

# STORMWATER INFILTRATION REPORT

FOR

1001 S. WALNUT STREET  
WESTTOWN TOWNSHIP  
CHESTER COUNTY

PREPARED FOR:

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February 2025

**Stormwater Infiltration Test Report**  
**1001 S. Walnut Street**  
**Westtown Township**  
**Chester County**

On Friday, February 7, 2025, Howell Engineering performed hydraulic conductivity tests for the proposed stormwater management areas for the property located at 1001 S. Walnut Street in Westtown Township, Chester County. The purpose of the hydraulic conductivity testing was to determine site suitability for the proposed stormwater infiltration areas associated with proposed improvements at the site (see development plan).

Testing was conducted in general accordance with the Pennsylvania Department of Environmental Protection (PADEP)'s Pennsylvania Stormwater Best Management Practices Manual specifications, in a cased, sealed, borehole utilizing the falling head method designed to measure the vertical hydraulic conductivity of the soil. An approximate five-inch diameter borehole was hand dug to the depth of the proposed bottom elevation of the infiltration structure and a 3-inch diameter PVC casing was installed. A mixture of bentonite and soil was placed around the annulus of the casing and packed to seal the casing in place. The casing was presoaked immediately prior to the start of the test to simulate field saturated conditions. A measured amount of water was poured into the sealed casing to begin the 30-minute presoak. After the final 30-minute presoaking period, the water in the casing was adjusted to a known depth and consecutively re-adjusted after each reading and the drop of the water column is measured. The test continued until the readings became stabilized or for a maximum of eight readings. A stabilized rate of drop means a difference of ¼ inch or less of drop between the highest and lowest readings of four consecutive readings.

Within the site, two hydraulic conductivity tests were conducted at the elevation associated with the proposed bottom of the infiltration structure. One deep test pit was excavated at each infiltration test to identify limiting conditions such as mottling, depth of bedrock, and depth of groundwater. Testing was to be conducted within the footprint of the proposed infiltration structure.

- Infiltration Test 2-7-1 was conducted at approximately  $\pm 6.5$  feet below existing grade, which corresponds to an approximate infiltration elevation of 416.5. One deep test pit was excavated at this location to a depth of 9.5 feet below existing grade. Redoximorphic features were encountered approximately 20-68 inches below the existing grade.
- Infiltration Test 2-7-2 was conducted at approximately  $\pm 6.5$  feet below existing grade, which corresponds to an approximate infiltration elevation of 416.5. No deep test pit was excavated at this location due to proximity to the underlying test 2-7-1.

Based on the hydraulic conductivity testing located within the footprint of the infiltration structure, Howell Engineering recommends the following infiltration rate for the soils underlying Tests 2-7-1 & 2-7-2: an infiltration rate of 0.234 inches per hour shall be used.

Please reference plan drawings for exact locations and visual representation of infiltration tests and test pits. Results of the hydraulic conductivity testing and soil horizon descriptions can be found in the enclosed attachments.

### **Hydraulic Conductivity Calculation**

Coefficient of Permeability:  $K = [A/(F*D*t)] \times \ln(h_1 / h_2)$

Where:        K = permeability (inches per hour)  
                  A = cross sectional area of cased hole  
                  F = shape factor (2.75 constant of flat bottom)  
                  D = cased hole diameter  
                  t = time for head change from h1 to h2  
                  h1 = initial height of water column in casing  
                  h2 = final height of water column in casing

\*Reference *Soil Hydraulic Conductivity Analysis Form* for infiltration testing data and *Soil Morphology Form* for soil profile data.



## Soil Morphology Form

PIT NUMBER: TP2-7-1    JOB NUMBER: 5054    INVESTIGATOR: CRS  
 DATE: 2/7/2025    STATE: PA    COUNTY: CHESTER  
 MUNICIPALITY: WESTTOWN TOWNSHIP    CLIENT: COLIN CHAVOUS  
 SUBDIVISION: N/A    SITE LOCATION: 1001 S. WALNUT STREET  
 MORPHOLOGIC DETERMINATION: SEWAGE    **STORMWATER**    SHWT SOILS

Horizon	Depth		Boundary		Color	Texture	%CFs	REDOX			Structure	Consistence	NOTES
	Upper	Lower	District	Topo				A	S	C			
	0	12 G	S		10 YR 3/3	SILT	0				GRAN	FRI	
	12	32 G	W		10 YR 5/4	CLAY	0				MA	FIRM	REDOX
	32	70 A	S		10 YR 5/8	CLAY LOAM	0				MA	FRI	REDOX
	70	102			7.5 YR 3/3	SANDY CLAY	0				GRAN	LO	

COMMENTS: This Deep Test Pit was conducted at Test 2-7-1. Redoximorphic (redox) features were encountered from approximately 20-68 inches below existing grade.

SOIL TYPE: \_\_\_\_\_ Soil Scientist Signature: \_\_\_\_\_

LIMITING CONDITION: \_\_\_\_\_

Type:    Water    Rock    **Mottling**    Excessively Drained    Somewhat Poorly Drained

Depth: 20-68"    Moderately Well Drained    Very Poorly Drained

WEATHER: 45° SUNNY    METHOD: Excavator

SLOPE: \_\_\_\_\_    EXCAVATION DEPTH: 102"

COVER: LAWN    LANDSCAPE POSITION: NE

REDOX – Redoximorphic features (Drainage Mottling) A/S/C – Abundance/Size/Contrast  
 Roots/Pores – f – few, c – common, m – many / f – fine, m – medium, c – coarse

JOB NO.: 5054  
 LOCATION: 1001 S. Walnut Street  
 MUNICIPALITY: Westtown Township, Chester County, Pa.  
 DESCRIPTION: Stormwater Infiltration Testing

DATE: 2/7/2025  
 BY: CS

### Field Test Results

WEATHER CONDITIONS: SUNNY      TEMPERATURE: 45 °F  
 PRECIPITATION IN LAST 24 HOURS: 0.1 in

Hole #	Depth (Inches)	Readings								
		Pre-Soak	1st	2nd	3rd	4th	5th	6th	7th	8th
TP 2-7-1	78									
Time(min.)		30	30	30	30	30	30	30	30	30
Drop(inches)		3.50	3.00	3.00	3.00	3.00	n/a	n/a	n/a	n/a
Initial Water Level	Depth (inches)	18	18	18	18	18	n/a	n/a	n/a	n/a

Hole #	Depth (Inches)	Readings								
		Pre-Soak	1st	2nd	3rd	4th	5th	6th	7th	8th
TP 2-7-2	78									
Time(min.)		30	30	30	30	30	30	30	30	30
Drop(inches)		2.50	2.00	2.00	1.75	1.75	n/a	n/a	n/a	n/a
Initial Water Level	Depth (inches)	18	18	18	18	18	n/a	n/a	n/a	n/a

### Determination of Hydraulic Conductivity (Kv)

$$Kv = [A/F \cdot D \cdot t] \cdot \ln(h1/h2)$$

- Kv* = Vertical Permeability
- A* = Cross-sectional area of cased hole
- F* = shape factor (2.75 constant for flat bottom)
- D* = cased hole diameter
- t* = time for head to change from h1 to h2
- h1* = initial height of water column in casing
- h2* = final height of water column in casing

#### TP 2-7-1 Results

<b>0.31243</b>	(in/hour)
7.06858	(Sq.in.)
2.75	(Units)
3	(Inches)
0.5	(hrs.)
18	(Inches)
15.00	(Inches)

#### TP 2-7-2 Results

<b>0.1753</b>	(in/hour)
7.0686	(Sq.in.)
2.75	(Units)
3	(Inches)
0.5	(hrs.)
18	(Inches)
16.25	(Inches)

Average Permeability	0.244 (in./hr)
<b>Geometric Mean</b>	<b>0.234 (in./hr)</b>