Schwanewede / Hals Engineering

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ON-SITE SOIL TESTING

1 FYKE ROAD
BLOCK 21 – LOTS 21 - 23
TOWNSHIP OF MAHWAH
BERGEN COUNTY, NJ

OCTOBER 19, 2020
REVISED FEBRUARY 9, 2021

PREPARED BY:

SCHWANEWEDE/HALS ENGINEERING
Civil Engineers & Land Surveyors

David A. Hals, PE, LS, PP, CME
New Jersey Professional Engineer & Land Surveyor
License No. GB29994

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining and preparing the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment.

Soil profile pits were excavated at the site on October 9, 2020 and January 21, 2021. Mottling of the soil was not observed in the profile pits so additional pits were excavated in January in accordance with Chapter 12 of the BMP Manual. No groundwater or seepage was observed in the profile pits on January 21, 2021.

Percolation tests were conducted at the site on October 17 and October 18, 2020. The tests were performed at the locations of the three (3) seepage pits that are proposed for groundwater recharge. The tests were conducted in accordance with Chapter 12 of the BMP Manual. On October 17 the holes were excavated to a depth of approximately 6' below grade. The perc test holes were then dug with a post hole digger to a depth of 12"-14" and the holes were presoaked. On October 18, the testing continued and the test results were recorded to determine the percolation rate of the soil.

The soil was determined to have a permeability rate of 2.7 in/hour to 3.4 in/hour which is a K-3 soil (2 -6 in/hr).

The drain time of the seepage pits full to capacity was calculated to be 15 hours.

SOIL TEST RESULTS CONDUCTED OCTOBER 9, 2020 & JANUARY 21, 2021

TEST HOLE #1

0"-6" TOPSOIL
6"- 35" 10 YR 5/3 BROWN SILT, CLAY, LOAM
35"-61" 10 YR 5/6 YELLOWISH BROWN SILTY CLAY LOAM, FIRM, 5% GRAVEL
61"-72" 10 YR 5/3 BROWN SILTY CLAY LOAM, TRACE OF SAND, HARD PACKED
72"-120" 10 YR 5/3 BROWN SILTY CLAY LOAM, TRACE OF SAND, FIRM
NO GROUND WATER
NO MOTTLING

TEST HOLE #2

0"-6" TOPSOIL
6"- 33" 10 YR 5/3 BROWN SILT, CLAY, LOAM
33"-58" 10 YR 5/6 YELLOWISH BROWN SILTY CLAY LOAM, FIRM, 5% GRAVEL
58"-70" 10 YR 5/3 BROWN SILTY CLAY LOAM, TRACE OF SAND, HARD PACKED
70"-120" 10 YR 5/3 BROWN SILTY CLAY LOAM, TRACE OF SAND, FIRM
NO GROUND WATER
NO MOTTLING

TEST HOLE #3

0"-6" TOPSOIL
6"-35" 10 YR 5/3 BROWN SILTY CLAY, QUARTZ CONGLOMERATE, HARD PACKED, 30% COBBLES
35"-80" 10 YR 5/3 BROWN SILTY CLAY LOAM, TRACE OF SAND, FIRM
NO GROUND WATER
NO MOTTLING

TEST HOLE#3

0"-12" TOPSOIL
12"- 36" 10 YR 5/3 BROWN SILT, CLAY, LOAM
36"-54" 10 YR 5/6 YELLOWISH BROWN SILTY CLAY LOAM, FIRM, 5% GRAVEL
54"-68" 10 YR 5/3 BROWN SILTY CLAY LOAM, TRACE OF SAND, HARD PACKED
68"-120" 10 YR 5/3 BROWN SILTY CLAY LOAM, TRACE OF SAND, FIRM
NO GROUND WATER
NO MOTTLING

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Percolation Test Data Sheet

Project: FYKE BROOK ESTATES
Municipality: MAHWAH
Date: 10/18/20

PRE-SOAK HOLES ON 10/17/20

Test Hole Dimensions

Test Pit # #1 EAST OF BUILDING #8

Test Hole Shape (select one): ROUND
Enter the Diameter (in) if Round was selected: 8"
Enter Dimensions (in) if Square or Rectangular was selected: Length
Width

TEST DEPTH 74" USE a = 22 FROM APPENDIX E

Test Results

Trial No.	Start Time	Stop Time	Time Interval (min)	Initial Water Depth (in)	Final Water Depth (in)	Change in Water Level (in)	Percolation Rate (min/in)	Converted Hydraulic Conductivity (in/hr)
1	10:10	10:30	20	11 1/4"	8"	3 1/4"	6.1	
2	10:30	10:50	20	8"	4 3/4"	3 1/4"	6.1	
3	10:50	11:10	20	4 3/4"	1 1/2"	3 1/4"	6.1	
4								
→ 5	11:40	12:22	42	7"	1"	6"	7.0	

FILL TO 7"

$K = \frac{a}{P} = \frac{22}{7.0} = 3.1$ IN/HR

Average

Test Hole Dimensions

Test Pit # #2 REAR OF BUILDING #7

Test Hole Shape (select one): ROUND
Enter the Diameter (in) if Round was selected: 8"
Enter Dimensions (in) if Square or Rectangular was selected: Length
Width

TEST DEPTH 75" a = 22

Test Results

Trial No.	Start Time	Stop Time	Time Interval (min)	Initial Water Depth (in)	Final Water Depth (in)	Change in Water Level (in)	Percolation Rate (min/in)	Converted Hydraulic Conductivity (in/hr)
1	10:15	10:35	20	12"	9 1/2"	2.5"	8.0	
2	10:35	10:55	20	9 1/2"	7 1/8"	2.4"	8.3	
3	10:55	11:15	20	7 1/8"	4 5/8"	2.5"	8.0	
4								
→ 5	11:20	12:09	49	7"	1"	6"	8.1	

FILL 7"

$K = \frac{a}{P} = \frac{22}{8.1} = 2.7$ IN/HR

Average

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Percolation Test Data Sheet

Project: FYKE BROOK ESTATES
Municipality: MAHWAH
Date: 10/18/20

PRE-SOAK HOLE ON 10/17/20

Test Hole Dimensions

Test Pit # #4 NEAR BUILDING #3

Test Hole Shape (select one)	ROUND	Enter the Diameter (in) if Round was selected	8"	Enter Dimensions (in) if Square or Rectangular was selected	Length	
					Width	

TEST DEPTH 73" USE a = 22

Test Results

Trial No.	Start Time	Stop Time	Time Interval (min)	Initial Water Depth (in)	Final Water Depth (in)	Change in Water Level (in)	Percolation Rate (min/in)	Converted Hydraulic Conductivity (in/hr)
1	10:20	10:40	20	12 1/4"	9 1/8"	3.1-	6.5	
2	10:40	11:00	20	9 1/8"	6"	3.1	6.5	
3	11:00	11:30	30	6"	1 3/8"	4.6	6.5	
4								
→ 5	11:35	12:14	39	7.5"	1.5"	6"	6.5	

FILL TO 7"

$K = \frac{a}{P} = \frac{22}{6.5} = 3.4$ IN/HR

Average

Test Hole Dimensions

Test Pit #

Test Hole Shape (select one)		Enter the Diameter (in) if Round was selected		Enter Dimensions (in) if Square or Rectangular was selected	Length	
					Width	

Test Results

Trial No.	Start Time	Stop Time	Time Interval (min)	Initial Water Depth (in)	Final Water Depth (in)	Change in Water Level (in)	Percolation Rate (min/in)	Converted Hydraulic Conductivity (in/hr)
1								
2								
3								
4								
5								

Average

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JOB 7944
SHEET NO. _____ OF _____
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

SEEPAGE PIT DRAIN TIME CALCULATIONS

ASSUME SEEPAGE PIT FULL

VOLUME OF PIT & STONE

$$\text{STONE} = (14' \times 14' \times 3.5') + \frac{\pi (6.5)^2 (3')}{4}$$

$$= 686 \text{ cf} - 99 \text{ cf} = 586 \text{ cf}$$

$$= 586 \text{ cf} \times 40\% = 235 \text{ cf}$$

$$\text{PIT} = \frac{\pi (6)^2 (3')}{4} = 85 \text{ cf}$$

TOTAL VOLUME = 235 + 85 = 320 cf

$$\text{DRAIN TIME} = \frac{\text{VOLUME}}{\text{INFILTRATION AREA} \times \text{PERMEABILITY}}$$

PERMEABILITY RATE FROM TESTING = 2.7 IN/HR
1/2 RATE FOR CALCULATION = 1.3 IN/HR

$$= \frac{320 \text{ cf} \times 12 \frac{\text{IN}}{\text{FT}}}{(14' \times 14') \times 1.3} \cong \underline{15 \text{ HOURS}}$$

1.5 HOURS < 72 HOURS OK