

TRIP REPORT CHARGER HIGHWAY 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 Charger Highway EFRD site located in Blair Township, Blair County, Pennsylvania as part of the Pennsylvania Pipeline Project (PPP) for Sunoco Pipeline, LP. Four tests (IT-A, IT-B, IT-C and IT-D) 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 Dan Fenstermacher and E. Stoestz of Rettew Associates, 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. IT-A test location was located in a field, while IT-B, IT-C and IT-D were located in a wooded area. All locations were approximately 100 to 500 feet east of Charger Highway.

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 11-inch diameter and 6-inch diameter sections of steel casing, each 7 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 1 inches into the soil. The infiltration test depths are presented in Table 1.

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 drops 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 and there was no recorded rainfall within 24 hours prior to the proposed testing.

Due to the amount of shallow fractured rock just below the ground surface, the field team was unable to competently install the infiltrometer rings in a manner that would allow for accurate testing. The test location was presoaked for 1 hour, however during the first reading the rings drained 2.7 liters in 45 seconds. The rings were refilled to full and quickly drained again. Test location IT-A drained a total of 10.8 liters in 139 seconds. The test was discontinued due to rapid drainage throughout the presoak period. Copies of the test data sheets are attached to this report.

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 refusal (see section 3.1). 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

Soil encountered generally consisted of a medium thick very dark gray (10YR3/1) to a dark brown (10YR 3/3) variation of a silty clay loam with some fine roots and fractured rock underlain by a medium thick (up to 10 inches) brown (7.5YR 4/4) to strong brown (7.5 5/6) silty clay with few fractured rocks, and a fractured limestone to limestone and shale layer that prevented further advancement of the hand auger. Fractured limestone bedrock was noted to be possibly found at IT-A 9 inches below ground surface (bgs); IT-B and IT-D were noted as refusal at approximately 12 inches bgs, IT-C was noted as refusal on bedrock at approximately 16 inches bgs.

Seasonal high water was not observed at the testing location, 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:

- Opequon-Hagerstown-Rock Outcrop Complex – (OxF soil symbol) with 25-50 percent slopes; with high runoff and well drained,
- Mertz Channery Silt Loam – (MnC soil symbol) with 8-15 percent slopes; with medium runoff and well drained.

3.2 Infiltration Tests Results

Table 1 summarizes the infiltration test locations by coordinates (latitude and longitude). Although multiple attempts were made, infiltration tests were not performed at this site; as during the pre-soak period extremely rapid drainage (inner ring was dewatered in less than 45 seconds) occurred at the test locations.

Table 1
Summary of Infiltration Test Results
Charger Highway EFRD
Blair Township, Blair County, PA
Sunoco PPP

Test Location (IT-)	Location Data		Test Depth (inches)	Infiltration Test Result (inches/hour)
	LATITUDE	LONGITUDE		
IT-A	40.4117171°	- 078.3991753°	Surface	NA
IT-B	40.4121072°	- 078.3994210°	Surface	NA
IT-C	40.4120725°	- 078.3997993°	Surface	NA
IT-D	40.4118954°	- 078.4001005°	Surface	NA

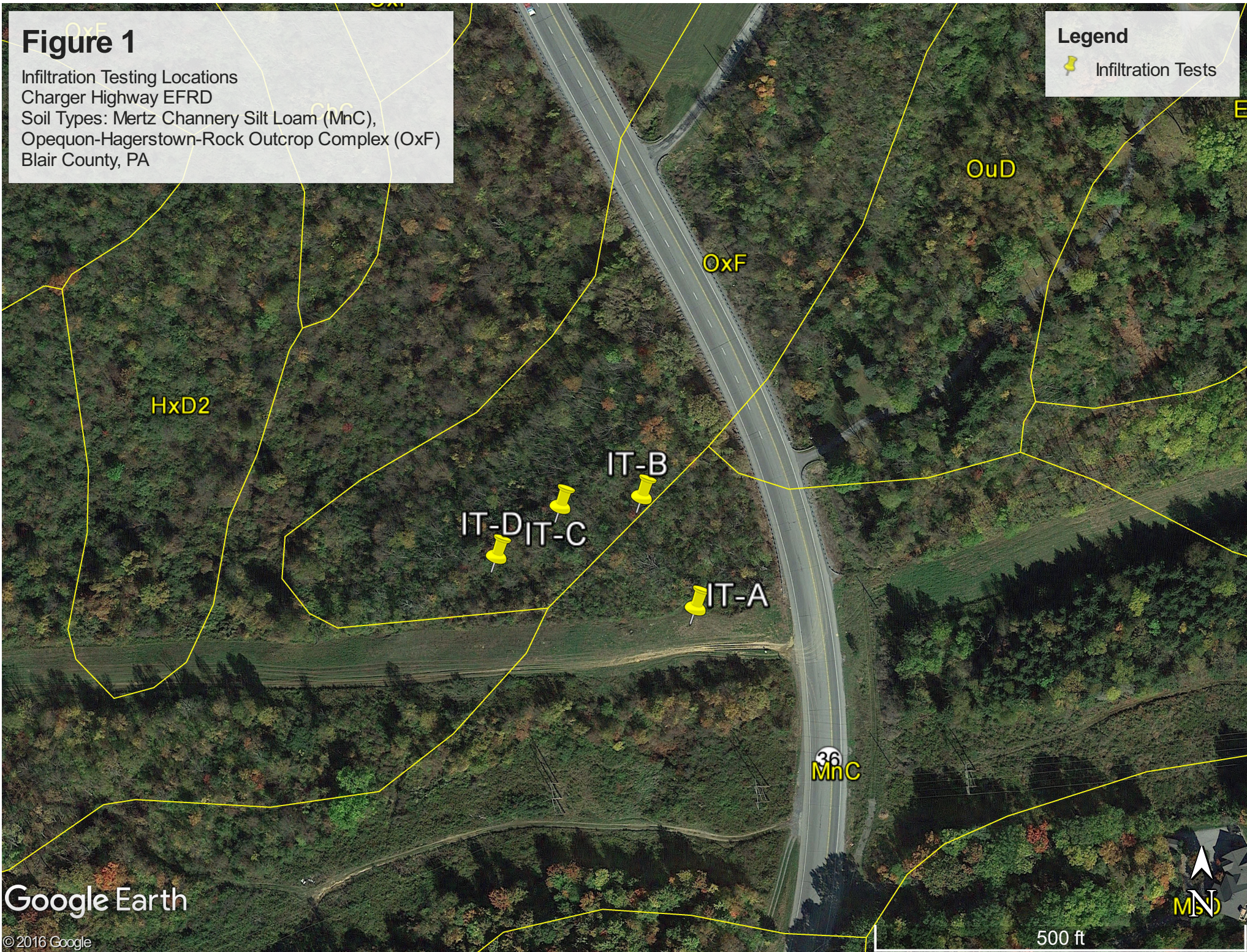
Note:

NA indicates that the infiltration tests were not conducted due to rapid drawdown.

Figure 1

Infiltration Testing Locations
Charger Highway EFRD
Soil Types: Mertz Channery Silt Loam (MnC),
Opequon-Hagerstown-Rock Outcrop Complex (OxF)
Blair County, PA

Legend
📌 Infiltration Tests



ATTACHMENTS

SOIL LOGS



Soil Log

Tested By: D Fenstermacher, CPSS (Kottew) Project: Sunoco PPP Project No.: 112 IC 05958
 Test Pit: Charge Highway It-A Date: 9/28/16 Elevation: _____ Equipment Used: Hand dig
 Geology: Kager & Tomoloway Soil Type: Mertz Channery Silt loam Land Use: Pipeline ROW Weather: Partly cloudy 70°

Additional Comments: within Existing Pipeline ROW, near tree line - located near summit

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"	Silty clay loam	30% gravel	10YR 9/3	No Redox	Common fine & medium roots Strong MSBIC Structure	-	-	attempted to test - Rapid
B ₁	7	9"	Silty clay	50% Stones	7.5YR 4/4	No Redox	Few fine roots Moderate SBIC	-	-	
R ₁	9"	9"	fractured limestone	Possible Bedrock				9	-	Fractured 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
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	



Soil Log

Tested By: D. Fenzlsmacher (Rotten), CPSS Project: Sunoco PFP
 Test Pit: Charger Highway IT-B Date: 9/28/16 Elevation: _____
 Geology: Keyser & Tonoloway Soil Type: Oregon-Hagerstown-Rock outcrop complex Land Use: Sapling forest

Project No.: 112 IC 05958
 Equipment Used: Hand dug
 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	5" CW	Playloam	70% gravel	10YR 3/3	No Redox	many fine roots granular	—	—	insufficient fines to Renovate structure
C	5"	12"	Playloam Cobbles	98% Playloam chert limestone, quartzite shale	10YR 4/4	No Redox	Rock detrital structure highly fractured few fine roots	—	—	Highly fractured Rock w/ insufficient fines to renovate structure
										Refusal @ 12" on coarse fragments
										insufficient fines to characterize
										Thin coating between coarse fragments

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: D. Fenstermacher, CPSS (Retiree)

Project: Sonoco PPP

Project No.: 112 IC 05958

Test Pit: Charger Highway ITC Date: 9/28/16

Elevation: _____

Equipment Used: Hand dug

Geology: keyes + tonoloway Soil Type: Opegun-Hagerstown-Rock outcrop Complex

Land Use: Thicket.

Weather: Overcast 60°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
A	0	8"	Clay loam	85% Channels < 4" limestone + shale	10YR 3/3	NO Redox	Many fine & common roots strong granular structure	-	-	
Bw	8"	16"	Clay loam	85% Channels + grains < 8"	10YR 5/4	Sand NO Redox	Common fine Rock defined structure	-	-	
R	16"	16+ "	-	limestone Bed Rock	-	-	-	16"	-	No visible cracks in Rock w/ hole. But surface was undulating

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	located above a steep drop off.
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

Soil Log

 Tested By: DUANE TRUAX

 Project: Susaco Marina II

 Project No.: 1121C 05958

 Test Pit: (UNLGCN) 'D'

 Date: 9-28-2016

Elevation: _____

 Equipment Used: HAND DIG

 Geology: Keyster + Tonoloway Soil Type: Opequon-Hagerstown-Rock outcrop Complex

 Land Use: Thicket

 Weather: Cloudy 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
A	0	AS 2	Silt Loam	VCIT 45%	7.5YR 4/3	-	M, M, R C, F, R	-	-	1, 1, 5BK S=20% C=14
Bt	2	AI 6	Silty C.L.	XCH 65%	7.5YR 5/4	-	C, M, R	-	-	2, 3, 5BK STRUCT. S=11% C=9%
Bct	6"	AW 12"	Silty C.L.	XCH 80% 85%	7.5YR 5/6	-	E, M, R	-	-	1, 1, 5BK S=18% C=31%
R	12t"	NAM	-	-	-	-	-	12"	-	LIMESTONE 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	
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	

INFILTRATION TEST DATA SHEETS

