STORM WATER MANAGEMENT CALCULATIONS

FOR

PROPOSED SITE PLAN

LAWRENCE TOWNSHIP
MERCER COUNTY
NEW JERSEY

BLOCK 2007, LOT 23.01

Project No. 4432

June 21, 2019

PREPARED BY
GRYBOWSKI GROUP, LLC.
Civil Engineering and Land Surveying
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Grybowski Group, P.C.

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NJPE GE35687

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DESIGN SUMMARY

Drainage design calculations for the proposed subdivision are presented herein. The SCS TR-55 method was used throughout to determine the quantity of storm water run-off from the site. The (2 yr., 10 yr., & 25 yr.) storm events were analyzed using the NRCS New Jersey 24 Hour Rainfall Frequency data.

Design Flow Summary Chart

EXISTING CONDITIONS

STORM EVENTS	*2 yr.*	*10 yr.*	*25 ytr.*

PROPOSED CONDITIONS

STORM EVENTS	*2 yr.*	*10 yr.*	*25 yr.*
PROPOSED CONDITIONS FLOWING TO INFILTRATION CHAMBERS	*0.134*	*0.206*	*0.258*
PROPOSED CONDITIONS INFILTRATOR CHAMBERS ROUTING	*0*	*0*	*0*

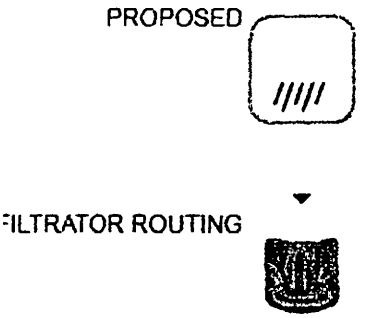
There will be no adverse impact to adjoining property from this project.

Basin Model

Hydrology Studio v 3.0.0.10

Project Name:

06-21-2019



PROPOSED CONDITIONS FLOWING TO INFILTRATION CHAMBERS

Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.10

06-21-2019

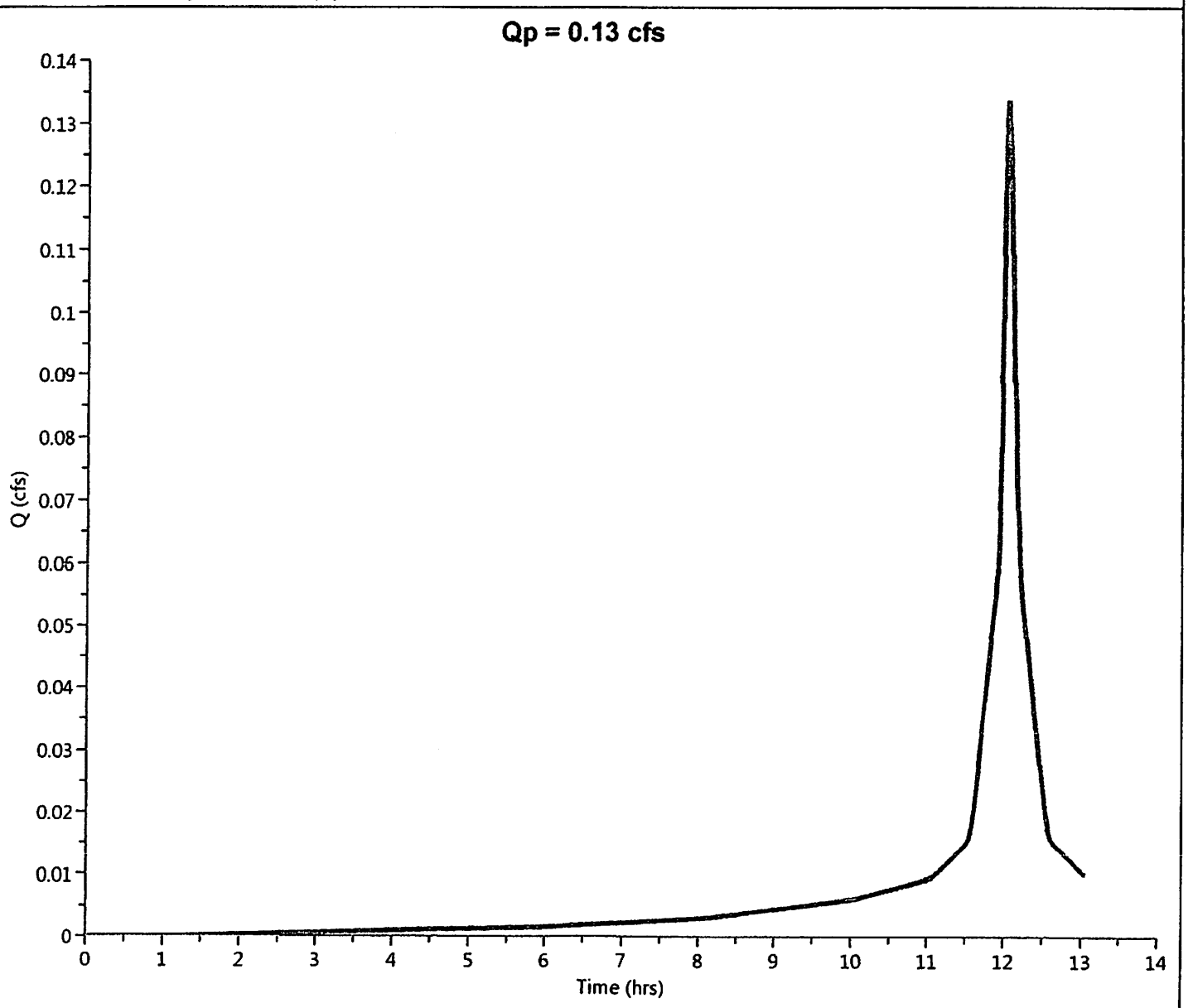
PROPOSED

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.134 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.07 hrs
Time Interval	= 2 min	Runoff Volume	= 453 cuft
Drainage Area	= 0.042 ac	Curve Number	= 98*
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 3.40 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.042	98	IMPERVIOUS
0.042	98	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.10

06-21-2019

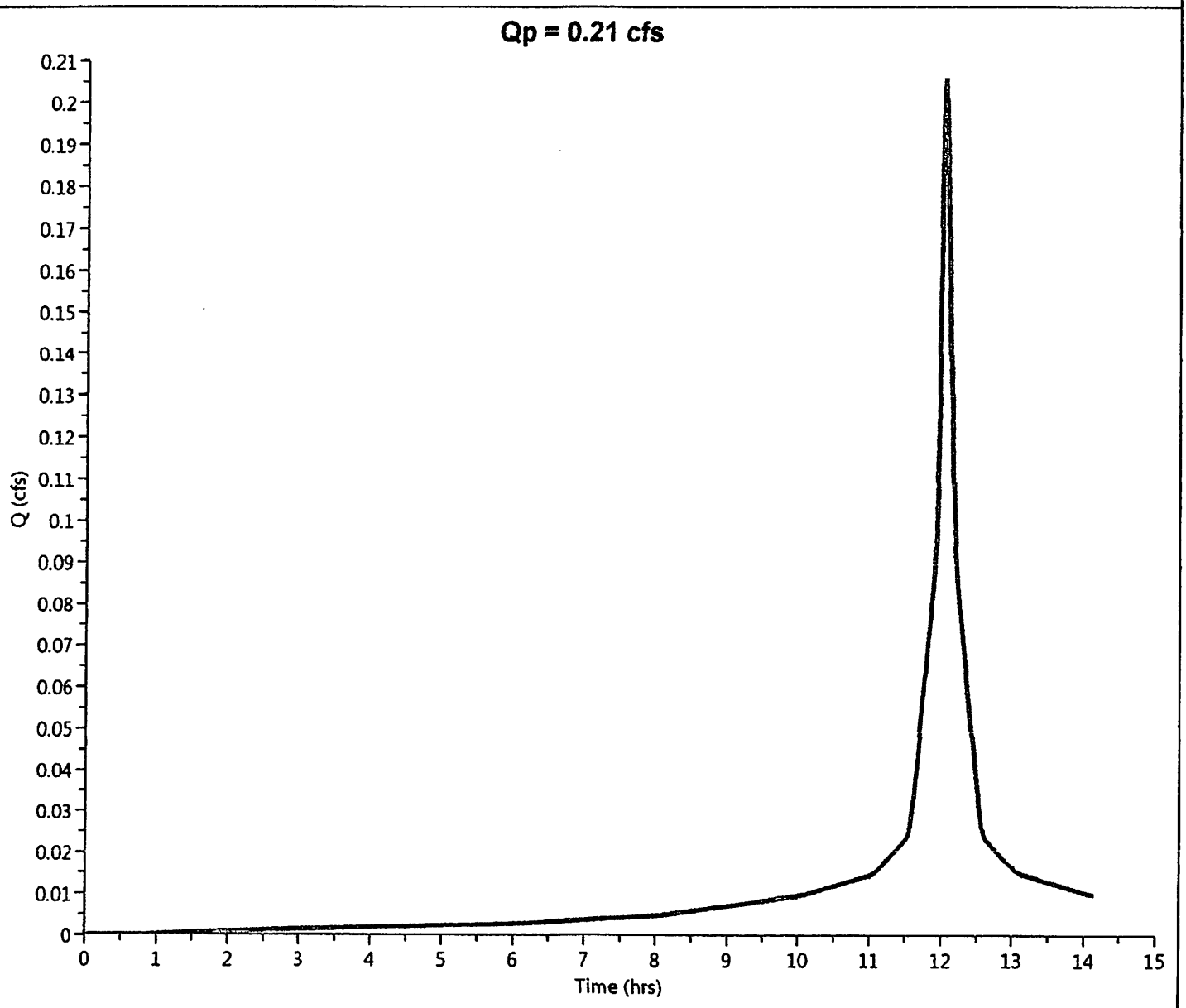
PROPOSED

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.206 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.07 hrs
Time Interval	= 2 min	Runoff Volume	= 709 cuft
Drainage Area	= 0.042 ac	Curve Number	= 98*
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 5.20 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.042	98	IMPERVIOUS
0.042	98	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.10

06-21-2019

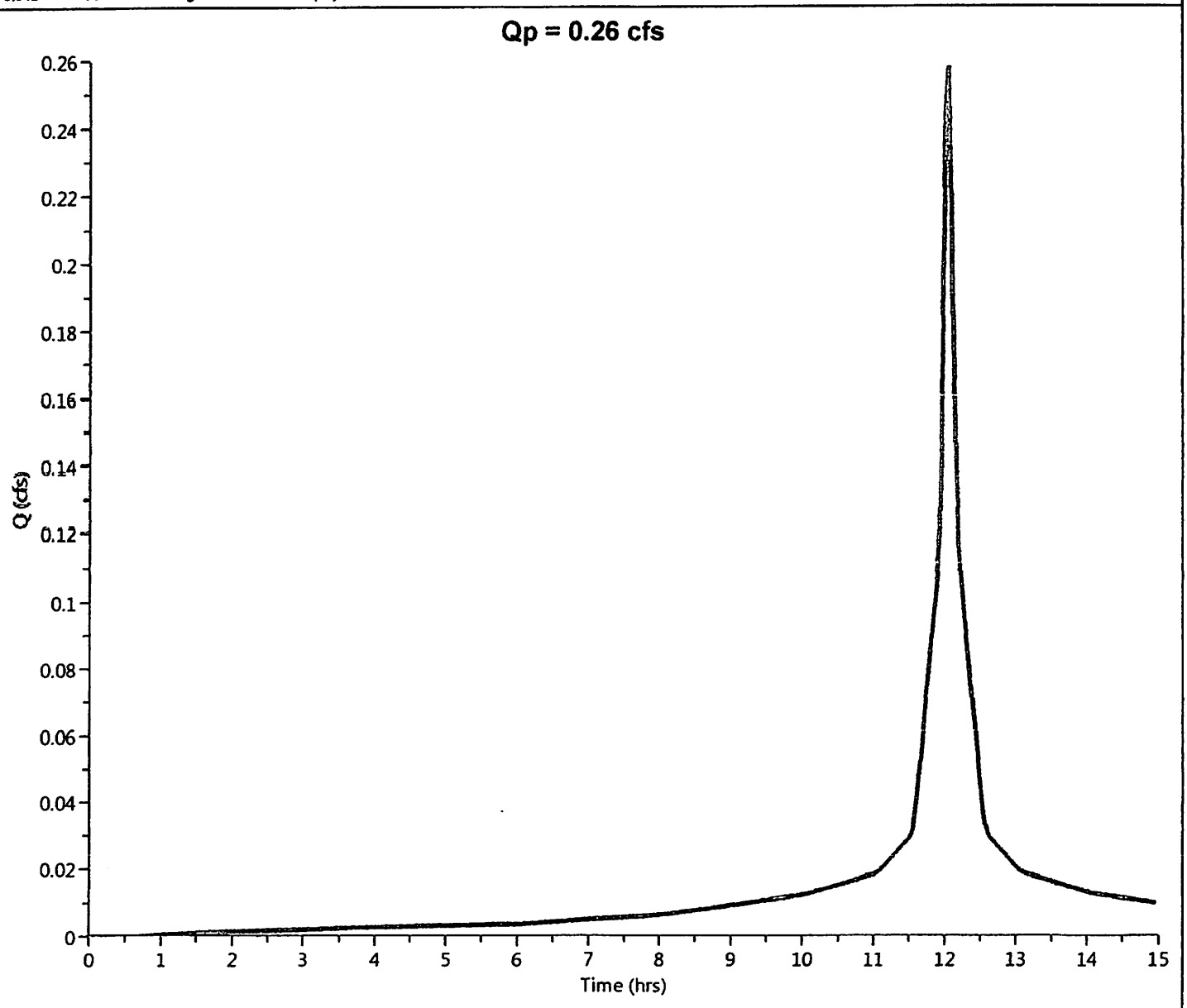
PROPOSED

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.258 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.07 hrs
Time Interval	= 2 min	Runoff Volume	= 895 cuft
Drainage Area	= 0.042 ac	Curve Number	= 98*
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 6.50 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.042	98	IMPERVIOUS
0.042	98	Weighted CN Method Employed



PROPOSED CONDITIONS
INFILTRATOR CHAMBERS
ROUTING

Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.10

06-21-2019

INFILTRATOR ROUTING

Hyd. No. 2

Hydrograph Type	= Pond Route	Peak Flow	= 0.000 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.00 hrs
Time Interval	= 2 min	Hydrograph Volume	= 0.000 cuft
Inflow Hydrograph	= 1 - PROPOSED	Max. Elevation	= 97.28 ft
Pond Name	= INFILTRATORS	Max. Storage	= 453 cuft

Pond Routing by Storage Indication Method

Qp = 0.00 cfs

Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.10

06-21-2019

INFILTRATOR ROUTING

Hyd. No. 2

Hydrograph Type	= Pond Route	Peak Flow	= 0.000 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.00 hrs
Time Interval	= 2 min	Hydrograph Volume	= 0.000 cuft
Inflow Hydrograph	= 1 - PROPOSED	Max. Elevation	= 98.05 ft
Pond Name	= INFILTRATORS	Max. Storage	= 709 cuft

Pond Routing by Storage Indication Method

Qp = 0.00 cfs

Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.10

06-21-2019

INFILTRATOR ROUTING

Hyd. No. 2

Hydrograph Type	= Pond Route	Peak Flow	= 0.000 cfs
Storm Frequency	= 25-yr	Time to Peak	= 0.00 hrs
Time Interval	= 2 min	Hydrograph Volume	= 0.000 cuft
Inflow Hydrograph	= 1 - PROPOSED	Max. Elevation	= 98.97 ft
Pond Name	= INFILTRATORS	Max. Storage	= 895 cuft

Pond Routing by Storage Indication Method

Qp = 0.00 cfs

Pond Report

Project Name:

Hydrology Studio v 3.0.0.10

06-21-2019

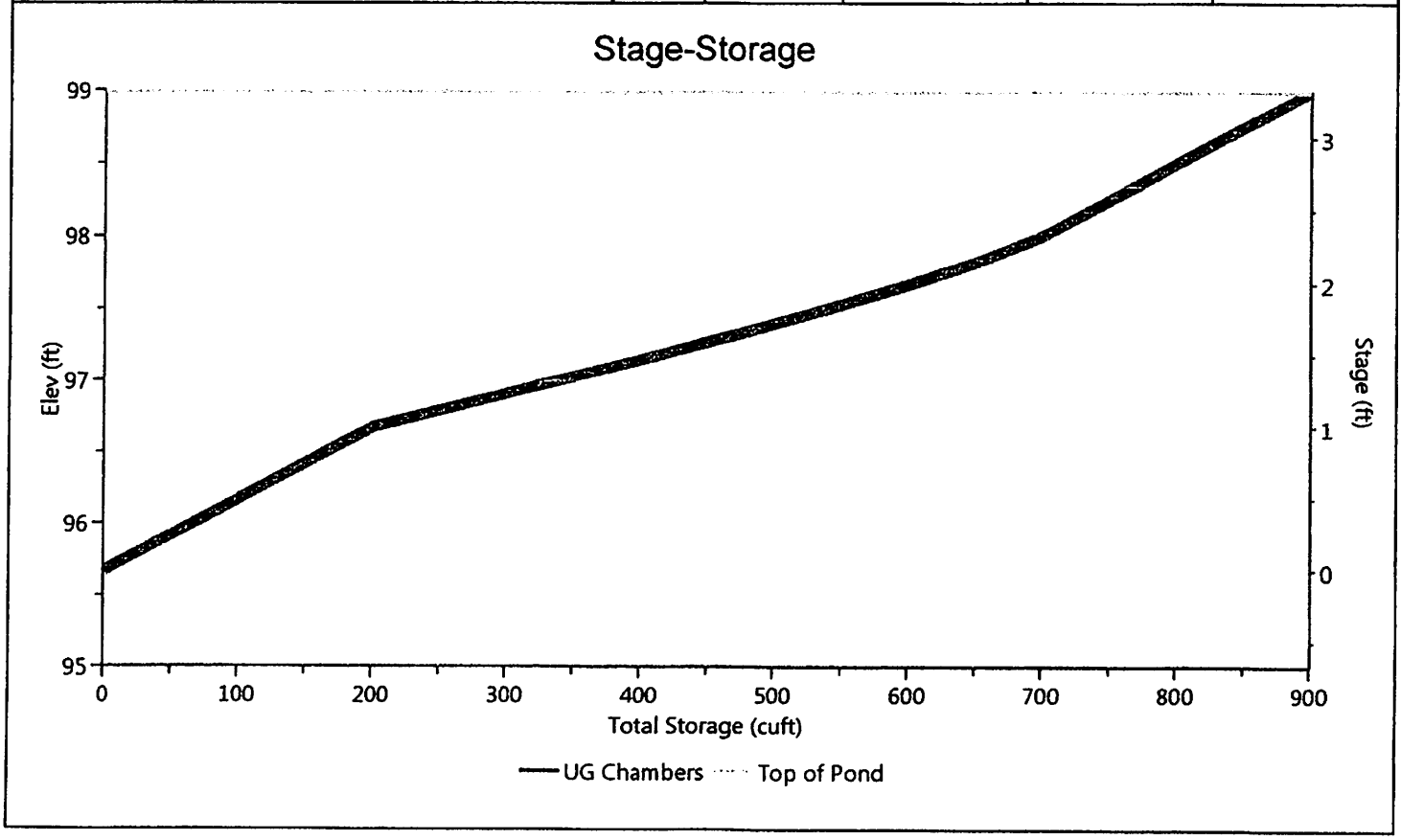
INFILTRATORS

Stage-Storage

Underground Chambers	
Description	**Input**
Invert Elev Down, ft	96.67
Chamber Rise, ft	1.33
Chamber Shape	Arch
Chamber Span, ft	2.83
Barrel Length, ft	36.00
No. Barrels	3
Barrel Slope, %	0.00
Headers, y/n	Yes
Stone Encasement, y/n	Yes
Encasement Bottom Elevation, ft	95.67
Encasement Width per Chamber, ft	3.83
Encasement Depth, ft	3.33
Encasement Voids, %	40.00

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour Area (sqft)	Incr. Storage (cuft)	Total Storage (cuft)
0.00	95.67	502	0.000	0.000
0.17	95.84	502	33.4	33.4
0.33	96.00	502	33.4	66.8
0.50	96.17	502	33.4	100
0.67	96.34	502	33.4	134
0.83	96.50	502	33.4	167
1.00	96.67	502	33.4	200
1.17	96.84	502	70.1	271
1.33	97.00	502	69.8	340
1.50	97.17	502	68.6	409
1.67	97.34	502	66.7	476
1.83	97.50	502	64.0	540
2.00	97.67	502	60.2	600
2.16	97.83	502	54.9	655
2.33	98.00	502	45.4	700
2.50	98.17	502	33.4	734
2.66	98.33	502	33.4	767
2.83	98.50	502	33.4	800
3.00	98.67	502	33.4	834
3.16	98.83	502	33.4	867
3.33	99.00	502	33.4	901



Pond Report

Project Name:

Hydrology Studio v 3.0.0.10

06-21-2019

INFILTRATORS

Stage-Discharge

Culvert / Orifices	Culvert	Orifices 1	Orifices 2	Orifices 3
Rise, in				
Span, in				
No. Barrels				
Invert Elevation, ft				
Orifice Coefficient, Co				
Length, ft				
Barrel Slope, %				
N-Value, n	0.000			

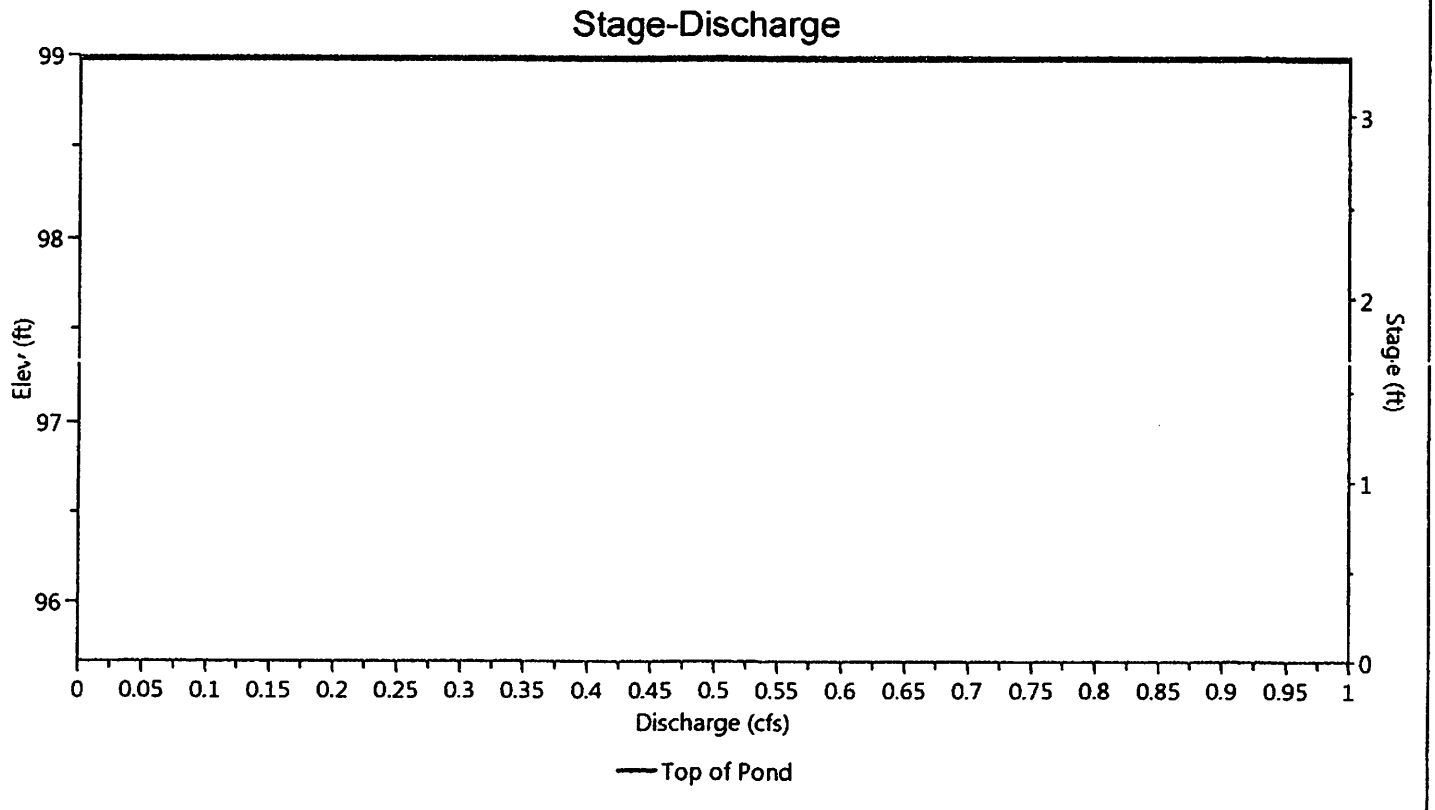
Weirs	Riser*	Weirs 1	Weirs 2	Weirs 3
Shape / Type				
Crest Elevation, ft				
Crest Length, ft				
Angle, deg				
Weir Coefficient, Cw				

Perforated Riser	
Perf. Rise, in	
Perf. Span, in	
No. Perforations	
Invert Elevation, ft	
Height, ft	
Orifice Coefficient, Co	

Ancillary

Exfiltration, in/hr	

*Routes through Culvert.



Pond Report

Project Name:

Hydrology Studio v 3.0.0.10

06-21-2019

INFILTRATORS

Stage-Storage-Discharge Summary

Stage (ft)	Elev. (ft)	Storage (cuft)	Culvert (cfs)	Orifices, cfs			Riser (cfs)	Weirs, cfs			Pf Riser (cfs)	Exfil (cfs)	User (cfs)	Total (cfs)
				1	2	3		1	2	3				
0.00	95.67	0.000												0.000
0.17	95.84	33.4												0.000
0.33	96.00	66.8												0.000
0.50	96.17	100												0.000
0.67	96.34	134												0.000
0.83	96.50	167												0.000
1.00	96.67	200												0.000
1.17	96.84	271												0.000
1.33	97.00	340												0.000
1.50	97.17	409												0.000
1.67	97.34	476												0.000
1.83	97.50	540												0.000
2.00	97.67	600												0.000
2.16	97.83	655												0.000
2.33	98.00	700												0.000
2.50	98.17	734												0.000
2.66	98.33	767												0.000
2.83	98.50	800												0.000
3.00	98.67	834												0.000
3.16	98.83	867												0.000
3.33	99.00	901												0.000

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

Pond Report

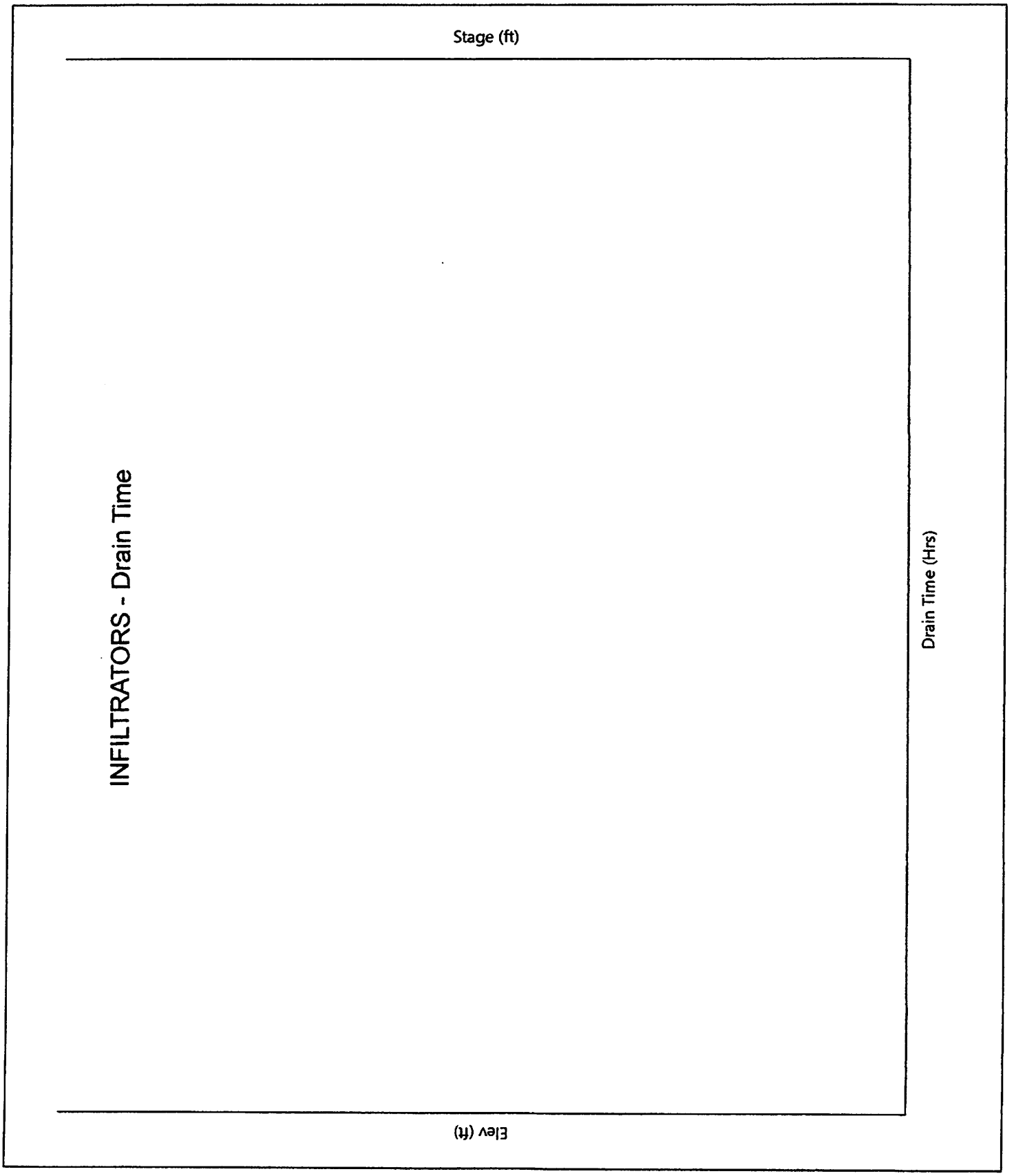
Project Name:

Hydrology Studio v 3.0.0.10

06-21-2019

INFILTRATORS

Pond Drawdown



SITE
SOIL LOGS

COUNTY/MUNICIPALITY Mercer / Lawrence
APPLICATION FOR PERMIT TO CONSTRUCT/ALTER/REPAIR Block ~~23.01~~ 2007

AN INDIVIDUAL SUBSURFACE SEWAGE DISPOSAL SYSTEM Lot ~~2007~~ 23.01

FORM 2B - SOIL LOG AND INTERPRETATION:

1. **Log Number** 1 Method (Check one): ✓ Profile pit _____ Boring

2. **Soil Log** 1 **Performed** 5/17/19

Depth (Inches) Top to bottom	Munsell Color Name and Symbol; Estimated Text Class; Estimated Volume % Coarse Fragments, If Present; Structure; Moist or Dry Consistence; Mottling Abundance, Size and Contrast, If Present
0 - 10"	10YR 3/3 Dk Brn silt loam topsoil.
10 - 30"	10YR 6/6 Brownish yellow sandy clay loam. SAB, moist, friable.
30 - 72"	10YR 6/8 Brownish yellow sandy loam. SAB, moist, moist, friable, 10% gravel.
72 - 108"	7.5YR 6/6 Reddish yellow sandy loam. SAB, moist, friable, 25% quartzite gravel. Few medium faint mottles of 10YR 7/1 (light gray) @ 72".
108-120"	10YR 6/3 Pale brown sandy loam. Single grained, moist, friable, 30% gravel.
> 120"	Stopped Test No GW

3. **Ground Water Observations:**
   - __ Seepage - Indicate Depth _____
   - __ Pit/Boring Flooded - Depth after _____ Hours _____

4. **Soil Limiting Zones** (Check Appropriate Categories)
   - ___ Fractured Rock Substratum - Depth to Top _____
   - ___ Massive Rock Substratum - Depth to Top _____
   - ___ Excessively Coarse Horizon - Depth Top to Bottom _____
   - ___ Excessively Coarse Substratum - Depth Top to Bottom _____
   - ___ Hydraulically Restrictive Horizon - Depth Top to Bottom _____
   - ___ Hydraulically Restrictive Substratum - Depth to Top _____
   - ___ Perched Zone of Saturation - Depth to Top _____
   - ✓ Regional Zone of saturation - Depth to Top 72"

5. **Soil Suitability Classification:** I

6. I hereby certify that the information furnished on form 2B of this application is true and accurate. I am aware that the falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A *et seq.*) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator John Luyber **Date** 5/17/19

Signature of Professional Engineer _____ **License #** _____