2-4(0)	
			14.0'		16" RECOVERY		
15		8	14.0'	4 6 7 13	Wet medium dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			16.0'		20" RECOVERY		
					Boring terminated at 16.0		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

	Low plasticity clay
	Silty low plasticity clay
	Poorly graded clayey silty sand
	Clayey sand
	Silty sand

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AUGUST 2015

Notes:

1. Exploratory boring was drilled on 2/21/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 2/21/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-031

Contract: 25-113-01

Boring Location: Sta. 615.00.00, 120' Rt. C.L.

Boring Surface Elev.: + 79.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 2/21/2008	Time	10.0'	8.0'	Dry	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;

3
No. of U-Sample Boring: Ft.
Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/21/08	1	1.0'	1	Saturated medium stiff brown clay with a trace of fine to coarse sand and gravel. 8" RECOVERY	A-4(8)	Cultivated Soil - 12".
			2.0'	2			
			2.0'	4			
			2.0'	5			
3		2	2.0'	3		A-4(8)	
			4.0'	5	Saturated stiff brown clay with some fine to coarse sand and a trace of gravel 19" RECOVERY		
			4.0'	4			
		3	4.0'	2		No Sieve Analysis: Indication of Saturated medium stiff brown clay with a trace of fine to coarse sand.	
			6.0'	4	Saturated stiff brown clayey fine to coarse sand with some gravel. 22" RECOVERY	A-6(2)	
			6.0'	5			
			6.0'	6			
			8.0'	3	Wet medium dense orange silty fine to coarse sand with a trace of gravel. 21" RECOVERY	A-2-4(0)	
			8.0'	5			
9		5	8.0'	6			
			10.0'		20" RECOVERY		
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 2/21/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-032

Contract: 25-113-01

Boring Location: Sta. 620+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 81.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/20/08		10.0'	8.0'	Dry	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 No. of U-Sample Boring: 3 Ft.
 U-Samples: ;
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/20/08	1	0.8'	3 3 4	Wet firm brown clay, trace of fine to coarse sand. 15" RECOVERY	A-6(13)	Cultivated Soil - 9".
3		2	2.0'	5 4 6 9	Wet stiff brown clayey silt, trace of fine to coarse sand and gravel. 24" RECOVERY	A-4(6)	
		3	4.0'	5 5	Wet stiff brown clayey silt w/ some fine sand, trace of coarse sand and gravel. 9" RECOVERY	A-4(3)	
6		3A	5.0'	6 6	Wet stiff brown fine sandy silt w/ some coarse sand, trace of gravel. 10" RECOVERY	A-4(0)	
		4	6.0'	2 4 6 7	Wet stiff brown clayey silt w/ some fine sand, trace of coarse sand. 24" RECOVERY	A-4(6)	
9		5	8.0'	3 5 7 7	Wet medium dense brown clayey coarse sand and gravel w/ some fine sand. 18" RECOVERY	A-2-4(0)	
12			10.0'		Boring terminated at 10.0 feet		
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 2/20/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-033

Contract: 25-113-01

Boring Location: Sta. 625+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 74.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 2/20/08	Time	10.0'	8.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/20/08	1	0.0'	1 3 3 4	Wet firm brown clayey silt, trace of fine to coarse sand.	A-4(8)	Cultivated Soil - 10".
			2.0'		14" RECOVERY		
3		2	2.0'	2 4 5 4	Wet stiff brown clayey silt, trace of fine to coarse sand and gravel.	A-4(6)	
			4.0'		19" RECOVERY		
		3	4.0'	6 7 9 9	Wet very stiff orange fine sandy silt, trace of gravel and coarse sand.	A-4(0)	
6			6.0'		18" RECOVERY		
		4	6.0'	7 9 10 9	Wet very stiff orange fine sandy silt.	A-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	4 8 8 20	Wet very stiff orange fine sandy silt, trace of gravel and coarse sand.	A-4(0)	
			10.0'		19" RECOVERY		
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 2/20/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-034

Contract: 25-113-01

Boring Location: Sta. 635+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 71.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To:	10.0'

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/4/08			10.0'	8.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/4/08	1	1.0'	3 4	Moist firm brown clayey silt, trace of fine to coarse sand. 12" RECOVERY	A-4(7)	Cultivated Soil - 10".
3		2	2.0'	4 5 6 7	Moist stiff brown silt w/ some clay and fine to coarse sand, trace of gravel. 18" RECOVERY	A-4(1)	
		3	4.0'	4 9 9 8	Moist medium dense light brown silty coarse sand w/ some fine sand, trace of gravel. 19" RECOVERY	A-1-b	
6		4	6.0'	7 8 10 9	Moist medium dense brown coarse sand w/ some silt, fine sand, and gravel. 20" RECOVERY	A-1-b	
9		5	8.0'	8 11 12 12	Moist medium dense brown gravel and coarse to fine sand w/ some silt. 14" RECOVERY	A-1-b	Sample contains rock fragments (gravel).
			10.0'		Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/4/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-035

Contract: 25-113-01

Boring Location: Sta. 639+99.11, 45' Rt. C.L.

Boring Surface Elev.: + 65.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	16.0'

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date			16.0'	14.0'	Dry	
3/4/08						

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/4/08	1	1.0'	4	Moist firm brown clayey silt, trace of fine sand.	A-4(7)	Cultivated Soil - 11".
			2.0'	4			
3		2	2.0'	3	Moist stiff brown silt w/ some gravel, coarse to fine sand, and clay.	A-4(0)	
			3.0'	7			
		2A	3.0'	14	Moist medium dense brown gravel and coarse sand w/ some silt and fine sand.	A-1-b	
			4.0'	13			
		3	4.0'	7	Wet very stiff brown fine sandy clay w/ some coarse sand, trace of gravel.	A-7-6(2)	
			4.0'	9			
6			6.0'	14	Wet stiff brown fine sandy clay w/ some coarse sand and gravel.	A-7-5(6)	
			6.0'	15			
			8.0'	8	Wet stiff brown fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(3)	
			8.0'	6			
9		5	8.0'	4	Wet loose brown clayey coarse to fine sand w/ some gravel.	A-2-5(0)	
			10.0'	7			
			10.0'	3	Wet medium dense brown clayey coarse to fine sand w/ some gravel.	A-2-5(0)	
			10.0'	5			
12		6	10.0'	3	Wet medium dense brown silty coarse to fine sand w/ some gravel.	A-2-4(0)	
			12.0'	7			
			12.0'	6	Boring terminated at 16.0 feet		
			12.0'	10			
			14.0'	2			
			14.0'	5			
15		8	14.0'	13			
			16.0'	7			
				5			

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/4/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-036

Contract: 25-113-01

Boring Location: Sta. 645+00.00, 99' Lt. C.L.

Boring Surface Elev.: + 68.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/4/08		16.0'	14.0'	Dry	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 16.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 3 Dia. U-Sample Boring: Ft.
 No. of U-Samples:
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	3/4/08	1	1.0'	3	Wet firm brown clay, trace of fine sand and gravel.	A-6(12)	Cultivated Soil - 12".
		2	2.0'	3	11" RECOVERY	A-4(8)	
6	3/4/08	3	4.0'	4	18" RECOVERY		
		3	4.0'	2	Wet medium dense brown clayey gravel w/ some fine to coarse sand.	A-2-6(0)	Sample contains rock fragments.
9	3/4/08	4	6.0'	15	23" RECOVERY	A-2-6(0)	Sample contains rock fragments.
		4	6.0'	15	21" RECOVERY		
12	3/4/08	5	8.0'	14	Wet dense brown clayey gravel and coarse sand w/ some fine sand.	A-2-7(0)	Sample contains rock fragments.
		5	8.0'	17	17" RECOVERY		
15	3/4/08	6	10.0'	9	Wet medium dense brown clayey gravel and fine to coarse sand.	A-2-6(0)	
		6	10.0'	11	23" RECOVERY		
15	3/4/08	7	12.0'	4	Wet medium dense orange and brown clayey coarse sand and gravel w/ some fine sand.	A-2-7(1)	
		7	12.0'	6	19" RECOVERY		
15	3/4/08	8	14.0'	3	Wet medium dense orange and brown clayey coarse to fine sand w/ some gravel.	A-2-7(0)	
		8	14.0'	9	19" RECOVERY		
			16.0'		Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/4/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-037

Contract: 25-113-01

Boring Location: Sta. 650+00.00, 57' Rt. C.L.

Boring Surface Elev.: + 65.0'

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: 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: 15.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/4/08	Time	15.0'	13.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	15.0	Ft.;		No. of: 3	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		No. of:	U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:				Core Drilling in Rock:			

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks	
	3/4/08	Bulk/1	1.0'	3 4		Wet brown fine to coarse sandy lean clay.	A-6(10)	Cultivated Soil - 11".
			2.0'			Wet firm brown clay, trace of fine sand.	A-6(11)	
3		2	2.0'	5 5 6 8		9" RECOVERY Wet stiff brown clayey silt, trace of fine to coarse sand.	A-4(7)	
			4.0'			18" RECOVERY		
		3	4.0'	2 4		Wet loose brown clayey fine to coarse sand, trace of gravel.	A-2-4(0)	
			5.0'			10" RECOVERY		
6		3A	5.0'	6 11		Wet very stiff brown silt w/ some clay, fine to coarse sand, and gravel.	A-4(1)	
			6.0'			10" RECOVERY		
		4	6.0'	26 38 44 22		Wet very dense light brown gravel w/ some silt and coarse to fine sand.	A-1-a	
			8.0'			8" RECOVERY		
9		5	8.0'	15 24 28 27		No recovery.		
			10.0'			0" RECOVERY		
12								
15		6	13.0'	12 8 5 8		Wet medium dense brown silty coarse sand w/ some fine sand and gravel.	A-2-4(0)	
			15.0'			17" RECOVERY		
						Boring terminated at 15.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Clayey sand



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/4/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

KEY TO SYMBOLS

Symbol Description

Strata symbols

 Low plasticity
clay

 Silt

 Clayey sand

 Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/3/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-039

Contract: 25-113-01

Boring Location: Sta. 660+00.00, 127' Rt. 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:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	16.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/3/08		16.0'	14.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/3/08	1	0.8'	3 6 7	Moist medium dense brown gravel w/ some silt and fine sand, trace of coarse sand. 12" RECOVERY	A-1-b	Cultivated Soil - 9".
3		2	2.0'	2 3 4 5	Moist loose brown fine to coarse sand w/ some silt, trace of gravel. 16" RECOVERY	A-2-4(0)	
6		3	4.0'	5 7 6 8	Moist medium dense light brown coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
9		4	6.0'	5 5 5 18	Moist loose light brown coarse to fine sand w/ some silt and gravel. 19" RECOVERY	A-1-b	
12		5	8.0'	5 7 8 10	Wet medium dense brown silty fine to coarse sand, trace of gravel. 21" RECOVERY	A-2-4(0)	
15		6	10.0'	5 10 11 15	Wet very stiff brown fine to coarse sandy silt, trace of gravel. 24" RECOVERY	A-5(0)	
		7	12.0'	11 12 14 13	Wet very stiff brown fine to coarse sandy silt w/ some gravel. 19" RECOVERY	A-4(0)	
		8	14.0'	5 7 11 10	Wet medium dense brown fine to coarse sand, trace of silt and gravel. 20" RECOVERY	A-3	
			16.0'		Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty gravel



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/3/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-040

Contract: 25-113-01

Boring Location: Sta. 680+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 56.0'

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: 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: 15.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/3/08		15.0'	13.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	15.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks	
	3/3/08	Bulk/	1.0'	3	[Hatched Pattern]	Moist brown fine to coarse sandy lean clay.	A-6(5)	Cultivated Soil - 10".
		1	2.0'	4		Wet firm brown clayey silt, trace of fine sand.	A-4(6)	
3		2	2.0'	3	[Hatched Pattern]	12" RECOVERY	A-4(6)	
				4		Wet stiff brown clayey silt, trace of fine to coarse sand.		
				5				
6		3	4.0'	3	[Hatched Pattern]	23" RECOVERY	A-4(0)	
			4.0'	5		Wet stiff brown silt w/ some fine to coarse sand, trace of gravel.		
9		4	6.0'	7	[Hatched Pattern]	24" RECOVERY	A-4(0)	
			6.0'	8		Wet very stiff brown fine sandy gravelly silt w/ some clay and coarse sand.		
				10				
12		5	8.0'	3	[Hatched Pattern]	20" RECOVERY	A-6(9)	
			8.0'	5		Wet very stiff brown clay w/ some fine sand, trace of coarse sand.		
15			10.0'	9	[Hatched Pattern]	24" RECOVERY		
				9				
		6	13.0'	4		Wet stiff brown clayey fine sandy silt, trace of coarse sand and gravel.	A-4(4)	
			15.0'	4	[Hatched Pattern]	24" RECOVERY		
					Boring terminated at 15.0 feet			

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Low plasticity
clay



Poorly graded clayey
silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/3/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-041

Contract: 25-113-01

Boring Location: Sta. 685+00.00, 120' Lt. C.L.

Boring Surface Elev.: +44.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To:	16.0'

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/3/08			16.0'	14.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/3/08	1	1.0'	3	11" RECOVERY	A-4(7)	Cultivated Soil - 11".
			2.0'	3		A-4(3)	
3		2	2.0'	3	21" RECOVERY	A-4(3)	
			2.0'	4			
			4.0'	4	23" RECOVERY	A-4(1)	
		3	4.0'	4			
			6.0'	9	18" RECOVERY	A-1-b	
6		4	6.0'	11			
			8.0'	4	18" RECOVERY	A-1-b	3" clay lens at 8.5'
9		5	8.0'	5			
			10.0'	5	24" RECOVERY	A-1-b	
		6	10.0'	8			
			12.0'	5	22" RECOVERY	A-1-b	
12		7	12.0'	6			
			14.0'	6	21" RECOVERY	A-1-b	
15		8	14.0'	11			
			16.0'	9			
					Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/3/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-042

Contract: 25-113-01

Boring Location: Sta. 695+00.00, 128' Rt. C.L.

Boring Surface Elev.: + 39.0'

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: Ball Sampler		O.D.		O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.		O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/3/08	Time	16.0'	14.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/3/08	1	0.8'	1 1 4	Moist firm brown clayey coarse sandy silt w/ some fine sand and gravel. 9" RECOVERY	A-4(0)	Cultivated Soil - 9".
		2	2.0'	3	Moist very loose coarse sand w/ some fine sand, silt, and gravel. 5" RECOVERY	A-1-b A-6(12)	
3		2A	2.5'	4 4 6	Moist stiff brown clay w/ some coarse sand, trace of fine sand. 15" RECOVERY	A-6(10)	
		3	4.0'	3 6 9 12	Moist stiff brown clay w/ some fine sand, trace of gravel and coarse sand. 12" RECOVERY		
6		4	6.0'	10 9 6 5	Moist medium dense light brown coarse sand w/ some fine sand and silt, trace of gravel. 20" RECOVERY	A-1-b	
		5	8.0'	5 5 7 7	Moist medium dense light brown coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY	A-1-b	
9		6	10.0'	7 6 7 12	Moist medium dense light brown coarse to fine sand w/ some silt, trace of gravel. 20" RECOVERY	A-1-b	
12		7	12.0'	8 5 6 5	Wet medium dense light brown coarse to fine sand, trace of silt and gravel. 18" RECOVERY	A-1-b	
		8	14.0'	5 3 3 2	Wet loose light brown coarse to fine sand w/ some silt, trace of gravel. 21" RECOVERY	A-2-4(0)	
15			16.0'		Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Low plasticity
clay



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/3/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-043

Contract: 25-113-01

Boring Location: Sta. 700+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 41.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/3/08	Time	10.0'	8.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 10.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;			U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/3/08	1	1.0'	3 4	Moist firm brown clay w/ some coarse to fine sand, trace of gravel.	A-6(6)	Cultivated Soil - 10".
		2	2.0'	3 6 9 12	10" RECOVERY Moist stiff brown clayey fine to coarse sandy silt, trace of gravel.	A-4(0)	
3		3	4.0'	9 12 17 7	18" RECOVERY Moist medium dense brown gravel and coarse sand w/ some silt and fine sand.	A-1-b	
6		4	6.0'	5 6 7 12	15" RECOVERY Moist medium dense light brown and brown silty fine sand w/ some coarse sand and gravel.	A-2-4(0)	
9		5	8.0'	6 11 11 12	15" RECOVERY Moist medium dense light brown coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	4" clay lens at 9.8 ft.
			10.0'		Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/3/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-044

Contract: 25-113-01

Boring Location: Sta. 705+00.00, 16' Rt. C.L.

Boring Surface Elev.: + 48.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings					
Date 3/3/08	Time	Depth of Hole 10.0'	Depth of Casing 8.0'	Depth of Water Dry	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 10.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;			U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/3/08	1	0.0'	1 3 4 4	Moist loose brown clayey coarse sand w/ some fine sand and gravel.	A-2-4(0)	Cultivated Soil - 10".
			2.0'		12" RECOVERY		
3		2	2.0'	6 10 10 12	Moist medium dense brown silty coarse to fine sand w/ some gravel.	A-1-b	
			4.0'		21" RECOVERY		
		3	4.0'	6 7 8 9	Wet medium dense brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
6			6.0'		22" RECOVERY		
		4	6.0'	9 6 5 4	Wet medium dense brown fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	4 5 4 6	Wet loose brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			10.0'		24" RECOVERY		
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/3/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R1-045

Contract: 25-113-01

Boring Location: Sta. 719+00.00, 65' Lt. C.L.

Boring Surface Elev.: + 53.0'

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: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings					
Date 3/3/08	Time	Depth of Hole 16.0'	Depth of Casing 14.0'	Depth of Water Dry	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;			No. of U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/3/08	1	1.0'	2 3	Moist firm brown clayey silt w/ some fine to coarse sand, trace of gravel.	A-4(5)	Cultivated Soil - 10".
			2.0'		10" RECOVERY		
3		2	2.0'	4 7 9 12	Moist medium dense brown silty coarse sand w/ some fine sand, trace of gravel.	A-1-b	
			4.0'		14" RECOVERY		
		3	4.0'	11 10 9 8	Moist medium dense brown and light brown silty coarse sand, trace of gravel.	A-1-b	
6			6.0'		18" RECOVERY		
		4	6.0'	6 6 4 2	Moist loose brown and light brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	6 2 3 3	Moist loose brown and light brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
		6	10.0'	3 6 7 5	Moist medium dense brown and light brown gravel and fine sand w/ some coarse sand and silt.	A-1-b	
12			12.0'		18" RECOVERY		
		7	12.0'	5 7 8 9	Moist medium dense brown gravel and coarse sand w/ some silt and fine sand.	A-1-b	
			14.0'		17" RECOVERY		
15		8	14.0'	7 7 6 7	Moist medium dense brown coarse to fine sand and gravel w/ some silt.	A-1-b	
			16.0'		18" RECOVERY		
					Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 3/3/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-046

Contract: 25-113-01

Boring Location: Sta. 460+00, 100.00' Lt. C.L.

Boring Surface Elev.: + 65.80'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Spoon		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 39.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/27/09		12.0	12.0	11.2	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	40.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: J. Truver
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/27/09	1	0.5'	3 3 3	Moist firm brown silt w/ some clay, trace of fine to coarse sand.	A-4(3)	Topsoil - 5".
			2.0'		17" RECOVERY		
3		2	2.0'	3 4 8 9	Moist medium dense brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			4.0'		22" RECOVERY		
		3	4.0'	2 2 2 3	Moist soft brown clayey gravelly silt w/ some fine sand, trace of coarse sand.	A-4(1)	
6			6.0'		18" RECOVERY		
		4	6.0'	6 6 6 8	Moist medium dense tan coarse sand w/ some silt and fine sand, trace of gravel.	A-1-b	
			8.0'		20" RECOVERY		
9		5	8.0'	1 5 7 7	Moist medium dense tan coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			10.0'		21" RECOVERY		
		6	10.0'	7 9 10 11	Moist medium dense brown gravel and coarse sand w/ some silt, trace of fine sand.	A-1-b	
12			12.0'		20" RECOVERY		
		7	12.0'	9 14 13 13	Indication of moist medium dense brown gravel and coarse sand, trace of clay and fine sand.		No sieve analysis.
			14.0'		17" RECOVERY		
15		8	14.0'	11 9 7 7	Indication of moist medium dense orange silty sand w/ some gravel.		No sieve analysis.
			16.0'		3" RECOVERY		
		9	16.0'	6 6 8 9	Wet medium dense orange, green, and brown clayey gravel and fine sand w/ some coarse	A-2-6(0)	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R1-046

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		sand. 16" RECOVERY		
		10	18.0'	3 4 5 6	Saturated stiff green and brown fine sandy clay, trace of gravel and coarse sand.	A-7-6(3)	
			20.0'		15" RECOVERY		
21							
24							
		11	24.0'	3 6 8 10	Saturated stiff green and brown clayey fine sandy silt, trace of coarse sand.	A-4(0)	
			26.0'		22" RECOVERY		
27							
30		12	29.0'	4 7 8 10	Saturated medium dense green fine sand w/ some silt and coarse sand, trace of organic matter and gravel.	A-2-4(0)	Glaucanitic.
			31.0'		21" RECOVERY		
33							
36		13	34.0'	W/H 6 9 11	Saturated medium dense green fine to coarse sand w/ some silt, trace of organic matter and gravel.	A-2-4(0)	Glaucanitic.
			36.0'		21" RECOVERY		
39							
		14	39.0'	5 7 9 10	Saturated medium dense green clayey fine to coarse sand w/ some organic matter and gravel.	A-2-4(0)	Glaucanitic.
			41.0'		23" RECOVERY		
42					End of Boring		
45							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols

 Silty low plasticity clay

 Silty sand

 Poorly graded sand with silt

 Clayey sand

 Poorly graded clayey silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/27/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-047

Contract: 25-113-01

Boring Location: Sta. 465+00, 100.00' Rt. C.L.

Boring Surface Elev.: + 60.5'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/6/09		10.0	10.0	8.6	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	58.9	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: J. Truver

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/6/09	1	0.5'	2 3 2	Moist loose tan silty fine to coarse sand w/ some gravel. 7" RECOVERY	A-2-4(0)	Forrest Duff - 4".
3		2	2.0'	5 11 11 6	Moist medium dense orange gravel w/ some fine to coarse sand and silt. 13" RECOVERY	A-1-b	
		3	4.0'	5 6 6 6	Wet stiff brown fine sandy clay w/ some coarse sand. 13" RECOVERY	A-7-6(3)	
6		4	6.0'	4 4 6 5	Wet stiff brown fine sandy clay w/ some coarse sand. 17" RECOVERY	A-7-6(3)	
		5	8.0'	3 4 4 5	Saturated firm brown fine sandy clay w/ some coarse sand, trace of organic matter. 15" RECOVERY	A-6(2)	
		6	10.0'	3 4 6 7	Saturated loose brown clayey fine sand w/ some coarse sand. 13" RECOVERY	A-2-4(0)	
12		7	12.0'	3 4 5 5	Saturated stiff brown fine sandy clay, trace of coarse sand. 17" RECOVERY	A-7-6(3)	
		8	14.0'	3 3 5 7	Saturated firm brown-orange fine sandy clay, trace of coarse sand. 16" RECOVERY	A-7-6(4)	Started mud rotary at 14.0'.
15		9	16.0'	2 3 5 6	Saturated firm brown-orange fine sandy clay, trace of coarse sand.	A-7-6(3)	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R1-047

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		12" RECOVERY		
		10	18.0'	3 5 7 10	Saturated stiff brown-orange fine sandy clay, trace of coarse sand.	A-6(4)	
			20.0'		24" RECOVERY		
21							
24							
		11	24.0'	3 4 5 7	Saturated loose dark green silty fine to coarse sand, trace of organic matter and gravel.	A-2-4(0)	
			26.0'		24" RECOVERY		
27							
30		12	29.0'	4 6 7 10	Saturated medium dense dark green fine to coarse sand w/ some silt, trace of organic matter and gravel.	A-2-4(0)	
			31.0'		23" RECOVERY		
33							
36		13	34.0'	7 7 16 15	Saturated medium dense dark green organic silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			36.0'		20" RECOVERY		
39							
		14	39.0'	5 4 7 11	Saturated medium dense dark green coarse to fine sand w/ some silt and gravel, trace of organic matter.	A-2-4(0)	
			41.0'		14" RECOVERY		
42							
45		15	44.0'	6 13 25 29	Saturated dense dark gray silty fine to coarse sand, trace of organic matter and gravel.	A-2-4(0)	

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-047

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		24" RECOVERY		
48							
		16	49.0'	18 23 50/4"	Saturated very dense dark gray fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
51			50.5'		12" RECOVERY		
54							
		17	54.0'	45 50/3"	Saturated very dense dark gray fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
57			55.0'		9" RECOVERY		
60		18	59.0'	39 50/5"	Saturated very dense dark gray fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			60.0'		8" RECOVERY		
					End of Boring		
63							
66							
69							
72							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Clayey sand

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Notes:

1. Exploratory borings were drilled on 3/6/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-048

Contract: 25-113-01

Boring Location: Sta. 540+00, 70.00' Lt. C.L.

Boring Surface Elev.: + 69.92'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 38.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/23/09		14.0	14.0	13.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 40.0 Ft.;
No. of 2 in. Dia. Shelby Tubes: ;
2 1/2 in. Dia. Contin. Sample Boring: Ft.;
Dia. U-Sample Boring: Ft.
U-Samples:
Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/23/09	1	0.0'	2 3 4 6	Moist firm light brown fine sandy silt w/ some coarse sand and clay, trace of gravel.	A-4(0)	Topsoil - 2".
			2.0'		22" RECOVERY		
3		2	2.0'	6 8 8 10	Moist medium dense light brown and orange silty fine to coarse sand, trace of mica.	A-2-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	5 12 13 14	Moist medium dense dark brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
6			6.0'		20" RECOVERY		
		4	6.0'	15 13 13 12	Moist medium dense dark brown silty coarse to fine sand w/ some gravel.	A-1-b	
			8.0'		16" RECOVERY		
9		5	8.0'	7 9 10 13	Moist medium dense light gray coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			10.0'		23" RECOVERY		
		6	10.0'	10 11 10 12	Moist medium dense light gray coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
12			12.0'		24" RECOVERY		
		7	12.0'	4 4 6 7	Wet loose brown and black mottled coarse to fine sand w/ some silt and gravel.	A-1-b	
			14.0'		23" RECOVERY		
15		8	14.0'	5 5 3 3	Wet loose light brown gravel and fine sand w/ some silt and coarse sand.	A-1-b	
			16.0'		14" RECOVERY		
		9	16.0'	8 10 9	Indication of wet very stiff dark black clayey		No sieve analysis.

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R1-048

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	9	sandy silt. 6" RECOVERY		Glauconitic.
		10	18.0'	8 9 11 9	Saturated very stiff dark black fine sandy clay, trace of coarse sand and gravel.	A-6(3)	Glauconitic.
			20.0'		21" RECOVERY		
21		11	20.0'	3 5 8 9	Saturated stiff dark black fine sandy clay, trace of coarse sand and gravel.	A-6(2)	Glauconitic.
			22.0'		21" RECOVERY		
		12	22.0'	8 12 13 16	Saturated very stiff dark black fine sandy clay, trace of coarse sand and gravel.	A-6(5)	Glauconitic.
24			24.0'		23" RECOVERY		
		13	24.0'	5 7 8 9	Saturated stiff dark black fine sandy silt, trace of coarse sand and gravel.	A-4(0)	Glauconitic.
			26.0'		23" RECOVERY		
27		14	26.0'	12 13 18 22	Saturated hard dark black fine sandy clay, trace of coarse sand.	A-6(3)	Glauconitic.
			28.0'		14" RECOVERY		
		15	28.0'	3 4 6 10	Saturated stiff dark black fine sandy clay, trace of coarse sand and gravel.	A-6(5)	Glauconitic.
30			30.0'		10" RECOVERY		
		16	30.0'	13 9 14 17	Saturated very stiff dark black fine sandy clay, trace of coarse sand and gravel.	A-7-6(4)	Glauconitic.
			32.0'		9" RECOVERY		
33		17	32.0'	3 5 8 8	Saturated stiff dark black fine sandy clay, trace of coarse sand and gravel.	A-7-6(5)	Glauconitic.
			34.0'		12" RECOVERY		
		18	34.0'	2 3 6 7	Saturated loose black clayey fine to coarse sand w/ some organic matter, trace of gravel.	A-2-6(1)	
36			36.0'		22" RECOVERY		
		19	36.0'	14 18 27 24	Saturated hard black organic fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
			38.0'		19" RECOVERY		
39		20	38.0'	5 11 18 24	Saturated medium dense black organic silty fine to coarse sand w/ some gravel.	A-2-5(0)	
			40.0'		8" RECOVERY		
42					End of Boring		
45							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Clayey sand



Low plasticity
clay

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Notes:

1. Exploratory borings were drilled on 3/23/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-049

Contract: 25-113-01

Boring Location: Sta. 545+00, 30.00' Lt. C.L.

Boring Surface Elev.: + 68.23'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 38.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/27/09		18.0	16.0	15.7	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	40.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/27/09	1	0.0'	2 3 3 5	Moist firm brown clay w/ some fine to coarse sand.	A-6(6)	
			2.0'		21" RECOVERY		
3		2	2.0'	5 10 8 5	Moist medium dense brown to orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			4.0'		22" RECOVERY		
		3	4.0'	3 3 5 6	Moist loose brown fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
6			6.0'		20" RECOVERY		
		4	6.0'	9 7 7 5	Moist medium dense brown coarse sand w/ some silt and fine sand, trace of gravel.	A-1-b	
			8.0'		22" RECOVERY		
9		5	8.0'	5 7 6 6	Moist medium dense brown coarse sand w/ some fine sand, gravel, and silt.	A-1-b	
			10.0'		17" RECOVERY		
		6	10.0'	6 10 7 6	Moist medium dense brown coarse to fine sand w/ some gravel, trace of silt.	A-1-b	
12			12.0'		18" RECOVERY		
		7	12.0'	2 4 6 8	Wet loose brown coarse to fine sand w/ some gravel, trace of silt.	A-1-b	
			14.0'		18" RECOVERY		
15		8	14.0'	7 5 4 7	Wet loose brown coarse to fine sand w/ some gravel, trace of silt.	A-1-b	
			16.0'		23" RECOVERY		
		9	16.0'	9 11 15	Wet medium dense coarse sand w/ some fine	A-1-b	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R1-049

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	16	sand and gravel, trace of silt. 23" RECOVERY		
		10	18.0'	17 6 7 5	Wet medium dense brown coarse to fine sand w/ some gravel and silt.	A-1-b	
			20.0'		18" RECOVERY		
21		11	20.0'	10 10 8 8	Wet medium dense brown coarse to fine sand w/ some gravel and silt.	A-1-b	
			22.0'		19" RECOVERY		
		12	22.0'	4 6 7 9	Saturated stiff brown to gray fine sandy clay, trace of coarse sand and gravel.	A-7-6(5)	
24			24.0'		18" RECOVERY		
		13	24.0'	4 11 14 17	Saturated very stiff gray fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(2)	
			26.0'		23" RECOVERY		
27		14	26.0'	14 18 20 22	Saturated hard gray fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(6)	
			28.0'		24" RECOVERY		
		15	28.0'	7 8 10 11	Saturated medium dense black silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
30			30.0'		18" RECOVERY		
		16	30.0'	8 8 10 12	Saturated medium dense black fine sand w/ some coarse sand, silt, and organic matter, trace of gravel.	A-2-4(0)	
			32.0'		20" RECOVERY		
33		17	32.0'	8 10 12 13	Saturated medium dense black silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			34.0'		23" RECOVERY		
		18	34.0'	4 5 8 14	Saturated medium dense black silty coarse to fine sand, trace of gravel.	A-2-4(0)	
36			36.0'		21" RECOVERY		
		19	36.0'	5 7 11 15	Saturated medium dense black silty coarse to fine sand w/ some gravel.	A-2-4(0)	
			38.0'		24" RECOVERY		
39		20	38.0'	42 50/3"	Saturated very dense black silty fine to coarse sand w/ some gravel.	A-2-5(0)	
			39.0'		10" RECOVERY		
42					End of Boring		
45							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt



Silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/27/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-050

Contract: 25-113-01

Boring Location: Sta. 550+00, 100.00' Rt. C.L.

Boring Surface Elev.: + 63.87

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 38.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/30/09		12.0	10.0	8.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	40.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/30/09	1	0.0'	2 4 4 6	Moist stiff brown clayey fine sandy silt, trace of coarse sand.	A-4(2)	
			2.0'		20" RECOVERY		
3		2	2.0'	3 4 8 8	Moist stiff brown clayey fine sandy silt w/ some coarse sand and gravel.	A-4(1)	
			4.0'		18" RECOVERY		
		3	4.0'	5 4 4 3	Moist loose brown silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
6			6.0'		18" RECOVERY		
		4	6.0'	3 2 2 5	Moist very loose brown and orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			8.0'		17" RECOVERY		
9		5	8.0'	3 4 8 6	Moist medium dense brown-orange coarse to fine sand and gravel w/ some silt.	A-1-b	
			10.0'		18" RECOVERY		
		6	10.0'	8 9 7 5	Moist medium dense brown-orange coarse sand and gravel w/ some fine sand and silt.	A-1-b	
12			12.0'		18" RECOVERY		
		7	12.0'	2 2 5 6	Moist medium dense brown and orange fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
			14.0'		19" RECOVERY		
15		8	14.0'	3 4 4 8	Moist loose orange coarse sand w/ some silt and fine sand, trace of gravel.	A-1-b	
			16.0'		20" RECOVERY		
		9	16.0'	8 5 8	Wet medium dense green clayey coarse to	A-2-6(1)	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R1-050

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	10	fine sand, trace of gravel.		
			18.0'		19" RECOVERY		
		10	18.0'	5 5 10 11	Wet medium dense green silty fine to coarse sand, trace of organic matter and gravel.	A-2-4(0)	
			20.0'		18" RECOVERY		
21		11	20.0'	8 10 7 10	Saturated medium dense green silty fine to coarse sand w/ some gravel and organic matter.	A-2-4(0)	
			22.0'		18" RECOVERY		
		12	22.0'	2 3 6 8	Saturated stiff green fine sandy clay w/ some coarse sand, trace of organic matter and gravel.	A-6(0)	
24			24.0'		21" RECOVERY		
		13	24.0'	4 18 12 12	Saturated very stiff green organic fine sandy silt w/ some clay and coarse sand, trace of gravel.	A-4(0)	
			26.0'		20" RECOVERY		
27		14	26.0'	4 7 14 20	Saturated medium dense green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			28.0'		19" RECOVERY		
		15	28.0'	5 8 14 31	Saturated very stiff green fine to coarse sandy clay, trace of gravel.	A-7-5(2)	
30			30.0'		17" RECOVERY		
		16	30.0'	30 50/4"	Saturated very dense green clayey fine sand w/ some coarse sand and gravel.	A-2-5(0)	
			31.0'		10" RECOVERY		
		17	32.0'	10 28 34 50/5"	Saturated very dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	
33			34.0'		19" RECOVERY		
		18	34.0'	30 20 23 28	Saturated dense green silty fine to coarse sand, trace of gravel.	A-2-5(0)	
36			36.0'		18" RECOVERY		
		19	36.0'	13 15 17 18	Saturated dense green fine to coarse sand w/ some gravel and silt.	A-2-4(0)	
			38.0'		18" RECOVERY		
39		20	38.0'	20 32 38 50/3"	Saturated very dense green clayey fine to coarse sand, trace of gravel.	A-2-4(0)	
			40.0'		18" RECOVERY		
42					End of Boring		
45							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/30/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-051

Contract: 25-113-01

Boring Location: Sta. 555+00, 100.00' Lt. C.L.

Boring Surface Elev.: + 62.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Spoon		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 34.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	4/1/09		6.0	4.0	3.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	60.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	4/1/09	1	0.5'	1 3 4	Wet firm gray clayey silt, trace of fine sand and gravel. 18" RECOVERY	A-4(8)	Topsoil - 3".
3		2	2.0'	9 8 9 13	Wet very stiff gray clayey silt, trace of fine to coarse sand and gravel. 19" RECOVERY	A-4(6)	
		3	4.0'	9 18 14 14	Wet hard gray-brown gravelly silt w/ some coarse to fine sand, trace of clay. 15" RECOVERY	A-4(0)	
6		4	6.0'	9 9 13 15	Wet medium dense brown and orange coarse to fine sand w/ some silt, trace of gravel. 19" RECOVERY	A-1-b	
9		5	8.0'	6 10 9 12	Wet medium dense brown coarse to fine sand w/ some gravel, trace of silt. 19" RECOVERY	A-1-b	
		6	10.0'	11 2 6 6	Wet medium dense brown coarse sand w/ some gravel and fine sand, trace of silt. 20" RECOVERY	A-1-b	
12		7	12.0'	5 4 3 3	Wet loose tan fine to coarse sand w/ some silt, trace of gravel. 20" RECOVERY	A-2-4(0)	
		8	14.0'	2 3 5 6	Wet loose tan fine to coarse sand w/ some silt, trace of gravel. 17" RECOVERY	A-2-4(0)	
15		9	16.0'	7 6 9 10	Wet medium dense tan-brown coarse sand w/ some silt, fine sand, and gravel.	A-1-b	

Remarks: Mud Rotary @ 34.0 Feet.

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R1-051

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		19" RECOVERY		
		10	18.0'	12 10 8 8	Wet medium dense tan-brown coarse sand w/ some fine sand, trace of silt and gravel.	A-1-b	
			20.0'		18" RECOVERY		
21							
24							
		11	24.0'	3 4 6 7	Saturated loose brown coarse sand w/ some fine sand, silt, and gravel.	A-1-b	
			26.0'		18" RECOVERY		
27							
30		12	29.0'	6 5 11 10	Saturated medium dense green coarse to fine sand w/ silt and gravel.	A-2-4(0)	Glauconitic.
			31.0'		18" RECOVERY		
33							
36		13	34.0'	8 9 12 14	Saturated medium dense green-brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	Mud Rotary @ 34.0'.
			36.0'		20" RECOVERY		
39							
42		14	39.0'	1 2 4 6	Saturated loose green-brown fine to coarse sand, trace of silt.	A-3	
			41.0'		20" RECOVERY		
45							
45		15	44.0'	9 9 13 16	Saturated medium dense green-brown fine sand w/ some coarse sand and silt.	A-2-4(0)	

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-051

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		21" RECOVERY		
48							
		16	49.0'	18 28 38 50/4"	Saturated very dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
51			51.0'		19" RECOVERY		
54							
		17	54.0'	14 26 33 50/4"	Saturated very dense green fine sand, trace of silt and coarse sand.	A-3	
			56.0'		17" RECOVERY		
57							
		18	58.0' 59.0'	28 50/3"	Saturated very dense green fine sand w/ some coarse sand and silt.	A-2-4(0)	
					9" RECOVERY		
60					End of Boring		
63							
66							
69							
72							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt



Well graded sand

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Notes:

1. Exploratory borings were drilled on 4/1/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-052

Contract: 25-113-01

Boring Location: Sta. 682+00, 40.00' Lt. C.L.

Boring Surface Elev.: + 50.61'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Spoon		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 20.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/10/09		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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/10/09	1	1.0'	3 4 4	Moist firm brown clayey silt, trace of coarse to fine sand.	A-4(9)	Cultivated Soil - 8".
3		2	2.0' 2.5'	4 4 3 4	Moist firm brown clayey silt, trace of fine to coarse sand.	A-4(7)	
			4.0'		14" RECOVERY		
			4.0'		18" RECOVERY		
6		3	4.0'	2 9 9 6	Moist medium dense orange gravel and fine sand w/ some clay, trace of coarse sand.	A-2-4(0)	
			6.0'		10" RECOVERY		
		4	6.0'	7 8 8 9	Moist medium dense orange silty fine sand and gravel w/ some coarse sand.	A-2-4(0)	
			8.0'		18" RECOVERY		
9		5	8.0'	3 3 7 3	Moist loose orange silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
		6	10.0'	3 4 5 5	Moist stiff orange fine sandy silt, trace of coarse sand.	A-4(0)	
12			12.0'		19" RECOVERY		
		7	12.0'	3 4 5 5	Moist loose orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			14.0'		21" RECOVERY		
15		8	14.0'	3 4 3 3	Moist loose orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			16.0'		15" RECOVERY		
		9	16.0'	3 18 17 16	Moist dense orange gravel and coarse sand w/ some fine sand, trace of silt.	A-1-a	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-052

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			18.0'		14" RECOVERY		
		10	18.0'	20 20 20 17	Moist dense orange gravel and coarse sand w/ some silt, trace of fine sand.	A-1-a	
			20.0'		18" RECOVERY		
21					End of Boring		
24							
27							
30							
33							
36							
39							
42							
45							

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KEY TO SYMBOLS

Symbol Description

Strata symbols

	Low plasticity clay
	Silt
	Poorly graded clayey silty sand
	Silty sand
	Poorly graded gravel with silt

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Notes:

1. Exploratory borings were drilled on 2/10/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-053

Contract: 25-113-01

Boring Location: Sta. 622+00, 190.00' Rt. C.L.

Boring Surface Elev.: + 78.42'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Spoon	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					48.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/25/09		39.0	39.0	35.2	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	50.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/24/09	1	1.0'	4 5	Moist stiff tan clayey silt, trace of fine to coarse sand.	A-4(6)	Cultivated soil - 9"; 4" frozen soil.
			2.0'		10" RECOVERY		
3		2	2.0'	6 7 6 5	Moist stiff tan silt, trace of fine to coarse sand and gravel.	A-4(0)	
			4.0'		16" RECOVERY		
		3	4.0'	3 5 5 6	Moist stiff tan clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(1)	
6			6.0'		14" RECOVERY		
		4	6.0'	7 6 6 7	Moist stiff tan clay w/ some fine sand, trace of coarse sand and gravel.	A-6(9)	
			8.0'		24" RECOVERY		
9		5	8.0'	2 3 6 7	Moist stiff tan fine sandy silt w/ some gravel, clay, and coarse sand.	A-4(0)	
			10.0'		14" RECOVERY		
		6	10.0'	9 8 11 11	Moist medium dense orange silty fine to coarse sand w/ some gravel.	A-2-4(0)	
12			12.0'		24" RECOVERY		
		7	12.0'	6 13 13 16	Moist medium dense orange coarse to fine sand and gravel w/ some silt.	A-1-b	
			14.0'		14" RECOVERY		
15		8	14.0'	8 10 10 9	Moist medium dense orange coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
			16.0'		19" RECOVERY		
		9	16.0'	15 14 12 12	Moist medium dense orange coarse to fine sand w/ some silt and gravel.	A-1-b	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R1-053

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		10	18.0'	10 18 10 9	17" RECOVERY	A-1-b	Cemented sands.
			18.0'		Wet medium dense orange coarse to fine sand and gravel w/ some silt.		
21			20.0'		17" RECOVERY		
24		11	24.0'	8 9 6 5	Wet medium dense orange-brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
			26.0'		14" RECOVERY		
27							
30		12	29.0'	5 4 6 5	Saturated loose orange-brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			31.0'		24" RECOVERY		
33							
36	2/25/09	13	34.0'	2 4 5 7	Saturated loose orange and gray mottled fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			36.0'		24" RECOVERY		
39							
42		14	39.0'	5 6 7 8	Saturated medium dense orange and gray mottled fine sand w/ some coarse sand and silt.	A-2-4(0)	
			41.0'		24" RECOVERY		
45		15	44.0'	8 10 14 11	Saturated medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
			46.0'		24" RECOVERY		

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-053

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48							
		16	48.0'	7 9 14 14	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
			50.0'		24" RECOVERY		
51					End of Boring		
54							
57							
60							
63							
66							
69							
72							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silt



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/24/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-054

Contract: 25-113-01

Boring Location: Sta. 622+00, 250.00' Lt. C.L.

Boring Surface Elev.: + 76.07'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 48.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/23/09		34.0	34.0	32.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	50.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	2/23/09	1	1.0'	3 4	Moist firm brown clay, trace of fine sand. 11" RECOVERY	A-6(11)	Cultivated Soil - 9".
		2	2.0'	3 7 6 6	Moist stiff brown clayey silt w/ some fine to coarse sand.	A-4(4)	
6	2/23/09	3	4.0'	3 4 5 6	16" RECOVERY Moist loose orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
		4	6.0'	6 7 9 8	14" RECOVERY Moist medium dense orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
9	2/23/09	5	8.0'	2 6 7 7	24" RECOVERY Moist medium dense yellow silty fine to coarse sand.	A-2-4(0)	
		6	10.0'	6 7 7 8	15" RECOVERY Moist medium dense yellow fine to coarse sand and gravel w/ some silt.	A-2-4(0)	
12	2/23/09	7	12.0'		20" RECOVERY Wet medium dense brown, green, and orange silty coarse to fine sand w/ some gravel.	A-2-4(0)	Cemented sands.
		8	14.0'	5 8 9 9	Wet medium dense brown, green, and orange silty fine to coarse sand w/ some gravel.	A-2-4(0)	Cemented sands.
15	2/23/09	9	16.0'	5 5 6 8	14" RECOVERY Wet medium dense brown, green, and orange coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	Cemented sands.

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R1-054

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		10	18.0'	7	12" RECOVERY Wet medium dense brown, green, and orange coarse to fine sand w/ some silt and gravel.	A-1-b	Cemented sands.
			18.0'	7 11 9			
21			20.0'		9" RECOVERY		
		11	24.0'	4	Wet medium dense brown, green, and orange fine to coarse sand w/ some silt and gravel.	A-2-4(0)	Cemented sands.
			26.0'	5 6 9			
24					20" RECOVERY		
		12	29.0'	3	Wet medium dense brown fine to coarse sand w/ some silt.	A-2-4(0)	Cemented sands.
			31.0'	5 7 6			
27					24" RECOVERY		
		13	34.0'	2	Wet medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	Cemented sands.
			36.0'	6 11 8			
30					20" RECOVERY		
		14	39.0'	6	Wet medium dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	Cemented sands.
			41.0'	10 11 14			
33					21" RECOVERY		
		15	44.0'	13	Wet dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	Cemented sands.
			46.0'	18 33 45			
36					16" RECOVERY		
39							
42							
45							

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-054

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48							
		16	48.0'	7 7 10 12	Wet medium dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	Cemented sands.
			50.0'		20" RECOVERY		
51					End of Boring		
54							
57							
60							
63							
66							
69							
72							

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/23/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-055

Contract: 25-113-01

Boring Location: Sta. 627+00, 360.00' Rt. C.L.

Boring Surface Elev.: +72.15'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 50.0

Water Level Readings

Date
2/26/09

Time

Depth of Hole
29.0

Depth of Casing
29.0

Depth of Water
26.9

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 50.0

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	2/25/09	1	1.0'	4 5	Moist stiff tan clayey silt, trace of fine to coarse sand. 10" RECOVERY	A-4(10)	Cultivated Soil - 10".
		2	2.0'	4 5	Moist stiff tan clayey silt, trace of fine to coarse sand. 10" RECOVERY	A-4(10)	
6	2/25/09	2A	3.0'	6 5	Moist medium dense tan-orange clayey coarse to fine sand w/ some gravel. 10" RECOVERY	A-2-4(0)	
		3	4.0'	4 9 8 9	Moist medium dense yellow-orange clayey coarse to fine sand, trace of gravel. 16" RECOVERY	A-2-6(0)	
		4	6.0'	10 10 11 10	Moist medium dense orange gravel and fine sand w/ some coarse sand and silt. 18" RECOVERY	A-1-b	
9	2/25/09	5	8.0'	12 13 14 10	Moist medium dense orange coarse sand and gravel w/ some fine sand and silt. 14" RECOVERY	A-1-b	
		6	10.0'	9 11 15 9	Moist medium dense orange coarse sand and gravel w/ some fine sand, trace of silt. 17" RECOVERY	A-1-b	
12	2/25/09	7	12.0'	6 11 11 9	Moist medium dense brown silty gravel and coarse sand w/ some fine sand. 8" RECOVERY	A-1-b	Cemented sands.
		8	14.0'	6 8 9 6	Wet very stiff brown fine to coarse sandy silt, trace of gravel. 11" RECOVERY	A-4(0)	Cemented sands.
15	2/25/09	9	16.0'	6 10 9 6	Wet medium dense brown clayey coarse to fine sand w/ some gravel.	A-2-5(0)	Cemented sands.

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R1-055

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		10	18.0'	6 2 2 3	9" RECOVERY	A-2-4(0)	Cemented sands.
			18.0'		Wet very loose orange silty coarse to fine sand w/ some gravel.		
21			20.0'		12" RECOVERY		
24		11	24.0'	5 10 7 4	Wet medium dense green-orange coarse to fine sand and gravel w/ some silt.	A-1-b	Cemented sands.
	2/26/09		26.0'		17" RECOVERY		
27							
30		12	29.0'	8 7 7 8	Saturated medium dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			31.0'		21" RECOVERY		
33		13	34.0'	4 6 10 12	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
36			36.0'		20" RECOVERY		
39							
42		14	39.0'	6 7 8 8	Saturated medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
			41.0'		22" RECOVERY		
45		15	44.0'	9 10 17 20	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
			46.0'		16" RECOVERY		

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-055

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0'	15 15 18 20	Saturated dense orange fine sand w/ some coarse sand and silt.	A-3	
			50.0'		16" RECOVERY		
51					End of Boring		
54							
57							
60							
63							
66							
69							
72							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/25/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-056

Contract: 25-113-01

Boring Location: Sta. 627+00, 360.00' Lt. C.L.

Boring Surface Elev.: + 80.38'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 48

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/23/09		39.0	39.0	38.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	50.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/20/09	1	1.0'	4 5	Moist stiff tan clayey silt, trace of fine to coarse sand.	A-4(8)	Cultivated Soil - 8".
			2.0'		10" RECOVERY		
3		2	2.0'	5 6 8 6	Moist stiff tan-orange fine sandy silt w/ some coarse sand, trace of clay.	A-4(0)	
			4.0'		16" RECOVERY		
		3	4.0'	4 4 4 4	Moist firm tan-orange fine sandy silt w/ some coarse sand.	A-4(0)	
6			6.0'		15" RECOVERY		
		4	6.0'	2 5 10 12	Moist stiff orange clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
			8.0'		22" RECOVERY		
9		5	8.0'	5 6 6 7	Moist medium dense orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
		6	10.0'	7 6 8 10	Moist medium dense orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
12			12.0'		24" RECOVERY		
		7	12.0'	4 6 7 12	Moist medium dense yellow coarse sand and gravel w/ some fine sand and silt.	A-1-b	
			14.0'		15" RECOVERY		
15		8	14.0'	25 17 12 11	Moist medium dense yellow fine to coarse sand and gravel w/ some silt.	A-1-b	
			16.0'		6" RECOVERY		
		9	16.0'	27 10 10 10	Moist medium dense yellow silty coarse sand and gravel w/ some fine sand.	A-1-b	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R1-056

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		10	18.0'	6 10 8 9	15" RECOVERY	A-7-5(1)	
			18.0'		Wet very stiff brown-orange fine sandy clay w/ some coarse sand and gravel.		
21			20.0'		18" RECOVERY		
		11	24.0'	7 4 4 4	Wet loose brown-orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
24			26.0'		14" RECOVERY		
27							
		12	29.0'	2 5 7 6	Wet medium dense brown-orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
30			31.0'		24" RECOVERY		
33							
		13	34.0'	2 4 7 7	Wet medium dense orange-white mottled fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
36			36.0'		23" RECOVERY		
39							
	2/23/09	14	39.0'	3 4 6 8	Wet loose orange-white mottled fine to coarse sand, trace of silt.	A-3	
42			41.0'		22" RECOVERY		
45							
		15	44.0'	5 8 12 20	Wet medium dense orange-white mottled fine sand w/ some coarse sand and silt.	A-2-4(0)	
			46.0'		24" RECOVERY		

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-056

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0'	10 16 17 15	Wet dense orange-white mottled fine to coarse sand, trace of silt and gravel.	A-3	
			50.0'		24" RECOVERY		
51					End of Boring		
54							
57							
60							
63							
66							
69							
72							

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Poorly graded clayey
silty sand



Poorly graded sand
with silt

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/20/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-057

Contract: 25-113-01

Boring Location: Sta. 632+00, 380.00' Rt. C.L.

Boring Surface Elev.: + 70.58'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split-Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 48.0

Water Level Readings
Date 2/17/09
Time

Depth of Hole 29.0
Depth of Casing 29.0
Depth of Water 27.1
Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 50.0 Ft.;
No. of 2 in. Dia. Shelby Tubes: ;
2 1/2 in. Dia. Contin. Sample Boring: Ft.;
Dia. U-Sample Boring: Ft.
No. of U-Samples:
Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/17/09	1	1.0'	3 4	Moist firm gray clay, trace of fine to coarse sand.	A-6(11)	Cultivated Soil - 9".
		2	2.0'	5 6 8 9	10" RECOVERY Moist stiff gray clay, trace of gravel and fine to coarse sand.	A-6(9)	
3		3	4.0' 4.0'	3 5 7 8	20" RECOVERY Moist medium dense orange coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
6		4	6.0' 7.0'	7 50/5"	15" RECOVERY Moist very dense orange coarse to fine sand w/ some gravel and silt.	A-1-b	
9		5	8.0'	4 5 7 8	8" RECOVERY Wet stiff orange-brown fine sandy clay w/ some gravel and coarse sand.	A-7-5(5)	Cemented sands.
		6	10.0'	6 7 13 14	12" RECOVERY Wet very stiff orange-brown fine sandy clay w/ some gravel and coarse sand.	A-7-5(8)	Cemented sands.
12		7	12.0'	4 7 8 11	20" RECOVERY Wet medium dense orange-brown clayey fine sand w/ some gravel and coarse sand.	A-2-6(0)	Cemented sands.
		8	14.0'	4 8 8 9	18" RECOVERY Wet medium dense orange-brown and green silty fine to coarse sand w/ some gravel.	A-2-4(0)	
15		9	16.0'	8 10 7 8	17" RECOVERY Wet medium dense orange-brown and green silty coarse to fine sand w/ some gravel.	A-2-4(0)	Cemented sands.

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R1-057

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		10	18.0'	8 3 7 8	20" RECOVERY	A-2-4(0)	Cemented sands.
			18.0'		Wet loose orange-brown and green silty coarse to fine sand w/ some gravel.		
21			20.0'		15" RECOVERY		
24		11	24.0'	6 3 5 3	Wet loose orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	Cemented sands.
			26.0'		24" RECOVERY		
27							
30		12	29.0'	3 4 5 6	Wet loose yellow and gray mottled fine to coarse sand, trace of silt and gravel.	A-3	
			31.0'		24" RECOVERY		
33							
36		13	34.0'	6 9 11 12	Wet medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
			36.0'		24" RECOVERY		
39							
42		14	39.0'	7 9 11 12	Wet medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			41.0'		24" RECOVERY		
45		15	44.0'	6 6 10 12	Wet medium dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
			46.0'		17" RECOVERY		

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-057

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0'	10 12 22 30	Wet dense orange fine sand w/ some fine sand, trace of silt.	A-3	
			50.0'		21" RECOVERY		
51					End of Boring		
54							
57							
60							
63							
66							
69							
72							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Elastic silt



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/17/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-059

Contract: 25-113-01

Boring Location: Sta. 637+00, 220.00' Rt. C.L.

Boring Surface Elev.: + 63.68'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Spoon		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 48.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/16/09		29.0	29.0	25.8	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	50.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/13/09	1	1.0'	4 4	Moist firm brown clayey silt, trace of fine to coarse sand and gravel.	A-4(9)	Cultivated Soil - 9".
			2.0'		10" RECOVERY	A-4(7)	
3		2	2.0'	6 7	Moist very stiff brown clayey silt, trace of fine to coarse sand and gravel.	A-1-b	
		2A	3.0'	11 7	8" RECOVERY	A-7-5(11)	
		3	4.0'	4 6 7 10	Moist medium dense brown clayey gravel and coarse sand w/ some silt and fine sand.	A-7-5(4)	Cemented sands.
			4.0'		4" RECOVERY		
6			6.0'		Moist stiff brown fine sandy clay w/ some coarse sand, trace of gravel.		
		4	6.0'	8 7 10 13	12" RECOVERY		
			8.0'		Moist stiff brown-orange fine to coarse sandy clay, trace of gravel.		
		5	8.0'	3 5 6 8	16" RECOVERY	A-2-7(1)	Cemented sands.
9			10.0'		Wet medium dense brown-orange clayey coarse to fine sand w/ some gravel.		
		6	10.0'	4 7 9 10	15" RECOVERY	A-2-7(0)	Cemented sands.
12			12.0'		Wet medium dense brown-orange clayey coarse to fine sand, trace of gravel.		
		7	12.0'	5 3 7 7	21" RECOVERY	A-1-b	Cemented sands.
			14.0'		Wet loose brown-orange silty coarse to fine sand and gravel.		
		8	14.0'	3 8 5 5	14" RECOVERY	A-1-b	Cemented sands.
15			16.0'		Wet medium dense brown-orange silty coarse to fine sand w/ some gravel.		
		9	16.0'	5 7 7 5	15" RECOVERY	A-2-4(0)	Cemented sands.

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R1-059

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		10	18.0'	3 3 3 5	21" RECOVERY	A-2-4(0)	
			18.0'		Wet loose orange fine to coarse sand w/ some silt, trace of gravel.		
21			20.0'		21" RECOVERY		
24		11	24.0'	3 5 6 7	Wet medium dense tan and yellow fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			26.0'		24" RECOVERY		
27							
30		12	29.0'	5 5 6 9	Wet medium dense tan and yellow fine to coarse sand, trace of silt and gravel.	A-3	
			31.0'		24" RECOVERY		
33							
36		13	34.0'	3 7 9 21	Wet medium dense orange fine to coarse sand, trace of silt.	A-3	
			36.0'		24" RECOVERY		
39							
42		14	39.0'	2 6 9 12	Wet medium dense orange fine to coarse sand, trace of silt.	A-3	
			41.0'		24" RECOVERY		
45		15	44.0'	6 13 14 19	Wet medium dense brown fine to coarse sand, trace of silt and gravel.	A-3	
			46.0'		20" RECOVERY		

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R1-059

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0'	4 4 7 13	Wet medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
			50.0'		19" RECOVERY		
51					End of Boring		
54							
57							
60							
63							
66							
69							
72							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols

	Low plasticity clay
	Silt
	Poorly graded clayey silty sand
	Elastic silt
	Silty sand
	Poorly graded sand with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/13/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-060

Contract: 25-113-01

Boring Location: Sta. 637+00, 150.00' Lt. C.L.

Boring Surface Elev.: +70.91'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 48.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/13/09		34.0	34.0	30.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	50.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	2/12/09	1	1.0'	2 3 4	Moist firm brown clay, trace of fine sand.	A-6(13)	Cultivated Soil - 8".
		2	2.0' 2.5'	7 6 6 6	Moist stiff brown clayey silt, trace of fine to coarse sand and gravel. 14" RECOVERY	A-4(8)	
		3	4.0' 4.0'	2 4 5 6	18" RECOVERY Moist loose tan and orange mottled clayey coarse to fine sand w/ some gravel.	A-2-4(0)	
6		4	6.0' 6.0'	3 10 11 12	10" RECOVERY Moist medium dense tan and orange gravel and coarse to fine sand w/ some silt.	A-1-b	
			8.0'		12" RECOVERY		
9	2/13/09	5	8.0'	7 11 8 7	Moist medium dense tan and orange clayey coarse sand and gravel w/ some fine sand.	A-2-7(0)	
		6	10.0' 10.0'	7 16 15 17	13" RECOVERY Moist hard brown and green coarse to fine sandy clay w/ some gravel.	A-7-5(3)	Cemented sands.
12		7	12.0' 12.0'	7 9 8 10	18" RECOVERY Wet medium dense orange clayey coarse to fine sand w/ some gravel.	A-2-5(0)	
		8	14.0' 14.0'	6 8 3 4	12" RECOVERY Wet medium dense orange silty coarse to fine sand, trace of gravel.	A-2-4(0)	Cemented sands.
15		9	16.0' 16.0'	14 8 4 7	20" RECOVERY Wet medium dense orange silty coarse to fine sand w/ some gravel.	A-1-b	Cemented sands.

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R1-060

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		10	18.0'	15 10 8 4	23" RECOVERY	A-1-b	Cemented sands.
			18.0'		Wet medium dense orange silty coarse to fine sand, trace of gravel.		
21			20.0'		10" RECOVERY		
		11	24.0'	5 5 5 6	Wet loose orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
24			26.0'		20" RECOVERY		
		12	29.0'	3 4 5 6	Wet loose gray and orange mottled fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
27			31.0'		23" RECOVERY		
30		13	34.0'	7 7 10 10	Wet medium dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			36.0'		21" RECOVERY		
33		14	39.0'	6 7 10 12	Wet medium dense orange fine to coarse sand, trace of silt.	A-3	
36			41.0'		20" RECOVERY		
39		15	44.0'	8 10 13 15	Wet medium dense orange fine to coarse sand, trace of silt.	A-3	
42			46.0'		23" RECOVERY		
45							

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AUGUST 2015

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-060

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0'	6 10 12 13	Wet medium dense orange fine to coarse sand, trace of silt.	A-3	
			50.0'		24" RECOVERY		
51					End of Boring		
54							
57							
60							
63							
66							
69							
72							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/12/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-061

Contract: 25-113-01

Boring Location: Sta. 629+50, 200.00' Lt. C.L.

Boring Surface Elev.: + 76.68'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings
Date 2/19/09
Time

Depth of Hole **Depth of Casing** **Depth of Water** **Elev. of Water**
Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0 Ft.;
No. of 2 in. Dia. Shelby Tubes: ;
2 1/2 in. Dia. Contin. Sample Boring: Ft.;
Dia. U-Sample Boring: Ft.
U-Samples:
Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: J. Truver
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	2/19/09	1	1.0'	4	Moist firm tan silt w/ some clay, trace of fine to coarse sand. 10" RECOVERY	A-4(3)	Asphalt - 6".
			2.0'	4		A-4(5)	
6		2	2.0'	4	Moist stiff tan clayey silt, trace of fine to coarse sand and gravel. 16" RECOVERY	A-4(3)	Offset 2' south to obtain shelby tube.
		3	4.0'	2			
9		4	6.0'	6	Moist very stiff orange clayey fine sandy silt w/ some coarse sand, trace of gravel. 18" RECOVERY	A-4(2)	
			6.0'	10			
12		5	8.0'	4	Moist stiff orange silty fine to coarse sand w/ some gravel. 19" RECOVERY	A-2-4(0)	
			8.0'	7			
15		6	10.0'	7	Moist very stiff orange and white mottled fine sandy silt w/ some coarse sand, trace of gravel. 16" RECOVERY	A-4(0)	Cemented sands.
			10.0'	9			
		7	12.0'	2	Moist medium dense orange-gray mottled silty fine sand. 22" RECOVERY	A-2-4(0)	Contains mica.
			12.0'	6			
		8	14.0'	10	Moist hard orange-gray mottled fine sandy silt, trace of coarse sand. 18" RECOVERY	A-4(0)	
			14.0'	14			
		8A	15.0'	17	Moist dense orange-brown silty coarse to fine sand w/ some gravel. 12" RECOVERY	A-2-4(0)	Cemented sands.
			15.0'	20			
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silt



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/19/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-062

Contract: 25-113-01

Boring Location: Sta. 629+40, 200.00' Rt. C.L.

Boring Surface Elev.: + 73.50'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 16.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/19/09		16.0	14.0	Dry	

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:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: J. Truver

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/19/09	1	1.0'	3 4	Moist firm brown silt w/ some clay and fine to coarse sand, trace of gravel.	A-4(2)	Asphalt - 6".
		2	2.0'	3 4 5 5	8" RECOVERY Moist loose orange clayey gravel and fine to coarse sand.	A-2-4(0)	
3			4.0'	3 4 5 6	15" RECOVERY Moist loose orange clayey fine to coarse sand, trace of gravel.	A-2-4(0)	
6			6.0'	8 9 10 17	15" RECOVERY Moist medium dense orange fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
9			8.0'	5 9 9 12	9" RECOVERY Moist very stiff brown and green gravelly clay w/ some fine to coarse sand.	A-7-6(5)	
12			10.0'	12 14 16 18	11" RECOVERY Wet very stiff brown and green fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(6)	
15			12.0'	4 7 10 11	19" RECOVERY Wet very stiff brown clayey fine to coarse sandy silt, trace of gravel.	A-5(0)	Cemented sands.
			14.0'	8 10 12 14	21" RECOVERY Wet medium dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	Cemented sands.
			16.0'		21" RECOVERY End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Clayey sand



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/19/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-063

Contract: 25-113-01

Boring Location: Sta. 667+00, C.L.

Boring Surface Elev.: + 31.44'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 18.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/11/09		6.0	6.0	5.6	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	20.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/11/09	1	0.0'	2 17 13 8	Moist very stiff brown fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
			2.0'		6" RECOVERY		
3		2	2.0'	1 3 8 8	Moist medium dense brown silty fine sand and gravel w/ some coarse sand.	A-2-4(0)	
			4.0'		7" RECOVERY		
		3	4.0'	1 3 4 5	Moist loose brown gravel and coarse sand w/ some fine sand, trace of silt.	A-1-a	
6			6.0'		4" RECOVERY		
		4	6.0'	3 5 7 8	Moist medium dense brown coarse sand and gravel w/ some fine sand, trace of silt.	A-1-b	
			8.0'		20" RECOVERY		
9		5	8.0'	4 5 8 8	Wet medium dense brown fine to coarse sand, trace of silt and gravel.	A-3	
			10.0'		24" RECOVERY		
		6	10.0'	10 12 16 16	Wet medium dense brown fine to coarse sand, trace of silt and gravel.	A-3	
12			12.0'		19" RECOVERY		
		7	12.0'	6 9 11 14	Wet medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			14.0'		10" RECOVERY		
15		8	14.0'	4 7 12 9	Wet medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	Cemented sands.
			16.0'		14" RECOVERY		
		9	16.0'	9 10 12	Wet medium dense brown fine sand w/ some	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-063

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	16	coarse sand and silt.		
			18.0'		18" RECOVERY		
		10	18.0'	6 7 9	Wet medium dense brown fine to coarse sand w/ some silt.	A-2-4(0)	
			20.0'		21" RECOVERY		
21					End of Boring		
24							
27							
30							
33							
36							
39							
42							
45							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded gravel



Poorly graded sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/11/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-064

Contract: 25-113-01

Boring Location: Sta. 670+00, C.L.

Boring Surface Elev.: +39.8'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 18.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/11/09		16.0	16.0	14.0	

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:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/11/09	1	0.5'	4 4 5	Moist loose orange-yellow clayey gravel and coarse sand w/ some fine sand. 16" RECOVERY	A-2-4(0)	Forest Duff - 3".
3		2	2.0'	7 5 3 2	Moist loose orange-yellow coarse sand and gravel w/ some fine sand and silt. 12" RECOVERY	A-1-b	
		3	4.0'	3 2 2 2	Moist very loose orange coarse to fine sand w/ some silt, trace of gravel. 13" RECOVERY	A-1-b	
6		4	6.0'	4 2 3 3	Moist loose orange coarse to fine sand, trace of silt and gravel. 20" RECOVERY	A-1-b	
		5	8.0'	3 2 3 3	Moist loose orange coarse sand w/ some fine sand, trace of silt and gravel. 20" RECOVERY	A-1-b	
		6	10.0'	2 2 3 4	Moist loose orange coarse to fine sand, trace of silt and gravel. 19" RECOVERY	A-1-b	
12		7	12.0'	1 2 2 4	Wet very loose orange coarse to fine sand, trace of silt and gravel. 19" RECOVERY	A-3	
		8	14.0'	1 2 1 2	Wet very loose orange coarse to fine sand, trace of silt and gravel. 21" RECOVERY	A-1-b	
15		9	16.0'	1 1 3 4	Wet very loose orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-064

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		24" RECOVERY		
		10	18.0'	3 4 5 6	Wet loose orange coarse to fine sand, trace of silt and gravel.	A-1-b	
			20.0'		22" RECOVERY		
21					End of Boring		
24							
27							
30							
33							
36							
39							
42							
45							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/11/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-065

Contract: 25-113-01

Boring Location: Sta. 741+00, C.L.

Boring Surface Elev.: + 16.7'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 26.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/20/09		10.0	10.0	9.9	

Pay Quantities:
2 1/2 in. Dia. Dry Sample Boring: 26.0 Ft.;
No. of 2 in. Dia. Shelby Tubes: ;
2 1/2 in. Dia. Contin. Sample Boring: Ft.;
Dia. U-Sample Boring: Ft.
No. of U-Samples: ;
Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: G. Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/20/09	1	1.0'	10 9	Moist dense orange fine to coarse sand w/ some gravel and silt.	A-2-4(0)	Topsoil - 9"; fill material.
		2	2.0'	7 8 11 17	12" RECOVERY Moist medium dense orange coarse to fine sand w/ some gravel and silt.	A-1-b	Fill material.
3		3	4.0'	11 11 20 29	20" RECOVERY Moist dense orange fine to coarse sand and gravel w/ some silt.	A-1-b	Fill material.
6		4	6.0'	38 31 40 30	11" RECOVERY Moist very dense brown coarse sand w/ some fine sand, silt, and gravel.	A-1-b	Fill material.
9		5	8.0'	7 9 6 7	18" RECOVERY Wet medium dense orange coarse to fine sand w/ some gravel and silt.	A-1-b	
		6	10.0'	3 4	16" RECOVERY Wet loose light brown coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
		6A	11.0'	4 5	10" RECOVERY Wet loose orange fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
12		7	12.0'	1 2 2 2	10" RECOVERY Saturated very loose orange fine sand w/ some coarse sand, trace of silt.	A-3	
15		8	14.0'	1 2 2 3	16" RECOVERY Saturated very loose orange fine sand w/ some coarse sand, trace of silt.	A-3	
		9	16.0'	3 3 3 4	19" RECOVERY Saturated loose orange fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R1-065

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			18.0'		18" RECOVERY		
		10	18.0'	4 2 3 4	Saturated loose orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
			20.0'		17" RECOVERY		
21		11	20.0'	1 1 2 2	Saturated very loose orange fine sand w/ some silt and coarse sand.	A-2-4(0)	
			22.0'		13" RECOVERY		
		12	22.0'	1 1 2 3	Saturated very loose orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
24			24.0'		19" RECOVERY		
		13	24.0'	10 15 17 19	Saturated dense brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			26.0'		18" RECOVERY		
27					End of Boring		
					DRAFT		
30					NOT FOR BIDDING		
					AUGUST 2015		
33							
36							
39							
42							
45							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/20/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: R1-066

Contract: 25-113-01

Boring Location: Sta. 744+50, C.L.

Boring Surface Elev.: + 16.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 26.0

Water Level Readings

Date
1/23/09

Time

Depth of Hole
14.0

Depth of Casing
14.0

Depth of Water
12.1

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 26.0

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;

Ft.;

Dia. U-Sample Boring:

No. of U-Samples:

Core Drilling in Rock:

Ft.

Ft.

Boring Contractor: Walton Corporation

Driller: G. Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/23/09	1	1.0'	8 8	Moist medium dense orange coarse to fine sand w/ some silt, trace of gravel.	A-1-b	Topsoil - 10", fill material.
		2	2.0'	18 19 16 15	8" RECOVERY Moist dense orange fine to coarse sand w/ some silt and gravel.	A-2-4(0)	Fill material.
3			4.0'		18" RECOVERY		
		3	4.0'	5 13 15 18	Moist medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	Fill material.
6			6.0'		17" RECOVERY		
		4	6.0'	22 18 19 20	Wet dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	Fill material.
			8.0'		20" RECOVERY		
9		5	8.0'	11 23 24 27	Wet dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	Fill material.
			10.0'		20" RECOVERY		
		6	10.0'	31 34 31 39	Wet very dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	Fill material.
12			12.0'		21" RECOVERY		
		7	12.0'	15 20 25 27	Wet dense light brown coarse sand w/ some fine sand, gravel, and silt.	A-1-b	
			14.0'		21" RECOVERY		
15		8	14.0'	9 15 21 27	Wet dense light brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			16.0'		20" RECOVERY		
		9	16.0'	11 24 23 18	Wet dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R1-066

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		10	18.0' 18.0'	W/H 2 5 4	12" RECOVERY Wet loose light brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
21		11	20.0' 20.0'	1 3 8 8	12" RECOVERY Wet medium dense light brown fine to coarse sand w/ some silt and gravel.	A-1-b	
		12	22.0' 22.0'	1 2 3 3	16" RECOVERY No Sample Recovery		
24		13	24.0' 24.0'	6 15 25 17	0" RECOVERY Saturated dense dark gray fine sand and gravel w/ some coarse sand, trace of silt.	A-3	
			26.0'		10" RECOVERY End of Boring		
27							
30							
33							
36							
39							
42							
45							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/23/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1

Boring No.: R1-067

Contract: 25-113-01

Boring Location: Sta. 596+00, C.L.

Boring Surface Elev.: + 66.3

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split-Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4"
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
6/29/2009

Time

Depth of Hole
10.0'

Depth of Casing
8.0'

Depth of Water
8.0'

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 40.0
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: Jason Truver

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	6/29/09	1	0.5'	2 3 3	Moist firm brown clayey silt w/trace of fine to coarse sand.	A-6(9)	Cultivated Soil - 8".
			2.0'		8" RECOVERY		
3		2	2.0'	8 7 9 14	Moist medium dense brown silty fine to coarse sand w/some gravel.	A-2-4(0)	
			4.0'		17" RECOVERY		
		3	4.0'	7 11 10 13	Moist medium dense tan coarse sand w/some fine sand and silt, trace of gravel.	A-1-b	
6			6.0'		17" RECOVERY		
		4	6.0'	8 9 9 11	Moist medium dense tan coarse to fine sand w/some silt, trace of gravel.	A-1-b	
			8.0'		20" RECOVERY		
9		5	8.0'	5 5 5 6	Moist loose tan coarse to fine sand w/some silt, trace of gravel.	A-1-b	
			10.0'		18" RECOVERY		
		6	10.0'	4 6 4 6	Wet loose tan coarse sand w/some fine sand, silt and gravel.	A-1-b	
12			12.0'		15" RECOVERY		
		7	12.0'	1 4 6 7	Wet loose tan coarse to fine sand w/some gravel and silt.	A-1-b	
			14.0'		12" RECOVERY		
15		8	14.0'	4 6 8 8	No Sieve Analysis - Indication of wet medium dense tan silty sand w/ some gravel.		Mud Rotary @ 14.0'.
			16.0'		5" RECOVERY		
		9	16.0'	10 6 7 8	No Sieve Analysis - Indication of wet medium dense tan sand w/some silt and gravel.		

Remarks: GTA Inspector - T. Kane

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1
Contract: 25-113-01

Boring No.: R1-067

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		2" RECOVERY		
		10	18.0'	4 2 2 6	Wet very loose brown coarse to fine sand w/some gravel, trace of silt.	A-1-b	
			20.0'		8" RECOVERY		
21							
24		11	23.0'	5 5 5 8	Wet stiff greenish brown fine sandy clay w/some gravel, trace of coarse sand.	A-6(2)	
			25.0'		17" RECOVERY		
27							
		12	28.0'	4 8 11 12	Wet medium dense greenish brown fine sand w/some silt, trace of gravel and coarse sand.	A-2-4(0)	
30			30.0'		22" RECOVERY		
33							
		13	33.0'	3 5 6 7	Wet stiff green fine sandy silt w/some coarse sand, trace of gravel.	A-4(0)	Glauconit
			35.0'		21" RECOVERY		
36							
39		14	38.0'	5 7 10 11	Wet medium dense green fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	Glauconit
			40.0'		22" RECOVERY		
					End of Boring		
42							
45							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/29/2009 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1

Boring No.: R1-068

Contract: 25-113-01

Boring Location: Sta. 688+00, C.L.

Boring Surface Elev.: + 65.19

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split-Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4"
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 39.0

Water Level Readings

Date
6/29/2009

Time

Depth of Hole
10.0'

Depth of Casing
8.0'

Depth of Water
6.3'

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 41.0
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: Gary Truver

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	6/29/09	1	0.0'	4 5 5 6	Moist stiff orange fine sandy silt w/some coarse sand, clay and gravel.	A-4(0)	Forest Duff - 2"
			2.0'		15" RECOVERY		
3		2	2.0'	5 4 6 6	Moist loose orange silty fine sand w/trace of coarse sand.	A-2-4(0)	
			4.0'		20" RECOVERY		
		3	4.0'	2 2 6 8	Moist to wet loose orange silty fine sand and gravel w/trace of coarse sand.	A-2-4(0)	
6			6.0'		8" RECOVERY		
		4	6.0'	8 7 10 9	Wet medium dense orange coarse sand w/some gravel and silt, trace of fine sand.	A-1-b	
			8.0'		16" RECOVERY		
9		5	8.0'	2 19 6 6	Wet medium dense orange coarse to fine sand w/some gravel and silt.	A-1-b	2" clay lens @ 9.5'.
			10.0'		17" RECOVERY		
		6	10.0'	5 7 9 11	Wet medium dense orange coarse to fine sand w/some gravel, trace of silt.	A-1-b	
12			12.0'		15" RECOVERY		
		7	12.0'	3 5 7 3	Wet medium dense orange fine to coarse sand w/some gravel and silt.	A-1-b	
			14.0'		16" RECOVERY		
15		8	14.0'	2 1 6 8	Wet loose orange silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			16.0'		18" RECOVERY		
		9	16.0'	2 5 5	Wet loose orange silty coarse to fine sand w/trace of gravel.	A-1-b	

Remarks: GTA Inspector - D. Zmijewski

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt



Silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/29/2009 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: R1-100

Contract: 28-113-01

Boring Location: Sta. 24+00.0' C.L.

Boring Surface Elev.: + 72.68

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 10.0

Water Level Readings

Date
7/20/10

Time

Depth of Hole
10.0

Depth of Casing
8.0

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 10.0

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/20/10	1	0.5'	4 5	Wet stiff brown clayey silt w/some fine to coarse sand, trace fine gravel.	A-4(4)	Topsoil - 7".
			2.0'		13" RECOVERY		
2.6		2	2.0'	6 5 4 4	Wet stiff brown fine sandy clay w/some silt and coarse sand, trace fine gravel.	A-7-6(10)	
			4.0'		19" RECOVERY		
		3	4.0'	3 6 8 13	Wet stiff grayish orange fine sandy clay w/ some silt and coarse sand, trace fine gravel.	A-6(1)	
5.2			6.0'		22" RECOVERY		
		4	6.0'	14 15 24 20	Wet dense grayish orange clayey fine gravelly fine sand w/some coarse sand and silt.	A-2-4(0)	
7.8			8.0'		21" RECOVERY		
		5	8.0'	13 14 18 20	Saturated hard orange silty clay w/some fine sand, trace coarse sand and fine gravel.	A-6(9)	
			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



Low plasticity
clay



High plasticity
clay



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

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.: R1-101

Contract: 28-113-01

Boring Location: Sta. 30+00.0' C.L.

Boring Surface Elev.: +72.00

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0
To:
To: 20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/16/10		20.0	18.0	16.8	

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:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: B. Munyan

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/16/10	1	0.5'	3 4 6	Wet firm brown clayey silt w/some fine gravel, trace fine to coarse sand. 16" RECOVERY	A-4(7)	Topsoil - 8".
		2	2.0'	8 12 12 15	Wet very stiff brown silty clay w/some fine sand, trace coarse sand and fine gravel. 19" RECOVERY	A-6(7)	
3.6		3	4.0'	4 7 10 14	Wet very stiff brown clayey fine sandy silt w/ trace fine gravel and coarse sand. 22" RECOVERY	A-4(1)	
		4	6.0'	18 16 14 23	Wet very stiff brown clayey fine sandy silt w/ trace coarse sand and fine gravel. 24" RECOVERY	A-4(0)	
7.2		5	8.0'	13 20 13 8	Wet dense brown clayey coarse sandy fine gravel w/some silt and fine sand. 21" RECOVERY	A-2-4(0)	
		6	10.0'	15 17 23 20	Saturated hard brown silty clay w/some fine sand, trace coarse sand and fine gravel. 21" RECOVERY	A-7-5(17)	
10.8		7	12.0'	6 11 12 15	Saturated medium dense orange clayey fine sand w/some coarse sand, fine gravel and silt. 20" RECOVERY	A-2-5(0)	
		8	14.0'	8 7 7 7	Saturated medium dense orange silty fine gravelly fine to coarse sand w/some clay. 14" RECOVERY	A-2-4(0)	
14.4		9	16.0'	6 10 15 12	Saturated medium dense orangish brown clayey fine gravel and coarse sand w/some fine sand and silt. 22" RECOVERY	A-2-7(0)	
18		10	18.0'	15 10 13 12	Saturated medium dense orangish brown silty coarse to fine sand w/some fine gravel. 21" RECOVERY	A-1-b	
			20.0'		End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Poorly graded clayey
silty sand



Silty sand



Elastic silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

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.: R1-102

Contract: 28-113-01

Boring Location: Sta. 35+00.0' C.L.

Boring Surface Elev.: + 65.00

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 30.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/19/10		30.0	28.0	12.8	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	30.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/19/10	1	0.5'	5 13 30	Wet hard brown silt w/trace fine to coarse sand and fine gravel. 15" RECOVERY	A-4(0)	Topsoil - 7".
		2	2.0'	15 17 25 44	Wet hard brown clayey fine gravelly silt w/ some coarse sand, trace fine sand. 8" RECOVERY	A-4(0)	
3.6		3	4.0'	13 13 10 9	Wet medium dense brown coarse sandy fine gravel w/some fine sand and silt. 18" RECOVERY	A-1-a	
		4	6.0'	20 15 12 13	Wet medium dense brown clayey coarse sand and fine gravel w/some fine sand, trace silt. 19" RECOVERY	A-2-7(1)	
7.2		5	8.0'	4 5 17 25	Saturated medium dense brown clayey coarse to fine sand w/some fine gravel and silt. 20" RECOVERY	A-2-7(0)	
		6	10.0'	19 27 19 8	Saturated dense brown clayey coarse to fine sand w/some fine gravel and silt. 21" RECOVERY	A-2-7(0)	
10.8		7	12.0'	5 7 15 27	Saturated medium dense brown clayey coarse to fine sand w/some fine gravel and silt. 22" RECOVERY	A-2-7(0)	
		8	14.0'	3 3 6 9	Saturated loose orange clayey fine to coarse sand w/some fine gravel and silt. 22" RECOVERY	A-2-7(0)	
14.4		9	16.0'	13 6 8 10	Saturated medium dense orangish brown clayey fine to coarse sand w/some silt, trace fine gravel. 15" RECOVERY	A-2-7(0)	
18		10	18.0'	6 6 6 13	Saturated medium dense brownish orange silty fine to coarse sand w/some fine gravel. 23" RECOVERY	A-2-4(0)	
			20.0'				

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1
Contract: 28-113-01

Boring No.: R1-102

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21.6							
25.2		11	24.0' 26.0'	3 4 8 9	Saturated medium dense orangish brown fine to coarse sand w/some silt, trace fine gravel. 17" RECOVERY	A-2-4(0)	
28.8		12	28.0' 30.0'	5 12 18 28	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace fine gravel. 19" RECOVERY	A-2-4(0)	
32.4					End of Boring		
36					<p style="font-size: 48px; color: orange; margin: 0;">DRAFT</p> <p style="font-size: 72px; color: orange; margin: 0;">NOT FOR BIDDING</p> <p style="font-size: 72px; color: orange; margin: 0;">AUGUST 2015</p>		
39.6							
43.2							
46.8							
50.4							
54							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Clayey sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on July 19, 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.: R1-103

Contract: 28-113-01

Boring Location: Sta. 40+00.0' C.L.

Boring Surface Elev.: + 59.00

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/19/10		20.0	18.0	11.9	

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:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/19/10	1	0.5'	7 5 9	Wet stiff brown fine sandy clay w/some coarse sand, fine gravel and silt. 15" RECOVERY	A-6(1)	Topsoil - 5".
		2	2.0'	5 6 7 8	Wet stiff brownish orange fine to coarse sandy clay w/some fine gravel and silt. 16" RECOVERY	A-6(1)	
3.6		3	4.0'	6 4 7 11	Saturated medium dense brownish orange clayey coarse to fine sand w/some fine gravel and silt. 18" RECOVERY	A-2-7(0)	
		4	6.0'	14 10 12 14	Saturated medium dense brownish orange clayey coarse to fine sand w/some fine gravel and silt. 15" RECOVERY	A-2-5(0)	
7.2		5	8.0'	9 6 4 4	Saturated loose orangish brown coarse to fine sand w/some silt, clay and fine gravel. 15" RECOVERY	A-1-b	
		6	10.0'	4 5 4 5	Saturated loose orangish brown fine to coarse sand w/some silt and fine gravel. 14" RECOVERY	A-2-4(0)	
10.8		7	12.0'	3 3 4 5	Saturated firm orangish brown clayey coarse to fine sandy silt w/trace fine gravel. 20" RECOVERY	A-5(1)	
		8	14.0'	4 4 4 4	Saturated loose orange silty fine to coarse sand w/trace fine gravel. 19" RECOVERY	A-2-4(0)	
14.4		9	16.0'	5 6 8 10	Saturated medium dense orange fine to coarse sand w/some silt, trace fine gravel. 19" RECOVERY	A-2-4(0)	
18		10	18.0'	8 11 12 11	Saturated medium dense orange fine to coarse sand w/some silt, trace fine gravel. 17" RECOVERY	A-2-4(0)	
			20.0'		End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on July 19, 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.: R1-069

Contract: 28-113-01

Boring Location: Sta. 745+00 O' C.L.

Boring Surface Elev.: + 77.66

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 10.0

Water Level Readings

Date
7/19/10

Time

Depth of Hole
10.0

Depth of Casing
8.0

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 10.0
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/19/10	1	0.5'	8 9 9	Wet very stiff brown clayey silt w/trace fine to coarse sand.	A-4(8)	Topsoil - 6".
			2.0'		17" RECOVERY		
2.6		2	2.0'	6 10 12 13	Wet very stiff brownish orange clayey silt w/trace fine to coarse sand and fine gravel.	A-4(6)	
			4.0'		18" RECOVERY		
		3	4.0'	8 9 9 8	Wet very stiff brownish orange fine sandy silt w/some coarse sand and clay, trace fine gravel.	A-4(0)	
5.2			6.0'		19" RECOVERY		
		4	6.0'	8 8 7 8	Wet stiff tannish orange clayey silt w/some fine to coarse sand.	A-4(4)	
7.8			8.0'		16" RECOVERY		
		5	8.0'	8 7 9 13	Wet very stiff tannish orange clayey fine to coarse sandy silt w/trace fine gravel.	A-4(2)	
			10.0'		18" RECOVERY		
10.4					End of Boring		
13							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Feruson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Low plasticity
clay



Silty low plasticity
clay

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on July 19, 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.: R1-070

Contract: 28-113-01

Boring Location: Sta. 752+00.0' C.L.

Boring Surface Elev.: + 70.18

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/19/10		20.0	18.0	17.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	20.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/19/10	1	0.5'	3 5	Wet stiff brown clayey silt w/trace fine to coarse sand and fine gravel. 15" RECOVERY	A-4(5)	Topsoil - 6".
		2	2.0'	6 8 10 12	Wet very stiff tan clayey silt w/trace fine to coarse sand. 16" RECOVERY	A-4(7)	
3.6		3	4.0'	3 7 12 17	Wet loose orangish brown clayey fine to coarse sand and fine gravel w/some silt. 20" RECOVERY	A-2-4(0)	
		4	6.0'	14 7 12 13	Saturated very stiff brownish red clayey coarse to fine sandy silt w/some fine gravel. 15" RECOVERY	A-5(1)	
7.2		5	8.0'	4 5 5 6	Saturated loose brownish red clayey coarse to fine sand w/some silt, trace fine gravel. 19" RECOVERY	A-2-5(0)	
		6	10.0'	10 7 8 9	Saturated medium dense brownish red clayey coarse to fine sand w/some silt and fine gravel. 17" RECOVERY	A-2-5(0)	
10.8		7	12.0'	3 4 8 8	Saturated medium dense brownish red silty coarse to fine sand w/trace fine gravel. 18" RECOVERY	A-2-4(0)	
14.4		8	14.0'	4 4 6	Saturated loose tannish orange clayey fine to coarse sand w/some silt, trace fine gravel. 14" RECOVERY	A-2-5(0)	
		8A	15.5'	6	Saturated medium dense reddish brown fine gravelly coarse to fine sand w/some silt. 6" RECOVERY	A-1-b	
		9	16.0'	6 5 6 9	Saturated medium dense tannish orange clayey fine to coarse sand w/some silt, trace fine gravel. 20" RECOVERY	A-2-7(0)	
18		10	18.0'	9 9 12 15	Saturated medium dense orange fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
			20.0'		Saturated medium dense orange fine to coarse sand w/some silt, trace fine gravel.		

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.: R1-070

Contract: 28-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21.6					19" RECOVERY End of Boring		
25.2							
28.8							
32.4							
36							
39.6							
43.2							
46.8							
50.4							
54							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols

 Silty low plasticity clay

 Low plasticity clay

 Poorly graded clayey silty sand

 Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on July 19, 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.: R1-071

Contract: 28-113-01

Boring Location: Sta. 755+00 O.C.L.

Boring Surface Elev.: + 76.21

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 10.0

Water Level Readings

Date
7/20/10

Time

Depth of Hole
10.0

Depth of Casing
8.0

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 10.0

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/20/10	1	0.5'	8 14 13	Moist very stiff brown clayey silt w/some fine gravel and fine to coarse sand.	A-4(4)	Topsoil - 7".
			2.0'		13" RECOVERY		
2.6		2	2.0'	9 12 12 9	Moist medium dense orangish brown clayey fine gravelly coarse sand w/some fine sand and silt.	A-2-4(0)	
			4.0'		16" RECOVERY		
		3	4.0'	4 4 8 9	Wet stiff brownish orange coarse sandy clay w/some silt and fine sand, trace fine gravel.	A-6(2)	
5.2			6.0'		21" RECOVERY		
		4	6.0'	12 9 7 7	Wet medium dense orangish brown fine to coarse sand w/some silt.	A-2-4(0)	
7.8			8.0'		18" RECOVERY		
		5	8.0'	7 7 8 14	Wet medium dense orangish tan coarse to fine sand w/some silt.	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



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

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.: R1-072

Contract: 28-113-01

Boring Location: Sta. 890+00 0' C.L.

Boring Surface Elev.: +20.52

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: 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:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/20/10	1	0.0'	7 8 10 8	Moist medium dense brown silty fine to coarse sand w/some fine gravel.	A-2-4(0)	Topsoil - 3".
2.6		2	2.0' 2.0'	8 9 11 10	14" RECOVERY Moist medium dense brown fine sand w/some silt and coarse sand, trace fine gravel.	A-2-4(0)	
5.2		3	4.0' 4.0'	10 10 8 9	16" RECOVERY Moist medium dense brown fine sand w/some coarse sand, trace silt.	A-3	
7.8		4	6.0' 6.0'	6 8 7 9	15" RECOVERY Wet medium dense brown silty fine sand w/ trace coarse sand.	A-2-4(0)	
10.4		5	8.0' 8.0'	6 6 7 6	18" RECOVERY Wet medium dense brown fine sand w/some silt, trace coarse sand.	A-2-4(0)	
13			10.0'		18" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

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.: R1-074

Contract: 28-113-01

Boring Location: Sta. 313+00.0' C.L.

Boring Surface Elev.: + 32.79

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 16.0

Water Level Readings

Date	Time	Depth of Hole	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:	Ft.;	No. of	U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:			Ft.

Boring Contractor: Walton Corporation

Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/16/10	1	0.5'	5 10 7	Moist medium dense brown silty coarse to fine sand w/trace fine gravel. 12" RECOVERY	A-2-4(0)	Topsoil - 4".
		2	2.0'	10 13 14 13	Moist very stiff brown silt w/some clay, coarse to fine sand and fine gravel. 20" RECOVERY	A-4(0)	
3.3		3	4.0'	4 10 12 13	Moist medium dense gray silty coarse to fine sand w/some fine gravel and clay. 18" RECOVERY	A-2-4(0)	
		4	6.0'	24 24 20 18	Moist dense tan coarse to fine sand w/some silt, trace fine gravel. 18" RECOVERY	A-2-4(0)	
6.6		5	8.0'	7 5 6 6	Moist medium dense brown fine to coarse sand and fine gravel w/some silt. 12" RECOVERY	A-1-b	
		6	10.0'	3 3 4 5	Wet loose brown coarse to fine sand w/some silt, trace fine gravel. 20" RECOVERY	A-1-b	
9.9		7	12.0'	3 2 2 3	Wet very loose brown coarse sand w/some fine sand and silt, trace fine gravel. 17" RECOVERY	A-1-b	
13.2		8	14.0'	3 4 4 6	Wet loose brown coarse sand w/some fine sand, trace silt and fine gravel. 16" RECOVERY	A-1-b	
16.5			16.0'		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

DRAFT
NOT FOR BIDDING
AUGUST 2015

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.: R1-075

Contract: 28-113-01

Boring Location: Sta. 907+00 20' Rt. C.L.

Boring Surface Elev.: + 33.92

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4 **Inches**
Hollow Stem Auger:

From Depth of: **To:**
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**
7/9/10 20.0 18.0 7.0

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: **Ft.;** **No. of U-Samples:** **Ft.**
2 1/2 in. Dia. Contin. Sample Boring: **Ft.;** **Core Drilling in Rock:** **Ft.**

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/9/10	1	0.5'	13 14 13	Moist very stiff brown clayey silt w/some fine sand, trace coarse sand and fine gravel. 10" RECOVERY	A-4(5)	Topsoil - 4".
		2	2.0'	11 9	Moist very stiff brown clayey silt w/some fine sand, trace coarse sand and fine gravel. 10" RECOVERY	A-4(2)	
3.6		2A	3.0'	9 10	8" RECOVERY	A-2-4(0)	
		3	4.0'	7 8 8 6	Moist medium dense brown silty fine sand w/some coarse sand, trace fine gravel. 10" RECOVERY	A-2-4(0)	
		4	6.0'	4 5 6 7	Wet medium dense brown fine to coarse sand w/some silt, trace fine gravel. 16" RECOVERY	A-2-4(0)	
7.2		5	8.0'	3 3 4 4	Wet medium dense orange fine sand w/some silt and coarse sand, trace fine gravel. 14" RECOVERY	A-2-4(0)	
		6	10.0'	4 5 8 7	Wet loose orange fine sand w/some coarse sand and silt, trace fine gravel. 18" RECOVERY	A-2-4(0)	
10.8		7	12.0'	3 3 3 3	Wet medium dense orange fine to coarse sand w/some silt, trace fine gravel. 18" RECOVERY	A-2-4(0)	
		8	14.0'	4 12 11 13	Wet loose orange fine to coarse sand w/some silt, trace fine gravel. 14" RECOVERY	A-2-4(0)	
14.4		9	16.0'	5 10 15 16	Wet medium dense orange fine sand w/some fine gravel, coarse sand and silt. 16" RECOVERY	A-2-4(0)	
		10	18.0'	11 26 24 25	Wet medium dense brown fine sand w/some silt, trace fine gravel and coarse sand. 18" RECOVERY	A-2-4(0)	
18			20.0'		Wet very dense brown fine to coarse sand w/some fine gravel, trace silt. 19" RECOVERY	A-1-b	
					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on July 9, 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.: R1-076

Contract: 28-113-01

Boring Location: Sta 923+00 20' Lt. C.L.

Boring Surface Elev.: + 53.55

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/12/10		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:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/12/10	1	1.0'	7 10	Moist very stiff brown clayey silt w/some coarse to fine sand and fine gravel.	A-4(3)	Asphalt - 4". Stone - 8".
		2	2.0'	7 5 5 6	8" RECOVERY Wet stiff brown silty clay w/trace fine to coarse sand and fine gravel.	A-6(13)	
3.6		3	4.0'	13 5 6 7	17" RECOVERY Wet stiff brown fine sandy silt w/some coarse sand and clay, trace fine gravel.	A-4(0)	
		4	6.0'	9 8 7 8	13" RECOVERY Wet stiff gray fine sandy silt w/some coarse sand and clay.	A-4(0)	
7.2		5	8.0'	9 11 7 8	15" RECOVERY Wet medium dense orange silty fine sand w/trace coarse sand.	A-2-4(0)	
		6	10.0'	6 5 5 7	14" RECOVERY Wet stiff tan fine sandy silt w/trace coarse sand.	A-4(0)	
10.8		7	12.0'	5 6 8 7	19" RECOVERY Wet medium dense tan silty fine sand w/trace coarse sand and fine gravel.	A-2-4(0)	
		8	14.0'	4 5 6 5	6" RECOVERY Wet medium dense tan fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
14.4		9	16.0'	4 6 10 11	19" RECOVERY Wet medium dense orange coarse to fine sand w/some silt, trace fine gravel.	A-2-4(0)	
18		10	18.0'	9 9 11 15	20" RECOVERY Wet medium dense brown fine gravelly coarse sand w/trace silt and fine sand.	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



Low plasticity
clay



Poorly graded clayey
silty sand



Silty low plasticity
clay



Silty sand



Silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on July 12, 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.: R1-077

Contract: 28-113-01

Boring Location: Sta. 1000+00.0' C.L.

Boring Surface Elev.: + 21.20

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	
	Hollow Stem Auger:		From Depth of:		To:	10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/19/10		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:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/19/10	1	0.5'	6 7	Moist medium dense brown fine gravel w/ some coarse sand, trace fine sand and silt.	A-1-a	Topsoil - 4".
			2.0'		6" RECOVERY		
2.6		2	2.0'	4 5 6 6	Moist medium dense brown coarse to fine sand w/some fine gravel and silt.	A-1-b	
			4.0'		16" RECOVERY		
		3	4.0'	6 10 12 14	Moist medium dense brown coarse to fine sand w/some fine gravel, clay and silt.	A-2-4(0)	
5.2			6.0'		14" RECOVERY		
		4	6.0'	17 18 14 13	Moist dense brown coarse to fine sand w/trace fine gravel and silt.	A-1-b	
7.8			8.0'		20" RECOVERY		
		5	8.0'	13 11 10 9	Moist medium dense brown coarse to fine sand w/some silt and fine gravel.	A-1-b	
			10.0'		22" RECOVERY		
10.4					End of Boring		
13							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Well graded gravel
with silt



Silty sand



Poorly graded clayey
silty sand



Poorly graded sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on July 19, 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.: R1-078

Contract: 28-113-01

Boring Location: Sta. 1005+00.0' C.L.

Boring Surface Elev.: + 25.20

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 10.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/19/10		10.0	8.0	Dry	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 Dia. U-Sample Boring: Ft.
 U-Samples: ;
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/19/10	1	0.5'	8 8 5	Moist medium dense brown coarse sandy fine gravel w/some fine sand, trace silt.	A-1-a	Topsoil - 6".
2.6		2	2.0'	7 3 1 5	6" RECOVERY No Sample Recovery		
5.2		3	4.0'	5 8 15 17	0" RECOVERY Moist medium dense brown coarse to fine sand w/some fine gravel and silt.	A-1-b	
7.8		4	6.0'	17 13 12 17	15" RECOVERY Moist medium dense brown fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
10.4		5	8.0'	17 25 50/4"	18" RECOVERY Moist very dense brown fine to coarse sand and fine gravel w/some silt.	A-1-b	
13			10.0'		12" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded gravel
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on July 19, 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.: R1-079

Contract: 28-113-01

Boring Location: Sta. 1010+00.0' C.L.

Boring Surface Elev.: + 26.64

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 10.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 7/19/10	Time	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:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/19/10	1	1.0'	5 3	Moist medium dense brown silty coarse to fine sand w/trace fine gravel and clay. 6" RECOVERY	A-2-4(0)	Topsoil - 10".
2.6		2	2.0'	4 5 4 4	Moist loose brown coarse to fine sand w/some silt, trace fine gravel. 16" RECOVERY	A-1-b	
		3	4.0'	4 4 3 4	Moist loose brown fine to coarse sand w/some silt, trace fine gravel. 14" RECOVERY	A-2-4(0)	
5.2		4	6.0'	4 5 5 6	Moist loose brown fine sand w/some coarse sand and silt, trace fine gravel. 20" RECOVERY	A-2-4(0)	
7.8		5	8.0'	4 5 5 5	Moist loose brown fine to coarse sand w/some silt, trace fine gravel. 22" RECOVERY	A-2-4(0)	
10.4			10.0'		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



Poorly graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on July 19, 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.: R1-080

Contract: 28-113-01

Boring Location: Sta. 1013+00.0' C.L.

Boring Surface Elev.: +24.62

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: 10.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 7/19/10	Time	10.0	8.0	6.5	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 Dia. U-Sample Boring: Ft.
 U-Samples: ;
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/19/10	1	0.5'	2 9 13 14	No Sieve Analysis - Indication of wet medium dense brown silty sand.		Topsoil - 4".
2.6		2	2.0'	8 10 9 10	2" RECOVERY No Sample Recovery		
5.2		3	4.0'	5 4 4 5	0" RECOVERY Wet loose orange coarse sand w/some fine sand and silt, trace fine gravel.	A-1-b	
7.8		4	6.0'	4 5 5 7	16" RECOVERY Wet loose brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	
10.4		5	8.0'	7 6 7 9	20" RECOVERY Wet medium dense brown fine to coarse sand w/trace silt.	A-3	
13			10.0'		16" 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

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on July 19, 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:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0
To:
To: 20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
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:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/27/10	1	0.5'	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'	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'	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'	5 4 6 7	Wet stiff tan fine sandy silt w/some coarse sand, fine gravel and clay. 19" RECOVERY	A-4(0)	
		5	8.0'	4 6 6 10	Wet medium dense tan coarse sand w/some fine sand and silt, trace fine gravel. 17" RECOVERY	A-1-b	
10.8							
14.4		6	14.0'	4 5 8 8	Wet medium dense tan coarse to fine sand w/some silt, trace fine gravel. 18" RECOVERY	A-1-b	
			16.0'				
18		7	18.0'	5 7 6 5	Wet medium dense tan fine to coarse sand w/some silt, trace fine gravel. 17" RECOVERY	A-2-4(0)	
			20.0'				
					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

DRAFT
NOT FOR BIDDING
AUGUST 2015

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.

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

DRAFT
NOT FOR BIDDING
AUGUST 2015

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:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 20.0

Water Level Readings

Date
7/27/10

Time

Depth of Hole
20.0

Depth of Casing
18.0

Depth of Water
11.0

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 20.0

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/27/10	1	1.0'	4 7	Moist firm brown coarse to fine sandy silt w/ trace fine gravel and clay.	A-4(0)	Topsoil - 10".
		2	2.0'	4 4 4	10" RECOVERY Moist loose tan coarse sand w/some fine sand and silt, trace fine gravel.	A-1-b	
3.6		3	4.0' 4.0'	4 6 5 7	17" RECOVERY Moist medium dense tan coarse sand w/some fine sand and silt, trace fine gravel.	A-1-b	
		4	6.0'	8 6 7 6	18" RECOVERY Moist medium dense tan coarse to fine sand w/some silt, trace fine gravel.	A-1-b	
7.2		5	8.0' 8.0'	4 4 5 5	18" RECOVERY Saturated loose tan coarse to fine sand w/trace silt and fine gravel.	A-1-b	
			10.0'		15" RECOVERY		
10.8							
		6	14.0' 16.0'	4 6 6 8	Saturated medium dense brown coarse to fine sand w/some fine gravel and silt.	A-1-b	
					12" RECOVERY		
14.4							
		7	18.0' 20.0'	10 12 5 5	Saturated medium dense brown coarse to fine sandy fine gravel w/some silt.	A-1-b	
					3" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 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:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	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	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

DRAFT
NOT FOR BIDDING
AUGUST 2015

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:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 10.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
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:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/27/10	1	1.0'	6 3	Moist stiff brown fine to coarse sandy silt w/ some clay. 12" RECOVERY	A-4(0)	Topsoil - 9".
2.6		2	2.0'	3 6 7 10	Wet stiff brown silt w/some fine sand, trace coarse sand and clay. 15" RECOVERY	A-4(2)	
		3	4.0'	7 8 12 14	Wet very stiff brown silt w/trace fine to coarse sand and clay. 14" RECOVERY	A-4(2)	
5.2		4	6.0'	7 12 13	Wet very stiff brown silt w/some fine sand, trace clay. 20" RECOVERY	A-4(1)	
7.8		5	8.0'	3 7 8 10	Wet stiff brown silt w/some fine sand and clay. 18" RECOVERY	A-4(3)	
10.4			10.0'		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

DRAFT
NOT FOR BIDDING
AUGUST 2015

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.

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

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:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	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	2.0'	9 11 9 11	10" RECOVERY Moist very stiff orange coarse sandy fine gravelly silt w/some fine sand and clay.	A-4(0)	
3.4		3	4.0'	5 8 8 6	14" RECOVERY Moist medium dense orange fine gravelly coarse sand w/some silt, trace fine sand.	A-1-b	
		4	6.0'	5 6 7 6	12" RECOVERY Moist medium dense orange silty fine sand w/some coarse sand and fine gravel.	A-2-4(0)	
6.8		5	8.0'	4 6 7 7	21" RECOVERY Moist medium dense brown silty coarse to fine sand w/trace fine gravel.	A-1-b	
			10.0'		18" RECOVERY		
10.2							
		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		
13.6							
		7	19.0'	3 4 7	Wet medium dense tan fine sand w/some silt,	A-2-4(0)	
17							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1
Contract: 28-113-01

Boring No.: R1-090

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'	4 4 5 6	Wet loose tan coarse to fine sand w/some silt, trace fine gravel.	A-1-b	
			25.0'		17" RECOVERY		
					End of Boring		
27.2							
30.6							
34							
37.4							
40.8							
44.2							
47.6							
51							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded clayey
silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 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:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 25.0

Water Level Readings

Date	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:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Jason Truver

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	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		
3.4		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)	
			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
Contract: 28-113-01

Boring No.: R1-091

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
20.4			20.0'	4	silt, trace fine gravel. 19" RECOVERY		
23.8		8	23.0'	7 23 26 18	Wet dense brown coarse sandy fine gravel w/ some fine sand and silt.	A-1-b	
			25.0'		14" RECOVERY		
27.2					End of Boring		
30.6							
34							
37.4							
40.8							
44.2							
47.6							
51							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

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:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 10.0

Water Level Readings
Date 7/27/10
Time

Time

Depth of Hole
10.0

Depth of Casing
8.0

Depth of Water
5.5

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 10.0

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	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

DRAFT
NOT FOR BIDDING
AUGUST 2015

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:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 10.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/26/10		10.0	8.0	4.0	

Pay Quantities:
2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
No. of 2 in. Dia. Shelby Tubes: ;
2 1/2 in. Dia. Contin. Sample Boring: Ft.;
Dia. U-Sample Boring: Ft.
No. of U-Samples:
Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: 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. 8" RECOVERY	A-2-4(0)	Asphalt - 8".
2.6		2	2.0'	7 5 6 7	Wet stiff gray silt w/some clay, trace fine to coarse sand and fine gravel. 20" RECOVERY	A-4(2)	
		3	4.0'	5 3 3 3	Wet loose gray silty coarse to fine sand and fine gravel. 17" RECOVERY	A-1-b	
5.2		4	6.0'	4 6 16 17	Wet medium dense orange coarse to fine sand w/some fine gravel and silt. 18" RECOVERY	A-1-b	
7.8		5	8.0'	9 13 16 17	Wet medium dense orangish brown coarse to fine sand w/some silt, trace fine gravel. 20" RECOVERY	A-1-b	
10.4			10.0'		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

DRAFT
NOT FOR BIDDING
AUGUST 2015

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:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
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:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/21/10	1	0.5'	3 5 7	Moist loose brown coarse sand w/some fine gravel and silt, trace fine sand. 16" RECOVERY	A-1-b	Topsoil - 5".
3.6		2	2.0'	6 3 2 2	Moist loose brown fine gravelly coarse sandy w/some silt and fine sand. 22" RECOVERY	A-1-b	
		3	4.0'	1 3 3 5	Saturated loose tan fine gravelly coarse to fine sand w/some silt. 15" RECOVERY	A-1-b	
7.2		4	6.0'	9 7 13 6	Saturated medium dense brownish orange coarse to fine sand w/some silt and fine gravel. 21" RECOVERY	A-1-b	
		5	8.0'	3 5 7 8	Saturated medium dense brownish orange coarse to fine sand w/some silt, trace fine gravel. 17" RECOVERY	A-1-b	
10.8		6	10.0'	6 8 5 4	Saturated medium dense brownish orange fine to coarse sand w/some silt and fine gravel. 19" RECOVERY	A-2-4(0)	
		7	12.0'	2 2 3 3	Saturated loose orange silty fine to coarse sand w/trace fine gravel. 15" RECOVERY	A-2-4(0)	
14.4		8	14.0'	2 3 4 6	Saturated loose orange fine to coarse sand w/some silt, trace fine gravel. 20" RECOVERY	A-2-4(0)	
		9	16.0'	6 5 5 9	Saturated loose orange fine to coarse sand w/some silt, trace fine gravel. 16" RECOVERY	A-2-4(0)	
18		10	18.0'	6 8 7 8	Saturated medium dense brownish orange fine to coarse sand w/some silt, trace fine gravel. 18" RECOVERY	A-2-4(0)	
			20.0'		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

DRAFT
NOT FOR BIDDING
AUGUST 2015

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:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
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:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/16/10	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		
3.6		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)	
			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		
7.2		4	6.0'	14 15 16 17	Moist dense brown silty coarse sand w/some fine sand, trace fine gravel.	A-1-b	
			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'	7 19	Moist medium dense brown clayey coarse sand w/some fine sand, fine gravel and silt.	A-2-4(0)	
			11.0'		10" RECOVERY		
		6A	11.0'	50		A-2-4(0)	
			12.0'				
		7	12.0'	5 14 7 7	Moist dense gray silty coarse sand and fine gravel w/some fine sand, trace clay.	A-4(0)	
			14.0'		6" RECOVERY		
14.4		8	14.0'	2 4 2 4	Wet very stiff gray fine sandy silt w/some coarse sand, clay and fine gravel.	A-4(0)	
			16.0'		18" RECOVERY		
		9	16.0'	5 10 16 19	Wet firm gray clayey coarse to fine sandy silt w/some fine gravel.	A-2-4(0)	
			18.0'		15" RECOVERY		
18		10	18.0'	9 12 11 10	Wet medium dense brownish gray clayey fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
			20.0'		18" RECOVERY		
					Wet medium dense brown fine to coarse sand w/some silt, trace fine gravel.	A-2-4(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							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 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:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/16/10		20.0	18.0	13.8	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 20.0

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;

Ft.;

Dia. U-Sample Boring:

No. of:

Core Drilling in Rock:

U-Samples:

Ft.

Ft.

Boring Contractor: Walton Corporation

Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/16/10	1	0.5'	5 7 8	Moist medium dense brown silty coarse to fine sand w/trace fine gravel. 15" RECOVERY	A-2-4(0)	Topsoil - 4".
3.6		2	2.0'	10 16 17 18	Moist dense brown clayey coarse sand w/ some fine sand, fine gravel and silt. 20" RECOVERY	A-2-4(0)	
		3	4.0'	10 14 15 9	Moist medium dense brown silty coarse to fine sand w/trace fine gravel. 18" RECOVERY	A-2-4(0)	
7.2		4	6.0'	9 19 20 24	Moist dense brown coarse to fine sand w/ some silt and clay, trace fine gravel. 21" RECOVERY	A-2-4(0)	
		5	8.0'	14 18 20 17	Moist dense brown fine to coarse sand w/ some silt, trace fine gravel. 19" RECOVERY	A-2-4(0)	
10.8		6	10.0'	10 10 10 5	Moist medium dense orange fine sand w/some silt, trace coarse sand and fine gravel. 20" RECOVERY	A-2-4(0)	
		7	12.0'	4 7 10 10	Wet medium dense brown coarse to fine sand w/some silt, trace fine gravel. 16" RECOVERY	A-1-b	
14.4		8	14.0'	4 5 6 5	Saturated medium dense brown coarse to dense sand w/some silt, trace fine gravel. 18" RECOVERY	A-1-b	
		9	16.0'	2 4 5 7	Saturated loose brown coarse to fine sand w/ some silt, trace fine gravel. 20" RECOVERY	A-1-b	
18		10	18.0'	2 2 5 3	Saturated loose brown coarse sand w/some fine sand, trace silt and fine gravel. 14" RECOVERY	A-1-b	
			20.0'		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

DRAFT
NOT FOR BIDDING
AUGUST 2015

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:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0 **To:** 30.0
To:

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
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	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
Contract: 28-113-01

Boring No.: R1-097

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21.6			21.0'	7	gravel. 20" RECOVERY		
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	
32.4					End of Boring		
36							
39.6							
43.2							
46.8							
50.4							
54							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

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.: R1-099

Contract: 28-113-01

Boring Location: Sta. 68+00.0' C.L.

Boring Surface Elev.: + 64.10

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 30.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/16/10		30.0	28.0	27.0	

Pay Quantities:
2 1/2 in. Dia. Dry Sample Boring: 30.0 Ft.;
No. of 2 in. Dia. Shelby Tubes: Ft.;
2 1/2 in. Dia. Contin. Sample Boring: Ft.;
Dia. U-Sample Boring: Ft.
U-Samples: Ft.
Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: B. Munyan

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/16/10	1	0.5'	3 4 5	Wet firm brown silty clay w/trace fine sand. 16" RECOVERY	A-6(14)	Topsoil - 8".
3.6		2	2.0'	4 8 8 8	Wet very stiff brown clayey silt w/trace fine to coarse sand. 19" RECOVERY	A-4(6)	
		3	4.0'	10 9 5 5	Wet stiff orangish brown fine to coarse sandy silt w/some clay. 22" RECOVERY	A-4(0)	
7.2		4	6.0'	10 8 12 13	Wet medium dense orange clayey fine sand w/some coarse sand and silt. 21" RECOVERY	A-2-4(0)	
		5	8.0'	7 13 15 10	Wet medium dense brown silty fine to coarse sand. 21" RECOVERY	A-2-4(0)	
10.8		6	10.0'	12 13 15 12	Wet medium dense brown coarse to fine sand w/some silt, trace fine gravel. 21" RECOVERY	A-1-b	
		7	12.0'	9 10 8 8	Wet very stiff brownish gray fine to coarse sandy clay w/some silt, trace fine gravel. 19" RECOVERY	A-6(2)	
14.4		8	14.0'	9 6 11 8	Wet medium dense brownish gray silty fine to coarse sand w/some fine gravel. 16" RECOVERY	A-2-4(0)	
		9	16.0'	10 8 9 9	Saturated medium dense brown clayey coarse to fine sand w/some fine gravel and silt. 16" RECOVERY	A-2-7(0)	
18		10	18.0'	15 11 15 9	Saturated medium dense dark brown coarse to fine sand w/some silt and fine gravel. 18" RECOVERY	A-1-b	
			20.0'				

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1
Contract: 28-113-01

Boring No.: R1-099

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21.6							
25.2		11	24.0' 26.0'	4 6 9 10	Saturated medium dense brown silty fine to coarse sand w/trace fine gravel. 24" RECOVERY	A-2-4(0)	
28.8		12	28.0' 30.0'	4 8 10 9	Saturated medium dense brown fine to coarse sand w/some silt, trace fine gravel. 21" RECOVERY	A-2-4(0)	
32.4					End of Boring		
36					<div style="font-size: 48px; color: orange; opacity: 0.5;">DRAFT</div> <div style="font-size: 72px; color: orange; opacity: 0.5;">NOT FOR BIDDING</div> <div style="font-size: 72px; color: orange; opacity: 0.5;">AUGUST 2015</div>		
39.6							
43.2							
46.8							
50.4							
54							

KEY TO SYMBOLS

Symbol Description

Strata symbols

	Low plasticity clay
	Silt
	Poorly graded clayey silty sand
	Silty sand
	Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

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: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-10-1

Contract: 25-113-01

Boring Location: Sta. 514+00, 250.00' Rt. C.L.

Boring Surface Elev.: + 53.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/25/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
4.9

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: J. Truver

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/25/09	1	0.5'	6 4 4	Moist firm brown fine sandy silt w/ some clay and coarse sand, trace of gravel. 15" RECOVERY	A-4(0)	Topsoil - 5".
3.5		2	2.0'	4 8 13 8	Moist medium dense brown gravel and coarse sand w/ some fine sand, trace of silt. 19" RECOVERY	A-1-a	
		3	4.0'	4 5 5 8	Moist loose brown coarse sand and gravel w/ some silt and fine sand. 6" RECOVERY	A-1-b	
7		4	6.0'	4 4 4 5	Wet loose brown coarse sand w/ some fine sand, silt, and gravel. 22" RECOVERY	A-1-b	
		5	8.0'	6 7 6 7	Wet medium dense brown coarse sand w/ some gravel, silt, and fine sand. 21" RECOVERY	A-1-b	
10.5		6	10.0'	4 8 8 13	Wet medium dense green and brown gravel w/ some coarse to fine sand and silt. 16" RECOVERY	A-1-a	
		7	12.0'	6 6 7 6	Saturated medium dense green and brown clayey fine to coarse sand, trace of gravel. 21" RECOVERY	A-2-4(0)	
14		8	14.0'	6 6 7 8	Saturated medium dense green and brown clayey fine to coarse sand w/ some gravel. 20" RECOVERY	A-2-4(0)	
17.5			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Poorly graded sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/25/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-1-1

Contract: 25-113-01

Boring Location: Sta. 462+00, 330' Rt. C.L.

Boring Surface Elev.: + 58.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/28/2009		10.0	8.0	7.2	

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:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/28/09	1	0.0'	4 5 6 4	Moist stiff brown silt w/some clay and fine to coarse sand.	A-4(2)	
			2.0'		22" RECOVERY		
		2	2.0'	4 5 7 10	Moist medium dense brown gravel w/some clay and coarse to fine sand.	A-1-b	
3.5			4.0'		15" RECOVERY		
		3	4.0'	8 4 3 3	Moist to wet loose brown silty fine to coarse sand w/some gravel.	A-2-4(0)	
			6.0'		16" RECOVERY		
		4	6.0'	4 3 4 6	Wet firm brown fine sandy clay w/some coarse sand.	A-7-6(4)	
7			8.0'		18" RECOVERY		
		5	8.0'	2 3 4 5	Wet firm green fine sandy clay w/some coarse sand, trace of gravel.	A-7-6(4)	
			10.0'		14" RECOVERY		
		6	10.0'	4 4 6 9	Wet stiff green fine sandy clay w/some coarse sand.	A-7-6(4)	
10.5			12.0'		18" RECOVERY		
		7	12.0'	3 5 7 8	Wet stiff green fine sandy clay w/trace of coarse sand.	A-6(3)	
			14.0'		17" RECOVERY		
14		8	14.0'	6 7 9 12	Wet very stiff green fine sandy clay w/trace of coarse sand.	A-6(4)	
			16.0'		18" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/27/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWMI-11-1

Contract: 25-113-01

Boring Location: Sta. 516+60, 270.00' Rt. C.L.

Boring Surface Elev.: + 53.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/26/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
5.6

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: J. Truver

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/26/09	1	0.5'	2 2 3	Moist firm brown silt w/ some clay, fine to coarse sand, and gravel.	A-4(1)	Topsoil - 5".
			2.0'		17" RECOVERY		
		2	2.0'	4 4 4 6	Moist loose brown gravel and coarse sand w/ some silt and fine sand.	A-1-b	
3.5			4.0'		20" RECOVERY		
		3	4.0'	2 2 2	Wet very loose brown coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
			6.0'		12" RECOVERY		
		4	6.0'	2 7 5 7	Wet medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
7			8.0'		20" RECOVERY		
		5	8.0'	5 5 7 7	Wet medium dense brown fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
			10.0'		21" RECOVERY		
		6	10.0'	4 5 7 7	Saturated medium dense brown and green silty fine sand w/ some coarse sand and gravel.	A-2-4(0)	
10.5			12.0'		20" RECOVERY		
		7	12.0'	8 11 13 16	Saturated medium dense brown and green clayey fine sand w/ some coarse sand and gravel.	A-2-4(0)	
14			14.0'		15" RECOVERY		
		8	14.0'	9 11 14 18	Saturated medium dense brown and green fine to coarse sand w/ some gravel and silt.	A-2-4(0)	
			16.0'		17" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/26/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-12-1

Contract: 25-113-01

Boring Location: Sta. 543+50, 280.00' Rt. C.L.

Boring Surface Elev.: + 65.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings
Date 3/30/09
Time

Depth of Hole 16.0
Depth of Casing
Depth of Water Dry
Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: Ft.;
No. of 2 in. Dia. Shelby Tubes: No. of
2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/30/09	1	0.5'	2 1 2	Moist soft brown clayey fine sandy silt, trace of coarse sand and gravel.	A-4(1)	Topsoil - 6".
			2.0'		17" RECOVERY		
3.5		2	2.0'	7 21 30 24	Moist very dense brown coarse sand and gravel w/ some fine sand and silt.	A-1-b	
			4.0'		20" RECOVERY		
		3	4.0'	9 12 13 12	Moist medium dense brown coarse sand and gravel w/ some fine sand, trace of silt.	A-1-b	
			6.0'		18" RECOVERY		
7		4	6.0'	22 20 17 17	Moist dense brown gravel and coarse sand w/ some fine sand, trace of silt.	A-1-b	
			8.0'		18" RECOVERY		
		5	8.0'	6 6 7 4	Wet medium dense brown and orange coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			10.0'		18" RECOVERY		
10.5		6	10.0'	8 8 11 12	Wet medium dense brown and orange coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			12.0'		15" RECOVERY		
		7	12.0'	4 8 12 11	Wet medium dense brown and orange coarse sand w/ some fine sand, trace of gravel and silt.	A-1-b	
14			14.0'		19" RECOVERY		
		8	14.0'	5 7 9 13	Wet medium dense brown and orange coarse to fine sand, trace of gravel and silt.	A-1-b	
			16.0'		17" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/30/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-13-1

Contract: 25-113-01

Boring Location: Sta. 547+00, 240.00' Lt. C.L.

Boring Surface Elev.: + 66.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
3/23/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
7.3

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/23/09	1	0.5'	4 5	Moist stiff brown silt w/ some coarse to fine sand and clay, trace of gravel. 10" RECOVERY	A-4(1)	Topsoil - 6"
		2	2.0'	8 8 9 11	Moist medium dense brown and gray clayey fine sandy silt, trace of coarse sand and gravel. 13" RECOVERY	A-4(1)	
3.5		3	4.0'	4 6 8 11	Moist medium dense brown and black mottled clayey fine to coarse sand, trace of gravel. 10" RECOVERY	A-2-4(0)	
		4	6.0'	7 9 8 6	Wet medium dense brown and black mottled coarse to fine sand w/ some silt, trace of gravel. 11" RECOVERY	A-2-4(0)	
7		5	8.0'	5 4 5 6	Wet loose brown and black mottled fine to coarse sand w/ some silt and gravel. 16" RECOVERY	A-2-4(0)	
		6	10.0'	5 7 6 7	Wet medium dense brown and black mottled fine to coarse sand w/ some silt, trace of gravel. 12" RECOVERY	A-2-4(0)	
10.5		7	12.0'	11 6 7 8	Wet medium dense brown coarse to fine sand w/ some gravel, trace of silt. 21" RECOVERY	A-1-b	
14		8	14.0'	3 5 8 10	Wet medium dense brown coarse to fine sand and gravel, trace of silt. 20" RECOVERY	A-1-b	
			16.0'		End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Clayey sand



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/23/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-14-1

Contract: 25-113-01

Boring Location: Sta. 558+60, 210.00' Lt. C.L.

Boring Surface Elev.: + 65.0

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Spoon	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	4/8/09		16.0		6.3	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	4/8/09	1	0.5'	2 5 6	Moist stiff gray and brown fine sandy silt, trace of coarse sand and clay.	A-4(0)	Topsoil - 6".
			2.0'		18" RECOVERY		
		2	2.0'	10 17 22 16	Moist dense orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	Iron staining.
3.5			4.0'		24" RECOVERY		
		3	4.0'	10 7 12 14	Wet medium dense brown and orange coarse to fine sand w/ some clay, trace of gravel.	A-2-4(0)	
			6.0'		21" RECOVERY		
		4	6.0'	20 18 20 15	Wet dense gray coarse sand w/ some gravel, fine sand, and silt.	A-1-b	
7			8.0'		20" RECOVERY		
		5	8.0'	6 7 6 7	Wet medium dense gray coarse to fine sand w/ some gravel and silt.	A-1-b	
			10.0'		12" RECOVERY		
		6	10.0'	14 8 9 7	Wet medium dense gray coarse sand and gravel w/ some fine sand, trace of silt.	A-1-b	
			12.0'		14" RECOVERY		
		7	12.0'	2 5 5 9	Wet loose gray coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			14.0'		18" RECOVERY		
		8	14.0'	20 25 18 19	Wet dense gray coarse to fine sand w/ some gravel and silt.	A-1-b	
			16.0'		23" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Poorly graded clayey
silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 4/8/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-15-1

Contract: 25-113-01

Boring Location: Sta. 563+52, 218.00' Rt. C.L.

Boring Surface Elev.: + 67.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/10/2009		12.0	10.0	6.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;	No. of	U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.5'	6 6 7	Moist stiff orange clayey fine sandy silt w/some coarse sand and gravel.	A-4(1)	Cultivated Soil - 8".
			2.0'		7" RECOVERY		
		2	2.0'	14 18 14 12	Moist dense orange coarse to fine sand w/some silt and gravel.	A-1-b	
3.5			4.0'		18" RECOVERY		
		3	4.0'	10 10 10 10	Moist medium dense silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			6.0'		21" RECOVERY		
		4	6.0'	10 16 7 12	Moist medium dense orange gravel and coarse sand w/some fine sand and silt.	A-1-b	
7			8.0'		15" RECOVERY		
		5	8.0'	4 9 9 8	Wet medium dense orange gravel and coarse sand w/some fine sand and silt.	A-1-b	
			10.0'		12" RECOVERY		
		6	10.0'	9 8 13 20	Wet medium dense orange gravel and coarse sand w/some fine sand, trace of silt.	A-1-b	
			12.0'		23" RECOVERY		
		7	12.0'	8 7 16 12	Wet very stiff green fine sandy clay w/some coarse sand and gravel.	A-7-5(4)	
			14.0'		14" RECOVERY		
		8	14.0'	10 13 14 17	Wet very stiff green fine sandy clay w/trace of coarse sand and gravel.	A-7-5(14)	
			16.0'		9" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: _____ **Soils Supervisor:** _____

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand
with silt



Elastic silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-17-1

Contract: 25-113-01

Boring Location: Sta. 570+34, 190.00' Lt. C.L.

Boring Surface Elev.: + 67.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/13/2009		14.0	12.0	11.9	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5'	3 4 3	Moist firm tan clayey silt w/trace of fine to coarse sand.	A-4(5)	Forrest Duff - 3"
			2.0'		14" RECOVERY		
		2	2.0'	5 5 6 8	Moist stiff tan clayey coarse sandy silt w/some fine sand, trace of gravel.	A-4(3)	
3.5			4.0'		20" RECOVERY		
		3	4.0'	8 10 5 8	Moist medium dense orange silty fine sand w/some coarse sand.	A-2-4(0)	
			6.0'		18" RECOVERY		
		4	6.0'	6 7 5 6	Moist medium dense orange silty fine sand w/some coarse sand.	A-2-4(0)	
7			8.0'		21" RECOVERY		
		5	8.0'	4 5 6 4	Wet medium dense orange fine sand and gravel w/some silt and coarse sand.	A-2-4(0)	
			10.0'		14" RECOVERY		
		6	10.0'	3 6 7 7	Wet medium dense orange coarse to fine sand w/some silt, trace of gravel.	A-2-4(0)	
10.5			12.0'		19" RECOVERY		
		7	12.0'	7 5 5 8	Wet stiff brown fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(7)	
			14.0'		14" RECOVERY		
14		8	14.0'	7 14 12 17	Wet very stiff greenish brown fine sandy clay w/some coarse sand.	A-7-6(9)	
			16.0'		24" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

 Silty low plasticity clay

 Low plasticity clay

 Silty sand

 Poorly graded sand with silt

 Elastic silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-18-1

Contract: 25-113-01

Boring Location: Sta. 573+15, 237.00' Rt. C.L.

Boring Surface Elev.: + 67.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/10/2009		12.0	10.0	9.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.5'	2 2 4	Moist firm gray clayey silt w/trace of fine to coarse sand and gravel.	A-4(5)	Cultivated Soil - 6"
			2.0'		16" RECOVERY		
3.5		2	2.0'	6 6 7 9	Wet stiff greenish brown and gray mottled silty fine sandy clay w/trace of gravel and coarse sand.	A-6(8)	USDA Classifica - Clay Loam
			4.0'		19" RECOVERY		
		3	4.0'	7 9 9 7	Wet very stiff greenish brown fine sandy clay w/some coarse sand.	A-7-5(12)	
			6.0'		16" RECOVERY		
7		4	6.0'	8 9 10 10	Wet very stiff green fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(2)	Glaucinit
			8.0'		19" RECOVERY		
		5	8.0'	3 7 10 8	Wet medium dense green silty fine to coarse sand.	A-2-4(0)	Glaucinit
			10.0'		18" RECOVERY		
10.5		6	10.0'	8 9 9 10	Wet very stiff green fine sandy silt w/some clay, organic matter and coarse sand.	A-4(0)	Glaucinit
			12.0'		21" RECOVERY		
		7	12.0'	1 2 1 1	Wet soft green clayey fine sandy silt w/some organic matter, trace of coarse sand and silt.	A-4(1)	Glaucinit
14			14.0'		21" RECOVERY		
		8	14.0'	1 1 1 1	Wet soft green organic fine to coarse sandy clay w/trace of gravel.	A-7-5(4)	Glaucinit
			16.0'		21" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

 Silty low plasticity clay

 Low plasticity clay

 Elastic silt

 Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-19-1

Contract: 25-113-01

Boring Location: Sta. 574+68, 209.00' Lt. C.L.

Boring Surface Elev.: + 66.0

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:
					14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/13/2009		12.0	10.0	9.2	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;	No. of	U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5'	4 3 4	Moist firm gray silt w/some clay and fine sand, trace of coarse sand.	A-4(2)	Cultivated Soil - 6".
			2.0'		16" RECOVERY		
		2	2.0'	8 12 14 13	Moist medium dense orangish gray coarse sand w/some clay and fine sand, trace of gravel and silt.	A-1-b	USDA Classifica
3.5			4.0'		20" RECOVERY		- Sandy
		3	4.0'	6 7 6 6	Moist medium dense orange silty coarse to fine sand w/trace of gravel.	A-2-4(0)	Clay Loam
			6.0'		18" RECOVERY		
		4	6.0'	5 7 7 6	Moist to wet medium dense orange fine to coarse sand w/some silt.	A-2-4(0)	
7			8.0'		16" RECOVERY		
		5	8.0'	4 4 3 10	Wet loose orange silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
			10.0'		16" RECOVERY		
10.5		6	10.0'	14 15 9 9	Wet medium dense orange gravel and fine to coarse sand w/some silt.	A-1-b	
			12.0'		24" RECOVERY		
		7	12.0'	4 6 7	Wet loose green clayey fine to coarse sand w/trace of gravel.	A-2-7(1)	Glauconit
14			14.0'		223" RECOVERY		
		8	14.0'	5 8 13 20	Wet medium dense green clayey fine to coarse sand w/trace of gravel.	A-2-7(2)	Glauconit
			16.0'		14" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-20-1

Contract: 25-113-01

Boring Location: Sta. 586+86, 192.00' Rt. C.L.

Boring Surface Elev.: + 67.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
6/26/2009

Time

Depth of Hole
12.0

Depth of Casing
10.0

Depth of Water
8.9

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: Gary Truver

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	6/26/09	1	0.5'	2 3 5	Moist firm tan clayey silt w/trace of fine to coarse sand.	A-4(4)	Cultivated Soil - 8"
			2.0'		10" RECOVERY		
		2	2.0'	4 5 8 9	Moist stiff tan fine sandy silt w/some clay, trace of coarse sand.	A-4(0)	
3.5			4.0'		12" RECOVERY		
		3	4.0'	3 6 7 8	Moist stiff brown fine sandy silt w/some coarse sand, trace of clay.	A-4(0)	USDA Classifica - Sandy Loam
			6.0'		17" RECOVERY		
		4	6.0'	12 13 15 8	Moist medium dense tan silty fine to coarse sand w/some gravel.	A-2-4(0)	
7			8.0'		17" RECOVERY		
		5	8.0'	3 5 6 7	Wet stiff brownish green fine sandy clay w/some coarse sand, trace of gravel.	A-7-6(9)	
			10.0'		17" RECOVERY		
		6	10.0'	7 8 10	Wet very stiff brownish green fine sandy clay w/trace of coarse sand and gravel.	A-7-5(19)	
10.5			12.0'		20" RECOVERY		
		7	12.0'	3 4 6 5	Wet stiff brown fine to coarse sandy clay w/trace of gravel.	A-7-5(3)	
14			14.0'		16" RECOVERY		
		8	14.0'	2 2 4 6	Wet firm gray fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(2)	
			16.0'		19" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Elastic silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/26//2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-2-1

Contract: 25-113-01

Boring Location: Sta. 465+50, 250.00' Rt. C.L.

Boring Surface Elev.: + 60.0

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Spoon	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/6/09		16.0		8.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16	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: J. Truver
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/6/09	1	0.5'	2 2 2	Moist soft light brown silt w/ some fine to coarse sand, trace of clay and gravel.	A-4(0)	Cultivated Soil - 6".
			2.0'		17" RECOVERY		
3.5		2	2.0'	4 4 6 14	Moist loose orange silty fine sand w/ some gravel and coarse sand.	A-2-4(0)	
			4.0'		16" RECOVERY		
		3	4.0'	9 10 9 11	Moist medium dense orange silty gravel and fine sand w/ some coarse sand.	A-2-4(0)	
			6.0'		13" RECOVERY		
7		4	6.0'	9 9 10 11	Wet medium dense brown fine to coarse sand w/ some clay, trace of gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
		5	8.0'	3 5 6 6	Wet medium dense brown clayey fine sand w/ some coarse sand.	A-2-6(0)	
			10.0'		15" RECOVERY		
10.5		6	10.0'	4 6 8 9	Wet stiff brown fine sandy clay w/ some coarse sand.	A-7-6(2)	
			12.0'		17" RECOVERY		
		7	12.0'	3 4 8 8	Saturated medium dense brown clayey fine sand w/ some coarse sand.	A-2-6(1)	
14			14.0'		18" RECOVERY		
		8	14.0'	3 6 8 10	Saturated medium dense brown silty fine sand w/ some coarse sand.	A-2-4(0)	
			16.0'		15" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/6/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-21-1

Contract: 25-113-01

Boring Location: Sta. 590+93, 226.00' Rt. C.L.

Boring Surface Elev.: + 67.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/27/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
8.6

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/27/09	1	1.0'	3 2	Moist firm light brown silt, trace of fine to coarse sand and clay. 10" RECOVERY	A-4(1)	Cultivated Soil - 12"
		2	2.0'	4 5 5 6	Moist stiff orange silt w/ some fine sand and clay, trace of coarse sand and gravel.	A-4(1)	
3.5			4.0'		20" RECOVERY		
		3	4.0'	7 11 13 9	Moist medium dense yellow clayey coarse to fine sand and gravel. 17" RECOVERY	A-2-4(0)	
			6.0'		17" RECOVERY		
7		4	6.0'	16 13 14 15	Moist medium dense white coarse sand w/ some fine sand, trace of clay and gravel. 18" RECOVERY	A-1-b	
			8.0'		18" RECOVERY		
		5	8.0'	4 9 8 8	Wet medium dense yellow coarse sand w/ some gravel, trace of silt and fine sand. 17" RECOVERY	A-1-b	
			10.0'		17" RECOVERY		
10.5		6	10.0'	3 5 10 9	Saturated stiff orange clayey coarse sandy silt w/ some fine sand and gravel. 24" RECOVERY	A-5(1)	Cemented sands.
			12.0'		24" RECOVERY		
		7	12.0'	2 2 4 5	Saturated firm orange coarse to fine sandy clay, trace of gravel. 18" RECOVERY	A-7-5(8)	Cemented sands.
14			14.0'		18" RECOVERY		
		8	14.0'	9 10 10 11	Saturated medium dense orange coarse to fine sand w/ some silt and gravel. 18" RECOVERY	A-1-b	Cemented sands.
			16.0'		18" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/27/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-22-1

Contract: 25-113-01

Boring Location: Sta. 595+65, 199.00' Rt. C.L.

Boring Surface Elev.: + 71.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/27/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/27/09	1	1.0'	7 7	Moist stiff brown clayey silt, trace of fine to coarse sand. 12" RECOVERY	A-4(8)	Cultivated Soil - 11"
		2	2.0'	8 7 6	Moist stiff brown and gray clay w/ some fine sand, trace of coarse sand. 12" RECOVERY	A-6(8)	
3.5		3	4.0' 4.0'	9 7 10 12	Moist very stiff gray fine sandy clay, trace of coarse sand and gravel. 24" RECOVERY	A-6(6)	
		4	6.0' 6.0'	5 8 13 20	Moist very stiff brown and gray mottled fine sandy clay, trace of coarse sand and gravel. 24" RECOVERY	A-6(8)	
7		5	8.0' 8.0'	3 6 14 15	Moist medium dense white silty fine sand and gravel, trace of coarse sand. 15" RECOVERY	A-2-4(0)	
		6	10.0' 10.0'	19 25 14 11	Moist dense gray to orange clayey gravel and coarse sand w/ some fine sand. 17" RECOVERY	A-2-4(0)	Cemented sands.
		7	12.0' 12.0'	7 11 12 16	Wet very stiff brown fine sandy clay w/ some coarse sand, trace of gravel. 12" RECOVERY	A-7-5(4)	
14		8	14.0' 14.0'	23 17 12 13	Wet medium dense orange clayey fine to coarse sand w/ some gravel. 24" RECOVERY	A-2-7(0)	
			16.0'		End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/27/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-23-1

Contract: 25-113-01

Boring Location: Sta. 600+00, 190.00' Rt. C.L.

Boring Surface Elev.: + 76.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/27/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3.5	2/27/09	1	1.0'	7 6	Moist stiff brown clayey silt, trace of fine to coarse sand. 12" RECOVERY	A-4(8)	Cultivated Soil - 9"
		2	2.0'	6 8 9 11	Moist very stiff brown clayey fine sandy silt w/ some coarse sand. 16" RECOVERY	A-4(3)	
7		3	4.0'	3 7 4 6	Moist medium dense orange silty fine sand w/ some coarse sand. 17" RECOVERY	A-2-4(0)	
		4	6.0'	4 4 6 4	Moist stiff orange to gray clay w/ some fine sand, trace of coarse sand. 24" RECOVERY	A-6(7)	
10.5		5	8.0'	1 4 7 8	Moist stiff orange and gray mottled fine sandy clay w/ some coarse sand, trace of gravel. 18" RECOVERY	A-6(4)	
		6	10.0'	7 7 14 16	Moist very stiff gray fine sandy clay w/ some coarse sand, trace of gravel. 20" RECOVERY	A-6(4)	
14		7	12.0'	3 9 10 11	Moist medium dense gray and orange mottled coarse to fine sand w/ some silt, trace of gravel. 17" RECOVERY	A-1-b	
		8	14.0'	12 15 19 27	Moist dense gray and orange mottled coarse sand and gravel w/ some fine sand, trace of silt. 20" RECOVERY	A-1-b	
17.5			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Clayey sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/27/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty low plasticity
clay



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/27/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-24-1

Contract: 25-113-01

Boring Location: Sta. 605+49, 196.00' Lt. C.L.

Boring Surface Elev.: + 76.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/27/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3.5	2/27/09	1	1.0'	5 6	Moist stiff tan fine sandy silt w/ some clay and coarse sand. 12" RECOVERY	A-4(1)	Topsoil - 8"
		2	2.0'	6 9 7	Moist very stiff tan silt w/ some fine sand, trace of clay and coarse sand. 18" RECOVERY	A-4(0)	
7	2/27/09	3	4.0'	6 10 13	Moist stiff orange clay w/ some fine sand, trace of coarse sand and gravel. 15" RECOVERY	A-6(11)	
		4	6.0'	6 8	Moist very stiff orange gray mottled fine sandy clay, trace of coarse sand and gravel. 12" RECOVERY	A-6(7)	
10.5	2/27/09	4A	7.0'	10 15	Moist medium dense orange-gray mottled silty fine to coarse sand, trace of gravel. 12" RECOVERY	A-2-4(0)	
		5	8.0'	5 7 7 6	Moist medium dense orange-gray mottled fine to coarse sand w/ some silt, trace of gravel. 15" RECOVERY	A-2-4(0)	
14	2/27/09	6	10.0'	5 7 9 10	Moist medium dense orange-gray mottled silty fine to coarse sand, trace of gravel. 22" RECOVERY	A-2-4(0)	
		7	12.0'	5 6 11 11	Moist medium dense orange fine sand and gravel w/ some coarse sand and silt. 15" RECOVERY	A-2-4(0)	
17.5	2/27/09	8	14.0'	22 12 12 12	Wet very stiff orange and brown coarse sandy clay w/ some fine sand and gravel. 14" RECOVERY	A-7-5(3)	Cemented sands.
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silt



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/27/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty low plasticity
clay



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/27/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/26/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-27-1

Contract: 25-113-01

Boring Location: Sta. 613+27, 225.00' Lt. C.L.

Boring Surface Elev.: + 71.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split-Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/26/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/26/09	1	1.0'	4 3	Moist firm brown clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(1)	Cultivated Soil - 10"
		2	2.0'	3 4 4 3	12" RECOVERY Moist loose orange silty coarse to fine sand, trace of gravel.	A-2-4(0)	
3.5			4.0'		16" RECOVERY		
		3	4.0'	4 4 3 4	Moist loose orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			6.0'		20" RECOVERY		
7		4	6.0'	6 24 10 7	Moist dense orange coarse to fine sand and gravel w/ some silt.	A-1-b	Cemented sands.
			8.0'		14" RECOVERY		
		5	8.0'	3 3 8 5	Wet medium dense orange silty coarse sand and gravel w/ some fine sand.	A-2-4(0)	Cemented sands.
			10.0'		9" RECOVERY		
10.5		6	10.0'	5 9 9 6	Wet medium dense orange silty coarse to fine sand, trace of gravel.	A-2-4(0)	Cemented sands.
			12.0'		19" RECOVERY		
		7	12.0'	2 6 8 10	Wet medium dense orange silty coarse to fine sand, trace of gravel.	A-2-5(0)	Cemented sands.
14			14.0'		13" RECOVERY		
		8	14.0'	7 9 8 10	Wet medium dense orange silty coarse to fine sand, trace of gravel.	A-1-b	Cemented sands.
			16.0'		19" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/26/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-28-1

Contract: 25-113-01

Boring Location: Sta. 624+80, 168.00' Lt. C.L.

Boring Surface Elev.: + 75.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/23/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/23/09	1	1.0'	3 3	Moist firm brown and tan silt w/ some clay, trace of fine to coarse sand and gravel.	A-4(3)	Cultivated Soil - 9"
		2	2.0'	5 6 7	12" RECOVERY Moist stiff brown and tan clayey silt, trace of fine to coarse sand and gravel.	A-4(5)	
3.5		3	4.0' 4.0'	4 6 7	16" RECOVERY Moist medium dense tan clayey fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
		4	6.0' 6.0'	6 8 9 9	14" RECOVERY Moist medium dense tan silty fine sand, trace of coarse sand.	A-2-4(0)	Contains trace of mica.
7		5	8.0' 8.0'	4 5 7 7	16" RECOVERY Moist medium dense orange-brown mottled silty fine sand, trace of gravel and coarse sand.	A-2-4(0)	Contains mica.
		6	10.0' 10.0'	10 10 12 13	17" RECOVERY Moist very stiff orange-brown, yellow, and white mottled fine sandy silt, trace of coarse sand.	A-4(0)	Contains mica.
10.5		7	12.0' 12.0'	7 12 22 8	24" RECOVERY Moist dense orange-brown fine to coarse sand w/ some gravel, trace of silt.	A-3	Cemented sands.
14		8	14.0' 14.0'	7 6 6 8	16" RECOVERY Wet medium dense orange and brown silty coarse to fine sand w/ some gravel/	A-2-5(0)	Cemented sands.
			16.0'		15" RECOVERY End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Clayey sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/23/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01
Boring Location: Sta. 625+05, 173.00' Rt. C.L.
Boring Surface Elev.: + 74.0'

Boring No.: SWM1-29-1

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
 S-Sampler:
 U-Sampler:
 Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings
Date 2/25/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:
 No. of 2 in. Dia. Shelby Tubes:
 2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/25/09	1	1.0'	3 4	Moist firm tan clayey silt, trace of fine to coarse sand. 6" RECOVERY	A-4(7)	Cultivated Soil - 8"
		2	2.0'	3 4 6 7	Moist stiff tan silt w/ some fine to coarse sand and clay, trace of gravel. 14" RECOVERY	A-4(0)	
3.5		3	4.0' 4.0'	3 4 6 7	Moist stiff orange fine sandy silt, trace of coarse sand and gravel. 15" RECOVERY	A-4(0)	
		4	6.0' 6.0'	4 7 7 4	Moist stiff orange fine sandy silt. 19" RECOVERY	A-4(0)	
7		5	8.0' 8.0'	2 4 6 6	Moist stiff orange fine sandy silt, trace of coarse sand and gravel. 18" RECOVERY	A-4(0)	
		6	10.0' 10.0'	20 17 18 30	Moist dense orange, tan, white mottled gravel and coarse sand w/ some fine sand and silt. 16" RECOVERY	A-1-b	Auger refusal at 10.5'. Boring offset 3.0' east to completion of boring.
10.5		7	12.0' 12.0'	19 20 12 7	Moist dense orange clayey coarse sand and gravel w/ some fine sand. 12" RECOVERY	A-2-6(0)	
14		8	14.0' 14.0'	8 15 15 16	Wet medium dense orange silty fine to coarse sand w/ some gravel. 16" RECOVERY	A-2-5(0)	Cemented sands.
			16.0'		End of Boring		Cemented sands. Cemented sands.
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/25/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-30-1

Contract: 25-113-01

Boring Location: Sta. 625+84, 485.00' Rt. C.L.

Boring Surface Elev.: + 74.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/26/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/26/09	1	1.0'	5	Moist stiff tan clay, trace of fine sand. 12" RECOVERY	A-6(13)	Cultivated Soil - 8"
			2.0'	5			
3.5		2	2.0'	6	Moist stiff tan clayey silt, trace of fine to coarse sand. 19" RECOVERY	A-4(9)	
			4.0'	7			
7		3	4.0'	4	Moist stiff tan silt w/ some fine to coarse sand, trace of clay and gravel. 11" RECOVERY	A-4(1)	
			6.0'	5			
		4	6.0'	5	Moist stiff orange fine sandy silt w/ some clay and coarse sand, trace of gravel. 17" RECOVERY	A-4(0)	
			8.0'	6			
10.5		5	8.0'	3	Moist loose yellow silty fine sand, trace of coarse sand. 15" RECOVERY	A-2-4(0)	
			10.0'	4			
14		6	10.0'	10	Moist medium dense yellow silty fine sand, trace of coarse sand. 20" RECOVERY	A-2-4(0)	
			12.0'	9			
		7	12.0'	6	Moist medium dense yellow fine to coarse sand w/ some gravel and silt. 16" RECOVERY	A-2-4(0)	Cemented sands.
			14.0'	12			
17.5		8	14.0'	16	Moist very dense yellow gravel and coarse sand w/ some fine sand and silt. 17" RECOVERY	A-1-b	Cemented sands.
			16.0'	29			
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/25/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-31-1

Contract: 25-113-01

Boring Location: Sta. 627+59, 178.00' Rt. C.L.

Boring Surface Elev.: + 73.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/25/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3.5	2/25/09	1	1.0'	4 4	Moist firm tan clayey silt, trace of fine to coarse sand and gravel. 12" RECOVERY	A-4(5)	Cultivated Soil - 8"
		2	2.0'	5 5 6	Moist stiff tan clayey silt w/ some fine to coarse sand, trace of gravel.	A-4(2)	
7	2/25/09	3	4.0' 4.0'	3 4 7 8	18" RECOVERY Moist stiff orange fine sandy silt, trace of coarse sand and gravel.	A-4(0)	Contains mica.
		4	6.0' 6.0'	9 9 9 9	16" RECOVERY Moist medium dense orange silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
10.5	2/25/09	5	8.0' 8.0'	3 8 7 12	17" RECOVERY Wet stiff orange fine sandy clay w/ some coarse sand and gravel.	A-7-5(4)	Cemented sands.
		6	10.0' 10.0'	10 15 15 18	12" RECOVERY Wet very stiff green fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(2)	Cemented sands.
14	2/25/09	7	12.0' 12.0'	4 6 8 10	17" RECOVERY Wet stiff green clayey fine to coarse sandy silt, trace of gravel.	A-4(0)	Cemented sands.
		8	14.0' 14.0'	8 9 9 9	15" RECOVERY Wet medium dense orange silty coarse to fine sand w/ some gravel.	A-2-4(0)	Cemented sands.
17.5	2/25/09		16.0'		24" RECOVERY End of Boring		

Remarks:

Reviewed By: Maureen Kelley

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 2/25/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-32-1

Contract: 25-113-01

Boring Location: Sta. 631+28, 196.00' Rt. C.L.

Boring Surface Elev.: + 73.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/18/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3.5	2/18/09	1	1.0'	3 4	Moist firm brown and tan clayey silt, trace of fine to coarse sand. 11" RECOVERY	A-4(9)	Cultivated Soil - 8"; boring offset 12' west due to overhead wires.
		2	2.0'	5 6 8 9	Moist stiff orange clayey fine sandy silt w/ some coarse sand and gravel. 15" RECOVERY	A-4(1)	
7	2/18/09	3	4.0'	7 8 10 11	Moist loose orange clayey fine to coarse sand, trace of gravel. 14" RECOVERY	A-2-4(0)	Cemented sands.
		4	6.0'	9 10	Moist medium dense brown silty fine to coarse sand w/ some gravel. 10" RECOVERY	A-2-4(0)	
		4A	7.0'	7 11	Wet very stiff orange fine sandy silt w/ some clay, trace of coarse sand and gravel. 10" RECOVERY	A-4(0)	
10.5	2/18/09	5	8.0'	7 10 12 14	Wet medium dense brown and green clayey fine sand and gravel w/ some coarse sand. 16" RECOVERY	A-2-7(0)	Cemented sands.
		6	10.0'	8 21 33 13	Wet hard brown and green fine sandy clay w/ some coarse sand, trace of gravel. 16" RECOVERY	A-7-5(2)	
14	2/18/09	7	12.0'	4 5 7 12	Wet medium dense brown, green, and gray mottled silty fine to coarse sand, trace of gravel. 18" RECOVERY	A-2-4(0)	Cemented sands.
		8	14.0'	8 10 7 7	Wet medium dense orange and red clayey fine to coarse sand w/ some gravel. 15" RECOVERY	A-2-5(0)	
17.5	2/18/09		16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/18/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-33-1

Contract: 25-113-01

Boring Location: Sta. 637+31, 390.00' Rt. C.L.

Boring Surface Elev.: + 66.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/12/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/12/09	1	1.0'	2 4 8	Moist stiff brown and orange clayey gravelly silt w/ some fine sand, trace of coarse sand.	A-4(1)	Cultivated Soil - 8"
		2	2.0' 2.5'	13 13 13 18	Moist medium dense yellow-tan gravel w/ some coarse sand, trace of silt and fine sand.	A-1-a	
3.5		3	4.0' 4.0'	4 8 10 9	No sample recovery.		
			6.0'		0" RECOVERY		
7		4	6.0'	12 15 19 13	Wet hard brown fine sandy clay w/ some gravel, trace of coarse sand.	A-7-5(10)	
			8.0'		8" RECOVERY		
		5	8.0'	2 4 5 7	Wet loose orange and brown clayey fine to coarse sand w/ some gravel.	A-2-7(1)	Cemented sands.
			10.0'		12" RECOVERY		
10.5		6	10.0'	2 3 3 2	Wet loose orange and brown clayey coarse to fine sand, trace of gravel.	A-2-5(0)	Cemented sands.
			12.0'		20" RECOVERY		
		7	12.0'	3 4 6 6	Wet stiff orange and brown coarse to fine sandy clay, trace of gravel.	A-7-5(2)	Cemented sands.
14			14.0'		19" RECOVERY		
		8	14.0'	4 6 7 8	Wet medium dense orange and brown silty coarse to fine sand, trace of gravel.	A-1-b	Cemented sands.
			16.0'		20" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Poorly graded gravel
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/12/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-34-1

Contract: 25-113-01

Boring Location: Sta. 638+75, 311.00' Lt. C.L.

Boring Surface Elev.: + 69.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/12/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks																																																																								
	2/12/09	1	1.0'	2	Moist firm orange clayey silt, trace of fine to coarse sand. 12" RECOVERY	A-4(8)	Cultivated Soil - 9"																																																																								
			2.0'	3				3.5		2	2.0'	4	Moist stiff orange clayey fine sandy silt w/ some coarse sand and gravel. 10" RECOVERY	A-4(1)		4.0'	7	7		3	4.0'	6	Moist medium dense gray clay gravel w/ some coarse to fine sand. 16" RECOVERY	A-2-4(0)		6.0'	5	10.5		4	6.0'	10	Moist medium dense brown and orange silty coarse sand w/ some gravel and fine sand. 8" RECOVERY	A-1-b	Cemented sands.	8.0'	10	14		5	8.0'	11	Wet medium dense brown and green silty coarse sand w/ some fine sand, trace of gravel. 8" RECOVERY	A-2-4(0)	Cemented sands.	10.0'	3	17.5		6	10.0'	6	Wet medium dense orange clayey coarse to fine sand, trace of gravel. 18" RECOVERY	A-2-7(1)	Cemented sands.	12.0'	12			7	12.0'	13	Wet medium dense orange silty coarse to fine sand, trace of gravel. 15" RECOVERY	A-2-4(0)	Cemented sands.	14.0'	6			8	14.0'	5	Wet medium dense orange silty coarse to fine sand w/ some gravel. 13" RECOVERY	A-2-4(0)	Cemented sands.	16.0'	14		
3.5		2	2.0'	4	Moist stiff orange clayey fine sandy silt w/ some coarse sand and gravel. 10" RECOVERY	A-4(1)																																																																									
			4.0'	7				7		3	4.0'	6	Moist medium dense gray clay gravel w/ some coarse to fine sand. 16" RECOVERY	A-2-4(0)		6.0'	5	10.5		4	6.0'	10	Moist medium dense brown and orange silty coarse sand w/ some gravel and fine sand. 8" RECOVERY	A-1-b	Cemented sands.	8.0'	10	14		5	8.0'	11	Wet medium dense brown and green silty coarse sand w/ some fine sand, trace of gravel. 8" RECOVERY	A-2-4(0)	Cemented sands.	10.0'	3	17.5		6	10.0'	6	Wet medium dense orange clayey coarse to fine sand, trace of gravel. 18" RECOVERY	A-2-7(1)	Cemented sands.	12.0'	12			7	12.0'	13	Wet medium dense orange silty coarse to fine sand, trace of gravel. 15" RECOVERY	A-2-4(0)	Cemented sands.	14.0'	6			8	14.0'	5	Wet medium dense orange silty coarse to fine sand w/ some gravel. 13" RECOVERY	A-2-4(0)	Cemented sands.	16.0'	14						End of Boring						
7		3	4.0'	6	Moist medium dense gray clay gravel w/ some coarse to fine sand. 16" RECOVERY	A-2-4(0)																																																																									
			6.0'	5				10.5		4	6.0'	10	Moist medium dense brown and orange silty coarse sand w/ some gravel and fine sand. 8" RECOVERY	A-1-b	Cemented sands.	8.0'	10	14		5	8.0'	11	Wet medium dense brown and green silty coarse sand w/ some fine sand, trace of gravel. 8" RECOVERY	A-2-4(0)	Cemented sands.	10.0'	3	17.5		6	10.0'	6	Wet medium dense orange clayey coarse to fine sand, trace of gravel. 18" RECOVERY	A-2-7(1)	Cemented sands.	12.0'	12			7	12.0'	13	Wet medium dense orange silty coarse to fine sand, trace of gravel. 15" RECOVERY	A-2-4(0)	Cemented sands.	14.0'	6			8	14.0'	5	Wet medium dense orange silty coarse to fine sand w/ some gravel. 13" RECOVERY	A-2-4(0)	Cemented sands.	16.0'	14						End of Boring																
10.5		4	6.0'	10	Moist medium dense brown and orange silty coarse sand w/ some gravel and fine sand. 8" RECOVERY	A-1-b	Cemented sands.																																																																								
			8.0'	10				14		5	8.0'	11	Wet medium dense brown and green silty coarse sand w/ some fine sand, trace of gravel. 8" RECOVERY	A-2-4(0)	Cemented sands.	10.0'	3	17.5		6	10.0'	6	Wet medium dense orange clayey coarse to fine sand, trace of gravel. 18" RECOVERY	A-2-7(1)	Cemented sands.	12.0'	12			7	12.0'	13	Wet medium dense orange silty coarse to fine sand, trace of gravel. 15" RECOVERY	A-2-4(0)	Cemented sands.	14.0'	6			8	14.0'	5	Wet medium dense orange silty coarse to fine sand w/ some gravel. 13" RECOVERY	A-2-4(0)	Cemented sands.	16.0'	14						End of Boring																										
14		5	8.0'	11	Wet medium dense brown and green silty coarse sand w/ some fine sand, trace of gravel. 8" RECOVERY	A-2-4(0)	Cemented sands.																																																																								
			10.0'	3				17.5		6	10.0'	6	Wet medium dense orange clayey coarse to fine sand, trace of gravel. 18" RECOVERY	A-2-7(1)	Cemented sands.	12.0'	12			7	12.0'	13	Wet medium dense orange silty coarse to fine sand, trace of gravel. 15" RECOVERY	A-2-4(0)	Cemented sands.	14.0'	6			8	14.0'	5	Wet medium dense orange silty coarse to fine sand w/ some gravel. 13" RECOVERY	A-2-4(0)	Cemented sands.	16.0'	14						End of Boring																																				
17.5		6	10.0'	6	Wet medium dense orange clayey coarse to fine sand, trace of gravel. 18" RECOVERY	A-2-7(1)	Cemented sands.																																																																								
			12.0'	12						7	12.0'	13	Wet medium dense orange silty coarse to fine sand, trace of gravel. 15" RECOVERY	A-2-4(0)	Cemented sands.	14.0'	6			8	14.0'	5	Wet medium dense orange silty coarse to fine sand w/ some gravel. 13" RECOVERY	A-2-4(0)	Cemented sands.	16.0'	14						End of Boring																																														
		7	12.0'	13	Wet medium dense orange silty coarse to fine sand, trace of gravel. 15" RECOVERY	A-2-4(0)	Cemented sands.																																																																								
			14.0'	6						8	14.0'	5	Wet medium dense orange silty coarse to fine sand w/ some gravel. 13" RECOVERY	A-2-4(0)	Cemented sands.	16.0'	14						End of Boring																																																								
		8	14.0'	5	Wet medium dense orange silty coarse to fine sand w/ some gravel. 13" RECOVERY	A-2-4(0)	Cemented sands.																																																																								
			16.0'	14									End of Boring																																																																		
					End of Boring																																																																										

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

 Low plasticity
clay

 Clayey sand

 Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/12/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-35-1

Contract: 25-113-01

Boring Location: Sta. 642+97, 236.00' Rt. C.L.

Boring Surface Elev.: + 56.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/12/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3.5	2/12/09	1	1.0'	6 6	Wet medium dense brown clayey coarse to fine sand, trace of gravel. 12" RECOVERY	A-2-7(0)	Cultivated Soil - 9".
		2	2.0'	6 7 8	Wet medium dense brown clayey coarse to fine sand, trace of gravel. 16" RECOVERY	A-2-7(0)	Cemented sands.
7	2/12/09	3	4.0'	2 10 6 6	Wet medium dense orange-brown silty coarse to fine sand w/ some gravel. 12" RECOVERY	A-1-b	Cemented sands.
		4	6.0'	6 8 10 5	Wet medium dense orange-brown coarse sand and gravel w/ some fine sand and silt. 19" RECOVERY	A-1-b	
10.5	2/12/09	5	8.0'	2 4 6 7	Wet loose orange fine to coarse sand w/ some silt, trace of gravel. 8" RECOVERY	A-2-4(0)	Cemented sands.
		6	10.0'	10 10 9 10	Wet medium dense orange fine to coarse sand w/ some silt, trace of gravel. 20" RECOVERY	A-2-4(0)	Cemented sands.
14	2/12/09	7	12.0'	2 3 4 5	Wet firm orange silt w/ some fine sand, trace of coarse sand and gravel. 18" RECOVERY	A-4(0)	
		8	14.0'	4 6 6 7	Wet medium dense orange-gray fine to coarse sand w/ some silt, trace of gravel. 24" RECOVERY	A-2-4(0)	
17.5					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/12/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-36-1

Contract: 25-113-01

Boring Location: Sta. 648+20, 209.00' Rt. C.L.

Boring Surface Elev.: + 59.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Spoon	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	
	Hollow Stem Auger:		From Depth of:		To:	14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/12/09		16.0		Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;	No. of	U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/12/09	1	1.0'	2 4	Wet firm brown clayey silt w/ some fine sand, trace of coarse sand and gravel.	A-4(6)	Cultivated Soil - 9";
		2	2.0'	2 3 3 4	12" RECOVERY Wet firm brown fine sandy clay, trace of gravel and coarse sand.	A-7-6(13)	cemented sands.
3.5			4.0'		13" RECOVERY		
		3	4.0'	2 4 5 10	Wet stiff orange fine sandy clay w/ some coarse sand and gravel.	A-7-5(5)	Cemented sands.
			6.0'		14" RECOVERY		
7		4	6.0'	5 5 8 7	Wet medium dense orange clayey coarse sand w/ some fine sand and gravel.	A-2-7(1)	Cemented sands.
			8.0'		19" RECOVERY		
		5	8.0'	2 4 6 14	Wet stiff orange-gray mottled coarse to fine sandy clay, trace of gravel.	A-7-5(3)	Cemented sands.
			10.0'		16" RECOVERY		
10.5		6	10.0'	4 6 6 19	Wet medium dense orange-gray mottled clayey coarse to fine sand, trace of gravel.	A-2-5(0)	Cemented sands.
			12.0'		19" RECOVERY		
		7	12.0'	2 10 12 14	Wet medium dense orange-brown coarse sand w/ some fine sand, gravel, and silt.	A-1-b	Cemented sands.
14			14.0'		13" RECOVERY		
		8	14.0'	13 12 9 10	Wet medium dense orange-brown coarse to fine sand w/ some gravel and silt.	A-1-b	Cemented sands.
			16.0'		23" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/12/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-37-1

Contract: 25-113-01

Boring Location: Sta. 664+13, 224.00' Lt. C.L.

Boring Surface Elev.: + 45.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date 2/11/2009

Time

Depth of Hole

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/11/09	1	0.0'	4 4 4 6	Moist firm brown clayey fine sandy silt, trace of gravel and coarse sand.	A-4(1)	No topsoil.
			2.0'		18" RECOVERY		
		2	2.0'	9 7 14 16	Moist medium dense orange coarse to fine sand and gravel, trace of silt.	A-1-b	Cemented sands.
3.5			4.0'		20" RECOVERY		
		3	4.0'	2 14 12 12	Moist medium dense brown coarse sand and gravel w/ some fine sand and silt.	A-1-b	Cemented sands.
			6.0'		16" RECOVERY		
7		4	6.0'	6 7 7 8	Wet medium dense dark orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			8.0'		23" RECOVERY		
		5	8.0'	3 4 5 5	Wet loose dark orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	Cemented sands.
			10.0'		20" RECOVERY		
10.5		6	10.0'	7 7 7 7	Wet medium dense orange-gray mottled fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			12.0'		24" RECOVERY		
		7	12.0'	2 6 5 6	Wet medium dense orange-gray mottled fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
14			14.0'		23" RECOVERY		
		8	14.0'	8 7 8 9	Wet medium dense orange-gray mottled fine to coarse sand w/ some silt.	A-2-4(0)	
			16.0'		24" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Well graded sand
with silt



Poorly graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/12/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-38-1

Contract: 25-113-01

Boring Location: Sta. 676+91, 230.00' Lt. C.L.

Boring Surface Elev.: + 62.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/10/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;

Ft.;

No. of:

Core Drilling in Rock:

Dia. U-Sample Boring:

U-Samples:

Ft.

Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/10/09	1	0.5'	3 3 4	Moist firm brown clayey silt, trace of fine sand.	A-4(7)	Cultivated Soil - 8".
			2.0'		13" RECOVERY		
3.5		2	2.0'	6 6 5 5	Moist stiff brown silt w/ some clay and fine sand, trace of coarse sand.	A-4(2)	
			4.0'		22" RECOVERY		
		3	4.0'	2 6 7	Moist stiff red-orange clayey fine sandy silt w/ some coarse sand and gravel.	A-4(3)	
			6.0'		11" RECOVERY		
7		4	6.0'	6 5 6 5	Moist stiff orange fine sandy silt w/ some coarse sand and clay, trace of gravel.	A-4(0)	
			8.0'		23" RECOVERY		
		5	8.0'	3 5 4 4	Moist loose orange silty coarse to fine sand, trace of gravel.	A-2-4(0)	
			10.0'		18" RECOVERY		
10.5		6	10.0'	5 6 7 8	Moist medium dense orange coarse sand and gravel w/ some fine sand and silt.	A-1-b	
			12.0'		18" RECOVERY		
		7	12.0'	3 4 5 6	Moist loose orange-yellow silty fine to coarse sand w/ some gravel.	A-2-4(0)	
14			14.0'		22" RECOVERY		
		8	14.0'	8 7 5	Moist medium dense orange fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
			15.5'		18" RECOVERY		
		8A	15.5'	5	Wet stiff orange-gray mottled fine sandy clay w/ some organic matter, trace of coarse sand and gravel.	A-7-6(10)	
			16.0'		6" RECOVERY		
17.5					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/12/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-39-1

Contract: 25-113-01

Boring Location: Sta. 687+49, 197.00' Lt. C.L.

Boring Surface Elev.: +43.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Spoon	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/10/09		16.0		Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;	No. of	U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/10/09	1	0.5'	4 4 6	Moist loose brown coarse sand and gravel w/ some silt, trace of fine sand.	A-1-b	Cultivated Soil - 8".
			2.0'		11" RECOVERY		
3.5		2	2.0'	4 4 6 8	Moist loose brown coarse sand w/ some gravel and silt, trace of fine sand.	A-1-b	
			4.0'		16" RECOVERY		
		3	4.0'	6 10 9 8	Moist medium dense brown coarse sand and gravel, trace of silt and fine sand.	A-1-b	
			6.0'		11" RECOVERY		
7		4	6.0'	6 7 4 6	Moist medium dense orange coarse sand w/ some gravel, trace of fine sand and silt.	A-1-b	
			8.0'		18" RECOVERY		
		5	8.0'	3 4 6 3	Moist loose orange coarse sand w/ some silt and fine sand, trace of gravel.	A-1-b	
			10.0'		16" RECOVERY		
10.5		6	10.0'	6 4 5 4	Moist loose orange coarse sand, trace of silt, fine sand, and gravel.	A-1-b	
			12.0'		21" RECOVERY		
		7	12.0'	3 5 5 5	Moist loose orange coarse sand w/ some gravel, trace of fine sand and silt.	A-1-b	
14			14.0'		13" RECOVERY		
		8	14.0'	3 5 5 5	Moist loose orange coarse sand, trace of gravel, fine sand, and silt.	A-1-b	
			16.0'		21" RECOVERY		
17.5					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/10/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-40-1

Contract: 25-113-01

Boring Location: Sta. 695+69, 210.00' Lt. C.L.

Boring Surface Elev.: + 31.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of: To:
From Depth of: 0.0 To: 14.0

Water Level Readings
Date 1/26/09
Time

Time

Depth of Hole 16.0

Depth of Casing

Depth of Water 5.6

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: J. Truver

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/26/09	1	1.0'	3 3 3	Moist firm brown coarse sandy silt w/ some fine sand and clay, trace of gravel.	A-4(0)	Cultivated Soil - 8"
		2	2.0' 2.5'	3 2 2 1	Moist very loose brown silty coarse sand w/ some gravel and fine sand. 10" RECOVERY	A-1-b	
3.5			4.0'		13" RECOVERY		
		3	4.0'	1 2 4 4	Moist loose brown coarse sand w/ some fine sand and gravel, trace of silt.	A-1-b	
			6.0'		18" RECOVERY		
7		4	6.0'	1 5 9 6	Moist medium dense brown coarse sand and gravel w/ some fine sand and silt.	A-1-b	
			8.0'		17" RECOVERY		
		5	8.0'	10 4 3 3	Wet loose yellow and black mottled fine to coarse sand w/ some gravel and silt.	A-2-4(0)	
			10.0'		20" RECOVERY		
10.5		6	10.0'	2 3 3 4	Wet loose yellow and black mottled fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			12.0'		18" RECOVERY		
		7	12.0'	W/R W/R 4 4	Wet very loose orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			14.0'		9" RECOVERY		
14		8	14.0'	6 9 16 21	Wet medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
			16.0'		14" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/26/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-41-1

Contract: 25-113-01

Boring Location: Sta. 713+82, 74.00' Lt. C.L.

Boring Surface Elev.: + 45.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Spoon	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/9/09		16.0		Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/9/09	1	1.0'	1	12" RECOVERY	A-4(10)	Cultivated Soil - 9"
			2.0'	3			
		2	2.0'	12	16" RECOVERY	A-4(0)	
				10			
3.5				15			
				14			
		3	4.0'	2	13" RECOVERY	A-1-b	
			4.0'	8			
				8			
		4	6.0'	8	20" RECOVERY	A-1-b	
				8			
7				9			
		5	8.0'	4	17" RECOVERY	A-2-4(0)	
				7			
				8			
				6			
		6	10.0'	8	24" RECOVERY	A-1-b	
				9			
				7			
		7	12.0'	4	23" RECOVERY	A-1-b	
				5			
				5			
14				6			
		8	14.0'	6	22" RECOVERY	A-1-b	
				7			
				9			
				4			
			16.0'		End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Poorly graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/9/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-42-1

Contract: 25-113-01

Boring Location: Sta. 717+39, 372.00' Lt. C.L.

Boring Surface Elev.: + 39.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings
Date 2/9/09
Time

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/9/09	1	1.0'	9	Moist medium dense orange coarse sand w/ some fine sand, trace of silt and gravel.	A-1-b	Cultivated Soil - 8"
			2.0'	8			
3.5		2	2.0'	8	12" RECOVERY	A-2-4(0)	
			4.0'	8	Moist medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			4.0'	6			
		3	4.0'	2	24" RECOVERY	A-2-4(0)	
			6.0'	2	19" RECOVERY	A-2-4(0)	
7		4	6.0'	2	Moist loose orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			8.0'	3	17" RECOVERY	A-3	
		5	8.0'	2	Moist very loose orange fine to coarse sand, trace of silt.	A-3	
			10.0'	2	18" RECOVERY	A-2-4(0)	
10.5		6	10.0'	2	Moist very loose yellow fine to coarse sand w/ some silt.	A-2-4(0)	
			12.0'	2	19" RECOVERY	A-1-b	
		7	12.0'	2	Moist loose yellow coarse to fine sand, trace of silt.	A-1-b	
14			14.0'	2	20" RECOVERY	A-1-b	
		8	14.0'	2	Moist loose brown coarse to fine sand, trace of silt and gravel.	A-1-b	
			16.0'	4	22" RECOVERY		
17.5					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded sand
with silt



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/9/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-43-1

Contract: 25-113-01

Boring Location: Sta. 727+00, 432.00' Lt. C.L.

Boring Surface Elev.: + 45.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings
Date 2/9/09
Time

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/9/09	1	0.5'	3 4 5	Moist stiff brown clayey silt w/ some coarse sand, trace of fine sand.	A-4(6)	Topsoil - 6".
			2.0'		12" RECOVERY		
		2	2.0'	4 4 4 4	Moist firm brown fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
3.5			4.0'		18" RECOVERY		
		3	4.0'	3 4 6 5	Moist loose brown silty coarse to fine sand w/ some gravel.	A-2-4(0)	
			6.0'		16" RECOVERY		
		4	6.0'	7 3 5 7	Moist loose orange coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
7			8.0'		20" RECOVERY		
		5	8.0'	1 4 4 5	Moist loose yellow coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			10.0'		13" RECOVERY		
		6	10.0'	6 6 6 6	Moist medium dense yellow coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
10.5			12.0'		20" RECOVERY		
		7	12.0'	3 4 5 6	Moist loose orange-yellow coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
14			14.0'		16" RECOVERY		
		8	14.0'	6 6 6 6	Moist medium dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			16.0'		18" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/9/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-44-1

Contract: 25-113-01

Boring Location: Sta. 108+82, 148' Rt. C.L.

Boring Surface Elev.: 66.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
9/29/2009

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

66.0
66.0
66.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: Gary Truver

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/29/09	1	0.5'	3 3 4	Wet firm brown clayey silt w/trace of fine sand.	A-4(8)	Topsoil - 6".
			2.0'		13" RECOVERY		
3.5		2	2.0'	11 11 14 13	Wet very stiff brownish tan mottled clay w/some fine sand, trace of gravel and coarse sand.	A-6(7)	
			4.0'		23" RECOVERY		
		3	4.0'	2 6 8 11	Wet stiff orangish green mottled fine sandy clay w/trace of coarse sand.	A-7-5(15)	
			6.0'		21" RECOVERY		
7		4	6.0'	9 18 22 24	Saturated hard orangish green mottled clay w/some fine sand, trace of coarse sand.	A-7-5(29)	
			8.0'		21" RECOVERY		
		5	8.0'	6 6 11 14	Saturated very stiff greenish orange mottled fine sandy clay w/trace of coarse sand.	A-7-5(29)	USDA Classifica - Clay.
10.5			10.0'		23" RECOVERY		
		6	10.0'	9 11 14 16	Saturated very stiff greenish orange clay w/some fine sand, trace of coarse sand.	A-7-5(16)	Glaucunit
			12.0'		23" RECOVERY		
		7	12.0'	2 3 4 4	Saturated firm greenish orange fine sandy clay w/some coarse sand, trace of gravel.	A-6(2)	Glaucunit
14			14.0'		22" RECOVERY		
		8	14.0'	4 13 25 26	Saturated dense greenish orange clayey fine to coarse sand w/trace of gravel.	A-2-6(0)	Glaucunit
			16.0'		23" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Low plasticity
clay



Elastic silt



Silty sand

DRAFT
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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/29/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-7-1

Contract: 25-113-01

Boring Location: Sta. 495+50, 300.00' Rt. C.L.

Boring Surface Elev.: + 50.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 16.0

Water Level Readings

Date
2/27/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
10.1

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: J. Truver

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/27/09	1	0.5'	5 3 4	Moist firm brown clayey coarse to fine sandy silt, trace of gravel.	A-4(0)	Topsoil - 5".
			2.0'		18" RECOVERY		
3.5		2	2.0'	1 5 8 6	Wet stiff gray and orange mottled clayey silt w/ some gravel, trace of fine to coarse sand.	A-4(6)	
			4.0'		20" RECOVERY		
		3	4.0'	6 6 6 7	Wet stiff gray and orange mottled clay, trace of fine to coarse sand.	A-6(12)	
			6.0'		19" RECOVERY		
7		4	6.0'	1 5 5 6	Wet stiff brown and green fine sandy clay, trace of coarse sand.	A-6(2)	
			8.0'		19" RECOVERY		
		5	8.0'	2 2 4 4	Saturated firm brown and green fine sandy clay, trace of coarse sand and gravel.	A-6(2)	
			10.0'		15" RECOVERY		
10.5		6	10.0'	3 6 5 5	Saturated stiff brown and green clayey fine sandy silt, trace of coarse sand.	A-4(2)	
			12.0'		20" RECOVERY		
		7	12.0'	4 7 7 9	Saturated stiff green and brown fine sandy clay w/ some coarse sand, trace of gravel.	A-6(2)	
14			14.0'		18" RECOVERY		
		8	14.0'	4 6 6 7	Saturated stiff green and brown fine sandy clay w/ some coarse sand, trace of gravel.	A-6(4)	Glauconit
			16.0'		19" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Low plasticity
clay



Clayey sand



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/27/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-9-1

Contract: 25-113-01

Boring Location: Sta. 506+14, 199.00' Rt. C.L.

Boring Surface Elev.: + 55.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings
Date 2/25/09
Time

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
7.2

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: J. Truver

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/25/09	1	0.5'	2 2 2	Moist soft brown clayey silt w/ some gravel and fine sand, trace of coarse sand. 16" RECOVERY	A-4(2)	Topsoil - 6".
3.5		2	2.0'	11 11 8 14	Moist medium dense brown coarse sand and gravel w/ some fine sand, trace of silt. 18" RECOVERY	A-1-b	
		3	4.0'	11 18 19 30	Moist dense brown coarse sand and gravel w/ some fine sand and silt. 19" RECOVERY	A-1-b	
7		4	6.0'	11 11 13 14	Wet medium dense brown coarse sand and gravel w/ some fine sand and silt. 22" RECOVERY	A-1-b	
		5	8.0'	7 8 11 14	Wet medium dense brown coarse to fine sand and gravel w/ some silt. 11" RECOVERY	A-1-b	
10.5		6	10.0'	4 4 13 18	Wet medium dense brown coarse to fine sand w/ some silt, trace of gravel. 17" RECOVERY	A-1-b	
		7	12.0'	7 10 11 13	Saturated very stiff brown and green fine sandy clay w/ some coarse sand, trace of gravel. 20" RECOVERY	A-6(1)	
14		8	14.0'	8 9 11	Saturated very stiff brown and green fine sandy clay w/ some coarse sand, trace of gravel. 20" RECOVERY	A-7-6(2)	
			16.0'		End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Well graded sand
with silt



Poorly graded sand
with silt



Silty sand

DRAFT
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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/25/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: TP-3-02

Contract: 25-113-01

Boring Location: Sta. 453+96.99, 133' Rt. C.L.

Boring Surface Elev.: + 64.30'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 40.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/12/2008		14.0'	12.0'	9.8'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	40.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: Jef Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	3 5 7 11	Wet stiff light brown silt w/ some clay, trace of fine to coarse sand and gravel.	A-4(4)	
2.49		2	2.0'	5 9 12 15	11" RECOVERY Wet very stiff light brown and gray silt w/ some clay and fine to coarse sand, trace of gravel.	A-4(1)	
4.98		3	4.0'	7 11 13 12	18" RECOVERY Wet medium dense gray coarse to fine sand w/ some clay, trace of gravel.	A-2-4(0)	
7.47		4	6.0'	7 8 10 11	20" RECOVERY Wet medium dense light brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
9.96		5	8.0'	3 5 3 3	20" RECOVERY Wet loose light brown coarse sand w/ some silt, fine sand, and gravel.	A-1-b	
12.45		6	10.0'	6 7 8 9	20" RECOVERY Saturated medium dense light brown coarse sand and gravel w/ some silt and fine sand.	A-1-b	
		7	12.0'	2 5 6 5	24" RECOVERY Saturated medium dense light brown gravel and coarse sand w/ some fine sand and silt.	A-1-b	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	7 8 9 17	18" RECOVERY Saturated medium dense light brown gravel and coarse sand, trace of fine sand and silt.	A-1-b	
17.43		9	16.0' 16.0'	8 9 12 11	10" RECOVERY No Sample Recovery		
19.92		10	18.0' 18.0'	17 25 7 7	0" RECOVERY Saturated dense light brown gravel and coarse sand w/ some fine sand and silt.	A-1-a	
22.41		11	20.0' 20.0'	8 9 12 13	6" RECOVERY Saturated medium dense brown and green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
24.9		12	22.0' 22.0'	6 9 9 12	12" RECOVERY Saturated medium dense dark brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
27.39		13	24.0' 24.0'	4 4 7 9	18" RECOVERY Saturated medium dense brown clayey fine sand, trace of coarse sand and gravel.	A-2-4(0)	
29.88		14	26.0' 26.0'	10 10 9 11	21" RECOVERY Saturated very stiff greenish brown fine sandy silt, trace of coarse sand and gravel.	A-6(1)	
32.37		15	28.0' 28.0'	5 7 9 11	24" RECOVERY Saturated medium dense greenish brown silty fine sand, trace of coarse sand.	A-2-4(0)	
34.86		16	30.0' 30.0'	7 7 7 12	24" RECOVERY Saturated medium dense gray and brown fine sand w/ some clay, trace of coarse sand and gravel.	A-2-4(0)	
37.35		17	32.0' 32.0'	7 7 7 8	24" RECOVERY Saturated medium dense gray green silty fine sand w/ some coarse sand.	A-2-4(0)	
		18	34.0' 34.0'	5 6 7 8	18" RECOVERY Saturated stiff gray green clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
		19	36.0' 36.0'	10 8 11 11	8" RECOVERY Saturated medium dense gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			38.0'		24" RECOVERY		
		20	38.0'	9 11 11	Saturated medium dense gray and green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
39.84			40.0'		24" RECOVERY		
					Boring Terminated at 40.0 feet		
42.33							
44.82							
47.31							
49.8							
52.29							
54.78							
57.27							
59.76							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a CME 55
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: TP-3-03

Contract: 25-113-01

Boring Location: Sta. 456+43.19, 295' Rt. C.L.

Boring Surface Elev.: + 65.85'

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:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0	To:	40.0

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/13/2008		14.0'	12.0'	10.0'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	40.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 2 3	Wet soft brown clayey fine sandy silt, trace of gravel.	A-4(3)	
2.49		2	2.0'	6 10 9 7	20" RECOVERY Wet very stiff gray silt w/ some fine to coarse sand and clay, trace of gravel.	A-4(0)	
4.98		3	4.0'	3 10 12 10	20" RECOVERY Wet very stiff gray clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
7.47		4	6.0'	9 10 10 10	16" RECOVERY Wet medium dense light brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
9.96		5	8.0'	3 6 6 7	21" RECOVERY Wet stiff gray clayey coarse sandy silt w/ some fine sand, trace of gravel.	A-4(1)	
12.45		6	10.0'	6 4 3 3	18" RECOVERY Saturated loose gray fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
		7	12.0'	1 1 3 2	18" RECOVERY Saturated very loose gray coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	4 4 3 4	16" RECOVERY Saturated loose gray silty gravel w/ some coarse to fine sand.	A-2-4(0)	
17.43		9	16.0' 16.0'	2 4 3 5	7" RECOVERY Saturated firm light brown fine sandy silt w/ some gravel and coarse sand.	A-4(0)	
19.92		10	18.0' 18.0'	8 4 4 4	8" RECOVERY Saturated loose green silty coarse to fine sand w/ some gravel.	A-1-b	
22.41		11	20.0' 20.0'	3 3 4 6	14" RECOVERY Saturated loose green silty coarse to fine sand, trace of gravel.	A-2-4(0)	
24.9		12	22.0' 22.0'	7 12 13 14	12" RECOVERY Saturated very stiff green fine sandy silt, trace of coarse sand.	A-6(1)	
27.39		13	24.0' 24.0'	6 7 7 8	10" RECOVERY Saturated medium dense brown silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
29.88		14	26.0' 26.0'	8 11 14 15	16" RECOVERY Saturated medium dense brown silty fine to coarse sand.		pH Testing
32.37		15	28.0' 28.0'	7 8 11 12	24" RECOVERY Saturated medium dense brown silty fine sand, trace of gravel and coarse sand.	A-2-4(0)	
34.86		16	30.0' 30.0'	8 9 9 9	16" RECOVERY Saturated medium dense brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
		17	32.0' 32.0'	6 8 11 11	24" RECOVERY Saturated medium dense gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
		18	34.0' 34.0'	7 8 11 14	10" RECOVERY Saturated medium dense gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
37.35		19	36.0' 36.0'	8 12 13 14	15" RECOVERY Saturated medium dense gray and green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			38.0'		24" RECOVERY		
		20	38.0'	8 18 23 28	Saturated dense gray and green silty fine to coarse sand, trace of gravel.	A-2-4(0)	
39.84			40.0'		24" RECOVERY		
					Boring Terminated at 40.0 feet		
42.33							
44.82							
47.31							
49.8							
52.29							
54.78							
57.27							
59.76							

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KEY TO SYMBOLS

Symbol Description

Strata symbols

	Low plasticity clay
	Silty low plasticity clay
	Poorly graded clayey silty sand
	Silty sand
	Poorly graded sand with silt
	Clayey sand

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Notes:

1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a CME 55
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01
Boring Location: Sta. 458+49.56, 518' Rt. C.L.
Boring Surface Elev.: + 64.26'

Boring No.: TP-3-04

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Reference:

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 40.0	

Water Level Readings					
Date 3/18/2008	Time	Depth of Hole 14.0'	Depth of Casing 12.0'	Depth of Water 10.0'	Elev. of Water

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 40.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: 3 No. of U-Sample Boring: Ft.
 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 2 2 2	Wet soft brown clayey silt, trace of fine to coarse sand and gravel.	A-4(7)	
2.49		2	2.0'	4 6 8 10	11" RECOVERY Wet stiff light brown clayey fine sandy silt w/ some coarse sand and gravel.	A-4(0)	
4.98		3	4.0'	3 5 8 7	17" RECOVERY Wet medium dense light brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
7.47		4	6.0'	7 9 8 6	17" RECOVERY Wet medium dense light brown coarse sand w/ some silt and fine sand, trace of gravel.	A-1-b	
9.96		5	8.0'	4 5 5	18" RECOVERY Wet loose light brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
12.45		6	10.0'	3 6 9 9	17" RECOVERY Saturated medium dense light brown silty coarse to fine sand and gravel.	A-1-b	
		7	12.0'	6 15 18 20	12" RECOVERY Saturated dense orange gravel and coarse sand w/ some silt and fine sand.	A-1-a	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	4 4 5 7	10" RECOVERY Saturated loose brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
17.43		9	16.0' 16.0'	6 10 11 13	12" RECOVERY Saturated medium dense brown clayey fine sand w/ some coarse sand.	A-2-6(1)	
19.92		10	18.0' 18.0'	4 8 11 11	14" RECOVERY Saturated medium dense brown clayey fine sand w/ some coarse sand, trace of gravel.	A-2-6(1)	
22.41		11	20.0' 20.0'	6 7 11 12	7" RECOVERY Saturated very stiff brown fine sandy silt w/ some coarse sand.	A-6(1)	
24.9		12	22.0' 22.0'	6 6 8 12	18" RECOVERY Saturated medium dense brown silty fine sand, trace of coarse sand.	A-2-4(0)	
27.39		13	24.0' 24.0'	2 6 10 9	10" RECOVERY Saturated very stiff brown fine sandy silt, trace of coarse sand.	A-4(0)	
29.88		14	26.0' 26.0'	8 12 13 14	16" RECOVERY Saturated very stiff brown and green fine sandy silt, trace of coarse sand.	A-4(0)	
32.37		15	28.0' 28.0'	4 8 11 10	11" RECOVERY Saturated medium dense green silty fine sand, trace of coarse sand.	A-2-4(0)	
34.86		16	30.0' 30.0'	10 12 15 17	18" RECOVERY Saturated very stiff green clayey fine sandy silt, trace of coarse sand.	A-4(1)	
37.35		17	32.0' 32.0'	6 12 13 12	16" RECOVERY Saturated medium dense green silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
		18	34.0' 34.0'	8 10 12 15	20" RECOVERY Saturated medium dense green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
		19	36.0' 36.0'	4 15 16 24	19" RECOVERY Saturated dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			38.0'		17" RECOVERY		
		20	38.0'	11 21 24 32	Saturated dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	
39.84			40.0'		14" RECOVERY		
					Boring Terminated at 39.2 feet		
42.33							
44.82							
47.31							
49.8							
52.29							
54.78							
57.27							
59.76							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Clayey sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: TP-3-05

Contract: 25-113-01

Boring Location: Sta. 452+34.19 379, Rt. C.L.

Boring Surface Elev.: + 61.64'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	40.0
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/13/2008		12.0'	10.0'	8.5'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	40.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: Jeff Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	3 3 3 12	Wet firm light brown silt w/ some clay, trace of fine to coarse sand and gravel.	A-4(2)	
2.49		U-1	2.0'		12" RECOVERY Wet orange clayey fine to coarse sand.	A-2-4(0)	Press Sample - Shelby Tube
4.98		3	4.0'	4 5 6 6	23" RECOVERY Wet medium dense light brown silty coarse to fine sand, trace of gravel.	A-1-b	
7.47		4	6.0'	10 12 10 23	24" RECOVERY Wet medium dense light brown silty gravel and fine sand w/ some coarse sand.	A-1-b	
9.96		5	8.0'	4 4 5 6	18" RECOVERY Saturated loose light brown coarse to fine sand w/ some silt and gravel.	A-1-b	
12.45		6	10.0'	5 6 10 8	20" RECOVERY Saturated medium dense light brown coarse to fine sand and gravel w/ some silt.	A-1-b	
		7	12.0'	8 6 5 6	24" RECOVERY Saturated medium dense brown silty fine to coarse sand w/ some gravel.	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	6 7 8 9	14" RECOVERY Saturated medium dense brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
17.43		9	16.0' 16.0'	8 10 9 11	16" RECOVERY Saturated medium dense brown silty fine sand w/ some coarse sand.	A-2-4(0)	
19.92		10	18.0' 18.0'	4 6 10 10	24" RECOVERY Saturated medium dense brown clayey fine sand, trace of coarse sand and gravel.	A-2-6(1)	
22.41		11	20.0' 20.0'	13 14 15 15	17" RECOVERY Saturated medium dense brown silty fine sand w/ some coarse sand.	A-2-4(0)	
24.9		12	22.0' 22.0'	6 6 6 6	24" RECOVERY Saturated stiff brown fine sandy clay, trace of coarse sand and gravel.	A-6(2)	
27.39		13	24.0' 24.0'	6 7 11 12	6" RECOVERY Saturated very stiff brown fine sandy clay, trace of coarse sand.	A-6(2)	
29.88		14	26.0' 26.0'	12 12 13 12	12" RECOVERY Saturated very stiff brown and gray fine sandy clay, trace of coarse sand.	A-6(1)	
32.37		15	28.0' 28.0'	8 8 13 14	18" RECOVERY Saturated medium dense gray silty fine sand, trace of coarse sand.	A-2-4(0)	
34.86		16	30.0' 30.0'	12 15 10 18	8" RECOVERY Saturated hard gray fine sandy clay, trace of coarse sand.	A-6(2)	
		17	32.0' 32.0'	6 13 14 14	12" RECOVERY Saturated very stiff gray fine sandy clay, trace of coarse sand and gravel.	A-6(1)	
		18	34.0' 34.0'	8 16 20 21	16" RECOVERY Saturated dense gray clayey fine sand w/ some coarse sand, trace of gravel.	A-2-6(0)	
37.35		19	36.0' 36.0'	13 14 25 31	17" RECOVERY Saturated dense gray and green clayey fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			38.0'		18" RECOVERY		
		20	38.0'	3 6 13 20	Saturated medium dense gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	
39.84			40.0'		24" RECOVERY		
					Boring Terminated at 40.0 feet		
42.33							
44.82							
47.31							
49.8							
52.29							
54.78							
57.27							
59.76							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Clayey sand



Poorly graded clayey
silty sand

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Notes:

1. Exploratory borings were drilled on 3/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a CME 55
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: TP-3-06W

Contract: 25-113-01

Boring Location: Sta. 454+80.40, 542' Rt. C.L.

Boring Surface Elev.: + 62.49'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	
Hollow Stem Auger:			From Depth of:		To:	40.0

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/19/2008		12.0'	10.0'	8.8'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	40.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Carperation
Driller: Gary Truver Sr.
Helpers: Dan Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 2 2 2	Wet soft brown clayey silt w/ some fine sand, trace of coarse sand and gravel.	A-4(3)	
2.49		2	2.0'	3 3 6 8	11" RECOVERY Wet stiff brown fine sandy silt w/ some gravel, coarse sand, and clay.	A-4(0)	
4.98		3	4.0'	8 18 21 19	15" RECOVERY Wet dense light brown silty coarse sand w/ some fine sand and gravel.	A-1-b	
7.47		4	6.0'	16 17 12 14	21" RECOVERY Wet medium dense light brown silty coarse sand w/ some fine sand, trace of gravel.	A-2-4(0)	
9.96		5	8.0'	7 7 9 9	24" RECOVERY Wet medium dense light brown silty fine to coarse sand w/ some gravel.	A-2-4(0)	
12.45		6	10.0'	15 16 17 16	22" RECOVERY Saturated dense light brown coarse sand and gravel w/ some silt and fine sand.	A-1-b	
		7	12.0'	5 8 7 8	17" RECOVERY Saturated medium dense light brown coarse sand and gravel w/ some fine sand, trace of silt.	A-1-b	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-06W

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0'	1	21" RECOVERY	A-1-b	
			14.0'	2 4 10	Saturated loose light brown coarse to fine sand w/ some gravel, trace of silt.		
17.43		9	16.0'	20	20" RECOVERY	A-1-b	
			16.0'	30 16 10	Saturated dense light brown coarse sand and gravel w/ some fine sand, trace of silt.		
19.92		10	18.0'	3	20" RECOVERY	A-7-6(9)	
			18.0'	5 8 9	Saturated stiff brown fine sandy clay w/ some coarse sand, trace of gravel.		
22.41		11	20.0'	10	16" RECOVERY	A-7-6(4)	
			20.0'	12 14 17	Saturated very stiff fine sandy clay, trace of coarse sand.		
24.9		12	22.0'	6	15" RECOVERY	A-2-4(0)	
			22.0'	8 8 9	Saturated medium dense brown silty fine sand w/ some coarse sand.		
27.39		13	24.0'	1	21" RECOVERY	A-2-4(0)	
			24.0'	6 13 17	Saturated medium dense brown silty fine sand, trace of coarse sand.		
29.88		14	26.0'	4	15" RECOVERY	A-4(0)	
			26.0'	7 8 12	Saturated stiff brown fine sandy silt w/ some clay, trace of coarse sand.		
32.37		15	28.0'	6	21" RECOVERY	A-2-4(0)	
			28.0'	6 9 13	Saturated medium dense brown silty fine sand, trace of coarse sand.		
34.86		16	30.0'	12	20" RECOVERY	A-4(0)	
			30.0'	14 17 19	Saturated hard brown fine sandy silt, trace of coarse sand.		
37.35		17	32.0'	6	22" RECOVERY	A-4(0)	
			32.0'	9 11 13	Saturated very stiff green fine to coarse sandy silt.		
		18	34.0'	4	15" RECOVERY	A-2-4(0)	
			34.0'	7 10 11	Saturated medium dense green silty fine sand w/ some coarse sand, trace of gravel.		
		19	36.0'	8	20" RECOVERY	A-2-4(0)	
			36.0'	10 11 12	Saturated medium dense green silty fine sand w/ some coarse sand, trace of gravel.		

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-06W

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			38.0'		17" RECOVERY		
		20	38.0'	12 15 15 19	Saturated medium dense green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
39.84			40.0'		20" RECOVERY		
					Boring Terminated at 39.7 feet		
42.33							
44.82							
47.31							
49.8							
52.29							
54.78							
57.27							
59.76							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols

 Silty low plasticity clay

 Poorly graded clayey silty sand

 Silty sand

 Poorly graded sand with silt

 Well graded sand with silt

 Well graded sand

 Clayey sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/19/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a CME 55
2. Groundwater levels recorded at the time of drilling. Well constructed upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: TP-3-07

Contract: 25-113-01

Boring Location: Sta. 456+86.76, 765' Rt. C.L.

Boring Surface Elev.: + 63.35'

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: 40.0	

Water Level Readings					
Date 3/18/2008	Time	Depth of Hole 16.0'	Depth of Casing 14.0'	Depth of Water 12.0'	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	40.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 3 3 2	Wet firm light brown clayey silt, trace of fine to coarse sand and gravel.	A-4(7)	
2.49		2	2.0'	10 9 9 7	10" RECOVERY Wet very stiff light brown fine to coarse sandy silt, trace of gravel.	A-4(0)	
4.98		3	4.0'	4 6 6 9	14" RECOVERY Wet medium dense light brown silty fine sand, trace of coarse sand.	A-2-4(0)	
7.47		4	6.0'	6 5 5 5	20" RECOVERY Wet loose light brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
9.96		5	8.0'	3 2 3	20" RECOVERY Wet very loose light brown coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
12.45		6	10.0'	3 4 3 4	16" RECOVERY Wet loose light brown silty coarse to fine sand w/ some gravel.	A-2-4(0)	
		7	12.0'	3 2 3 3	15" RECOVERY Saturated loose light brown coarse sand and gravel w/ some silt and fine sand.	A-1-b	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	6 4 4 9	14" RECOVERY Saturated loose orange coarse sand w/ some gravel, silt, and fine sand.	A-1-b	
17.43		9	16.0' 16.0'	12 10 6 8	16" RECOVERY Saturated medium dense green and brown silty fine to coarse sand w/ some gravel.	A-2-4(0)	
19.92		10	18.0' 18.0'	6 8 11 14	15" RECOVERY Saturated medium dense green and brown silty fine sand w/ some coarse sand.	A-2-4(0)	
22.41		11	20.0' 20.0'	9 10 17 19	16" RECOVERY Saturated medium dense green and brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
24.9		12	22.0' 22.0'	2 5 7 10	17" RECOVERY Saturated stiff green fine sandy silt, trace of coarse sand.	A-4(0)	
27.39		13	24.0' 24.0'	2 8 12 14	17" RECOVERY Saturated medium dense green fine sand w/ some silt and coarse sand.	A-2-4(0)	
29.88		14	26.0' 26.0'	10 15 21 20	15" RECOVERY Saturated dense green silty fine sand, trace of coarse sand.	A-2-4(0)	
32.37		15	28.0' 28.0'	3 8 14 19	16" RECOVERY Saturated medium dense green fine sand w/ some silt and coarse sand.	A-2-4(0)	
34.86		16	30.0' 30.0'	10 13 20 30	19" RECOVERY Saturated dense green silty fine sand, trace of coarse sand.	A-2-4(0)	
37.35		17	32.0' 32.0'	5 12 18 22	23" RECOVERY Saturated medium dense green silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
		18	34.0' 34.0'	4 8 13 15	16" RECOVERY Saturated medium dense green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
		19	36.0' 36.0'	11 16 30 40	17" RECOVERY Saturated dense green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			38.0'		22" RECOVERY		
		20	38.0'	16 25 39 39	Saturated very dense green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
39.84			40.0'		14" RECOVERY		
					Boring Terminated at 39.2 feet		
42.33							
44.82							
47.31							
49.8							
52.29							
54.78							
57.27							
59.76							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: TP-3-08

Contract: 25-113-01

Boring Location: Sta. 459+72.81, 867' Rt. C.L.

Boring Surface Elev.: + 56.9'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0	To:	40.0

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/19/2008		14.0'	12.0'	9.7'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	40.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	5 6 4 7	Wet stiff brown clayey coarse sandy silt w/ some fine sand and gravel.	A-4(2)	
		Bulk			Wet brown clayey fine to coarse sand.	A-6(1)	
2.49		2	2.0'	8 6 6 6	9" RECOVERY Wet medium dense tan fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
4.98		3	4.0'	2 11 19 21	17" RECOVERY Wet medium dense tan gravel and fine sand w/ some coarse sand and silt.	A-1-b	
7.47		4	6.0'	11 14 13 13	13" RECOVERY No Sample Recovery		
9.96		5	8.0'	3 4 6 10	0" RECOVERY Wet loose brown clayey fine sand w/ some coarse sand, trace of gravel.	A-2-6(1)	
12.45		6	10.0'	8 9 11 14	18" RECOVERY Saturated very stiff brown fine sandy clay w/ some coarse sand.	A-6(1)	
		7	12.0'	2 3 4 7	22" RECOVERY Saturated loose green and brown clayey fine sand w/ some coarse sand, trace of gravel.	A-2-6(0)	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0'	3	15" RECOVERY	A-4(0)	
			14.0'	4 8 8	Saturated medium dense green and brown clayey fine sandy silt w/ some coarse sand.		
17.43		9	16.0'	6	13" RECOVERY	A-2-4(0)	
			16.0'	11 13 11	Saturated medium dense green and brown silty fine sand w/ some coarse sand.		
19.92		10	18.0'	7	15" RECOVERY	A-2-4(0)	
			18.0'	5 11 18	Saturated medium dense green and brown silty fine sand, trace of coarse sand.		
22.41		11	20.0'	11	15" RECOVERY	A-2-4(0)	
			20.0'	16 13 21	Saturated medium dense green brown silty fine sand, trace of coarse sand.		
24.9		12	22.0'	8	12" RECOVERY	A-2-4(0)	
			22.0'	11 17 22	Saturated medium dense green brown silty fine sand, trace of coarse sand.		
27.39		13	24.0'	5	15" RECOVERY	A-2-4(0)	
			24.0'	6 7	Saturated medium dense dark green silty fine sand, trace of coarse sand and gravel.		
29.88		14	26.0'	11	14" RECOVERY	A-2-4(0)	
			26.0'	14 18 21	Saturated dense dark green silty fine sand, trace of coarse sand.		
32.37		15	28.0'	1	24" RECOVERY	A-2-4(0)	
			28.0'	7 13 16	Saturated medium dense dark green silty fine to coarse sand, trace of gravel.		
34.86		16	30.0'	13	14" RECOVERY	A-2-4(0)	
			30.0'	16 18 24	Saturated dense dark green silty fine sand w/ some coarse sand, trace of gravel.		
37.35		17	32.0'	7	13" RECOVERY	A-2-4(0)	
			32.0'	11 16 16	Saturated medium dense dark green silty fine to coarse sand, trace of gravel.		
		18	34.0'	9	17" RECOVERY	A-2-4(0)	
			34.0'	11 22 13	Saturated dense dark green silty fine to coarse sand, trace of gravel.		
		19	36.0'	11	16" RECOVERY	A-4(0)	
			36.0'	50/5"	Saturated hard dark green fine sandy silt w/ some coarse sand, trace of gravel.		
			37.0'		9" RECOVERY		

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: TP-3-08

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		20	38.0'	25 37 50/3"	Saturated hard dark green fine sandy silt w/ some coarse sand, trace of gravel and seashells. 14" RECOVERY	A-5(0)	
39.84			39.5'				
					Boring Terminated at 39.2 feet		
42.33							
44.82							
47.31							
49.8							
52.29							
54.78							
57.27							
59.76							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand

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Notes:

1. Exploratory borings were drilled on 3/19/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: TP-3-09

Contract: 25-113-01

Boring Location: Sta. 451+12.11, 563' Rt. C.L.

Boring Surface Elev.: + 58.18'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	40.0
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/13/2008		12.0'	10.0'	7.8'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	40.0	Ft.;	No. of:	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	Core Drilling in Rock:		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:						

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: Jeff Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	4 4 5 13	Moist stiff light brown gravelly silt w/ some coarse to fine sand.	A-4(0)	
2.49		2	2.0' 2.0'	22 20 42 27	16" RECOVERY Moist very dense orange brown gravel and coarse sand w/ some fine sand and silt.	A-1-b	
4.98		3	4.0' 4.0'	4 17 20 18	16" RECOVERY Wet dense orange brown coarse sand and gravel w/ some silt and fine sand.	A-1-b	
7.47		4	6.0' 6.0'	22 19 6 7	19" RECOVERY Wet medium dense brown clayey gravel w/ some fine to coarse sand.	A-1-b	
9.96		5	8.0' 8.0'	2 5 6 8	18" RECOVERY Saturated medium dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
12.45		6	10.0' 10.0'	4 5 7 8	18" RECOVERY Saturated medium dense brown silty fine sand w/ some gravel and coarse sand.	A-2-4(0)	
		7	12.0' 12.0'	5 8 8 9	16" RECOVERY Saturated very stiff brown fine sandy silt w/ some coarse sand.	A-4(0)	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-09

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	4 6 7 9	19" RECOVERY Saturated medium dense brown silty fine sand w/ some coarse sand.	A-2-4(0)	
17.43		9	16.0' 16.0'	2 6 10 14	10" RECOVERY Saturated medium dense dark brown silty fine sand w/ some coarse sand.	A-2-4(0)	
19.92		10	18.0' 18.0'	1 2 1 1	24" RECOVERY Saturated very loose brown silty fine sand w/ some coarse sand.	A-2-4(0)	
22.41		11	20.0' 20.0'	5 5 12 17	10" RECOVERY Saturated medium dense brown silty fine sand, trace of coarse sand.	A-2-4(0)	
24.9		12	22.0' 22.0'	8 13 15 18	17" RECOVERY Saturated very stiff green and gray fine sandy silt, trace of coarse sand.	A-4(0)	
27.39		13	24.0' 24.0'	7 11 11 10	20" RECOVERY Saturated very stiff gray fine sandy silt, trace of coarse sand.	A-4(0)	
29.88		14	26.0' 26.0'	8 13 15 18	17" RECOVERY Saturated very stiff gray and green fine sandy silt, trace of coarse sand.	A-4(0)	
32.37		15	28.0' 28.0'	4 6 8 14	20" RECOVERY Saturated stiff gray fine sandy silt, trace of coarse sand.	A-4(0)	
34.86		16	30.0' 30.0'	10 14 16 18	21" RECOVERY Saturated very stiff green and brown fine sandy silt w/ some coarse sand.	A-4(0)	
37.35		17	32.0' 32.0'	4 6 11 11	9" RECOVERY Saturated very stiff green and gray clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
		18	34.0' 34.0'	7 10 14 17	24" RECOVERY Saturated very stiff gray clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
		19	36.0' 36.0'	8 9 10 12	18" RECOVERY Saturated medium dense gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-09

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			38.0'		24" RECOVERY		
		20	38.0'	10 12 14 24	Saturated medium dense gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	
39.84			40.0'		24" RECOVERY		
					Boring Terminated at 40.0 feet		
42.33							
44.82							
47.31							
49.8							
52.29							
54.78							
57.27							
59.76							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Silt



Clayey sand

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Notes:

1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a CME 75
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01
Boring Location: Sta. 453+17.60, 788' Rt. C.L.
Boring Surface Elev.: + 59.94'

Boring No.: TP-3-10

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Reference:

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 40.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/13/2008		12.0'	10.0'	7.9'	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 40.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: 3 No. of U-Sample Boring: Ft.
 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: Jeff Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	4 4 5 6	Wet stiff light brown clayey silt, trace of fine to coarse sand and gravel.	A-4(6)	
		Bulk			Wet brown clayey fine to coarse sand with a trace of gravel.	A-2-4(0)	
2.49		U-1	2.0' 2.0'		20" RECOVERY Saturated orange sandy clay with some gravel.	A-4(3)	Press Sample - Shelby Tube
			3.3'		15" RECOVERY		
4.98		3	4.0'	14 15 6 5	Wet very stiff orange brown clayey coarse to fine sandy silt, trace of gravel.	A-4(0)	
			6.0'		12" RECOVERY		
7.47		4	6.0'	3 5 5 6	Wet loose brown silty coarse to fine sand w/ some gravel.	A-1-b	
			8.0'		14" RECOVERY		
9.96		5	8.0'	2 4 5 7	Saturated loose brown coarse to fine sand w/ some silt and gravel.	A-2-4(0)	
			10.0'		16" RECOVERY		
		6	10.0'	11 19 22 24	Saturated dense orange brown coarse sand w/ some gravel, fine sand, and silt.	A-1-b	
			12.0'		24" RECOVERY		
12.45		7	12.0'	30 37 15 13	Saturated very dense orange brown silty fine to coarse sand and gravel.	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-10

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	1 2 7 8	22" RECOVERY Saturated loose brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
17.43		9	16.0' 16.0'	8 18 17 17	15" RECOVERY Saturated dense brown silty fine sand w/ some coarse sand.	A-2-4(0)	
19.92		10	18.0' 18.0'	2 5 7 12	24" RECOVERY Saturated medium dense gray silty fine sand, trace of gravel.	A-2-4(0)	
22.41		11	20.0' 20.0'	16 17 17 18	10" RECOVERY Saturated dense gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
24.9		12	22.0' 22.0'	4 12 14 23	17" RECOVERY Saturated medium dense gray silty fine sand w/ some coarse sand.	A-2-4(0)	
27.39		13	24.0' 24.0'	7 8 15 17	20" RECOVERY Saturated medium dense gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
29.88		14	26.0' 26.0'	12 12 13 12	20" RECOVERY Saturated medium dense gray fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
32.37		15	28.0' 28.0'	7 15 21 27	24" RECOVERY Saturated dense gray silty fine sand, trace of coarse sand.	A-2-4(0)	
34.86		16	30.0' 30.0'	14 17 26 26	19" RECOVERY Saturated dense gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
37.35		17	32.0' 32.0'	4 4 14 15	20" RECOVERY Saturated medium dense green gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
		18	34.0' 34.0'	6 11 17 18	20" RECOVERY Saturated medium dense green gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
		19	36.0' 36.0'	24 24 23 30	17" RECOVERY Saturated dense gray green fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: TP-3-10

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			38.0'		24" RECOVERY		
		20	38.0'	30 32 37	Saturated very dense gray green fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
39.84			40.0'		24" RECOVERY		
					Boring Terminated at 40.0 feet		
42.33							
44.82							
47.31							
49.8							
52.29							
54.78							
57.27							
59.76							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a CME 75
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: TP-3-11

Contract: 25-113-01

Boring Location: Sta. 455+23.96, 1011' Rt. C.L.

Boring Surface Elev.: + 59.70'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: 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: 40.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/18/2008		12.0'	10.0'	7.3'	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 40.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 No. of: 3 Dia. U-Sample Boring: Ft.
 Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: Jeff Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	2 3 4 14	Moist firm brown silt w/ some fine sand and clay, trace of coarse sand and gravel.	A-4(2)	
2.49		2	2.0'	15 13 13 13	14" RECOVERY Moist medium dense light brown silty fine to coarse sand w/ some gravel.	A-2-4(0)	
4.98		3	4.0'	10 12 13 13	17" RECOVERY Moist medium dense light brown coarse sand and gravel w/ some fine sand, trace of silt.	A-1-b	
7.47		4	6.0'	6 1 5 4	15" RECOVERY Wet loose brown coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
9.96		5	8.0'	6 6 5 10	18" RECOVERY Saturated medium dense brown silty fine to coarse sand w/ some gravel.	A-2-4(0)	
12.45		6	10.0'	6 6 7 8	14" RECOVERY Saturated medium dense brown coarse sand and gravel w/ some silt and fine sand.	A-1-b	
		7	12.0'	2 4 6 20	24" RECOVERY Saturated loose brown coarse to fine sand w/ some gravel and silt.	A-1-b	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-11

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	5 20 25 18	24" RECOVERY Saturated dense brown silty fine to coarse sand and gravel.	A-1-b	
17.43		9	16.0' 16.0'	4 6 8 14	15" RECOVERY Saturated medium dense brown clayey fine sand w/ some coarse sand, trace of gravel.	A-2-7(1)	
19.92		10	18.0' 18.0'	4 3 7 8	12" RECOVERY Saturated loose brown green fine sand w/ some coarse sand and silt.	A-2-4(0)	
22.41		11	20.0' 20.0'	9 11 17 31	10" RECOVERY Saturated medium dense brown gray fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
24.9		12	22.0' 22.0'	5 9 10 15	24" RECOVERY Saturated medium dense green gray fine sand w/ some silt and coarse sand and gravel.	A-2-4(0)	
27.39		13	24.0' 24.0'	7 9 10 10	17" RECOVERY Saturated medium dense green gray fine sand w/ some silt and coarse sand.	A-2-4(0)	
29.88		14	26.0' 26.0'	9 11 17 16	20" RECOVERY Saturated medium dense green gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
32.37		15	28.0' 28.0'	6 10 22 20	15" RECOVERY Saturated dense green gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
34.86		16	30.0' 30.0'	10 12 13 12	20" RECOVERY Saturated medium dense green gray silty fine sand, trace of coarse sand.	A-2-4(0)	
37.35		17	32.0' 32.0'	6 10 24 28	24" RECOVERY Saturated dense green gray fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
		18	34.0' 34.0'	10 10 13 18	20" RECOVERY Saturated medium dense gray green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
		19	36.0' 36.0'	18 19 20 23	15" RECOVERY Saturated dense gray green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-11

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			38.0'		24" RECOVERY		
		20	38.0'	13 14 15 17	Saturated medium dense gray green silty fine to coarse sand, trace of gravel.	A-2-4(0)	
39.84			40.0'		20" RECOVERY		
					Boring Terminated at 40.0 feet		
42.33							
44.82							
47.31							
49.8							
52.29							
54.78							
57.27							
59.76							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a CME 75
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: TP-3-12W

Contract: 25-113-01

Boring Location: Sta. 458+10.01, 1113' Rt. C.L.

Boring Surface Elev.: + 57.56'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Sampler		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: 40.0	

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/18/2008			10.0'	8.0'	6.4'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 40.0	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: Gary Truver Sr.
Helpers: Dan Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	2 4 5 8	Moist stiff brown clay, trace of fine to coarse sand and gravel.	A-6(11)	
2.49		2	2.0'	6 15 23 25	18" RECOVERY Moist dense brown and light brown coarse to fine sand and gravel w/ some silt.	A-1-b	
4.98		3	4.0'	6 16 21 22	12" RECOVERY Moist dense light brown gravel and coarse sand w/ some fine sand, trace of silt.	A-1-b	
7.47		4	6.0'	16 26 26 29	14" RECOVERY Wet very dense light brown gravel w/ some silt and coarse to fine sand.	A-1-b	
9.96		5	8.0'	8 13 14 16	19" RECOVERY Saturated medium dense light brown coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
12.45		6	10.0'	18 8 7 13	23" RECOVERY Saturated medium dense light brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
		7	12.0'	3 9 12 13	15" RECOVERY Saturated medium dense brown silty fine sand w/ some coarse sand.	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-12W

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	3 4 6 8	12" RECOVERY Saturated loose green fine sandy clay w/ some coarse sand, trace of gravel.	A-7-6(4)	
17.43		9	16.0' 16.0'	7 10 13 18	21" RECOVERY Saturated medium dense green clayey fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
19.92		10	18.0' 18.0'	3 5 8 9	20" RECOVERY Saturated medium dense brown and green fine sand w/ some coarse sand and silt.	A-2-4(0)	
22.41		11	20.0' 20.0'	5 9 16 15	18" RECOVERY Saturated medium dense green fine sand w/ some silt and coarse sand.	A-2-4(0)	
24.9		12	22.0' 22.0'	W/R 1 5 7	21" RECOVERY Saturated loose green fine sand w/ some silt and coarse sand.	A-2-4(0)	
27.39		13	24.0' 24.0'	5 9 11 15	18" RECOVERY Saturated medium dense green fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
29.88		14	26.0' 26.0'	5 9 11 14	20" RECOVERY Saturated medium dense green silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
32.37		15	28.0' 28.0'	5 6 7 9	21" RECOVERY Saturated medium dense green fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
34.86		16	30.0' 30.0'	6 6 9 12	18" RECOVERY Saturated medium dense green fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
		17	32.0' 32.0'	17 14 14 15	20" RECOVERY Saturated medium dense green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
		18	34.0' 34.0'	4 5 6 11	21" RECOVERY Saturated medium dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	
37.35		19	36.0' 36.0'	8 13 15 16	21" RECOVERY Saturated medium dense green fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-12W

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			38.0'		14" RECOVERY		
		20	38.0'	12 14 22 29	Saturated dense green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
39.84			40.0'		18" RECOVERY		
					Boring Terminated at 39.5 feet		
42.33							
44.82							
47.31							
49.8							
52.29							
54.78							
57.27							
59.76							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



Clayey sand

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Notes:

1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a CME 55
2. Groundwater levels recorded at the time of drilling. Well constructed upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01
Boring Location: Sta. 455+58.66, 423' Rt. C.L.
Boring Surface Elev.: + 64.75'

Boring No.: TP-3-15A

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Barrel		O.D.	O.D. of Sampler: 2		IN.
S-Sampler:		O.D.	O.D. of Samp. Tube:		IN.
U-Sampler: Ball Sampler		O.D.	O.D. of Samp. Tube: 3		IN.
Core Bit:		O.D.	O.D. of Rock Core:		IN.

Reference:

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 40.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/19/2008		12.0'	10.0'	8.5'	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 40.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 No. of: 3 Dia. U-Sample Boring: Ft.
 Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: Jeff Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	2 3 3 4	Moist firm light brown clayey silt w/ some fine sand, trace of coarse sand and gravel.	A-4(5)	
2.49		U-1	2.0' 2.0'		12" RECOVERY Moist brown fine to coarse sand with some silt and gravel.	A-1-b	Press Sample - Shelby Tube
			3.3'		16" RECOVERY		
4.98		3	4.0'	6 8 10 8	Moist medium dense brown coarse to fine sand w/ some silt and gravel.	A-1-b	
			6.0'		15" RECOVERY		
7.47		4	6.0'	13 15 14 13	Moist medium dense brown silty coarse to fine sand w/ some gravel.	A-1-b	
			8.0'		20" RECOVERY		
9.96		5	8.0'	3 2 3	Wet loose light brown coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
			10.0'		17" RECOVERY		
12.45		6	10.0'	4 5 8 13	Saturated medium dense light brown silty coarse to fine sand w/ some gravel.	A-2-4(0)	
			12.0'		20" RECOVERY		
		7	12.0'	7 11 15 11	Saturated medium dense light brown gravel and coarse sand w/ some silt and fine sand.	A-1-a	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-15A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0'	4	16" RECOVERY	A-1-b	
			14.0'	6 7 8	Saturated medium dense light brown gravel and coarse sand w/ some fine sand and silt.		
17.43		9	16.0'	7	10" RECOVERY	A-1-b	
			16.0'	8 14 8	Saturated medium dense light brown gravel and fine to coarse sand w/ some silt.		
19.92		10	18.0'	8	16" RECOVERY	A-1-b	
			18.0'	8 25 25	Saturated dense light brown gravel w/ some fine to coarse sand and silt.		
22.41		11	20.0'	11	6" RECOVERY	A-2-4(0)	
			20.0'	12 12 13	Saturated medium dense brown fine sand w/ some gravel, coarse sand, and silt.		
24.9		12	22.0'	4	24" RECOVERY	A-2-4(0)	
			22.0'	4 12 13	Saturated medium dense brown silty fine sand w/ some gravel, trace of coarse sand.		
27.39		13	24.0'	6	14" RECOVERY	A-2-4(0)	
			24.0'	8 12 15	Saturated medium dense brown silty fine sand, trace of coarse sand and gravel.		
29.88		14	26.0'	6	15" RECOVERY	A-2-4(0)	
			26.0'	6 16 18 12	Saturated dense brown silty fine sand, trace of coarse sand.		
32.37		15	28.0'	10	14" RECOVERY	A-2-4(0)	
			28.0'	10 10 12	Saturated medium dense brown silty fine sand w/ some coarse sand, trace of gravel.		
34.86		16	30.0'	10	14" RECOVERY	A-2-4(0)	
			30.0'	10 12 14 16	Saturated medium dense brown silty fine sand, trace of coarse sand.		
37.35		17	32.0'	10	13" RECOVERY	A-4(0)	
			32.0'	10 10 10 15	Saturated very stiff brown fine sandy silt, trace of coarse sand.		
		18	34.0'	10	17" RECOVERY	A-2-4(0)	
			34.0'	10 12 13 15	Saturated medium dense gray silty fine sand w/ some coarse sand.		
		19	36.0'	10	10" RECOVERY	A-2-4(0)	
			36.0'	13 12 12	Saturated medium dense gray silty fine sand w/ some coarse sand.		

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-15A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			38.0'		16" RECOVERY		
		20	38.0'	7 9 13 19	Saturated medium dense gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	
39.84			40.0'		18" RECOVERY		
					Boring Terminated at 39.5 feet		
42.33							
44.82							
47.31							
49.8							
52.29							
54.78							
57.27							
59.76							

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Silty gravel



Poorly graded sand
with silt



Poorly graded gravel
with silt

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/19/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a CME 75
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: TP-3-1W

Contract: 25-113-01

Boring Location: Sta. 460+05.08, 267' Rt. C.L.

Boring Surface Elev.: + 62.92'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Splitt Barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	
Hollow Stem Auger:			From Depth of:		To:	50.0

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/17/2008		12.0'	10.0'	7.7'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	40.0	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: Gary Truver
Helpers: Dan Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	2 2 3 4	Moist firm brown clayey fine to coarse sandy silt, trace of gravel.	A-4(1)	
		Bulk			Wet brown clayey fine to coarse sand with a trace of gravel.	A-4(0)	
2.49		2	2.0'	4 4 3 3	10" RECOVERY Moist loose light brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			4.0'		8" RECOVERY		
4.98		3	4.0'	2 5 6 6	Moist medium dense light brown silty coarse to fine sand, trace of gravel.	A-1-b	
			6.0'		14" RECOVERY		
7.47		4	6.0'	2 6 16 26	Wet medium dense light brown and brown silty fine sand w/ some coarse sand and gravel.	A-2-4(0)	
			8.0'		17" RECOVERY		
		5	8.0'	18 16 27 15	Wet dense brown gravel w/ some fine to coarse sand and silt.	A-1-a	
			10.0'		14" RECOVERY		
9.96		6	10.0'	20 23 8 6	Saturated dense brown gravel w/ some coarse to fine sand and silt.	A-1-a	
			12.0'		17" RECOVERY		
12.45		7	12.0'	4 5 6 11	Saturated medium dense brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-1W

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	2 6 5 11	16" RECOVERY Saturated stiff brown fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
17.43		9	16.0' 16.0'	7 13 16 11	21" RECOVERY Saturated stiff brown fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
19.92		10	18.0' 18.0'	2 4 8 9	20" RECOVERY Saturated stiff brown and green fine sandy silt, trace of coarse sand and gravel.	A-4(0)	
22.41		11	20.0' 20.0'	9 12 12 15	19" RECOVERY Saturated medium dense brown and green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
24.9		12	22.0' 22.0'	1 6 10 9	19" RECOVERY Saturated medium dense brown and green silty fine sand, trace of gravel.	A-2-4(0)	
27.39		13	24.0' 24.0'	W/R 2 4 8	16" RECOVERY Saturated loose green silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
29.88		14	26.0' 26.0'	6 9 14 12	24" RECOVERY Saturated very stiff green fine sandy clay, trace of coarse sand.	A-7-6(4)	
32.37		15	28.0' 28.0'	6 7 11 13	13" RECOVERY Saturated very stiff brown and green fine sandy clay w/ some coarse sand.	A-7-6(4)	
34.86		16	30.0' 30.0'	8 11 11 14	18" RECOVERY Saturated very stiff dark green clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-6(1)	
37.35		17	32.0' 32.0'	10 12 12 12	15" RECOVERY Saturated very stiff dark green clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
		18	34.0' 34.0'	5 6 9 10	24" RECOVERY Saturated medium dense dark green silty fine to coarse sand, trace of gravel.	A-2-4(0)	
		19	36.0' 36.0'	6 10 13 13	19" RECOVERY Saturated medium dense dark green coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-1W

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			38.0'		12" RECOVERY		
		20	38.0'	4 9 7 7	Saturated medium dense dark green silty fine to coarse sand, trace of gravel.	A-2-4(0)	
39.84			40.0'		19" RECOVERY		
					Boring Terminated at 39.6 feet		
42.33							
44.82							
47.31							
49.8							
52.29							
54.78							
57.27							
59.76							

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KEY TO SYMBOLS

Symbol Description

Strata symbols

 Silty low plasticity clay

 Silty sand

 Silt

 Clayey sand

 Poorly graded clayey silty sand

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Notes:

1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a CME 55
2. Groundwater levels recorded at the time of drilling. Well constructed upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01
Boring Location: Sta. 453+0.371, 950' Rt. C.L.
Boring Surface Elev.: + 56.75'

Boring No.: TP-3-20A

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: 40.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date: 3/17/2008	Time	8.0'	6.0'	5.8'	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 40.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;

3
 No. of U-Sample Boring: Ft.
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: Jeff Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	4 5 7 13	Wet stiff brown clayey gravelly silt w/ some fine to coarse sand.	A-4(0)	
2.49		2	2.0'		6" RECOVERY Wet orange silty fine to coarse sand with a trace of gravel.	A-1-b	Press Sample - Shelby Tube.
			3.8'		22" RECOVERY		
4.98		3	4.0'	10 16 24 27	Wet dense brown coarse to fine sand and gravel w/ some silt.	A-1-b	
			6.0'		12" RECOVERY		
7.47		4	6.0'	14 16 17 22	Wet dense brown coarse sand and gravel w/ some silt and fine sand.	A-1-b	
			8.0'		16" RECOVERY		
9.96		5	8.0'	12 18 26 11	Wet dense orange brown gravel and fine sand w/ some coarse sand and silt.	A-1-b	
			10.0'		12" RECOVERY		
		6	10.0'	5 8 9 10	Saturated medium dense orange brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			12.0'		14" RECOVERY		
12.45		7	12.0'	3 6 9 9	Saturated medium dense brown clayey fine sand w/ some coarse sand, trace of gravel.	A-2-7(1)	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-20A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	2 4 8 10	21" RECOVERY Saturated medium dense brown silty fine sand w/ some coarse sand.	A-2-4(0)	
17.43		9	16.0' 16.0'	8 10 9 11	19" RECOVERY Saturated medium dense brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
19.92		10	18.0' 18.0'	6 8 15 15	20" RECOVERY Saturated very stiff green brown fine sandy silt, trace of coarse sand.	A-4(0)	
22.41		11	20.0' 20.0'	12 14 16 20	15" RECOVERY Saturated medium dense gray green silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
24.9		12	22.0' 22.0'	9 12 12 17	15" RECOVERY Saturated medium dense gray green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
27.39		13	24.0' 24.0'	7 16 16 16	17" RECOVERY Saturated hard gray fine sandy silt, trace of coarse sand and gravel.	A-4(0)	
29.88		14	26.0' 26.0'	18 20 22 18	12" RECOVERY Saturated hard gray green fine sandy silt, trace of coarse sand and gravel.	A-4(0)	
32.37		15	28.0' 28.0'	12 12 16 17	15" RECOVERY Saturated very stiff gray fine sandy silt, trace of coarse sand and gravel.	A-4(0)	
34.86		16	30.0' 30.0'	28 26 26 21	14" RECOVERY Saturated very dense gray green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
37.35		17	32.0' 32.0'	10 20 20 20	18" RECOVERY Saturated dense gray green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
		18	34.0' 34.0'	7 12 15 17	15" RECOVERY Saturated medium dense gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	
		19	36.0' 36.0'	10 12 13 14	20" RECOVERY Saturated medium dense gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-20A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			38.0'		20" RECOVERY		
		20	38.0'	9 12 17 18	Saturated medium dense gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	
39.84			40.0'		18" RECOVERY		
					Boring Terminated at 39.5 feet		
42.33							
44.82							
47.31							
49.8							
52.29							
54.78							
57.27							
59.76							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand
with silt



Poorly graded clayey
silty sand

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Notes:

1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a CME 75
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: TP-3-25A

Contract: 25-113-01

Boring Location: Sta. 459+45.87, 1036' Rt. C.L.

Boring Surface Elev.: + 59.81'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split barrel	O.D.	O.D. of Sampler:	2	IN.
	S-Sampler:	O.D.	O.D. of Samp. Tube:	3	IN.
	U-Sampler: Ball Sampler	O.D.	O.D. of Samp. Tube:	3	IN.
	Core Bit:	O.D.	O.D. of Rock Core:		IN.

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0	To:	40.0

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/19/2008		10.0'	8.0'	6.0'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	40.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:				Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	4 5 6 7	Moist medium dense light brown gravel and coarse to fine sand w/ some silt.	A-1-b	
2.49		2	2.0'	4 6 5 4	8" RECOVERY Moist medium dense light brown fine to coarse sand and gravel w/ some silt.	A-1-b	
4.98		3	4.0'	3 2 5 6	8" RECOVERY Wet loose light brown fine sand and gravel w/ some coarse sand and silt.	A-2-4(0)	
7.47		4	6.0'	4 4 5 6	13" RECOVERY Saturated stiff brown fine to coarse sandy silt, trace of gravel.	A-4(0)	
9.96		U-1	8.0'		16" RECOVERY Saturated brown clayey fine to coarse sand with a trace of gravel.	A-7-6(7)	Press Sample - Shelby Tube
12.45		6	10.0'	4 6 7 10	24" RECOVERY Saturated stiff brown fine sandy silt w/ some coarse sand.	A-4(0)	
		7	12.0'	3 3 9 10	18" RECOVERY Saturated stiff brown fine sandy clay w/ some coarse sand.	A-7-6(2)	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-25A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	4 5 8 10	14" RECOVERY Saturated medium dense brown silty fine sand w/ some coarse sand.	A-2-4(0)	
17.43		9	16.0' 16.0'	2 4 10 10	19" RECOVERY Saturated medium dense brown silty fine sand w/ some coarse sand.	A-2-4(0)	
19.92		10	18.0' 18.0'	3 6 10 11	14" RECOVERY Saturated medium dense gray green clayey fine sand w/ some coarse sand.	A-2-6(0)	
22.41		11	20.0' 20.0'	10 11 11 11	15" RECOVERY Saturated medium dense gray green clayey fine sand, trace of coarse sand.	A-2-6(0)	
24.9		12	22.0' 22.0'	9 11 12 11	14" RECOVERY Saturated very stiff gray green fine sandy clay, trace of coarse sand.	A-6(1)	
27.39		13	24.0' 24.0'	5 6 7 9	12" RECOVERY Saturated medium dense gray green silty fine sand, trace of coarse sand.	A-2-4(0)	
29.88		14	26.0' 26.0'	4 10 13 18	22" RECOVERY Saturated very stiff green clayey fine sandy silt, trace of coarse sand and gravel.	A-4(0)	
32.37		15	28.0' 28.0'	6 8 9 10	8" RECOVERY Saturated medium dense green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
34.86		16	30.0' 30.0'	12 12 16 16	14" RECOVERY Saturated medium dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	
37.35		17	32.0' 32.0'	5 7 10 11	18" RECOVERY Saturated medium dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	
		18	34.0' 34.0'	6 10 11 12	14" RECOVERY Saturated medium dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	
		19	36.0' 36.0'	2 12 14 11	16" RECOVERY Saturated medium dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: TP-3-25A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			38.0'		17" RECOVERY		
		20	38.0'	11 14 22 32	Saturated medium dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	
39.84			40.0'		23" RECOVERY		
					Boring Terminated at 39.9 feet		
42.33							
44.82							
47.31							
49.8							
52.29							
54.78							
57.27							
59.76							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Clayey sand



Poorly graded clayey
silty sand

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Notes:

1. Exploratory borings were drilled on 3/19/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

TEST BORING LOG



PROJECT: US 301-Pleasanton Mitigation Site
SITE: New Castle County, Delaware
DRILLING CO.: RK&K **RIG:** Hand

COMMISSION NO.: 108-013-02.1C
NORTH: 545207
EAST: 572600
ELEVATION: 66.58 - ft
START DATE: 1/12/2009
END DATE: 1/12/2009
DRILLER: Mike Schening
LOGGED BY: TAS

GROUNDWATER DATA (ft)					EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Cave-In	TYPE	HA	HA	
					SIZE, ID (in)		4	
					HAMMER WT. (lb)			-
					HAMMER FALL (in)			-

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE RECOVERY (in)	BLOWS/6" (% ROD)	LABORATORY TEST RESULTS			DEPTH	ELEV. DEPTH	GRAPHIC	DESCRIPTION AND CLASSIFICATION <small>(moisture, density, color, proportions, etc.)</small>	NOTES:
				NMC/ Frac. Freq.	LIQUID LIMIT	PLASTICITY INDEX					
S-1								EL 65.7		Moist, Brown, SILT, Trace Sand, Trace Mica, Trace Organics, Trace Root Fragments (m) [a-4] {USDA: Silt Loam}	
S-2			20.2%	27	4			0.9 EL 65.1		Damp, Tan, SILT, Some Sand, Little Clay, Trace Mica (ML) [A-4] {USDA: SILT LOAM}	
S-3								1.5 EL 64.4		Moist, Tan with Orange Mottles, SILT, Trace Clay, Trace Mica, Trace Fine Gravel (m) [a-4] {USDA: Silt Loam}	
S-4								2.2 EL 64.0		Moist, Orange and Light Gray, SILT, Some Sand, Little Clay, Trace Gravel (m) [a-4] {USDA: Silt Loam}	
S-5								2.6 EL 63.8		Moist, Orange and Light Gray, SAND, Little Silt (sm) [a-2-4] {USDA: Sandy Loam}	
S-6								2.8 EL 62.1		Moist, Orange-Brown, SAND, Trace Silt, Trace Clay (SC-SM) [A-1-b] {USDA: LOAMY SAND}	
S-7			11%	23	6			4.5 EL 62.1		Little Gravel at 3.7-ft	
								5 EL 62.1		Bottom of Boring @ 4.5 ft	

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SAMPLE IDENTIFICATION	DRILLING METHOD	BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE PROPORTIONS (PERCENT)	
- S - SPLIT SPOON	HSA - HOLLOW STEM AUGERS	0-4	VERY LOOSE	0-2	VERY SOFT	TRACE	1 TO 10
- T - THIN WALL TUBE	SSA - SOLID STEM AUGERS	5-10	LOOSE	3-4	SOFT	LITTLE	11 TO 20
- SS - 3" SPLIT SPOON	DC - DRIVING CASING	11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	SOME	21 TO 35
- D - DENISON	MD - MUD DRILLING	31-50	DENSE	9-15	STIFF	AND	36 TO 50
- RC - ROCK CORE	HA - HAND AUGER	OVER 50	VERY DENSE	16-30	VERY STIFF		
				OVER 30	HARD		

RKK_NORTHEAST (DEFAULT)_WETLAND MITIGATION.GPJ_RKK_CURRENT.GDT_3/3/09

TEST BORING LOG



PROJECT: US 301-Pleasanton Mitigation Site
SITE: New Castle County, Delaware
DRILLING CO.: RK&K **RIG:** Hand

COMMISSION NO.: 108-013-02.1C
NORTH: 545249
EAST: 573447
ELEVATION: 62.28 - ft
START DATE: 1/12/2009
END DATE: 1/12/2009
DRILLER: Mike Schening
LOGGED BY: TAS

GROUNDWATER DATA (ft)					EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Cave-In	TYPE	HA	HA	
					SIZE, ID (in)		4	
					HAMMER WT. (lb)			-
					HAMMER FALL (in)			-

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE RECOVERY (in)	BLOWS/6" (% RQD)	LABORATORY TEST RESULTS			DEPTH	ELEV. DEPTH	GRAPHIC	DESCRIPTION AND CLASSIFICATION (moisture, density, color, proportions, etc.)	NOTES:
				NMC/ Frac. Freq.	LIQUID LIMIT	PLASTICITY INDEX					
S-1									[Symbol: Dotted]	Moist, Gray, SILT, Trace Clay, Trace Sand, Trace Root Fragments, Trace Organics (ml) [a-4] {USDA: Silt Loam}	Ice on surface
S-2								EL 61.4 0.9	[Symbol: Dotted]	Damp, Gray and Light Gray with Brown Mottles, SILT, Some Clay, Trace Mica, Trace Sand (CL) [A-6] {USDA: SILT LOAM}	
S-3				22.4%	36	17		EL 60.3 2.0	[Symbol: Hatched]	Orange Mottling at 1.5-ft Bottom of Boring @ 2.0 ft	

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SAMPLE IDENTIFICATION	DRILLING METHOD	BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE PROPORTIONS (PERCENT)	
<ul style="list-style-type: none"> <input checked="" type="checkbox"/> - S - SPLIT SPOON <input type="checkbox"/> - T - THIN WALL TUBE <input type="checkbox"/> - SS - 3" SPLIT SPOON <input type="checkbox"/> - D - DENISON <input type="checkbox"/> - RC - ROCK CORE 	<ul style="list-style-type: none"> HSA - HOLLOW STEM AUGERS SSA - SOLID STEM AUGERS DC - DRIVING CASING MD - MUD DRILLING HA - HAND AUGER 	<ul style="list-style-type: none"> 0-4 5-10 11-30 31-50 OVER 50 	<ul style="list-style-type: none"> VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE 	<ul style="list-style-type: none"> 0-2 3-4 5-8 9-15 16-30 OVER 30 	<ul style="list-style-type: none"> VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD 	<ul style="list-style-type: none"> TRACE LITTLE SOME AND 	<ul style="list-style-type: none"> 1 TO 10 11 TO 20 21 TO 35 36 TO 50

RKK NORTH/EAST (DEFAULT) WETLAND MITIGATION.GPJ RKK_CURRENT.GDT 3/3/09

TEST BORING LOG



PROJECT: US 301-Pleasanton Mitigation Site
SITE: New Castle County, Delaware
DRILLING CO.: RK&K **RIG:** Hand

COMMISSION NO.: 108-013-02.1C
NORTH: 545043
EAST: 573032
ELEVATION: 62.64 - ft
START DATE: 1/12/2009
END DATE: 1/12/2009
DRILLER: Mike Schening
LOGGED BY: TAS

GROUNDWATER DATA (ft)					EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Cave-In	TYPE	HA	HA	
					SIZE, ID (in)		4	
					HAMMER WT. (lb)			-
					HAMMER FALL (in)			-

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE RECOVERY (in)	BLOWS/6" (% ROD)	LABORATORY TEST RESULTS			DEPTH	ELEV. DEPTH	GRAPHIC	DESCRIPTION AND CLASSIFICATION (moisture, density, color, proportions, etc.)	NOTES:
				NMC/ Frac. Freq.	LIQUID LIMIT	PLASTICITY INDEX					
S-1										Moist, Gray, SILT, Some Clay, Trace Organics, Trace Root Matter (ml) [a-4] {USDA: Silty Clay Loam}	Worm Activity
S-2										Sample S-2: Gray with Reddish Brown Mottling, Little Clay	
S-3							EL 61.8 0.8			Moist, Gray with Reddish Brown, CLAY, And Silt, Trace Root Fragments (c) [a-6] {USDA: Silty Clay}	
S-4				38%	65	36	EL 61.4 1.2			Damp, Gray with Orange Mottling, CLAY, And Silt, Trace Fine Sand (CH) [A-7-6] {USDA: SILTY CLAY}	
S-5							EL 60.9 1.7			Damp, Gray, Yellow and Orange, SILT, Some Clay, Trace Sand, Trace Root Fragments (ml) [a-4] {USDA: Silty Clay}	
							EL 60.6 2.0			Bottom of Boring @ 2.0 ft	

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SAMPLE IDENTIFICATION		DRILLING METHOD		BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE PROPORTIONS (PERCENT)	
	- S - SPLIT SPOON	HSA - HOLLOW STEM AUGERS		0-4	VERY LOOSE	0-2	VERY SOFT	TRACE	1 TO 10
	- T - THIN WALL TUBE	SSA - SOLID STEM AUGERS		5-10	LOOSE	3-4	SOFT	LITTLE	11 TO 20
	- SS - 3" SPLIT SPOON	DC - DRIVING CASING		11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	SOME	21 TO 35
	- D - DENISON	MD - MUD DRILLING		31-50	DENSE	9-15	STIFF	AND	36 TO 50
	- RC - ROCK CORE	HA - HAND AUGER		OVER 50	VERY DENSE	16-30	VERY STIFF		
						OVER 30	HARD		

RKK NORTH/EAST (DEFAULT) WETLAND MITIGATION.GPJ RKK_CURRENT.GDT 3/3/09

TEST BORING LOG



PROJECT: US 301-Pleasanton Mitigation Site
SITE: New Castle County, Delaware
DRILLING CO.: RK&K **RIG:** Hand

COMMISSION NO.: 108-013-02.1C
NORTH: 544699
EAST: 572543
ELEVATION: 66.81 - ft
START DATE: 1/12/2009
END DATE: 1/12/2009
DRILLER: Mike Schening
LOGGED BY: TAS

GROUNDWATER DATA (ft)					EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Cave-In	TYPE	HA	HA	
					SIZE, ID (in)		4	
					HAMMER WT. (lb)			-
					HAMMER FALL (in)			-

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE RECOVERY (in)	BLOWS/6" (% ROD)	LABORATORY TEST RESULTS			DEPTH	ELEV. DEPTH	GRAPHIC	DESCRIPTION AND CLASSIFICATION <small>(moisture, density, color, proportions, etc.)</small>	NOTES:
				NMC/ Frac. Freq.	LIQUID LIMIT	PLASTICITY INDEX					
S-1										Moist, Dark Brown, SILT, Little Fine Sand, Trace Organics (ml) [a-4] (USDA: Silt Loam)	
S-2							EL 65.8 1.0			Moist, Light Brown, SILT, Some Clay, Trace Mica (CL) [a-6] (USDA: SILT LOAM)	
S-3			26.9%	38	16		EL 64.8 2.0			Sample S-3: Little Sand, Trace Root Fragments	
										Bottom of Boring @ 2.0 ft	

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SAMPLE IDENTIFICATION	DRILLING METHOD	BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE PROPORTIONS (PERCENT)	
- S - SPLIT SPOON	HSA - HOLLOW STEM AUGERS	0-4	VERY LOOSE	0-2	VERY SOFT	TRACE	1 TO 10
- T - THIN WALL TUBE	SSA - SOLID STEM AUGERS	5-10	LOOSE	3-4	SOFT	LITTLE	11 TO 20
- SS - 3" SPLIT SPOON	DC - DRIVING CASING	11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	SOME	21 TO 35
- D - DENISON	MD - MUD DRILLING	31-50	DENSE	9-15	STIFF	AND	36 TO 50
- RC - ROCK CORE	HA - HAND AUGER	OVER 50	VERY DENSE	16-30	VERY STIFF		
				OVER 30	HARD		

RKK_NORTHEAST (DEFAULT)_WETLAND_MITIGATION.GPJ_RKK_CURRENT.GDT_3/3/09

TEST BORING LOG



PROJECT: US 301-Pleasanton Mitigation Site
SITE: New Castle County, Delaware
DRILLING CO.: RK&K **RIG:** Hand

COMMISSION NO.: 108-013-02.1C
NORTH: 544797
EAST: 573423
ELEVATION: 65.81 - ft
START DATE: 1/12/2009
END DATE: 1/12/2009
DRILLER: Mike Schening
LOGGED BY: TAS

GROUNDWATER DATA (ft)					EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Cave-In	TYPE	HA	HA	
					SIZE, ID (in)		4	
					HAMMER WT. (lb)			-
					HAMMER FALL (in)			-

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE RECOVERY (in)	BLOWS/6" (% ROD)	LABORATORY TEST RESULTS			DEPTH	ELEV. DEPTH	GRAPHIC	DESCRIPTION AND CLASSIFICATION (moisture, density, color, proportions, etc.)	NOTES:
				NMC/ Frac. Freq.	LIQUID LIMIT	PLASTICITY INDEX					
S-1									[Symbol: Dotted]	Damp, Grayish Brown, SILT, Some Fine Sand (ml) [a-4] {USDA: Silt Loam}	
S-2							EL 64.9 0.9		[Symbol: Dotted]	Damp, Reddish Brown, SILT, Trace Clay, Trace Sand, Trace Root Fragments (CL) [A-4] {USDA: SILT LOAM}	
S-3			22.4%	28	9				[Symbol: Diagonal Lines]	Sample S-3: Moist, Brown, Some Sand, Little Clay, Trace Mica, Trace Gravel	
S-4							EL 63.8 2.0		[Symbol: Diagonal Lines]	Sample S-4: Moist, Brown, Some Sand	
									[Symbol: Diagonal Lines]	Bottom of Boring @ 2.0 ft	

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SAMPLE IDENTIFICATION	DRILLING METHOD	BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE PROPORTIONS (PERCENT)	
- S - SPLIT SPOON	HSA - HOLLOW STEM AUGERS	0-4	VERY LOOSE	0-2	VERY SOFT	TRACE	1 TO 10
- T - THIN WALL TUBE	SSA - SOLID STEM AUGERS	5-10	LOOSE	3-4	SOFT	LITTLE	11 TO 20
- SS - 3" SPLIT SPOON	DC - DRIVING CASING	11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	SOME	21 TO 35
- D - DENISON	MD - MUD DRILLING	31-50	DENSE	9-15	STIFF	AND	36 TO 50
- RC - ROCK CORE	HA - HAND AUGER	OVER 50	VERY DENSE	16-30	VERY STIFF		
				OVER 30	HARD		

RKK NORTH/EAST (DEFAULT) WETLAND MITIGATION.GPJ RKK_CURRENT.GDT 3/3/09

TEST BORING LOG

Boring No. SS-01
Page 1 of 1



PROJECT: US 301-Pleasanton Mitigation Site
SITE: New Castle County, Delaware
DRILLING CO.: RK&K **RIG:** Hand

COMMISSION NO.: 108-013-02.1C
NORTH: 545256
EAST: 572480
ELEVATION: 66.52 - ft
START DATE: 1/12/2009
END DATE: 1/12/2009
DRILLER: Mike Schening
LOGGED BY: TAS

GROUNDWATER DATA (ft)				EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Cave-In	TYPE	HA	HA
1/12/2009		4.9			SIZE, ID (in)		2
					HAMMER WT. (lb)		-
					HAMMER FALL (in)		-

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE RECOVERY (in)	BLOWS/6" (% ROD)	LABORATORY TEST RESULTS			DEPTH	ELEV. DEPTH	GRAPHIC	DESCRIPTION AND CLASSIFICATION (moisture, density, color, proportions, etc.)	NOTES:
				NMC/ Frac. Freq.	LIQUID LIMIT	PLASTICITY INDEX					
S-1								EL 65.5		Moist, Gray, SILT, Little Fine Sand, Trace Mica, Trace Organics, Trace Root Fragments (ml) [a-4] {USDA: silt loam} Slight Mottling at 0.5-ft	
S-2								1.0		Damp, Light Gray with Orange-Brown Mottling, SILT, Trace Clay (ml) [a-4] {USDA: Silt Loam} Little Clay, Trace Fine Gravel at 1.5-ft	
S-3			22.1%	37	17					Sample S-3: Moist, Light Gray and Orange-Brown, Some Sand, Little Clay, Trace Gravel (CL) [A-6] {USDA: SILT LOAM}	
S-4										Sample S-4: Some Sand, Trace Gravel	
S-5								EL 63.3 3.2		Moist, Orange-Brown and Light Gray, SAND, Little Clay (sc) [a-2-6] {USDA: Sandy Clay Loam}	
S-6								EL 62.5 4.0		Some Silt at 3.8 ft Wet, Light Gray and Orange-Brown, SAND, Little Silt (sm) [a-2-4] {USDA: Loamy Sand}	
								5		Some Gravel from 6.5 to 8-ft	
								EL 58.5 8.0		Bottom of Boring @ 8.0 ft	

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SAMPLE IDENTIFICATION	DRILLING METHOD	BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE PROPORTIONS (PERCENT)	
- S - SPLIT SPOON	HSA - HOLLOW STEM AUGERS	0-4	VERY LOOSE	0-2	VERY SOFT	TRACE	1 TO 10
- T - THIN WALL TUBE	SSA - SOLID STEM AUGERS	5-10	LOOSE	3-4	SOFT	LITTLE	11 TO 20
- SS - 3" SPLIT SPOON	DC - DRIVING CASING	11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	SOME	21 TO 35
- D - DENISON	MD - MUD DRILLING	31-50	DENSE	9-15	STIFF	AND	36 TO 50
- RC - ROCK CORE	HA - HAND AUGER	OVER 50	VERY DENSE	16-30	VERY STIFF		
				OVER 30	HARD		

Boring No. SS-01

TEST BORING LOG

Boring No. SS-03
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PROJECT: US 301-Pleasanton Mitigation Site
SITE: New Castle County, Delaware
DRILLING CO.: RK&K **RIG:** Hand

COMMISSION NO.: 108-013-02.1C
NORTH: 545248
EAST: 573052
ELEVATION: 62.15 - ft
START DATE: 1/12/2009
END DATE: 1/12/2009
DRILLER: Mike Schening
LOGGED BY: TAS

GROUNDWATER DATA (ft)					EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Cave-In	TYPE	HA	HA	
1/12/2009		4			SIZE, ID (in)		2	
					HAMMER WT. (lb)			-
					HAMMER FALL (in)			-

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE RECOVERY (in)	BLOWS/6" (% RQD)	LABORATORY TEST RESULTS			DEPTH	ELEV. DEPTH	GRAPHIC	DESCRIPTION AND CLASSIFICATION <small>(moisture, density, color, proportions, etc.)</small>	NOTES:
				NMC/ Frac. Freq.	LIQUID LIMIT	PLASTICITY INDEX					
S-1				27%	41	20				Wet, Gray with Slight Red Mottling, CLAY, And Silt, Trace Organics, Trace Root Fragments, Trace Sand (CL) [A-7-6] {USDA: SILTY CLAY LOAM}	Organic Content = 3.6%
S-2								EL 61.0 1.2		Damp, Gray and Yellow with Orange Mottles, SILT, Little Clay, Trace Mica (ml) [a-4] {USDA: Silt Loam}	
										Trace Clay at 2 ft	
S-3								EL 59.0 3.2		Moist, Light Gray with Orange Mottling, SILT, And Fine Sand (ml) [a-4] {USDA: Silt Loam}	
S-4								EL 58.2 4.0		Wet, Light Gray and Brown, SAND, Some Medium Rounded Gravel, Trace Silt (sp) [a-1-b] {USDA: Sand} Wet, Trace Mica at 4.3-ft	
S-5								EL 56.2 6.0		Bottom of Boring @ 6.0 ft	

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SAMPLE IDENTIFICATION	DRILLING METHOD	BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE PROPORTIONS (PERCENT)	
- S - SPLIT SPOON	HSA - HOLLOW STEM AUGERS	0-4	VERY LOOSE	0-2	VERY SOFT	TRACE	1 TO 10
- T - THIN WALL TUBE	SSA - SOLID STEM AUGERS	5-10	LOOSE	3-4	SOFT	LITTLE	11 TO 20
- SS - 3" SPLIT SPOON	DC - DRIVING CASING	11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	SOME	21 TO 35
- D - DENISON	MD - MUD DRILLING	31-50	DENSE	9-15	STIFF	AND	36 TO 50
- RC - ROCK CORE	HA - HAND AUGER	OVER 50	VERY DENSE	16-30	VERY STIFF		
				OVER 30	HARD		

RKK_NORTH/EAST (DEFAULT)_WETLAND MITIGATION.GPJ_RKK_CURRENT.GDT_3/3/09

TEST BORING LOG

Boring No. SS-05
Page 1 of 1



PROJECT: US 301-Pleasanton Mitigation Site
SITE: New Castle County, Delaware
DRILLING CO.: RK&K **RIG:** Hand

COMMISSION NO.: 108-013-02.1C
NORTH: 545258
EAST: 573684
ELEVATION: 61.95 - ft
START DATE: 1/13/2009
END DATE: 1/13/2009
DRILLER: Thomas Hauesler
LOGGED BY: TAS

GROUNDWATER DATA (ft)					EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Cave-In	TYPE	HA	HA	
1/13/2009		3			SIZE, ID (in)		2	
					HAMMER WT. (lb)			-
					HAMMER FALL (in)			-

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE RECOVERY (in)	BLOWS/6" (% ROD)	LABORATORY TEST RESULTS			DEPTH	ELEV. DEPTH	GRAPHIC	DESCRIPTION AND CLASSIFICATION (moisture, density, color, proportions, etc.)	NOTES:
				NMC/ Frac. Freq.	LIQUID LIMIT	PLASTICITY INDEX					
S-1				31.4%	34	10		EL 61.1		Moist, Grayish Brown, SILT, Some Sand, Trace Organics, Trace Root Fragments, Trace Clay (CL) [A-4] {USDA: SILT LOAM}	Organic Content = 4.1%
S-2							0.9	EL 60.4		Moist, Gray and Light Brown, SILT, Trace Rounded Gravel, Trace Fine Sand (ml) [a-4] {USDA: Silt Loam}	
S-3							1.6	EL 59.4		Moist, Orange, SAND, Some Silt (sm) [a-2-4] {USDA: Sandy Loam}	
S-4							2.6			Wet, Orange and Pinkish Gray, SAND, Little Silt, Little Gravel (sm) [a-2-4] {USDA: Sandy Loam}	
S-5							5			No Gravel from 3.4 to 4.8-ft Gray and Brown at 4.5-ft	
							5.3	EL 56.3		Tan, Trace Gravel at 5.3-ft	
							5.7			Bottom of Boring @ 5.7 ft	

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RKK_NORTHEAST (DEFAULT)_WETLAND MITIGATION.GPJ_RKK_CURRENT.GDT_3/3/09

SAMPLE IDENTIFICATION		DRILLING METHOD		BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE PROPORTIONS (PERCENT)	
	- S - SPLIT SPOON	HSA - HOLLOW STEM AUGERS		0-4	VERY LOOSE	0-2	VERY SOFT	TRACE	1 TO 10
	- T - THIN WALL TUBE	SSA - SOLID STEM AUGERS		5-10	LOOSE	3-4	SOFT	LITTLE	11 TO 20
	- SS - 3" SPLIT SPOON	DC - DRIVING CASING		11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	SOME	21 TO 35
	- D - DENISON	MD - MUD DRILLING		31-50	DENSE	9-15	STIFF	AND	36 TO 50
	- RC - ROCK CORE	HA - HAND AUGER		OVER 50	VERY DENSE	16-30	VERY STIFF		
						OVER 30	HARD		

Boring No. SS-05

TEST BORING LOG

Boring No. SS-07
Page 1 of 1



PROJECT: US 301-Pleasanton Mitigation Site
SITE: New Castle County, Delaware
DRILLING CO.: RK&K **RIG:** Hand

COMMISSION NO.: 108-013-02.1C
NORTH: 545049
EAST: 573276
ELEVATION: 63.54 - ft
START DATE: 1/13/2009
END DATE: 1/13/2009
DRILLER: Thomas Hauesler
LOGGED BY: TAS

GROUNDWATER DATA (ft)					EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Cave-In	TYPE	HA	HA	
1/13/2009		4.1			SIZE, ID (in)		2	
					HAMMER WT. (lb)			-
					HAMMER FALL (in)			-

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE RECOVERY (in)	BLOWS/6" (% RQD)	LABORATORY TEST RESULTS			DEPTH	ELEV. DEPTH	GRAPHIC	DESCRIPTION AND CLASSIFICATION (moisture, density, color, proportions, etc.)	NOTES:
				NMC/ Frac. Freq.	LIQUID LIMIT	PLASTICITY INDEX					
S-1								EL 62.7		Damp, Gray, SILT, Trace Organics, Trace Root Fragments (ml) [a-4] {USDA: Silt Loam}	
S-2								0.8		Damp, Gray with Light Brown Mottling, SILT, Trace Fine Sand (ml) [a-4] {USDA: Silt Loam} Reddish Brown Mottles at 0.8-ft	
S-3										Some Fine Sand, Reddish Brown Mottling at 2-ft	
S-4										Reddish Brown, Some Sand at 2.5-ft	
S-5								EL 59.9		Moist, Light Gray and Reddish Brown, CLAY, And Sand, Little Silt (cl) [a-4] {USDA: Clay Loam}	
								EL 59.3		Wet, Tan and Orange Brown, SAND, Little Silt, Trace Rounded Gravel (sm) [a-4] {USDA: Sandy Loam}	
								4.2		Some Gravel, Trace Clay at 5-ft	
								5		No Gravel, No Clay from 5.2-ft	
								EL 57.5		Bottom of Boring @ 6.0 ft	
								6.0			

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RKK NORTH/EAST (DEFAULT) WETLAND MITIGATION.GPJ RKK_CURRENT.GDT 3/3/09

SAMPLE IDENTIFICATION		DRILLING METHOD		BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE PROPORTIONS (PERCENT)	
	- S - SPLIT SPOON		HSA - HOLLOW STEM AUGERS	0-4	VERY LOOSE	0-2	VERY SOFT	TRACE	1 TO 10
	- T - THIN WALL TUBE		SSA - SOLID STEM AUGERS	5-10	LOOSE	3-4	SOFT	LITTLE	11 TO 20
	- SS - 3" SPLIT SPOON		DC - DRIVING CASING	11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	SOME	21 TO 35
	- D - DENISON		MD - MUD DRILLING	31-50	DENSE	9-15	STIFF	AND	36 TO 50
	- RC - ROCK CORE		HA - HAND AUGER	OVER 50	VERY DENSE	16-30	VERY STIFF		
						OVER 30	HARD		

Boring No. SS-07

TEST BORING LOG

Boring No. SS-09
Page 1 of 1



PROJECT: US 301-Pleasanton Mitigation Site
SITE: New Castle County, Delaware
DRILLING CO.: RK&K **RIG:** Hand

COMMISSION NO.: 108-013-02.1C
NORTH: 545029
EAST: 572694
ELEVATION: 65.76 - ft
START DATE: 1/13/2009
END DATE: 1/13/2009
DRILLER: Thomas Hauesler
LOGGED BY: TAS

GROUNDWATER DATA (ft)					EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Cave-In	TYPE	HA	HA	
1/13/2009		4			SIZE, ID (in)		2	
					HAMMER WT. (lb)			-
					HAMMER FALL (in)			-

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE RECOVERY (in)	BLOWS/6" (% ROD)	LABORATORY TEST RESULTS			DEPTH	ELEV. DEPTH	GRAPHIC	DESCRIPTION AND CLASSIFICATION (moisture, density, color, proportions, etc.)	NOTES:
				NMC/ Frac. Freq.	LIQUID LIMIT	PLASTICITY INDEX					
S-1										Moist, Brown, SILT, Some Fine Sand, Trace Organics, Trace Root Fragments, Trace Gravel (ml) [a-4] {USDA: Silt Loam}	
							EL 64.7 1.1			Moist, Tan with Reddish Brown Mottles, SILT, Little Fine Sand, Trace Clay (ml) [a-4] {USDA: Silt Loam}	
S-2											
							EL 63.5 2.3			Moist, Orange-Brown and Tan, SAND, Some Silt, Trace Gravel (sm) [a-z-4] {USDA: Sandy Loam}	
S-3										No Gravel from 3 to 5.8-ft	
S-4										Sample S-4: Wet, Orange and Gray	
S-5							EL 59.8 6.0			Sample S-5: Wet, Brown, Little Silt Bottom of Boring @ 6.0 ft	

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SAMPLE IDENTIFICATION	DRILLING METHOD	BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE PROPORTIONS (PERCENT)	
- S - SPLIT SPOON	HSA - HOLLOW STEM AUGERS	0-4	VERY LOOSE	0-2	VERY SOFT	TRACE	1 TO 10
- T - THIN WALL TUBE	SSA - SOLID STEM AUGERS	5-10	LOOSE	3-4	SOFT	LITTLE	11 TO 20
- SS - 3" SPLIT SPOON	DC - DRIVING CASING	11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	SOME	21 TO 35
- D - DENISON	MD - MUD DRILLING	31-50	DENSE	9-15	STIFF	AND	36 TO 50
- RC - ROCK CORE	HA - HAND AUGER	OVER 50	VERY DENSE	16-30	VERY STIFF		
				OVER 30	HARD		

RKK NORTH/EAST (DEFAULT) WETLAND MITIGATION.GPJ RKK_CURRENT.GDT 3/3/09

TEST BORING LOG

Boring No. SS-11
Page 1 of 1



PROJECT: US 301-Pleasanton Mitigation Site
SITE: New Castle County, Delaware
DRILLING CO.: RK&K **RIG:** Hand

COMMISSION NO.: 108-013-02.1C
NORTH: 544820
EAST: 572391
ELEVATION: 69.32 - ft
START DATE: 1/13/2009
END DATE: 1/13/2009
DRILLER: Thomas Hauesler
LOGGED BY: TAS

GROUNDWATER DATA (ft)					EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Cave-In	TYPE	HA	HA	
1/13/2009		7.2			SIZE, ID (in)		2	
					HAMMER WT. (lb)			-
					HAMMER FALL (in)			-

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE RECOVERY (in)	BLOWS/6" (% ROD)	LABORATORY TEST RESULTS			DEPTH	ELEV. DEPTH	GRAPHIC	DESCRIPTION AND CLASSIFICATION (moisture, density, color, proportions, etc.)	NOTES:
				NMC/ Frac. Freq.	LIQUID LIMIT	PLASTICITY INDEX					
S-1								EL 68.5		Damp, Brown, SILT, Some Fine Sand, Trace Organics, Trace Root Fragments, Trace Clay (ml) [a-4] {USDA: Silt Loam}	
S-2								0.8		Damp, Orange-Brown, CLAY, And Silt, Trace Sand (cl) [a-6] {USDA: Silty Clay Loam}	
S-3			12.6%	22	7			EL 68.0 1.3		Some Sand, Trace Gravel at 1.2-ft	
S-4								EL 67.7 1.6		Damp, Brown, SAND, Little Silt, Little Clay, Little Gravel (SC-SM) [A-2-4] {USDA: SANDY LOAM}	
										Moist, Brown, SAND, Trace Silt (sp) [a-3] {USDA: Sand}	
										Trace Gravel at 2.7-ft	
										Tan and Orange Brown from 3.5-ft	
										Tan and Black at 4.3-ft	
S-5								5		Sample S-5: Brown, Black and Purple, Trace Gravel	
										Tan and Black, Trace Mica at 5.1-ft	
										Tan, Orange and Black, Trace Mica, Trace Gravel at 5.6-ft	
S-6										Sample S-6: Wet, Light Brown and Black, Trace Mica	
								EL 60.8 8.5		Bottom of Boring @ 8.5 ft	

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AUGUST 2015

RKK NORTH/EAST (DEFAULT) WETLAND MITIGATION.GPJ RKK_CURRENT.GDT 3/3/09

SAMPLE IDENTIFICATION	DRILLING METHOD	BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE PROPORTIONS (PERCENT)	
- S - SPLIT SPOON	HSA - HOLLOW STEM AUGERS	0-4	VERY LOOSE	0-2	VERY SOFT	TRACE	1 TO 10
- T - THIN WALL TUBE	SSA - SOLID STEM AUGERS	5-10	LOOSE	3-4	SOFT	LITTLE	11 TO 20
- SS - 3" SPLIT SPOON	DC - DRIVING CASING	11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	SOME	21 TO 35
- D - DENISON	MD - MUD DRILLING	31-50	DENSE	9-15	STIFF	AND	36 TO 50
- RC - ROCK CORE	HA - HAND AUGER	OVER 50	VERY DENSE	16-30	VERY STIFF		
				OVER 30	HARD		

Boring No. SS-11

TEST BORING LOG

Boring No. SS-13
Page 1 of 1



PROJECT: US 301-Pleasanton Mitigation Site
SITE: New Castle County, Delaware
DRILLING CO.: RK&K **RIG:** Hand

COMMISSION NO.: 108-013-02.1C
NORTH: 544817
EAST: 572959
ELEVATION: 63.99 - ft
START DATE: 1/13/2009
END DATE: 1/13/2009
DRILLER: Thomas Stanley
LOGGED BY: TH

GROUNDWATER DATA (ft)					EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Cave-In	TYPE	HA	HA	
1/13/2009		3.5			SIZE, ID (in)		2	
					HAMMER WT. (lb)			-
					HAMMER FALL (in)			-

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE RECOVERY (in)	BLOWS/6" (% ROD)	LABORATORY TEST RESULTS			DEPTH	ELEV. DEPTH	GRAPHIC	DESCRIPTION AND CLASSIFICATION (moisture, density, color, proportions, etc.)	NOTES:
				NMC/ Frac. Freq.	LIQUID LIMIT	PLASTICITY INDEX					
S-1										Damp, Gray, SILT, Trace Root Fragments, Trace Organics, Trace Fine Rounded Gravel (ml) [a-4] {USDA: Silt Loam}	
							EL 63.1 0.9			Reddish Brown Mottles at 0.7-ft	
S-2										Damp, Light Gray, SILT, Trace Fine Sand, Light Brown Mottles (ml) [a-4] {USDA: Silt Loam}	
										Trace Clay at 1.6-ft	
S-3							EL 61.9 2.1			Trace Fine Rounded Gravel, Light Brown Mottles at 1.8-ft	
										Moist, Orange and Light Gray, SAND, Some Silt (sm) [a-2-4] {USDA: Loamy Sand}	
										Yellow and Tan, Little Silt, Trace Gravel at 2.8-ft	
										Little Gravel	
										Wet at 3.6-ft	
										Light Brown from 4.3-ft	
S-4							EL 58.0 6.0			Bottom of Boring @ 6.0 ft	

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SAMPLE IDENTIFICATION	DRILLING METHOD	BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE PROPORTIONS (PERCENT)	
- S - SPLIT SPOON	HSA - HOLLOW STEM AUGERS	0-4	VERY LOOSE	0-2	VERY SOFT	TRACE	1 TO 10
- T - THIN WALL TUBE	SSA - SOLID STEM AUGERS	5-10	LOOSE	3-4	SOFT	LITTLE	11 TO 20
- SS - 3" SPLIT SPOON	DC - DRIVING CASING	11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	SOME	21 TO 35
- D - DENISON	MD - MUD DRILLING	31-50	DENSE	9-15	STIFF	AND	36 TO 50
- RC - ROCK CORE	HA - HAND AUGER	OVER 50	VERY DENSE	16-30	VERY STIFF		
				OVER 30	HARD		

RKK NORTH/EAST (DEFAULT) WETLAND MITIGATION.GPJ RKK_CURRENT.GDT 3/3/09

TEST BORING LOG

Boring No. SS-15
Page 1 of 1



PROJECT: US 301-Pleasanton Mitigation Site
SITE: New Castle County, Delaware
DRILLING CO.: RK&K **RIG:** Hand

COMMISSION NO.: 108-013-02.1C
NORTH: 544851
EAST: 573733
ELEVATION: 63.51 - ft
START DATE: 1/13/2009
END DATE: 1/13/2009
DRILLER: Thomas Hauesler
LOGGED BY: TAS

GROUNDWATER DATA (ft)					EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Cave-In	TYPE	HA	HA	
1/14/2009		6.1			SIZE, ID (in)		2	
					HAMMER WT. (lb)			-
					HAMMER FALL (in)			-

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE RECOVERY (in)	BLOWS/6" (% ROD)	LABORATORY TEST RESULTS			DEPTH	ELEV. DEPTH	GRAPHIC	DESCRIPTION AND CLASSIFICATION (moisture, density, color, proportions, etc.)	NOTES:
				NMC/ Frac. Freq.	LIQUID LIMIT	PLASTICITY INDEX					
S-1								EL 62.5		Damp, Grayish Brown, SILT, Trace Organics, Trace Mica, Trace Root Fragments (ml) [a-4] {USDA: Silt Loam}	
S-2								1.0 EL 62.2		Damp, Grayish Brown, SILT (ml) [a-4] {USDA: Silt Loam}	
								1.3		Moist, Grayish Brown, SILT, Trace Clay (ml) [a-4] {USDA: Silt Loam}	
S-3				12.8%	29	9		EL 60.9 2.6		Light Gray with Reddish Brown Mottles, Trace Roots at 2.5-ft Moist, Tan and White, SAND, Little Silt, Trace Rounded Gravel (SC) [A-2-4] {USDA: SANDY LOAM} Sample S-3: Tan and Red, Some Rounded Gravel, Trace Silt, Trace Clay	
								EL 59.5 4.0		Moist, Tan and Orange-Brown, SAND, Trace Silt (sp) [a-3] {USDA: Sand}	
								5		Wet at 6.1-ft	
								EL 56.5 7.0		Bottom of Boring @ 7.0 ft	

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RKK_NORTHEAST (DEFAULT)_WETLAND MITIGATION.GPJ_RKK_CURRENT.GDT_3/3/09

SAMPLE IDENTIFICATION	DRILLING METHOD	BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE PROPORTIONS (PERCENT)	
- S - SPLIT SPOON	HSA - HOLLOW STEM AUGERS	0-4	VERY LOOSE	0-2	VERY SOFT	TRACE	1 TO 10
- T - THIN WALL TUBE	SSA - SOLID STEM AUGERS	5-10	LOOSE	3-4	SOFT	LITTLE	11 TO 20
- SS - 3" SPLIT SPOON	DC - DRIVING CASING	11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	SOME	21 TO 35
- D - DENISON	MD - MUD DRILLING	31-50	DENSE	9-15	STIFF	AND	36 TO 50
- RC - ROCK CORE	HA - HAND AUGER	OVER 50	VERY DENSE	16-30	VERY STIFF		
				OVER 30	HARD		

Boring No. SS-15

TEST BORING LOG

Boring No. SS-17
Page 1 of 1



PROJECT: US 301-Pleasanton Mitigation Site
SITE: New Castle County, Delaware
DRILLING CO.: RK&K **RIG:** Hand

COMMISSION NO.: 108-013-02.1C
NORTH: 544615
EAST: 572389
ELEVATION: 69.2 - ft
START DATE: 1/13/2009
END DATE: 1/13/2009
DRILLER: Thomas Hauesler
LOGGED BY: TAS

GROUNDWATER DATA (ft)					EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Cave-In	TYPE	HA	HA	
1/14/2009		7.6			SIZE, ID (in)		2	
					HAMMER WT. (lb)			-
					HAMMER FALL (in)			-

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE RECOVERY (in)	BLOWS/6" (% ROD)	LABORATORY TEST RESULTS			DEPTH	ELEV. DEPTH	GRAPHIC	DESCRIPTION AND CLASSIFICATION (moisture, density, color, proportions, etc.)	NOTES:
				NMC/ Frac. Freq.	LIQUID LIMIT	PLASTICITY INDEX					
S-1				18.3%	30	9		EL 68.2		Damp, Brown, SILT, And Sand, Trace Clay, Trace Organics, Trace Root Fragments (CL) [A-4] {USDA: SILT LOAM}	Organic Content = 4.2%
S-2								1.0		Moist, Light Brown, SILT, And Clay, Trace Root Fragments (ml) [a-4] {USDA: Silty Clay Loam}	
S-3								3.3		Trace Clay, Trace Fine Sand, Trace Mica at 2.3-ft And Sand, Trace Clay at 3-ft Moist, Light Brown and Grayish Brown SAND, Some Silt, Trace Clay (sm) [a-2-4] {USDA: Sandy Loam}	
S-4								5.6		Little Silt at 4.4-ft Light Brown and Black, Little Silt at 5.1-ft Light Brown and Black, Little Silt at 5.1-ft Moist, Tan, SAND, Trace Silt, Trace Fine Rounded Gravel (sp) [a-3] {USDA: Sand} Some Gravel at 5.8-ft	
								8.2		Wet at 7.6-ft Wet at 8.1-ft Bottom of Boring @ 8.2 ft	

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SAMPLE IDENTIFICATION	DRILLING METHOD	BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE PROPORTIONS (PERCENT)	
- S - SPLIT SPOON	HSA - HOLLOW STEM AUGERS	0-4	VERY LOOSE	0-2	VERY SOFT	TRACE	1 TO 10
- T - THIN WALL TUBE	SSA - SOLID STEM AUGERS	5-10	LOOSE	3-4	SOFT	LITTLE	11 TO 20
- SS - 3" SPLIT SPOON	DC - DRIVING CASING	11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	SOME	21 TO 35
- D - DENISON	MD - MUD DRILLING	31-50	DENSE	9-15	STIFF	AND	36 TO 50
- RC - ROCK CORE	HA - HAND AUGER	OVER 50	VERY DENSE	16-30	VERY STIFF		
				OVER 30	HARD		

Boring No. SS-17