

TRIP REPORT SHADE VALLEY 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 Shade Valley Road Valve site located in Tell Township, Huntingdon County, Pennsylvania, as part of the Pennsylvania Pipeline Project (PPP) for Sunoco Pipeline, LP. Five shallow tests (IT-A, IT-B, IT-C, IT-D, and IT-E) 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 Stephanie Warino and Jim Coffman of Tetra Tech, Inc., on September 28, 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 on the west side of Shade Valley Road.

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 10-inch diameter and 6-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 approximately 70 degrees Fahrenheit. A check of the nearest weather station, located approximately 7.3 miles away, indicated approximately 0.01 inches of rain had occurred during the 24 hour period preceding the testing.

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 Soil Description

Soils encountered generally consisted of a shallow (up to approximately 10 inches) brown to pink (7.5 YR 4/4 to 7.5YR 7/4) channery sandy loam topsoil/surface layer. Small roots were found within the top 2 inches of the layer. This topsoil/surface layer was underlain by a reddish yellow to strong brown (7.5YR 7/6 to 7.5YR 5/8) channery silt loam which became sandier toward the eastern test unit (IT-E). Bedrock was not observed within the test area.

Seasonal high water was not observed at the testing locations, nor was any mottling observed.

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

- Hublersburg Channery Silt Loam - (HxB soil symbol) with 3-8 percent slopes; with medium runoff and well drained,
- Brinkerton Silt Loam – (BrB soil symbol) with 3-8 percent slopes; with very high runoff and poorly drained.

3.2 Infiltration Tests Results

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 results for IT-A and IT-B indicated low infiltration rates, requiring 30 minute test cycles; whereas, the pre-soak test results for IT-C, IT-D, and IT-E indicated high infiltration rates, requiring 10 minute test cycles.

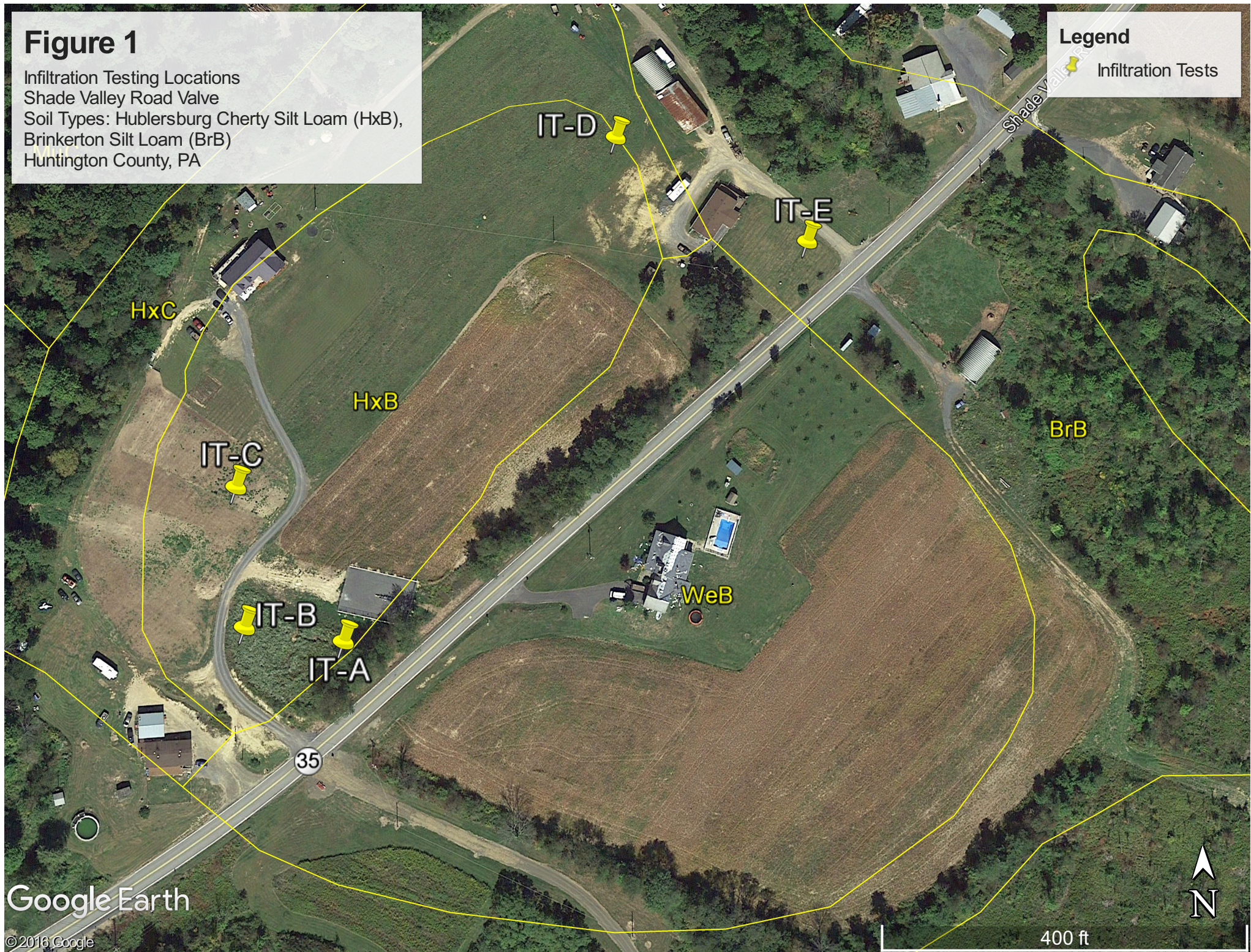
Table 1
Summary of Infiltration Test Results
Shade Valley Road Valve
Tell Township, Huntingdon County, PA
Sunoco PPP

Test Location (IT-)	Location Data		Test Depth (inches)	Infiltration Test Result (inches/hour)
	LATITUDE	LONGITUDE		
IT-A (shallow)	40.3137296°	- 077.7529455°	3	3.56
IT-B (shallow)	40.3137779°	- 077.7533291°	3	1.06
IT-C (shallow)	40.3141961°	- 077.7533710°	3	9.56
IT-D (shallow)	40.3152854°	- 077.7518516°	3	5.72
IT-E (shallow)	40.3149567°	- 077.7510705°	3	4.31

Figure 1

Infiltration Testing Locations
Shade Valley Road Valve
Soil Types: Hublersburg Cherty Silt Loam (HxB),
Brinkerton Silt Loam (BrB)
Huntington County, PA

Legend
Infiltration Tests



ATTACHMENTS

SOIL LOGS



TETRA TECH

Soil Log

Tested By: J. Goffman

Project: Sunoco Mariner E 2

Project No.: 112 IC 05958

Test Pit: a/b/c (Shade Valley) Date: 9/28/16

Elevation: _____

Equipment Used: hand auger

Geology: Soil Soil Type: Silt

Land Use: a & b undeveloped, c - horse corral (pasture)

Weather: _____

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
A	0"	7"	Sandy gravelly silt	Small to large rock frag (up to 1" dia)	Tan 7.5YR 7/4	solid	small roots top 2"	-	-	dry
B	7"	27"	Silt with clay little gravel		Tan-orange 7.5YR 7/6	solid		-	-	dry

Horizon:	USDA Definition	Soil Textural Class	Boundary	Notes:
O	Organic debris	Use ternary diagram from US Department of Agriculture Soil Conservation Service	Use depth and classification	c location hand auger yielded 10YR 4/6 (Brown) Sandy/gravelly soil from 0-12 inches, and color from 12-27 inches 7.5YR 5/8 (orange-brown)
A	Dark colored, mixed mineral organic matter		Classification as Follows: Abrupt	
B	Maximum accumulation of silicate clay minerals		Clear	
C	Weathered parent material		Gradual	
R	Layer of consolidated rock beneath the soil		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



Soil Log

Tested By: J. Coffman Project: Sunoco Mariner E2 Project No.: 112IC05958
 Test Pit: d (Shade Valley) Date: 9/28/16 Elevation: _____ Equipment Used: hand auger
 Geology: soil Soil Type: loam Land Use: flat/sher t veg. Weather: cloudy 90°

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
A	0"	8"	Sandy gravelly loam	1/2" rock frag-2" frag	Bur 7.5YR 6/6	Solid	small roots grz - P. 55.	-	-	dry
"	8"	26"	loam	"	Org-Bur 7.5YR 7/8	Solid	frag ↓	-	-	dry

Horizon:	USDA Definition	Soil Textural Class	Boundary	Notes:
O	Organic debris	Use ternary diagram from US Department of Agriculture Soil Conservation Service	Use depth and classification	
A	Dark colored, mixed mineral organic matter		Classification as Follows: Abrupt	
B	Maximum accumulation of silicate clay minerals		Clear	
C	Weathered parent material		Gradual	
R	Layer of consolidated rock beneath the soil		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



Soil Log

Tested By: J. Coffman
 Test Pit: Shore Valley/e (by road)
 Geology: Soil

Date: 9/28/16
 Soil Type: loam

Project: Sunoco Mariner E2
 Elevation: _____
 Land Use: grass (front yard of residence)

Project No.: 112IC05958
 Equipment Used: hand auger
 Weather: Cloudy 70°

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
A	0"	10"	Sandy/gravelly loam	1/2" - 2" rock frag (fragments)	7.5YR 4/4	Solid, no mottling	Small roots top 2"	—	—	dry
A	10"	27"	1	1	7.5YR 5/6	Solid, no mottling		—	—	dry

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

Table based on: Sample soil log located on page 12 of the Pennsylvania Stormwater Best Management Practices Manual
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INFILTRATION TEST DATA SHEETS

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INFILTRATION TEST DATA SHEET

Tetra Tech, Inc.

PROJECT NAME: Sunoco TEST AREA ID: BV13 Shade Valley A
 PROJECT NUMBER: 112TC05958 PERSONNEL: Stephanie Marino

TEST METHOD: Double Ring Infiltrometer Percolation
 Single Ring Infiltrometer

INNER RING INSIDE DIAMETER/HEIGHT: 6.5" / 10"
 OUTER RING INSIDE DIAMETER/HEIGHT: 10" / 10"

Location Coordinates or Description:
Edge of woods, natural area
40.3137296
-077.7529455

PERCOLATION HOLE DIAMETER: NA (If performing an open hole perc test)

DATE(s): 9/28/16 **Rainfall within last 24 hrs < 0.5"**

Distance from the bottom of the inner ring/hole to measuring point (minimum water column of 6-8 inches): 8"

MEASURING POINT: Ring Rim Indicator Mark DEPTH OF TEST: 3"

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
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PRESOAK DATA

1235	0	-----	2.5 gal	start of pre-soak
1305	30	3 1/8"	2.0 L	
1335	60	1 3/4"	---	use 30-min interval

TEST DATA

1335	0	-----	0.8 L	start of test
1405	30	1 7/16"	0.7 L	
1435	60	1 5/16"	0.7 L	
1505	90	3 4/16"	1.6 L	
1535	120	1 13/16"	1.0 L	
1605	150	1 13/16"	1.0 L	
1635	180	1 14/16"	0.9 L	
1705	210	1 12/16"	0.9 L	stable



INFILTRATION TEST DATA SHEET

Tetra Tech, Inc.

PROJECT NAME: Sinoco TEST AREA ID: BV13 Shade Valley C
 PROJECT NUMBER: 112 IC 05958 PERSONNEL: Stephanie Warren

TEST METHOD: ~~Double Ring Infiltrometer~~ Percolation
 Single Ring Infiltrometer

Location Coordinates or Description:
in ag field / livestock grazing area
40.3141961
-077.7533710

INNER RING INSIDE DIAMETER/HEIGHT: 6.25" / 10"
 OUTER RING INSIDE DIAMETER/HEIGHT: 10" / 10"

PERCOLATION HOLE DIAMETER: NA (If performing an open hole perc test)

DATE(s): 9/28/16 Rainfall within last 24 hrs < 0.5"

Distance from the bottom of the inner ring/hole to measuring point (minimum water column of 6-8 inches): 8"

MEASURING POINT: Ring Rim Indicator Mark

DEPTH OF TEST: 4"

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 DATA				
1325	0	-----	2.5 gallon	start of presoak
1343	18	5 3/8"	2.75 L	
1401	36	4 5/16"	2.30 L	
1425	60	5 7/16"	-	use 10-minute interval
TEST DATA				
1425	0	-----	2.7 L	start of test
1440	15	4 7/16"	2.1 L	
1450	25	2 5/16"	1.2 L	
1500	35	1 3/16"	1.2 L	
1514	49	2 8/16"	1.6 L	
1524	59	1 1/16"	1.1 L	
1534	69	1 9/16"	1.0 L	
1544	79	1 9/16"	0.8 L	
1554	89	1 1/16"	1.0 L	
1604	99	1 10/16"	0.8 L	
1614	109	1 8/16"	0.8 L	stable

