

# **Land Engineering, LLC**

84 E. Grant Street, Suite #1

Woodstown, NJ 08098

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Engineering and Land Surveying - Certificate of Authorization No. 24GA28091800

August 30, 2018

Roger Anderson  
415 Chestnut Street  
Elmer, NJ 08318

**Re: Soils Evaluation**  
Block 3, Lots 31 & 32  
415 Chestnut Street  
Borough of Elmer, Salem County

Dear Roger,

This is to inform you that on August 16, 2018 (3) test pits were dug on the above-mentioned lot ( see attached for pit locations).

## **Design Test Pits:**

### Test Pit #1

00" - 12"	10YR 4/2	Sandy Loam	Subangular Blocky	Moist	Friable
12" - 26"	10YR 6/6	Sandy Loam	Subangular Blocky	Moist	Friable
26" - 40"	10YR 5/6	Sandy Loam 10% cor.	frag. Subangular Blocky	Moist	Friable
40" - 84"	10YR 5/8	Loam	Subangular Blocky	Moist	Firm
84" - 136"	10YR 6/6	Loamy Sand	Single Grain	Moist	Loose

S.H.W.T. = 50" - Mottles 50" 10YR 8/1 com., med., distinct  
Samples taken at 48" & 90"  
SEEPAGE = 72"

Test Pit #2

00" - 08"	10YR 4/2	Sandy Loam	Subangular Blocky	Moist	Friable
08" - 21"	10YR 6/6	Sandy Loam	Subangular Blocky	Moist	Friable
21" - 48"	10YR 5/6	Loam 10% cor. frag.	Subangular Blocky	Moist	Firm
48" - 90"	10YR 5/6	Loam	Subangular Blocky	Moist	Firm
90" - 139"	10YR 6/6	Loamy Sand	Single Grain	Moist	Loose

S.H.W.T. = 52" - Mottles 52" 10YR 8/1 com., med., distinct

Samples taken at 60" & 110"

SEEPAGE= 77"

Test Pit #3

00" - 13"	10YR 3/2	Sandy Loam	Subangular Blocky	Moist	Friable
13" - 26"	10YR 6/3	Loam	Subangular Blocky	Moist	Firm
26" - 48"	10YR 6/4	Sandy Loam	Subangular Blocky	Moist	Friable
48" - 90"	10YR 5/2	Loam	Subangular Blocky	Moist	Firm
90" - 144"	10YR 5/8	Loamy Sand	Single Grain	Moist	Loose

S.H.W.T. = 60" - Mottles 60" 10YR 8/1 com., med., distinct

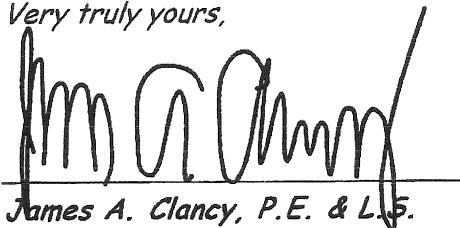
Samples taken at 60" & 96"

SEEPAGE= 78"

*These tests were performed for the design of a stormwater drainage system (by others) only and the applicant should obtain approval from any and all other regulatory agencies having proper jurisdiction prior to construction of any improvements (i.e. NJDEP Wetlands approval, Salem County Health Department, Elmer Zoning approval, etc.).*

*If you have any questions, please feel free to contact me at (856) 769-9460.*

*Very truly yours,*



*James A. Clancy, P.E. & L.S.*

*Land Engineering, L.L.C.*

*NJ License #33998*

**Form 3a Soil Permeability Data**

**Block 3 Lot 31 & 32 Boro of Elmer**

Assign a number for each test and a letter for each test replicate. Show test data and calculations on Form 3b, 3c, 3e, 3f, or 3g. Use one sheet for each separate test or test replicate.

1. Summary of Data---Enter data for each test replicate on a separate line.

Type of Test	test (number)	Replicate (letter)	Depth (inches)	Result*
Tube Permeameter	1		48" T.P. #1	0.23 IN/HR
Tube Permeameter	1	A	48" T.P. #1	0.27 IN/HR
Tube Permeameter	2		60" T.P. #3	0.36 IN/HR
Tube Permeameter	2	A	60" T.P. #3	0.43 IN/HR

\* For tube permeameter, pit bailing and piezometer tests report results in inches per hour. For Soil permeability class rating, give soil permeability class number. For percolation test report result in minutes per inch. For basin flooding test report result as positive if basin drains completely within 24 hours after second filing, negative otherwise.

2. Design Permeability/Percolation Rate: Specify Test Number \_\_\_\_\_

- \_\_\_ Average of Test Replicates
- \_\_\_ Single Replicate
- \_\_\_ Slowest of Replicates

3.

Type of Limiting Zone Identified	Test Number

4. Attachments (Check items included):

- Form 3b – Tube Permeameter Test Data – Number of Sheets 4
- \_\_\_ Form 3c – Soil Permeameter Class Rating – Number of Sheets
- \_\_\_ Form 3d – Percolation Test Data – Number of Sheets
- \_\_\_ Form 3e – Pit Bailing Test Data – Number of Sheets
- \_\_\_ Form 3f – Piezometer Test Data – Number of Sheets
- \_\_\_ Form 3g – Basin Flooding Test Data – Number of Sheets

I hereby certify that the information furnished on Form 3a of this application (and the attachments thereto) is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator \_\_\_\_\_ Date 8/30/2018

Signature of Professional Engineer  \_\_\_\_\_ License # 33998

**Form 3b Form Tube Permeameter Test Data**

- 1. Test Number 1 Replicate (Letter)      Date Collected 08/16/2018
- 2. Material Tested:      Fill  Test in Native Soil---Indicate Depth 48" T.P. 1
- 3. Type of Sample:      Undisturbed  Disturbed
- 4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 2.54 Length of Sample, L, in inches 4"
- 5. Bulk Density Determination (Disturbed Samples Only)
  - Sample weight (Wt. Tube Containing Sample – Wt. of Empty Tube), grams 394
  - Sample Volume (L x 2.54cm. /inch x 3.14R 2), cc 205.7
  - Bulk Density (Sample Wt./Sample Volume), grams/cc 1.92
- 6. Standpipe Used:      No  Yes --- Indicate Internal Radius, cm .635
- 7. Height of Water Level Above Rim of Test Basin, in inches: At Beginning of Each Test Interval, H1 9" At the End of Each Test Interval, H2 7"
- 8. Rate of Water Level Drop (Add additional lines if needed):

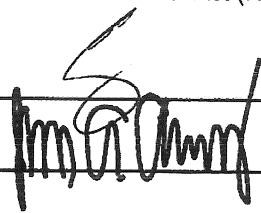
Time, Start of Test Interval, t1	Time, End of Test, Interval t2	Length of Test Interval, T, minutes
00:00	16:32.16	16.536
00:00	18:20.64	18.344
00:00	12:16.74	12.279
00:00	14:40.32	14.672

- 9. Calculation of Permeability:  

$$K, (in/hr) = 60 \text{ min/hr} \times r^2/R^2 \times L(in)/t(\text{min}) \times \ln(H1/H2) = 60 \text{ min/hr} \times .4032 / 6.45 \times 4 / 16.536 \times \ln(9 / 7) = 0.23 \text{ IN/HR}$$

(.2513)
- 10. Defects in the Sample (Check appropriate items):  
 None      Cracks      Worm Channels  
     Root Channels      Soil/Tube Contact  
     Large Gravel      Large Roots  
     Dry Soil      Smearing      Compaction  
     Other --- Specify \_\_\_\_\_

11. I hereby certify that the information furnished on Form 3b of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator \_\_\_\_\_ Date 08/30/2018  
 Signature of Professional Engineer  \_\_\_\_\_ License # 33998

**Form 3b Form Tube Permeameter Test Data**

- 1. Test Number 1 Replicate (Letter) A Date Collected 08/16/2018
- 2. Material Tested:      Fill X Test in Native Soil---Indicate Depth 48" T.P. #1
- 3. Type of Sample:      Undisturbed X Disturbed
- 4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 2.54 Length of Sample, L, in inches 4"
- 5. Bulk Density Determination (Disturbed Samples Only)
  - Sample weight (Wt. Tube Containing Sample – Wt. of Empty Tube), grams 423
  - Sample Volume (L x 2.54cm. /inch x 3.14R 2), cc 205.7
  - Bulk Density (Sample Wt./Sample Volume), grams/cc 2.06
- 6. Standpipe Used:      No X Yes --- Indicate Internal Radius, cm .635
- 7. Height of Water Level Above Rim of Test Basin, in inches: At Beginning of Each Test Interval, H1 9" At the End of Each Test Interval, H2 7"
- 8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, t1	Time, End of Test, Interval t2	Length of Test Interval, T, minutes
00:00	13:52.32	13.872
00:00	20:24.16	20.403
00:00	18:20.10	18.335
00:00	15:38.17	15.636

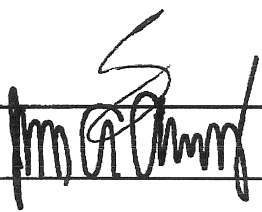
9. Calculation of Permeability:  

$$K, (in/hr) = 60 \text{ min/hr} \times r^2/R^2 \times L(in)/t(min) \times \ln(H1/H2) = 60 \text{ min/hr} \times \frac{.4032}{6.45} \times \frac{4}{13.872} \times \ln\left(\frac{9}{7}\right) = \frac{0.27}{(.2513)} \text{ IN/HR}$$

10. Defects in the Sample (Check appropriate items):
- X None      Cracks      Worm Channels
  - Root Channels      Soil/Tube Contact
  - Large Gravel      Large Roots
  - Dry Soil      Smearing      Compaction
  - Other --- Specify \_\_\_\_\_

11. I hereby certify that the information furnished on Form 3b of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator \_\_\_\_\_ Date 08/30/2018

Signature of Professional Engineer  License # 33998

### Form 3b Form Tube Permeameter Test Data

1. Test Number 2 Replicate (Letter)      Date Collected 08/16/2018
2. Material Tested:      Fill X Test in Native Soil---Indicate Depth 60" T.P. 3
3. Type of Sample:      Undisturbed X Disturbed
4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 2.54 Length of Sample, L, in inches 4"
5. Bulk Density Determination (Disturbed Samples Only)
- Sample weight (Wt. Tube Containing Sample – Wt. of Empty Tube), grams 430
- Sample Volume (L x 2.54cm. /inch x 3.14R 2), cc 205.7
- Bulk Density (Sample Wt./Sample Volume), grams/cc 2.09
6. Standpipe Used:      No X Yes --- Indicate Internal Radius, cm .635
7. Height of Water Level Above Rim of Test Basin, in inches: At Beginning of Each Test Interval, H1 9" At the End of Each Test Interval, H2 7"
8. Rate of Water Level Drop (Add additional lines if needed):

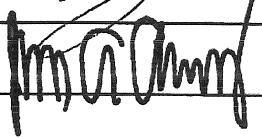
Time, Start of Test Interval, t1	Time, End of Test, Interval t2	Length of Test Interval, T, minutes
00:00	10:20.10	10.335
00:00	12:30.72	12.512
00:00	09:17.52	9.292
00:00	11:33.16	11.553

9. Calculation of Permeability:  

$$K, (in/hr) = 60 \text{ min/hr} \times r^2/R^2 \times L(in)/t(min) \times \ln(H1/H2) = 60 \text{ min/hr} \times \frac{.4032}{6.45} \times \frac{4}{10.335} \times \ln\left(\frac{9}{7}\right) = \frac{0.36}{.2513} \text{ IN/HR}$$
10. Defects in the Sample (Check appropriate items):  
 None  Cracks  Worm Channels  
 Root Channels  Soil/Tube Contact  
 Large Gravel  Large Roots  
 Dry Soil  Smearing  Compaction  
 Other --- Specify \_\_\_\_\_

11. I hereby certify that the information furnished on Form 3b of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator  Date 8/30/2018

Signature of Professional Engineer  License # 33998

**Form 3b Form Tube Permeameter Test Data**

- 1. Test Number 2 Replicate (Letter) A Date Collected 08/16/2018
- 2. Material Tested:  Fill  Test in Native Soil---Indicate Depth 60" T.P. #3
- 3. Type of Sample:  Undisturbed  Disturbed
- 4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 2.54 Length of Sample, L, in inches 4"
- 5. Bulk Density Determination (Disturbed Samples Only)
  - Sample weight (Wt. Tube Containing Sample – Wt. of Empty Tube), grams 390
  - Sample Volume (L x 2.54cm. /inch x 3.14R 2), cc 205.7
  - Bulk Density (Sample Wt./Sample Volume), grams/cc 1.90
- 6. Standpipe Used:  No  Yes --- Indicate Internal Radius, cm .635
- 7. Height of Water Level Above Rim of Test Basin, in inches: At Beginning of Each Test Interval, H1 9" At the End of Each Test Interval, H2 7"
- 8. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, t1	Time, End of Test, Interval t2	Length of Test Interval, T, minutes
00:00	08:50.40	8.840
00:00	11:37.26	11.621
00:00	07:20.37	7.340
00:00	09:45.17	9.753

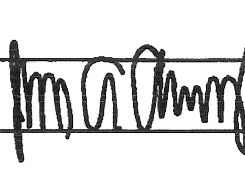
9. Calculation of Permeability:  

$$K, (in/hr) = 60 \text{ min/hr} \times r \ 2/R2 \times L(in)/t(min) \times \ln (H1/H2) = 60 \text{ min/hr} \times .4032 / 6.45 \times 4 / 8.840 \times \ln ( \frac{9}{7} ) = \frac{0.43}{(.2513)} \text{ IN/HR}$$

10. Defects in the Sample (Check appropriate items):
- None  Cracks  Worm Channels
  - Root Channels  Soil/Tube Contact
  - Large Gravel  Large Roots
  - Dry Soil  Smearing  Compaction
  - Other --- Specify \_\_\_\_\_

11. I hereby certify that the information furnished on Form 3b of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

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