40.0

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

F.A. Project: U.S. 301 Maryland State Line to I-95 Boring No.: B-4-09

Contract: 28-113-01

Boring Location: Sta. 680+08.82, 173.00' Lt. C.L.

Boring Surface Elev.: + 57.85 Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 2/2/09 31.1 40.0 38.0

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
	2/2/09	1	0.5'	2 3 3	Moist firm brown silt w/trace of fine to coarse A-4(0) 6" of topsoil.	
			0.01			
		2	2.0'	4	10" RECOVERY Moist stiff brown clayey silt w/some fine A-4(5)	-
2.8				4 4 7 10	sand, trace of coarse sand.	
				10		
		V	4.0'		22" RECOVERY	
	_	3	4.0'	2 4 5	Moist stiff brown clayey silt w/some fine A-4(5)	
			_	5 7	sand, trace of coarse sand.	
5.6			6.0		19" RECOVERY	
		4	6.0'	6	Moist stiff orange clayey fine sandy silt w/ A-4(2)	_
			_	6 8 9	some coarse sand.	
			8.0'		20" RECOVERY	
8.4		5	8.0'	4 5	Moist medium dense orange fine to coarse A-1-b	
				4 5 7 9	sand and gravel w/some silt.	
			10.0'	7	18" RECOVERY	
		6	10.0'	7 7 10 11	Moist very stiff orange clay w/some fine sand, A-6(12)	
11.2				11	trace of coarse sand.	
		7	12.0' 12.0'	6	21" RECOVERY Moist medium dense orange coarse to fine A-1-b	\dashv
		'	12.0	6 13 17 15	sand and gravel w/trace of silt.	
				15	respond and graves without or site.	
14			14.0'		ENAME ENAME 20" RECOVERY	
'		8	14.0'	6	Moist very stiff orange fine to coarse sandy A-4(0) 4" clay lens @ 15.0'.	\neg
				6 9 10 11	silt w/some clay, trace of gravel.	
			16.0'		20" RECOVERY	

Remarks:

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

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

Depth	Daily		Sample					Γ
(ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	11 12 15 12		Moist very stiff orange fine sandy silt w/some	A-4(0)	3" clay lens @ 17.0'.
	1			12		coarse sand, trace of gravel.		
			18.0'			19" RECOVERY		
		10	18.0'	3 7		Moist stiff pink fine sandy clay w/trace of	A-6(9)	
			19.0'			coarse sand.		
19.6		10A	19.0'	10 11		11" RECOVERY Moist very stiff light brown clayey silt w/	A-4(0)	
		11	20.0' 20.0'	11		trace of fine to coarse sand and gravel.		
		11	20.0	11 26 27 26		9" RECOVERY Moist very dense orange coarse sand and	A-1-b	
				26		gravel w/some fine sand and silt.		
			22.0'			15" RECOVERY		
22.4		12	22.0'	13 13		Moist medium dense orange gravel and coarse	A-1-b	
				11 13		sand w/some silt and fine sand.		
		13	24.0' 24.0'	14	-	20" RECOVERY		
		13	24.0	14 18 16 16		No Sample Recovery		
25.2				16		DDAET		
			26.0'			0" RECOVERY		
		14	26.0'	6 7	1:1:1:1:1 1:1:1:1:1:1 1:1:1:1:1:1	Moist medium dense orange coarse sand and	A-1-b	
				13 15		giaver w/trace or sitt and time sand.		
): : : : : : : : : : : : : : : : : :			
28		15	28.0' 28.0'	11		17" RECOVERY Moist medium dense orange gravel and coarse	A-1-b	
	•		20.0	11 13 11		sand w/trace of silt and fine sand.	A-1-0	1
				14		ii ii		
			30.0			TOWN DECOMEDIA	1	
		16	30.0'	14 14 14 14		No Sample Recovery		Water encountered at 31.1'.
30.8	1			14				
		17	32.0' 32.0'	2	1:0127 1:0127 1:0141 1:0113	ii 0" RECOVERY	A-1-b	
			02.0	4 4 4		gravel w/trace of silt.	A-1-0	
33.6				4				
33.0	1		34.0'			18" RECOVERY		
		18	34.0'	1 6		Wet medium dense brown coarse to fine sand	A-1-b	
				9 12		and gravel w/trace of silt.		
	1		20.01		1:	11: 11:		
36.4	1	19	36.0' 36.0'	9		Wet medium dense brown gravel and coarse	A-1-b	
	1				1:	to fine sand w/trace of silt.	11 1 0	
					1:1:1:1:1 1:1:1:1:1 1:1:1:1:1 1:1:1:1:1	(i)		
			38.0'		1:1:1:1:1:	20" RECOVERY		
		20	38.0'	/	1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1:	No Sieve Analysis		pH sample sent to GTA for testing.
39.2]			9		iii		woung.
			40.0'		1.1.1.1.1.	E 16" RECOVERY		
			40.0		1-1-1-1-1-	End of Boring.		
						O		
42								
1					1			

Symbol Description

Strata symbols

Silt



Silty low plasticity clay



Low plasticity clay



Silty sand



Poorly graded sand with silt



Poorly graded clayey silty sand



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 2/2/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Trailor 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

50.0

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

F.A. Project: U.S. 301 Maryland State Line to I-95 Boring No.: B-4-10W

Contract: 28-113-01

Boring Location: Sta. 683+80.18, 364.00' Lt. C.L.

Boring Surface Elev.: + 53.62 Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 1/30/09 40.0 38.0 36.1

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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
	1/30/09	1	0.5'	2 4 5	Moist stiff brown clayey silt w/trace of fi coarse sand.	ne to A-4(7)	5" of topsoil, 8" of frost.
			2.0'		18" RECOVERY		
		2	2.0'	2	Moist firm brown clayey fine to coarse sa	andy A-4(1)	
2.8				2 4 4 4	silt w/trace of gravel.		
					())) \	
		N '	4.0'	2	21" RECOVERY		
		3	4.0'	3 3 3	Moist firm brown fine to coarse sandy sil	t. A-4(0)	
				5			
5.6			6.0		18" RECOVERY		
		4	6.0'	3 3	Moist firm brown clayey silt w/some coa	rse A-4(3)	
				3 5 7	to fine sand, trace of gravel.		
		U-1	8.0' 8.0'		21" RECOVERY		Pressed Shelby Tube, 15"
8.4		0-1	8.0		Wet orange brown mottled silty fine to co sand, trace of gravel.	parse	recovery.
					sand, trace of graver.		
			10.0'		15" RECOVERY		
		5	10.0'	6 5	Moist medium dense brownish orange sil	ty A-2-4(0)	
11.2				6 5 6 6	coarse to fine sand w/trace of gravel.		
11.2							
		6	12.0' 12.0'	5	22" RECOVERY	A 2 4(0)	
		0	12.0	5 5 4 5	Moist loose brownish orange silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
				5	course saile withtee of graver.		
14			14.0'		20" RECOVERY		
		7	14.0'	4 4 5 5	Moist loose brownish orange coarse sand	l w/ A-1-b	
				5 5	some fine sand, trace of silt and gravel.		
			16.0'		22" RECOVERY		

Remarks:

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

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

Boring No.: B-4-10W

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
16.8	-	8	16.0'	5 6 6 7		Moist medium dense brownish orange coarse sand w/some fine sand and silt, trace of gravel.	A-1-b	
			18.0'			21" RECOVERY		
		9	18.0'	3 6 8 8		Moist stiff grayish red clayey silt w/some	A-4(3)	
				8		coarse to fine sand.		
19.6								
		10	20.0'	5		22" RECOVERY Moist medium dense brownish orange coarse	A-1-b	
		'0	20.0	5 6 6 7		sand w/some fine sand and silt, trace of	A-1-0	
				7		gravel.		
			22.0'			20" RECOVERY		
22.4		11	22.0'	2 5		Moist medium dense brownish orange coarse	A-1-b	
				2 5 7 10		sand w/some fine sand and silt, trace of		
						gravel.		
			24.0'			20" RECOVERY		
		12	24.0'	3 4 4 5		Moist loose light brown and orange fine to	A-2-4(0)	
25.2				5		coarse sand w/some silt, trace of gravel.		
						IJKAFI		
		13	26.0' 26.0'	3 3	13014335	22" RECOVERY Wet loose light brown and orange fine to	A-2-4(0)	
		'	20.0	4		coarse sand w/some silt, trace of gravel.	A-2-4(0)	
				5	1: 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Course said wisome shit, trace of graves.		
28			28.0'			20" RECOVERY		
20		14	28.0'	2 2		Wet very loose brown silty fine sand.	A-2-4(0)	
	_			2 2 2 4				
				l				
			30.0'			22" RECOVERY	45	
30.8		15	30.0'	3 3 2		Wet loose brown fine sand w/some silt, trace	A-2-4(0)	
30.6				3		of coarse sand.		
			00.01					
		16	32.0' 32.0'	1		21" RECOVERY Wet very loose brown fine sand w/some silt,	A-2-4(0)	
				1 1 2		trace of coarse sand.	11 2 4(0)	
22.0				2				
33.6			34.0'			23" RECOVERY		
		17	34.0'	2 3 3 3		Wet loose brown fine sand w/some silt, trace	A-2-4(0)	
				3 3		of coarse sand and gravel.		
		10	36.0'	3		23" RECOVERY		XX
36.4		18	36.0'	3 8 6	64 14 16 64 14 15 64 14 15	Wet medium dense brownish black fine to coarse sand w/trace of silt and gravel.	A-3	Water encountered at 36.1'.
				9	1:11731 1:11471 1:14471	Coarse saild w/trace or sitt and graver.		
			38.0'		00 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
		19	38.0'	3	111111	22" RECOVERY Wet medium dense brownish black coarse to	A-3	
				3 8 7 8		fine cand w/trace of cilt and gravel		
39.2				-		_		
-			40.0'			22" RECOVERY		
		20	40.0'	4 9 8 9	00 1 2 3 1 6 00 1 3 1 3 1 6 00 1 3 1 3 1 6	Wet medium dense brownish black fine to	A-3	Washed out augers using
				9		coarse sand w/trace of silt and gravel.		mud/water mix.
<u> </u>					(2.111):E			
42		21	42.0' 42.0'	4		23" RECOVERY	A 2 4(0)	Washadantaasaasaasa
		۷۱	42.0	4 6		Saturated medium dense brownish black fine	A-2-4(0)	Washed out augers using

Boring No.: B-4-10W

STATE OF DELAWARE DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

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

Contract: 28-113-01

Depth Daily Sample Blows/6" Class./G.I. No. Sample Description Remarks (ft.) Progress Depth 10 12 sand w/some coarse sand and silt, trace of mud/water mix. gravel. 44.0' 19" RECOVERY 22 44.0' Saturated medium dense brownish orange fine A-2-4(0)Washed out augers using 44.8 sand w/some coarse sand and silt, trace of mud/water mix. gravel. 19" RECOVERY 46.0' 23 46.0' Saturated medium dense brownish orange fine A-2-4(0)Washed out augers using to coarse sand w/some silt, trace of gravel. mud/water mix. 47.6 48.0' 22" RECOVERY 24 48.0' pH sample sent to GTA for No Sieve Analysis testing. 50.0' 22" RECOVERY 50.4 End of Boring. 53.2 56 **GUST 2015** 58.8 61.6 64.4 67.2

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 1/30/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Trailor 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

40.0

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

F.A. Project: U.S. 301 Maryland State Line to I-95 Boring No.: B-4-11

Contract: 28-113-01

Boring Location: Sta. 687+52.09, 341.00' Lt. C.L.

Boring Surface Elev.: + 46.96 Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 2/4/09 28.0 26.0 24.2

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	2/3/09	1	0.0'	6 7 6 7		Moist medium dense orange clayey coarse sand and gravel, trace of fine sand.	A-2-7(2)	
		0	2.0'	6		12" RECOVERY	A 11	
2.8			4.0'	6 6 5 5		Moist medium dense orange coarse sand w/ some silt and gravel, trace of fine sand. 20" RECOVERY	A-1-b	IG
5.6		3	6.0'	3 4 5 2		Moist loose orange coarse sand w/ some gravel and silt, trace of fine sand.	A-1-b	
		4	6.0' 8.0'	2 3 2 3	11133166 11144166 1113166 1113166 1113166 1113166 1113166 1113166 1113166	Moist loose orange coarse sand, trace of silt, fine sand, and gravel. 17" RECOVERY	A-1-b	
8.4		5	8.0' 10.0'	2 2 3 2	11133160 1113166 1113166 1113166 1113166 1113166 1113166 1113166 1113166	Moist loose orange coarse sand, trace of silt, fine sand, and gravel. 14" RECOVERY	A-1-b	
11.2		6	10.0'	3 4 4 3		Moist loose yellow coarse sand w/ some fine sand and silt, trace of gravel. 20" RECOVERY	A-1-b	
14		7	12.0' 14.0'	5 5 7 7	10133165 10134166 101313166 10133166 10133166 10133166 10133166 10133166	Moist medium dense yellow coarse sand, trace of fine sand, silt, and gravel. 18" RECOVERY	A-1-b	
		8	14.0'	4 3 3 4	100 1 2 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Moist loose orange coarse sand w/ some silt, trace of fine sand and gravel.	A-1-b	

Remarks:

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

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

Depth	Daily	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress		16.0'		(CE 3 1 3:0 T (CE 1 4 3:0 F	18" RECOVERY		
16.8		9	16.0'	4 3 5 6		Moist loose orange coarse sand w/ some gravel, trace of silt and fine sand.	A-1-b	
			18.0'		156 13 1566 . 126 1 7 7 7 15 15 156 1 4 1 156 8	18" RECOVERY		
19.6		10	18.0'	3 4 6 7		Moist loose orange coarse sand, trace of silt, fine sand, and gravel.	A-1-b	
19.0			20.0'			16" RECOVERY		
		11	20.0'	6 10 18 13		Moist medium dense orange coarse sand and gravel w/ some fine sand, trace of gravel.	A-1-b	Contains cemented sands.
22.4		12	22.0' 22.0'	7	1.012121	14" RECOVERY Wet medium dense yellow, orange, and white	A 2 4(0)	
22.4		12	24.0'	7 7 5 4		mottled fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
		13	24.0'	3	000143166 001143166	Wet loose brown and light brown fine sand w/	A-3	Water encountered at 24.2'.
25.2			26.0'	3 4 3 4		some coarse sand, trace of silt and gravel. 21" RECOVERY		
		14	26.0'	3 4		Wet loose brown and light brown fine sand w/	A-2-4(0)	
28			28.0'	6 10		some coarse sand and silt, trace of gravel.	NIC	JG
20	_	15	28.0'	3 3		Wet loose orange fine to coarse sand w/ some	A-2-4(0)	
			30.0'	5 5		silt, trace of gravel.	15	
30.8		16	3 <mark>0</mark> .0'	7 11 16 18		Wet medium dense orange fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
		47	32.0' 32.0'	1	***************************************	18" RECOVERY		
33.6		17	32.0	14 13 30		Wet medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	Contains cemented sands.
00.0			34.0'		12 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	24" RECOVERY		
		18	34.0'	13 14 19 22		Wet dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
36.4		19	36.0' 36.0'	28		20" RECOVERY	A-3	
30.4		19		28 36 21 42		Wet very dense orange fine to coarse sand, trace of silt and gravel.	A-3	
39.2		20	38.0' 38.0'	11 21 21 20		Indication of wet dense orange fine to coarse sand, trace of silt and gravel.		pH sample sent to GTA for testing.
<u> </u>			40.0'		oniviti. Granica Granica	18" RECOVERY		
42						End of Boring.		

Symbol Description

Strata symbols

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

40.0

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

F.A. Project: U.S. 301 Maryland State Line to I-95 Boring No.: B-4-12

Contract: 28-113-01

Boring Location: Sta. 690+81.42, 192.00' Lt. C.L.

Boring Surface Elev.: + 28.06 Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 1/26/09 5.1 10.0 8.0

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.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	1/26/09	1	0.5'	2 1 10		Wet stiff brown clayey coarse sandy silt w/	A-4(1)	Topsoil - 6".
				10		some fine sand, trace of gravel.		
		2	2.0' 2.0'	3		12" RECOVERY	(2)	
2.8		_	2.0	3 4 5 5		Wet stiff brown clayey coarse sandy silt w/	A-4(2)	-
2.8			4.0'	5		some gravel, trace of fine sand. 18" RECOVERY		IG
		3	4.0'	1 1 1 2		Wet soft gray and orange mottled gravelly and coarse sandy silt w/ some fine sand.	A-4(0)	
5.6			6.0			8" RECOVERY	15	
		4	6 <mark>.</mark> 0'	1 5 7 6		No Sample Recovery		
				6				
		5	8.0' 8.0'	1	11.612.712.01	0" RECOVERY	1.0.1(0)	
8.4		5	8.0	1 2 1 1	636 44-166 6 669 43-66 669 43-66 661 73-66 661 73-66 661 73-66 661 73-66 663 13-66	Wet very loose yellow fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			10.0'		12172.121. 12172.121.	18" RECOVERY		
		6	10.0'	2 3 4 4		Wet loose yellow and light brown coarse sand	A-1-b	
11.2				4		w/ some fine sand, trace of silt and gravel.		
			12.0'			24" RECOVERY		
		7	12.0'	1 4 5 10	#(129)## #4441## #4419##	Saturated loose orange fine to coarse sand w/	A-2-4(0)	
				10		some silt, trace of gravel.		
14			14.0'			12" RECOVERY		
		8	14.0'	10 10		Saturated medium dense orange fine to coarse	A-2-4(0)	
				12 15	(C t 2 1 2 C C C C C C C C C C C C C C C C C	sand w/ some silt, trace of gravel.	`,	
			16.0'		121111111111111111111111111111111111111	20" RECOVERY		

Remarks:

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	9 11 11		Saturated medium dense orange fine to coarse	A-3	
10.0	1			11 14		sand, trace of silt and gravel.		
	-				0:41:49:60 0:43:13:60 1:63:43:66			
	-	10	18.0' 18.0'	5		24" RECOVERY Saturated dense orange fine sand w/ some	A-2-4(0)	
	_	'	10.0	5 15 24 13		coarse sand and silt, trace of gravel.	A-2-4(0)	
	-			13		course said and sitt, trace of graver.		
19.6	-		20.0'		00 8 3 1 3 3 0 0 13 6 1 3 1 3 0 6 12 6 1 7 3 7 0 0	20" RECOVERY		
	-	11	20.0'	6 10		Saturated medium dense orange fine sand w/	A-3	
	-			13 18		some coarse sand, trace of silt and gravel.		
			22.0'			22" RECOVERY		
22.4	_	12	22.0'	5 5	#1137781 #114776 #114776	Saturated medium dense orange fine sand w/	A-2-4(0)	
				18 20	136 14 330 6 426 1 7 7 9 6 1 12 1 1 4 2 1 0 1	some coarse sand and silt, trace of gravel.		
			24.0'		12 1 7 3 2 1 1 15 1 3 4 3 5 6 6	21" RECOVERY		
		13	24.0'	9 10 11		Saturated medium dense orange fine sand w/	A-3	
25.2				11 16		some coarse sand, trace of silt and gravel.		
						IJRAFI		
		14	26.0' 26.0'	14		21" RECOVERY Saturated dense orange fine sand w/ some	A-3	
		'-	20.0	14 16 25 36		coarse sand, trace of silt.	A-3	
				36	126 1 7 3 10 U 11 C 1 4 1 1 C 1 2 C 1 C 1 D 1 C 1			
28			28.0'		12 13 13 10 10 12 13 13 13 6 6 12 13 13 13 10 1	22" RECOVERY	\mathcal{A}	
20	1 1	15	28.0'	9		Saturated medium dense orange fine sand w/	A-3	
	1 .			9 10 18 21	0: 00 13:00 1:614 3:06 0:6173:00	some coarse sand, trace of silt.		
	1				11 (1 4 3 1 6 6 14 (17) 16 (16 (17) 19 (1			
	_		30.0			24" RECOVERY	15	
		16	30.0'	9 14 23 24		Saturated dense orange fine sand w/ some	A-3	
30.8	1			23 24	136 13 116 6 126 1 7 3 16 1 13 1 1 1 1 1 1 1 1 1	coarse sand, trace of silt and gravel.		
	-				(** 14*)** (* (** 14*)** (* (** 14*)* (*			
			32.0'	0	128 1 7 3 7 5 L 126 1 4 1 1 6 E 126 1 2 7 1 E	20" RECOVERY		
	-	17	32.0'	9 14 26 26	14 14 15 15 15 15 15 15 15 16 14 15 15	Saturated dense orange fine sand w/ some	A-3	
				26	6617361 11111111111111111111111111111111	coarse sand, trace of silt and gravel.		
33.6	1							
		18	34.0' 34.0'	10 13	100141166 100141166	24" RECOVERY Saturated medium dense orange fine sand w/	A-3	
				13 16 22		some coarse sand, trace of silt.	A-3	
				22	**************************************	Some course sums, was or sim		
			36.0'			23" RECOVERY		
36.4		19	36.0'	8 10		Saturated medium dense orange fine sand w/	A-3	
				8 10 16 26		some coarse sand, trace of silt.		
			38.0'			18" RECOVERY		
		20	38.0'	8 13 18 24		Saturated dense orange fine sand with some		pH sample sent to GTA for
39.2				24):::1:1:1:::0 :::1::::0 :::1::::0	silt.		testing.
	1				1.617311. 1.617316.6 1.617316.6			
	<u> </u>		40.0'			24 RECOVERT		
	1					End of Boring		
	1							
40	1							
42	†							

Symbol Description

Strata symbols



Silty low plasticity clay



Clayey sand



Silty sand



Poorly graded sand with silt



Well graded sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

40.0

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

F.A. Project: U.S. 301 Maryland State Line to I-95 Boring No.: B-4-20

Contract: 28-113-01

Boring Location: Sta. 700+36.79, 224.00' Lt. C.L.

Boring Surface Elev.: + 44.17 Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Time **Depth of Water** Depth of Hole Elev. of Water Date 1/22/09 26.0 24.0 22.0

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: D. Zmijewski

Depth	Daily	Na	Sample	Dlaws/C"		Cample Description	Class /C.I	Damarka
(ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	1/22/09	1	1.0'	3 3		Moist firm brown fine sandy silt w/ some	A-4(0)	Topsoil - 9".
			2.0'			coarse sand, trace of gravel. 10" RECOVERY		
2.8		2	2.0'	1 5 6 6		Moist stiff brown clayey silt w/ some fine to	A-4(3)	
2.0	_			6		coarse sand, trace of gravel.		_
							$\supset IV$	
			4.0' 4.0'	5		18" RECOVERY		
		3	4.0	5 6 7 8		Moist stiff orange and gray clayey fine sandy silt, trace of coarse sand.	A-6(6)	
				8		siit, trace of coarse sand.		
5.6								
		4	6.0' 6.0'	8		15" RECOVERY Moist very stiff orange and yellow mottled	4.4(0)	
			0.0	8 11 10 10		fine sandy silt, trace of coarse sand.	A-4(0)	
				10		The sandy sitt, trace of coarse sand.		
			0.01			23" RECOVERY		
8.4		5	8.0' 8.0'	2		Moist firm orange and yellow mottled fine	A-4(0)	
0.1				2 2 5 7		sandy silt, trace of coarse sand.	A-4(0)	
				/		sandy sind, trace of course sand.		
			10.0'			20" RECOVERY		
		6	10.0'	7		Moist medium dense orange-yellow mottled	A-2-4(0)	
				7 8 10 10		silty fine sand.	11 2 1(0)	
11.2				10		,		
			12.0'			22" RECOVERY		
		7	12.0'	4		Moist medium dense brown fine to coarse	A-2-4(0)	
				4 6 9 9		sand w/ some silt, trace of gravel.		
14			14.0'			18" RECOVERY		
		8	14.0'	4 8 14 13		Moist medium dense brown coarse sand and	A-1-b	
				14 13	12 14 11 6 12 14 15 16 16 15 14 15 16 16 16 16 16 16 16	gravel w/ some fine sand and silt.		
					-4 -1 -1 C 1 -1 -5			
			16.0'		125 7 7 1 1 1 1 1 126 1 7 3 1 1 1 126 1 4 3 1 6 6	18" RECOVERY		
		9	16.0'	11 8		Moist medium dense orange and yellow	A-1-b	

Remarks:

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"			Sample Description	Class./G.I.	Remarks
				9 11	121212121 121212121 121212121	.J.J.J. :1:1:1: :1:1:1:	coarse to fine sand w/ some gravel, trace of		
	-				1.1.1.1.1	11.11.11 11.11.11 11.11.11	silt.		
	1	10	18.0' 18.0'	4	100000	715.5	20" RECOVERY Wet loose yellow fine to coarse sand, trace of	A-3	
	-	'	10.0	4 4 5 6		3166	silt and gravel.	A-3	
40.0	-			6					
19.6			20.0'		111111	.110f. 3100 3160	18" RECOVERY		
	-	11	20.0'	5 5 5 6		307	Wet loose yellow fine to coarse sand, trace of	A-3	
	1			6		3166	silt and gravel.		
	-					3167 3167			
22.4	-	12	22.0' 22.0'	3	11111		22" RECOVERY Wet medium dense orange fine to coarse sand	A-1-b	
22.7		'-		3 6 12 13			and gravel w/ some silt.	A-1-0	
				13			2-1-1 g-1-1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -		
			24.0'				13" RECOVERY		
		13	24.0'	5 10			Wet medium dense orange fine to coarse sand	A-2-4(0)	
25.2	1			5 6			w/ some silt and gravel.		
	1								
		14	26.0' 26.0'	4			18" RECOVERY Wet medium dense orange coarse to fine sand	A-1-b	
		''	20.0	7 4	1:	:1:1:1:	w/ some silt, trace of gravel.	A-1-0	
				4			W some shift the of graver		
28			28.0'		1:1:1:1: 1:1:1:1:1	111111	18" RECOVERY		
		15	28.0'	5 8			Saturated medium dense orange fine sand w/	A-2-4(0)	
		4 '		10 13			some coarse sand and silt, trace of gravel.	—	
]								
		16	30.0' 30.0'	8			20" RECOVERY	A 2 4(0)	
30.8		10	30.0	8 11 14 16			Saturated medium dense orange fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	
				16					
			32.0'				22" RECOVERY		
		17	32.0'	8 11		1100 1100	Saturated medium dense orange fine sand w/	A-2-4(0)	
				14 16		3166	some coarse sand and silt, trace of gravel.		
33.6					100.11	116 f			
	<u> </u>	18	34.0' 34.0'	9	1111	7: F. U	22" RECOVERY Saturated medium dense orange fine sand w/	A-2-4(0)	
	_		0	9 11 13 18		300 F	some coarse sand and silt, trace of gravel.	A-2-4(0)	
				10	100 142	300			
			36.0'			116 f. 116 f. 116 f.	21" RECOVERY		
36.4		19	36.0'	8 18 24 25	000 (1) 104 (1)	9366 3366 3361	Saturated dense orange fine to coarse sand,	A-3	
	<u> </u> -			24 25		386	trace of silt and gravel.		
	-								
	-	20	38.0' 38.0'	18		3106	14" RECOVERY Saturated dense brown fine to coarse sand		pH sample sent to GTA for
			00.0	18 20 22 31		316.5	with some silt.		testing.
39.2				31		3717.0			
			40.0'		bitiri	300 (c)	24" RECOVERY		
							End of Boring		
	-								
42	-								
	-								
			1	1			ı		

Symbol Description

Strata symbols

Silty sand



Silty low plasticity clay



Low plasticity clay



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

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

40.0

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

F.A. Project: U.S. 301 Maryland State Line to I-95 Boring No.: B-4-27

Contract: 28-113-01

Boring Location: Sta. 707+51.38, 263.00' Lt. C.L.

Boring Surface Elev.: + 49.71 Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 1/21/09 30.0 28.0 26.6

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.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: D. Zmijewski

Depth Daily Progress No. Sample Blows/6* Sample Description Class/G.l. Remarks									
and gravel, trace of course sand. 2.0' 2 2.0' 5	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
2.0' 12' RECOVERY		1/21/09	1	0.5'	4 4		Moist firm brown fine sandy silt w/ some clay	A-4(0)	Topsoil - 6".
2 2.0°					4		and gravel, trace of coarse sand.		
Some coarse sand, trace of gravel. Some coarse sand, trace of gravel.				2.0'			12" RECOVERY		
2.8 3 4.0' 4 Moist loose orange coarse to fine sand w/ some silt, trace of gravel. 5.6 6.0 Moist nedium dense orange fine to coarse and and w/ some silt, trace of gravel. 8.0' Moist nedium dense orange fine to coarse sand and w/ some silt, trace of gravel. 8.0' Moist nedium dense orange fine to coarse sand and w/ some silt, trace of gravel. 8.4 5 8.0' 5			2	2.0'	5		Moist medium dense orange silty fine sand w/	A-2-4(0)	
Ado	2.8				6				
Moist loose orange coarse to fine sand w/ some silt, trace of gravel. A-1-b Some silt, trace of gravel.								111/	
Moist loose orange coarse to fine sand w/ some silt, trace of gravel. A-1-b Some silt, trace of gravel.			V	4.0'			18" RECOVERY	<i></i>	
some silt, trace of gravel. 17		•	3	4.0'	4			A-1-b	
Solution					3				
17"RECOVERY	-				,		DIIOTOO		
Moist medium dense orange fine to coarse sand w/ some silt, trace of gravel. 8.4 5 8.0' 6 10.0' 10.0'	5.6			6.0'			17" RECOVERY		
8.0' 8.0' 8.0' 5 8.0' 5 8.0' 6 10.0' 1			4		5			A-2-4(0)	
8.4 5 8.0' 5 8.0' 6 7 10.0' 10.0' 11.2 6 10.0' 12.0' 7 12.0' 7 12.0' 14 14.0' 16 Moist loose orange coarse to fine sand w/ some silt, trace of gravel. Moist loose orange and yellow coarse to fine sand w/ some silt, trace of gravel. Moist loose orange and yellow coarse to fine sand w/ some silt, trace of gravel. Moist loose orange and yellow coarse to fine sand w/ some silt, trace of gravel. Moist loose orange and yellow coarse to fine sand w/ some silt, trace of gravel. Moist loose orange and yellow coarse to fine sand w/ some silt, trace of gravel. Moist medium dense orange and yellow coarse sand and silt. Moist medium dense orange and yellow coarse sand w/ some gravel, trace of fine sand and silt.				_	5			1 2 1	
8.4 5 8.0' 5 6 7 12.0' 18" RECOVERY 10.20' 1 12.0' 18" RECOVERY 12.0' 18" RECOVERY 14.0' 20" RECOVERY 14.0' 8 14.0' 5 6 6 6 6 6 6 16.0' 16.0' 16" RECOVERY 16.0' 16" RECOVERY 16.0' 16" RECOVERY 16					5				
8.4 5 8.0' 5 6 7 12.0' 18" RECOVERY 10.20' 1 12.0' 18" RECOVERY 12.0' 18" RECOVERY 14.0' 20" RECOVERY 14.0' 8 14.0' 5 6 6 6 6 6 6 16.0' 16.0' 16" RECOVERY 16.0' 16" RECOVERY 16.0' 16" RECOVERY 16				9.0'			21" DECOVEDY		
gravel w/ some fine sand and silt. 10.0'	8.4		5		5	1.012756		A-1-h	
10.0' 10	<u> </u>				6 7	1111111		71 1 0	
Moist loose orange coarse to fine sand w/ some silt, trace of gravel. A-1-b					2		graver w/ some time same and since		
Moist loose orange coarse to fine sand w/ some silt, trace of gravel. A-1-b				40.01		100 2 1 3 10 0 100 1 A 11 0 0 100 1 2 3 20 0	10" RECOVERY		
11.2 12.0' 18" RECOVERY 7 12.0' 3			6		1	1:0343:09		A 1 b	
11.2 12.0' 18" RECOVERY 7 12.0' 3 2				10.0	3 4			A-1-0	
Moist loose orange and yellow coarse to fine sand w/ some silt, trace of gravel. 14 14.0' 8 14.0' 8 14.0' 16.0' Moist loose orange and yellow coarse to fine sand yellow coarse to fine sand w/ some silt, trace of gravel. A-1-b Coarse sand w/ some gravel, trace of fine sand and silt.	11.2				3		some sitt, trace of graver.		
Moist loose orange and yellow coarse to fine sand w/ some silt, trace of gravel. 14 14.0' 8 14.0' 8 14.0' 16.0' Moist loose orange and yellow coarse to fine sand yellow coarse to fine sand w/ some silt, trace of gravel. A-1-b Coarse sand w/ some gravel, trace of fine sand and silt.									
14.0' 8 14.0' 8 14.0' 16.0' 16.0' 17-10 10-10-10-10-10-10-10-10-10-10-10-10-10-1			7		3			A 1 b	
14.0' 8 14.0' 8 14.0' 9			′	12.0	2 6			A-1-0	
8 14.0' 5 Moist medium dense orange and yellow coarse sand w/ some gravel, trace of fine sand and silt. 16.0' 16.0' 16.0' 16" RECOVERY					7		sand w/ some snt, trace of graver.		
8 14.0' 5 Moist medium dense orange and yellow coarse sand w/ some gravel, trace of fine sand and silt. 16.0' 16.0' 16.0' 16" RECOVERY									
coarse sand w/ some gravel, trace of fine sand and silt.	14				5			A 1 1	
16.0' and silt.			°	14.0	6 9	1:3:3:3:3:3:3:3 1:3:3:3:3:3:3:3 1:3:3:3:3		A-1-b	
16.0' RECOVERY					6	1:1:1:1:1:1:1			
10.0						13131313131			
				16.0'		1-1-1-1-1-1-1	I IO RECOVERI		

Remarks:

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

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

		ı		ı	ı	1		
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	7 7 5 5	65 444 166 66 5 19 10 6 66 19 3 10 6 76 19 3 10 6 76 19 3 10 6 10 19 3 10 6	Moist medium dense orange and yellow coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
		10	18.0' 18.0'	5	12111111111111111111111111111111111111	23" RECOVERY	A 1 1	
19.6		10	20.0'	5 6 5 6	12 13 15 16 1 12 13 13 16 1	Moist medium dense orange and yellow coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
	1	11	20.0'	3	100143168 100143168 100143168	Moist loose orange and yellow coarse to fine	A-1-b	
			22.0'	3 5 5 5	00000000000000000000000000000000000000	sand w/ some silt, trace of gravel.	74 1 0	
22.4		12	22.0'	5 8		Moist medium dense yellow, orange, and	A-1-b	
			24.0'	20 26		brown coarse to fine sand w/ some silt and gravel.		
	-	13	24.0'	14 17	1111111	Moist dense yellow, orange, and brown gravel	A-1-b	
25.2			26.0'	24 21	069 1936 6 66 193 6	and coarse sand w/ some fine sand, trace of silt.	11 0	
	-	14	26.0'	22 18 11	11.013.11.00 13.14.11.61 10.13.13.00	Moist medium dense yellow, orange, and	A-1-b	
	=			11 13	138 14 300 8 128 1 7 3 2 0 128 1 3 3 2 0	brown gravel and coarse sand w/ some fine		
28		15	28.0' 28.0'	2	12 12 12 14 15 15 15 15 15 15 15 15 15 15 15 15 15	sand, trace of silt. 18" RECOVERY Wet loose yellow fine to coarse sand, trace of	A-3	IG
30.8	_	16	30.0' 30.0'	2 3 4 5	13014 166 12614 169 12614 169 12614 169 12614 169 12614 169 12614 169 12614 169	silt and gravel. 24" RECOVERY Saturated medium dense yellow fine to coarse	A-3	
30.0		47	32.0'	7	100 1 7 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	sand, trace of silt and gravel. 24" RECOVERY		
33.6		17	32.0'	2 3 3 4	100 1 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Saturated loose yellow fine to coarse sand, trace of silt.	A-3	
	1		34.0'		00111100 01111100	24" RECOVERY		
		18	34.0'	10 6 4 4	100 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Saturated loose orange fine to coarse sand, trace of silt and gravel. 24" RECOVERY	A-3	
36.4		19	36.0'	8 9 10 10		Saturated medium dense orange fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
			38.0'			24" RECOVERY		
39.2		20	38.0'	5 6 7 9		Saturated medium dense orange brown silty fine to coarse sand.		pH sample sent to GTA for testing.
<u> </u>			40.0'			24" RECOVERY		
						End of Boring		
42								

Symbol Description

Strata symbols



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

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-04-01

Contract: 25-113-01

Boring Location: Sta. 688+30.49, 67' Rt. C.L.

Boring Surface Elev.: 32.06 Reference:

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

IN. IN. U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0' 34.0'

Water Level Readings

Elev. of Water **Depth of Water** Time **Depth of Hole Depth of Casing** Date 28.3 32.1 2/15/08 4.0' 4.0' 3.8'

Pay Quantities:

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

Boring Contractor: Walton Corperation **Driller:** Dave Burt

Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
		1	2.0'	1 4 4 4	Saturated firm brown silt with some fine sand, trace of coarse sand and gravel. 20" RECOVERY
2.49		2	2.0'	3 5 8 9	Wet stiff brown coarse sandy silt with some fine sand red and clay, trace of gravel. 15" RECOVERY
4.98	-	3	4.0'	3 5 18 18	Wet medium dense brown gravelly coarse sand with some fine sand and silt. 18" RECOVERY
7.47		4	6.0'	10 13 15 14	Wet medium dense brown gravelly coarse sand with some silt and fine sand. A-2-4(0)
9.96	-	5	8.0' 8.0'	8 12 12 13	24" RECOVERY Moist medium dense brown coarse sandy gravel, trace of silt and fine sand. 4" RECOVERY
		6	10.0'	19 19 15 13	Moist dense brown fine sandy gravel with some coarse sand, trace of silt. 18" RECOVERY
12.45		7	12.0'	16 16 17 18	Saturated dense brown coarse to fine sand, trace of silt. A-2-4(0)

Remarks: Mud Rotary @ 34.0

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(11)		8	\ 14.0' <i>j</i>	12	1:019 1:00 1:01	6" RECOVERY	A-2-6(0)	
			14.0'	12 12 13 8	130 33.120 130 33.120		A-2-0(0)	
14.94				8	neer rancu neer rancu reer rancu	gravel with some fine sand, trace of silt.		
					00111101 00111101			
			16.0'			5" RECOVERY		
		9	16.0'	5	######################################	Saturated medium dense brown fine sandy	A-2-4(0)	
				5 9 8 11	110 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	gravel with some coarse sand, trace of silt.	(0)	
					000 1 3 3 0 0 0 000 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	,		
17.43					100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
			18.0'		1217131 1217131	24" RECOVERY		
		10	18.0'	6 8 7 11		Saturated medium dense brown fine sand with	A-2-4(0)	
				7 11		some silt and coarse sand.		
19.92			20.0'		-	16" RECOVERY		Dance Committee Challes Took
		U-1	20.0'			No Sample Recovery - Tube Bent		Press Sample - Shelby Tube
			00.01					
			22.0'		-	0" RECOVERY		
22.41								
		11	24.0'	5		Saturated medium dense brown fine sand with	A-2-4(0)	
		VI I	2 1.0	5 8 8 10		some silt and coarse sand, trace of gravel	A-2-4(0)	
24.9		•		10		some six and coarse said, trace of graver.		
			26.0			19" RECOVERY	4 —	
			-3.7					
						3UST 70		
					1			
27.39								
		12	29.0'	8	-	N.S.A - Sample sent to GTA lab.		pH Sample
00.00				8 10 17 20		r		r ···· r ·
29.88				20				
			31.0'			20" RECOVERY		
		13	31.0'	15 19		Saturated dense brown fine sand with some	A-2-4(0)	
				15 19 21 23		silt, coarse sand, and gravel.	\	
32.37								
32.31								
			33.0'			24" RECOVERY		
		14	34.0'	10 10		Saturated medium dense brown fine sand with	A-2-4(0)	
34.86				10 11 10		some coarse sand and silt, trace of gravel.	_ (0)	
J -1 .00				10		8-11-11		
\vdash								
			36.0'			12" RECOVERY		
37.35								
31.35			L]		

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		15	39.0'	9 12 15 20	Saturated medium dense reddish-brown fine sand with some silt and coarse sand, trace of	A-2-4(0)	
			41.0'		gravel. 24" RECOVERY		
42.33							
44.82		16	44.0'	6 15 18 25	Saturated dense brown fine sand with some silt and coarse sand.	A-3	
74.02				25	DDAET		
			46.0'		18" RECOVERY		
47.31	R			_			
		1				יווכ	1G
49.8		17	49.0'	10 15 20 23	Saturated dense gray silty fine sand, trace of coarse sand.	A-3	
				10	JUSI ZU	CI	
			51.0'		20" RECOVERY		
52.29							
		18	54.0'	10 15 23 23	Saturated dense gray silty fine sand, trace of	A-3	
54.78				23 23	coarse sand and gravel.		
			56.0'		20" RECOVERY		
57.27							
		19	59.0'	18		A 2 4(0)	
59.76		19	39.0	18 15 20 20	Saturated dense gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Clas	ss./G.I. Remarks
(10.)	1 1091000		61.0'		24" RECOVERY	
	1					
62.25						
	-					
		20	64.0'	10	Saturated medium dense gray silty fine sand	A-3
64.74				10 12 13 13	with some coarse sand, trace of gravel and	
					seashells.	
	-		66.0'		20" RECOVERY	
	-					
67.23						
	<u> </u>					
			22.01	40	DDAET	
69.72	-	21	69.0'	13 15 17 24	Saturated hard gray fine sandy silt, trace of coarse sand and gravel.	A-3
				24		
			71.0'	_	24" RECOVERY	
			, , , ,		24' RECOVERY	ING
72.21		A .				
12.21						
			Λ		PLICT 2014	
74.7		22	74.0'	12 14 17 24		2-4(0)
14.1	1			24	trace of coarse sand, gravel, and organic matter.	
			76.0'		Boring Terminated at 75.8'	
77.40						
77.19	1					
	-					
79.68						
	-					
]					
82.17	-					
	-					
]					

Symbol Description

Strata symbols

Silt



Poorly graded clayey silty sand



Silty sand



Well graded gravel with silt



Poorly graded gravel with silt



Well graded sand with silt



Poorly graded sand with silt

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 Truck CME

55

- 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.

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-04-02

Contract: 25-113-01

Boring Location: Sta. 691+01.78, 67' Rt. C.L.

Boring Surface Elev.: + 30.60 Reference:

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

U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0' 56.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 2/29/2008 6.0' 6.0' 4.5'

Pay Quantities:

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

Boring Contractor: Walton Corperation Driller: Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample	e Description	Class./G.I.	Remarks
		1	0.0'	1 3 5 5	trace of fine to co		A-4(3)	
2.49		2	2.0'	6 6 7 7	Moist medium d	יסוסו	A-4(6)	1G
4.98		3	4.0' 4.0'	2 1 2 3	Wet very loose befine sand and gra	4" RECOVERY brown coarse sand with some avel, trace of silt.	A-4(3)	
7.47		4	6.0'	3 3 11 10	Wet medium der some fine sand a	ase brown coarse sand with and clay, trace of gravel.	A-6(3)	
9,96		5	8.0'	4 4 16 16	Wet medium der with some fine s	nse brown silty coarse sand and, trace of gravel.	A-1-b	
0.00		6	10.0'	8 8 7 7	Wet medium der	nse brown coarse sand with trace of silt and gravel.	A-2-4(0)	
12.45		7	12.0'	1 2 4 5	[4.44:614]	prown fine to coarse sand	A-2-4(0)	

Remarks: Mud Rotary @ 56.0

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
,,	, 3. 300	8	14.0' /	3		13" RECOVERY	A-4(0)	
14.94		Ü	14.0'	3 7 7 7		Wet medium dense brown fine to coarse sand with some silt, trace of gravel.	A-4(0)	
		9	16.0' 16.0'	8		17" RECOVERY Wet medium dense brown fine to coarse sand	A-1-b	
		9	10.0	8 13 16 20		with some silt, trace of gravel.	A-1-0	
17.43								
		10	18.0' 18.0'	2 6		16" RECOVERY Saturated medium dense brown fine sand with	A-2-4(0)	
				6 10 12		some silt and coarse sand, trace of gravel.	11 2 4(0)	
40.00								
19.92			20.0'		-	10" RECOVERY		
						DDAET		
22.41						DRAFT		
24.9		11	24.0'	6 6 6 7		Saturated medium dense brown silty fine sand with some coarse sand, trace of gravel.	A-2-4(0)	
24.9	•							
			26.0			19" RECOVERY	4 [
						BUS 20		
27.39								
29.88		12	29.0'	7 13 16 18		Saturated medium dense brown fine sand with some coarse sand, trace of silt.	A-1-b	
23.00				10				
			31.0'			16" RECOVERY		
32.37								
34.86		13	34.0'	9 11 18 16		Saturated medium dense brown fine sand with some silt and coarse sand, trace of gravel.	A-2-4(0)	
5 1.50								
			36.0'			15" RECOVERY		
37.35								

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		14	39.0'	11		Saturated medium dense brown fine sand with	A-2-4(0)	
39.84				11 11 12 10		some coarse sand and silt.	A-2-4(0)	
			41.0'			16" RECOVERY		
42.33								
		45	44.01	0				
44.82		15	44.0'	9 10 13 16		Saturated medium dense brownish-gray fine sand with some coarse sand, trace of silt.	A-2-4(0)	
11.02				16	1-64-1-1-1			
			46.0'		166 1 4346 6 166 1 4346 6 166 1 4 446 6 166 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	19" RECOVERY		
47.31		_			/06 / 40 / 10 / 10 / 10 / 10 / 10 / 10 / 10			_
47.51			M .				\mathcal{I}	
		V			11	OR BIDI	ノル	NG
	_							
40.0		16	49.0'	9 13 16 19		Saturated medium dense brownish-gray fine sand with some silt, trace of coarse sand and	A-2-4(0)	
49.8				19		gravel.	15	
			51.0'	1		17" RECOVERY		
			31.0			17 RECOVER I		
52.29								
		17	54.0'	9 15 17 24		Saturated dense gray silty fine sand with some	A-2-4(0)	
54.78				1 <i>f</i> 24		coarse sand.		
			_					
			56.0'			20" RECOVERY		
57.27								
		18	58.0'	8		Saturated band and Control 11 11	A 2 4(0)	
		10	36.0	8 12 18 44		Saturated hard gray fine sandy silt with some clay, trace of coarse sand and seashells.	A-2-4(0)	
59.76			60.0'			24" RECOVERY		

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

Depth	Daily	1	Sample	1	Ī	T
(ft.)	Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I	Remarks
00.05						
62.25						
		19	63.0'	9		
		13	03.0	9 15 19 25	Saturated dense gray silty fine sand, trace of coarse sand.	
				25		
64.74			65.0'		24" RECOVERY	
			00.0			
67.23						
		20	68.0'	5	Saturated very stiff gray fine sandy silt with A-2-4(0)	
				5 8 15 16	some coarse sand and clay, trace of gravel.	
69.72			70.0'		24" RECOVERY	
	A	1 1			OR BIDDII	
		$\mathbf{M}_{\mathbf{I}}$				MCI
72.21	•			•		
				l		_
		21	73.0'	8 15 20 22	Saturated hard gray fine sandy silt, trace of A-2-4(0)	
				20 22	coarse sand.	
74.7						
7 4.7			75.0'		24" RECOVERY	
					Boring Terminated at 75.0'	
77.19						
79.68						
00.47						
82.17						

Symbol Description

Strata symbols



Poorly graded gravel with clay



Silty sand



Well graded sand with silt



Poorly graded clayey silty sand



Poorly graded sand with silt



Poorly graded sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 2/29/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
- 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.
- These logs are subject 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.

35.0

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

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-04-03

Contract: 25-113-01

Boring Location: Sta. 689+88.45, 50' Lt. C.L.

Boring Surface Elev.: + 29.17 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: 2 Type of: Split-Barrel O.D.

Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. O.D. U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 2/19/2008 5.5' 6.0' 6.0'

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: Dia. U-Sample Boring: U-Samples: 75.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation **Driller:** Dave Burt

Helpers: A. Joseph

	•		•		
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
		1	0.0'	2 2 4 4	Saturated firm brown silt with some fine sand, trace of coarse sand. A-4(0)
2.49		2	2.0'	3 3 2 2	Saturated firm brown silt, trace of fine to coarse sand. A-4(0)
4.98		3	4.0' 4.0'	1 2 1 8	Saturated medium dense brown fine to coarse sand and gravel, little silt. 3" RECOVERY
7.47		4	6.0' 8.0'	17 10 9 10	Wet medium dense grayish-brown coarse to fine sand with some gravel and silt. 17" RECOVERY
9.96		5	8.0'	2 3 6 8	Saturated loose grayish-brown silty coarse to fine sand, trace of gravel. 14" RECOVERY
		6	10.0'	6 6 6 7	Saturated medium dense brown fine to coarse sand with some silt, trace of gravel. 15" RECOVERY
12.45		7	12.0'	4 5 6 6	Saturated medium dense brown fine sand with some coarse sand, trace of silt and gravel.

Remarks: Mud Rotary @ 35.0

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
14.94		8	14.0' <i>J</i> 14.0'	1 5 7 7		Saturated medium dense brown fine sand with some coarse sand and silt, trace of gravel.	A-7-5(2)	
17.43		9	16.0' 16.0'	8 9 10 12		14" RECOVERY Saturated medium dense brown fine sand with some silt and coarse sand.	A-2-7(1)	
17.43			18.0'			24" RECOVERY		
		10	18.0'	10 12 12 12 16		Saturated medium dense brown fine sand with some silt and coarse sand.	A-7-5(4)	
19.92			20.0'		-	24" RECOVERY		
22.41						DRAFT		
24.9		11	24.0'	9 11 12 12		Saturated medium dense brown fine sand with some coarse sand and silt, trace of gravel.	A-5(0)	1G
27.39			26.0	l		3US 20	15	
29.88		12	29.0'	5 5 8 10		Saturated medium dense brown fine sand with some coarse sand and silt.	A-2-4(0)	
			31.0'		-	17" RECOVERY		
32.37								
		13	34.0'	3		Saturated medium dense brown fine sand with	A-2-4(0)	
34.86				3 7 14 15		some coarse sand, trace of silt.	ζ-/	
			36.0'			17" RECOVERY		
37.35					66313966 18141966 18143966 18143966 18143966			

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Cla	ass./G.I.	Remarks
			·				
39.84		14	39.0'	6 11 14 20	Saturated medium dense brown fine sand with some silt and coarse sand.	A-2-4(0)	
			41.0'		17" RECOVERY		
42.33							
		15A	44.0'	7 11	Saturated dense brown silty fine sand, trace of A	x-2-4(0)	
44.82			45.0'	23	coarse sand.	(3)	
		15B	45.5' 46.0'	23	Saturated dense gray silty fine sand, trace	A-3	
		15B	46.0' 46.3'		Saturated dense gray silty fine sand, trace coarse gravel 4" RECOVERY Saturated dense gray silty fine sand, trace of		
47.31			0	T	R BIDD		1G
49.8		16	49.0' 51.0'	8 14 23 25	Saturated dense gray silty fine sand, trace of coarse sand and gravel. 15" RECOVERY	-2-4(0)	
52.29		<u>U-1</u>	52.0' 52.0'		No recovery. 0" RECOVERY		Press Sample - Shelby Tube.
54.78		17	54.0'	13 11 17 19	Saturated very stiff gray fine sandy silt, trace of coarse sand and seashells.	A-2-4(0)	
34.76				19	of coarse saild and seasiteris.		
			56.0'		15" RECOVERY		
57.27							
59.76		18	59.0'	9 10 22 26	Saturated hard gray fine sandy silt, trace of coarse sand and gravel.	-2-4(0)	

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

Contra	act: 25-113	-01				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
			61.0'		24" RECOVERY	
62.25	_					
62.25	1					
	_					
64.74	-	19	64.0'	13 19 26 34	Saturated dense gray silty fine sand, trace of A-2-4(0)	
04.74	1			34	coarse sand, gravel, and seashells.	
			66.0'		24" RECOVERY	
	_		00.0		24 RECOVERT	
67.23	-					
07.23]					
	-					
	-					
69.72	1	20	69.0'	11 15 18 42	Saturated hard gray fine sandy silt with some A-2-4(0) clay, trace of coarse sand and gravel.	
03.72]			42	aggree Clay, trace of coarse sand and graver.	
			71.0'		24' RECOVERY	
	- N		71.0		24' RECOVERY	
72.21	-	A .				
72.21						
	_	21	73.0'	8 30 50/3"	Saturated very dense gray silty fine sand with A-2-4(0)	
	_			50/3"	some coarse sand.	
74.7	-					
7			75.0'		Boring Terminated at 74.8'	
	-				8" RECOVERY	
	_					
77.19	1					
	-					
	_					
79.68	_					
	-					
	-					
	-					
82.17]					
	-					
	-					
I	4	I	1			

Symbol Description

Strata symbols

Silt

Silty sand

1.00000 1.000000 1.000000 Poorly graded sand with silt



Poorly graded clayey silty 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 Truck CME

55

- 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.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR1-04-04

Contract: 25-113-01

Boring Location: Sta. 689+44.36, 52' Rt. C.L.

Boring Surface Elev.: + 30.37 Reference:

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

Casing Size: 3 1/4 Inches From Depth of:

To: To: Hollow Stem Auger: From Depth of: 0.0' 38.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 2/15/2008 4.0' 6.0' 6.0'

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: Dia. U-Sample Boring: U-Samples: 75.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation Driller: Cecil Velazlo

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
		1	0.0'	1 2 2 3	Saturated soft brownish-gray silt, trace of fine to coarse sand and gravel. A-3
2.49		2	2.0'	2 2 2 1	Saturated soft brownish-gray silt, trace of fine A-4(0) to coarse sand.
4.98		3	4.0'	1 1 2 2 2	Saturated soft grayish-black silt with some fine sand, clay, and organic matter, trace of coarse sand and gravel. A-4(5)
7.47		4	6.0' 6.0'	1 5 10 13	13" RECOVERY Saturated stiff gray silt with some fine sand, trace of coarse sand, gravel, clay, and organic matter. A-4(0)
		5A	8.0' 8.0' 9.0'	2 12	Saturated very stiff gray silt with some fine to coarse sand and gravel, trace of organic
9.96		5B	9.0'	14 11	matter. 12" RECOVERY Saturated medium dense brown coarse to fine sand with some silt, trace of gravel. 8" RECOVERY
12.45		7	12.0'	5	Saturated medium dense brownish-gray fine A-2-4(0)
12.45		·		5 6 7 6	to coarse sand with some silt, trace of gravel.

Remarks: Mud Rotary @ 38.0

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(11.)	riogicco	8	14.0' /	2		16" RECOVERY	A-2-4(0)	
44.04			14.0'	2 3 5 6		Saturated loose brown silty fine to coarse	A-2-4(0)	
14.94						sand, trace of gravel.		
						1011 DECOVEDA		
		9	16.0' 16.0'	2		12" RECOVERY Saturated medium dense brown fine sand with	A-2-4(0)	
				2 6 7 7		some silt and coarse sand, trace of gravel.	A-2-4(0)	
47.40				,		, ,		
17.43						1011 P.F.GOVERN		
		10	18.0' 18.0'	2		18" RECOVERY Saturated medium dense brown fine sand with	A-2-4(0)	
				2 5 7 9		some silt and coarse sand, trace of gravel.	A-2-4(0)	
				9		Ž		
40.00								
19.92			20.0'			17" RECOVERY		
00.44						DRAFI		
22.41								
		_						
	N	11	24.0'	6		Saturated medium dense brown fine sand with	A-2-4(0)	
04.0		71.1	2 1.0	6 5 6 8		some silt and coarse sand.	A-2-4(0)	
24.9	•							
			26.0			19" RECOVERY	1 [
						BUS 20		
27.39				1		9001 20		
21.39								
		12	29.0'	2 6		Saturated medium dense brown fine sand with	A-2-4(0)	
29.88				6 10 11		some silt and coarse sand, trace of gravel.	11 2 4(0)	
29.00						, ,		
			0.4.01					
			31.0'			16" RECOVERY		
32.37								
02.01								
		U-1	34.0'			Saturated orange/brown fine sand with some	A-3	Press Sample - Shelby Tube.
34.86						coarse sand, trace of gravel	11.5	11355 Sumple Bholoy Tube.
						<u> </u>		
			20.01			24# BECOVERY		
		13	36.0' 36.0'	2 5		24" RECOVERY Saturated medium dense brown fine sand with	A-2-4(0)	
				5 14 19	nici (aii: iii ia aii: iii ia aii:	some coarse sand and silt.	11 2 T(U)	
37.35						6 년		
57.00			L		lite i di dilit	ť]		<u> </u>

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

Depth	Daily		Sample				
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			38.0'		24" RECOVERY		
					173.55 133.66 133.66		
		14	39.0'	13	Saturated dense brown fine sand with	some A-2-4(0)	
39.84				13 15 21 19	coarse sand and silt.	712 1(0)	
			41.0'		20" RECOVERY		
42.33							
.=							
44.82		15	44.0'	7 13 28 23	Saturated dense gray silty fine sand, t coarse sand.	race of A-2-4(0)	
44.02				23		_	
			46.0'		16" RECOVERY		
			40.0				
47.31	A	1/					
		16	48.0′	6	Saturated dense gray fine sand with so	ome silt, A-2-4(0)	
	•			6 11 20 22	trace of coarse sand and gravel.	one sit, 12 4(0)	
			_				
49.8			50 <mark>.0</mark> '		16" RECOVERY	(1)15	
				1			
52.29							
				40			
		17	53.0'	12 16 19 23	Saturated dense gray silty fine sand w coarse sand, trace of gravel.	vith some A-2-4(0)	
				23	date of glave.		
54.78			55.0'		24" RECOVERY		
57.27							
		18	58.0'	8 14 21 23	Saturated dense gray fine sand with so	ome A-2-4(0)	
				23	clay, trace of coarse sand.		
59.76							
			60.0'		24" RECOVERY		

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

Depth	Daily		Sample				
(ft.)	Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
02.20							
		19	63.0'	11	Saturated hard gray fine sandy silt,	trace of A-4(0)	
				11 14 29 42	coarse sand and gravel.		
64.74			65.0'		24" RECOVERY		
67.23							
		20	68.0'	10 10 16 22	Saturated very stiff gray fine sandy		
				22	some coarse sand and clay, trace of organic matter.	graver and	
69.72			70.01				
			70.0'		24" RECOVERY		
	R						
					OR BI	I)	I (¬
72.21		4					

		21	73.0'	7	Saturated hard gray fine sandy silt	with some A-4(0)	
				7 13 24 29	clay, trace of coarse sand, gravel, a	nd organic	
74.7					matter.		
74.7			75.0'		24" RECOVERY		
					Boring Terminated at 75.0'		
77.19							
79.68							
82.17							

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silt

Well graded sand with silt

Silty sand

Poorly graded sand

1.032001 1.03201 1.03201

Poorly graded sand with silt



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 2/15/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
- 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.

51.0'

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

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-04-05

Contract: 25-113-01

Boring Location: Sta. 690+58.49, 67' Rt. C.L.

Boring Surface Elev.: + 31.21 Reference:

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

IN. IN. U-Sampler: 3 Ball Sampler Core Bit: O.D.

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

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 2/20/2008 6.0' 6.0' 3.8'

Pay Quantities:

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

Boring Contractor: Walton Corperation **Driller:** Dave Burt

Helpers: A. Joseph/T. Kane

	-		•			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
		1	0.0'	1 2 4 3	Wet firm brown coarse sandy silt with some fine sand and clay, trace of gravel. A-4(2)	
2.49	I	2	2.0'	2 2 3 4	Wet loose brown coarse sand with some gravel fine sand and clay. A-7-5(1)	
4.98		3	4.0'	1 5 7 14	14" RECOVERY Wet medium dense brown gravelly coarse sand, trace of fine sand and silt. A-2-4(0)	
7.47		4	6.0' 6.0'	7 17 17 14	Wet dense brown gravelly coarse sand with some fine sand and silt. A-2-4(0)	
			8.0'		History 22" RECOVERY	
9.96		5	8.0'	4 10 8 7	Saturated medium dense brownish-gray coarse to fine sand with some silt, trace of gravel. 10" RECOVERY	
		6	10.0'	3 3 3 3	Wet loose brownish-gray coarse to fine sand, trace of silt and gravel. 17" RECOVERY	
12.45		7	12.0'	5 4 4 5	Saturated loose brownish-gray coarse to fine sand, trace of silt and gravel. A-2-4(0)	

Remarks: Mud Rotarty @ 51.0'

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

140	- ·	l 5 "			1	1			Г
14.94	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
16.0 16.0		_ ŭ	8	14.0'	3	in 13 July in 17 July		A-2-4(0)	
16.0	4404			14.0'	6			112 1(0)	
16.0 7 7 7 7 7 7 7 7 7	14.94				_ ′	66100366	trace of silt and gravel.		
16.0 9 16.0 7 7 1 1 1 1 1 1 1 1									
17.43 18.0' 10		1							
17.43 10 18.0			9	16.0'	6 7	(3) (4) (6) (3) (3) (3) (5) (3) (4) (3) (5)	No Sample Recovery		
17.43 18.0" 18.0" 19.0					10	100143366			
18.0 7 7 7 7 7 7 7 7 7	17.43					1000 3 3 3000 6 1			
10 18.0 7 11 11 11 11 11 11 11				18 0'		bicirricial	0" RECOVERY		
18 20 20 3 3 3 4 0 1 3 4 0 1 3 3 4 0 1 3 3 4 0 1 3 3 4 0 1 3 3 4 0 1 3 3 4 0 1 3 3 4 0 1 3 3 4 0 1 3 3 4 0 1 3 3 4 0 3 3 4 0 3 3 4 0 3 3 4 0 3 4 4 0 3 4 4 4 4 4 4 4 4 4		1	10		7			A-2-4(0)	
19.92					11			(0)	
10 24.0 10 24.0 10 24.0 10 24.0 24.1 24.1 2					15):(1 ¹ 0):(1.	,		
22.41 11 24.0 7 5 5 5 5 5 5 5 5 5						191743161. 201773161 201773161			
22.41 24.0 24.0 24.0 26.0 26.0 26.0 27.39 28.0 29.88 12 29.0 31.0 31.0 34.0 36.0	19.92			20.0'		0.6433:06	9" RECOVERY		
22.41 24.9 11 24.0 70 26.0						######################################			
22.41 11 24.0 70 24.9 25 Saturated medium dense brown fine sand with A-4(0) G 26.0						HEE E D 934 G F			
22.41 11 24.0 1/1 24						hier active in			
24.9 24.9 24.9 25.0 26.0 27.39 12 29.0' 9 10 10 10 10 10 10 10 10 10 10 10 10 10						120 13.310 0 14 14 16 0			
24.9 24.9 24.9 25.0 26.0 27.39 12 29.0' 9 10 10 10 10 10 10 10 10 10 10 10 10 10	22.41								
24.9 24.9 26.0 26.0 26.0 27.39 12 29.0 30 18 18 29.88 31.0 31.0 34.0 36.0 36.0 36.0 36.0 37. Saturated medium dense brown fine sand with some coarse sand and silt, trace of gravel. 38. Saturated medium dense brown fine sand with some silt and coarse sand. 31.0 32.37 33.37 34.0 36.0 36.0 36.0 37. Saturated medium dense brown fine sand with some coarse sand, trace of silt. 36.0 16° RECOVERY									
24.9 24.9 26.0 26.0 27.39 12 29.0° 31.0° 31.0° 34.66 13 34.0° 36.0° 34.66 36.0° 34.66 36.0° 34.66 36.0° 35. Saturated medium dense brown fine sand with some coarse sand. and silt, trace of gravel 34.40 35. Saturated medium dense brown fine sand with some silt and coarse sand. 17° RECOVERY 32.37 34.66 36.0° 36.0° 37. Saturated medium dense brown fine sand with some coarse sand, trace of silt. 16° RECOVERY		1				1:61))(1:1:1: 1:(1:1:1:1:			
24.9 26.0 27.39 12 29.0'						10001000			
27.39 12 29.0° 9 10 18 Saturated medium dense brown fine sand with Some silt and coarse sand. 31.0° 17" RECOVERY 13 34.0° 9 10 10 10 10 10 10 10 10 10 10 10 10 10			11	24.0'	7	12 7316 U 2 3316 U	Cotymotod mediany donocherym fine condinita	4.4(0)	
27.39 12 29.0° 9 10 18 Saturated medium dense brown fine sand with Some silt and coarse sand. 31.0° 17" RECOVERY 13 34.0° 9 10 10 10 10 10 10 10 10 10 10 10 10 10			/ 1	24.0	10 7	1300		A-4(0)	
27.39 12 29.0' 9 10 18 Saturated medium dense brown fine sand with some silt and coarse sand. 13 34.0' 9 13 13 17 Saturated medium dense brown fine sand with some coarse sand, trace of silt. 16 RECOVERY	24.9		•		11		some coarse sand and sitt, trace of graver		
27.39 12 29.0' 9 10 29.88 13 34.0' 9 10 13 17' RECOVERY 13 34.0' 9 10 13 17' Saturated medium dense brown fine sand with some silt and coarse sand. Saturated medium dense brown fine sand with some coarse sand. 16' RECOVERY Saturated medium dense brown fine sand with some coarse sand, trace of silt. 16' RECOVERY						11:6 1 3 3:1:6 1			
27.39 12 29.0' \$\frac{9}{10}\$ Saturated medium dense brown fine sand with some silt and coarse sand. 13 34.0' \$\frac{9}{10}\$ Saturated medium dense brown fine sand with some silt and coarse sand. 13 34.0' \$\frac{9}{10}\$ Saturated medium dense brown fine sand with some coarse sand, trace of silt.		1		26.0		# (1 3 9)	16" RECOVERY		
27.39 12 29.0' 9 10 18 18 Saturated medium dense brown fine sand with some silt and coarse sand. 31.0' 17" RECOVERY 13 34.0' 9 10 13 13 17 Saturated medium dense brown fine sand with some coarse sand, trace of silt. 34.86 36.0' 16" RECOVERY							2116.1.711	15	
12 29.0' 9 10 18 19							JUOI ZU		
29.88 12 29.0'	27.39			_		127 1 A 3 1 C 1 1 C 1 J 3 2 C C 1 C 1 J 3 2 C C			
29.88 12 29.0'						reivists Gerrinists Gerrinists			
29.88 12 29.0'						111116			
29.88 31.0' 31.0' 17" RECOVERY 13 34.0' 9 10 10 10 10 10 10 10 10 10 10 10 10 10									
29.88 31.0' 31.0' 17" RECOVERY 13 34.0' 9 10 10 10 10 10 10 10 10 10 10 10 10 10			12	29 0'	9		Saturated madium dance brown fine and with	A 2 4(0)	
31.0' 31.0' 31.0' 17" RECOVERY 13 34.0' 31 31 34.0' 31 34.0' 31 31 31 31 31 31 31 31 31 31 31 31 31 3			'-	20.0	10 18			A-2-4(0)	
32.37 13 34.0' 9 10 Saturated medium dense brown fine sand with some coarse sand, trace of silt. 36.0' 16" RECOVERY	29.88				19		some sitt and coarse sand.		
32.37 13 34.0' 9 10 Saturated medium dense brown fine sand with some coarse sand, trace of silt. 36.0' 16" RECOVERY									
13 34.0' 9 10 13 13 17 Saturated medium dense brown fine sand with some coarse sand, trace of silt. 34.86 36.0' 16" RECOVERY				31.0'			17" RECOVERY		
13 34.0' 9 10 13 13 17 Saturated medium dense brown fine sand with some coarse sand, trace of silt. 34.86 36.0' 16" RECOVERY									
13 34.0' 9 10 13 13 17 Saturated medium dense brown fine sand with some coarse sand, trace of silt. 36.0' 16" RECOVERY									
34.86 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0'	32.37								
34.86 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0'									
34.86 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0'									
34.86 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0'									
34.86 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0' 36.0'		1	13	34.0'	9		Saturated medium dance brown fine cond with	Δ_2 4(0)	
36.0' 16" RECOVERY	24.00			50	10 13			A-2-4(0)	
	34.80				17		some course suita, trace of sitt.		
37.35				36.0'			16" RECOVERY		
37.35									
37.35									
[11]	37.35								

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		14	39.0'	10	iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii		1.2.4(0)	
39.84		14	39.0	10 12 15 20	some c	ed medium dense brown fine sand with oarse sand, trace of silt.	A-2-4(0)	
					14.166. 111966 111966 111966 111966			
			41.0'		144166 313066 113366 113366	17" RECOVERY		
42.33					149)60 11000 11000 11100 11100			
					1177.00 1117.00 1117.00 117.10 117.10 117.10 117.10			
					11 1000 11 1000 12 1000 11 11000 11 1100			
44.82		15	44.0'	7 12 18 18		ed medium dense brownish-gray fine ith some silt and coarse sand.	A-2-4(0)	
						DVET		
			46.0'			19" RECOVERY		
47.31								
						R BIDI		J(j
	•							
49.8		16	49.0'	10 18 22 28		ed dense gray fine sand with some silt, f coarse sand and gravel.	A-2-4(0)	
				\U		JOI ZU	10	
			51.0'			20" RECOVERY		
52.29								
		17	53.0'	12	Saturat	ed very dense grayish-green fine sand	A-2-4(0)	
			00.0	12 22 32 39		me silt and coarse sand, trace of	A-2-4(0)	
54.78			55.0'		giuvei.	14" RECOVERY		
57.27								
		18	58.0'	10	Saturat	ed dense grayish-green silty fine sand	A-2-4(0)	
				10 16 22 30		me coarse sand, trace of gravel.	11.2-4(0)	
59.76			60.0'			24" RECOVERY		
						- 1		
	I	<u> </u>	l	<u> </u>	:::::::::::::::::::::::::::::::::::::::		<u> </u>	l

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

Depth	Daily	No.	Sample Depth	Blows/6"	" Sample Description Class./G.I. Remarks	
(ft.)	Progréss	NO.	Depth	DIOWS/0	Sample Description Class./G.I. Remarks	
62.25						
		19	63.0'	7 12 16 20	Saturated medium dense grayish-green silty A-2-4(0)	
				20	fine sand with some coarse sand, trace of gravel.	
64.74			05.01			
			65.0'		24" RECOVERY	
67.23						
		20	68.0'	7 7	Saturated medium dense grayish-green fine A-2-4(0)	
				7 7 16 16	sand with some coarse sand and clay.	
69.72						
00.12			70.0'		24" RECOVERY	
					OR BIDDING	
70.04		A .				
72.21						
			Λ			
		21	74.0'	7 12 22 25	Saturated dense grayish-green fine sand with A-4(0)	
74.7				22 25	some clay, trace of coarse sand.	
					24" RECOVERY	
			76.0'		24" RECOVERY Boring Terminated at 76.0'	
					2 5.mg 10 manutes at 7 5.10	
77.19						
79.68						
82.17						
		1	1	1	· · · · · · · · · · · · · · · · · · ·	

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Well graded sand with silt



Poorly graded sand with silt



Silty sand



Poorly graded 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 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.

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-04-06

Contract: 25-113-01

Boring Location: Sta. 688+75.08, 67' Lt. C.L.

Boring Surface Elev.: + 30.20 Reference:

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

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0' 51.0'

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 2/18/2008 10.0' 10.0 7.4'

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: Dia. U-Sample Boring: U-Samples: 76.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		1	0.0'	3 5 5 5		Saturated stiff brown sh-gray silt with some clay, trace of fine to coarse sand and gravel.	A-4(4)	
2.49	N	2	2.0'	4 6 9 11		Wet stiff gray silt with some clay, coarse sand, and gravel, trace of fine sand.	A-4(7)	1G
			4.0'			8" RECOVERY		
4.98		3	4.07	25 41 50/5"	10 10 10 10 10 10 10 10 10 10 10 10 10 1	Moist very dense brown gravel with some coarse sand, trace of silt and fine sand.	A-4(2)	
		4	6.0' 6.0'	19 11 12 11		11" RECOVERY Wet medium dense brown gravelly fine to	A-1-b	
7.47			8.0'	12		coarse sand with some silt. 18" RECOVERY		
		5	8.0'	6 6 9 11	CHIPPEC CHIPPEC CHIPPEC CHIPPEC CHIPPEC CHIPPEC CHIPPEC CHIPPEC CHIPPEC CHIPPEC CHIPPEC CHIPPEC CHIPPEC	Wet medium dense brownish-gray coarse to fine sand with some silt, trace of gravel.	A-1-b	
9.96			10.0'		176 1 7 3 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	20" RECOVERY		
		6	10.0'	7 10 11 13	THE PROPERTY OF THE PROPERTY O	Wet medium dense brownish-gray coarse to fine sand with some silt, trace of gravel.	A-1-b	
		7	12.0' 12.0'	6		21" RECOVERY	4.4(0)	
12.45		,	12.0	6 12 9 13	1513 1115 1513 73 6 7 1513 73 6 7 1513 751 75 1513 75 7 1513 75 7 1513 75 7 1513 75 7 1513 75 7	Wet medium dense brownish-gray fine to coarse sand with some gravel and silt.	A-4(0)	

Remarks: Mud Rotary @ 51.0'

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		8	14.0' / 14.0'	7 9		18" RECOVERY	A-2-4(0)	
14.94			14.0	7 9 9 13		Saturated medium dense brown silty fine sand with some coarse sand.	,	
			16.0'	5		14" RECOVERY	1.5(0)	
		9	16.0'	5 7 9 14	oterenci. Gerranco Gerranco Gerranco	Saturated medium dense brown fine sand with some coarse sand and silt.	A-6(8)	
17.43				14	0:0133000 0:0173000 0:013400 0:014100			
17.43			18.0'			18" RECOVERY		
		10	18.0'	7 13 23 18		Saturated dense brown fine sand with some	A-4(7)	
				23 18		silt and coarse sand, trace of gravel.		
19.92			20.0'			17" RECOVERY		
22.41						DRAFI		
	A	11	24.0'	7				
24.9		VI (24.0	7 13 15 23		Saturated medium dense brown fine sand with some silt and coarse sand.	A-4(3)	
24.9	•			23				
			26.0	l		18" RECOVERY		
			20.0			GUST 20	15	
				1		JUSI ZU		
27.39								
		12	29.0'	11	::::::::::::::::::::::::::::::::::::::	Saturated dense brown fine sand with some	A-3	
29.88				11 12 19 22		coarse sand, trace of silt.	11.0	
					4 6 4 9 9 9 6 6 12 12 12 12 12 12 12 12 12 12 12 12 12 1			
			31.0'			17" RECOVERY		
					(0.0013000) (0.0133000) (0.0133000) (0.01333000)			
					/414446 			
32.37					0.0143166 0.0143166 0.0143166			
					MARIANEA MERITANCE MERITANCE MERITANCE			
		13	34.0'	10 17		Saturated dense brown fine to coarse sand,	A-1-b	
34.86				10 17 21 23	# 6 1 3 3 1 6 6 # 6 2 4 4 1 6 6 # 6 3 4 4 6 6 # 6 4 4 4 6 6	trace of silt.		
					1041			
			36.0'		0:03 13:07 1:03 13:07 1:01 13:00 1:01 13:00	24" RECOVERY		
37.35					00111100 00111100 00111100 00111100			
JI .33	l	<u> </u>	L					l

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

Dawth	Dalle		Com-1-		T	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class	ss./G.I. Remarks
					1913 1916 1917 1916 1918 1918 1918 1918 1918 1918 1918 1918 1918 1918 1918 1918 1918 1918 1918 1918 1918 1918	
39.84		14	39.5'	13 18 21 24	coarse sand, trace of silt.	-1-b
42.33			41.5'		17" RECOVERY	
44.82		15	44.0'	17 24 41 50/5"	Saturated very dense brown silty fine sand, trace of coarse sand. 17" RECOVERY	-1-b
47.31	N	16	49.0'_	12	OR BIDD	
49.8			51.0'	12 18 30 36	Saturated dense gray silty fine sand, trace of coarse sand and gravel. 19" RECOVERY	5
52.29						
54.78		17	54.0' 56.0'	12 18 24 26	Saturated dense gray silty fine sand with some coarse sand, trace of gravel. 17" RECOVERY	A-3
57.27						
59.76		18	59.0'	7 15 17 34	Saturated hard gray fine sandy silt with some clay, trace of coarse sand and gravel.	A-3

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class	ss./G.I. Remarks
(***)			61.0'		21" RECOVERY	
62.25						
		19	64.0'	7 16 24 24		2-4(0)
64.74				24 24	coarse sand.	
			66.0'		22" RECOVERY	
07.00						
67.23						
		20	69.0'	12		2.4(0)
69.72		20	69.0	13 16 20 23	Saturated hard gray fine sandy silt, trace of A-2 coarse sand and gravel.	2-4(0)
	1			23	Course saind and graven	
		١				
			71.0'		20" RECOVERY	
		M			20" RECOVERY	ING
72.21	•			•		
					PHOT 201	
		21	74.0'	12 14 16 24		2-4(0)
74.7				16 24	of coarse sand and gravel.	
			76.0'		24" RECOVERY	
					Boring Terminated at 76.0'	
77.19						
]					
79.68						
82.17						
\vdash						

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity clay



Well graded gravel with silt



Silty sand



Poorly graded sand with silt



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 2/18/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
- 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.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR1-04-07

Contract: 25-113-01

Boring Location: Sta. 691+01.90, 29' Lt. C.L.

Boring Surface Elev.: + 31.50 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: IN. Type of: Split Barrel O.D. 2

Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. O.D. U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0' 56.0'

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 2/29/2008 8.0 6.0' 4.0'

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: Dia. U-Sample Boring: U-Samples: 75.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation Driller: Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
		1	0.0'	1 2 3 6	Wet firm brownish-gray coarse to fine sandy silt with some clay, trace of gravel. A-4(2)
2.49		2	2.0' 2.0'	8 9 9	Moist medium dense brown coarse sand with some fine sand and silt, trace of gravel. 15" RECOVERY
4.98		3	4.0'	3 3 4 4	Wet loose brown coarse sand with some fine sand and gravel, trace of silt. 17" RECOVERY
7.47		4	6.0'	3 4 5 7	Wet loose brown coarse to fine sand with some silt, trace of gravel. 14" RECOVERY
9.96		5	8.0'	10 8 5 5	Wet medium dense brown coarse to fine sand with some silt and gravel. 19" RECOVERY
		6	10.0'	4 6 7 7	Wet medium dense brownish-gray coarse to fine sand, trace of silt and gravel. 15" RECOVERY
12.45		7	12.0'	3 3 10 11	Saturated medium dense brown fine to coarse sand with some silt, trace of gravel.

Remarks: Mud Rotary @ 56.0

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth	Daily		Sample		ı			
(ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
14.94		8	14.0' / 14.0'	17 17 20 26		Wet dense brown coarse to fine sand, trace of silt and gravel.	A-2-5(0)	
			16.0'		1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:	16" RECOVERY		
17.43		9	16.0'	6 6 9 11	ATTITUTE ATTITU	Saturated medium dense brown fine sand with some coarse sand and silt, trace of gravel.	A-2-4(0)	
			18.0'		101 (410 g 101 g 101 (410 g 101 g	8" RECOVERY		
		10	18.0'	7 8 9 10	100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	No Sample Recovery		
19.92			20.0'		10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0" RECOVERY		
22.41				_	net fame 1619 166 1619 166 166	DRAFI	5 11	
24.9		11	24.0'	8 10 10 17		Saturated medium dense brown fine sand with some coarse sand and silt, trace of gravel.	A-2-4(0)	IG
27.39			26.0			3US 20	15	
29.88		12	29.0'	12 11 11 12	61134361 16134361 16134361 16134361 16134361 16134361	Saturated medium dense brown fine sand with some coarse sand, trace of silt.	A-2-4(0)	
			31.0'			16" RECOVERY		
32.37					nti a site Grandoni G			
34.86		13	34.0'	7 10 12 17		Saturated medium dense brown fine sand with some coarse sand and silt.	A-2-4(0)	
37.35			36.0'		100 100 00 100 00 10	16" RECOVERY		

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		14	39.0'	8 10 10 14	0113.120 0113.120 0113.120 0113.120	Saturated integrand delibe of own time band with	A-2-4(0)	
39.84				10 14	(* 13 3 6 6 12 1 7 1 2 1 4 1 1 3 4 4 6 12 1 2 2 2 2 1	some coarse sand, trace of silt.		
			41.0'		13 14 13 6 6 13 13 13 16 6 13 13 13 16 6 14 13 13 16 6	23" RECOVERY		
					10.00 4 3 10.00 13.00 1 3 10.00 13.00 1 3 10.00 13.00 1 3 10.00			
42.33					000111000 000111000 00011000			
					100 9 20 10 6 1 100 1 9 3 3 10 6 100 1 7 9 10 10 100 1 7 9 10 10			
44.82		15	44.0'	8 12 17 20		Saturated medium dense brownish gray fine sand with some silt and coarse sand.	A-2-4(0)	
44.02				20				
			46.0'			20" RECOVERY		
47.31				_			- 11	
						FOR BIDI		J(j
		4		•				
		16	49.0'_	10 10 11		Saturated medium dense gray fine sand with	A-2-4(0)	
49.8				11 13		some silt, trace of coarse sand and gravel.	15	
				10		JUU1 ZU		
			51.0'		-	18" RECOVERY		
52.29								
					_			
54.78		U-1	54.0'			No recovery.		Press Sample - Shelby Tube.
			56.0'			0" RECOVERY		
57.27								
		17	58.0'	9 10 15 17		Saturated medium dense gray silty fine sand with some coarse sand, trace of gravel.	A-2-4(0)	
				1/		some course sand, aloce of graven		
59.76			60.0'			24" RECOVERY		

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

	.	ı		1	1	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
62.25						
		40	00.01	10		
		18	63.0'	10 12 15 16	Saturated medium dense gray clayey fine sand with some coarse sand, trace of gravel.	
				16	graven	
64.74			65.0'		24" RECOVERY	
			00.0		24 KLCOVEKI	
67.23						
		19	68.0'	9	Saturated very stiff gray fine sandy silt, trace A-4(0)	
				9 11 15 26	of coarse sand.	
00.70					III)RAFI I	
69.72			70.0'		24" RECOVERY	
		_				
	N		—			
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	V			FOR BIDDIN	
72.21	_			_		
		20	73.0'	10 11 13 15	Saturated medium dense gray fine sand with some silt, trace of coarse sand. A-2-4(0)	
				15	is the some sin, trace of coarse said.	
74.7			75.0'		(2) 2, 12 (4) (4) (4) (4) (4) (4) (4) (4) (4) (4)	
			75.0		24" RECOVERY Boring Terminated at 75.0'	
77.19						
79.68						
19.00						
82.17						

KEY TO SYMBOLS

Symbol Description

Strata symbols

Poorly graded clayey silty sand

Silty sand

Well graded sand with silt

Poorly graded sand with silt



Clayey sand



silt

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 2/28/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
- 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.

36.0'

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

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-04-08

Contract: 25-113-01

Boring Location: Sta. 688+30.49, 29' Rt. C.L.

Boring Surface Elev.: + 32.54 Reference:

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

U-Sampler: 3 Ball Sampler Core Bit: O.D.

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

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 2/18/2088 10.0' 10.0 8.0'

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: Dia. U-Sample Boring: U-Samples: 75.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation **Driller:** Dave Burt

Helpers: J. Hiilebrand

Depth	Daily	I	Sample			
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	-	1	0.0'	5 5 5 5	Saturated stiff brown silt, trace of fine to A-4(0) coarse sand.	
	R		2.0' 2.0'	3	8" RECOVERY	
2.49			2.0	3 4 5 5	Saturated stiff brown silt with some fine to coarse sand, trace of gravel.	j
			4.0'		10" RECOVERY	
4.98		3	4.0'	5 18 17 31	Wet dense brown silty gravel with some coarse to fine sand. A-2-4(0)	
			6.0'		14" RECOVERY	
		4	6.0'	27 18 14 27	Wet medium dense brown coarse sandy gravel with some fine sand and silt. A-4(1)	
7.47			8.0'		24" RECOVERY	
		5	8.0'	12 9 12 10	Wet medium dense brown coarse sandy A-1-b gravel with some silt and fine sand.	
9.96			10.0'		3" RECOVERY	
		6	10.0'	4 6 10 9	Wet medium dense brown coarse to fine sand A-1-b with some silt, trace of gravel.	
40.45		7	12.0' 12.0'	3	24" RECOVERY 11 Saturated loose brown coarse to fine sand, A-1-b	
12.45		•	12.0	3 4 6 7	trace of silt and gravel.	

Remarks: Mud Rotary @ 36.0'

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth	Daily		Sample	T			T
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	-	8	14.0'	3	24" RECOVERY	A-1-b	
14.94			14.0'	3 10 8 8	Wet medium dense brown fine to coarse sand		
14.94					with some gravel and silt.		
		9	16.0' 16.0'	8	12" RECOVERY	h A-1-b	
		9	16.0	8 8 9 7	Saturated medium dense brown fine sand wit some silt and coarse sand, trace of gravel.	n A-1-b	
				7	some sitt and coarse sand, trace of graver.		
17.43							
			18.0'		24" RECOVERY		
		10	18.0'	10 11 9 8	Saturated medium dense brown fine sand wit	h A-1-b	
				8	some coarse sand and silt, trace of gravel.		
19.92			20.0'		24" RECOVERY		
			20.0		Z i KBCO VEKT		
					DRAFI		
22.41							
	R						
		11	24.0'	8 11	Saturated medium dense brown fine sand wit	h A-2-4(0)	
24.9		V '		11 12	some silt, coarse sand, and gravel.		NO
			26.0		18" RECOVERY		
			20.0				
					GUST 20		
27.39				1			
27.39							
		40	00.01	6			
		12	29.0'	6 6 12 15	Saturated medium dense reddish-brown fine	A-1-b	
29.88				15	to coarse sand with some silt, trace of gravel.		
			31.0'	<u>L</u>	24" RECOVERY		
32.37							
		13	34.0'	7	Cotymotod modium dense and dish has a Con-	A 2	
1		١٥	34.0	7 7 12 16	Saturated medium dense reddish-brown fine sand with some silt and coarse sand, trace of	A-3	
34.86				16	gravel.		
<u> </u>					<i>8</i>		
			36.0'		24" RECOVERY		
37.35							

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample	Description	Class./G.I.	Remarks
(11.)	riogiess		Берип					
39.84		14	39.0'	11 11 16 15		n dense reddish-brown silty me coarse sand, trace of	A-2-4(0)	
			41.0'		18	" RECOVERY		
42.33		U-1	42.0' 43.5'		with some coarse	orange and brown fine sand sand. " RECOVERY	A-3	Press Sample - Shelby Tube.
44.82		15	43.5'	6 15 17 20	Saturated dense b	prown fine sand with some e of silt and gravel.	A-3	
			45.5'			"RECOVERY		
47.31				Τ	OR	BIDI		IG
49.8		16	49.0' 51.0'	8 10 12 20	trace of coarse sa	n dense gray silty fine sand, nd.	A-2-4(0)	
52.29								
54.78		17	54.0'	15 19 20 22	Saturated dense g coarse sand, trace	gray silty fine sand with some e of gravel.	A-3	
57.27			56.0'		20	" RECOVERY		
59.76		18	59.0'	14 12 20 18	Saturated dense g coarse sand and g	gray silty fine sand, trace of gravel.	A-2-4(0)	

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(11.)	- Togress		61.0'	/		20" RECOVERY		
	1							
62.25	-							
	1							
	-	19	64.0'	10 11 12 14		Saturated very stiff gray fine sandy silt, trace	A-2-4(0)	
64.74	1			12 14		of coarse sand and gravel.		
	1							
			66.0'			24" RECOVERY		
	-							
67.23	+							
	-							
	1	20	69.0'	10		Saturated very stiff gray fine sandy silt, trace	A-2-4(0)	
69.72	-			10 10 14 13		of coarse sand, gravel, and organic matter.	, ,	
	†							
			71.0'	T		24" RECOVERY		
]	N١				IUK DIUI	JII	IG
72.21				_				
	1		ΙΛ				45	
		21	73.0'	18 27 31 40		Saturated hard gray fine sandy silt with some clay, trace of coarse sand, gravel, and organic	A-2-4(0)	
	-			40		matter.	10	
74.7	_		75.0'			24" RECOVERY		
					19742 17 17	Boring Terminated at 75.0'		
	_							
77.19	1							
	1							
79.68	-							
	+							
	1							
]							
82.17	1							
	-							
	1							
	1							
	1	1		1				I

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silt

Silty sand

Poorly graded sand with silt

Poorly graded sand



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 Truck CME

55

- 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.

76'

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

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR1-05-01

Contract: 25-113-01

Boring Location: Sta. 674+48.48, 75' Lt. C.L.

Boring Surface Elev.: + 51.47 Reference:

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

U-Sampler: Core Bit: O.D.

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

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 24.5 Dry 1/24/0851.0' 28.8' 1/28/08 1/29/08 28.8 Dry

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: Dia. U-Sample Boring: U-Samples: 76.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation Driller: Jason Turner

Helpers: J. Hillebrand

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

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth	Daily		Sample					ī
(ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	- J	8	\ 14.0' /	4		18" RECOVERY	A-1-b	
4464			14.0'	4 5 7 7		Moist medium dense brown coarse to fine		
14.94				'		sand w/ some silt, trace of gravel.		
\vdash								
<u> </u>			16.0'			20" RECOVERY		
		9	16.0'	7 8 9 10		Moist medium dense brown coarse sand w/	A-3	
				10		some fine sand and silt, trace of gravel.		
17.43								
			18.0'			24" RECOVERY		
		10	18.0'	8		Moist medium dense brown coarse to fine	A-3	
				8 8 9 8		sand w/ some silt, trace of gravel.		
						_		
40.00								
19.92			20.0'			24" RECOVERY		
<u> </u>								
22.41						DRAFT		
		11	24.0'	3	.) 9961			
		/ 1	24.0	3 4 5 5		Saturated loose brown fine to coarse sand w/ some silt, trace of gravel.	A-3	
24.9		4 ,		5		some sin, trace of graver.		
			26.0		1. (1 J 1 J 1 L 	20" RECOVERY		
						4UST 20	116	
						GUST 20		
27.39								
27.00					, tirii. 			
					120 22 22 10 1 120 1 2 2 2 10 1 100 1 2 3 3 6 0			
<u> </u>		40	00.01					
		12	29.0'	6 2 4 7		Saturated loose brown coarse to fine sand w/	A-2-4(0)	
29.88				7		some silt, trace of gravel.		
			31.0'			24" RECOVERY		
						· · -		
32.37								
52.57								
				ļ	ЩЩ			
<u> </u>		13	34.0'	4 6 8 9		Saturated medium dense brown coarse to fine	A-3	
34.86				8 9		sand, trace of silt and gravel.		
			36.0'			12" RECOVERY		
			30.0			12 RECOVERT		
27.25					1261			
37.35			1					

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

Depth	Daily		Sample	l				
(ft.)	Progress	No.	Depth	Blows/6"	M.b. 1	Sample Description	Class./G.I.	Remarks
					176 74 16 16 17 16 176 17 16			
					1:(33.1)e (1:(33.1)e (1:(33.1)e (1:(33.1)e (:		
		14	39.0'	5	1:617:1:61 4:113:1:60 4:113:1:60		A 470°	
39.84		14	39.0	5 9 10 11	130 13.11 0 1 120 1 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-4(0)	
33.04				11	0013400 131141 141141	same we some sind, made of graven		
			41.0'			20" RECOVERY		
			41.0			20 RECOVERT		
)			
42.33					126 3 A. 126 f 126 1 7 3 22 U 126 1 7 3 22 G 126 1 7 3 22 U			
					00 6 2 1 20 0 0 156 2 5 1 1 5 6 6 10 6 1 7 2 7 0 0			
					096) # 316 6 ### ###############################			
		15	44.0'	4	120 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		A 4(0)	
44.82		13	44.0	4 7 9 11		Saturated medium dense reddish brown fine sand w/ some coarse sand, trace of silt and	A-4(0)	
17.02				11	00000000000000000000000000000000000000	gravel.		
			46.0'					
			40.0					
					00 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
47.31	R				100 1 (21) (1 100 1 (1) (1) (1) 101 1 (1) (1) (1) 101 1 (1) (1)			
					12 1 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1) \	
		4			1: 1: 2:3.1(2:1 1:2:4 (4:1):1 1:2:13:10:1			
		16	49.0'_	9				pH Testing.
49.8		10	49.0	10 14 16		testing.	15	pri resung.
10.0				10		1051/0		
			51.0'	1	1:61/3:00 1:61/3:00 1:61/1:61 1:61/1:00	18" RECOVERY		
		17	51.0'			Saturated dense brown fine sand w/ some silt	A-2-4(0)	
				17 25 35 23		and coarse sand.		
52.29								
			53.0'			20" RECOVERY		
		18	54.0'	6	:::::::::::::::::::::::::::::::::::::::	Colored and disconding the Colored Col	A 2 4(0)	
54.78		10	34.0	11 11 11	150 3 2 3 3 5 6 150 1 2 3 3 5 6 150 1 2 3 3 5 6	some coarse and trace of silt	A-2-4(0)	
				''				
			56.0'			24" RECOVERY		
			30.0			24 RECOVERT		
57.27					1:::::::::::::::::::::::::::::::::::::			
					00 6 2 1 200 0 136 2 2 3 1 3 0 0 126 2 2 3 2 5 0 0			
					06143166 026170901 034114100			
		10	E0.01	9			1010	
59.76		19	59.0'	9 11 13 17		Saturated medium dense reddish brown fine sand w/ some silt, trace of coarse sand and	A-2-4(0)	
				17		gravel.		
			1	1	m-1-1-1-1-1-1-1-1-1	H. Carlotte and the car	I.	1

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
()			61.0'			15" RECOVERY		
	1							
62.25								
	_							
	-							
		20	64.0'	9		Saturated medium dense brown fine sand w/	A-4(0)	
64.74	1			9 10 11 13	100 100 100 100 100 100 100 100 100 100 100	some silt, trace of coarse sand and gravel.	11 4(0)	
					120 14 12 12 12			
			66.0'		66 1 7 1 6 1 1: (1 2 3 1 : : : : 1: (1 4 1 : : : : : : : : : : : : : : : : :	14" RECOVERY		
67.23					000 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
					156143166 136171366 136171366			
					100 (13 (10) 100 (15) (10) 100 (17) (10)			
					66 4 3 3 3 6 6 13 6 4 3 3 1 6 6 13 6 6 6 7 3 3 6 6	DDAET		
69.72		21	69.0'	10 13 17 24		Saturated medium dense gray silty fine sand	A-4(0)	
69.72	1			24		w/ some coarse sand, trace of gravel.		
		H	71.0'		-	20" RECOVERY		IG
		V						
72.21								
	-					DIJOT OO	4 -	
						4U.ST 70	15	
		22	74.0'	10		Saturated dense grayish green silty fine sand	A-4(0)	
74.7				10 19 20 24		w/ some coarse sand, trace of gravel.	11 1(0)	
	-							
			76.0'			24" RECOVERY		
	-					Boring Terminated at 76.0'		
77.19								
	=							
79.68	-							
]							
]							
00.47	-							
82.17	1							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Poorly graded clayey silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 1/24/2008 using a
 3 1/4-inch diameter continuous flight power auger. Rig is a truck mounted
 CME 55.
- No free water was encountered at the time of drilling or when re-checked the following day.
- 3. Boring locations and elevations were surveyed by Century Engineering using information contained in the project development scope.
- These logs are subject 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.

56.0'

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

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-05-02

Contract: 25-113-01

Boring Location: Sta. 678+38.38, 85' Rt. C.L.

Boring Surface Elev.: 61.28 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: IN. Type of: Split Barrel O.D. 2

Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. O.D. U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Time Depth of Hole **Depth of Casing Depth of Water** Elev. of Water Date 28.8 61.3 1/24/08 32.5' 76.0 $\begin{array}{c} 61.3 \\ 61.3 \end{array}$

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: Dia. U-Sample Boring: U-Samples: 76.0' Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation **Driller:** Dan Taylor

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
		1	2.0'	2 4 4 5	Wet firm brownish gray silt w/ some fine A-4(3) sand and clay, trace of coarse sand and gravel.
2.49		2	2.0' 4.0'	3 4 6 6	Saturated stiff brown silty clay w/ some fine to coarse sand, trace of gravel. 23" RECOVERY
4.98		3	4.0' 5.0'	2 4	Wet firm brown fine to coarse sandy silt w/ A-2-4(0) some clay, trace of gravel.
		3A	5.0' 6.0'	5 3	Wet loose brown silty fine sand w/ some coarse sand. A-1-b
7.47		4	6.0'	6 9 10 5	9" RECOVERY Moist medium dense brown coarse sandy gravel w/ some fine sand and silt. A-1-b
		5	8.0' 8.0'	6 8 9 9	19" RECOVERY Moist medium dense brown gravelly coarse sand w/ some silt, trace of fine sand.
9.96		6	10.0'	2 5 5 5	Wet loose brown coarse sand w/ some silt and fine sand, trace of gravel. 17" RECOVERY
12.45		7	12.0'	5 3 5 5 5	Wet loose brown silty fine to coarse sand, trace of gravel. A-6(12)

Remarks: Mud Rotary @ 56.0

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		8	14.0'	2	/////	20" RECOVERY	A 6(5)	
14.94		Ü	14.0'	2 4 7 9		Saturated stiff brown silty clay w/ some fine sand, trace of coarse sand.	A-6(5)	
			16.0'			18" RECOVERY		
		9	16.0' 17.0'	9		Wet very stiff gray silty fine sandy clay. 9" RECOVERY	A-4(3)	
17.43		9A	17.0'	12 11		Moist medium dense brownish gray fine sand w/ some silt.	A-2-4(0)	
		10	18.0' 18.0'	3		9" RECOVERY	A-2-4(0)	
			. 5.5	3 4 6 10		Saturated stiff brownish gray fine sandy silt w/ some clay, trace of coarse sand.	A-2-4(0)	
19.92			20.0'			20" RECOVERY		
		U-1	20.0'			Saturated medium dense brown coarse to fine sand w/ some gravel, trace silt	A-2-4(0)	Press Sample - Shelby Tube.
22.41			22.0'			24" RECOVERY		
22.41						DIVALL		
		11	24.0'	11 13		Moist medium dense brown silty gravel w/	A-1-b	
24.9		V '		11 13 16 12		some fine to coarse sand.	711'	
			26.0			18" RECOVERY		
						GUST 20	15	
27.39								
		12	29.0'	11 15		Moist dense brown fine sandy gravel w/ some	A-1-b	
29.88				11 15 17 14		silt, trace of coarse sand.		
			31.0'			15" RECOVERY		
32.37								
32.31								
0155		13	34.0'	10 10 9 8		Wet medium dense brown fine sandy gravel w/ some silt, trace of coarse sand.	A-4(0)	
34.86				8		w/ some sin, nace of coarse sailu.		
			26.01			0" DECOVEDV		
			36.0'			9" RECOVERY		
37.35								

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

Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress		Depth	2.2	,		
		14	39.0'	6	Saturated stiff brownish gray coarse sandy silt	A-2-4(0)	
39.84			00.0	6 7 7 7	w/ some fine sand, trace of gravel.	A-2-4(0)	
			41.0'		11" RECOVERY		
42.33							
		45	44.01	4			
44.82		15	44.0'	4 5 7 8	Saturated medium dense brownish gray silty fine to coarse sand.	A-2-4(0)	
			46.0'		15" RECOVERY		
47.31	R						
		M			OR BIDI	ノル	IG
	•			_			
49.8		16	49.0'	12 10 11	Saturated medium dense brown silty fine sand w/ some coarse sand.	A-2-4(0)	
10.0				13	JUS 1 20		
			51.0'	•	16" RECOVERY		
52.29							
54.78		17	54.0'	12 14 19 22	Saturated dense brown silty fine sand w/ some	A-2-4(0)	
54.78				22	coarse sand, trace of gravel.		
			56.0'		20" RECOVERY		
57.27							
		18	59.0'	8 9 13 13	Saturated medium dense brown silty fine sand	A-2-4(0)	
59.76				13 13	w/ some coarse sand, trace of gravel.		

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
\/			61.0'		15" RECOVERY		
00.05	-						
62.25	1						
	-						
	-	19	64.0'	7 10 15 17	Saturated medium dense brownish gray silty	A-2-4(0)	
64.74	1			17	fine sand w/ some coarse sand.		
					441 PEGGUERA		
	-		66.0'		15" RECOVERY		
	-						
67.23	-						
	1	20	69.0'	9 15 16 18	Saturated dense brownish gray silty fine sand	A-2-4(0)	
69.72	-			16 18	w/ some coarse sand.		
	_	_					_
		H	71.0'		15" RECOVERY	\mathcal{I}	
		N١			OK DIDI	JII'	1G
72.21	-						
	-		_		OLIOT OO	4 -	
					11.51 70	15	
	1	21	74.0'	14 17	Saturated dense gray silty fine sand, trace of	A-2-4(0)	
74.7	-			14 17 19 22	coarse sand and gravel.	()	
	1						
			76.0'		20" RECOVERY		
	_				Boring Terminated at 76.0'		
77.19	-						
	1						
79.68	-						
	1						
	1						
]						
82.17	1						
	-						
	1						
	1						
	1	1	1	1 1			I

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty low plasticity clay

Low plasticity clay

Clayey sand



Silty sand



Poorly graded sand with silt



Poorly graded sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 1/24/2008 using a
 3 1/4-inch diameter continuous flight power auger. Rig is a truck mounted
 CME 55.
- No free water was encountered at the time of drilling or when re-checked the following day.
- 3. Boring locations and elevations were surveyed by Century Engineering using information contained in the project development scope.
- These logs are subject 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.

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-05-03

Contract: 25-113-01

Boring Location: Sta. 675+58.34, at C.L.

Boring Surface Elev.: + 59.65 Reference:

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

IN. IN. U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0' 76.0'

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 1/24/08 1/25/08 31.7' Dry 76.0' 27.5' 27.5 1/28/08 Dry

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: Dia. U-Sample Boring: U-Samples: 76.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Turner

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		1	0.0'	3 4 3 4		Saturated firm brown clayey silt w/ some coarse sand, trace of fine sand.	A-4(2)	
	R	2	2.0'	3		15" RECOVERY		10
2.49	ľ			3 5 5 8		Saturated stiff brown silt w/some clay, trace of fine to coarse sand.	A-1-a	IG
		3	4.0' 4.0'	6		20" RECOVERY Wet very stiff brown fine sandy silt w/ some	A-4(2)	
4.98				6 8 12 14		coarse sand and clay, trace of gravel.		
			6.0'			22" RECOVERY		
		4	6.0'	10 12 13 15	preireigi gerraneg gerraneg gerraneg gerraneg	Wet medium dense brown gravelly coarse sand w/ some silt and fine sand.	A-1-b	
7.47			8.0'		66439966 13323967 166393966 166393966 176393966	19" RECOVERY		
		5	8.0'	6 9 10 10	pierviete Gerrang Ligitation Gerrang Gerrang Gerrang Gerrang Gerrang Gerrang Gerrang Gerrang	Wet medium dense brown gravelly coarse sand w/ some fine sand and silt.	A-1-b	
9.96			10.0'			20" RECOVERY		
		6	10.0'	10 12 15 14		Wet medium dense brown coarse sand w/some fine sand, silt, and gravel.	A-3	
			12.0'			19" RECOVERY		
12.45		7A	12.0' 13.0'	4 8		Saturated very stiff brown fine sandy silt, trace of coarse sand. 12" RECOVERY	A-2-4(0)	
		7B	13.0' 13.5'	10		Wet medium dense brown fine sand w/ some	A-2-4(0)	
		7C	13.5'	8		\silt and coarse sand, trace of gravel.	A-6(8)	

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

	Depth	Daily		Sample		1			T
14.0 14.0			No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
14.94			U-1					A-6(11)	
16.0° 2	14.94			14.0				` ,	
17.43	14.54						6" RECOVERY		
SA 16.0 2							Saturated very stiff tan clay with some fine		
17.43			ΩΩ		2			A 2 4(0)	
17.43 60 7.0 7 7.0 7 8.0 7 8.0 7				16.5'			Saturated firm brownish gray clayey silt w/		
17.0 7				16.5' 17.0' /			some fine sand.		
18.0 18.0	17.43		8C		7			A-2-4(0)	
19.92 20.0 24.0 7 27.0 24.9 24.9 26.0 26.0 29.88 31.0 3							_\clay, trace of coarse sand.		
19.92 20.0 24.0 7 27.0 24.9 24.9 26.0 26.0 29.88 31.0 3			9	18.0'	8 17	156 44-156 fe 156 7 17:15 5		A-2-4(0)	
19.92 20.0 Saturated dense brown coarse sandy gravel w some fine sand and silt. 13° RECOVERY					25 22	0017390 1111160	1 1		
10 24.0 12 24.9 24.9 24.9 24.9 24.9 24.9 24.9 26.0 26.0 26.0 27.39 29.88 29.88 31.0 31.0 31.0 32.37 32.37 34.86 36.0						EFFARET.	12" RECOVERY		
10 24.0 1/4	19.92			20.0'			Saturated dense brown coarse sandy gravel w/		
10 24.0 1/2				20.0		111 13 11 11 11 11 11 11 11 11 11 11 11	some fine sand and silt.		
10 24.0 7.2 24.9 24.9 24.9 26.0 26.						06133166 20172261	13" RECOVERY		
10 24.0 7.2 24.9 24.9 24.9 26.0 26.						edikiri. Polyansi			
22.41 10 24.0						1.1.1.1.1.1.1.1.1			
10 24.0 7.4									
10 24.0 7.4	22.41						IJRAFI		
10 24.0 7 24.9 18 24.9 26.0 26.0 27.39 26.0 27.39 27.39 27.39 29.88 29.88 31.0 29.81 31.0 29.81 32.37 34.86 36.0 36.0 36.0 20° RECOVERY 30° RECOVERY									
10 24.0 7 24.9 18 24.9 26.0 26.0 27.39 26.0 27.39 27.39 27.39 29.88 29.88 31.0 29.81 31.0 29.81 32.37 34.86 36.0 36.0 36.0 20° RECOVERY 30° RECOVERY									
24.9 24.9 26.0'a 27.39 11 29.0' 6 1 10 10 10 10 10 10 10 10 10 10 10 10 1		R							
26.0			10	24.0'	7 12			A-2-4(0)	
26.0 AU BUST 20 15 27.39 11 29.0' 6	24.9		V		14 18	1: 1:	coarse sand, trace of fine sand and silt.	/	N
27.39 11 29.0° 6 11 10 29.88 11 29.0° 6 11 10 31.0° 18" RECOVERY 31.0° 18" RECOVERY 12 34.0° 6 7 15 18 18 18 18 18 18 18 18 18 18 18 18 18									
27.39 11 29.0' 6				26.0		1:1:1:1:1:1:1:1: 1:1:1:1:1:1:1:1:	17" RECOVERY		
27.39 11 29.0' 6 Wet medium dense brown coarse sand w/ some gravel and fine sand, trace of silt. 31.0' 18" RECOVERY 12 34.0' 6 7 15 18 Wet medium dense brown gravelly coarse sand w/ sand, trace of fine sand and silt. 36.0' 20" RECOVERY				20.0		E111111111111		15	
27.39 11 29.0' 6 Wet medium dense brown coarse sand w/ some gravel and fine sand, trace of silt. 31.0' 18" RECOVERY 12 34.0' 6 7 15 18 Wet medium dense brown gravelly coarse sand w/ sand, trace of fine sand and silt. 36.0' 20" RECOVERY						1:	711.51 /11		
11 29.0° 6 11 13 13 13 13 13 13	27.20				1		3001 Z0		
11 29.0'	27.39					1:3:3:3:3:3:3:3: 1:3:3:3:3:3:3:3:3: 1:3:3:3:3			
11 29.0'									
29.88 10 10 10 10 10 10 10									
29.88 10 10 10 10 10 10 10						1-1-1-1-1-1-1			
31.0' 31.0' 18" RECOVERY 12 34.0' 6 7 7			11	29.0'	11			A-2-4(0)	
31.0' 31.0' 18" RECOVERY 12 34.0' 6 7 15 18	29.88				13	1:1:1:1:1:1:1: 1:1:1:1:1:1:1:1:	some gravel and fine sand, trace of silt.		
32.37 12 34.0'									
32.37 12 34.0' 6 7				31.0'		11:1:1:1:1:1:1:1:1	18" RECOVERY		
32.37 12 34.0' 6 Wet medium dense brown gravelly coarse sand, trace of fine sand and silt. 36.0' 20" RECOVERY						1:			
32.37 12 34.0' 6 7						1:1:1:1:1:1:1:1: 1:1:1:1:1:1:1:1:1:			
12 34.0' 6 Wet medium dense brown gravelly coarse sand, trace of fine sand and silt. 36.0' 20" RECOVERY	32.37					1.1.1.1.1.1.1			
12 34.0' 6 Wet medium dense brown gravelly coarse sand, trace of fine sand and silt. 34.86 36.0' 20" RECOVERY									
12 34.0' 6 Wet medium dense brown gravelly coarse sand, trace of fine sand and silt. 34.86 36.0' 20" RECOVERY						100000000000			
34.86 12 34.0' 6 7									
36.0' 20" RECOVERY			10	24.0'	6		With and Provided In 19	A 2 4/0\	
36.0' 20" RECOVERY			12	34.0	7 15			A-2-4(0)	
	34.86				18		sand, trace of time sand and sitt.		
37.35				36.0'			20" RECOVERY		
37.35									
37.35									
	37.35								

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

Depth	Daily		Sample					
(ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
39.84		13	39.0'	9 12 11 12		Wet medium dense brown fine to coarse sand, trace of silt and gravel.	A-2-4(0)	
			41.0'		100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11" RECOVERY		
42.33					eerrane gerrane gerrane gerrane gerrane gerrane gerrane gerrane gerrane			
44.82		14	44.0'	9 7 7 9	10 13 10 10 10 10 10 10 10 10 10 10 10 10 10	Wet medium dense brown fine to coarse sand, trace of silt and gravel.	A-2-4(0)	
47.31			46.0'			24" RECOVERY	-	
	r				or reservant or ranco or	OR BIDI		IG
49.8		15	49.0'	10 11 13 17		Saturated medium dense brown fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
52.29			51.0'		_	19" RECOVERY		
54.78		16	54.0'	10 10 19 22	411 944 6 15 14 15 6 15 14 15 6 15 15 16 6 15 17 16 6 15 14 16 6 15 14 16 6	Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-4(0)	
			56.0'			19" RECOVERY		
57.27					00 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
59.76		17	59.0'	12 15 29 30	100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Saturated dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
			61.0'		100 14 100 0 100 14 14 16 0 100 14 14 16 0	22" RECOVERY		
00.05					130 33.310 f. 120 3 3 3 3 5 6 14 1 3 3 5 6			
62.25	1				# 6 4 3 4 # 6 # 6 4 3 4 # 6 # 6 4 4 4 # 6 #			
	1				126 13 326 6 126 1 7 226 1 126 1 3 426 6 126 1 3 426 6			
					661 (4)66 661 (4)66 661 (4)66 661 (4)66			
	-	18	64.0'	13 22 29 32		Saturated very dense brown fine sand w/	A-2-4(0)	
64.74				29 32	000 13 300 0 000 17 12 0 000 13 17 18 0 000 13 14 12 0	some coarse sand and silt.		
			66.0'		66133166 6634466 6631366	19" RECOVERY		
					66173966 6613366 6617966 6631366			
67.23	<u> </u>				188 14 1886 188 1 7 3 3 5 0 188 1 4 188 6 188 1 7 1 1 1 1 1 1			
					156 3 1 3 1 0 C 156 3 5 1 1 0 C 10 C 1 7 3 7 C U			
					06143066 12171200 66133066 13132166			
		19	69.0'	15		Saturated medium dense brown fine sand w/	A-2-4(0)	
69.72				15 13 17 19	0:01:03:00:0 0:01:03:00:0 0:01:03:00:0	some coarse sand and silt.		
	-				6113466 613466 613466 613466 613466			
			71.0'		6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	19" RECOVERY		
		M			0 /9000 11 /4000 12 /4000 13 /1000	'UR BIDI		JG
72.21					156133166 126173750 126173766			
			_		preimpres Resilones Resilonies Resisone		4	
						31181 70	15	
		20	74.0'	19	erione Derriet Derriet Deriver Derriet	Saturated very dense brown fine sand, trace of	A-3	
74.7			7 1.0	19 30 36 40	664) 316 G 1863 2 1 1 6 1 1864 1 1 2 1 6 1	l	A-3	
	<u> </u>				100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
			76.0'		11, 12, 11, 11, 12, 13, 13, 13, 13, 13, 13, 13, 13, 13, 13	24" RECOVERY		
						Boring Terminated at 76.0'		
77.19								
	-							
79.68								
	<u> </u>							
	-							
82.17]							
	-							

KEY TO SYMBOLS

Symbol Description

Strata symbols

Low plasticity clay



Silt



Poorly graded sand with silt



Silty sand



Well graded sand with silt



Poorly graded sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 1/24/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a truck mounted CME 55.
- No free water was encountered at the time of drilling or when re-checked the following day.
- 3. Boring locations and elevations were surveyed by Century Engineering using information contained in the project development scope.
- These logs are subject 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.

29.0'

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

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR1-05-04

Contract: 25-113-01

Boring Location: Sta. 677+82.45, 89' Rt. C.L.

Boring Surface Elev.: + 57.17 Reference:

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

IN. IN. U-Sampler: 3 Ball Sampler Core Bit: O.D.

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

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 2/29/08 3/3/08 28.4' Dry 49.0 18.1 3/4/08 18.1 Dry

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: Dia. U-Sample Boring: U-Samples: 76.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation Driller: Gary Turner

Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		1	1.0' 2.0'	6 7		iff brown silty fine sandy clay w/ some sand, trace of gravel.	A-4(1)	4" Asphalt - 6" Road Base
2.49		2	2.0'	12 13 15 17		medium dense brown gravelly coarse	A-1-a	
			4.0			7/ some silt, trace of fine sand.		JG
	•	3	4.0'	14 12 8		ery stiff brown gravelly fine sandy silt ne coarse sand and clay.	A-1-b	•
4.98			6.0'	8		18" RECOVERY	15	
		4	6.0'	4 5 6 8	///	iff brown silty fine sandy clay, trace of sand and gravel.	A-2-4(0)	
7.47			8.0'	8	Course	20" RECOVERY		
		5	8.0'	5 5 6 7		nedium dense brown silty fine sand, of gravel and coarse sand.	A-4(0)	
9.96			10.0'			10" RECOVERY		
		6	10.0'	11 9 11 12		ted very stiff brown silty clay w/ some nd, trace of coarse sand.	A-2-4(0)	
		L	12.0'		///	12" RECOVERY		
12.45		U-1	12.0'			ted medium dense light brown coarse to nd, trace silt and gravel	A-3	Press Sample - Shelby Tube.
<u> </u>			14.0'	4		24" RECOVERY		
		7	14.0'	4 5 9 11		ted stiff brown silty clay w/ some fine race of coarse sand.	A-2-4(0)	

Remarks: Mud Rotary @ 29.0

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		8	16.0' 16.0'	5 8 11 27		14" RECOVERY Wet medium dense brown silty fine to coarse sand w/ some gravel.	A-2-5(0)	
17.43		9	18.0' 18.0'	16 20 26 30		18" RECOVERY Moist dense brown coarse to fine sandy gravel, trace of silt.	A-1-b	
19.92			20.0'		1214.1161 1214.1161	18" RECOVERY		
22.41					101 17 300 0 101 101 101 101 101 101 101 101 1	DRAFT		
24.9		10	24.0'	16 20 26 30	10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Moist dense brown coarse sandy gravel w/ some fine sand, trace of silt. 14" RECOVERY	A-2-4(0)	IG
27.39			A	\U	Partyck, to the party to the pa	GUST 20	15	
29.88		11	29.0' 31.0'	11 14 13 17	HERDANDER HERDANDER HERDANDER HERDANDER HERDANDER HERDANDER HERDANDER HERDANDER HERDANDER HERDANDER HERDANDER HERDANDER HERDANDER HERDANDER HERDANDER HERDANDER	Wet medium dense brown coarse sandy gravel, trace of fine sand and silt. 8" RECOVERY	A-2-4(0)	
32.37					Helyjeb milyting mily			
34.86		12	34.0'	12 15 14 14		Wet medium dense brown coarse sandy gravel, trace of fine sand and silt. 8" RECOVERY	A-2-4(0)	
37.35								

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

		1	I -	1				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	-							
		13	39.0'	7 5 7 7		Saturated medium dense brown fine sand w/	A-2-4(0)	
39.84				7		some coarse sand and silt, trace of gravel.		
			41.0'			10" RECOVERY		
42.33								
		14	44.0'	10 10 13 15		Saturated medium dense brown fine sand w/	A-2-4(0)	
44.82				15		some coarse sand and silt.		
			46.0'			18" RECOVERY		
						\square		
47.31								
			40.0	12		()R R		
49.8		15	49.0'	13 19 30 35		Saturated dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
40.0				35		eourse saint and sin, nace or graver.	_	
			51,0'			18" RECOVERY	15	
			31.0			J Control of the cont		
52.29								
		16	54.0'	12		Saturated medium dense brown fine to coarse	A-2-4(0)	
54.78		10	0 1.0	12 11 15 13		sand, trace of silt and gravel.	A-2-4(0)	
			56.0'			19" RECOVERY		
		17	56.0'	21 20 22 34				pH Testing.
F7.07				34	(1414):61; (1411):66 (1414):66			
57.27					00143000 00143000 00143000			
			58.0'		150 3 5.100 f. 100 1 3 3 10 0 100 1 3 3 10 0	20" RECOVERY		
		18	59.0'	12	001 / 410 v 041 / 1160 01 / 1160 01 / 1260 01 / 1260	Saturated dense brown fine sand w/ some	A-3	
59.76				12 14 17 19	016 14 316 6 016 17 17 16 16 66 8 1 1 1 16 6	coarse sand, trace of silt and gravel.		
			61.0'		000 1900 0 664 0 906 6 000 0 0 0 0 0 0 000 0 0 0 0 0 0 0	18" RECOVERY		
					136 13 3300 136 1 7 136 1 4 6 6 7 1 13 10 10			
					erraner. Erritet			

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

							_	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
62.25					Geldige John Timi Gellige Geligi			
					eci faice Et 13 16 c Fer electi			
					66133166 66133166 86133166			
		19	64.0'	16			1.2.1(0)	
64.74		19	64.0	16 21 36 50/3"	000 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Saturated very dense brown fine sand w/ some coarse sand, trace of silt.	A-2-4(0)	
				50/3"	61133166 61133161 6114366	50.110 604.150 544.15, 4.400 51 514.		
			65.8'			21" RECOVERY		
					(1) 13:00 (1) 13:00 (1) 13:00 (1) 13:00			
<u> </u>								
67.23					0:117330 0:1143369 7:1143361			
					000010000 120001000 1200010000			
					prei riici. Gradii e G Prei iliai e G			
		20	69.0'	17		Saturated very dense brown fine sand w/	A-2-4(0)	
69.72				17 30 50 80		some silt, trace of coarse sand and gravel.	1121(0)	
						IJRAFI		
			71.0'			15" RECOVERY		
72.21	l N	1						
,		M				OR BIDI	יוול	
				•				
				l <u>.</u> .				
		21	74.0'	24 24 19 31		Saturated hard gray fine sandy silt, trace of	A-2-4(0)	
74.7				19 31		coarse sand and gravel.		
			76.0'			20" RECOVERY		
						Boring Terminated at 76.0'		
77.19								
79.68								
. 5.55								
82.17								
84.66								

KEY TO SYMBOLS

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

Clayey sand



Poorly graded sand with silt



Poorly graded gravel with silt

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 2/29/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a truck mounted CME 55.
- No free water was encountered at the time of drilling or when re-checked the following day.
- 3. Boring locations and elevations were surveyed by Century Engineering using information contained in the project development scope.
- These logs are subject 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.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR1-05-05

Contract: 25-113-01

Boring Location: Sta. 675+37.70, 75' Lt. C.L.

Boring Surface Elev.: 54.29 Reference:

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

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

O.D.

Hollow Stem Auger: From Depth of: 0.0' 34.0'

Water Level Readings

Core Bit:

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 2/27/08 2/29/08 27.5' 14.5' 26.8 39.8 34.0' 17.5'

Pay Quantities:

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

Boring Contractor: Walton Corperation Driller: Gary Turner

Helpers: J. Hillebrand

			T -	1	1	1		
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		1	2.0'	3 5 5 5		Saturated stiff brown silt w/ some fine sand and clay, trace of coarse sand and gravel. 12" RECOVERY	A-4(4)	
2.49		2	2.0'	3 5 5 5		Saturated stiff brown silt w/some clay, trace of fine to coarse sand. 24" RECOVERY	A-4(6)	IG
4.98		3	4.0'	3 5 10 12		Saturated stiff brown silt w/ some clay, trace of fine to coarse sand and gravel. 12" RECOVERY	A-2-4(0)	
7.47		4	6.0'	5 10 10 10	on the first of the control of the c	Moist medium dense brown coarse sand w/ some fine sand, trace of silt and gravel. 14" RECOVERY	A-2-4(0)	
9.96		5	8.0'	2 5 6 10		Saturated stiff brown silt w/ some clay, trace of fine to coarse sand and gravel. 24" RECOVERY	A-2-4(0)	
9.90		U-1	10.0'			Saturated brown medium dense coarse to fine sand w/ some gravel, trace silt 10" RECOVERY	A-2-6(0)	Press Sample - Shelby Tube.
12.45		6	12.0'	6 15 13 12		Moist medium dense brown gravelly coarse sand w/ some fine sand, trace of silt.	A-2-4(0)	

Remarks: Mud Rotary @ 34.0

Reviewed By: Kelly Maureen Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(,	- 3.223	7	14.0'	6	1333333333 1333333333	12" RECOVERY	A-2-4(0)	
			14.0'	6 7 10 12		Moist medium dense brown coarse to fine	A-2-4(0)	
14.94				12	1:1:1:1:1:1:1: 1:1:1:1:1:1:1:	sand w/ some gravel, trace of silt.		
			16.0'		1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:	16" RECOVERY		
		8	16.0'	9 9 9	jairjai. 2013ai. 2013ai.et	Moist medium dense brown coarse to fine	A-2-5(0)	
				9	100	sand w/ some silt, trace of gravel.		
17.43					odeirodek 1883 isto 1883 isto			
17.40			40.01		need valeur Deed valeur Deed valeur	10" PEGOVERY		
		9	18.0' 18.0'	4	 - - - - - 	18" RECOVERY Moist medium dense brown coarse to fine	A-5(0)	
		3	10.0	5 6 7		sand, trace of silt and gravel.	A-3(0)	
				7	1-1-1-1-1-1-1-1	sand, trace of sitt and graver.		
19.92			20.0'			20" RECOVERY		
					1010101010101 1010101010101			
					1:3:3:3:3:3:3:3: 1:3:3:3:3:3:3:3: 1:3:3:3:3			
					1-1-1-1-1-1-1			
-					1: 1			
22.41						DRAFI		
					1:3:3:3:3:3:3:1: 1:3:3:3:3:3:3:3:			
					: : : : : : : : : : : : : : : : : : :			
					1:1:1:1:1:1:1: 1:1:1:1:1:1:1:1: 1:			
		10	24.0'	5		Wet medium dense brown coarse to fine sand	A-2-4(0)	
24.9		\mathbf{V}		5 5 7 5		w/ some silt, trace of gravel.	112 (0)	
24.9	•			3	0.1499;66 0.1341;66 0.6349;66			
					128 13 110 6			
			26.0			20" RECOVERY		
						3 S 20		
						JUOI ZU		
27.39								
					reivieir Esilier Esilier			
					00111100 00111100			
					pie i viste. Gerbiece Litizaijer.			
		44	29.0'	2	403.161. 6017466 617466			
		11	29.0	2 3 5 7		Wet loose brown coarse to fine sand, trace of	A-2-4(0)	
29.88				7		silt and gravel.		
			31.0'		1:3:3:3:3:3:3:3: 1:3:3:3:3:3:3:3: 1:3:3:3:3	20" RECOVERY		
<u></u>					1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	·		
					1:1:1:1:1:1:1:1: 1:1:1:1:1:1:1:1:1: 1:			
32.37								
32.31					1:3:3:3:3:3:3:3: 1:3:3:3:3:3:3:3: 1:3:3:3:3			
					1:1:1:1:1:1:1: 1:1:1:1:1:1:1:1: 1:1:1:1:1:1:1:1:1:			
		12	34.0'	7 7		Saturated medium dense brown fine to coarse	A-2-4(0)	
34.86				7 7 7 7		sand w/ some silt, trace of gravel.		
			36.0'			12" RECOVERY		
<u> </u>								
37.35								

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

	·	1		1	1			T
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		40	00.01					
39.84		13	39.0'	5 4 5 7		Saturated loose brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
39.04				7		and course said, trace of graver.		
			41.0'			20" RECOVERY		
			41.0			20 RECOVERT		
42.33								
		14	44.0'	17		Saturated dense brown fine sand w/ some	A-2-4(0)	
44.82			11.0	17 23 23 21		coarse sand and silt.	A-2-4(0)	
			46.0'			18" RECOVERY		
47.31		14						
		M				FOR BIDI		J(j
				•				
		15	49.0'_	11		Saturated dense brown fine sand w/ some	A-2-4(0)	
49.8				11 18 25 30		coarse sand and silt.	15	
				1		JUSI ZU		
			51.0'			18" RECOVERY		
52.29								
02.20								
					1:032.1:0 1:032.1:0			
		16	54.0'	16 20 25 27		FI Sucurated delibe of will fine balla w/ bolile bit	A-2-4(0)	
54.78				27		and coarse sand.		
			56.0'			16" RECOVERY		
57.27								
					potarbol Geodosc Geodosc Geodosc Nocaros			
					6614316 6613316			
		4-	F0.0'	Ω	1:(
59.76		17	59.0'	8 8 13 16		Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
55.75				16		some sit and course suite.		
		<u> </u>		1	04444444	H		l .

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

Contin								
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(11.)			61.0'			16" RECOVERY		
	-							
62.25	-							
	=							
	-	18	64.0'	12 12		Saturated medium dense brown fine sand w/	A-4(0)	
64.74	-			12 12 15 19		some silt, trace of coarse sand.		
	-							
	1		66.0'			18" RECOVERY		
67.23	_							
	_							
	-							
		19	69.0'	11		Saturated dense brown fine sand w/ some silt	A-2-4(0)	
69.72	_	10	00.0	11 19 25 29		and coarse sand.	A-2-4(0)	
	-							
			71.0'			20" RECOVERY		
	1	M				20" RECOVERY		
72.21] "	,		•				
	=							
	-	20	73.0'	13 19 19 28	WY	Saturated hard gray fine sandy silt w/ some	A-2-4(0)	
	-			19 28		clay, trace of coarse sand.		
74.7								
			75.0'			24" RECOVERY Boring Terminated at 75.0'		
	-							
	_							
77.19	-							
	-							
	_							
79.68	-							
	-							
82.17	-							
02.17	1							
]							
L]							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity clay



Low plasticity clay



Poorly graded sand with silt



Poorly graded sand



Well graded sand with silt



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 2/27/2008 using a
 3 1/4-inch diameter continuous flight power auger. Rig is a truck mounted
 CME 55.
- No free water was encountered at the time of drilling or when re-checked the following day.
- 3. Boring locations and elevations were surveyed by Century Engineering using information contained in the project development scope.
- These logs are subject 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.

43.5'

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

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR1-06-01

Contract: 25-113-01

Boring Location: Sta. 699+65.89, 292' Lt. C.L.

Boring Surface Elev.: 29.33 Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 20.3 29.3 9.0' 2/6/08 10.0 8.0' 29.3 29.3 29.3

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: Dia. U-Sample Boring: U-Samples: 91.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Danny Taylor

Helpers: A. Joseph

Danilla	D-ii.		0	1	1			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		1	1.0'	3 6	WW	Wet stiff brown clayey silt w/ some fine to	A-2-4(0)	10" Asphalt
			2.0'			coarse sand, trace of gravel. 12" RECOVERY		
2.49		2	2.0'	5 3 8 27		Wet stiff brown clayey fine sandy silt w/	A-2-4(0)	
	1 _			8 27		some coarse sand and gravel.		
			4.0'			12" RECOVERY		
	•	3	4.0'		1:	Wet medium dense orange-brown coarse sand	A-2-4(0)	
4.98				6		and gravel w/ some tine sand, trace of silt.		
4.50	1		5.5			6" RECOVERY	15	
		ЗА	5.5'	7		Wet stiff orange-brown clay w/ some fine	A-2-4(0)	
	1	4	6.0' /	8		sand, trace of coarse sand and gravel. 6" RECOVERY	A-2-4(0)	
				11 11 12		Wet very stiff orange-brown fine sandy silt,		
7.47						trace of coarse sand.		
<u> </u>	1		8.0'			24" RECOVERY		
		5	8.0'	6		Saturated loose orange-brown fine to coarse	A-2-4(0)	
				6 6 4 4	10 15.110 10 15.110		, ,	
9.96			10.0'			15" RECOVERY		
9.90		6	10.0'	2	######################################	Saturated loose orange-brown fine to coarse	A-2-4(0)	
				2 4 5 2		sand w/ some silt, trace of gravel.	112 (0)	
				_		-		
			40.0			2011 DECOVEDY		
40.45		7	12.0' 12.0'	3		20" RECOVERY Saturated loose orange-brown fine sand w/	A-2-5(0)	
12.45	1			3 3 2 4		some silt, trace of coarse sand and gravel.	A-2-3(0)	
				4		,		
		8	14.0' 14.0'	1		19" RECOVERY	A-2-4(0)	
			14.0	1 2 4		Saturated loose orange-brown fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	
1	I	l	1	5		Bonne sire, trace of course sand and graver.		

Remarks: Mud Rotary @ 43.5

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth	Daily		Sample					
(ft.)	Progress	No.	Depth	Blows/6"	8888888	Sample Description	Class./G.I.	Remarks
			16.0'			24" RECOVERY		
		9	16.0'	5 9 7 10		Saturated medium dense orange-brown fine sand w/ some silt, trace of coarse sand and gravel.	A-3	
17.43			40.01					
		10	18.0' 18.0'	4 9 9 9			A-7-5(9)	
				9		sand w/ some coarse sand and sitt.		
19.92			20.0'		161436 171717	16" RECOVERY		
			20.0		2017420 961436 9617220	TO RECOVERT		
					130 3 3.312 120 1 4 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3			
22.41								
		11	23.5'	5 4 6	155 15 155		A-1-b	
24.9				6		some coarse sand, trace of silt and gravel.		
			25.5'			10" DECOVEDY) \	
		A,	25.5'	4 7 8 10	i 	brown fine sand w/ some coarse sand and silt		Sample brought to GTA lab for pH testing.
				10	20 (10 2 21 (10 12 21 (10 12 20 (10 12			
27.39			27.5'			20" RECOVERY	15	
				10		7001 20	10	
		12	28.5'	3 4 5		Saturated loose orange-brown fine sand w/	A-1-b	
29.88				6		some silt, trace of coarse sand.		
20.00			30.5'			22" RECOVERY		
					66			
32.37					7.01 T 7.0 66			
)			
		13	33.5'	3 5 9		Saturated medium dense orange-brown fine	A-1-b	
34.86				9		sand w/ some silt, trace of coarse sand.		
57.00			35.5'			21" RECOVERY		
			-					
37.35								
		<u> </u>						l

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
20.04	-	14	38.5'	7 9 10 11	Saturated medium dense green-brown silty fine sand w/ some coarse sand, trace of gravel. A-2-4(0)	
39.84			40.5'		23" RECOVERY	
42.33						
		15	43.5'	4 9 9 17	Saturated very stiff gray fine sandy silt, trace A-2-4(0)	
44.82				17	of coarse sand and gravel.	
			45.5'		24" RECOVERY	
					II)KAFI	
47.31						
				_		
		16	49.0′	6	Setupoted medium dance constitue cand viv	$\mathbf{V}(\mathbf{j})$
49.8	•		40.0	6 9 10 14	Saturated medium dense gray fine sand w/ A-2-4(0) some silt, trace of coarse sand, gravel, and	
			Λ		organic matter.	
			51.0'		24" RECOVERY	
52.29						
32.29						
		17	54.0'	3 5	Saturated loose gray clayey fine sand w/ some A-2-4(0)	
54.78				3 5 5 8	coarse sand, trace of organic matter.	
			56.0'		24" RECOVERY	
			30.0		24 RECOVERT	
57.27						
		18	59.0'	4 4 8 12	Saturated medium dense gray fine sand w/ A-4(0)	
59.76				12	some clay, trace of coarse sand and organic matter.	
			61.0'		23" RECOVERY	
		U-1	61.5'		No recovery.	Press Sample - Shelby Tube.
\Box	I	L	31.0	L	ANNEN	

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

					T		Г
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25			63.5'		0" RECOVERY		
64.74		19	64.0' 66.0'	4 8 9 13	Saturated medium dense gray silty fine sand, trace of coarse sand, gravel, organic matter, and seashells. 24" RECOVERY	A-3	
67.23			00.0		24 RECOVERT		
69.72		20	69.0' 71.0'	6 12 11 14	Saturated very stiff gray fine sandy silt, trace of coarse sand, gravel, and organic matter. 24" RECOVERY	A-4(0)	
72.21	l		0	Т	FOR BIDI		IG
74.7		21	74.0'	9 11 14 27	Saturated very stiff gray clayey fine sandy silt, trace of organic matter and gravel.	A-4(0)	
77.19			76.0'		24" RECOVERY		
79.68		22	79.0' 81.0'	8 9 12 18	Saturated medium dense dark gray silty fine sand, trace of organic matter, coarse sand, gravel, and seashells. 24" RECOVERY	A-2-4(0)	
82.17							
84.66		23	84.0'	15 18 18 24	Saturated hard dark green fine sandy silt, trace of organic matter, coarse sand, and gravel.	A-4(0)	glauconitic.

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

		1	T -			1	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			86.0'		24" RECOVERY		
87.15							
89.64		24	89.0'	7 10	Saturated medium dense dark green fine sand	A-2-4(0)	
09.04		24A	90.0'	12 16	w/ some clay, trace of coarse sand, organic matter, gravel, and seashells.	A C(15)	
		24/	91.0'	16	Saturated very stiff dark gray clayey silt, trace	A-6(15)	
			01.0		of fine to coarse sand, organic matter, and seashells.		
92.13					12" RECOVERY Boring terminated at 91.0 feet.		
					Boring terminated at 91.0 rect.		
					DRAFT		
					DRAFI		
94.62							
	N	1/			FOR BIDI		
		V			LOK DIDI	יווע	
97.11							
			Λ		GUST 20	15	
				$\setminus \bigcup$	GUSI ZU	GI	
99.6							
102.09							
102.09							
104.58							
107.07							

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty low plasticity clay

Silt

10:10:10:10:10:10:10 10:10:10:10:10:10:10 10:10:10:10:10:10:10

Well graded sand with silt



Low plasticity clay



Poorly graded sand with silt



Silty sand



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 2/6/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
- 2. Groundwater levels recorded at time of drilling 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.

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-06-02

Contract: 25-113-01

Boring Location: Sta. 671+81.87, 183' Lt. C.L.

Boring Surface Elev.: 32.34 Reference:

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

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0' 100.0'

Water Level Readings

Elev. of Water Time **Depth of Casing Depth of Water Depth of Hole** Date 6.8' 7.9' 25.5 24.4 2/8/08 8.0' 9.3' 6.0' 2/16/08

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: Dia. U-Sample Boring: U-Samples: 100.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Wayne Hurd

Helpers: A. Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	4 2 5 4	No Sample Recovery		4" Topsoil
			2.0'		0" RECOVERY		
2.49		2	2.0'	3 3 3 4	Wet loose tan fine to coarse sand w/ some silt and gravel. (Fill)	A-4(0)	IG
			4.0'		10" RECOVERY		
4.98		3	4.0'	2 1 5 3	Wet loose tan fine to coarse sand, trace of silt and gravel.	A-1-a	
			6.0'		16" RECOVERY		
7.47		4	6.0'	2 1 3 3	Saturated very loose tan coarse to fine sand, trace of silt and gravel.	A-2-4(0)	
			8.0'		EEEEEEE 18" RECOVERY		
		5	8.0'	5 4 4 5	Saturated loose tan coarse to fine seand, trace of silt and gravel.	A-2-4(0)	
9.96			10.0'		20" RECOVERY		
		6	10.0'	3 3 4 4	Saturated loose tan to orange-brown coarse to fine sand, trace of silt and gravel. 24" RECOVERY	A-1-b	
12.45		7	12.0'	2 1 1 1	Saturated very loose orange-brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	-	8	14.0' / 14.0'	1		20" RECOVERY Seturated years loose light brown fine and w/	A-2-4(0)	
14.94				1 2 3		Saturated very loose light brown fine sand w/some coarse sand and silt, trace of gravel.		
		0	16.0'	2	12177112	22" RECOVERY		
		9	16.0'	2 1 3 5	provincio Realistica Realistica Realistica	Saturated very loose light brown fine to coarse sand, trace of silt and gravel.	A-2-4(0)	
47.40				5	0013300 3703703017 40133900	coarse sand, trace of sin and graver.		
17.43			18.0'		000 1 4 3 0 0 0 1 000 1 4 3 0 0 0 000 1 3 3 0 0 0	22" RECOVERY		
		10	18.0'	2		Saturated loose light brown fine to coarse	A-2-5(0)	
				2 4 5 4		sand w/ some gravel, trace of silt.		
					150 1343 150 1 150 1343 155 1			
19.92			20.0'		# (1 / 4 / F () (1 / 4 / F ()	18" RECOVERY		
					11 14 11 6 11 14 11 6 11 14 11 6 7			
					00117700 0011700 00117100			
					100143166 100171401 100113166			
22.41					130 73 130 1 120 1 7 7 7 12 1 131 1 7 1 7 1 1 1 1	\square \square \square \square \square		
22.71					664) 306 6 155 3 3 5 6 7 155 3 3 5 6 7			
		11	23.0' 23.5'	50/4"		Saturated very dense light brown fine sand	A-2-4(0)	
			23.5		100 1 3 300 6 100 1 7 1 1 1 1 1 100 1 3 3 1 1 1 1 1	and gravel w/ some coarse sand, trace of silt. 4" RECOVERY		
24.9		A .			11111111111111111111111111111111111111			
			Λ			DI LOT OO	15	
						iUS I 20		
27.39				1	100 1 7 3 10 0 100 1 3 1 1 0 0 1 1 1 1 1 1 1 1 1 1	3001 20		
					erijaer Erianer Eriaer			
		12	28.0'	6 5	### 34 ## ##############################	Saturated medium dense light brown fine	A-2-4(0)	
				7 9		sand w/ some coarse sand, trace of silt and gravel.		
					661 7466 661 7466 661 7466	graver.		
29.88			30.0'			20" RECOVERY		
					0017376 1113766 1014766			
					00111100 00111100 00111100			
32.37					00173000 00143000 00175000			
					66433966 66333966 96143966			
		13	33.0'	8 6 7 10	00 10 10 10 1 00 10 10 10 1 00 10 10 10 1 10 10 10 10 1	Saturated medium dense light brown fine	A-2-4(0)	
				10		sand w/ some coarse sand, trace of silt.		
04.00					66113006 6615006 6614300 6614366			
34.86			35.0'		erricie erricie erricie	18" RECOVERY		
					0001 (4000) 00014 (000 00017 (000) 00017 (000)			
					61 (446 f 61 (446 f			
37.35					(16) 1 (10) (16) 4 (10) (16) 7 (10) (16) 7 (10)			

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

				1				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
					140 3 A 1 1 E 1 140 3 A 1 1 E 1 140 3 A 1 1 E 1			
		14	38.0'	5 7 7 8		Saturated medium dense light brown silty fine sand w/ some coarse sand.	A-2-4(0)	
39.84			40.0'			16" RECOVERY		
42.33								
		15	43.0'	3 5 6 6		Saturated medium dense light brown fine sand w/ some coarse sand, trace of silt and gravel.	A-2-4(0)	
44.82			45.0'			DRAFT		
47.31		16	48.0′	4 5 8 10		Saturated stiff light gray fine sandy silt, trace of coarse sand.	A-2-4(0)	1G
49.8			50.0'	\U		3 Latrecovery 20	15	
52.29								
		17	53.0'	6 6 10 16		Saturated very stiff light gray fine sandy silt w/ some coarse sand, trace of organic matter.	A-2-4(0)	
54.78			55.0'			24" RECOVERY		
57.27								
			<u></u>	<u></u>				
		18	58.0'	6 6 8 13		Saturated medium dense light gray silty fine sand, trace of coarse sand and organic matter.	A-2-4(0)	
59.76			60.0'			24" RECOVERY		
		L	L]		l

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
62.25								
		19	63.0'	4 6 9 16		Saturated medium dense light gray silty fine sand, trace of coarse sand and organic matter.	A-2-4(0)	
64.74			65.0'		-	24" RECOVERY		
67.23								
		20	68.0'	4 7 7 9		Saturated medium dense light gray silty fine sand, trace of coarse sand, gravel, and organic matter.	A-2-4(0)	
69.72			70.0'		-	24" RECOVERY		
72.21			0	Τ		OR BIDI		1G
		21	73.0	5 7 8 12		Saturated stiff light gray fine sandy silt, trace of coarse sand, gravel, organic matter, and seashells.	A-2-4(0)	
74.7			75.0'		_	24" RECOVERY		
77.19								
		22	78.0'	10 11 12 15		Saturated very stiff gray fine sandy silt w/ some clay, trace of gravel, coarse sand, organic matter, and seashells.	A-4(0)	
79.68			80.0'			24" RECOVERY		
82.17								
		23	83.0'	8 12 16 25	nanna	Saturated very stiff dark gray fine sandy silt, trace of coarse sand, organic matter, and seashells.	A-4(0)	

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

- ·	.	ı					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
84.66			85.0'		22" RECOVERY		
87.15							
		24	88.0'	12 20 30 38	Saturated dense dark gray silty fine sand, trace of coarse sand, organic matter, and	A-2-4(0)	
				38	seashells.		
89.64			90.0'		22" RECOVERY		
			90.0		22 RECOVERT		
92.13							
					DRAFI		
		25	93.0'	6 7 9 9	Saturated medium dense dark gray silty fine	A-2-4(0)	
	_			9	sand, trace of coarse sand, gravel, organic matter, and seashells.		_
94.62						$\supset IV$	
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	\ 	95.0'		22" RECOVERY		IG
	_						
					NI IOT OO	4	
97.11					4UST 20	15	
				1	3001 20		
		26	98.0'	8 11 13 16	Saturated very stiff dark gray clay w/ some	A-7-6(29)	
				13 16	organic matter, trace of fine sand.		
99.6							
			100.0'		24" RECOVERY Boring terminated at 100.0 feet.		
					20111g terminated at 10010 100t.		
102.09							
104.58							
107.07							
1		i	1	1		i	

KEY TO SYMBOLS

Symbol Description

Strata symbols

Fill

Poorly graded sand

ite ite ite ite ite it ite ite ite ite ite ite it ite ite ite ite ite ite it

Well graded sand with silt



Silty sand



Poorly graded sand with silt



Poorly graded clayey silty sand



High plasticity clay

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 2/8/2008 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.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR1-06-03

Contract: 25-113-01

Boring Location: Sta. 670+28.94, 241' Lt. C.L.

Boring Surface Elev.: 28.54 Reference:

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

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0' 81.0'

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date 2/2/08 2/5/08 7.2' 6.0' 21.3 22.5 22.7 28.5 8.0' 8.5' 6.0' 2/6/08 8.5' 5.8'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 91.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	1.0' 2.0'	3 8	Moist loose brown coarse to fine sand w/ some gravel and silt.	A-1-b	10" Asphalt
2.49		2	2.0'	16 14 8 8	Moist medium dense tan and gray fine to coarse sand w/ some silt and grayel.	A-2-4(0)	
			4.0'		14" RECOVERY		JG
4.98	_	3	4.0'	1 2 2 4	Wet soft gray silt, trace of fine to coarse sand and gravel.	A-4(0)	•
			6.0'		18" RECOVERY	15	
		4	6.0'	3 4 4 6	Saturated firm gray silt, trace of fine to coarse sand and clay.	A-4(2)	
7.47			8.0'		18" RECOVERY		
		5	8.0' 9.0'	2 3	Saturated loose gray gravel and fine sand w/ some coarse sand, trace of gravel. 5" RECOVERY	A-1-b	
9.96		5A	9.0'	11 10	Saturated stiff gray organic fine sandy silt w/ some coarse sand, trace of gravel. 10" RECOVERY	A-4(0)	
		6	10.0'	5 10 14 16	Saturated medium dense orange gravel and coarse to fine sand, trace of silt.	A-1-b	
			12.0'		18" RECOVERY		
12.45		7	12.0'	W/R W/R 1 4	Saturated very loose orange fine to coarse sand w/ some gravel, trace of silt.	A-3	
			14.0'		9" RECOVERY		
		U-1	14.0'		Wet orange fine to coarse sand, trace of silt and gravel.	A-3	Press Sample - Shelby Tube.

Remarks: Mud Rotary @ 81.0'

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(/	- g. 200				00 1 1 1 1 0 0 0 100 1 4 1 1 0 0 00 1 1 1 1 1 0 0 10 1 1 1 1 1 0 0			
		0	16.0'	10	66.149366 66.13966 61.13386	20" RECOVERY		
		8	16.0'	10 9 12 15	ori falcy Del falcy	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
17.43					00 19 9:00 1301 W 1:013 6 8 1 3 4:06 1:013 h 1:01			
			18.0'	-	1:11	18" RECOVERY		
		9	18.0'	7 7 8 12	166 14-166 (166 14-166 (166 14-166 (166 17-166 (Saturated medium dense orange fine sand w/some coarse sand, trace of silt and gravel.	A-3	
				12	100143166 121171261 10113126 101131261			
19.92			20.0'		100113100 1001131000 1001131000	18" RECOVERY		
					ict danger neet danger Neet danger daet voorte			
					130 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
					441446 44146 44146			
22.41								
					118 14 11 16 6 14 1 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	DRAFI		
					01111000 01111100 01111100			
		10	24.0'	7 6 7	661 1466 661 1406 661 1406 661 1406 661 1406	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
24.9				8		some coarse sand, trace of sitt.	\mathcal{I}	
		V	26.0'			19"RECOVERY	JII'	NG
					100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
27.39			Λ		6214326 621326 621316 621316 6613360	OLICT OO	15	
27.00						GUST 20		
					16111166 1711171777 171171777			
		11	29.0'	11 5	13 (Saturated loose orange fine sand w/ some silt	A-2-4(0)	
29.88			20.0	5 5 10	130 ja jet 140 ga 141 ga 140 ga 141 ga 141 ga 141 ga 141 ga 141 g	and coarse sand.	A-2-4(0)	
					11111111111111111111111111111111111111			
			31.0'			22" RECOVERY		
32.37								
					0011000 0011006 0011006 0011000			
					06143166 Januario Gradang Gradang Gradang			
		12	34.0'	5 7	14 14 14 16 1 14 14 14 14 14 14 14 14 14 14 14 14 14 1	Saturated medium dense brown fine sand w/	A-3	
34.86				5 7 9 11	1813.196. 126133122 18133166 22133161	some coarse sand, trace of silt.		
					66333166 6633166 66333166 66333166			
			36.0'		introduct Coloniet Coloniet VCI (alce	21" RECOVERY		
					(11 11 11 11 11 11 11 11 11 11 11 11 11			
37.35								
					151 (A.1) (C.1) 151 (A.1) (C.1) 151 (A.1) (C.1) 151 (A.1) (A.1) 151 (A.1) (A.1)			
	l		L	L	hetijaire		l .	I.

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I	Remarks
(11.)	Flogiess		Берин		HAR	
39.84		13	39.0'	10 8 14 10	Saturated medium dense brown-gray silty fine A-2-4(0) sand, trace of coarse sand and gravel.	
39.04				10	Sand, trace or compe sand and graven	
			41.0'		21" RECOVERY	
42.33						
		14	44.0'	7 10 16 20	Saturated medium dense gray silty fine sand A-2-4(0)	
44.82				16 20	w/ some coarse sand, trace of gravel and organic matter.	
			46.0'		21" RECOVERY	
			40.0			
47.31					URALI	
	N			Т		
		15	49.0'	10 9 10 11	Saturated medium dense gray silty fine sand, A-2-4(0)	NO
49.8				11	trace of coarse sand, gravel, and organic matter.	
			51,0'		24" RECOVERY	
		U-2	51.0'	10	Saturated medium dense gray clayey fine to A-2-4(0) coarse sand.	Press Sample - Shelby Tube.
52.29					Coarse said.	
			53.0'		15" RECOVERY	
		16	54.0'	5 6	Saturated medium dense gray silty fine sand A-2-4(0)	
54.78				5 6 8 9	w/ some coarse sand, trace of organic matter.	
			56.0'		AN RECOVERY	
			0.00		24" RECOVERY	
57.27						
02.						
		17	59.0'	4	Saturated medium dense gray silty fine sand, A-2-4(0)	
59.76				4 6 6 11	trace of coarse sand and organic matter.	
			61.0'		24" RECOVERY	

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

Depth	Daily		Sample					T
(ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
62.25								
			2.1.21					
64.74		18	64.0'	5 7 11 22		Saturated medium dense gray silty fine sand, trace of coarse sand, gravel, and organic	A-2-4(0)	
04.74				22		matter.		
			66.0'			20" RECOVERY		
67.23								
		19	69.0'	8 8		Saturated medium dense gray silty fine sand,	A-2-4(0)	
69.72				8 8 8 16		trace of coarse sand, silt, and organic matter.		
						IJKAFI		
			71.0'			24" RECOVERY		
72.21		1						
12.21		\mathbf{M}				FOR BIDI		
	•	"		•				
		20	74.0'	8	737	Saturated medium dense gray fine sandy silt	A-4(0)	
74.7				8 10 10 17		w/ some coarse sand and clay, trace of gravel	71-4(0)	
				1		and organic matter.		
			76.0'			19" RECOVERY		
			70.0			TO RECOVERT		
77.19								
			70.0	0				
79.68		21	79.0'	8 12 15 19		Saturated medium dense gray silty fine sand, trace of coarse sand, gravel, and organic	A-2-4(0)	
				19		matter.		
			81.0'			24" RECOVERY		
82.17								
04.00		22	84.0'	14 21 19 23		Saturated dense green-gray silty fine sand,	A-2-4(0)	glauconitic
84.66				19 23		trace of organic matter and coarse sand.		

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

F =			· .	ı			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			86.0'		20" RECOVERY		
87.15							
89.64		23	89.0'	14 14 18 20	Saturated dense gray-green silty fine sand w/	A-2-4(0)	glauconitic
				20	some organic matter, trace of coarse sand and gravel.		
			04.01				
			91.0'		Boring terminated at 91.0 feet.		
92.13					-		
32.13							
					DRAFT		
04.00							
94.62							
		14			FOR BIDI		
		M			FUR BILL		
				•			
97.11			_				
					IGUST 20	15	
				1	0001 20		
99.6							
102.09							
104.58							
107.07							
		ı	I	I			

KEY TO SYMBOLS

Symbol Description

Strata symbols

Poorly graded sand with silt

Silty sand

silt



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

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

50.0'

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

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR1-06-04

Contract: 25-113-01

Boring Location: Sta. 671+25.11

Boring Surface Elev.: 28.78 Reference:

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

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Casing Time Depth of Hole **Depth of Water** Elev. of Water Date 20.8 22.8 22.8 28.8 10.0' 2/4/08 12.0'8.0' 2/6/08 6.0' 6.0' 2/7/08 6.0' 6.0'

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.; Dia. U-Sample Boring: U-Samples: 101.0 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Danny Taylor

Helpers: A. Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		1	0.5'	7 12 11		Moist medium dense orange-brown fine to coarse sand w/ some silt, trace of gravel. (Fill)	A-2-4(0)	6" Asphalt
			2.0'			16" RECOVERY		
2.49		2	2.0'	8 6 7 7		Moist medium dense orange-brown silty fine	A-2-4(0)	
		V (7		to coarse sand, trace of gravel. (Fill)		IG
			4.0'	_	\bowtie	24" RECOVERY		
		3	4.0'	5 4	10101010101		A-1-b	
4.98				5 3		JUS ZU	15	
		4	6.0' 6.0'	4		15" RECOVERY	4 1 1	
		4	6.0	4 4 10		Wet loose tan coarse to fine sand w/ some silt and gravel.	A-1-b	
7.47			7.5'			18" RECOVERY		
		4A	7.5'	3		Wet stiff gray organic fine sandy clay w/	A-7-5(3)	
		5	8.0' 8.0'	2		some coarse sand, trace of gravel.	A-4(2)	
		5A	8.5' / 8.5'	8 14 13	12 1 3 3 3 6 12 1 3 7 3 6 12 1 7 1 3 6	6" RECOVERY Saturated stiff gray clayey silt w/ some fine to	A-1-b	
			0.5	13	064) 406 000 20.000 000 4000	coarse sand and gravel, trace of organic		
9.96			10.0'		000 1 5 3 1 6 1 7 1 7 1 7 1 6 4 6 6 7 3 3 1 6	matter.		
		6	10.0'	10 11		6" RECOVERY Saturated medium dense orange-brown gravel	A-1-b	
				10 10 10		and fine to coarse sand, trace of silt.	-	
						10" RECOVERY		
						Saturated medium dense orange-brown gravel		
<u> </u>		7	12.0' 12.0'	4		w/ some fine to coarse sand and silt.	A-2-4(0)	
12.45		'	12.0	4 2 3 4		Saturated loose orange-brown fine sand w/	A-2-4(0)	
				4		some coarse sand and silt, trace of gravel.		
			14.0'	14.75		16" RECOVERY		
L		8	14.0'	W/R 3	176 1 C 176	Saturated loose orange-brown fine sand w/	A-3	

Remarks: Mud Rotary @ 50.0'

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

					1			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
14.94				3 3	6114366 6114366	some coarse sand, trace of silt and gravel.		
					661)3166 66143166 86143166			
			16.0'		######################################	14" RECOVERY		
		9	16.0'	W/H 2 4 4	0013300 0013000 0013000	Saturated loose orange-brown fine sand w/	A-3	
				4 4	iii saliii i woo saliii iii saliii	some coarse sand, trace of silt.		
17.43					### 134 ### #################################			
			18.0'			16" RECOVERY		
		10	18.0'	2 3 4 7	00 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Saturated loose orange-brown fine sand w/	A-3	
				7		some coarse sand and silt.		
					00173700 00143166 001777013			
19.92			20.0'		111 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	17" RECOVERY		
					0111111111 011111111111111111111111111			
					110 73.110 7. 120 7430 6 121 7430 6 121 77 75 613			
					######################################			
00.11					01111000 011111000 011111000			
22.41					136 134 116 6 126 1 1 1 1 1 1 1 1 126 1 3 1 1 1 1 1 1 1			
		11	23.5'	W/H	06 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Saturated very loose orange-brown fine sand	A-3	
				1 3 5	110324191. 110324191.	w/ some coarse sand, trace of silt.	A-3	
24.9					10 14 300 0 10 10 116 12 6 1 1 116 6 11 116 116 1			
24.0		V	0F F!		12 (4) C4 12 (4) C4 12 (4) C4 13 (4) C4 14 (4) C4 15 (4) C4 16 (4) C4 17 (4)	24 RECOVERY		
	_	12	25.5' 25.5'	4 5	19 19 19 19 19 19 19 19 19 19 19 19 19 1	Visual description: Saturated medium dense		Sample brought to GTA lab
				6 8	01143000 01143000	orange-brown fine sand, trace of silt and	4 —	for pH testing.
					etiáite. Etiáite.	coarse sand.	15	
27.39			27.5'		Carrieda CHIANES CHIANES	18" RECOVERY		
						To the second se		
		13	28.5'	4 6	100 100 EV.	Saturated medium dense orange-brown fine	A-3	
				6 7		sand, trace of silt and coarse sand.		
29.88					60 (406) 60 (406) 61 (406)			
			30.5'			19" RECOVERY		
					135 13 3165 125 1 7 7 7 1 1 1 11 1 1 7 1 1 1 1 1			
					######################################			
					net i rajnu net i rajnu rit i rajnu			
32.37					663 1300 6 151 33,110 6 151 7330 0 161 14 316 0			
		14	33.5'	4	00111100 001111000	Coturated loose cropped brown fire and discount	A-3	
		14	33.3	4 4 6 7	98199969 6631986 1814886 1814886	Saturated loose orange-brown fine sand, trace of coarse sand and silt.	A-3	
34.86				'	016143166 021173200 06433400			
U-1.00			05 -:		nici indicer. Nici i indicer Nici i di Nici	ANI DEGGS VETS		
			35.5'		120 120 120 120 120 120 120 120 120 120	20" RECOVERY		
					11111111111111111111111111111111111111			
					130 131 131 14 1 150 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
37.35								
			1		er (1 3 9 °P P)			

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

Depth	Daily	l ,.	Sample	5		<u> </u>	Ol 15:	
(ft.)	Progress	No.	Depth	Blows/6"	म् <u>ट्र</u> ाप्त स्टब्स	Sample Description	Class./G.I.	Remarks
		15	38.5'	1 1 1		Saturated very loose brown fine sand w/ some	A-2-4(0)	
00.04				1		silt and coarse sand, trace of gravel.		
39.84								
			40.5'			22" RECOVERY		
		U-1	41.5'			No recovery.		Press Sample - Shelby Tube.
42.33								I was a same of the same of th
			43.5'			0" RECOVERY		
		16	43.5'	3 4		Saturated medium dense gray clayey fine	A-2-4(0)	
				3 4 7 8		sand, trace of coarse sand.		
44.82								
			45.5'			17" RECOVERY		
						IJKAFI		
47.31								
		1						
		17	48.5'	6			1 2 1(0)	
			46.5	6 8 14 20		Saturated medium dense gray silty fine sand, trace of coarse sand.	A-2-4(0)	
49.8				20		under of course same.		
			50.5'			24" RECOVERY	1 5	
			50.5			24 RECOVERY		
				1				
		U-2	51.5'			Saturated medium dense gray clayey fine to	A-2-4(0)	Press Sample - Shelby Tube.
52.29						coarse sand w/ some silt.		
			53.5'			24" RECOVERY		
F. 4 = 5								
54.78		18	54.5'	3 4 6 8		Saturated loose gray clayey fine sand w/ some	A-2-4(0)	
				8		coarse sand, trace of gravel.		
			56.5'			24" RECOVERY		
57.27								
		19	59.0'	4 4		Saturated loose gray silty fine sand, trace of	A-2-4(0)	
59.76				4 4 6 9		coarse sand and gravel.	(-)	
			61.0'			24" RECOVERY		

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

		ı		1	ı —		I	1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
62.25								
02.20								
64.74		20	64.0'	5 9 11 21		Saturated medium dense gray silty fine sand, trace of coarse sand, gravel, and organic	A-2-4(0)	
J				21		matter.		
			66.0'			24" RECOVERY		
67.23								
			22.01					
69.72		21	69.0'	6 7 10 10		Saturated medium dense gray silty fine sand, trace of coarse sand, organic matter, gravel,	A-2-4(0)	
				10		and seashells.		
			71.0'			24" RECOVERY		
	R							
72.21		M				FOR BIDI		
				•				
			_			DIIOT OO		
		- 00	74.01	7			15	
74.7		22	74.0'	9 12 15		Saturated very stiff gray clayey fine sandy silt, trace of gravel, organic matter, and	A-4(0)	
				15		seashells.		
			76.0'			24" RECOVERY		
77.19								
			70.01					
79.68		23	79.0'	8 11 17 23		Saturated medium dense dark gray silty fine sand, trace of organic matter, coarse sand, and	A-2-4(0)	
				23		seashells.		
			81.0'			24" RECOVERY		
82.17								
84.66		24	84.0'	13 23 34 35		Saturated very dense dark gray silty fine sand,	A-2-4(0)	
	1			35		trace of organic matter, gravel, and seashells.		

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

						_
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
87.15			86.0'		17" RECOVERY	
		25	89.0'	6	Saturated medium dense dark gray silty fine A-2-4(0)	
89.64		20	00.0	6 7 10 3	Saturated medium dense dark gray silty fine sand, trace of coarse sand, organic matter, gravel, and seashells. A-2-4(0)	
92.13			91.0'		24" RECOVERY	
		26	94.0'	7	Saturated very stiff dark gray clay w some A-7-6(32)	
94.62			96.0'	7 10 11 19	organic matter, trace of fine sand, gravel, and seashells. 24 RECOVERY	VG
97.11			Δ	\U	GUST 2015	
99.6		27	99.0'	12 22 30 36	Saturated hard dark gray fine sandy silt, trace of organic matter and seashells. A-4(0) 24" RECOVERY	
					Boring terminated at 101.0 feet	
102.09						
104.58						
107.07						

KEY TO SYMBOLS

Symbol Description

Strata symbols

Fill

Well graded sand with silt

Silty sand

Silt



Poorly graded sand with silt



Clayey sand



Poorly graded clayey silty sand



High plasticity organic clays

DRAFT NOT FOR BIDDING

Notes:

1. Exploratory borings were drilled on 1/31/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.

AUGUST 2015

- 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.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR1-06-05

Contract: 25-113-01

Boring Location: Sta. 671+97.00, 209' Lt. C.L.

Boring Surface Elev.: 31.12 Reference:

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

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0' 76.0'

Water Level Readings

Elev. of Water Time **Depth of Hole Depth of Casing Depth of Water** Date 7.2' 9.3' 23.9 21.8 2/4/08 8.0' 10.0 2/6/08 14.0 2/7/08 9.0' 6.5' 24.6 31.1

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: Dia. U-Sample Boring: U-Samples: 76.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: J. Hillebrand

Depth	Daily	l	Sample			
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description Class./G.I.	Remarks
		1	1.0'	6 6	Moist medium dense orange coarse sand w/ A-2-4(0)	10" Asphalt
			2.0'		some clay, gravel, and fine sand.	
2.49		2	2.0'	4 4 4	Moist loose light brown coarse to fine sand w/ A-1-b	
		_		4 3	some silt, trace of gravel.	
		\mathbf{M}	4.0'		18" RECOVERY	
	•	3	4.0'	3 3	Wet loose light brown coarse to fine sand, A-1-b	
4.98				3 3 2 3	trace of silt and gravel.	
4.00			Λ			
			6.0'		12" RECOVERY	
		4	6.0'	5	Wet loose light brown coarse to fine sand, A-1-b	
				3 3 3	trace of silt and gravel.	
7.47					HEREN HEREN HEREN	
7.47			8.0'		6" RECOVERY	
		5	8.0'	W/R	Whether the state of the state	
				W/H 1 2	coarse sand w/ some silt, trace of gravel.	
				_	19 into 19 into 19 into	
—					13.1cc 13.1cc	
9.96		6	10.0' 10.0'	2	17754 20" RECOVERY 17754 Saturated very loose light brown fine to A-3	
		ľ	10.0	2 1 1 2	Saturated very loose light brown fine to A-3	
				2	ijiiti	
					15.1(2). 17.43(2) 18.1(4)	
			12.0'		20" RECOVERY	
12.45		7	12.0'	2 2 3 4	Saturated loose orange fine to coarse sand w/ A-2-4(0)	
				4	some silt, trace of gravel.	
			14.0'		11" RECOVERY	
		8	14.0'	3 2 4 5	Saturated loose brown-orange fine to coarse A-2-4(0)	
				4 5	sand w/ some silt, trace of gravel.	

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
			16.0'			16" RECOVERY		
		9	16.0'	4 5 8 8	on reside La compania La compania La compania La compania		A-3	
17.43					100 1 3 3 10 0 3 2 1 1 2 3 10 0 4 5 6 3 3 4 10 0 12 3 3 3 10 0 10 6 1 3 3 10 0			
		10	18.0' 18.0'	8		24" RECOVERY Saturated medium dense brown fine sand and	A-2-4(0)	
				8 6 9 9		gravel w/ some coarse sand and silt.	A-2-4(0)	
19.92			20.0'		196 19.000 f. 196 199 199 f. 196 199 199 f. 196 199 199 f.	12" RECOVERY		
					130 30.110 f. 120 1 7 4 20 0 130 1 7 3 20 1 120 1 7 3 2 0 130 1 3 2 2 0			
					130 33.110 1. 120 1 4 4 10 4 120 1 2 3 3 10 0 120 1 2 3 4 6 1			
22.41								
						DDVET		
						DNAFI		
		11	24.0'	10 10 13		Saturated medium dense brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
24.9				15		some sitt and coarse saild, trace of graver.	\mathcal{I}	JG
		7 '	26.0'			16" RECOVERY	711	N \cup
27.39						iUST 20	15	
				1	1	3001 Z0		
		12	29.0'	10 10	*!!!!!!!! !!!!!!!!!!	Saturated medium dense brown fine sand w/	A-2-4(0)	
29.88				10 12 15	0000 (4000 10000 1000 10000 1000 10000 1000 10000 1000	some coarse sand and silt.	112 1(0)	
			31.0'		0661 69666 12612 2026 1261 94266 1261 49266 1261 49266	24" RECOVERY		
			01.0		0:0313:07 0:0133:06 0:0133:06 0:0133:06 0:0133:06	21 MEGVERT		
32.37					00111100 00111100 00111100 00111100			
					00000000000000000000000000000000000000			
					00010000 00010000 000100100 00010000			
34.86		13	34.0'	8 6 6 9		Saturated medium dense brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
37.00				9				
			36.0'			20" RECOVERY		
37.35								

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

14 39.0' \$	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
Trace of coarse sand and silt. 41.0' 41.0' 20" RECOVERY 15				-					
41.0' 42.33 42.33 15 44.0' 3 20" RECOVERY 3 44.82 15 44.0' 24" RECOVERY 24" RECOVERY 24" RECOVERY	20.94	_	14	39.0'	8 5 6	11:0 1 2 3:11	Saturated medium dense brown fine sand,	A-3	
42.33 42.33 15 44.0' 2 Saturated very loose brown fine sand w/ some silt and coarse sand, trace of gravel. 46.0' 24" RECOVERY	39.64	1			8		trace of coarse said and sit.		
15 44.0' 3 Saturated very loose brown fine sand w/ some silt and coarse sand, trace of gravel. 46.0' 24" RECOVERY		-		41.0'			20" RECOVERY		
15 44.0' 3 Saturated very loose brown fine sand w/ some silt and coarse sand, trace of gravel. 46.0' 24" RECOVERY		-							
15 44.0' 3 Saturated very loose brown fine sand w/ some silt and coarse sand, trace of gravel. 46.0' 24" RECOVERY	42.33	1				## 1310 ## 13.10 ## 13.10 ## 13.10			
44.82 46.0' Substituted very foods of will fine state with some of gravel. 24" RECOVERY						okitik Carlos Kijalik			
44.82 46.0' Substituted very foods of will fine state with some of gravel. 24" RECOVERY		_				6614316 12017112 6411312			
44.82 46.0' Substituted very foods of will fine state with some of gravel. 24" RECOVERY		-	15	44.0'	3		Saturated very loose brown fine sand w/ some	A-2-4(0)	
DRAFT	44.82				2 1 2			A-2-4(0)	
DRAFT		-							
		-		46.0'		-	24" RECOVERY		
47.31							DPAFI		
	47.31	-							
		_							
					Т		COD BIDI	\mathcal{I}	
Saturated medium dense brown-gray silty fine A-2-4(0) sand w/ some coarse sand, trace of gravel.		- "	16	49.0'	8 10	-		A-2-4(0)	
49.8 sand w/ some coarse sand, trace of gravel.	49.8	-			12 15		sand w/ some coarse sand, trace of gravel.		
]		F4.0				15	
U-1 51.0' No recovery. Press Sample - Shelby Tube			U-1						Press Sample - Shelby Tube.
	50.00	-							
52.29 52.7' 0" RECOVERY	52.29	1		52.7'		_	0" RECOVERY		
		_							
54.78 17 54.0' 8 13 Saturated medium dense gray silty fine sand, A-2-4(0) trace of coarse sand.	54.78	_	17	54.0'	8 13 17		Saturated medium dense gray silty fine sand, trace of coarse sand	A-2-4(0)	
					15		trace of course said.		
56.0' 24" RECOVERY		-		56.0'		_	24" RECOVERY		
		1							
57.27	57.27]							
		-							
		-							
18 59.0' 6 Saturated medium dense gray clayey fine sand A-2-4(0)		1	18	59.0'	6		Saturated medium dense gray clavey fine sand	A-2-4(0)	
59.76 15 15 15 15 15 15 15 1	59.76				13 15 20		w/ some coarse sand, trace of gravel and	1127(0)	
organic matter.		-					organic matter.		
U-2 61.0' 24" RECOVERY U-2 61.0' Press Sample - Shelby Tube		1	11-2				ian		Press Sample - Shelby Tube.
U-2 61.0' No recovery. Press Sample - Shelby Tube]	0-2	01.0			no recovery.		11000 Dampie Bholoy Tube.

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class	ss./G.I. Remarks
62.25			62.3'		0" RECOVERY	
64.74		19	64.0'	10 14 17 24	Saturated dense gray fine to coarse sand w/ A-2- some silt, trace of gravel and organic matter.	2-4(0)
67.00		U-3	66.0' 66.0'		10" RECOVERY 10" No recovery.	Press Sample - Shelby Tube.
67.23			67.8'		(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	
69.72		20	69.0' 71.0'	9 15 35 50/5"	Saturated dense gray silty fine sand, trace of coarse sand, gravel, and organic matter. 14" RECOVERY	2-4(0)
72.21			O'	Т	FOR BIDD	ING
74.7		21	74.0	10 15 17 29	coarse sand, organic matter, clay, and gravel.	4(0)
			76.0'		Boring terminated at 76.0 feet.	
77.19						
79.68						
82.17						
84.66						

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand

Well graded sand with silt

Poorly graded sand with silt

Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 2/4/2008 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.

75.0'

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

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-06-06

Contract: 25-113-01

Boring Location: Sta. 669+57.61, 248' Lt. C.L.

Boring Surface Elev.: 29.20 Reference:

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

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Elev. of Water **Depth of Casing** Time **Depth of Hole Depth of Water** Date 22.0 22.2 23.2 29.2 7.2' 7.0' 1/31/0810.0 8.0' 9.6' 2/1/08 2/4/08 8.5' 6.0'

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: Dia. U-Sample Boring: U-Samples: 75.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
		1	1.0' 2.0'	2 5	Moist firm gray silt w/ some fine to coarse sand and clay, trace of gravel. (Fill) 8" Asphalt - 8" Stone sand and clay, trace of gravel.	
2.49		2	2.0'	2 4 5 6	Moist stiff gray clayey coarse sandy silt w/ some fine sand and grayel. (Fill) A-4(2)	
			4.0'	Т	12" RECOVERY	
	_	3	4.0'	2 6 34 12	Moist dense brown gravel and coarse sand, A-1-a trace of fine sand and silt. (Fill)	
4.98			6.0'	12	4" RECOVERY	
		4	6.0'	9 6 12 14	Wet medium dense brown fine to coarse sand w/ some silt, trace of gravel.	
7.47			8.0'	_	12" RECOVERY	
		5	8.0'	5 5 5 5	Saturated loose brown fine to coarse sand w/ A-2-4(0) some silt, trace of gravel.	
9.96			10.0'		18" RECOVERY	
		6	10.0'	4 3 3 5	Saturated loose brown fine to coarse sand, trace of silt and gravel.	
			12.0'		(ii jäjiit) Iii 1 juli Iii 1 juli	
12.45		7	12.0'	2 3 2 3	Saturated loose brown fine sand w/ some coarse sand, trace of silt and gravel.	
-		8	14.0' 14.0'	4	17" RECOVERY	
		O	14.0	4 3 3 4	Saturated loose brown fine sand w/ some silt, trace of coarse sand and gravel. A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

18.0	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
9 16.0 2						(0) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
10 18.0 24' RECOVERY 10 18.0 5 7 7 7 7 7 7 7 7 7			9		2 4		A-2-4(0)	
18.0					6 7	trace of coarse sand and gravel.		
10	17.43			40.0		24" PECOVERY		
19.92			10	18.0'	5 6	Saturated medium dense brown silty fine sand	A-2-4(0)	
11 24.0 8					10	w/ some coarse sand.		
11 24.0° 6	19.92			20.0'		24" RECOVERY		
11 24.0° 6								
11 24.0° 6								
11 24.0° 6								
24.9 AUST 2015 27.39 AUST 2015 12 29.0° 10 112 112 113 113 112 113 113 114 114 115 114 115 115 114 115 115 114 115 115	22.41							
24.9 AUST 2015 27.39 AUST 2015 12 29.0° 10 112 112 113 113 112 113 113 114 114 115 114 115 115 114 115 115 114 115 115						IIII)KALI		
27.39 AUST 2015 AUST 2015 12 29.0' 10 12 12 12 13 12 12 13 14 12 13 14 12 13 14 14 14 14 14 14 14 14 14 14 14 14 14			11	24.0'	6	Saturated medium dense brown fine sand w/	A-2-4(0)	
27.39 AU ST 2015 12 29.0° 10 23.31 trace of coarse sand and silt. 29.88 31.0° 20° RECOVERY 13 34.0° 7 11 12 13 13 13 13 13 13 13 13 13 13 13 13 13	24.9	R			13 15		112 1(0)	
27.39 12 29.0' 10 112 113						III ()R.BII)I		
12 29.0' 10 11 11 12 12 13 13 12 13 13		•		26.0'		24 RECOVERY		
12 29.0' 10 11 11 12 12 13 13 12 13 13	07.00			Λ		DIJOT OO	15	
12 29.0' 10 11 11 12 12 13 13 13 13	27.39						CI	
31.0' 31.0' 31.0' 32.37 13 34.0' 7 7 61116 12 61116								
31.0' 31.0' 31.0' 32.37 13 34.0' 7 7 61116 12 61116			12	29.0'	10	Saturated medium dense brown fine sand,	A-3	
32.37 13 34.0' 7	29.88				12 13	trace of coarse sand and silt.		
32.37 13 34.0' 7 11				24.0'		6614 360 614 340 614 340		
13 34.0' 7 Saturated medium dense brown fine sand w/ A-2-4(0) 34.86 36.0' Some coarse sand and silt. 20" RECOVERY				31.0				
34.86 13 34.0' 7	32 37					eriteri George George George		
36.0'	02.01							
36.0'						ist i siler Gerinden Gerinden		
36.0'			13	34.0'	7 7	Saturated medium dense brown fine sand w/	A-2-4(0)	
36.0'	34.86				11 12	p:e1:e3:0:1		
				36 N'		iti inititi ner ramut hen antico		
37.35				30.0		- 611) 316 20 KBCOVEKT itimizer		
	37.35					6613966 6613966 6613466 6614366		
126 17 18 10 10 10 10 10 10 10 10 10 10 10 10 10						Recovered et i dete et i dete et i dete		

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
(11.)	Flogless		Берит		HARR	
		14	39.0'	8 8 11 13	Saturated medium dense gray silty fine sand, trace of coarse sand and gravel.	
39.84				13	trace of coarse saild and graver.	
			41.0'		19" RECOVERY	
		U-1	41.0'		Saturated medium dense gray fine to coarse A-2-4(0) sand w/ some silt.	Press Sample - Shelby Tube.
42.33					Sand w/ some site.	
			43.0'		11" RECOVERY	
		15	44.0'	8 10 11 11	Saturated medium dense gray silty fine sand, A-2-4(0)	
44.82				11 11	trace of coarse sand and gravel.	
			40.01		A H DEGOVEDY	
			46.0'		24" RECOVERY	
47.31					URAFI	
47.51						
	R			_		
		16	49.0′	7	Saturated medium dense gray silty fine sand, A-2-4(0)	
49.8	•			7 9 15 25	trace of coarse sand and gravel.	
					DIJOT OO4E	
			51.0'		24" RECOVERY	
				. •		
52.29						
54.78		17	54.0'	7 9 13 15	Saturated medium dense gray silty fine sand, trace of coarse sand and gravel.	
					_	
			56.0'		24" RECOVERY	
57.27						
59.76		18	59.0'	6 10 10 9	Saturated medium dense gray silty fine sand, trace of coarse sand.	
33.70				9	uace of coarse sailu.	
			61.0'		24" RECOVERY	
	<u> </u>			I		l

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
64.74		19	64.0'	9 14 20 32	Saturated dense gray silty fine sand, trace of coarse sand and gravel. 24" RECOVERY	
67.23		20	69.0'	10 11 14 16	Saturated medium dense gray fine sand w/ A-2-4(0)	
72.21	N		71.0'	16	some silt and coarse sand. 24" RECOVERY	
74.7		21	73.0'	8 8 15 20	Saturated very stiff gray clayey fine sandy silt, trace of organic matter and coarse sand. A-4(0)	<u>IG</u>
77.19			7 <mark>5</mark> .0'		20" RECOVERY Boring terminated at 75.0 feet.	
79.68						
82.17						
84.66						

KEY TO SYMBOLS

Symbol Description

Strata symbols

Fill



Silty sand



Poorly graded sand with silt



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 1/31/2008 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.

101.0

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

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR1-06-07

Contract: 25-113-01

Boring Location: Sta. 119+17, 26' Rt. C.L.

Boring Surface Elev.: + 28.45 Reference:

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

IN. Core Bit: O.D. **Casing Size:** 3 1/4 Inches

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

Water Level Readings

Depth of Casing Time **Depth of Water** Depth of Hole Elev. of Water Date 8.5

2/12/09 10.0 12.0

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; 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
(11.7)	2/11/09	1	0.0'		Augered to 2.0'.	Asphalt - 14". Subgrade - 10".
			2.0'		0" RECOVERY	
3		2	4.0'	2 1 1 2 2	Wet soft gray silt w/ some fine sand and clay, A-4(1) trace of coarse sand and gravel. 22" RECOVERY	1G
		3	4.0' 4.5' /	2	Wet soft gray silt w/ some fine sand and clay, A-4(1)	
6		3A	4.5' 6.0'	3 2 2	trace of coarse sand and gravel. 6" RECOVERY Wet soft gray coarse to fine sandy silt w/	
		4	6.0'	2 2 3 3	some gravel, trace of clay. 13" RECOVERY A-4(0)	
			8.0'		Wet firm gray fine sandy silt w/ some coarse sand, trace of gravel. 18" RECOVERY	
9		5	8.0'	14 16 19 14	No Sample Recovery 0" RECOVERY	
		6	10.0'	4 4 3 3	Saturated loose orange fine sand w/ some silt, trace of coarse sand and gravel. A-2-4(0)	
12			12.0'		13" RECOVERY	
12		7	12.0'	4 4 3 4	Saturated loose orange fine sand w/ some silt, trace of coarse sand. A-2-4(0)	
			14.0'		17" RECOVERY	
15		8	14.0'	3 3 3 3	Saturated loose orange fine sand w/ some coarse sand, trace of silt. 17" RECOVERY	
		9	16.0' 16.0'	3 3	Coturated loose aronge fine and trace of silt A 2	
				3	Himi	

Remarks:

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

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

Depth	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Flogress		Берит	3	0.63 1380 C 0614 2866 0613 3866	and coarse sand.		
18			18.0'		(* 1739); (* 110142); (* 11142); (*) 11442); (*)	17" RECOVERY		
		10	18.0'	3 6 9 13		Saturated medium dense orange fine sand w/	A-2-4(0)	
				13		some coarse sand and silt.		
			20.0'			19" RECOVERY		
21								
					100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
					okiński Graniski Graniski			
					6114366 2114366 2114366			
24					minimer. Verrany Stringt			
		11	24.0'	10 9 11 9		Saturated medium dense brown fine sand w/	A-3	
				9	1.1111111	some coarse sand, trace of silt.		
			26.0'			19" RECOVERY		
07					66 14 13 6 6 12 13 13 6 6 12 14 13 6 6 12 14 13 13 6 6			
27								
					1811.1966. 1961.1933.0 1961.1933.66 1961.1933.0			
					663 1386 1373 1966 1373 1966			
		12	29.0'	7 6 10 13		Saturated medium dense brown fine sand,	A-3	
30		A .		10 13		trace of coarse sand and silt.		
			31.0'			20" RECOVERY		
			\				15	
						GUST 20		
33				1		5001 20		
					pairpo. Granier Granier.			
		13	34.0'	6		Saturated medium dense brown fine sand,	A-3	Mud Rotary @ 34.0'.
				6 8 9 10		trace of silt and coarse sand.	113	Mud Rotary & 54.0.
36			36.0'			19" RECOVERY		
					61143166 2417226 4417366			
39			00.01	0	15173.1167. 126173.1167 14173.1167			
		14	39.0'	8 11 11 12		Saturated medium dense light brown fine sand w/ some silt and coarse sand, trace of	A-2-4(0)	
				12		gravel.		
			41.0'			19" RECOVERY		
42								
7								
		15	44.0'	7 10 16 16		Saturated medium dense gray fine sand w/	A-2-4(0)	
45				16 16		some clay, trace of coarse sand and gravel.		

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

Depth	Daily	NI-	Sample	DI/0"		O-mala D-cariation	01 /0 1	Damada
(ft.)	Progréss	No.	Depth	Blows/6"	ununun	Sample Description	Class./G.I.	Remarks
			46.0'			24" RECOVERY		
48								
		16	49.0'	11		Saturated medium dense gray clayey fine sand	A-2-4(0)	
			10.0	11 10 18 20		w/ some coarse sand, trace of gravel.	A-2-4(0)	
				20		_		
51			51.0'			24" RECOVERY		
54								
		17	54.0'	3 6 10 18		Saturated medium dense gray clayey fine	A-2-4(0)	
				18		sand, trace of coarse sand and organic matter.		
			56.0'			23" RECOVERY		
57	R					$\cdot \bigcirc \square$		
						OR BIDI		J(j
	•	,		•				
		18	59.0'_	4 7 16		Saturated medium dense gray silty fine sand.	A-2-4(0)	
60				16 19		trace of coarse sand, organic matter, and	15	
			61.0'			gravel. 23" RECOVERY		
			01.0			23 RECOVERY		
63								
03								
		19	64.0'	5			1 2 4(0)	
		19	04.0	5 6 16 45		Saturated medium dense gray silty fine sand, trace of coarse sand and organic matter.	A-2-4(0)	
				45				
66			66.0'			24" RECOVERY		
69								
		20	69.0'	7 11 19 22		Saturated medium dense gray clayey fine	A-2-4(0)	
				22		sand, trace of coarse sand and organic matter.		
L			71.0'			24" RECOVERY		
72								
L								

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

		1			1		I	Т
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	-							
		21	74.0'	6 10 16 17		Saturated very stiff gray clayey fine sandy	A-4(0)	
75				17		silt, trace of organic matter.		
			76.0'			24" RECOVERY		
78								
		22	79.0'	6		Setunded hand and fire and wilt to a set	A 4(0)	
		22	79.0	6 9 25 37		Saturated hard gray fine sandy silt, trace of organic matter and coarse sand.	A-4(0)	
				37				
81			81.0'			22" RECOVERY		
						DDAET		
84						IJRAFI		
04	2/12/09	23	84.0'	18 35		Saturated very dense green silty fine sand,	A-2-4(0)	Glauconitic
				18 35 34 27		trace of organic matter, coarse sand, and	. ,	
			00.01			gravel.		
			86.0'			17" RECOVERY		
87				•				
			_					
						PHQT 90	115	
						<u> </u>		
		24	89.0'	7		Saturated medium dense green-gray clayey	A-2-4(0)	Glauconitic
90		24A	90.0'	12 15		fine sand, trace of organic matter, coarse \sand, and gravel.	A-7-6(21)	
			91.0'	15		12" RECOVERY	11 / 0(21)	
						Saturated very stiff gray silty clay w/ some fine sand trace of organic matter		
						fine sand, trace of organic matter. 8" RECOVERY		
93								
		25	94.0'	4		Saturated very stiff gray clay w/ some fine	A-7-6(19)	
				4 8 12 13		sand and organic matter, trace of coarse sand.	11 1-0(19)	
96			96.0'			24" RECOVERY		
99								
		26	99.0'	8 18 26 45		Saturated dense gray fine sand w/ some silt,	A-2-4(0)	
				26 45		trace of organic matter and gravel.		
			101.0'			21" RECOVERY		
			.01.0			End of Boring		
		l .	1	l .	1		l	İ

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty low plasticity clay

Silty sand



silt



Poorly graded sand with silt



Poorly graded clayey silty sand



Clayey sand



Low plasticity clay

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 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

18.0

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

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: BR1-6-08

Contract: 25-113-01

Boring Location: Sta. 116+48.6 21 RT C.L.

Boring Surface Elev.: + 35.52 Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Elev. of Water Time Depth of Hole Date 3/1/2010 10.0 8.0 7.7

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.; Dia. U-Sample Boring: U-Samples: Ft. 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
	3/1/10	1	0.0'	2 2 4 4	Moist loose brown fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	Topsoil - 2".
			2.0'		12" RECOVERY		
2.5		2	2.0'	3332	Moist loose brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
			4.0'	4	15" RECOVERY		
5		3	4.0'	4 6 7 7	No Sample Recovery		
			6.0'		0" RECOVERY		
		4	6.0'	8 9 7 6	No Sieve Analysis - Indication of moist tan medium dense silty sand.		
7.5					ERECTERE ERECTERE		
1	1		8.0'		2" RECOVERY		
		5	8.0'	1 3 3 4	Wet loose tan coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
					EFFICIENT		
10]		10.0'		16" RECOVERY		
1,,	1				HEREIGHE HEREIGH HEREIGH		
]				HEREIGHE HEREIGHE		
]				EERELEEE EERELEEE		
]				HEREERE HEREERE		
12.5]				REGERER REGERER PERFERE		
12.5	1						
		6	13.0'	1 2 4	Wet loose tan fine to coarse sand w/trace of silt and fine gravel.	A-3	

Remarks: Switch to Mud Rotary @ 18.0 feet

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

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

Depth Progress No. Semple Boowle Sample Description Class /G.1 Remarks								
15.0	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
7 18.0 3 4 Wet loose tan fine to coarse sand w/some silt, trace of fine gravel. 20 DRAFT 225 8 23.0 5						et 13 met 114 vieut 114 vieut		
18.00 3 4	15			15.0'		14" RECOVERY		
18.00 3 4						51 () () () () () () () () () (
18.00 3 4						17 (A (A)(A)(A)(A)(A)(A)(A)(A)(A)(A)(A)(A)(
18.00 3 4						PATENTAL ELITECTURE ELITECTURE		
18.00 3 4						1		
20 19° RECOVERY 19° RECOVERY 18.0°. 18	17.5					(E) 3.1867 (E) 1.3906 (E) 1.3168		
18.0. 18.0			7	18.0'	3	Wet loose tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	Mud
20 20 19° RECOVERY					4 4	, , , , , , , , , , , , , , , , , , , ,		Rotary @
Saturated medium dense brown fine sand w/some coarse sand and silt. A-2-4(0)								18.0'.
22.6	20			20.0'		19" RECOVERY		
8 23.0° 8								
8 23.0° 8								
8 23.0° 8								
8 23.0° 8								
25 25 26 27.5 27.5 27.5 27.5 27.5 27.5 27.5 27.5	22.5					IIIJKALI		
25 25 26 27.5 27.5 27.5 27.5 27.5 27.5 27.5 27.5			8	23.0'	6	Saturated medium dense brown fine sand w/some coarse sand and silt	A-2-4(0)	
25 25 26 27.5 27.5 27.5 27.5 27.5 27.5 27.5 27.5			١.		10 13	trace of fine gravel.	11 2 4(0)	
Company Comp								
Company Comp	25		V	25.0'		20" RECOVERY	J	
27.5 9 28.0' 9 10 10 12 12 14		1 -						
27.5 9 28.0' 9 10 10 12 12 14								
27.5 9 28.0' 9 10 10 12 12 14								
9 28.0' 9 28.0' 10 12 12 14					7	JUUI ZUIJ		
30 30.0° 21" RECOVERY 32.5 10 33.0° 7 31.0° 11 12 11	27.5							
30 30.0° 21" RECOVERY 32.5 10 33.0° 7 31.0° 11 12 11			9	28.0'	9	Saturated medium dense brown fine sand w/some coarse sand and silt	A-2-4(0)	
30 30.0' 21" RECOVERY 10 33.0' 7 11 12 13 14 14 15 15 15 15 15 15 15 15 15 15 15 15 15					10 12 14	Saturated inectain dense brown the sand w/some coarse sand and sin.	11 2 4(0)	
32.5 10 33.0' 7 8 111 12 1313								
32.5 10 33.0' 7 8 111 12 1313	30			30.0'		21" RECOVERY		
10 33.0' 7 8 113.55 Saturated medium dense brown fine sand w/some coarse sand, trace of silt. 35 35.0' 17" RECOVERY		1						
10 33.0' 7 8 113.55 Saturated medium dense brown fine sand w/some coarse sand, trace of silt. 35 35.0' 17" RECOVERY								
10 33.0' 7 8 113.55 Saturated medium dense brown fine sand w/some coarse sand, trace of silt. 35 35.0' 17" RECOVERY								
10 33.0' 7 8 113.55 Saturated medium dense brown fine sand w/some coarse sand, trace of silt. 35 35.0' 17" RECOVERY								
35 35.0' SILVERY SILVE	32.5							
35 35.0' SILVERY SILVE			10	33.0'	7	Saturated medium dense brown fine sand w/some coarse sand trace of	Δ_3	-
35 35.0' SILVERY SILVE					8 11 12		Λ-3	
						######################################		
	35			35.0'		initial initial initial 17" RECOVERY		
37.5]		1		teld files Recorded Recorded		
37.5						REES ARCE. FEET FAIRE FEET ARCE.		
37.5 Rijist						rayyrat stijists stijists		
37.5						th 1 1907 Sin 1 1165 Sin 1 1165 Sin 1 1165		
	37.5					strateri strateri		

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(11.)	1 1091633				1:619 1:66 1:619 1:66 664 14:66			
		11	38.0'	10 10 13 14		Saturated medium dense brown fine sand w/some silt and coarse sand.	A-2-4(0)	
				14				
			40.01			ACM PERCONTENT		
40			40.0'			18" RECOVERY		
42.5								
		12	43.0'	5 8 11 12		Saturated medium dense brown fine sand w/some coarse sand, trace of	A-3	
				11 12		silt.		
45			45.0'		61 14 15 6 . 61 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	16" RECOVERY		
						DDAET		
					156193566 166193566 166193566	DRAFT		
					6611166 6611166 6611166			
47.5					onivia. Collina			
		13	48.0'	7 8		Saturated medium dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
	•			8 7 10	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
50			50.0'			GUS 21" RECOVERY 15		
				76		JUJ1 ZU1J		
					6013.186 80177.88 90117.886			
					611 1566 611 1466 511 1455			
52.5					riiviii. Gellinii Gilinii			
		14	53.0'	8 10		Saturated very stiff brown clayey fine snady silt w/trace of coarse sand.	A-4(0)	
				8 10 10 14				
55			55.0'			24" RECOVERY		
57.5								
		15	58.0'	16		Saturated dense brown silty fine sand w/some clay, trace of coarse sand.	A-2-4(0)	
				16 16 22 26		same same same same same same same same		
60			60.0'			22" RECOVERY		

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5	1						
	-	16	63.0'	8 10 12 13	Saturated very stiff gray clayey fine sandy silt w/trace of coarse sand.	A-4(0)	
				12 13			
65	_		65.0'		23" RECOVERY		
	-						
07.5							
67.5	-			_			
	_	17	68.0'	5 10 12 20	Saturated medium dense gray clayey fine sand w/trace of coarse sand and silt.	A-2-4(0)	
	-				DPAFT		
70			70.0'		23" RECOVERY		
	-						
		M			FOR BIDDING	<u> </u>	
72.5] "			•			
		18	73.0'	9 10 16 21	Saturated very stiff gray fine sandy silt w/some clay, trace of coarse sand	A-4(0)	
	-		<i>F</i>	21	and fine gravel.		
75			75.0'		24" RECOVERY		
	=						
77.5	_						
77.5	<u> </u>	19	78.0'	٥		4.4(0)	
		19	76.0	9 14 17 17	Saturated hard gray clayey fine sandy silt w/trace of coarse sand.	A-4(0)	
	1						
80			80.0'		22" RECOVERY End of Boring		
	-						
82.5]						
	_						

KEY TO SYMBOLS

Symbol Description

Strata symbols

Poorly graded sand with silt

10:10:10:10:10 10:10:10:10:10 10:10:10:10:10 Well graded sand with silt

10 10 10 10 10 10 10 10 10 10 10 10

Silty sand



Clayey sand



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

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

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: BR1-6-09

Contract: 25-113-01

Boring Location: Sta. 116+48.12 21 LT C.L.

Boring Surface Elev.: + 48.75 Reference:

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

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 38.0

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 2/24/2010 27.9 30.0 28.0

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth	Daily		Sample				
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/24/10	1	0.5'	4 9 8	Moist stiff brown fine gravelly clay w/some coarse sand and silt, t fine sand.	race of A-6(2)	Topsoil - 6".
			2.0'		6" RECOVERY		
2.5		2	2.0'	7 9 6 6	Moist medium dense brown clayey coarse sandy fine gravel w/sor sand and silt.	ne fine A-2-4(0)	
		3	4.0' 4.0'	3	15" RECOVERY	and fine A-1-b	
5		7	6.0	3 5 7 8	Moist medium dense brown fine gravelly coarse sand w/some silt sand. 16" RECOVERY		
7.5		4	6.0'	7 8 6 5	Moist medium dense brown coarse sandy fine gravel w/some fine and silt.	sand A-1-b	
		5	8.0' 8.0'	4	16" RECOVERY	aval A 2 4(0)	
		ა	0.0	4 3 4 4	Moist loose brown fine to coarse sand w/some silt, trace of fine gr	avel. A-2-4(0)	
10			10.0'		8" RECOVERY		
12.5							
		6	13.0'	11 14 18 21	Moist dense brown fine gravel w/some coarse to fine sand and silt	. A-1-a	

Remarks: Switch to Mud Rotary @ 38.0 feet

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15			15.0'		10" RECOVERY		
17.5							
		7	18.0'	4 6 6 8	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
				8			
20			20.0'		い記し 16" RECOVERY		
					19386 19386 19387		
					11 11 11 11 11 11 11 11 11 11 11 11 11		
22.5							
		8	23.0'	4 8 7 6	Moist medium dense orange fine gravelly coarse to fine sand w/trace of silt.	A-1-b	
				6	14 (18) 14 (18) 14 (18)		
25		\bigcup	25.0'		17" RECOVERY		
		V					
					GUST 2015		
27.5							
		9	28.0'	1 3 4 6	Wet loose tan coarse sand w/some fine sand, trace of fine gravel and silt.	A-1-b	
				6			
30			30.0'		20" RECOVERY		
32.5							
		10	33.0'	3 6 11 11	Wet medium dense tan fine to coarse sand w/trace of silt and fine gravel.	A-3	
				11	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
35			35.0'		6" RECOVERY		
					13 1051 7 3 6 6 7 1		
					7 1 2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5		
					iisied 184561 18360		
37.5					17725 1326 1326 1436 1436		

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

	D=:L.		01-				Τ	1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		11	38.0'	8 10 9 7		Wet medium dense brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	Mud Rotary @ 38.0'.
40			40.0'			15" RECOVERY		
42.5								
		12	43.0'	11 13 12 15		Wet medium dense brown fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
				15	1361 Y 1361 411 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	inie graver.		
45			45.0'			18" RECOVERY		
					2011/2020 2011/2020 2011/2020 2011/2020	DDAET		
						DRAFT		
47.5	_				6619366 2017200 6641206 664206 664206 664406			
	3/1/10	13	48.0'	8 13 15	2011 C	Wet medium dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
		V		17	+ (
50			50.0'			16" RECOVERY		
				41		GUST 2015		
	-				 1111366 1211366 1211366	00012010		
52.5					10 12 12 12 1 12 1 1 1 1 1 1 1 1 1 1 1 1 1			
		14	53.0'	9		Wet medium dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
				9 10 15 20		Wet mediani dense brown tine sand wisonic course sand and sin.	112 1(0)	
			FF 0'		661 (966) 118 14 1186 166 (966) 166 (966)	15" RECOVERY		
55			55.0'		(1) 13:66 14:166 14:166 14:166	13 RECOVER1		
					######################################			
					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
57.5					6614366 Januara 641366 Mijanea Mijanea			
		15	58.0'	7 10 17		Wet medium dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
				17 15				
60			60.0'			15" RECOVERY		
	l						<u> </u>	

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

Depth	Daily	ı	Sample				
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5							
		16	63.0'	9 10 13 14	Wet medium dense brown fine sand w/some coarse sand, trace of silt.	A-3	
65			65.0'		14" RECOVERY		
					10.1651 11/1655 11/1656 11/1656 11/1656 11/1656		
					11/300 14/366 11/366 11/366 14/366 14/366		
67.5	<u> </u> 				11966 11966 11966 11367 11387		
		17	68.0'	9 12 14 13	Wet medium dense brown fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
70			70.0'		16" RECOVERY		
				\top	FOR BIDDING		
72.5		10	72.01	13			
		18	73.0'	13 17 20 30	wet dense brown silty fine sand w/trace of coarse sand and silt.	A-2-4(0)	
75			75.0'	76	24" RECOVERY		
77.5							
		19	78.0'	7 14 17 17	Wet dense gray silty fine sand w/trace of fine gravel and organic matter.	A-2-4(0)	
00			00.01		All DECOVEDY		
80			80.0'		24" RECOVERY		
82.5							
		20	83.0'	7 10 13 21	Wet medium dense gray silty fine sand w/trace of coarse sand and organic matter.	A-2-4(0)	
85			85.0'		24" RECOVERY		
	1		33.0		2: 12001211		

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
87.5		21	88.0'	4 8 13 19	Wet medium dense gray silty fine sand w/trace of coarse sand, fine gravel and organic matter.	A-2-4(0)	
90			90.0'		End of Boring		
92.5	-						
92.5							
					DRAFT		
95							
		M			FOR BIDDING		
		N					
97.5				Δ	JGUST 2015		
				76	70001 Z013		
100							
102.5							
							1
							1
105							
100							1
							1
107.5							1
							1
<u> </u>	-						1

KEY TO SYMBOLS

Symbol Description

Strata symbols

Clayey sand



Silty sand



Poorly graded sand with silt



Well graded sand



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 2/24/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

18.0

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

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-06-10

Contract: 25-113-01

Boring Location: Sta. 913+20 20' Lt C.L.

Boring Surface Elev.: + 45.0 Reference:

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

Core Bit: O.D. IN.

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

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 17.5 7/8/10 18.0 18.0

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: Dia. U-Sample Boring: U-Samples: 100.0 Ft.; Ft. 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
	7/8/10	1	0.5' 2.0'	15 13 9		Moist very stiff brown silt w/some fine to coarse sand, fine gravel and clay. 15" RECOVERY	A-4(0)	Topsoil - 4".
_	_	2	2.0'	6 5 6		No Sample Recovery		Gravel blocking spoon.
3			4.0	4		0" RECOVERY		JG
		3	4.0'	4 5 5 5		Moist loose brown clayey coarse to fine sand w/some fine gravel, trace silt.	A-2-4(0)	
6			6.0'	_		17" RECOVERY	15	
		4	6.0'	5 6 8 5		Moist medium dense brown coarse sandy fine gravel w/some fine sand and silt.	A-1-b	
			8.0'	6		15" RECOVERY		
9		5	8.0'	6 7 7 6		Moist medium dense brown fine gravelly coarse sand w/some fine sand and silt.	A-1-b	
			10.0'		11111111111111111111111111111111111111	10" RECOVERY		
		6	10.0'	4 5 5 5		Moist loose orange coarse to fine sand w/ some silt, trace fine gravel.	A-1-b	
12			12.0'			21" RECOVERY		
		7	12.0'	5 6 4 5		Moist loose orange coarse sand w/some fine sand, fine gravel and silt.	A-1-b	
			14.0'	5	100 13 1100 f. 100 13 13 11 10 100 13 13 13 15 15	17" RECOVERY		
15		8	14.0'	5 5 7 6		Moist medium dense orange coarse sand w/ some fine sand and fine gravel, trace silt.	A-1-b	
			16.0'	-	100 13 11 0 f 100 1 7 3 2 0 0 10 1 1 1 1 1 1 1 1	17" RECOVERY		
		9	16.0'	5 7 5 5		Wet medium dense tan coarse sand w/some fine sand, trace silt and fine gravel.	A-1-b	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
18			18.0'			16" RECOVERY		
		10	18.0'	4 5 6 6		Wet medium dense tan fine to coarse sand w/ some fine gravel, trace silt. 18" RECOVERY	A-1-b	Mud Rotary @ 18.0'
21								
24		11	23.0'	4 5 6 5		'1' 1 C' 1	A-1-b	
			25.0'			16" RECOVERY		
27						DRAFI		
		12	28.0'	5 5 5		Wet loose brown fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
30			30.0'		-	L5" RECOVERY		IG
33		13	33.0'			GUST 20	15	
		13	33.0	6 8 10 13	100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	sand w/some coarse sand and silt.	A-2-4(0)	
36			35.0'			20" RECOVERY		
39		14	38.0'	8 10 7 7		Saturated medium dense reddish brown fine sand w/some coarse sand and silt, trace fine gravel. 17" RECOVERY	A-2-4(0)	
42								
		15	43.0'	6 6 7 8	1031.1161. 1013.1161 1013.1161 1013.1161 1031.1161.		A-3	
45			45.0'			19" RECOVERY		

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48					17.000 17.000 17.000 17.000 17.000 17.000 17.000 17.000 17.000 17.000 17.000 17.000 17.000 17.000 17.000 17.000 17.000 17.000		
40		16	48.0'	7 9 10 13	Saturated medium dense brown fine some coarse sand, trace silt.	sand w/ A-3	
51			50.0'		18" RECOVERY		
54		17	53.0'	5 7 9 10	Saturated medium dense brown fine some silt and coarse sand.	sand w/ A-2-4(0)	
57			55.0'		BRAFI		
57		18	58.0'	6 7 7 7	Saturated medium dense brown fine some coarse sand, trace silt and fine g		1G
60			60.0'	ΙU	20" RECOVERY	2015	
63		19	63.0'	11 8 11 12	Saturated medium dense tan fine sand silt, trace coarse sand, fine gravel and 21" RECOVERY		
66			33.0		21 RECOVERT		
69		20	68.0' 70.0'	5 6 10 12	Saturated medium dense gray silty fir w/trace coarse sand. 24" RECOVERY	ne sand A-2-4(0)	
72							
		21	73.0'	6 8 12	Saturated very stiff gray fine sandy si trace coarse sand and clay.	lt w/ A-4(0)	

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			75.01	19			
75			75.0'		22" RECOVERY		
78							
		22	78.0'	6 7 9 11	Saturated medium dense gray silty fine sand	A-2-4(0)	
				11	w/trace coarse sand.		
			80.0'		24" RECOVERY		
81							
		23	83.0'	8 8 9 13	Saturated very stiff gray fine sandy silt w/	A-4(0)	
84				9 13	trace coarse sand, fine gravel and clay.		
			85.0'		22" RECOVERY		
	I.						
87					FOR BIDI) \	
01		`					
		24	88.0	10 11	Saturated medium dense gray silty fine sand	A-2-4(0)	
				13 14	w/trace coarse sand.	15	
90			90.0'	10	24" RECOVERY	10	
93		25	93.0'	5	Saturated very stiff greenish gray fine sandy	A-4(0)	
			00.0	5 8 10 10	silt w/trace fine gravel, coarse sand and clay.	A-4(0)	
			95.0'		20" RECOVERY		
			30.0		29 1123 1211		
96							
99		26	98.0'	7 13 16 24	Saturated medium dense green silty fine sand w/some organic matter, trace fine gravel and	A-2-4(0)	
			400.5	24	coarse sand.		
			100.0'		End of Boring		
102							

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



Poorly graded sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on July 8, 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.

F.A. Project: US 301 Preferred Alternative Contract 1A Boring No.: BR1-07-01

Contract: 25-113-01

Boring Location: Sta. 668+62.39, 46' Rt. C.L.

Boring Surface Elev.: + 27.07 Reference:

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

U-Sampler: Ball Sampler Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4" **Casing Size:** Inches Hollow Stem Auger: 0.0' 56.0'

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 1/28/2008 12.0' 9.3 14.0

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: Dia. U-Sample Boring: U-Samples: 91.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation **Driller:** Dan Taylor

Helpers: Tom Kane

Б и	Б. 11	1	0 1					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
()		1	0.0'	2		Moist brown loose silty coarse to fine sand w/	A-2-4(0)	FILL
				2 3 3 4		trace of gravel.	(*)	
			2.0'			13" RECOVERY		
		2	2.0'	3 3 4		Wet loose brown coarse sand w/some fine	A-2-4(0)	FILL
3				3 4		sand, gravel and clay.		
		V					<i></i>	
-	_	3	4.0' 4.0'	3		14" RECOVERY	1 1(0)	TWI
		٥	4.0	3 3 4		Wet firm brown coarse sandy silt w/some fine	A-4(0)	FILL
-			Λ	4		sand and gravel, trace of clay.		
6			6.0'			10" RECOVERY		
6		4	6.0'	3		Wet very loose brown silty coarse to fine sand	A-1-b	FILL
				3 2 2 2		w/some gravel.	71 1 0	
				2		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
			8.0'			14" RECOVERY		
		5	8.0'	2 W/H		Saturated soft gray clay w/some fine sand,	A-7-6(22)	FILL
9				W/H W/H		trace of coarse sand.		
			10.0'			3" RECOVERY		
		6	10.0'	1 1 2		Saturated soft gray silt w/some clay and	A-4(5)	FILL
				2		organic matter, trace of fine to coarse sand		
l		6A	11.5' 11.5'	4		and gravel. 12" RECOVERY		
12		7	12.0'		עואוא	¬ No Sieve Analysis ¬	A-1-b	
		'	12.0'	7 20 19		6" RECOVERY	A-1-0	
				13		Saturated dense brown coarse sandy gravel w/ some fine sand, trace of silt.		
			14.0'			11" RECOVERY		
		8	14.0'	1		Saturated loose brown silty fine sand w/some	A-2-4(0)	
15				1 2 4 4		coarse sand, trace of gravel.	-1 (0)	
				-		, ,		
			16.0'			20" RECOVERY		
		9	16.0'	2 2		Saturated loose brown fine to coarse sand w/	A-3	
1	I	I	1	4	[99979997			

Remarks: Mud Rotary starting @ 56.0'

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

Donth	Daile	1	Comple		1			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
				8		trace of silt and gravel.		
18			18.0'			15" RECOVERY		
		10	18.0'	3 7 7 8		Saturated medium dense brown fine sand w/	A-3	
				7 8	10.6143166 10.6171161 10.61131166 10.6131166	some coarse sand, trace of silt.		
			20.0'		eri i ancu Biri i ancu Biri i ancu	15" RECOVERY		
			20.0		erijaer Eriaaier Periaer	13 RECOVERT		
21					(11 14 16 6 12 14 16 16 16 4 16 17 17 18 16			
					1:0 33.1:01. 1:0 1 43.0 6 1:0 1 3 3:0 0			
					66133366 6634366			
24		11	23.5'	4 7 8	######################################	Saturated medium dense brown fine sand w/	A-3	
				9	116 13 116 6 116 1 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	some coarse sand, trace of silt and gravel.		
			25.5'		0:63 13:00 0:613 2:06 0:613 2:06	19" RECOVERY		
					10.01 4 30.00 63.14-30.66 80.1130.00 80.1130.00 80.113.106			
27					66 13 13 10 C 66 13 13 66 70 6 1 73 70 C	UNALI		
L					(66143)66 (64133)66 (64133)66			
	_			_	150 33.1 00 150 33.1 00 150 34 34 64			
		12	28.5'	5 6 9	. 14101 1 14101 1 14101	Saturated medium dense brown fine sand w/	A-3	
30	l '	M		9		some coarse sand, trace of silt.		
30	•		30.5'	•):	18" RECOVERY		
			_					
					1177	PLICT ON	115	
					eninec Elinei	GUST 20		
33					06143 <u>06</u> 0617300 6613306			
			65 =:		etikiei Hillet			
		13	33.5'			(C	A-3	
				8 12		trace of coarse saily and silt.		
			35.5'			19" RECOVERY		
36								
					60 173 % C 16 1 4 2 4 6 16 1 4 7 1 6 1			
					12			
					196143166 196143166 196143166			
		L	20.51	2	et iniet. Nei iniet Hillet			
39		14	38.5'	2 5 6 7	(2011.1.0) 1-61 (4:64 (2012.1.0)	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
				7		some coarse sand, trace of sitt.		
			40.5'		(: 6) () (: 6) (: 6) () () (: 6) (: 6) () () (: 6)	18" RECOVERY		
40					10 1 1 7 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
42					12			
					166143166 1781717171 188133186			
			46.7		1:033.1:01 1:01 /3:00 1:11 /3:00			
		15	43.5'	5 8 8		Saturated medium dense brownish gray fine	A-2-4(0)	
45				12		sand w/some silt and coarse sand, trace of gravel.		
45						D		

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

16	Dareth	Daile:		Com-1-		ı			Γ
18	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
Saturated medium dense gray sitly fine sand w/some coarse sand, trace of gravel and organic matter. 24° RECOVERY A-2-4(0)		-					20" RECOVERY		
Saturated medium dense gray sitly fine sand w/some coarse sand, trace of gravel and organic matter. 24° RECOVERY A-2-4(0)									
Saturated medium dense gray sitly fine sand w/some coarse sand, trace of gravel and organic matter. 24° RECOVERY A-2-4(0)									
Saturated medium dense gray sitly fine sand w/some coarse sand, trace of gravel and organic matter. 24° RECOVERY A-2-4(0)									
Saturated very stiff gray fine sandy silt w/ trace of coarse sand, gravel and organic matter. Saturated very stiff gray fine sandy silt w/ trace of coarse sand, gravel and organic matter. Saturated very stiff gray fine sandy silt w/ trace of coarse sand, gravel and organic matter. A-2-4(0)	48								
Saturated very stiff gray fine sandy silt w/ trace of coarse sand, gravel and organic matter. Saturated very stiff gray fine sandy silt w/ trace of coarse sand, gravel and organic matter. Saturated very stiff gray fine sandy silt w/ trace of coarse sand, gravel and organic matter. A-2-4(0)									
Saturated very stiff gray fine sandy silt w/ trace of coarse sand, gravel and organic matter. Saturated very stiff gray fine sandy silt w/ trace of coarse sand, gravel and organic matter. Saturated very stiff gray fine sandy silt w/ trace of coarse sand, gravel and organic matter. A-2-4(0)			16	49.0'	3		Saturated medium dense gray silty fine sand	A-2-4(0)	
Saturated very stiff gray fine sandy silt w/ trace of coarse sand, gravel and organic matter. Saturated very stiff gray fine sandy silt w/ trace of coarse sand, gravel and organic matter. Saturated very stiff gray fine sandy silt w/ trace of coarse sand, gravel and organic matter. A-2-4(0)					8 10		w/some coarse sand, trace of gravel and	(-)	
Saturated very stiff gray line sandy silew/ 17							III -		
17 54.0 9	51			51.0'			24" RECOVERY		
17 54.0 9									
17 54.0 9									
17 54.0 9									
17 54.0 9	E4								
Saturated loose gray silty fine sand w/some A-2-4(0)	1 34		17	54.0'	6 7		Saturated very stiff gray fine sandy silt w/	A-4(0)	
56.0' 25' RECOVERY 57					10 11		trace of coarse sand, gravel and organic		
18 59.0° 3 Saturated loose gray silty fine sand w/some A-2-4(0)				50.01					
18 59.0° 3				56.0			23" RECOVERY		
18 59.0° 3	57								
18 59.0° 3									1/2
18 59.0° 3			V				IUN DIDI		
60 61.0' 22" RECOVERY 19 64.0'		_			_				
63 19 64.0' 7 8 8 8 8 8 8 8 8 8			18	59.0'	3 4			A-2-4(0)	
63 19 64.0' 4 7 9 15 Saturated dense gray fine sand w/some clay, trace of coarse sand and organic matter. 20" RECOVERY 20" RECOVERY Saturated medium dense silty fine sand w/ trace of coarse sand, gravel and organic matter. 22" RECOVERY	60				5 6		coarse sand, trace of organic matter.	115	
63 19 64.0' 4 7 9 15 Saturated dense gray fine sand w/some clay, trace of coarse sand and organic matter. 20" RECOVERY 20" RECOVERY Saturated medium dense silty fine sand w/ trace of coarse sand, gravel and organic matter. 22" RECOVERY				61.01			D COURTS A		
Saturated dense gray fine sand w/some clay, trace of coarse sand and organic matter. 66 66.0' 20" RECOVERY Saturated medium dense silty fine sand w/ trace of coarse sand, gravel and organic matter. 71.0' 22" RECOVERY				04.0			22 RECOVERT		
Saturated dense gray fine sand w/some clay, trace of coarse sand and organic matter. 66 66.0' 20" RECOVERY Saturated medium dense silty fine sand w/ trace of coarse sand, gravel and organic matter. 71.0' 22" RECOVERY									
Saturated dense gray fine sand w/some clay, trace of coarse sand and organic matter. 66 66.0' 20" RECOVERY Saturated medium dense silty fine sand w/ trace of coarse sand, gravel and organic matter. 71.0' 22" RECOVERY									
66 66.0' 20" RECOVERY 69 20 69.0' 5 7 7 9 15 Saturated medium dense silty fine sand w/ trace of coarse sand, gravel and organic matter. 22" RECOVERY A-2-4(0)	63								
66 66.0' 20" RECOVERY 69 20 69.0' 5 7 7 9 15 Saturated medium dense silty fine sand w/ trace of coarse sand, gravel and organic matter. 22" RECOVERY A-2-4(0) 15 15 16 16 16 16 16 16									
66 66.0' 20" RECOVERY 69 20 69.0' 5 7 7 9 15 Saturated medium dense silty fine sand w/ trace of coarse sand, gravel and organic matter. 22" RECOVERY A-2-4(0) 15 15 16 16 16 16 16 16			19	64.0'	7			A-2-4(0)	
69 20 69.0' 5/7 Saturated medium dense silty fine sand w/ trace of coarse sand, gravel and organic matter. 71.0' 22" RECOVERY					15		trace of coarse sand and organic matter.		
69 20 69.0' 57	66			66.0'			20" RECOVERY		
20 69.0' 57 9							<u>-</u>		
20 69.0' 57 9									
20 69.0' 57 9									
20 69.0' 57 9									
71.0' matter.	69								
71.0' matter.			20	69.0'	5 7 9			A-2-4(0)	
71.0' 22" RECOVERY					15				
72				71.0'					
	72								

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

	1	1	T -	1	,		
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
` ′	<u> </u>						
75		21	74.0'	6 9 11 12	Saturated medium dense gray fine sand w/ some clay, trace of coarse sand, gravel and organic matter. 22" RECOVERY	A-2-4(0)	
78							
		22	79.0'	5 9 11 13	Saturated very stiff grayish green silt w/some clay, trace of coarse sand, gravel and organic matter.	A-4(0)	
81			81.0'		24" RECOVERY DRAFT		
	N	23	84.0'	7 13 20 37	Saturated dense grayish green silty fine sand w/trace of coarse sand and organic matter. 24" RECOVERY	A-2-4(0)	JG
87			<u>Δ</u>		GUST 20) III 15	
90		24	89.0' 91.0'	9 10 11 13	Saturated medium dense green silty fine sand w/trace of coarse sand, gravel and organic matter. 24" RECOVERY	A-2-4(0)	
					Boring Terminated at 91 feet		
93							
96							
99							

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand



Clayey sand



Low plasticity clay



Silty low plasticity clay



Poorly graded sand



Poorly graded sand with silt



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 1/28/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
- 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.

39.0'

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

Boring No.: BR1-07-02 F.A. Project: US 301 Preferred Alternative Contract 1A

Contract: 25-113-01

Boring Location: Sta. 670+44.23, 37' Lt. C.L.

Boring Surface Elev.: + 33.0' Reference:

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

Core Bit: O.D. **Casing Size:**

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

Water Level Readings

Depth of Water Time **Depth of Casing** Depth of Hole Elev. of Water Date 2/6/2008 10.0' 12.0 6.8

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

Boring Contractor: Walton Corperation Driller: William Sharp

Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
		1	0.0'	2 3 3 3	No Sieve Analysis
			2.0'		2" RECOVERY
3		2	4.0'	4 6 7 7	F No Sieve Analysis 2" RECOVERY
		3	4.0'	3 3 2 3	Wet loose brown fine to coarse sand w/some A-2-4(0)
6			6.0'		silt, trace of gravel.
		4	6.0'	3 3 2 2	Wet loose brown fine to coarse sand w/trace A-3 of silt and gravel.
			8.0'		(5) 1) 15 (5) (5) (5) (5) (5) (5) (5) (5) (5) (5
9		5	8.0'	1 1 1 2	Wet very loose brown fine to coarse sand w/ Some silt. 18" RECOVERY
		6	10.0'	2 2 2 3	Wet very loose brown coarse to fine sand w/ A-1-b trace of silt and gravel.
12			12.0'		20" RECOVERY
		7	12.0'	2 2 2 3	Wet very loose brown coarse to fine sand w/ A-1-b trace of silt and gravel.
			14.0'		HIANG HIANG
15		8	14.0'	2 3 3 3	Saturated loose brown coarse to fine sand w/ trace of gravel and silt. 12" RECOVERY
		9	16.0'	4 5 5	Saturated loose brown coarse to fine sand w/ A-1-b
		I			

Remarks: Mur Rotary starting @ 39.0'

Reviewed By:	Soils Supervisor:

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
				4		some gravel, trace of silt.		
18			18.0'			22" RECOVERY		
		10	18.0'	3 5 4 4		Saturated loose brown fine to coarse sand w/	A-3	
	-			4		trace of silt and gravel.		
			20.0'			20" RECOVERY		
21								
	-				166143166 1761717617 1761717617			
					188 13.1161. 1261 7420 0 1661 43166			
					errier. Erriier			
24		11	24.0'	5		Saturated medium dense brown silty fine sand	A-2-4(0)	
				5 6 7 8		w/some coarse sand, trace of gravel.	112 .(0)	
	-		26.0'		-	20" RECOVERY		
27						\square		
	1							
		12	29.0'	6		Saturated medium dense brown fine sand w/	A-3	
30		V '		6 8 7 8		some gravel, trace of coarse sand and silt.		
					(2014) (2014) (2014)			
	-		31.0' 31.0'	4		18" RECOVERY		pH sample only.
				4 5 7 12		2119171	115	
]							
33	_		33.0'		100 1 7 3 10 C 100 1 3 3 6 C 100 1 7 7 1 C C	22" RECOVERY		
					erander Erakter Nei faker			
	-	13	34.0'	4 6		Saturated medium dense brown fine sand w/	A-3	
	_			6 8 8	11111111111111111111111111111111111111	some coarse sand, trace of silt and gravel.		
			36.0'		(31443) (4144) (4144)	22" RECOVERY		
36	-		36.0			22 RECOVERY		
					115 14 11 6 f. 115 14 11 6 f. 115 14 11 6 f			
	-							
39								
]	14	39.0'	4 7 9 11		Saturated medium dense brown fine sand w/	A-3	
<u> </u>	-			11		some coarse sand, trace of silt.		
			41.0'			24" RECOVERY		
	1		17.0			2. RECOVERT		
42								
		15	44.0'	8 10 13 14		Saturated medium dense brown fine sand w/	A-2-4(0)	
45				13 14		some silt and coarse sand, trace of gravel.		

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(10.)	1 10g1000		46.0'			22" RECOVERY		
			40.0			22 RECOVERT		
48								
		16	49.0'	7 9		Saturated medium dense grayish green silty	A-2-4(0)	
				11 11		fine sand w/trace of coarse sand and gravel.	11 2 1(0)	
51			51.0'			24" RECOVERY		
54								
34		17	54.0'	5 9 12 14		Saturated medium dense grayish green silty fine sand w/some coarse sand.	A-2-4(0)	
				14		LJKALI		
			56.0'			18" RECOVERY		
57	N	1		Т				
		V				FOR BIDI	יווע	
		18	59.0'_	W/R		Saturated loose gray silty fine sand w/trace of		
60				4 3 5		coarse sand.	7-2-4(0)	
			61.0'	10		17" RECOVERY		
63		U-1	62.0'			No Sample Recovery - Tube only pushed 14".		Press Sample - Shelby Tube.
- 55			64.0'			0" RECOVERY		
		19	64.0'	3 3 8 17		Saturated medium dense gray silty fine sand	A-2-4(0)	
				17		w/trace of coarse sand and gravel.		
66			66.0'			20" RECOVERY		
69		20	69.0'	4	ggan.	C.	A 4/0\	
		20	09.0	4 5 8 10		Saturated stiff gray fine sandy silt w/some clay, trace of coarse sand.	A-4(0)	
			71.0'			24" RECOVERY		
72								
_								

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
, , ,			-1					
		21	74.0'	8 9		Saturated very stiff gray fine sandy silt w/	A-4(0)	
75				12 19		trace of coarse sand, gravel and organic		
			76.0'			matter. 24" RECOVERY		
			70.0		1	24 RECOVERT		
78								
		22	79.0'	10 11 15 19		Saturated medium dense gray fine sand w/	A-2-4(0)	
				19		some clay, trace of coarse sand, gravel, organic matter and sea shells.		
81			81.0'			24" RECOVERY		
			0.110					
84								
		23	84.0'	6 9 12		Saturated medium dense gray silty fine sand	A-2-4(0)	
				17		w/trace of coarse sand, gravel, organic matter and sea shells.		
			86.0'			24" RECOVERY		11 (2
87								
						21191 20	14	
		0.1	20.01	12				
00		24	89.0'	12 21 34 50/4"		Saturated very dense green silty fine sand w/ trace of coarse sand, organic matter and sea	A-2-4(0)	
90				50/4"		shells.		
			91.0'			20" RECOVERY		
93								
		25	94.0'	7		Saturated madium dance are weither fine cond	A 2 4(0)	
			34.0	7 11 17 25		Saturated medium dense gray silty fine sand w/trace of coarse sand and organic matter.	A-2-4(0)	
				25				
96			96.0'			24" RECOVERY		
99		26	99.0'	7		Saturated very stiff gray clay w/some fine	A-6(13)	
				7 11 17 22		sand and organic matter, trace of sea shells.	11 0(13)	
						_		
			101.0'		<i>[]]]]</i>	24" RECOVERY		
						Boring Terminated at 101 feet.		

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand

1.03.000

Poorly graded sand with silt

Well graded sand with silt

Poorly graded sand



Poorly graded clayey silty sand



Low plasticity clay

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 1/28/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
- 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.

51.0'

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

F.A. Project: US 301 Preferred Alternative Contract 1A **Boring No.:** BR1-07-03

Contract: 25-113-01

Boring Location: Sta. 667+53.23, 30' Rt. C.L.

Boring Surface Elev.: + 29.60 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Wt. of Sample Hammer: IN. Lbs. 30 IN. Type of: Split-Barrel O.D. 2

Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: D-Sampler: S-Sampler: U-Sampler: IN. IN. O.D. 3 Ball Sampler Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4" **Casing Size:** Inches

Hollow Stem Auger: 0.0'

Water Level Readings

Depth of Water Depth of Casing Time **Depth of Hole** Elev. of Water Date 2/25/2008 16.0' 14.0' 18.0

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: Dia. U-Sample Boring: U-Samples: 100.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation Driller: Jason Truver

Helpers: Tom Kane

Depth	Daily		Sample				Ι
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 4	Saturated firm brown silt w/trace of fine to	A-4(1)	
				4 4 4	coarse sand, gravel and clay.		
		2	2.0'	2	16" RECOVERY	1.4(0)	
	R		2.0	2 3 4 5	Saturated firm gray silt w/trace of fine to coarse sand.	A-4(0)	
3				5	coarse sand.		
		A .	4.0'		18" RECOVERY		
		3	4.0'	3 4 5	Saturated loose gray gravel w/trace of coarse	A-1-a	
			_	5 14	to fine sand and silt.	4	
						16	
6			6.0'		6" RECOVERY		
		4	6.0'	9	Saturated medium dense brown fine to coarse	A-2-4(0)	
				11 5	sand w/some silt, trace of gravel.		
			8.0'		16" RECOVERY		
		5	8.0'	3	Saturated medium dense brown fine to coarse	A-2-4(0)	
9				3 5 8 8	sand w/some silt, trace of gravel.	11 2 1(0)	
				0	8		
			10.0'		19" RECOVERY		
		6	10.0'	6 8 11 11	Saturated medium dense brown fine sand w/	A-2-4(0)	
				11 11	some silt and coarse sand, trace of gravel.		
12		7	12.0' 12.0'	4	14" RECOVERY	1.2.4(0)	
		′	12.0	4 7 7 9	Saturated medium dense brown fine sand w/	A-2-4(0)	
				9	some silt and coarse sand.		
			14.0'		15" RECOVERY		
		8	14.0'	W/R	Saturated loose brown fine sand w/some silt	A-2-4(0)	
15				W/R 3 5 8	and coarse sand.	'(*)	
			16.0'		15" RECOVERY		
		9	16.0'	5 10 11	Saturated medium dense brownish red silty	A-2-4(0)	

Remarks: Mud Rotarty starting @ 51.0'

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

18.0 18.0 2 2 20.0 18.0 2 2 20.0 12° RECOVERY 24 24 26.0 26.0 26.0 27° RECOVERY 27° 27° 28 28 28 28 28 28 28 2	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
10 18.0 \$\frac{2}{8}				·	15	fine sand w/some coarse sand.		
24	18		10	18.0'	2		A 2 4(0)	
21 24 21 21 21 22 21 21 21 22 21 21 21 22 21 22 21 22 27 27 27 28 28 28 29 20 27 27 28 29 20 20 27 27 28 20 20 20 20 20 20 20 20 20 20 20 20 20			10	16.0	2 6 8		A-2-4(0)	
21 24 11 24.0 6								
11 24.0 8				20.0'		12" RECOVERY		
11	21							
11								
11								
11								
26.0' DRAFT 15" RECOVERY DRAFT 15" RECOVERY DRAFT 15" RECOVERY DRAFT 15" RECOVERY DRAFT 13" RECOVERY DRAFT 13" RECOVERY DRAFT 13" RECOVERY 13" RECOVERY 13" RECOVERY 13" RECOVERY 13" RECOVERY 17" RECOVERY 17" RECOVERY 14" 39.0' 2	24			0.4.01				
27 27			11	24.0	6 8	: [:] : [:] : [:] : [:]	A-2-4(0)	
12 29.0 7					8			
30 31.0' 31.				26.0'		15" RECOVERY		
30 31.0' 31.0' 31.0' 33 34.0' 34 36 36.0' 39 14 39.0' 39 14 39.0' 39 30 30 31 31 31 31 32 33 34 35 36 36 37 38 38 38 39 39 30 30 30 30 30 30 30 30	27					MI)KALI		
30 31.0' 31.0' 31.0' 33 34.0' 34 36 36.0' 39 14 39.0' 39 14 39.0' 39 30 30 31 31 31 31 32 33 34 35 36 36 37 38 38 38 39 39 30 30 30 30 30 30 30 30								
30 31.0' 31.0' 31.0' 33 34.0' 34 36 36.0' 39 14 39.0' 39 14 39.0' 39 30 30 31 31 31 31 32 33 34 35 36 36 37 38 38 38 39 39 30 30 30 30 30 30 30 30			١.					
30 31.0' 31.0' 31.0' 33 34.0' 34 36 36.0' 39 14 39.0' 39 14 39.0' 39 30 30 31 31 31 31 32 33 34 35 36 36 37 38 38 38 39 39 30 30 30 30 30 30 30 30		N	12	29.0'	7	Saturated medium dense brown fine sand w/	A-2-4(0)	
33 13 34.0° 3 3 34.0° 3 3 34.0° 3 3 34.0° 3 3 34.0° 3 3 34.0° 3 3 34.0° 3 3 34.0° 3 3 34.0° 3 3 34.0° 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	30		V 1		8 8 7			
33 13 34.0° 3 3 34.0° 3 3 34.0° 3 3 34.0° 3 3 34.0° 3 3 34.0° 3 3 34.0° 3 3 34.0° 3 3 34.0° 3 3 34.0° 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3				31.0'		13" PECOVERY		
33 13 34.0° 3 13 24 25 25 25 25 25 25 25				1.0			16	
33 13 34.0° 3 13 24 25 25 25 25 25 25 25								
36 36.0' 36.0' 37	33							
36 36.0' 36.0' 37								
36 36.0' 17" RECOVERY 39 14 39.0' 2			13	34.0'	3 3		A-3	
36 36.0' 17" RECOVERY 39.0' 2					6	nt i a difiu nt adantus		
39 14 39.0' 2 Saturated loose brown silty fine sand w/some coarse sand, trace of gravel. 41.0' 23" RECOVERY	36			36.0'		P 15 10 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
39 14 39.0' 2 Saturated loose brown silty fine sand w/some coarse sand, trace of gravel. 41.0' 23" RECOVERY						315-177 315-1305 315-1305		
39 14 39.0' 2 3 3 3 Saturated loose brown silty fine sand w/some coarse sand, trace of gravel. 41.0' 23" RECOVERY						66 5 15 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6		
39 14 39.0' 2 3 3 3 Saturated loose brown silty fine sand w/some coarse sand, trace of gravel. 41.0' 23" RECOVERY						25 73 5 U 11 3 1 0 1 3 1 V 1 2 1		
coarse sand, trace of gravel.	39					ii ja ii je j 16 ja ii ja j 16 ja ja ja j		
41.0' 23" RECOVERY			14	39.0'	2 3 3		A-2-4(0)	
					3	coarse saind, trace or graver.		
				41.0'		23" RECOVERY		
	42							
15 44.0' ³ Saturated loose brown fine sand w/some silt. A-2-4(0)			15	44.0'	3	Saturated loss burner for the later later	A 2 4(0)	
	45		15A	√ 44.5′ /	5 5	Saturated loose brown fine sand w/some silt, trace of coarse sand and gravel.	A-2-4(0) A-2-4(0)	
A FI SINGIPLE SALE WINDOWS SILE OF THE SALE WINDOWS SILE OF THE SALE WINDOWS SILE OF THE SALE OF THE S	45		15A	44.5'	5 5	\trace of coarse sand and gravel.	A-2-4(0)	

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

7 6" RECOVERY 46.0' Saturated medium dense gray fine sand w/ some coarse sand and clay. 16" RECOVERY	
1 1	
48	
U-1 49.0' No Sample Recovery Press Sample - Si	helby Tube.
51 51.0' 0" RECOVERY	
16 53.0' 3 Saturated medium dense gray fine sand w/ A-2-4(0) some coarse sand and clay.	
55.0' 24" RECOVERY	
57 17 58.0' 3 Saturated stiff gray fine sandy silt w/trace of A-4(0)	
coarse sand.	
60 60.0 60.0 24" RECOVERY	
63	
18 63.0' 6 7 Saturated stiff gray fine sandy silt w/trace of A-4(0) coarse sand and gravel.	
65.0' 24" RECOVERY	
19 68.0' 6 Saturated very stiff grayish green fine sandy A-4(0)	
69 19 68.0' 6 8 Saturated very stiff grayish green fine sandy silt w/trace of coarse sand and gravel. A-4(0)	
70.0' 23" RECOVERY	
72	
20 73.0' 10	

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
(11.)	1.1091000		20pm	12 12 13	Saturated very stiff grayish green fine sandy silt w/some clay, trace of coarse sand.	A-4(0)	
75			75.0'		silt w/some cray, trace of coarse sand. 24" RECOVERY		
78		21	78.0'	9	Saturated medium dense green fine sand w/	A-2-4(0)	
			. 5.5	9 10 16 22	some clay, trace of gravel and coarse sand.	A-2-4(0)	
			80.0'		24" RECOVERY		
81							
01							
		22	83.0'	15 23 50	Saturated very dense green silty fine sand w/	A-2-4(0)	
84				50	trace of coarse sand.	112 .(0)	
			84.5'		17" RECOVERY		
				Т		\mathcal{I}	
0.7		11			HOR BID	JII'	
87							
		23	88.0'	8 10	Saturated very stiff green fine sandy silt w/	A-4(0)	
				8 10 15 13	trace of coarse sand and gravel.		
90			90.0'		24" RECOVERY		
93		24	93.0'	8 12 12 17	Saturated very stiff gray clay w/some organic	A-7-6(23)	
				12 17	matter, trace of fine to coarse sand.		
			95.0'		24" RECOVERY		
96							
		25	98.0'	16 30 40 50	Saturated hard grayish green fine sandy silt w/	A-4(0)	
99				50	trace of coarse sand.		
			100.0'		18" RECOVERY Boring Terminated at 100 feet.		
					Boring Terminated at 100 feet.		

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silt



Poorly graded gravel



Silty sand



Poorly graded sand with silt



Poorly graded clayey silty sand



Silty low plasticity clay



Low plasticity clay

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 2/25/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
- 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.

96.0'

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

F.A. Project: US 301 Preferred Alternative Contract 1A Boring No.: BR1-07-04

Contract: 25-113-01

Boring Location: Sta. 668+75.28, 29' Lt. C.L.

Boring Surface Elev.: + 26.50' Reference:

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

U-Sampler: 3 Ball Sampler Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4" **Casing Size:** Inches

Hollow Stem Auger: 0.0'

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 2/18/2008 10.0' 8.0 2.8'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 96.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation Driller: William Sharp

Helpers: William Hurd

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 2 2 3	Saturated soft brownish gray silt w/trace of fine sand.	A-4(0)	
			2.0'		20" RECOVERY		
3		2	4.0'	4 3 3 4	Saturated firm brownish gray silt w/trace of fine to coarse sand and gravel. 24" RECOVERY	A-4(0)	1G
		3	4.0'	1 1	Saturated soft gray silt w/some fine sand and	A-4(0)	
6			6.0'	2 2	organic matter, trace of coarse sand and gravel. 14" RECOVERY	15	
		4	6.0'	2	Saturated soft gray fine snady silt w/some	A-4(1)	
		4A	7.0' 7.0'	6	clay and organic matter, trace of coarse sand. 8" RECOVERY	A 1	
		4/1	8.0'	6 12	C-4 4 . 1 1 1 1 1 1	A-1-a	
		5	8.0'	3 3 7 6	some fine to coarse sand, trace of silt. 4" RECOVERY	A-2-4(0)	
9			10.0'		Saturated loose brown fine sand and gravel was some coarse sand and silt. 12" RECOVERY		
		6	10.0'	3 3 4 6	Saturated loose brown fine sand w/some silt, trace of coarse sand and gravel.	A-2-4(0)	
12			12.0'		20" RECOVERY		
		7	12.0'	3 4 6 7	Saturated loose brown fine sandy silt w/some coarse sand, trace of gravel.	A-4(0)	
			14.0'	,	20" RECOVERY		
15		8	14.0'	3 3 5 7	Saturated loose brown fine sand w/some coarse sand, trace of silt.	A-3	
			16.0'		20" RECOVERY		
		9	16.0'	5 6 7	Saturated medium dense brown silty fine sand	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

Depth (ft.) Progress No. Sample Depth Depth Sample Description Class./G.	. Remarks
⁹ w/some coarse sand.	
18 18.0' 22" RECOVERY 10 18.0' 3 Saturated medium dense brown fine sand w/ A-2-4(0	
Saturated medium dense brown fine sand w/ A-2-4(0 some silt and coarse sand.	
20.0' 22" RECOVERY	
21	
24	
11 24.0' 24 Saturated medium dense brown fine sand w/ A-2-4(0 some silt and coarse sand.	
26.0' 20" RECOVERY	
12 29.0' 2 Saturated loose brown silty fine sand w/trace A-2-4(0	NIC -
12 29.0' 24 Saturated loose brown silty fine sand w/trace A-2-4(0 of coarse sand and gravel.	
31.0' 18" RECOVERY	
H AUMGUSI 2015	
33	
13 34.0' 4 Saturated medium dense brown silty fine sand A-2-4(0	
8 11 w/trace of coarse sand and gravel.	
36.0' 20" RECOVERY	
39	
14 39.0' 5 Saturated medium dense grayish green fine A-2-4(0 sand w/some silt, trace of coarse sand and	
gravel.	
41.0' 24" RECOVERY	
42	
15 44.0' 4 Saturated medium dense gravish green silty A-2-4(0)	
15 44.0' 4 5 Saturated medium dense grayish green silty fine sand w/some coarse sand, trace of gravel	

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
(11.)	1 Togicss				and organic matter.		
			46.0'		24" RECOVERY		
48							
		16	49.0'	4 6 8 12	Saturated stiff grayish green fine sandy silt w/	A-4(0)	
				12	trace of coarse sand, gravel and organic matter.		
51			51.0'		24" RECOVERY		
F.4							
54		17	54.0'	3 5 7 7	Saturated medium dense grayish green silty	A-2-4(0)	
				7	fine sand w/trace of coarse sand and organic matter.		
			56.0'		22" RECOVERY		
57							
					OR BIDI		
		7					V O
		18	59.0'	3 4	Saturated stiff grayish green fine sandy silt w/	A-4(0)	
60				4 6 6	trace of coarse sand and organic matter.	15	
			61.0'	10	24" RECOVERY		
63							
03							
		19	64.0'	6	Saturated medium dense gray silty fine sand	A-2-4(0)	
				6 9 11 15	w/trace of coarse sand, gravel, organic matter and sea shells.		
66			66.0'		24" RECOVERY		
69		20	69.0'	3	Saturated stiff gray fine sandy silt w/some	A-4(0)	
				3 5 9 11	clay, trace of coarse sand, gravel, organic	(0)	
			71.0'		matter and sea shells. 24" RECOVERY		
72							
12							

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75		21	74.0'	10 15 19 23	Saturated hard gray fine sandy silt w/some clay, trace of fine sand, gravel, organic matter and sea shells. 24" RECOVERY	A-4(0)	
78		22	79.0'	7,	Saturated hard gray fine sandy silt w/trace of	A-4(0)	
81			81.0'	7 15 23 28	coarse sand, organic matter and sea shells. 22" RECOVERY	11 1(0)	
84		23	84.0'	7 9 11 17	Saturated very stiff gray fine sandy silt w/ trace of coarse sand, gravel, organic matter and sea shells. 24" RECOVERY	A-4(0)	
87					GUST 20	יווכ 15	IG
90	-	24	91.0'	5 9 11 13	Saturated very stiff gray clay w/trace of fine to coarse sand and organic matter. 24" RECOVERY	A-7-6(21)	
96	-	25	94.0'	10 11 13 16	Saturated very stiff gray clay w/some organic matter, trace of fine to coarse sand and sea shells. 24" RECOVERY	A-7-6(27)	
99					Boring Terminated at 96 feet.		

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silt



Silty low plasticity clay



Poorly graded gravel



Silty sand



Poorly graded sand



Poorly graded clayey silty sand



Low plasticity clay

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 2/18/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
- 2. No free water was encountered at the time of drilling or when re-checked the following day.
- 3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

84.0'

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

F.A. Project: US 301 Preferred Alternative Contract 1A **Boring No.:** BR1-07-05

Contract: 25-113-01

Boring Location: Sta. 667+59.36, 67' Lt. C.L.

Boring Surface Elev.: + 30.0' Reference:

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

Core Bit: O.D.

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

Hollow Stem Auger:

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 2/20/2008 10.0' 5.8' 8.0

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: Dia. U-Sample Boring: U-Samples: 101.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation Driller: William Sharp

Helpers: William Hurd

Depth	Daily		Sample					Γ
(ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		1	0.0'	W/H 4		Wet medium dense brown fine sandy gravel	A-1-b	
				W/H 4 7 13		w/some silt and coarse sand.		
			2.0'	7	ЩЩ.	16" RECOVERY		
	R	2	2.0	7 9 11		Wet medium dense brown coarse sandy	A-1-b	
3				11 12		gravel w/some fine sand, trace of silt.		
		A .	4.0'			20" RECOVERY		
		3	4.0'	6 8 7		Wet medium dense brown coarse to fine	A-1-b	
				7		sandy gravel w/trace of silt.	4	
			/				16	
6			6.0'			16" RECOVERY		
		4	6.0'	4		Wet loose brown silty fine sand w/some	A-2-4(0)	
				5 6		coarse sand, trace of gravel.		
			0.01					
		5	8.0' 8.0'	3		20" RECOVERY Saturated loose brown fine to coarse sand w/	A-2-4(0)	
9			0.0	3 4 4 4		some silt, trace of gravel.	A-2-4(0)	
9				4		some sint, trace of graver.		
			10.0'			18" RECOVERY		
		6	10.0'	3 4			A-3	
				3 4 6 8		trace of silt and gravel.		
12			12.0'	6		22" RECOVERY		
		7	12.0'	6 5 5 8		MI I	A-2-4(0)	
				8		some silt, trace of gravel.		
			14.0'			18" RECOVERY		
		8	14.0'	6		Saturated medium dense brown fine sand w/	A-2-4(0)	
15				6 5 6 9		some coarse sand and silt, trace of gravel.	-12 (0)	
						,		
			16.0'			18" RECOVERY		
		9	16.0'	9 8 8		Saturated medium dense brown fine sand w/	A-2-4(0)	

Remarks: Mud Rotary starting @ 84.0'

Reviewed By: Maureen Kellery Soils Supervisor: Randy Ferguson

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
				9		some gravel, coarse sand and silt.		
18			18.0'			20" RECOVERY		
		10	18.0'	5 5 8 10		Saturated medium dense brown fine sand w/	A-3	
				10		some coarse sand, trace of silt and gravel.		
			20.0'			20" RECOVERY		
21								
24		11	24.0'	6		Saturated medium dense brown fine sand w/	A 2 4(0)	
		''	24.0	6 6 10 12		some silt and coarse sand.	A-2-4(0)	
				12				
			26.0'		-	22" RECOVERY		
27						I)RAFI		
	A							
200		12	29.0'	7 6 8 7		Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
30	•			7		some site and coarse said.		
			31.0'			20" RECOVERY		
						GUST 20	15	
				1		JUSI ZU		
33								
		13	34.0'	2 3 5 6		Saturated loose brown fine sand w/some silt	A-2-4(0)	
				6		and coarse sand.		
36			36.0'		-	20" RECOVERY		
39								
		14	39.0'	4 8 12 15		Saturated medium dense brownish green fine	A-2-4(0)	
				12 15		sand w/some silt and coarse sand.		
			41.0'			24" RECOVERY		
42								
		15	44.0'	4 6		Saturated very stiff gray fine sandy silt w/	A-4(0)	
45				4 6 10 11		trace of coarse sand and gravel.	, ,	

F.A. Project: US 301 Preferred Alternative Contract 1A **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'	4 7	Saturated medium dense grayish green silty	A-2-4(0)	
				4 7 9 11	fine sand w/trace of coarse sand and gravel.		
51			51.0'		22" RECOVERY		
54		17	54.0'	4 7 11 15	Saturated medium dense grayish green fine	A-2-4(0)	
			56.0'	15	sand w/some clay, trace of coarse sand and gravel. 24" RECOVERY		
57		_	36.0		24 RECOVERT		
07					OR BIDI		
	•						
60		18	59.0'	4 6 8 14	Saturated medium dense grayish green silty fine sand w/trace of coarse sand.	A-2-4(0)	
			61.0'	1	24" RECOVERY	13	
63							
		19	64.0'	6	Saturated very stiff grayish green fine sand w/	A-4(0)	
				6 7 9 13	trace of coarse sand, gravel and clay.		
66			66.0'		24" RECOVERY		
69		20	69.0'	6 9 13 18	Saturated medium dense grayish green silty fine sand w/trace of coarse sand.	A-2-4(0)	
			71.0'	18	11ne sand w/trace of coarse sand. 24" RECOVERY		
72			/ 1.0		24 RECUVERY		
12							

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
75		21	74.0' 76.0'	8 10 12 17	<i>[][]</i>] s	Saturated very stiff grayish green fine sandy ilt w/some clay, trace of coarse sand, gravel and sea shells.	A-4(0)	
			76.0			24" RECOVERY		
78		22	79.0'	۵				
		22		9 15 17 28	///// s	Saturated dense grayish green fine sand w/ ome clay, trace of coarse sand, gravel and ea shells.	A-2-4(0)	
81			81.0'			22" RECOVERY		
84		23	84.0'	10		JRAFI	A 2 4(0)	
	R	25	<u> </u>	10 19 28 32		Saturated dense grayish green silty fine sand v/trace of gravel, coarse sand and sea shells.	A-2-4(0)	
87	ľ	1	86.0			24" RECOVERY	יווכ	IG
		0.4	Δ			SUST 20	15	
90		24	89.0'	7 12 13 21	S s:	aturated very stiff grayish green fine sandy ilt w/trace of coarse sand and sea shells.	A-4(0)	
			91.0'			24" RECOVERY		
93								
		25	94.0'	7 9 13 15		Saturated very stiff gray fine sandy clay w/ ome organic matter, trace of sea shells.	A-7-6(13)	
96			96.0'			24" RECOVERY		
99								
		26	99.0'	9 13 16 22		Saturated very stiff gray clay w/some organic natter, trace of fine sand and sea shells.	A-7-6(25)	
			101.0'			24" RECOVERY		
					В	Boring Terminated at 101 feet.		

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand

1.03000

Poorly graded sand with silt

Poorly graded sand



Clayey sand



Poorly graded clayey silty sand



Silt



Low plasticity clay

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 2/20/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
- 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.

31.0'

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

F.A. Project: US 301 Preferred Alternative Contract 1A Boring No.: BR1-07-06

Contract: 25-113-01

Boring Location: Sta. 669+61.56, 67' Rt. C.L.

Boring Surface Elev.: + 37.39' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Wt. of Sample Hammer: IN. Lbs. 30 IN. Type of: Split-Barrel O.D. 2

Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: D-Sampler: S-Sampler: U-Sampler: IN. IN. O.D. 3 Ball Sampler Core Bit: O.D.

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

Water Level Readings

Time **Depth of Hole Depth of Casing** Elev. of Water **Depth of Water** Date

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: Dia. U-Sample Boring: U-Samples: 100.5 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation **Driller:** Dan Taylor

Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		1	0.0'	1 3 4 9		Saturated firm brown coarse sandy silt w/some fine sand and clay, trace of gravel.	A-4(2)	
3	N	2	2.0'	8 5 3 1		12" RECOVERY No Sample Recovery		
	\	3	4.0' 4.0'			0" RECOVERY	יוו <i>ר</i>	IG .
		3	4.0	2 2 2 2		Saturated very loose brown coarse to fine sand w/trace of silt and gravel.	A-1-b	
6		4	6.0'	2 2 3 2		Saturated loose brown coarse to fine sand w/ trace of silt and gravel.	A-1-b	
			8.0'		13113131313131313131313131313131313131	16" RECOVERY		
9		5	8.0'	1 2 2 2 2	65 14-116 6 05 9 13 16 6 05 13 16 6	Saturated very loose brown fine to coarse sand w/some silt, trace of gravel. 19" RECOVERY	A-2-4(0)	
		6	10.0'	W/H 1 W/H 1	10111100 10111100 10111100 10111100 10111100 10111100 10111100 10111100	Saturated very loose brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
12		7	12.0' 12.0'	2 1 1 1	101133.66 101133.66	Saturated very loose brown fine to coarse sand w/trace of silt and gravel.	A-3	
15		8	14.0' 14.0'	1 1 2 2	10111111111111111111111111111111111111	19" RECOVERY Saturated very loose brown fine to coarse sand w/trace of silt and gravel.	A-3	
		9	16.0' 16.0'	1 1 2	[:::::::::::::::::::::::::::::::::::::	16" RECOVERY Saturated very loose brown coarse sand w/	A-1-b	

Remarks: Mud Rotary starting @ 31.0'

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
			·	3		some fine sand, trace of silt and gravel.		
18			18.0'			13" RECOVERY		
		10	18.0'	3 1 3 7		Saturated very loose brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
				7		said w/some sitt, trace of graver.		
			20.0'		-	19" RECOVERY		
21								
0.4								
24		11	24.0'	1 2		Saturated loose brown fine sand w/some	A-3	
				1 2 5 10		coarse sand and gravel, trace of silt.		
			26.0'			17" RECOVERY		
						DDAET		
27					12173710 121737169 121737161	DRAFI		
				_	20112300 20112300 201123000 201123000			
		12	29.0'	5 6		Saturated medium dense brown fine sand w/	A-3	
30		A .		5 6 10 12		some coarse sand, trace of silt.		
			31.0'			18" RECOVERY		
			Λ				15	
						3UST 20		
33						500. 20		
					eritike Griniër Griniër Griniër			
		13	34.0'	5 9		Saturated medium dense brown fine sand w/	A-3	
				9 10 13	0017300 0614366 0617300 6613306 16174166 06174306			
36			36.0'		00113100 00113100 00113100	19" RECOVERY		
					er i i i i i i i i i i i i i i i i i i i			
39		14	38.5'	3 =	663 (366) 661) 376 661 (366) 661 (366)	Saturated medium dense brown fine sand w/	A-3	
				3 5 6 9		trace of coarse sand and silt.		
			40.5'		66 14 16 16 16 16 16 16 16 16 16 16 16 16 16	19" RECOVERY		
			40.0			19 RECOVERT		
42					66313066 66313066 76133366			
					oniviki Gerineg Giriniei Girance			
		15	43.5'	3	heel (1100) 10111100 10111100 10111100	Saturated loose brown fine sand w/trace of	A-3	
				5	100 100 100 1	coarca cand and cilt		
45					664)4 66 11032 126 1406 6			

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

Depth	Daily		Sample		I			
(ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
			45.5'):::: <u> </u>	17" RECOVERY		
					664) 4 6 150 3 3 1 1 1 1 1 1 3 3 1 1 1 1			
					######################################			
48								
		16	48.5'	3		Saturated loose brown fine sand w/some	A-3	
		'	40.0	3 3 5 6		coarse sand, trace of silt and gravel.	A-3	
				6		course same, trace of six and graver.		
			50.5'			17" RECOVERY		
51					(4) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4)			
					rtivic			
		4-	50.51	7				
54		17	53.5'	7 10 13 17		Saturated medium dense gray fine sand w/ some clay, trace of coarse sand and organic	A-2-4(0)	
				17		matter.		
			55.5'			21" RECOVERY		
		U-1	55.5'			Saturated gray clayey fine sand w/some	A-2-4(0)	Press Sample - Shelby Tube
						coarse sand, trace of gravel and organic		
57	R		57.5			matter. 24" RECOVERY		
			57.5			24 RECOVERT		
		4						10
		18	58.5'	6 8 12		Saturated medium dense gray silty fine sand	A-2-4(0)	
				15		w/some coarse sand, trace of organic matter.		
60			60.5'			24" RECOVERY		
			30.0	1				
00								
63								
		19	63.5'	6 9 12 15		Saturated medium dense gray silty fine sand	A-2-4(0)	
				12 15		w/trace of coarse sand and organic matter.		
			65.51			201 PEGOVERY		
66			65.5'			20" RECOVERY		
69		20	68.5'	3 5		Saturated medium dense gray silty fine sand	A-2-4(0)	
				3 5 6 17		w/trace of coarse sand, gravel and organic	(-/	
						matter.		
			70.5'			21" RECOVERY		
72								
		<u> </u>						

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
75		21	73.5'	5 7 10 12	Saturated medium dense gray fine sand w/ A-2-4(0) some clay, trace of coarse sand, gravel and organic matter.	
			75.5'		24" RECOVERY	
70						
78		- 00	70.51	1		
		22	78.5'	1 7 11 15	Saturated medium dense gray silty fine sand w/trace of coarse sand, gravel and organic matter. A-2-4(0)	
81			80.5'		19" RECOVERY	
					DRAFT	
84		23	83.5'	7 10 10 13	Saturated very stiff gray clayey fine sandy silt A-4(0) w/trace of coarse sand and organic matter.	
			85.5'	15	21" RECOVERY	
			00.0			$\mathbf{J}(\mathbf{\dot{i}})$
87				•		
			^		211CT 2015	
		24	88.5'	10 12 16 22	Saturated medium dense green silty fine sand A-2-4(0) w/trace of coarse sand, gravel and organic	
90			90.5'	22	matter. 24" RECOVERY	
			90.5		24 RECOVERT	
93						
		25	94.0'	18 25 37 45	Saturated very dense green silty fine sand w/ A-2-4(0) trace of coarse sand, gravel and organic	
96			96.0'	40	matter. 19" RECOVERY	
96			90.0		19 RECOVERT	
99		26	98.5'	5 6 10 14	Saturated medium dense green silty fine sand A-2-4(0) w/trace of coarse sand and organic matter.	
			100.5'		22" RECOVERY	
					Boring Terminated at 100.5 feet.	
					-	

KEY TO SYMBOLS

Symbol Description

Strata symbols

Low plasticity clay

00 00 00 00 00 00 0 00 00 00 00 00 00 0 Well graded sand with silt

1.033333

Poorly graded sand with silt

Well graded sand



Silty sand



Clayey sand



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 1/29/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
- 2. No free water was encountered at the time of drilling or when re-checked the following day.
- 3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

101.0'

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

F.A. Project: US 301 Preferred Alternative Contract 1A Boring No.: BR1-07-07

Contract: 25-113-01

Boring Location: Sta. 667+51.56 67' Lt. C.L.

Boring Surface Elev.: + 27.00' Reference:

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

Core Bit: O.D. IN.

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

Water Level Readings

Time Depth of Hole **Depth of Casing Depth of Water** Elev. of Water Date 2/22/2008 7.3' 10.0 8.0'

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: Dia. U-Sample Boring: U-Samples: 101.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation Driller: Bill Holden

Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0' 1.0' 1.0'	3 3 2 2	No Sieve Analysis		
			2.0'		6" RECOVERY		
3		2	4.0'	2 2 2 2 2	Saturated soft gray silt w/some clay, trace of fine to coarse sand and gravel. 3" RECOVERY	A-4(4)	IG
		3	4.0'	1 1 3	Saturated soft grayish brown gravelly silt w/	A-4(0)	
6			6.0'	2	some fine to coarse sand, trace of clay. 10" RECOVERY	15	
		4	6.0'	2 21 24	Saturated medium dense brown coarse sandy	A-1-a	
				24	gravel w/some fine sand and silt.		
			8.0'		14" RECOVERY		
9		5	8.0'	3 4 6 5	Saturated loose brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			10.0'		18" RECOVERY		
		6	10.0'	5 6 8 7	Saturated medium dense brown fine to coarse sand w/some gravel and silt.	A-2-4(0)	
12		7	12.0'	2	11" RECOVERY		
		7	12.0'	2 4 7 11	Saturated medium dense brown fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	
			14.0'		20" RECOVERY		
15		8	14.0'	8 10 12 12	Saturated medium dense brown silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
<u> </u>			16.0'		16" RECOVERY		
		9	16.0'	8 12 13	Saturated medium dense brown fine sand w/	A-3	

Remarks:

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

Depth	Daily		Sample		1			
(ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
				15	00 14 300 6 00 14 300 6 00 14 300 1	some coarse sand, trace of silt.		
18			18.0'			15" RECOVERY		
		10	18.0'	10 12 17 17	1:01/1:00 1:01/1:00 1:01/1:00		A-3	
				17		some coarse sand, trace of silt.		
			20.0'			21" RECOVERY		
			20.0			21 ABGGVERT		
21					1:6133:66 1:6177:61 1:6177:61			
					161436 121712			
					reivici Compression Compression			
24		11	24.0'	5		Setunded and in a description of the conduction	A 2 4(0)	
		''	24.0	5 10 11	120 3 3.31 6 7 120 3 3 3 3 6 6 120 3 3 3 5 6 6 130 3 3 7 2 3 6 7	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
				11	etijije 30 14 15 6 16 1 1 1 1 1 1 1 1	Sand did sin		
			26.0'		(10 14 10 0 (14 17 10 0 (17 17 17 18 1	18" RECOVERY		
					136 13-136 (136 13-13:01 136 13-13:01			
27						UNALI		
);tiri;ti			
	N	12	29.0'	23			1 2 1(0)	
30		12	29.0	23 19 9 10	12 1 3 3 3 1 0 1 12 1 3 3 3 3 5 6 12 1 3 3 3 5 6 6	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
30	•			10		some course suite and site.		
			31.0'			22" RECOVERY		
						GUST 20	15	
						4UST 70		
33				1	130 14.1961 120 14.1961			
					rtiviti Collins			
		13	34.0'	8		Saturated medium dense brown fine sand w/	A 2 4(0)	
		'3	34.0	10 11 13		some silt, trace of coarse sand.	A-2-4(0)	
				13		and one of course surface.		
36			36.0'			17" RECOVERY		
39		14	39.0'	4		Saturated medium dense brownish red fine	A-3	
		'-	33.0	6 6 5		sand w/some coarse sand and silt, trace of	A-3	
				5	**************************************	gravel.		
			41.0'			16" RECOVERY		
40								
42		U-1	42.0'			No Sample Recovery		Press Sample - Shelby Tube.
					pitiriiti Lii iiiii Lii iiiiii			
		15	44.0' 44.0'	6		0" RECOVERY Saturated very stiff gray fine sandy silt w/	A-4(0)	
45			1 1.0	6 7 11 15		some clay, trace of coarse sand and gravel.	A-4(U)	
<u>`</u> _	1	I	1	1 10		x	I	

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		22" RECOVERY		
48							
		16	49.0'	6 8 9 12	Saturated medium dense gray fine sand w/ some clay, trace of coarse sand and gravel.	A-2-4(0)	
51			51.0'	12	22" RECOVERY		
			00		22 1000 1211		
F.4							
54							
					DRAFT		
57				Т	OR BIDI	\mathcal{I}	
		7		ı			
		17	59.0'	6 10 12 13	Saturated very stiff gray fine sandy silt w/	A-4(0)	
60				13	trace of coarse sand and gravel.	15	
			61.0'	1	23" RECOVERY		
63							
		18	64.0'	6 7 8 12	Saturated stiff gray fine sandy silt w/some	A-4(0)	
				8 12	coarse sand, trace of gravel.		
66			66.0'		22" RECOVERY		
69		19	69.0'	9	Saturated hard grayish green fine sandy silt w/	A-4(0)	
				9 13 18 18	trace of coarse sand and gravel.	(")	
			71.0'		21" RECOVERY		
72							

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

	I =				I			T
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	-							
		20	74.0'	12 13 16 18		aturated very stiff grayish green fine sandy	A-4(0)	
75				18		lt w/some clay, trace of coarse sand and		
			76.0'		gı	ravel. 22" RECOVERY		
			70.0			22 RECOVERT		
70								
78								
				_				
		21	79.0'	9 12 18 18		aturated very stiff grayish green fine sandy	A-4(0)	
				18	S1	lt w/trace of coarse sand and gravel.		
81			81.0'			24" RECOVERY		
						$IR\DeltaFI$		
84		22	84.0'	17	C.	aturated years dange amon ciltur fine cond ye	A 2 4(0)	
		22	04.0	17 25 43 50/4"		aturated very dense green silty fine sand w/ ace of coarse sand, gravel and organic	A-2-4(0)	
	R			50/4		atter.		
			86.0'			17" RECOVERY		
07		A .						
87								
						LIOT OO	4 -	
						11.51 70		
		23	89.0'	9	Sa	aturated hard green fine sandy silt w/trace of	A-4(0)	
90				9 15 24 30		parse sand and organic matter.		
			91.0'			21" RECOVERY		
93								
		24	94.0'	9 12 23 50/3"	Sa	aturated hard green silty fine sandy clay w/	A-6(8)	
				50/3"		ace of coarse sand, gravel and organic natter.		
96			96.0'			18" RECOVERY		
99			65			I. Canada Dana		
		25	99.0'	5 6 16 16	N N	o Sample Recovery		
				16				
			101.0'			0" RECOVERY		
					В	oring Terminated at 101 feet.		

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



Silt



Low plasticity clay

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 2/19/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
- 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.

33.0'

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

F.A. Project: US 301 Preferred Alternative Contract 1A **Boring No.:** BR1-07-08

Contract: 25-113-01

Boring Location: Sta. 670+10.20, 28' Lt. C.L.

Boring Surface Elev.: + 36.83' Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 1/31/2008

12.0' 10.3' 14.0

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: Dia. U-Sample Boring: U-Samples: 100.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation **Driller:** Dan Taylor

Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		1	2.0'	2 2 2 2		Wet very loose brown silty fine to coarse sand w/some gravel. 11" RECOVERY	A-2-4(0)	
3		2	4.0'	2 2 4 5		Wet loose brown coarse sandy gravel w/some silt and fine sand. 9" RECOVERY	A-1-b	1G
6		3	4.0'	2 2 2 2 2		Wet very loose brown fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
		4	6.0' 8.0'	3 3 3		Wet loose brown coarse sand w/some fine sand and silt, trace of gravel. 17" RECOVERY	A-1-b	
9		5	8.0'	2 3 2 2		Wet loose brown coarse to fine sand w/some silt, trace of gravel. 21" RECOVERY	A-1-b	
12		6	10.0'	1 1 1		Saturated very loose brown fine to coarse sand w/some silt, trace of gravel. 20" RECOVERY	A-2-4(0)	
12		7	12.0'	2 3 2 3		Saturated loose brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
15		8	14.0' 14.0'	1 1 1 1 1		Saturated very loose brown coarse to fine sand w/trace of silt and gravel. 18" RECOVERY	A-1-b	
		9	16.0'	1 1 1	# 143 6 6 # 143 6 6 # 143 6 6 # 143 6 6	Saturated very loose brown fine to coarse	A-3	

Remarks: Mud Rotary starting @ 33.0'

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

Dawth	Daile:	1	Cc1:		1			Г
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
				2		sand w/trace of silt and gravel.		
18			18.0'		0.6111100	1/I" DECOVEDV		
		10	18.0'	4 2 2 2		Saturated very loose brown fine to coarse	A-2-4(0)	
				2		sand w/some silt, trace of gravel.		
			20.0'		000 (400 c 000 13 100 c 000 13 100 c	22" RECOVERY		
21								
					000 1000 100 14 100 100 14 100			
	-				116143166 126141161 126133166			
	-				in in incide the individual the individual incidental			
0.4					00112100			
24		11	24.0'	3 3		Saturated loose brown fine sand w/trace of	A-3	
				4 8		coarse sand, gravel and silt.		
			00.01			ANII DEGGATERA		
			26.0'		######################################	20" RECOVERY		
27					00 1 1 1 1 1 0 0 13 1 1 1 1 1 0 6 10 1 1 1 1 1 1 0 0 10 1 1 1 1 1 1 0 0	I)RAFI		
					0111111111 011111111111111111111111111			
	_				126133100 166133166 17617301			
					13 23 13 2 C 13 23 13 2 C 14 23 13 2 C			
		12	29.0'	4 4 6 10	######################################	Saturated loose brown fine sand w/some	A-2-4(0)	
30		A .		6 10		coarse sand and silt.		
			31.0'		0:03 13:05 0:03 13:05 0:01 73:05	19" RECOVERY		
	-				hitianiev Militiani Militiani	DIJOT OO	4 -	
	-							
33				10	12 13 13 0 C	5001 20	10	
33	1	13	33.0'	4 6		Saturated medium dense brown fine sand w/	A-3	
	-			4 6 7 7		some coarse sand, trace of gravel.		
			25.01		66147996 6614366 6614366			
	1		35.0'		######################################	19" RECOVERY		
36					00			
					00111900 00113000 00113000			
	-				6614366			
					663 1300 6 137 33.1707 127 33.1707 147 348 446			
		14	38.0'	4 5 6		Saturated medium dense brown fine sand w/	A-3	
39	-			10		some coarse sand, trace of silt.		
			40.0'		0:63 13:66 0:61 33:66 0:61 33:66	21" RECOVERY		
]		13.0		1311111			
40					100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
42	1				0614366 0317000 0417000			
					1211.1.1.21			
		15	43.0'	5 6 6		Saturated medium dense brown fine sand w/	A-3	
				6	1.11.1.1.1.1.1.	trace of silt and coarse sand.		
45			45.0'		000010000 130001000 1001000 1001000	I N° RECOVERY		

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

	r		1		1		ſ	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
48					156 1 A. 11 6 f. 12 f. 1 f f. 12 f. 12 12 f. 12 f. 12 f. 12 12 f. 12 f.			
		16	48.0'	9 10 12		Saturated medium dense brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
		16A	49.5' 49.5'	15		14" RECOVERY	A 2 4(0)	
		10/	50.0'			Saturated medium dense gray fine sand w/ some silt and coarse sand, trace of gravel. 6" RECOVERY	A-2-4(0)	
51						0 RECOVERT		
		17	53.0'	4		Saturated medium dense gray silty fine sand	A-2-4(0)	
54				4 5 7 10		w/trace of coarse sand.		
			55.0'			24" RECOVERY		
57								
						\cdot ()R RII)I		
	•	18	58.0'	5 7 8 10		Saturated medium dense gray silty fine sand w/trace of coarse sand, gravel and organic	A-2-4(0)	
			60.0	10		matter. 24" RECOVERY	4 -	
60			60.0			24 RECOVERT	15	
63		19	63.0'	5		Saturated medium dense gray silty fine sand	A-2-4(0)	
				5 6 10 12		w/some coarse sand, trace of organic matter.		
			65.0'			24" RECOVERY		
66								
69		20	68.0'	5 6 8 12		Saturated stiff gray fine sandy silt w/some clay, trace of coarse sand, gravel and organic	A-4(0)	
			70.0'	12		matter. 24" RECOVERY		
			70.0			24 RECOVERT		
72								
		21	73.0'	6				

F.A. Project: US 301 Preferred Alternative Contract 1A **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				7 8 11	Saturated stiff gray fine sandy silt w/trace of coarse sand, gravel and organic matter.	A-4(0)	
75			75.0'		24" RECOVERY		
-, -		U-1	75.0'		No Sample Recovery		Press Sample - Shelby Tube
			77.0'		24" RECOVERY		
78							
		22	78.0'	6 10 12 17	Saturated medium dense grayish green silty	A-2-4(0)	
				17	fine sand w/trace of coarse sand and organic matter.		
			80.0'		24" RECOVERY		
81							
		23	83.0'	9	Saturated very stiff green fine sandy silt w/	A-4(0)	
84				9 15 15 21	some clay, trace of gravel, silt and organic	A-4(0)	
			85.0'		matter. 24" RECOVERY		
	R		00.0		cj		
		M			OR BIDI		
87	•			•			
			_			4	
		24	88.0'	6 11 16	Saturated medium dense green silty fine sand	A-2-4(0)	
				24	w/trace of coarse sand, gravel and organic matter.		
90			90.0'		22" RECOVERY		
93		25	93.0'	16	Saturated very dense blackish green silty fine	A-2-4(0)	
				16 22 30 28	sand w/trace of coarse sand and organic	Λ-2-4(0 <i>)</i>	
			95.0'		matter. 24" RECOVERY		
			30.0		27 RECOTERT		
96							
		26	98.0'	9 12 16 24	Saturated medium dense green silty fine sand	A-2-4(0)	
99				24	w/trace of coarse sand and organic matter.		
			100.0'		24" RECOVERY		
					Boring Terminated at 100 feet.		

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand



Poorly graded sand with silt



Poorly graded clayey silty sand



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 1/31/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
- 2. No free water was encountered at the time of drilling or when re-checked the following day.
- 3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

101.0

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

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-07-09

Contract: 25-113-01

Boring Location: Sta. 665+76, 22' Rt. C.L.

Boring Surface Elev.: + 36.85 Reference:

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

IN. IN. IN. Core Bit: O.D.

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

Water Level Readings

Time **Depth of Casing** Depth of Hole **Depth of Water** Elev. of Water Date 2/10/09

10.5 14.0 12.0

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.; Dia. U-Sample Boring: U-Samples: Ft. 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
	2/10/09	1	0.0'	2 3 9 9		Moist stiff brown silt w/ some fine sand and clay, trace of coarse sand and gravel.	A-4(1)	Topsoil - 2".
			2.0'	0		20" RECOVERY		
3		1	4.0'	9 8 9 8		Moist very stiff brown fine sandy silt, trace of coarse sand and gravel. 17" RECOVERY	A-4(0)	JG
		3	4.0'	6 10 8		Moist medium dense orange coarse sand and	A-1-b	
6			6.0'	4		gravel w/ some fine sand, trace of silt. 10" RECOVERY	15	
		4	6.0' 8.0'	5 5 6		Wet loose orange fine sand w/ some silt and coarse sand. 21" RECOVERY	A-2-4(0)	
9		5	8.0'	3 4 4 4		Wet loose orange fine sand w/ some silt and coarse sand.	A-2-4(0)	
		6	10.0'	4 5 5 7		Saturated loose orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
12		7	12.0' 12.0'	2		19" RECOVERY		
		'	12.0	2 6 7 9		Saturated medium dense red and brown fine to coarse sand, trace of silt and gravel.	A-3	
			14.0'	_	11/14/16/ 11/14/16/ 11/14/16/	20" RECOVERY		
15		8	14.0'	5 5 6 8	133 44 16 6 1 136 1 4 1 13 16 6 136 1 4 1 16 6	Saturated medium dense red-brown fine sand w/ some coarse sand, trace of silt. 17" RECOVERY	A-3	
		9	16.0'	4 7	100143166 101131160 101171161	Saturated medium dense red-brown fine sand	A-3	
				11	4111446	Salarate mediam dense red erown time build	11.5	

Remarks:

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
			· ·	16		w/ some coarse sand, trace of silt.		
18			18.0'			17" RECOVERY		
"		10	18.0'	5 8	04 140 60 04 110 05 04 11 16 04 12 16 04 14 16 04 14 16 04 14 16	Saturated medium dense red-brown fine to	A-3	
				11 11	1::133:0:0 1::17:14:1 1::13:1::1 1::13:1::1	coarse sand, trace of silt.		
					100 1 4 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
			20.0'			17" RECOVERY		
21					(1831) (1831) (1831) (1831)			
					1993 1996 1993 1996 1993 1996			
					ockiechei Maanaec Miliotei Menaace			
					156333166 126372161 166332166			
24					list a autiert. Nach dabeie			
		11	24.0'	8 9		Saturated medium dense red-brown coarse to	A-1-b	
				13 14		fine sand, trace of silt.		
			26.0'			20" RECOVERY		
			20.0					
27						IJRAFI		
					1:1:1:1:1:1:1:1: 1:1:1:1:1:1:1:1:1:			
		12	29.0'	4 4		Saturated medium dense red-brown coarse	A-1-b	Mud Rotary @ 29.0'.
30		A .		4 7 10	1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1:	sand w/some fine sand, trace of silt and		
			0.4.01			gravel.		
			31.0'		1:1:1:1:1:1:1:	20" RECOVERY		
						iUS 1 20	115	
33								
	2/13/09	13	34.0'	3 4		Saturated loose brown coarse sand w/ some	A-1-b	
				6 8		fine sand, trace of silt.		
					(30 43-336) (56 4 13-66) (56 43 436)			
36			36.0'			18" RECOVERY		
					00 5 1 3 1 3 1 0 1 10 5 1 3 1 3 1 0 5 10 5 1 7 3 1 5 0			
39					des isièè ut saiter. Per saite			
39		14	39.0'	2 5 7		Saturated medium dense brown fine sand w/	A-3	
				7 9		some coarse sand, trace of silt.		
			41.0'			18" RECOVERY		
42								
, <u>,,,</u>								
					esa ince esa ince estantes.			
		15	44.0'	2 5		Saturated medium dense brown fine sand w/	A-3	
45				5 7 8		some coarse sand, trace of silt and gravel.		
			1		na 14 116 F	-	1	

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
			46.0'		131 15.1127 124 15.1127 124 15.1127	19" RECOVERY		
			40.0			1) KECVEKI		
48								
					120 3 1 3 1 0 1 120 3 3 4 1 0 0 120 1 7 3 2 1 1			
		16	49.0'	5 8 13 15		Saturated medium dense gray and brown silty fine sand w/ some coarse sand, trace of	A-2-4(0)	
				15		gravel.		
51			51.0'			21" RECOVERY		
F 4								
54		17	54.0'	4 9 14 17		Saturated medium dense gray clayey fine sand	A-2-4(0)	
				14 17		w/ some coarse sand.		
			56.0'			19" RECOVERY		
57								
						OR BIDI		
		N 1		ı				
		18	59.0'_	6		Saturated medium dense gray silty fine sand,	A-2-4(0)	
60				6 9 13 16		trace of coarse sand.	15	
			61.0'	1		22" RECOVERY		
63								
		40	04.01	4			1.2.4(0)	
		19	64.0'	4 7 11 14		Saturated medium dense gray silty fine sand, trace of coarse sand.	A-2-4(0)	
60			66.0'			21" RECOVERY		
66			00.0			21 RECOVERY		
69								
		20	69.0'	4 6 9 9		Saturated stiff gray clayey fine sandy silt, trace of coarse sand.	A-4(0)	
				9		trace of coarse saird.		
-			71.0'			20" RECOVERY		
72								
	1			I				l

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
75		21	74.0'	4 11 22 22		d dense gray silty fine sand, trace of and and organic matter.	A-2-4(0)	
			76.0'			24" RECOVERY		
78								
		22	79.0'	6 11 18 22		l very stiff gray clayey fine sandy e of organic matter, coarse sand, and	A-4(0)	
81			81.0'			24" RECOVERY		
84						RAFT		
	2/16/09	23	84.0'	5 12 17 19		l very stiff gray clayey fine sandy of organic matter and coarse sand.	A-4(0)	
87			86.0'	T		24" RECOVERY		1G
						JST 20	15	
90		24	89.0'	6 12 23 33		dense gray silty fine sand, trace of natter and coarse sand.	A-2-4(0)	
			91.0'			23" RECOVERY		
93								
		25	94.0'	11 18 25 38	Saturated organic n	dense gray silty fine sand, trace of matter and coarse sand.	A-2-4(0)	Glauconitic
96			96.0'			24" RECOVERY		
00								
99		26	99.0'	5 10 13 15	Saturated sand.	l very stiff gray clay w/ some fine	A-7-6(28)	
			101.0'			24" RECOVERY		
					End of B	oring		

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity clay



Silt



Well graded sand with silt



Silty sand



Poorly graded sand with silt



Poorly graded clayey silty sand



Clayey sand



High plasticity clay

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 ATV CME 55.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR1-07-10

Contract: 25-113-01

Boring Location: Sta. 666+58, 60' Lt. C.L.

Reference: Boring Surface Elev.: 33.89'

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

U-Sampler: IN. Core Bit: O.D.

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

Water Level Readings **Depth of Water** Time Depth of Hole **Depth of Casing** Elev. of Water Date 2/6/09 10.0 8.0 7.0 26.9 33.9

101

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.; Dia. U-Sample Boring: Ft. U-Samples: Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation

Driller: G. Truver/B. Holden Helpers: T. Kane

Depth Daily Sample Blows/6" Class./G.I. Remarks No. Sample Description **Progress** (ft.) Depth 2/6/09 0.0' A-2-4(0) Topsoil - 2". Moist medium dense orange silty fine to coarse sand w/ some gravel. 12" RECOVERY 1.5' 2.0 Moist loose orange fine sand w/ some silt and A-2-4(0)coarse sand, trace of gravel. 3 17" RECOVERY 4.0 3 4.0 Wet loose orange fine sand w/ some coarse A-2-4(0)sand and silt, trace of gravel. 18" RECOVERY 6 6.0 4 6.0 Wet loose orange fine to coarse sand w/ some A-2-4(0)silt, trace of gravel. 8.0' 21" RECOVERY 5 2 4 8.0 Saturated loose orange fine sand w/ some A-2-4(0)coarse sand and silt, trace of gravel. 9 10.0' 20" RECOVERY 6 10.0' Saturated medium dense orange fine sand w/ A-3 some coarse sand, trace of silt. 12.0' 17" RECOVERY 12 2/9/09 7 12.0' 3 4 Saturated loose brown fine sand w/ some A-3 coarse sand, trace of silt and gravel. 14.0' 19" RECOVERY 8 14.0' Saturated medium dense brown fine sand w/ A-2-4(0)some coarse sand and silt, trace of gravel. 15 18" RECOVERY 16.0'

Saturated medium dense brown fine sand w/

A-3

Remarks:

9

16.0

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
				15		some coarse sand, trace of silt and gravel.		
18			18.0'		11:13:13:15	16" RECOVERY		
		10	18.0'	5 9 9 12	######################################	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
				12		some coarse sand, trace or sin.		
			20.0'			18" RECOVERY		
21								
					11.00 (11.00			
					ice a 1500 c ice a 1500 c ice a 1510 c ice a 250 c			
					GENENIGE Den Trico Generalie Generalier			
24		11	24.0'	6			A 2	
		''	24.0	6 6 7 9	::::::::::::::::::::::::::::::::::::::	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
				9	0.0139000 0.01441000 0.0141000 0.0141000	some course suma, nace of sine.		
			26.0'			20" RECOVERY		
27					(1) 13 (C) (3) 13 (C) (C) 13 (C) (C) 13 (C)	\square		
					100 1 7 3 10 0 100 1 7 3 10 0 100 1 7 3 10 1			
	R							
		12	29.0'	3 5 8 9		Saturated medium dense brown fine sand w/	A-3	
30		4		9	12	some coarse sand, trace of silt.		
			31.0'			21" RECOVERY		
						DI ICT ON	15	
						3UO 1 /U		
33					189 JANES. 120 JANES 120 JANES	500. 20		
					orivito Crimiec Crimiec			
		13	34.0'	6		Saturated medium dense brown fine sand w/	A-3	
				5 7 7		some coarse sand, trace of silt.		
			36.0'		(16 14 15 6 f (16 14 15 6 f (16 14 15 6 f	20" RECOVERY		
36			36.0		1:61	20" RECOVERY		
					155 1 A 20 C S 10 C 1 7 7 2 C V 10 C 1 7 7 3 C V			
					/:::::::::::::::::::::::::::::::::::::			
					nergriee Derver Gerrand Gerrand			
39		14	39.0'	4				N 1D
		14	39.0	4 5 7 8	60 (44) 16 (44) 16 (44) 16 (44)	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-3	Mud Rotary @ 39.0'.
				8		some course suma, nace of sine.		
			41.0'			19" RECOVERY		
42								
<u> </u>	1							
					12 7 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
					erriner. Erriner. Merriner			
		15	44.0'	4 5 7 10		Saturated medium dense gray silty fine sand	A-2-4(0)	
45				7 10		w/ some coarse sand, trace of organic matter.		

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	-		46.0'			18" RECOVERY		
48								
		16	49.0'	4		Cod and down I'm down and down Con-	A 2 4(0)	
		10	49.0	4 6 7 11		Saturated medium dense gray clayey fine sand, trace of coarse sand, organic matter, and gravel.	A-2-4(0)	
51			51.0'			22" RECOVERY		
54		17	54.0'	6 7		Saturated medium dense gray silty fine sand,	A-2-4(0)	
				10 12		trace of coarse sand, gravel, and organic matter.		
			56.0'		-	21" RECOVERY		
57				Т		OR BIDI	ΔIV	
		7						
60		18	59.0'	3 5 9 14		Saturated stiff gray clayey fine sandy silt, trace of coarse sand, organic matter, and	A-4(0)	
00			61.0'	14		gravel. 24" RECOVERY	15	
63								
		19	64.0'	4 5 10 10		Saturated stiff gray clayey fine sandy silt, trace of coarse sand, gravel, and organic	A-4(0)	
66			66.0'			matter. 23" RECOVERY		
69		20	69.0'	4		Saturated medium dense gray silty fine sand,	A-2-4(0)	
				4 4 7 9		trace of coarse sand, gravel, and organic matter.	11 2 T(U)	
			71.0'			22" RECOVERY		
72								

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
75		21	74.0'	6 9 3 16		Saturated very stiff gray fine sandy silt, trace of gravel, coarse sand, and organic matter.	A-4(0)	
			76.0'			24" RECOVERY		
78								
70								
		22	79.0'	5		Saturated very stiff gray fine sandy silt, trace	A-4(0)	
				5 11 15 21		of organic matter and clay.	A-4(0)	
81			81.0'			24" RECOVERY		
						\square \square \square \square \square		
84	2/10/09	23	84.0'	7		Saturated dense gray silty fine sand, trace of	A-2-4(0)	
	2/10/00	20	04.0	7 13 18 28		organic matter, coarse sand, and gravel.	A-2-4(0)	
		1/						
			86.0'			24" RECOVERY		
87				•				
							4	
						21181 20	15	
		24	89.0'	14		Saturated very dense green silty fine sand,	A-2-4(0)	Glauconitic
90			00.0	14 23 38 41		trace of organic matter, gravel, and coarse	A-2-4(0)	Giauconnic
						sand.		
			91.0'			23" RECOVERY		
93								
- 50								
		25	94.0'	8		Saturated very stiff gray and green fine sandy	A-4(0)	Glauconitic
				8 10 13		silt, trace of organic matter, coarse sand, and	11 1(0)	Giacomic
00		25A	95.5' 95.5'	18		gravel. 18" RECOVERY	A-7-6(20)	
96		20/1	96.0'			Saturated very stiff gray clay w/ some organic	A-7-0(20)	
						matter, trace of fine sand and gravel. 6" RECOVERY		
99		26	99.0'	7 0		Saturated very stiff gray clay w/ some organic	A-7-6(25)	
				7 8 12 18		matter, trace of fine sand.	5(-5)	
			101.0'			24" RECOVERY		
			101.0		Y///A	End of Boring		

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand

1.03000 1.03000 1.03000 Poorly graded sand with silt

Poorly graded clayey silty sand



Clayey sand



Low plasticity clay

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 2/6/2009 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

101.0

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

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR1-07-11

Contract: 25-113-01

Boring Location: Sta. 668+50, 20' Lt. C.L.

Reference: **Boring Surface Elev.: 28.0**'

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

Core Bit: To: To: Casing Size: 3 1/4 Inches From Depth of: 0.0

Hollow Stem Auger:

Water Level Readings Time Depth of Hole **Depth of Casing Depth of Water** Elev. of Water Date

21.4 28.0 2/4/09 8.0 10.0 6.6 28.0 28.0

From Depth of:

Pay Quantities:

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

Boring Contractor: Walton Corporation

Driller: G. Truver **Helpers:**

Depth Daily Sample Blows/6" Class./G.I. Remarks No. Sample Description **Progress** (ft.) Depth 2/4/09 0.0' Topsoil - 3". Wet firm brown silt w/ some clay, trace of A-4(4)fine to coarse sand and gravel. 14" RECOVERY 1.5' 2.0 Wet stiff brown silt, trace of fine to coarse A-4(0)sand and gravel. 3 16" RECOVERY 4.0 3 4.0 Wet firm brown silt w/ some fine sand, trace A-4(0)of coarse sand and gravel. 14" RECOVERY 6 6.0 4 6.0'Wet firm gray silt w/ some fine sand, trace of A-4(0)coarse sand and gravel. 8.0' 15" RECOVERY 14 18 9 9 5 8.0 Wet medium dense orange gravel and coarse A-1-a sand w/ some fine sand, trace of silt. 9 10.0' 13" RECOVERY 6 10.0' Saturated loose orange fine sand w/ some silt, A-2-4(0)trace of coarse sand. 12.0' 15" RECOVERY 12 W/R 2 5 6 7 12.0' Saturated loose orange fine sand w/ some silt, A-2-4(0)trace of coarse sand and gravel. 14.0' 14" RECOVERY 8 14.0' Saturated loose orange fine sand w/ some A-2-4(0)coarse sand and silt. 15 15" RECOVERY 16.0'

Saturated medium dense orange fine sand w/

A-2-4(0)

Remarks:

9

16.0'

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

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

_	l	1		F	1		ı	I
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
				23		some coarse sand and silt.		
18			18.0'			20" RECOVERY		
		10	18.0'	4 8	100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Saturated medium dense orange fine sand w/	A-3	
				10 13	iniviri. Hiliniri	some coarse sand, trace of silt and gravel.		
			20.0'			20" RECOVERY		
21								
					0000 1000 10014 100 1001 7000			
					neen vaneu Genaniee Venneuen			
24					0.011.41.64 0.017.11.61 0.017.11.61			
		11	24.0'	6 6 7 8	100 100 100 100 100 100 100 100 100 100	Saturated medium dense orange fine sand w/	A-3	
				7 8	100 13 300 0 100 1 7 1 1 1 1 1 1 1	some coarse sand, trace of silt.		
			26.0'					
			20.0		10.014316.0 14.14-14.1 10.131316.0			
27					:::::::::::::::::::::::::::::::::::::			
					die intinte De annoue De la liber De nach			
					1969 4 9 16 6 1761 7 177 177 167 168 1 1 2 1 2 1 2 1 2			
	0/7/0							
00	2/5/09	12	29.0'	6 6 9 9	1 1145 1 1145 1 1146 1 1146 1 1146	Saturated medium dense orange fine sand, trace of silt and coarse sand.	A-3	
30	•			9		trace of sitt and coarse said.		
			31.0'			20" RECOVERY		
						GUST 20	15	
						GUST 20		
33					1911.1961 1911.1961 1911.1966			
					errier Granaec Granaec			
		13	34.0'	4		Saturated medium dense orange fine sand w/	A-3	
				4 8 9		some coarse sand, trace of silt.		
					136 44-136 f 136 7 136 7 136 74 136 8			
36			36.0'		4-6173-60 10013-100 1003-100-0 1003-100-0	21" RECOVERY		
					0014106 0014100 0014100			
					okiejki. Kariotek Kariotek			
					100 1 1 1 1 100 10 100 1 1 1 1 100 10 100 1 1 1 1			
39								
		14	39.0'	4 5 6 9	## 1 J 47 # 0 ## 1 J 43 # 0 ## 1 J 43 # 6 ## 1 A 3 # 6	Saturated medium dense orange fine sand w/	A-3	Mud Rotary @ 39.0'.
				9		some coarse sand, trace of silt and gravel.		
			41.0'			22" RECOVERY		
					71.01			
42								
					166 JA 1010 G 166 JA 1166 176 J J J J J J			
					onivini. Gerrini.			
		15	44.0'	2		Saturated stiff gray fine sandy silt, trace of	A-4(0)	
45		'	17.0	2 5 9 12		coarse sand and gravel.	A-4(U)	
<u> </u>	1			12		<i>o</i>		<u> </u>

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

	r		1	1			ı	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
			46.0'			22" RECOVERY		
			70.0			22 RECOVERT		
48								
		16	49.0'	3 8 10 13		Saturated medium dense gray silty fine sand, trace of coarse sand, organic matter, and	A-2-4(0)	
				13		gravel.		
51			51.0'			23" RECOVERY		
54		17	54.0'	3		Saturated stiff gray clayey fine sandy silt,	A-4(0)	
				3 4 8 10		trace of coarse sand, organic matter, and	(0)	
			56.0'			gravel. 24" RECOVERY		
57	N						$\supset IV$	
		N				FOR BIDI	ノル	NG
60		18	59.0'	3 6 10 16		Saturated very stiff gray fine sandy silt, trace of coarse sand, organic matter, and gravel.	A-4(0)	
00				16		703170		
			61.0'	10		24" RECOVERY		
63								
		19	64.0'	4 6 6 7		Saturated medium dense gray silty fine sand,	A-2-4(0)	
				6 7		trace of coarse sand, organic matter, and gravel.		
66			66.0'			24" RECOVERY		
69	2/6/09	20	69.0'	2	aganna	Saturated stiff and fine and the state of	A 4(0)	
	2/0/09	20	09.0	2 5 9 12		Saturated stiff gray fine sandy silt w/ some clay, trace of coarse sand, organic matter, and	A-4(0)	
			74.0			gravel.		
			71.0'			21" RECOVERY		
72								

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

					_			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	_							
		21	74.0'	4 8 10 11		Saturated very stiff gray clayey fine sandy	A-4(0)	
75				10 11		silt, trace of organic matter and coarse sand.		
			76.0'			23" RECOVERY		
			70.0			23 RECOVER I		
78								
		22	79.0'	5 10 19 23		Saturated medium dense gray silty fine sand,	A-2-4(0)	
				19 23		trace of organic matter and coarse sand.		
81			81.0'			22" RECOVERY		
01			01.0		1	22 RECOVERT		
84						DNALL		
		23	84.0'	9 19 29 35		Saturated dense green silty fine sand, trace of	A-2-4(0)	Glauconitic
				29 35		organic matter and coarse sand.		
			86.0'			20" RECOVERY		
	· ·	71	55.0		-			
87	_			•				
							_	
						PHICT ON	15	
		24	89.0'	6 8		Saturated medium dense gray and green silty	A-2-4(0)	Glauconitic
90				11 15		fine sand, trace of organic matter and coarse sand.		
			91.0'			19" RECOVERY		
02								
93								
		25	94.0'	4 7 11 13		Saturated very stiff gray silty clay w/ some	A-7-6(28)	
				13		organic matter, trace of fine sand.		
96			96.0'			24" RECOVERY		
99		- 00	00.01	4				
		26	99.0'	4 17 28 32		Saturated dense gray silty fine sand, trace of organic matter, coarse sand, and gravel.	A-2-4(0)	
				32		organic matter, coarse sand, and graver.		
			101.0'			19" RECOVERY		
<u> </u>						End of Boring		

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty low plasticity clay

Silt

Poorly graded sand with silt



Silty sand



Poorly graded clayey silty sand



Low plasticity clay

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 2/4/2009 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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

Contract: 25-113-01

Boring Location: Sta. 629+57.39, 90' Rt. C.L.

Boring Surface Elev.: 76.67 Reference:

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

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0' 77.0'

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 45.7 76.7 1/25/08 34.0' 31.0' 36.0

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: Dia. U-Sample Boring: U-Samples: 77.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: J. Hillebrand

Depth	Daily		Sample					
(ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		1	0.0'	5 3 4 4		Wet firm light brown clayey silt, trace of fine	A-4(6)	8" Cultivated Soils
				4 4		to coarse sand.		
			2.0'			10" RECOVERY		
2.49	N	2	2.0'	3 3 2 3		Wet firm light brown fine sandy silt w/ some	A-2-4(0)	
		M		2 3		coarse sand and clay.		
	•			•				
			4.0'			24" RECOVERY		
		3	4.0'	2 3 6 8		Wet firm light brown fine to coarse sandy silt,	A-4(1)	
4.98				6 8		trace of gravel and clay.		
				1		5001 20		
			6.0'			14" RECOVERY		
		4	6.0'	4 7 7 7		Wet medium dense orange brown clayey fine	A-2-4(0)	
				7 7		to coarse sand, trace of gravel.		
7.47								
			8.0'			24" RECOVERY		
		5	8.0'	3 4 5 7	11 12 11 11 12 12 12 12 12 12 12 13 13 14 14	Wet loose orange brown fine sand w/ some	A-2-4(0)	
				5 7	intranțet. Netranice Gerrina	coarse sand and silt, trace of gravel.		
					inivitati 411)3966 11132141			
9.96			10.0'			19" RECOVERY		
		6	10.0'	6 6 13 11		Wet medium dense orange brown silty fine	A-7-6(1)	
				13 11		sand w/ some coarse sand.		
			12.0'			10" RECOVERY		
12.45		7	12.0'	4 4		Wet stiff reddish brown fine sandy clay w/	A-2-4(0)	
				4 4 8 9		some coarse sand, trace of gravel.		

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
(,	- 3.200	8	14.0'	5	14" RECOVERY	A-2-7(0)	
14.94		Ü	14.0'	5 7 11 11	Wet very stiff reddish brown fine sandy clay w/ some coarse sand.	A-2-7(0)	
		9	16.0' 16.0'	11 11	16" RECOVERY Wet medium dense reddish brown silty fine to	A-2-7(0)	
17.43				11 11 14 15	coarse sand, trace of gravel.		
17.43					45, 50, 60, 55, 7		
		10	18.0' 18.0'	7	17" RECOVERY Wet medium dense reddish brown silty fine to	A-2-4(0)	
			. 5.5	7 14 14 8	coarse sand w/ some gravel.	A-2-4(0)	
19.92			20.0'		8" RECOVERY		
00.44					DRAFT		
22.41							
		11	24.0'	7 7	Wet medium dense reddish brown silty coarse	A-2-4(0)	1/2
24.9		V		7 7 8 15	to fine sand, trace of gravel.		
	_			_			
			26.0		24" RECOVERY	4	
					GUST 20	16	
				1	JUOI ZU		
27.39							
		12	29.0'	2	W. d. P. L.d. L. L. L. L. C.	A 2 4(0)	
29.88		12	29.0	2 4 4 9	Wet loose light brown and reddish brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
29.88				9	to course said wy some sin, nace of graven		
		U-1	31.0' 31.0'		24" RECOVERY Saturated medium dense light brown and	A-2-4(0)	Press Sample - Shelby Tube.
					reddish brown fine to coarse sand w/ some	11 2 T(U)	11000 Sample Shelby 1 doc.
32.37					silt, trace of gravel.		
			32.8'		18" RECOVERY		
		13	34.0'	4 6 7	Saturated medium dense brown fine to coarse	A-2-4(0)	
34.86				7 9	sand w/ some silt, trace of gravel.		
			36.0'		24" RECOVERY		
37.35							

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

Depth	Daily		Sample	DI/0"		Consolo Benediation	01 (0.1	Domestic.
(ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		14	39.0'	7 7		Saturated medium dense reddish brown fine	A-3	
39.84				7 7 9 10		to coarse sand w/ some silt.		
			41.0'			24" RECOVERY		
42.33								
					jairja Gringe Gringe			
					6614366 January 6613366			
		15	44.0'	11			1.2.4(0)	
44.82		15	44.0	11 11 10 17		Saturated medium dense reddish brown fine to coarse sand w/ some silt.	A-2-4(0)	
				17		DDAET		
			46.0'			24" RECOVERY		
47.04	_							
47.31	N	4					$\supset I \setminus I$	
		N١				OR BIDI		IG
	_			_				
		16	49.0'	11 14 21 24		Saturated dense brown fine sand w/ some	A-3	
49.8				24		coarse sand and silt.	15	
				1				
			51.0'			14" RECOVERY		
					::::::::::::::::::::::::::::::::::::::			
52.29								
					onivici. Gradica Gradica			
		17	54.0'	11		Saturated dense brown fine to coarse sand w/	A-2-4(0)	
54.78				11 14 17 25		some silt.		
			56.0'			16" RECOVERY		
57.27								
					piti i piti. Grandini Grandini Grandini Grandini Grandini di piti.			
			F2 6'					
59.76		18	59.0'	5 9 13 15		Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-3	
55.75				15	(6.14-) (6. (6.14-) (6. (6.14-) (6. (6.14-) (6.	some course said and site		
					1:6143.68 1:61:61.61 1:61:13:06			

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

	act: 25-113	-01		1			Γ	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
			61.0'		66143166 56143166 66133166	24" RECOVERY		
	-				131 33.136 î. 126 î 33.136 î 14 î 3 3 3 6 î			
62.25	-							
	=				(11) (11) (11)			
	-				000 (436 f 000 (436 f 000 (436 f			
		19	64.0'	8		Saturated medium dense brown fine sand w/	A-2-4(0)	
64.74	_			8 11 13 15	10013300 100133000 300173000 4013300	some coarse sand and silt.	112 1(0)	
	-				inidier. Vergeer Gererati			
	-		66.0'		intrinti 664) 3966 intrinijer.	24" RECOVERY		
	_				11111111111111111111111111111111111111			
67.23	-				130 1436 F 130 1436 F 130 143 153 153 153 153 153 153 153 153 153 15			
01.20]							
	_							
	-	20	69.0'	10 12		Saturated dense brown fine sand w/ some	A-3	
69.72	1			10 12 21 20	nei 7370 16143166 Januarian 66433166	coarse sand, trace of silt.		
	=				liti i alitici. Neci anno e			
			71.0'		66143166 6 1486 6 1486 6 1486	19" RECOVERY		
		M				()R"BII)I		J(j
72.21] "	,		•	in <mark>t a</mark> hat e fa Not I (4 in 6 Int I a me f			
			_					
		21	73.0'	7		Visual Description: Saturated medium dense	15	Sample brought to GTA lab
	_			10 17 24		light brown clayey fine to coarse sand.		for pH testing.
	-		_					
74.7	-		75.0'			18" RECOVERY		
	=	22	75.0'	8 13 18 20	rairraci 611)346 Etimiet.	Saturated dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
				20		coarse said and site.		
	_		77.01			12" PEGGVERV		
77.19			77.0'			12" RECOVERY Boring terminated at 77.0 feet.		
	=					C		
	_							
79.68	-							
]							
	-							
82.17	-							
	-							
	-							
]							
	1	I	1		I		I	I

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty low plasticity clay

Clayey sand

1.030000 1.0300000 Poorly graded sand with silt

Silty sand

Silt

Elastic silt

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 1/25/2008 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.

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-08-02

Contract: 25-113-01

Boring Location: Sta. 629+22.39, 90' Lt. C.L.

Boring Surface Elev.: 77.13 Reference:

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

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0' 77.0'

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 50.1 77.1 1/26/08 29.0' 27.0' 31.0

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: Dia. U-Sample Boring: U-Samples: 77.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Rem	narks
		1	0.0'	3333	Wet firm brown silt w/ some clay, trace of A-4(3) 10" Cultivated fine to coarse sand.	d Soils
2.49		2	2.0'	2 2 2 4	Wet soft brown silt w/ some clay, trace of fine to coarse sand. A-4(4)	
4.98		3	4.0' 4.0'	3 4 6 6	10" RECOVERY Wet loose brown fine to coarse sand w/ some silt. 10" RECOVERY	
7.47		4	6.0'	4 6 8 8	Wet stiff orange brown fine sandy silt w/ some coarse sand, trace of gravel. A-4(1) 20" RECOVERY	
9.96		5	8.0'	4 5 6 9	Wet medium dense orange brown clayey gravel and coarse sand w/ some fine sand. 22" RECOVERY	
		6	10.0'	6 7 9 9	Wet medium dense light brown silty fine sand, trace of coarse sand. 24" RECOVERY	
12.45		7	12.0'	10 11 9 9	Wet very stiff reddish brown organic fine to coarse sandy silt w/ some gravel, trace of clay. A-7-6(1)	

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

18.90	Depth	Daily	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
14.0	(ft.)	Progress	_				·	1.5.1(0)	
16.0			0	14.0'	9			A-2-4(0)	
16.0	14.94				13				
17.42							matter.		
17.42				16.0'			10" RECOVERY		
of gravel. 10 18.0 18.0 24 RECOVERY 10 18.0 25 Wet medium dense reddish brown clayey coarse to fine sand w/ some gravel. 19.92 DRAFT 10 24.0 4 24 Wet look light brown silty-fine to coarse sand w/ some gravel. 11 24.0 4 25 Wet look light brown silty-fine to coarse A-2.4(0) Gravel sand w/ some gravel. 22.41 Wet look light brown silty-fine to coarse A-2.4(0) Gravel sand w/ some gravel. 23.37 28.0 22° RECOVERY 24.80 22° RECOVERY 25.80 22° RECOVERY 26.80 20° RECOVERY 27.39 20° RECOVERY 29.0 3 4 5 5 5 5 5 5 5 5 5			9		8			A-2-7(0)	
of gravel. 10 18.0 18.0 24 RECOVERY 10 18.0 25 Wet medium dense reddish brown clayey coarse to fine sand w/ some gravel. 19.92 DRAFT 10 24.0 4 24 Wet look light brown silty-fine to coarse sand w/ some gravel. 11 24.0 4 25 Wet look light brown silty-fine to coarse A-2.4(0) Gravel sand w/ some gravel. 22.41 Wet look light brown silty-fine to coarse A-2.4(0) Gravel sand w/ some gravel. 23.37 28.0 22° RECOVERY 24.80 22° RECOVERY 25.80 22° RECOVERY 26.80 20° RECOVERY 27.39 20° RECOVERY 29.0 3 4 5 5 5 5 5 5 5 5 5					11			· /	
18.0	47.40				10				
10 18.0 9	17.43								
19.92			40		0				
19.92 19.92			10	18.0	7 7			A-2-7(0)	
11 24.0 24					5		coarse to fine sand w/ some gravel.		
11 24.0 24									
11 240 14 240 15 240 15 240 16 240	19.92			20.0'			10" RECOVERY		
11 24.0 5 Wet loose light brown silty fine to coarse A-2-4(0) C									
11 24.0 5 Wet loose light brown sitty fine to coarse A-2-4(0) C									
11 24.0 5 Wet loose light brown sitty fine to coarse A-2-4(0) C									
11 24.0 5 Wet loose light brown silty fine to coarse A-2-4(0) C									
11 24.0 5 Wet loose light brown sitty fine to coarse A-2-4(0) C									
11 24.0 5 Wet loose light brown sitty fine to coarse A-2-4(0) C	22.41						IJKAFI		
26.0°									
26.0									
26.0									
26.0			11	24.0'	6 4		Wet loose light brown silty fine to coarse	A-2-4(0)	
27.39 28.0 28.0 28.0 29.88 29.88 31.0 31.0 20" RECOVERY Saturated loose light brown fine to coarse sand w/ some silt, trace of gravel. 20" RECOVERY A-2-4(0) Press Sample - Shelby Tube Saturated loose light brown and reddish brown fine to coarse sand w/ some silt, trace of gravel. 20" RECOVERY A-2-4(0) A-2-4(0) A-2-4(0) A-2-4(0) A-2-4(0) Saturated loose brown fine to coarse sand w/ some silt, trace of gravel. 20" RECOVERY A-2-4(0) A-2-4(0) A-2-4(0) Saturated loose brown fine to coarse sand w/ some silt.	24.9		\mathbf{V}		4 4				
12 29.0' 3		_			_				
12 29.0' 3									
27.39 28.0' 28.0' 22" RECOVERY 12 29.0' 3 4 6 7			11-1					2.4(0)	Dragg Comple Challey Tube
27.39 28.0' 29.0' 3			0-1	20.0				A-2-4(0)	Press Sample - Shelby Tube
28.0'					10		sand w/ some sin.		
12 29.0' 3	27.39								
29.88 31.0' 31.0' 20" RECOVERY 32.37 34.86 36.0' Saturated loose brown fine to coarse sand w/ some silt, trace of gravel. A-2-4(0) Some silt.				28.0'			22" RECOVERY		
29.88 31.0' 31.0' 20" RECOVERY 32.37 34.86 36.0' Saturated loose brown fine to coarse sand w/ some silt, trace of gravel. A-2-4(0) Some silt.									
29.88 31.0' 31.0' 20" RECOVERY 32.37 34.86 36.0' Saturated loose brown fine to coarse sand w/ some silt, trace of gravel. A-2-4(0) Some silt.									
29.88 31.0' 31.0' 20" RECOVERY 13 34.0' 5 13 34.0' 5 2 13.5' 4 21.55 5 4 21.55 5 4 21.55 6 4 21			12	29.0'	3		Saturated loose light brown and reddish	A-2-4(0)	
31.0' 20" RECOVERY 32.37 13 34.0' 4 3322 Saturated loose brown fine to coarse sand w/ some silt. 34.86 36.0' 24" RECOVERY	29.88				6 7			· /	
32.37 34.86	20.00				,		of gravel.		
32.37 34.86									
13 34.0'				31.0'		-	20" RECOVERY		
13 34.0'									
13 34.0'									
34.86 36.0' 36.0' 36.0' 24" RECOVERY	32.37								
34.86 36.0' 36.0' 36.0' 24" RECOVERY									
34.86 36.0' 36.0' 36.0' 24" RECOVERY									
34.86 36.0' 36.0' 36.0' 24" RECOVERY									
34.86 36.0' 36.0' 36.0' 24" RECOVERY			13	34.0'	4 5		Saturated loose brown fine to coarse sand w/	A-2-4(0)	
36.0' 24" RECOVERY	3/1 86				5 5) ·	11 2 T(0)	
36.0'	34.00				4				
36.0'									
37.35				36.0'			24" RECOVERY		
37.35	<u> </u>								
37.35 billion						150 JA 116 150 JA 116 150 JA 116			
	37.35					bairid 441146	<u> </u>		

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

			I -	ı				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
					0:01/3:00 0:01/3:00 0:01/01:01 0:01/01:00			
					1:0 13.1]00 1:0 1 1 13:0 0 1:0 1 3 3:0 0 1:0 1 1:0 1:0 1			
		14	39.0'	4		Saturated medium dense orange brown fine	A-2-4(0)	
39.84				4 5 10 13		sand w/ some coarse sand and silt.	11 2 4(0)	
			41.0'			24" RECOVERY		
42.33								
		4.5	44.01	0				
44.82		15	44.0'	9 11 12 14		Saturated medium dense orange brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
				14		DDAET		
			46.0'			24" RECOVERY		
47.31	_	_						
77.51						FOR BIDI	JIV	JG
		V				OR DIDL	ノ Ш`	
49.8		16	49.0'	10 11 13 13		Saturated medium dense brown fine to coarse sand, trace of silt.	A-3	
49.0				13		said, trace of site.		
			51.0'	1		24" RECOVERY		
			31.0		(:	24 RECOVERT		
					11.63 4 3 16 6 12.61 1 2 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
52.29					100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
					nie dichier nie da dance nie da diche dichieranie			
					664)3366 66433366 8644366			
		17	54.0'	11 14 15 21		Saturated medium dense brown fine to coarse	A-2-4(0)	
54.78				21		sand w/ some silt.		
			56.0'		63 (44) 6 ((6 () 19 () 6 ((6 () 19 () 6 ((6 () 19 () 6 (17" RECOVERY		
					11.6143166 14414166 164141666 16414166			
57.27					100 1 7 7 7 10 10 10 1 1 4 2 16 9 10 1 1 1 7 7 10 1			
					166333366 166333666 166333666 166333666			
);tir;iti 661);iti 1313;iti 1513;iti 1513;iti			
		18	59.0'	7 8		Saturated medium dense brown fine sand w/	A-3	
59.76				8 12 13	### # # ### ## ### ###################	some coarse sand, trace of silt.		

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(***)			61.0'		0014100 011700 011700	24" RECOVERY		
					100 1 1 3 1 0 0 0 100 1 1 3 1 0 0 100 1 1 3 1 0 0			
62.25					122 12 12 12 12 12 12 12 12 12 12 12 12			
					100 1 0 4 10 0 100 1 2 3 10 0 100 1 0 1 0 1			
					######################################			
		19	64.0'	11 10 13 13		Saturated medium dense brown silty fine sand	A-2-4(0)	
64.74				13 13		w/ some coarse sand.		
	<u> </u>							
			66.0'			18" RECOVERY		
67.23								
						DDAET		
69.72		20	69.0'	15 12 13 14		Saturated medium dense brown fine sand w/	A-3	
09.72	1			14	061 (1966) 061 (1966)	Some coarse same, mace of sint.		
					######################################			
			71.0'		1. 1759; (1. 1759; (24" RECOVERY		
		M				TOR BILL		JG
72.21				•	12 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
					166 3 A 116 f 176 1 7 3 7 0 0 166 1 3 3 16 6			
		21	73.0'	17	121775 11116 11116	Visual Description: Saturated dense gray silty	15	Sample brought to GTA lab
			75.0	17 20 22 29		fine sand, trace of coarse sand		for pH testing.
				29	1	5001 20		
74.7								
		22	75.0' 75.0'	16		12" RECOVERY Saturated dense gray silty fine sand, trace of	A-2-4(0)	
			. 5.5	16 19 23 25		coarse sand.	A-2-4(0)	
				20				
			77.01			10" BECOVERY		
77.19			77.0'			Boring terminated at 77.0 feet.		
						2		
-								
-								
79.68	-							
00.47								
82.17								
	1							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity clay



Silt



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 1/26/2008 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.

75.0'

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

F.A. Project: U.S. 301, Maryland State Line to I-95 **Boring No.:** BR1-08-03

Contract: 25-113-01

Boring Location: Sta. 629+30.71, at C.L.

Boring Surface Elev.: 75.88 Reference:

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

Core Bit: O.D. 3 1/4 Inches From Depth of:

To: To: **Casing Size:** Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Casing Elev. of Water **Depth of Water** Time **Depth of Hole** Date 44.9 75.9 75.9 75.9 1/30/08 34.0' 31.0' 36.0

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: Dia. U-Sample Boring: U-Samples: 75.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	•	1	1.0' 2.0'	3 4	Wet firm brown clayey silt w/ some fine sand, trace of coarse sand. 8" RECOVERY	A-4(6)	6" Asphalt
2.49		2	2.0'	7 7 7 6	Wet stiff brown clayey fine sandy silt w/	A-4(1)	
			4.0'	Т	some coarse sand, trace of gravel. 10" RECOVERY		JG
	_	3	4.0'	7 6 7	Wet stiff brown clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(2)	
4.98			6.0'	ĺ	18" RECOVERY	15	
		4	6.0'	7 8 7	Wet medium dense brown clayey coarse to fine sand, trace of gravel.	A-2-4(0)	
7.47			8.0'	9	24" RECOVERY		
		5	8.0'	4 5 9 9	Wet medium dense brown silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
9.96			10.0'		20" RECOVERY		
		6	10.0'	9 11 9 10	Wet medium dense light brown silty fine sand, trace of coarse sand.	A-2-4(0)	
			12.0'	6	20" RECOVERY		
12.45		7	12.0'	6 6 7 9	Wet medium dense light brown silty fine sand w/ some gravel, trace of coarse sand. 17" RECOVERY	A-2-4(0)	
		8	14.0'	4 6 12 14	Wet medium dense reddish brown clayey fine to coarse sand, trace of gravel.	A-2-6(0)	

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		9	16.0' 16.0'	7	14" RECOVERY Wet medium dense reddish brown silty coarse	A-2-4(0)	
				7 5 6 7	to fine sand, trace of gravel.	N-2-4(0)	
17.43							
		10	18.0' 18.0'	3	17" RECOVERY	A 2 4(0)	
		10	10.0	3 4 4 5	Wet loose reddish brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
19.92			20.0'		12" RECOVERY		
		U-1	20.0'		Saturated reddish brown clayey fine to coarse sand w/ some silt and gravel.	A-2-7(0)	Press Sample - Shelby Tube
					<u></u>		
			22.0'		19" RECOVERY		
22.41							
					DBVFI		
		11	24.0'	4 5 7	Wet medium dense brown silty fine to coarse	A-2-4(0)	
24.9		1		7	sand, trace of gravel.		
		V	26.0'		14" RECOVERY	יווע	IG
	_		20.0	_	TT RECOVERY		
			Λ		OUT OO	4 [
27.39					GUST 20		
					300120		
				4			
29.88		12	29.0'	4 4 4 4	Wet loose brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
29.00				4	, g		
			31.0'		18" RECOVERY		
32.37							
		13	34.0'	5	Saturated medium dense brown fine to coarse	A-2-4(0)	
34.86		10	0 1.0	5 8 9 10	sand w/ some silt, trace of gravel.	A-2-4(0)	
			36.0'		24" RECOVERY		
37.35							

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(11.)	Flogress		Берит					
		14	39.0'	7 8 12 12		Saturated medium dense brown fine sand w/	A-2-4(0)	
39.84				12		some coarse sand and silt, trace of gravel.		
			41.0'			24" RECOVERY		
			41.0		-	24 RECOVERT		
40.00								
42.33								
44.82		15	44.0'	10 14 17 26	etiaiei. Mairaiei Mairaiei	Saturated dense brown fine sand w/ some coarse sand and silt.	A-3	
11.02				20	66134166 66134166 6613466			
			46.0'		6617666 1119766 1114166	24" RECOVERY		
					13 14 14 16 6 13 14 14 14 16 16 16 16 16 16 16 16 16 16 16 16 16	DDAET		
47.31					00313000 0013300 0013300 0013300			
					onividio Compres Compres Compres			
	A	1		Т	0614366 0717760 6 1386 6 13167	OD DIDI		
		16	49.0'	5 9		Saturated medium dense brown fine sand w/	A-3	
49.8	_			10 13	20112121 20112121 20112121	some coarse sand, trace of silt.		
			Λ			DILICT ON	4 -	
			51.0'			24" RECOVERY		
						300.20		
52.29					61313166 1813166 1813166			
					onivicio Composico Cinicio Composico			
					00143166 02012121 0213126 0213126			
F4.70		17	54.0'	16 18 22 26	1001 (4104 1001 (4104 1001 (4104 1001 (4104 1001 (4104 1001 (4104 1001 (4104)	Saturated dense brown fine sand w/ some	A-3	
54.78				26		coarse sand, trace of gravel.		
			56.0'		000 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	24" RECOVERY		
					1.61),441,6 1.614,166 1.614,166 1.611,131,66			
57.27					13 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
					00000000000000000000000000000000000000			
					raturitu Gerlinica Gerlinica Gerranca			
		18	59.0'	7	06133166 20172261	Saturated medium dense brown fine sand w/	A 2 4(0)	
59.76		10	33.0	7 9 16 20	1836.1666 1613.1666 1613.1666 1613.1666	some coarse sand and silt.	A-2-4(0)	
					664 1346 6 1873 1967 1861 7436 6 1861 7436 6 1861 7436 6			
			61.0'			24" RECOVERY		
					1361 Y 1361 411 1 1 1 1 1 1 1 11 1 1 1 1 1 1 1 1 1			
				1			ı	

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

	act. 25-115	· ·		T			Г	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
62.25					GERFRE PRITING GERRANG GERRANG			
					120 1 7 4 10 1 100 1 2 7 1 10 0 170 1 7 1 10 1 170 1 1 1 1 1 1 1 1			
					er innier Nordanier			
		19	64.0'	9		Saturated medium dense brown fine sand,	A-3	
64.74				9 11 16 14		trace of coarse sand and silt.		
			66.0'		6617766 66177766 66177766 76177766	24" RECOVERY		
67.23					100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
					riiriii. Certiic Giriiri			
					66143166 1217121 6613466			
		20	69.0'	9	130 3 3 3 3 3 5 5 120 3 3 3 3 5 5 120 3 3 3 3 5 5		A 2	
69.72		20	09.0	9 10 11 10	131 Y 131 1 61 1 1 1 1 1 1 1 1 61 1 1 1 1 1 1 1	Saturated medium dense brown fine sand, trace of coarse sand, silt, and gravel.	A-3	
				10		I)RAFI		
			71.0'		00 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	20" RECOVERY		
					(34 (4) (4) (34 (4) (3) (4) (34 (4) (4) (4) (34 (4) (4) (4) (4) (4) (4) (4) (4) (4)			
72.21		1						
		V			15 14.00 10	UR DIDI		
	_	21	73.0'	10 17 27	1217 14:00	Saturated dense brown silty fine sand, trace of	A-2-4(0)	
				27 29		coarse sand and gravel.	4 -	
74.7						4U.ST 70	15	
			7 <mark>5</mark> .0'	10		24" RECOVERY Boring terminated at 75.0 feet.		
77.19								
79.68								
82.17								
84.66								
5 7.00								

KEY TO SYMBOLS

Symbol Description

Strata symbols

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 1/30/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
- 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.

46.0'

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

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR1-08-04

Contract: 25-113-01

Boring Location: Sta. 629+05.87, 93' Rt. C.L.

Boring Surface Elev.: 76.00 Reference:

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

Core Bit: O.D.

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

Water Level Readings

Elev. of Water Time **Depth of Hole Depth of Casing Depth of Water** Date 44.2 76.0 1/25/08 34.0' 31.8' 36.0 76.0 76.0

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: Dia. U-Sample Boring: U-Samples: 76.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: J. Hillebrand

Depth	Daily		Sample				
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 3 3 3	Wet firm orange clayey fine sandy silt w/	A-4(3)	5" Cultivated Soils
				3	some coarse sand.		
			2.0'		14" RECOVERY		
2.49		2	2.0'	2 2 2 2 3	Wet soft brown silt w/ some fine sand, trace	A-4(4)	
		V		3	of coarse sand and gravel.	<i></i>	
	_			_			
			4.0'		16" RECOVERY		
		3	4.0'	2 6 7 11	Wet stiff orange fine to coarse sandy clay,	A-6(1)	
4.98				11	trace of gravel.		
			6.0'		15" RECOVERY		
		4	6.0'	6 7 8 7	Wet medium dense orange silty fine to coarse	A-2-4(0)	
				7	sand, trace of gravel.		
7.47							
			8.0'		20" RECOVERY		
		5	8.0'	4 7 7	Wet medium dense orange silty fine to coarse	A-2-4(0)	
				9	sand.		
9.96			10.0'		19" RECOVERY		
		6	10.0'	5 7 8 10	Wet medium dense orange silty fine sand w/	A-2-4(0)	
				10	some coarse sand.		
			12.0'		21" RECOVERY		
12.45		7	12.0'	8 12 13 10	Wet medium dense orange fine to coarse sand	A-2-4(0)	
				13	and gravel w/ some silt.		

Remarks: Mud Rotary @ 46.0

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(111)		8	\ 14.0' /	4		17" RECOVERY	A-2-4(0)	
14.94			14.0'	4 8 11 14		Wet medium dense green and brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			16.0'			15" RECOVERY		
		9	16.0'	8 10 12 17		Wet medium dense red and orange silty coarse to fine sand, trace of gravel.	A-2-4(0)	
17.43								
		10	18.0' 18.0'	4		18" RECOVERY Wet medium dense red and orange silty	A-2-4(0)	
				4 6 7 10		coarse to fine sand w/ some gravel.		
19.92			20.0'			16" RECOVERY		
22.41						DRAFI		
						_		
		11	24.0'	4 4		Wet loose brown silty coarse to fine sand,	A-2-4(0)	
24.9		V		4 4 5 6		trace of gravel.		
			26.0			19" RECOVERY		
		U-1	26.0'			Saturated loose reddish orange fine to coarse sand w/ some silt.	A-2-7(0)	Press Sample - Shelby Tube
27.39			20.01			All DECOVEDY		
		12	28.0' 28.0'	4 4		24" RECOVERY Wet loose orange fine to coarse sand w/ some	A-2-4(0)	
				4 5		silt, trace of gravel.		
29.88			30.0'			24" RECOVERY		
32.37								
		13	34.0'	4		Cotamotal and disable days because Control	A 2 4(0)	
34.86		13	34.0	4 6 7 9		Saturated medium dense brown fine to coarse sand w/ some silt.	A-2-4(0)	
			00.5			A W DUGOVEDAY		
			36.0'			24" RECOVERY		
37.35					1913.1961 1911.73710 1911.73710 1911.73710 1911.73710 1911.73710			
	1	<u> </u>	L	L	h:::::	1		I

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

Depth	Daily	Nie	Sample	Blows/6"		Comple Description	Clear /C !	Domostr
(ft.)	Progress	No.	Depth	Blows/6"	ista kasins	Sample Description	Class./G.I.	Remarks
					01143100 121741212 44434101			
					126 1 4 4 1 1 1 1 126 1 2 3 3 1 1 1 1 126 1 2 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
		14	39.0'	8 10		Saturated medium dense brown fine sand w/	A-2-4(0)	
39.84				8 10 15 18		some coarse sand and silt.		
			41.0'			22" RECOVERY		
42.33								
		4.5	44.01	0				
44.82		15	44.0'	9 12 13 19		Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
11.02				19	020 17 03 00 0 60 10 9 16 6 60 10 10 10 6 60 10 10 10 6 60 10 10 10 6			
			46.0'			18" RECOVERY		
47.04								
47.31	N	1			6 4 3 6 5 1 Trick (2 13:0 6			
		M			ii dalei na galee G. galee	OR BIDI		IG
	•			•	c = 131 c C			
		16	49.0'	11 12 13 15		Saturated medium dense brown fine sand w/	A-3	
49.8				15		some coarse sand, trace of silt.	15	
				10				
			51.0'		,	18" RECOVERY		
52.29					1973.196 1973.198 1973.198			
					on or other Constraint Constraint Constraint			
		17	54.0'	13		Saturated medium dense brown fine sand w/	A-3	
54.78				13 14 15 19		some coarse sand, trace of silt.	113	
			56.0'			20" RECOVERY		
57.27								
					0017300 0117300 1017300			
59.76		18	59.0'	9 10 12 14		Saturated medium dense brown fine sand w/	A-3	
39.76				14	034440.66 03919:05 1391419:06	some coarse sand, trace of silt.		

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
` /			61.0'		06143166 John Tribor Gerring	16" RECOVERY		
62.25					endiciei. Medalee Gedalee Dearlee			
02.20					664)3466 66334766 9644366			
					inividi. 1113116 111316			
0474		19	64.0'	8 13 16 21		Saturated medium dense brown fine sand w/	A-3	
64.74				21	0111100 Jerylali 4111100 Gualet	some coarse sand, trace of silt.		
			00.01			1 (II PEGOVERY		
			66.0'			16" RECOVERY		
67.23					11177111 11177111 11177111			
					orivier Grinner Grinner Brinner			
		20	69.0'	7 10 11 12		Saturated medium dense brown fine sand w/	A-3	
69.72				11 12	111111111111111111111111111111111111111	some coarse sand, trace of silt and gravel.		
		_			6614166 6614166 6614166			
		+	71.0'		65 (44),664 (6 19:66) (6 14)466 (6 17)466	17" RECOVERY	$\bigcup IV$	
		V			10 4 3 6 6 6 1 4 4 5 6 6 6 1 5 6 6 6		JII '	
72.21					150 13.1566. Veri 22.000 Veri 22.000 Zeri 17.200			
			Λ		00113:00 0013:00 00173:00 00143:00	DILICT ON	1	
						3USI 7U		
		21	74.0'	6 9 14 15		Saturated medium dense gray clayey fine	A-2-4(0)	
74.7				14 15		sand, trace of coarse sand and gravel.		
			76.0'			24" RECOVERY Boring terminated at 76.0 feet.		
						Doring terminated at 10.0 feet.		
77.19								
79.68								
82.17								

KEY TO SYMBOLS

Symbol Description

Strata symbols

Low plasticity clay



Clayey sand



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 1/25/2008 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.

46.0'

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

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR1-08-05

Contract: 25-113-01

Boring Location: Sta. 629+74.82, 86' Lt. C.L.

Boring Surface Elev.: 76.79 Reference:

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

U-Sampler: Core Bit: O.D.

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

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 1/25/08 39.0' 33.7 41.0 43.1 76.8 76.8 76.8

Pay Quantities:

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

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: D. Zmijewski

		1		1	1			T
Depth	Daily	No.	Sample	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress		Depth					
		1	0.0'	6 5 4 5		Wet stiff brown silt w/ some clay, trace of	A-4(3)	6" Cultivated Soils
				5		fine to coarse sand.		
			2.0'			16" RECOVERY		
2.49		2	2.0'	5 8 10 8		Wet very stiff brown silt, trace of fine to	A-4(6)	
				10 8		coarse sand and clay.		
		—						
			4.0'_			20" RECOVERY		
		3	4.0'	2		Wet firm brown silt w/ some clay, trace of	A-4(3)	
				2 3 4 5		fine to coarse sand and gravel.		
4.98								
			6.0'			19" RECOVERY		
		4	6.0'	6 7		Wet stiff brown clay w/ some fine to coarse	A-6(3)	
				10		sand and gravel.	(-)	
						sand and graver.		
7.47			7.5'			16" RECOVERY		
		4A	7.5'	12		Wet medium dense orange silty coarse sand	A-1-b	
		5	8.0' 8.0'	6		\ \w/\ some fine sand, trace of gravel.	A-2-4(0)	
			0.0	6 7 7 8		6" RECOVERY	A-2-4(0)	
				8		Wet medium dense orange fine to coarse sand		
1						w/ some silt, trace of gravel.		
9.96			10.0'			24" RECOVERY		
9.30		6	10.0'	9		Wet medium dense orange silty fine sand,	A-2-4(0)	
		ľ	10.0	11 9 11		trace of coarse sand.	A-2-4(0)	
				11		trace of coarse sand.		
1								
			40.01			A UI DEGGLUEDY		
		7	12.0' 12.0'	16		24" RECOVERY	A 4(0)	
12.45		Ι΄	12.0	16 15		Wet hard orange fine sandy silt w/ some	A-4(0)	
L			13.0'			coarse sand and gravel. 12" RECOVERY		
		7A	13.0'	14 16		Wet medium dense brown gravel and fine	A-1-b	
				10				
I	I			1		sand w/ some silt and coarse sand.		

Remarks: Mud Rotary @ 46.0

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"			Sample Description	Class./G.I.	Remarks
		8	14.0'	6			12" RECOVERY	A-2-4(0)	
14.94		Ü	14.0'	6 12 23 10			Wet dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			16.0'				18" RECOVERY		
17.43		9	16.0'	14 17 21 19			Wet dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
17.40			18.0'				22" RECOVERY		
		10	18.0' 19.0'	9 8			Wet medium dense brown coarse to fine sand w/ some gravel and silt. 12" RECOVERY	A-1-b	
		10A	19.0'	5 11			Wet medium dense brown gray silty coarse to	A-2-4(0)	
19.92		U-1	20.0'				fine sand, trace of gravel. 3" RECOVERY	A-2-7(2)	Press Sample - Shelby Tube
		0 1	20.0				Saturated medium dense brown clayey fine to coarse sand w/ some silt, trace of gravel.	A-2-1(2)	Press Sample - Sheloy Tube
			22.0'				24" RECOVERY		
22.41							DRAFI		
		11	24.0'	8 6			Wet medium dense brown and light brown	A-2-4(0)	
24.9		N '	25.0'				silty coarse to fine sand, trace of gravel. 11" RECOVERY		
		11A	25.0'	8 9			Wet medium dense light brown silty fine to	A-2-4(0)	
			26.0				coarse sand, trace of gravel.	15	
27.39				10			5001 20	10	
29.88		12	29.0'	5 6 5 9			Wet medium dense light brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
29.88				9			said wy some shi, truce of graven		
			31.0'				17" RECOVERY		
32.37									
24.00		13	34.0'	6 10 12 15			Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
34.86				15			some course said and sitt, trace of graver.		
			36.0'				24" RECOVERY		
37.35									
	_	_		_	_	_			

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

Danith	D-il.	I	01-				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	39.0'	7		1.2.4(0)	
39.84		14	39.0	7 14 20 21	Saturated dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
33.04				21	course same and smy trace of graven		
			41.0'		24" RECOVERY		
			41.0		24 RECOVERT		
42.33							
		15	44.0'	8	Saturated dense brown fine sand w/ some	A-2-4(0)	
44.82			14.0	8 16 17 22	coarse sand and silt.	A-2-4(0)	
			46.0'		24" RECOVERY		
47.31	A						
		$\mathbf{M}_{\mathbf{I}}$			-OR BIDI		J(j
				•			
		16	49.0'_	4	Saturated dense brown fine sand w/ some	A-2-4(0)	
49.8				4 10 27 50/5"	coarse sand and silt.		
					JUOI ZU		
			51.0'		22" RECOVERY		
52.29							
52.29							
		17	54.0'	18 19	Saturated dense brown fine sand w/ some	A-2-4(0)	
54.78				18 19 18 21	coarse sand and silt.		
			56.0'		19" RECOVERY		
57.27							
<u> </u>							
-		18	59.0'	17 17 20 20	Saturated dense brown silty fine sand w/ some	A-2-4(0)	
59.76				20 20	coarse sand.		

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
()	1.29.000		61.0'			19" RECOVERY		
62.25								
		19	64.0'	15 14 15 18	11134EC 11134EC 11134EC	Saturated medium dense brown fine sand w/	A-2-4(0)	
64.74				15 18		some silt and coarse sand.		
					130 13131 6 f . 196 1 1 1 1 1 1 1 1 1 136 1 3 1 1 1 1 1 1 1			
			66.0'			23" RECOVERY		
					::::::::::::::::::::::::::::::::::::::			
					04 (4) (4) (4) 13 (4) (4) 14) (4)			
67.23					000173700 001147160 001177760			
					11111111111111111111111111111111111111			
					orienien Gernaue Gernauer			
		20	00.01	11	beer rains		. 2 4(0)	
69.72		20	69.0'	11 12 15 20		Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
				20	031703301 6413366 6433361 6434366	some sit and course said.		
			71.0'		65 (44) 66 (4 0 1996 (4 1 1996 (4	24" RECOVERY		
	'	M				24" RECOVERY		JG
72.21	•			-	126 13 13 16 C 126 13 13 16 C 126 13 13 15 C			
			_		, 11 ti			
					11111111111111111111111111111111111111	THET ON	115	
					eriane.	1001 /U		
		21	74.0'	9 20		Saturated hard brown fine sandy silt, trace of	A-4(0)	
74.7				9 20 26 37		coarse sand and clay.		
			76.0'			24" RECOVERY		
						Boring terminated at 76.0 feet.		
77.19								
11.18								
79.68								
<u> </u>								
82.17								

Symbol Description

Strata symbols

Silty low plasticity clay

Low plasticity clay

silt



Silty sand



Poorly graded sand with silt



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 1/25/2008 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.

38.0

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

F.A. Project: U.S. 301 maryland State Line to S.R. 1 Boring No.: BR1-4-9

Contract: 25-113-01

Boring Location: Sta. 830+12, 90' Lt. C.L.

Boring Surface Elev.: + 27.4 Reference:

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

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 9/25/2009 6.0 4.0 4.0

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.; Dia. U-Sample Boring: U-Samples: 100 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Jason Truver

Helpers: J. Lafferty

Depth	Daily	No.	Sample	Blows/6"			Sample Description	Class./G.I.	Remarks
(ft.)	Progress 9/25/09	1	Depth 0.0'	1	Ш		<u> </u>		F .
	9/25/09	'	0.0				Moist soft gray silt w/some clay, trace of organic matter and fine to coarse	A-4(4)	Forrest
				i			sand.		Duff - 3".
			2.0'				13" RECOVERY		
	_	2_	2.0'	1 2			Wet soft gray silt w/trace of coarse to fine sand and gravel.	A-4(0)	
3.5		V	4.0'	4			Figure 16' Recovery		
		3	4.0'	1 7 18 13			Wet medium dense grayish orange gravel and coarse sand w/some fine sand and silt.	A-1-b	
			6.0'				14" RECOVERY		
7		4	6.0'	5 7 9 9			Wet medium dense tan coarse sand w/some fine sand, trace of gravel and silt.	A-1-b	
			8.0'				24" RECOVERY		
		5	8.0'	1 1 2 5	2011 2011 2012 2013 2014 4011	1161 1161 1161 1161 1161	Wet very loose brown coarse to fine sand w/trace of silt and gravel.	A-1-b	
			10.0'		11(11) 11(11)	1.01	12" RECOVERY		
10.5		6	10.0'	5 5 7 9	2011 2012 2014 2014 2014 4014	1911 1911 1911 1911 1911 1911	Wet medium dense orange fine to coarse sand w/some silt, trace of tgravel.	A-2-4(0)	
			12.0'		11(11) 	1101	16" RECOVERY		
		7	12.0'	4 8 10 15			Wet medium dense orange fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	
14			14.0'				16" RECOVERY		
		8	14.0'	7 13 14 16			Wet medium dense orange fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
			16.0'				16" RECOVERY		
		9	16.0'	7 9 9 16			Wet medium dense orange fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	Cemented Sands
17.5				16			· ·		
		10	18.0'	6			14" RECOVERY	1 2 1(0)	
		10	18.0'	6 9 10 10			Wet medium dense orange fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	Cemented Sands

Remarks: Mud Rotary @ 38.0 feet

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

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

52.5

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
·			20.0'		16" RECOVERY		
21	l '		'				
	l '		'				
	l '		'				
	l '						
	l '	11	23.0'	8 10 21 25	Wet dense orange fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	Cemented
24.5	l '		'	21 25			Sands
2 1.0	l '	<u> </u>	25.0'		18" RECOVERY		
	l '		'				
	l '		'				
	l '		'				
28	l '		'				
	l '	12	28.0'	9 16 15 21	Wet dense orange fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	Cemented
	1		'	15 21			Sands
	l '		30.0'		18" RECOVERY		
	l '						
31.5	l '		'		DRAFI		
31.0	l '		'				
	l '		'				
	l _'	13	33.0'	9	Wet dense orange fine sand w/some coarse sand, trace of silt and gravel.	A-3	Cemented
				9 15 19 20	The delite of the said who had a sound and so had a sound and so had a sound and so had a sound a sound and so had a sound a s	113	Sands
35		N	35.0'		18" RECOVERY		
33			00.0		i i i i i i i i i i i i i i i i i i i		
	l '		'				
	l '				OLICT ON 1E		
	l '			+			
38.5	9/28/09	14	38.0'	6	wet medium dense brown fine sand w/some coarse sand, trace of silt.	A-3	Mud
30.5	0,20,00	` `	00.0	6 11 13 13	wet illeutum dense brown fine sand w/some coarse sand, trace of site.	A-3	Rotary @
	l '		40.0	13	17" PECOVERY		38.0'.
	l '	\vdash	40.0'	-	17" RECOVERY		
	l '		'				
40	l '		'				
42	l '		'	ļ			
	l '	45	10.01				
	l '	15	43.0'	8 7 10 12	Wet medium dense brown fine sand w/some coarse sand, trace of silt and	A-3	
	l '		'	12			
15 5	l '	<u> </u>	45.0'		20" RECOVERY		
45.5	l '		'				
	l '		'				
	l '		'				
	l '		!				
10	l '	16	48.0'	10 20 18 23	Wet dense green silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	Glauconit
49	l '		'	23			
	l '	<u> </u>	50.0'		21" RECOVERY		
	l '		'				
	l '		'				
	i '	1	1 '	j ,			

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	-	17	53.0'	5 7 8 11	Wet medium dense gray clayey fine sand w/trace of coarse sand and	A-2-4(0)	Glauconit
				11	gravel.		
	<u> </u> -		55.0'		22" RECOVERY		
56	_						
	-						
	-						
	1	18	58.0'	9 11 20 23	Wet dense gray clayey fine sand w/trace of coarse sand and gravel.	A-2-4(0)	Glauconit
59.5				23			
	_	_	60.0'		23" RECOVERY		
	-						
	-						
63	_						
-03	=	19	63.0'	4 7 9 11	Wet medium dense green clayey fine sand w/trace of coarse sand and	A-2-6(0)	Glauconit
				9 11	gravel.		
			65.0'		23" RECOVERY		
66.5	l N						
	1	M			-UR BIIJIJIIG		
	j "	20	68.0'	8 9 15 17	wet medium dense gray fine sand w/some clay, trace of coarse sand.	A-2-4(0)	Glauconit
				15 17			
70	_		70.0'		GUS T23" RECOVERY 15		
	-			NU	JUSI 2013		
	_						
	-						
73.5]	21	73.0'	5	Wet medium dense gray silty fine sand w/trace of coarse sand and gravel.	A-2-4(0)	
				5 8 11 17			
	-		75.0'		23" RECOVERY		
	_						
77	=						
	†						
]	22	78.0'	4	Wet medium dense gray clayey fine sand w/some gravel, trace of coarse	A-2-4(0)	
				4 8 9 11	sand.	11 2 4(0)	
	<u> </u>		80.0'		22" RECOVERY		
80.5	-						
	_						
	1						
]	23	83.0'	9	Wet medium dense green clayey fine sand w/trace of organic matter,	A-2-4(0)	Glauconit
84			33.3	9 11 17 32	gravel and coarse sand.	/1-4-4(U)	Giaucoiill
	-	L	85.0'		23" RECOVERY		
1	1					1	I

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
87.5		24	88.0'	9 17 50/5"	Wet very dense green silty fine sand w/trace of organic matter, coarse sand and gravel. 15" RECOVERY	A-2-4(0)	Glauconit
91		25	93.0'	18 22 27 32	Wet dense green clayey fine sand w/trace of organic matter, gravel and coarse sand. 23" RECOVERY	A-2-4(0)	Glauconit
98		26	98.0'	19 22 23 33	Wet dense green clayey fine sand w/trace of organic matter, gravel and coarse sand. 22' RECOVERY	A-2-4(0)	
101.5					JGUST 2015	י	
105							
112							
115.5							

Symbol Description

Strata symbols

Silt



Silty sand



Poorly graded sand



Poorly graded sand with silt



Poorly graded clayey silty sand



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 9/25/2009 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All Blows are un corrected.

F.A. Project: U.S. 301 maryland State Line to S.R. 1 Boring No.: BR1-4-10

Contract: 25-113-01

Boring Location: Sta. 830+22, 90' Lt. C.L.

Boring Surface Elev.: 26.0 Reference:

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

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0 16.0

Water Level Readings

Elev. of Water **Depth of Casing Depth of Water** Time **Depth of Hole** Date 9/23/2009 22.0 26.0 6.0 4.0 4.0

 $\frac{26.0}{26.0}$

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.; Dia. U-Sample Boring: U-Samples: 100 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: D. Zmijewski

		Г		1				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	9/23/09	1	0.5' 2.0'	3 2 3		Moist firm brownish gray silt w/some clay and coarse to fine sand, trace of gravel. 14" RECOVERY	A-4(1)	Cultivated Soil - 8".
		2	2.0'	3 4 7		Moist stiff brownish gray coarse sandy silt w/some fine sand, trace of gravel.	A-4(0)	
3.5			4.0'	7		15' RECOVERY		
		3	4.0'	3 10 10 10		Wet medium dense orangish gray mottled fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			6.0'			12" RECOVERY		
7		4	6.0' 8.0'	6 10 6 6		Wet medium dense brownish orange coarse to fine sand w/some silt, trace of gravel. 24" RECOVERY	A-2-4(0)	
		5	8.0' 10.0'	4 6 6 2		Wet medium dense tan coarse tof ine sand w/trace of silt and gravel. 6" RECOVERY	A-1-b	
10.5		6	10.0'	3 3 4 6		Wet loose tan coarse to fine sand w/trace of silt and gravel.	A-1-b	
			12.0'			20" RECOVERY		
		7	12.0'	3 6 6 8		Wet medium dense orange coarse tof ine sand w/trace of silt and gravel.	A-1-b	
14		L_	14.0'	4		17" RECOVERY		
		8	14.0'	1 1 4 6	midaicí. Pricame Prica	Wet loose orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			16.0'			17" RECOVERY		
17.5		9	16.0'	5 5 7 7		Wet medium dense orange fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	Mud Rotary @
17.5			18.0'			18" RECOVERY		16.0.
		10	18.0'	7 8 7 9		Wet medium dense orange fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	
			20.0'			14" RECOVERY		

Remarks: Mud Rotary @ 16.0 feet

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

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

Depth	Daily	I	Sample				<u> </u>
(ft.)	Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21							
		11	23.0'	6	Wet medium dense orange fine sand w/some coarse sand and silt.	A-2-4(0)	
24.5				6 8 17 15	### ##################################		
24.5			25.0'		20" RECOVERY		
					0011300 011300 011300		
28	1	12	28.0'	9 10 15 11	Wet medium dense orange fine to coarse sand w/some silt.	A-2-4(0)	
				15 11			
			30.0'		17" RECOVERY		
31.5					IIII)KAHI		
		13	33.0'	9 15 17	Wet dense orange fine sand w/some coarse sand, trace of silt.	A-3	
				21			
35		H	35.0'		21 RECOVERY		
	_			_	(213.10) (213.10) (213.10)		
38.5		14	38.0	7 17 17 20	Wet dense tan and orange fine sand w/some silt and coarse sand.	A-2-4(0)	
			40.0'	20	20" RECOVERY		
			40.0		20 RECOVERT		
42							
		15	43.0'	12	XX 1 it C 1 it C	A 2 4(0)	
		'3	45.0	12 19 26 26	Wet dense gray silty fine sand w/trace of coarse sand.	A-2-4(0)	
			45.0'		12" RECOVERY		
45.5							
		16	48.0'	10	Wet dense gray fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
49				10 20 20 20 23	3 g.u. o.	(0)	
			50.0'		24" RECOVERY		
52.5							

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/24/09	17	53.0'	8 18 21 18	Wet dense gray silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
				18	ATT DESCRIPTIVE		
	-		55.0'		17" RECOVERY		
56							
	-						
	-						
		18	58.0'	14 12 12 12	Wet very stiff gray clayey fine sandy silt w/some coarse sand, trace of	A-4(0)	
59.5				12	gravel.		
	-		60.0'		24" RECOVERY		
	-						
	-						
63	-						
]	19	63.0'	8 24 31 50	Wet hard gray fine sandy silt w/some clay, trace of coarse sand.	A-4(0)	
	-			50	DDAET		
	-		65.0'		24" RECOVERY		
66.5							
66.5							
		M			-()R RII)I)IN(:		
		20	68.0'	8 23 30 49	Wet very dense gray silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
	-			49			
70			70.0'	\	18" RECOVERY		
	-		<i> </i>	$\mathbf{A}\mathbf{U}$	GUST 2015		
					OOO! ZO!O		
	_						
73.5		21	73.0'	6 8 12 13	Wet very stiff gray fine sandy silt w/some clay, trace of coarse sand and	A-4(0)	
	-			13	gravel.		
	-		75.0'		21" RECOVERY		
]						
77]						
			<u>L</u>				<u> </u>
		22	78.0'	4 11 24 20	Wet dense gray silty fine sand w/trace of coarse sand and gravel.	A-2-4(0)	
	-		65 =:	20			
80.5]		80.0'		19" RECOVERY		
	-						
0.4	-	23	83.0'	10 11 19 19	Wet very stiff gray clayey fine sandy silt w/trace of coarse sand.	A-4(1)	
84				19			
]		85.0'		24" RECOVERY		
	1						

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	-						
87.5	-						
	_	24	88.0'	8 12 19 28	Wet dense gray fine sandy silt w/some clay, trace of gravel and coarse sand.	A-4(0)	
			90.0'	28	24" RECOVERY		
	-		30.0		THE 24 RECOVERY		
91	1						
]						
	-	25	93.0'	12	Wet very dense green silty fine sand w/trace of organic matter, coarse	A-2-4(0)	Glauconit
94.5	-			12 21 39 50/4"	sand and gravel.		& Sea
54.5	_	<u> </u>	95.0'		15" RECOVERY		Shells
<u> </u>	-						
	-						
98					III)RAFI		
	-	26	98.0'	8 9 19 38	Wet very stiff green fine sandy silt w/some organic matter and clay, trace of coarse sand and gravel.	A-4(0)	Glauconit & sea
<u> </u>	-	╵╶	100.0'	38	21" RECOVERY		Shells
<u> </u>			100.0		End of Boring		
101.5] [V			LOU DIDDING	7	
<u> </u>	-						
	-				ICHICT 2015		
			<i> </i>	HU	JGUST 2015		
105	-		_				
<u> </u>	-						
<u> </u>	-						
108.5	-						
	_						
	-						
112	-						
	_						
<u> </u>	-						
115.5	-						
110.0							
	-						
<u> </u>	-						
119	-						

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Well graded sand with silt



Poorly graded sand with silt



Poorly graded clayey silty sand



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 9/23/2009 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All Blows are un corrected.

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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.: BR1-5-06

Contract: 25-113-01

Boring Location: Sta. 815+84.53 8 LT C.L.

Boring Surface Elev.: + 57.87 Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 2/22/2010 30.0 28.0 28.3

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/22/10	1	0.5' 2.0'	2 4 5	Wet firm brown clayey silt w/some coarse to fine sand and fine gravel. 12" RECOVERY	A-4(3)	Topsoil - 4".
		2	2.0'	5 7 9	Wet very stiff brown clayey coarse sandy fine gravelly silt w/some fine sand.	A-4(0)	
3.5	N		4.0'	6	12" RECOVERY		
		3	4.0'	3 4 4 4	Wet loose brown clayey coarse sandy fine gravel w/some fine sand and silt.	A-2-4(0)	
			6.0'		6" RECOVERY		
7		4	6.0' 8.0'	4 3 3 3 3	Wet firm brown clayey coarse sandy silt w/some fine sand and fine gravel. 4" RECOVERY	A-4(1)	
		5	8.0'	3 3 3 3	Wet loose brown clayey coarse sandy fine gravel w/some fine sand, trace of silt.	A-2-4(0)	
10.5			10.0'		8" RECOVERY		
14		6	13.0'	2 2 4 4	Wet loose brown clayey coarse sandy silt w/some fine sand and fine gravel.	A-4(1)	
			15.0'		14" RECOVERY		
17.5							
		7	18.0'	3 3 3 3	Wet loose brown clayey coarse sandy fine gravel w/some fine sand, trace of silt.	A-2-4(0)	
			20.0'		16" RECOVERY		

Remarks: Mud Rotary at 28.0

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21							
24.5		8	23.0'	50/2"	No Sample Recovery 0" RECOVERY		Gravel blocking spoon.
28			20.0				
		9	28.0'	3 3 5 6	Wet loose tan fine to coarse sand w/trace of silt and fine gravel.	A-3	Mud Rotary @ 28.0'.
31.5			30.0'		20" RECOVERY DRAFT		
35		10	33.0'	6 8 9 9	Wet medium dense tan fine to coarse sand w/trace of silt and fine gravel.	A-3	
38.5	-	11	38.0	34	Wet medium dense orange fine sand w/some silt and coarse sand.	A-2-4(0)	
36.3			40.0'	4 5 5	20" RECOVERY	A-2-4(0)	
42							
	2/24/10	12	43.0'	5 5 6 8	Wet medium dense orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
45.5			45.0'		16" RECOVERY		
49		13	48.0' 50.0'	7 8 8 10	Wet medium dense brown fine sand w/some coarse sand and silt, trace of fine gravel. 22" RECOVERY	A-2-4(0)	
52.5					1 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1		

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	53.0'	11 12 13 18	Wet medium dense brown fine sand w/some coarse sand, trace of silt and	A-3	
			55.0'	18	fine gravel. 21" RECOVERY		
	-		55.0		21 RECOVERT		
56					77.585. 17.765 14.765		
	-				14 1200 14 14 15 1 14 14 12 1		
		1-	50.01	44	11 (12) 11 (12) 11 (12)		
	-	15	58.0'	11 13 21 27	Wet dense brown fine sand w/some coarse sand, trace of silt and fine gravel.	A-3	
59.5			60.0'	21	19" RECOVERY		
	_		00.0		13 1125 14 125 14 125 14 125 14 125		
	-				t fraction traction traction		
					(14.10) (14.10) (14.10)		
63		16	63.0'	8	13 13 15 15 15 15 15 15 15 15 15 15 15 15 15	A-3	
	_	10	03.0	8 9 12 15	Wet medium dense brown fine sand w/some coarse sand, trace of silt.	A-3	
			65.0'		22" RECOVERY		
66.5					5 (
	l N						
		17	68.0'	9	Wet medium dense brown fine sand w/some silt and coarse sand, trace of	A-2-4(0)	
	i -			9 9 11 14	fine gravel.	1 2 4(0)	
70			70.0'		20" RECOVERY		
	-				GUSI 2015		
				10			
	-				11 73 CC 11 73 CC		
73.5]	18	73.0'	13 17	Wet dense brown fine sand w/some silt and coarse sand, trace of fine	A-2-4(0)	
	_			13 17 27 34	gravel.		
			75.0'		18" RECOVERY		
	-						
77	-						
]						
		19	78.0'	14 18 24 26	Wet dense gray silty fine sand w/trace of coarse sand and fine gravel.	A-2-4(0)	
	-			24 26			
80.5			80.0'		24" RECOVERY End of Boring		
50.5]				Life of Doring		
]						
84	1						
]						
	I						

Symbol Description

Strata symbols

Low plasticity clay

Clayey sand

(1.00) (0.00) (1.00) (0.00) (1.00) (0.00)

Poorly graded sand with silt



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 2/22/2010 using a 3 1/4 inch continues flight power auger. Rig is a Track 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: BR1-5-07

Contract: 25-113-01

Boring Location: Sta. 817+52 70 RT C.L.

Boring Surface Elev.: + 58.95 Reference:

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

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 28.0

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 3/2/2010 30.0 28.0 27.6

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.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

			1				
Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress		Depth				
	3/2/10	1	0.0'		No Sampling		Asphalt -
							4". Stone
]		2.0'		0" RECOVERY		- 8" .
		2	2.0'	5 6	Wet very stiff orange clayey fine sandy silt w/some coarse sand, trace of	A-4(1)	
				10 12	fine gravel.		
3.5			4.0'		16" RECOVERY		
		3	4.0'	7	Wet medium dense brown clayey fine gravelly fine to coarse sand.	A-2-4(0)	
		`		7 12 7	wet medium dense brown erayey rine graverry rine to coarse saild.	A-2-4(0)	
				9			
			6.0'	42	17" RECOVERY		_
 	1	4	6.0'	12 15 14 14	Wet medium dense brown coarse sandy fine gravel w/some fine sand and	A-1-b	
7	1			14	silt.		
	1		8.0'		18" RECOVERY		
		5	8.0'	5 6	No Sieve Analysis - Indication of wet medium dense brown silty sand.		
				6			
			10.0'		III DECOVEDA		
10.5	1		10.0		1" RECOVERY		
10.5							
		6	13.0'	2	Wet at:ff too allow along w/a and fine and	A ((0)	
14		്	13.0	2 3 6 8	Wet stiff tan silty clay w/some fine sand.	A-6(9)	
	1			8			
			15.0'		18" RECOVERY		
17.5							
	1				////		
		7	18.0'	17 19 17	Wet dense tan coarse sandy fine gravel w/trace of fine sand.	A-1-a	
				17 19	it i a sicio i a i a sicio		
					i) 1940 F1849F		

Remarks: Switch to Mud Rotary @ 28.0 feet

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

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

52.5

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
(- /	19 11		20.0'		HERD. 14" RECOVERY		
21]				# 12 mg / # 17 mg / # 17 mg /		
					11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	<u> </u>				11.1 (E) 11.1 (E) 11.1 (E) 11.1 (E)		
	-	8	23.0'	11	Wet dense tan fine gravelly coarse sand w/trace of fine sand.	A-1-b	
	-		20.0	11 14 17 18	Wet dense tall fille gravery coarse saild w/trace of fille saild.	A-1-0	
24.5	1		25.0'	10	15" RECOVERY		
	1				314181 141314 141314		
	1				77 (7300) 13 (7400) 3 (7400)		
	1				13 (14 (15) 15 (14 (15) 15 (14 (15)		
28]				23 (v 124) 1 1 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1		
		9	28.0'	5 7 9 7	No Sieve Analysis - Indication of wet medium dense brown coarse sandy fine gravel.		
	-			7	(
	-		30.0'		11" RECOVERY		
	-				DRAET		
31.5	1						
	1				11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	3/4/10	10	33.0'	20 8 5	Wet medium dense tan fine to coarse sand w/some silt, trace of fine	A-2-4(0)	
		M		5 5	gravel.		
35		N	35.0'		17" RECOVERY		
	-						
	<u> </u>						
	-			7			
38.5	-	11	38.0'	6	Wet medium dense tan fine to coarse sand w/trace of silt.	A-3	
30.3	1	''	30.0	6 4 7 8	wet medium dense tan fine to coarse sand w/trace of sht.	A-3	
	1		40.0'	, o	16" RECOVERY		
			1010		13 14 14 15 15 15 15 15 15 15 15 15 15 15 15 15		
	-				7.1776U 1.1786 1.1787		
42	_				5 (1) (5 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)		
	-				ilivitii 13 dec		
	1	12	43.0'	11 11 18 20	Wet medium dense brown fine sand w/some coarse sand, trace of silt and	A-3	
	1			20	fine gravel.		
45.5	1		45.0'		19" RECOVERY		
]				51 (3) 6 (7) 51 (7) 6 (8) 51 (7) 51 (8)		
	1				ATTICH 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	1				1653666 Naturen Estatue		
	-	13	48.0'	11 20	Wet dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
49	-			11 20 24 20			
	-		50.0'		22" RECOVERY		
	1						
	1						
	1	I	1	1			1

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	-	14	53.0'	13 15	Wet dense brown fine sand w/some coarse sand and silt, trace of fine	A-2-4(0)	
	-			13 15 18 19	gravel.		
			55.0'		18" RECOVERY		
56	_						
	-				11 (12) 11 (12) 11 (12)		
		15	58.0'	12 17 18 18	Wet dense brown fine sand w/some coarse sand, trace of silt.	A-3	
59.5	-		60.0'	18	21" RECOVERY		
	-						
	-				1773.00 1179.00 1170.00		
63	-	16	63.0'	10 14 30 36	Wet dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
				30 36			
	-		65.0'		18" RECO <mark>V</mark> ERY		
66.5							
00.5					EOD BIDDING		
		17	00.01	10		7	
		17	68.0' 69.0'	18 18	Wet dense tan silty fine sand w/trace of coarse sand. 12" RECOVERY	A-2-4(0)	
70		17A	69.0' 70.0'	25 26	Wet very dense gray silty fine sand w/trace of coarse sand and organic matter.	A-2-4(0)	
	-		<i>F</i>	AU	8" RECOVERY		
	-						
	-						
73.5		18	73.0'	13 17 26 29	Wet dense gray fine sand w/some silt, trace of coarse sand and organic	A-2-4(0)	
	-			26 29	matter.		
	-		75.0'		18" RECOVERY		
77	-						
	-	40	78.0'	12		1.2.4(0)	
		19	76.0	13 16 26 27	Wet dense gray fine sand w/some silt and coarse sand, trace of organic matter.	A-2-4(0)	
	-		80.0'	ZI	23" RECOVERY		
80.5	-				End of Boring		
	-						
84	1						
	1						

Symbol Description

Strata symbols

Clayey sand



Silty sand



Low plasticity clay



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

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

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: BR1-7-12

Contract: 25-113-01

Boring Location: Sta. 806+53.04 18 LT C.L.

Boring Surface Elev.: + 33.02 Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 2/22/2010 10.0 8.0 4.0

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: J. Lafferty

	г	_	_			1	1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/22/10	1	0.5'	3 3 3	Moist firm brown fine sandy silt w/some fine gravel, coarse sand and	A-4(0)	Topsoil -
			2.0'	ა	15" RECOVERY		3".
		2	2.0'	10 7	Saturated very stiff brown clayey fine sandy silt w/some coarse sand and	A-4(0)	
3			4.0'	13	fine gravel. 18' RECOVERY		
		3	4.0'	3 6 10	Saturated medium dense brown silty fine to coarse sandy fine gravel w/	A-1-b	
				11	some clay.		
6		<u> </u>	6.0'	7	15" RECOVERY		
		4	6.0'	7 10 10 9	Saturated medium dense brown fine gravelly fine to coarse sand w/trace of silt.	A-1-b	
					64-9-1664 ea 19465 14-1865		
		5	8.0' 8.0'	7	20" RECOVERY		
			8.0	7 7 12 11	Saturated medium dense brown fine gravelly fine to coarse sand w/trace	A-1-b	Mud Rotary @
9	1			11	HAME OF SIR. HAME HAME		10.0'.
			10.0'		21" RECOVERY		
					14 - 15 - 1 1 1 1 1 1 1 1 1 1 1		
	1				11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
12					1700-151 1775 1775		
					HISTORY HISTORY HISTORY		
		6	13.0'	5 6 10 8	Saturated medium dense brown fine sand w/some silt and coarse sand,	A-2-4(0)	
-				8	trace of fine gravel.		
15			15.0'		22" RECOVERY		
1.0	1						
	-						

Remarks: Switch to Mud Rotary @ 10 feet

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

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

Depth	Daily	l	Sample			0. (0.	Ι
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18		7	18.0'	5 6 12 15	Saturated medium dense brown fine sand w/some coarse sand, trace of silt. 21" RECOVERY	A-3	
21					G4 4 - 16 - 16 - 16 - 16 - 16 - 16 - 16 -		
24		8	23.0'	5 6 9 12	Saturated medium dense brownish orange fine sand w/some coarse sand and silt. 20" RECOVERY	A-2-4(0)	
27					DRAFT		
30	ľ	9	30.0'	7 7 9 10	Saturated medium dense brownish orange fine sand w/some coarse sand trace of silt. 20" RECOVERY	A-3	
33		10	33.0	7	GUST 2015 Saturated medium dense brown fine sand w/some silt, trace of coarse	A-2-4(0)	
			35.0'	9 11 10	sand. 19" RECOVERY		
36					3 4 3 5 7 7 7 7 7 7 7 7 7		
39		11	38.0' 40.0'	5 7 8 8	Saturated medium dense brownish orange fine sand w/some silt, trace of coarse sand. 19" RECOVERY	A-2-4(0)	
42					0.441.0.4. 0.113.0.6. 0.113.0.6. 0.113.0.6. 0.113.0.6. 0.113.0.6. 0.113.0.6. 0.113.0.6. 0.113.0.6. 0.113.0.6. 0.113.0.6. 0.113.0.6. 0.113.0.6. 0.113.0.6. 0.113.0.6. 0.113.0.6. 0.113.0.6. 0.113.0.6. 0.113.0.6. 0.113.0.6.		
		12	43.0'	4 5 7 7	Saturated medium dense brown fine sand w/some coarse sand and silt, trace of fine gravel.	A-3	
45			45.0'		20" RECOVERY		

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
					# 17 1998 21 17 1201 21 1806 21 1806 21 1806 21 1806 21 1806 21 1806 21 1806		
48		13	48.0' 50.0'	4 6 6 8	Saturated medium dense gray clayey fine sand w/some silt, trace of fine gravel and coarse sand. 22" RECOVERY	A-2-4(0)	
51							
54	2/24/10	14	53.0' 55.0'	6 11 19 23	Saturated medium dense gray silty fine sand w/some clay, trace of coarse sand and fine gravel. 22" RECOVERY	A-2-4(0)	
57			33.0		DRAFI		
		15	58.0'	5 7 11 23	Saturated medium dense gray silty fine sand w/some coarse sand, trace or organic matter.	A-2-4(0)	
60			60.0'	JL	GUST 2015		
63		16	63.0'	6 6 10 11	Saturated medium dense gray clayey fine sand w/some silt, trace of coars sand and fine gravel.	e A-2-4(0)	
66			65.0'		23" RECOVERY		
69		17	68.0' 70.0'	5 7 10 17	Saturated medium dense gray silty fine sand w/some clay, trace of coarse sand, fine gravel and organic matter. 23" RECOVERY	A-2-4(0)	
72			-				
		18	73.0'	10 15 23	Saturated hard gray fine sandy silt w/some clay, trace of coarse sand, fine grayel and organic matter.	A-4(0)	

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

Depth	Daily	1	Sample		1			<u> </u>
(ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
75			75.0'	50/4"		22" RECOVERY		
78								
		19	78.0'	10 19 23 31		Saturated hard gray clayey fine sandy silt w/trace of organic matter.	A-4(1)	
			80.0'			23" RECOVERY		
81								
84		20	83.0' 85.0'	11 14 19 22		Saturated dense green clayey fine sand w/some silt, trace of coarse sand, organic matter and shell fragments. 23" RECOVERY	A-2-4(0)	
87		V	O	T		FOR BIDDING		
90		21	88.0' 90.0'	23 33 50/5"		Saturated very dense green silty fine sand w/trace of coarse sand, fine gravel, organic matter and shell fragments. 21" RECOVERY	A-2-4(0)	
93					-			
93		22	93.0'	7 10 13 20		Saturated medium dense green clayey fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			95.0'			22" RECOVERY		
96								
99		23	98.0'	7 12 14 20	mantal A	Saturated very stiff gray silty clay w/some organic matter, trace of fine sand and shell fragments.	A-7-6(33)	
			100.0'			23" RECOVERY End of Boring		
						Lite of Doring		
102								

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Clayey sand



Poorly graded sand with silt



Silty sand



High plasticity clay

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 2/22/2010 using a 3 1/4 inch diameter continues flight power auger. Rig is a Track mounted CME 55.
- 2. Groundwater levels recorded at the time of drillign and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: BR1-7-13

Contract: 25-113-01

Boring Location: Sta. 805+75.8 66 RT C.L.

Boring Surface Elev.: + 32.49 Reference:

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

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 23.0

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 3/5/2010 10.0 8.0 4.0

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.; Dia. U-Sample Boring: U-Samples: Ft. 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
	3/5/10	1	0.5' 2.0'	7 7 6	Wet stiff brown silty clay w/trace of fine to coarse sand and fine gravel. 17" RECOVERY	A-6(13)	Topsoil - 6".
		2	2.0'	3 7	Wet stiff brown clayey silt w/some fine sand, trace of coarse sand and	A-4(7)	
3			4.0'	7 12	fine gravel. 22' RECOVERY		
	•	3	4.0'	4 10 7 7	Saturated medium dense brown silty fine snady fine gravel w/some coarse sand and clay.	A-2-4(0)	
6			6.0'		16" RECOVERY		
		4	6.0'	13 17 15 15	Saturated dense brown coarse to fine sandy fine gravel w/some silt.	A-1-b	
			8.0'		23" RECOVERY		
9		5	8.0'	5 13 14 18	Saturated medium dense brown fine gravelly coarse to fine sand w/trace of silt.	A-1-b	
			10.0'		18" RECOVERY		
					HELLERIE ELLERIEL ELLERIEL		
12							
		6	13.0'	5 8 11 13	Saturated medium dense orangish brown fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
15			15.0'		22" RECOVERY		
					7.7.1077 61.7.7.107 61.7.7.107 61.7.107		

Remarks: Switch to Mud Roatary @ 23.0 feet

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	Progress		Берип				
18		7	18.0'	7 11 11 13	Saturated medium dense orangish brown fine sand w/some coarse sand, trace of silt and fine gravel.	A-3	
21			20.0'		21" RECOVERY		
24		8	23.0'	13 17 17 19	Saturated dense orangish brown fine sand w/some coarse sand, trace of silt.	A-3	Mud Rotary @ 23.0'.
27			25.0'		23" RECOVERY		
21		9	28.0'	10 11 13 17	Saturated dense brown fine sand w/some coarse sand, trace of silt.	A-3	
30	ľ	1	30.0'	13 17	OR Pagrecovery		
33			-	AL	GUST 2015		
		10	33.0	6 7 10 15	Saturated medium dense brown fine sand w/some coarse sand, trace of silt.	A-3	
36			35.0'		23" RECOVERY (1) 10 10 10 10 10 10 10 10 10 10 10 10 10		
39		11	38.0'	6 8 10 12	Saturated medium dense brown fine sand w/some coarse sand, trace of silt.	A-3	
			40.0'		22" RECOVERY		
42					### ##################################		
		12	43.0'	8 11 12 17	Saturated medium dense brown fine sand w/some coarse sand, trace of sil	t A-3	
45			45.0'		22" RECOVERY		

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

Depth	Daily	<u>.</u>	Sample	DI- 'O"	0 15 17	01- '0'	D
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
					erten Histori Hang		
					tiddet tivnti tiddet		
48					EL (400°) EL 1910ET EL 1910ET		
		13	48.0'	8 13 14 33	Saturated medium dense gray clayey fine sand w/trace of silt, coarse sand	A-2-4(0)	
				33	and fine gravel.		
			50.0'		23" RECOVERY		
51							
		14	53.0'	10		A 2 4(0)	
54		14	55.0	10 17 24 49	Saturated dense gray clayey fine sand w/trace of silt, coarse sand, fine gravel and organic matter.	A-2-4(0)	
				40			
			55.0'		23"-RECOVERY		
57							
		15	58.0'	10 15	Saturated dense gray clayey fine sand w/trace of silt, coarse sand, fine	A-2-4(0)	
				10 15 24 50/5"	gravel and organic matter.		
60			60.0'		23" RECOVERY		
					GUST ^{23" RECOVERY}		
				76	JUSI ZUIJ		
63							
	3/8/10	16	63.0'	6 7 11 20	Saturated medium dense gray silty fine sand w/trace of coarse sand, fine	A-2-4(0)	
				20	gravel and organic matter.		
			65.0'		22" RECOVERY		
66							
		17	68.0'	8	Saturated very stiff gray clayey fine sandy silt w/trace of coarse sand, fine	A 4(0)	
69		'′	00.0	8 10 13 41	Saturated very stiff gray clayey fine sandy silt w/trace of coarse sand, fine gravel and organic matter.	A-4(0)	
			70.0				
			70.0'		23" RECOVERY		
72							
		18	73.0'	10 13 20	Saturated dense gray silty fine sand w/trace of coarse sand, fine gravel	A-2-4(0)	
				20	and organic matter.		

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
				24				
75			75.0'			22" RECOVERY		
78								
70		19	78.0'	13 20 21 50/3"		Saturated dense gray silty fine sand w/trace of coarse sand, fine gravel	A-4(0)	
				50/3"		and organic matter.		
			80.0'			23" RECOVERY		
81								
		20	83.0'	4 15		Saturated dense gray clayey fine sand w/trace of silt, fine gravel, coarse	A-2-4(0)	
84				4 15 17 27		sand and organic matter.		
			85.0'			23" RECOVERY		
				_				
		M				FOR BIDDING	i	
87	•							
		21	88.0'	15		Saturated very dense gray silty fine sand w/trace of coarse sand, fine	A-2-4(0)	
				15 21 33 50/4"		gravel and organic matter.		
90			90.0'	7		22" RECOVERY		
93		22	93.0'	8		Saturated medium dense gray silty fine sand w/trace of fine gravel,	A-2-4(0)	
				8 12 15 22		organic matter and coarse sand.	A-2-4(0)	
			95.0'			23" RECOVERY		
00								
96								
-								
		23	98.0'	10			A 77 - 212-21	
99		23	90.0	10 11 15 26		Saturated very stiff gray silty clay w/some organic matter, trace of fine sand.	A-7-6(23)	
			100.0'			22" RECOVERY		
					////	End of Boring		
102	[

Symbol Description

Strata symbols

Low plasticity clay

Poorly graded clayey silty sand

Silty sand

10 10 10 10 10 10 1 10 10 10 10 10 10 1 10 10 10 10 10 10 1

Well graded sand with silt

Poorly graded sand with silt



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

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

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: BR1-7-14

Contract: 25-113-01

Boring Location: Sta. 806+60.96 18 RT C.L.

Reference: **Boring Surface Elev.:** + 32.1

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 3/1/2010 10.0 8.0 4.0

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.; Dia. U-Sample Boring: U-Samples: Ft. 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	3/1/10	2	1.5' \ 2.0' f 2.0'	6 10 19 17 10	Moist firm brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 6" RECOVERY Moist dense brown coarse sandy fine gravel w/some fine sand and silt.	A-4(2) A-1-b	Topsoil - 18".
6		3	4.0' 4.0'	3 4 10 12	12" RECOVERY Wet medium dense brown coarse sandy fine gravel w/some fine sand, silt and clay. 11" RECOVERY	A-1-b	
0		4	6.0' 8.0'	8 8 11 16	Saturated medium dense brown fine gravelly coarse sand w/trace of fine sand and silt. 24" RECOVERY	A-1-b	
9		5	8.0'	7 7 8 9	Saturated medium dense brown fine gravelly coarse sand w/some fine sand, trace of silt. 24" RECOVERY	A-1-b	Mud Rotary @ 10.0'.
12							
		6	13.0'	5 8 9 9	Saturated medium dense orange fine sand w/some coarse sand and silt.	A-2-4(0)	
15			15.0'		20" RECOVERY		
18							

Remarks: Switch to Mud Rotary @ 10.0 feet.

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

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

	I		I				1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		7	18.0'	7 11 14	Saturated medium dense orange fine sand w/some coarse sand and silt.	A-2-4(0)	
	-		20.0'		21" RECOVERY		
21							
	-						
	_	8	23.0'	6		1.2.4(0)	
24		°	23.0	6 7 10 11	Saturated medium dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
	1				H 1966 H 1966 H 1966		
	_		25.0'		24" RECOVERY		
					# 1180 113,005 113,000		
27	1				(17):00 11):16(f) 11):16(f)		
	-		00.01	6			
		9	28.0'	6 7 8 10	Saturated medium dense brown fine sand w/some coarse sand, trace of	A-3	
	-			10			
30			30.0'		22" RECOVERY		
		M			FOR BIDDING		
		A					
					11 17 12 1 11 17 12 1 11 17 12 1		
33							
		10	33.0'	5 7 8 8	Saturated medium dense brown fine sand w/some coarse sand, trace of silt.	A-3	
	-			8	11/100 SILL.		
	-		35.0'		22" RECOVERY		
36					0 1 3 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
					######################################		
	-				11 1780 11 11 15 1 11 11 15 1		
					113181 113181 H1388		
20		11	38.0'	4 5 6 7	Saturated medium dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
39	1			7	H4488 H4488 H4488		
			40.0'		1996 1996 1996 1996		
					15 (5 (5 (5 (5 (5 (5 (5 (5 (5 (5 (5 (5 (5		
					H-VIRI- 11 Date 13 Date		
42	}				117500 117501 117501		
			(2 -:		[13][14] [14][14]		
		12	43.0'	4 5 6 6	Saturated medium dense brown fine sand w/some fine gravel and coarse sand, trace of silt.	A-3	
	1			6	initiali initiali initiali		
45			45.0'		11 PART 1		
					(1400) 1930: 1940:		
	1	I			1150511	1	

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

-	.	1					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48							
		13	48.0'	5 7 10 13	Saturated medium dense gray clayey fine sand w/some coarse sand and	A-2-4(0)	
				13	silt, trace of organic matter.		
			50.0'		24" RECOVERY		
l							
51							
		14	53.0'	7 10 13 14	Saturated medium dense gray clayey fine sand w/some silt, trace of coarse	A-2-4(0)	
54				13 14	sand and organic matter.		
			55.0'		24" RECOVERY		
			22.2				
					DDAET		
57					DRAFT		
		15_	58.0'	5	Saturated medium dense gray clayey fine sand w/some silt, trace of coarse	A-2-4(0)	
				9 10	sand and organic matter.	(0)	
		V	60.0'		THE PECOVERY L	J	
60	_	_	60.0'	_	24" RECOVERY		
				7	GUST 2015		
				7	0001 2010		
63		16	63.0'	5	Saturated dense gray clayey fine sand w/some silt, trace of coarse sand,	A-2-4(0)	
		10	00.0	5 11 20 22	fine gravel and organic matter.	A-2-4(0)	
			65.0'		12" RECOVERY		
66							
		47	60.01	7		A 2 ((2)	
69		17	68.0'	7 9 11 12	Saturated medium dense gray silty fine sand w/some clay, trace of coarse sand and organic matter.	A-2-4(0)	
				12			
			70.0'		24" RECOVERY		
72							
	3/2/10	18	73.0'	12 12 16 17	Saturated medium dense gray clayey fine sand w/some silt, trace of coarse sand and organic matter.	A-4(0)	
				17	sand and organic matter.		

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
(111)	g		75.0'		12" RECOVERY		
	-						
78							
		19	78.0'	7 11 14 17	Saturated very stiff gray fine sandy clay w/some silt, trace of organic matter and coarse sand.	A-6(2)	
	-			17	matter and coarse said.		
			80.0'		24" RECOVERY		
0.4							
81	-						
	-	20	83.0'	20	Saturated dense dark gray silty fine sand w/trace of coarse sand, fine	A-2-4(0)	
84				20 22 18 22	gravel and organic matter.		
			85.0'		17" RECOVERY		
	-		85.0		LJ A PARECUERT		
	-						
07							
87							
		N	00.01	16			
		21	88.0'	16 20 26 30	Saturated dense dark gray silty fine sand w/trace of coarse sand and organic matter.	A-2-4(0)	
	1			30			
90			90.0'		24" RECOVERY		
				76			
	1						
93							
93	1	22	93.0'	12 9	Saturated very stiff dark gray silty fine sandy clay w/trace of organic	A-6(12)	Hole had
	_			12 9 13 17	matter and coarse sand.		caving
			95.0'		18" RECOVERY		issues could not
			95.0		End of Boring		get
96							farther
							than 95.0'.
	-						
00							
99	1						
	-						
102]						
						1	

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded clayey silty sand



Poorly graded sand



Well graded sand



Poorly graded sand with silt



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

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

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

Boring No.: IT1-21 F.A. Project: U.S. 301 Maryland State Line to S.R. 1

Contract: 28-113-01

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

Boring Surface Elev.: + 66.0 Reference:

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

IN. IN. Core Bit: O.D.

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

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: D. Zmijewski

B	5 "	_				ı	1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.5' 2.0'	8 9 10	Moist very stiff gray clay w/some fine to coarse sand, trace of gravel. 17" RECOVERY	A-6(8)	Cultivated Soil - 6".
		2	2.0'	18	Moist very stiff gray clay w/trace of fine to coarse sand and gravel.	A-6(11)	
3			4.0'	18 13 16 18	19" RECOVERY		
6		3	4.0' 6.0'	7 12 15 10	Moist very stiff grayish orange mottled fine sandy silt w/some clay, trace of coarse sand and gravel. 18" RECOVERY	A-4(0)	USDA Classifica - Sandy Loam.
0		4	6.0'	9 12 10 9	Moist medium dense orange silty fine sand w/trace of coarse sand.	A-2-4(0)	Bounn
			8.0'		18" RECOVERY		
9		5	8.0' 10.0'	4 5 6 7	Wet medium dense orange fine sand w/some silt and coarse sand, trace of gravel. 19" RECOVERY	A-2-4(0)	
		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		L	12.0'		9" RECOVERY		
		7	12.0'	5566	Wet medium dense orange coarse sand w/some gravel and fine sand, trace of silt. 21" RECOVERY	A-1-b	
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:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Well graded sand with silt



Poorly graded sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Casing Size: 3 1/4 Inches

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

Water Level Readings

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

Pay Quantities:

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

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: D. Zmijewski

Danth	Date		Cam1:		I			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5' 2.0'	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		Moist stiff gray silt w/some clay, trace of fine to coarse sand.	A-4(2)	
3		3	4.0'	8 10		Wet medium dense orange silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
6		Ū	6.0'	5 6 7 5		18" RECOVERY	, ,	
		4	6.0' 8.0'	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.	A-1-a	
		6	10.0' 10.0'	15		11" RECOVERY wet medium dense orange coarse sand and gravel w/some fine sand, trace	A-1-b	
		0		15 9 5 4		of silt.	A-1-0	
12		-	12.0'	2	22222	10" RECOVERY		
		7	12.0'	3 4 4 6		Wet stiff orange gravelly clay w/some fine to coarse sand. 16" RECOVERY	A-7-6(5)	
15		8	14.0'	7 8 10 5		Wet medium dense orange clayey fine to coarse sand w/some gravel.	A-2-5(0)	Cemented sands.
			16.0'			12" RECOVERY		
						End of Boring		

Remarks:

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

- 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 recomendations 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**

Boring No.: IT1-23 F.A. Project: U.S. 301 Maryland State Line to S.R. 1

Contract: 28-113-01

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

Boring Surface Elev.: + 65.4 Reference:

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

Core Bit: O.D.

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

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	4 3 3	Moist firm grayish orange mottled clay w/trace of fine to coarse sand. 14" RECOVERY	A-6(14)	Cultivated Soil - 6".
		2	2.0'	6 7	Moist stiff gray clayey silt w/trace of fine to coarse sand and gravel.	A-4(5)	
3			4.0'	7	FOR PIT' RECOVERY		
		3	4.0'	3 6 6 8	silt, trace of clay.	A-2-4(0)	USDA Classifica - Loamy
6		4	6.0' 6.0'	8	16" RECOVERY Moist medium dense orange fine to coarse sand and gravel w/some silt.	A-1-b	Sand.
				8 7 8 8	Worst inculant dense drange thie to coarse sand and graver w/some sint.	A-1-0	
			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)	
		<u> </u>	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)	
		ļ	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		
			10.0		End of Boring		

Remarks:

Symbol Description

Strata symbols



Low plasticity clay



Silty low plasticity clay



Silty sand



Elastic silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All Blows are 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:

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

Casing Size: 3 1/4 Inches

O.D.

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

Water Level Readings

Core Bit:

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	3 5 6	Moist stiff orange clayey fine sandy silt w/some coarse sand. 12" RECOVERY	A-4(3)	Cultivated Soil - 6".
—		2	2.0'	9 12	Moist medium dense orange fine to coarse sand w/some silt.	A-2-4(0)	
3		~	3.0'	12	Worst medium dense orange fine to coarse sand w/some sit.	A-2-4(0)	
<u>3</u>		2A	3.0' 4.0'	14 7	Moist medium dense orange fine to coarse sand w/some silt. 4" RECOVERY	A-2-4(0)	
		3	4.0'	8 14	Moist very stiff orange silt w/some fine sand, trace of coarse sand and	A-4(0)	
			5.0'		gravel.		
		ЗА	5.0'	12 6	7" RECOVERY	A-2-4(0)	USDA
6	[6.0'		Moist medium dense orange fine to coarse sand w/some silt, trace of clay.		Classifica
		4	6.0'	9 12 11	Moist medium dense orangish yellow mottled silty fine sand w/some	A-2-4(0)	- Sand.
				11 14	coarse sand, trace of gravel.		
		<u> </u>	8.0'		16" RECOVERY		
		5	8.0'	9 9	Moist medium dense orange coarse to fine sand and gravel w/some silt.	A-1-b	
9				16 11			
			10.0'		17" RECOVERY		
		6	10.0'	9 4	No Sieve Analysis - Indication of wet medium dense orange coarse to fine		
<u> </u>		L	11.0'		sand and gravel w/some silt. 6" RECOVERY		
		6A	11.0'	4 5	No Sieve Analysis - Indication of wet very stiff green sandy clay.		
12		L	12.0'		11" RECOVERY		
		7	12.0'	4 5	Wet stiff green fine to coarse sandy clay w/trace of gravel.	A-6(0)	
<u> </u>				6			
<u> </u>			14.0'	2	18" RECOVERY		
		8	14.0'	3 4 9	Wet medium dense orangish green mottled clayey fine to coarse sand w/	A-2-7(0)	
15				4	some gravel.		
<u> </u>			16.0'		14" RECOVERY		
					End of Boring		

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	4 4 4	Moist firm gray clayey silt w/some fine sand, trace of coarse sand. 12" RECOVERY	A-4(4)	Cultivated Soil - 8".
	'	2	2.0'	3 5	Moist stiff orange fine sandy silt w/some clay, trace of coarse sand.	A-4(1)	
3			4.0'	777	18' RECOVERY		
6		3	4.0' 6.0'	4 5 9 7	Moist stiff orange fine sandy silt w/trace of coarse sand. 24" RECOVERY	A-4(0)	
		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
		<u> </u>	8.0'	<u> </u>	24" RECOVERY		Clay
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)	Loam.
	{ '	6	10.0'	3	15" RECOVERY	. 5 5(10)	
		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	1 '	!	12.0'	<u> </u>	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)	
	{ '	8	14.0' 14.0'	5	18" RECOVERY	1 2 4(0)	
15		0	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:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Clayey sand



High plasticity clay

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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**

Boring No.: IT1-26 F.A. Project: U.S. 301 Maryland State Line to S.R. 1

Contract: 28-113-01

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

Boring Surface Elev.: + 69.2' Reference:

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

Core Bit: O.D.

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

Water Level Readings

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

Dry

14.0

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	4 5 4	Moist stiff brown clayey silt w/trace of fine to coarse sand. 17" RECOVERY	A-4(8)	Cultivated Soil - 5".
		2	2.0'	3 4	Moist stiff brown silt w/some clay, trace of fine to coarse sand.	A-4(2)	
3			4.0'	6 10	15" RECOVERY		
6	•	3	4.0' 6.0'	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.
		4	6.0'	8 10 11 13	Moist medium dense brownish orange silty fine sand w/some gravel and coarse sand.	A-2-4(0)	
			8.0'		18" RECOVERY		
9		5	8.0'	5 10 17 8	Wet very stiff brown coarse to fine sandy clay w/trace of gravel.	A-7-5(3)	
			10.0'		15" RECOVERY		
		6	10.0'	8 10 11 12	Wet very stiff brown fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(6)	
12			12.0'		17" RECOVERY		
		7	12.0'	3 4 3 3	Wet loose brown clayey coarse to fine sand w/trace of gravel.	A-2-7(1)	
			14.0'		19" RECOVERY		
15		8	14.0'	3 4 5 7	Wet loose brown clayey coarse to fine sand w/trace of gravel.	A-2-7(1)	
			16.0'		22" RECOVERY		
					End of Boring		
	1						

Remarks:

Symbol Description

Strata symbols



Low plasticity clay



Silty low plasticity clay



Silty sand



Silt

DRAFT NOT FOR BIDDING AUGUST 2015

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

IN. IN. Core Bit: O.D.

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

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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
	7/14/09	1	0.5' 2.0'	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	MMH		4.4715	
			2.0	11 11 14		Moist very stiff brown silt w/some fine sand, trace of clay and coarse	A-4(1)	
3			3.5'			sand. 18" RECOVERY		
		2A	3.5' 4.0'	14		Moist medium dense brown silty fine sand w/some coarse sand.	A-2-4(0)	
	-	3	4.0'	2 3			A-6(6)	
			1.0	6 10		Wet stiff grayish orange mottled clay w/some fine sand, trace of coarse		
						sand and gravel.		
6			6.0'			22" RECOVERY		
		4	6.0'	14 14 16 16		Moist very stiff grayish orange mottled fine sandy clay w/some coarse	A-6(6)	
				16 16		sand, trace of gravel.		
			8.0'			20" RECOVERY		
		5	8.0'	10 11 12 12		Moist medium dense white silty fine sand w/trace of clay and coarse sand.	A-2-4(0)	USDA
9				12 12				Classifica
								- Sandy
			10.0'			20" RECOVERY		Loam.
		6	10.0'	4 8		Moist medium dense orangish gray coarse sand w/some silt and fine sand,	A-1-b	
				8 8		trace of gravel.		
12			12.0'			16" RECOVERY		
		7	12.0'	14 22 26 11		Moist dense orangish tan coarse sand and gravel w/some silt and fine	A-1-b	
				26 11		sand.		
			14.0'			16" RECOVERY		
		8	14.0'	18 20 14 16		Wet dense brownish red clayey coarse sand w/some fine sand and gravel.	A-2-5(0)	
15				14 16				
			16.0'			19" RECOVERY		
						End of Boring		

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silt



Silty sand



Low plasticity clay

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	6 4 5	Moist stiff brown clayey silt w/trace of fine sand and gravel. 14" RECOVERY	A-4(6)	Topsoil - 5".
		2	2.0'	7 6	Moist stiff brown clayey silt w/trace of fine sand.	A-4(9)	
3			4.0'	9	P 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	1	<u></u>	6.0'		17" RECOVERY	2 1 5(5)	
		4	6.0'	5 7 8 8	Moist stiff orangish gray mottled clay w/some fine to coarse sand, trace of gravel.	of 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, trac of gravel.	e A-7-5(4)	
			16.0'		23" RECOVERY		
					End of Boring		
	4						

Remarks:

Symbol Description

Strata symbols

Silt

Low plasticity clay

Clayey sand

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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
	7/14/09	1	0.5' 2.0'	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	Moist medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
3		3	4.0'	8 10	21' RECOVERY Moist first top and grow always silk by/some first and trace of posters and		
6		J	6.0'	2 2 3 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.	A-6(14)	
		<u> </u>	8.0'	1	22" RECOVERY		
9		5	8.0' 10.0'	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.	A-2-4(0)	
12			12.0'		19" RECOVERY		
		7	12.0' \ 12.5' <i>[</i>	5	No Sieve Analysis - Indication of moist medium dense orangish gray		
		7A	12.5' 12.5'	8 8 9	mottled sand w/some clay. 3" RECOVERY Moist medium dense brown silty fine sand w/some coarse sand, trace of	A-2-4(0)	
		8	14.0'	11 14	gravel.	A-1-b	
15				14 16 16	Moist medium dense brown coarse sand and gravel w/some fine sand,		
			16.0'		trace of silt.		
					End of Boring		

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

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

Casing Size: 3 1/4 Inches

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

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	3 3 4		Moist firm brown clayey fine sandy silt w/some coarse sand, trace of gravel. 13" RECOVERY	A-4(1)	Topsoil - 6".
		2	2.0'	3 3		Moist firm brown clayey silt w/some fine to coarse sand, trace of gravel.	A-4(6)	
3			4.0'	3		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	1	<u></u>	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		
	1	5	8.0'	4		Wet medium dense brownish red silty coarse to fine sand w/trace of	A-2-4(0)	-
9		Ĭ	0.0	4 5 6 7		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		<u></u>	12.0'	<u> </u>		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)	
			110	!		A (II DE GOVERN)		
	1	8	14.0' 14.0'	4		16" RECOVERY	1 2 4(0)	<u> </u>
15	1	°	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		
					144444444	End of Boring		<u> </u>
	_							
	1	1	1					

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All Blows are un corrected.

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

Boring No.: IT1-31 F.A. Project: U.S. 301 Maryland State Line to S.R. 1

Contract: 28-113-01

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

Boring Surface Elev.: + 87.8 Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 7/13/2009 16.0 14.0

Dry

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	4 4 4	Moist firm brown clayey silt w/trace of fine to coarse sand and gravel. 14" RECOVERY	A-4(8)	Topsoil - 5".
		2	2.0'	7 5	Moist stiff brown clayey silt w/trace of fine to coarse sand.	A-4(8)	
3		V	4.0'	5	FOR PIS'RECOVERY		
		3	4.0'	5 7 8	Moist stiff brownish gray silt w/some clay and fine sand, trace of coarse sand and gravel.	A-4(3)	
6	1 '		6.0'	'	19" RECOVERY		ļ !
		4	6.0'	5 5 7 8	Moist stiff brown silt w/some clay and fine sand, trace of coarse sand.	A-4(4)	
	1		8.0'	'	21" RECOVERY		
9		5	8.0'	7 5 7	Moist stiff brown clayey fine sandy silt w/some coarse sand and gravel.	A-4(1)	
			10.0'	' !	17" RECOVERY		
		6	10.0'	7 9 9 11	Moist very stiff orange fine sandy silt w/some coarse sand and clay.	A-4(0)	USDA Classifica
	1		'	'			- Sandy
12	1	7	12.0' 12.0'		19" RECOVERY	1(0)	Loam.
<u> </u>	_	'	12.0	5 7 8 9	Moist medium dense orange silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
	1		14.0'	'	18" RECOVERY		
	1	8	14.0'	8 11	Moist medium dense orange coarse to fine sand w/some silt, trace of	A-1-b	
15	1			13 13	gravel.		
			16.0'	'	18" RECOVERY		
				<u> </u>	End of Boring		
	1		'	'			

Remarks:

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

- 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 recomendations 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:

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

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	4 2 2	Moist soft brown clayey fine sandy silt w/some coarse sand, trace of gravel. 12" RECOVERY	A-4(2)	Topsoil - 5".
		2	2.0'	5 6	Moist stiff brown clayey silt w/some coarse to fine sand, trace of gravel.	A-4(3)	
3			4.0'	6	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'	A _'	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		
			10.0		End of Boring		
				!			

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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**

Boring No.: IT1-33 F.A. Project: U.S. 301 Maryland State Line to S.R. 1

Contract: 28-113-01

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

Boring Surface Elev.: + 76.4 Reference:

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

Core Bit: O.D.

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

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	4 3 3	Moist firm brown clay w/trace of fine to coarse sand.	A-6(11)	Topsoil - 5".
		2	2.0'	4 5 7	Moist stiff brown fine sandy silt w/some clay and coarse sand, trace of	A-4(2)	
3			4.0'	7	Per BIDDING		
		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' 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' 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	Louin
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' 14.0'	17 19 21 26	Moist dense brown clayey coarse sand and gravel w/some fine sand.	A-2-6(0)	
			10.0		End of Boring		

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty low plasticity clay



Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All Blows are 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: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

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

Water Level Readings

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

16.0 14.0

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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
	7/14/09	1	0.5'	3 4 4		Moist frim brown clayey silt w/trace of fine to coarse sand.	A-4(4)	Topsoil - 5".
			2.0'			14" RECOVERY		3.
		2	2.0'	5 7		Moist very stiff brown clayey silt w/trace of fine to coarse sand.	A-4(7)	
3		V	4.0'	9		20" RECOVERY		
	•	3	4.0'	4 4 7 8		Moist medium dense orange clayey fine to coarse sand w/trace of gravel.	A-2-6(0)	
6			6.0'			19" RECOVERY		
		4	6.0'	3 6 7 8		Moist stiff orange fine to coarse sandy clay w/trace of gravel.	A-6(5)	
			8.0'			18" RECOVERY		
9		5	8.0'	3 5 5 7		Moist loose orange silty fine sand w/trace of clay, coarse sand and gravel.	A-2-4(0)	USDA Classifica
			10.0'			16" RECOVERY		- Sandy Loam
		6	10.0'	3 4 4 5		Moist loose orange silty fine sand.	A-2-4(0)	
10			40.01			10" DECOVEDY		
12		7	12.0' 12.0'	6		18" RECOVERY Moist stiff orange fine sandy silt.	A-4(0)	
				6 7 7 8			(-)	
			14.0'			19" RECOVERY		
		8	14.0'	16 13		Moist medium dense brownish red coarse to fine sand w/some silt and	A-1-b	
15				16 13 11 6		gravel.		
			16.0'			13" RECOVERY		
			10.0			End of Boring		
						20.00 C 20.00 C		
	1	i .			I			

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Low plasticity clay



Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

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

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0 14.0

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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
	7/14/09	1	0.5' 2.0'	3 3 4	Moist firm brown clayey silt w/trace of fine sand. 13" RECOVERY	A-4(7)	Topsoil - 5".
		2	2.0'	7 9 8	Moist very stiff brown clayey silt w/some fine sand, trace of coarse sand	A-4(4)	
3			4.0'	10	and gravel. 18" RECOVERY		
	•	3	4.0'	3 5 7 8	Moist medium dense orange clayey coarse to fine sand w/trace of gravel	A-2-6(0)	
6		4	6.0' 6.0'	9	19" RECOVERY	A-1-b	USDA
		7	0.0	9 11 9 10	Moist medium dense orange coarse sand w/some silt and fine sand, trace of gravel and clay.	A-1-0	Classificate - Sand
			8.0'	4	21" RECOVERY		
9		5	8.0'	4 6 5 5	Moist medium dense orange silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			10.0'		20" RECOVERY		
		6	10.0'	6 9 11 13	Moist medium dense orange silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
12			12.0'		16" RECOVERY		
		7	12.0'	14 14 18 14	Moist hard brownish red fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(6)	
			14.0'		19" RECOVERY		
15		8	14.0'	11 13 11 10	Moist medium dense greenish red silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			16.0'		18" RECOVERY		
					End of Boring		
\vdash	l	l	1				

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0

Water Level Readings

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

Dry

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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
	7/15/09	1	0.5'	3 4 4	Moist firm brown clayey silt w/trace of fine to coarse sand.	A-4(9)	Topsoil - 7".
<u> </u>		2	2.0'	4	12" RECOVERY Moist stiff brown clayey silt w/trace of fine to coarse sand.	A-4(9)	
3		´_'	2.0	6 9	Moist still brown clayey sin w/trace of fine to coarse sailu.	A-4(9)	
<u> </u>		V	4.0'	8	16' RECOVERY		
		3	4.0'	8 10 8	Moist very stiff brown coarse to fine snady clay w/trace of gravel.	A-6(1)	
6		'	6.0'	Λ	20" RECOVERY	İ	
		4	6.0'	9 10 7 7	MOist medium dense brown clayey fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	USDA Classifica - Sandy
	1	'	8.0'		21" RECOVERY	ı	Loam
9		5	8.0'	4 5 6 6	Moist medium dense brown silty fine sand w/trace of coarse sand.	A-2-4(0)	
			10.0'		20" RECOVERY		
		6	10.0'	9 6 9 15	Moist medium dense brown silty fine sand w/trace of coarse sand.	A-2-4(0)	
12		'	12.0'		22" RECOVERY	İ	
12		7	12.0'	7 9 11 13	Moist medium dense brownish red clayey coarse to fine sand w/trace of gravel.	A-2-5(0)	
	'		14.0'		17" DECOVERY	ı	
		8	14.0' 14.0'	7	17" RECOVERY Wet medium dense brownish red clayey coarse to fine sand w/trace of	A-2-7(0)	
15	'			8 6 8	gravel.	H 2 7(0)	
			16.0'		20" RECOVERY	ı	
					End of Boring		
	<u> </u>	1				ı	

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Clayey sand



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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.

3 1/4

Boring Surface Elev.: + 70.6 Reference:

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

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** Hollow Stem Auger: 0.0

Water Level Readings

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

Inches

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

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

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silt



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Casing Size: 3 1/4 Inches

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

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	5 5 5	Moist stiff brown clayey silt w/trace of fine sand. 13" RECOVERY	A-4(10)	Topsoil - 7".
		2	2.0'	5 7	Moist stiff brown clayey silt w/trace of fine to coarse sand.	A-4(7)	
3		3	4.0'	3 3 3 6	Moist stiff brown clayey fine andy silt w/some coarse sand, trace of gravel.	A-4(2)	
6			6.0'	9	17" RECOVERY		
		4	6.0'	6566	Moist medium dense orange coarse sand w/some silt and fine sand, trace of gravel.	A-1-b	
			8.0'		18" RECOVERY		
9		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
		6	10.0'	15 20 25 20	Moist dense brown gravel and coarse sand w/some silt and fine sand.	A-1-b	Pulverized gravel in tip of
12		<u> </u>	12.0'	-	12" RECOVERY		spoon.
		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)	
15		8	14.0'	3 7 5 4	Wet medium dense brown coarse to fine sand w/some silt, trace of gravel	. A-1-b	
			10.0		End of Boring		

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

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

Core Bit: O.D.

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

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	6 6 6	Moist stiff clayey silt w/some gravel, trace of fine to coarse sand.	A-4(7)	Topsoil - 6".
		2	2.0'	6 8	Moist very stiff brown clayey silt w/trace of fine to coarse sand.	A-4(9)	
3			4.0'	11	18' RECOVERY		
	•	3	4.0' 6.0'	4 5 5 8	Moist stiff brownish orange mottled clayey silt w/trace of fine to coarse sand. 20" RECOVERY	A-4(7)	USDA Classifica - Silt
6		4	6.0'	7 21 12 14	Moist dense brown clayey gravel w/some coarse sand, trace of fine sand.	A-1-b	Pulverized gravel in tip of
-		5	8.0' 8.0'	3	8" RECOVERY	A 2 ((0)	spoon.
9		5	0.0	3 5 7 10	Moist medium dense greenish orange clayey gravel and fine sand w/some silt and coarse sand.	A-2-6(0)	
			10.0'		17" RECOVERY		
		6	10.0'	6 8 12 8	Moist medium dense orange coarse to fine sand and gravel w/some silt.	A-1-b	
12			12.0'		17" RECOVERY		
		7	12.0'	3 3 4	Wet loose orange silty coarse to fine sand w/some gravel.	A-2-4(0)	
			14.0'		21" RECOVERY		
15		8	14.0'	12 9 6 21	Wet medium dense brown coarse sand and gravel w/some coarse sand and silt.	A-1-b	
			16.0'		20" RECOVERY		
					End of Boring		

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silt



Silty clayey gravel



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

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

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

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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.	A-4(10)	Topsoil -
			2.0'	,	11" RECOVERY		7".
		2	2.0'	7	Moist firm brown silt w/some clay, trace of fine sand.	A-4(4)	
3			4.0'	5	P P 19' RECOVERY		
	•	3	4.0'	3 7 7 13	Moist medium dense brown clayey gravel w/some coarse to fine sand.	A-2-4(0)	
6			6.0'		16" RECOVERY		
		4	6.0'	11 12 13 18	Moist medium dense tan gravel and coarse to fine sand w/some silt, trace of clay.	A-1-b	USDA Classifica - Sandy
			8.0'		14" RECOVERY		Loam
9		5	8.0'	4 10 8 9	Moist medium dense orangish green clayey fine sand w/some coarse sand and gravel.	A-2-7(1)	
			10.0'		13" RECOVERY		
		6	10.0'	8 7 8 10	Moist medium dense orangish green clayey gravel and fine sand w/some coarse sand.	A-2-7(1)	
12			12.0'		20" RECOVERY		
		7	12.0'	3 5 7 5	Wet medium dene orange silty coarse to fine sand and gravel.	A-1-b	
		0	14.0'	4	16" RECOVERY		
15		8	14.0'	4 13 9 8	Wet medium dense orange silty coarse to fine sand and gravel.	A-1-b	
			16.0'		13" RECOVERY		
					End of Boring		

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty low plasticity clay



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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".
 	1 '	2	2.0'	4		Moist very stiff brown clayey coarse sandy silt w/some fine sand and	A-4(2)	USDA
3		V	4.0'	4 8 10 15		gravel. 17" RECOVERY	11 -1(2)	Classifica - Loam
		3	4.0'	8 23 13 12		No Sieve Analysis - Indication of moist dense brown silty sand w/trace of gravel.		Piece of gravel in tip of
6	1 '	<u> </u>	6.0'	10		3" RECOVERY		spoon.
		4	6.0'	13 10 13 12		No Sieve Analysis - Indication of moist medium dense brown silty sand w/trace of gravel.		Piece of gravel in tip of
	∫ '	<u> </u>	8.0'			2" RECOVERY		spoon.
9	 	5	8.0'	3 5 6 6		Wet medium dense orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
	'	'	10.0'			15" RECOVERY		
	-	6	10.0'	6 5 6 6		Wet medium dense orange clayey coarse to fine sand w/some gravel.	A-2-7(1)	
12	l '	'	12.0'			17" RECOVERY		
12		7	12.0'	3 5 7 7		Wet medium dense orange silty coarse to fine sand w/some gravel.	A-1-b	
<u> </u>	1 '	<u> </u>	14.0'			20" RECOVERY		
15	'	8	14.0'	3 5 8 7		Wet medium dense orange silty coarse to fine sand w/some gravel.	A-2-4(0)	
	'		16.0'			22" RECOVERY		
			1333		133333333	End of Boring		
		'						

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

1.0000000

Poorly graded sand with silt



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

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

Core Bit: O.D.

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

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	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	Moist dense brown clayey gravel w/some fine to coarse sand.	A-2-4(0)	
3		3	4.0'	15 16 13 15 14 14	13" RECOVERY Moist medium dense orangish brown clayey gravel and fine sand w/some coarse sand.	A-2-7(1)	
6			6.0'		16" RECOVERY		
		4	6.0'	14 8 11 13	Wet medium dense orange clayey gravel and fine sand w/some coarse sand.	A-2-7(0)	
			8.0'		15" RECOVERY		
9		5	8.0'	16 15 13 5	Wet very stiff orange coarse to fine sandy clay w/trace of gravel.	A-7-5(2)	
			10.0'		4" RECOVERY		
		6	10.0'	4 4 7 8	Wet medium dense orange silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
12			12.0'		17" RECOVERY		
		7	12.0'	4 5 7 7	Wet mediumd ense orange silty coarse sand and gravel w/some fine sand.	A-1-b	
		8	14.0' 14.0'	6	10" RECOVERY Wet medium dense orange silty coarse to fine snad w/some gravel.	A-2-4(0)	
15		0	17.0	6 5 7 7	wet medium dense orange sitty coarse to fine snad w/some gravel.	A-2-4(0)	
			16.0'		18" RECOVERY		
					End of Boring		

Remarks:

Symbol Description

Strata symbols

Clayey sand



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

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

IN. IN. Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 7/17/2009 16.0

14.0 Dry

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	555	Moist stiff brown clayey silt w/trace of fine to coarse sand. 12" RECOVERY	A-4(8)	Topsoil - 7".
		2	2.0'	5 6 7	Moist stiff brown clayey silt w/some fine sand, trace of coarse sand and	A-4(6)	
3			4.0'	6	gravel. 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 Classificat - Clay Loam
6		4	6.0'	5	18" RECOVERY	+	Loain
		4	6.0' 8.0'	5 6 5 5	Wet stiff brown fine sandy clay w/some coarse sand, trace of gravel. 17" RECOVERY	A-7-5(7)	
		5	8.0'	3		A-7-5(5)	
9		Ü	10.0'	3 4 5 5	Wet stiff orangish green coarse sandy clay w/some fine sand, trace of gravel. 12" RECOVERY	A-7-3(3)	
		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'	3558	Wet loose orangish brown silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
		8	14.0'	8	Wet medium dense brownish orange silty coarse to fine sand w/trace of	A-2-4(0)	
15		Ĭ	0	8 4 7 13	gravel.	A-2-4(0)	
			16.0'		18" RECOVERY		
					End of Boring		

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silt

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0 14.0

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Laffertty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/17/09	1	0.5' 2.0'	6 6 8	Moist stiff brown clayey silt w/trace of fine to coarse sand and gravel. 13" RECOVERY	A-4(7)	Topsoil - 5".
		2	2.0'	5 7	Moist very stiff brown clayey silt w/some fine to coarse sand, trace of	A-4(4)	
3		2A	3.0' 3.0' 4.0'	18 10	gravel. 10" RECOVERY Moist medium dense brown coarse to fine sand w/some gravel and silt. 12" RECOVERY	A-1-b	
	•	3	4.0' 6.0'	7 8 7 9	Moist medium dense brown coarse to fine sand and gravel w/some silt. 18" RECOVERY	A-1-b	
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
		5	8.0' 8.0'	5	18" RECOVERY Moist medium dense brownish orange silty coarse to fine sand w/trace of	A-2-4(0)	
9				5 7 10 7	gravel.	A-2-4(0)	
		6	10.0' 10.0'	6	15" RECOVERY Wet medium dense brownish orange silty coarse to fine sand w/trace of	A-2-4(0)	
				6 6 5 6	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:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

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

Core Bit: O.D.

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

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	11 12 12	III WALI WALI	Moist very stiff brown clayey silt w/trace of fine to coarse sand and gravel. 13" RECOVERY	A-4(5)	Topsoil - 5".
		2	2.0'	8 8 9		Moist very stiff orange fine sandy clay w/trace of coarse sand and gravel.	A-6(8)	
3		3	4.0'	6 10 16 10		17' RECOVERY 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'	Q		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:

Symbol Description

Strata symbols

Silty low plasticity clay



Low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 7/21/2009 16.0 14.0 Dry

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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"	l	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
]		2.0'			12" RECOVERY		Soil -
		2	2.0'	8 9 12 14		Moist very stiff orange gravelly clay w/some coarse sand, trace of fine	A-6(3)	12".
3				12 14		sand.		
			4.0'			16"RECOVERY		
		3	4.0'	3 5 9		Moist medium dense orange clayey gravel and coarse sand w/trace of fine	A-2-6(1)	
				9		sand.	= -(.,	
6]		6.0'			16" RECOVERY		
		4	6.0'	8 11		Moist medium dense orange clayey gravel w/some coarse sand, trace of	A-2-6(0)	
				14 20		fine sand.		
			0.01			12" PEGOLUTINA		
<u> </u>	!	5	8.0' 8.0'	9 9		12" RECOVERY MOist medium dense orange coarse to fine sand and gravel w/some silt.	A-1-b	
9		ਁ	0.0	9		WOIST medium dense orange coarse to time sand and graver w/some sin.	A-1-0	
9				9				
			10.0'			17" RECOVERY		
		6	10.0'	10 4		Moist loose orange silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
				4		-		
12		<u> </u>	12.0'			24" RECOVERY		
		7	12.0'	5 6 9 10		Moist medium dense orange coarse to fine sand and gravel w/some silt.	A-1-b	
				10				
			14.0'			20" DECOVEDY		
		8	14.0' 14.0'	9 7		20" RECOVERY Moist medium dense orange coarse to fine snad w/some gravel, trace of	A-1-b	
15				7 6	2011 19:00 10 10 10:00 10 10 10:00	silt.	A-1-0	
10				7		Sit.		
			16.0'			22" RECOVERY		
					ENJLES	End of Boring		

Remarks:

Symbol Description

Strata symbols

Silt



Clayey sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All Blows are 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:

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

Core Bit: O.D.

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

Water Level Readings

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

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	4 4 7	Moist stiff brown clay w/trace of fine to coarse sand and gravel. 12" RECOVERY	A-6(12)	Topsoil - 7".
		2	2.0'	8 9 9	Moist very stiff brown clayey silt w/trace of fine to coarse sand.	A-4(8)	
3		3	4.0'	10	16" RECOVERY Moist stiff brown clay w/some fine to coarse sand, trace of gravel.	A-6(7)	
6			6.0'	7 6 7 6	18" RECOVERY		
		4	6.0' 8.0'	9 8 6 8	Moist stiff brown clay w/some fine to coarse sand and gravel. 17" RECOVERY	A-6(8)	
9		5	8.0'	6 5 6 12	Moist medium dense brown silty coarse sand w/some fine sand, trace of gravel.	A-1-b	
		6	10.0'	7 10 9 9	19" RECOVERY Moist medium dense brown coarse to fine sand w/some gravel and silt.	A-1-b	
12		7	12.0' 12.0'	8 10 9 10	21" RECOVERY Moist medium dense brown fine to coarse sand w/some silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
15		8	14.0'	8 9 9 7	Moist medium dense brown fine to coarse sand w/some gravel and silt.	A-2-4(0)	
			10.0		End of Boring		

Remarks:

Symbol Description

Strata symbols

Strata Symbols

Low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 7/6/2009 16.0 14.0 Dry

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress		Depth				
	7/6/09	1	0.5' 2.0'	10 14 17	Moist medium dense gravel w/some fine to coarse sand and silt. 14" RECOVERY	A-1-b	Cultivated Soil - 6".
		2	2.0'	6 9 7	Moist medium dense orange fine to coarse sand w/some silt, trace of	A-2-4(0)	
3		V	4.0'	12	gravel. 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		L.	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 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		
12		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'		######################################		
					End of Boring		
					·		

Remarks:

Symbol Description

Strata symbols



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 7/6/2009 16.0 14.0 7.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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'	5 4 4	Moist loose brown coarse sand w/some clay, gravel and fine sand.	A-2-4(0)	Topsoil - 4".
		2	2.0'	6	12" RECOVERY Moist stiff brown clayey coarse sandy silt w/some gravel, trace of fine	A-4(1)	
3				6	sand	Λ-4(1)	
			4.0'	0	15' RECOVERY		
	•	3	4.0'	4 4 4 7	Moist loose brown clayey coarse sand w/some gravel and fine sand.	A-2-4(0)	
6			6.0'		18" RECOVERY		
		4	6.0'	16 19 22 14	Moist dense brown coarse sand w/some fine sand and silt, trace of gravel.	A-1-b	
			9.0'		HARE		
		5	8.0' 8.0'	11	16" RECOVERY Wet medium dense brown silty coarse sand and gravel w/some fine sand.	A-1-b	
9				11 9 12 14	wet medium dense brown sing course said and graver wisome time said.	71 1 0	
			10.0'		14" RECOVERY		
		6	10.0'	12 11 14 9	Wet medium dense brown coarse sand and gravel w/some fine sand and silt.	A-1-b	
40			10.0		HAME		
12		7	12.0' 12.0'	6	19" RECOVERY Wet loose brown fine to coarse sand w/trace of silt and gravel.	A-3	
				6 3 4	Hilliet Wet 10050 510 wil fine to course said w/trace of sitt and graver.	11 5	
				7	11 4 11 15 15 1 14 14 14 15 1 14 1 18 15 1		
			14.0'		111161 111165 111165		
		8	14.0'	6 5 14 12	Wet medium dense brown fine to coarse sand w/some gravel, trace of silt.	A-3	
15				12	74 1736 G 61 4 3 G 14 4 5 G		
			16.0'		14" RECOVERY		
			. 5.5		End of Boring		

Remarks:

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Clayey sand



Poorly graded sand with silt



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Water Depth of Casing Time **Depth of Hole** Elev. of Water Date 7/6/2009 14.0 16.0 14.0

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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 3 2	Moist firm brown clayey coarse sandy silt w/trace of fine sand.	A-4(4)	Cultivated Soil - 6"
		2	2.0'	4 5	Moist stiff brown coarse to fine sandy silt w/trace of gravel.	A-4(0)	
3		V	4.0'	5	14' RECOVERY		
	•	3	4.0	7 5 5 3	Moist stiff brown fine sandy silt w/some coarse sand, trace of gravel.	A-4(0)	
6		4	6.0' 6.0'	8	16" RECOVERY	A-1-b	
		"	0.0	8 12 13 9	Moist medium dense brown coarse sand and gravel w/some fine sand, trace of silt.	A-1-0	
			8.0'		18" RECOVERY		
9		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
			10.0'		5" RECOVERY		Sand
		6	10.0'	16 13 10 10	Moist medium dense brown coarse sand w/some gravel, silt and fine sand.	A-1-b	
12			12.0'		######################################		
'-		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'		FILMER FILMER FILMER FILMER		
15		8	14.0'	6 6 6	Wet medium dense brown coarse to fine sand w/trace of silt and gravel.	A-1-b	
			16.0'		17" RECOVERY		
			10.0		End of Boring		
<u> </u>							

Remarks:

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

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 11.5

7/6/2009 16.0 14.0

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

- ·	Б. 11		0 1				1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
()	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	Moist stiff brown fine sandy silt w/some clay, coarse sand and gravel.	A-4(0)	
3		3	4.0'	7	16" RECOVERY	2.4(0)	
6		3_	6.0'	9 9 11	Moist medium dense brown fine sand w/some silt, coarse sand and gravel	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.	A-2-4(0)	USDA Classifica - Sandy Loam
		5	8.0' 8.0'	20	21" RECOVERY Moist medium dense brown gravel and fine sand w/some silt and coarse	A-1-b	Loam
9			10.0'	20 14 10 11	sand.	A-1-0	
		6	10.0'	12 11 10 5	Wet medium dense brown coarse to fine sand w/some gravel, trace of silt.	A-1-b	
12			12.0'		14" RECOVERY		
		7	12.0'	10 6 5 4	Wet medium dense tan fine to coarse sand w/trace of silt and gravel.	A-3	
15		8	14.0'	3 4 6 6	Wet loose tan coarse to fine sand w/trace of silt and gravel.	A-1-b	
			16.0'		17" RECOVERY		
					End of Boring		

Remarks:

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

- 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 recomendations 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**

Boring No.: IT1-52 F.A. Project: U.S. 301 Maryland State Line to S.R. 1

Contract: 28-113-01

Boring Location: Sta. 703+00, 53.00' Rt. C.L.

Boring Surface Elev.: + 47.0 Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 7/6/2009 16.0 14.0

Dry

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	3 3 3	Moist firm brown clay w/some fine to coarse sand, trace of gravel. 10" RECOVERY	A-6(4)	Cultivated Soil - 7".
		2	2.0'	2 2 2	Moist soft brown coarse to fine sandy silt w/trace of gravel.	A-4(0)	
3		J	4.0'	2	E P P 15' RECOVERY		
	•	3	4.0	7 6 7 6	Moist medium dense brown silty fine to coarse sand w/trace of gravel.	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.	A-2-4(0)	USDA Classifica - Loamy Sand
		5	8.0' 8.0'	8	16" RECOVERY Moist medium dense brown coarse sand w/some fine sand and silt.	A-1-b	Sand
9			10.0'	8 7 6 7	15" RECOVERY	7110	
		6	10.0'	8 8 7 9	Moist medium dense brown coarse sand w/trace of silt, fine sand and gravel.	A-1-b	
12			12.0'		74497 14485 20" RECOVERY		
		7	12.0'	5 4 4 7	Moist loose brown coarse sand w/trace of fine sand, gravel and silt.	A-1-b	
		8	14.0' 14.0'	9	16" RECOVERY Moist dense brown gravel and coarse sand w/trace of fine sand and silt.	A-1-b	
15			16.0'	9 13 20 29	Moist dense brown graver and coarse sand w/trace of fine sand and stit.	A-1-0	
			10.0		End of Boring		

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

Poorly graded sand with silt

Well graded sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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**

Boring No.: IT1-58 F.A. Project: U.S. 301 Maryland State Line to S.R. 1

Contract: 25-113-01

Boring Location: Sta.110+09, Lt. C.L.

Boring Surface Elev.: Reference:

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

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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
(11.)	9/30/09	1	0.0'		No Sample Taken		Hand Auger - Topsoil
			1.0'		0" RECOVERY		
1.5		2	2.0	T	Wet brown clay w/trace of fine to coarse sand. 12" RECOVERY	A-6(11)	Hand Auger
3		3	3.0'		Wet greenish brown clay w/trace of coarse to fine sand and gravel. 12" RECOVERY	A-6(8)	Hand Auger
		4	3.0 ¹		Wet brownish gray clay w/some fine to coarse sand, trace of gravel. 12" RECOVERY	A-6(8)	Hand Auger
4.5		5	4.0' 5.0'		Wet brownish gray clay w/some gravel and fine sand, trace of coarse sand. 12" RECOVERY	A-6(12)	Hand Auger
		6	5.0'		Wet brownish gray silty clay w/some gravel and fine sand, trace of coarse sand.	A-6(10)	Hand Auger USDA Classificat
6		7	6.0' 6.0'		12" RECOVERY Wet brownish gray clayey gravel w/some fine to coarse sand.	A-2-6(2)	- Clay Loam Hand
			7.0'		12" RECOVERY		Hand Auger
					End of Boring		
7.5							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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: Wt. of Sample Hammer: IN. IN. IN. Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Lbs. D-Sampler: S-Sampler: U-Sampler: Core Bit: Type of: O.D. IN. IN. O.D. O.D.

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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	1.0'			Wet gray silt w/some fine sand and clay, trace of coarse sand.	A-4(2)	Hand
1.5								Auger
		2_	2.0'			12" RECOVERY Wet gray clayey silt w/some fine sand, trace of coarse sand.	A-4(2)	Hand
		-				wet gray crayey sift w/some time sand, trace of coarse sand.	A-4(2)	Auger
		M				-()R BII JI JIIVI(·		ruger
3			3.0'			12" RECOVERY		
		3	3.0'			Wet brown silty fine to coarse sand w/some gravel.	A-2-4(0)	Hand
								Auger
			4.01			12" PECOVERY		
		4	4.0' 4.0'	76		12" RECOVERY Wet orange coarse to fine sand w/some silt, trace of gravel.	A-1-b	Hand
4.5						wet orange course to fine saila wisonie sitt, trace of graver.	7110	Auger
								Ŭ
			5.0'			12" RECOVERY		
		5	5.0'			Wet orange silt w/some fine sand, trace of coarse sand.	A-4(0)	Hand
								Auger USDA
6			6.0'			12" RECOVERY		CLassifica
		6	6.0'			Wet orange coarse to fine sand w/some silt.	A-2-4(0)	- Sandy
								Loam
								Hand
		7	7.0' 7.0'			12" RECOVERY	A 1 1	Auger
 		'	7.0			Wet orange coarse sand w/some fine sand and silt, trace of gravel.	A-1-b	Hand
7.5								Auger
			8.0'		1613 1316 6 1613 136 6 1613 1316 1	12" RECOVERY		
			-		1.141:65	End of Boring		
9								

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



silt



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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.: IT1-60

Contract: 25-113-01

Boring Location: Sta. 719+55, Rt C.L.

Boring Surface Elev.: Reference:

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

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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	1.0'		No Sample Taken 0" RECOVERY		Hand Auger Topsoil - 6".
		2	1.0'		Moist gray gravel and coarse sand w/some fine sand and silt.	A-1-b	Hand
1.5			2.0'		TOR BULLING	j	Auger
		3	2.0'		Wet gray clay w/some fine sand, trace of coarse sand.	A-6(12)	Hand
3			3.0'	11	GIST _{12" RECOVERY} 15		Auger
		4	3.0		Wet gray clayey fine sandy silt w/trace of coarse sand.	A-4(0)	Hand
			4.0'		12" RECOVERY		Auger
		5	4.0'		Wet gray silty fine sand w/trace of coarse sand.	A-2-4(0)	Hand
4.5							Auger USDA
		6	5.0' 5.0'		12" RECOVERY	1 2 4(0)	Classifica
		0	5.0		Wet gray silty fine sand w/trace of coarse sand.	A-2-4(0)	- Loamy Sand.
			6.0		100 RECOVERY		Hand Auger
6		7	6.0' 6.0'		12" RECOVERY Wet gray silty fine sand w/some coarse sand.	A-2-4(0)	Hand
			0.0		wet gray sing time same wisome coarse same.	A-2-4(0)	Auger
<u> </u>							1.0501
			7.0'		12" RECOVERY		
					End of Boring		
7.5							

Remarks:

Symbol Description

Strata symbols

Silty sand



Low plasticity clay



Silty low plasticity clay

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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: Wt. of Sample Hammer: IN. IN. IN. Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Lbs. D-Sampler: S-Sampler: U-Sampler: Core Bit: Type of: O.D. IN. IN. O.D. O.D.

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

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: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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
	1	2	1.0'	 	Moist gray clayey silt w/trace of fine to coarse sand.	A-4(8)	Auger Topsoil -
1.5		-	1.5'	'	6" RECOVERY	A-4(0)	6".
							Hand
		2	2.0'	 '	12" RECOVERY	1 (0)	Auger
		3	2.0'	√	Moist orange fine sandy silt w/some coarse sand and clay.	A-4(0)	Hand Auger
				'			Augei
3	<u>'</u>		3.0'		12" RECOVERY		
		4	3.0'	/\	Wet orange clayey silt w/some fine sand, trace of coarse sand.	A-4(3)	Hand
	1			71			Auger
	_		4.0'		12" RECOVERY		
	1	5	4.0'	<u> </u>	Wet orange clayey fine to coarse sand.	A-2-4(0)	Hand
4.5	-			'			Auger
	1		5.0'	'	12" RECOVERY		USDA CLassifica
<u> </u>	-	6	5.0'	 	Wet orange clayey gravel w/some fine to coarse sand.	A-2-4(0)	- Sandy
<u> </u>	1			'			Loam.
<u> </u>	1			'			Hand
6	1	7	6.0' 6.0'	 '	12" RECOVERY Saturated green fine sandy clay w/some gravel, trace of coarse sand.	A-7-6(8)	Auger Hand
	1			'	Saturated green fine sandy eray w/some graver, trace or course sand.	Λ-1-0(0)	Auger
	1			'			
	<u> </u>	—	7.0'	 '	12" RECOVERY		
7.5	1			'	End of Boring		
1.0	1			'			
	1			'			
	1			'			
			1	'			
	<u> </u>	<u></u>		<u> </u>			

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty low plasticity clay



Poorly graded clayey silty sand



Clayey sand



Silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 4. Results of tests conducted on samples recovered are reported on the logs.

Boring No.: IT1-62 F.A. Project: U.S. 301 Maryland State Line to S.R. 1

Contract: 25-113-01

Boring Location: Sta. 728+728+84, Rt. C.L.

Boring Surface Elev.: Reference:

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

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

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

Boring Contractor: Walton Corporation **Driller:**

Helpers:

			_			1	
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 -
			1.0'		0" RECOVERY		6".
1.5		1	2.0'		Wet brown clayey silt w/trace of fine to coarse sand. 12" RECOVERY	A-4(6)	Hand Auger
		2	2.0'		Wet gray clayey silt w/trace of fine to coarse sand.	A-4(8)	Hand
3			3.0'		S T _{12" RECOVERY}		Auger
		3	3.0'		Wet gray clayey silt w/trace of fine to coarse sand.	A-4(7)	Hand
			4.0'		12" RECOVERY		Auger
		4	4.0'		Wet orange clayey silt w/some fine sand, trace of coarse sand.	A-4(4)	Hand
4.5			5 01			12 (()	Auger
		5	5.0' 5.0'		12" RECOVERY	A 4(2)	TT 1
		3	6.0'		Wet orange clayey fine sandy silt w/some coarse sand.	A-4(2)	Hand Auger USDA Classificat
6		6	6.0'		12" RECOVERY	A 2 4(0)	Loam.
		0	0.0		Wet green silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	Hand Auger
			7.0'		12" RECOVERY		
		7	7.0'		Wet green silty fine to coarse sand w/some gravel.	A-2-4(0)	
7.5			0.01		101 DECOVEDY		
			8.0'		12" RECOVERY		
					End of Boring		

Remarks:

Symbol Description

Strata symbols

Silty low plasticity clay



Low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 4. Results of tests conducted on samples recovered are reported on the logs.

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: Wt. of Sample Hammer: IN. IN. IN. Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Lbs. D-Sampler: S-Sampler: U-Sampler: Core Bit: Type of: O.D. IN. IN. O.D. O.D.

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:**

Helpers:

Depth (ft.)	Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/29/09	1	0.0'		No Sample Taken		Hand Auger
<u> </u>	1 '	<u> </u>	1.0'	<u> </u> '	0" RECOVERY	<u> </u>	
1.5		2	2.0'	T	Wet brown clay w/trace of fine to coarse sand and gravel. 12" RECOVERY	A-6(9)	Hand Auger
3		3	3.0'		Wet brown clay w/some fine sand, trace of coarse sand and gravel. 12" RECOVERY	A-6(8)	Hand Auger
		4	3.0' 4.0'		Wet brownish green clayey fine sandy silt w/some coarse sand and gravel. 12" RECOVERY	. A-4(1)	Hand Auger
4.5		5	4.0'		Wet brownish green silty fine sand w/some coarse sand and gravel.	A-2-4(0)	Hand Auger USDA Classifica
		6	5.0' 5.0'		Wet brown clayey silt w/trace of fine to coarse sand and gravel.	A-4(9)	- Sandy Loam. Hand
6	1'	['	6.0'	'	12" RECOVERY	'	Auger
7.5					End of Boring		
					!		

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 4. Results of tests conducted on samples recovered are reported on the logs.

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: To:

Water Level Readings

Date Time Depth of Hole Depth of Casing Depth of Water Elev. of Water

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:**

Driller: Helpers:

			1			1	
Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress		Depth			510001/ 5.11	
	9/22/09	1	0.0'		No Sampl <mark>e Take</mark> n		Hand
							Auger
			1.0'		12" RECOVERY		
		2	1.0'		Wet brown silt w/some fine sand and clay, trace of coarse sand.	A-4(3)	Hand
1.5							Auger
1.0							
		7	2.0'		12" RECOVERY		
		3	2.0'		Wet brown fine to coarse sand w/some silt.	A-2-4(0)	Hand
		`			wet brown thie to coarse said w/some sit.	A-2-4(0)	Auger
							Augei
3			3.0'		12" RECOVERY	1 2 1(0)	** 1
		4	3.0		Wet brown coarse to fine sand w/some silt.	A-2-4(0)	Hand
							Auger
-			4.0'		12" RECOVERY		
		5	4.0'		Wet brown fine sandy silt w/some coarse sand and clay.	A-4(0)	Hand
4.5							Auger
							USDA
			5.0'		12" RECOVERY		Classifica
		6	5.0'		Wet brown clayey silt w/some fine sand, trace of coarse sand.	A-4(6)	- Loam.
_					////		Hand
1							Auger
6			6.0'		12" RECOVERY		
°			0.0		End of Boring		
-					Liid of Doring		
\vdash							
7.5							
\vdash							
1	l	l				1	

Remarks:

Reviewed By:	Soils Supervisor:	

Symbol Description

Strata symbols

Silty low plasticity clay



Silty sand



Low plasticity clay

DRAFT NOT FOR BIDDING AUGUST 2015

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- 2. Surveyed boring location and elevation was provided by Century Engineering.
- 3. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 4. Results of tests conducted on samples recovered are reported on the logs.

Boring No.: IT1-66 F.A. Project: U.S. 301 Maryland State Line to S.R. 1

Contract: 25-113-01

Boring Location: Sta. 739+70, Lt. C.L.

Boring Surface Elev.: Reference:

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

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:**

Helpers:

Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress		Depth				
	9/22/09	1	1.0'		Wet brown silt w/some fine sand and clay, trace of coarse sand.	A-4(1)	Hand
1.5							Auger
							Topsoil -
1			2.0'		12" RECOVERY		6".
		2	2.0'		Wet brown clay w/some fine sand, trace of coarse sand and gravel.	A-6(8)	Hand
						_	Auger
		V				J	
3	•		3.0'	_	12" RECOVERY		
		3	3.0'		Wet gray clayey silt w/trace of fine to coarse sand and gravel.	A-4(8)	Hand
							Auger
			4.0'		12" RECOVERY		
		4	4.0'		Wet gray fine sandy silt w/some coarse sand.	A-4(0)	Hand
4.5							Auger
			5.0'		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
6			6.0'		12" RECOVERY	1 1/0	Classifica
		6	6.0'		Wet gray fine sandy silt w/some coarse sand and clay, trace of gravel.	A-4(0)	- Sandy
							Loam.
			7.0'		12" RECOVERY		
—					End of Boring		
7.5							
-							
9							
	1	1 i	1)				

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Low plasticity clay



Silty sand



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING **AUGUST 2015**

- 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 recomendations in this report.
- 4. Results of tests conducted on samples recovered are reported on the logs.

Boring No.: IT1-67 F.A. Project: U.S. 301 Maryland State Line to S.R. 1

Contract: 25-113-01

Boring Location: Sta. 739+11, Rt. C.L.

Boring Surface Elev.: Reference:

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

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

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: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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		
3		2	3.0'	T	Wet brown clay w/trace of fine to coarse sand. 12" RECOVERY	A-6(11)	Hand Auger
		3	3.0' 4.0'	14	Wet brown clay w/some fine sand, trace of coarse sand and gravel. 12" RECOVERY	A-6(10)	Hand Auger
4.5		4	4.0 ¹ 5.0'		Wet brown clayey silt w/some fine sand, trace of coarse sand and silt. 12" RECOVERY	A-4(3)	Hand Auger
		5	5.0'		Wet brown fine sandy silt w/some coarse and and clay.	A-4(0)	Hand Auger USDA Classifica
6			6.0'		End of Boring		- Sandy Loam.
7.5							
9							

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Low plasticity clay



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 4. Results of tests conducted on samples recovered are reported on the logs.

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: Wt. of Sample Hammer: IN. IN. IN. Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Lbs. D-Sampler: S-Sampler: U-Sampler: Core Bit: Type of: O.D. IN. IN. O.D. O.D.

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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	2.0'		Wet gray clayey silt w/trace of fine to coarse sand and gravel. 12" RECOVERY	A-4(7)	Hand Auger Topsoil - 6".
3		2	3.0'		Wet gray clay w/trace of fine to coarse and and gravel. 12" RECOVERY	A-6(11)	Hand Auger
		3	3.0'		Wet gray clayey silt w/some fine sand, trace of coarse sand. 12" RECOVERY	A-4(4)	Hand Auger
4.5		4	4.0 ¹ 5.0'		Wet gray clayey fine sandy silt w/some coarse sand, trace of gravel. 12" RECOVERY	A-4(2)	Hand Auger
6		5	5.0' 6.0'		Wet gray silty clay w/some fine sand, trace of coarse sand. 12" RECOVERY	A-6(6)	Hand Auger USDA Classifica
		6	6.0' 7.0'		Wet gray clay w/some fine sand, trace of coarse sand and gravel. 12" RECOVERY	A-6(9)	Loam. Hand Auger
7.5		7	7.0' 8.0'		Wet gray fine sandy clay w/trace of coarse sand and gravel. 12" RECOVERY	A-6(10)	Hand Auger
9			3.3		End of Boring		

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty low plasticity clay

DRAFT NOT FOR BIDDING AUGUST 2015

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- 4. Results of tests conducted on samples recovered are reported on the logs.

Boring No.: IT1-71 F.A. Project: U.S. 301 Maryland State Line to S.R. 1

Contract: 25-113-01

Boring Location: Sta. 750+73, Lt. C.L.

Boring Surface Elev.: Reference:

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

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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 -
			2.0'		12" RECOVERY		6".
3		2	3.0'	T	Wet brown silty fine sand w/some coarse sand, trace of gravel. 12" RECOVERY	A-2-4(0)	Hand Auger
		3	3.0' 4.0'		Wet brown clayey fine to coarse sand w/trace of gravel. 12" RECOVERY	A-2-4(0)	Hand Auger
4.5		4	4.0 ¹ /		Wet orange fine sandy silt w/trace of coarse sand and gravel. 12" RECOVERY	A-4(0)	Hand Auger
		5	5.0'		Wet orange silty fine sand w/some clay, trace of coarse sand.	A-2-4(0)	Hand Auger USDA
6			6.0'		12" RECOVERY		Classifica
		6	6.0'		Wet orange gravel and coarse sand w/some fine sand, trace of silt.	A-1-a	- Sandy Loam. Hand
			7.0'		12" RECOVERY		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:

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

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Boring No.: IT1-72 F.A. Project: U.S. 301 Maryland State Line to S.R. 1

Contract: 25-113-01

Boring Location: 751+30, Rt. C.L.

Boring Surface Elev.: Reference:

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

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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
			1.0'		12" RECOVERY		
1.5		2	2.0'		Wet brown silt w/some fine to coarse sand and clay. 12" RECOVERY	A-4(1)	Hand Auger
3		3	3.0'	1	Wet brown clayey fine sandy silt w/some coarse sand. 12" RECOVERY	A-4(2)	Hand Auger
		4	3.0 ¹		Wet brown clay w/some fine sand, trace of coarse sand and gravel. 12" RECOVERY	A-6(11)	Hand Auger
4.5		5	4.0' 5.0'		Wet brown fine sandy clay w/some coarse sand and silt, trace of gravel. 12" RECOVERY	A-6(5)	Hand Auger USDA Classifica
6		6	5.0' 6.0'		Wet brownish orange clayey fine to coarse sand w/some gravel. 12" RECOVERY	A-2-6(0)	Loam. Hand Auger
		7	6.0'		Wet brownish orange silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	Hand Auger
			7.0'		12" RECOVERY End of Boring		
7.5					End of Boring		

Remarks:

Symbol Description

Strata symbols

Silty low plasticity clay

Low plasticity clay



Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

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- 2. Surveyed boring location and elevation was provided by Century Engineering.
- 3. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 4. Results of tests conducted on samples recovered are reported on the logs.

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: Wt. of Sample Hammer: IN. IN. IN. Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Lbs. D-Sampler: S-Sampler: U-Sampler: Core Bit: Type of: O.D. IN. IN. O.D. O.D.

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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	2.0'		Wet brown clayey silt w/trace of fine to coarse sand and gravel. 12" RECOVERY	, ,	Hand Auger Topsoil - 8".
3		2	3.0'	T	Wet brown clay w/trace of fine to coarse sand. 12" RECOVERY	A-6(11)	Hand Auger
	_	3	3.0' 4.0'		Wet brown clay silt w/trace of fine to coarse and gravel. 12" RECOVERY	, ,	Hand Auger
4.5	-	4	4.0 ¹ 5.0'		Wet brown clayey silt w/trace of fine to coarse sand. 12" RECOVERY	\ /	Hand Auger
	-	5	5.0'		Wet brown fine sandy silt w/some coarse sand and clay. 12" RECOVERY		Hand Auger USDA CLassific
6		6	6.0'		Wet brown silty fine to coarse sand w/trace of gravel. 12" RECOVERY	` ′	- Loam. Hand Auger
7.5	-	7	7.0'		Wet brown silty fine sand w/trace of coarse sand. 12" RECOVERY	` '	Hand Auger
9			0.0		End of Boring		
	′		'	'		'	1

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silt

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 4. Results of tests conducted on samples recovered are reported on the logs.

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: Wt. of Sample Hammer: IN. IN. IN. Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Lbs. D-Sampler: S-Sampler: U-Sampler: Core Bit: Type of: O.D. IN. IN. O.D. O.D.

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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	2.0'		Moist brown clayey gravel w/some fine to coarse sand. 12" RECOVERY	A-2-6(0)	Hand Auger Topsoil - 6".
3		2	3.0'		Wet brown clayey gravelly silt w/some fine sand, trace of coarse sand. 12" RECOVERY	A-4(2)	Hand Auger
		3	3.0'	1	Wet brown clayey fine sand w/some coarse sand, trace of gravel. 12" RECOVERY	A-2-6(0)	Hand Auger
4.5		4	4.0 ¹ /		Wet orange silty fine to coarse sand w/trace of gravel. 12" RECOVERY	A-2-4(0)	Hand Auger
6		5	5.0'		Wet orange silty fine to coarse sand w/some clay, trace of gravel. 12" RECOVERY	A-2-4(0)	Hand Auger USDA Classifica
		6	6.0' 7.0'		Wet orange fine to coarse sand w/some silt.	A-2-4(0)	- Loamy Sand. Hand Auger
7.5		7	7.0'		Wet orange fine to coarse sand w/some silt. 12" RECOVERY	A-2-4(0)	Hand Auger
9			0.0		End of Boring		

Remarks:

Symbol Description

Strata symbols



Clayey sand



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 4. Results of tests conducted on samples recovered are reported on the logs.

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: Wt. of Sample Hammer: IN. IN. IN. Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Lbs. D-Sampler: S-Sampler: U-Sampler: Core Bit: Type of: O.D. IN. IN. O.D. O.D.

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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	3.0'		Wet brown clayey silt w/trace of fine to coarse sand and gravel. 12" RECOVERY	A-4(8)	Hand Auger
		3	3.0'	41	Wet brown clay w/some fine sand, trace of coarse sand and gravel. 12" RECOVERY	A-6(8)	Hand Auger
4.5		4	4.0 ¹ 5.0 ¹		Wet orange clayey fine to coarse and w/trace of gravel. 12" RECOVERY	A-2-4(0)	Hand Auger
6		5	5.0' 6.0'		Wet orange silty fine and w/some clay, trace of coarse sand. 12" RECOVERY	A-2-4(0)	Hand Auger USDA Classifica
		6	6.0' 7.0'		Wet orange silty fine asand w/trace of coarse sand. 12" RECOVERY	A-2-4(0)	- Sandy Loam. Hand Auger
			7.0		End of Boring		
7.5					Zing of Zoring		
9							

Remarks:

Symbol Description

Strata symbols

Silty low plasticity clay

Low plasticity clay



Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 4. Results of tests conducted on samples recovered are reported on the logs.

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: Wt. of Sample Hammer: IN. IN. IN. Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Lbs. D-Sampler: S-Sampler: U-Sampler: Core Bit: Type of: O.D. IN. IN. O.D. O.D.

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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
			1.0'		12" RECOVERY		
1.5		2	2.0'		Wet brownish gray clayey silt w/trace of fine to coarse sand. 12" RECOVERY	A-4(10)	Hand Auger
3		3	3.0'	41	Wet brownish gray clayey silt w/trace of fine sand. 12" RECOVERY	A-4(8)	Hand Auger
		4	3.0 ¹ 4.0 ¹		Wet brown clay w/trace of fine to coarse sand. 12" RECOVERY	A-6(11)	Hand Auger
4.5		5	4.0' 5.0'		Wet brown clayey coarse to fine sandy silt w/some gravel. 12" RECOVERY	A-4(0)	Hand Auger USDA Classifica
6		6	5.0' 6.0'		Wet brown silty coarse to fine sand w/some gravel. 12" RECOVERY	A-1-b	- Sandy Loam. Hand Auger
					End of Boring		J
7.5							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silt



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 4. Results of tests conducted on samples recovered are reported on the logs.

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: Wt. of Sample Hammer: IN. IN. IN. Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Lbs. D-Sampler: S-Sampler: U-Sampler: Core Bit: Type of: O.D. IN. IN. O.D. O.D.

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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	2.0'		12" RECOVERY Wet brown clay w/trace of fine to coarse sand and gravel.	A-6(14)	Hand
3			3.0'		wet brown clay wrutace of time to coarse sand and graver. 12" RECOVERY	A-0(14)	Auger
		3	3.0'		Wet brown silty gravel and fine asand w/some coarse sand.	A-2-4(0)	Hand
			4.0'	11	12" RECOVERY		Auger
		4	4.0	1	Wet brown clayey fine sand and gravel w/trace of coarse sand.	A-2-4(0)	Hand
4.5							Auger
		5	5.0' 5.0'		12" RECOVERY Wet brown fine sandy silt w/some clay, trace of coarse sand.	A-4(0)	Hand
		Ü	0.0		wet brown time sandy sint w/some cray, trace of coarse sand.	A-4(0)	Auger USDA
6			6.0'		12" RECOVERY		Classifica
					End of Boring		- Sandy Loam.
7.5							
9							
I		l	1	1			I

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 4. Results of tests conducted on samples recovered are reported on the logs.

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: Wt. of Sample Hammer: Lbs. Average Fall: IN. IN. IN. IN. IN. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Lbs. D-Sampler: S-Sampler: U-Sampler: Core Bit: Type of: O.D. O.D. O.D. O.D.

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Time **Depth of Hole Depth of Casing Depth of Water** Elev. of Water Date

Pay Quantities:

ualitiles. 2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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
<u> </u>	1 '	<u> </u>	1.0'	<u> </u>	0" RECOVERY		
1.5		2	2.0'	T	Wet brown clay w/trace of fine to coarse sand. 12" RECOVERY	A-6(12)	Hand Auger
	1 '	3	2.0'		Wet brown clay w/trace of fine to coarse sand.	A-6(11)	Hand
3			3.0'	ΔL	12" RECOVERY		Auger
		4	3.0 ¹		Wet brown clayey silt w/trace fine to coarse and gravel. 12" RECOVERY	A-4(7)	Hand Auger
	1 '	5	4.0'		Wet brown clayey gravel and coarse sand w/trace of silt and fine sand.	A-2-6(0)	Hand
4.5	- '				wet blown clayey graver and coarse saild w/trace of six and fine saild.	A-2-0(0)	Auger
	1 '	Ĺ'	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	<u> </u> '	<u> </u>	6.0'		12" RECOVERY		
					End of Boring		
	· '	['	'				
	- '	['	'				
7.5	√ ′	['	'				
	! '	['	'				
	1 '	'	'	!			
I .	1	1	1 '				1

Remarks:

Reviewed By:	Soils Supervisor:

Symbol Description

Strata symbols



Low plasticity clay



Poorly graded gravel with clay



Well graded gravel with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 4. Results of tests conducted on samples recovered are reported on the logs.

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: Wt. of Sample Hammer: IN. IN. IN. Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Lbs. D-Sampler: S-Sampler: U-Sampler: Core Bit: Type of: O.D. IN. IN. O.D. O.D.

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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	2.0'		Wet brown clayey silt w/trace of gravel and fine to coarse sand. 12" RECOVERY	A-4(5)	Hand Auger Topsoil - 6".
3		2	3.0'	T	Wet brown clayey silt w/trace of gravel and fine to coarse sand. 12" RECOVERY	A-4(9)	Hand Auger
		3	3.0' 4.0'		Wet brown clayey silt w/trace of fine sand. 12" RECOVERY	A-4(8)	Hand Auger
4.5		4	4.0 ¹ 5.0'		Wet brown fine to coarse sandy silt w/some clay, trace of gravel. 12" RECOVERY	A-4(0)	Hand Auger
6		5	5.0' 6.0'		Wet brown coarse sand w/some silt and fine sand, trace of clay and gravel. 12" RECOVERY	A-1-b	Hand Auger USDA Classifica
					End of Boring		- Loamy Sand.
7.5							
9							

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Low plasticity clay



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 4. Results of tests conducted on samples recovered are reported on the logs.

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: Wt. of Sample Hammer: IN. IN. IN. Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Lbs. D-Sampler: S-Sampler: U-Sampler: Core Bit: Type of: O.D. IN. IN. O.D. O.D.

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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	9/30/09	1	1.0'		Moist brown silty coarse to fine sand w/trace of gravel.	A-2-4(0)	Hand Auger Topsoil - 8".
	1 _ '	2	2.0'	 '	12" RECOVERY	. 11	
3		V	3.0'	T	Moist brown coarse to fine sand and gravel w/some silt. 12" RECOVERY	A-1-b	Hand Auger
l _]	1	3	3.0'	'	Moist brown fine to coarse sand and gravel w/some silt.	A-1-b	Hand
			4.0'		12" RECOVERY		Auger
	1	4	4.0		Moist orange coarse to fine sand w/some silt, trace of gravel.	A-2-4(0)	Hand
4.5			5.0'		12" RECOVERY		Auger
\vdash	1	5	5.0'	 	MOist orange fine to coarse sand w/trace of silt, clay and gravel.	A-3	Hand
]				111) 111 1		Auger USDA
6		<u> </u>	6.0'	!	IFIANTI ELIZARE FILLION	<u></u>	Classifica
	1	6	6.0'		Moist orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	- Sand.
	1		'	'	is (4) speci (Fe) / Specie (Fe) a steel		Hand
	1		'	'	\$ (4.12); \$ (1.12); 		Auger
	1	<u> </u>	7.0'	<u> '</u>	12" RECOVERY		
	1	7	7.0'	'	Moist orange fine to coarse sand w/trace of silt and gravel.	A-3	Hand
7.5	1		1	'	##1779## \$514.9891	1	Auger
	4 '		2.0	'	(1)		1
		\vdash	8.0'	+	12" RECOVERY End of Boring		
			1	'	Ella of Bornig	1	1
[1		1	'		1	1
9	1		'	'		İ '	
l –	1		'	'		<u>'</u>	
		1				1	1 7

Remarks:

Symbol Description

Strata symbols



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 4. Results of tests conducted on samples recovered are reported on the logs.

Boring No.: IT1-84 F.A. Project: U.S. 301 Maryland State Line to S.R. 1

Contract: 25-113-01 **Boring Location:**

Boring Surface Elev.: Reference:

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

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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	1.0'		No Sample Taken 0" RECOVERY		Hand Auger - Topsoil
	_	2	1.0'		Wet brownish gray clayey silt w/trace of fine to coarse sand.	A-4(7)	Hand
1.5			2.0'		TOR BUDING	j	Auger
		3	2.0'		Wet brownish gray clayey silt w/trace of fine to coarse sand and gravel.	A-4(7)	Hand
3			3.0'	11	12" RECOVERY 15		Auger
		4	3.0		Wet brownish gray clayey fine sandy silt w/trace of coarse sand and	A-4(2)	Hand
					gravel.		Auger
			4.0'		12" RECOVERY		
		5	4.0'		Wet brownish gray silty fine sand w/some clay, trace of coarse sand and	A-2-4(0)	Hand
4.5					gravel.		Auger
							USDA
			5.0' 5.0'		12" RECOVERY		Classifica
		6	5.0		Wet brownish orange coarse to fine sand w/some silt, trace of gravel.	A-1-b	- Sandy Loam.
							Hand
6			6.0'		12" RECOVERY		Auger
		7	6.0'		Wet brownish orange coarse sand w/some fine sand, trace of silt and	A-1-b	Hand
					gravel.		Auger
					(4) (4) (4) (4) (4) (4) (4) (4) (4) (4)		
			7.0'		EISE 12" RECOVERY		
—					End of Boring		
7.5							
1	I	I	1	1		I	1 1

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 4. Results of tests conducted on samples recovered are reported on the logs.

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: IT1-85

Contract: 25-113-01

Boring Location: STA. 723+00 103' Rt. C.L.

Boring Surface Elev.: + 68.28 Reference:

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

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Time **Depth of Hole Depth of Casing Depth of Water** Elev. of Water Date 2/24/11 8.5

8.2

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: Dia. U-Sample Boring: U-Samples: 8.5 Ft.; Ft. 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
2.53	2/24/11	1	1.5' 2.5'		Wet tan clayey silt w/trace of fine to coarse A-4(6) Topsoil - 8". Hand Auger
		2	2.5' 3.5'		Wet grayish brown silty clay w/trace of fine to coarse sand. A-6(14) Hand Auger
		3	3.5		Wet brown fine sandy silt w/trace of coarse sand and clay. A-4(0) Hand Auger
5.06	•			١.,	
			6.5'		36" RECOVERY
7.59		4	6,5' 7.5'		Wet orange silty coarse to fine sand w/trace A-2-4(0) Hand Auger of fine gravel. 12" RECOVERY
		5	7.5' 8.5'		Saturated orange coarse sandy fine gravel w/ A-1-a Hand Auger some fine sand, trace of silt.
					End of Boring
10.12					
12.65					
15.18					

Remarks: Hand Auger

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols



Silty low plasticity clay



Low plasticity clay



silt



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on February 24, 2011 using a hand auger.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.

10.0

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

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: IT1-86

Contract: 25-113-01

Boring Location: STA. 804+00 122' Rt. C.L.

Boring Surface Elev.: +41.11 Reference:

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

Core Bit: O.D. 3 1/4 Inches

From Depth of: From Depth of: To: To: **Casing Size:** Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 2/17/11 10.0 9.5 10.0

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: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. 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. Re	emarks
	2/17/11	1	1.0' 2.0'	2 2	Wet soft brown clayey silt w/some fine sand, trace of coarse sand and fine gravel. 10" RECOVERY Topsoil - 12	".
2.53		2	2.0'	2 5 5 5	Wet loose brown silty coarse to fine sand w/ A-1-b some fine gravel.	
			4.0'		14" RECOVERY	
5.06	•	3	4.0'	5 5 4 4	Wet loose brown fine to coarse sand w/some A-2-4(0) silt, trace of fine gravel.	
			6.0'		14" RECOVERY	
		4	6,0'	5 5 5	Wet loose brown fine to coarse sand w/some A-2-4(0) USDA Class silt, trace of clay.	
7.59			8.0'		18" RECOVERY	
		5	8.0'	1 4 4 4	Wet loose brown fine to coarse sand w/some A-2-4(0) silt.	
10.12			10.0'		18" RECOVERY	
					End of Boring	
12.65						

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on February 17, 2011 using 3 1/4 inch diameter continuous flight power auger. Rig is CME 55 ATV
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

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

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

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

Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 2/20/08 10.0 8.0' 4.1'

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: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: D. Zmijewski

Depth	Daily	No.	Sample	Blows/6"	Sample Description Class./G.I. Remarks
(ft.)	Progress	1	Depth 1.0'		
		'	2.0'	6 12	
		2	2.0'	9	coarse sand, trace of gravel. 11" RECOVERY A-2-4(0)
3				9 14 20 25	Wet dense brown fine to coarse sand w/ some
	R				silt, trace of gravel.
		3	4.0' 4.0'	10	12" RECOVERY Saturated medium dense brown fine to coarse A-3
		A.	1.9	10 12 16 15	Saturated medium dense brown fine to coarse A-3 sand, trace of silt and gravel.
				15	1. (1) 3 in (1
6			6.0'		15" RECOVERY
		4	6.0	16 17 18 16	Saturated dense brown and light brown gravel A-1-b and coarse to fine sand w/ some silt.
				16	and coarse to thie said w/ some sit.
			8.0'		20" RECOVERY
		5	8.0'	8 9 10 10	Saturated medium dense orange coarse to fine A-2-4(0)
9				10	sand w/ some silt, trace of gravel.
			10.0'		18" RECOVERY
			10.0		Boring terminated at 10.0 feet
l					
12					
15					
15					
1		l			

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to 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: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3 Ball Sampler

Core Bit: O.D.

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

Water Level Readings

Time **Depth of Hole Depth of Casing Depth of Water** Elev. of Water Date 2/20/08 7.5' 10.0 8.0'

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: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. 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' 2.0'	1 2 3	Moist soft brown coarse sandy silt w/ some A-4(1) Topsoil - 5". clay and fine sand, trace of gravel. 10" RECOVERY
3	N	2	2.0'	5 10 11 15	Moist medium dense orange coarse to fine sand w/ some silt and gravel.
		3	4.0' 4.0'	10 16 15 15	20" RECOVERY Moist dense orange fine to coarse sand w/ A-2-4(0) some silt, trace of gravel.
6		4	6.0' 6.0'		19" RECOVERY
		4		14 19 29 22	Wet hard orange and brown gravelly silt w/ A-4(0) some coarse to fine sand.
9		5	8.0' 8.0'	2 2 6 8	17" RECOVERY Saturated loose brown silty fine to coarse sand. A-2-4(0)
			10.0'		16" RECOVERY Boring terminated at 10.0 feet
12					
15					

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to 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: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3 Ball Sampler

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 2/20/08 12.0' 14.0 5.8'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	1 2 2	Wet soft light brown silt w/ some gravel and fine to coarse sand, trace of clay. 12" RECOVERY	Topsoil - 4".
	_	2	2.0'	3 5	Wet loose light brown coarse sand w/ some A-1-b	_
3		2A	3.0' 4.0' 4.0'	11 22	silt, fine sand, and gravel. 7" RECOVERY Wet dense brown silty fine sand w/ some coarse sand, trace of gravel. 11" RECOVERY A-2-4(0) A-1-b	IG
				14 13 13	Wet medium dense brown coarse sand w/	
6			6.0'		some fine sand, silt, and gravel.	
		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	
9		5	8.0'	5 6 5 4	Saturated medium dense brown coarse to fine sand w/ some silt and gravel.	
		6	10.0' 10.0'	2	16" RECOVERY Saturated loose brown fine to coarse sand, A-3	
		ŭ		2 4 6 10	trace of silt and gravel.	
12		7	12.0' 12.0'	W/R	18" RECOVERY Saturated loose brown fine to coarse sand w/ A-2-4(0)	
			14.0'	W/R 2 3 6	some silt, trace of gravel. 20" RECOVERY	
15		8	14.0'	6 11 19 22	Saturated medium dense brown fine sand and gravel w/ some coarse sand, trace of silt.	
			16.0'		17" RECOVERY Boring terminated at 16.0 feet	
					Boring terminated at 10.0 feet	

Remarks:

Symbol Description

Strata symbols

Silt

Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to 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: Average Fall: IN. Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3 Ball Sampler

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 3/12/08 12.0' 10.1 14.0

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	3 6	Moist stiff brown clayey fine sandy silt w/ some coarse sand, trace of gravel. 13" RECOVERY	A-4(1)	Topsoil - 10".
3		2	2.0'	6 12 16 16	Moist very stiff brown fine sandy silt w/ some coarse sand and gravel.	A-4(0)	. (
			4.0'		22" RECOVERY		
		3	4.0'	9 16 17 13	Moist hard brown fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
6			6.0'		22" RECOVERY		
		4	6.0'	12 15 12 6	Moist medium dense brown silty coarse to fine sand w/ some gravel.	A-1-b	
			8.0'		19" RECOVERY		
9		5	8.0'	4 5 5 4	Moist loose light brown coarse sand w/ some gravel, fine sand, and silt.	A-1-b	
			10.0'		14" RECOVERY		
		6	10.0'	5 5 6 4	Wet medium dense light brown coarse to fine sand w/ some gravel and silt.	A-1-b	
12			12.0'		13" RECOVERY		
		7	12.0'	4 4 4 14	Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			14.0'	7	24" RECOVERY		
15		8	14.0'	7 5 6 5	Saturated medium dense light brown coarse sand and gravel w/ some fine sand, trace of silt.	A-1-b	
			16.0'		5" RECOVERY		
					Boring terminated at 16.0 feet		

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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

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

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

Core Bit: O.D.

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

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 3/5/08 10.0 8.0' 5.4'

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: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. 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'	4 8	Wet stiff gray clay, trace of fine to coarse 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 18" RECOVERY
6	ľ	3	6.0	4 4 12 15	Wet medium dense orange and gray mottled silty fine sand w/ some gravel, trace of coarse sand. 12" RECOVERY
		4	6.0' 8.0'	10 12 10 9	Saturated medium dense brown coarse to fine sand w/ some silt and gravel. 18" RECOVERY
9		5	8.0'	3 7 8 9	Saturated medium dense brown coarse to fine sand, trace of silt and gravel. 24" RECOVERY
					Boring terminated at 10.0 feet
12					
15					

Remarks:

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

- 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.
- These logs are subject 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:

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

IN. IN. U-Sampler: 3 Ball Sampler Core Bit: O.D.

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

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 3/5/08 10.0 8.0' 4.4'

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: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: D. Zmijewski

Donth	Daily		Sample		
Depth (ft.)	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. 16" RECOVERY
6		3	4.0'	3 6 9 9	Saturated medium dense gray coarse sand w/some silt and fine sand, trace of gravel. 17" RECOVERY
		4	6.0′	10 9 8 9	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:

Symbol Description

Strata symbols

Low plasticity clay



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- These logs are subject 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:

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

IN. IN. U-Sampler: 3 Ball Sampler Core Bit: O.D.

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

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 3/5/08 10.0 8.0' 8.0'

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: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. 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
<u> </u>	J	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 23" RECOVERY	A-2-4(0)	IG
6		3	6.0	6 9 12 12		Wet medium dense brown silty coarse to fine sand w/ some gravel. 19" RECOVERY	A-2-4(0)	
0		4	6.0' 8.0'	11 14 16 14		Wet medium dense brown coarse to fine sand w/ some silt and gravel.	A-1-b	
9		5	8.0'	13 14 12 6		Saturated very stiff brown clayey fine to coarse sandy silt, trace of gravel. 4" RECOVERY	A-4(0)	
			10.0		MANNAI	Boring terminated at 10.0 feet		
12								
15								

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- These logs are subject 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:

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

U-Sampler: 3 Ball Sampler Core Bit: O.D.

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

Water Level Readings

Time **Depth of Casing Depth of Water Depth of Hole** Elev. of Water Date 12.0' 10.0' 3/5/08 14.0

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.; Dia. U-Sample Boring: U-Samples: 16.0 Ft. 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 C	Class./G.I.	Remarks
	-	1	1.0'	2 4		A-4(4)	Cultivated Soil - 12".
		2	2.0'	4	sand, trace of coarse sand and gravel.	A-4(0)	
3		_	2.0	4 5 10	Moist stiff brown clayey gravelly coarse	A-4(0)	
3				10	sandy silt w/ some fine sand.		
			4.0'		22" RECOVERY	$I \cap I \cap I$	
		3	4.0'	4 5	Moist medium dense brown and light brown A	A-2-4(0)	
	•	,		4 5 10 10	silty fine to coarse sand, trace of gravel.		
6		4	6.0'	0	18" RECOVERY	1 2 (0)	
		4	6.0	9 9 9 8	Moist medium dense orange silty fine to Coarse sand, trace of gravel.	A-2-4(0)	
				8	coarse saild, trace of graver.		
			8.0'		21" RECOVERY		
		5	8.0'	3 5	1 1 1 1 1 1 1 1 1 1	A-2-4(0)	
9				3 5 4 3	silt, trace of gravel.	()	
			10.0'		18" RECOVERY		
		6	10.0'	3 5 6 5	P223 A222 21	A-1-b	
				5	and gravel w/ some silt.		
12			12.0'		(5) 12 RECOVERY		
12		7	12.0'	4	(1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	A-1-b	
				4 5 19 10	sand w/ some silt, trace of gravel.	1110	
				10			
			14.0'		20" RECOVERY		
		8	14.0'	6 10	[A. (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	A-1-b	
15				11 12	coarse sand w/ some fine sand and silt.		
			16.0		19" RECOVERY		
			16.0'		Boring terminated at 16.0 feet		
					Boring terminated at 10.0 feet		

Remarks:

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

- 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.
- These logs are subject 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: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3

Ball Sampler Core Bit: O.D.

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

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 12.0' 10.7 3/6/08 14.0

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.; Dia. U-Sample Boring: U-Samples: 16.0 Ft. 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.	A-4(2)	Forest Duff - 3".
		2	2.0'	3		18" RECOVERY	A 2 4(0)	
	_	_	2.0	3 6 8 12		Moist medium dense light brown silty coarse to fine sand w/ some gravel.	A-2-4(0)	_
3			4.0'			18" RECOVERY		JG
	•	3	4.0'	11 16		Moist hard light brown coarse sand w/ some	A-1-b	
				18 17		silt and fine sand, trace of gravel.		
6			6.0'			19" RECOVERY	15	
		4	6.0'	11 13 13 12		Wet medium dense brown silty coarse to fine sand w/some gravel.	A-1-b	
				12				
			8.0'			20" RECOVERY		
		5	8.0'	6 9 5 6		Wet medium dense brown coarse to fine sand	A-1-b	
9				6		w/ some silt and gravel.		
			10.0'			20" RECOVERY		
		6	10.0'	3 5 12 9		Wet medium dense orange coarse to fine sand	A-1-b	
				9		and gravel w/ some silt.		
10			40.0		11111111111111111111111111111111111111	17# DECOVEDY		
12		7	12.0' 12.0'	17 9	6111176 1111111	17" RECOVERY Wet medium dense orange coarse sand and	A-1-b	
			13.0'	_	1:3:3:3:3:3:3:3: 1:3:3:3:3:3:3:3:3: 1:3:3:3:3	gravel w/ some fine sand, trace of silt.	A-1-0	
		7A	13.0'	7 8		12" RECOVERY	A-2-7(1)	
			14.0'			Saturated medium dense brown clayey gravel		
		8	14.0'	10 4		and fine to coarse sand.	A-7-5(2)	
15				6 5		Saturated stiff brown and green fine sandy		
			46.51			clay w/ some coarse sand, trace of gravel.		
			16.0'			15" RECOVERY		
						Boring terminated at 16.0 feet		

Remarks:

Symbol Description

Strata symbols

Silt

Silty sand

Poorly graded sand with silt

10:10:10:10:10:10:10 10:10:10:10:10:10:10 10:10:10:10:10:10:10:10 Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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

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

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

IN. IN. U-Sampler: 3 Ball Sampler Core Bit: O.D.

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

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 3/5/08 10.0 8.0' 6.3'

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: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. 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		
		2	2.0'	12 12 11 14		Moist medium dense brown coarse to fine	A-1-b	
3			4.0'			sand w/ some silt and gravel. 21" RECOVERY		IG
		3	4.0'	7 7 8		Wet medium dense brown fine to coarse sand,	A-3	
6			6.0'	7	tı	race of silt and gravel. 24" RECOVERY	15	
		4	6.0'	6 7 10 14		Saturated medium dense brown fine sand w/	A-2-4(0)	
				14	S	some coarse sand, silt, and gravel.		
			8.0'			18" RECOVERY		
		5	8.0'	4 7 7 9		Saturated stiff brown fine sandy clay w/ some	A-7-5(9)	
9				7 9	c	coarse sand, trace of gravel.		
			10.0'			16" RECOVERY		
			10.0		E	Boring terminated at 10.0 feet		
40								
12								
15								

Remarks:

Symbol Description

Strata symbols

Clayey sand



Silty sand



Poorly graded sand



Elastic silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- These logs are subject 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:

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

Core Bit: O.D.

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

Water Level Readings

Time **Depth of Casing Depth of Water Depth of Hole** Elev. of Water Date 12.0' 10.0' 3/6/08 14.0

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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.
			4.0		20" RECOVERY
		3	4.0'	6 8 9 15	Moist medium dense light brown silty fine A-2-4(0) sand, trace of coarse sand and gravel.
6]	1	6.0'		16" RECOVERY
	-	4	6.0'	12 18 26 13	Moist dense light brown coarse to fine sand and gravel w/ some silt.
'			8.0'		10" RECOVERY
		5	8.0'	8	No Sample Recovery
9				8 23 17 9	Two Sumple Recovery
<u> </u>	_	<u></u>	10.0'	<u> </u>	0" RECOVERY
	 	6	10.0'	4 8 14 11	Saturated very stiff brown and green fine to coarse sandy clay, trace of gravel. A-7-5(2)
12			12.0'		19" RECOVERY
		7	12.0'	7 9 12 13	Saturated very stiff green-gray fine to coarse sandy clay, trace of gravel. A-7-5(1)
]		14.0'		21" RECOVERY
15	'	8	14.0'	8 11 4 3	Saturated medium dense green silty fine to coarse sand, trace of gravel. A-2-4(0)
			16.0'		24" RECOVERY
					Boring terminated at 16.0 feet
· 1 · '	1	1			

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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

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

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

Core Bit: O.D. **Casing Size:** 3 1/4 Inches

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

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/6/08 10.0 8.0' Dry

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: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. 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' 2.0'	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	N	2	2.0'	3 5 6 9	Moist stiff brown fine sandy silt w/ some coarse sand and clay.
		3	4.0'	4 4 9 8	Moist stiff brown and gray mottled fine sandy A-4(0) silt w/ some coarse sand.
6		4	6.0' 6.0'	7 9 7 6	24" RECOVERY Moist very stiff light brown and gray fine to coarse sandy silt, trace of gravel. A-4(0)
		5	8.0' 8.0'	9	15" RECOVERY Moist medium dense light brown and gray A-2-4(0)
9			10.0'	9 14 14 14	silty fine to coarse sand, trace of gravel. 17" RECOVERY
					Boring terminated at 10.0 feet
12					
15					

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Poorly graded clayey silty sand



silt



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- 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 recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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

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

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

Core Bit: O.D.

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

Water Level Readings

Depth of Water Time Elev. of Water **Depth of Hole Depth of Casing** 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: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. 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
	3/6/08	1	1.0' 2.0'	7 7	Wet stiff brown silt w/ some clay and fine sand, trace of coarse sand.	A-4(3)	Cultivated Soil - 11".
3		2	2.0'	5 11 11	11" RECOVERY Wet very stiff brown fine sandy silt, trace of	A-4(0)	
3	R			13	coarse sand.		
		3	4.0	6 5 8 10	Wet stiff brown and gray clayey gravelly s	ilt A-4(1)	
	_			10	w/ some fine to coarse sand.		
6		4	6.0' 6.0'	7	13" RECOVERY	14.5	
		4	6.0	7 9 13 19	Wet very stiff brown fine sandy clay w/ so coarse sand, trace of gravel.	me A-6(2)	
			8.0'		22" RECOVERY		
		5	8.0'	4 8	Wet very stiff brown fine sandy clay w/ so	me A-7-5(2)	
9				4 8 11 14	coarse sand, trace of gravel.		
			10.0'		19" RECOVERY		
					Boring terminated at 10.0 feet		
12							
l							
15							

Remarks:

Symbol Description

Strata symbols

Silty low plasticity clay

Silt



Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- These logs are subject 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: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: 2 Type of: Split Barrel O.D. IN. IN. O.D. 3

U-Sampler: Ball Sampler Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 2/21/08 14.0' 16.0 Dry

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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	4.0'	6 5 9 9	Wet stiff brown fine sandy silt w/ some clay and coarse sand. 18" RECOVERY	A-4(0)	IG
		3	4.0'	6 8	Wet very stiff orange and gray clayey silt w/	A-4(2)	
6			6.0'	9	some fine to coarse sand, trace of gravel. 16" RECOVERY	15	
		4	6.0'	10	Wet very stiff gray clay w/ some fine sand,	A-6(10)	
		4A	7.0' 7.0'	15	trace of coarse sand and gravel. 12" RECOVERY		
		4A	8.0'	15 16	Wet dense gray clayey fine to coarse sand,	A-2-4(0)	
_		5	8.0'	5 9 9	trace of gravel. 6" RECOVERY	A-2-4(0)	
9			40.01	8	Wet medium dense gray silty fine sand w/ some coarse sand.		
		6	10.0' 10.0'	3 11	20" RECOVERY Wet stiff gray clayey fine sandy silt, trace of	A-4(3)	
			11.0'	11	coarse sand and gravel.	A-4(3)	
		6A	11.0'	15 14	5" RECOVERY	A-1-a	
12			12.0'		Wet medium dense gray gravel w/ some		
		7	12.0'	16 49 27 19	coarse and fine sand and silt. 9" RECOVERY	A-1-b	Chattering in auger drilling to 14 ft.
			14.0'	19	Wet very dense brown gravel w/ some coarse sand and silt, trace of fine sand and rock		1710
		8	14.0'	4 9	fragments. 8" RECOVERY	A-4(0)	
15				7 10	Wet medium dense brown silty fine to coarse	(-)	
					sand w/ some gravel, trace of cemented sands.		
			16.0'		12" RECOVERY		
					Boring terminated at 16.0 feet		

Remarks:

Symbol Description

Strata symbols

Silty low plasticity clay

Low plasticity clay

Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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:

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

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 2/21/08 10.0 8.0' Dry

75.0 75.0

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: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. 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. Cultivated Soil - 11".	
			2.0'	8	14" RECOVERY Wet stiff brown fine sandy silt, trace of coarse A-4(0)	
3			4.0'	8 7 8 8	sand and clay. 18" RECOVERY	
		3	4.0'	2 3 6	Wet stiff gray clayey silt w/ some fine sand, trace of coarse sand and gravel. A-4(4)	
6			6.0'	6	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)	
		<u> </u>	8.0'		22" RECOVERY	
9		5	8.0'	6 9 11 12	Wet medium dense gray silty coarse to fine sand, trace of gravel. 19" RECOVERY	
			10.0		Boring terminated at 10.0 feet	
	ļ					
12						
15						

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silt

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- These logs are subject 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: Average Fall: IN. Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D.

3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Depth of Casing Time **Depth of Hole** Elev. of Water Date 2/21/08 14.0' 16.0 Dry

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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. R	emarks
	2/21/08	1	0.0'	2 3 6 9	Wet stiff brown clayey silt, trace of fine to coarse sand. Cultivated	Soil - 11".
			2.0'		14" RECOVERY	
3		2	4.0'	10 15 17 20	Wet hard gray and brown silt w/ some clay, A-4(3) trace of fine to coarse sand. 24" RECOVERY	
		3	4.0'	4 7 11	Wet very stiff gray and brown clayey silt w/ A-4(3)	
6			6.0'	11	some fine sand, trace of coarse sand. 24" RECOVERY	
		4	6.0'	10	Wet very stiff brown fine sandy clay w/ some A-6(4)	
		4A	7.0' 7.0'	11	coarse sand.	
		7/1	8.0'	11 14	Wet medium dense brown silty fine to coarse A-2-4(0)	
9		5	8.0'	5 8 7 11	sand, trace of gravel. 10" RECOVERY Wet medium dense orange clayey fine to coarse sand, trace of gravel. 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 A-2-4(0) coarse sand and gravel.	
			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:

Symbol Description

Strata symbols

Low plasticity clay



Silty low plasticity clay



Poorly graded clayey silty sand



Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- These logs are subject 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.: R1-030

Contract: 25-113-01

Boring Location: Sta. 610+00.00, 148' Lt. C.L.

Boring Surface Elev.: + 73.0' Reference:

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

U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0' 16.0'

Water Level Readings

Depth of Water Depth of Casing Time **Depth of Hole** Elev. of Water Date 2/21/08 14.0' 16.0 Dry

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	3 3	trace of coarse sand.	ted Soil - 12".
3		2	2.0'	3 5 4 6	Wet stiff brown clayey fine to coarse sandy silt, trace of gravel. A-4(1)	
		3	4.0	3 2 3 5	Wet firm orange fine sandy silt, trace of coarse sand. A-4(0)	7
6	'		6.0'		21" RECOVERY	
		4	6.0	5 7 7 8	Wet medium dense orange and light brown fine sand w/ some silt, trace of coarse sand. A-2-4(0)	
	'		8.0'		18" RECOVERY	
9		5	8.0'	5 5 7 6	Wet medium dense orange and light brown silty fine sand w/ some coarse sand, trace of gravel. 22" RECOVERY	
		6	10.0'	7 10 8 9	Wet medium dense brown clayey fine to coarse sand, trace of gravel. A-2-5(0)	
12	√ '	<u> </u>	12.0'	ļ	11" RECOVERY	
		7	12.0'	7 8 10 9	Wet medium dense brown clayey fine to coarse sand, trace of gravel. 20" RECOVERY	
15		8	14.0'	11 9 10 11	Wet medium dense brown coarse to fine sand w/ some silt and gravel. 18" RECOVERY	
					Boring terminated at 16.0 feet	

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Clayey sand

Silt



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- These logs are subject 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.

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:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 2/21/2008 Dry

10.0 8.0'

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: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. 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' 2.0'	1 2 4 5 3 5 5	Saturated medium stiff brown clay with a trace of fine to coarse sand and gravel. 8" RECOVERY	A-4(8)	Cultivated Soil - 12".
3		2	2.0'	3 5 5	Saturated stiff brown clay with some fine to	A-4(8)	
		3	4.0'	2 3 4 3	No Sieve Analysis: Indication of Saturated medium stiff brown clay with a trace of fine to coarse sand.	AIC	IG
6		4	6.0' 6.0'	4	22" RECOVERY Saturated stiff brown clayey fine to coarse	A-6(2)	
		·		4 5 6 6	sand with some gravel.	A-0(2)	
		5	8.0' 8.0'	3	21" RECOVERY Wet medium dense orange silty fine to coarse	A-2-4(0)	
9			0.0	3 5 5 6	sand with a trace of gravel.	A-2-4(0)	
-			10.0'	Ů	20" RECOVERY		
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Clayey sand

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.

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:

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

IN. IN. U-Sampler: 3 Ball Sampler Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 2/20/08 10.0 8.0' Dry

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: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. 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	0.8' 2.0'	3 3 4	Wet firm brown clay, trace of fine to coarse 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. A-4(6)	
			4.0'		24" RECOVERY	
		3	4.0' 5.0'	5 5	Wet stiff brown clayey silt w/ some fine sand, A-4(3) trace of coarse sand and gravel.	
6		3A	5.0' 6.0'	6	9" RECOVERY A-4(0) Wet stiff brown fine sandy silt w/ some	
		4	6.0'	2 4 6	coarse sand, trace of gravel. 10" RECOVERY A-4(6)	
			8.0'	7	Wet stiff brown clayey silt w/ some fine sand, trace of coarse sand. 24" RECOVERY	
9		5	8.0'	3 5 7 7	Wet medium dense brown clayey coarse sand A-2-4(0) and gravel w/ some fine sand.	
			10.0'		18" RECOVERY	
					Boring terminated at 10.0 feet	
12						
15						

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty low plasticity clay



Silty sand



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- These logs are subject 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:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 2/20/08 10.0 8.0' Dry

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: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. 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. Cultivated Soil - 10".
			2.0'		14" RECOVERY
3		2	4.0'	2 4 5 4	Wet stiff brown clayey silt, trace of fine to coarse sand and gravel. 19" RECOVERY
		3	4.0'	6 7 9	Wet very stiff orange fine sandy silt, trace of A-4(0)
6			6.0'	9	gravel and coarse sand. 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'		Boring terminated at 10.0 feet
					Bornig terminated at 10.0 feet
12					
15					

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.

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:

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

IN. IN. U-Sampler: 3 Ball Sampler Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/4/08 10.0 8.0' Dry

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.; Dia. U-Sample Boring: U-Samples: 10.0 Ft. 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' 2.0'	3 4	Moist firm brown clayey silt, trace of fine to coarse sand.	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.	A-4(1)	
			4.0		18' RECOVERY	$\Delta\Pi$	
		3	4.0	4 9 9 8	Moist medium dense light brown silty coarse sand w/ some fine sand, trace of gravel.	A-1-b	
6		4	6.0' 6.0'	7	19" RECOVERY Moist medium dense brown coarse sand w/	A-1-b	
		·		7 8 10 9	some silt, fine sand, and gravel.	A-1-0	
		5	8.0' 8.0'	8 11 12 12	20" RECOVERY Moist medium dense brown gravel and coarse	A-1-b	Sample contains rock
9				12 12	to fine sand w/ some silt.		fragments (gravel).
			10.0'		Boring terminated at 10.0 feet		
					Bornig terminated at 10.0 feet		
12							
15							

Remarks:

Symbol Description

Strata symbols



Low plasticity clay



Silty low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- These logs are subject 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:

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

U-Sampler: Ball Sampler Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Casing Depth of Hole** Elev. of Water Date 14.0' 3/4/08 16.0 Dry

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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. Rem	narks
	3/4/08	1	1.0' 2.0'	4 4	Moist firm brown clayey silt, trace of fine A-4(7) Cultivated So	il - 11".
		2	2.0'	3 7	10" RECOVERY A-4(0)	
3			3.0'	/	Moist stiff brown silt w/ some gravel, coarse	
		2A	3.0'	14 13	to fine sand, and clay. 7" RECOVERY A-1-b	
			4.0	7	Moist medium dense brown gravel and coarse	
		3	4.0	7 9 14 15	sand w/ some silt and fine sand. 7" RECOVERY	
				15	Wet very stiff brown fine sandy clay w/ some	
6			6.0'		coarse sand, trace of gravel. 11" RECOVERY	
		4	6.0'	8 6 9 14		
				9	Wet stiff brown fine sandy clay w/ some coarse sand and gravel.	
			8.0'		18" RECOVERY	
		5	8.0'	4 7	Wet stiff brown fine sandy clay w/ some A-7-5(3)	
9				4 7 5 6	coarse sand, trace of gravel.	
			10.0' 10.0'	2	12" RECOVERY	
		6	10.0	3 3 5 7	Wet loose brown clayey coarse to fine sand A-2-5(0) w/ some gravel.	
				7	w/ some graver.	
12			12.0'		19" RECOVERY	
		7	12.0'	6 5 11 10	Wet medium dense brown clayey coarse to A-2-5(0)	
				11 10	fine sand w/ some gravel.	
			14.0'		18" RECOVERY	
		8	14.0'	2	Wet medium dense brown silty coarse to fine A-2-4(0)	
15				2 13 7 5	sand w/ some gravel.	
			16.0'		18" RECOVERY	
					Boring terminated at 16.0 feet	
1	I		1			

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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:

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

IN. IN. 3 Ball Sampler Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Casing Depth of Hole** Elev. of Water Date 14.0' 3/4/08 16.0 Dry

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	3 3	Wet firm brown clay, trace of fine sand and grayel.	A-6(12)	Cultivated Soil - 12".
3		2	2.0'	3 4 5 4	Wet stiff brown clayey silt, trace of fine to	A-4(8)	
	N		4.0'		coarse sand. 18" RECOVERY		
		3	4.0	2 4 12 12	Wet medium dense brown clayey gravel w/ some fine to coarse sand.	A-2-6(0)	Sample contains rock fragments.
6			6.0'		23" RECOVERY		
		4	6.0′	15 15 22 21	Wet dense brown clayey gravel and coarse sand w/ some fine sand.	A-2-6(0)	Sample contains rock fragments.
			8.0'		21" RECOVERY		
9		5	8.0'	14 17 19 12	Wet dense brown clayey gravel and coarse sand w/ some fine sand.	A-2-7(0)	Sample contains rock fragments.
			10.0'		17" RECOVERY		
		6	10.0'	9 11 12 16	Wet medium dense brown clayey gravel and fine to coarse sand.	A-2-6(0)	
12			12.0'		23" RECOVERY		
		7	12.0'	4 6 8 10	Wet medium dense orange and brown clayey coarse sand and gravel w/ some fine sand.	A-2-7(1)	
		8	14.0' 14.0'	3	19" RECOVERY Wet medium dense orange and brown clayey	A-2-7(0)	
15				3 9 7 9	coarse to fine sand w/ some gravel.	11-2-1(U)	
			16.0'		19" RECOVERY		
					Boring terminated at 16.0 feet		

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Clayey sand

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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:

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

Core Bit: O.D. **Casing Size:**

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

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 13.0' 3/4/08 15.0 Dry

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: Dia. U-Sample Boring: U-Samples: 15.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: D. Zmijewski

Depth	Daily	I	Sample		
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description Class./G.I. Remarks
	3/4/08	Bulk 1	1.0' 2.0'	3 4	Wet brown fine to coarse sandy lean clay. Wet firm brown clay, trace of fine sand. A-6(10) Cultivated Soil - 11". A-6(11)
		2	2.0'	5	9" RÉCOVERY A-4(7)
3				5 5 6 8	Wet stiff brown clayey silt, trace of fine to
				Ü	coarse sand.
			4.0'		18" RECOVERY
		3	4.0' 5.0'	2 4	Wet loose brown clayey fine to coarse sand, trace of gravel. A-2-4(0)
		3A	5.0'	6 11	10" RECOVERY Wet your ediff brown eilt w/ some clay fine to
6			6.0'	26	Wet very stiff brown silt w/ some clay, fine to
		4	6.0'	26 38 44 22	coarse sand, and gravel. 10" RECOVERY A-1-a
				22	Wet very dense light brown gravel w/ some
			8.0'		silt and coarse to fine sand. 8" RECOVERY
		5	8.0'	15	No recovery.
9				15 24 28 27	
			10.0'		0" RECOVERY
12					
12					
		6	13.0'	12 8 5 8	Wet medium dense brown silty coarse sand A-2-4(0)
				5 8	w/ some fine sand and gravel.
15			15.0'		17" RECOVERY
					Boring terminated at 15.0 feet

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silt



Clayey sand



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- These logs are subject 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.: R1-038

Contract: 25-113-01

Boring Location: Sta. 655+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 63.0' Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 13.0' 3/3/08 15.0 Dry

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: Dia. U-Sample Boring: U-Samples: 15.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: D. Zmijewski

Depth	Daily		Sample		
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description Class./G.I. Remarks
	3/3/08	1	1.0'	3 5	Wet firm brown clayey silt, trace of fine to A-4(9) Cultivated Soil - 10".
			2.0'		coarse sand.
		2	2.0'	3 4 5 5	Wet stiff brown silt w/ some clay, trace of A-4(4)
3				5	fine to coarse sand and gravel.
		1/	4.0'		20" RECOVERY
		3	4.0	4	Wet loose brown clayey fine to coarse sand, A-2-4(0)
		4 ,		4 4 4 9	trace of gravel.
6			6.0'		18" RECOVERY
		4	6.0	8 9 11 11	Wet medium dense orange and brown gravel A-2-4(0)
				11	w/ some fine to coarse sand and silt.
		5	8.0' 8.0'	7	20" RECOVERY Wet medium dense orange and brown gravel A-1-b
9			0.0	7 8 9 10	Wet medium dense orange and brown gravel A-1-b and fine sand w/ some coarse sand and silt.
9				10	and the said w/ some coarse said and sit.
			10.0'		20" RECOVERY
12					
		6	13.0'	2	
		0	13.0	2 7 8 4	Wet medium dense orange and brown gravel A-1-b and coarse sand w/ some silt and fine sand.
				4	and coarse said w/ some sitt and time said.
15			15.0'		16" RECOVERY
'			10.0		Boring terminated at 15.0 feet

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silt

Clayey sand

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- These logs are subject 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: Average Fall: IN. Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3

Ball Sampler Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Casing Depth of Hole** Elev. of Water Date 14.0' 3/3/08 16.0 Dry

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: D. Zmijewski

Depth	Daily	I	Comple			
(ft.)	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 A-1-b Cultivated Soil - 9".	
			2.0'	7	silt and fine sand, trace of coarse sand.	
		2	2.0'	2 3 4	Moist loose brown fine to coarse sand w/ A-2-4(0)	
3				5	some silt, trace of gravel.	
			4.0'		16" RECOVERY	
		3	4.0'	5 7	Moist medium dense light brown coarse to A-2-4(0)	
				5 7 6 8	fine sand w/ some silt, trace of gravel.	
6		4	6.0' 6.0'	5	18" RECOVERY	
		4	0.0	5 5 5	Moist loose light brown coarse to fine sand w/ A-1-b some silt and gravel.	
				18	some silt and gravel.	
			8.0'		19" RECOVERY	
		5	8.0'	5 7	Wet medium dense brown silty fine to coarse A-2-4(0)	
9				5 7 8 10	sand, trace of gravel.	
		6	10.0' 10.0'	5	21" RECOVERY	
		0	10.0	5 10 11	Wet very stiff brown fine to coarse sandy silt, A-5(0) trace of gravel.	
				15	trace of graver.	
12			12.0'		24" RECOVERY	
	1	7	12.0'	11 12 14 13	Wet very stiff brown fine to coarse sandy silt A-4(0)	
				14 13	w/ some gravel.	
		8	14.0' 14.0'	5	19" RECOVERY	
4.5		ľ	14.0	5 7 11 10	wet medium dense brown line to coarse sand, A-5	
15				10		
			16.0'		ENTER DE LA COVERY 20" RECOVERY	
					Boring terminated at 16.0 feet	

Remarks:

Symbol Description

Strata symbols

Silty gravel



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- These logs are subject 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:

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

U-Sampler: Ball Sampler Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 13.0' 3/3/08 15.0 Dry

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: Dia. U-Sample Boring: U-Samples: 15.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: D. Zmijewski

Depth	Daily	1	Sample		
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description Class./G.I. Remarks
	3/3/08	Bulk	1.0'	3 4	Moist brown fine to coarse sandy lean clay. A-6(5) Cultivated Soil - 10".
		1	2.0'	2	Wet firm brown clayey silt, trace of fine sand. A-4(6)
		2	2.0'	3 4 5 5	Wet stiff brown clayey silt, trace of fine to A-4(6)
3	_	_		5	coarse sand.
	l N		4.0'	Т	23" RECOVERY
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	3	4.0	3 5 5 8	Wet stiff brown silt w/ some fine to coarse A-4(0)
	•	,		5 8	sand, trace of gravel.
6		4	6.0' 6.0'	7	24" RECOVERY Wet very stiff brown fine sandy gravelly silt A-4(0)
			0.0	7 8 10 11	Wet very stiff brown fine sandy gravelly silt Wet very stiff brown fine sandy gravelly silt Wet very stiff brown fine sandy gravelly silt A-4(0)
				11	wy some clay and course sand.
			8.0'		20" RECOVERY
		5	8.0'	3 5	Wet very stiff brown clay w/ some fine sand, A-6(9)
9				3 5 9 9	trace of coarse sand.
			10.0'		24" RECOVERY
12					
		6	13.0'	4 4 6 10	Wet stiff brown clayey fine sandy silt, trace of A-4(4)
				10	coarse sand and gravel.
45			15.0'		24" DECOVEDY
15			15.0'		Boring terminated at 15.0 feet
					Boring terminated at 15.0 feet

Remarks:

Symbol Description

Strata symbols

Silt

Low plasticity clay



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- These logs are subject 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:

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

Core Bit: O.D. 3 1/4 Inches From Depth of:

To: To: **Casing Size:** Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time **Depth of Casing Depth of Hole** Elev. of Water Date 14.0' 3/3/08 16.0 Dry

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: D. Zmijewski

Remarks
Remarks
ted Soil - 11".
lens at 8.5'
ichs at 6.5

Remarks:

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

- 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.
- These logs are subject 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:

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

IN. IN. U-Sampler: 3 Ball Sampler Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Casing Depth of Hole** Elev. of Water Date 14.0' 3/3/08 16.0 Dry

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	1 1 4	Moist firm brown clayey coarse sandy silt w/ A-4(0) Cultivated Soil - 9".	
		2	2.0'	3	Moist very loose coarse sand w/ some fine A-1-b	
3	N	2A	2.5' <i>f</i> 2.5' 4.0'	4 4 6	sand, silt, and gravel. 5" RECOVERY Moist stiff brown clay w/ some coarse sand,	
		3	4.0'	3 6 9 12	trace of fine sand. 15" RECOVERY A-6(10)	
				12	Moist stiff brown clay w/ some fine sand,	
6			6.0'		trace of gravel and coarse sand. 12" RECOVERY	
		4	6.0'	10 9 6 5	Moist medium dense light brown coarse sand w/some fine sand and silt, trace of gravel.	
			8.0'		HIANN HIANN 20" RECOVERY	
9		5	8.0'	5 5 7 7	Moist medium dense light brown coarse to A-1-b fine sand w/ some silt, trace of gravel.	
			10.0'		(#14) (#15)	
		6	10.0'	7 6 7 12	Moist medium dense light brown coarse to fine sand w/ some silt, trace of gravel.	
12			12.0'		20" RECOVERY	
		7	12.0'	8 5 6 5	Wet medium dense light brown coarse to fine sand, trace of silt and gravel.	
			14.0'		18" RECOVERY	
15		8	14.0'	5 3 3 2	Wet loose light brown coarse to fine sand w/ A-2-4(0) some silt, trace of gravel.	
			16.0'		21" RECOVERY	
			10.0		Boring terminated at 16.0 feet	\neg

Remarks:

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

- 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.
- These logs are subject 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.

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

IN. IN. 3 Ball Sampler Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/3/08 10.0 8.0' Dry

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: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. 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' 2.0'	3 4	Moist firm brown clay w/ some coarse to fine sand, trace of gravel.	A-6(6)	Cultivated Soil - 10".
3		2	2.0'	3 6 9 12	Moist stiff brown clayey fine to coarse sandy silt, trace of gravel.	A-4(0)	
			4.0'	T	18" RECOVERY	ΔIV	
		3	4.0	9 12 17 7	Moist medium dense brown gravel and coarse sand w/ some silt and fine sand.	A-1-b	
6			6.0'		15" RECOVERY	4	
		4	6.0	5 6 7 12	Moist medium dense light brown and brown silty fine sand w/ some coarse sand and gravel.	A-2-4(0)	
		5	8.0' 8.0'	6	15" RECOVERY Moist medium dense light brown coarse sand	A-1-b	4" clay lens at 9.8 ft.
9				6 11 11 12	w/ some fine sand and silt, trace of gravel.	1110	1 014 10110 40 710 14
			10.0'				
					Boring terminated at 10.0 feet		
12							
12							
15							
15							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/3/08 10.0 8.0' Dry

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: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: D. Zmijewski

Depth	Daily		Sample		
(ft.)	Progress	No.	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/ A-2-4(0) Cultivated Soil - 10".
				4	some fine sand and gravel.
			2.0'		12" RECOVERY
		2	2.0'	6	Moist medium dense brown silty coarse to A-1-b
3				10 12	fine sand w/ some gravel.
		1	4.0'		21" RECOVERY
		3	4.0'	6 7	Wet medium dense brown silty coarse to fine A-2-4(0)
			Λ	8 9	sand, trace of gravel.
6			6.0'		22" RECOVERY
		4	6.0'	9	Wet medium dense brown fine to coarse sand A-2-4(0)
				6 5 4	w/ some silt and gravel.
		5	8.0' 8.0'	4	20" RECOVERY Wet loose brown fine to coarse sand w/ some A-2-4(0)
9				4 5 4 6	silt, trace of gravel.
				Ů	
			10.0'		24" RECOVERY
					Boring terminated at 10.0 feet
12					
15					

Remarks:

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.

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:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Casing Depth of Hole** Elev. of Water Date 14.0' 3/3/08 16.0 Dry

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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 A-4(5) Cultivated Soil - 10".	
		2	2.0'	4	coarse sand, trace of gravel.	
			2.0	4 7 9 12	Moist medium dense brown silty coarse sand A-1-b	
3	_	_		12	w/ some fine sand, trace of gravel.	
			4.0'		14" RECOVERY	
		3	4.0'	11 10 9 8	Moist medium dense brown and light brown A-1-b	
	•	,		9 8	silty coarse sand, trace of gravel.	
6			6.0'		18" RECOVERY	
		4	6.0	6 6 4 2	Moist loose brown and light brown fine to A-2-4(0)	
				4 2	coarse sand w/ some silt, trace of gravel.	
			8.0'		20" RECOVERY	
		5	8.0'	6 2 3 3	Moist loose brown and light brown silty fine A-2-4(0)	
9				3	to coarse sand, trace of gravel.	
			10.0'		19" RECOVERY	
		6	10.0'	3 6 7 5	Moist medium dense brown and light brown A-1-b	
				5	gravel and fine sand w/ some coarse sand and	
					silt.	
12			12.0'		18" RECOVERY	
		7	12.0'	5 7 8 9	Moist medium dense brown gravel and coarse A-1-b	
				9	sand w/ some silt and fine sand.	
		8	14.0' 14.0'	7	17" RECOVERY	
		8	14.0	7 7 6 7	Moist medium dense brown coarse to fine A-1-b	
15				7	sand and gravel w/ some silt.	
			16.0'		18" RECOVERY	
					Boring terminated at 16.0 feet	

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.

39.0

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

Core Bit: O.D. IN. 3 1/4 Inches

From Depth of: From Depth of: To: To: **Casing Size:** Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Time Depth of Hole **Depth of Water** Elev. of Water Date 2/27/09 11.2 12.0 12.0

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: Dia. U-Sample Boring: U-Samples: 40.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** J. Truver

Helpers: J. Lafferty

Depth	Daily	No.	Sample	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress		Depth				Class./G.I.	
	2/27/09	1	0.5'	3 3 3		Moist firm brown silt w/ some clay, trace of	A-4(3)	Topsoil - 5".
				3		fine to coarse sand.		
			2.0'	2	uu	17" RECOVERY		
		2	2.0'	3 4 8		Moist medium dense brown coarse to fine	A-1-b	
3				9		sand w/ some silt, trace of gravel.		
			4.0'			22" RECOVERY		
		3	4.0'	2 2 2 3		Moist soft brown clayey gravelly silt w/ some	A-4(1)	
				2 3		fine sand, trace of coarse sand.		
						DI IOT OO		
6	_	4	6.0' 6.0'	6		18" RECOVERY	16	
		4	6.0	6 6 6		Moist medium dense tan coarse sand w/ some	A-1-b	
				8		silt and fine sand, trace of gravel.		
			8.0'			20" RECOVERY		
	-	5	8.0'	1		Moist medium dense tan coarse to fine sand	A-1-b	
9				1 5 7 7		w/ some silt, trace of gravel.	71 1 0	
				'		, 8		
			10.0'			21" RECOVERY		
		6	10.0'	7 9	1.0 1 4 1 E (1.0 1 1 1 E (1.0 1 7 4 3 E (Moist medium dense brown gravel and coarse	A-1-b	
				10 11		sand w/ some silt, trace of fine sand.		
					2001.1127 2001.1129			
12			12.0'	0		20" RECOVERY		NIa siana analosia
		7	12.0'	9 14 13 13	(*	Indication of moist medium dense brown		No sieve analysis.
				13		gravel and coarse sand, trace of clay and fine		
			14.0'			sand. 17" RECOVERY		
		8	14.0'	11		Indication of moist medium dense orange silty		No sieve analysis.
15				11 9 7 7	157 7 3 1 3 1 C 1 157 7 3 1 7 5 C 1	sand w/ some gravel.		
15	1			7	06143666 06173666 0611366	Said W Solito graver.		
			16.0'		110 J	3" RECOVERY		
	1	9	16.0'	6		Wet medium dense orange, green, and brown	A-2-6(0)	
				6 6 8 9		clayey gravel and fine sand w/ some coarse		

Remarks:

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. 15" RECOVERY	A-7-6(3)	
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					DRAFT		
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. 21" RECOVERY	A-2-4(0)	Glauconitic.
33			A	\U	GUST 20	15	
		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)	Glauconitic.
36			30.0		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)	Glauconitic.
			41.0'		End of Boring		
42					<u></u>		
45							

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

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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:

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

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0 14.0

Water Level Readings

Depth of Casing Time **Depth of Water Depth of Hole** Elev. of Water Date 10.0 3/6/09 10.0 8.6

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: Dia. U-Sample Boring: U-Samples: 58.9 Ft.; Ft. 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' 2.0'	2 3 2	Moist loose tan silty fine to coarse sand w/ some gravel. 7" RECOVERY	A-2-4(0)	Forrest Duff - 4".
	1	2	2.0'	5 11	Moist medium dense orange gravel w/ some	A-1-b	
3		1 🔳		11	fine to coarse sand and silt.		
			4.0	6	13" RECOVERY		IG
		-3	4.0'	5 6 6	Wet stiff brown fine sandy clay w/ some	A-7-6(3)	
	<u> </u>			6 6	coarse sand.	,	
6			6.0		13" RECOVERY	15	
		4	6.0'	4 4 6 5	Wet stiff brown fine sandy clay w/ some	A-7-6(3)	
				5	coarse sand.		
	1	<u> </u>	8.0'	<u> </u>	17" RECOVERY		
9		5	8.0'	3 4 4 5	Saturated firm brown fine sandy clay w/ some coarse sand, trace of organic matter.	A-6(2)	
			10.0'		15" RECOVERY		
		6	10.0'	3 4 6 7	Saturated loose brown clayey fine sand w/ some coarse sand.	A-2-4(0)	
		1		'	1		
12	<u> </u>		12.0'		13" RECOVERY		
		7	12.0'	3 4 5 5	Saturated stiff brown fine sandy clay, trace of coarse sand.	A-7-6(3)	
			44.01	'	17" DECOVEDY		
		8	14.0' 14.0'	3	17" RECOVERY	A 7.6(4)	Started mand notomy at 14.0'
15			14.0	3 3 5 7	Saturated firm brown-orange fine sandy clay, trace of coarse sand.	A-7-6(4)	Started mud rotary at 14.0'.
			16.0'		16" RECOVERY		
		9	16.0'	2 3 5 6	Saturated firm brown-orange fine sandy clay, trace of coarse sand.	A-7-6(3)	

Remarks:

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

Boring No.: R1-047

Depth	Daily	No.	Sample	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress	10.	Depth	2.5 11 0/0			0.000.70.11.	Romano
18		10	18.0' 18.0'	3 5 7 10		12" RECOVERY Saturated stiff brown-orange fine sandy clay, trace of coarse sand.	A-6(4)	
21			20.0'			24" RECOVERY		
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		_				DRAFT		
30		12	31.0'	4 6 7 10	-	Saturated medium dense dark green fine to coarse sand w/ some silt, trace of organic matter and gravel. 23" RECOVERY	A-2-4(0)	IG
33			A	l		GUST 20	15	
		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			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. 14" RECOVERY	A-2-4(0)	
42			41.0		-	14 RECOVERI		
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)	

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

Boring No.: R1-047

	aci. 25-113							
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
. ,			46.0'			24" RECOVERY		
48								
		16	49.0' 50.5'	18 23 50/4"		Saturated very dense dark gray fine to coarse sand w/ some silt, trace of gravel. 12" RECOVERY	A-2-4(0)	
51								
54		17	54.0' 55.0'	45 50/3"	_	Saturated very dense dark gray fine sand w/some silt and coarse sand, trace of gravel. 9" RECOVERY	A-2-4(0)	
57	N		0			OR BIDI		IG
60		18	59.0' 60.0'	39 50/5"		Saturated very dense dark gray fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			A	\U		End of Boring	15	
63								
66								
69								
72								
	1							

Symbol Description

Strata symbols

Silty sand



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

38.0

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:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Casing Depth of Hole** Elev. of Water Date 3/23/09 13.0 14.0 14.0

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: Dia. U-Sample Boring: U-Samples: 40.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** D. Burt

Helpers:

Donth	Doily	I	Comple			1		
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Samp	le Description	Class./G.I.	Remarks
	3/23/09	1	0.0'	2 3	Moist firm ligh	t brown fine sandy silt w/	A-4(0)	Topsoil - 2".
				2 3 4 6	some coarse sai	nd and clay, trace of gravel.		-
			2.0'	6		2" RECOVERY		
	N.		2.0	6 8 8 10		dense light brown and orange	A-2-4(0)	
3				10	shty fine to coa	rse sand, trace of mica.		
		A .	4.0'			8" RECOVERY		
		3	4.0'	5 12 13	Moist medium	dense dark brown coarse to	A-1-b	
				13 14	fine sand w/ so	ne silt, trace of gravel.		
						2 ')()	15	
6		4	6.0'	15		20" RECOVERY		
		4	0.0	15 13 13 12	to fine sand w/	dense dark brown silty coarse	A-1-b	
				12	to fine sand w/	some graver.		
			8.0'			6" RECOVERY		
		5	8.0'	7 9	111	dense light gray coarse to fine	A-1-b	
9				7 9 10 13		lt, trace of gravel.		
		6	10.0' 10.0'	10	111	23" RECOVERY		
		0	10.0	10 11 10 12		dense light gray coarse sand	A-1-b	
				12	w/ some mie sa	nd and silt, trace of gravel.		
12			12.0'			24" RECOVERY		
		7	12.0'	4 4	-111	n and black mottled coarse to	A-1-b	
				4 4 6 7	fine sand w/ so	ne silt and gravel.		
			14.0'	5		23" RECOVERY		
,_		8	14.0'	5 5 3 3	Wet loose light some silt and co	brown gravel and fine sand w/	A-1-b	
15				3	Some sin and co	vaise saiiu.		
			16.0'			4" RECOVERY		
		9	16.0'	8 10	888	et very stiff dark black clayey		No sieve analysis.
1			1	9		, ,		

Remarks:

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

Depth	Daily	No.	Sample	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress	INO.	Depth	9	8888888	·	Class./G.I.	
				9		sandy silt.		Glauconitic.
18			18.0'	_		6" RECOVERY		
		10	18.0'	8 9 11 9		Saturated very stiff dark black fine sandy	A-6(3)	Glauconitic.
				9		clay, trace of coarse sand and gravel.		
			20.0'			21" RECOVERY		
		11	20.0'	3		Saturated stiff dark black fine sandy clay,	A-6(2)	Glauconitic.
21				3 5 8 9		trace of coarse sand and gravel.	` /	
		12	22.0' 22.0'	8		21" RECOVERY	A ((F)	C1
		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.
				16		ciay, trace or coarse said and graver.		
24			24.0'			23" RECOVERY		
		13	24.0'	5 7 8 9		Saturated stiff dark black fine sandy silt, trace	A-4(0)	Glauconitic.
				8 9		of coarse sand and gravel.		
			00.01			2011 DEGGVEDV		
		14	26.0' 26.0'	12		23" RECOVERY Saturated hard dark black fine sandy clay,	A-6(3)	Glauconitic.
27				12 13 18 22		trace of coarse sand.	11 0(3)	Gladeomile.
				22				
			28.0'			14" RECOVERY		
		15	28.0'	3 4 6 10		Saturated stiff dark black fine sandy clay,	A-6(5)	
	N			10		trace of coarse sand and gravel.	\mathcal{I}	
30	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	M	30.0'			10" RECOVERY		
30	•	16	30.0'	13 9		Saturated very stiff dark black fine sandy	A-7-6(4)	Glauconitic.
				14 17		clay, trace of coarse sand and gravel.	,	
						PLICT OF	1 [
		17	32.0' 32.0'	3		9" RECOVERY	7.6(5)	Glauconitic.
33		''	32.0	3 5 8 8		Saturated stiff dark black fine sandy clay, trace of coarse sand and gravel.	A-7-6(5)	Giaucomiic.
33				8		trace of course saint and graver.		
			34.0'			12" RECOVERY		
		18	34.0'	2 3 6 7		Saturated loose black clayey fine to coarse	A-2-6(1)	
				6 7		sand w/ some organic matter, trace of gravel.		
			20.01			2011 DEGOVERY		
36		19	36.0' 36.0'	14		22" RECOVERY Saturated hard black organic fine sandy silt w/	A-4(0)	
				14 18 27 24		some coarse sand, trace of gravel.	'(0)	
			38.0'	E		19" RECOVERY		
		20	38.0'	5 11 18 24		Saturated medium dense black organic silty	A-2-5(0)	
39				24		fine to coarse sand w/ some gravel.		
			40.0'			8" RECOVERY		
					1-1-1-1-1-1-1-1	End of Boring		
42								
45	1		1		I			

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Clayey sand



Low plasticity clay

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

38.0

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:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Time **Depth of Water Depth of Hole** Elev. of Water Date 3/27/09

18.0 16.0 15.7

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: Dia. U-Sample Boring: U-Samples: 40.0 Ft.; Ft. 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	4.0'	5 10 8 5		Moist medium dense brown to orange silty fine to coarse sand, trace of gravel. 22" RECOVERY	A-2-4(0)	IG
		3	4.0'	3 3 5	136 144 116 1 - 126 14 12 16 1 126 14 12 16 1	Moist loose brown fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
6			6.0'	6		20" RECOVERY	<u>15</u>	
		4	6.0' 8.0'	9 7 7 5		Moist medium dense brown coarse sand w/some silt and fine sand, trace of gravel. 22" RECOVERY	A-1-b	
9		5	8.0'	5 7 6 6		Moist medium dense brown coarse sand w/ some fine sand, gravel, and silt. 17" RECOVERY	A-1-b	
		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		7	12.0' 12.0'	2		18" RECOVERY	A 1 1	
		,		2 4 6 8		Wet loose brown coarse to fine sand w/ some gravel, trace of silt.	A-1-b	
			14.0'	7		18" RECOVERY		
15		8	14.0'	7 5 4 7		Wet loose brown coarse to fine sand w/ some gravel, trace of silt. 23" RECOVERY	A-1-b	
		9	16.0'	9 11		Wet medium dense coarse sand w/ some fine	A-1-b	
1				15				

Remarks:

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

- ·	l =	1		I	1			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	Ŭ.			16		sand and gravel, trace of silt.		
18			18.0'					
		10	18.0'	17 6 7 5		Wet medium dense brown coarse to fine sand	A-1-b	
				7 5		w/ some gravel and silt.		
			20.0'			18" RECOVERY		
		11	20.0'	10 10		Wet medium dense brown coarse to fine sand	A-1-b	
21				8 8		w/ some gravel and silt.		
		12	22.0' 22.0'	4		19" RECOVERY Saturated stiff brown to gray fine sandy clay,	A-7-6(5)	
		'-		4 6 7 9		trace of coarse sand and gravel.	A-7-0(3)	
				9				
24		40	24.0'	4		18" RECOVERY		
		13	24.0'	4 11 14		Saturated very stiff gray fine sandy clay w/	A-7-5(2)	
				14 17		some coarse sand, trace of gravel.		
			26.0'			23" RECOVERY		
		14	26.0'	14 18 20 22		Saturated hard gray fine sandy clay w/ some	A-7-5(6)	
27				20 22		coarse sand, trace of gravel.		
			28.0'			24" RECOVERY		
		15	28.0'	7 8		Saturated medium dense black silty fine sand	A-2-4(0)	
	l A	1		10 11		w/ some coarse sand, trace of gravel.		
						TORBILL		
30		16	30.0' 30.0'	8		18" RECOVERY Saturated medium dense black fine sand w/	A-2-4(0)	
			55.5	8 8 10 12		some coarse sand, silt, and organic matter,	A-2-4(0)	
			Λ	12		trace of gravel.	1	
		47	32.0'	0		20" RECOVERY		
00		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)	
33				13		w/ some coarse sand, trace of graver.		
			34.0'			23" RECOVERY		
		18	34.0'	4 5 8 14		Saturated medium dense black silty coarse to	A-2-4(0)	
				14		fine sand, trace of gravel.		
36			36.0'			21" RECOVERY		
		19	36.0'	5 7 11 15		Saturated medium dense black silty coarse to	A-2-4(0)	
				11 15		fine sand w/ some gravel.		
			20.01			24# RECOVERY		
		20	38.0' 38.0'	42 50/3"		24" RECOVERY Saturated very dense black silty fine to coarse	A-2-5(0)	
39			39.0'	50/3		sand w/ some gravel.	(0)	
						10" RECOVERY		
						End of Boring		
						End of Boring		
42								
45								

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

Poorly graded sand with silt

Well graded sand with silt

Silt

DRAFT NOT FOR BIDDING **AUGUST 2015**

- 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.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

38.0

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

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/30/09 10.0 12.0 8.1

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: Dia. U-Sample Boring: U-Samples: 40.0 Ft.; Ft. 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		stiff brown clayey fine sandy silt, trace ese sand.	A-4(2)	
			2.0'			20" RECOVERY		
3		2	4.0'	3 4 8 8		stiff brown clayey fine sandy silt w/ coarse sand and gravel. 18" RECOVERY	A-4(1)	IG
		3	4.0'	5 4		loose brown silty fine sand, trace of	A-2-4(0)	
6			6.0'	3		sand and gravel. 18" RECOVERY	15	
		4	6.0'	2 2 2 5		very loose brown and orange fine to	A-2-4(0)	
				5	coarse	sand w/ some silt, trace of gravel.		
			8.0'			17" RECOVERY		
9		5	8.0'	3 4 8 6		medium dense brown-orange coarse to nd and gravel w/ some silt.	A-1-b	
			10.0' 10.0'	0		18" RECOVERY		
		6	10.0	8 9 7 5		medium dense brown-orange coarse nd gravel w/ some fine sand and silt.	A-1-b	
12		7	12.0' 12.0'	2	34	18" RECOVERY	A 2 4(0)	
		,	12.0	2 2 5 6		medium dense brown and orange fine see sand w/ some silt and gravel.	A-2-4(0)	
			14.0'			19" RECOVERY		
15		8	14.0'	3 4 4 8		loose orange coarse sand w/ some silt are sand, trace of gravel.	A-1-b	
			16.0'	0		20" RECOVERY		
		9	16.0'	8 5 8	Wet m	edium dense green clayey coarse to	A-2-6(1)	

Remarks:

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

	1	1	T -						
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"			Sample Description	Class./G.I.	Remarks
				10			fine sand, trace of gravel.		
18			18.0'				19" RECOVERY		
		10	18.0'	5 5 10 11			Wet medium dense green silty fine to coarse	A-2-4(0)	
				10 11			sand, trace of organic matter and gravel.		
			20.0'				18" RECOVERY		
		11	20.0'	8 10			Saturated medium dense green silty fine to	A-2-4(0)	
21				8 10 7 10			coarse sand w/ some gravel and organic		
							matter.		
		12	22.0' 22.0'	2			18" RECOVERY Saturated stiff green fine sandy clay w/ some	A-6(0)	
				2 3 6 8			coarse sand, trace of organic matter and	11 0(0)	
							gravel.		
24		13	24.0' 24.0'	4	W.	ALAHA Alahan	21" RECOVERY Saturated very stiff green organic fine sandy	A 4(0)	
		'	24.0	4 18 12 12			silt w/ some clay and coarse sand, trace of	A-4(0)	
				12			gravel.		
			26.0'	4		200	20" RECOVERY		
		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)	
27				20			w/ some coarse sand, trace of graver.		
			28.0'				19" RECOVERY		
		15	28.0'	5 8			Saturated very stiff green fine to coarse sandy	A-7-5(2)	
				14 31			clay, trace of gravel.	\mathcal{A}	
30		N۷	30.0'				17" RECOVERY	<i></i>	
	_	16	30.0'	30 50/4"			Saturated very dense green clayey fine sand	A-2-5(0)	
			31.0'		1		w/ some coarse sand and gravel.	4	
								15	
		17	32.0'	10 28 34			Saturated very dense green silty fine to coarse	A-2-4(0)	
33				34 50/5"			sand, trace of gravel.		
			34.0'				19" RECOVERY		
		18	34.0'	30			Saturated dense green silty fine to coarse	A-2-5(0)	
				30 20 23 28			sand, trace of gravel.		
			00.01				101 PEGOVERY		
36		19	36.0' 36.0'	13			18" RECOVERY Saturated dense green fine to coarse sand w/	A-2-4(0)	
				13 15 17 18			some gravel and silt.	(-)	
<u> </u>		20	38.0' 38.0'	20			18" RECOVERY Saturated very dense green clayey fine to	A-2-4(0)	
39				20 32 38 50/3"			coarse sand, trace of gravel.	Π-2-4(U)	
				30/3			, ,		
			40.0'		┦Ш		18" RECOVERY		
							End of Boring		
42									
45	ı	1	1	1	1				I

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

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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: IN. Lbs. Average Fall: Wt. of Sample Hammer: IN. Lbs. 30 IN. Type of: Split Spoon O.D. 2

Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: D-Sampler: S-Sampler: U-Sampler: IN. IN. O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0 34.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 4/1/09 6.0 4.0 3.1

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: Dia. U-Sample Boring: U-Samples: 60.0 Ft.; Ft. 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' 2.0'	1 3 4		Wet firm gray clayey silt, trace of fine sand and gravel. 18" RECOVERY	A-4(8)	Topsoil - 3".
		2	2.0'	9 8 9		Wet very stiff gray clayey silt, trace of fine to	A-4(6)	
3			4.0'	13		coarse sand and gravel. 19" RECOVERY		JG
		3	4.0'	9 18 14 14		Wet hard gray-brown gravelly silt w/ some coarse to fine sand, trace of clay.	A-4(0)	
6			6.0'			15" RECOVERY	15	
		4	6.0'	9 9 13 15		Wet medium dense brown and orange coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			8.0'		000 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	19" RECOVERY		
9		5	8.0'	6 10 9 12		Wet medium dense brown coarse to fine sand w/ some gravel, trace of silt.	A-1-b	
			10.0'		1:3:3:3:3:3:3: 1:3:3:3:3:3:3:3: 1:3:3:3:3	19" RECOVERY		
		6	10.0'	11 2 6 6		Wet medium dense brown coarse sand w/ some gravel and fine sand, trace of silt.	A-1-b	
12			12.0'			20" RECOVERY		
		7	12.0'	5 4 3 3		Wet loose tan fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			14.0'			20" RECOVERY		
15		8	14.0'	2 3 5 6		Wet loose tan fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			16.0'			17" RECOVERY		
		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.

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

Depth	Daily	No.	Sample	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress	INU.	Depth	DIOWS/0		Затирів резстрион	UIASS./U.I.	Remains
18		10	18.0' 18.0'	12		19" RECOVERY Wet medium dense tan-brown coarse sand w/	A-1-b	
		10	10.0	12 10 8 8			A-1-0	
			20.0'			18" RECOVERY		
21								
):::::::::::::::::::::::::::::::::::::			
24		11	24.0'	3 4		Saturated loose brown coarse sand w/ some	A-1-b	
				3 4 6 7		fine sand, silt, and gravel.		
			26.0'			18" RECOVERY		
			20.0			16 RECOVER1		
27						DRAFT		
						DNAFI		
		12	29.0'	6		Saturated medium dense green coarse to fine	A-2-4(0)	Glauconitic.
30			20.0	6 5 11 10		sand w/ silt and gravel.	A-2-4(0)	Gladcollide.
		A .						
			31.0'			18" RECOVERY		
			Λ			DI IOT OO	1	
						GUST 20	15	
33				1		5001 20		
		40	24.0					200
		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'.
				14		The to course sund, trace of graver.		
36			36.0'			20" RECOVERY		
39								
		14	39.0'	1 2 4 6		Saturated loose green-brown fine to coarse	A-3	
				6		sand, trace of silt.		
			41.0'		(10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	20" RECOVERY		
40								
42					1			
		15	44.0'	9 9 13 16		Saturated medium dense green-brown fine	A-2-4(0)	
45				13 16		sand w/ some coarse sand and silt.		

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

Depth	Daily	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
(ft.)	Progress		Дерth 46.0'		21" RECOVERY	
48						
40						
		40	40.01	10		
		16	49.0'	18 28 38 50/4"	Saturated very dense brown fine sand w/ A-2-4(0) some silt and coarse sand.	
				50/4"	some sht and course sand.	
51			51.0'		19" RECOVERY	
54						
J 4		17	54.0'	14 26 33 50/4"	Saturated very dense green fine sand, trace of A-3	
				33 50/4"	silt and coarse sand.	
			56.0'		17" RECOVERY	
			00.0	ļ	ster Pictoria	
57					1000 1000 1000 1000	
	A	1/				
		18	58.0'	28 50/3"	Saturated very dense green fine sand w/ some A-2-4(0) coarse sand and silt.	
	_		59.0'	_	coarse sand and silt. 9" RECOVERY	
60					End of Boring GUST 20 15	
					CHQT 2016	
				1	GUOI ZUIJ	
			_			
63						
66						
69						
UB						
72						
						1

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt



Well graded sand with silt



Well graded sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

20.0

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:

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

Core Bit: O.D. **Casing Size:** 3 1/4 Inches

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

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 2/10/09 Dry 20.0 18.0

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: Dia. U-Sample Boring: U-Samples: 20.0 Ft.; Ft. 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'	4 4 3 4	Moist firm brown clayey silt, trace of fine to coarse sand. 14" RECOVERY	A-4(7)	
			4.0'		18" RECOVERY		
		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			6.0'		10" RECOVERY	4	
		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)	
	1	8	14.0'	3 4	Moist loose orange fine to coarse sand w/	A-2-4(0)	
15			16.0'	3 4 3 3	some silt, trace of gravel. 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:

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

Danth	Dailu		Camania				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
(11.)	1 Togrood		18.0' /		14" RECOVERY		
		10	18.0'	20 20 20 17	Moist dense orange gravel and coarse sand w/	A-1-a	
				20 17	some silt, trace of fine sand.		
			20.0'		18" RECOVERY		
					End of Boring		
21							
24							
27							
					DRAFT		
30					FOR BIDI		
		V					
	-	_		_			
			Λ		IGUST 20		
33							
					ICIUOI ZU		
36							
- 00							
39							
42							
<u>'</u>							
45							
H-3							

Symbol Description

Strata symbols

Low plasticity clay



Silt



Poorly graded clayey silty sand



Silty sand



Poorly graded gravel with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

48.0

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:

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

IN. IN. Core Bit: O.D.

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

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 2/25/09 39.0 39.0 35.2

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: Dia. U-Sample Boring: U-Samples: 50.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** D. Burt

Helpers: D. Zmijewski

Donth	Doily		Comple		$\overline{}$			
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	A-4(6)	Cultivated soil - 9"; 4" frozen
	 		2.0'			coarse sand.		soil.
	 	2	2.0'	6 7 6 5		10" RECOVERY	A-4(0)	
3				6 5		Moist stiff tan silt, trace of fine to coarse sand		
						and gravel.		
			4.0'			16" RECOVERY	\rightarrow	
		3	4.0	3 5 5 6		Moist stiff tan clayey fine sandy silt w/ some	A-4(1)	
				6		coarse sand, trace of gravel.		
						1		
6	 		6.0'	7		14" RECOVERY	4	
		4	6.0	7 6 6 7		Moist stiff tan clay w/ some fine sand, trace of	A-6(9)	
				Ž		coarse sand and gravel.		
		5	8.0' 8.0'	2	HAM	24" RECOVERY	A 4(0)	
			0.0	2 3 6 7		Moist stiff tan fine sandy silt w/ some gravel,	A-4(0)	
9	1			7		clay, and coarse sand.		
			10.0'			14" RECOVERY		
	1	6	10.0'	9	MIN I	Moist medium dense orange silty fine to	A-2-4(0)	
		-		9 8 11		coarse sand w/ some gravel.	11-2-4(0)	
	1			11		Course suite w/ some graver.		
12	 		12.0'			24" RECOVERY		
12	1	7	12.0'	6		Moist medium dense orange coarse to fine	A-1-b	
				6 13 13 16		sand and gravel w/ some silt.	11 1 0	
	1			10		8		
			14.0'			14" RECOVERY		
]	8	14.0'	8 10		Moist medium dense orange coarse sand w/	A-1-b	
15				8 10 10 9		some fine sand and silt, trace of gravel.		
]					_		
			16.0'			19" RECOVERY		
		9	16.0'	15 14 12 12		Moist medium dense orange coarse to fine	A-1-b	
				12 12		sand w/ some silt and gravel.		
L		Į.		l i		1		į l

Remarks:

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

Depth Progress No. Supple Bloom/er Sample Description Class./G.I. Remarks									
10 18.0 18	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
21			10	18.0'	10 18 10 9		Wet medium dense orange coarse to fine sand	A-1-b	Cemented sands.
11 24.0 8				20.0'			17" RECOVERY		
11 24.0 8	21								
26.0" 14" RECOVERY 14" RECOVERY 14" RECOVERY 12" 29.0" 15" 24" RECOVERY 15"	24		11	24.0'	8 9		Wet medium dense orange-brown silty coarse	A-2-4(0)	
12 29.0° 5 4 5 5 44.0° 5 6 6 6 6 6 6 6 6 6					6 5			(-/	
12 29.0' 5				26.0'		-	14" RECOVERY		
30 31.0 33.0 33.0 33.0 33.0 33.0 34.0 24 RECOVERY 34.0 35.0 36	27						DRAFT		
33 2/25/09 13 34.0' 2/4 Saturated loose orange and gray mottled fine to coarse sand w/ some silt, trace of gravel. 36 37 38 14 39.0' 6/6 Saturated medium dense orange and gray mottled fine to coarse sand w/ some silt, trace of gravel. 39 14 39.0' 6/6 Saturated medium dense orange and gray mottled fine sand w/ some coarse sand and silt. Saturated medium dense orange and gray mottled fine sand w/ some coarse sand and silt. 42 42 43 44 45 15 44.0' 6/10 10 10 10 10 10 10 10 10 10 10 10 10 1			12	29.0'	5 4			A-2-4(0)	
2/25/09 13 34.0' 2 4 5 5 5 6 6 6 6 6 6 6	30	ľ		31.0'	5	-	r()K KII)I		IG
36 36.0' 14 39.0' 5	33			A	\U		GUST 20	15	
39 14 39.0'		2/25/09	13	34.0'	2 4 5 7			A-2-4(0)	
Saturated medium dense orange and gray mottled fine sand w/ some coarse sand and silt. 41.0' Saturated medium dense orange and gray mottled fine sand w/ some coarse sand and silt. Saturated medium dense orange fine sand w/ some coarse sand and silt. Saturated medium dense orange fine sand w/ some coarse sand and silt.	36			36.0'			24" RECOVERY		
Saturated medium dense orange and gray mottled fine sand w/ some coarse sand and silt. 41.0' Saturated medium dense orange and gray mottled fine sand w/ some coarse sand and silt. Saturated medium dense orange fine sand w/ some coarse sand and silt. Saturated medium dense orange fine sand w/ some coarse sand and silt.									
41.0' Silt. 24" RECOVERY	39		14	39.0'	5 6		Saturated medium dense orange and gray	A-2-4(0)	
42 15 44.0' 8 10 14 11 Saturated medium dense orange fine sand w/ some coarse sand and silt. A-2-4(0)					7 8				
15 44.0' 8 Saturated medium dense orange fine sand w/ A-2-4(0) some coarse sand and silt.				41.0'					
	42								
	45		15	44.0'	8 10 14 11			A-2-4(0)	
				46.0'			24" RECOVERY		

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **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. 24" RECOVERY	A-3	
			30.0		End of Boring		
51							
54							
					DDAET		
57					DRAFT		
31		_					
				Т	FOR BIDI		
60				•			
			A	\U	IGUST 20	15	
63							
66							
69							
72							

Symbol Description

Strata symbols

Silty low plasticity clay

Silt



Low plasticity clay



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

48.0

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:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Time **Depth of Water Depth of Hole** Elev. of Water Date 2/23/09 32.5 34.0 34.0

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: Dia. U-Sample Boring: U-Samples: 50.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** D. Burt

Helpers: D. Zmijewski

Depth	Daily	Ī	Sample				
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/23/09	1	1.0'	3 4	Moist firm brown clay, trace of fine sand.	A-6(11)	Cultivated Soil - 9".
			2.0'		11" RECOVERY		
		2	2.0'	3 7 6 6	Moist stiff brown clayey silt w/ some fine to	A-4(4)	
3				6 6	coarse sand.		
			4.0'		16" RECOVERY		
	· ·	3	4.0	3 4 5	Moist loose orange silty fine to coarse sand,	A-2-4(0)	
	•			5 6	trace of gravel.		
6		4	6.0'	6	14" RECOVERY	1 2 (0)	
		4	6.0	6 7 9 8	Moist medium dense orange silty fine to	A-2-4(0)	
-				8	coarse sand, trace of gravel.		
			8.0'		24" RECOVERY		
		5	8.0'	2	Moist medium dense yellow silty fine to	A-2-4(0)	
9				2 6 7 7	coarse sand.	11 2 4(0)	
	1			/	Surse surse.		
			10.0'		15" RECOVERY		
		6	10.0'	6 7	Moist medium dense yellow fine to coarse	A-2-4(0)	
				6 7 7 8	sand and gravel w/ some silt.		
12			12.0'		20" RECOVERY		
		7			Wet medium dense brown, green, and orange	A-2-4(0)	Cemented sands.
					silty coarse to fine sand w/ some gravel.		
		8	14.0'	5	XV. 4 a 1' a 1 a 1 a 1	A 2 4(0)	Comments I com Is
1 ,-		"	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	1			9	sitty file to coarse saile w/ some graver.		
			16.0'		14" RECOVERY		
		9	16.0'	5	Wet medium dense brown, green, and orange	A-2-4(0)	Cemented sands.
				5 5 6 8	coarse to fine sand w/ some silt, trace of	112 (0)	Compiled Suitable
	1				gravel.		
1			1				

Remarks:

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description Class./C	S.I. Remarks
	-	40	18.0'	7		12" RECOVERY	
		10	18.0'	7 7 11 9		Wet medium dense brown, green, and orange A-1-t	Cemented sands.
				9		coarse to fine sand w/ some silt and gravel.	
			20.0'			9" RECOVERY	
21	_						
	-						
 							
24	-	11	24.0'	4		Wat madium dance brown aroon and arongs A 2.40	0) Cemented sands.
		''	24.0	5 6 9		Wet medium dense brown, green, and orange fine to coarse sand w/ some silt and gravel.	5) Cemented sailds.
	-			9		The to coarse saild w/ some sitt and graver.	
			26.0'			20" RECOVERY	
	-		20.0			20 RECOVERT	
27							
	1						
] _	12	29.0'	3 5		Wet medium dense brown fine to coarse sand A-2-4(0) Cemented sands.
30				7 6		w/some silt.	
						·()R BII II II	
		N '	31.0'			24" RECOVERY	
						3 I	
				l			
			Λ				
33							
				1	1: 0 3 1 1 1: 0 3 3 1 1: 0 3 3 1	3001 2010	
	_	13	34.0'			Wet medium dense brown fine sand w/ some A-2-4(0) Cemented sands.
				2 6 11		coarse sand and silt, trace of gravel.	5) Cemented sands.
	-			8		course suite and sitt, trace of graver.	
36			36.0'			20" RECOVERY	
			00.0			20 11200 (2111	
39					Щ		
		14	39.0'	6 10			Cemented sands.
	-			11 14		coarse sand, trace of silt and gravel.	
	-		41.0'			21" RECOVERY	
42	1						
	1						
	1	15	44.0'	13		Wet dense brown fine sand w/ some coarse A-3	Cemented sands.
45				13 18 33 45			
	1				1:014		
]		46.0'			: 16" RECOVERY	
					1100 4 4 7		

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

	l	1		1			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48					Control Con		
		16	48.0' 50.0'	7 7 10 12	Wet medium dense brown fine sand w/ some coarse sand, trace of silt and gravel. 20" RECOVERY	A-3	Cemented sands.
51					End of Boring		
54							
57					DRAFT		
			0	Τ	FOR BIDI		IG
60			Δ		GUST 20		
63					000120		
66							
69							
72							

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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:

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

Core Bit: O.D. **Casing Size:** 3 1/4 Inches

From Depth of: From Depth of: To: To: Hollow Stem Auger: 0.0 50.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 2/26/09 29.0 29.0 26.9

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: Dia. U-Sample Boring: U-Samples: 50.0 Ft.; Ft. 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
	2/25/09	1	1.0'	4 5		Moist stiff tan clayey silt, trace of fine to	A-4(10)	Cultivated Soil - 10".
			2.0'	4		coarse sand.		
		2	2.0'	4 5		Moist stiff tan clayey silt, trace of fine to	A-4(10)	
3			3.0'			coarse sand.		
	N	2A	3.0' 4.0'	6 5		Moist medium dense tan-orange clayey coarse	A-2-4(0)	
	· ·	3	4.0'	4 9 8 9		to fine sand w/ some gravel. 10" RECOVERY	A-2-6(0)	5
				9		Moist medium dense yellow-orange clayey		
6			6.0'			coarse to fine sand, trace of gravel.		
		4	6.0	10		16" RECOVERY	A-1-b	
				10 10 11 10		Moist medium dense orange gravel and fine		
				10		sand w/ some coarse sand and silt.		
			8.0'			18" RECOVERY		
		5	8.0'	12		Moist medium dense orange coarse sand and	A-1-b	
9				12 13 14		gravel w/ some fine sand and silt.	71 1 0	
9				10		graver w/ some rine sand and site.		
			10.0'			14" RECOVERY		
		6	10.0'	9 11		Moist medium dense orange coarse sand and	A-1-b	
			10.0	15	(1) (1) (1) (2) (3) (3)	gravel w/ some fine sand, trace of silt.	A-1-0	
				9		graver w/ some time sand, trace of sin.		
			40.01		66313366 6633366	15" DEGGVEDV		
12		7	12.0' 12.0'	6		17" RECOVERY		
		′	12.0	6 11		Moist medium dense brown silty gravel and	A-1-b	Cemented sands.
				11 9		coarse sand w/ some fine sand.		
			14.0'			8" RECOVERY		
		8	14.0'	6 8 9		Wet very stiff brown fine to coarse sandy silt,	A-4(0)	Cemented sands.
15				9		trace of gravel.		
			16.0'			11" RECOVERY		
		9	16.0'	6 10		Wet medium dense brown clayey coarse to	A-2-5(0)	Cemented sands.
				9		fine sand w/ some gravel.		
						_		

Remarks:

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		10	18.0' 18.0'	6 2 2 3		9" RECOVERY Wet very loose orange silty coarse to fine sand w/ some gravel.	A-2-4(0)	Cemented sands.
			20.0'			12" RECOVERY		
21								
24								
	2/26/09	11	24.0'	5 10 9 4		Wet medium dense green-orange coarse to fine sand and gravel w/ some silt.	A-1-b	Cemented sands.
				4				
			26.0'		1	17" RECOVERY		
27								
						III)RAFI I		
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)	
30				8		*()K KII)I) \	
	•		31.0'	-	1	21 RECOVERY		
			_				4	
33						 	15	
				10			10	
		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)	
				12				
36			36.0'		1	20" RECOVERY		
39								
		14	39.0'	6 7 8 8		Saturated medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
				8		some coarse sand and sitt.		
			41.0'			22" RECOVERY		
42								
		15	44.0'	9 10 17 20		Saturated medium dense orange fine sand w/	A-3	
45				20		some coarse sand, trace of silt.		
			46.0'			16" RECOVERY		

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

Depth	Daily	Na	Sample	Plous /0"	Comple Description	Class /C I	Domorko
(ft.)	Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
					611936 611936 611936 611936		
					50 (73)50 61 (33)66 61 (34)66 61 (34)66		
48		16	48.0'	15 15		A-3	
				15 15 18 20	coarse sand and silt.		
			50.0'		Saturated dense orange fine sand w/ some coarse sand and silt. 16" RECOVERY		
					End of Boring		
51							
54							
					DDAET		
					DRAFT		
57							
				_			
					FOR BIDI		
		N 1			וטוט זוט ו		
60							
			Λ			15	
					IGUST 20	15	
63							
66							
69							
72							

Symbol Description

Strata symbols

Low plasticity clay

Clayey sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING **AUGUST 2015**

- 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.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

48

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:

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

To: To: **Casing Size:** 3 1/4 Inches

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

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 2/23/09 38.0 39.0 39.0

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: Dia. U-Sample Boring: U-Samples: 50.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** D. Burt

Helpers: D. Zmijewski

Depth	Daily	l	Sample		I			
(ft.)	Progress	No.	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	A-4(8)	Cultivated Soil - 8".
			2.0'			coarse sand.		
		2	2.0'	5 6 8 6		Moist stiff ton group of fire and by silt and group	A-4(0)	
3				8 6		Moist stiff tan-orange fine sandy silt w/ some coarse sand, trace of clay.		
			4.0' 4.0'	1		16" RECOVERY		
		3	4.0	4 4 4		Moist firm tan-orange fine sandy silt w/ some	A-4(0)	
	-			4		coarse sand.		
			6.0'			15" RECOVERY	_	
6	1	4	6.0	2	W	Moist stiff orange clayey fine sandy silt w/	A-4(0)	
				2 5 10 12		some coarse sand, trace of gravel.	71-4(0)	
				12		some course raine, there of graves.		
			8.0'			22" RECOVERY		
	1	5	8.0'	5 6		Moist medium dense orange silty fine to	A-2-4(0)	
9				5 6 6 7		coarse sand, trace of gravel.		
			10.0'			19" RECOVERY		
		6	10.0'	7 6 8 10		Moist medium dense orange silty fine to	A-2-4(0)	
				10		coarse sand, trace of gravel.		
12		7	12.0' 12.0'	4		24" RECOVERY		
		′	12.0	4 6 7		Moist medium dense yellow coarse sand and gravel w/ some fine sand and silt.	A-1-b	
				12		graver w/ some time sand and sint.		
			14.0'		111111	15" RECOVERY		
		8	14.0'	25		Moist medium dense yellow fine to coarse	A-1-b	
15				25 17 12 11		sand and gravel w/ some silt.	71 1 0	
'	1			"		8		
			16.0'			6" RECOVERY		
]	9	16.0'	27 10 10 10		Moist medium dense yellow silty coarse sand	A-1-b	
				10 10		and gravel w/ some fine sand.		
1	ı	I	1	i .	101111111111	111	İ	i

Remarks:

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

Danth	D-il.	I	01-					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		10	18.0' 18.0'	6		15" RECOVERY	A-7-5(1)	
		'	18.0	6 10 8 9		Wet very stiff brown-orange fine sandy clay	A-7-3(1)	
				9		w/ some coarse sand and gravel.		
			20.0'			18" RECOVERY		
			20.0			TO ABCOVERT		
21								
24		11	24.0'	7		Wet loose heavyn aronge silty fine to seems	A-2-4(0)	
		''	24.0	7 4 4 4		Wet loose brown-orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
				4		sand, trace of graver.		
			26.0'			14" RECOVERY		
			20.0			1, 1,555,211		
27								
						I)RAFI		
		12	29.0'	2		XX	1 2 4(0)	
l		12	29.0	2 5 7 6		Wet medium dense brown-orange fine to	A-2-4(0)	
30				6		coarse sand w/ some silt, trace of gravel.		
	` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` `	M	31.0'			24" RECOVERY		
			31.0			24 RECOVERT		
			Λ					
33						4UST 20	15	
						JUUI ZU		
		40	0.4.01	2				
		13	34.0'	2 4 7		Wet medium dense orange-white mottled fine	A-2-4(0)	
				7		to coarse sand w/ some silt, trace of gravel.		
36			36.0'			23" RECOVERY		
30			30.0			23 RECOVERT		
39	0/00/00	4.4	20.01	2	Щ	y yy . 1		
	2/23/09	14	39.0'	3 4 6 8	120 2 4 4 1 120 2 4 4 1 120 2 4 1 1 1 1	Wet loose orange-white mottled fine to coarse	A-3	
1				8		sand, trace of silt.		
1			41.0'			22" RECOVERY		
			71.0			22 RECOVERT		
42								
						5 5		
						ह. ए ह		
					president Littici	0 6 7		
<u> </u>		45	44.01			E XXV		
1		15	44.0'	5 8 12 20	0.6 0.6 1.6	Wet medium dense orange-white mottled fine	A-2-4(0)	
45				20		sand w/ some coarse sand and silt.		
			46.0'			24" RECOVERY		
<u> </u>		<u> </u>	+0.0			E 24 RECOVERT		

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

			1	ı		
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
48					## 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
		16	48.0' 50.0'	10 16 17 15	Wet dense orange-white mottled fine to coarse sand, trace of silt and gravel. 24" RECOVERY	
			00.0		End of Boring	
51						
54						
					DDAET	
					DRAFT	
57						
	R			_		
		\mathbf{M}			FOR BIDDII	
60	•					
				\U	GUST 2015	
63						
66						
69						
72						

Symbol Description

Strata symbols

Silt

Silty sand



Poorly graded clayey silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

48.0

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:

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

IN. IN. Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 2/17/09 29.0 29.0 27.1

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: Dia. U-Sample Boring: U-Samples: 50.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** D. Burt

Helpers: D. Zmijewski

Danth	Daile		0	1	1			
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	A-6(11)	Cultivated Soil - 9".
		2	2.0'	5		sand.	1 5(0)	
			2.0	5 6 8 9		Moist stiff gray clay, trace of gravel and fine	A-6(9)	
3				9		to coarse sand.		
	N		4.0'			20" RECOVERY		
	· ·	3	4.0'	3 5 7		Moist medium dense orange coarse to fine	A-1-b	
	•			7 8		sand w/ some silt, trace of gravel.		
6			6.0'			15" RECOVERY		
		4	6.0	7 50/5"		Moist very dense orange coarse to fine sand	A-1-b	
			7.0'			w/ some gravel and silt.		
					1	8" RECOVERY		
			0.01	4				
		5	8.0'	4 5 7 8		Wet stiff orange-brown fine sandy clay w/	A-7-5(5)	Cemented sands.
9				8		some gravel and coarse sand.		
		6	10.0' 10.0'	6		12" RECOVERY	A. 7. 7. (0)	
		0	10.0	6 7 13 14		Wet very stiff orange-brown fine sandy clay	A-7-5(8)	Cemented sands.
				14		w/ some gravel and coarse sand.		
l			40.01			2011 PEGOVERNY		
12		7	12.0' 12.0'	4		20" RECOVERY Wet medium dense orange-brown clayey fine	A-2-6(0)	Cemented sands.
		'	12.0	4 7 8 11		sand w/ some gravel and coarse sand.	A-2-0(0)	Cemented sands.
				11		sand w/ some graver and coarse sand.		
			14.0'			18" RECOVERY		
		8	14.0'	4		Wet medium dense orange-brown and green	A-2-4(0)	
15				8 8 9		silty fine to coarse sand w/ some gravel.	A-2- 4 (0)	
13				9		sity line to course said w/ solite gravel.		
			16.0'			17" RECOVERY		
		9	16.0'	8		Wet medium dense orange-brown and green	A-2-4(0)	Cemented sands.
1				8 10 7 8		silty coarse to fine sand w/ some gravel.	(0)	
						g.u.,		

Remarks:

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks			
		10	18.0'	8 3 7 8		20" RECOVERY Wet loose orange-brown and green silty coarse to fine sand w/ some gravel.	A-2-4(0)	Cemented sands.			
21			20.0'			15" RECOVERY					
27		11	24.0'	6 3 5 3		Wet loose orange fine to coarse sand w/ some silt, trace of gravel. 24" RECOVERY	A-2-4(0)	Cemented sands.			
27						DRAFT					
30		12	29.0'	3 4 5 6		coarse sand, trace of silt and gravel. 24" RECOVERY	A-3	1G			
33			A	\U		GUST 20	15				
		13	34.0'	6 9 11 12		Wet medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)				
36			36.0'			24" RECOVERY					
39		14	39.0'	7 9 11 12		coarse sand, trace of silt and gravel.	A-3				
42											
45		15	44.0'	6 6 10 12		coarse sand, trace of silt.	A-3				
			46.0'		(1) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	17" RECOVERY					

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

			r	1		T	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
					613360 613360 9217161		
					611 1916 181 1814 181 1818		
48					55177251 6117166 6131461		
		16	48.0'	10 12 22 30	Wet dense orange fine sand w/ some fine	A-3	
				30	sand, trace of silt.		
			50.0'		21" RECOVERY		
					End of Boring		
51							
54							
					DDAET		
					DRAFT		
57							
					FOR BIDI		
		V			FUR DIDI		IG
60	_			_			
					GUST 20	116	
				1	GUST ZU		
63							
66							
	1						
69							
72							
L	1						

Symbol Description

Strata symbols

Low plasticity clay

Silty sand



Elastic silt



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: 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: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Spoon O.D. 2 IN. IN. O.D.

Core Bit: O.D. IN. **Casing Size:** 3 1/4 Inches

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

Water Level Readings

Depth of Casing Time **Depth of Water Depth of Hole** Elev. of Water Date 2/16/09 29.0 29.0 25.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 50.0 Ft.; Ft. 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 A-4(9) Cult	tivated Soil - 9".
			2.0'	-	coarse sand and gravel.	
		2	2.0'	6 7	10" RECOVERY A-4(7)	
3			3.0'		Moist very stiff brown clayey silt, trace of	
		2A	3.0'	11	fine to coarse sand and gravel. 8" RECOVERY A-1-b	
			4.0'		Moist medium dense brown clayey gravel and	
	· ·	3	4.0'	4 6 7	coarse sand w/ some silt and fine sand. A-7-5(11)	
		•		7 10	4" RECOVERY	
					Moist stiff brown fine sandy clay w/ some	
6			6.0'		coarse sand, trace of gravel.	
		4	6.0	8 7		nented sands.
				10 13	Moist very stiff brown-orange fine to coarse	
					sandy clay, trace of gravel.	
			8.0'		16" RECOVERY	
		5	8.0'	3 5 6 8		nented sands.
9				6 8	coarse to fine sand w/ some gravel.	
			10.0'		15" RECOVERY	
		6	10.0'	4 7 9 10		nented sands.
				10	coarse to fine sand, trace of gravel.	
12			12.0'		21" RECOVERY	
		7	12.0'	5 3 7 7		nented sands.
				7	sand and gravel.	
1						
			14.0'	2	14" RECOVERY	
		8	14.0'	3 8 5 5		nented sands.
15				5	to fine sand w/ some gravel.	
1						
		9	16.0' 16.0'	5	15" RECOVERY	
		9	10.0	5 7 7 5		nented sands.
	-			5	to fine sand w/ some gravel.	

Remarks:

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
			18.0'		21" RECOVERY		
		10	18.0'	3 3 3 5	Wet loose orange fine to coarse sand w/ some silt, trace of gravel. 21" RECOVERY	A-2-4(0)	
21							
		11	24.0' 26.0'	3 5 6 7	Wet medium dense tan and yellow fine to coarse sand w/ some silt, trace of gravel. 24" RECOVERY	A-2-4(0)	
27					DRAFT		
30		12	29.0' 31.0'	5 5 6 9	Wet medium dense tan and yellow fine to coarse sand, trace of silt and gravel. 24" RECOVERY	A-3	IG
33			A	\U	GUST 20	15	
		13	34.0'	3 7 9 21	Wet medium dense orange fine to coarse sand, trace of silt.	A-3	
36			36.0'		24" RECOVERY		
39		14	39.0' 41.0'	2 6 9 12	Wet medium dense orange fine to coarse sand, trace of silt. 24" RECOVERY	A-3	
42							
45		15	44.0' 46.0'	6 13 14 19	Ç	A-3	

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
					Ref 13/100 (61) 13/000 (51) 17/100 (61) 13/000		
48		16	48.0'	4	Wet medium dense brown fine sand w/ some	A-2-4(0)	
				4 4 7 13	silt and coarse sand.		
			50.0'		19" RECOVERY		
					End of Boring		
51							
54							
					DRAFT		
57							
	N				FOR BIDI		
		V			LOK DIDI	יווע	
60							
			Λ		CLICT OO	4	
					GUST 20	15	
					000.20		
63							
66							
69							
70							
72							
	I	ı	1	, ,	1	1	

Symbol Description

Strata symbols

Low plasticity clay



Silt



Poorly graded clayey silty sand



Elastic silt



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R1-060

Contract: 25-113-01

Boring Location: Sta. 637+00, 150.00' Lt. C.L.

Boring Surface Elev.: + 70.91' Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 2/13/09 30.0 34.0 34.0

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: Dia. U-Sample Boring: U-Samples: 50.0 Ft.; Ft. 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
	2/12/09	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	Moist stiff brown clayey silt, trace of fine to	A-4(8)	
3				6	coarse sand and gravel. 14" RECOVERY		
			4.0'		18" RECOVERY	\mathcal{M}	
		3	4.0	2 4 5 6	Moist loose tan and orange mottled clayey coarse to fine sand w/ some gravel.	A-2-4(0)	
6			6.0'		10" RECOVERY		
		4	6.0'	3 10 11 12	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)	
			10.0'		13" RECOVERY		
		6	10.0'	7 16 15 17	Moist hard brown and green coarse to fine sandy clay w/ some gravel.	A-7-5(3)	Cemented sands.
12			12.0'		18" RECOVERY		
		7	12.0'	7 9 8 10	Wet medium dense orange clayey coarse to fine sand w/ some gravel.	A-2-5(0)	
		8	14.0' 14.0'	6	12" RECOVERY	A 2 4(0)	C 1 . 1
15		0	14.0	6 8 3 4	Wet medium dense orange silty coarse to fine sand, trace of gravel.	A-2-4(0)	Cemented sands.
			16.0'		20" RECOVERY		
		9	16.0'	14 8 4 7	Wet medium dense orange silty coarse to fine sand w/ some gravel.	A-1-b	Cemented sands.

Remarks:

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 Progress No. Supple Bloomée Sample Description Class.G.I. Remarks									
18.0 18.0	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
21 24 24 24 25 Wet loose orange fine to coarse sand w/some A-2-4(0)			10	18.0'	15			A-1-h	Cemented sands
21 24 24 24 25 Wet loose orange fine to coarse sand w/some A-2-4(0)				10.0	10 8 4			11 1 0	Comoned sands.
24				00.01			_		
11 24.0' 5				20.0			10° RECOVERY		
11 24.0 \$	21								
11 24.0 \$									
11 24.0 \$									
11 24.0 \$									
26.0 Silt, trace of gravel. 20° RECOVERY 20° RECOVERY 20° RECOVERY 20° RECOVERY 20° RECOVERY 20° RECOVERY 20° RECOVERY 20° RECOVERY 20° RECOVERY 20° RECOVERY 20° RECOVERY 20° RECOVERY 21	24								
27 DRAFT DRAFT Wet loose gray and orange mottled fine to coarse sand w/s some silt, trace of gravel. 30			11	24.0'	5 5 5			A-2-4(0)	
12 29.0° 3/4		-			6		sit, trace of graver.		
12 29.0° 3 Wet loose gray and orange mottled fine to coarse sand w/some silt, trace of gravel. DING		-		26.0'			20" RECOVERY		
30 31.6 31.6 31.6 33.6 33.3 34.0' 7 10 36 36.0' 38.0' 41.0' 41.0' 42.0 45.0 46.0' 46.0' 31.6 33.6 33.6 34.0' 34.0' 7 10 34.0' 7 10 34.0' 7 10 34.0' 7 10 34.0' 7 10 35.0' Wet medium dense orange fine to coarse sand w/some silt, trace of gravel. 21" RECOVERY Wet medium dense orange fine to coarse sand sand, trace of silt. 20" RECOVERY Wet medium dense orange fine to coarse sand sand, trace of silt. 20" RECOVERY	27								
30 31.6 31.6 31.6 33.6 33.3 34.0' 7 10 36 36.0' 38.0' 41.0' 41.0' 42.0 45.0 46.0' 46.0' 31.6 33.6 33.6 34.0' 34.0' 7 10 34.0' 7 10 34.0' 7 10 34.0' 7 10 34.0' 7 10 35.0' Wet medium dense orange fine to coarse sand w/some silt, trace of gravel. 21" RECOVERY Wet medium dense orange fine to coarse sand sand, trace of silt. 20" RECOVERY Wet medium dense orange fine to coarse sand sand, trace of silt. 20" RECOVERY							DDAET		
30 31.6 31.6 31.6 33.6 33.3 34.0' 7 10 36 36.0' 38.0' 41.0' 41.0' 42.0 45.0 46.0' 46.0' 31.6 33.6 33.6 34.0' 34.0' 7 10 34.0' 7 10 34.0' 7 10 34.0' 7 10 34.0' 7 10 35.0' Wet medium dense orange fine to coarse sand w/some silt, trace of gravel. 21" RECOVERY Wet medium dense orange fine to coarse sand sand, trace of silt. 20" RECOVERY Wet medium dense orange fine to coarse sand sand, trace of silt. 20" RECOVERY							DIALI		
30 31.6 31.6 31.6 33.6 33.3 34.0' 7 10 36 36.0' 38.0' 41.0' 41.0' 42.0 45.0 46.0' 46.0' 31.6 33.6 33.6 34.0' 34.0' 7 10 34.0' 7 10 34.0' 7 10 34.0' 7 10 34.0' 7 10 35.0' Wet medium dense orange fine to coarse sand w/some silt, trace of gravel. 21" RECOVERY Wet medium dense orange fine to coarse sand sand, trace of silt. 20" RECOVERY Wet medium dense orange fine to coarse sand sand, trace of silt. 20" RECOVERY		-	12	20.0'	3		Wydlandaddaddaddaddaddaddaddaddaddaddaddadda	A 2 4(0)	
33 AUST 2015 13 34.0"	30	R		29.0	5			A-2-4(0)	
33 34.0' 77 Wet medium dense orange fine to coarse sand w/some silt, trace of gravel. 36 36.0' Wet medium dense orange fine to coarse sand w/some silt, trace of gravel. 21" RECOVERY 42 44.0' 8 6 6 6 6 6 6 6 6 6							$\mathbf{H}(\mathbf{I})$		
13 34.0° 7				31.0'			23" RECOVERY		
13 34.0° 7					l				
13 34.0° 7	33						PHET 20	15	
36 36.0' 39 14 39.0'		1					JUSI ZU		
36 36.0' 39 14 39.0'			13	34.0'	7		Wet medium dense orange fine to coarse sand	A-2-4(0)	
14 39.0' 6 21.22 Wet medium dense orange fine to coarse sand, trace of silt. 20" RECOVERY 41.0' 20" RECOVERY 42 45 46.0' 46.0' 23" RECOVERY 23" RECOVERY 42 46.0' 46.0' 23" RECOVERY 43" RECOVERY 44.0' 10 10 10 10 10 10 10					10 10			11 2 .(0)	
14 39.0' 6 21.22 Wet medium dense orange fine to coarse sand, trace of silt. 20" RECOVERY 41.0' 20" RECOVERY 42 45 46.0' 46.0' 23" RECOVERY 23" RECOVERY 42 46.0' 46.0' 23" RECOVERY 43" RECOVERY 44.0' 10 10 10 10 10 10 10	36			36.0'			21" RECOVERY		
14 39.0' 6 7 10 10 10 10 10 10 10 10 10 10 10 10 10	30	1		00.0			27 KBCO VZKY		
14 39.0' 6 7 10 10 10 10 10 10 10 10 10 10 10 10 10		-							
14 39.0' 6 7 10 10 10 10 10 10 10 10 10 10 10 10 10									
14 39.0' 6 7 10 10 10 10 10 10 10 10 10 10 10 10 10	20								
42 41.0' 20" RECOVERY 42 15 44.0' 8 10 13 13 13 15 15 15 15 15 15 15 15 15 15 15 15 15	39	1	14	39.0'	6 7	0.01100	Wet medium dense orange fine to coarse	A-3	
42 42 15 44.0' 8 16 17 18 18 18 18 18 18 18 18 18		-			10 12	136 13 110 136 137 136	sand, trace of silt.		
42 15 44.0' 8 16 17 18 18 19 19 19 19 19 19 19 19				41.0'			<i>6</i> 1		
15 44.0' 8 Wet medium dense orange fine to coarse A-3 sand, trace of silt.						(1) 13 (1) (2) 13 (1)			
15 44.0' 8 113.15 Wet medium dense orange fine to coarse A-3 45 46.0' 8 113.15 sand, trace of silt.	42	1				11.63.43.6	San San San San San San San San San San		
15 44.0' 8 113.15 Wet medium dense orange fine to coarse A-3 45 46.0' 8 113.15 sand, trace of silt.							되 당 당		
46.0' 33" RECOVERY						23 1 1 1 1 1 2 127 1 3 1 1 2	É		
46.0' 33" RECOVERY			15	44.0'	8 10 13	10 6 3 1 3 10 10 6 7 4 3 3 10	Wet medium dense orange fine to coarse	A-3	
	45	1			15		;		
				46.0'			23" RECOVERY		

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
48	J	16	48.0'	6	Wet medium dense orange fine to coarse	A-3	
		10		6 10 12 13	sand, trace of silt.	A-3	
			50.0'		24" RECOVERY End of Boring		
51							
54							
					DDAET		
57					DRAFT		
				T	FOR BIDI		JG
60	•						
				\U	GUST 20	15	
63							
66							
69							
72							

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

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R1-061

Contract: 25-113-01

Boring Location: Sta. 629+50, 200.00' Lt. C.L.

Boring Surface Elev.: + 76.68' Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 2/19/09 Dry

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** J. Truver

Helpers: D. Zmijewski

	T =	1	T			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
()	2/19/09	1	1.0'	4 4	Moist firm tan silt w/ some clay, trace of fine A-4(3) Aspl	nalt - 6".
			2.0'	4	to coarse sand.	iuit o .
		2	2.0'	4 5	10" RECOVERY A-4(5)	
3				4 5 5 4	Moist stiff tan clayey silt, trace of fine to	
					coarse sand and gravel.	
			4.0'		16" RECOVERY	
		3	4.0'	2 3 4 5		et 2' south to obtain
	•			4 5	trace of coarse sand.	by tube.
6		4	6.0'	6	18" RECOVERY	
		4	6.0	6 10 11	Moist very stiff orange clayey fine sandy silt A-4(2)	
				li	w/ some coarse sand, trace of gravel.	
			8.0'		19" RECOVERY	
		5	8.0'	4	Moist stiff orange silty fine to coarse sand w/ A-2-4(0)	
9				4 7 7 7	some gravel.	
	1			/	some graven	
			10.0'		16" RECOVERY	
	1	6	10.0'	7 9		ented sands.
				7 9 10 11	sandy silt w/ some coarse sand, trace of	
					gravel.	
12			12.0'		22" RECOVERY	
		7	12.0'	2 6 6 8		tains mica.
				8	silty fine sand.	
		8	14.0' 14.0'	10	18" RECOVERY	
1 45				10 14	Moist hard orange-gray mottled fine sandy A-4(0) silt, trace of coarse sand.	
15		8A	15.0' 15.0'	17 20	100 PEGGYERY	ented sands.
			16.0'	20	Moist dense orange-brown silty coarse to fine	enca sanas.
			10.0		sand w/ some gravel.	
					End of Boring	
	1				End of Dorling	
1	l	l	1			

Remarks:

Symbol Description

Strata symbols

Silty low plasticity clay

Silt



Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R1-062

Contract: 25-113-01

Boring Location: Sta. 629+40, 200.00' Rt. C.L.

Boring Surface Elev.: + 73.50' Reference:

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

Core Bit: O.D. 3 1/4 Inches

From Depth of: From Depth of: To: To: **Casing Size:** Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Casing Depth of Hole** Elev. of Water Date 2/19/09 16.0 14.0 Dry

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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' 2.0'	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		8" RECOVERY	A-2-4(0)	
3				3 4 5 5		Moist loose orange clayey gravel and fine to	A-2-4(0)	
3				5		coarse sand.		
			4.0'			15" RECOVERY		
		3	4.0	3 4		Moist loose orange clayey fine to coarse sand,	A-2-4(0)	
		•		3 4 5 6		trace of gravel.		
6			6.0'			15" RECOVERY		
		4	6.0	8 9 10 17		Moist medium dense orange fine to coarse	A-2-4(0)	
				10 17		sand w/ some silt and gravel.		
		5	8.0' 8.0'	5	77777	9" RECOVERY	A 7 ((5)	
		J	0.0	5 9 9 12		Moist very stiff brown and green gravelly clay w/ some fine to coarse sand.	A-7-6(5)	
9				12		ciay w/ some time to coarse sand.		
			10.0'			11" RECOVERY		
		6	10.0'	12		Wet very stiff brown and green fine sandy	A-7-5(6)	
				12 14 16 18		clay w/ some coarse sand, trace of gravel.		
						·		
12			12.0'			19" RECOVERY		
		7	12.0'	4 7		Wet very stiff brown clayey fine to coarse	A-5(0)	Cemented sands.
				10 11		sandy silt, trace of gravel.		
		8	14.0' 14.0'	8		21" RECOVERY	A 2 4(0)	Cemented sands.
4.5			14.0	8 10 12 14		Wet medium dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	Cemented sands.
15				14		sand, trace of graver.		
			16.0'			21" RECOVERY		
			. 5.0			End of Boring		

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Clayey sand



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R1-063

Contract: 25-113-01

Boring Location: Sta. 667+00, C.L.

Boring Surface Elev.: + 31.44' Reference:

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

IN. IN. O.D. Core Bit: O.D.

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

Water Level Readings

Time **Depth of Casing Depth of Water Depth of Hole** Elev. of Water Date 2/11/09 6.0 6.0 5.6

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: Dia. U-Sample Boring: U-Samples: 20.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** D. Burt

Helpers: D. Zmijewski

Donath	Daily		Comente		Ι			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(11.)	2/11/09	1	0.0'	2 17 13 8		Moist very stiff brown fine sandy silt w/ som	e A-4(0)	
				8		coarse sand, trace of gravel.		
			2.0'	1		6" RECOVERY	1.2.4(0)	
3			2.0	1 3 8 8		Moist medium dense brown silty fine sand and gravel w/ some coarse sand.	A-2-4(0)	
	· ·	V 1	4.0'			7" RECOVERY	PII'	NG
		3	4.0'	1 3	j.	Moist loose brown gravel and coarse sand w/	A-1-a	
				3 4 5		some fine sand, trace of silt.		
6			6.0'			4" RECOVERY	115	
		4	6.0'	3		Moist medium dense brown coarse sand and	A-1-b	
				3 5 7 8		gravel w/ some fine sand, trace of silt.		
			8.0'			20" RECOVERY		
		5	8.0'	4 5 8 8		27.21	l, A-3	
9				8 8		trace of silt and gravel.		
						(6) 146 146		
			10.0'	40	::();; !:(13)	24" RECOVERY		
		6	10.0'	10 12		Wet medium dense brown fine to coarse sand	l, A-3	
				16 16		trace of silt and gravel.		
						75.VI 1905 1965		
12		7	12.0' 12.0'	6		19" RECOVERY	1 1 2 1(0)	
		′	12.0	6 9 11 14		Wet medium dense brown fine to coarse sand	A-2-4(0)	
				14		w/ some silt, trace of gravel.		
			44.0			10" PECOVERY		
		8	14.0' 14.0'	4		10" RECOVERY Wet medium dense brown fine sand w/ some	A-2-4(0)	Cemented sands.
15				4 7 12 9		coarse sand and silt, trace of gravel.	A-2-4(0)	Cemented sailus.
15				9		coarse sailed and sint, trace or graver.		
			16.0'			14" RECOVERY		
		9	16.0'	9 10		Wet medium dense brown fine sand w/ some	A-2-4(0)	
				10 12		some sand w/ some	11 2-7(0)	

Remarks:

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.: R1-063

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			·	16	coarse sand and silt.		
18	_	40	18.0'	6	18" RECOVERY		
		10	18.0'	6 7 9 9	Wet medium dense brown fine to coarse sand w/ some silt.	A-2-4(0)	
	1			9			
			20.0'		21" RECOVERY End of Boring		
21	_				5		
	-						
24	-						
	-				DDAET		
27	-				DRAFT		
	-						
	R						
		NI (FOR BIDI) \	
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	1						
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Symbol Description

Strata symbols



Silty sand



Poorly graded gravel



Poorly graded sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R1-064

Contract: 25-113-01

Boring Location: Sta. 670+00, C.L.

Boring Surface Elev.: + 39.8' Reference:

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

IN. IN. O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 2/11/09 14.0 16.0 16.0

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: Dia. U-Sample Boring: U-Samples: 20.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** D. Burt

Helpers: D. Zmijewski

Б #	Б :	1		1	1	1		I
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
()	2/11/09	1	0.5'	4	////	Moist loose orange-yellow clayey gravel and	A-2-4(0)	Forest Duff - 3".
	-			4 4 5		coarse sand w/ some fine sand.	11 2 1(0)	Totost Bull 3.
			2.0'			16" RECOVERY		
		2	2.0'	7		Moist loose orange-yellow coarse sand and	A-1-b	
3				7 5 3 2		gravel w/ some fine sand and silt.		
	1 N						γ	
			4.0'			12" RECOVERY		
	•	3	4.0'	3 2 2 2		Moist very loose orange coarse to fine sand	A-1-b	
				2 2		w/ some silt, trace of gravel.		
						bilot oo		
6			6.0'			13" RECOVERY	16	
		4	6.0'	4 2 3	1.1.1.1.1.1	iii Worst 100se of ange coarse to fine sand, trace	A-1-b	
				3				
	-	5	8.0' 8.0'	3		20 RECOVERT	4 1 1	
		3	0.0	3 2 3 3	1:1:1:1:1:1: 1:1:1:1:1:1:1:	ii worst roose orange coarse sand w/ some tine	A-1-b	
9	-			3		ill sand, trace of sint and Staven.		
			10.0'		1:	20" RECOVERY		
		6	10.0'	2		Moist loose orange coarse to fine sand, trace	A-1-b	
				2 2 3 4	0:03 13 10 1:0 14 13 10 0:0 17 17 18	C . 11 1	A-1-0	
	-			4		or site and graver.		
12			12.0'			19" RECOVERY		
'-	1	7	12.0'	1 2		Wet very loose orange coarse to fine sand	A-3	
				1 2 2 4		1	-	
	1					; ;		
			14.0'			19" RECOVERY		
		8	14.0'	1 2		Wet very loose orange coarse to fine sand,	A-1-b	
15				1 2		trace of silt and gravel.		
			16.0'		## 1555 ## 1555	21" RECOVERY		
		9	16.0'	1 1			A-2-4(0)	
				4		coarse sand and silt, trace of gravel.		
15		9		1 2 1 2	0:1110 0:1110 0:1111 0:1111 0:1111 0:1111 0:1111 0:1111	trace of silt and gravel.	A-1-0 A-2-4(0)	

Remarks:

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.: R1-064

Contin							
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		24" RECOVERY		
10	1	10	18.0'	3	Wet loose orange coarse to fine sand, trace of	A-1-b	
				3 4 5 6	silt and gravel.		
					Wet loose orange coarse to fine sand, trace of silt and gravel. 22" RECOVERY		
			20.0'		22" RECOVERY		
					End of Boring		
21							
24							
27							
21	1				DRAFT		
-					FOR BIDI		
30							
30		V					
	•			•			
			Λ		IGUST 20	15	
33							
33	1				000120		
36							
30							
39							
	1						
-							
42							
74	1						
-							
15							
45	1						

Symbol Description

Strata symbols

Clayey sand



Silty sand



Well graded sand with silt



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R1-065

Contract: 25-113-01

Boring Location: Sta. 741+00, C.L.

Boring Surface Elev.: + 16.7' Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Casing Time **Depth of Water Depth of Hole** Elev. of Water Date 1/20/09 10.0 9.9 10.0

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: Dia. U-Sample Boring: U-Samples: 26.0 Ft.; Ft. Ft.; 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' 2.0'	10 9		Moist dense orange fine to coarse sand w/ some gravel and silt.	A-2-4(0)	Topsoil - 9"; fill material.
3		2	2.0'	7 8 11 17		Moist medium dense orange coarse to fine	A-1-b	Fill material.
	N		4.0	11		sand w/ some gravel and silt. 20" RECOVERY	Λ IC	
		3	4.0	11 11 20 29		Moist dense orange fine to coarse sand and gravel w/ some silt.	A-1-b	Fill material.
6			6.0'			11" RECOVERY		
		4	6.0'	38 31 40 30		Moist very dense brown coarse sand w/ some fine sand, silt, and gravel.	A-1-b	Fill material.
			8.0'			18" RECOVERY		
9		5	8.0'	7 9 6 7		Wet medium dense orange coarse to fine sand w/ some gravel and silt.	A-1-b	
			10.0'			16" RECOVERY		
		6	10.0' 11.0'	3 4	66 141 66 66 141 66 66 141 66 66 141 66	Wet loose light brown coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
40		6A	11.0'	4 5	66 44 15 6 12 5 1 1 1 1 1 1 7 12 5 1 4 1 1 6 6	10" RECOVERY Wet loose orange fine sand w/ some silt,	A-2-4(0)	
12		7	12.0' 12.0'	1 2 2 2	######################################	trace of coarse sand. 10" RECOVERY	A-3	
			14.0'	2	666 73 60 661 43 66 661 43 66 663 13 66 663 13 66 661 33 60	Saturated very loose orange fine sand w/ some coarse sand, trace of silt.		
15		8	14.0'	1 2 2 3		Saturated very loose orange fine sand w/ some coarse sand, trace of silt.	A-3	
			16.0'	-	64 14 15 66 66 13 15 66 66 13 15 66 76 17 17 17 16 16 16 16 16 16 16 16 16 16 16 16 16	19" RECOVERY		
		9	16.0'	3 3 3 4	000133966 3001731613 600134966 600134966 600134966 800174966	Saturated loose orange fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	

Remarks:

Boring No.: R1-065

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

Depth Daily Sample Blows/6" Class./G.I. No. Sample Description Remarks (ft.) Progress Depth 18" RECOVERY 18.0' 10 A-2-4(0)18.0' Saturated loose orange fine sand w/ some coarse sand and silt. 17" RECOVERY 20.0' 11 20.0' Saturated very loose orange fine sand w/ A-2-4(0)some silt and coarse sand. 21 22.0' 13" RECOVERY 12 22.0' A-2-4(0) Saturated very loose orange fine sand w/ some coarse sand and silt, trace of gravel. 24.0' 19" RECOVERY 24 13 24.0' Saturated dense brown silty fine sand w/ some A-2-4(0)coarse sand, trace of gravel. 26.0' 18" RECOVERY End of Boring 27 30 **GUST 2015** 33 36 39 42 45

Symbol Description

Strata symbols



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R1-066

Contract: 25-113-01

Boring Location: Sta. 744+50, C.L.

Boring Surface Elev.: + 16.0' Reference:

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

Core Bit: O.D.

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

Water Level Readings

Time **Depth of Casing Depth of Water Depth of Hole** Elev. of Water Date 1/23/09 14.0 14.0 12.1

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: Dia. U-Sample Boring: U-Samples: 26.0 Ft.; Ft. Ft.; 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
	1/23/09	1	1.0' 2.0'	8 8	Moist medium dense orange coarse to fine A-1-b sand w/ some silt, trace of gravel.	Topsoil - 10", fill material.
3		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.
			4.0'		18" RECOVERY	
		3	4.0'	5 13 15 18	Moist medium dense orange fine sand w/ A-2-4(0) some coarse sand and silt, trace of gravel.	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'	44	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/ A-2-4(0) some silt, trace of gravel.	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	
		8	14.0' 14.0'	9	21" RECOVERY Wet dense light brown coarse to fine sand w/ A-1-b	
15			40.0	9 15 21 27	some silt, trace of gravel.	
		9	16.0' 16.0'	11 24 23 18	20" RECOVERY Wet dense orange fine to coarse sand w/ some silt, trace of gravel. A-2-4(0)	

Remarks:

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)
			20.0'		12" RECOVERY
21		11	20.0'	1 3 8 8	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			24.0'		0" RECOVERY
		13	24.0'	6 15 25 17	Saturated dense dark gray fine sand and Gravel w/ some coarse sand, trace of silt.
			26.0'		10" RECOVERY
27					End of Boring PAFT
					DRAFI
30				Τ	FOR BIDDING
33				\U	GUST 2015
36					
39					
42					
45					

Symbol Description

Strata symbols

Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

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

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: 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: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches 0.0

Hollow Stem Auger:

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 7/9/10 20.0 18.0 7.0

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: Dia. U-Sample Boring: U-Samples: 20.0 Ft.; Ft. 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' 2.0'	13 14 13	Moist very stiff brown clayey silt w/some fine sand, trace coarse sand and fine gravel.
		2	2.0' 3.0'	11 9	Moist very stiff brown clayey silt w/some fine A-4(2)
3.6	N	2A	3.0' 4.0'	9 10	sand, trace coarse sand and fine gravel. 8" RECOVERY A-2-4(0)
		3	4.0 [']	7 8 8 6	Moist medium dense brown silty fine sand w A-2-4(0) some coarse sand, trace fine gravel. 10" RECOVERY Wet medium dense brown fine to coarse sand
7.2		4	6.0' 8.0'	4 5 6 7	w/some silt, trace fine gravel. 16" RECOVERY Wet medium dense orange fine sand w/some silt and coarse sand, trace fine gravel.
		5	8.0' 10.0'	3 3 4 4	14" RECOVERY Wet loose orange fine sand w/some coarse sand and silt, trace fine gravel. 18" RECOVERY
10.8		6	10.0'	4 5 8 7	Wet medium dense orange fine to coarse sand w/some silt, trace fine gravel. 18" RECOVERY
		7	12.0'	3 3 3 3	Wet loose orange fine to coarse sand w/some silt, trace fine gravel. 14" RECOVERY
14.4		8	14.0'	4 12 11 13	Wet medium dense orange fine sand w/some fine gravel, coarse sand and silt. 16" RECOVERY
		9	16.0'	5 10 15 16	Wet medium dense brown fine sand w/some silt, trace fine gravel and coarse sand. A-2-4(0)
18		10	18.0' 18.0'	11 26 24 25	18" RECOVERY Wet very dense brown fine to coarse sand w/ A-1-b
			20.0'	25	some fine gravel, trace silt.
					End of Boring

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Low plasticity clay



Silty low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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:

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

Casing Size: 3 1/4 Inches

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

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 7/12/10 Dry 20.0 18.0

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: Dia. U-Sample Boring: U-Samples: 20.0 Ft.; Ft. 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. Rei	marks
	7/12/10	1	1.0' 2.0'	7 10	Moist very stiff brown clayey silt w/some A-4(3) Asphalt - 4".	Stone - 8".
		2	2.0'	7	coarse to fine sand and fine gravel. 8" RECOVERY A-6(13)	
				7 5 5 6	Wet stiff brown silty clay w/trace fine to	
3.6			4.0'	ŭ	coarse sand and fine gravel.	
	l N	3	4.0'	13 5	17" RECOVERY Wet stiff brown fine sandy silt w/some coarse A-4(0)	
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	\mathbf{V}		13 5 6 7	sand and clay, trace fine gravel.	
	•		6.0'	•	13" RECOVERY	
		4	6.0'	9 8	Wet stiff gray fine sandy silt w/some coarse A-4(0)	
7.2			Λ	7 8	sand and clay.	
			8.0'		15" RECOVERY	
		5	8.0'	9 11 7	Wet medium dense orange silty fine sand w/ A-2-4(0)	
				8	trace coarse sand.	
		6	10.0' 10.0'	6	14" RECOVERY	
10.8		0	10.0	6 5 5 7	Wet stiff tan fine sandy silt w/trace coarse A-4(0) sand.	
				7		
		7	12.0' 12.0'	5	19" RECOVERY Wet medium dense tan silty fine sand w/trace A-2-4(0)	
		'	12.0	5 6 8 7	coarse sand and fine gravel.	
			44.01	7	6" RECOVERY	
14.4		8	14.0' 14.0'	4	Wet medium dense tan fine to coarse sand w/ A-2-4(0)	
				4 5 6 5	some silt, trace fine gravel.	
			16.0'		19" RECOVERY	
		9	16.0'	4 6	Wet medium dense orange coarse to fine sand A-2-4(0)	
				10 11	w/some silt, trace fine gravel.	
18			18.0'		20" RECOVERY	
.,		10	18.0'	9	Wet medium dense brown fine gravelly A-1-b	
				11 15	coarse sand w/trace silt and fine sand.	
			20.0'		Historia 14" RECOVERY	
					End of Boring	
	I	i e	1	1	1	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

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

- 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.
- These logs are subject to the 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:

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

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 2/25/09 16.0 4.9

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.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** J. Truver

Helpers:

Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress	140.	Depth				
	2/25/09	1	0.5'	6 4 4	Moist firm brown fine sandy silt w/ some clay and coarse sand, trace of gravel.	A-4(0)	Topsoil - 5".
		2	2.0' 2.0'	4 8	15" RECOVERY Moist medium dense brown gravel and coarse sand w/ some fine sand,	A-1-a	
<u> </u>		_		13	trace of silt.		
3.5			4.0'		19"RECOVERY		
		3	4.0'	4 5 5 8	Moist loose brown coarse sand and gravel w/ some silt and fine sand.	A-1-b	
			6.0'		6" RECOVERY		
7		4	6.0' 8.0'	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	. A-1-b	
40.5		6	10.0' 10.0'	4	21" RECOVERY		
10.5		0	10.0	4 8 8 13	Wet medium dense green and brown gravel w/ some coarse to fine sand and silt.	A-1-a	
			12.0'		16" RECOVERY		
		7	12.0'	6 6 7 6	Saturated medium dense green and brown clayey fine to coarse sand, trace of gravel.	A-2-4(0)	
14			14.0'		21" RECOVERY		
		8	14.0'	6 6 7	Saturated medium dense green and brown clayey fine to coarse sand w/	A-2-4(0)	
				8	some gravel.		
			16.0'		20" RECOVERY		
					End of Boring		
17.5							

Remarks:

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Poorly graded sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

IN. IN. Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 7.2

7/28/2009 10.0 8.0

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: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. 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
	7/28/09	1	0.0'	4 5 6	Moist stiff brown silt w/some clay and fine to coarse sand.	A-4(2)	
] '	'		6 4			
	'	Ĺ'	2.0'		22" RECOVERY		
	[_ '	2	2.0'	5	Moist medium dense brown gravel w/some clay and coarse to fine sand.	A-1-b	
3.5				10	TOD DIDDING		1
0.0	1 '		4.0'		15" RECOVERY		
	"	3	4.0'	8 4	Moist to wet loose brown silty fine to coarse sand w/some gravel.	A-2-4(0)	1 /
	'	'		3	l		1 /
	['	<u> </u>	6.0'		16" RECOVERY		
 _	1 '	4	6.0'	4 3 4	Wet firm brown fine sandy clay w/some coarse sand.	A-7-6(4)	
7	1 '	'		6	JUJ1 ZU1J '		
-	 	Ĺ'	8.0'		18" RECOVERY		
<u> </u>	{ '	5	8.0'	2 3	Wet firm green fine sandy clay w/some coarse sand, trace of gravel.	A-7-6(4)	
<u> </u>	{ '	'		4 5	I		
<u> </u>	! '	<u> </u>	10.0'		14" RECOVERY		
10.5	4 '	6	10.0'	4 4	Wet stiff green fine sandy clay w/some coarse sand.	A-7-6(4)	
<u> </u>		'		6 9	I		
	1 '	Ĺ'	12.0'		18" RECOVERY		
		7	12.0'	3 5 7	Wet stiff green fine sandy clay w/trace of coarse sand.	A-6(3)	
	∫ '	'		7 8	· ·		1
14	<u>'</u>	Ĺ'	14.0'		17" RECOVERY		
	['	8	14.0'	6 7	Wet very stiff green fine sandy clay w/trace of coarse sand.	A-6(4)	ĺ
	['	'		9 12	I		ĺ
	Ĺ'	<u> </u>	16.0'		18" RECOVERY		
	<u> </u>			<u> </u>	End of Boring		
17.5	'	'		'	ı		ĺ
17.5	['	'		'	I		ĺ
	'	'		'	l		ĺ
-	1 '	1 '		ļ ,	· · · · · · · · · · · · · · · · · · ·		1

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Poorly graded clayey silty sand



Silty sand



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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.: SWM1-11-1

Contract: 25-113-01

Boring Location: Sta. 516+60, 270.00' Rt. C.L.

Boring Surface Elev.: + 53.0 Reference:

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

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 2/26/09 5.6

16.0

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.; Dia. U-Sample Boring: U-Samples: Ft. 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
	2/26/09	1	0.5' 2.0'	2 2 3	Moist firm brown silt w some clay, fine to coarse sand, and gravel.	A-4(1)	Topsoil - 5".
		2	2.0'	4 4 4	Moist loose brown gravel and coarse sand w/ some silt and fine sand.	A-1-b	
3.5	N		4.0'	6	20" RECOVERY		
		3	4.0'	2 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		
7		4	6.0' 8.0	2 7 5 7	Wet medium dense brown fine to coarse sand w/ some silt, trace of gravel. 20" RECOVERY	A-2-4(0)	
		5	8.0'	5 5 7 7	Wet medium dense brown fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
10.5		6	10.0' 10.0'	4 5 7 7	21" RECOVERY Saturated medium dense brown and green silty fine sand w/ some coars sand and gravel. 20" RECOVERY	e A-2-4(0)	
		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		8	14.0' 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	"			
-			16.0'		End of Boring		
<u> </u>					Did of Dorling		
17.5							
-							

Remarks:

Symbol Description

Strata symbols

Silty low plasticity clay



Silty sand



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 3/30/09 16.0 Dry

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.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** D. Burt

Helpers:

Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress	140.	Depth				
	3/30/09	1	0.5'	2 1	Moist soft brown clayey fine sandy silt, trace of coarse sand and gravel.	A-4(1)	Topsoil -
			00	2	17" RECOVERY		6".
		2	2.0' 2.0'	7		A 1 L	
			2.0	7 21 30	Moist very dense brown coarse sand and gravel w/ some fine sand and	A-1-b	
3.5				24	silt.		
			4.0'		20" RECOVERY		
		3	4.0'	9 12 13 12	Moist medium dense brown coarse sand and gravel w/ some fine sand.	A-1-b	
	•			13 12	trace of silt.		
		'	6.0'		EEFEREE HEFEREE HEFEREE		
		4	6.0'	22 20	18" RECOVERY Moist dense brown gravel and coarse sand w/ some fine sand, trace of silt.	A-1-b	
7		, ,	0.0	17	Wioist dense brown graver and coarse sand w/ some time sand, trace or sit.	Α-1-υ	
,				17			
			8.0		18" RECOVERY		
		5	8.0'	6 6	Wet medium dense brown and orange coarse to fine sand w/ some silt,	A-1-b	
		'	'	7 4	trace of gravel.		
			10.0'		18" RECOVERY		
10.5		6	10.0'	8	Wet medium dense brown and orange coarse to fine sand w/ some silt,	A-1-b	
10.0			'	8 8 11 12	trace of gravel.	A-1-0	
			'	12			
<u> </u>		L'	12.0'	ļ!	15" RECOVERY		
		7	12.0'		Wet medium dense brown and orange coarse sand w/ some fine sand,	A-1-b	
			'	12 11	trace of gravel and silt.		
14			14.0'		######################################		
'		8	14.0'	5 7	Wet medium dense brown and orange coarse to fine sand, trace of gravel	A-1-b	
		'	'	9	and silt.		
		'	'		EEEEEEE		
		<u> </u>	16.0'		HEREBEET 17 RECOVERT		
			'		End of Boring		
17.5			'				
17.5			'				
—			'				
		'	'				
			'	1			

Remarks:

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

- 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.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All Blows are 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:

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

Core Bit: O.D.

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

14.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 3/23/09 16.0 7.3

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.; Dia. U-Sample Boring: U-Samples: Ft. 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
	3/23/09	1	0.5' 2.0'	4 5 5	Moist stiff brown silt w/some coarse to fine sand and clay, trace of gravel.	A-4(1)	Topsoil - 6".
		2	2.0'	8 8 9	Moist medium dense brown and gray clayey fine sandy silt, trace of	A-4(1)	
3.5			4.0'	11	coarse sand and gravel. 13" RECOVERY		
		3	4.0'	4 6 8 11	Moist medium dense brown and black mottled clayey fine to coarse sand, trace of gravel.	A-2-4(0)	
			6.0'		10" RECOVERY		
7		4	6.0' 8.0'	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)	
		5	8.0'	5 4 5 6	Wet loose brown and black mottled fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
10.5		_	10.0'	5	16" RECOVERY	1 2 4(0)	
10.5		6	10.0'	5 7 6 7	Wet medium dense brown and black mottled fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			12.0'		12" RECOVERY		
		7	12.0'	11 6 7 8	Wet medium dense brown coarse to fine sand w/ some gravel, trace of silt.	A-1-b	
14			14.0'		21" RECOVERY		
		8	14.0'	3 5 8 10	Wet medium dense brown coarse to fine sand and gravel, trace of silt.	A-1-b	
			16.0'		20" RECOVERY		
					End of Boring		
17.5							

Remarks:

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

- 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.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All Blows are 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:

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

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0 14.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 4/8/09 16.0 6.3

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.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** D. Burt

Helpers:

Depth Dealty Character								1	
2.0° 2 2.0° 3.5 Moist dense orange silty fine to coarse sand, trace of gravel. A-2-4(0) Iron staining. 4.0° 4 6.0° 4 6.0° 5 8.0° 5 8.0° 6 10.0° 10.5 Moist dense orange silty fine to coarse sand, trace of gravel. A-2-4(0) Iron staining. Wet medium dense brown and orange coarse to fine sand w/ some clay. A-2-4(0) trace of gravel. 20° RECOVERY Wet dense gray coarse sand w/ some gravel fine sand, and silt. A-1-b 10.5 6 10.0° 12" RECOVERY Wet medium dense gray coarse to fine sand w/ some gravel and silt. A-1-b 10.5 6 10.0° 12" RECOVERY Wet medium dense gray coarse sand and gravel w/ some fine sand, trace of silt. 12.0° 12.0° 12.0° 12.0° 12.0° 12.0° 12.0° 12.0° 12.0° 12.0° 12.0° 13.33 14" RECOVERY Wet loose gray coarse to fine sand w/ some silt, trace of gravel. A-1-b 14 14.0° 15 16.0° 16.0° 17 18" RECOVERY End of Boring	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
2 2.0° 10 10 10 10 10 10 10		4/8/09	1					A-4(0)	
3.5 4.0' 10 24' RECOVERY 3 4.0' 10 32' 4.0' 32' 4.0' 4.0		<u> </u>	2		10 17 22		Moist dense orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
Column C	3.5	N							
Wet dense gray coarse sand w/ some gravel, fine sand, and silt. A-1-b 20" RECOVERY 5 8.0' 6 7 6 7 7 7 12.0' 14 8 14.0' 20 8 14.0'			3	4.0'	10 7 12 14			A-2-4(0)	
8.0' 6 21.35: Wet medium dense gray coarse to fine sand w/ some gravel and silt. A-1-b 10.5 6 10.0' 14 Wet medium dense gray coarse sand and gravel w/ some fine sand, trace of silt. 12.0' 14 Wet loose gray coarse to fine sand w/ some silt, trace of gravel. A-1-b 14.0' 18" RECOVERY 14.0' 20 21.35: Wet loose gray coarse to fine sand w/ some gravel and silt. A-1-b 16.0' 20 21.35: Wet dense gray coarse to fine sand w/ some gravel and silt. A-1-b 16.0' 23" RECOVERY End of Boring End of Boring		1 '		6.0'	F		21" RECOVERY		
10.0' 10.0' 10.0' 12" RECOVERY Wet medium dense gray coarse sand and gravel w/ some fine sand, trace of silt. 12.0' 14" RECOVERY 7 12.0' 2 13.555 5 13.555 6 14.0' 20 20 13.555 18" RECOVERY Wet loose gray coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY Wet dense gray coarse to fine sand w/ some gravel and silt. A-1-b 16.0' End of Boring A-1-b 23" RECOVERY	7	-	4	/	20 18 20 15		(40)51 2015	A-1-b	
10.5 6 10.0' 14 8 9 9 9 12.0' 12.0' 2 13.05 5 13.05 5 13.05 14.0' 20 18 14.0' 20 18 18 19 16.0' 16.0' 16.0' End of Boring End of Boring End of Boring Wet medium dense gray coarse sand and gravel w/ some fine sand, trace A-1-b A-			5		6 7 6 7	erijae Prijaire Prijae Prijae Prijae Prijaire		A-1-b	
7 12.0' 2	10.5	-	6		14 8 9 7		Wet medium dense gray coarse sand and gravel w/ some fine sand, trace	A-1-b	
14	ļ	-			ľ	111111111			
8 14.0' 20 if 1318 Wet dense gray coarse to fine sand w/ some gravel and silt. A-1-b 18 14.0' 18			7	12.0'	2 5 5 9	111 10.1161 1201 14304 121 143161 121 143161 141 143161	Wet loose gray coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
16.0' End of Boring End of Boring	14	∫ '			<u> </u>				
End of Boring			8		20 25 18 19	11111111111111111111111111111111111111		A-1-b	
		<u> </u> '	<u> </u>	16.0'	<u> </u>	1:11 1:1:0			
17.5		']		End of Boring		
	17.5	'							
		-							

Remarks:

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

- 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 recomendations 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: IN. IN. IN. Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: 30 Lbs. D-Sampler: S-Sampler: U-Sampler: Core Bit: 2 Type of: Split Barrel O.D. O.D. O.D. IN. IN.

O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 7/10/2009 10.0 12.0 6.5

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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
(14.7)	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
			2.0'	7	7" RECOVERY		Soil - 8".
		2	2.0'	14 18 14 12	Moist dense orange coarse to fine sand w/some silt and gravel.	A-1-b	
3.5	R		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		
7		4	6.0' 8.0'	10 16 7 12	Moist medium dense orange gravel and coarse sand w/some fine sand and silt. 15" RECOVERY	A-1-b	
		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'		tracter frieste 11 RECOVERY		
10.5		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'		11.13151 11.13151 11.13151		
		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			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:

Symbol Description

Strata symbols

Clayey sand

Silty sand

1.0) 30 L3

Poorly graded sand with silt



Elastic silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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.: SWM1-16-1

Contract: 25-113-01

Boring Location: Sta. 570+13, 187.00' Rt. C.L.

Boring Surface Elev.: + 65.0' Reference:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 7/10/2009 10.0 8.0 6.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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' 2.0'	5 8 12	Moist very stiff gray silt w/some clay, trace of fine to coarse sand and gravel. 15" RECOVERY	A-4(3)	Cultivated Soil - 8".
		2	2.0'	8 12 12 14	Moist very stiff orangish gray mottled fine sandy silt w/some clay and coarse sand, trace of gravel.	A-4(0)	
3.5			4.0'		18" RECOVERY		
		3	4.0'	10 5 4 2	Moist loose orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			6.0'		19" RECOVERY		
7		4	6.0' 8.0	6 4 3 1	Moist loose orangish gray mottled coarse to fine sand w/some silt, trace gravel. 14" RECOVERY	of A-1-b	
		5	8.0'	2 3 4 5	Wet loose orange silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
10.5		6	10.0' 10.0'	7 8 12 11	Wet medium dense orange coarse sand and gravel w/some fine sand, tracof silt. 24" RECOVERY	ce A-1-b	
		7	12.0'	7 8 11 20	Wet very stiff greenish brown mottled fine sandy clay w/some coarse sand and gravel.	A-7-5(1)	
14			14.0'		17" RECOVERY		
		8	14.0'	10 12 11 12	Wet medium dense green clayey fine to coarse sand w/some gravel.	A-2-6(0)	Glauconit
			16.0'		10" RECOVERY		
					End of Boring		
17.5							
17.5							
<u> </u>							

Remarks:

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

- 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 recomendations 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:

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

Core Bit: O.D. **Casing Size:**

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

Water Level Readings

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

11.9

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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' 2.0'	3 4 3	Moist firm tan clayey silt w/trace of fine to coarse sand. 14" RECOVERY	A-4(5)	Forrest Duff - 3".
		2	2.0'	5 5 6	Moist stiff tan clayey coarse sandy silt w/some fine sand, trace of gravel.	A-4(3)	
3.5			4.0'	8	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		
7		4	6.0'	6 7 5 6	Moist medium dense orange silty fine sand w/some coarse sand. 21" RECOVERY	A-2-4(0)	
		5	8.0'	4	Wet medium dense orange fine sand and gravel w/some silt and coarse	A-2-4(0)	
		Ü		4 5 6 4	sand.	A-2-4(0)	
10.5		6	10.0' 10.0'	3	14" RECOVERY Wet medium dense orange coarse to fine sand w/some silt, trace of grave	1. A-2-4(0)	
10.5		Ü	12.0'	3 6 7 7	wet medium dense orange coarse to fine sand w/some sin, trace of grave	1. A-2-4(0)	
		7	12.0'	7	Wet stiff brown fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(7)	
				7 5 5 8		A-7-3(1)	
14			14.0'	7	14" RECOVERY	1	
		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							
17.5							
-							

Remarks:

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

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 7/10/2009 10.0 9.0 12.0

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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' 2.0'	2 2 4	Moist firm gray clayey silt w/trace of fine to coarse sand and gravel. 16" RECOVERY	A-4(5)	Cultivated Soil - 6".
0.5		2	2.0'	6 6 7 9	Wet stiff greenish brown and gray mottled silty fine sandy clay w/trace o gravel and coarse sand.	f A-6(8)	USDA Classifica
3.5			4.0'	7	19" RECOVERY		- Clay Loam
		3	4.0'	7 9 9 7	Wet very stiff greenish brown fine sandy clay w/some coarse sand.	A-7-5(12)	Couri
			6.0'		16" RECOVERY		
7		4	6.0' 8.0'	8 9 10 10	Wet very stiff green fine sandy clay w/some coarse sand, trace of gravel. 19" RECOVERY	A-7-5(2)	Glauconit
		5	8.0'	3 7 10 8	Wet medium dense green silty fine to coarse sand.	A-2-4(0)	Glauconit
40.5		6	10.0' 10.0'	8	18" RECOVERY	1 4(0)	CI :
10.5		О	12.0'	8 9 9 10	Wet very stiff green fine sandy silt w/some clay, organic matter and coarse sand. 21" RECOVERY	A-4(0)	Glauconit
		7	12.0'	1	Wet soft green clayey fine sandy silt w/some organic matter, trace of	A-4(1)	Glauconit
		·	. =.0	1 2 1 1	coarse sand and silt.	A-4(1)	Giaucoini
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)	Glauconit
			16.0'		21" RECOVERY		
					End of Boring		
17.5							
17.5							

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Low plasticity clay



Elastic silt



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 7/13/2009 10.0 9.2 12.0

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers:

		_				1	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5' 2.0'	4 3 4	Moist firm gray silt w/some clay and fine sand, trace of coarse sand. 16" RECOVERY	A-4(2)	Cultivated Soil - 6".
		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		
7		4	6.0' 8.0'	5 7 7 6	Moist to wet medium dense orange fine to coarse sand w/some silt. 16" RECOVERY	A-2-4(0)	
		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							
		l	I			1	I

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

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

IN. IN. Core Bit: O.D.

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

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 6/26/2009 10.0 12.0 8.9

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers:

						_	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	6/26/09	1	0.5' 2.0'	2 3 5	Moist firm tan clayey silt w/trace of fine to coarse sand. 10" RECOVERY	A-4(4)	Cultivated Soil - 8".
		2	2.0'	4 5 8	Moist stiff tan fine sandy silt w/some clay, trace of coarse sand.	A-4(0)	
3.5	N		4.0'	9	12" RECOVERY		
	ı	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
	1		6.0'		17" RECOVERY		Loam
7		4	6.0' 8.0'	12 13 15 8	Moist medium dense tan silty fine to coarse sand w/some gravel. 17" RECOVERY	A-2-4(0)	Loam
		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		
10.5		6	10.0'	7 8 10 10	Wet very stiff brownish green fine sandy clay w/trace of coarse sand and gravel.	A-7-5(19)	
			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:

Symbol Description

Strata symbols

Silty low plasticity clay



Silty sand



Elastic silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 3/6/09 16.0 8.5

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** J. Truver

Helpers:

	1		Τ_	1			1	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	3/6/09	1	0.5' 2.0'	2 2 2	Moist sof gravel.	It light brown silt w/ some fine to coarse sand, trace of clay and	A-4(0)	Cultivated Soil - 6".
		2	2.0'	4 4 6	Moist loc	se orange silty fine sand w/ some gravel and coarse sand.	A-2-4(0)	
3.5			4.0'	14		16" RECOVERY		
		3	4.0'	9 10 9 11	Mo <mark>i</mark> st me sand.	dium dense orange silty gravel and fine sand w/ some coarse	A-2-4(0)	
			6.0'			13" RECOVERY		
7		4	6.0' 8.0'	9 9 10 11	Wet med gravel.	ium dense brown fine to coarse sand w/ some clay, trace of 20" RECOVERY	A-2-4(0)	
		5	8.0'	3 5 6 6	Wet med	ium dense brown clayey fine sand w/ some coarse sand.	A-2-6(0)	
		<u> </u>	10.0'	4		15" RECOVERY	<u> </u>	
10.5		6	10.0'	4 6 8 9	Wet stiff	brown fine sandy clay w/ some coarse sand. 17" RECOVERY	A-7-6(2)	
	1	7	12.0'	3	Cotumotod	medium dense brown clayey fine sand w/ some coarse sand.	A-2-6(1)	
		,		3 4 8 8	Saturated	medium dense brown crayey fine sand w/ some coarse sand.	A-2-0(1)	
14		<u> </u>	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)	
		L	16.0'			15" RECOVERY		
					End of B			
H						-		
17.5								

Remarks:

Symbol Description

Strata symbols

Silt

Silty sand

Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D. **Casing Size:** 3 1/4 Inches

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

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date

2/27/09 16.0 8.6

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.; Dia. U-Sample Boring: U-Samples: Ft. 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
	2/27/09	1	1.0' 2.0'	3 2	Moist firm light brown silt, trace of fine to coarse sand and clay.	A-4(1)	Cultivated
3.5		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)	12".
3.5			4.0'		20" RECOVERY		
		3	4.0'	7 11 13 9	Moist medium dense yellow clayey coarse to fine sand and gravel.	A-2-4(0)	
		4	6.0' 6.0'	16	17" RECOVERY	A-1-b	
7		7	8.0'	16 13 14 15	Moist medium dense white coarse sand w/ some fine sand, trace of clay and gravel. 18" RECOVERY	A-1-0	
		5	8.01	4 9 8 8	Wet medium dense yellow coarse sand w/ some gravel, trace of silt and fine sand.	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.	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.	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.	A-1-b	Cemented sands.
			16.0'		18" RECOVERY		
					End of Boring		
17.5							

Remarks:

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

- 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.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All Blows are 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:

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

Core Bit: O.D.

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

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 2/27/09

16.0 Dry

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.; Dia. U-Sample Boring: U-Samples: Ft. 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
	2/27/09	1	1.0' 2.0'	7 7	Moist stiff brown clayey silt, trace of fine to coarse sand.	A-4(8)	Cultivated
		2	2.0'	8 7 7	Moist stiff brown and gray clay w/ some fine sand, trace of coarse sand.	A-6(8)	Soil - 11".
3.5				7 6			111
0.0	R		4.0'		12" RECOVERY		
		3	4.0'	3 7 10 12	Moist very stiff gray fine sandy clay, trace of coarse sand and gravel.	A-6(6)	
			6.0'		24" RECOVERY		
7		4	6.0'	5 8 13 20	Moist very stiff brown and gray mottled fine sandy clay, trace of coarse	A-6(8)	
,			8.0'	20	sand and gravel. 24" RECOVERY		
		5	8.0	3 6	Moist medium dense white silty fine sand and gravel, trace of coarse	A-2-4(0)	
				14 15	sand.		
			10.0'	40	15" RECOVERY		
10.5		6	10.0'	19 25 14 11	Moist dense gray to orange clayey gravel and coarse sand w/ some fine sand.	A-2-4(0)	Cemented sands.
			12.0'		17" RECOVERY		
		7	12.0'	7 11 12 16	Wet very stiff brown fine sandy clay w/ some coarse sand, trace of grave	el. A-7-5(4)	
14			14.0'		12" RECOVERY		
		8	14.0'	23 17 12 13	Wet medium dense orange clayey fine to coarse sand w/ some gravel.	A-2-7(0)	
			40.01	13			
			16.0'		End of Boring		
					End of Borning		
17.5							
1							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

Silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date

2/27/09 Dry 16.0

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.; Dia. U-Sample Boring: U-Samples: Ft. 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
(11.)	2/27/09	1	1.0' 2.0'	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.	A-4(3)	3011 - 9 .
3.5			4.0'	_	16" RECOVERY		
		3	4.0'	3 7 4 6	Moist medium dense orange silty fine sand w/ some coarse sand.	A-2-4(0)	
			6.0'		17" RECOVERY		
7		4	6.0'	4 4 6 4	Moist stiff orange to gray clay w/ some fine sand, trace of coarse sand.	A-6(7)	
		5	8.0' 8.0'	1	24" RECOVERY	1 (1)	
		5	8.0	4 7 8	Moist stiff orange and gray mottled fine sandy clay w/ some coarse sand, trace of gravel.	A-6(4)	
			10.0'		18" RECOVERY		
10.5		6	10.0'	7 7 14 16	Moist very stiff gray fine sandy clay w/ some coarse sand, trace of gravel.	A-6(4)	
		7	12.0' 12.0'	3	20" RECOVERY	4 1 1	
		<i>'</i>	12.0	3 9 10 11	Moist medium dense gray and orange mottled coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
14			14.0'		17" RECOVERY		
		8	14.0'	12 15 19 27	Moist dense gray and orange mottled coarse sand and gravel w/ some fine sand, trace of silt.	A-1-b	
			16.0'		20" RECOVERY		
					End of Boring		
17.5							
17.5							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Clayey sand



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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.: SWM1-23-2

Contract: 25-113-01

Boring Location: Sta. 605+00, 205.00' Rt. C.L.

Boring Surface Elev.: + 74.0 Reference:

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

Core Bit: O.D.

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

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 2/27/09 16.0 Dry

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.; Dia. U-Sample Boring: U-Samples: Ft. 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
(111)	2/27/09	1	1.0' 2.0'	7 8		Moist stiff brown silt, trace of fine to coarse sand. 10" RECOVERY	A-4(0)	Cultivated Soil -
		2	2.0'	6 6 8		Moist stiff brown clayey silt w/ some fine sand, trace of coarse sand.	A-4(3)	3011 - 11".
3.5			4.0'	5		19" RECOVERY		
		3	4.0'	3 4 7 7		Moist stiff gray clayey silt w/ some fine sand, trace of coarse sand.	A-4(6)	
		4	6.0' 6.0'	3		20" RECOVERY	A C(11)	
7		4	0.0	3 5		Moist stiff gray clay w/ some fine sand, trace of coarse sand.	A-6(11)	
			8.0'	8		24" RECOVERY		
		5	8.0'	3 5 8 8		Moist medium dense yellow fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			10.0'			17" RECOVERY		
10.5		6	10.0'	12		Moist medium dense yellow silty fine sand w/ some coarse sand, trace of	A-2-4(0)	
10.0				12 9 7 8		gravel.	A-2-4(0)	
				8		graver.		
			12.0'			17" RECOVERY		
		7	12.0'	8 7 6 9		Moist medium dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
14			14.0'			18" RECOVERY		
		8	14.0'	8 13 11		Moist medium dense orange fine sand and gravel w/ some silt and coarse	A-2-4(0)	
				11 11		sand. Moist medium dense orange fine sand and gravel w/ some silt and		
						coarse sand.		
			16.0'			16" RECOVERY		
						End of Boring		
17.5								
1		l	1		l			

Remarks:

Symbol Description

Strata symbols

Silt



Silty low plasticity clay



Low plasticity



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 2/27/09 Dry

16.0

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.; Dia. U-Sample Boring: U-Samples: Ft. 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
	2/27/09	1	1.0' 2.0'	5 6	Moist stiff tan fine sandy silt w/ some clay and coarse sand. 12" RECOVERY	A-4(1)	Topsoil - 8".
3.5		2	2.0'	6 7 9 7	Moist very stiff tan silt w/ some fine sand, trace of clay and coarse sand.	A-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	3656	Moist stiff orange clay w/ some fine sand, trace of coarse sand and gravel.	A-6(11)	
		4	6.0' 6.0'	6	15" RECOVERY	1 (7)	
7		4	7.0'	6 8	Moist very stiff orange gray mottled fine sandy clay, trace of coarse sand	A-6(7)	
		4A	7.0' 8.0'	10 15	and gravel. 12" RECOVERY Moist medium dense orange-gray mottled silty fine to coarse sand, trace	A-2-4(0)	
		5	8.01	5 7 7 6	of gravel. 12" RECOVERY	A-2-4(0)	
			10.0'		Moist medium dense orange-gray mottled fine to coarse sand w/ some silt,	,	
10.5		6	10.0'	5 7 9 10	trace of gravel. 15" RECOVERY	A-2-4(0)	
			12.0'	10	Moist medium dense orange-gray mottled silty fine to coarse sand, trace of gravel.		
		7	12.0'	5 6 11 11	22" RECOVERY Moist medium dense orange fine sand and gravel w/ some coarse sand and silt.	A-2-4(0)	
14			14.0'		15" RECOVERY		
14		8	14.0'	22 12 12 12	Wet very stiff orange and brown coarse sandy clay w/ some fine sand and gravel.	A-7-5(3)	Cemented sands.
			16.0'				
			16.0'		End of Boring		
					Lift of Dornig		
17.5							
	į l						

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silt



Low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All Blows are 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.: SWM1-25-1

Contract: 25-113-01

Boring Location: Sta. 605+80, 174.00' Rt. C.L.

Boring Surface Elev.: + 74.0' Reference:

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

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0 14.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 2/27/09 Dry 16.0

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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
	2/27/09	1	1.0' 2.0'	4 6	Moist stiff tan clayey silt, trace of fine to coarse sand. 12" RECOVERY	A-4(8)	Topsoil - 8".
		2	2.0'	12 13 11 8	Moist very stiff tan clayey silt w/ some fine sand, trace of coarse sand.	A-4(3)	<u>8.</u>
3.5			4.0'	8	21" RECOVERY		
		3	4.0'	3 4 5 5	Moist stiff tan and gray mottled clayey silt w/ some fine sand, trace of coarse sand.	A-4(5)	
	_		6.0'		18" RECOVERY		
7		4	6.0' 7.0'	5 14	Moist very stiff tan and gray mottled clayey silt w/ some fine sand, trace of coarse sand and grayel.	A-4(5)	
		4A	7.0' 8.0'	13 12	12" RECOVERY	A-2-4(0)	
		5	8.0'	4 6	Moist medium dense orange and gray mottled silty fine sand w/ some coarse sand.	A-2-4(0)	
			40.01	8 7	Moist medium dense orange and yellow mottled silty fine sand, trace of		
10.5		6	10.0' 10.0'	8 15 11 10	coarse sand.	A-2-4(0)	
				11 10	Moist medium dense orange fine to coarse sand w/ some silt.		
		7	12.0' 12.0'	4	20" RECOVERY Moist dense brown gravel and coarse to fine sand w/ some silt.	A-1-b	
		,	12.0	4 10 24 24	Taked Moist dense brown graver and coarse to time sand w/ some sitt.	A-1-0	
14			14.0'		11" RECOVERY		
		8	14.0'	17 14 17 13	Wet dense brown clayey fine to coarse sand w/ some gravel.	A-2-7(1)	
			16.0'		16" RECOVERY		
					End of Boring		
17.5							
-							

Remarks:

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

- 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.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All Blows are 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.: SWM1-26-1

Contract: 25-113-01

Boring Location: Sta. 610+87, 210.00' Lt. C.L.

Boring Surface Elev.: + 66.0 Reference:

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

Core Bit: O.D.

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

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 2/26/09 16.0 Dry

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.; Dia. U-Sample Boring: U-Samples: Ft. 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
3.5	2/26/09	2	1.0' 2.0' 2.0'	3 4 4 4 4 6	Moist firm orange fine sandy silt w/ some clay, trace of coarse sand and gravel. 9" RECOVERY Moist loose orange silty fine to coarse sand, trace of gravel.	A-4(0) A-2-4(0)	Cultivated Soil - 10".
3.5		3	4.0' 4.0' 6.0'	3 3 6 3	12" RECOVERY Wet loose orange silty coarse to fine sand, trace of gravel. 8" RECOVERY	A-2-5(0)	Cemented sands.
7		4	6.0' 8.0'	4 8 4 5	Wet medium dense orange coarse sand w/ some fine sand, silt, and gravel. 10" RECOVERY	A-1-b	Cemented sands.
		5	8.0 ¹	3 3 4 5	Wet loose orange silty coarse to fine sand, trace of gravel. 12" RECOVERY	A-2-4(0)	Cemented sands.
10.5		6	10.0'	6 6 7 4	Wet medium dense orange silty fine to coarse sand, trace of gravel. 18" RECOVERY	A-2-4(0)	Cemented sands.
14		7	12.0'	3 4 4 6	Wet loose brown and gray fine to coarse sand w/ some silt, trace of gravel. 17" RECOVERY	A-2-4(0)	
		8	14.0'	7 7 6 7	Wet medium dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	Cemented sands.
17.5			16.0'		End of Boring		

Remarks:

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

IN. IN. Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 2/26/09 16.0 Dry

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.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** D. Burt

Helpers:

			I -				1
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	A-4(1)	Cultivated
		2	2.0' 2.0'		gravel.	A 2 4(0)	Soil -
		~	2.0	3 4 4	Moist loose orange silty coarse to fine sand, trace of gravel.	A-2-4(0)	10".
3.5	_	_		3			
	N	3	4.0'	4	16" RECOVERY Moist loose orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			4.0	4 3 4	Worst loose of ange stity fille to coarse saild, trace of graver.	A-2-4(0)	
			6.0'		20" RECOVERY		
7		4	6.0'	6 24 10	Moist dense orange coarse to fine sand and gravel w/ some silt.	A-1-b	Cemented
			8.0'	7	14" RECOVERY		sands.
		5	8.0	3 3 8 5	Wet medium dense orange silty coarse sand and gravel w/ some fine sand	l. 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	Wet medium dense orange silty coarse to fine sand, trace of gravel.	A-1-b	Cemented
				7 9 8 10			sands.
			16.0'		19" RECOVERY		
					End of Boring		
17.5							
17.5							
	l	l					

Remarks:

Symbol Description

Strata symbols

Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 2/23/09 16.0 Dry

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.; Dia. U-Sample Boring: U-Samples: Ft. 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
	2/23/09	1	1.0' 2.0'	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	A-4(5)	002
3.5			4.0'	7 !	gravel. 16° RECOVERY		
		3	4.0'	4 6 7 7	Moist medium dense tan clayey fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
	1		6.0'		14" RECOVERY		<u> </u>
<u> </u>	-	4	6.0'	6 8 _	Moist medium dense tan silty fine sand, trace of coarse sand.	A-2-4(0)	Contains
7	-		8.0'	9 9	G S T _{16" RECOVERY} 15		trace of mica.
		5	8.0	4 5 7	Moist medium dense orange-brown mottled silty fine sand, trace of grave and coarse sand.	el A-2-4(0)	Contains mica.
			10.0'	7	and coarse sand. 17" RECOVERY		linca.
10.5	1	6	10.0'	10	Moist very stiff orange-brown, yellow, and white mottled fine sandy silt,	A-4(0)	Contains
10.0	_			10 10 12 13	trace of coarse sand.	A-4(0)	mica.
		1	12.0'	'	24" RECOVERY		1
		7	12.0'	7 12 22 8	Moist dense orange-brown fine to coarse sand w/ some gravel, trace of silt.	A-3	Cemented sands.
14	1		14.0'	'	(元] (元]		
·	1 '	8	14.0'	7	Wet medium dense orange and brown silty coarse to fine sand w/ some	A-2-5(0)	Cemented
'	1			7 6 6 8	gravel/	11 = 0 (0)	sands.
 '			16.0'		15" RECOVERY		
<u> </u>	<u> </u>		10.0	'	End of Boring		
<u> </u>	1		1	'			
17.5	1			'			1
<u> </u>	-			'			
			1	'			1
l'	1			'			
,	1	1	'	'			1

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Clayey sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All Blows are 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.: SWM1-29-1

Contract: 25-113-01

Boring Location: Sta. 625+05, 173.00' Rt. C.L.

Boring Surface Elev.: + 74.0' Reference:

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

Core Bit: O.D.

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

Water Level Readings

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

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.; Dia. U-Sample Boring: U-Samples: Ft. 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
	2/25/09	1	1.0' 2.0'	3 4	Moist firm tan clayey silt, trace of fine to coarse sand. 6" RECOVERY	A-4(7)	Cultivated Soil - 8".
3.5		2	2.0'	3 4 6 7	Moist stiff tan silt w/ some fine to coarse sand and clay, trace of gravel.	A-4(0)	3011 - 8 .
3.5			4.0'		14" RECOVERY		
		3	4.0'	3 5 6 7	Moist stiff orange fine sandy silt, trace of coarse sand and gravel.	A-4(0)	
			6.0'		15" RECOVERY		
7		4	6.0' 8.0'	4 7 7 4	Moist stiff orange fine sandy silt. 19" RECOVERY	A-4(0)	
		5	8.0'	2 4 6 6	Moist stiff orange fine sandy silt, trace of coarse sand and gravel.	A-4(0)	
10.5		6	10.0' 10.0'	20	18" RECOVERY	A 1 1.	A
10.5			10.0	20 17 18 30	Moist dense orange, tan, white mottled gravel and coarse sand w/ some fine sand and silt.	A-1-b	Auger refusal at 10.5'.
		<u> </u>	12.0'	40	16" RECOVERY		Boring
		7	12.0'	19 20 12 7	Moist dense orange clayey coarse sand and gravel w/ some fine sand.	A-2-6(0)	offset 3.0'
14			14.0'		12" RECOVERY		completio
		8	14.0'	8 15 15 16	Wet medium dense orange silty fine to coarse sand w/ some gravel.	A-2-5(0)	of boring. Cemented
			16.0'		16" RECOVERY		sands. Cemented
					End of Boring		sands.
17.5							Cemented sands.
							panus.

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

IN. IN. Core Bit: O.D.

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

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 2/26/09 16.0 Dry

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.; Dia. U-Sample Boring: U-Samples: Ft. 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
	2/26/09	1	1.0' 2.0'	5 5	Moist stiff tan clay, trace of fine sand. 12" RECOVERY	A-6(13)	Cultivated Soil - 8".
		2	2.0'	6 7 8 7	Moist stiff tan clayey silt, trace of fine to coarse sand.	A-4(9)	Teon o.
3.5			4.0'	/	19" RECOVERY		
		3	4.0'	4 5 7	Moist stiff tan silt w/ some fine to coarse sand, trace of clay and gravel.	A-4(1)	
			6.0'	9	11" RECOVERY		
7		4	6.0'	5 5 6	Moist stiff orange fine sandy silt w/ some clay and coarse sand, trace of gravel.	A-4(0)	
			8.0'	7	17" RECOVERY		
		5	8.01	3 4 6 8	Moist loose yellow silty fine sand, trace of coarse sand.	A-2-4(0)	
			10.0'		15" RECOVERY		
10.5		6	10.0'	10 9 9 8	Moist medium dense yellow silty fine sand, trace of coarse sand.	A-2-4(0)	
			12.0'		20" RECOVERY		
		7	12.0'	6 12 9 11	Moist medium dense yellow fine to coarse sand w/ some gravel and silt.	A-2-4(0)	Cemented sands.
14			14.0'		16" RECOVERY		Suras.
		8	14.0'	16 29 22 31	Moist very dense yellow gravel and coarse sand w/ some fine sand and silt.	A-1-b	Cemented sands.
			16.0'	31	17" RECOVERY		Sall Go.
					End of Boring		
17.5							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty low plasticity clay



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

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

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.; Dia. U-Sample Boring: U-Samples: Ft. 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
	2/25/09	1	1.0' 2.0'	4 4	Moist firm tan clayey silt, trace of fine to coarse sand and gravel. 12" RECOVERY	A-4(5)	Cultivated Soil - 8".
3.5		2	2.0'	5 7 5 6	Moist stiff tan clayey silt w/some fine to coarse sand, trace of gravel.	A-4(2)	,5011 - 0 .
5.5			4.0'		18" RECOVERY		
		3	4.0'	3 4 7 8	Moist stiff orange fine sandy silt, trace of coarse sand and gravel.	A-4(0)	Contains mica.
	()		6.0'		16" RECOVERY		
7		4	6.0' 8.0'	9 9 9 9	Moist medium dense orange silty fine sand, trace of coarse sand and gravel. 17" RECOVERY	A-2-4(0)	
		5	8.0'	3 8 7 12	Wet stiff orange fine sandy clay w/ some coarse sand and gravel.	A-7-5(4)	Cemented sands.
		اا	10.0'	40	12" RECOVERY		
10.5		6	10.0'	10 15 15 18	Wet very stiff green fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(2)	Cemented sands.
		7	12.0' 12.0'	4	17" RECOVERY Wat stiff groop clayer fine to coerce sendy silt, trace of grovel	A 4(0)	Cemented
		′	12.0	4 6 8 10	Wet stiff green clayey fine to coarse sandy silt, trace of gravel.	A-4(0)	sands.
14			14.0'		15" RECOVERY		
		8	14.0'	8 9 9	Wet medium dense orange silty coarse to fine sand w/ some gravel.	A-2-4(0)	Cemented sands.
	<u> </u>	L	16.0'		24" RECOVERY		
					End of Boring		
17.5						1	
17.5							
						1	
1 1	1	1	l 1	1		1	1 1

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 2/18/09 16.0 Dry

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.; Dia. U-Sample Boring: U-Samples: Ft. 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
	2/18/09	1	1.0' 2.0'	3 4	Moist firm brown and tan clayey silt, trace of fine to coarse sand.	A-4(9)	Cultivated Soil - 8";
3.5		2	2.0'	5 5 8 9	Moist stiff orange clayey fine sandy silt w/ some coarse sand and gravel.	A-4(1)	boring offset 12'
		3	4.0'	3 4 5 5	Moist loose orange clayey fine to coarse sand, trace of gravel.	A-2-4(0)	weset due to over head wires.
		4	6.0' 6.0'	9 10	14" RECOVERY Moist medium dense brown silty fine to coarse sand w/ some gravel.	A-2-4(0)	Cemented
7		4A	7.0' 7.0'	7 11	Wet very stiff orange fine sandy silt w/ some clay, trace of coarse sand	A-4(0)	sands.
		5	8.0' 8.0'		and gravel. 10" RECOVERY	` ′	G . 1
]		7 10 12 14	Wet medium dense brown and green clayey fine sand and gravel w/ some coarse sand.	A-2-7(0)	Cemented sands.
10.5		6	10.0'	8 21 33 13	Wet hard brown and green fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(2)	Cemented sands.
		7	12.0' 12.0'	4 5 7 12	Wet medium dense brown, green, and gray mottled silty fine to coarse sand, trace of gravel.	A-2-4(0)	
14		8	14.0' 14.0'	8	18" RECOVERY	1 2 7(0)	G . 1
		°	14.0	8 10 7 7	Wet medium dense orange and red clayey fine to coarse sand w/ some gravel.	A-2-5(0)	Cemented sands.
			16.0'		15" RECOVERY		
					End of Boring		
17.5							
1							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Poorly graded clayey silty sand

Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 2/12/09 16.0 Dry

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.; Dia. U-Sample Boring: U-Samples: Ft. 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 8	Moist stiff brown and orange clayey gravelly silt w/ some fine sand, trace of coarse sand.		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	A-1-a	<u> </u>
3.5				18	and fine sand.		
	N	3	4.0'	4	8" RECOVERY		
		3	4.0	8 10 9	No sample recovery.	7	
			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'	13	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	A-1-b	Cemented
				7 8	gravel.		sands.
			16.0'		20" RECOVERY		
					End of Boring		
17.5							

Remarks:

Symbol Description

Strata symbols

Clayey sand



Poorly graded gravel with silt



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 2/12/09 Dry 16.0

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.; Dia. U-Sample Boring: U-Samples: Ft. 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' 2.0'	2 3	Moist firm orange clayey silt, trace of fine to coarse sand. 12" RECOVERY	A-4(8)	Cultivated Soil - 9".
		2	2.0'	4 7 7 6	Moist stiff orange clayey fine sandy silt w/ some coarse sand and gravel.	A-4(1)	<u>5011 7 .</u>
3.5			4.0'		10" RECOVERY		
		3	4.0'	5 11 19 14	Moist medium dense gray clay gravel w/ some coarse to fine sand.	A-2-4(0)	
			6.0'		16" RECOVERY		
_		4	6.0'	10 10	Moist medium dense brown and orange silty coarse sand w/some gravel	A-1-b	Cemented
7			8.0'	10 11	and fine sand. 8" RECOVERY		sands.
		5	8.0'	3 6 8 7	Wet medium dense brown and green silty coarse sand w/ some fine sand, trace of gravel.	A-2-4(0)	Cemented sands.
			10.0'		8" RECOVERY		
10.5		6	10.0'	12 13 11 10	Wet medium dense orange clayey coarse to fine sand, trace of gravel.	A-2-7(1)	Cemented sands.
			12.0'		18" RECOVERY		
		7	12.0'	3 6 5 14	Wet medium dense orange silty coarse to fine sand, trace of gravel.	A-2-4(0)	Cemented sands.
14			14.0'		15" RECOVERY		
		8	14.0'	20 10 12 14	Wet medium dense orange silty coarse to fine sand w/ some gravel.	A-2-4(0)	Cemented sands.
			16.0'		13" RECOVERY		
					End of Boring		
17.5					-		
17.5							
		I					

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Clayey sand

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 2/12/09 16.0 Dry

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.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** D. Burt

Helpers:

Danille	Daile.		0				ı
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/12/09	1	1.0' 2.0'	6 6	Wet medium dense brown clayey coarse to fine sand, trace of gravel.	A-2-7(0)	Cultivated
		2	2.0'	6 7 7 8	Wet medium dense brown clayey coarse to fine sand, trace of gravel.	A-2-7(0)	Soil - 9". Cemented sands.
3.5			4.0'		16" RECOVERY		
		3	4.0'	2 10 5 5	Wet medium dense orange-brown silty coarse to fine sand w/ some gravel.	A-1-b	Cemented sands.
		<u> </u>	6.0' 6.0'	6	12" RECOVERY		
7	1	4	6.0	6 8 10	Wet medium dense orange-brown coarse sand and gravel w/ some fine	A-1-b	
/			8.0'	5	sand and silt. 19" RECOVERY		
	-	5	8.01	2 4 6 7	Wet loose orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	Cemented sands.
<u> </u>			10.0'		8" RECOVERY		
10.5		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.
	1	7	12.0'	2	Wet firm orange silt w/ some fine sand, trace of coarse sand and gravel.	A-4(0)	
		,	12.0	2 3 4 5	Wet fifth orange sht w/ some thie sand, trace of coarse sand and graver.	A-4(0)	
14]		14.0'		18" RECOVERY		
		8	14.0'	4 6 6 7	Wet medium dense orange-gray fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
	1		16.0'		24" RECOVERY		
					End of Boring		
17.5							
17.5	 						
]						
	1						

Remarks:

Symbol Description

Strata symbols

Silty sand

Silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

Core Bit: O.D.

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

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 2/12/09 16.0 Dry

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.; Dia. U-Sample Boring: U-Samples: Ft. 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' 2.0'	2 4	Wet firm brown clayey silt w/ some fine sand, trace of coarse sand and gravel.	A-4(6)	Cultivated Soil - 9";
	<u> </u>	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'	4 5 10	Wet stiff orange fine sandy clay w/ some coarse sand and gravel.	A-7-5(5)	Cemented sands.
	'	<u> </u>	6.0'	<u> </u>	14" RECOVERY		
7		4	6.0' 8.0'	5 5 8 7	Wet medium dense orange clayey coarse sand w/ some fine sand and gravel. 19" RECOVERY	A-2-7(1)	Cemented sands.
	-	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.
<u> </u>	4 '	1 _ '	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.
<u> </u>	1 '	<u> </u>	12.0'		19" RECOVERY		-
	<u> </u>	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	1	L'	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		
				1	End of Boring		
17.5	<u> </u>		'	'			
			'	'			
			'	'			
	-			'			
I '	1 '	1	1	'			·

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING **AUGUST 2015**

- 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.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All Blows are 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:

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

Core Bit: O.D.

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

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 2/11/2009 Dry

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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
	2/11/09	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.
		<u> </u>	2.0'		18" RECOVERY		
3.5		2	2.0'	9 7 14 16	Moist medium dense orange coarse to fine sand and gravel, trace of silt. 20' RECOVERY	A-1-b	Cemented sands.
	•	3	4.0'	2 14 12 12	Moist medium dense brown coarse sand and gravel w/ some fine sand ar silt.	d A-1-b	Cemented sands.
7		4	6.0' 6.0' 8.0'	6 7 7 8	Wet medium dense dark orange silty fine to coarse sand, trace of gravel. 23" RECOVERY	A-2-4(0)	
		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.
10.5		6	10.0'	7 7 7 7	20" RECOVERY 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'	2656	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		
			13.0		End of Boring		
17.5							

Remarks:

Symbol Description

Strata symbols

Clayey sand

10:10:10:10:10:10 10:10:10:10:10:10:10 10:10:10:10:10:10:10 Well graded sand with silt

Poorly graded sand with silt



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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 recomendations 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:

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

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0 16.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 2/27/09 10.1 16.0

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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. 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
	2/27/09	1	0.5' 2.0'	5 3 4	Moist firm brown clayey coarse to fine sandy silt, trace of gravel. 18" RECOVERY	A-4(0)	Topsoil - 5".
		2	2.0'	1 5 8	Wet stiff gray and orange mottled clayey silt w/ some gravel, trace of fin to coarse sand.	e A-4(6)	
3.5			4.0'	6	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' 8.0'	1 5 5 6	Wet stiff brown and green fine sandy clay, trace of coarse sand. 19" RECOVERY	A-6(2)	
		5	8.0'	2 2 4 4	Saturated firm brown and green fine sandy clay, trace of coarse sand and gravel.	A-6(2)	
10.5		6	10.0'	3 6 5 5	Saturated stiff brown and green clayey fine sandy silt, trace of coarse sand. 20" RECOVERY	A-4(2)	
		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'	4	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							
17.5							

Remarks:

Symbol Description

Strata symbols

Poorly graded clayey silty sand

Low plasticity clay

Clayey sand

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 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.
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- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All Blows are 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:

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

Core Bit: O.D.

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

Water Level Readings

Time Depth of Water Depth of Hole **Depth of Casing** Elev. of Water Date 2/25/09 7.2

16.0

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.; Dia. U-Sample Boring: U-Samples: Ft. 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
	2/25/09	1	0.5' 2.0'	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".
		2	2.0'	11 11 8	Moist medium dense brown coarse sand and gravel w/ some fine sand, trace of silt.	A-1-b	
3.5	N		4.0'		18" RECOVERY		
		3	4.0'	11 18 19 30	Moist dense brown coarse sand and gravel w/ some fine sand and silt.	A-1-b	
	1 '		6.0'		19" RECOVERY		
7		4	6.0' 8.0	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.	A-1-b	
—	1 '		10.0'		11" RECOVERY	ļ	
10.5		6	10.0'	4 4 13 18	Wet medium dense brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
	1 '		12.0'		17" RECOVERY		
		7	12.0'	7 10 11 13	Saturated very stiff brown and green fine sandy clay w/ some coarse sand trace of gravel.	A-6(1)	
14	1 '		14.0'		20" RECOVERY	<u> </u>	
		8	14.0'	8 9 11 11	Saturated very stiff brown and green fine sandy clay w/ some coarse sand trace of gravel.	A-7-6(2)	
[1 '		16.0'		20" RECOVERY		
					End of Boring		
	1						
17.5	· '						
	1 '						
	1 '						

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Well graded sand with silt



Poorly graded sand with silt



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

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