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

F.A. Project: U.S. 301 Maryland State Line to I-95 Boring No.: B-4-01

Contract: 28-113-01

Boring Location: Sta. 680+88.54, 913.00' Lt. C.L.

Boring Surface Elev.: +41.03 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: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. U-Sampler: 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 Water Depth of Hole** Elev. of Water Date 2/3/09 20.0 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: Gary Truver

Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
(11.)	2/2/09	1	0.5'	2	Moist firm brown clayey gravelly silt w/some A-4(1)	Topsoil - 5".
				2 3 4	coarse to fine sand.	Торзон - 5 .
			2.0'		14" RECOVERY	
		U-1	2.0'		Saturated tan pink orange mottled fine to	Press Sample - Shelby Tube
2.8					coarse sandy clay.	
			4.0'		24"RECOVERY	
		2	4.0'	3 4 7	Moist stiff orange clayey fine sandy gravelly A-4(0)	
				7 7	silt w/trace of coarse sand.	
5.6						
J			6.0'		14" RECOVERY	
		3	6.0'	6 8 8 10	Moist very stiff orange clayey fine sandy silt A-4(1)	
				8 10	w/trace of coarse sand.	
<u> </u>			8.0'		21" RECOVERY	
8.4		4	8.0'	5 5 10 20	Moist medium dense orange fine sand w/some A-2-4(0)	
				20	gravel, coarse sand and silt.	
					51-01-01 8-1-13-05 1-13-0-05	
			10.0'	11	14" RECOVERY	
		5	10.0'	11 8 8 8	Moist medium dense orange coarse to fine A-1-b	
11.2				8	sand w/some gravel, trace of silt.	
					ETERTER ETERTER	
		6	12.0' 12.0'	4	21" RECOVERY	
		0	12.0	4 4 5 6	Moist loose orange fine to coarse sand w/trace A-3 of silt and gravel.	
				6	or sitt and graver.	
					61 1906 61 1906	
14		7	14.0' 14.0'	4	22" RECOVERY Moist loose orange coarse to fine sand w/trace A-1-b	
<u> </u>		′	14.0	4 4 6 6	ETHERE of gilt	
<u> </u>				6	ELECTRIC OI SIIL.	
			40.01		EEEEEE EEEEEE	
1			16.0'		21" RECOVERY	

Remarks:

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		8	16.0'	4 6 5 5		.1127. 1167	Wet medium dense orange coarse to fine sand	A-3	
10.0				5 5			w/trace of silt and gravel.		
			40.01			110 f	1 (II DE GOVERNY		
	2/3/09	9	18.0' 18.0'	1	W	17:0	16" RECOVERY Wet very loose orange fine sand w/some silt,	A-2-4(0)	
				1 1			trace of coarse sand.	A-2-4(0)	
100				1			tado or comoc suria.		
19.6			20.0'				20" RECOVERY		
		10	20.0'	4 6			Wet medium dense brown fine sand w/some	A-2-4(0)	
-				4 6 6 6			silt, trace of gravel and coarse sand.		
-									
			22.0'	_			17" RECOVERY		
22.4		11	22.0'	5 9 8 7			Wet medium dense brown fine sand w/some	A-2-4(0)	
				7			silt and gravel, trace of coarse sand.		
		12	24.0' 24.0'	12			19" RECOVERY Wet medium dense brown fine sand w/some	A-2-4(0)	
		'-	2 1.0	12 7 7			silt and gravel, trace of coarse sand.	A-2-4(0)	
25.2				9			sht and graves, trace of coarse saint.		
			26.0'				20" RECOVERY		
		13	26.0'	4 5			Wet loose orange fine sand w/some silt, trace	A-2-4(0)	
				4 5 5 6			of coarse sand and gravel.	,	
28			28.0'				20" RECOVERY		
		14	28.0'	2 5 9 11			Wet medium dense orange fine sand w/some	A-2-4(0)	Charged augers @ 28.0'
				11			gravel and silt, trace of coarse sand.		
			20.01					204	
		15	30.0' 30.0'	8		155 155	17" RECOVERY Wet medium dense brown fine to coarse sand	A-2-4(0)	^
30.8				11 9 14		110 F	w/some gravel and silt.	112 4(0)	
				'-		100			
			32.0'			110f.	19" RECOVERY		
		16	32.0'	5 8		11.00 11.00 11.00	Saturated medium dense brown fine sand w/	A-2-4(0)	
				14 18		100	some coarse sand and silt, trace of gravel.		
33.6									
		17	34.0' 34.0'	10	1111	3 0 0 3 6 6 3 6 6	18" RECOVERY	1.2.4(0)	
		''	34.0	10 9 15 18			Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
				18		3.66	some coarse sand and sin, trace of graver.		
			36.0'			Aier. Aier.	13" RECOVERY		
36.4		18	36.0'	13		316.6 316.6 316.6	Saturated dense brown fine sand w/some	A-3	
				13 16 23 28	11111	1101. 1101 1101	coarse sand, trace of silt.		
						1161. 1166 1167			
			38.0'			1:0:0 1:0:0	16" RECOVERY		
		19	38.0'	16 16 16 35		116 b 116 b	Saturated, brown, fine to coarse sandy clay,		pH sample sent to GTA
39.2				35			trace gravel.		
			40.0'		12117	ditte ding	12" RECOVERY		
							End of Boring		
42									
+4									

Symbol Description

Strata symbols

Clayey sand



Poorly graded clayey silty sand



Silty low plasticity clay



Poorly graded sand with silt



Well graded sand with silt



Silty sand

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 2/2/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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.: B-4-02

Contract: 28-113-01

Boring Location: Sta. 686+61.38, 1,011.00' Lt. C.L.

Boring Surface Elev.: +23.42' 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: O.D. Core Bit: O.D. IN.

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

Water Level Readings

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: B. Holden

Driller: B. Holden **Helpers:** J. Lafferty

Daniti	Daile	т —	0		T	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	1/14/09	1	0.5' 2.0'	4 3 2	Moist firm brown clayey and gravelly silt w/ A-4(2) some coarse to fine sand.	4" of topsoil, 1" of frost.
		2	2.0'	3 4	Moist loose brownish black coarse to fine A-1-b	
2.8		N	4.0'	4 4	sand and gravel w/some silt. 22" RECOVERY	G
		3	4.0'	4 4	Wet loose brownish black silty fine sand w/ A-2-4(0)	
5.6		S	6.0'	4	trace of coarse sand. 22" RECOVERY	5
		4	6.0'	4 5 5 4	Wet loose brownish black silty fine sand w/ A-2-4(0) trace of coarse sand.	
8.4	1	5	8.0' 8.0'	1	22" RECOVERY Wet very loose brown fine to coarse sand w/ A-3	
0.4				1 2 3	trace of silt and gravel.	
		6	10.0' 10.0'	2	191916 22" RECOVERY	
		0	10.0	2 4 5 5	Wet loose brown fine sand w/some coarse A-2-4(0)	
11.2			40.0	5	sand and silt, trace of gravel.	
		7	12.0' 12.0'	1	23" RECOVERY Wet very loose brown fine sand w/some A-3	
14		,	14.0'	1 2 2 4	coarse sand, trace of silt and gravel.	
17		8	14.0'	3 4 5 7	Wet loose brown fine to coarse sand w/trace of silt and gravel.	
	1		16.0'		20" RECOVERY	

Remarks:

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'	3 3 4 5		107. 107.	Wet loose brown fine sand w/some coarse	A-3	
10.0	1			5			sand, trace of silt.		
	1		18.0'				21" RECOVERY		
		10	18.0'	3 4	Ш		Wet loose brownish orange fine sand w/some	A-2-4(0)	
				3 4 6 6			silt and coarse sand.	. ,	
19.6									
		11	20.0'	5			20" RECOVERY	A 2 4(0)	777
		11	20.0'	5 6 5 5			Saturated medium dense brownish orange fine sand w/some silt and coarse sand.	A-2-4(0)	Water encountered in auger at 20.1'.
				5			sand w/some sint and coarse sand.		at 20.1.
			22.0'				20" RECOVERY		
22.4		12	22.0'	3 5			Saturated medium dense brownish orange fine	A-3	
				3 5 6 6			sand w/some coarse sand, trace of silt.		
<u> </u>									
		13	24.0' 24.0'	4	1:0141	100	21" RECOVERY	A 2	
		13	24.0	4 6 7 7			Saturated medium dense brownish orange fine sand w/trace of silt and coarse sand.	A-3	
25.2				/					
			26.0'				22" RECOVERY		
		14	26.0'	3 3 3		100	Saturated loose brown fine sand w/trace of silt	A-3	
				3 4			and coarse sand.		
						100		7 1	
28	-	15	28.0' 28.0'	4 5		6 ¢	22" RECOVERY Saturated medium dense brown fine sand w/	A-3	
			20.0	6 8			some coarse sand, trace of silt.	V-2	
				0	11.01.1		,		
			30.0'			iici. Iocu Ioc	23" RECOVERY	004	
30.8		16	30.0'	4 4 6			Saturated loose brown fine sand w/trace of	A-3	
30.6	1			6			silt, coarse sand and gravel.		
			20.01			166 166	ATH DECOVERY		
		17	32.0' 32.0'	4	12 14 1	ide Int	21" RECOVERY Saturated medium dense brown fine sand w/	A-3	
				4 6 8 7			some coarse sand, trace of silt and gravel.		
33.6						5			
00.0	1		34.0'				23" RECOVERY		
		18	34.0'	6 7 8	131.14.1		Saturated medium dense brown fine sand w/ trace of coarse sand and silt.	A-3	
				11			trace of coarse sand and snt.		
			36.0'			100 G 100 F	22" RECOVERY		
36.4		19	36.0'	6			Saturated medium dense brown fine sand w/	A-2-4(0)	
				6 10 12 14			some silt and coarse sand, trace of gravel.		
		20	38.0' 38.0'	4			22" RECOVERY		pH sample sent to GTA for
		20	36.0	4 8 10 11			Saturated medium dense brown silty, clayey, fine to coarse sand, trace gravel.		testing.
39.2				11			Time to course sund, trace graver.		Ü
			40.0'				23" RECOVERY		
					100000		End of Boring.		
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42									
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Symbol Description

Strata symbols

Clayey sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 1/14/2009 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.

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

F.A. Project: U.S. 301 Maryland State Line to I-95 Boring No.: B-4-03

Contract: 28-113-01

Boring Location: Sta. 676+42.09, 636.00' Lt. C.L.

Boring Surface Elev.: + 50.75 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: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. U-Sampler: 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 $\begin{array}{c} \textbf{Depth of Water} \\ 31.0 \end{array}$ Time **Depth of Hole** Elev. of Water Date 2/2/09 34.0 32.0

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 (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	2/2/2009	1	0.5'	4 6		Moist loose brown clayey fine to coarse sand	A-2-6(1)	Cultivated Soil - 8".
			1.5'			w/trace of gravel. 9" RECOVERY		
						9" RECOVERY		
		2	2.0'	6 5		Moist loose orange clayey gravel and coarse	A-2-6(0)	
2.8				5		sand w/some fine sand.		
						-()R RII)I) \	
			4.0'			19" RECOVERY	ノロN	
1		3	4.0'	3 4		Moist stiff reddish gray fine sandy silty clay.	A-6(9)	
	1			3 4 5 7				
5.6							$\mathbf{D} \mathbf{A}$	
3.0			6.0'			20" RECOVERY	/	
		4	6.0'	5 6		Moist stiff reddish gray silt w/some fine sand,	A-6(12)	
-				5 6 9 8		trace of clay.	` ,	
						-		
			8.0'			14" RECOVERY		
8.4		5	8.0'	10		Moist very dense orange gravel and fine sand	A-1-b	
				10 21 25 25		w/some silt and coarse sand.		
			10.0'			9" RECOVERY		
		6	10.0'	50/4"		No Sample Recovery		
						1		
11.2								
			12.0'			0" RECOVERY		
		7	12.0'	5	1:1:1:1:1:1:1	Moist medium dense orange coarse sand and	A-1-b	
				5 6 9 10	1:1:1:1:1:1:1	gravel w/some fine sand, trace of silt.		
				"0		,		
14	1		14.0'			15" RECOVERY		
'-	1	8	14.0'	6	1:1:1:1:1:1:	3.5.1	A-1-b	
				6 8 10 14	1:1:1:1:1:1:1	gravel w/some fine sand, trace of silt.		
				"	1:1:1:1:1:1:1	,		
-			16.0'		1:1:1:1:1:1:1:1	13" RECOVERY		

Remarks:

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

Depth	Daily		Sample		I		_	
(ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	14 16 16 13		Moist dense orange gravel and coarse sand w/ some fine sand, trace of silt.	A-1-b	
			18.0'			16" RECOVERY		
19.6		10	18.0'	9 7 8 9		Moist medium dense yellow coarse to fine sand w/trace of silt and gravel.	A-1-b	
		11	20.0'	5 6 5 6		21" RECOVERY Moist medium dense yellowish orange coarse to fine sand w/trace of silt and gravel.	A-1-b	
		40	22.0'	7		17" RECOVERY		
22.4		12	22.0'	7 6 7 6		Moist medium dense yellowish orange coarse to fine sand w/trace of silt and gravel.	A-1-b	
25.2		13	24.0' 24.0'	7 8 8 7		19" RECOVERY Moist medium dense yellowish orange coarse to fine sand w/trace of silt and gravel.	A-1-b	
		14	26.0' 26.0'	5 5 6 6		18" RECOVERY Wet medium dense yellowish orange coarse to fine sand w/trace of gravel and silt.	A-1-b	
28		15	28.0' 28.0'	2 3 5 6		Wet loose orange fine sand w/some silt, trace of coarse sand.	A-2-4(0)	G
			30.0'	D		24" RECOVERY	001	
30.8		16	30.0'	4 4 7 10		Wet medium dense orange fine sand w/some coarse sand and silt.	A-2-4(0)	3
			32.0'			12" RECOVERY		
		17	32.0'	1 3 4 5		Saturated loose orange fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
33.6	-		34.0'			24" RECOVERY		
		18	34.0'	W/R 3 5 6		Saturated loose orange fine sand w/some silt, trace of coarse sand and gravel.	A-2-4(0)	
20.4		19	36.0' 36.0'	5		24" RECOVERY	A 2 4(0)	
36.4		19		5 10 14 14		Saturated medium dense orange fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	
39.2		20	38.0' 38.0'	11 11 14 13		18" RECOVERY No Sieve Analysis - pH sample retained by GTA.		
			40.0'			18" RECOVERY		
						End of Boring		
42								

Symbol Description

Strata symbols

Clayey sand

Low plasticity clay

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Silty sand

Well graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 2/2/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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.: B-4-04

Contract: 28-113-01

Boring Location: Sta. 681+41.78, 616.00' Lt. C.L.

Boring Surface Elev.: + 52.73 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: 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 40.0

Water Level Readings

Depth of Casing $\begin{array}{c} \textbf{Depth of Water} \\ 30.1 \end{array}$ Time **Depth of Hole** Elev. of Water Date 2/3/09 34.0 32.0

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 (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
(***/	2/2/09	1	0.5'	1 2 2	Moist soft brown clayey silt w/trace of fine to coarse sand. 10" RECOVERY	8" of cultivated soil.
2.8		2 U-1	2.0' 4.0' 4.0'	3 3 4 4 4	Moist firm brown clayey silt w/trace of fine to coarse sand. 17" RECOVERY Moist tan fine to coarse sandy silt.	Press Sample - Shelby Tube.
5.6		S	6.0'	P.	E 24" RECOVERY	5
		3	6.0'	3 3 5 6	Moist loose brown clayey fine sandy silt w/ A-4(4) some coarse sand.	
8.4		4	8.0'	8 14 15 17	24" RECOVERY Moist medium dense orange gravel and fine sand w/some coarse sand and silt. 18" RECOVERY	
11.2		5	10.0' 10.0'	8 14 14 11	No Sample Recovery 0" RECOVERY	
14		6	12.0'	3 6 9 13	Moist stiff reddish orange clayey fine sandy silt w/trace of coarse sand. 16" RECOVERY	
14		7	14.0'	6 8 9 9	Moist medium dense orange silty fine sand w/ A-2-4(0) some coarse sand.	

Remarks:

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

				1	ı	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
16.8		8	16.0'	5 8 11 11	Moist medium dense orange fine to coarse sand w/some silt, trace of gravel. A-2-4(0)	
			18.0'		20" RECOVERY	
		9	18.0'	8 8 10 12	Moist medium dense yellowish orange and A-1-b	
19.6				12	brown coarse sand and gravel w/some fine sand and silt.	
	2/3/09	10	20.0'	10	17" RECOVERY Moist medium dense yellowish orange and A-1-b	
	2/0/03	10		10 14 16 21	brown gravel and coarse sand w/some fine sand, trace of silt.	
00.4		11	22.0' 22.0'	10	FEFFER 9" RECOVERY	
22.4		''	22.0	10 13 13 8	Moist medium dense yellowish orange and brown coarse sand and gravel w/some fine sand, trace of silt. A-1-b	
		12	24.0' 24.0'	6	HEREITE 16" RECOVERY	
25.2		12	26.0'	6 7 7 7	Moist medium dense yellow fine to coarse sand w/some silt, trace of gravel. 20" RECOVERY	
		13	26.0'	5 7 7	Wet medium dense yellow fine sand w/some A-2-4(0)	
				7 7	silt, trace of coarse sand and gravel.	
28	1		28.0'		23" RECOVERY	
		14	28.0'	3 3 4 4	Wet loose yellow fine sand w/some silt, trace of coarse sand. A-2-4(0)	
			30.0'		18" RECOVERY	
30.8		15	30.0'	2 2 5 9	Wet loose yellow fine sand w/some coarse sand, trace of silt.	Water encountered in auger at 30.1'.
			32.0'		18" RECOVERY	
		16	32.0'	1 1	Wet very loose yellow fine to coarse sand w/ A-3	
				3 5	trace of silt.	
33.6					614-1561 61-15166 61-15166	
		17	34.0' 34.0'	WOR	22" RECOVERY Wet very loose yellow fine to coarse sand w/ A-3	
			00	1 3 4	trace of silt and gravel.	
		18	36.0' 36.0'	4	19" RECOVERY	
36.4		10	36.0	4 8 13 14	Wet medium dense orange yellow and brown fine to coarse sand w/trace of silt and gravel.	
			00.00			
		19	38.0' 38.0'	8	14" RECOVERY Indication of saturated orange yellow	pH sample sent to GTA for
39.2				8 10 13 14	(1916) titlet titlet titlet titlet titlet titlet	testing.
			40.0'		19" RECOVERY	
					End of Boring.	
<u> </u>						
42						

Symbol Description

Strata symbols



Low plasticity clay



Silty low plasticity clay



Silty sand



Well graded sand with silt



Poorly graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 2/2/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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.: B-4-05

Contract: 28-113-01

Boring Location: Sta. 684+75.86, 662.00' Lt. C.L.

Boring Surface Elev.: + 42.97 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: 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 40.0

Water Level Readings

Depth of Casing Time **Depth of Water Depth of Hole** Elev. of Water Date 2/3/09 20.0 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: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	2/3/09	1	0.5'	7 6 4	Moist stiff brown clayey silt w/some fine to coarse sand. 6" of to	psoil.
			2.0'		11" RECOVERY	
2.8		2	2.0'	8 8 12 14	Moist medium dense orange fine to coarse A-2-4(0)	
2.0			4.0'		sand w/some clay, trace of gravel. 12" RECOVERY	
		3	4.0'	9 7 4	Moist medium dense orange fine to coarse A-2-4(0)	
5.6			6.0'		sand w/some clay, trace of gravel. 16" RECOVERY	
		4	6.0'	10 11 9 7	Moist medium dense orange gravel and coarse A-1-a	
			8.0'	7	sand w/some fine sand, trace of silt.	
8.4		5	8.0'	2	Moist medium dense orange coarse sand w/ A-1-b	
				2 4 7 9	some fine sand, trace of silt and gravel.	
			10.0' 10.0'	4	17" RECOVERY	
		6	10.0	5 6 8	Moist medium dense orange coarse sand w/ A-1-b some fine sand, trace of silt and gravel.	
11.2				8	HEREBER SOME THE SAND, HACE OF SHE AND GLAVET.	
			12.0'	-	16" RECOVERY	
		7	12.0'	5 7 8 10	Moist medium dense brown coarse sand w/ some fine sand, trace of silt and gravel. 19" RECOVERY	
14		8	14.0'	10	Moist medium dense brown gravel and coarse A-1-a	
				10 13 10 12	sand w/some fine sand, trace of silt.	
1			16.0'		12" RECOVERY	

Remarks:

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'	5 5 7 8			brown fine sandy silt w/trace of	A-4(0)	
10.0	1			8		gravel.			
	1		18.0'				14" RECOVERY		
		10	18.0'	5		Wet med	ium dense light brown silty fine sand	A-2-4(0)	
				5 5 6 5			f coarse sand and gravel.		
19.6									
		11	20.0'	5		XX7 . 1	20" RECOVERY	1 2 4(0)	1 (20.0)
		11	20.0'	5 6 6 6			fum dense light brown silty fine sand f coarse sand.	A-2-4(0)	Water encountered at 20.0'.
				6		w/trace o	i Coarse sand.		
			22.0'				22" RECOVERY		
22.4]	12	22.0'	6 7		Wet med	ium dense light brown fine sand w/	A-2-4(0)	
				6 7 7 7			trace of coarse sand.		
	<u> </u>	13	24.0' 24.0'	5		G 1	23" RECOVERY	1 2 4(0)	
		13	24.0	5 6 6 7			medium dense light brown fine ome silt, trace of coarse sand.	A-2-4(0)	
25.2				7		Sand W/Sc	sine sint, trace of coarse saint.		
			26.0'				20" RECOVERY		
		14	26.0'	4 9 10 8			medium dense light brown fine	A-2-4(0)	
	1			10 8		sand w/so	ome silt, trace of coarse sand.		
								7 1	
28		15	28.0' 28.0'	8	1:012	Cotomotod	20" RECOVERY medium dense orange fine to coarse	A-2-4(0)	
		13	20.0	8 5 6 8			ome silt, trace of gravel.	A-2-4(0)	
				8		i saira w			
			30.0'				18" RECOVERY	100	
		16	30.0'	5 5 7			medium dense orange fine to coarse	A-2-4(0)	
30.8	-			7 11		sand w/so	ome silt, trace of gravel.		
	_								
	-	17	32.0' 32.0'	3		Saturated	20" RECOVERY loose orange fine sand w/some	A-2-4(0)	
	-	''	02.0	5 8		rl = ==================================	and silt, trace of gravel.	A-2-4(0)	
33.6				0		r l	, 2		
33.0	1		34.0'			i V	15" RECOVERY		
	-	18	34.0'	5 6 9 11			medium dense orange fine sand w/	A-3	
	-			11		some coa	rse sand, trace of silt and gravel.		
	-								
36.4		19	36.0' 36.0'	5 11		Saturated	15" RECOVERY medium dense orange fine sand w/	A-2-4(0)	
	1			11 18 21			rse sand and silt.	11 2 4(0)	
	1					r r V			
			38.0'			r is	16" RECOVERY		
		20	38.0'	18 23 25 28		:1	n of Saturated dense orange		pH Sample sent to GTA for Testing.
39.2]			28		d i			resuitg.
			40.0'):(14):(17):(17	6 6	14" RECOVERY		
			40.0		iit i ii.	End of Bo			
	_								
42									
				1			I		

Symbol Description

Strata symbols

Low plasticity clay

Poorly graded clayey silty sand

(0.000 (0.00 (0.000 (0.00 (0.000 (0.00)

Poorly graded sand with silt

Well graded sand with silt



Poorly graded gravel with silt



silt



Silty sand

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 2/3/2009 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.

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

F.A. Project: U.S. 301 Maryland State Line to I-95 Boring No.: B-4-06

Contract: 28-113-01

Boring Location: Sta. 688+84.40, 618.00' Lt. C.L.

Boring Surface Elev.: +41.01 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. IN. **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 2/4/09 20.0 18.0 16.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: 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
	2/4/09	1	2.0'	4 6 7 7	Moist stiff brown clayey coarse sandy silt w/ some fine sand and gravel. 12" RECOVERY
2.8		2	2.0'	9 7 6 5	Moist medium dense orange coarse sand and gravel w/trace of silt and fine sand. 18" RECOVERY
5.6		3	4.0' 6.0'	3 4 3 5	Moist loose orange coarse sand w/trace of silt, fine sand and gravel. 18" RECOVERY
		4	6.0' 8.0'	7 6 5 5	Moist medium dense yellow coarse sand w/ some fine sand, trace of silt and gravel. 20" RECOVERY
8.4		5	8.0'	3 3 4 4	Moist loose yellow coarse sand w/some fine sand, trace of silt and gravel. 20" RECOVERY
11.2		6	10.0'	4 3 2 4	Moist loose orange coarse sand and gravel w/ A-1-b trace of silt and fine sand.
14		7	12.0' 14.0'	6 11 6 5	Moist medium dense orange yellow coarse to fine sand and gravel w/trace of silt. 17" RECOVERY
		8	14.0'	4 4 5 3	Wet loose orange fine sand w/some silt, trace of coarse sand and gravel. A-2-4(0)

Remarks:

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
			16.0'		18" RECOVERY		
16.8		9	16.0'	4 3 3 4	Wet loose orange silty fine sand w/trace or gravel and coarse sand.	A-2-4(0)	
			18.0'		24" RECOVERY		
		10	18.0'	3 3 3 3	Saturated loose orange silty fine sand w/tra of coarse sand and gravel.	ce A-2-4(0)	
19.6	-		20.0'		14" RECOVERY		
-	-	11	20.0'	2	Saturated medium dense orange fine sand	// A-2-4(0)	
			22.0	2 5 7 10	some silt and coarse sand, trace of gravel.		
22.4	1	12	22.0' 22.0'	W/R	20" RECOVERY Saturated very loose orange fine to coarse	A 2 4(0)	
22.4		12		1 3 4	sand w/some silt, trace of gravel.	A-2-4(0)	
			24.0'	W/D	15" RECOVERY		
25.2		13	24.0'	W/R 1 2 4	Saturated very loose orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
	-	4.4	26.0'	7	17" RECOVERY		
	-	14	26.0'	7 11	Saturated dense orange fine to coarse sand	w/ A-3	
28		N	28.0'	20 14	some gravel, trace of silt.	DIN	G
	1	15	28.0'	8	Saturated medium dense orange fine sand	// A-2-4(0)	
		C		8 11 14 18	some coarse sand and silt.	201	5
		16	30.0' 30.0'	11	22" RECOVERY		
30.8		10		11 13 18 21	Saturated dense orange fine to coarse sand trace of silt.	A-3	
	-	17	32.0' 32.0'	11	23" RECOVERY Saturated medium dense orange fine sand	-/	
33.6		.,	02.0	11 12 14 13	saturated medium dense orange fine sand some coarse sand and silt.	// A-2-4(0)	
33.0	1		34.0'		20" RECOVERY		
		18	34.0'	2 2 5 8	Saturated loose orange fine sand w/some coarse sand, trace of silt.	A-3	
00.4	1	19	36.0' 36.0'	6	21" RECOVERY	/ 4.2.4(0)	
36.4		19		6 6 18 20	Saturated medium dense orange fine sand some coarse sand and silt.	7/ A-2-4(0)	
<u> </u>		20	38.0' 38.0'	11	18" RECOVERY		Sample retained by GTA for
39.2		20	30.0	11 13 20 21	No Sieve Analysis		pH testing.
			40.0'		19" RECOVERY		
\vdash	-				End of Boring		
<u> </u>	-						
<u> </u>							
42							

Symbol Description

Strata symbols

Poorly graded clayey silty sand

20 Well graded sand with silt

1.0000000 1.0000000 0.000000

Poorly graded sand with silt



Silty sand

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 2/4/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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.: B-4-07

Contract: 28-113-01

Boring Location: Sta. 673+34.98, 378.00' Lt. C.L.

Boring Surface Elev.: + 58.03 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. 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 Depth of Water Time **Depth of Hole** Elev. of Water Date 1/30/09 34.4 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: Jason Truver

Helpers: D. Zmijewski

						1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	1/30/09	1	0.5' 2.0'	4 4 5	Moist stiff brown clayey silt w/trace of fine to coarse sand and gravel. 10" RECOVERY	8" of cultivated soil; 6" of frozen soil.
<u> </u>		2	2.0'	5	Moist stiff brown clayey silt w/some fine to A-4(2)	
2.8		N	4.0'	5 5 6 4	coarse sand and gravel. 24" RECOVERY	G
		3	4.0'	5 6 5 7	Moist stiff brown clayey gravelly silt w/some A-6(3)	
5.6		U-1	6.0' 6.0'	Ď'	fine to coarse sand. 17" RECOVERY Moist brown clayey fine to coarse sand with some fine to coarse gravel.	Pressed Sample - Shelby Tube.
			8.0'		14" RECOVERY	
8.4		4	8.0'	6 6 5 6	Moist medium dense orange gravel and fine sand w/some silt and coarse sand. 12" RECOVERY	
-		5	10.0'	8	Moist very stiff orange gray and red fine A-6(7)	1
11.2			12.0'	8 10 13 12	sandy clay w/trace of gravel and coarse sand. 19" RECOVERY	
		6	12.0'	2	Moist stiff orange gray and red clay w/some A-6(11)	
14			14.0'	2 6 9 10	fine sand, trace of gravel and coarse sand.	
'-		7	14.0'	2 5	Moist stiff orange gray and red silty clay w/ A-6(8)	
				2 5 8 8	some fine sand, trace of gravel and coarse sand.	
			16.0'		17" RECOVERY	

Remarks:

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

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Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
16.8		8	16.0'	8 9 8 9		Moist medium dense reddish orange and yellow mottled silty fine sand w/trace of coarse sand.	A-2-4(0)	
	-	9	18.0' 18.0'	0		24" RECOVERY	4.1.1	
19.6		9		9 18 17 31		Moist dense orange gravel and coarse sand w/ some silt and fine sand.	A-1-b	
		10	20.0'	16	301.3	12" RECOVERY Moist medium dense yellowish orange coarse	A-1-b	
	_	10		16 14 14 16	116 1 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	sand and gravel w/some fine sand, trace of silt.	A-1-0	
22.4	1	11	22.0' 22.0'	13	11111	17" RECOVERY Moist medium dense orange coarse sand and	A-1-b	
<i>LL</i> .¬¬				13 14 14 13		gravel w/some fine sand, trace of silt.	A-1-0	
	-	12	24.0' 24.0'	10	1111111	18" RECOVERY	A-1-b	
25.2			26.0'	10 12 17 17		gravel w/some fine sand, trace of silt.	A-1-0	
		13	26.0'	12 14 10	100 137	Moist medium dense orange gravel and coarse	A-1-b	
	_	NI		10 10	100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	to fine sand w/some silt.		
28		14	28.0' 28.0'	3 4 6 8		sand w/trace of silt and gravel.	A-1-b	G
	<u> </u>		30.0'				DOA	
30.8	-	15	30.0'	4 6 7 6		Wet medium dense yellowish orange coarse to fine sand w/trace of silt and gravel.	A-1-b	3
	_				1:1:1:1:1 1:1:1:1:1:1 1:1:1:1:1:1	1: 1:		
<u> </u>	_	16	32.0' 32.0'	WOR		;; 22" RECOVERY	A 2 4(0)	
	-		02.0	WOR WOR 2 3		trace of gravel and coarse sand.	A-2-4(0)	
33.6	-		34.0'			24" RECOVERY		
	1	17	34.0'	1 1 2 3		Saturated very loose orange fine sand w/some	A-2-4(0)	Water Encountered at 34.4'.
				2 3		silt, trace of coarse sand.		
26.4	-	18	36.0' 36.0'	2		24" RECOVERY	A 2 4(0)	
36.4		10	30.0	2 4 5 4		Saturated loose orange fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
]		38.0'			17" RECOVERY		
]	19	38.0'	4 6 8 8		Indication of Saturated medium dense		pH Sample sent to GTA for testing.
39.2]			8		orange		wanig.
]		40.0'			10" DECOVEDV		
			70.0			18" RECOVERY End of Boring.		
	_					<u> </u>		
42								

Symbol Description

Strata symbols

Low plasticity clay

Clayey sand



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 1/30/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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.: B-4-08

Contract: 28-113-01

Boring Location: Sta. 676+77.06, 300.00' Lt. C.L.

Boring Surface Elev.: + 59.89 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: 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 Depth of Water 31.2 Time **Depth of Hole** Elev. of Water Date 1/29/09 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: Jason Truver

Helpers: D. Zmijewski

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Depth (ft.) P	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/29/09	1	0.5'	2 3 4	Moist firm brown clay w/some fine sand, trace of coarse sand and gravel.	A-6(7)	6" of topsoil, 2" of frozen soil.
			2.0'		15" RECOVERY		
		2	2.0'	4 4 3 5	Moist firm brown fine sandy clay w/some	A-6(7)	
2.8			4.0'	5	coarse sand, trace of gravel. 21"RECOVERY		G
		3	4.0'	2 2 5 7	Moist loose orange silty coarse to fine sand	A-1-b	
				5 7	w/trace of gravel.		
5.6			6.0'	P	18" RECOVERY	01	5
		4	6.0'	7 10 9 9	Moist medium dense orange coarse sand w/	A-1-b	
\vdash				9	some fine sand, silt and gravel.		
			8.0'		19" RECOVERY		
8.4		5	8.0'	7 8	Moist medium dense orange coarse sand and	A-1-b	
				7 8 9 4	gravel w/some fine sand, trace of silt.		
					Here Here		
			10.0'		iiiii Heli Heli Heli Heli Heli Heli Heli		
		6	10.0'	4	1000	A-2-4(0)	
				5 8 9	sand w/some silt and gravel.	112 .(0)	
11.2				9	8.4.4.		
			40.01		100 DECOVEDA		
		7	12.0' 12.0'	5	19" RECOVERY Moist very loose orange coarse sand and	A-1-b	
		'	12.0	5 2 2 3	graval w/gama fine gand trace of gilt	A-1-U	
\vdash				3	graver w/some time sand, trace of sitt.		
\vdash					ETEL ETEL		
14		0	14.0'	-	16" RECOVERY		
		8	14.0'	5 5		A-6(13)	
			15.0'		trace of gravel and coarse sand. 6" RECOVERY		
		8A	15.0'	3 4	Moist loogo raddish gray grayal yy/gama	A-1-a	
			16.0'		coarse to fine sand, trace of silt.		

Remarks:

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	16.0'	6 6 7		\ 10" RECOVERY	A-4(2)	
16.8	-			7 9		Moist stiff reddish gray clayey fine sandy silt		
						w/some gravel, trace of coarse sand.		
			18.0'			19" RECOVERY		
		10	18.0'	7		Moist medium dense orange gravel and fine	A-1-b	
	1			7 11 8 24	CE 1 1 1 1 1 1 1 1 1 1 1 1 1	sand w/some coarse sand and silt.		
	-			24	1. (1 4 1 1 6 6 (1 1 1 1 1 1 1 1			
19.6	-		20.0'			17" RECOVERY		
		11	20.0'	14	11111111	Moist dense orange gravel and coarse sand w/	A-1-b	
				14 16 18 21	1:1:1:1:1:1:1:1 1:1:1:1:1:1:1:1	some fine sand, trace of silt.	A-1-0	
				21		some fine sand, trace of sit.		
					1:1:1:1:1:1:1 1:1:1:1:1:1:1:1			
00.4	1	12	22.0' 22.0'	10	::::::::::::::::::::::::::::::::::::::	20" RECOVERY		
22.4	-	12	22.0	10 10	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	
				9		gravel w/trace of fine sand and silt.		
					1: 1: 1: 1: 1: 1: 1 1: 1: 1: 1: 1: 1: 1			
			24.0'			16" RECOVERY		
		13	24.0'	20 30 28 29		Moist very dense orange gravel w/some	A-1-a	
05.0	-			28 29		coarse to fine sand, trace of silt.		
25.2	-							
			26.0'			13" RECOVERY		
		14	26.0'	11 8 8		Moist medium dense yellow fine sand w/some	A-2-4(0)	
				8 7		coarse sand, gravel and silt.	(*)	
				,	ri i da i e i ra i i <mark>e i e i</mark>			
	1		28.0'			22" RECOVERY		
28	-	15	28.0'	3 4	100144164 10114154	Moist loose yellow fine to coarse sand w/	A-2-4(0)	
	-	.0	20.0	5		some silt, trace of gravel.	A-2-4(0)	
				4	126 1 7 3 3 6 U 126 1 4 3 1 6 6 136 1 4 6 3 6 6	some sint, trace of graver.		
					ii la ii ci		004	_
		40	30.0'			20" RECOVERY	//.).1	
20.0	1	16	30.0'	3 5 5 5		Wet loose yellow fine sand w/some silt, trace	A-2-4(0)	Water encountered at 31.2'.
30.8	1			5		of coarse sand and gravel.		
	-							
			32.0'			20" RECOVERY		
		17	32.0'	1 1		Wet loose yellow fine to coarse sand w/some	A-2-4(0)	
				4 5	(000) 1900 p (000) 1900 p (000) 1900 p (000) 1900 p	silt, trace of gravel.		
33.6					(% (%).6 (() () 10:0 (:		
33.0	1		34.0'		166 19.356 f 166 1 7 3 30 U 166 1 4 3 6 6	20" RECOVERY		
		18	34.0'	1 3		Wet loose orange coarse sand w/some fine	A-1-b	
<u> </u>				4 4		sand, trace of gravel and silt.		
<u></u>]		36.0'		10000000000 1010101010101	:1		
36.4		19	36.0'	4 7		Wet medium dense orange coarse to fine sand	A-1-b	
00.1	1			9	1:1:1:1:1:1:1:1 1:1:1:1:1:1:1:1	w/trace of gravel and silt.	A-1-0	
	-			13		with the of graver and sitt.		
	-				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			
		20	38.0' 38.0'	4		Z1" RECOVERY		pH Sample sent to GTA for
]	20	30.0	7 9	1:1:1:1:1:1:1 1:1:1:1:1:1:1:1 1:1:1:1:1	Saturated medium dense yellow brown fine to		testing.
39.2				13		coarse sand, trace silt.		Coung.
	1				11:1:1:1:1:1:1:1	:		
			40.0'		100000001 100000001 10000000			
<u> </u>	-					End of Boring.		
	-							
42								
	1	I			l			1

Symbol Description

Strata symbols

Low plasticity clay



Silty sand

Well graded sand with silt



Silt



Poorly graded sand with silt



Poorly graded gravel with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 1/29/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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.: B-4-10W

Contract: 28-113-01

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

Boring Surface Elev.: + 53.62 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: 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 Depth of Water Time **Depth of Hole** Elev. of Water Date 1/30/09 36.1 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: 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' 2.0'	2 4 5	Moist stiff brown clayey silt w/trace of fine to coarse sand. 18" RECOVERY 5" of topsoil, 8" of frost.
2.8		2	2.0'	2 4 4	Moist firm brown clayey fine to coarse sandy A-4(1)
2.0		N	4.0'	4	silt w/trace of gravel.
		3	4.0'	3 3 3 5	Moist firm brown fine to coarse sandy silt. A-4(0)
5.6			6.0'	P	E N R P 2015
		4	6.0'	3 3 5 7	Moist firm brown clayey silt w/some coarse A-4(3) to fine sand, trace of gravel.
			8.0'	7	21" RECOVERY
8.4		U-1	8.0'		Wet orange brown mottled silty fine to coarse sand, trace of gravel. Pressed Shelby Tube, 15" recovery.
			10.0'		15" RECOVERY
		5	10.0'	6 5 6 6	Moist medium dense brownish orange silty coarse to fine sand w/trace of gravel. A-2-4(0)
11.2			12.0'	0	22" RECOVERY
		6	12.0'	5 5 4 5	Moist loose brownish orange silty fine to coarse sand w/trace of gravel. A-2-4(0)
14		7	14.0' 14.0'	4	20" RECOVERY Moist loose brownish orange coarse sand w/ A-1-b
		,		4 4 5 5	some fine sand, trace of silt and gravel.
	1		16.0'		REITHER 22" RECOVERY

Remarks:

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		8	16.0'	5 6 6 7				Moist medium dense brownish orange coarse	A-1-b	
10.0				6 7				sand w/some fine sand and silt, trace of		
					101	(((((((((((((((((((gravel.		
-		9	18.0' 18.0'	3				21" RECOVERY Maigt stiff growish rad alayay silt yy/sama	A 4(2)	
			10.0	3 6 8 8				Moist stiff grayish red clayey silt w/some coarse to fine sand.	A-4(3)	
				8				coarse to fine sand.		
19.6			20.0'					22" RECOVERY		
		10	20.0'	5	ľ			Moist medium dense brownish orange coarse	A-1-b	
				5 6 6 7				sand w/some fine sand and silt, trace of	11 1 0	
				,				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.		
		40	26.0'	3		,		22" RECOVERY	1 2 1(0)	
		13	26.0'	3 3 4	100			Wet loose light brown and orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
				5			ie i	coarse sand w/some snt, trace of graver.		
			22.01				ξź.			
28		14	28.0' 28.0'	2 2			Ĥ	20" RECOVERY Wet very loose brown silty fine sand.	A-2-4(0)	
				2 2				wetvery loose of wir sitty fine suite.	112 1(0)	
				4						
			30.0'					22" RECOVERY	004	
		15	30.0'	3 3 2 3				Wet loose brown fine sand w/some silt, trace	A-2-4(0)	
30.8				2 3				of coarse sand.		
			32.0'			Ш		21" RECOVERY		
		16	32.0'	1 1				Wet very loose brown fine sand w/some silt,	A-2-4(0)	
				1 2				trace of coarse sand.		
33.6										
		17	34.0' 34.0'	2				23" RECOVERY Wet loose brown fine sand w/some silt, trace	A-2-4(0)	
		l ''	01.0	2 3 3 3				of coarse sand and gravel.	A-2-4(0)	
				3				2- Journa and Bratter		
			36.0'					23" RECOVERY		
36.4		18	36.0'	3 8	101		11	Wet medium dense brownish black fine to	A-3	Water encountered at 36.1'.
				3 8 6 9				coarse sand w/trace of silt and gravel.		
							, i			
			38.0'		12			22" RECOVERY		
		19	38.0'	3 8 7 8				Wet medium dense brownish black coarse to	A-3	
39.2				8				fine sand w/trace of silt and gravel.		
55.2) (1) (1) (1)					
			40.0'	Λ	100	1177	inch Ee	22" RECOVERY		777 1 1
		20	40.0'	9 8 9			1111	Wet medium dense brownish black fine to	A-3	Washed out augers using mud/water mix.
				9				coarse sand w/trace of silt and gravel.		muu/watel IIIIX.
			40.00					2011 DECOVEDY		
42		21	42.0' 42.0'	4 6	100			23" RECOVERY Saturated medium dense brownish black fine	A-2-4(0)	Washed out augers using
		<u> </u>		6		ПŰ	999	Saturated inedialii delise biowilisii biack lille	A-2-4(U)	washed out augets 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 sand w/some coarse sand and silt, trace of 10 12 mud/water mix. gravel. 19" RECOVERY 44.0' 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 pH sample sent to GTA for 24 48.0' No Sieve Analysis testing. 50.0' 22" RECOVERY 50.4 End of Boring. 53.2 56 TEMBER 20 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 SEPTEMBER 2015

- 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.

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: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. U-Sampler: 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 2/4/09 24.2 28.0 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: 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)	
			2.0'		12" RECOVERY	
2.8		2	4.0'	6 6 5 5	Moist medium dense orange coarse sand w/ some silt and gravel, trace of fine sand. 20" RECOVERY	G
		3	4.0'	3	Moist loose orange coarse sand w/ some A-1-b	
5.6		U)	6.0'	3 4 5 2	gravel and silt, trace of fine sand. 15" RECOVERY	5
		4	6.0' 8.0'	2 3 2 3	Moist loose orange coarse sand, trace of silt, fine sand, and gravel. 17" RECOVERY	
8.4		5	8.0'	2 2 3 2	Moist loose orange coarse sand, trace of silt, fine sand, and gravel. 14" RECOVERY	
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	
14		7	12.0' 14.0'	5 5 7 7	Moist medium dense yellow coarse sand, trace of fine sand, silt, and gravel. 18" RECOVERY	
		8	14.0'	4 3 3 4	Moist loose orange coarse sand w/ some silt, trace of fine sand and gravel.	

Remarks:

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
	1		16.0'		(12 / 12) (14 / 14)		18" RECOVERY		
	-	9	16.0'	4	1: (1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1167	Moist loose orange coarse sand w/ some	A-1-b	
16.8				4 3 5 6	1:6313 1:6133 1:6133		gravel, trace of silt and fine sand.		
				0			<u> </u>		
	1					iii d			
<u> </u>	-		18.0'		11111	1000	18" RECOVERY		
]	10	18.0'	3 4 6			Moist loose orange coarse sand, trace of silt,	A-1-b	
				6 7	1:1:1:1:1:	1:1:1:[fine sand, and gravel.		
	1								
19.6	-		20.0'		1:	1:1:1:	16" DECOVERY		
]	11	20.0'	6	101010101 101010101	1:1:1: 1:1:1:	16" RECOVERY	A 1 1	
		''	20.0	6 10 18 13	1:1:1:1:1:	1:1:1:	Moist medium dense orange coarse sand and	A-1-b	Contains cemented sands.
	1			13			gravel w/ some fine sand, trace of gravel.		
	-				1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1:				
	1		22.0'				14" RECOVERY		
22.4		12	22.0'	7 7 5			Wet medium dense yellow, orange, and white	A-2-4(0)	
]			5			mottled fine to coarse sand w/ some silt, trace	- .(<i>v</i>)	
	-			4			of gravel.		
	-								
]		24.0'			100	18" RECOVERY		
]	13	24.0'	3 4			Wet loose brown and light brown fine sand w/	A-3	Water encountered at 24.2'.
	1			3 4			some coarse sand, trace of silt and gravel.		
25.2) () 4) () () ()				
]		00.01				WI DECOVEDY		
		14	26.0' 26.0'	3			21" RECOVERY	A 2 4(0)	
	1	L 14	20.0	3 4 6			Wet loose brown and light brown fine sand w/	A-2-4(0)	
	-			10			some coarse sand and silt, trace of gravel.		
	1						$\cdot () \bowtie \bowtie \square$		
28		I N	28.0'				15" RECOVERY	\mathcal{I} I I \mathbf{N}	
	1	15	28.0'	3			Wet loose orange fine to coarse sand w/ some	A-2-4(0)	
	1			3 3 5			silt, trace of gravel.	-(-)	
]		 				$\mathbf{H} \mathbf{N} \mathbf{I} \mathbf{H} \mathbf{H} \mathbf{H} \mathbf{H} \mathbf{I}$	/() [
		10	30.0'	7			14" RECOVERY		
66.5	1	16	30.0'	7 11			Wet medium dense orange fine sand w/ some	A-2-4(0)	
30.8	-			16 18			silt, trace of coarse sand.		
			32.0'				18" RECOVERY		
	1	17	32.0'	1	11111		Wet medium dense orange fine sand w/ some	A-3	Contains cemented sands.
	1	''		14 13 30	11111		coarse sand, trace of silt and gravel.	Λ-3	Contains contented sands.
				30			coarse sand, trace of sift and graver.		
33.6									
]		34.0'			1100	24" RECOVERY		
	1	18	34.0'	13 14 19 22			Wet dense orange fine sand w/ some coarse	A-2-4(0)	
	-			19			sand and silt, trace of gravel.		
]						, ,		
			20.01				10" PECOVERY		
60.	1	10	36.0'	28		##	20" RECOVERY	4.2	
36.4	-	19	36.0'	28 36 21 42			Wet very dense orange fine to coarse sand,	A-3	
				42			trace of silt and gravel.		
	1		38.0'				16" RECOVERY		
\vdash	1	20	38.0'	11			Indication of wet dense orange fine to coarse		pH sample sent to GTA for
				11 21 21 20	: (141):(11)		sand, trace of silt and gravel.		testing.
39.2				20	10 8 3 1 3 138 3 3 3 100 1 3 3	1:06 1:06	sand, nace of sint and graver.		<i>G</i> -
]					1166			
			40.0'			nie d nie d	18" RECOVERY		
	-						End of Boring.		
1.	1								

Symbol Description

Strata symbols

SCIACA SYMBOIS

Clayey sand

Silty sand

Poorly graded sand with silt

Well graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 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.

F.A. Project: U.S. 301 Maryland State Line to I-95 Boring No.: B-4-13

Contract: 28-113-01

Boring Location: Sta. 692+04.54, 544.00' Lt. C.L.

Boring Surface Elev.: + 28.57 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. IN.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 40.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 1/20/09 8.0 10.0 6.9

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: Jason Truver

Helpers: C. Shaw

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	1/20/09	1	0.5' 2.0'	7 12 17		Moist medium dense brown gravel and fine to coarse sand w/ some silt. 15" RECOVERY	A-1-b	Topsoil - 7".
		2	2.0'	33 18			A-1-b	
2.8		_		18 15	9:9:9:9:9:9 1:9:9:3:3:3:1 1:1:1:1 <mark>:0:0</mark>	i.i	A-1-0	
			4.0'	12		22" RECOVERY		G
		3	4.0'	5 4		Wet loose brown coarse to fine sand w/ some	A-1-b	
				4	:::::::::: ::::::::::			
5.6		S	6.0'	P		17" RECOVERY	201	5
		4	6.0'	1 2		Wet very loose light brown fine to coarse	A-2-4(0)	
			8.0'	1 1		91	,	
8.4		5	8.0'	1		1 11 1 1 1	A-1-b	
				1 1 2		sand, trace of silt and gravel.	71 1 0	
1			10.0'		/	16" RECOVERY		
		U-1	10.0'			Saturated brown fine to coarse sand w/ some		Press Sample - Shelby Tube.
11.2					7.817778 667336 667336	silt and gravel.		
						ē 		
			12.0'			£ 22" RECOVERY		
		6	12.0'	8 6 7 9		Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
14			14.0'		166 19.316 100 1 7 3 10 100 1 7 3 10	14" RECOVERY		
17		7	14.0'	9 9 9 12		Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			16.0'			16" RECOVERY		
1	I		10.0			III 10 RECOVERT		

Remarks:

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		8	16.0'	19 22 23 15	2015.1127. 1111.1111.111	Saturated dense brown fine sand w/ some	A-2-4(0)	
]			15		coarse sand and fine sand, trace of gravel.		
			18.0'		000 1000 C 000 1000 C 000 1000 C	20" RECOVERY		
		9	18.0'	4 5 9 10		Saturated medium dense brown fine sand w/	A-3	
				9 10	66133366 66173366 56143366	some coarse sand and silt.		
19.6					000 1000 C 000 1000 C	400 777 7077777		
	_	10	20.0'	8	30141166 30141166	18" RECOVERY Saturated dense brown fine sand w/ some	A-3	
	-			8 10 22 25	0063133000 06333306 063333000	coarse sand, trace of silt and gravel.		
	_							
		44	22.0'	4	00111100 00111100 00111100	20" RECOVERY		
22.4	-	11	22.0'	4 5 9 9	(30.44-3067) (30.9.13067) (30.9.33067)	Saturated medium dense brown fine sand w/some coarse sand, trace of silt and gravel.	A-3	
	-			9		some coarse sand, trace or site and graver.		
			24.0'		6614.1966 001173700 001173700	22" RECOVERY		
		12	24.0'	4 5 9 11	11199160 20141261 2011926	Saturated medium dense brown fine sand w/	A-3	
25.2				11	66133166 66173766 66173366	some coarse sand, trace of silt and gravel.		
]		00.01		66 14 19 6 f			
		13	26.0' 26.0'	9	156143166	18" RECOVERY Saturated dense brown fine sand w/ some	A-2-4(0)	
				9 15 18 27		coarse sand and silt.		
	_							
28		44	28.0'	5	11.11.EF	20" RECOVERY		
		14	28.0'	5 9 16 16	66 4 1 1 1 6 6 4 66 6 1 1 1 1 6 6 66 6 3 3 3 6 6	Saturated medium dense brown fine sand w/some coarse sand, trace of silt.	A-3	
	_			16	12	Some coarse sand, trace of site.		
			30.0'	\Box	6614.166. 96173369 9614366	20" RECOVERY	004	
		15	30.0'	5 8 8 16	00 14 15 0 0 01 14 15 0 0 01 1 1 1 10 0 0	Saturated medium dense brown fine sand w/	A-3	
30.8	1			16		some coarse sand, trace of silt.		
			20.01		663 1366 6 663 1366 6 663 133 66	100 DECOVEDY		
		16	32.0' 32.0'	8	0614166 0614166 0644166	18" RECOVERY Saturated dense brown fine sand w/ some	A-3	
	1			8 14 25 25	10 6 7 1 3 1 5 6 6 10 6 1 3 3 1 6 6 10 6 1 7 3 1 5 1 5	coarse sand, trace of silt.		
33.6								
		17	34.0' 34.0'	5	0017370V 0014106 001710V	20" RECOVERY	4.2	
		17	34.0	5 5 10 13	66 144 166 6 66 14 156 6 66 14 166 6	Saturated medium dense brown fine sand w/some coarse sand, trace of silt.	A-3	
				13	00143169 00143169 00143169	zzane zonioż omia, mace or one.		
			36.0'		60141166. 60172766 6017266	18" RECOVERY		
36.4		18	36.0'	13 19 30 35		Saturated dense brown fine sand w/ some	A-3	
				35		coarse sand, trace of silt.		
			38.0'			19" RECOVERY		
		19	38.0'	3 9	51111000 511111000	Saturated medium dense brown fine sand with		pH sample sent to GTA for
39.2				14 20		a trace of silt.		testing.
J3.2	1				eriyane Gildaler Diriyan			
	<u> </u>		40.0'			22" RECOVERY End of Boring		
]					Lind of Dorling		
42]							

Symbol Description

Strata symbols

Silty sand

Well graded sand with silt

(1.00) (1.00) (1.00) (1.00) (1.00) (1.00)

Poorly graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 1/20/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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.: B-4-14W

Contract: 28-113-01

Boring Location: Sta. 692+46.87, 1,050.00' Lt. C.L.

Boring Surface Elev.: + 39.32 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. IN.

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

Hollow Stem Auger: 0.0 50.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 1/27/09 18.1 22.0 20.0

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 (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	1/27/09	1	0.5' 1.5'	4 7	Moist stiff brown clayey silt, trace of fine to coarse sand and gravel. 12" RECOVERY Cultivated Soil - 8".
2.8		2	2.0'	5 4	Moist stiff brown silt w/ some clay and fine A-4(2) sand, trace of coarse sand and gravel.
		2A	3.0' 4.0'	5 7	10" RECOVERY Moist medium dense orange silty fine to A-2-4(0)
		3	4.0'	4 4 5 8	coarse sand, trace of gravel. 10" RECOVERY Moist loose orange coarse sand and gravel,
5.6		4	6.0' 6.0'		trace of fine sand and silt. 18" RECOVERY
		4	8.0'	3 5 4 5	Moist loose orange coarse sand w/ some silt, fine sand, and gravel. 18" RECOVERY
8.4		5	8.0'	3 5 6 6	Moist medium dense orange coarse sand w/ A-1-b some fine sand, trace of silt and gravel.
11.2		6	10.0'	3 5 5 7	Moist loose orange coarse sand w/ some fine sand and silt, trace of gravel.
		7	12.0' 12.0' 13.0'	4 4	20" RECOVERY Moist loose orange coarse sand w/ some fine sand and gravel, trace of silt.
14		7A	13.0' 14.0'	6 6	Moist stiff orange silty clay w/ some fine sand, trace of gravel and coarse sand. A-6(6) Clay lens from 12.5' to 13.0'
		8	14.0' 16.0'	5 5 7	Sand, trace of graver and coarse sand. 12" RECOVERY Moist loose orange coarse sand w/ some fine sand, trace of silt and gravel. 20" RECOVERY

Remarks:

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

Depth Dept					1				
18.0	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
18.0" 18.0" 20 RECOVERY Wet medium dense orange fine to coarse sand A-2-4(0) w/s ome sift, trace of gravel.	16.8		9	16.0'	8			A-1-b	
10	10.0	1			7		sand w/ some gravel, trace of silt.		
10		-		10.01		1:	20" RECOVERY		
19		1	10		10	1.01211		A-2-4(0)	
19		-			10	10 6 7 1 3 1 0 1 1 2 6 1 4 1 2 1 0 1 2 6 1 7 7 3 1 0		112 .(0)	
11 20.0° 1 11 20.0° 2 15 15 15 15 15 15 15	19.6					1.614316	_		
22.0	13.0	1				1563436 1563436	13" RECOVERY		
22.0 22 22.0 4 22.0 4 22.0 4 22.0 4 22.0 4 22.0 4 22.0 4 22.0 4 22.0 4 22.0 4 22.0 4 22.0 4 24.0 24.0 24.0 25.2 26.0 25.2 26.0 26.0 27.			11	20.0'	1 4	11.0 1 2 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		A-3	
22.4					4	1.0141.6	silt and gravel.		
22.4									
24.0" 16" RECOVERY 16" RECOVERY 125.2 28.0" 12" 16" RECOVERY 14" 28.0" 16" RECOVERY 14" 28.0" 16" RECOVERY 22" RECOVERY 28.0" 16" RECOVERY 28.0" 28.0	22.4	1	12		4	111111		A 1 h	
24.0° 16° RECOVERY 22.0° RECOVERY 22.0° RECOVERY 22.0° RECOVERY 32.0° 32	22.7	1			4 6			A-1-0	
13		1			,		6.0.0		
13				24.0'			16" RECOVERY		
26.0' 12 22*RFCOVERY 22*RFCOVERY 22*RFCOVERY 28.0' 12 34.55 35.55			13		1 2			A-2-4(0)	
26.0° 12 12 12 12 12 12 12 1	25.2	1			4 3		w/ some silt, trace of gravel.		
14	20.2	1							
28 8 8 6 1 1 1 1 1 1 1 1 1			1.1		12	1:0133:0		A 2 4(0)	
15 28.0° 16 17 18 18 18 18 18 18 18			14	20.0	8	136 14 13:0 136 14 13:0		A-2-4(0)	
15					8	1:61 / 3 1:6 1:61 / 3 1:6 1:61 (1:61-6)	w/ some sit, trace of graver.		
15	28			28 0'			16" RECOVERY		
30.0	20	1	15		6	1: [1 4 7 E		A-3	
16 30.0° 18 20					7 7	(36 14 19) (41 7 7 9)	sand, trace of silt and gravel.		
16 30.0° 18 20									
32.0' 10" RECOVERY A-2-4(0)		1	40		11	111111)().1	6
32.0' 10" RECOVERY A-2-4(0)	30.8		16	30.0	18 20			A-2-4(0)	
17 32.0° 7 9 2 24" RECOVERY A-2-4(0)	00.0	1			20		coarse sand, sint, and graver.		
17 32.0° 7 9 2 24" RECOVERY A-2-4(0)				32.0'			10" RECOVERY		
33.6 34.0'			17		7 7			A-2-4(0)	
33.6 34.0' 24" RECOVERY A-2-4(0)		1			9 12		[:]	()	
34.0' 24" RECOVERY A-2-4(0)	33.6								
36.0' 19 36.0' 9 11 11 11 11 11 11 12 12 13 15 16 16 16 16 16 16 16	00.0	1							
36.0' 19 36.0' 9 11 11 11 11 11 11 12 12 13 15 16 16 16 16 16 16 16			18	34.0'	8 8 8			A-2-4(0)	
19 36.0' 9 18 28 28 28 28 28 28 28					13	1.61716	some coarse sand and silt, trace of gravel.		
19 36.0' 9 18 28 28 28 28 28 28 28		1		20.01		66 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	22# RECOVERY		
38.0' 16" RECOVERY 20 38.0' 15 15 15 15 15 15 15 1	36.4	1	19		9			A-2-4(0)	
38.0' 16" RECOVERY 20 38.0' 15 15 15 15 15 15 15 1		1			28 31	00 1 1 1 1 1 0 0 00 1 1 1 1 1 0 00 1 1 1 1		112 1(0)	
39.2 20 38.0' 10 15 15 12 12 12 13 15 12 12 13 15 12 12 13 15 13 15 12 13 15 13 15 12 13 15 13 15 12 13 15 13 15 12 13 15 12 13 15 12 13 15 12 13 15 12 13 15 12 13 15 12 13 15 12 13 15 12 13 15 12 13 15 12 13 15 12 13 15 12 13 15 12 13		1							
40.0' 19" RECOVERY A-3		1							
40.0' 19" RECOVERY A-3		1	20	38.0'	10 15			A-3	
40.0' 19" RECOVERY 19" RECOVERY 21 40.0' 11 11 11 11 11 11 11	39.2	1			18		coarse sand, trace of silt.		
21 40.0' 11 Saturated dense orange fine sand w/ some coarse sand, trace of silt. 42 42.0' 15" RECOVERY]		42.5:					
21 21 31 42 42.0' 51 75 8 15 8 15 8 15 8 15 8 15 8 15 8 1]	21		11		•	Λ_2	
42 42.0' 15" RECOVERY			-:		21 21			Λ-3	
					20		,		
	42			42.0'			15" RECOVERY		
]	22	42.0'	8 8	erikie Grigare	Saturated medium dense orange fine sand w/	A-2-4(0)	

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

					<u> </u>	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
				9 10	some coarse sand and silt.	
					661 64066 561 8 3666	
		23	44.0' 44.0'	5	18" RECOVERY Saturated medium dense orange fine sand w/ A-3	
44.8		20	44.0	5 5 8 10	some coarse sand trace of silt	
				10	itivitis	
			46.0'		18" RECOVERY	
		24	46.0'	4 8 16 24	Saturated medium dense orange fine sand w/ A-3	
				16 24	some coarse sand, trace of silt.	
47.6					15 14 10 15 5 14 15 16 16 5 14 15 16 16	
		25	48.0' 48.0'	4	24" RECOVERY Indication of saturated medium dense orange	pH sample sent to GTA for
			10.0	4 5 8 17	Indication of saturated medium dense orange fine sand w/ some coarse sand, trace of silt.	testing.
				17	FE 13.316 F	
			50.0'		開始的 開催 開催 20" RECOVERY	
50.4					End of Boring	
\vdash						
					DDAET	
\vdash					DRAFT	
53.2						
					FOR BIDDIN	l(j
				_		
56						_
					TEMBER 201	
				_		
58.8						
61.6						
<u> </u>						
\vdash						
64.4						
67.2						
57.2						

Symbol Description

Strata symbols



Low plasticity clay



Silty low plasticity clay



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 1/27/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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-4-15

Contract: 28-113-01

Boring Location: Sta. 695+80.95, 1,139.00' Lt. C.L.

Boring Surface Elev.: + 47.53 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: 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 Depth of Water Time **Depth of Hole** Elev. of Water Date 12/22/08 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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: D. Zmijewski

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

Remarks:

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
				8 10		sand w/ some silt, trace of gravel.		
			18.0'	_	111111111111111111111111111111111111111	17" RECOVERY		
		10	18.0'	5 6 7 8	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:	Moist medium dense orange coarse sand and gravel, trace of fine sand and silt.	A-1-b	
19.6				8		graves, state of the canal and the		
		11	20.0'	10		18" RECOVERY	A 1 L	
		''	20.0	10 10 9 9		Moist medium dense yellow coarse sand w/ some gravel, fine sand, and silt.	A-1-b	
-					06143366 0614366 0614366 0613366			
22.4		12	22.0' 22.0'	4	11111111111111111111111111111111111111	19" RECOVERY Moist medium dense yellow coarse sand w/	A-1-b	
22.7				4 5 8 8	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	some fine sand, trace of silt and gravel.	A-1-0	
					1:1:1:1:1:1:1: 1:1:1:1:1:1:1:1: 1:1:1:1:1:1:1:1:			
-		13	24.0' 24.0'	5		22" RECOVERY Moist medium dense yellow coarse to fine	A-1-b	
25.2				5 7 7 13		sand, trace of silt and gravel.	1110	
25.2					1: 1	DDAET		
		14	26.0' 26.0'	22 16	34457	17" RECOVERY Moist medium dense yellow gravel and coarse	A-1-b	
				22 16 13 11		to fine sand, trace of silt.		
			28.0'		100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	4" RECOVERY		
28		15	28.0'	1 2	66343.69	Wet very loose orange fine sand w/ some	A-2-4(0)	
				1 2 2 6		coarse sand and silt, trace of gravel.	711 N	
			30.0'			22" RECOVERY		
		16	30.0'	6 7 8		Wet medium dense yellow and light brown	A-1-b	5
30.8				9		coarse to fine sand w/ some gravel, trace of silt.	40 I	
			32.0'			21" RECOVERY		
		17	32.0'	1 3 5 18	11111111111111111111111111111111111111	Wet loose yellow and light brown fine to	A-3	
				18		coarse sand, trace of silt and gravel.		
33.6			34.0'		1993.1966 1993.1966 1993.1966 1993.1966	20" RECOVERY		
		18	34.0'	4 9 16 15	10 14 15 0 14 14 15 0 16 14 15 0 16 14 15 0	Wet medium dense brown fine to coarse sand w/ some gravel, trace of silt.	A-3	
				15		w/ some graver, trace or sin.		
			36.0'		13513.1166. 1261731166 126173166	16" RECOVERY		
36.4		19	36.0'	4 20 26 30		Saturated dense brown fine to coarse sand, trace of silt.	A-3	
				30		trace of site.		
		- 00	38.0'	5	100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	22" RECOVERY		ull comule cont to CTA for
		20	38.0'	5 6 11 10	0017390 0014300 0017300	Saturated medium dense brown fine to coarse sand, trace of silt and gravel.		pH sample sent to GTA for testing.
39.2				10				-
			40.0'		erinier Billier	20" RECOVERY		
						End of Boring		
42								
\vdash								

Symbol Description

Strata symbols

Silty low plasticity clay

Silt

Silty sand

Clayey sand

1000000

Poorly graded sand with silt

Well graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

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

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

F.A. Project: U.S. 301 Maryland State Line to I-95 Boring No.: B-4-16

Contract: 28-113-01

Boring Location: Sta. 697+74.42, 884.00' Lt. C.L.

Boring Surface Elev.: + 45.24 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 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 Depth of Water Time **Depth of Hole** Elev. of Water Date 12/22/08

24.7 28.0 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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	12/22/08	1	1.0' 2.0'	2 2 2 4		Moist firm brown clayey silt, trace of fine to coarse sand.	A-4(10)	Cultivated Soil - 11".
2.8		2	2.0'	4 6 6 9		Moist stiff brown silt, trace of fine to coarse sand.	A-4(0)	
			4.0'	1		18" RECOVERY		G
		3	4.0'	1 5 6 6		Moist stiff brown silt w/ some clay and coarse to fine sand, trace of gravel.	A-4(1)	
5.6			6.0'			20" RECOVERY	001	5
		4	6.0'	6 9 14 13		Moist very stiff brown silt w/ some coarse to fine sand, trace of gravel.	A-4(0)	5
<u> </u>			8.0'			18" RECOVERY		
8.4		5	8.0'	3 5 5 6		Moist loose orange coarse sand, trace of fine sand, silt, and gravel.	A-1-b	
			10.0'		0013.000 00173000 00143000	20" RECOVERY		
11.2		6	10.0'	6 6 7 6		Moist medium dense orange coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
			12.0'		061))060 0114100 014400 014400	19" RECOVERY		
		U-1	12.0'		100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			Press Sample - Shelby Tube.
14			14.0'		000 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	22" RECOVERY		
		7	14.0'	6 6 9		Moist medium dense brown coarse sand w/	A-1-b	
				9 9		some fine sand, trace of silt and gravel.		
			16.0'		6617376V	18" RECOVERY		
		8	16.0'	7 8		Moist medium dense brown coarse sand w/	A-1-b	

Remarks:

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
	- 5			9	100000000000000000000000000000000000000	some fine sand and gravel, trace of silt.		
					1-1-1-1-1-1			
			18.0'		1:	22" RECOVERY		
		9	18.0'	5 6 8 7		Moist medium dense brown coarse to fine	A-1-b	
				8 7		sand w/ some silt, trace of gravel.		
19.6								
10.0			20.0'			23" RECOVERY		
		10	20.0'	6 8	1:	Moist medium dense brown coarse to fine	A-1-b	
				9 11	10101010101	sand, trace of silt and gravel.		
			22.0'		1:	23" RECOVERY		
22.4		11	22.0'	5	1:1:1:1:1:1:	Moist medium dense brown coarse sand w/	A-1-b	
				5 6 9 10	1:0:0:0:0:0:0:0: 1:0:0:0:0:0:0:0: 1:0:0:0:0	some fine sand and gravel, trace of silt.		
				10				
			24.0'		10101010101	24" RECOVERY		
		12	24.0'	14	1: C 1 2 3 : E 1: C 1 2 3 : E	Wet medium dense brown fine to coarse sand	A-2-4(0)	
				14 11 7 9	1:6713:0 1:613.1:0	w/ some gravel and silt.	112 (0)	
25.2				9		20 Ben es men 2 11		
			26.0'			24" RECOVERY		
		13	26.0'	3	100 1 4 1 6 1 100 1 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Wet medium dense yellow fine to coarse	A-3	
				3 5 8	CE 13 350 CE 13 350	sand, trace of silt and gravel.	A-3	
				8	1:01/1/10	sand, trace of sitt and graver.		
			00.01		(00) 1 3 (0) (00) 4 4 6 6			
28		14	28.0' 28.0'	1	100 1 4 1 6 100 1 4 1 1 1	24" RECOVERY Wet medium dense yellow fine to coarse	A 2	
<u> </u>			20.0	4 7 7		sand, trace of silt and gravel.	A-3	
				7		sand, trace of sint and graver.		
					60 J 13 G 18 J 3 13 G			
		15	30.0' 30.0'	10	11 1 2 7 1 1	21" RECOVERY		
30.8		15	30.0	10 21 28 22	(10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Wet dense brown and orange fine to coarse	A-3	Contains cemented sands.
30.0				22		sand w/ some silt, trace of gravel.	4UI	
				_	(1) 13 (c) (2) 14 (c)			
<u> </u>		40	32.0'	10	1001430	10" RECOVERY		
		16	32.0'	10 20 20	(4 14 14 (11 17 17 17 17 17 17 17 17 17 17 17 17 1	Wet dense brown and orange fine to coarse	A-2-4(0)	
				20		sand w/ some silt, trace of gravel.		
33.6					(66 140 166 (66 14 156 (66 14 166			
			34.0'		111111	20" RECOVERY		
		17	34.0'	4 9		Saturated medium dense brown and orange	A-3	
				14 17		fine sand w/ some coarse sand, trace of silt.		
					0114916			
			36.0'		156 1 9 3 1 6 156 1 9 3 1 6 156 1 9 3 1 6	24" RECOVERY		
36.4		18	36.0'	19 21 28 31	046 1 4 4 0 6 126 1 2 3 3 1 6 126 1 7 7 1 5 6	Saturated dense brown and orange fine sand	A-3	
				28 31		w/ some coarse sand, trace of silt and gravel.		
					10 6 7 1 7 1 6 10 6 1 4 1 1 0 10 6 1 7 7 1 6			
			38.0'		0111111	20" RECOVERY		
		19	38.0'	8 11		Saturated medium dense brown fine to coarse		pH sample sent to GTA for
				16 16	, 11 mile (11 mile)	sand, trace of silt.		testing.
39.2					188 3 3.316 178 1 3 3 70 198 1 3 3 36			
			40.0'		jitiriik Cooliik Militir	22" RECOVERY		
			15.5		13.3.110	End of Boring		
						Č		
42								
44								
I		l	1	1	1			1

Symbol Description

Strata symbols

Low plasticity clay



Silt



Silty low plasticity clay



Poorly graded sand with silt



Well graded sand with silt



Silty sand

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 12/22/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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.: B-4-17

Contract: 28-113-01

Boring Location: Sta. 695+78.34, 425.00' Lt. C.L.

Boring Surface Elev.: + 36.40 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. IN.

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

Hollow Stem Auger: 0.0 40.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 1/21/09 20.0 18.0 14.1

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: Jason Truver

Helpers: C. Shaw

Depth	Daily	No.	Sample	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress 1/20/09	1	Depth 0.5'	3	////		A ((12)	T. '1 7"
	1/20/09	'	0.5	3 3 3		t firm brown clayey silt, trace of fine to	A-6(13)	Topsoil - 7".
					coars	e sand.		
			2.0'	3	MILIMITE TO A STATE OF THE PARTY OF THE PART	9" RECOVERY		
2.8		2	2.0'	3 6		t stiff brown clayey silt w/ some gravel	A-4(1)	
2.0	1	A	3.0'	-	and f	ine to coarse sand. 9" RECOVERY		
		2A	3.0'	5 8		t medium dense brown coarse sand w/	A-1-b	
			4.0'			gravel, silt, and fine sand.		
		3	4.0'	5 5 5		5" RECOVERY	A-1-b	
				14		t loose brown coarse sand and gravel w/	0 4	
5.6					some	e silt and fine sand.	<i>) (</i>) 1	6
	1		<mark>6</mark> .0'			17" RECOVERY		
		4	6.0'	14 16 13 13		t medium dense brown coarse sand and	A-1-b	
	1			13 13	grave	el w/ some fine sand, trace of silt.		
					(14) () (() 100 ()			
			8.0'		6143060 6143060 6143066	16" RECOVERY		
8.4		5	8.0'	4 4	Mois	t loose brown coarse sand w/ some fine	A-1-b	
				4 4 6 6	sand	and gravel, trace of silt.		
					1:1:1:1:1:1:1 1:1:1:1:1:1:1 1:1:1:1:1:1			
			10.0'		101010101 1111111111 1111111111	16" RECOVERY		
		6	10.0'	7	Mois	t medium dense brown coarse sand and	A-1-b	
-				7 9 10 9	grave	el, trace of silt and fine sand.		
11.2								
			12.0'		614 116 f 617 316 c	14" RECOVERY		
		7	12.0'	4	Wet	medium dense brown coarse to fine sand	A-1-b	
				5 7 8	k / 10:00l	ome silt, trace of gravel.	11 1 0	
	1			8		Silv, times of graver.		
			44.01		63 13:00 613 3:66 613 3:00	12" RECOVERY		
14		8	14.0' 14.0'	7 8	Mat	very dense light brown fine to coarse	A-3	
			11.0	8 50/4"		trace of silt and gravel.	A-3	
					::::::::::::::::::::::::::::::::::::::			
			15.5'		63 1500 C 613 200 f	5" RECOVERY		
1	I	I	1	I	113355			

Remarks:

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

					1				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"			Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	2 4 5 6			Saturated loose light brown coarse to fine	A-1-b	
10.0	1			6			sand, trace of silt and gravel.		
	1		18.0'			110 f	15" RECOVERY		
		10	18.0'	5	Ш		Saturated medium dense brown fine sand w/	A-2-4(0)	
				5 5 6 7			some coarse sand and silt, trace of gravel.	()	
19.6	1								
	1,,,,,,,,		20.0'	4	101111	111	12" RECOVERY		
	1/21/09	11	20.0'	1 2 1			Saturated very loose fine sand w/ some coarse	A-2-4(0)	
				3			sand, silt, and gravel.		
			22.0'			310 d 110 f 320 u	15" RECOVERY		
22.4		12	22.0'	7 8	15(14)	1166 1166	Saturated medium dense brown fine to coarse	A-3	Contains cemented sands.
				11 10			sand, trace of silt and gravel.		
			24.0'			1000 1000	20" RECOVERY		
		13	24.0'	5 6 5 8			Saturated medium dense brown fine sand w/	A-3	
25.2]			8			some coarse sand, trace of silt and gravel.		
			26.0'			iler Nef	20" RECOVERY		
		14	26.0'	7 11			Saturated medium dense brown fine sand w/	A-2-4(0)	
				13 21			some silt and coarse sand, trace of gravel.	(-)	
28			28.0'				19" RECOVERY		
		15	28.0'	7 8 9			Saturated medium dense brown fine sand w/	A-3	
	_			9		接ば	some coarse sand, trace of silt and gravel.		
	-		30.0'	D '		ing.	20" RECOVERY		
		16	30.0'	8			Saturated medium dense brown fine sand w/	A-2-4(0)	<u> </u>
30.8				8 10 15 20			some coarse sand and silt, trace of gravel.		
			32.0'			111	20" RECOVERY		
	-	17	32.0'	6 7 8			Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
				8 11			some coarse sand and sm.		
33.6	-		34.0'			316 G 116 F 220 V	24" RECOVERY		
		18	34.0'	4 9		166	Saturated medium dense brown fine sand w/	A-3	
	-			12 10			some coarse sand, trace of silt and gravel.		
	-								
		40	36.0'	10	11111	316.0 316.0	18" RECOVERY		
36.4	-	19	36.0'	10 13 27 29			Saturated dense brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
	-			29			and coarse sand, trace of graver.		
	1		38.0'				15" RECOVERY		
	-	20	38.0'	10 15			Saturated dense orange brown fine to coarse		pH sample sent to GTA for
39.2	1			10 15 28 32			sand w/ some silt.		testing.
39.2	1								
			40.0'				19" RECOVERY		
	1						End of Boring		
	1								
42	1								
	1	l		1	1				

Symbol Description

Strata symbols



Low plasticity clay



Silty low plasticity clay



Poorly graded sand with silt



Silty sand



Well graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

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

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STATE OF DELAWARE DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

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

Boring No.: B-4-18

Contract: 28-113-01

Boring Location: Sta. 698+68.08, 506.00' Lt. C.L.

Boring Surface Elev.: +45.50 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: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. U-Sampler: O.D. Core Bit: O.D. IN.

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

Water Level Readings

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: Jason Truver

Driller: Jason Truver **Helpers:** D. Zmijewski

Depth	Daily		Sample			
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description Class./G.I. R	temarks
	1/23/09	1	0.5' 2.0'	4 4 4	Moist firm brown clayey silt, trace of fine to A-4(6) Topsoil - 8' coarse sand.	"-
<u> </u>		2	2.0'	5	Moist stiff brown silt w/ some clay and fine to A-4(1)	
2.8			4.0'	5 5 6	coarse sand, trace of gravel. 20"RECOVERY	
		3	4.0'	4 5 7 9	Moist medium dense orange coarse sand and gravel w/ some silt and fine sand.	
5.6			6.0'		22" RECOVERY	
		4	6.0'	5 7 5 7	Moist stiff orange and brown mottled fine sandy silt, trace of clay and coarse sand. A-4(5)	
\vdash			8.0'		24" RECOVERY	
8.4		5	8.0' 9.0'	3 4	Moist firm orange and brown mottled clayey silt w/ some fine sand, trace of coarse sand.	
		5A	9.0'	6 9	8" RECOVERY Moist medium dense orange silty fine sand, A-2-4(0)	
		6	10.0'	7 7	trace of coarse sand. 10" RECOVERY Moist stiff brown and gray mottled clayey silt	
11.2		6A	11.0' 12.0'	10 16	w/ some fine sand, trace of coarse sand. 8" RECOVERY Moist medium dense orange coarse to fine	
		7	12.0'	4 7 9 10	\sand w/ some silt, trace of gravel. 9" RECOVERY	
14			14.0'		Moist medium dense orange-yellow mottled coarse to fine sand w/ some silt, trace of	
		8	14.0' 16.0'	4 7 9 9	gravel. 19" RECOVERY Moist medium dense yellow coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY	

Remarks:

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

	I	Г		T	_		Т		
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"			Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	7 6 7 5			Moist medium dense yellow fine to coarse	A-2-4(0)	
10.0	1			5			sand w/ some silt, trace of gravel.		
			18.0'				24" RECOVERY		
		10	18.0'	4		141.66	Moist medium dense yellow coarse to fine	A-1-b	
				4 6 8 7			sand w/ some silt, trace of gravel.		
19.6									
	1/23/09	11	20.0' 20.0'	7	12.0	133 C.C 143 G.C 133 C.C	23" RECOVERY	A 1.1	
	1/23/09	111	20.0	7 13 11		14-11-61- 112-6-6 14-11-6-6	Moist medium dense orange coarse to fine sand w/ some gravel and silt.	A-1-b	
				9			sand w/ some graver and sitt.		
			22.0'				20" RECOVERY		
22.4		12	22.0'	6	İ		Wet medium dense orange fine sand w/ some	A-2-4(0)	
				6 6 5 5			coarse sand, silt, and gravel.		
		13	24.0' 24.0'	3			18" RECOVERY	A 7 ((14)	
		13	24.0	3 3 8 13			Saturated stiff light brown and orange mottled clay, trace of gravel and fine to coarse sand.	A-7-6(14)	
25.2				13			suite.		
			26.0'				24" RECOVERY		
		14	26.0'	4 4 5		11116	Saturated loose yellow fine sand w/ some	A-3	
				5 4	1 5	13.1166 17776 1776	coarse sand, trace of silt and gravel.		
								7 6	
28	-	15	28.0' 28.0'	3 6		4169	14" RECOVERY Saturated medium dense orange and brown	A-2-4(0)	Contains cemented sand.
				9 10		1	mottled fine sand w/ some coarse sand and	A-2-4(0)	Contains commence sand.
				10		149 6 F 149 6 F 149 6 F	silt, trace of gravel.		
			30.0'		100	1.1 () () 1.1 () () 1.1 () ()	17" RECOVERY	$) \cap 1$	
30.8		16	30.0'	5 10 11 20			Saturated medium dense orange and brown	A-3	
30.0	1			20			mottled fine sand w/ some coarse sand, trace of gravel.		
			22.01			11100 11100 11100			
		17	32.0' 32.0'	8		11166	Saturated dense orange and brown mottled	A-2-4(0)	
				12 20 20			fine sand w/ some silt and coarse sand, trace	(-)	
33.6	1						of gravel.		
	1		34.0'				21" RECOVERY		
		18	34.0'	8 12 15 22			Saturated medium dense orange and brown mottled fine sand w/ some coarse sand and	A-2-4(0)	
				22			silt, trace of gravel.		
			36.0'				20" RECOVERY		
36.4		19	36.0'	10 16			Saturated dense orange and brown mottled	A-2-4(0)	
				10 16 25 36			fine sand w/ some silt and coarse sand, trace		
							of gravel.		
		20	38.0' 38.0'	10	-		12" RECOVERY		pH sample sent to GTA for
		20	30.0	10 10 21 36			Saturated dense brown mottled fine to coarse sand with a trace of silt.		testing.
39.2				36			Salla Hilli a diace of one.		
			40.0'				24" RECOVERY		
					Ţ''		End of Boring		
42	-								
	ı	1	1	1	1				

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Low plasticity clay



Poorly graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

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

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STATE OF DELAWARE DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

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

Boring No.: B-4-19

Contract: 28-113-01

Boring Location: Sta. 698+34.83, 330.00' Lt. C.L.

Boring Surface Elev.: +39.61 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. IN.

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

Water Level Readings

Date Time Depth of Hole Depth of Casing Depth of Water Elev. of Water 1/23/09 18.0 15.7

Pay Quantities:

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

Boring Contractor: Walton Corporation Driller: Jason Truver

Driller: Jason Truver **Helpers:** D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	1/23/09	1	0.5'	3 3 3		Moist firm brown clayey silt, trace of fine to oarse sand and gravel.	A-4(8)	Topsoil - 8".
		2	2.0' 2.0'	6	<i>/////</i>	14" RECOVERY	1.4(6)	
2.8	1		2.0	6 9 13 11		Moist very stiff brown clayey silt, trace of	A-4(6)	
2.0			4.0'		-fi	ine to coarse sand and gravel. 24" RECOVERY	M	G
		3	4.0'	3 5 7		Moist stiff brown clayey fine sandy silt w/ ome coarse sand, trace of gravel.	A-4(2)	
5.6			6.0'	P		22" RECOVERY	201	5
		4	6.0' 8.0'	11 14 14 11	co	Moist medium dense orange and yellow oarse to fine sand w/ some gravel, trace of ilt.	A-1-b	
8.4		5	8.0'	4 8 9 9		Moist medium dense yellow coarse to fine and w/ some silt, trace of gravel.	A-1-b	
		6	10.0' 10.0'	7	1:11:11:11	21" RECOVERY	A-1-b	
			10.0	7 8 11 14		Moist medium dense yellow coarse sand w/	A-1-0	
11.2			12.0'	14		ome fine sand and gravel, trace of silt. 24" RECOVERY		
		7	12.0'	8	SCIANCE N	Moist medium dense orange, yellow, and	A-1-b	
		,	12.0	8 12 11 11	w	white fine to coarse sand w/ some gravel and ilt.	A-1-U	
14			14.0'			23" RECOVERY		
		U-1	14.0'			Saturated tan orange sand with some silt and race of coarse sand.		Press Sample - Shelby Tube.
	1		16.0'			24" RECOVERY		

Remarks:

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		8	16.0'	4 4 4 5		et loose yellow coarse to fine sand, trace of and gravel.	A-3	
		9	18.0' 18.0'	W/R 3 4 4		24" RECOVERY et loose yellow coarse to fine sand, trace of evel and silt.	A-1-b	
19.6			20.0'			24" RECOVERY		
		10	20.0'	4 6 5 9		et medium dense yellow coarse to fine ad, trace of silt and gravel.	A-1-b	
22.4		11	22.0'	4 5 14 17		24" RECOVERY et medium dense orange coarse to fine ad, trace of silt and gravel.	A-1-b	
25.2		12	24.0' 24.0' 26.0'	6 8 10 11	Sat son	24" RECOVERY turated medium dense orange fine sand w/ me coarse sand and silt. 21" RECOVERY	A-2-4(0)	
		13	26.0'	8 7 7 9		turated medium dense orange fine sand w/me coarse sand, trace of silt and gravel.	A-3	
28		14	28.0' 28.0'	8	1913.166. 1613.166 1613.166	17" RECOVERY	A-2-4(0)	(-
		14	20.0	8 10 11 16		turated medium dense orange fine sand w/me coarse sand and silt, trace of gravel.	A-2-4(0)	
30.8		15	30.0' 30.0'	4 8 18 22		19" RECOVERY turated medium dense orange fine sand w/ ne coarse sand and silt.	A-2-4(0)	5
33.6		16	32.0' 32.0'	8 13 22 24	10.63 (10.60)	turated dense orange fine sand w/ some arse sand, trace of silt and gravel.	A-3	
33.0		17	34.0' 34.0'	10	effater verrier verrier verrier verrier	20" RECOVERY turated medium dense orange fine sand w/	A-3	
				10 12 18 24		me coarse sand, trace of silt and gravel.	71 3	
36.4		18	36.0' 36.0'	17 16 21 21		turated dense orange fine sand w/ some arse sand and silt, trace of gravel.	A-2-4(0)	
39.2		19	38.0' 38.0' 40.0'	17 11 16 17	den	18" RECOVERY turated medium dense orange medium use fine to coarse sand with some silt and a use of gravel. 18" RECOVERY		pH sample sent to GTA for testing.
42					*********	d of Boring		

Symbol Description

Strata symbols

Low plasticity clay

Poorly graded sand with silt

Silty sand



Well graded sand with silt



Poorly graded sand

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 1/23/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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: 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: 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 Depth of Water Time **Depth of Hole** Elev. of Water Date 1/22/09 22.0 26.0 24.0

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 (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	1/22/09	1	1.0' 2.0'	3 3		t firm brown fine sandy silt w/ some e sand, trace of gravel. 10" RECOVERY	A-4(0)	Topsoil - 9".
2.8		2	2.0'	1 5 6 6	Mois	t stiff brown clayey silt w/ some fine to e sand, trace of gravel.	A-4(3)	
			4.0'			18" RECOVERY		G
		3	4.0'	5 6 7 8		t stiff orange and gray clayey fine sandy race of coarse sand.	A-6(6)	
5.6			6.0'			15" RECOVERY	201	5
		4	6.0'	8 11 10 10		t very stiff orange and yellow mottled andy silt, trace of coarse sand.	A-4(0)	J
			8.0'			23" RECOVERY		
8.4		5	8.0'	2 2 5 7		t firm orange and yellow mottled fine silt, trace of coarse sand.	A-4(0)	
			10.0'	_		20" RECOVERY		
11.2		6	10.0'	7 8 10 10		t medium dense orange-yellow mottled fine sand.	A-2-4(0)	
		7	12.0' 12.0'	4	M	22" RECOVERY t medium dense brown fine to coarse	A 2 4(0)	
		,	12.0	4 6 9 9	:1:1:1:1:1:1:	w/ some silt, trace of gravel.	A-2-4(0)	
14			14.0'			18" RECOVERY		
		8	14.0'	4 8 14 13) 1 1 1 1 P	t medium dense brown coarse sand and l w/ some fine sand and silt.	A-1-b	
			16.0'	44	1173000 1143166 1143166	18" RECOVERY		
		9	16.0'	11 8	Mois	t medium dense orange and yellow	A-1-b	

Remarks:

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	coarse to fine sand w/ some gravel, trace of silt.	
			18.0'		ieifieiei Eelelele Eelelele Eelelele	
		10	18.0'	4 4 5 6	Wet loose yellow fine to coarse sand, trace of silt and gravel.	
40.0				6	egypte Sitt and graver.	
19.6			20.0'	_	18" RECOVERY	
		11	20.0'	5 5 5 6	Wet loose yellow fine to coarse sand, trace of silt and gravel.	
				6	errand Sit und gruver.	
		40	22.0'	2	IRIANGE RELIGION 22" RECOVERY	
22.4		12	22.0'	3 6 12 13	Wet medium dense orange fine to coarse sand A-1-b and gravel w/ some silt.	
				13	g-u	
		13	24.0' 24.0'	5	13" RECOVERY	
		13	24.0	5 10 5 6	Wet medium dense orange fine to coarse sand w/some silt and gravel.	
25.2						
		14	26.0' 26.0'	4	18" RECOVERY Wet medium dense orange coarse to fine sand A-1-b	
		'-	20.0	4 7 4 4	w/ some silt, trace of gravel.	
28		15	28.0' 28.0'	5	18" RECOVERY Saturated medium dense orange fine sand w/ A-2-4(0)	
				5 8 10 13	some coarse sand and silt, trace of gravel.	U
		16	30.0' 30.0'	8	20" RECOVERY Saturated medium dense orange fine sand w/ A-2-4(0)	
30.8				8 11 14 16	some coarse sand and silt, trace of gravel.	
				_		
		17	32.0' 32.0'	8 11	22" RECOVERY Saturated medium dense orange fine sand w/ A-2-4(0)	
				11 14 16	some coarse sand and silt, trace of gravel.	
33.6					PRIMITE TELLING TELLING TELLING	
		18	34.0' 34.0'	9	22" RECOVERY Saturated medium dense orange fine sand w/ A-2-4(0)	
				9 11 13 18	some coarse sand and silt, trace of gravel.	
			36.0'		REFIELD REF	
36.4		19	36.0'	8 18 24 25	Saturated dense orange fine to coarse sand, A-3	
				24 25	trace of silt and gravel.	
			38.0'		14" RECOVERY	
		20	38.0'	18 20 22 31	Saturated dense brown fine to coarse sand	pH sample sent to GTA for
39.2				31	Sivility with some silt.	testing.
			40.0'		History Histor	
			2.2		End of Boring	
42						

Symbol Description

Strata symbols

Silty sand



Silty low plasticity clay



Low plasticity clay



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 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.

F.A. Project: U.S. 301 Maryland State Line to I-95 Boring No.: B-4-21

Contract: 28-113-01

Boring Location: Sta. 698+16.32, 1,224.00' Lt. C.L.

3 1/4

Boring Surface Elev.: + 44.91 Reference:

Inches

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. IN.

From Depth of: From Depth of: To: To: **Casing Size:** Hollow Stem Auger: 0.0 40.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 1/14/09 37.1 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: Bill Holden

Helpers: J. Lafferty

Б "	- ·			Τ		1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	1/14/09	1	0.5' 2.0'	2 3 3	Moist firm brown clayey silt w/ some coarse to fine sand, trace of gravel. 15" RECOVERY	Topsoil - 5".
		2	2.0'	4 6	Moist medium dense brown coarse sand w/ A-2-4(0)	
2.8		N	4.0'	777	some clay, fine sand, and gravel. 21" RECOVERY	G
		3	4.0'	3 3 5 5	Moist loose brown silty coarse sand and A-1-b	
5.6		S	6.0'	P	gravel w/ some fine sand. 22" RECOVERY	5
		4	6.0'	6 5 5 4	Moist loose brown coarse sand and gravel w/ A-1-b some fine sand and silt.	
8.4		5	8.0' 8.0'	4	20" RECOVERY Moist loose brown fine to coarse sand w/ A-2-4(0)	
0.4		J		4 4 4 5	some silt, trace of gravel.	
		6	10.0' 10.0'	4	21" RECOVERY Moist medium dense brown coarse to fine A-1-b	
11.2		Ü		4 6 5 4	sand w/ some silt and gravel.	
			12.0'		21" RECOVERY	
14		7	12.0'	5 6 7 10	Moist medium dense brown coarse to fine sand w/ some silt, trace of gravel. 22" RECOVERY	
17		8	14.0'	5 5 5 6	Moist loose brown coarse sand w/ some fine A-1-b sand and gravel, trace of silt.	
1			16.0'		21" RECOVERY	

Remarks:

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'	5 6 6 7		Moist medium dense brown coarse to fine	A-1-b	
10.8	1			6 7		sand w/ some gravel and silt.		
					(414). (411). (411).			
			18.0'	_		20" RECOVERY		
		10	18.0'	5 5 7 6		Moist medium dense brown coarse to fine	A-1-b	
				6		sand w/ some silt, trace of gravel.		
19.6					0941993669 04313366 34143366			
		L	20.0'	_	00173700 01141169	20" RECOVERY		
	1	11	20.0'	5 6 6 7	alianer. Etijoer	Moist medium dense brown and black fine to	A-2-4(0)	
				7	1111116	coarse sand w/ some silt, trace of gravel.		
			22.0'	4	00113300 0614366	21" RECOVERY		
22.4		12	22.0'	4 5 7 8		Moist medium dense brown and light brown	A-2-4(0)	
				8		fine to coarse sand w/ some gravel and silt.		
		40	24.0'	4		19" RECOVERY		
		13	24.0'	4 3 4		Wet loose brown and light brown fine sand w/	A-2-4(0)	
25.2				4		some silt.		
	1							
		44	26.0'	4		22" RECOVERY		
		14	26.0'	4 4 4		Wet loose brown and light brown fine to	A-2-4(0)	
				5		coarse sand w/ some silt, trace of gravel.		
							7 1	
28		45	28.0'	3		21" RECOVERY		
		15	28.0'	3 2 3		Wet loose brown coarse sand w/ some fine	A -1-b	
				3 3		sand and gravel, trace of silt.		
							204	
		_16	30.0' 30.0'	-W/R	1-	21" RECOVERY		h
30.8	1	10	30.0	W/R 1	1: 1:	Wet very loose brown coarse to fine sand, trace of silt and gravel.	A-1-b	
55.5	1			2		trace of sift and graver.		
					1:			
		17	32.0' 32.0'	3	3512135	20" RECOVERY Saturated loose brown fine to coarse sand,	A-3	
		''	32.0	4 4 5		trace of silt and gravel.	A-3	
				5		trace of sift and graver.		
33.6			0.4.01		66 3 13 6 C 66 14 16 6 67 17 17 17 1	ALL DECOVERY		
		18	34.0' 34.0'	4	156141166 156141166	21" RECOVERY Saturated medium dense brown fine to coarse	A-3	
			0	5 8 8		sand, trace of silt and gravel.	A-3	
				8		sand, trace of site and graver.		
			36.0'		100 2 1 3 1 3 1 1 C C 100 1 3 1 3 1 5 6 6 100 1 3 3 7 5 7 5 7 6	20" RECOVERY		
36.4	1	19	36.0'	6	156141166 16141166	Saturated medium dense green fine to coarse	A-3	
	1			6 6 7 7		sand, trace of silt and gravel.	11 3	
				,		, g		
			38.0'			20" RECOVERY		
<u> </u>		20	38.0'	6		Saturated medium dense brown fine to coarse		pH sample sent to GTA for
				6 7 7 8	1161 4116 6 1161 1166 1 1161 1166 1	sand trace silt.		testing
39.2								
			40.0'		6611300G	18" RECOVERY		
			70.0		par / 3.1(61.)	End of Boring		
						-		
42								
72	1							

Symbol Description

Strata symbols

Silty low plasticity clay



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt



Well graded sand



Well graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 1/14/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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.: B-4-22

Contract: 28-113-01

Boring Location: Sta. 699+71.28, 1,386.00' Lt. C.L.

Boring Surface Elev.: + 40.20 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: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. U-Sampler:

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

From Depth of: From Depth of: To: To: 3 1/4 Inches Hollow Stem Auger: 0.0 40.0

Water Level Readings

Time **Depth of Hole Depth of Casing Depth of Water** Elev. of Water Date 1/13/09 27.2 32.0 30.0

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: Bill Holden

Helpers: J. Lafferty

	ı		1 -					T
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
()	1/13/09	1	0.5'	5 7 6		Moist medium dense brown silty coarse sand	A-1-b	Topsoil - 4". Frost - 3".
				6		and gravel w/ some fine sand.		1
			2.0'			17" RECOVERY		
		2	2.0'	5		Moist medium dense brown coarse sand w/	A-1-b	
2.8				6 5		some fine sand and silt, trace of gravel.		
			4.0'			19" RECOVERY	JHN	J
		3	4.0'	2 3 3	0.013336.0 0.043-1.67 0.0313:00	Moist loose brown coarse sand, trace of fine	A-1-b	
				3 3	136 14 136 6 126 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	sand, silt, and gravel.	0 4	
5.6						HMRHR 1	/(11	5
		4	6.0' 6.0'	3		18" RECOVERY Moist loose brown coarse to fine sand w/	A-1-b	U
<u> </u>			0.0	3 3 3 4	(1) 13:00 (3) 13 10:00	some silt, trace of gravel.	A-1-0	
<u> </u>				4	11.01.43.64 11.11.11.64 12.11.11.66	, ,		
			8.0'		186 13.1106 100 1 7 7 7 10 100 1 7 7 10 0	19" RECOVERY		
8.4		5	8.0'	3 4 4	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	Moist loose orange and light brown coarse	A-1-b	
<u> </u>				4 4		sand w/ some fine sand, trace of silt and gravel.		
-			40.01					
		6	10.0' 10.0'	3	111111111 1111111111111111111111111111	20" RECOVERY Moist loose orange and light brown coarse to	A-1-b	
-				3 4 3 4	069 1300 6 0619 3006 06173960	fine sand, trace of silt and gravel.	71 1 0	
11.2				-	156143168 1561515161 1561313166			
-			12.0'		00143000 00143000	21" RECOVERY		
-		7	12.0'	4 5 5 6		Moist loose brown coarse to fine sand, trace	A-1-b	
-				6		of silt and gravel.		
—			14.01		000 1500 0 0013 1500 0 0013 1500 0	22" RECOVERY		
14		8	14.0' 14.0'	4	106343569	Moist loose brown coarse to fine sand, trace	A-1-b	
-				4 3 4 6	1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:	of silt and gravel.	A-1-0	
			16.0'			21" RECOVERY		

Remarks:

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		U-1	16.0'			Moist orange brown fine to coarse sand trace		Press Sample - Shelby Tube.
	1		17.51			silt and gravel. 18" RECOVERY		
	1		17.5'			18 RECOVER I		
		9	18.0'	6 6 8	::::::::::::::::::::::::::::::::::::::	Moist medium dense brown fine to coarse	A-3	
				8 9		sand w/ some gravel, trace of silt.		
19.6					0344-0364 03212305 03131264			
		10	20.0'	15	0017700 0014100	20" RECOVERY	A 2 4(0)	
		10	20.0	15 8 6 6		Wet medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
				6		sit and coarse sand.		
			22.0'			19" RECOVERY		
22.4		11	22.0'	3 3 3 4		Wet loose brown and black fine to coarse	A-2-4(0)	
				3 4		sand w/ some silt, trace of gravel.		
	_							
	-	12	24.0' 24.0'	3	3512755	22" RECOVERY Wet medium dense orange fine to coarse	A-3	
		'-	24.0	3 5 7 6	(1) 13:05 (1) 13:05	sand, trace of silt and gravel.	A-3	
25.2				6	1.6143161 1.4141.41			
	-		26.0'		19114.1166 1211777111 1211777111	22" RECOVERY		
		13	26.0'	4 6	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	Wet medium dense orange coarse to fine	A-1-b	Mud Rotary @ 26.0'.
	_			8 7		sand, trace of silt and gravel.		
L	-				1:			
28	-	14	28.0' 28.0'	6 8	1:1111	23" RECOVERY Wet medium dense light brown and brown	A-3	
				10 14	00 13 13 00 0 00 13 10 0 00 1 7 3 0 0	fine to coarse sand w/ some gravel, trace of	N-5	
				14	11.614316.6 11.11-11.61 11.11-11.66	silt.		_
	_		30.0'		136 1 A 31 G f 126 1 7 2 2 C U 126 1 4 3 G G	21" RECOVERY		
30.8	1	15	30.0'	6 9 10		Wet medium dense light brown and brown	A-3	
30.6	1			10		fine to coarse sand, trace of silt and gravel.		
	-		22.01		0000 1000 0 000 1000 0 000 1000 0	22# RECOVERY		
	-	16	32.0' 32.0'	6	0:6343164 0:6343164 0:6443164	23" RECOVERY Saturated medium dense light brown and	A-2-4(0)	
	-			7 9 9	0: 0 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 /	brown fine sand w/ some coarse sand and silt,		
33.6						trace of gravel.		
00.0	1		34.0'	_	100 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	20" RECOVERY		
	1	17	34.0'	7 8 8	64 14 16 6 6 6 7 1 1 1 1 1 1 1 6 6 7 4 1 1 1 1 1 1	Saturated medium dense brown fine sand w/	A-3	
				10		some coarse sand, trace of silt.		
			36.0'		00 1 2 1 2 1 0 0 0 18 1 3 1 1 6 6 10 7 1 7 2 7 0 0	22" RECOVERY		
36.4		18	36.0'	7 9	156343164 15143164 15133164	Saturated medium dense brown fine sand w/	A-3	
				11 14		some coarse sand, trace of silt and gravel.		
		40	38.0'	2	66 14 15 6 6 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	23" RECOVERY		nII sample sant to CTA for
		19	38.0'	3 5 6 8	026173761 06143169 2417261	Saturated medium dense brown fine to coarse sand trace silt.		pH sample sent to GTA for testing.
39.2				8	155 3 A 105 C C 155 3 A 105 C 105 1 7 3 7 C C	Sand trace Sitt.		
			40.0'			23" RECOVERY		
						End of Boring		
	-							
	-							
42	-							

Symbol Description

Strata symbols

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 SEPTEMBER 2015

- Exploratory borings were drilled on 1/13/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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-4-23

Contract: 28-113-01

Boring Location: Sta. 702+08.80, 1,172.00' Lt. C.L.

Boring Surface Elev.: + 44.51 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: 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 Depth of Water 31.5 Time **Depth of Hole** Elev. of Water Date 1/19/09 36.0 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: 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	
	1/19/09	1	0.5'	4 5 6	Moist stiff brown silt, trace of coarse to fine A-6(10) Topsoil - 6".	
			2.0'		12" RECOVERY	
2.8		2	2.0'	6 8 7 8	Moist stiff brown coarse sandy silt w/ some A-4(0)	
2.0				8	fine sand and clay, trace of gravel.	
			4.0'		18" RECOVERY	
		3	4.0'	5 5 9	Moist medium dense orange coarse sand w/ A-1-b	
-				9	some silt, gravel, and fine sand.	
5.6			6.0'		17" RECOVERY	
		4	6.0'	9 9 7 9	Moist medium dense orange silty coarse sand A-1-b w/ some fine sand and gravel.	
				9	w/ some time sand and graver.	
			8.0'		19" RECOVERY	
8.4		5	8.0'	3 3 9 4	Moist medium dense orange-brown clayey A-2-4(0) Contains cemented sa fine to coarse sand and gravel.	nds.
				4	The to coarse said and graver.	
			10.0'		22" RECOVERY	
		6	10.0'	3 5 6 6	Moist medium dense orange-brown coarse to A-1-b fine sand w/ some silt, trace of gravel.	
11.2				6	The Sand w/ Some Sitt, trace of graver.	
			12.0'		16" RECOVERY	
		7	12.0'	6 10 8 11	Moist medium dense brown-orange coarse to fine sand w/ some silt, trace of gravel. A-1-b	
				11	Time sand w/ some sin, trace of graver.	
14			14.0'		18" RECOVERY	
		8	14.0'	4 5 5 3	Moist loose orange-yellow mottled coarse to fine sand, trace of silt and gravel. A-1-b	
				3	THE Sand, trace of Sitt and graver.	
			16.0'		18" RECOVERY	

Remarks:

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'	5 6 6 7	126 1	1900 f 1900 f 1900 f 1900 f 1900 f 1900 f	Moist medium dense orange-yellow mottled coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			18.0'			13750	24" RECOVERY		
		10	18.0'	7 7 7 7			Moist medium dense orange-yellow mottled	A-1-b	
				7			coarse sand w/ some fine sand, trace of silt		
19.6							and gravel.		
		11	20.0' 20.0'	8		1322	18" RECOVERY	A 1 1	
		11		8 8 8 6			Moist medium dense orange-yellow mottled coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
		12	22.0'	0			20" RECOVERY		
22.4		12	22.0'	9 9 16 19			Moist medium dense orange and yellow mottled coarse to fine sand w/ some gravel and silt.	A-1-b	Contains cemented sands.
		40	24.0'	47	_		19" RECOVERY		
		13	24.0'	17 19 27 23			No Sample Recovery		
25.2			26.0'				0" RECOVERY		
		14	26.0'	8 8 8			Moist medium dense orange fine to coarse	A-2-4(0)	
				8		77.00	sand w/ some silt, trace of gravel.		
28		15	28.0' 28.0'	10	121	6) 6 (13 (C 13 (C 13 (C 13 (C 13 (C	21" RECOVERY	A-2-4(0)	G
		13	20.0	10 9 10 10			Wet medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
				10			coarse sailed and sint, trace or graver.		
			30.0'	D			21" RECOVERY		
		16	30.0'	6			Wet medium dense yellow-orange-brown	A-2-4(0)	^
30.8				6 9 10 10			mottled silty fine to coarse sand, trace of gravel.		
			32.0'		Ш		24" RECOVERY		
		17	32.0'	6 9 12 14			Wet medium dense yellow fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
33.6			0.4.01			13000	A HI DE GOVERNY		
		18	34.0' 34.0'	5	1111	1166	24" RECOVERY Wet medium dense yellow coarse to fine sand	A-1-b	
			0	5 10 12 13			w/ some gravel, trace of silt.	A-1-0	
				13			W some graver, trace of site.		
			36.0'				24" RECOVERY		
36.4		19	36.0'	12			Wet dense yellow fine to coarse sand, trace of	A-3	
				12 13 24 20			silt and gravel.		
			38.0'				12" RECOVERY		
		20	38.0'	12 14 17 26		7370	Saturated dense brown fine to coarse sand w/		pH sample sent to GTA for
39.2				17 26	(1) (1) (1)	1):01: 13:06 14:06	some silt.		testing; contains cemented
J3.2						73 % V 13 6 f			sands.
			40.0'			13:00	19" RECOVERY		
\vdash							End of Boring		
<u> </u>									
42									
				1					1

Symbol Description

Strata symbols

Low plasticity clay



Silty low plasticity clay



Silty sand



Clayey sand



Well graded sand with silt



Poorly graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 1/19/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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.: B-4-24

Contract: 28-113-01

Boring Location: Sta. 702+50.19, 755.00' Lt. C.L.

Boring Surface Elev.: + 52.86 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. U-Sampler: IN. O.D. Core Bit: O.D. IN.

From Depth of: From Depth of: To: To: 40.0 **Casing Size:** 3 1/4 Inches 0.0

Hollow Stem Auger:

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 1/19/09 31.5 38.0 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: 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
	1/15/09	1	0.5' 2.0'	1 1 3		Moist soft brown and gray clayey silt, trace of coarse to fine sand and gravel. 16" RECOVERY	A-4(5)	Topsoil - 6".
		2	2.0'	7 8		Moist medium dense brown silty coarse sand	A-1-b	
2.8			4.0'			and gravel, trace of fine sand. 21" RECOVERY	NIC	G
		3	4.0'	3 6 6 8	11.01 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Moist medium dense brown coarse sand w/ some silt, gravel, and fine sand.	A-1-b	_
5.6			6 .0'	P			2()1	5
		4	6.0' 8.0'	9 7 8 6		221 DECOVEDY	A-1-b	
8.4		5	8.0'	4 5 7 8		Moist medium dense brown coarse sand w/ some gravel, fine sand, and silt. 22" RECOVERY	A-1-b	
		6	10.0'	12 10	1:01331; 6:0441; 6:0313:0 6:0313:0		A-1-b	
11.2			11.0'		126 1 7 7 9 1 126 1 7 9 16 126 1 7 1 2 1 126 1 7 1 2 1 126 1 7 7 2 1 126 1 7 2 2 1 126 1 7 2 2 1	12" RECOVERY		
		7	12.0' 13.0'	3 4		Moist firm brown and gray clay w/ some fine sand, trace of gravel and coarse sand. 10" RECOVERY	A-6(9)	
14		7A	13.0' 14.0'	7 8		Moist medium dense brown and light brown	A-2-4(0)	
14		8	14.0'	5 6 6 7		silty fine sand. 12" RECOVERY Moist medium dense brown silty fine sand, trace of coarse sand. 20" RECOVERY	A-2-4(0)	

Remarks:

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'	5 7 8 9	Moist medium dense brown silty fine sand, trace of gravel.	
			18.0'		23" RECOVERY	
		10	18.0'	3 6 6 6	Moist stiff red and gray clayey fine sandy silt, A-4(3)	
19.6				6	trace of coarse sand.	
		11	20.0'	11	21" RECOVERY	
		11	20.0'	11 11 10 11	Moist medium dense orange and yellow silty fine sand, trace of coarse sand. A-2-4(0)	
			22.0'		23" RECOVERY	
22.4	1/19/09	12	22.0'	9 5 9 9	Moist medium dense orange and yellow fine to coarse sand w/ some silt, trace of gravel. A-2-4(0)	
			24.0'	0	22" RECOVERY	
25.2		13	24.0'	9 9 12 15	Moist medium dense orange-brown coarse to fine sand and gravel w/ some silt. 19" RECOVERY	
		14	26.0'	11 10 9	Moist medium dense orange, light brown, and A-3	
				9 8	yellow mottled fine to coarse sand, trace of	
28			28.0'		18" RECOVERY	
		15	28.0'	3 4 5 6	Moist loose orange, light brown, and yellow M-2-4(0) mottled fine to coarse sand w/ some silt, trace of gravel.	
			30.0'	Ю.	Of graver.	
30.8		16	30.0'	6 6 6 9	Wet medium dense orange, light brown, and yellow mottled coarse to fine sand, trace of	0
			32.0'	9	silt, gravel, and organic matter.	
	-	17	32.0'	1 4	Wet medium dense orange and brown mottled A-2-4(0)	
33.6				7 9	fine to coarse sand w/ some silt, trace of gravel.	
]	40	34.0'	2	21" RECOVERY	
		18	34.0'	3 3 3 6	Wet loose orange and brown mottled fine to coarse sand w/ some silt and gravel. A-2-4(0)	
36.4	-	19	36.0' 36.0'	6	20" RECOVERY Wet medium dense orange and brown mottled A-1-b	
30.4				6 9 12 15	coarse to fine sand, trace of silt and gravel.	
	1		38.0'		20" RECOVERY	
39.2		20	38.0'	9 13 21 23	Saturated dense orange and brown fine to coarse sand w/ some silt.	pH sample send to GTA for testing.
			40.0'		614366 Riving	
			40.0		End of Boring	
42						

Symbol Description

Strata symbols

Silt

Silty sand

1.000000 1.0000000 1.0000000 Poorly graded sand with silt

Well graded sand with silt



Low plasticity clay

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 1/15/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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-4-25W

Contract: 28-113-01

Boring Location: Sta. 703+02.86, 467.00' Lt. C.L.

Boring Surface Elev.: + 49.70 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: 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 Depth of Water Time **Depth of Hole** Elev. of Water Date 1/29/09 30.0 28.1 32.0

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	No.	Sample	Blows/6"	Sample Description Class./G.I. Remarks	
(ft.)	Progress		Depth			
	1/27/09	1	1.0'	4 5	Moist stiff brown clayey silt, trace of coarse A-4(6) Cultivated Soil - 8".	
			2.0'	_	to fine sand and gravel.	
		2	2.0'	5 4 3 3	Moist loose orange silty coarse to fine sand A-1-b	
2.8				3	w/ some gravel and fine sand.	
-						
			4.0'		17" RECOVERY	
		3	4.0'	3 7 7 6	Moist medium dense orange coarse sand w/ A-1-b	
				6	some fine sand and silt, trace of gravel.	
5.6						
			6.0'		23" RECOVERY	
		4	6.0'	7 5 6 5	Moist medium dense orange coarse sand w/ A-1-b	
				6 5	some fine sand and silt, trace of gravel.	
-						
			8.0'		24" RECOVERY	
8.4		5	8.0'	1 2 3 3	Moist loose orange coarse sand w/ some silty A-1-b	
				3	fine sand, trace of gravel.	
1						
			10.0'		18" RECOVERY	
		6	10.0'	4 5	Moist loose orange fine to coarse sand w/ A-2-4(0)	
—				4 5 4 4	some silt and gravel.	
11.2						
			12.0'		15" RECOVERY	
		7	12.0'	2	Moist loose orange silty fine sand, trace of A-2-4(0)	
				2 3 3 3	coarse sand and gravel.	
14			14.0'		24" RECOVERY	
<u> </u>		8	14.0'	3	Moist medium dense orange fine to coarse A-2-4(0)	
				3 6 6 10	sand w/ some silt and gravel.	
\vdash				10		
<u> </u>			16.0'		15" RECOVERY	
		9	16.0'	7 8	Moist medium dense orange coarse sand, A-1-b	
				8	many most meature dense orange course sund,	

Remarks:

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

17.0" 4	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
18.0° 18.0° 20.0° 19.0° 20.0° 19.0° 20.0° 19.0° 20.0° 19.0° 20.0° 19.0° 20.0° 19.0° 20.0° 19.0° 20.0° 19.0° 20.0	(11.)	Flogress		17.0'		trace	of silt, fine sand, and gravel.		
of fine to coarse sand. "RECOVERY No Sample Recovery 10 20.0" 22.0" Moist loose yellow-orange mottled fine to coarse sand w/ some silt, trace of gravel. 24.0" 24.0" 25.2 26.0" Moist medium dense yellow coarse to fine sand, trace of silt and gravel. 26.0" 27.00			9A		6 4	Moist		A-6(14)	
19.6			U-1				e to coarse sand.		Press Sample - Shelby Tube.
19.6						No Sa			
20.0° 10 20.0° 10 20.0° 10 20.0° 10 20.0° 10 20.0° 10 20.0° 10 20.0° 10 20.0° 10 20.0° 10 20.0° 10 20.0° 10 20.0°	19.6								
22.0			40		0	/// a			
22.0			10	20.0	10 12	No Sa	ample Recovery		
11 22.0° 5 6 6 7 7 7 7 7 7 7 7					13				
24.0' 24" RECOVERY 12 24.0' 3 3 3 3 4 3 3 4 5 3 3 5 3 3 4 5 3 3 4 5 3 3 4 5 3 3 4 5 3 3 4 5 3 3 4 5 3 3 4 5 3 3 4 5 3 3 4 5 3 3 4 5 3 3 4 5 3 3 4 5 3 3 4 5 3 3 4 5 3 3 4 5 3 3 4 5 3 3 4 5 3 3 3 4 5 3 3 3 3 3 4 5 3 3 3 3 3 3 3 3 3									
24.0' 3 3 3 3 3 3 3 3 3	22.4		11	22.0'	5 5 5			A-2-4(0)	
Moist medium dense yellow coarse to fine sand, trace of silt and gravel.					6	1431661	e sand w/ some silt, trace of gravel.		
Moist medium dense yellow coarse to fine sand, trace of silt and gravel.				24 0'		1 1 1 1 0 0 0 1 1 1 1 0 0 0 1 7 2 7 0 0	24" RECOVERY		
28.0° 20"RECOVERY 20"RECOVERY 20"RECOVERY 32.0° 32.0° 32.0° 32.0° 32.0° 32.0° 32.0° 34.0° 34.0° 45.0° 34.0° 34.0° 34.0° 36			12		3 5	1.1.1.1.1.1	t medium dense yellow coarse to fine	A-1-b	
28.0° 20" RECOVERY Wet medium dense orange coarse to fine sand, trace of silt and gravel.	25.2				6	ririii Sanu,	trace of silt and gravel.		
Wet medium dense orange coarse to fine sand, trace of silt and gravel. 13				00.01		10101011			
28			13		4 5			A-1-b	
Wet medium dense orange fine to coarse sand w/ some silt, trace of gravel. 21" RECOVERY 15 30.0" 30.8 Wet medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 24" RECOVERY 16 32.0" 24" RECOVERY Wet loose orange fine sand w/ some coarse sand and silt, trace of gravel. 33.6 34.0" 24" RECOVERY 17 34.0" 5 Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 36.4 18 36.0' Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 36.4 Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.					6 8				
Wet medium dense orange fine to coarse sand w/ some silt, trace of gravel. 21" RECOVERY 15 30.0" 30.8 Wet medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 24" RECOVERY 16 32.0" 24" RECOVERY Wet loose orange fine sand w/ some coarse sand and silt, trace of gravel. 33.6 34.0" 24" RECOVERY 17 34.0" 5 Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 36.4 18 36.0' Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 36.4 Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.						10:00 10:00 14:06			
30.0' 3 Wet medium dense orange fine sand w/ some A-2-4(0)	28		14		3	Wet a		A 2 4(0)	
30.8 30.0' 37 Wet medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. A-2-4(0)	-			20.0	6 7 8			A-2-4(0)	
30.8 30.0' 37									
30.8 30.8 32.0' 24" RECOVERY 16 32.0' 32 Wet loose orange fine sand w/ some coarse sand and silt, trace of gravel. 33.6 34.0' 24" RECOVERY Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 36.0' 36.0' 36.0' 21" RECOVERY Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 36.4 36.0' Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.									_
32.0' 16 32.0' 24" RECOVERY Wet loose orange fine sand w/ some coarse sand and silt, trace of gravel. 33.6 34.0' 24" RECOVERY A-2-4(0) Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 36.0' 36.0' 21" RECOVERY A-2-4(0) Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.	30.8		15	30.0	7 8			A-2-4(0)	5
Wet loose orange fine sand w/ some coarse sand and silt, trace of gravel. 33.6				/	11	Coars	e saile and sitt, trace of graver.		
33.6 34.0' 24" RECOVERY 17 34.0' Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 36.4 18 36.0' Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 21" RECOVERY Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. A-2-4(0)				32.0'			24" RECOVERY		
33.6 34.0' 24" RECOVERY 17 34.0' 5 7			16	32.0'	3 2			A-2-4(0)	
34.0' 17 34.0' 34.0' Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 36.0' 21" RECOVERY 36.0' 21" RECOVERY A-2-4(0) Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.					7	sand	and silt, trace of gravel.		
36.4 17 34.0' 34.0' 35 7 10 Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 21" RECOVERY Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. A-2-4(0) Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.	33.6			34 0'			24" RECOVERY		
36.4 36.0' 18 36.0' 5 10 11 Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. A-2-4(0)			17		4 5		ated medium dense orange fine sand w/	A-2-4(0)	
36.4 18 36.0' 5 10 Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. A-2-4(0)					7 10	some	coarse sand and silt, trace of gravel.		
36.4 18 36.0' 5 10 Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. A-2-4(0)									
	36.4		18		5	Satur		A-2-4(0)	
					11 13				
100 PEGOVERNY									
			19	38.0' 38.0'	6	Cotur	19" RECOVERY	A 2 4(0)	
some silt and coarse sand, trace of gravel.			10	00.0	12 13 18			A-2-4(0)	
39.2	39.2				10		, 2		
40.0' 16" RECOVERY									
Saturated medium dense orange fine sand w/ A-2-4(0) some coarse sand and silt.			20	40.0'	11 16			A-2-4(0)	
18 Some coarse sand and site.					18	Some	coarse saint and sitt.		
42.0' 17" RECOVERY	42			42.0'	<u>L</u>		17" RECOVERY		
21 42.0' 10 11 Saturated medium dense orange fine sand w/ A-2-4(0)			21	42.0'	10 11			A-2-4(0)	
14 some coarse sand and silt.					14	some	coarse sand and silt.		

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
			44.0'		18" RECOVERY	
		22	44.0'	9	Saturated medium dense orange fine sand w/ A-2-4(0)	
44.8				9 10 13 16	some coarse sand and silt.	
					13 (17) 24 (19) 24 (19) 25 (19)	
\vdash			46.0'	40	24" RECOVERY	
		23	46.0'	10 24 29 31	Saturated very dense orange fine sand w/ A-2-4(0) some coarse sand and silt.	
				31	MARTI Some Coarse sand and sin.	
47.6			48.0'		13" RECOVERY	
		24	48.0'	20 24	Saturated dense orange brown silty fine to	pH sample sent to GTA for
				20 24 22 32	coarse sand.	testing.
					77 1 3 17 C 11 3 16 C 2 1 T 16 C	
50.4			50.0'		24" RECOVERY	
50.4					End of Boring	
53.2					DRAFT	
00.2						
					FOR BIDDIN	()
						U
56						
						_
					TEMBER 201	h
					I LIVIDLIX 40 I	
58.8						
61.6						
\vdash						
64.4						
\vdash						
\vdash						
67.2						
\vdash						

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

Poorly graded sand with silt

Well graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 1/27/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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.: B-4-26

Contract: 28-113-01

Boring Location: Sta. 704.32.72, 370.00' Lt. C.L.

Boring Surface Elev.: +48.21 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 IN. IN. O.D. U-Sampler: Core Bit: O.D. IN.

Casing Size:3 1/4InchesFrom Depth of:To:Hollow Stem Auger:From Depth of:0.0To:40.0

Water Level Readings

Pay Quantities:

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

Boring Contractor: Walton Corporation Driller: Dave Burt

Driller: Dave Burt **Helpers:** D. Zmijewski

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

Remarks:

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

Depth	Daily	No.	Sample	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress	INO.	Depth 16.0'	DIOWS/0	1.1.1.1.1.		Class./G.I.	Remarks
		9	16.0'	14 15	1:	17" RECOVERY	A-1-b	
16.8				14 15 24 15		Moist dense orange gravel and coarse sand w	<u>'</u>	
<u> </u>					1:1:1:1:1:	some fine sand, trace of silt.		
		10	18.0' 18.0'	10	1:	15" RECOVERY	A 1.1	
-		10	16.0	10 6 7 7	1:1:1:1:1: 1:1:1:1:1: 1:1:1:1:1:	Moist medium dense yellow coarse to fine sand, trace of silt and gravel.	A-1-b	
-				7		sand, trace of sitt and graver.		
19.6			20.0'		10000000	19" RECOVERY		
		11	20.0'	10 9 8 7	111111	Moist medium dense yellow coarse to fine	A-1-b	
				8 7	110 14 1	sand w/ some silt, trace of gravel.		
22.4		12	22.0' 22.0'	6	120143	20" RECOVERY	A-2-4(0)	
22.4	1	'-	22.0	6 7 8 7		Moist medium dense yellow coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
				,				
			24.0'		120 13.31 120 13.31 120 13.31	19" RECOVERY		
		13	24.0'	6 6 6	1:1:1:1:1 1:1:1:1:1 1:1:1:1:1	Wet medium dense yellow coarse to fine	A-1-b	
25.2				6		sand, trace of silt and gravel.		
	1				1:			
		14	26.0' 26.0'	4 4	111111	21" RECOVERY Wet medium dense orange coarse to fine	A-1-b	
				8 7	1:1:1:1:1: 1:1:1:1:1: 1:1:1:1:1:1	sand, trace of silt and gravel.	ATO	
					1: 1: 1: 1: 1 1: 1: 1: 1: 1 1: 1: 1: 1: 1	-()		
28			28.0'			22" RECOVERY	JIIN	U
		15	28.0'	4 5 10		Wet medium dense orange coarse to fine	A-1-b	
				9		sand, trace of silt and gravel.	004	
			30.0'		100 133	24" RECOVERY	701	5
		16	30.0'	8 8	1 1 1	Wet medium dense orange fine to coarse	A-3	U
30.8				8 8 9 10		sand, trace of silt and gravel.		
					(** 14.1 (** 14.1 (** 14.1			
-		17	32.0' 32.0'	1	33,73	13" RECOVERY	1 2 4(0)	
		''	32.0	4 8 14		Saturated medium dense orange fine to coarse sand, trace silt.	A-2-4(0)	
				14		Saria, trace sit.		
33.6	1		34.0'			12" RECOVERY		
		18	34.0'	14 24 19 18		Saturated dense orange fine sand w/ some	A-2-4(0)	
				19 18		coarse sand and silt, trace of gravel.		
36.4		19	36.0' 36.0'	18		22" RECOVERY Saturated dense orange coarse to fine sand,	A-3	
30.4	1			18 18 21 30		trace of silt and gravel.	A-3	
						Ü		
			38.0'		11.0 1 4 1 10.0 1 4 1 10.0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	19" RECOVERY		
		20	38.0'	8 8 14 18		Saturated medium dense brown silty fine to		pH sample sent to GTA for testing.
39.2				18	10000			testing.
			40.0'		06141 031171 031171	f		
			40.0		158 3 3.45	End of Boring		
						- C		
42	1	I	1		1			1

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Poorly graded sand with silt



Well graded sand with silt



Low plasticity clay

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 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.

14.0

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: SWM1-38-1

Contract: 25-113-01

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

Boring Surface Elev.: + 62.0' Reference:

Wt. of Casing Hammer: 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 Spoon O.D. 2 IN. IN. O.D. U-Sampler: 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 2/10/09 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
	2/10/09	1	0.5' 2.0'	3 3 4	Moist firm brown clayey silt, trace of fine sand. 13" RECOVERY	A-4(7)	Cultivated Soil - 8".
		2	2.0'	6 6 5	Moist stiff brown silt w/ some clay and fine sand, trace of coarse sand.	A-4(2)	
3.5		Λ	4.0'	5	22" RECOVERY		
		3	4.0'	2 5 7 7	Moist stiff red-orange clayey fine sandy silt w/ some coarse sand and gravel.	A-4(3)	
			6.0'		11" RECOVERY		
7		4	6.0' 8.0'	6 5 6 5	Moist stiff orange fine sandy silt w/ some coarse sand and clay, trace of gravel. 23" RECOVERY	A-4(0)	
		5	8.0'	3 5 4 4	Moist loose orange silty coarse to fine sand, trace of gravel.	A-2-4(0)	
-			10.0'		18" RECOVERY		
10.5		6	10.0'	5 6 7 8	Moist medium dense orange coarse sand and gravel w/ some fine sand and silt.	A-1-b	
		7	12.0' 12.0'	3	18" RECOVERY	A 2 4(0)	
		′		3 4 5 6	Moist loose orange-yellow silty fine to coarse sand w/ some gravel.	A-2-4(0)	
14		<u> </u>	14.0'	0	22" RECOVERY		
		8	14.0'	8 7 5	Moist medium dense orange fine to coarse sand w/ some silt and grave	el. A-2-4(0)	
			15.5'		18" RECOVERY		
		8A	15.5'	5	Wet stiff orange-gray mottled fine sandy clay w/ some organic matter,	A-7-6(10)	
			16.0'		trace of coarse sand and gravel. 6" RECOVERY		
17.5					End of Boring		

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Low plasticity clay



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 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.

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:

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: 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 40.0

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: Dia. U-Sample Boring: U-Samples: 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	
	1/21/09	1	0.5'	4 4 4	Moist firm brown fine sandy silt w/ some clay A-4(0) Topsoil - 6".	
			0.01			
		2	2.0'	5 6	12" RECOVERY Moist medium dense orange silty fine sand w/ A-2-4(0)	
2.8				6 6 5	some coarse sand, trace of gravel.	
				Ĭ		
			4.0'		18" RECOVERY	
		3	4.0'	4 3 3	Moist loose orange coarse to fine sand w/ A-1-b	
				3 4	some silt, trace of gravel.	
5.6						
			6.0'	5	17" RECOVERY	
		4	6.0'	5 6 5 5	Moist medium dense orange fine to coarse A-2-4(0) sand w/ some silt, trace of gravel.	
				5	Sand w/ some sitt, trace of graver.	
			8.0'		21" RECOVERY	
8.4		5	8.0'	5	Moist medium dense orange coarse sand and A-1-b	
				5 6 7 2	gravel w/ some fine sand and silt.	
				_	inct a street	
			10.0'		IEFERENCE NUMBER Frightser 16" RECOVERY	
		6	10.0'	1 3 4 3	Moist loose orange coarse to fine sand w/ A-1-b	
11.2				3	some silt, trace of gravel.	
11.2						
		7	12.0' 12.0'	3	18" RECOVERY	
		′	12.0	3 2 6 7	Moist loose orange and yellow coarse to fine A-1-b sand w/ some silt, trace of gravel.	
				7	Sand w/ Some Sitt, trace of graver.	
14			14.0'		20" RECOVERY	
'*		8	14.0'	5	Moist medium dense orange and yellow A-1-h	
				5 6 9 6	coarse sand w/ some gravel, trace of fine sand	
					and silt.	
			16.0'		HEREIGER HEREIGER EFFEREIR 16" RECOVERY	

Remarks:

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
40.0		9	16.0'	7 7		Moist medium dense orange and yellow	A-1-b	
16.8				7 5 5	06143066 06173066	coarse to fine sand w/ some silt, trace of		
					######################################	gravel.		
			18.0'		151 / 3.1 (61. 171 / 3.2 (1)	23" RECOVERY		
		10	18.0'	5 6 5 6		Moist medium dense orange and yellow	A-1-b	
				5 6	106 13 206 6 106 1 7 3 10 10 10 1 3 2 10 0	coarse to fine sand w/ some silt, trace of		
19.6					66 44-106 i - 63 2 1 2 6 5	gravel.		
			20.0'		111 2 2 2 1 1 1 1 1 12 1 1 2 2 2 1 1 1 12 1 3 2 3 6 6	21" RECOVERY		
		11	20.0'	3 5 5 5	11.01.2.21.11.1 13.14.11.11.1 10.13.13.10.1	Moist loose orange and yellow coarse to fine	A-1-b	
—				5 5		sand w/ some silt, trace of gravel.		
					(444-144) (441-144)			
			22.0'			21" RECOVERY		
22.4		12	22.0'	5 8		Moist medium dense yellow, orange, and	A-1-b	
				20 26		brown coarse to fine sand w/ some silt and		
						gravel.		
			24.0'			18" RECOVERY		
		13	24.0'	14 17	11.00 mm to 11.00	Moist dense yellow, orange, and brown gravel	A-1-b	
				24 21		and coarse sand w/ some fine sand, trace of		
25.2					11.03 4 3 1 5 F 1 1 11.03 4 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	silt.		
			26.0'		0014106 5117255	18" RECOVERY		
		14	26.0'	22 18 11	::::::::::::::::::::::::::::::::::::::	Moist medium dense yellow, orange, and	A-1-b	
				11 13		brown gravel and coarse sand w/ some fine		
				15	nii i i i i i i i i i i i i i i i i i i	sand, trace of silt.		
28			28.0'			18" RECOVERY		
20		15	28.0'	2 3	11111111111111111111111111111111111111	Wet loose yellow fine to coarse sand, trace of	A-3	G
\vdash				4	0063 (516 f) 106 19 19 16 f 106 19 19 19 19	silt and gravel.		
				5		2 · · · · · · · · · · · · · · · · · · ·		
			30.0'		HEIAHEE.	24" RECOVERY		
		16	30.0'	5	11.01.01.00 11.01.00 11.01.00	Saturated medium dense yellow fine to coarse	A-3	
30.8			/ L	5 5 7 7	06919866 06143866	sand, trace of silt and gravel.		
						-		
			32.0'		135 3 A 35 6 G 135 3 A 35 6 F 126 1 7 3 20 C	24" RECOVERY		
		17	32.0'	2 3	1063 4 3 10 6 1063 4 3 10 10 1 4364 4 1 1664	Saturated loose yellow fine to coarse sand,	A-3	
				3 3 4	0:69 (3:00) 1:513 3:06	trace of silt.	11 3	
				4	11111111111111111111111111111111111111			
33.6			34.0'		156 3 A 356 6 156 3 A 356 6 156 1 7 3 50 0	24" RECOVERY		
		18	34.0'	10	00143566 00143566 00445664	Saturated loose orange fine to coarse sand,	A-3	
				10 6 4 4	663 1306 6 1513 1306 6	trace of silt and gravel.	71 3	
				4		trace of sire and graver.		
			36.0'		156 3 5 3 10 10 G 156 3 5 3 10 6 6 156 1 7 3 5 0 0	24!! DECOVEDY		
36.4		19	36.0'	8 9	6614366	24" RECOVERY Saturated medium dense orange fine sand w/	A-2-4(0)	
30.4			00.0	9 10 10		some silt and coarse sand, trace of gravel.	A-2-4(0)	
				10		some sitt and course sand, trace of graver.		
\vdash			20.01			24II DEGOVERN		
<u> </u>		20	38.0' 38.0'	5		24" RECOVERY		pH sample sent to GTA for
		-~	30.0	5 6 7 9		Saturated medium dense orange brown silty fine to coarse sand.		testing.
39.2				9		inie to course suitu.		
			40.01			AN DECOVERY		
			40.0'			24" RECOVERY End of Boring		
						End of Dornig		
42								
			1	1				

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 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.: B-4-28

Contract: 28-113-01

Boring Location: Sta. 705+03.65, 949.00' Lt. C.L.

Boring Surface Elev.: + 42.47 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. IN.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 40.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 1/15/09 24.0 28.0 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: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: J. Lafferty

				1	_			T
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	1/15/09	1	0.5' 2.0'	1 2 2		Moist soft brown clayey silt w/ some fine to coarse sand, trace of gravel. 14" RECOVERY	A-4(3)	Topsoil - 6".
		2	2.0'	5	MM.	Moist stiff brown clayey silt w/ some fine	A-4(4)	
2.8		_		5 6 7 7		sand, trace of coarse sand and gravel.	Λ-4(4)	
			4.0'			23" RECOVERY		G
		3	4.0'	4 4 8		Moist stiff brown and gray fine sandy silt,	A-4(0)	
				8		trace of coarse sand and gravel.		
5.6			6.0'	P		20" RECOVERY	201	5
		4	6.0'	8 9 10 9		Moist very stiff brown fine sandy silt.	A-4(0)	
			8.0'			21" RECOVERY		
8.4		5	8.0'	4 5 6 5		Moist medium dense brown coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
			10.0'			22" RECOVERY		
		6	10.0'	4		Moist loose brown coarse sand, trace of fine	A-1-b	
				4 4 5 4		sand, silt, and gravel.	7110	
11.2				4	(1) (3) (3) (4) (4)	i suria, siri, aria graveri		
					511415	U 8		
	1	U-1	12.0' 12.0'			22" RECOVERY		Press Sample - Shelby Tube.
		0-1	12.0		111111	Moist orange brown fine to coarse sand, trace		1 1633 Sample - Shelby Tube.
\vdash						silt and gravel.		
					061430	ए ह		
14			14.0'			23" RECOVERY		
		7	14.0'	15 14 11 11		Moist medium dense brown and light brown	A-1-b	
				11 11		coarse sand and gravel w/ some fine sand and		
	1					silt.		
			16.0'			21" RECOVERY		
					Dief a sain			

Remarks:

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		8	16.0'	10 8 7 6		1166 1166 1166 1166 1166 1166 1166	Moist medium dense brown and light brown coarse to fine sand, trace of silt and gravel.	A-3	
			18.0'	6	1111		22" RECOVERY		
19.6		9	18.0'	6 7 8 9	9:30:3:33 9:30:3:33 1:30:3:33 1:30:3:33 1:30:3:33 9:30:3:33 1:30:3:33 1:30:3:33		Moist medium dense brown and light brown coarse sand w/ some gravel and fine sand, trace of silt.	A-1-b	
		10	20.0' 20.0'	6		1:1:1: 1:1:1:	20" RECOVERY Wet medium dense brown coarse to fine sand,	A-1-b	
		10		6 8 10 9		1:1:1:	trace of silt and gravel.	A-1-0	
20.4		11	22.0' 22.0'	6			23" RECOVERY	A 2 4(0)	
22.4		11		6 7 7 4			Wet medium dense brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
-		12	24.0' 24.0'	5			20" RECOVERY Wet medium dense brown silty fine sand,	A-2-4(0)	
25.2			26.0'	5 5 7 5			trace of coarse sand. 20" RECOVERY	N-2-4(0)	
		13	26.0'	3 4 7			Saturated medium dense brown fine sand w/	A-2-4(0)	
				7 5			some silt, trace of coarse sand.		
28			28.0'				22" RECOVERY		
		14	28.0'	6 8			Saturated medium dense brown and orange	A-2-4(0)	
				12 11			fine sand w/ some coarse sand and gravel, trace of gravel.		
			30.0'		10011	106 106 100	22" RECOVERY	701	
30.8		15	30.0'	8 10 12 11			Saturated medium dense brown and orange fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	3
			32.0'				21" RECOVERY		
		16	32.0'	5 5 8 10			Saturated medium dense brown and orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
33.6						1000 1000			
		17	34.0' 34.0'	7	30143	100	21" RECOVERY Saturated medium dense brown and orange	A-3	
				7 8 12 12			fine sand w/ some coarse sand, trace of silt.	N-3	
36.4	1	18	36.0' 36.0'	7		164	20" RECOVERY Saturated medium dense brown and orange	A-2-4(0)	
				7 12 15 19			fine sand w/ some silt and coarse sand.	Λ-2-4(0)	
	1		38.0'				21" RECOVERY		
		19	38.0'	17 22 29 33			Saturated dense brown fine to coarse sand		pH sample sent to GTA for
39.2				29 33			with some silt.		testing.
<u> </u>			40.0'				22" RECOVERY		
					1	-1444	End of Boring		
							-		
42									

Symbol Description

Strata symbols

Low plasticity clay



Silty low plasticity clay



Silt



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 1/15/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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-4-29

Contract: 28-113-01

Boring Location: Sta. 706+59.11, 578.00' Lt. C.L.

Boring Surface Elev.: + 48.38 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: 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 1/19/09 27.3 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: C. Shaw

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
(10.)	1/15/09	1	1.0'	2 3	Moist firm brown clayey silt, trace of fine to A-4(10) Cultivated Soil - 8".
2.8		2	2.0'	4 4	8" RECOVERY Moist firm brown clay, trace of fine to coarse A-6(9)
		2A	3.0' 3.0' 4.0'	10 19	sand and gravel. 10" RECOVERY Moist medium dense brown fine to coarse
		3	4.0'	4 6 7 6	sand and gravel w/ some clay. 10" RECOVERY
5.6			6.0'		Moist medium dense light brown coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY
		4	6.0'	5 6 6 7	Moist medium dense light brown coarse to A-2-4(0) fine sand w/ some silt, trace of gravel.
			8.0'		18" RECOVERY
8.4		5	8.0'	4 5 7 6	Moist medium dense light brown fine to coarse sand w/ some silt, trace of gravel.
			10.0'	6	18" RECOVERY
11.2		6	10.0'	6 4 5 5	Moist loose light brown coarse sand w/ some fine sand, trace of silt and gravel.
			12.0'	-	Elisaber 20" RECOVERY
		7	12.0'	5 4 5 6	Moist loose light brown coarse sand w/ some A-1-b fine sand and silt, trace of gravel.
14			14.0'		EFFREE 21" RECOVERY
		8	14.0'	6 6 7 8	Moist medium dense light brown coarse sand w/ some fine sand and silt, trace of gravel.
			16.0'	Ω	20" RECOVERY
		9	16.0'	8 9	Moist medium dense light brown gravel and A-1-b

Remarks:

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

			1 -	1			T	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
			·	10		coarse sand, trace of fine sand and silt.		
		9A	17.5' 17.5'	19		13" RECOVERY	4.1	
		10	18.0' /	50/3"		Moist medium dense black gravel w/ some	A-1-a	
		10	18.0'	30/3	1563 (356) 1563 (356) 1563 (356)	coarse sand, trace of fine sand and silt. 5" RECOVERY		
					#	No Sample Recovery		
19.6			00.01			All DECOVERY		
		11	20.0'	11 10	(** (***)* (*) (** (* 13:0)	0" RECOVERY No Sample Recovery		
				10 11 11	::::::::::::::::::::::::::::::::::::::	100 Sample Recovery		
				11	2011/2016 2011/2016 2011/2016			
			22.0'			0" RECOVERY		
22.4		12	22.0'	3	11111111	Moist loose light brown fine to coarse sand,	A-3	
				3 4 5 5	0:6313:06 0:61313:06 0:6133:06	trace of silt and gravel.		
			24.0'		15619.3566 156199356 156199366	20" RECOVERY		
		13	24.0'	4 5 6 5		Moist medium dense light brown coarse to	A-1-b	
25.2				6 5	1:1:1:1:1:1:1: 1:1:1:1:1:1:1:1: 1:	fine sand, trace of silt and gravel.		
25.2					1:1:1:1:1:1:1: 1:1:1:1:1:1:1:1: 1:			
			26.0'		1:1:1:1:1:1:1:	20" RECOVERY		
		14	26.0'	3 6 4		Wet loose light brown fine sand w/ some	A-2-4(0)	
				5		coarse sand and silt.		
		L.			(0) (0) (0) (0) (0) (0) (0) (0) (0) (0)			
28	1/19/09	15	28.0' 28.0'	1	100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	21" RECOVERY		
	1/19/09	13	20.0	1 5 6		Wet loose light brown fine to coarse sand, trace of silt and gravel.	A-3	
				6	100 1 1 1 1 10 10 10 (1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	trace of sitt and graver.		
			30.0'		000 1 1 1 1 1 0 0 100 1 1 1 1 1 1 1 1 100 1 1 1 1	16" RECOVERY		
		16	30.0'	2		Wet medium dense light brown fine to coarse	A-3	
30.8				2 6 9 12		sand, trace of silt.		
				12			_	
			32.0'		100 1 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	14" RECOVERY		
		17	32.0'	7 17	126 14 1266 1261 73 25 U	No Sample Recovery		
				23 27				
33.6					0013300 0013300			
			34.0'		66233266 67233467	0" RECOVERY		
		18	34.0'	8 13 15 22		Saturated medium dense brown fine sand w/	A-2-4(0)	
				22		some coarse sand and silt, trace of gravel.		
36.4		19	36.0' 36.0'	14		19" RECOVERY Saturated very dense brown fine sand w/	A-3	
30.4		'	00.0	14 23 32 33		some coarse sand, trace of silt and gravel.	A-3	
				33	0.6 / 1 / 1 / 0.6 f	Some course sand, trace of sint and graver.		
			38.0'			17" RECOVERY		
		20	38.0'	10	00 6 7 1 2 1 0 1 0 0 10 6 1 3 1 1 0 6 10 6 1 7 2 10 0	Saturated dense orange brown fine to coarse		pH sample sent to GTA for
				10 16 15 33	6614366 66176766 6611366	sand with some silt.		testing.
39.2					1873.1961. 1961.73760 1961.73766			
			40.0'		rierieria. Gerranea Gerraniea	16" RECOVERY		
						End of Boring		
42								
1		I			I			I

Symbol Description

Strata symbols



Low plasticity clay



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 1/15/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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.: B-4-33

Contract: 28-113-01

Boring Location: Sta. 707+85.40, 836.00' Lt. C.L.

Boring Surface Elev.: + 47.78 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: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. U-Sampler: 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 40.0

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 1/2/09 29.9 34.0 32.0

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	1/2/09	1	0.5'	2 3 4		Moist firm brown silt w/ some clay, trace of	A-4(5)	7" of topsoil
			0.01			fine to coarse sand and gravel.		
		2	2.0' 2.0'	4		18" RECOVERY Moist stiff brown clayey silt, trace of fine to	A-4(6)	
2.8				5 5		coarse sand.	A-4(0)	
				Ī		-()P		
			4.0'			20" RECOVERY	$J \coprod \mathbf{N}$	
		3	4.0'	2 6 11 13		Moist medium dense brown coarse to fine	A-1-b	
				11 13		sand and gravel w/ some silt.	004	
5.6						HINNER '	7(11	h
		4	6.0' 6.0'	14		Moist medium dense brown coarse sand and	A-1-b	
		~	0.0	14 13 8 7		gravel w/ some fine sand and silt.	A-1-0	
				/		graver we some time same and since		
			8.0'			22" RECOVERY		
8.4		5	8.0'	5 5 5 5	11.1331.10 (3.14-1.6) (3.14-1.6)	Moist loose brown coarse sand w/ some silt,	A-1-b	
				5 5	05143006 05173000 00143000	trace of fine sand and gravel.		
					66149666 66143666 66143666			
		6	10.0' 10.0'	5	12 1 7 3 1 C C 12 1 3 4 3 6 C 12 1 3 3 1 C C	22" RECOVERY	A 1 1	
		0	10.0	5 5 5 7	00 14-100 0 00 1 1 1 1 0 0 0 00 1 4 1 0 0 0	Moist loose brown coarse sand, trace of silt, fine sand, and gravel.	A-1-b	
11.2				7		Time sailed, and graver.		
			12.0'		00 1 7 1 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	20" RECOVERY		
		7	12.0'	6 7	11. 13. 13. 15. 15. 15. 15. 15. 15. 15. 15. 15. 15	Moist medium dense brown coarse sand w/	A-1-b	
				6 7 6 8		some fine sand and silt, trace of gravel.		
					66 14-16 6 1 66 14 13:00 66 14 13:00			
14			14.0'	4	0014160 0114160	21" RECOVERY		
		8	14.0'	4 7 5 6	650 14-11-67- 100 7 1 1 1 1 1 1 1 1 100 1 1 1 1 1 1 1 1 1	Moist medium dense brown coarse sand w/	A-1-b	
				6		some fine sand and silt, trace of gravel.		
			16.0'		06313166 6634366 06173366	20" RECOVERY		
1			10.0		0.6343.66	ZU KECUVEKI		

Remarks:

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

B "	l 5 "			1				Г
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	5 6 7 6		Moist medium dense brown coarse sand w/ some gravel, trace of silt and fine sand.	A-1-b	
	_		18.0'		18113.1966. 18117.1819	21" RECOVERY		
19.6		10	18.0'	15 11 8 6		Moist medium dense light brown and brown coarse to fine sand, trace of silt and gravel.	A-1-b	
		11	20.0'	6		19" RECOVERY Moist loose light brown and brown coarse to	A-1-b	
			22.0'	6 4 5 7		fine sand, trace of silt and gravel. 19" RECOVERY	A-1-0	
22.4		12	22.0'	6	**************************************	Moist medium dense light brown and brown	A-1-b	
			24.0'	7 6	0:00 10 0:00 1:00 10 0:00 1:00 10 0:00 1:00 10 0:00 1:00 10 0:00 1:00 10 0:00 1:00 10 0:00	coarse to fine sand, trace of silt and gravel. 21" RECOVERY		
		13	24.0'	5 5 5 7		Moist loose light brown and brown coarse sand w/ some fine sand, trace of silt and	A-1-b	
25.2			26.0'	,		gravel. 19" RECOVERY		
	_	14	26.0'	4 5 5	1:::::::::::::::::::::::::::::::::::::	Wet loose brown fine to coarse sand, trace of	A-3	
				5 7	(2014 1006 (2017 2006 (2017 2006 (2017 2006 (2017 2006	silt.		
28		15	28.0' 28.0'	1 3		20" RECOVERY Wet loose brown coarse to fine sand, trace of	A-1-b	G
				6 6		silt and gravel.	204	_
30.8		16	30.0' 30.0'	1 4 5 9		Saturated loose brown fine to coarse sand, trace of silt and gravel.	A-3	5
			32.0'		136 14 11 6 f. 126 1 7 3 22 C 126 1 4 3 1 6 E	23" RECOVERY		
		17	32.0'	3 4 4 5	### 14 15 ### ##########################	Saturated loose brown fine to coarse sand, trace of silt and gravel.	A-3	
33.6			34.0'		6649-966 0631000 6643-966 06133000	22" RECOVERY		
		18	34.0'	5 6 12 22	11.00 mm to 11.00	Saturated medium dense brown fine sand w/	A-3	
				12 22	126 14 22 06 126 14 22 07 126 14 22 07 126 14 22 07 126 14 22 07	some coarse sand, trace of silt and gravel.		
36.4		19	36.0' 36.0'	11	00111100 0014100 0011100	23" RECOVERY	A 2	
30.4		15	30.0	11 14 22 31		Saturated dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
	1		38.0'		100 133 166 100 133 166 100 133 166	20" RECOVERY		
39.2		20	38.0'	11 12 24 28	1981 3 3 1 6 6 12 6 1 7 7 7 1 1 1 12 6 1 7 7 7 1 1 1 12 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Saturated dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
			40.0'		196943166 17617171717 17617171767 17617171767	21" RECOVERY		
					1	End of Boring.		
42	-							

Symbol Description

Strata symbols



Silty low plasticity clay



Low plasticity clay



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 1/2/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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.: B-4-34

Contract: 28-113-01

Boring Location: Sta. 708+17.71, 962.00' Lt. C.L.

Boring Surface Elev.: + 48.68 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: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. U-Sampler: 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 40.0

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 12/23/08 28.3 34.0 32.0

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: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Rema	arks
	12/23/08	1	0.5'	4 4 4	Moist loose orange-brown clayey fine to coarse sand w/ some gravel. 10" RECOVERY	d soil.
		2	2.0'	3	Moist loose orange-brown silty fine to coarse A-2-4(0)	
2.8			4.0'	3 3 5 6	sand, trace of gravel. 20" RECOVERY	
		3	4.0'	5 5 4 5	Moist loose silty fine sand w/ some coarse sand, trace of gravel.	
5.6			6.0'	P	20" RECOVERY	. 1
		U-1	6.0'		Moist orange brown fine to coarse sand with some silt. Press Shelby T	ube
			7.5'		18" RECOVERY	
8.4		4	8.0'	6 7 6 6	Moist medium dense yellow coarse to fine A-1-b sand w/ some silt, trace of gravel.	
		5	10.0' 10.0'	8	19" RECOVERY Moist medium dense vellow coarse sand w/ A-1-b	
11.2		3	10.0	8 8 9 9	Moist medium dense yellow coarse sand w/ A-1-b some fine sand, trace of silt and gravel.	
			12.0'		17" RECOVERY	
		6	12.0'	3 6 8 10	Moist medium dense yellow coarse sand w/ A-1-b some fine sand, trace of silt and gravel.	
14			14.0'	E	21" RECOVERY	
		7	14.0'	5 6 8 9	Moist medium dense yellow coarse sand w/ some fine sand and silt, trace of gravel.	
1			16.0'		TELEPHONE TO THE TELEPHONE THE TELEPHON	

Remarks:

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		8	16.0'	6 7		Moist medium dense yellow coarse sand w/	A-1-b	
10.0				10 11		some fine sand, trace of silt and gravel.		
			18.0'		26 JA 150 26 JA 150	19" RECOVERY		
		9	18.0'	11		Moist medium dense yellow fine to coarse	A-1-b	
				11 13 11 10		sand w/ some silt, trace of gravel.		
19.6								
		40	20.0'	11		24" RECOVERY		
		10	20.0'	11 13 12 10		Moist medium dense orange coarse sand w/ some fine sand and gravel, trace of silt.	A-1-b	
				10		some time sailed and graver, trace of sitt.		
			22.0'			24" RECOVERY		
22.4		11	22.0'	5 6		Moist medium dense yellow coarse to fine	A-1-b	
				9		sand, trace of silt and gravel.		
					1: 1:			
		12	24.0' 24.0'	5	1:	: 19" RECOVERY	A 1 1.	
		12	24.0	5 6 6 10	1:1:1:1:1:1: 1:1:1:1:1:1: 1:1:1:1:1:1:	Moist medium dense yellow coarse to fine sand w/ some gravel, trace of silt.	A-1-b	
25.2				10				
			26.0'			19" RECOVERY		
		13	26.0'	8 10 13 13	1:01/100 1:01/100 1:01/100	Moist medium dense yellow coarse to fine	A-1-b	
				13	156 1 A 3 1 G 1 - F 1 7 7 1 G 1 - F 1 7 7 1 G	sand, trace of gravel and silt.		
28		14	28.0' 28.0'	3 5		24" RECOVERY Wet medium dense yellow fine to coarse	A-3	Water encounter at 28.3'.
				6 9	(1) 15 (1) (3) 14 13 (1) (4) 17 17 (1)	sand, trace of silt and gravel.	71-5	water encounter at 20.5.
				Ů	11.6 1 4 2 1 6 1 1 1 1 1 1 1 1 1 1 2 4 1 1 2 1 0			_
			30.0'		120 13.110	23" RECOVERY	004	<u> </u>
30.8		15	30.0'	2 6 10 16		Wet medium dense yellow fine to coarse	A-3	
30.6				16		sand, trace of silt and gravel.		
			32.0'		00 / 1200 125 / A. 110 126 / A. 110 126 / 7 / 7 / 7	24" RECOVERY		
		16	32.0'	7	100 14 100 100 14 100 100 14 100 100 14 100		A-3	
				14 33		sand, trace of silt and gravel.		
33.6								
		17	34.0' 34.0'	10	120 1 3 3 20 120 1 3 3 20 120 1 3 3 20	24" RECOVERY		C + 1 1
		''	34.0	10 11 14 26	196 14-116 106 1 1 1 106 106 1 4 106	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	Contains cemented sands.
				26		some course saine, trace of sin and graver.		
			36.0'			20" RECOVERY		
36.4		18	36.0'	20 25 41 28		Saturated very dense orange fine sand w/	A-2-4(0)	Contains cemented sands.
				41 28		some coarse sand and silt.		
		19	38.0' 38.0'	18		20" RECOVERY Saturated dense fine to coarse sand trace silt.		pH sample sent to GTA for
				18 25 23 36				testing. Contains cemented
39.2								sands.
			40.0'		onivid Collina Collina Collina	22 RECOVERT		
						End of Boring.		
40								
42								

Symbol Description

Strata symbols

SCIACA SYMBOIS

Clayey sand

Silty sand

Poorly graded sand with silt

Well graded sand

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- Exploratory borings were drilled on 12/23/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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-4-35

Contract: 28-113-01

Boring Location: Sta. 705+03.65, 1,269.00' Lt. C.L.

Boring Surface Elev.: + 33.92 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: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. U-Sampler: 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 Depth of Water Time **Depth of Hole** Elev. of Water Date 1/9/09 20.0 18.0 16.1

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: Jason Truver

Helpers: D. Zmijewski

Depth	Daily	1	Cample			ı
(ft.)	Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	1/9/09	1	1.0'	2 3	Moist firm brown clayey silt, trace of fine to A-4(7)	11" of cultivated soil.
			2.0'		coarse sand and gravel.	
\vdash		2	2.0'	4 4		
2.8				4 4 4 4	Moist firm brown clay, trace of fine to coarse sand.	
			4.0'		8" RECOVERY	
		3	4.0'	2 2 2 2 5	Moist soft brown clay, trace of fine to coarse A-6(10)	
				2 5	sand and gravel.	
5.6						_
			6.0'		18" RECOVERY	h
		4	6.0'	10 15 10 12	Moist medium dense brown fine to coarse A-2-4(0)	
				10 12	sand w/ some silt, trace of gravel.	
			8.0'		14" RECOVERY	
8.4		5	8.0'	5 8 8 10	Moist medium dense brown coarse to fine A-1-b	
				10	sand w/ some silt, trace of gravel.	
					73.TPP.1 113.1051	
		6	10.0' 10.0'	8	17" RECOVERY	
		0	10.0	8 8 9 10	Moist medium dense brown fine to coarse A-2-4(0)	
11.2				10	sand w/ some silt and gravel.	
					ti iiict HAREF	
		7	12.0' 12.0'	6	Wet medium dense orange and brown fine to A-2-4(0)	
		′	12.0	6 7 8 9	wet medium dense orange and brown fine to A-2-4(0) coarse sand w/ some silt, trace of gravel.	
				9	course suite w/ some sitt, trace of graver.	
			14.01		22" RECOVERY	
14		8	14.0' 14.0'	10	Wet medium dense orange and brown fine to A-2-4(0)	Contains cemented sands.
		-		10 10 5	coarse sand w/ some silt, trace of gravel.	Contains comented saids.
			15.5'		16" RECOVERY	
		8A	15.5'	10	Wet stiff light brown clay, trace of fine to A-6(16)	
		9	16.0'	10 10	coarse sand. A-6(7)	Water encountered at 16.1'.
			16.0'	10		attraction at 10.1.

Remarks:

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
	_ ĭ		17.0'			////	6" RECOVERY		
		9A	17.0'	11 10			Saturated very stiff light brown fine sandy	A-2-4(0)	
l			18.0'				clay, trace of coarse sand.		
	1	10	18.0'	5		13711	11" RECOVERY	A-2-4(0)	
				5 5 5	100	/ 10:05 14 1:65	Saturated medium dense brown fine sand w/	A-2-4(0)	
				10	11:0	14166	some coarse sand, silt, and gravel. 9" RECOVERY		
19.6]					1909:61 113:66 13:166			
l .			20.0'		12.0	143 EF	Saturated loose brown fine sand w/ some		
	1	11	20.0'	6 5 7			coarse sand and silt, trace of gravel.	A-3	
	1			7		143166	Saturated medium dense brown fine sand w/		
						147.66			
l			22.0'			13.1 e f	some coarse sand, trace of silt. 20" RECOVERY		
22.4	1	12	22.0'	5	11.5	14166	Saturated medium dense brown fine sand w/	A-3	
22.4	1	'-	22.0	5 5 6 8				A-3	
<u> </u>				8	hit	1 / 1 / 6 (some coarse sand, trace of silt.		
]				1.1	11000			
l .			24.0'		12.0	173700	16" RECOVERY		
		13	24.0'	4	136	141.67	Saturated medium dense brown fine sand w/	A-3	
-				4 12 13 15		111100 141106 1111106	some coarse sand, trace of silt and gravel.		
25.2				15	1.1	14166			
l .					13.6	113:00 13.1:07			
	1		26.0'		1:1	14166	24" RECOVERY		
	1	14	26.0'	4 8			Saturated medium dense brown fine sand w/	A-2-4(0)	
				11 13			some silt and coarse sand.		
l									
28	1		28.0'				20" RECOVERY		
20	1	15	28.0'	19			Saturated medium dense brown fine sand w/	A-2-4(0)	
-				19 10 10 12			some silt and coarse sand, trace of gravel.	A-2-4(0)	
]			12			some sitt and coarse sand, trace of graver.		
l									
	1		30.0'				20" RECOVERY		
\vdash	-	16	30.0'	10 7	1	11111	Saturated medium dense brown fine sand,	A-3	
30.8				9			trace of silt and coarse sand.		
l					1	4,,,,,			
]		00.01			13.1166	24" RECOVERY		
	1	17	32.0' 32.0'	18	- 11	143,64	Saturated medium dense brown fine sand w/	A 2 4(0)	
		''	32.0	18 9 8				A-2-4(0)	
				7			some silt, trace of coarse sand.		
33.6									
	1		34.0'				18" RECOVERY		
		18	34.0'	WOR	1:1		Saturated loose brown fine sand, trace of	A-3	
<u> </u>				4 6 6	1156) 13:00 13:1:06 13:3:00	coarse sand and silt.		
				0	1.0				
					1: 8 1: 5	113:00 13.1:01			
	1	40	36.0'			14166	21" RECOVERY		
36.4		19	36.0'	5 7	136	14-11-7 111:05	Saturated medium dense brown fine sand w/	A-2-4(0)	
				10 11			some silt, trace of coarse sand and gravel.		
					136	143.66			
	1		38.0'		13.F	13.1 6 f	23" RECOVERY		
<u> </u>		20	38.0'	10	11.5	14166	Saturated dense brown fine to coarse sand,		pH sample sent to GTA for
		-	55.0	10 19 31 41	1996	141.60 141.60 111.60	·		testing.
39.2				41	1.0	17760	trace silt and gravel.		Comis.
	1					190).61 113:07			
—			40.0'			1 7 3 % C 1 4 1 6 F	24" RECOVERY		
					Т		End of Boring.		
42									

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- 1. Exploratory borings were drilled on 1/9/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
- Groundwater levels recorded at the time of drilling and re-checked 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.: B-4-36

Contract: 28-113-01

Boring Location: Sta. 704+01.75, 1,486.00' Lt. C.L.

Boring Surface Elev.: + 32.63 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. IN.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 40.0

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 1/12/09 20.0 18.0 16.6

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: 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
	1/12/09	1	1.0'	5 5	Moist stiff brown clayey coarse to fine sandy A-4(0)	12" of topsoil; 12" of frost.
-			2.0'		silt, trace of gravel	1
-		2	2.0'	11 16 11	12" RECOVERY A-1-b	
2.8				11 12	Moist medium dense orange coarse to fine	
				12	sand w/ some gravel and silt.	
			4.0'		10" RECOVERY	
		3	4.0'	5 5 8 5	Moist medium dense orange coarse to fine A-1-b	
				8 5	sand w/ some silt and gravel.	
5.6						_
0.0			6.0'		16" RECOVERY	
		4	6.0'	7 6 6 7	Moist medium dense orange-yellow mottled A-3	
				6 7	fine to coarse sand, trace of silt and gravel.	
<u> </u>					13.4.7.16.7 14.4.16.1 14.7.16.1	
			8.0'		18 RECOVERY	
8.4		5	8.0'	3 5	Moist medium dense orange and gray fine to A-2-4(0)	
				3 5 6 8	coarse sand w/ some silt, trace of gravel.	
			10.0'		17" RECOVERY	
\vdash		6	10.0'	8	Moist medium dense orange coarse to fine A-2-4(0)	Contains cemented sands.
<u> </u>				8 7 10 6	sand w/ some silt, trace of gravel.	Contains contented saids.
11.2				6	Sund III Some Sin, was of graven	
			40.01		IC!! DECOVERY	
		7	12.0' 12.0'	5	16" RECOVERY Wet medium dense brown fine sand and A-2-4(0)	Contains cemented sands.
		'	12.0	5 5 7	gravel w/ some silt, trace of coarse sand.	Contains cemented sands.
				9	graver w/ some sin, nace of coarse same.	
14		8	14.0' 14.0'	3	10" RECOVERY	
		٥	14.0	3 4 4 5	Wet loose brown fine to coarse sand w/ some A-2-4(0)	
				5	silt, trace of gravel.	
					24.1912.4.4 12.1912.6.1 15.14.16.15	
			16.0'		20" RECOVERY	
		9	16.0'	5 8	Wet medium dense orange fine to coarse sand A-2-4(0)	Water encountered at 16.6'.

Remarks:

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"	·T		Sample Description	Class./G.I.	Remarks
(1)	- 5			8 7	100		w/ some silt, trace of gravel.		
						111100 141106 171100			
		10	18.0' 18.0'	3	111	143,64	18" RECOVERY Wet medium dense orange fine to coarse sand	A-2-4(0)	
		10	10.0	3 5 6 6			w/ some silt, trace of gravel.	A-2-4(0)	
				6			w/ some sitt, trace of graver.		
19.6	-		20.0'				14" RECOVERY		
		11	20.0'	4 6		14111	Wet medium dense orange fine to coarse sand	A-2-4(0)	
\vdash				4 6 7 7		13100	w/ some silt, trace of gravel.		
<u> </u>						14-14-1			
\vdash			22.0'		111	143.66	16" RECOVERY		
22.4		12	22.0'	7 13 11 8		44-166. 1100t	Saturated medium dense orange-brown	A-3	
				8		14766	mottled fine sand w/ some coarse sand, trace of silt and gravel.		
<u> </u>			04.01			11100C			
		13	24.0' 24.0'	1	122	14366 14366 14366	20" RECOVERY Saturated medium dense orange and brown	A-3	
<u> </u>				4 9 13) 19:00 f 14:10 f 17:30 f	mottled fine sand w/ some coarse sand, trace	71.5	
25.2				10		14716F 1401F 1101F	of silt and gravel.		
			26.0'		111	14.1966 177700 143166	22" RECOVERY		
		14	26.0'	9 14 24 24	1111	1411E 1411E 1111E	Saturated dense orange-brown mottled fine	A-3	
				24 24		14166 14166	sand w/ some coarse sand, trace of silt and		
						11000 11000 14166	gravel.		
28		15	28.0' 28.0'	7	100	143 66	23" RECOVERY	A 2	
			20.0	7 8 12 15			Saturated medium dense orange-brown fine sand w/some coarse sand, trace of silt.	A-3	
				15		14 c.	sand w some course sand, race of site.		
			30.0'			14.1 6 f. 173.0 C	18" RECOVERY		
		16	30.0'	8 14 15 28		4111	Saturated medium dense orange-brown fine	A-3	5
30.8				15 28		14 a c 6	sand w/ some coarse sand, trace of silt and		
-						140 () () () () () () () () () (gravel.		
		47	32.0'	6	11	111166	20" RECOVERY		
		17	32.0'	6 6 11		14-15-6 112-6-5 14-16-6	Saturated medium dense orange-brown fine sand w/ some coarse sand, trace of silt and	A-3	
<u> </u>				16		177766 14766 14966	gravel.		
33.6			34.0'			13.106 13.106 173,00	23" RECOVERY		
-		18	34.0'	4 5		143.6F	Saturated medium dense orange-brown fine	A-3	
<u> </u>				4 5 6 7			sand w/ some coarse sand, trace of silt.		
						14.141.			
			36.0'		111	13.1 6 f. 173.0 0 143.6 f	20" RECOVERY		
36.4		19	36.0'	5 12 14 20		44-166. 1100t	Saturated dense orange-brown fine sand w/	A-2-4(0)	
-				20		17396 14356 14366	some silt and coarse sand.		
\vdash			20.01			11300 C 14.100 C	22# DECOVERY		
		20	38.0' 38.0'	5		14166 14166 14166	23" RECOVERY Saturated dense brown fine to coarse sand		pH sample sent to GTA for
—	-			5 16 18 19		111100 141106 171900	trace silt.		testing.
39.2	1					14716F 14716F 11710G			
			40.0'			17376 U 17376 U	24" RECOVERY		
							End of Boring.		
	-								
<u></u>	-								
42	1								
	I	I	1	1	- 1			l	i e

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING SEPTEMBER 2015

- Exploratory borings were drilled on 1/12/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and 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-4-37

Contract: 28-113-01

Boring Location: Sta. 701+30.97, 1,658.00' Lt. C.L.

Boring Surface Elev.: + 26.04 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. 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 Depth of Water Time **Depth of Hole** Elev. of Water Date 1/12/09 10.0 12.0 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: 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	
	1/12/09	1	1.0' 2.0'	5 6	Moist stiff brown fine to coarse sandy silt w/ A-4(0) 11" of cultivated soil. some gravel, trace of clay.	
2.8		2	2.0'	5 10 10 8	Moist medium dense orange gravel and coarse sand w/ some fine sand, trace of silt. A-1-a	
		U-1	4.0' 4.0'		Wet brown fine to coarse sand trace gravel. Press Shelby Tube.	
5.6			6.0'		21" RECOVERY	
		3	6.0'	10 5 7 7	Moist medium dense orange coarse to fine sand and gravel w/ some silt.	
8.4		4	8.0' 8.0'	5 1 1 2	Wet very loose brown and orange fine sand w/ some gravel, silt, and coarse sand. Wet very loose brown and orange fine sand w/ some gravel, silt, and coarse sand.	7.
11.2		5	10.0' 10.0'	2 2 2 2 3	10" RECOVERY Wet very loose brown and orange fine sand w/ some coarse sand and silt, trace of gravel. 24" RECOVERY	
		6	12.0'	1 2 2 3	Wet very loose brown and orange coarse to fine sand, trace of silt and gravel. A-1-b	
14		7	14.0' 14.0'	1 2 3 5	24" RECOVERY Wet loose brown and orange coarse to fine sand, trace of silt and gravel. 24" RECOVERY A-1-b	
		8	16.0'	12 8	Wet medium dense brown and orange coarse A-1-b	

Remarks:

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
				6 8	1:1:1:1:1:1:1	to fine sand and gravel, trace of silt.		
					1: 1			
		9	18.0' 18.0'	1	10101010101 10111111111111111111111111	18" RECOVERY	A-3	
-		9	10.0	1 3 5 6	(14.4-1.6) (14.111:01 (14.14.1:06	Saturated loose brown and orange fine to coarse sand, trace of silt and gravel.	A-3	
				6	12617396U 126143266 13614366	coarse sand, trace or sitt and graver.		
19.6			20.0'		00 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	23" RECOVERY		
		10	20.0'	6	111111111111111111111111111111111111111	Saturated medium dense brown and orange	A-3	
				6 6 7 9	1:	fine sand w/ some coarse sand, trace of silt.	113	
				9	1.6147.64 1.4141.61	ŕ		
			22.0'		166 14.116 f 176 177 77 1	22" RECOVERY		
22.4		11	22.0'	1 4		Saturated loose brown and orange fine sand	A-3	
				4 4 5		w/ some coarse sand, trace of silt.		
					(4 (4)) E (
			24.0'		10011111111111111111111111111111111111	20" RECOVERY		
		12	24.0'	1 2 4 5		Saturated loose brown and orange fine sand	A-3	Contains cemented sands.
25.2				5		w/ some coarse sand, trace of silt.		
		13	26.0' 26.0'	1	501416	22" RECOVERY	A-3	Contains cemented sands.
		'	20.0	1 2 5 7	100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Saturated loose brown and orange fine sand w/some coarse sand, trace of silt.	A-3	Contains cemented sands.
				7		w/ some coarse sand, trace of site.		
28			28.0'			23" RECOVERY		
20		14	28.0'	1 2	15 1 4 7 6 F	Saturated loose orange fine sand w/ some	A-3	
				1 3 3 5	10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	coarse sand, trace of silt.	J II N	G
				_	11.6147164 12.112124 12.112124			
			30.0'		156 3 9 . 3 5 6 6 12 6 1 7 3 2 6 1	24" RECOVERY		
—		15	30.0'	9 10 11 12		Saturated medium dense orange fine sand w/	A-3	
30.8				12		some coarse sand, trace of silt.		
				_	124 12 12 12 12 12 12 12 12 12 12 12 12 12			
		16	32.0' 32.0'	3	12 1 1 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1	23" RECOVERY	4.2	
		10	32.0	3 4 4	(14.4-1.6) (14.11116) (14.11116)	Saturated loose orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
				3	12617396U 12614226 12614936	coarse saile, trace of sitt and graver.		
33.6			34.0'		155 1330 0 155 13.156 f 155 1330 0	24" RECOVERY		
		17	34.0'	1	1111111111	Saturated medium dense orange fine sand w/	A-3	
				1 3 8 12	0:13 13:05 0:13 13:05 0:13 13:01	some coarse sand, trace of silt and gravel.		
			36.0'		155 13.156 f 155 173 75 16 155 173 75 16	22" RECOVERY		
36.4		18	36.0'	10 11	100 1 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Saturated medium dense brown fine to coarse		pH sample sent to GTA for
				11 10	6617366 6617366	sand some silt trace gravel.		testing.
					036 130 130 0 038 2 130 0 0 138 13 136 6			
		40	38.0'	10	HILLIAN CO	24" RECOVERY		
		19	38.0'	19 25 33 24		Saturated very dense dark gray clayey fine	A-2-4(0)	
39.2				24		sand, trace of coarse sand.		
			40.01			(II DECOVEDY		
			40.0'			6" RECOVERY End of Boring.		
						Ziid VI Doinig.		
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Symbol Description

Strata symbols

Silty sand

20 Well graded sand with silt

1.000000 1.0000000

Poorly graded sand with silt



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING SEPTEMBER 2015

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