TRIP REPORT WEST TRINDLE ROAD VALVE SITE – INFILTRATION TESTING

1.0 PURPOSE

This Trip Report presents the field data and results of double-ring soil infiltration tests conducted to support the design of a stormwater management system at the West Trindle Road Valve site located in Silver Spring Township, Cumberland County, Pennsylvania, as part of the Pennsylvania Pipeline Project (PPP) for Sunoco Pipeline, LP. Two surface tests (IT-A and IT-B) were performed at the site. The test locations are listed by coordinates (latitude and longitude) in Table 1 and shown on the attached figure.

2.0 FIELD ACTIVITIES

The infiltration tests were conducted by Kevin Nuble and Cosmo Lettich of CH2M Hill, Inc., on October 6, 2016. The test locations were positioned in the field using a handheld, WAAS-enabled GPS unit. Table 1 provides the coordinates of the test locations. The tests were located in a field near the intersection of West Trindle Road and the Pennsylvania Turnpike (Route 76).

The infiltration tests were performed in accordance with the procedure specified in the 2006 Pennsylvania Stormwater Best Management Practices (BMP) Manual. The test locations were prepared with hand tools and care was taken to minimize disturbance of the soil surface to be tested. Double-ring infiltrometers were used for testing and consisted of 8-inch diameter and 4-inch diameter sections of steel casing, each 10 inches in height. After digging to the target depth, the test surface was leveled, and loose soil and debris were removed. The rings were driven a minimum of 2 inches into the soil. The infiltration test depths are presented in Table 1.

The test locations were pre-soaked for 1 hour. The tests were then conducted with measurements at 10-minute or 30-minute intervals, based on the observed water level drop during the last half of the pre-soak period. Pre-soak and test information was recorded on infiltration test data sheets; copies of the test data sheets are attached to this report.

The weather at the time of testing was sunny and approximately 65 degrees Fahrenheit. Additionally, less than 0.5 inches of precipitation was observed 24 hours prior to testing.

A hand auger was utilized to characterize the soil, determine the depth to bedrock, if encountered, and inspect for evidence of the seasonal high water table near the test areas. This was completed from the ground surface down to two feet below the target infiltration test depth. Descriptions of the soil were documented on field logs, which were based on the form example in the BMP manual. Copies of the soil logs are attached to this report.

3.0 RESULTS

3.1 <u>Soil Description</u>

Soils encountered at the site generally consisted of a thin (up to approximately 2 inches) brown (10YR [4/3, 5/3]) topsoil/surface soil layer composed of an organic silt loam with small roots which was underlain by a yellow brown (10YR [5/4, 5/6, 5/8]) silt loam with small roots. An illuvial layer was found approximately 4 to 24 inches below ground surface and consisted of a reddish brown (5YR [4/3, 4/4, 5/3, 5/4]) silty clay which trended to a clay loam with depth. Bedrock was not encountered.

Seasonal high water was not observed at the testing location, with lithochromatic mottling being observed in test unit B at roughly 12 inches below ground surface, however this may have been due to mixing of soils and not indicative of seasonal high water.

According to United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey data, the soil type for the test location is mapped as follows:

 Hagerstown Silt Loam - (HaA soil symbol) with 0-3 percent slopes; with low runoff and is well drained.

3.2 <u>Infiltration Tests Results</u>

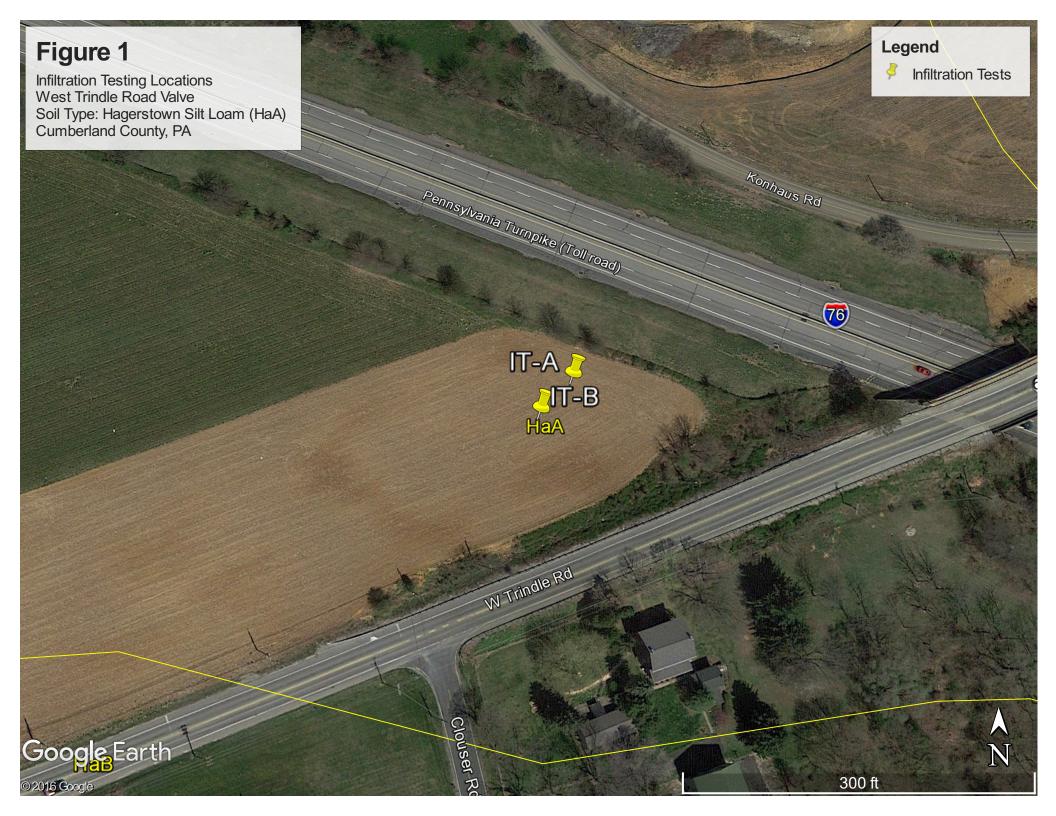
Table 1 summarizes the infiltration rates (inches per hour) calculated from the test data. The infiltration rates presented in Table 1 were calculated from the average water level drop of the last four stabilized readings measured in the inner ring.

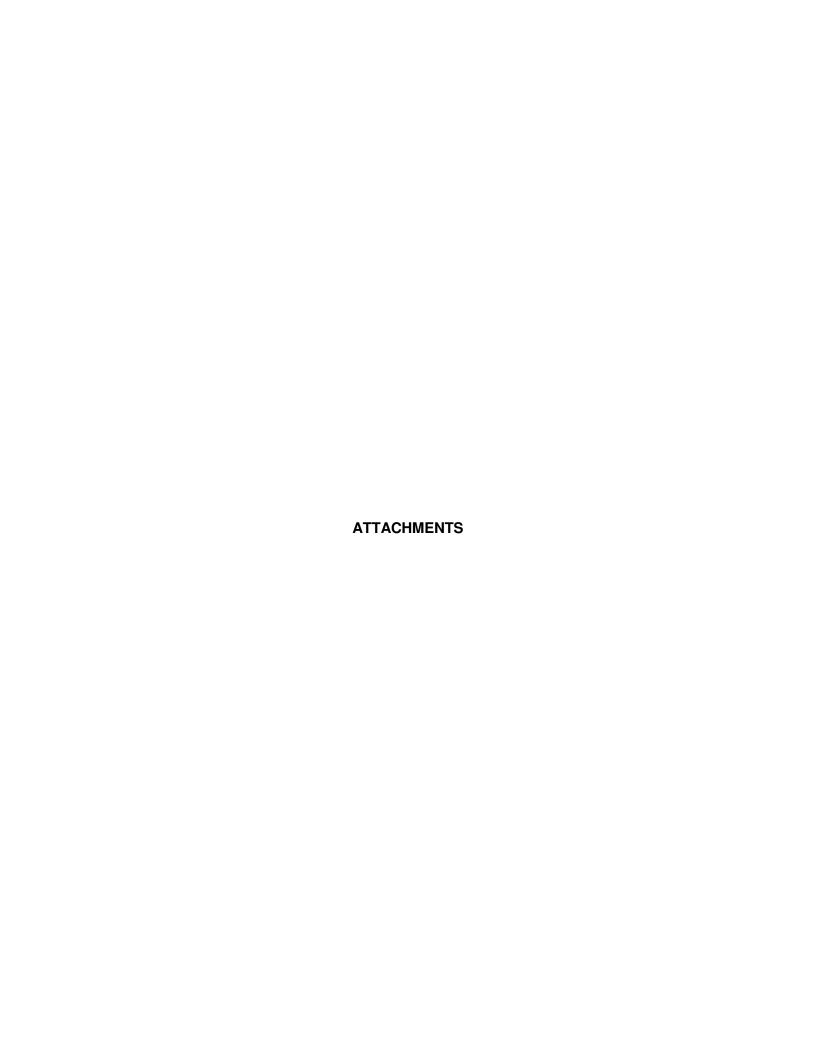
The pre-soak test result for IT-A indicated a high infiltration rate, requiring a 10 minute test cycle; whereas, the pre-soak test result for IT-B indicated a low infiltration rate, requiring a 30 minute test cycle.

Table 1
Summary of Infiltration Test Results
West Trindle Road Valve
Silver Spring Township, Cumberland County, PA
Sunoco PPP

Test Location	Location Data		Test Depth (inches)	Infiltration Test Result	
(IT-)	LATITUDE	LONGITUDE		(inches/hour)	
IT-A (shallow)	40.2029080°	- 077.0442170°	2.5	12.00*	
IT-B (shallow)	40.2028173°	- 077.0443268°	2.5	0.00	

^{*} Water level dropped from 8" to 6" within infiltration test ring for a 2" drop per 10 minute interval







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Soil Log

Tested By: C. NUble	·	
	Elevation:	Project No.: //2 4 C 05958 Equipment Used: Shawl
Additional Comments	Land Use: AG (157	Weather: 50M/

Hori	izon E	Upper Boundary	Lower Boundary	Soil Textural Class	Type, Size, Coarse Fragments, etc.	Soil Color	Color	Pores, Roots, Rock	Depth to		
\mathbb{C}		\bigcirc	2"			30.07	Patterns	Structure	Bedrock	Depth to Water	Comments
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<u></u>		2	4"	SILLUDA	Not BE.	Olgnic Silf	No.	Now			
B	- 5	. "	24"	CIPY	2101		40001 +0001	NIN			
				- 707	. 106,0		+0 691	70 172	_	_	

Horizon:	USDA Definition	Soil Textural Class	T	
	Organic debris	Use ternary diagram from	Boundary	Notes:
Α \	v organic matter	US Department of Agriculture Soil	Use depth and classification	AC till
В "	Maximum accumulation of silicate clay minerals	Conservation Service	Abrupt	AG Field Wall compach
С	Weathered parent material			
R	Layer of consolidated rock beneath the soil		Gradual	Heory C/Ay
	il log located on page 12 of the Pen		Diffuse	

Table based on: Sample soil log located on page 12 of the Pennsylvania Stormwater Best Management Practices Manual USDA Definitions located from: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054308

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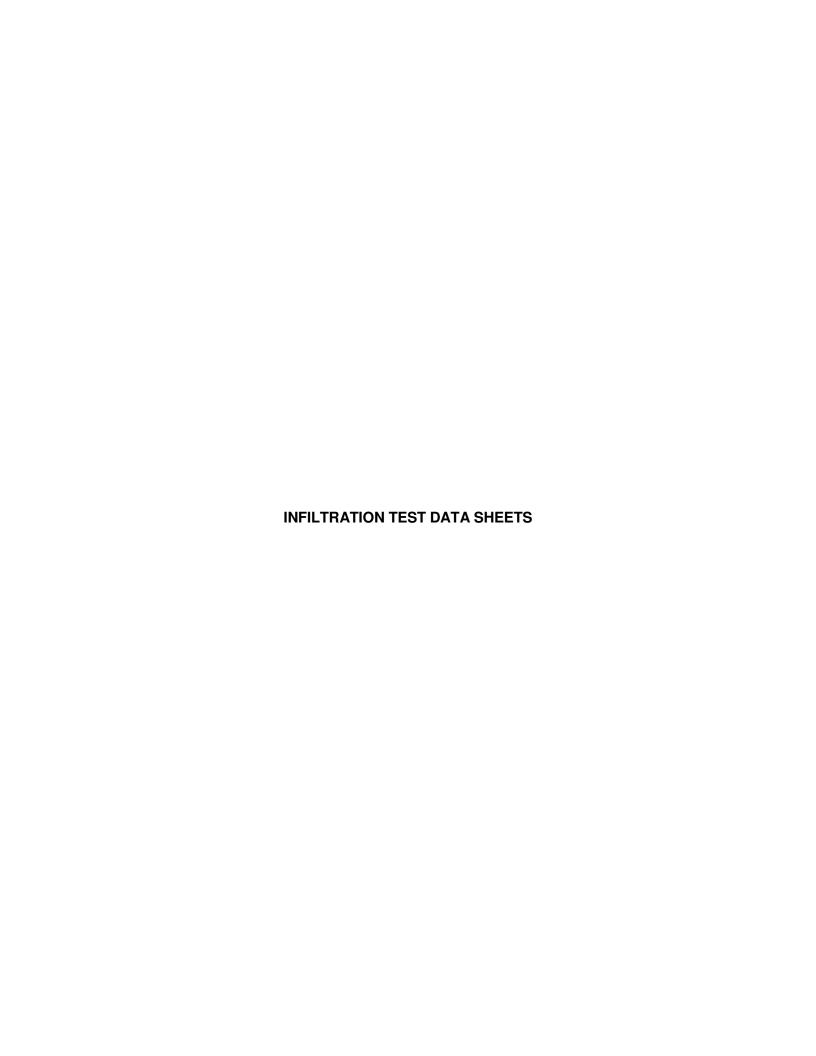
Soil Log

Tested By: C. Leffich	Project: Sunow Logistics	Project No.: //2 1 C 05/58
Test Pit: 2 hand Nug Date: 10/6/16	Elevation:	Used: Should
Geology: Soil Type:	Land Use: Corn Field	Weather: warm dear

Additional Comments

Horizon	Upper Boundary	Lower Boundary	Soil Textural Class	Type, Size, Coarse Fragments, etc.	Soil Color	Color Patterns	Pores, Roots, Rock Structure	Depth to Bedrock	Depth to Water	Comments
0	0	2"	Top 3011	organic material	yellowig	Hano-	Corn Roots	NA	NA	
A	2"	4"	Silty	None			V			
B	4"	124"	Lean St.	r 1	V	motled @12"	Fine	V	V	
B	12"	24"	Lean Clay	<i>J</i>	receish brown	Homo- gona s	None	į	1	
								,		
									10 pp	

Horizon:	USDA Definition	Soil Textural Class	Boundary	Notes:
0	Organic debris	'Use ternary diagram from	Use depth and classification	
А	Dark colored, mixed mineral organic matter	US Department of Agriculture Soil Conservation Service	Classification as Follows: Abrupt	
В	Maximum accumulation of silicate clay minerals		Clear	
С	Weathered parent material		Gradual	<u> </u>
R	Layer of consolidated rock beneath the soil		Diffuse	





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INFILTRATION TEST DATA SHEET

Tetra Tech, Inc.

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PROJECT NAM PROJECT NUM		logitics	TEST AREA ID: Y	V/TRINDE ROAD VAIVE A
TROJECT NOW	IDLK. 118720	7 77 8	PERSONNEL: CO	Some Letten Keunschi
TEST METHO	D: Double Ring Infil Single Ring Infilt	trometer 'Percolation		ocation Coordinates or Description:
	RING INSIDE	611.011	i	
	TER/HEIGHT: RING INSIDE	7/10	_ 4	10' 12' 10.24'N
	TER/HEIGHT:	8/10"	7	17' 2' 3775'W
PERCOLATIO:	N HOLE DIAMETE	IR: NA	(If performing an o	
DATE(s):	10/6/16	- 0.4		
Distance from the	he bottom of the inne	Rain fall er ring/hole to measur	vithin 1957 24 ing point (minimum wa	hrs < 0.5" ater column of 6-8 inches):
	OINT: Ring Rim	Indicator Mark		HOF TEST: 301+A1-
	ELAPSED TIME	WATER LEVEL	VOLUME OF WATER	
TIME	SINCE START OF	DROP, INNER RING OR PERCOLATION	ADDED AT EACH CYCLE, INNER RING	REMARKS
	TEST (minutes)	HOLE (inches)	(liters)	
	IÀ III S			
10:25	0		6.56	Clay Like Aq Soil
10:50	5	4"	e 75L	
10:40	1015	4'1	0751	
10:55		4"	. 50 /	
11:10	45	4 '	e 75 /	
TEST DATA	1.4.1.465.66.4.4.1.2.1			
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				1 1 1/1/12 05
11730	6)		6.5	OI FRY TIS
16.40	10	388"/11	36 /	172
1130	20	7 1/611	. 36 L	
1200	30	8/6"	<u> 35 </u>	
1210	40	8/6/1		Tist END
		7		35-35-0 NO
				Change in Riguire Liters
				Chings 17 and other Liftles
				



INFILTRATION TEST DATA SHEET

Tetra Tech, Inc.

PROJECT NAM	1E: <u>Sunoc</u> 1BER: //2 T (Logistics	TEST AREA ID: M	V. Trindle Rd, Test B Leffich
	Double Ring Infil	trometer Percolation		LEHICH
DIAME OUTER	Single Ring Infilit RING INSIDE TER/HEIGHT: RING INSIDE TER/HEIGHT:	4"/10' 8'/10'		Ao"(2"(0.24"N 77" 237-75"W
	N HOLE DIAMETE	R: NA	(If performing an op	pen hole perc test)
DATE(s):	10/6/16	Pailall	within last 24	hrs < 0.5°
			ing point (minimum wa	hrs < 0.5° ater column of 6-8 inches):
MEASURING P	OINT: Ring Rim	Indicator Mark	DEPTE	HOF TEST: Surfave
TIME	ELAPSED TIME SINCE START OF TEST (minutes)	WATER LEVEL DROP, INNER RING OR PERCOLATION HOLE (inches)	VOLUME OF WATER ADDED AT EACH CYCLE, INNER RING (liters)	REMARKS
PRESOAK DA	IA grant of the			A STATE OF THE STA
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050	30	φ	Ø	1/26" drop outer ring
1120	60_	Ø	φ	-0.3 drep outer ring
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TEST DATA !				
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1200	30	Ø	6	Added 325 nL to exter ring after = 18" over ring drop presex
1230	60	Ø	6	0 31411 11119 61 01
1300	90	Ø	Ø	outer ring total drap < 14"
1330	120	<i>b</i>	Ø	
			<i>—</i>	
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