PROPOSED

STORM WATER MANAGEMENT CALCULATIONS

FOR

BLOCK 57, LOT 4
BOROUGH OF BRADLEY BEACH
MONMOUTH COUNTY
NEW JERSEY

Project No. 21052
Date: 06/03/25

PREPARED BY
Landmark Surveying & Engineering, Inc.
813 Main Street
Avon-by-the-Sea, NJ 07717
Phone: 732-775-8558

Landmark Surveying & Engineering, Inc.

DANIEL W. CARUSO, P.E.
NJPE GE35687

Table of Content

Design Summary

Drainage design calculations for the proposed site plan are presented herein. The SCS TR55 method was used to analyze the 2 yr., and 10 yr. storm events. Del Marva Unit Hydrograph along with site specific NOAA "D" rain fall intensity values were used in the analysis.

The proposed drainage analysis is broken into two analyses: Existing conditions, proposed site and proposed addition.

We are proposing one (1) 900 gal. seepage chamber infiltration system to collect the storm water run-off from the proposed addition roof area. The infiltration system was sized to capture the entire 2 yr. storm event. For this analysis we did not use the infiltration rate of the soils in the sizing of the infiltration system.

The infiltration system was also analyzed for the 10 Yr. storm events. For this analysis the infiltration rate was used.

The following chart outlines the existing and proposed conditions flow rates.

Basin Model

Hydrology Studio v 3.0.0.38

File: storm seepage tanks 2 yr. storm.hys
06-03-2025

Design Flow Rate Chart

	2yr.	*10yr.*
Existing Conditions	*0.172*	*0.363*
Proposed Site Condition	*0.104*	*0.218*
Proposed Conditions Roof Area	*0.062*	*0.088*
Proposed Conditions Infiltration system Routing	*0.000*	*0.000*
Proposed Total	*0.104*	*0.208*

There will be no run-off for the 2 yr. and 10yr. storm leaving the site after development.

There will be no adverse impact to the existing storm sewer system or adjoining properties from this project.

Existing Conditions
(2 yr.& 10 yr. Storm Event)

Hydrograph Report

Hydrology Studio v 3.0.0.38

File: storm seepage tanks 2 yr. storm.hys
06-03-2025

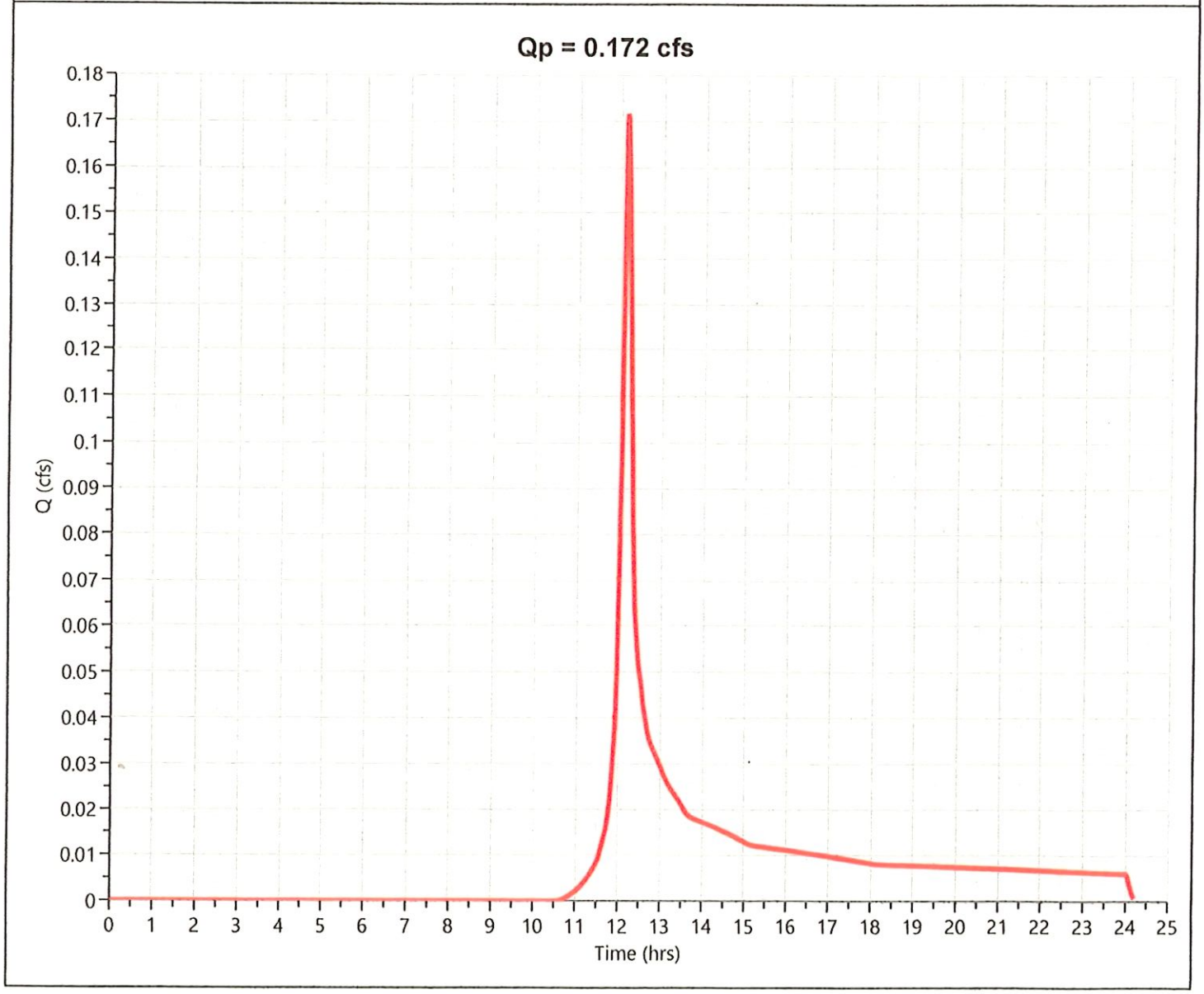
Existing Conditions

Hyd. No. 3

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.172 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.13 hrs
Time Interval	= 1 min	Runoff Volume	= 709 cuft
Drainage Area	= 0.209 ac	Curve Number	= 70.56*
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 3.34 in	Design Storm	= NRCC-D
Storm Duration	= 24 hrs	Shape Factor	= 285

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.054	98.00	Impervious
0.155	61.00	Lawn
0.209	**70.56**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.38

File: storm seepage tanks 10 yr. storm.hys
06-03-2025

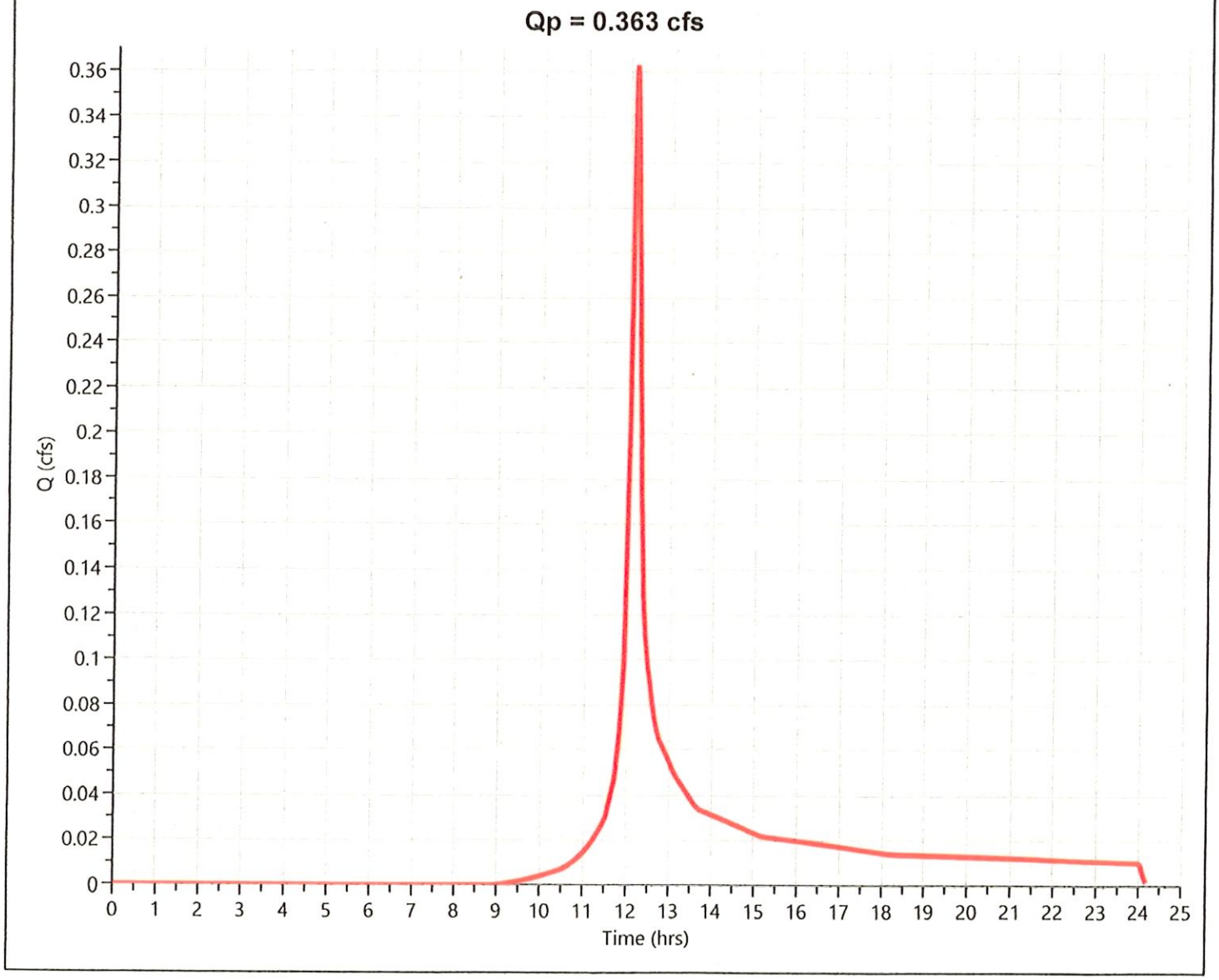
Existing Conditions

Hyd. No. 3

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.363 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.13 hrs
Time Interval	= 1 min	Runoff Volume	= 1,412 cuft
Drainage Area	= 0.209 ac	Curve Number	= 70.56*
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 4.72 in	Design Storm	= NRCC-D
Storm Duration	= 24 hrs	Shape Factor	= 285

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.054	98.00	Impervious
0.155	61.00	Lawn
0.209	**70.56**	Weighted CN Method Employed



Proposed Conditions
Site Area
(2 yr.& 10 yr. Storm Event)

Hydrograph Report

Hydrology Studio v 3.0.0.38

File: storm seepage tanks 2 yr. storm.hys
06-03-2025

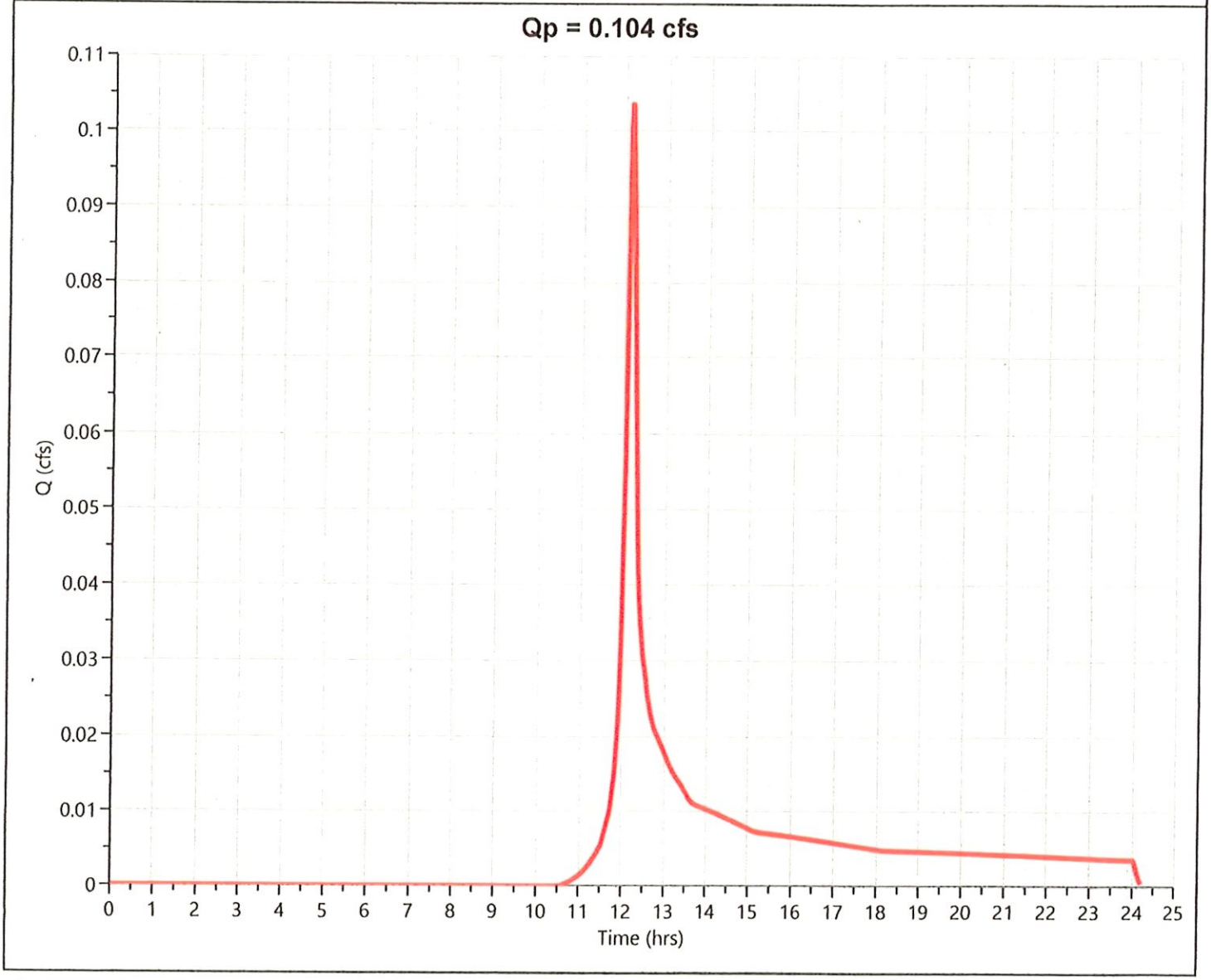
Proposed Site

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.104 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.13 hrs
Time Interval	= 1 min	Runoff Volume	= 427 cuft
Drainage Area	= 0.124 ac	Curve Number	= 70.85*
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 3.34 in	Design Storm	= NRCC-D
Storm Duration	= 24 hrs	Shape Factor	= 285

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.053	98.00	Existing Impervious
0.009	98.00	Proposed Impervious
0.123	61.00	Lawn
0.124	**70.85**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.38

File: storm seepage tanks 10 yr. storm.hys
06-03-2025

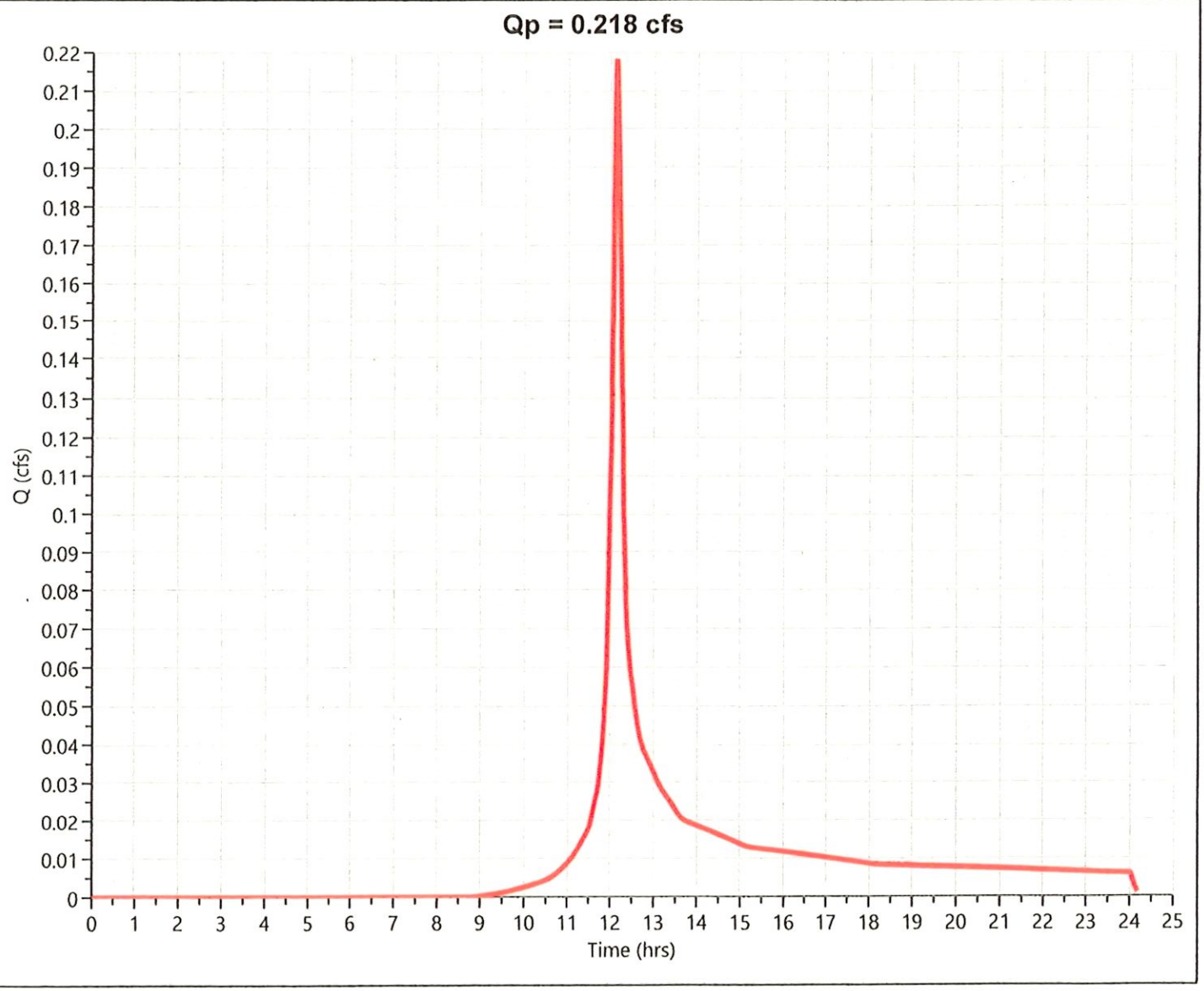
Proposed Site

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.218 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.13 hrs
Time Interval	= 1 min	Runoff Volume	= 848 cuft
Drainage Area	= 0.124 ac	Curve Number	= 70.85*
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 4.72 in	Design Storm	= NRCC-D
Storm Duration	= 24 hrs	Shape Factor	= 285

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.053	98.00	Existing Impervious
0.009	98.00	Proposed Impervious
0.123	61.00	Lawn
0.124	**70.85**	Weighted CN Method Employed



Proposed Conditions
Building Addition Roof Area
(2 yr.& 10 yr. Storm Event)

Hydrograph Report

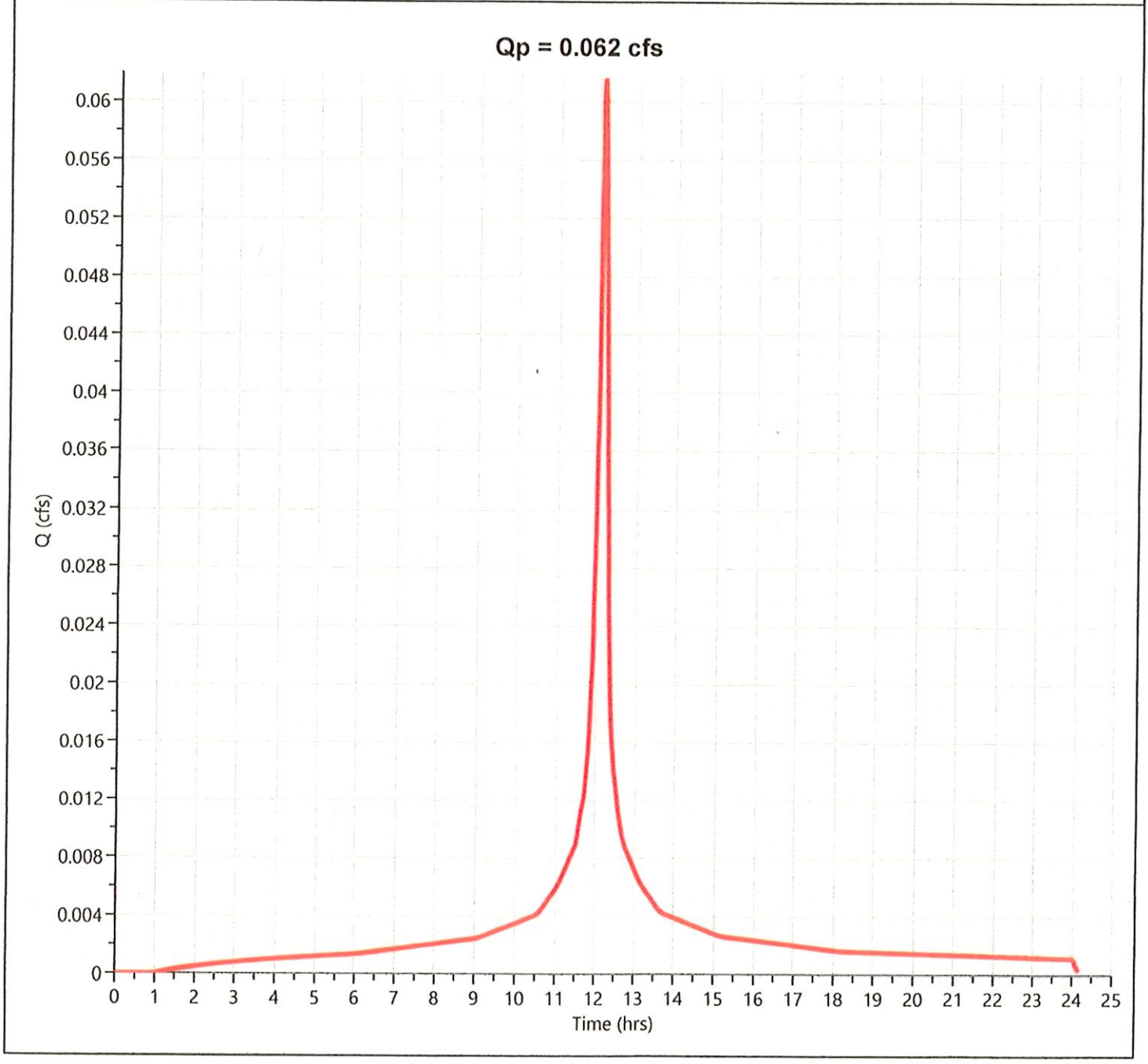
Hydrology Studio v 3.0.0.38

File: storm seepage tanks 2 yr. storm.hys
06-03-2025

Prop Dwelling

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.062 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.13 hrs
Time Interval	= 1 min	Runoff Volume	= 269 cuft
Drainage Area	= 0.024 ac	Curve Number	= 98.00
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 3.34 in	Design Storm	= NRCC-D
Storm Duration	= 24 hrs	Shape Factor	= 285



Hydrograph Report

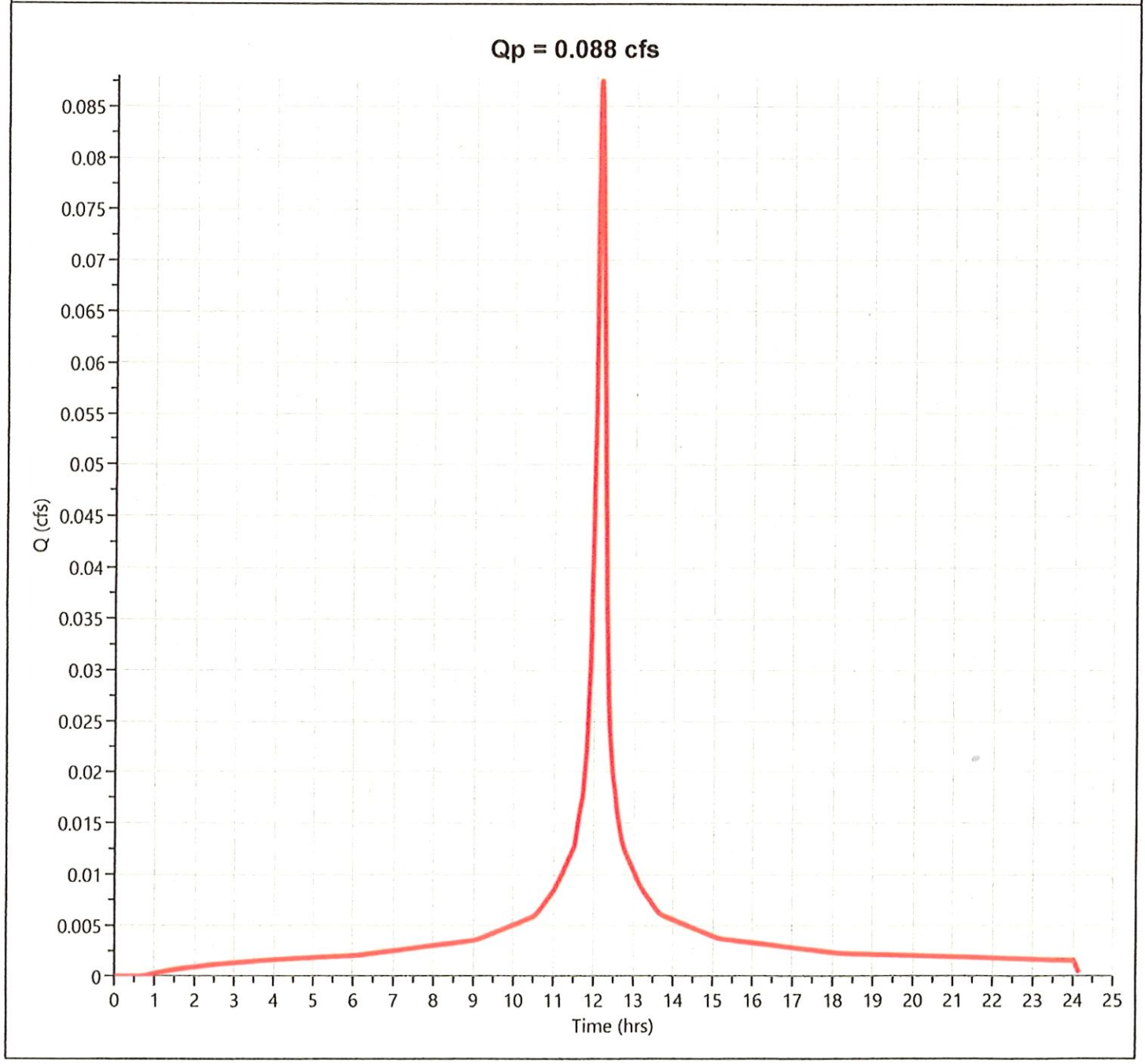
Hydrology Studio v 3.0.0.38

File: storm seepage tanks 10 yr. storm.hys
06-03-2025

Prop Dwelling

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.088 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.13 hrs
Time Interval	= 1 min	Runoff Volume	= 388 cuft
Drainage Area	= 0.024 ac	Curve Number	= 98.00
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 4.72 in	Design Storm	= NRCC-D
Storm Duration	= 24 hrs	Shape Factor	= 285



CHF

Proposed Conditions
infiltration Routing
Building Addition Roof Area
(2 yr. Storm Event – No Infiltration)

Hydrograph Report

Hydrology Studio v 3.0.0.38

File: storm seepage tanks 2 yr. storm.hys
06-03-2025

Seepage Tanks

Hyd. No. 2

Hydrograph Type	= Pond Route	Peak Flow	= 0.000 cfs
Storm Frequency	= 2-yr	Time to Peak	= 0.00 hrs
Time Interval	= 1 min	Hydrograph Volume	= 0.000 cuft
Inflow Hydrograph	= 1 - Prop Dwelling	Max. Elevation	= 101.34 ft
Pond Name	= chamber	Max. Storage	= 269 cuft

Pond Routing by Storage Indication Method

Qp = 0.000 cfs

Pond Report

File: storm seepage tanks 2 yr. storm.hys

Hydrology Studio v 3.0.0.38

06-03-2025

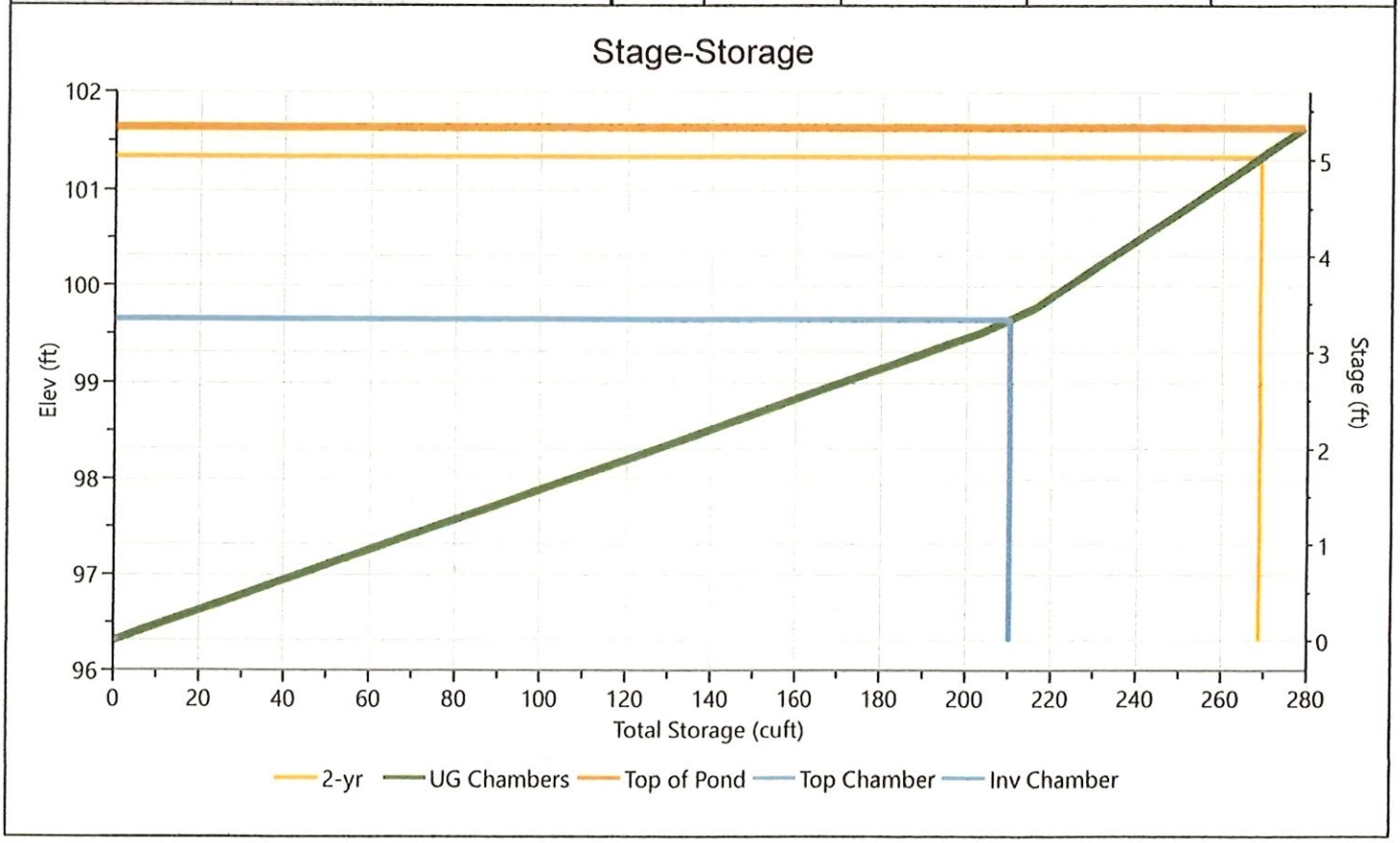
chamber

Stage-Storage

Underground Chambers	
Description	**Input**
Invert Elev Down, ft	96.32
Chamber Rise, ft	3.33
Chamber Shape	Box
Chamber Span, ft	5.00
Barrel Length, ft	10.00
No. Barrels	1
Barrel Slope, %	0.00
Headers, y/n	No
Stone Encasement, y/n	Yes
Encasement Bottom Elevation, ft	96.31
Encasement Width per Chamber, ft	7.00
Encasement Depth, ft	5.33
Encasement Voids, %	40.00

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour Area (sqft)	Incr. Storage (cuft)	Total Storage (cuft)
0.00	96.31	84	0.000	0.000
0.27	96.58	84	16.7	16.7
0.53	96.84	84	17.0	33.6
0.80	97.11	84	17.0	50.6
1.07	97.38	84	17.0	67.5
1.33	97.64	84	17.0	84.5
1.60	97.91	84	17.0	101
1.87	98.18	84	17.0	118
2.13	98.44	84	17.0	135
2.40	98.71	84	17.0	152
2.67	98.98	84	17.0	169
2.93	99.24	84	17.0	186
3.20	99.51	84	17.0	203
3.46	99.77	84	13.2	216
3.73	100.04	84	8.96	225
4.00	100.31	84	8.96	234
4.26	100.57	84	8.96	243
4.53	100.84	84	8.96	252
4.80	101.11	84	8.96	261
5.06	101.37	84	8.96	270
5.33	101.64	84	8.96	279



Pond Report

File: storm seepage tanks 2 yr. storm.hys

Hydrology Studio v 3.0.0.38

06-03-2025

chamber

Stage-Discharge

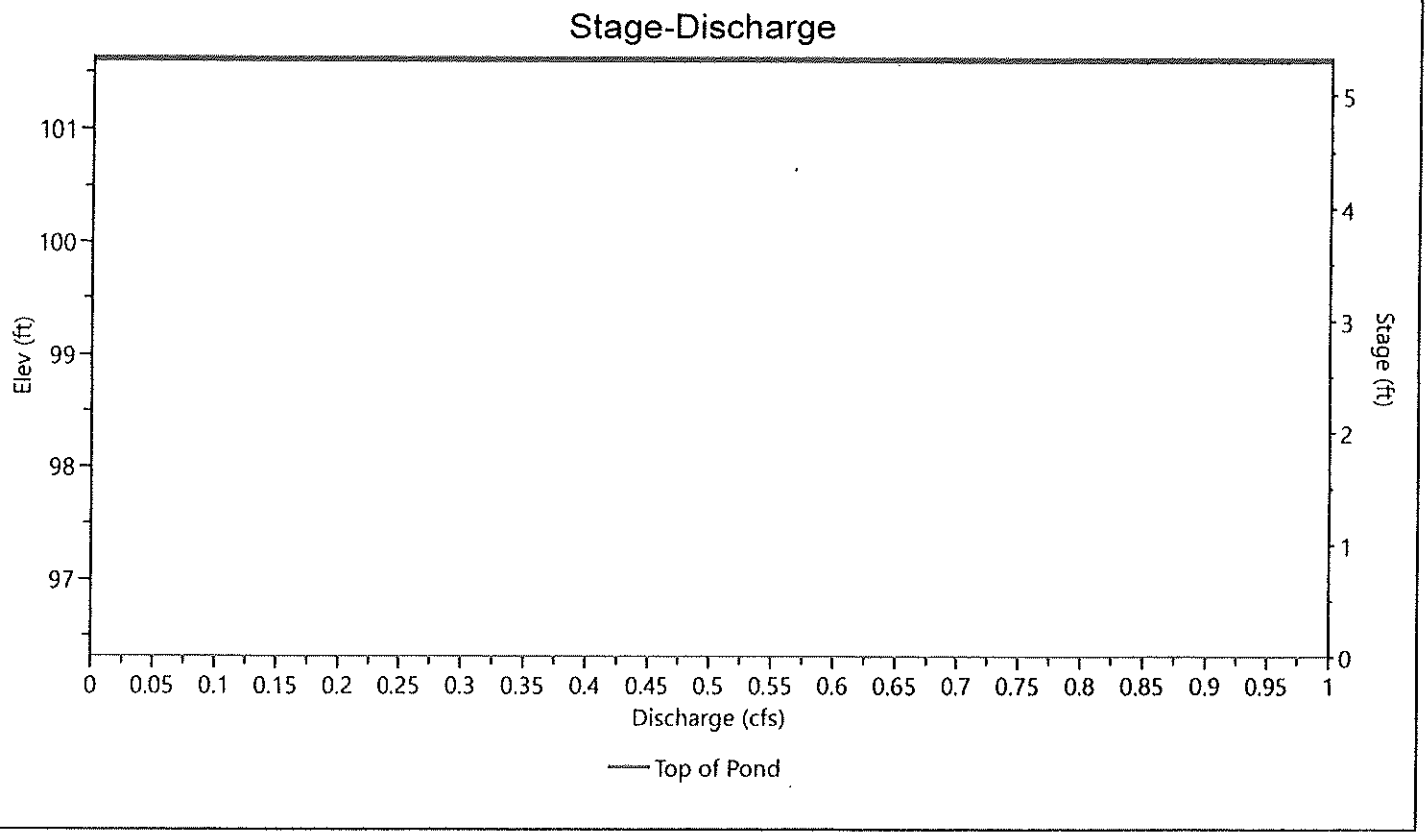
Culvert / Orifices	Cir Culvert	Orifice 1	Orifice 2	Orifice 3
Rise, in				
Span, in				
No. Barrels	1			
Invert Elevation, ft	100.00			
Orifice Coefficient, Co	0.60			
Length, ft				
Barrel Slope, %				
N-Value, n				

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

Perforated Riser	
Hole Diameter, in	
No. holes	
Invert Elevation, ft	
Height, ft	
Orifice Coefficient, Co	

Ancillary

Exfiltration, in/hr	



Proposed Conditions
Infiltration Routing
Building Addition Roof Area
(10 yr. Storm Event – With Infiltration)

Hydrograph Report

Hydrology Studio v 3.0.0.38

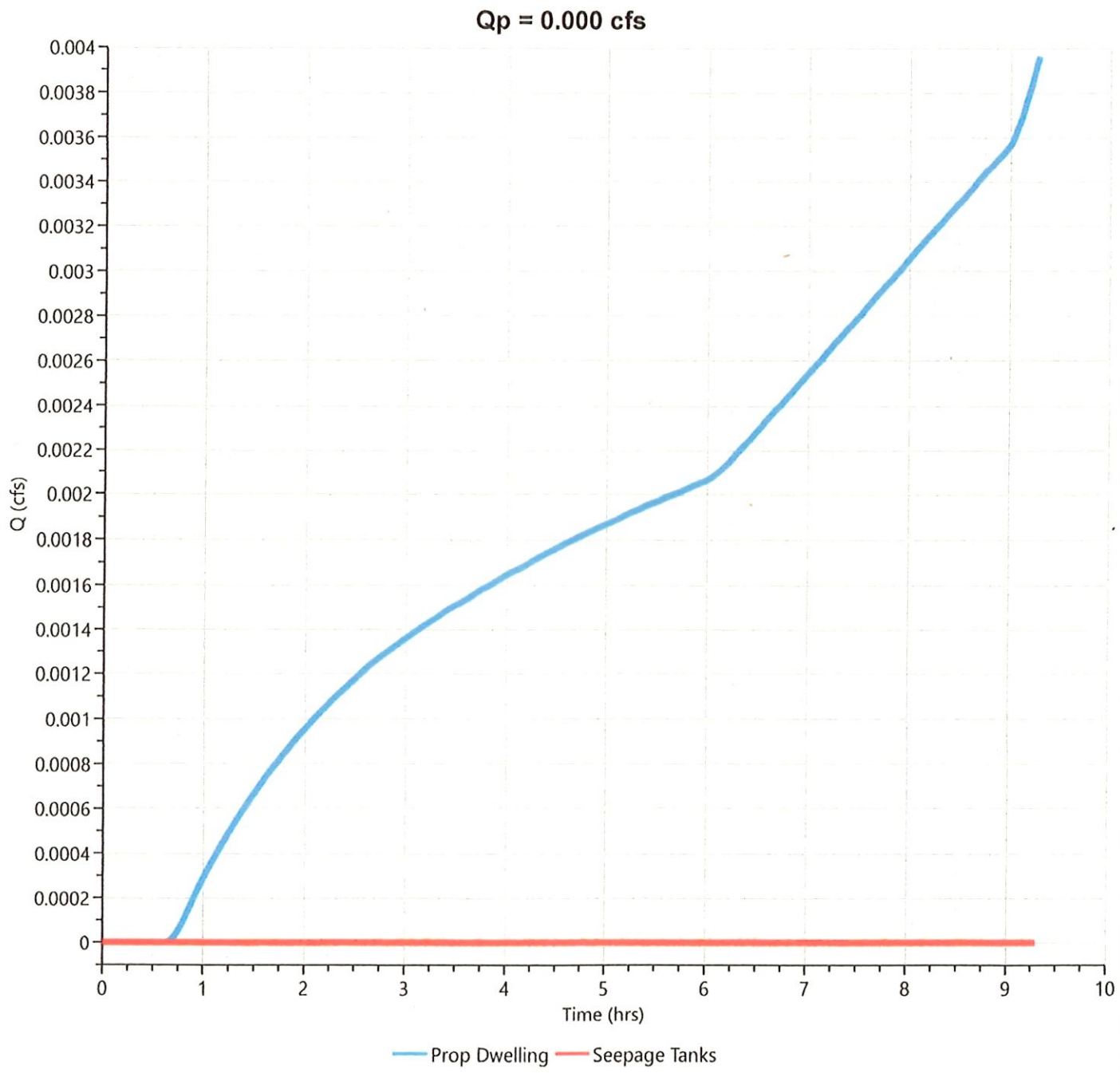
File: storm seepage tanks 10 yr. storm.hys
06-03-2025

Seepage Tanks

Hyd. No. 2

Hydrograph Type	= Pond Route	Peak Flow	= 0.000 cfs
Storm Frequency	= 10-yr	Time to Peak	= 9.28 hrs
Time Interval	= 1 min	Hydrograph Volume	= 0.000 cuft
Inflow Hydrograph	= 1 - Prop Dwelling	Max. Elevation	= 97.56 ft
Pond Name	= chamber	Max. Storage	= 79.3 cuft

Pond Routing by Storage Indication Method



Pond Report

File: storm seepage tanks 10 yr. storm.hys

Hydrology Studio v 3.0.0.38

06-03-2025

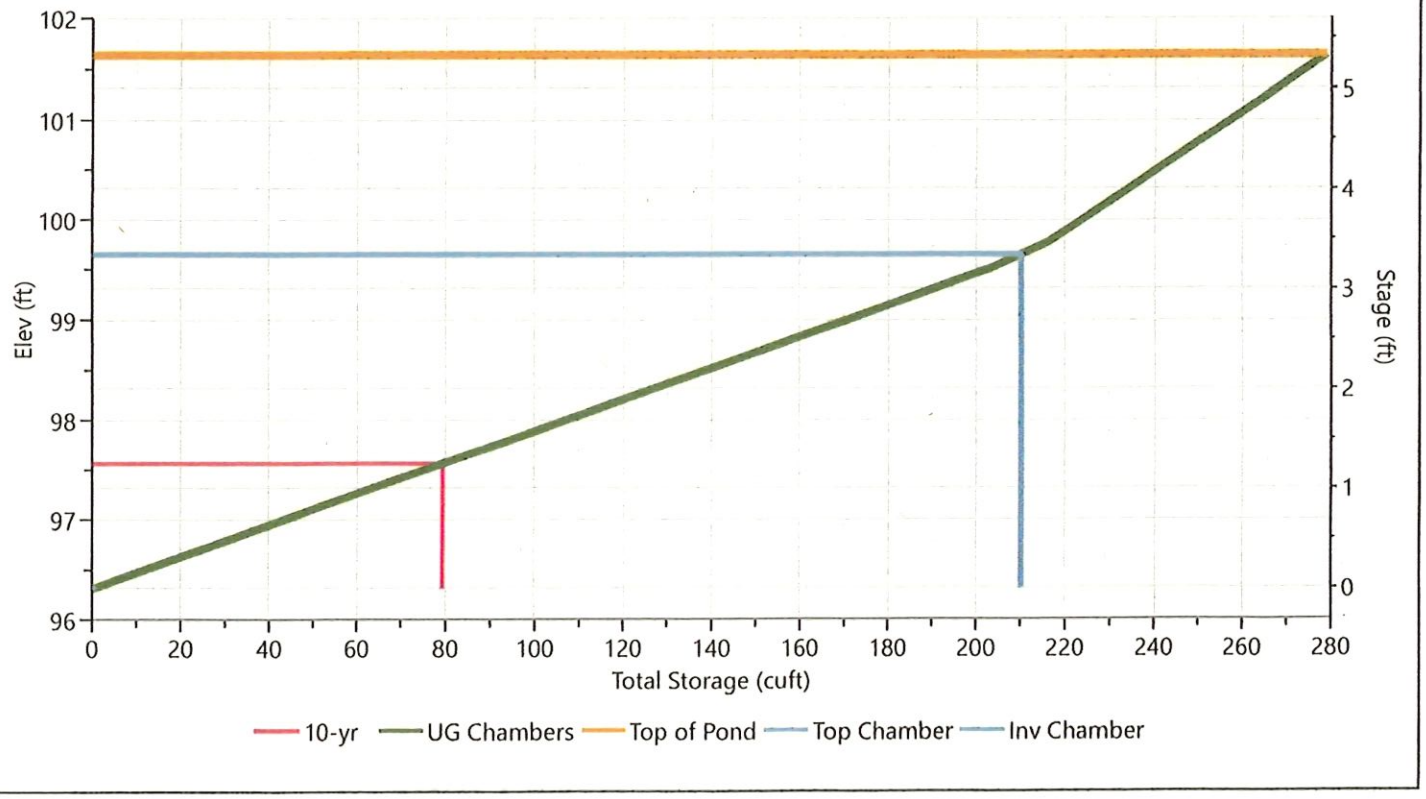
chamber

Stage-Storage

Underground Chambers	
Description	**Input**
Invert Elev Down, ft	96.32
Chamber Rise, ft	3.33
Chamber Shape	Box
Chamber Span, ft	5.00
Barrel Length, ft	10.00
No. Barrels	1
Barrel Slope, %	0.00
Headers, y/n	No
Stone Encasement, y/n	Yes
Encasement Bottom Elevation, ft	96.31
Encasement Width per Chamber, ft	7.00
Encasement Depth, ft	5.33
Encasement Voids, %	40.00

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour Area (sqft)	Incr. Storage (cuft)	Total Storage (cuft)
0.00	96.31	84	0.000	0.000
0.27	96.58	84	16.7	16.7
0.53	96.84	84	17.0	33.6
0.80	97.11	84	17.0	50.6
1.07	97.38	84	17.0	67.5
1.33	97.64	84	17.0	84.5
1.60	97.91	84	17.0	101
1.87	98.18	84	17.0	118
2.13	98.44	84	17.0	135
2.40	98.71	84	17.0	152
2.67	98.98	84	17.0	169
2.93	99.24	84	17.0	186
3.20	99.51	84	17.0	203
3.46	99.77	84	13.2	216
3.73	100.04	84	8.96	225
4.00	100.31	84	8.96	234
4.26	100.57	84	8.96	243
4.53	100.84	84	8.96	252
4.80	101.11	84	8.96	261
5.06	101.37	84	8.96	270
5.33	101.64	84	8.96	279



Pond Report

File: storm seepage tanks 10 yr. storm.hys

Hydrology Studio v 3.0.0.38

06-03-2025

chamber

Stage-Discharge

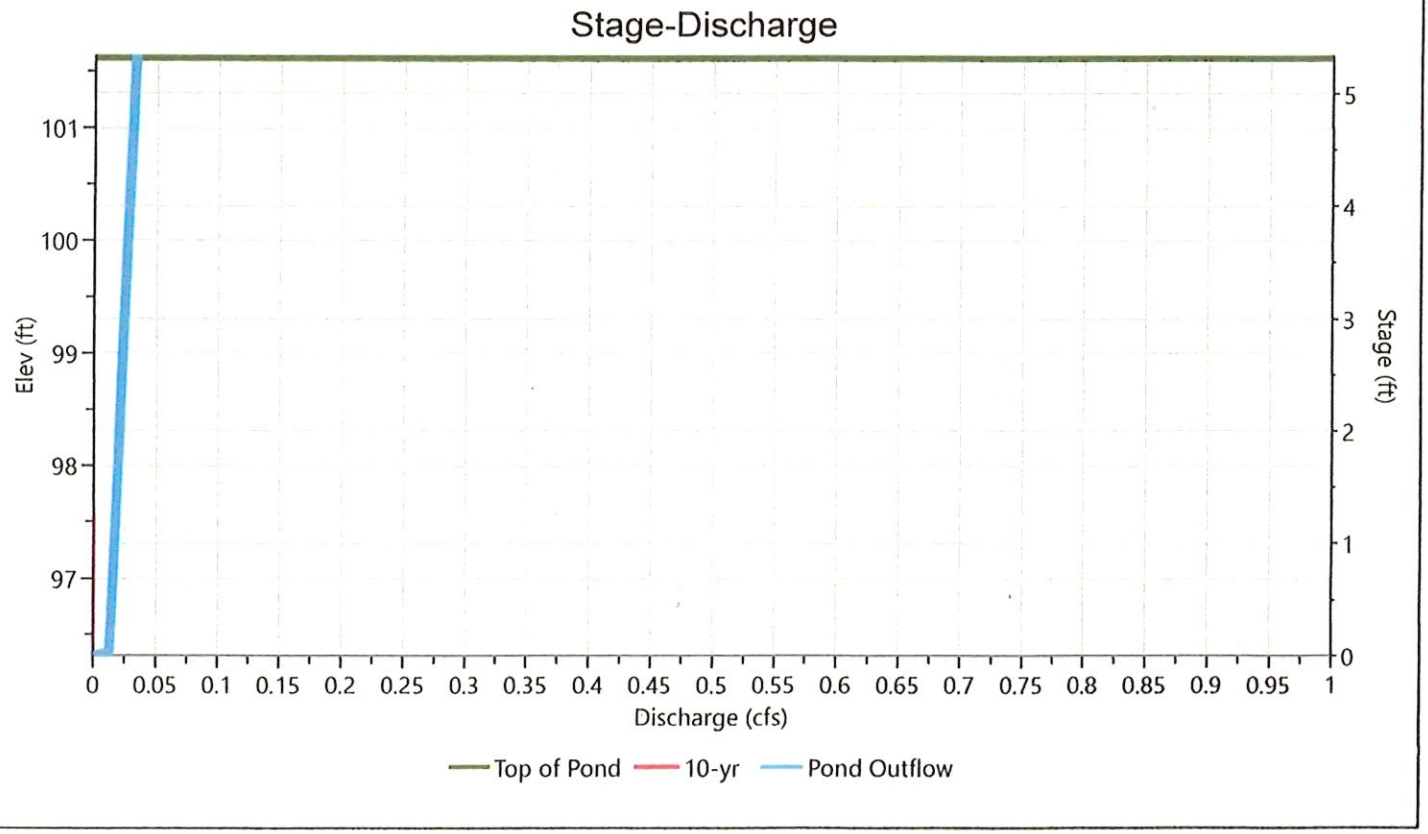
Culvert / Orifices	Cir Culvert	Orifice 1	Orifice 2	Orifice 3
Rise, in				
Span, in				
No. Barrels	1			
Invert Elevation, ft	100.00			
Orifice Coefficient, Co	0.60			
Length, ft				
Barrel Slope, %				
N-Value, n				

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

Perforated Riser	
Hole Diameter, in	
No. holes	
Invert Elevation, ft	
Height, ft	
Orifice Coefficient, Co	

Ancillary	
Exfiltration, in/hr	6.75**

**Exfiltration extracted from outflow hydrograph. Rate applied to contours.



Existing Soil Permeability Testing

Application Number _____ **Date** _____

SOIL PERMEABILITY DATA - Form 3A
Zone of Discharge
Municipal Borough of Bradley Beach **Block** 57 **Lot** 4
Address 615 Fifth Avenue

1 **Summary of Data**

Type of Test	Test (Number)	Replicate (Letter)	Depth (Inches)	Results (in/hr)
Tube Permeability	1	A	60" +	13.50
Tube Permeability	2	B	60" +	14.32

2 **Design Permeability** 13.50 K4

3 **Attachments:**
Form 3B - Tube Permeablility Test Data - 2 sheets

4 I hereby certify that the information furnished on Form 3A of this application (and the attachments thereto) is true and accurate. I am aware the 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 Professional Engineer  NJPE #35687

Date 6/2/25

Application Number _____ **Date** _____

SOIL PERMEABILITY DATA - Form 3B
Zone of Discharge

Municipal Borough of Bradley Beach **Block** 57 **Lot** 4
Address 615 Fifth Avenue

1 **Test Number** 1 **Replicate (Letter)** A **Date Collected** 5/20/2025

2 **Material tested:** Native Soil

3 **Type of sample:** Disturbed

4 **Sample Dimensions:**

	in	cm
Inside Radius of Sample Tube, R1:	1.25	3.18
Length of Sample, L:	6.25	15.88

5 **Bulk Density Determination (Disturb Samples Only):**

Sample weight (Wt tube containing sample - Wt empty tube) 599 grams
Sample Volume ($L * 3.14 * R1^2$) 502.49 cm^3
Bulk Density (Sample Wt/ Sample Volume) 1.19 $grams/cm^3$

6 **Stand Pipe Used** Yes

7 **Height of Water Level Above Rim of Test Basin, in inches**

At the Beginning of Each Test Interval, H1: 37.75 inches
At the End of Each Test Interval, H2: 21.75 inches

8 **Rate of Water Level Drop**

Time, Start of Test Intervals, T1	Time, End of Test Intervals, T2	Length of Test Intervals, T, min
00:00.0	00:19.2	0.32
00:00.0	00:21.0	0.35
00:00.0	00:22.2	0.37

9 **Calculation of Permeability**

K (in/hr) = (60 min/hr) x (r2/R2) x (L in) / (T min) x Ln (H1/H2)
= 60 *(0.21675 ^{2} / 1.25 ^{2})*(4.75 / 0.35)* Ln (37.8 / 21.8)
K (in/hr) = 13.50

10 **Defects in the Sample** None

11 I hereby certify that the information furnished on Form 3A of this application (and the attachments thereto) is true and accurate. I am aware the 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 Professional Engineer _____ NJPE #35687

Date 6/3/25

Application Number _____ **Date** _____

SOIL PERMEABILITY DATA - Form 3B
Zone of discharge

Municipal Borough of Bradley Beach **Block** 57 **Lot** 4
Address 615 Fifth Ave

1 **Test Number** 2 **Replicate (Letter)** B **Date Collected** 5/20/2025

2 **Material tested:** Native Soil

3 **Type of sample:** Disturbed

4 **Sample Dimensions:**

	in	cm
Inside Radius of Sample Tube, R1:	1.25	3.18
Length of Sample, L:	6.25	15.88

5 **Bulk Density Determination (Disturb Samples Only):**

Sample weight (Wt tube containing sample - Wt empty tube) 601 grams
Sample Volume (L * 3.14 * $R1^2$) 502.49 cm^3
Bulk Density (Sample Wt/ Sample Volume) 1.20 $grams/cm^3$

6 **Stand Pipe Used** Yes

7 **Height of Water Level Above Rim of Test Basin, in inches**

At the Beginning of Each Test Interval, H1: 37.375 inches
At the End of Each Test Interval, H2: 21.75 inches

8 **Rate of Water Level Drop**

Time, Start of Test Intervals, T1	Time, End of Test Intervals, T2	Length of Test Intervals, T, min
05:00.0	00:19.2	0.32
12:00.0	00:19.8	0.33
19:00.0	00:20.4	0.34

9 **Calculation of Permeability**

K (in/hr) = (60 min/hr) x (r2/R2) x (L in) / (T min) x Ln (H1/H2)
= 60 *(0.21675 ^{2} / 1.25 ^{2})*(4.75 / 0.33)* Ln (37.8 / 21.8)
K (in/hr) = 14.32

10 **Defects in the Sample** None

11 I hereby certify that the information furnished on Form 3A of this application (and the attachments thereto) is true and accurate. I am aware the 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 Professional Engineer _____ NJPE #35687

Date 10/3/25