

## **TRIP REPORT BOOT ROAD EFRD 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 Boot Road EFRD site located in West Goshen Township, Chester County, Pennsylvania as part of the Pennsylvania Pipeline Project (PPP) for Sunoco Pipeline, LP. One deep and two shallow 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 Ken McGill and Heather Rychlak 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. All three tests were located in a grassy field, approximately 50 feet northeast of East Boot 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 a mini-excavator, and care was taken to minimize disturbance of the soil surface to be tested. Double-ring infiltrometers were used for testing and consisted of 24-inch diameter and 12-inch diameter sections of steel casing, each 20 inches in height, as well as a set of double-ring infiltrometers with ring sizes consisting of an 8-inch and a 4-inch with both being 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.

During the testing, the weather was sunny, approximately 65 degrees Fahrenheit, and no precipitation was observed during the time of testing. Additionally, no precipitation was observed 24 hours prior to testing.

Test pits were excavated near each testing location to characterize the soil, determine the depth to bedrock, if encountered, and inspect for evidence of the seasonal high water table. The test pits were identified with the corresponding infiltration test name. The test pits were machine-excavated to 2 feet below the target infiltration test depth or refusal, whichever was encountered first. Descriptions of the soil were recorded on field logs, which were based on the form example in the BMP manual. Copies of the field soil logs are attached to this report.

## **3.0 RESULTS**

### **3.1 Soil Description**

Soils encountered generally consisted of a thin (up to approximately 4 inches) brown (7.5YR 4/4) organic loam topsoil/surface layer. This topsoil/surface layer was underlain by a dark brown (7.5YR 3/4) silt loam layer which ranged down to approximately 48 inches below ground surface. Bedrock/excavator refusal was encountered at approximately 30-48 inches below ground surface.

Seasonal high water was not observed at the testing location. Lithochromatic mottling was observed in the test pit for IT-B. Roughly 15% of the soil profile contained mottles of strong brown (7.5YR 5/6).

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

- Glenelg Silt Loam - (GgB soil symbol) with 3-8 percent slopes; with medium runoff and is well drained.

### **3.2 Infiltration Tests Results**

Table 1 summarizes the infiltration rates (inches per hour) calculated from the test data. 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 (surface and deep) and IT-B (surface) indicated low infiltration rates, requiring 30 minute test cycles. Test IT-B (deep) was not conducted due to bedrock encountered at approximately 30 inches below ground surface during test pit excavation.

**Table 1**  
**Summary of Infiltration Test Results**  
**Boot Road EFRD**  
**West Goshen Township, Chester County, PA**  
**Sunoco PPP**

Test Location (IT-)	Location Data		Test Depth (inches)	Infiltration Test Result (inches/hour)
	LATITUDE	LONGITUDE		
IT-A (shallow)	40.0047902°	- 075.5805140°	4	0.20
IT-A (deep)			24	0.20
IT-B (shallow)	40.0047081°	- 075.5806076°	4	1.00
IT-B (deep)			NA	NA

Note:

NA = Test not conducted due to encountering bedrock at approximately 30 inches below ground surface.

# Figure 1

Infiltration Testing Locations  
Boot Road EFRD  
Soil Type: Glenelg Silt Loam (GgB)  
Chester County, PA

**Legend**  
📌 Infiltration Tests



## **ATTACHMENTS**

## SOIL LOGS



TETRA TECH

### Soil Log

Tested By: #Rychlak

Project: Sunoco PPP

Project No.: N/A 112305958

Test Pit: a; Boot Road Date: 10/6/16

Elevation:

Equipment Used: backhoe

Geology: Schist Soil Type:

Land Use: Roadside ROW

Weather: Sunny 70°F

#### 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
O	0	2"	loam	silt	7.5YR 4/4	N/A	roots	4'	N/A	
A	2	48"	loam	silt	7.5YR 3/4	N/A	rocks	0"	N/A	
shist bedrock		48"								refusal at bedrock

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	Area is adjacent to highway ROW/pipeline ROW
A	Dark colored, mixed mineral organic matter		Classification as Follows:	
B	Maximum accumulation of silicate clay minerals		Abrupt	
C	Weathered parent material		Clear	
R	Layer of consolidated rock beneath the soil		Gradual	
			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](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054308)



# Soil Log

Tested By: H. Rycheck; K. McGill

Project: Sunoco

Project No.: 112IC 0595B

Test Pit: a; Boot Road Date: 10/6/2016

Elevation: \_\_\_\_\_

Equipment Used: Backhoe/Auger (Hand)

Geology: Shi Soil Type: \_\_\_\_\_

Land Use: ROW

Weather: Sunny 70°F

**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
O	0	2"	loam	silts	7.5YR 4/4	N/A	roots	4'	N/A	
A	2"	48"	loam	silts	7.5YR 3/4	N/A	rocks	0"	N/A	
shist Bedrock		48"								Rotunal at Bedrock

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	Test location on level ground. Area is adjacent to highway ROW/Pipeline ROW
A	Dark colored, mixed mineral organic matter		Classification as Follows:	
B	Maximum accumulation of silicate clay minerals		Abrupt	
C	Weathered parent material		Clear	
R	Layer of consolidated rock beneath the soil		Gradual	
			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](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054308)



TETRA TECH

Soil Log

112IC05958

Tested By: H Rychlak K McGill

Project: Sunoco

Project No.: N/A

Test Pit: b; Boot Road Date: 10/6/16

Elevation:

Equipment Used: backhoe

Geology: Schist Soil Type:

Land Use: ROW Roadside

Weather: Sunny 70°F

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
O	0"	4"	loam	silts	7.5YR 3/3	N/A	roots	2.5'	N/A	Refusal at bedrock
A	4"	30"	loam	silts	7.5YR 4/4	15% 7.5YR 5/6	Rocks	0	N/A	
Bedrock Schist	30"+									Refusal at shallow bedrock

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	Area adjacent to highway ROW. Appears to be fill material
A	Dark colored, mixed mineral organic matter		Classification as Follows:	
B	Maximum accumulation of silicate clay minerals		Abrupt	
C	Weathered parent material		Clear	
R	Layer of consolidated rock beneath the soil		Gradual	
			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](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054308)

**INFILTRATION TEST DATA SHEETS**





