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**The Pit Area Sidewalk Improvements, UNC Main Campus**

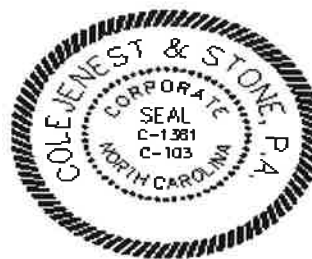
**CJS # 50395**

**CALCULATIONS FOR:**

***SILVA CELL DETENTION DESIGN***

**DATE: 01.25.16**

**REV: 03.28.16**



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<b>The Pit Area Sidewalk Improvements, UNC Main Campus</b>	
CJS PROJECT NO.:	50395
DATE: <b>01.25.16</b>	BY: <b>LJV</b>
REVISED: <b>03.28.16</b>	RVW: <b>TF</b>



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Raleigh  
Wilmington

Land Planning + Landscape Architecture + Civil Engineering + Urban Design

<u>DESCRIPTION</u>	<u>SECTION</u>
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# Section 1: Narrative

## **Stormwater Narrative**

### **Site Description**

This project is for the design & construction of sidewalk improvements to the Pit Area. The area is currently afflicted by a number of issues related to aging pavement and landscape. Differential settling of the sidewalk overtime has resulted in many tripping hazards and ponding during rainfall events. Additionally, aging trees have caused pavement upheaval and are in decline. Pedestrian congestion is an ongoing problem related to the current configuration of site walls and landscape material. This project seeks to remedy these issues.

The site is within the UNC Chapel Hill Campus and is bounded by Davis Library, Lenoir Hall, Greenlaw Hall and Bingham Hall to the North and House Undergrad Library, Daniels Student Stores, and the Graham Student Center to the South.

### **Project Description**

The proposed Pit Pedestrian Improvement Plan is an approximately 1.5 acre area located on the UNC Chapel Hill campus, Chapel Hill NC. The project consists of two principal phases; phase 1 consists primarily of demolition and construction of walls, pavers and landscaping to the area surrounding the north half of the Lenoir Dining Hall, Davis Library, Graham Student Union, and Daniels Student Stores. Phase 2 consists primarily of demolition and construction of walls, pavers and landscaping in the area surrounded by House Undergraduate Library and the Daniels Student Stores. Phase 1 will also include an underground modular soil system designed to detain runoff for the 10-year while providing water for a series of tree planters to the west of the Graham Student Union.

### **Site Conditions**

The project is located in the "Meeting of the Waters" basin, which is part of Jordan Lake watershed and the Cape Fear River basin. The project area is currently 92.5% impervious, which primarily consists of pedestrian pavers. The on-site soil is classified as "Ur" or "Urban Land" and unclassified hydrologic soil group as per the USDA's Web Soil Survey (access date Nov. 10, 2015). No USGS 'blueline' stream is indicated on the Topographic quadrangle entitled 'Chapel Hill, NC' dated 2013. The site is outside any delineated flood hazard zone as per FEMA / NFIP Flood Insurance Rate Map number 3710978800J, effective date February 2, 2007.

### **Proposed Stormwater Management Design**

Currently, The Pit experiences flooding that could be due to a number of factors. The most likely culprit is undersized drainage pipes downstream of the inlets located in the Pit. The storm pipes in the project area were videotaped by Rummel, Klepper, & Kahl, LLP to determine the existing flow paths and pipe conditions. The existing storm pipe hydraulic analysis is being studied under a separate contract and has been provided under a separate cover. This analysis shows that the pipes have capacity for the 10-

year and 25-year storm, but the ADA accessible grates are hydraulically inefficient to drain the pit. Because UNC will not make improvements to the Pit itself due to a future redesign of the area, the best solution at this time in reducing the flooding in the Pit is to provide a non-ADA drop inlet grate in the northwest corner of the pit surround on three sides by wall to limit access. The grate proposed is a beehive grate to improve hydraulic efficiency versus a standard grate configuration.

With the proposed stormwater pipe design, approximately 1.27 acres of upstream drainage area is proposed to bypass the Silva Cell. The original intent was to direct this drainage area to the proposed Silva Cell system adjacent to Graham Student Union. Further investigation revealed the existing stormwater pipe is approximately 14' deep at the Silva Cell, +/- 9' deeper than the Silva Cell. As a result, the storm pipe system is proposed to bypass the Silva Cell. The Silva Cell and the pervious pavement system above it, has a drainage area of 0.74 acres. The detention model shows the cell can detain the 10-year storm. The model also shows that the system can safely pass the 100-year storm, however a grated inlet has been provided at the Silva Cell outlet for emergency overflow.

## **Silva Cell Modeling Procedure**

The pervious pavement/silva cell system was modeled using HydroCAD Stormwater Modeling Software. HydroCAD software has the Deep Root Silva Cell system built in as a pre-fabricated structure which is beneficial for this complicated system. The drainage area to the silva cell system is 0.65 acres with a CN Value of 98 and an assumed time of concentration of 5.00 minutes.

Based on data published by the Federal Highway Administration, the permeability of pervious pavement though the open-graded No. 57 stone is approximated to be between 50 and 5000 in/hours. Although this is a large range, its infiltration rate through the storage medium will far exceed the rainfall rate, even for the 100-year storm. Accordingly, the pervious pavement was ignored in the model. The storage system was modeled as one unit including the pavement base stone, Silva Cell and underdrain stone. Exfiltration was used to outlet the underdrain stone to the 6" underdrains provided.

The system can easily detain the 10-year storm and safely pass the 100-year storm. As a precaution, the outlet control structure has a grated inlet top to allow for overflow if the system were to clogged.

## **Section 2: Water Quality Volume**

<b>NCDEQ-Water Quality Calculation</b>		 <b>ColeJenest &amp; Stone</b> <small>Charlotte Raleigh Wilmington</small> <small>Land Planning + Landscape Architecture + Civil Engineering + Urban Design</small>
<b>The Pit Area Sidewalk Improvements, UNC Main Campus</b>		
CJS PROJECT NO.:	50395	
DATE:	3/28/2016 BY: LJV	
REVISED:	RVW: TF	

**RUNOFF VOLUME CALCULATIONS**

**SIMPLE METHOD:**

$$R_v = 0.05 + 0.9 \cdot I_A$$

R<sub>v</sub> = Volumetric Runoff Coefficient (storm runoff (in)/storm rainfall (in)) - unitless

I<sub>A</sub> = Impervious Fraction (impervious portion of drainage area (ac)/ total drainage area (ac)) - unitless

$$V = 3630 \cdot R_D \cdot R_v \cdot A$$

V = Volume of runoff that must be controlled for the design storm (ft<sup>3</sup>)

R<sub>D</sub> = Design Storm Rainfall Depth (in)

A = Watershed area (ac)

("Simple Method" - Schueler, 1987)

(NCDENR Stormwater BMP Manual 07/02/07; pg 3-3)

I <sub>A</sub> =	1	Impervious Fraction
R <sub>v</sub> =	0.95	Runoff Coefficient
A =	0.72	Watershed area (ac)
R <sub>D</sub> =	1	Design Storm Rainfall Depth (in)
V =	2482.92	Volume of Runoff (ft <sup>3</sup> )

**Silva Cell Volume**

120 Chambers x 3.9 cf =	468.2 cf of Chamber storage
120 Chambers x 21.2 cf =	2544.4 cf of Displacement
1319.d cf of Stone x 40% voids =	527.8 cf of Stone Storage

**Total Storage Provided =** 3540.400 cf

**UNDERDRAIN SIZING - Based on Bioretention criteria provided in NCDEQ BMP manual**

\*Underdrain required if the in-situ soil permeability is less than 2 in/hr.

Cleanouts must be provided every 1,000 SF of surface area.

Minimum pipe diameter = 4inches.

Min slope of 1% required

**Water Draw Through Rate:**

Darcy's Equation:

$$Q = (.0000232) \cdot K \cdot A \cdot (H/L)$$

Q = 0.0660 cfs
----------------

Where:

Q = Flow (Rate of Draw) through Bioretention Soil (cfs)

K = Hydraulic Conductivity of soil (in./hr.) ( Use 1"/Hour)

A = Surface Area of Bio-Retention Area (SF) =

2845 SF

H = Height of Water above Drainage Pipe (Underdrain)

= 4 FT

L = Thickness of Soil Bed (Usually 4' )

= 4 FT

Assume ( H/L ) ~ 1

Source: (NCSU Rain Garden Design Worksheet, Bill Hunt)

**Time to Drawdown water from Inundation to Saturation at Surface:**

Volume/Q:

0 Seconds
0.0 Hours to Saturation

**Time to lower Water Table to 2.0 feet below surface:**

Assume 45% Porosity

Volume = Area x 2' x 0.45

= 2560.5 Cubic Feet

= 38793 Seconds

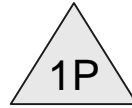
10.8 Hours to Lower Water 2' below surface
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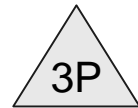
## **Section 3: Silva Cell Detention Modeling**



Drainage Area



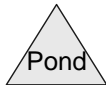
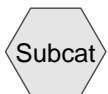
Porous Pavement



Underdrains



Silva Cell



**Routing Diagram for Silva Cell**

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## Silva Cell

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### Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.740	98	(2S)
<b>0.740</b>	<b>98</b>	<b>TOTAL AREA</b>

# Silva Cell

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## Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.740	Other	2S
<b>0.740</b>		<b>TOTAL AREA</b>

**Silva Cell**

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**Ground Covers (all nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	0.740	0.740		2S
<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.740</b>	<b>0.740</b>	<b>TOTAL AREA</b>	

## Silva Cell

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### Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	2P	365.23	365.00	10.5	0.0219	0.013	18.0	0.0	0.0
2	2P	365.46	365.23	94.0	0.0024	0.011	6.0	0.0	0.0

**Silva Cell**

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Type II 24-hr 1-year Rainfall=3.00"

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Time span=1.00-50.00 hrs, dt=0.05 hrs, 981 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 2S: Drainage Area**

Runoff Area=0.740 ac 100.00% Impervious Runoff Depth=2.77"  
Tc=5.0 min CN=98 Runoff=3.17 cfs 0.171 af

**Pond 1P: Porous Pavement**

Peak Elev=0.00' Storage=0 cf  
Primary=0.00 cfs 0.000 af

**Pond 2P: Silva Cell**

Peak Elev=368.30' Storage=1,289 cf Inflow=3.17 cfs 0.171 af  
Outflow=3.02 cfs 0.171 af

**Pond 3P: Underdrains**

Peak Elev=0.00' Storage=0.000 af  
Primary=0.00 cfs 0.000 af

**Total Runoff Area = 0.740 ac Runoff Volume = 0.171 af Average Runoff Depth = 2.77"**  
**0.00% Pervious = 0.000 ac 100.00% Impervious = 0.740 ac**

### Summary for Subcatchment 2S: Drainage Area

[49] Hint:  $T_c < 2dt$  may require smaller dt

Runoff = 3.17 cfs @ 11.95 hrs, Volume= 0.171 af, Depth= 2.77"

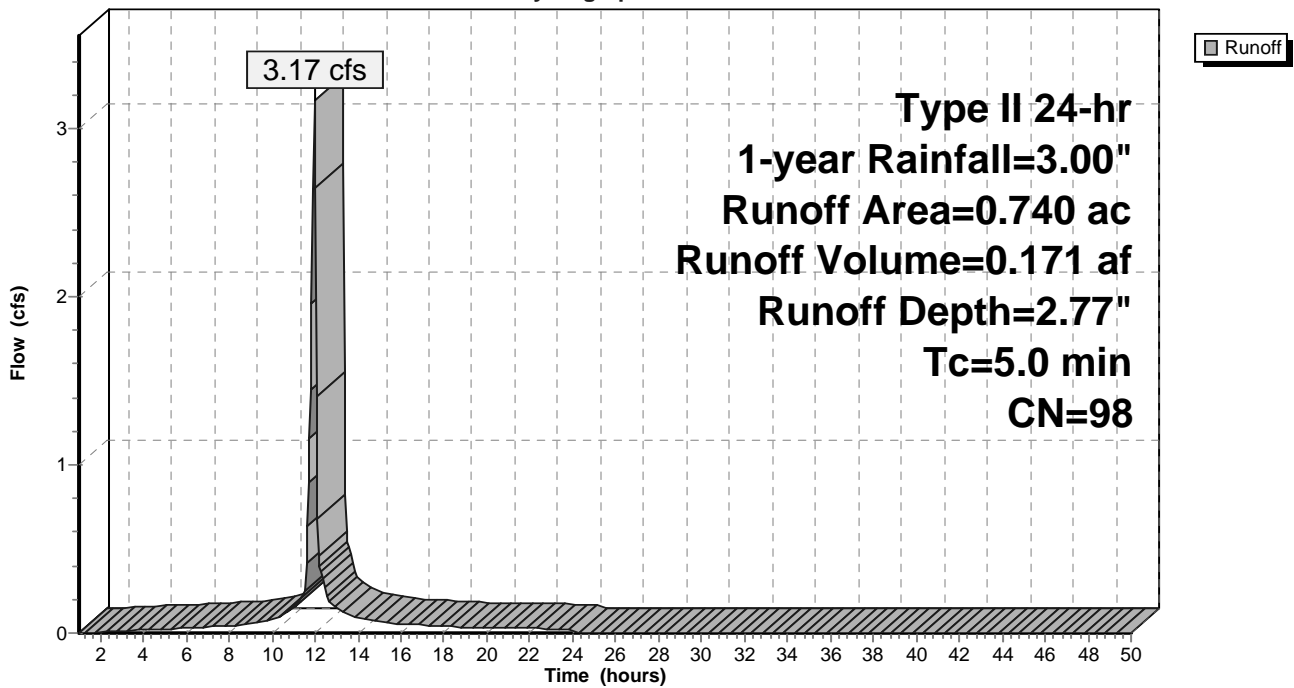
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-50.00 hrs, dt= 0.05 hrs  
 Type II 24-hr 1-year Rainfall=3.00"

Area (ac)	CN	Description
* 0.740	98	
0.740		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

### Subcatchment 2S: Drainage Area

Hydrograph





**Hydrograph for Subcatchment 2S: Drainage Area**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.03	0.00	0.00	27.50	3.00	2.77	0.00
1.50	0.05	0.00	0.00	28.00	3.00	2.77	0.00
2.00	0.07	0.00	0.01	28.50	3.00	2.77	0.00
2.50	0.08	0.01	0.01	29.00	3.00	2.77	0.00
3.00	0.10	0.01	0.01	29.50	3.00	2.77	0.00
3.50	0.12	0.02	0.01	30.00	3.00	2.77	0.00
4.00	0.14	0.03	0.02	30.50	3.00	2.77	0.00
4.50	0.17	0.05	0.02	31.00	3.00	2.77	0.00
5.00	0.19	0.06	0.02	31.50	3.00	2.77	0.00
5.50	0.21	0.08	0.03	32.00	3.00	2.77	0.00
6.00	0.24	0.10	0.03	32.50	3.00	2.77	0.00
6.50	0.27	0.12	0.03	33.00	3.00	2.77	0.00
7.00	0.30	0.14	0.04	33.50	3.00	2.77	0.00
7.50	0.33	0.17	0.04	34.00	3.00	2.77	0.00
8.00	0.36	0.19	0.04	34.50	3.00	2.77	0.00
8.50	0.40	0.23	0.05	35.00	3.00	2.77	0.00
9.00	0.44	0.27	0.06	35.50	3.00	2.77	0.00
9.50	0.49	0.31	0.06	36.00	3.00	2.77	0.00
10.00	0.54	0.36	0.08	36.50	3.00	2.77	0.00
10.50	0.61	0.42	0.10	37.00	3.00	2.77	0.00
11.00	0.71	0.51	0.15	37.50	3.00	2.77	0.00
11.50	0.85	0.65	<b>0.24</b>	38.00	3.00	2.77	0.00
12.00	1.99	1.76	<b>2.64</b>	38.50	3.00	2.77	0.00
12.50	2.20	1.98	0.23	39.00	3.00	2.77	0.00
13.00	2.32	2.09	0.14	39.50	3.00	2.77	0.00
13.50	2.40	2.17	0.11	40.00	3.00	2.77	0.00
14.00	2.46	2.23	0.09	40.50	3.00	2.77	0.00
14.50	2.51	2.28	0.08	41.00	3.00	2.77	0.00
15.00	2.56	2.33	0.07	41.50	3.00	2.77	0.00
15.50	2.60	2.37	0.06	42.00	3.00	2.77	0.00
16.00	2.64	2.41	0.05	42.50	3.00	2.77	0.00
16.50	2.67	2.44	0.05	43.00	3.00	2.77	0.00
17.00	2.71	2.47	0.05	43.50	3.00	2.77	0.00
17.50	2.74	2.50	0.04	44.00	3.00	2.77	0.00
18.00	2.76	2.53	0.04	44.50	3.00	2.77	0.00
18.50	2.79	2.56	0.04	45.00	3.00	2.77	0.00
19.00	2.81	2.58	0.03	45.50	3.00	2.77	0.00
19.50	2.84	2.60	0.03	46.00	3.00	2.77	0.00
20.00	2.86	2.62	0.03	46.50	3.00	2.77	0.00
20.50	2.88	2.64	0.03	47.00	3.00	2.77	0.00
21.00	2.89	2.66	0.03	47.50	3.00	2.77	0.00
21.50	2.91	2.68	0.03	48.00	3.00	2.77	0.00
22.00	2.93	2.70	0.03	48.50	3.00	2.77	0.00
22.50	2.95	2.72	0.03	49.00	3.00	2.77	0.00
23.00	2.97	2.73	0.03	49.50	3.00	2.77	0.00
23.50	2.98	2.75	0.03	50.00	3.00	2.77	0.00
24.00	<b>3.00</b>	<b>2.77</b>	0.02				
24.50	3.00	2.77	0.00				
25.00	3.00	2.77	0.00				
25.50	3.00	2.77	0.00				
26.00	3.00	2.77	0.00				
26.50	3.00	2.77	0.00				
27.00	3.00	2.77	0.00				

**Summary for Pond 1P: Porous Pavement**

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	368.50'	3,633 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

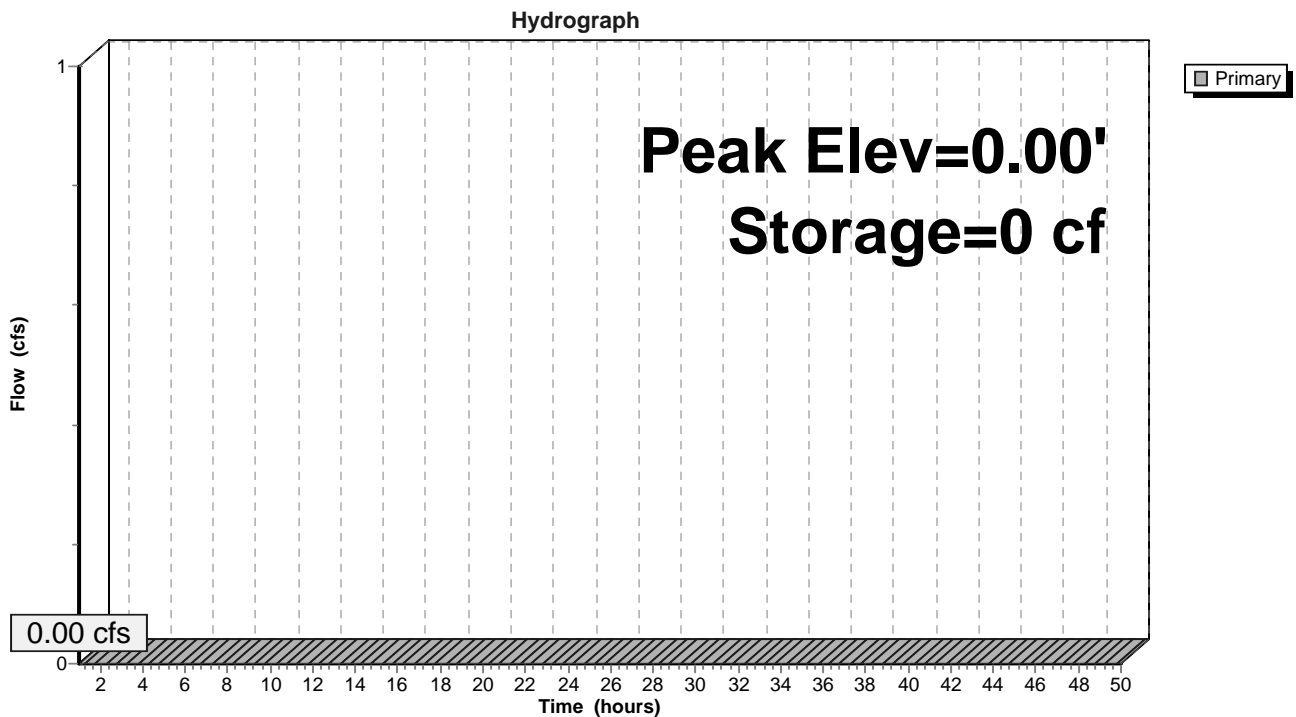
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
368.50	2,496	0.0	0	0
369.00	2,496	40.0	499	499
369.33	2,496	30.0	247	746
369.50	2,496	20.0	85	831
370.00	8,712	100.0	2,802	3,633

Device	Routing	Invert	Outlet Devices
#1	Primary	368.50'	<b>10.000 in/hr Exfiltration over Surface area above 368.50'</b> Conductivity to Groundwater Elevation = 0.00' Excluded Surface area = 2,496 sf

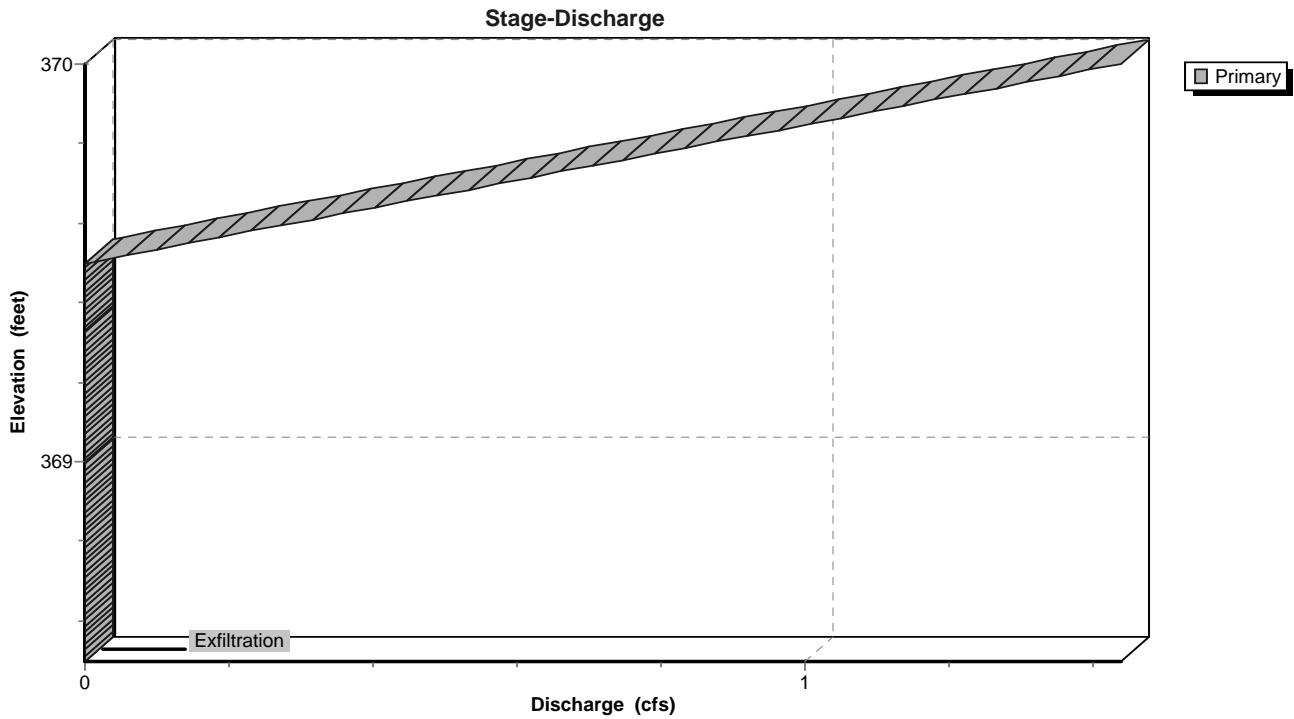
**Primary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=0.00' (Free Discharge)

←1=Exfiltration ( Controls 0.00 cfs)

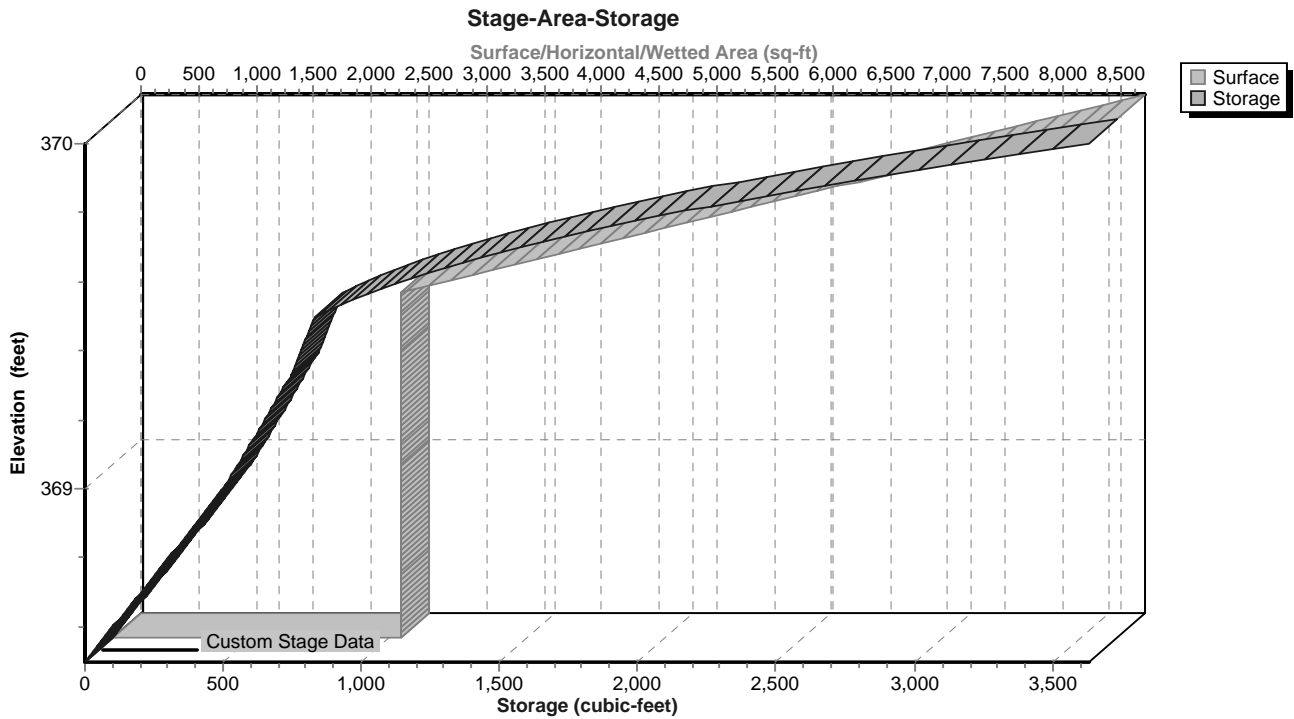
**Pond 1P: Porous Pavement**



### Pond 1P: Porous Pavement



### Pond 1P: Porous Pavement



**Stage-Discharge for Pond 1P: Porous Pavement**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
368.50	0.00	369.03	0.00	369.56	0.17
368.51	0.00	369.04	0.00	369.57	0.20
368.52	0.00	369.05	0.00	369.58	0.23
368.53	0.00	369.06	0.00	369.59	0.26
368.54	0.00	369.07	0.00	369.60	0.29
368.55	0.00	369.08	0.00	369.61	0.32
368.56	0.00	369.09	0.00	369.62	0.35
368.57	0.00	369.10	0.00	369.63	0.37
368.58	0.00	369.11	0.00	369.64	0.40
368.59	0.00	369.12	0.00	369.65	0.43
368.60	0.00	369.13	0.00	369.66	0.46
368.61	0.00	369.14	0.00	369.67	0.49
368.62	0.00	369.15	0.00	369.68	0.52
368.63	0.00	369.16	0.00	369.69	0.55
368.64	0.00	369.17	0.00	369.70	0.58
368.65	0.00	369.18	0.00	369.71	0.60
368.66	0.00	369.19	0.00	369.72	0.63
368.67	0.00	369.20	0.00	369.73	0.66
368.68	0.00	369.21	0.00	369.74	0.69
368.69	0.00	369.22	0.00	369.75	0.72
368.70	0.00	369.23	0.00	369.76	0.75
368.71	0.00	369.24	0.00	369.77	0.78
368.72	0.00	369.25	0.00	369.78	0.81
368.73	0.00	369.26	0.00	369.79	0.83
368.74	0.00	369.27	0.00	369.80	0.86
368.75	0.00	369.28	0.00	369.81	0.89
368.76	0.00	369.29	0.00	369.82	0.92
368.77	0.00	369.30	0.00	369.83	0.95
368.78	0.00	369.31	0.00	369.84	0.98
368.79	0.00	369.32	0.00	369.85	1.01
368.80	0.00	369.33	0.00	369.86	1.04
368.81	0.00	369.34	0.00	369.87	1.07
368.82	0.00	369.35	0.00	369.88	1.09
368.83	0.00	369.36	0.00	369.89	1.12
368.84	0.00	369.37	0.00	369.90	1.15
368.85	0.00	369.38	0.00	369.91	1.18
368.86	0.00	369.39	0.00	369.92	1.21
368.87	0.00	369.40	0.00	369.93	1.24
368.88	0.00	369.41	0.00	369.94	1.27
368.89	0.00	369.42	0.00	369.95	1.30
368.90	0.00	369.43	0.00	369.96	1.32
368.91	0.00	369.44	0.00	369.97	1.35
368.92	0.00	369.45	0.00	369.98	1.38
368.93	0.00	369.46	0.00	369.99	1.41
368.94	0.00	369.47	0.00	370.00	<b>1.44</b>
368.95	0.00	369.48	0.00		
368.96	0.00	369.49	0.00		
368.97	0.00	369.50	0.00		
368.98	0.00	369.51	0.03		
368.99	0.00	369.52	0.06		
369.00	0.00	369.53	0.09		
369.01	0.00	369.54	0.12		
369.02	0.00	369.55	0.14		

**Stage-Area-Storage for Pond 1P: Porous Pavement**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
368.50	2,496	0	369.56	3,242	1,003
368.52	2,496	20	369.58	3,491	1,071
368.54	2,496	40	369.60	3,739	1,143
368.56	2,496	60	369.62	3,988	1,220
368.58	2,496	80	369.64	4,236	1,302
368.60	2,496	100	369.66	4,485	1,390
368.62	2,496	120	369.68	4,734	1,482
368.64	2,496	140	369.70	4,982	1,579
368.66	2,496	160	369.72	5,231	1,681
368.68	2,496	180	369.74	5,480	1,788
368.70	2,496	200	369.76	5,728	1,900
368.72	2,496	220	369.78	5,977	2,017
368.74	2,496	240	369.80	6,226	2,139
368.76	2,496	260	369.82	6,474	2,266
368.78	2,496	280	369.84	6,723	2,398
368.80	2,496	300	369.86	6,972	2,535
368.82	2,496	319	369.88	7,220	2,677
368.84	2,496	339	369.90	7,469	2,824
368.86	2,496	359	369.92	7,717	2,976
368.88	2,496	379	369.94	7,966	3,133
368.90	2,496	399	369.96	8,215	3,295
368.92	2,496	419	369.98	8,463	3,461
368.94	2,496	439	370.00	<b>8,712</b>	<b>3,633</b>
368.96	2,496	459			
368.98	2,496	479			
369.00	2,496	499			
369.02	2,496	514			
369.04	2,496	529			
369.06	2,496	544			
369.08	2,496	559			
369.10	2,496	574			
369.12	2,496	589			
369.14	2,496	604			
369.16	2,496	619			
369.18	2,496	634			
369.20	2,496	649			
369.22	2,496	664			
369.24	2,496	679			
369.26	2,496	694			
369.28	2,496	709			
369.30	2,496	724			
369.32	2,496	739			
369.34	2,496	751			
369.36	2,496	761			
369.38	2,496	771			
369.40	2,496	781			
369.42	2,496	791			
369.44	2,496	801			
369.46	2,496	811			
369.48	2,496	821			
369.50	2,496	831			
369.52	2,745	884			
369.54	2,993	941			

**Silva Cell**

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**Summary for Pond 2P: Silva Cell**

Inflow Area = 0.740 ac, 100.00% Impervious, Inflow Depth = 2.77" for 1-year event  
 Inflow = 3.17 cfs @ 11.95 hrs, Volume= 0.171 af  
 Outflow = 3.02 cfs @ 11.99 hrs, Volume= 0.171 af, Atten= 5%, Lag= 2.6 min  
 Primary = 3.02 cfs @ 11.99 hrs, Volume= 0.171 af

Routing by Stor-Ind method, Time Span= 1.00-50.00 hrs, dt= 0.05 hrs  
 Peak Elev= 368.30' @ 11.99 hrs Surf.Area= 3,055 sf Storage= 1,289 cf

Plug-Flow detention time= 20.8 min calculated for 0.171 af (100% of inflow)  
 Center-of-Mass det. time= 21.4 min ( 774.3 - 753.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	369.00'	998 cf	<b>24.00'W x 104.00'L x 1.00'H Pavement Stone</b> 2,496 cf Overall x 40.0% Voids
#2A	366.00'	528 cf	<b>12.30'W x 80.33'L x 2.58'H Field A Z=2.0</b> 3,864 cf Overall - 2,544 cf Embedded = 1,319 cf x 40.0% Voids
#3A	366.00'	468 cf	<b>DeepRoot Silva Cell 20% x2 x 120 Inside #2</b> Inside= 24.6"W x 30.9"H => 0.97 sf x 4.02'L = 3.9 cf Outside= 24.6"W x 30.9"H => 5.28 sf x 4.02'L = 21.2 cf 6 Rows of 20 Chambers
#4	365.46'	451 cf	<b>12.00'W x 94.00'L x 1.00'H Underdrain</b> 1,128 cf Overall x 40.0% Voids
		2,446 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	365.23'	<b>18.0" Round Culvert</b> L= 10.5' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 365.23' / 365.00' S= 0.0219 1/1 Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	365.46'	<b>8.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	367.96'	<b>3.5' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 2	365.46'	<b>6.0" Round Culvert</b> L= 94.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 365.46' / 365.23' S= 0.0024 1/1 Cc= 0.900 n= 0.011, Flow Area= 0.20 sf

**Primary OutFlow** Max=2.91 cfs @ 11.99 hrs HW=368.29' (Free Discharge)

1=Culvert (Passes 2.91 cfs of 16.09 cfs potential flow)  
 2=Orifice/Grate (Passes 0.99 cfs of 2.58 cfs potential flow)  
 4=Culvert (Barrel Controls 0.99 cfs @ 5.03 fps)  
 3=Broad-Crested Rectangular Weir (Weir Controls 1.92 cfs @ 1.66 fps)

## Silva Cell

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### Pond 2P: Silva Cell - Chamber Wizard Field A

**Chamber Model = DeepRoot Silva Cell 20% x2 (Silva Cell +1", Bioretention Soil, 20% Voids, 2 Deep)**

Inside= 24.6"W x 30.9"H => 0.97 sf x 4.02'L = 3.9 cf

Outside= 24.6"W x 30.9"H => 5.28 sf x 4.02'L = 21.2 cf

20 Chambers/Row x 4.02' Long = 80.33' Row Length

6 Rows x 24.6" Wide = 12.30' Base Width

30.9" Chamber Height = 2.58' Field Height

2.0 ' Side-Z x Height = 61.8" Flare/Side

Base Length + Flare x 2 = 90.63' Top Length

Base Width + Flare x 2 = 22.60' Top Width

120 Chambers x 3.9 cf = 468.2 cf Chamber Storage

120 Chambers x 21.2 cf = 2,544.4 cf Displacement

3,863.9 cf Field - 2,544.4 cf Chambers = 1,319.5 cf Stone x 40.0% Voids = 527.8 cf Stone Storage

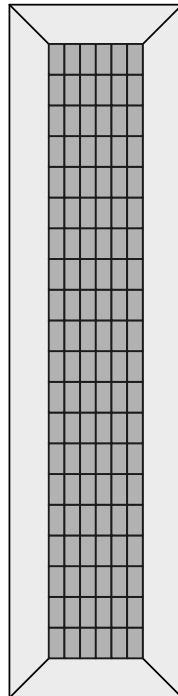
Chamber Storage + Stone Storage = 996.0 cf = 0.023 af

Overall Storage Efficiency = 25.8%

120 Chambers

143.1 cy Field

48.9 cy Stone



# Silva Cell

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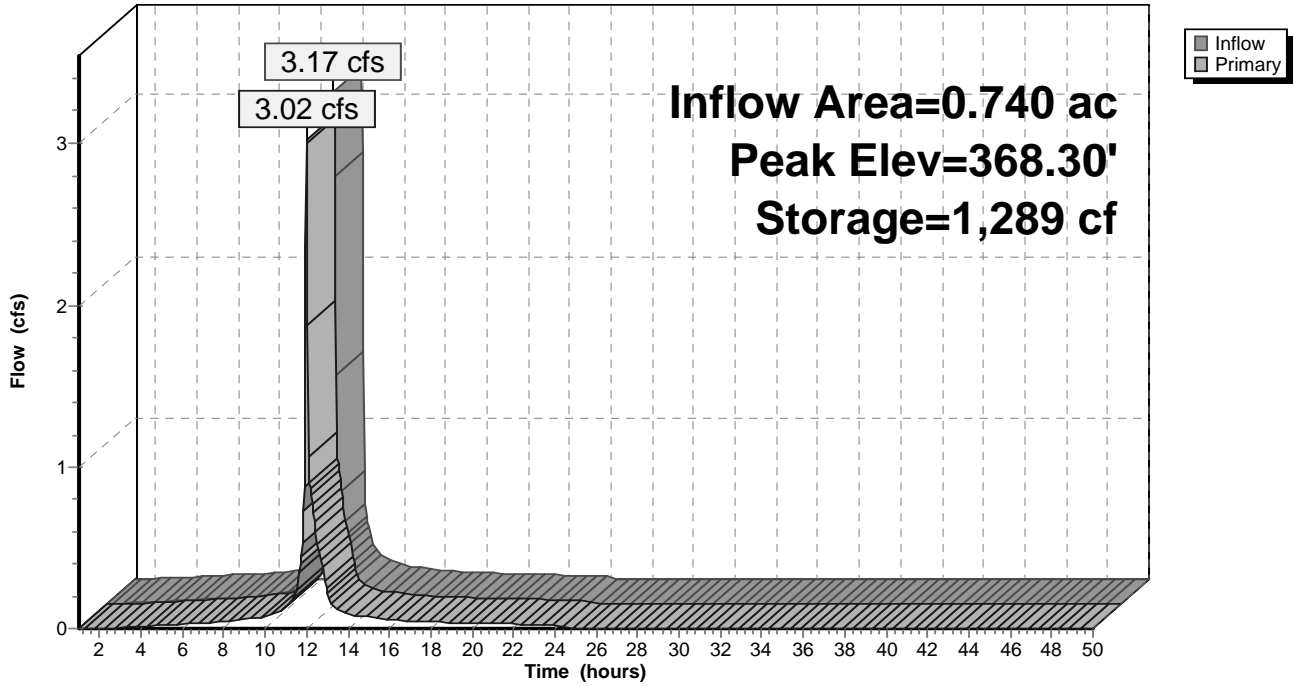
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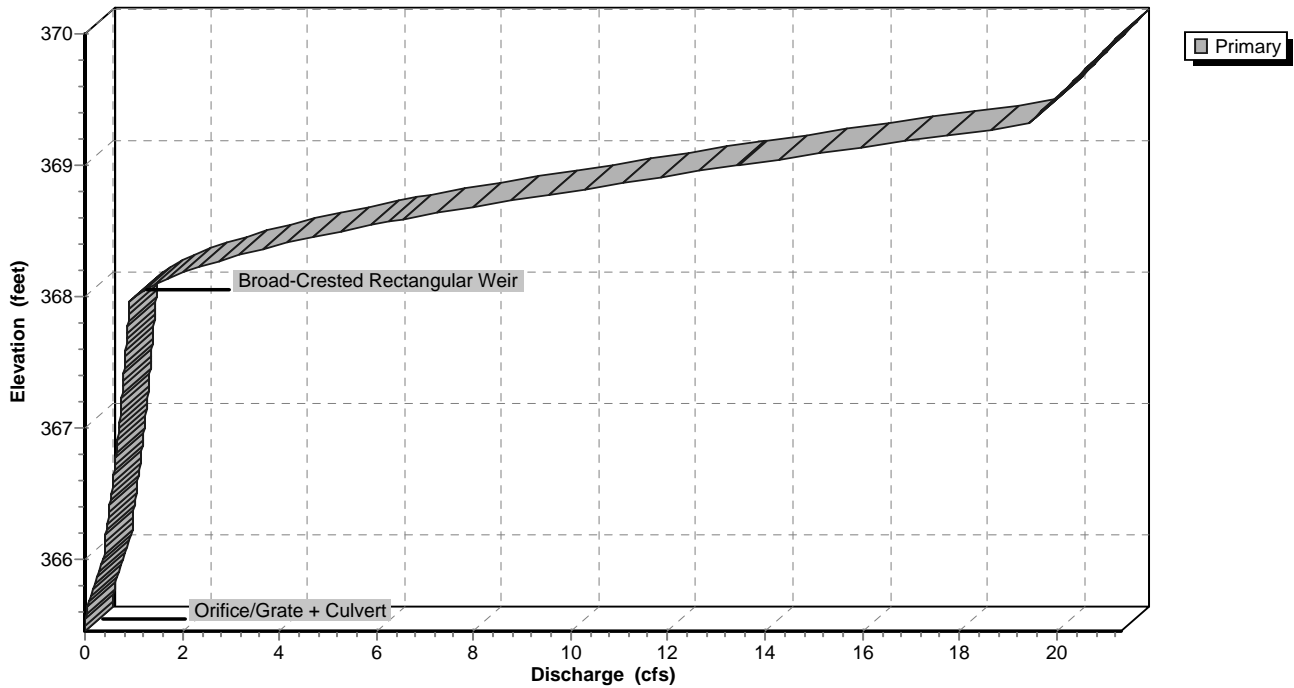
## Pond 2P: Silva Cell

Hydrograph



## Pond 2P: Silva Cell

Stage-Discharge





# Silva Cell

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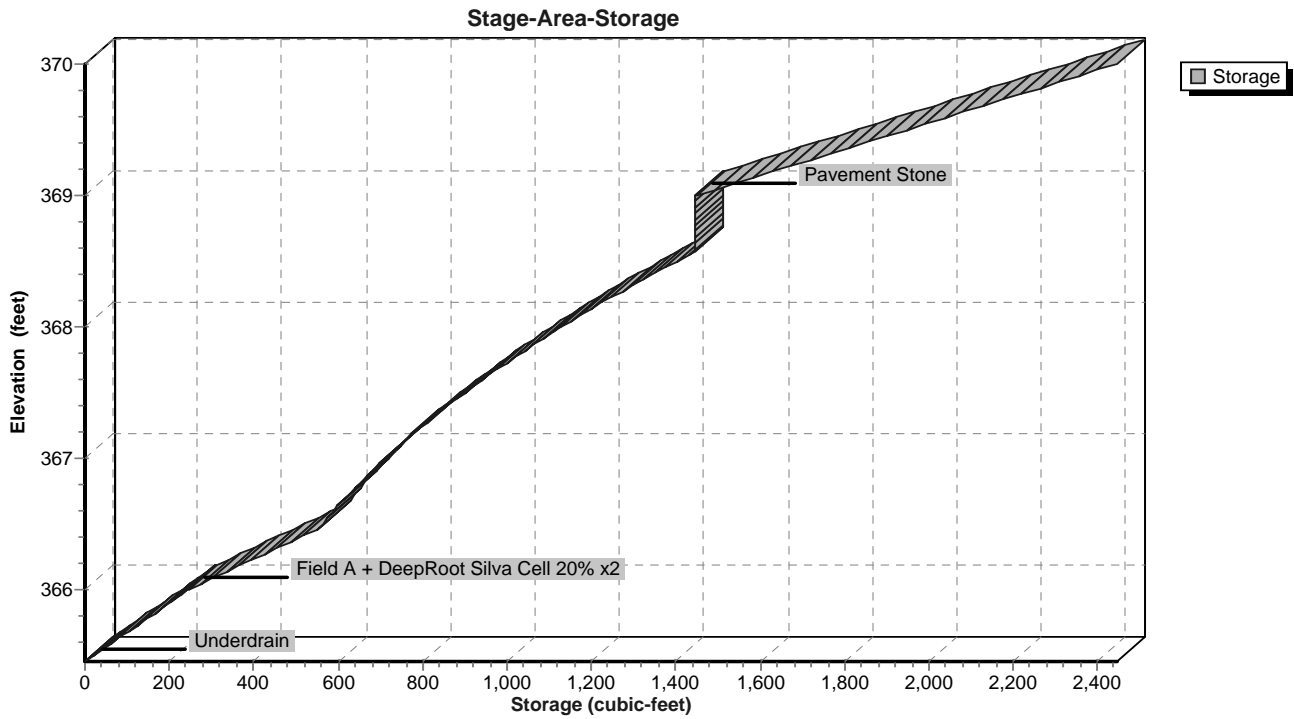
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## Pond 2P: Silva Cell



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**Hydrograph for Pond 2P: Silva Cell**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	365.46	0.00
2.00	0.01	6	365.47	0.00
3.00	0.01	30	365.53	0.00
4.00	0.02	50	365.57	0.01
5.00	0.02	59	365.59	0.02
6.00	0.03	67	365.61	0.03
7.00	0.04	72	365.62	0.03
8.00	0.04	78	365.63	0.04
9.00	0.06	91	365.66	0.06
10.00	0.08	101	365.68	0.07
11.00	<b>0.15</b>	132	365.75	0.13
12.00	<b>2.64</b>	<b>1,288</b>	<b>368.30</b>	<b>3.00</b>
13.00	0.14	171	365.84	0.22
14.00	0.09	111	365.71	0.09
15.00	0.07	99	365.68	0.07
16.00	0.05	89	365.66	0.06
17.00	0.05	84	365.65	0.05
18.00	0.04	79	365.64	0.04
19.00	0.03	74	365.63	0.04
20.00	0.03	69	365.61	0.03
21.00	0.03	67	365.61	0.03
22.00	0.03	66	365.61	0.03
23.00	0.03	65	365.60	0.03
24.00	0.02	64	365.60	0.02
25.00	0.00	30	365.53	0.00
26.00	0.00	21	365.51	0.00
27.00	0.00	16	365.50	0.00
28.00	0.00	13	365.49	0.00
29.00	0.00	10	365.48	0.00
30.00	0.00	8	365.48	0.00
31.00	0.00	6	365.47	0.00
32.00	0.00	5	365.47	0.00
33.00	0.00	4	365.47	0.00
34.00	0.00	3	365.47	0.00
35.00	0.00	3	365.47	0.00
36.00	0.00	2	365.46	0.00
37.00	0.00	2	365.46	0.00
38.00	0.00	1	365.46	0.00
39.00	0.00	1	365.46	0.00
40.00	0.00	1	365.46	0.00
41.00	0.00	1	365.46	0.00
42.00	0.00	0	365.46	0.00
43.00	0.00	0	365.46	0.00
44.00	0.00	0	365.46	0.00
45.00	0.00	0	365.46	0.00
46.00	0.00	0	365.46	0.00
47.00	0.00	0	365.46	0.00
48.00	0.00	0	365.46	0.00
49.00	0.00	0	365.46	0.00
50.00	0.00	0	365.46	0.00

**Silva Cell**

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**Stage-Discharge for Pond 2P: Silva Cell**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
365.46	0.00	368.11	1.52
365.51	0.00	368.16	1.84
365.56	0.01	368.21	2.21
365.61	0.03	368.26	2.63
365.66	0.06	368.31	3.09
365.71	0.09	368.36	3.59
365.76	0.14	368.41	4.14
365.81	0.19	368.46	4.73
365.86	0.23	368.51	5.37
365.91	0.28	368.56	6.05
365.96	0.33	368.61	6.80
366.01	0.37	368.66	7.59
366.06	0.40	368.71	8.44
366.11	0.41	368.76	9.34
366.16	0.40	368.81	10.15
366.21	0.43	368.86	10.98
366.26	0.45	368.91	11.84
366.31	0.47	368.96	12.73
366.36	0.49	369.01	13.62
366.41	0.51	369.06	14.53
366.46	0.53	369.11	15.46
366.51	0.54	369.16	16.42
366.56	0.56	369.21	17.39
366.61	0.58	369.26	18.38
366.66	0.59	369.31	19.39
366.71	0.61	369.36	19.55
366.76	0.63	369.41	19.70
366.81	0.64	369.46	19.84
366.86	0.66	369.51	19.98
366.91	0.67	369.56	20.12
366.96	0.68	369.61	20.26
367.01	0.70	369.66	20.40
367.06	0.71	369.71	20.54
367.11	0.72	369.76	20.68
367.16	0.74	369.81	20.81
367.21	0.75	369.86	20.95
367.26	0.76	369.91	21.08
367.31	0.78	369.96	<b>21.22</b>
367.36	0.79		
367.41	0.80		
367.46	0.81		
367.51	0.82		
367.56	0.83		
367.61	0.85		
367.66	0.86		
367.71	0.87		
367.76	0.88		
367.81	0.89		
367.86	0.90		
367.91	0.91		
367.96	0.92		
368.01	1.04		
368.06	1.25		

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**Stage-Area-Storage for Pond 2P: Silva Cell**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
365.46	0	368.11	1,185
365.51	23	368.16	1,211
365.56	45	368.21	1,238
365.61	68	368.26	1,265
365.66	90	368.31	1,293
365.71	113	368.36	1,321
365.76	135	368.41	1,350
365.81	158	368.46	1,379
365.86	180	368.51	1,408
365.91	203	368.56	1,438
365.96	226	368.61	1,447
366.01	250	368.66	1,447
366.06	282	368.71	1,447
366.11	314	368.76	1,447
366.16	347	368.81	1,447
366.21	380	368.86	1,447
366.26	413	368.91	1,447
366.31	447	368.96	1,447
366.36	481	369.01	1,457
366.41	516	369.06	1,507
366.46	551	369.11	1,557
366.51	563	369.16	1,607
366.56	577	369.21	1,657
366.61	590	369.26	1,707
366.66	604	369.31	1,757
366.71	618	369.36	1,807
366.76	633	369.41	1,857
366.81	648	369.46	1,906
366.86	664	369.51	1,956
366.91	680	369.56	2,006
366.96	696	369.61	2,056
367.01	713	369.66	2,106
367.06	730	369.71	2,156
367.11	747	369.76	2,206
367.16	765	369.81	2,256
367.21	783	369.86	2,306
367.26	802	369.91	2,356
367.31	821	369.96	<b>2,406</b>
367.36	841		
367.41	861		
367.46	881		
367.51	902		
367.56	923		
367.61	945		
367.66	967		
367.71	989		
367.76	1,012		
367.81	1,036		
367.86	1,059		
367.91	1,084		
367.96	1,108		
368.01	1,133		
368.06	1,159		

### Summary for Pond 3P: Underdrains

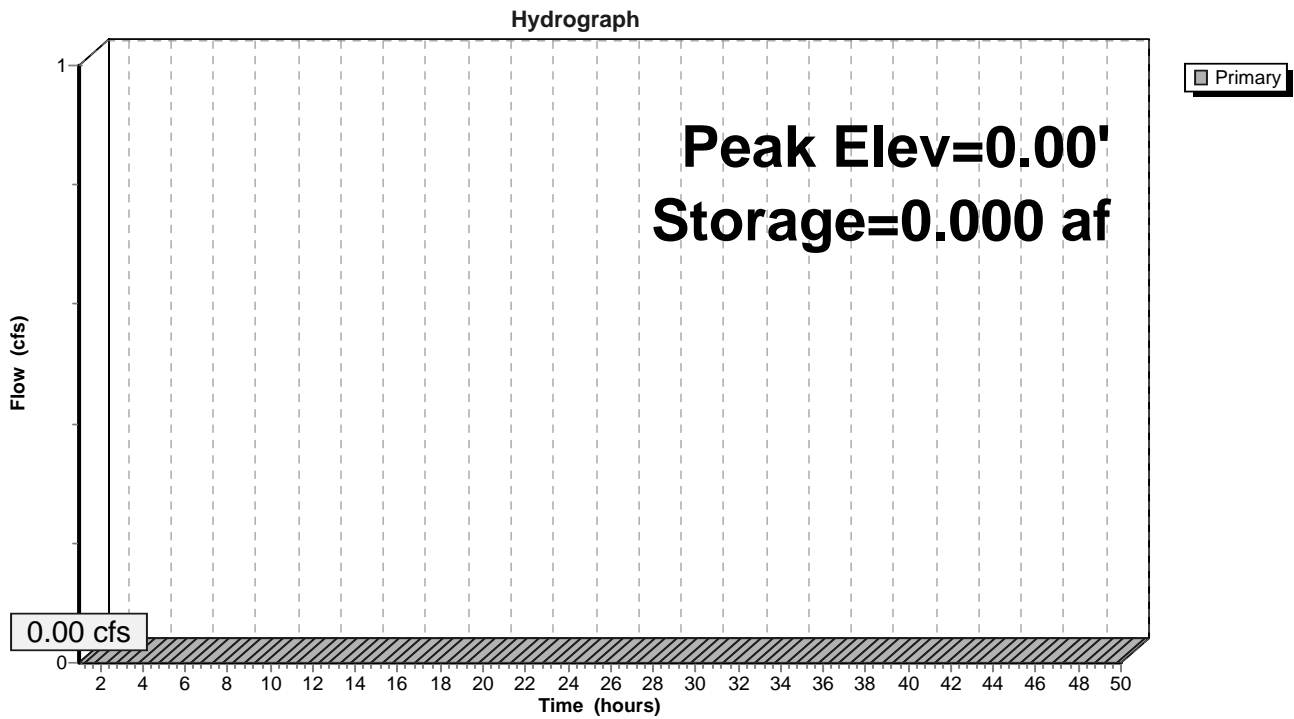
[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	366.00'	0.010 af	<b>12.00'W x 94.00'L x 1.00'H Prismatic</b> 0.026 af Overall x 40.0% Voids

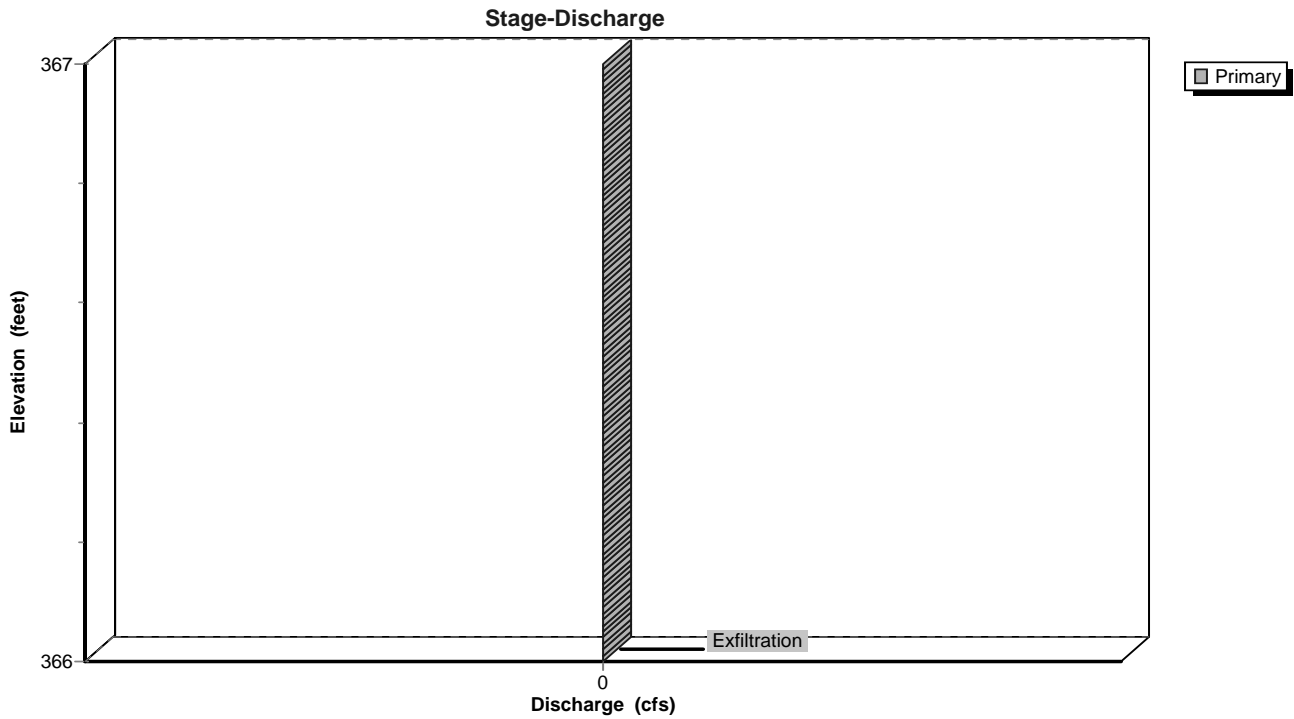
Device	Routing	Invert	Outlet Devices
#1	Primary	366.00'	<b>10.000 in/hr Exfiltration over Surface area above 366.00'</b> Conductivity to Groundwater Elevation = 0.00' Excluded Surface area = 0.026 ac

**Primary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=0.00' (Free Discharge)  
 ↳ **1=Exfiltration** ( Controls 0.00 cfs)

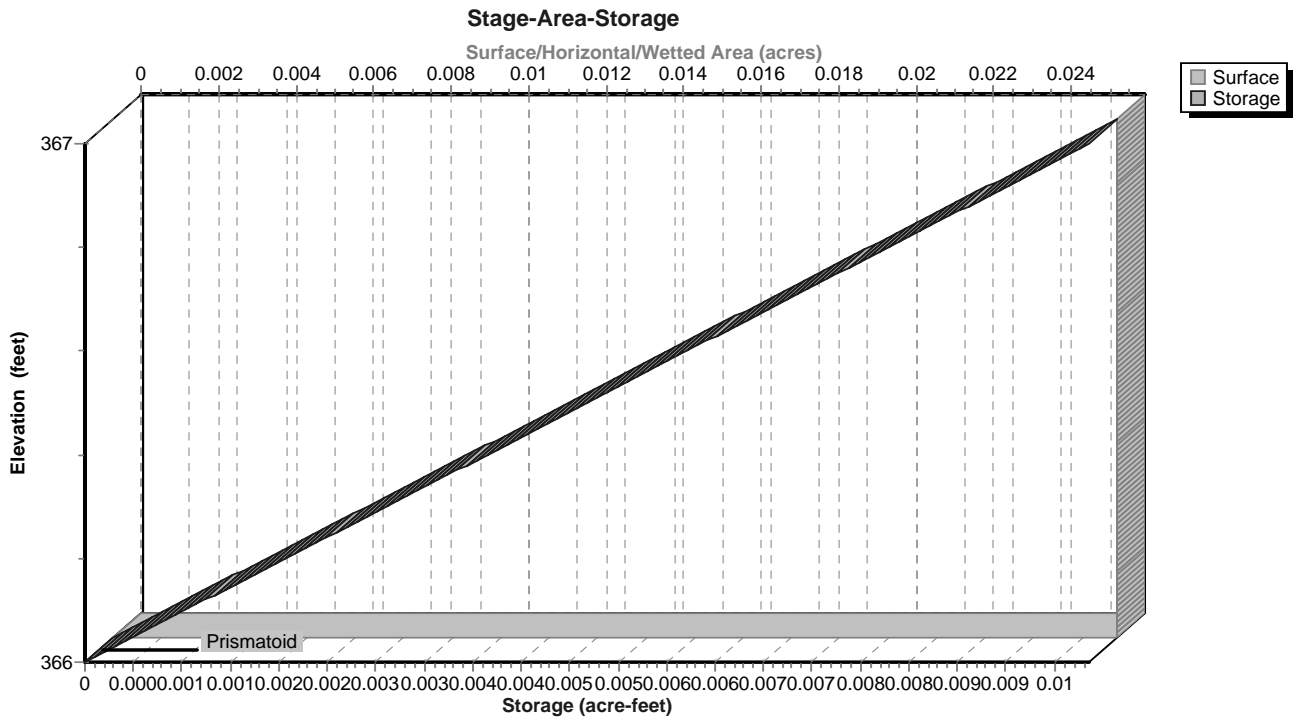
### Pond 3P: Underdrains



### Pond 3P: Underdrains



### Pond 3P: Underdrains



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**Stage-Discharge for Pond 3P: Underdrains**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
366.00	<b>0.00</b>	366.53	0.00
366.01	0.00	366.54	0.00
366.02	0.00	366.55	0.00
366.03	0.00	366.56	0.00
366.04	0.00	366.57	0.00
366.05	0.00	366.58	0.00
366.06	0.00	366.59	0.00
366.07	0.00	366.60	0.00
366.08	0.00	366.61	0.00
366.09	0.00	366.62	0.00
366.10	0.00	366.63	0.00
366.11	0.00	366.64	0.00
366.12	0.00	366.65	0.00
366.13	0.00	366.66	0.00
366.14	0.00	366.67	0.00
366.15	0.00	366.68	0.00
366.16	0.00	366.69	0.00
366.17	0.00	366.70	0.00
366.18	0.00	366.71	0.00
366.19	0.00	366.72	0.00
366.20	0.00	366.73	0.00
366.21	0.00	366.74	0.00
366.22	0.00	366.75	0.00
366.23	0.00	366.76	0.00
366.24	0.00	366.77	0.00
366.25	0.00	366.78	0.00
366.26	0.00	366.79	0.00
366.27	0.00	366.80	0.00
366.28	0.00	366.81	0.00
366.29	0.00	366.82	0.00
366.30	0.00	366.83	0.00
366.31	0.00	366.84	0.00
366.32	0.00	366.85	0.00
366.33	0.00	366.86	0.00
366.34	0.00	366.87	0.00
366.35	0.00	366.88	0.00
366.36	0.00	366.89	0.00
366.37	0.00	366.90	0.00
366.38	0.00	366.91	0.00
366.39	0.00	366.92	0.00
366.40	0.00	366.93	0.00
366.41	0.00	366.94	0.00
366.42	0.00	366.95	0.00
366.43	0.00	366.96	0.00
366.44	0.00	366.97	0.00
366.45	0.00	366.98	0.00
366.46	0.00	366.99	0.00
366.47	0.00	367.00	0.00
366.48	0.00		
366.49	0.00		
366.50	0.00		
366.51	0.00		
366.52	0.00		

**Stage-Area-Storage for Pond 3P: Underdrains**

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
366.00	<b>0.026</b>	0.000	366.53	0.026	0.005
366.01	0.026	0.000	366.54	0.026	0.006
366.02	0.026	0.000	366.55	0.026	0.006
366.03	0.026	0.000	366.56	0.026	0.006
366.04	0.026	0.000	366.57	0.026	0.006
366.05	0.026	0.001	366.58	0.026	0.006
366.06	0.026	0.001	366.59	0.026	0.006
366.07	0.026	0.001	366.60	0.026	0.006
366.08	0.026	0.001	366.61	0.026	0.006
366.09	0.026	0.001	366.62	0.026	0.006
366.10	0.026	0.001	366.63	0.026	0.007
366.11	0.026	0.001	366.64	0.026	0.007
366.12	0.026	0.001	366.65	0.026	0.007
366.13	0.026	0.001	366.66	0.026	0.007
366.14	0.026	0.001	366.67	0.026	0.007
366.15	0.026	0.002	366.68	0.026	0.007
366.16	0.026	0.002	366.69	0.026	0.007
366.17	0.026	0.002	366.70	0.026	0.007
366.18	0.026	0.002	366.71	0.026	0.007
366.19	0.026	0.002	366.72	0.026	0.007
366.20	0.026	0.002	366.73	0.026	0.008
366.21	0.026	0.002	366.74	0.026	0.008
366.22	0.026	0.002	366.75	0.026	0.008
366.23	0.026	0.002	366.76	0.026	0.008
366.24	0.026	0.002	366.77	0.026	0.008
366.25	0.026	0.003	366.78	0.026	0.008
366.26	0.026	0.003	366.79	0.026	0.008
366.27	0.026	0.003	366.80	0.026	0.008
366.28	0.026	0.003	366.81	0.026	0.008
366.29	0.026	0.003	366.82	0.026	0.008
366.30	0.026	0.003	366.83	0.026	0.009
366.31	0.026	0.003	366.84	0.026	0.009
366.32	0.026	0.003	366.85	0.026	0.009
366.33	0.026	0.003	366.86	0.026	0.009
366.34	0.026	0.004	366.87	0.026	0.009
366.35	0.026	0.004	366.88	0.026	0.009
366.36	0.026	0.004	366.89	0.026	0.009
366.37	0.026	0.004	366.90	0.026	0.009
366.38	0.026	0.004	366.91	0.026	0.009
366.39	0.026	0.004	366.92	0.026	0.010
366.40	0.026	0.004	366.93	0.026	0.010
366.41	0.026	0.004	366.94	0.026	0.010
366.42	0.026	0.004	366.95	0.026	0.010
366.43	0.026	0.004	366.96	0.026	0.010
366.44	0.026	0.005	366.97	0.026	0.010
366.45	0.026	0.005	366.98	0.026	0.010
366.46	0.026	0.005	366.99	0.026	0.010
366.47	0.026	0.005	367.00	0.026	<b>0.010</b>
366.48	0.026	0.005			
366.49	0.026	0.005			
366.50	0.026	0.005			
366.51	0.026	0.005			
366.52	0.026	0.005			



**Silva Cell**

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Type II 24-hr 2-year Rainfall=3.50"

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Time span=1.00-50.00 hrs, dt=0.05 hrs, 981 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 2S: Drainage Area**

Runoff Area=0.740 ac 100.00% Impervious Runoff Depth=3.27"  
Tc=5.0 min CN=98 Runoff=3.71 cfs 0.201 af

**Pond 1P: Porous Pavement**

Peak Elev=0.00' Storage=0 cf  
Primary=0.00 cfs 0.000 af

**Pond 2P: Silva Cell**

Peak Elev=368.39' Storage=1,340 cf Inflow=3.71 cfs 0.201 af  
Outflow=3.87 cfs 0.201 af

**Pond 3P: Underdrains**

Peak Elev=0.00' Storage=0.000 af  
Primary=0.00 cfs 0.000 af

**Total Runoff Area = 0.740 ac Runoff Volume = 0.201 af Average Runoff Depth = 3.27"**  
**0.00% Pervious = 0.000 ac 100.00% Impervious = 0.740 ac**

### Summary for Subcatchment 2S: Drainage Area

[49] Hint:  $T_c < 2dt$  may require smaller  $dt$

Runoff = 3.71 cfs @ 11.95 hrs, Volume= 0.201 af, Depth= 3.27"

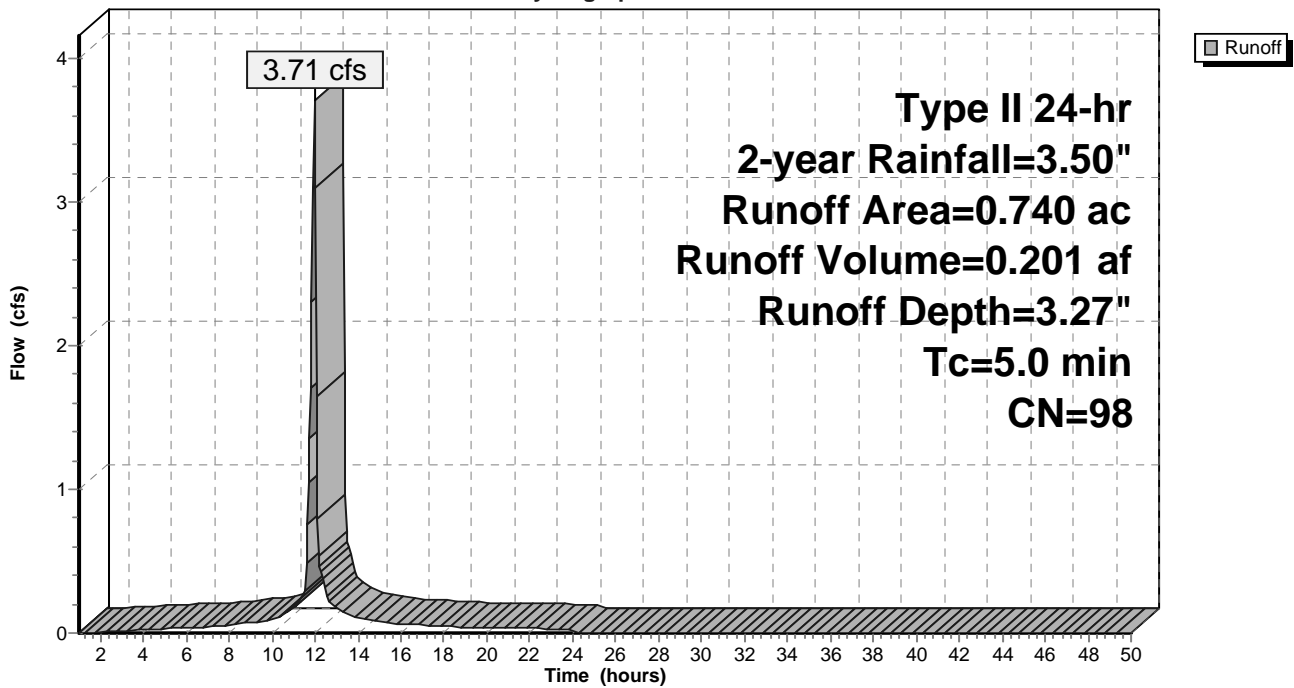
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-50.00 hrs,  $dt=0.05$  hrs  
 Type II 24-hr 2-year Rainfall=3.50"

Area (ac)	CN	Description
* 0.740	98	
0.740		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

### Subcatchment 2S: Drainage Area

Hydrograph



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Type II 24-hr 2-year Rainfall=3.50"

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**Hydrograph for Subcatchment 2S: Drainage Area**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.04	0.00	0.00	27.50	3.50	3.27	0.00
1.50	0.06	0.00	0.00	28.00	3.50	3.27	0.00
2.00	0.08	0.01	0.01	28.50	3.50	3.27	0.00
2.50	0.10	0.01	0.01	29.00	3.50	3.27	0.00
3.00	0.12	0.02	0.02	29.50	3.50	3.27	0.00
3.50	0.14	0.03	0.02	30.00	3.50	3.27	0.00
4.00	0.17	0.05	0.02	30.50	3.50	3.27	0.00
4.50	0.19	0.07	0.03	31.00	3.50	3.27	0.00
5.00	0.22	0.08	0.03	31.50	3.50	3.27	0.00
5.50	0.25	0.11	0.03	32.00	3.50	3.27	0.00
6.00	0.28	0.13	0.04	32.50	3.50	3.27	0.00
6.50	0.31	0.16	0.04	33.00	3.50	3.27	0.00
7.00	0.35	0.18	0.04	33.50	3.50	3.27	0.00
7.50	0.38	0.21	0.05	34.00	3.50	3.27	0.00
8.00	0.42	0.25	0.05	34.50	3.50	3.27	0.00
8.50	0.46	0.28	0.06	35.00	3.50	3.27	0.00
9.00	0.51	0.33	0.07	35.50	3.50	3.27	0.00
9.50	0.57	0.38	0.08	36.00	3.50	3.27	0.00
10.00	0.63	0.44	0.09	36.50	3.50	3.27	0.00
10.50	0.71	0.52	0.12	37.00	3.50	3.27	0.00
11.00	0.82	0.62	0.17	37.50	3.50	3.27	0.00
11.50	0.99	0.78	<b>0.28</b>	38.00	3.50	3.27	0.00
12.00	2.32	2.09	<b>3.09</b>	38.50	3.50	3.27	0.00
12.50	2.57	2.34	0.27	39.00	3.50	3.27	0.00
13.00	2.70	2.47	0.17	39.50	3.50	3.27	0.00
13.50	2.80	2.57	0.13	40.00	3.50	3.27	0.00
14.00	2.87	2.64	0.10	40.50	3.50	3.27	0.00
14.50	2.93	2.70	0.09	41.00	3.50	3.27	0.00
15.00	2.99	2.76	0.08	41.50	3.50	3.27	0.00
15.50	3.04	2.80	0.07	42.00	3.50	3.27	0.00
16.00	3.08	2.85	0.06	42.50	3.50	3.27	0.00
16.50	3.12	2.89	0.06	43.00	3.50	3.27	0.00
17.00	3.16	2.92	0.05	43.50	3.50	3.27	0.00
17.50	3.19	2.96	0.05	44.00	3.50	3.27	0.00
18.00	3.22	2.99	0.05	44.50	3.50	3.27	0.00
18.50	3.25	3.02	0.04	45.00	3.50	3.27	0.00
19.00	3.28	3.05	0.04	45.50	3.50	3.27	0.00
19.50	3.31	3.08	0.04	46.00	3.50	3.27	0.00
20.00	3.33	3.10	0.03	46.50	3.50	3.27	0.00
20.50	3.35	3.12	0.03	47.00	3.50	3.27	0.00
21.00	3.38	3.14	0.03	47.50	3.50	3.27	0.00
21.50	3.40	3.17	0.03	48.00	3.50	3.27	0.00
22.00	3.42	3.19	0.03	48.50	3.50	3.27	0.00
22.50	3.44	3.21	0.03	49.00	3.50	3.27	0.00
23.00	3.46	3.23	0.03	49.50	3.50	3.27	0.00
23.50	3.48	3.25	0.03	50.00	3.50	3.27	0.00
24.00	<b>3.50</b>	<b>3.27</b>	0.03				
24.50	3.50	3.27	0.00				
25.00	3.50	3.27	0.00				
25.50	3.50	3.27	0.00				
26.00	3.50	3.27	0.00				
26.50	3.50	3.27	0.00				
27.00	3.50	3.27	0.00				

**Summary for Pond 1P: Porous Pavement**

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	368.50'	3,633 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

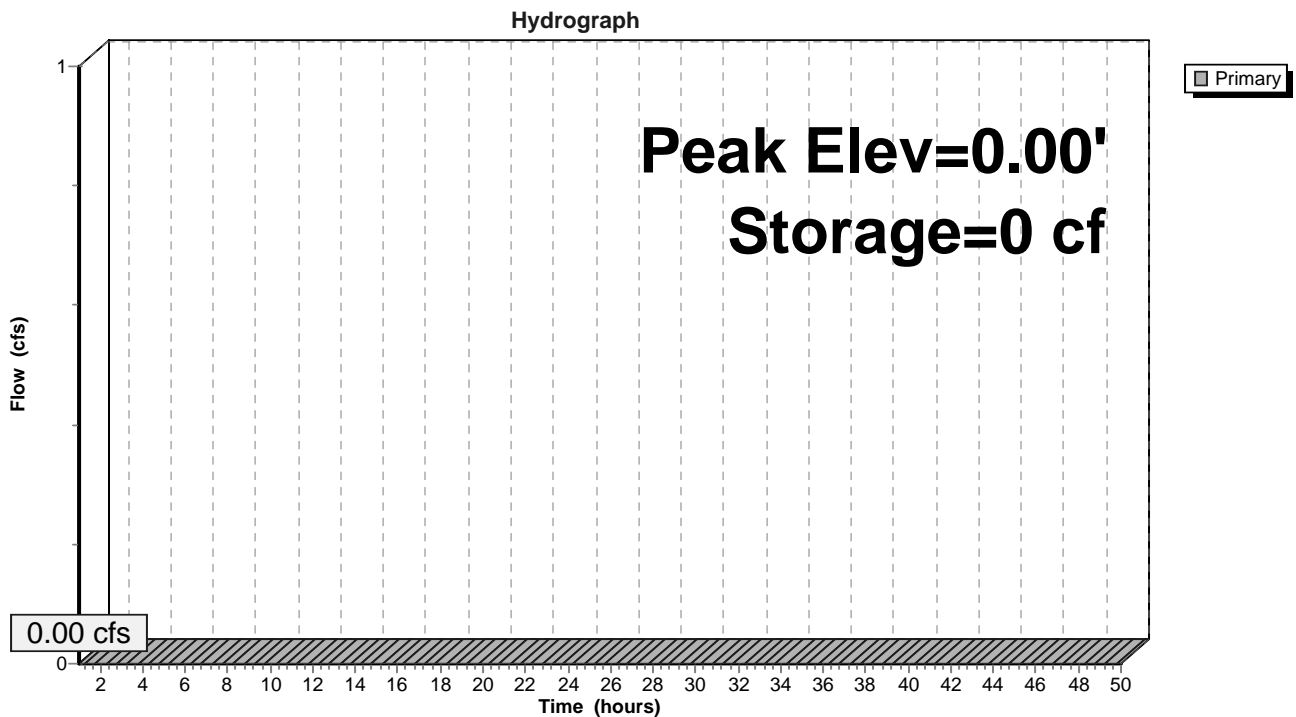
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
368.50	2,496	0.0	0	0
369.00	2,496	40.0	499	499
369.33	2,496	30.0	247	746
369.50	2,496	20.0	85	831
370.00	8,712	100.0	2,802	3,633

Device	Routing	Invert	Outlet Devices
#1	Primary	368.50'	<b>10.000 in/hr Exfiltration over Surface area above 368.50'</b> Conductivity to Groundwater Elevation = 0.00' Excluded Surface area = 2,496 sf

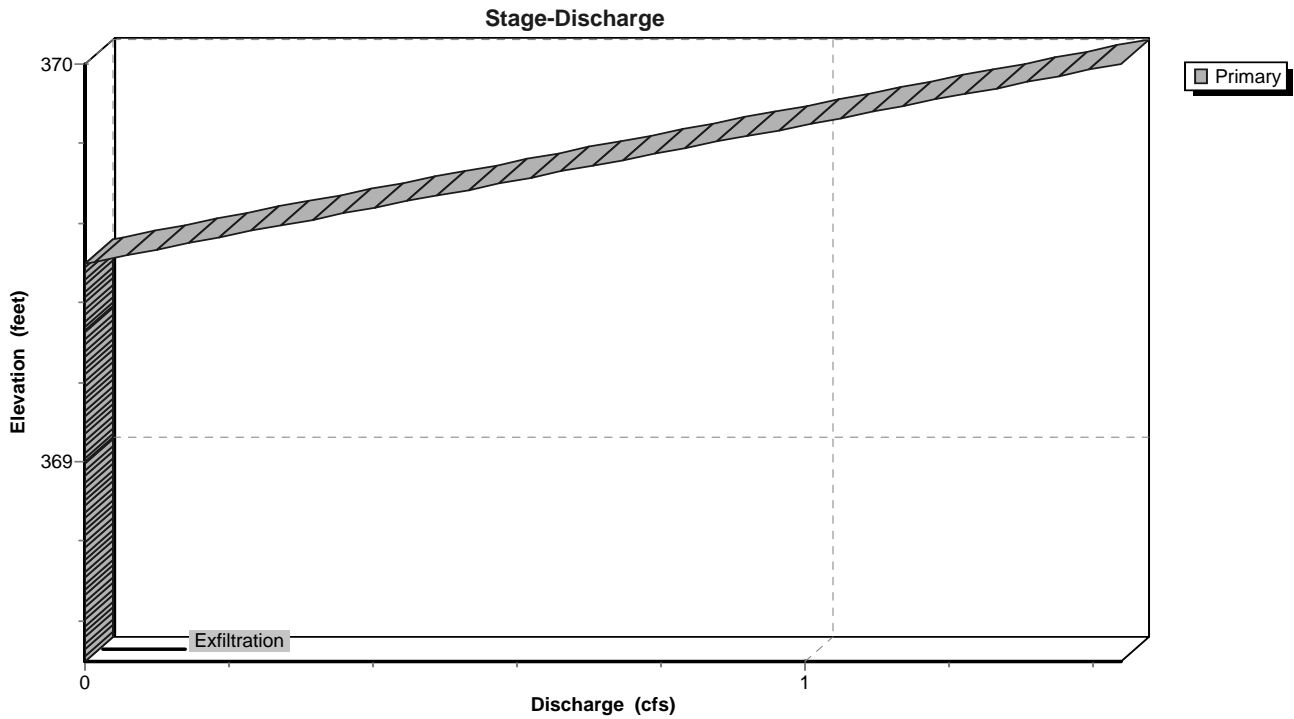
**Primary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=0.00' (Free Discharge)

←1=Exfiltration ( Controls 0.00 cfs)

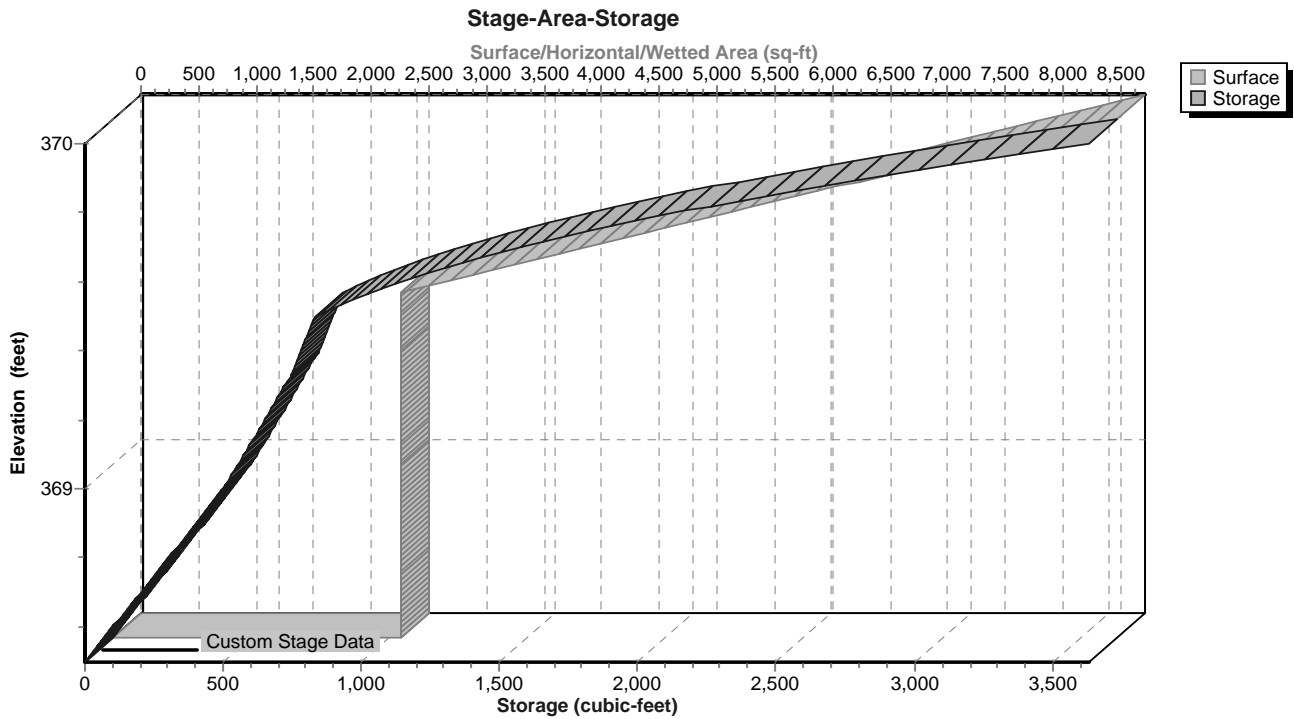
**Pond 1P: Porous Pavement**



### Pond 1P: Porous Pavement



### Pond 1P: Porous Pavement



**Stage-Discharge for Pond 1P: Porous Pavement**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
368.50	0.00	369.03	0.00	369.56	0.17
368.51	0.00	369.04	0.00	369.57	0.20
368.52	0.00	369.05	0.00	369.58	0.23
368.53	0.00	369.06	0.00	369.59	0.26
368.54	0.00	369.07	0.00	369.60	0.29
368.55	0.00	369.08	0.00	369.61	0.32
368.56	0.00	369.09	0.00	369.62	0.35
368.57	0.00	369.10	0.00	369.63	0.37
368.58	0.00	369.11	0.00	369.64	0.40
368.59	0.00	369.12	0.00	369.65	0.43
368.60	0.00	369.13	0.00	369.66	0.46
368.61	0.00	369.14	0.00	369.67	0.49
368.62	0.00	369.15	0.00	369.68	0.52
368.63	0.00	369.16	0.00	369.69	0.55
368.64	0.00	369.17	0.00	369.70	0.58
368.65	0.00	369.18	0.00	369.71	0.60
368.66	0.00	369.19	0.00	369.72	0.63
368.67	0.00	369.20	0.00	369.73	0.66
368.68	0.00	369.21	0.00	369.74	0.69
368.69	0.00	369.22	0.00	369.75	0.72
368.70	0.00	369.23	0.00	369.76	0.75
368.71	0.00	369.24	0.00	369.77	0.78
368.72	0.00	369.25	0.00	369.78	0.81
368.73	0.00	369.26	0.00	369.79	0.83
368.74	0.00	369.27	0.00	369.80	0.86
368.75	0.00	369.28	0.00	369.81	0.89
368.76	0.00	369.29	0.00	369.82	0.92
368.77	0.00	369.30	0.00	369.83	0.95
368.78	0.00	369.31	0.00	369.84	0.98
368.79	0.00	369.32	0.00	369.85	1.01
368.80	0.00	369.33	0.00	369.86	1.04
368.81	0.00	369.34	0.00	369.87	1.07
368.82	0.00	369.35	0.00	369.88	1.09
368.83	0.00	369.36	0.00	369.89	1.12
368.84	0.00	369.37	0.00	369.90	1.15
368.85	0.00	369.38	0.00	369.91	1.18
368.86	0.00	369.39	0.00	369.92	1.21
368.87	0.00	369.40	0.00	369.93	1.24
368.88	0.00	369.41	0.00	369.94	1.27
368.89	0.00	369.42	0.00	369.95	1.30
368.90	0.00	369.43	0.00	369.96	1.32
368.91	0.00	369.44	0.00	369.97	1.35
368.92	0.00	369.45	0.00	369.98	1.38
368.93	0.00	369.46	0.00	369.99	1.41
368.94	0.00	369.47	0.00	370.00	<b>1.44</b>
368.95	0.00	369.48	0.00		
368.96	0.00	369.49	0.00		
368.97	0.00	369.50	0.00		
368.98	0.00	369.51	0.03		
368.99	0.00	369.52	0.06		
369.00	0.00	369.53	0.09		
369.01	0.00	369.54	0.12		
369.02	0.00	369.55	0.14		

**Stage-Area-Storage for Pond 1P: Porous Pavement**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
368.50	2,496	0	369.56	3,242	1,003
368.52	2,496	20	369.58	3,491	1,071
368.54	2,496	40	369.60	3,739	1,143
368.56	2,496	60	369.62	3,988	1,220
368.58	2,496	80	369.64	4,236	1,302
368.60	2,496	100	369.66	4,485	1,390
368.62	2,496	120	369.68	4,734	1,482
368.64	2,496	140	369.70	4,982	1,579
368.66	2,496	160	369.72	5,231	1,681
368.68	2,496	180	369.74	5,480	1,788
368.70	2,496	200	369.76	5,728	1,900
368.72	2,496	220	369.78	5,977	2,017
368.74	2,496	240	369.80	6,226	2,139
368.76	2,496	260	369.82	6,474	2,266
368.78	2,496	280	369.84	6,723	2,398
368.80	2,496	300	369.86	6,972	2,535
368.82	2,496	319	369.88	7,220	2,677
368.84	2,496	339	369.90	7,469	2,824
368.86	2,496	359	369.92	7,717	2,976
368.88	2,496	379	369.94	7,966	3,133
368.90	2,496	399	369.96	8,215	3,295
368.92	2,496	419	369.98	8,463	3,461
368.94	2,496	439	370.00	<b>8,712</b>	<b>3,633</b>
368.96	2,496	459			
368.98	2,496	479			
369.00	2,496	499			
369.02	2,496	514			
369.04	2,496	529			
369.06	2,496	544			
369.08	2,496	559			
369.10	2,496	574			
369.12	2,496	589			
369.14	2,496	604			
369.16	2,496	619			
369.18	2,496	634			
369.20	2,496	649			
369.22	2,496	664			
369.24	2,496	679			
369.26	2,496	694			
369.28	2,496	709			
369.30	2,496	724			
369.32	2,496	739			
369.34	2,496	751			
369.36	2,496	761			
369.38	2,496	771			
369.40	2,496	781			
369.42	2,496	791			
369.44	2,496	801			
369.46	2,496	811			
369.48	2,496	821			
369.50	2,496	831			
369.52	2,745	884			
369.54	2,993	941			

**Silva Cell**

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**Summary for Pond 2P: Silva Cell**

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.740 ac, 100.00% Impervious, Inflow Depth = 3.27" for 2-year event  
 Inflow = 3.71 cfs @ 11.95 hrs, Volume= 0.201 af  
 Outflow = 3.87 cfs @ 11.97 hrs, Volume= 0.201 af, Atten= 0%, Lag= 1.1 min  
 Primary = 3.87 cfs @ 11.97 hrs, Volume= 0.201 af

Routing by Stor-Ind method, Time Span= 1.00-50.00 hrs, dt= 0.05 hrs  
 Peak Elev= 368.39' @ 11.97 hrs Surf.Area= 3,095 sf Storage= 1,340 cf

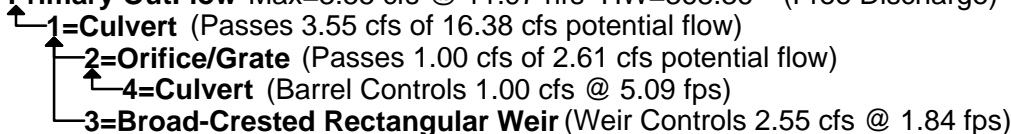
Plug-Flow detention time= 20.0 min calculated for 0.201 af (100% of inflow)  
 Center-of-Mass det. time= 19.6 min ( 769.3 - 749.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	369.00'	998 cf	<b>24.00'W x 104.00'L x 1.00'H Pavement Stone</b> 2,496 cf Overall x 40.0% Voids
#2A	366.00'	528 cf	<b>12.30'W x 80.33'L x 2.58'H Field A Z=2.0</b> 3,864 cf Overall - 2,544 cf Embedded = 1,319 cf x 40.0% Voids
#3A	366.00'	468 cf	<b>DeepRoot Silva Cell 20% x2 x 120 Inside #2</b> Inside= 24.6"W x 30.9"H => 0.97 sf x 4.02'L = 3.9 cf Outside= 24.6"W x 30.9"H => 5.28 sf x 4.02'L = 21.2 cf 6 Rows of 20 Chambers
#4	365.46'	451 cf	<b>12.00'W x 94.00'L x 1.00'H Underdrain</b> 1,128 cf Overall x 40.0% Voids
		2,446 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	365.23'	<b>18.0" Round Culvert</b> L= 10.5' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 365.23' / 365.00' S= 0.0219 1/ S= 0.0219 1/ Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	365.46'	<b>8.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	367.96'	<b>3.5' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 2	365.46'	<b>6.0" Round Culvert</b> L= 94.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 365.46' / 365.23' S= 0.0024 1/ S= 0.0024 1/ Cc= 0.900 n= 0.011, Flow Area= 0.20 sf

**Primary OutFlow** Max=3.55 cfs @ 11.97 hrs HW=368.36' (Free Discharge)





## Silva Cell

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### Pond 2P: Silva Cell - Chamber Wizard Field A

**Chamber Model = DeepRoot Silva Cell 20% x2 (Silva Cell +1", Bioretention Soil, 20% Voids, 2 Deep)**

Inside= 24.6"W x 30.9"H => 0.97 sf x 4.02'L = 3.9 cf

Outside= 24.6"W x 30.9"H => 5.28 sf x 4.02'L = 21.2 cf

20 Chambers/Row x 4.02' Long = 80.33' Row Length

6 Rows x 24.6" Wide = 12.30' Base Width

30.9" Chamber Height = 2.58' Field Height

2.0 ' Side-Z x Height = 61.8" Flare/Side

Base Length + Flare x 2 = 90.63' Top Length

Base Width + Flare x 2 = 22.60' Top Width

120 Chambers x 3.9 cf = 468.2 cf Chamber Storage

120 Chambers x 21.2 cf = 2,544.4 cf Displacement

3,863.9 cf Field - 2,544.4 cf Chambers = 1,319.5 cf Stone x 40.0% Voids = 527.8 cf Stone Storage

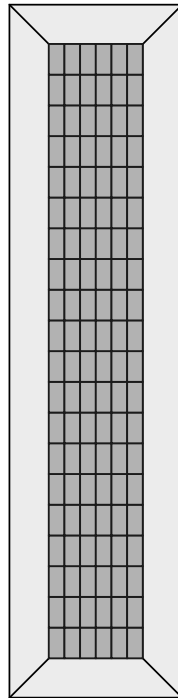
Chamber Storage + Stone Storage = 996.0 cf = 0.023 af

Overall Storage Efficiency = 25.8%

120 Chambers

143.1 cy Field

48.9 cy Stone



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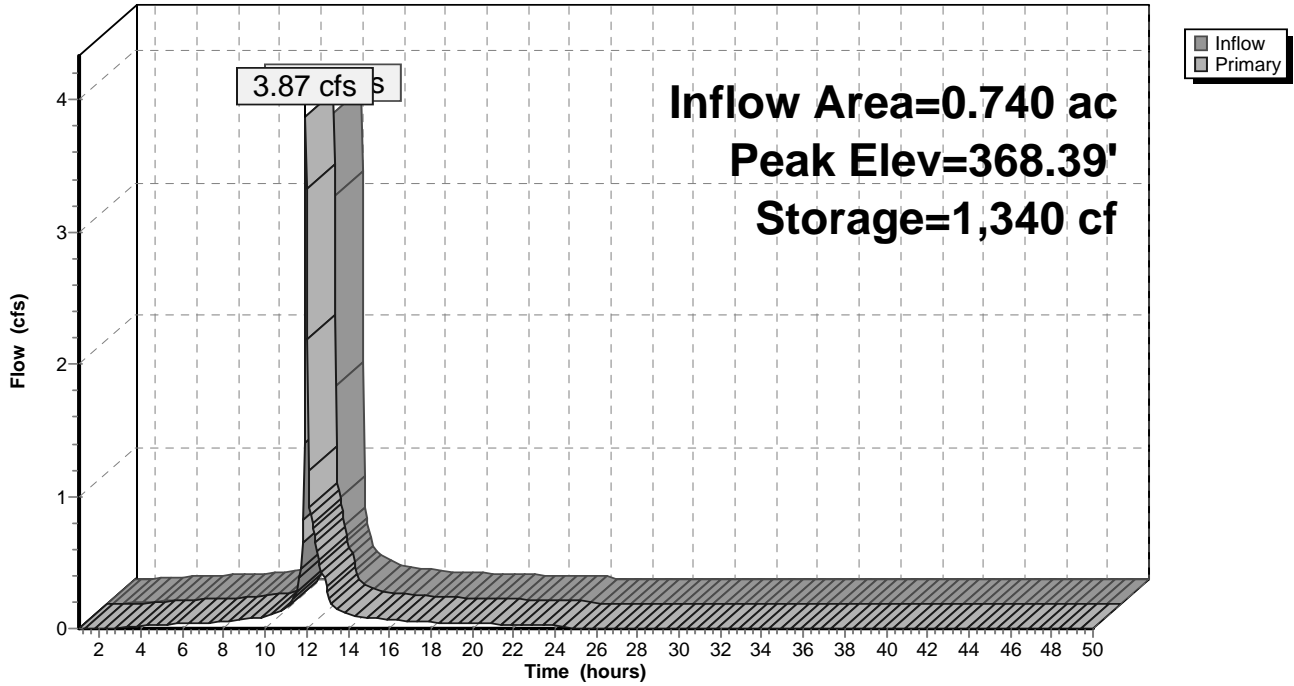
Type II 24-hr 2-year Rainfall=3.50"

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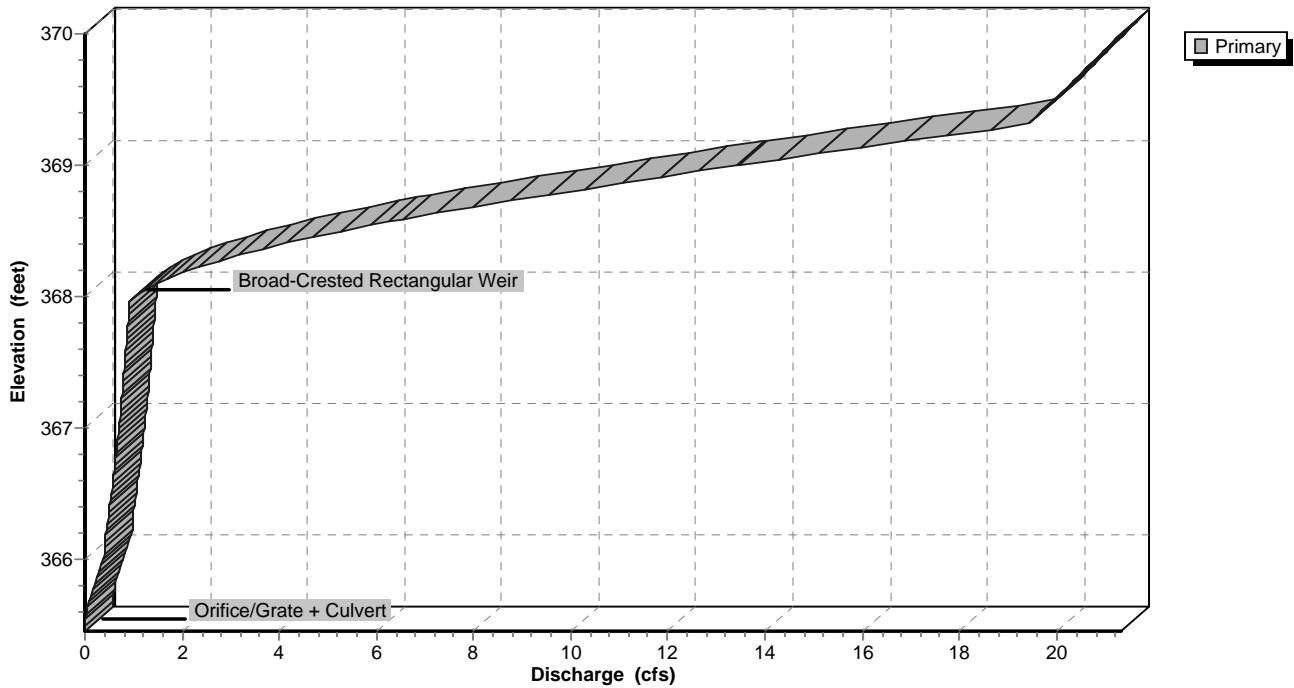
## Pond 2P: Silva Cell

Hydrograph



## Pond 2P: Silva Cell

Stage-Discharge



# Silva Cell

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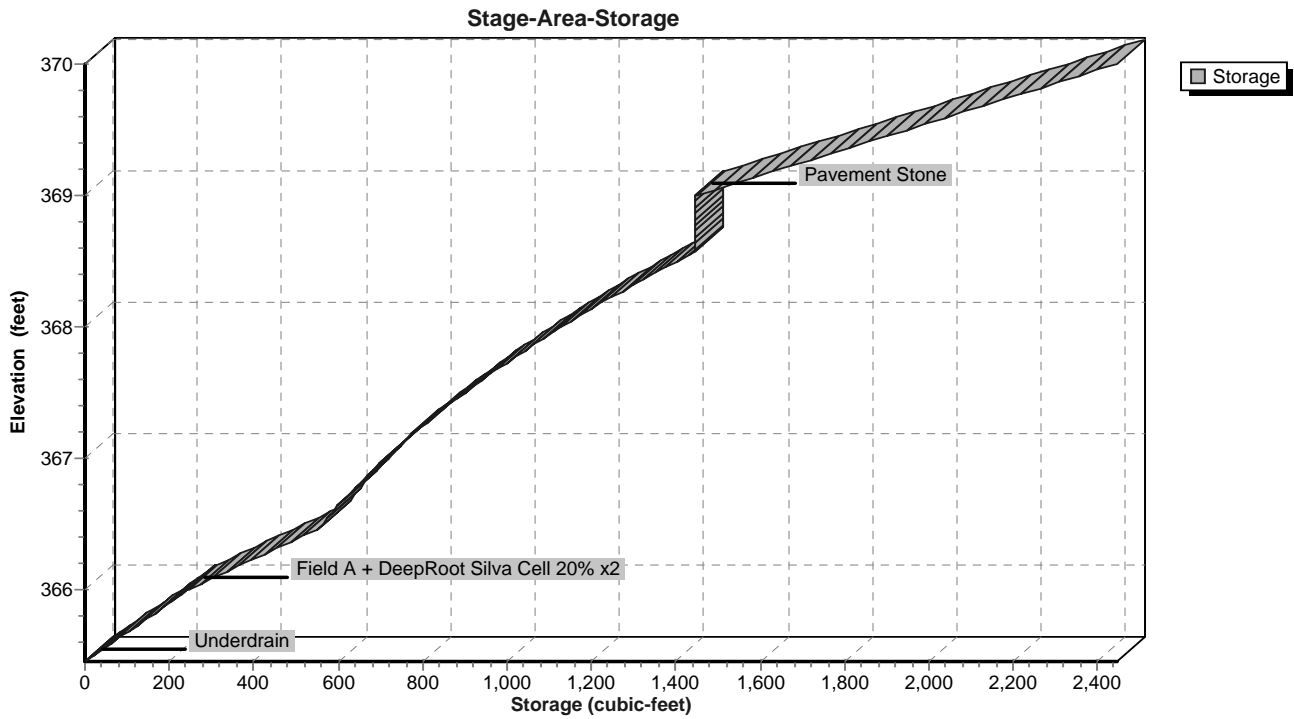
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Type II 24-hr 2-year Rainfall=3.50"

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## Pond 2P: Silva Cell



**Silva Cell**

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Type II 24-hr 2-year Rainfall=3.50"

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**Hydrograph for Pond 2P: Silva Cell**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	365.46	0.00
2.00	0.01	12	365.49	0.00
3.00	0.02	42	365.55	0.01
4.00	0.02	57	365.59	0.02
5.00	0.03	66	365.61	0.03
6.00	0.04	73	365.62	0.03
7.00	0.04	79	365.64	0.04
8.00	0.05	85	365.65	0.05
9.00	0.07	98	365.68	0.07
10.00	0.09	109	365.70	0.09
11.00	<b>0.17</b>	<b>143</b>	<b>365.78</b>	<b>0.16</b>
12.00	<b>3.09</b>	<b>1,307</b>	<b>368.33</b>	<b>3.33</b>
13.00	0.17	200	365.90	0.28
14.00	0.10	119	365.72	0.11
15.00	0.08	106	365.69	0.08
16.00	0.06	95	365.67	0.06
17.00	0.05	89	365.66	0.06
18.00	0.05	85	365.65	0.05
19.00	0.04	80	365.64	0.04
20.00	0.03	74	365.62	0.04
21.00	0.03	71	365.62	0.03
22.00	0.03	70	365.62	0.03
23.00	0.03	69	365.61	0.03
24.00	0.03	68	365.61	0.03
25.00	0.00	31	365.53	0.00
26.00	0.00	21	365.51	0.00
27.00	0.00	17	365.50	0.00
28.00	0.00	13	365.49	0.00
29.00	0.00	10	365.48	0.00
30.00	0.00	8	365.48	0.00
31.00	0.00	6	365.47	0.00
32.00	0.00	5	365.47	0.00
33.00	0.00	4	365.47	0.00
34.00	0.00	3	365.47	0.00
35.00	0.00	3	365.47	0.00
36.00	0.00	2	365.46	0.00
37.00	0.00	2	365.46	0.00
38.00	0.00	1	365.46	0.00
39.00	0.00	1	365.46	0.00
40.00	0.00	1	365.46	0.00
41.00	0.00	1	365.46	0.00
42.00	0.00	0	365.46	0.00
43.00	0.00	0	365.46	0.00
44.00	0.00	0	365.46	0.00
45.00	0.00	0	365.46	0.00
46.00	0.00	0	365.46	0.00
47.00	0.00	0	365.46	0.00
48.00	0.00	0	365.46	0.00
49.00	0.00	0	365.46	0.00
50.00	0.00	0	365.46	0.00

**Silva Cell**

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Type II 24-hr 2-year Rainfall=3.50"

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**Stage-Discharge for Pond 2P: Silva Cell**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
365.46	0.00	368.11	1.52
365.51	0.00	368.16	1.84
365.56	0.01	368.21	2.21
365.61	0.03	368.26	2.63
365.66	0.06	368.31	3.09
365.71	0.09	368.36	3.59
365.76	0.14	368.41	4.14
365.81	0.19	368.46	4.73
365.86	0.23	368.51	5.37
365.91	0.28	368.56	6.05
365.96	0.33	368.61	6.80
366.01	0.37	368.66	7.59
366.06	0.40	368.71	8.44
366.11	0.41	368.76	9.34
366.16	0.40	368.81	10.15
366.21	0.43	368.86	10.98
366.26	0.45	368.91	11.84
366.31	0.47	368.96	12.73
366.36	0.49	369.01	13.62
366.41	0.51	369.06	14.53
366.46	0.53	369.11	15.46
366.51	0.54	369.16	16.42
366.56	0.56	369.21	17.39
366.61	0.58	369.26	18.38
366.66	0.59	369.31	19.39
366.71	0.61	369.36	19.55
366.76	0.63	369.41	19.70
366.81	0.64	369.46	19.84
366.86	0.66	369.51	19.98
366.91	0.67	369.56	20.12
366.96	0.68	369.61	20.26
367.01	0.70	369.66	20.40
367.06	0.71	369.71	20.54
367.11	0.72	369.76	20.68
367.16	0.74	369.81	20.81
367.21	0.75	369.86	20.95
367.26	0.76	369.91	21.08
367.31	0.78	369.96	<b>21.22</b>
367.36	0.79		
367.41	0.80		
367.46	0.81		
367.51	0.82		
367.56	0.83		
367.61	0.85		
367.66	0.86		
367.71	0.87		
367.76	0.88		
367.81	0.89		
367.86	0.90		
367.91	0.91		
367.96	0.92		
368.01	1.04		
368.06	1.25		

**Silva Cell**

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Type II 24-hr 2-year Rainfall=3.50"

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**Stage-Area-Storage for Pond 2P: Silva Cell**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
365.46	0	368.11	1,185
365.51	23	368.16	1,211
365.56	45	368.21	1,238
365.61	68	368.26	1,265
365.66	90	368.31	1,293
365.71	113	368.36	1,321
365.76	135	368.41	1,350
365.81	158	368.46	1,379
365.86	180	368.51	1,408
365.91	203	368.56	1,438
365.96	226	368.61	1,447
366.01	250	368.66	1,447
366.06	282	368.71	1,447
366.11	314	368.76	1,447
366.16	347	368.81	1,447
366.21	380	368.86	1,447
366.26	413	368.91	1,447
366.31	447	368.96	1,447
366.36	481	369.01	1,457
366.41	516	369.06	1,507
366.46	551	369.11	1,557
366.51	563	369.16	1,607
366.56	577	369.21	1,657
366.61	590	369.26	1,707
366.66	604	369.31	1,757
366.71	618	369.36	1,807
366.76	633	369.41	1,857
366.81	648	369.46	1,906
366.86	664	369.51	1,956
366.91	680	369.56	2,006
366.96	696	369.61	2,056
367.01	713	369.66	2,106
367.06	730	369.71	2,156
367.11	747	369.76	2,206
367.16	765	369.81	2,256
367.21	783	369.86	2,306
367.26	802	369.91	2,356
367.31	821	369.96	<b>2,406</b>
367.36	841		
367.41	861		
367.46	881		
367.51	902		
367.56	923		
367.61	945		
367.66	967		
367.71	989		
367.76	1,012		
367.81	1,036		
367.86	1,059		
367.91	1,084		
367.96	1,108		
368.01	1,133		
368.06	1,159		

**Summary for Pond 3P: Underdrains**

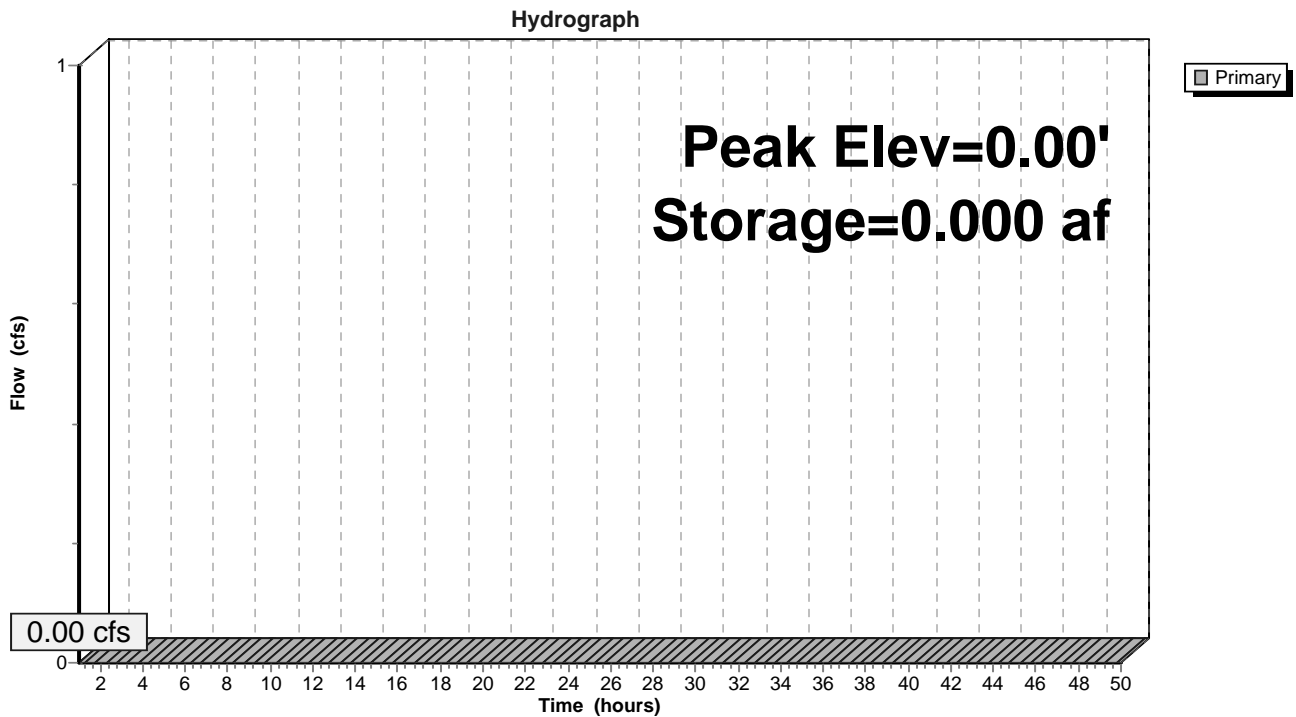
[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	366.00'	0.010 af	<b>12.00'W x 94.00'L x 1.00'H Prismatic</b> 0.026 af Overall x 40.0% Voids

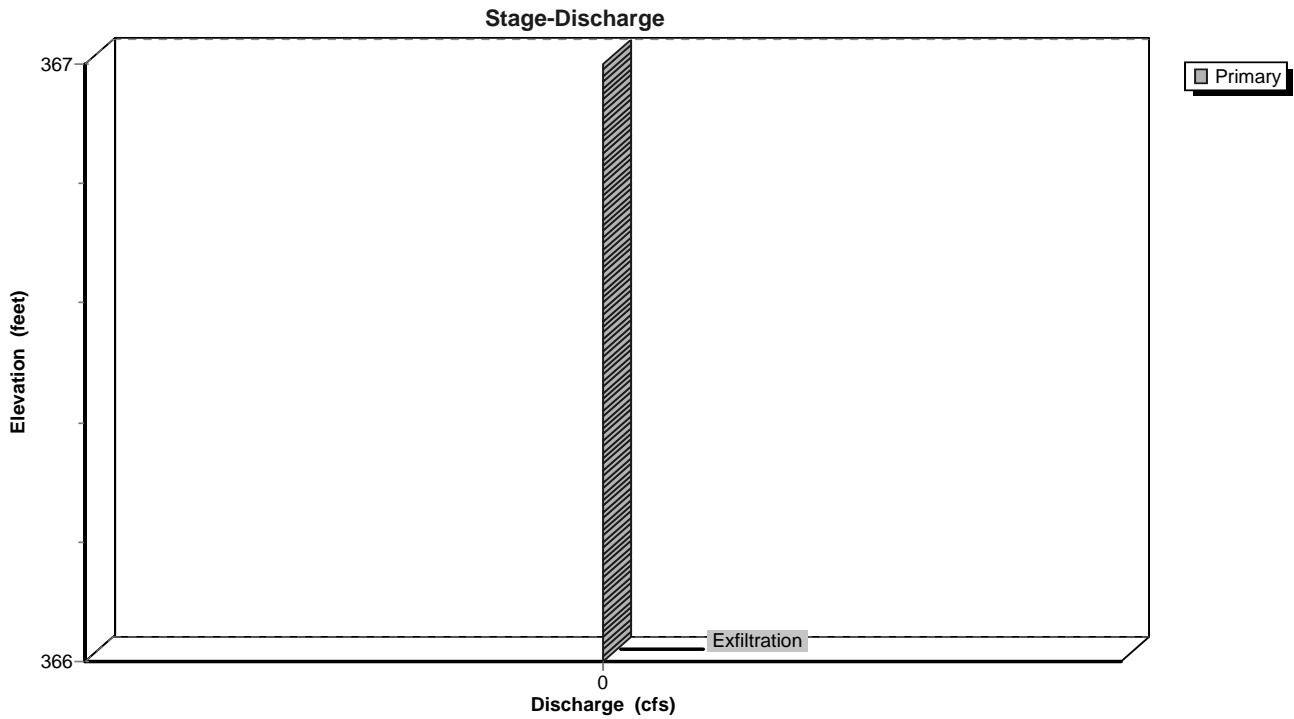
Device	Routing	Invert	Outlet Devices
#1	Primary	366.00'	<b>10.000 in/hr Exfiltration over Surface area above 366.00'</b> Conductivity to Groundwater Elevation = 0.00' Excluded Surface area = 0.026 ac

**Primary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=0.00' (Free Discharge)  
 ↳ **1=Exfiltration** ( Controls 0.00 cfs)

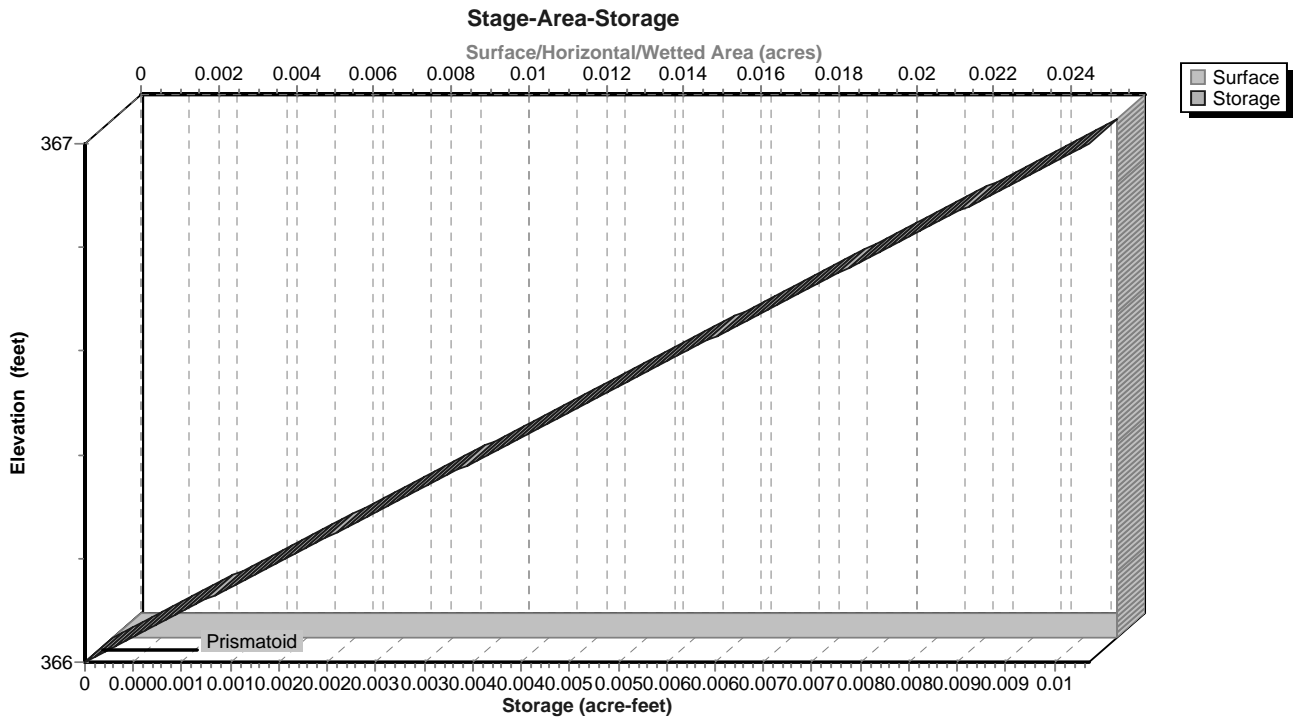
**Pond 3P: Underdrains**



### Pond 3P: Underdrains



### Pond 3P: Underdrains





**Silva Cell**

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Type II 24-hr 2-year Rainfall=3.50"

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**Stage-Discharge for Pond 3P: Underdrains**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
366.00	0.00	366.53	0.00
366.01	0.00	366.54	0.00
366.02	0.00	366.55	0.00
366.03	0.00	366.56	0.00
366.04	0.00	366.57	0.00
366.05	0.00	366.58	0.00
366.06	0.00	366.59	0.00
366.07	0.00	366.60	0.00
366.08	0.00	366.61	0.00
366.09	0.00	366.62	0.00
366.10	0.00	366.63	0.00
366.11	0.00	366.64	0.00
366.12	0.00	366.65	0.00
366.13	0.00	366.66	0.00
366.14	0.00	366.67	0.00
366.15	0.00	366.68	0.00
366.16	0.00	366.69	0.00
366.17	0.00	366.70	0.00
366.18	0.00	366.71	0.00
366.19	0.00	366.72	0.00
366.20	0.00	366.73	0.00
366.21	0.00	366.74	0.00
366.22	0.00	366.75	0.00
366.23	0.00	366.76	0.00
366.24	0.00	366.77	0.00
366.25	0.00	366.78	0.00
366.26	0.00	366.79	0.00
366.27	0.00	366.80	0.00
366.28	0.00	366.81	0.00
366.29	0.00	366.82	0.00
366.30	0.00	366.83	0.00
366.31	0.00	366.84	0.00
366.32	0.00	366.85	0.00
366.33	0.00	366.86	0.00
366.34	0.00	366.87	0.00
366.35	0.00	366.88	0.00
366.36	0.00	366.89	0.00
366.37	0.00	366.90	0.00
366.38	0.00	366.91	0.00
366.39	0.00	366.92	0.00
366.40	0.00	366.93	0.00
366.41	0.00	366.94	0.00
366.42	0.00	366.95	0.00
366.43	0.00	366.96	0.00
366.44	0.00	366.97	0.00
366.45	0.00	366.98	0.00
366.46	0.00	366.99	0.00
366.47	0.00	367.00	0.00
366.48	0.00		
366.49	0.00		
366.50	0.00		
366.51	0.00		
366.52	0.00		

**Stage-Area-Storage for Pond 3P: Underdrains**

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
366.00	<b>0.026</b>	0.000	366.53	0.026	0.005
366.01	0.026	0.000	366.54	0.026	0.006
366.02	0.026	0.000	366.55	0.026	0.006
366.03	0.026	0.000	366.56	0.026	0.006
366.04	0.026	0.000	366.57	0.026	0.006
366.05	0.026	0.001	366.58	0.026	0.006
366.06	0.026	0.001	366.59	0.026	0.006
366.07	0.026	0.001	366.60	0.026	0.006
366.08	0.026	0.001	366.61	0.026	0.006
366.09	0.026	0.001	366.62	0.026	0.006
366.10	0.026	0.001	366.63	0.026	0.007
366.11	0.026	0.001	366.64	0.026	0.007
366.12	0.026	0.001	366.65	0.026	0.007
366.13	0.026	0.001	366.66	0.026	0.007
366.14	0.026	0.001	366.67	0.026	0.007
366.15	0.026	0.002	366.68	0.026	0.007
366.16	0.026	0.002	366.69	0.026	0.007
366.17	0.026	0.002	366.70	0.026	0.007
366.18	0.026	0.002	366.71	0.026	0.007
366.19	0.026	0.002	366.72	0.026	0.007
366.20	0.026	0.002	366.73	0.026	0.008
366.21	0.026	0.002	366.74	0.026	0.008
366.22	0.026	0.002	366.75	0.026	0.008
366.23	0.026	0.002	366.76	0.026	0.008
366.24	0.026	0.002	366.77	0.026	0.008
366.25	0.026	0.003	366.78	0.026	0.008
366.26	0.026	0.003	366.79	0.026	0.008
366.27	0.026	0.003	366.80	0.026	0.008
366.28	0.026	0.003	366.81	0.026	0.008
366.29	0.026	0.003	366.82	0.026	0.008
366.30	0.026	0.003	366.83	0.026	0.009
366.31	0.026	0.003	366.84	0.026	0.009
366.32	0.026	0.003	366.85	0.026	0.009
366.33	0.026	0.003	366.86	0.026	0.009
366.34	0.026	0.004	366.87	0.026	0.009
366.35	0.026	0.004	366.88	0.026	0.009
366.36	0.026	0.004	366.89	0.026	0.009
366.37	0.026	0.004	366.90	0.026	0.009
366.38	0.026	0.004	366.91	0.026	0.009
366.39	0.026	0.004	366.92	0.026	0.010
366.40	0.026	0.004	366.93	0.026	0.010
366.41	0.026	0.004	366.94	0.026	0.010
366.42	0.026	0.004	366.95	0.026	0.010
366.43	0.026	0.004	366.96	0.026	0.010
366.44	0.026	0.005	366.97	0.026	0.010
366.45	0.026	0.005	366.98	0.026	0.010
366.46	0.026	0.005	366.99	0.026	0.010
366.47	0.026	0.005	367.00	0.026	<b>0.010</b>
366.48	0.026	0.005			
366.49	0.026	0.005			
366.50	0.026	0.005			
366.51	0.026	0.005			
366.52	0.026	0.005			

**Silva Cell**

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Type II 24-hr 10-year Rainfall=5.10"

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Time span=1.00-50.00 hrs, dt=0.05 hrs, 981 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 2S: Drainage Area**

Runoff Area=0.740 ac 100.00% Impervious Runoff Depth>4.86"  
Tc=5.0 min CN=98 Runoff=5.43 cfs 0.300 af

**Pond 1P: Porous Pavement**

Peak Elev=0.00' Storage=0 cf  
Primary=0.00 cfs 0.000 af

**Pond 2P: Silva Cell**

Peak Elev=368.50' Storage=1,402 cf Inflow=5.43 cfs 0.300 af  
Outflow=5.22 cfs 0.300 af

**Pond 3P: Underdrains**

Peak Elev=0.00' Storage=0.000 af  
Primary=0.00 cfs 0.000 af

**Total Runoff Area = 0.740 ac Runoff Volume = 0.300 af Average Runoff Depth = 4.86"**  
**0.00% Pervious = 0.000 ac 100.00% Impervious = 0.740 ac**

### Summary for Subcatchment 2S: Drainage Area

[49] Hint:  $T_c < 2dt$  may require smaller dt

Runoff = 5.43 cfs @ 11.95 hrs, Volume= 0.300 af, Depth > 4.86"

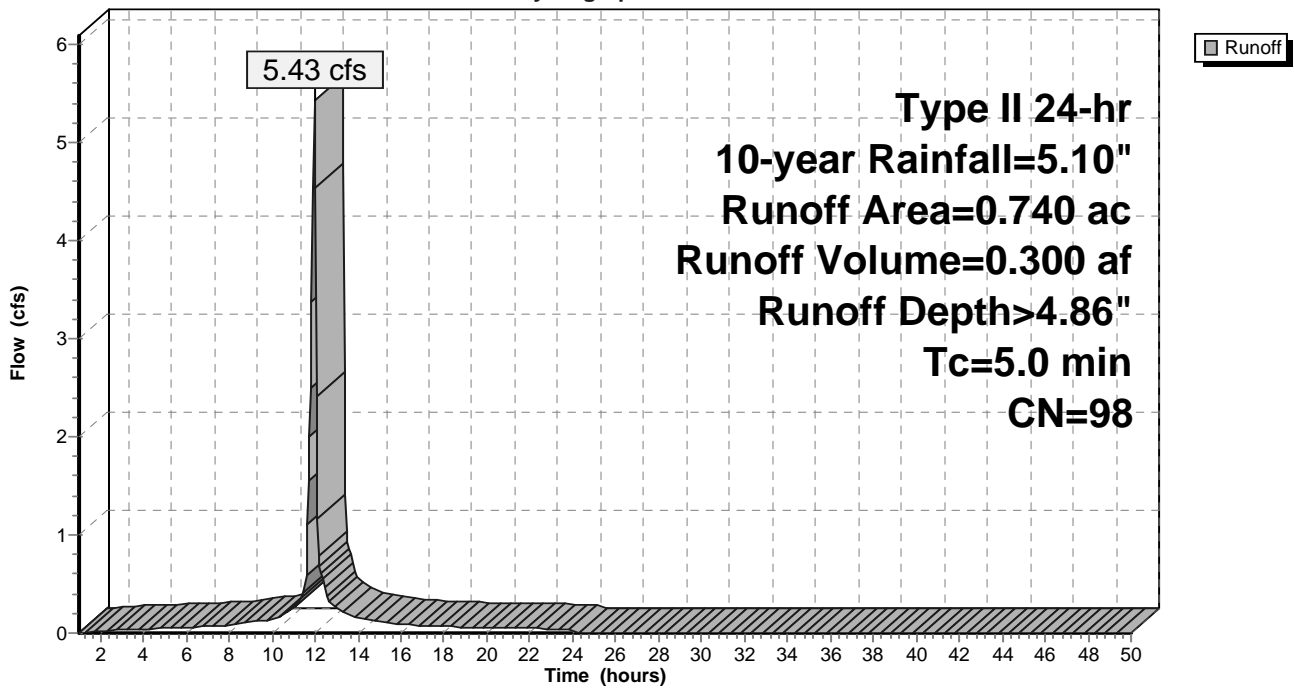
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-50.00 hrs, dt= 0.05 hrs  
 Type II 24-hr 10-year Rainfall=5.10"

Area (ac)	CN	Description
* 0.740	98	
0.740		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

### Subcatchment 2S: Drainage Area

Hydrograph



**Hydrograph for Subcatchment 2S: Drainage Area**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.05	0.00	0.00	27.50	5.10	4.86	0.00
1.50	0.08	0.01	0.01	28.00	5.10	4.86	0.00
2.00	0.11	0.02	0.02	28.50	5.10	4.86	0.00
2.50	0.14	0.03	0.03	29.00	5.10	4.86	0.00
3.00	0.18	0.05	0.03	29.50	5.10	4.86	0.00
3.50	0.21	0.08	0.04	30.00	5.10	4.86	0.00
4.00	0.24	0.10	0.04	30.50	5.10	4.86	0.00
4.50	0.28	0.13	0.04	31.00	5.10	4.86	0.00
5.00	0.32	0.16	0.05	31.50	5.10	4.86	0.00
5.50	0.36	0.20	0.05	32.00	5.10	4.86	0.00
6.00	0.41	0.24	0.06	32.50	5.10	4.86	0.00
6.50	0.46	0.28	0.06	33.00	5.10	4.86	0.00
7.00	0.50	0.32	0.07	33.50	5.10	4.86	0.00
7.50	0.56	0.37	0.07	34.00	5.10	4.86	0.00
8.00	0.61	0.42	0.08	34.50	5.10	4.86	0.00
8.50	0.67	0.48	0.09	35.00	5.10	4.86	0.00
9.00	0.75	0.55	0.11	35.50	5.10	4.86	0.00
9.50	0.83	0.63	0.12	36.00	5.10	4.86	0.00
10.00	0.92	0.72	0.14	36.50	5.10	4.86	0.00
10.50	1.04	0.83	0.19	37.00	5.10	4.86	0.00
11.00	1.20	0.98	0.26	37.50	5.10	4.86	0.00
11.50	1.44	1.22	<b>0.42</b>	38.00	5.10	4.86	0.00
12.00	3.38	3.15	<b>4.52</b>	38.50	5.10	4.86	0.00
12.50	3.75	3.51	0.40	39.00	5.10	4.86	0.00
13.00	3.94	3.70	0.25	39.50	5.10	4.86	0.00
13.50	4.07	3.84	0.19	40.00	5.10	4.86	0.00
14.00	4.18	3.95	0.15	40.50	5.10	4.86	0.00
14.50	4.27	4.04	0.13	41.00	5.10	4.86	0.00
15.00	4.35	4.12	0.12	41.50	5.10	4.86	0.00
15.50	4.42	4.19	0.10	42.00	5.10	4.86	0.00
16.00	4.49	4.25	0.09	42.50	5.10	4.86	0.00
16.50	4.55	4.31	0.08	43.00	5.10	4.86	0.00
17.00	4.60	4.36	0.08	43.50	5.10	4.86	0.00
17.50	4.65	4.41	0.07	44.00	5.10	4.86	0.00
18.00	4.70	4.46	0.07	44.50	5.10	4.86	0.00
18.50	4.74	4.51	0.06	45.00	5.10	4.86	0.00
19.00	4.78	4.55	0.06	45.50	5.10	4.86	0.00
19.50	4.82	4.58	0.05	46.00	5.10	4.86	0.00
20.00	4.86	4.62	0.05	46.50	5.10	4.86	0.00
20.50	4.89	4.65	0.05	47.00	5.10	4.86	0.00
21.00	4.92	4.68	0.05	47.50	5.10	4.86	0.00
21.50	4.95	4.72	0.05	48.00	5.10	4.86	0.00
22.00	4.98	4.75	0.05	48.50	5.10	4.86	0.00
22.50	5.01	4.78	0.04	49.00	5.10	4.86	0.00
23.00	5.04	4.81	0.04	49.50	5.10	4.86	0.00
23.50	5.07	4.83	0.04	50.00	5.10	4.86	0.00
24.00	<b>5.10</b>	<b>4.86</b>	0.04				
24.50	5.10	4.86	0.00				
25.00	5.10	4.86	0.00				
25.50	5.10	4.86	0.00				
26.00	5.10	4.86	0.00				
26.50	5.10	4.86	0.00				
27.00	5.10	4.86	0.00				

**Summary for Pond 1P: Porous Pavement**

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	368.50'	3,633 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

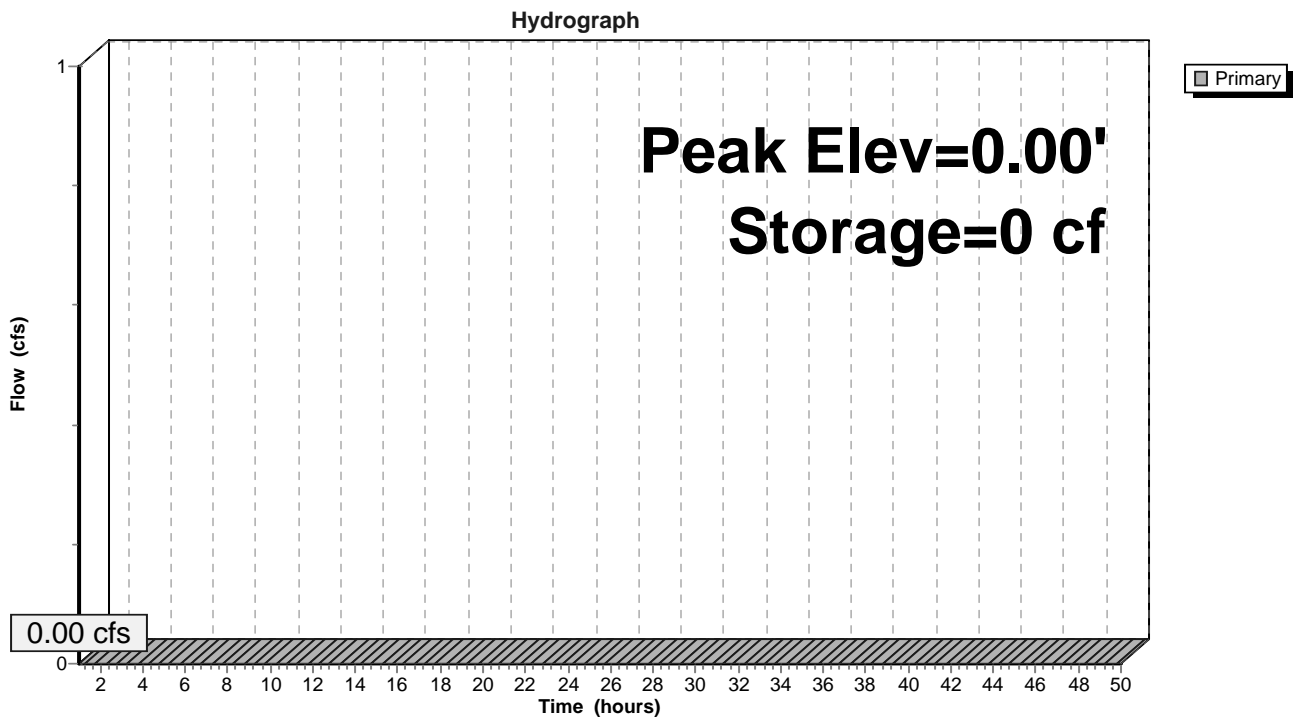
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
368.50	2,496	0.0	0	0
369.00	2,496	40.0	499	499
369.33	2,496	30.0	247	746
369.50	2,496	20.0	85	831
370.00	8,712	100.0	2,802	3,633

Device	Routing	Invert	Outlet Devices
#1	Primary	368.50'	<b>10.000 in/hr Exfiltration over Surface area above 368.50'</b> Conductivity to Groundwater Elevation = 0.00' Excluded Surface area = 2,496 sf

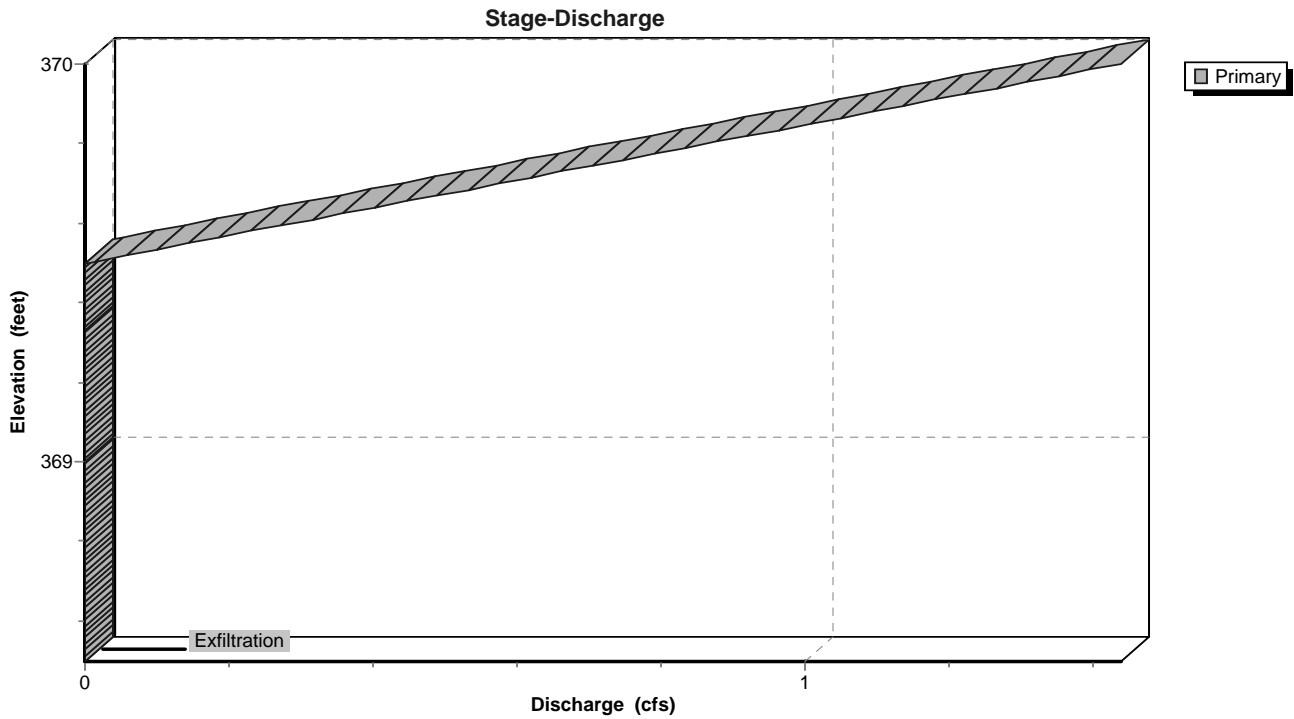
**Primary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=0.00' (Free Discharge)

←1=Exfiltration ( Controls 0.00 cfs)

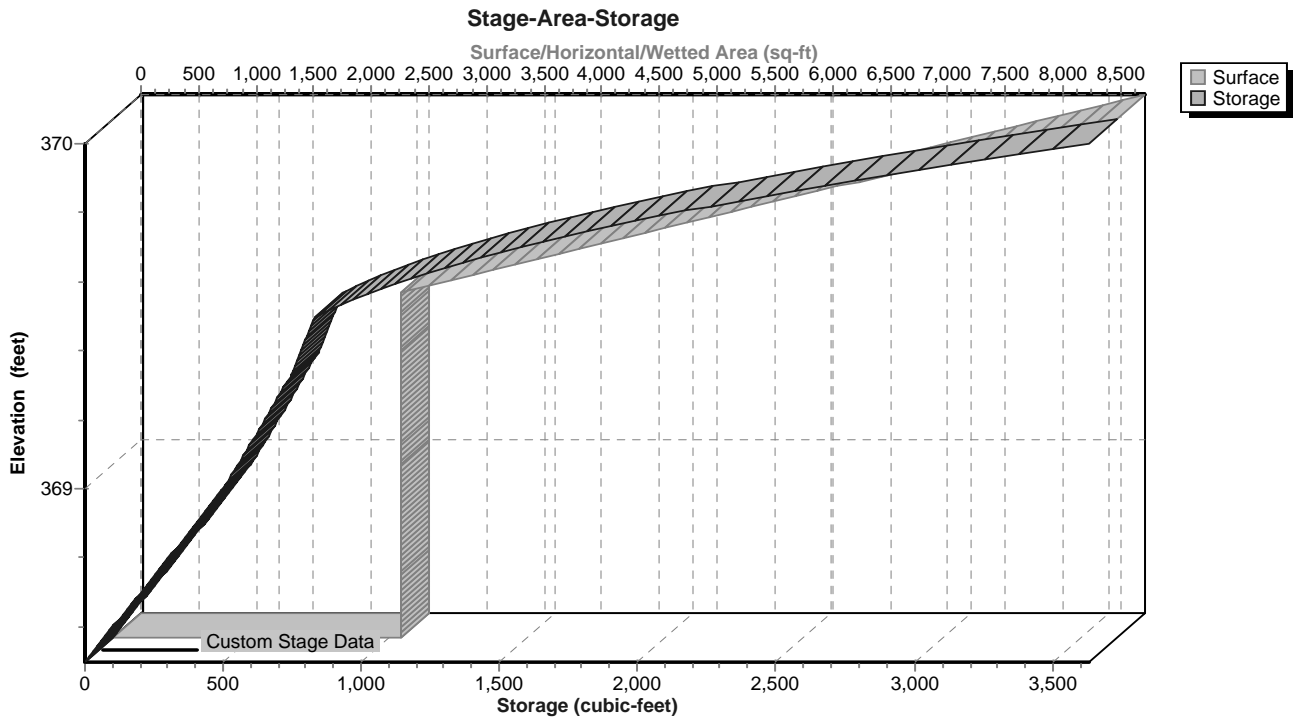
**Pond 1P: Porous Pavement**



### Pond 1P: Porous Pavement



### Pond 1P: Porous Pavement



**Stage-Discharge for Pond 1P: Porous Pavement**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
368.50	0.00	369.03	0.00	369.56	0.17
368.51	0.00	369.04	0.00	369.57	0.20
368.52	0.00	369.05	0.00	369.58	0.23
368.53	0.00	369.06	0.00	369.59	0.26
368.54	0.00	369.07	0.00	369.60	0.29
368.55	0.00	369.08	0.00	369.61	0.32
368.56	0.00	369.09	0.00	369.62	0.35
368.57	0.00	369.10	0.00	369.63	0.37
368.58	0.00	369.11	0.00	369.64	0.40
368.59	0.00	369.12	0.00	369.65	0.43
368.60	0.00	369.13	0.00	369.66	0.46
368.61	0.00	369.14	0.00	369.67	0.49
368.62	0.00	369.15	0.00	369.68	0.52
368.63	0.00	369.16	0.00	369.69	0.55
368.64	0.00	369.17	0.00	369.70	0.58
368.65	0.00	369.18	0.00	369.71	0.60
368.66	0.00	369.19	0.00	369.72	0.63
368.67	0.00	369.20	0.00	369.73	0.66
368.68	0.00	369.21	0.00	369.74	0.69
368.69	0.00	369.22	0.00	369.75	0.72
368.70	0.00	369.23	0.00	369.76	0.75
368.71	0.00	369.24	0.00	369.77	0.78
368.72	0.00	369.25	0.00	369.78	0.81
368.73	0.00	369.26	0.00	369.79	0.83
368.74	0.00	369.27	0.00	369.80	0.86
368.75	0.00	369.28	0.00	369.81	0.89
368.76	0.00	369.29	0.00	369.82	0.92
368.77	0.00	369.30	0.00	369.83	0.95
368.78	0.00	369.31	0.00	369.84	0.98
368.79	0.00	369.32	0.00	369.85	1.01
368.80	0.00	369.33	0.00	369.86	1.04
368.81	0.00	369.34	0.00	369.87	1.07
368.82	0.00	369.35	0.00	369.88	1.09
368.83	0.00	369.36	0.00	369.89	1.12
368.84	0.00	369.37	0.00	369.90	1.15
368.85	0.00	369.38	0.00	369.91	1.18
368.86	0.00	369.39	0.00	369.92	1.21
368.87	0.00	369.40	0.00	369.93	1.24
368.88	0.00	369.41	0.00	369.94	1.27
368.89	0.00	369.42	0.00	369.95	1.30
368.90	0.00	369.43	0.00	369.96	1.32
368.91	0.00	369.44	0.00	369.97	1.35
368.92	0.00	369.45	0.00	369.98	1.38
368.93	0.00	369.46	0.00	369.99	1.41
368.94	0.00	369.47	0.00	370.00	<b>1.44</b>
368.95	0.00	369.48	0.00		
368.96	0.00	369.49	0.00		
368.97	0.00	369.50	0.00		
368.98	0.00	369.51	0.03		
368.99	0.00	369.52	0.06		
369.00	0.00	369.53	0.09		
369.01	0.00	369.54	0.12		
369.02	0.00	369.55	0.14		



**Stage-Area-Storage for Pond 1P: Porous Pavement**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
368.50	2,496	0	369.56	3,242	1,003
368.52	2,496	20	369.58	3,491	1,071
368.54	2,496	40	369.60	3,739	1,143
368.56	2,496	60	369.62	3,988	1,220
368.58	2,496	80	369.64	4,236	1,302
368.60	2,496	100	369.66	4,485	1,390
368.62	2,496	120	369.68	4,734	1,482
368.64	2,496	140	369.70	4,982	1,579
368.66	2,496	160	369.72	5,231	1,681
368.68	2,496	180	369.74	5,480	1,788
368.70	2,496	200	369.76	5,728	1,900
368.72	2,496	220	369.78	5,977	2,017
368.74	2,496	240	369.80	6,226	2,139
368.76	2,496	260	369.82	6,474	2,266
368.78	2,496	280	369.84	6,723	2,398
368.80	2,496	300	369.86	6,972	2,535
368.82	2,496	319	369.88	7,220	2,677
368.84	2,496	339	369.90	7,469	2,824
368.86	2,496	359	369.92	7,717	2,976
368.88	2,496	379	369.94	7,966	3,133
368.90	2,496	399	369.96	8,215	3,295
368.92	2,496	419	369.98	8,463	3,461
368.94	2,496	439	370.00	<b>8,712</b>	<b>3,633</b>
368.96	2,496	459			
368.98	2,496	479			
369.00	2,496	499			
369.02	2,496	514			
369.04	2,496	529			
369.06	2,496	544			
369.08	2,496	559			
369.10	2,496	574			
369.12	2,496	589			
369.14	2,496	604			
369.16	2,496	619			
369.18	2,496	634			
369.20	2,496	649			
369.22	2,496	664			
369.24	2,496	679			
369.26	2,496	694			
369.28	2,496	709			
369.30	2,496	724			
369.32	2,496	739			
369.34	2,496	751			
369.36	2,496	761			
369.38	2,496	771			
369.40	2,496	781			
369.42	2,496	791			
369.44	2,496	801			
369.46	2,496	811			
369.48	2,496	821			
369.50	2,496	831			
369.52	2,745	884			
369.54	2,993	941			

**Silva Cell**

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Type II 24-hr 10-year Rainfall=5.10"

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**Summary for Pond 2P: Silva Cell**

Inflow Area = 0.740 ac, 100.00% Impervious, Inflow Depth > 4.86" for 10-year event  
 Inflow = 5.43 cfs @ 11.95 hrs, Volume= 0.300 af  
 Outflow = 5.22 cfs @ 11.96 hrs, Volume= 0.300 af, Atten= 4%, Lag= 0.8 min  
 Primary = 5.22 cfs @ 11.96 hrs, Volume= 0.300 af

Routing by Stor-Ind method, Time Span= 1.00-50.00 hrs, dt= 0.05 hrs  
 Peak Elev= 368.50' @ 11.96 hrs Surf.Area= 3,142 sf Storage= 1,402 cf

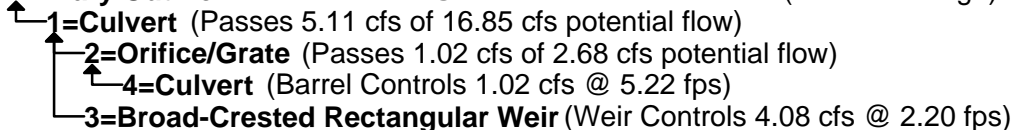
Plug-Flow detention time= 16.6 min calculated for 0.300 af (100% of inflow)  
 Center-of-Mass det. time= 16.1 min ( 758.8 - 742.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	369.00'	998 cf	<b>24.00'W x 104.00'L x 1.00'H Pavement Stone</b> 2,496 cf Overall x 40.0% Voids
#2A	366.00'	528 cf	<b>12.30'W x 80.33'L x 2.58'H Field A Z=2.0</b> 3,864 cf Overall - 2,544 cf Embedded = 1,319 cf x 40.0% Voids
#3A	366.00'	468 cf	<b>DeepRoot Silva Cell 20% x2 x 120 Inside #2</b> Inside= 24.6"W x 30.9"H => 0.97 sf x 4.02'L = 3.9 cf Outside= 24.6"W x 30.9"H => 5.28 sf x 4.02'L = 21.2 cf 6 Rows of 20 Chambers
#4	365.46'	451 cf	<b>12.00'W x 94.00'L x 1.00'H Underdrain</b> 1,128 cf Overall x 40.0% Voids
		2,446 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	365.23'	<b>18.0" Round Culvert</b> L= 10.5' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 365.23' / 365.00' S= 0.0219 1/1 Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	365.46'	<b>8.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	367.96'	<b>3.5' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 2	365.46'	<b>6.0" Round Culvert</b> L= 94.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 365.46' / 365.23' S= 0.0024 1/1 Cc= 0.900 n= 0.011, Flow Area= 0.20 sf

**Primary OutFlow** Max=5.11 cfs @ 11.96 hrs HW=368.49' (Free Discharge)



# Silva Cell

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## Pond 2P: Silva Cell - Chamber Wizard Field A

**Chamber Model = DeepRoot Silva Cell 20% x2 (Silva Cell +1", Bioretention Soil, 20% Voids, 2 Deep)**

Inside= 24.6"W x 30.9"H => 0.97 sf x 4.02'L = 3.9 cf

Outside= 24.6"W x 30.9"H => 5.28 sf x 4.02'L = 21.2 cf

20 Chambers/Row x 4.02' Long = 80.33' Row Length

6 Rows x 24.6" Wide = 12.30' Base Width

30.9" Chamber Height = 2.58' Field Height

2.0 ' Side-Z x Height = 61.8" Flare/Side

Base Length + Flare x 2 = 90.63' Top Length

Base Width + Flare x 2 = 22.60' Top Width

120 Chambers x 3.9 cf = 468.2 cf Chamber Storage

120 Chambers x 21.2 cf = 2,544.4 cf Displacement

3,863.9 cf Field - 2,544.4 cf Chambers = 1,319.5 cf Stone x 40.0% Voids = 527.8 cf Stone Storage

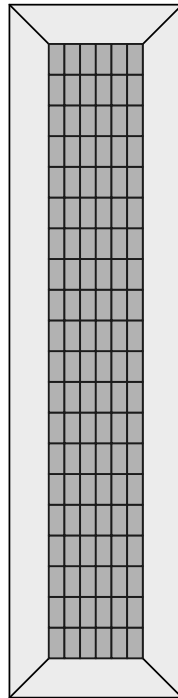
Chamber Storage + Stone Storage = 996.0 cf = 0.023 af

Overall Storage Efficiency = 25.8%

120 Chambers

143.1 cy Field

48.9 cy Stone



# Silva Cell

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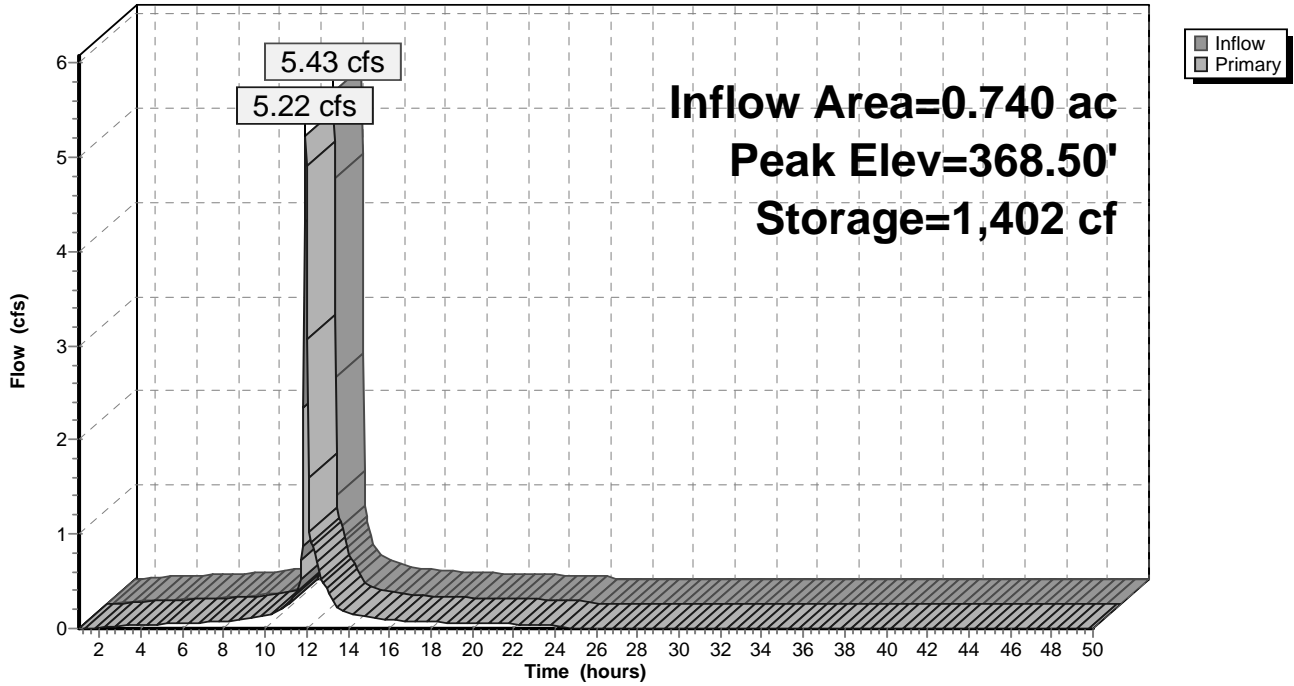
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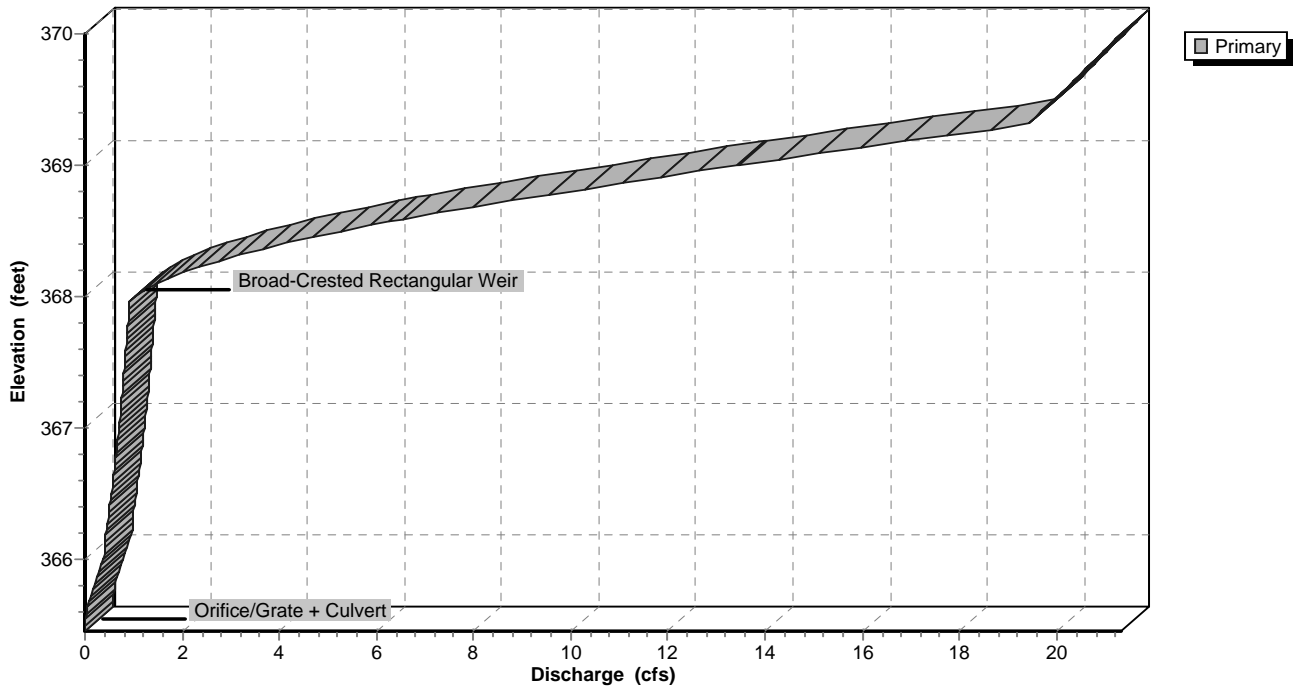
## Pond 2P: Silva Cell

Hydrograph



## Pond 2P: Silva Cell

Stage-Discharge



# Silva Cell

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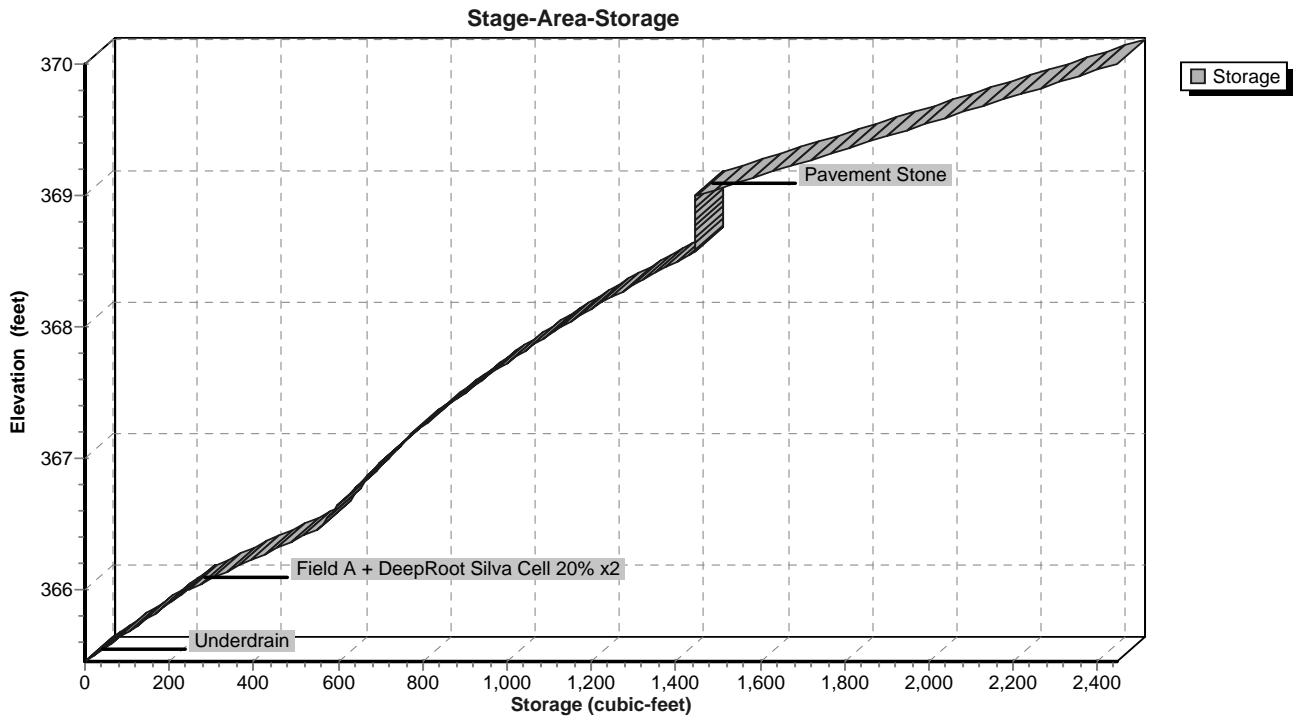
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## Pond 2P: Silva Cell



**Silva Cell**

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**Hydrograph for Pond 2P: Silva Cell**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	365.46	0.00
2.00	0.02	37	365.54	0.01
3.00	0.03	66	365.61	0.03
4.00	0.04	75	365.63	0.04
5.00	0.05	84	365.65	0.05
6.00	0.06	90	365.66	0.06
7.00	0.07	97	365.67	0.07
8.00	0.08	102	365.69	0.08
9.00	0.11	119	365.72	0.11
10.00	0.14	132	365.75	0.13
11.00	<b>0.26</b>	<b>181</b>	<b>365.86</b>	<b>0.24</b>
12.00	<b>4.52</b>	<b>1,387</b>	<b>368.47</b>	<b>4.91</b>
13.00	0.25	344	366.16	0.40
14.00	0.15	143	365.78	0.16
15.00	0.12	125	365.74	0.12
16.00	0.09	112	365.71	0.09
17.00	0.08	105	365.69	0.08
18.00	0.07	99	365.68	0.07
19.00	0.06	93	365.67	0.06
20.00	0.05	87	365.65	0.05
21.00	0.05	84	365.65	0.05
22.00	0.05	83	365.64	0.05
23.00	0.04	82	365.64	0.04
24.00	0.04	80	365.64	0.04
25.00	0.00	33	365.53	0.01
26.00	0.00	21	365.51	0.00
27.00	0.00	17	365.50	0.00
28.00	0.00	13	365.49	0.00
29.00	0.00	11	365.48	0.00
30.00	0.00	8	365.48	0.00
31.00	0.00	7	365.47	0.00
32.00	0.00	5	365.47	0.00
33.00	0.00	4	365.47	0.00
34.00	0.00	3	365.47	0.00
35.00	0.00	3	365.47	0.00
36.00	0.00	2	365.46	0.00
37.00	0.00	2	365.46	0.00
38.00	0.00	1	365.46	0.00
39.00	0.00	1	365.46	0.00
40.00	0.00	1	365.46	0.00
41.00	0.00	1	365.46	0.00
42.00	0.00	1	365.46	0.00
43.00	0.00	0	365.46	0.00
44.00	0.00	0	365.46	0.00
45.00	0.00	0	365.46	0.00
46.00	0.00	0	365.46	0.00
47.00	0.00	0	365.46	0.00
48.00	0.00	0	365.46	0.00
49.00	0.00	0	365.46	0.00
50.00	0.00	0	365.46	0.00

**Silva Cell**

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**Stage-Discharge for Pond 2P: Silva Cell**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
365.46	0.00	368.11	1.52
365.51	0.00	368.16	1.84
365.56	0.01	368.21	2.21
365.61	0.03	368.26	2.63
365.66	0.06	368.31	3.09
365.71	0.09	368.36	3.59
365.76	0.14	368.41	4.14
365.81	0.19	368.46	4.73
365.86	0.23	368.51	5.37
365.91	0.28	368.56	6.05
365.96	0.33	368.61	6.80
366.01	0.37	368.66	7.59
366.06	0.40	368.71	8.44
366.11	0.41	368.76	9.34
366.16	0.40	368.81	10.15
366.21	0.43	368.86	10.98
366.26	0.45	368.91	11.84
366.31	0.47	368.96	12.73
366.36	0.49	369.01	13.62
366.41	0.51	369.06	14.53
366.46	0.53	369.11	15.46
366.51	0.54	369.16	16.42
366.56	0.56	369.21	17.39
366.61	0.58	369.26	18.38
366.66	0.59	369.31	19.39
366.71	0.61	369.36	19.55
366.76	0.63	369.41	19.70
366.81	0.64	369.46	19.84
366.86	0.66	369.51	19.98
366.91	0.67	369.56	20.12
366.96	0.68	369.61	20.26
367.01	0.70	369.66	20.40
367.06	0.71	369.71	20.54
367.11	0.72	369.76	20.68
367.16	0.74	369.81	20.81
367.21	0.75	369.86	20.95
367.26	0.76	369.91	21.08
367.31	0.78	369.96	<b>21.22</b>
367.36	0.79		
367.41	0.80		
367.46	0.81		
367.51	0.82		
367.56	0.83		
367.61	0.85		
367.66	0.86		
367.71	0.87		
367.76	0.88		
367.81	0.89		
367.86	0.90		
367.91	0.91		
367.96	0.92		
368.01	1.04		
368.06	1.25		

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**Stage-Area-Storage for Pond 2P: Silva Cell**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
365.46	0	368.11	1,185
365.51	23	368.16	1,211
365.56	45	368.21	1,238
365.61	68	368.26	1,265
365.66	90	368.31	1,293
365.71	113	368.36	1,321
365.76	135	368.41	1,350
365.81	158	368.46	1,379
365.86	180	368.51	1,408
365.91	203	368.56	1,438
365.96	226	368.61	1,447
366.01	250	368.66	1,447
366.06	282	368.71	1,447
366.11	314	368.76	1,447
366.16	347	368.81	1,447
366.21	380	368.86	1,447
366.26	413	368.91	1,447
366.31	447	368.96	1,447
366.36	481	369.01	1,457
366.41	516	369.06	1,507
366.46	551	369.11	1,557
366.51	563	369.16	1,607
366.56	577	369.21	1,657
366.61	590	369.26	1,707
366.66	604	369.31	1,757
366.71	618	369.36	1,807
366.76	633	369.41	1,857
366.81	648	369.46	1,906
366.86	664	369.51	1,956
366.91	680	369.56	2,006
366.96	696	369.61	2,056
367.01	713	369.66	2,106
367.06	730	369.71	2,156
367.11	747	369.76	2,206
367.16	765	369.81	2,256
367.21	783	369.86	2,306
367.26	802	369.91	2,356
367.31	821	369.96	<b>2,406</b>
367.36	841		
367.41	861		
367.46	881		
367.51	902		
367.56	923		
367.61	945		
367.66	967		
367.71	989		
367.76	1,012		
367.81	1,036		
367.86	1,059		
367.91	1,084		
367.96	1,108		
368.01	1,133		
368.06	1,159		



### Summary for Pond 3P: Underdrains

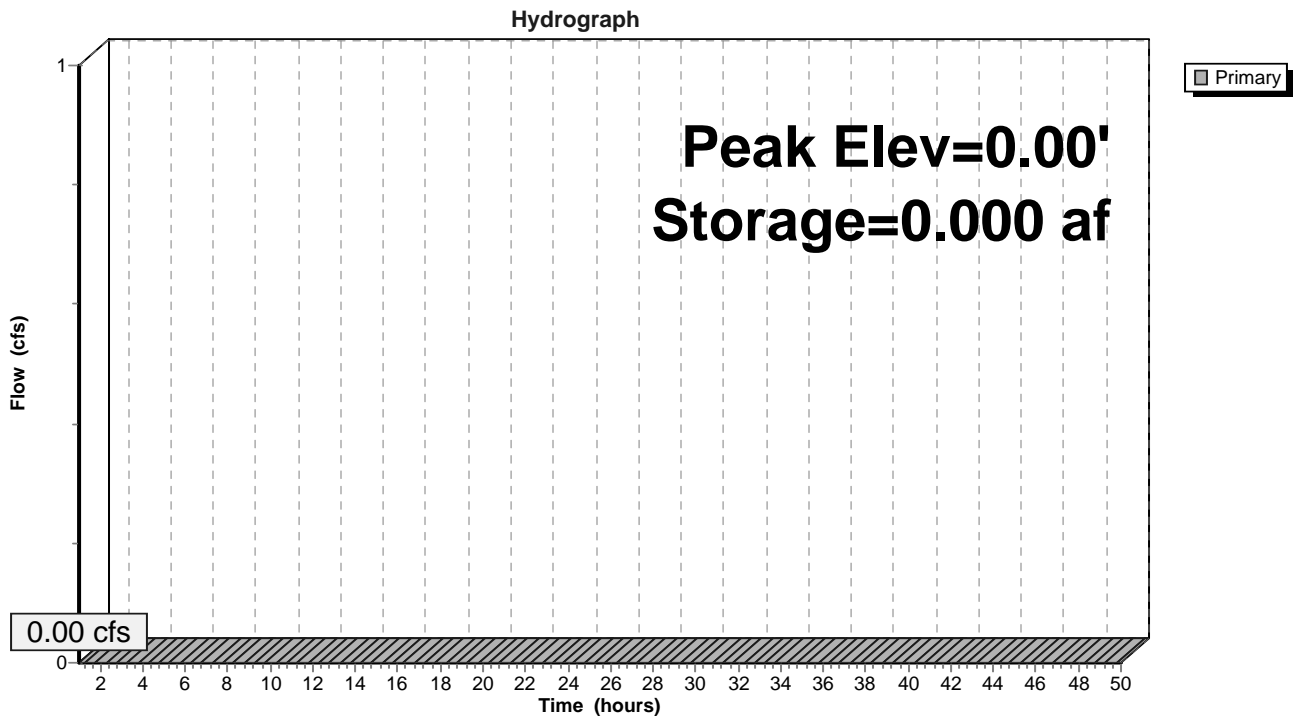
[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	366.00'	0.010 af	<b>12.00'W x 94.00'L x 1.00'H Prismatic</b> 0.026 af Overall x 40.0% Voids

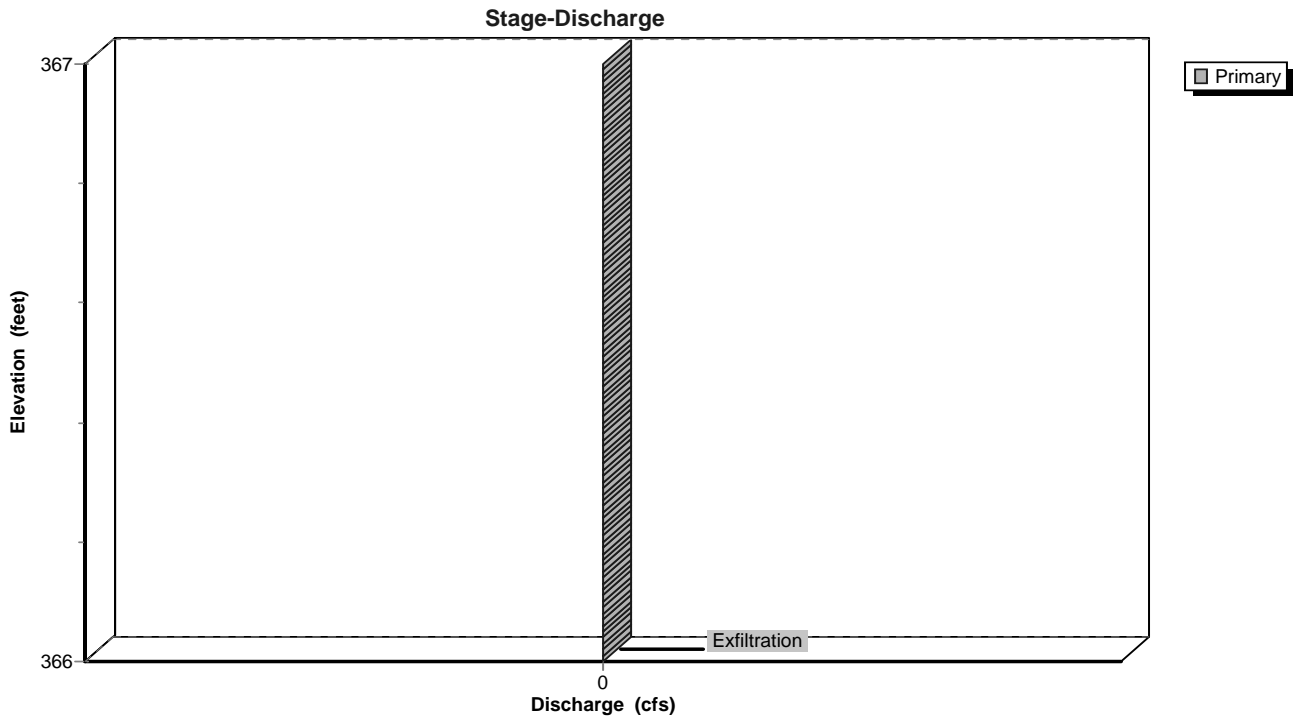
Device	Routing	Invert	Outlet Devices
#1	Primary	366.00'	<b>10.000 in/hr Exfiltration over Surface area above 366.00'</b> Conductivity to Groundwater Elevation = 0.00' Excluded Surface area = 0.026 ac

**Primary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=0.00' (Free Discharge)  
 ↳ **1=Exfiltration** ( Controls 0.00 cfs)

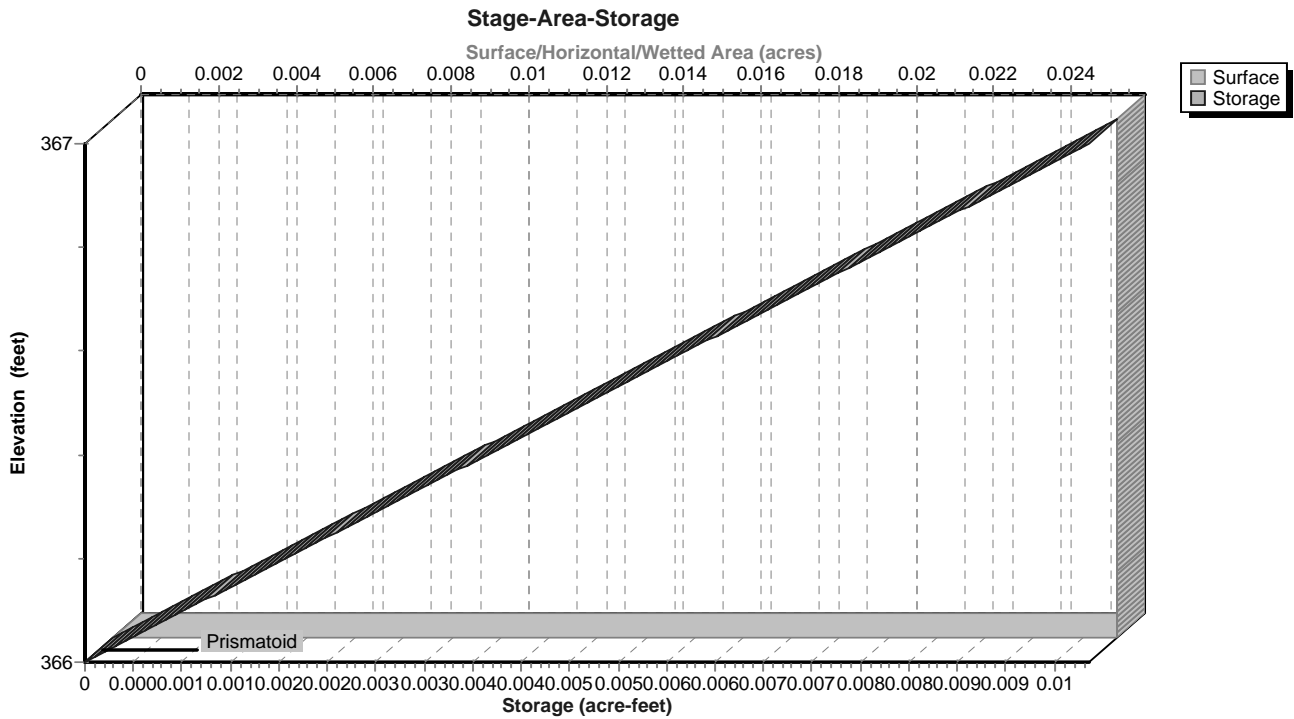
### Pond 3P: Underdrains



### Pond 3P: Underdrains



### Pond 3P: Underdrains



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**Stage-Discharge for Pond 3P: Underdrains**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
366.00	0.00	366.53	0.00
366.01	0.00	366.54	0.00
366.02	0.00	366.55	0.00
366.03	0.00	366.56	0.00
366.04	0.00	366.57	0.00
366.05	0.00	366.58	0.00
366.06	0.00	366.59	0.00
366.07	0.00	366.60	0.00
366.08	0.00	366.61	0.00
366.09	0.00	366.62	0.00
366.10	0.00	366.63	0.00
366.11	0.00	366.64	0.00
366.12	0.00	366.65	0.00
366.13	0.00	366.66	0.00
366.14	0.00	366.67	0.00
366.15	0.00	366.68	0.00
366.16	0.00	366.69	0.00
366.17	0.00	366.70	0.00
366.18	0.00	366.71	0.00
366.19	0.00	366.72	0.00
366.20	0.00	366.73	0.00
366.21	0.00	366.74	0.00
366.22	0.00	366.75	0.00
366.23	0.00	366.76	0.00
366.24	0.00	366.77	0.00
366.25	0.00	366.78	0.00
366.26	0.00	366.79	0.00
366.27	0.00	366.80	0.00
366.28	0.00	366.81	0.00
366.29	0.00	366.82	0.00
366.30	0.00	366.83	0.00
366.31	0.00	366.84	0.00
366.32	0.00	366.85	0.00
366.33	0.00	366.86	0.00
366.34	0.00	366.87	0.00
366.35	0.00	366.88	0.00
366.36	0.00	366.89	0.00
366.37	0.00	366.90	0.00
366.38	0.00	366.91	0.00
366.39	0.00	366.92	0.00
366.40	0.00	366.93	0.00
366.41	0.00	366.94	0.00
366.42	0.00	366.95	0.00
366.43	0.00	366.96	0.00
366.44	0.00	366.97	0.00
366.45	0.00	366.98	0.00
366.46	0.00	366.99	0.00
366.47	0.00	367.00	0.00
366.48	0.00		
366.49	0.00		
366.50	0.00		
366.51	0.00		
366.52	0.00		

**Stage-Area-Storage for Pond 3P: Underdrains**

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
366.00	<b>0.026</b>	0.000	366.53	0.026	0.005
366.01	0.026	0.000	366.54	0.026	0.006
366.02	0.026	0.000	366.55	0.026	0.006
366.03	0.026	0.000	366.56	0.026	0.006
366.04	0.026	0.000	366.57	0.026	0.006
366.05	0.026	0.001	366.58	0.026	0.006
366.06	0.026	0.001	366.59	0.026	0.006
366.07	0.026	0.001	366.60	0.026	0.006
366.08	0.026	0.001	366.61	0.026	0.006
366.09	0.026	0.001	366.62	0.026	0.006
366.10	0.026	0.001	366.63	0.026	0.007
366.11	0.026	0.001	366.64	0.026	0.007
366.12	0.026	0.001	366.65	0.026	0.007
366.13	0.026	0.001	366.66	0.026	0.007
366.14	0.026	0.001	366.67	0.026	0.007
366.15	0.026	0.002	366.68	0.026	0.007
366.16	0.026	0.002	366.69	0.026	0.007
366.17	0.026	0.002	366.70	0.026	0.007
366.18	0.026	0.002	366.71	0.026	0.007
366.19	0.026	0.002	366.72	0.026	0.007
366.20	0.026	0.002	366.73	0.026	0.008
366.21	0.026	0.002	366.74	0.026	0.008
366.22	0.026	0.002	366.75	0.026	0.008
366.23	0.026	0.002	366.76	0.026	0.008
366.24	0.026	0.002	366.77	0.026	0.008
366.25	0.026	0.003	366.78	0.026	0.008
366.26	0.026	0.003	366.79	0.026	0.008
366.27	0.026	0.003	366.80	0.026	0.008
366.28	0.026	0.003	366.81	0.026	0.008
366.29	0.026	0.003	366.82	0.026	0.008
366.30	0.026	0.003	366.83	0.026	0.009
366.31	0.026	0.003	366.84	0.026	0.009
366.32	0.026	0.003	366.85	0.026	0.009
366.33	0.026	0.003	366.86	0.026	0.009
366.34	0.026	0.004	366.87	0.026	0.009
366.35	0.026	0.004	366.88	0.026	0.009
366.36	0.026	0.004	366.89	0.026	0.009
366.37	0.026	0.004	366.90	0.026	0.009
366.38	0.026	0.004	366.91	0.026	0.009
366.39	0.026	0.004	366.92	0.026	0.010
366.40	0.026	0.004	366.93	0.026	0.010
366.41	0.026	0.004	366.94	0.026	0.010
366.42	0.026	0.004	366.95	0.026	0.010
366.43	0.026	0.004	366.96	0.026	0.010
366.44	0.026	0.005	366.97	0.026	0.010
366.45	0.026	0.005	366.98	0.026	0.010
366.46	0.026	0.005	366.99	0.026	0.010
366.47	0.026	0.005	367.00	0.026	<b>0.010</b>
366.48	0.026	0.005			
366.49	0.026	0.005			
366.50	0.026	0.005			
366.51	0.026	0.005			
366.52	0.026	0.005			

**Silva Cell**

Type II 24-hr 100-year Rainfall=7.40"

Prepared by Microsoft

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Time span=1.00-50.00 hrs, dt=0.05 hrs, 981 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 2S: Drainage Area**

Runoff Area=0.740 ac 100.00% Impervious Runoff Depth>7.16"  
Tc=5.0 min CN=98 Runoff=7.90 cfs 0.441 af

**Pond 1P: Porous Pavement**

Peak Elev=0.00' Storage=0 cf  
Primary=0.00 cfs 0.000 af

**Pond 2P: Silva Cell**

Peak Elev=368.70' Storage=1,447 cf Inflow=7.90 cfs 0.441 af  
Outflow=8.28 cfs 0.441 af

**Pond 3P: Underdrains**

Peak Elev=0.00' Storage=0.000 af  
Primary=0.00 cfs 0.000 af

**Total Runoff Area = 0.740 ac Runoff Volume = 0.441 af Average Runoff Depth = 7.16"**  
**0.00% Pervious = 0.000 ac 100.00% Impervious = 0.740 ac**

### Summary for Subcatchment 2S: Drainage Area

[49] Hint:  $T_c < 2dt$  may require smaller  $dt$

Runoff = 7.90 cfs @ 11.95 hrs, Volume= 0.441 af, Depth > 7.16"

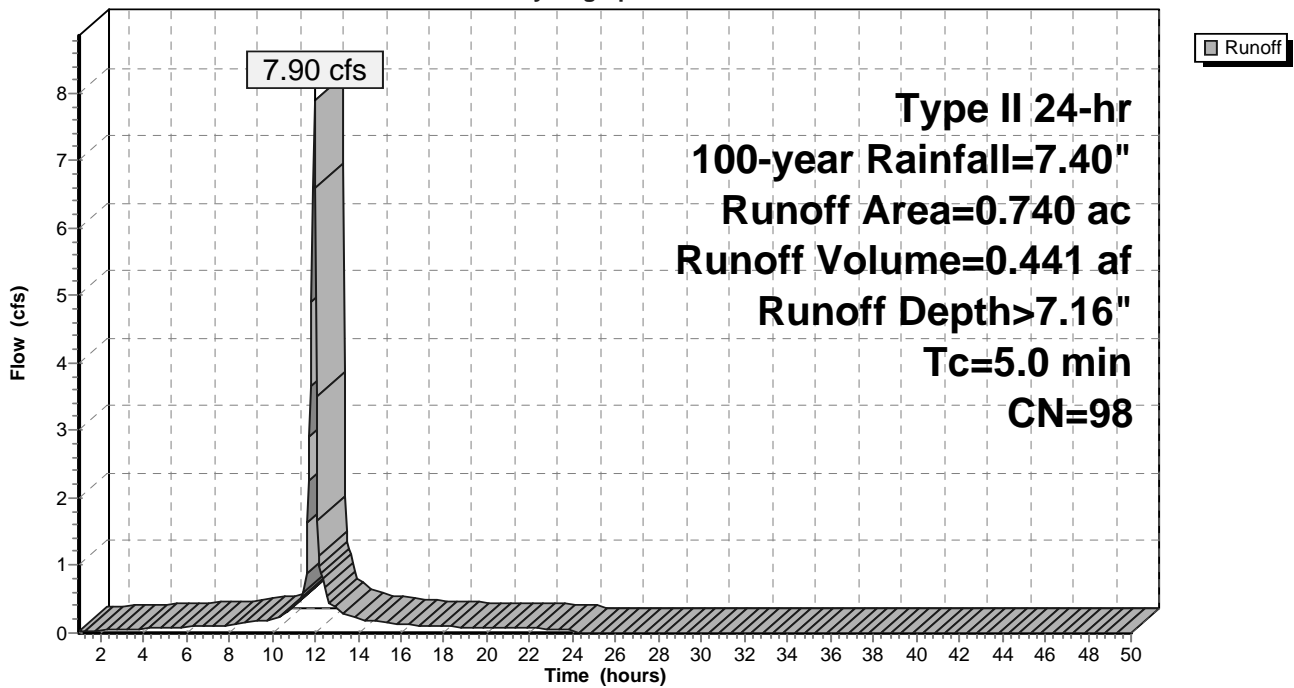
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-50.00 hrs,  $dt=0.05$  hrs  
 Type II 24-hr 100-year Rainfall=7.40"

Area (ac)	CN	Description
* 0.740	98	
0.740		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

### Subcatchment 2S: Drainage Area

Hydrograph



**Hydrograph for Subcatchment 2S: Drainage Area**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.01	0.01	27.50	7.40	7.16	0.00
1.50	0.12	0.02	0.03	28.00	7.40	7.16	0.00
2.00	0.16	0.05	0.04	28.50	7.40	7.16	0.00
2.50	0.21	0.08	0.05	29.00	7.40	7.16	0.00
3.00	0.26	0.11	0.05	29.50	7.40	7.16	0.00
3.50	0.30	0.15	0.06	30.00	7.40	7.16	0.00
4.00	0.36	0.19	0.06	30.50	7.40	7.16	0.00
4.50	0.41	0.24	0.07	31.00	7.40	7.16	0.00
5.00	0.47	0.29	0.08	31.50	7.40	7.16	0.00
5.50	0.53	0.34	0.08	32.00	7.40	7.16	0.00
6.00	0.59	0.40	0.09	32.50	7.40	7.16	0.00
6.50	0.66	0.47	0.10	33.00	7.40	7.16	0.00
7.00	0.73	0.53	0.10	33.50	7.40	7.16	0.00
7.50	0.81	0.61	0.11	34.00	7.40	7.16	0.00
8.00	0.89	0.68	0.12	34.50	7.40	7.16	0.00
8.50	0.98	0.77	0.14	35.00	7.40	7.16	0.00
9.00	1.09	0.88	0.17	35.50	7.40	7.16	0.00
9.50	1.21	0.99	0.17	36.00	7.40	7.16	0.00
10.00	1.34	1.12	0.21	36.50	7.40	7.16	0.00
10.50	1.51	1.29	0.27	37.00	7.40	7.16	0.00
11.00	1.74	1.52	0.38	37.50	7.40	7.16	0.00
11.50	2.09	1.87	<b>0.62</b>	38.00	7.40	7.16	0.00
12.00	4.91	4.67	<b>6.58</b>	38.50	7.40	7.16	0.00
12.50	5.44	5.20	0.58	39.00	7.40	7.16	0.00
13.00	5.71	5.47	0.36	39.50	7.40	7.16	0.00
13.50	5.91	5.67	0.27	40.00	7.40	7.16	0.00
14.00	6.07	5.83	0.21	40.50	7.40	7.16	0.00
14.50	6.20	5.96	0.19	41.00	7.40	7.16	0.00
15.00	6.32	6.08	0.17	41.50	7.40	7.16	0.00
15.50	6.42	6.18	0.15	42.00	7.40	7.16	0.00
16.00	6.51	6.27	0.13	42.50	7.40	7.16	0.00
16.50	6.59	6.36	0.12	43.00	7.40	7.16	0.00
17.00	6.67	6.43	0.11	43.50	7.40	7.16	0.00
17.50	6.75	6.51	0.11	44.00	7.40	7.16	0.00
18.00	6.82	6.58	0.10	44.50	7.40	7.16	0.00
18.50	6.88	6.64	0.09	45.00	7.40	7.16	0.00
19.00	6.94	6.70	0.09	45.50	7.40	7.16	0.00
19.50	6.99	6.76	0.08	46.00	7.40	7.16	0.00
20.00	7.04	6.81	0.07	46.50	7.40	7.16	0.00
20.50	7.09	6.85	0.07	47.00	7.40	7.16	0.00
21.00	7.14	6.90	0.07	47.50	7.40	7.16	0.00
21.50	7.18	6.95	0.07	48.00	7.40	7.16	0.00
22.00	7.23	6.99	0.07	48.50	7.40	7.16	0.00
22.50	7.27	7.03	0.07	49.00	7.40	7.16	0.00
23.00	7.32	7.08	0.06	49.50	7.40	7.16	0.00
23.50	7.36	7.12	0.06	50.00	7.40	7.16	0.00
24.00	<b>7.40</b>	<b>7.16</b>	0.06				
24.50	7.40	7.16	0.00				
25.00	7.40	7.16	0.00				
25.50	7.40	7.16	0.00				
26.00	7.40	7.16	0.00				
26.50	7.40	7.16	0.00				
27.00	7.40	7.16	0.00				

**Summary for Pond 1P: Porous Pavement**

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	368.50'	3,633 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

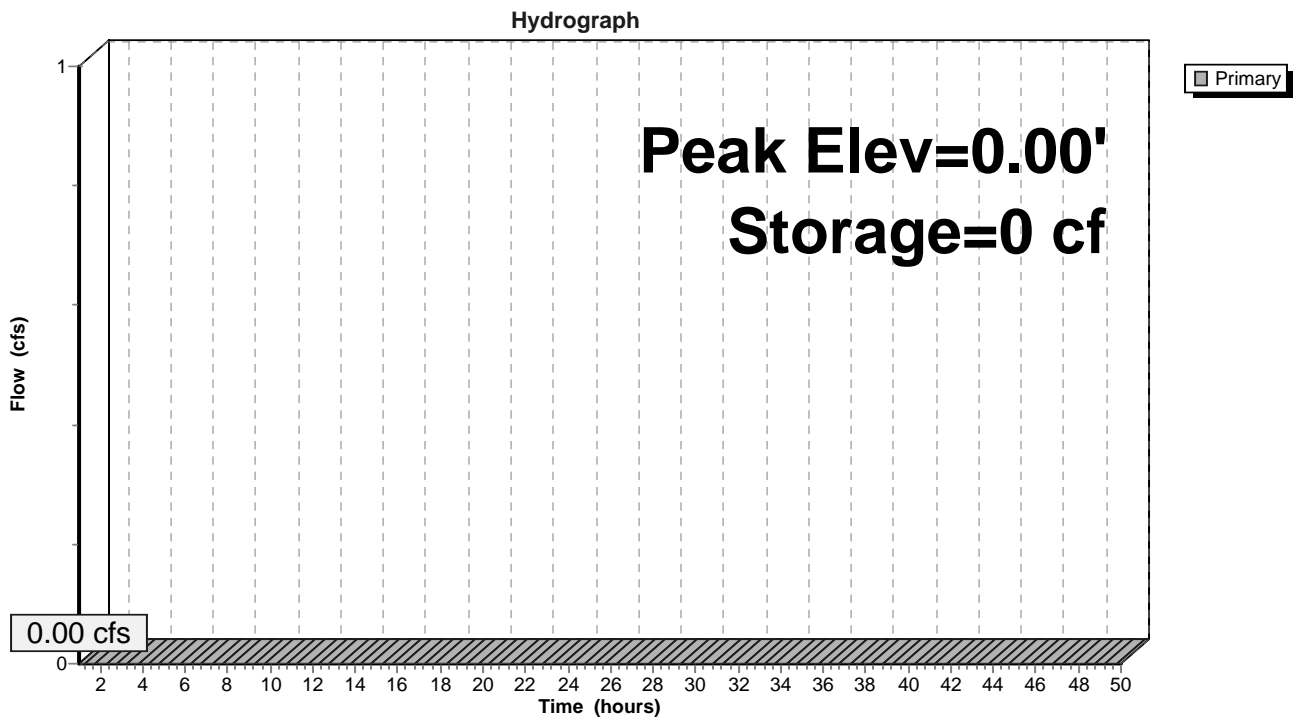
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
368.50	2,496	0.0	0	0
369.00	2,496	40.0	499	499
369.33	2,496	30.0	247	746
369.50	2,496	20.0	85	831
370.00	8,712	100.0	2,802	3,633

Device	Routing	Invert	Outlet Devices
#1	Primary	368.50'	<b>10.000 in/hr Exfiltration over Surface area above 368.50'</b> Conductivity to Groundwater Elevation = 0.00' Excluded Surface area = 2,496 sf

**Primary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=0.00' (Free Discharge)

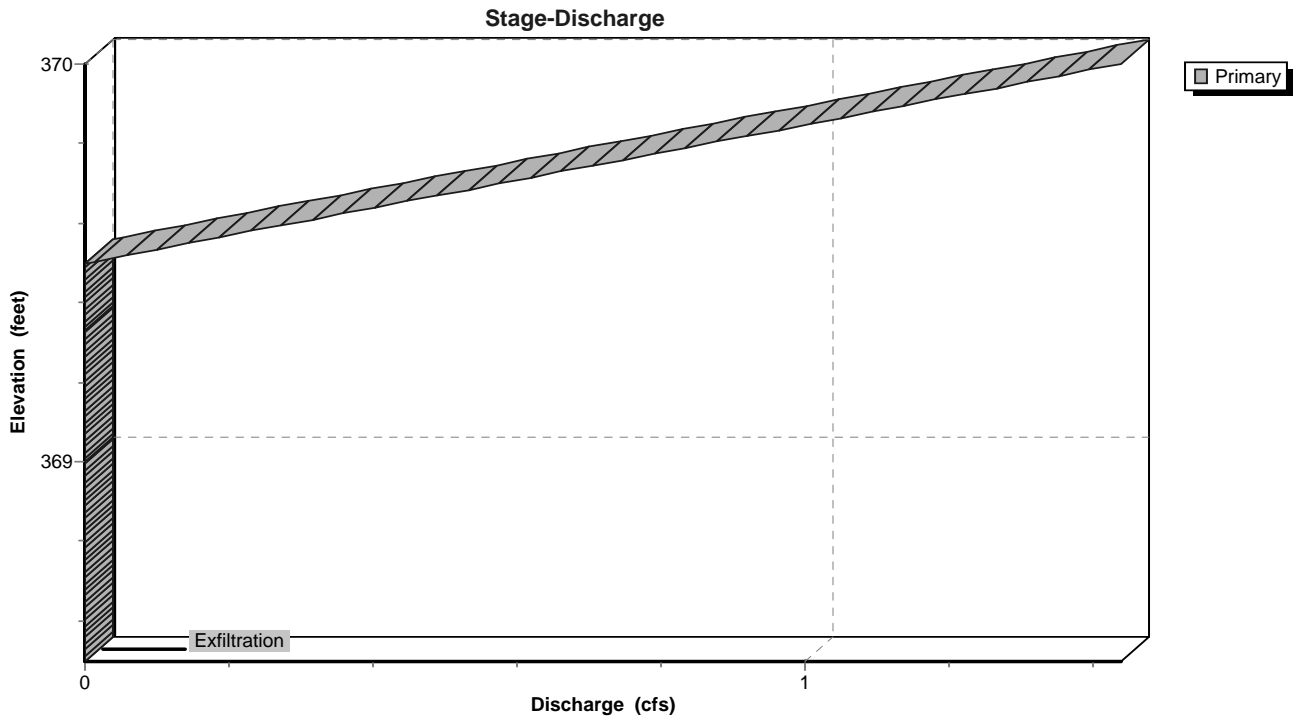
←1=Exfiltration ( Controls 0.00 cfs)

**Pond 1P: Porous Pavement**

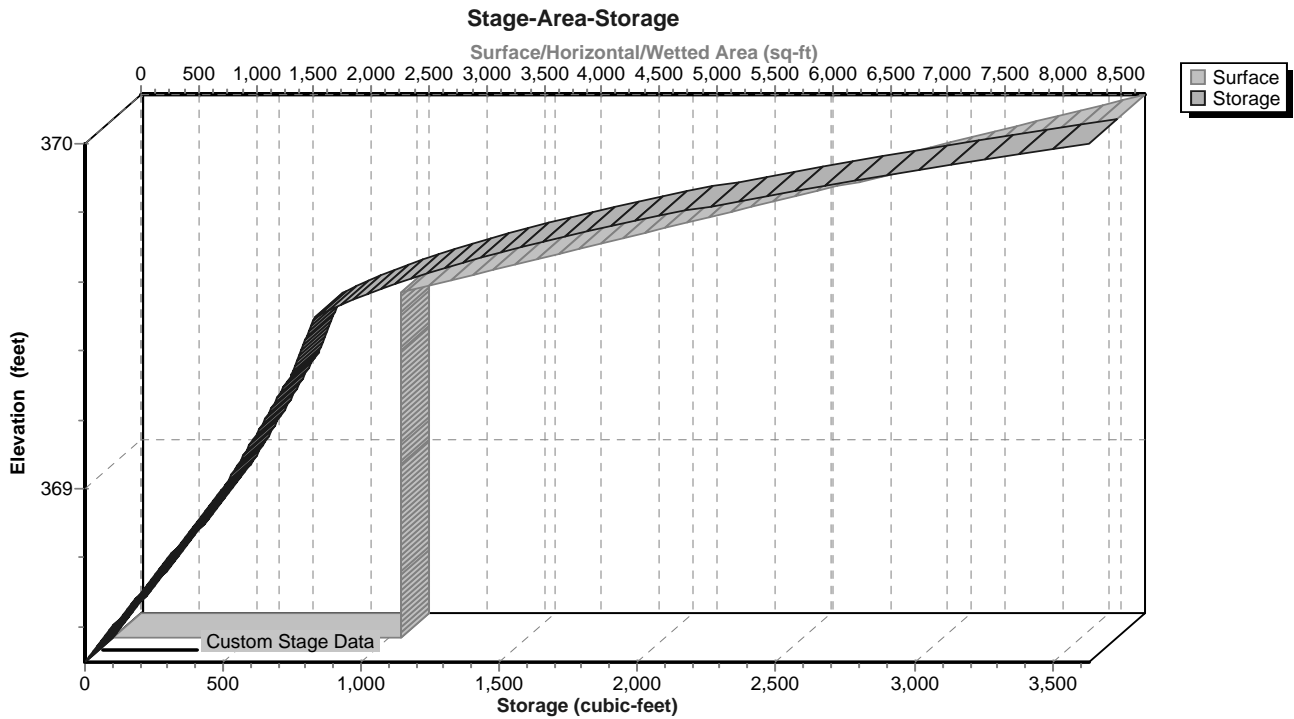




### Pond 1P: Porous Pavement



### Pond 1P: Porous Pavement



**Stage-Discharge for Pond 1P: Porous Pavement**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
368.50	0.00	369.03	0.00	369.56	0.17
368.51	0.00	369.04	0.00	369.57	0.20
368.52	0.00	369.05	0.00	369.58	0.23
368.53	0.00	369.06	0.00	369.59	0.26
368.54	0.00	369.07	0.00	369.60	0.29
368.55	0.00	369.08	0.00	369.61	0.32
368.56	0.00	369.09	0.00	369.62	0.35
368.57	0.00	369.10	0.00	369.63	0.37
368.58	0.00	369.11	0.00	369.64	0.40
368.59	0.00	369.12	0.00	369.65	0.43
368.60	0.00	369.13	0.00	369.66	0.46
368.61	0.00	369.14	0.00	369.67	0.49
368.62	0.00	369.15	0.00	369.68	0.52
368.63	0.00	369.16	0.00	369.69	0.55
368.64	0.00	369.17	0.00	369.70	0.58
368.65	0.00	369.18	0.00	369.71	0.60
368.66	0.00	369.19	0.00	369.72	0.63
368.67	0.00	369.20	0.00	369.73	0.66
368.68	0.00	369.21	0.00	369.74	0.69
368.69	0.00	369.22	0.00	369.75	0.72
368.70	0.00	369.23	0.00	369.76	0.75
368.71	0.00	369.24	0.00	369.77	0.78
368.72	0.00	369.25	0.00	369.78	0.81
368.73	0.00	369.26	0.00	369.79	0.83
368.74	0.00	369.27	0.00	369.80	0.86
368.75	0.00	369.28	0.00	369.81	0.89
368.76	0.00	369.29	0.00	369.82	0.92
368.77	0.00	369.30	0.00	369.83	0.95
368.78	0.00	369.31	0.00	369.84	0.98
368.79	0.00	369.32	0.00	369.85	1.01
368.80	0.00	369.33	0.00	369.86	1.04
368.81	0.00	369.34	0.00	369.87	1.07
368.82	0.00	369.35	0.00	369.88	1.09
368.83	0.00	369.36	0.00	369.89	1.12
368.84	0.00	369.37	0.00	369.90	1.15
368.85	0.00	369.38	0.00	369.91	1.18
368.86	0.00	369.39	0.00	369.92	1.21
368.87	0.00	369.40	0.00	369.93	1.24
368.88	0.00	369.41	0.00	369.94	1.27
368.89	0.00	369.42	0.00	369.95	1.30
368.90	0.00	369.43	0.00	369.96	1.32
368.91	0.00	369.44	0.00	369.97	1.35
368.92	0.00	369.45	0.00	369.98	1.38
368.93	0.00	369.46	0.00	369.99	1.41
368.94	0.00	369.47	0.00	370.00	<b>1.44</b>
368.95	0.00	369.48	0.00		
368.96	0.00	369.49	0.00		
368.97	0.00	369.50	0.00		
368.98	0.00	369.51	0.03		
368.99	0.00	369.52	0.06		
369.00	0.00	369.53	0.09		
369.01	0.00	369.54	0.12		
369.02	0.00	369.55	0.14		

**Stage-Area-Storage for Pond 1P: Porous Pavement**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
368.50	2,496	0	369.56	3,242	1,003
368.52	2,496	20	369.58	3,491	1,071
368.54	2,496	40	369.60	3,739	1,143
368.56	2,496	60	369.62	3,988	1,220
368.58	2,496	80	369.64	4,236	1,302
368.60	2,496	100	369.66	4,485	1,390
368.62	2,496	120	369.68	4,734	1,482
368.64	2,496	140	369.70	4,982	1,579
368.66	2,496	160	369.72	5,231	1,681
368.68	2,496	180	369.74	5,480	1,788
368.70	2,496	200	369.76	5,728	1,900
368.72	2,496	220	369.78	5,977	2,017
368.74	2,496	240	369.80	6,226	2,139
368.76	2,496	260	369.82	6,474	2,266
368.78	2,496	280	369.84	6,723	2,398
368.80	2,496	300	369.86	6,972	2,535
368.82	2,496	319	369.88	7,220	2,677
368.84	2,496	339	369.90	7,469	2,824
368.86	2,496	359	369.92	7,717	2,976
368.88	2,496	379	369.94	7,966	3,133
368.90	2,496	399	369.96	8,215	3,295
368.92	2,496	419	369.98	8,463	3,461
368.94	2,496	439	370.00	<b>8,712</b>	<b>3,633</b>
368.96	2,496	459			
368.98	2,496	479			
369.00	2,496	499			
369.02	2,496	514			
369.04	2,496	529			
369.06	2,496	544			
369.08	2,496	559			
369.10	2,496	574			
369.12	2,496	589			
369.14	2,496	604			
369.16	2,496	619			
369.18	2,496	634			
369.20	2,496	649			
369.22	2,496	664			
369.24	2,496	679			
369.26	2,496	694			
369.28	2,496	709			
369.30	2,496	724			
369.32	2,496	739			
369.34	2,496	751			
369.36	2,496	761			
369.38	2,496	771			
369.40	2,496	781			
369.42	2,496	791			
369.44	2,496	801			
369.46	2,496	811			
369.48	2,496	821			
369.50	2,496	831			
369.52	2,745	884			
369.54	2,993	941			

**Summary for Pond 2P: Silva Cell**

[82] Warning: Early inflow requires earlier time span

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.740 ac, 100.00% Impervious, Inflow Depth > 7.16" for 100-year event  
 Inflow = 7.90 cfs @ 11.95 hrs, Volume= 0.441 af  
 Outflow = 8.28 cfs @ 11.95 hrs, Volume= 0.441 af, Atten= 0%, Lag= 0.0 min  
 Primary = 8.28 cfs @ 11.95 hrs, Volume= 0.441 af

Routing by Stor-Ind method, Time Span= 1.00-50.00 hrs, dt= 0.05 hrs  
 Peak Elev= 368.70' @ 11.95 hrs Surf.Area= 3,176 sf Storage= 1,447 cf

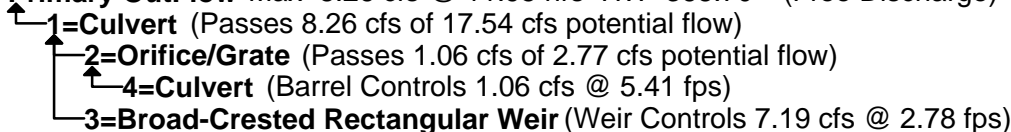
Plug-Flow detention time= 14.1 min calculated for 0.441 af (100% of inflow)  
 Center-of-Mass det. time= 13.6 min ( 751.0 - 737.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	369.00'	998 cf	<b>24.00'W x 104.00'L x 1.00'H Pavement Stone</b> 2,496 cf Overall x 40.0% Voids
#2A	366.00'	528 cf	<b>12.30'W x 80.33'L x 2.58'H Field A Z=2.0</b> 3,864 cf Overall - 2,544 cf Embedded = 1,319 cf x 40.0% Voids
#3A	366.00'	468 cf	<b>DeepRoot Silva Cell 20% x2 x 120 Inside #2</b> Inside= 24.6"W x 30.9"H => 0.97 sf x 4.02'L = 3.9 cf Outside= 24.6"W x 30.9"H => 5.28 sf x 4.02'L = 21.2 cf 6 Rows of 20 Chambers
#4	365.46'	451 cf	<b>12.00'W x 94.00'L x 1.00'H Underdrain</b> 1,128 cf Overall x 40.0% Voids
		2,446 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	365.23'	<b>18.0" Round Culvert</b> L= 10.5' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 365.23' / 365.00' S= 0.0219 1/ S= 0.0219 1/ Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	365.46'	<b>8.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	367.96'	<b>3.5' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 2	365.46'	<b>6.0" Round Culvert</b> L= 94.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 365.46' / 365.23' S= 0.0024 1/ S= 0.0024 1/ Cc= 0.900 n= 0.011, Flow Area= 0.20 sf

**Primary OutFlow** Max=8.26 cfs @ 11.95 hrs HW=368.70' (Free Discharge)



## Silva Cell

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### Pond 2P: Silva Cell - Chamber Wizard Field A

**Chamber Model = DeepRoot Silva Cell 20% x2 (Silva Cell +1", Bioretention Soil, 20% Voids, 2 Deep)**

Inside= 24.6"W x 30.9"H => 0.97 sf x 4.02'L = 3.9 cf

Outside= 24.6"W x 30.9"H => 5.28 sf x 4.02'L = 21.2 cf

20 Chambers/Row x 4.02' Long = 80.33' Row Length

6 Rows x 24.6" Wide = 12.30' Base Width

30.9" Chamber Height = 2.58' Field Height

2.0 ' Side-Z x Height = 61.8" Flare/Side

Base Length + Flare x 2 = 90.63' Top Length

Base Width + Flare x 2 = 22.60' Top Width

120 Chambers x 3.9 cf = 468.2 cf Chamber Storage

120 Chambers x 21.2 cf = 2,544.4 cf Displacement

3,863.9 cf Field - 2,544.4 cf Chambers = 1,319.5 cf Stone x 40.0% Voids = 527.8 cf Stone Storage

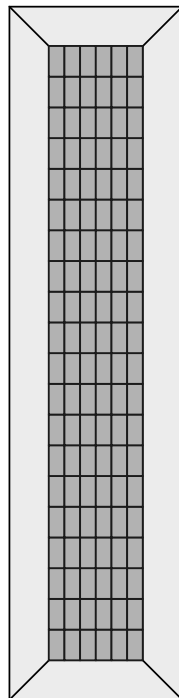
Chamber Storage + Stone Storage = 996.0 cf = 0.023 af

Overall Storage Efficiency = 25.8%

120 Chambers

143.1 cy Field

48.9 cy Stone



# Silva Cell

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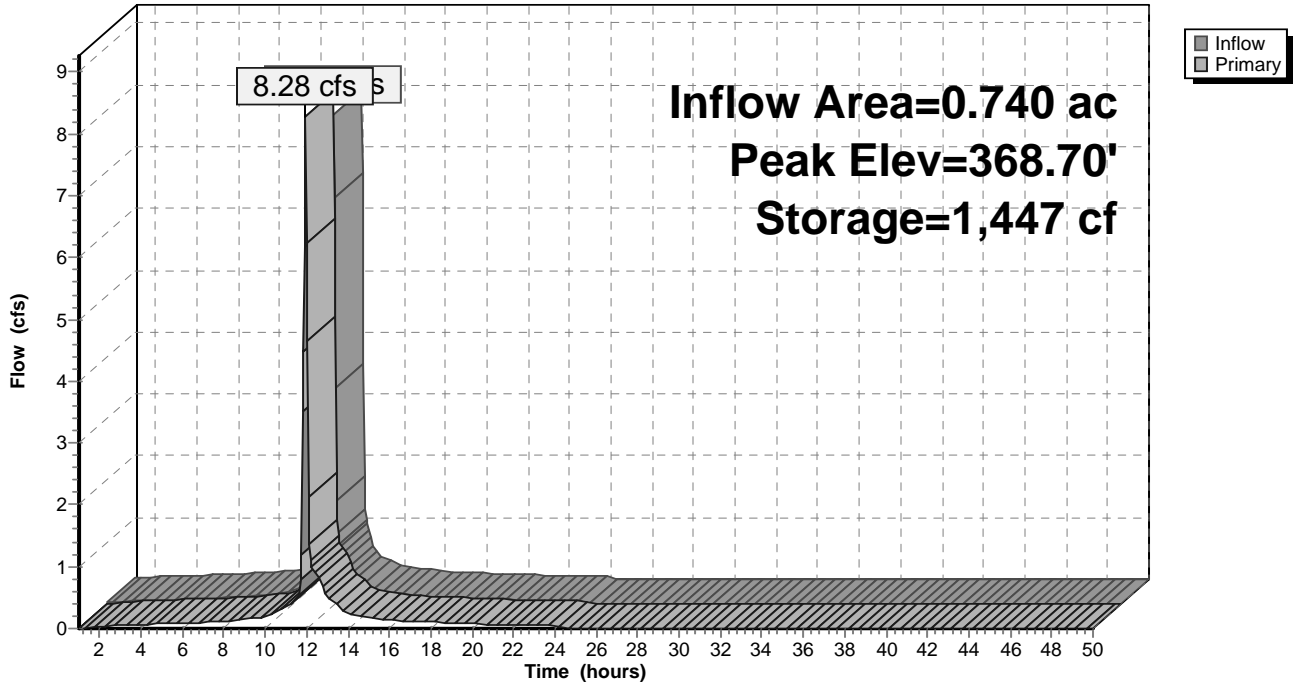
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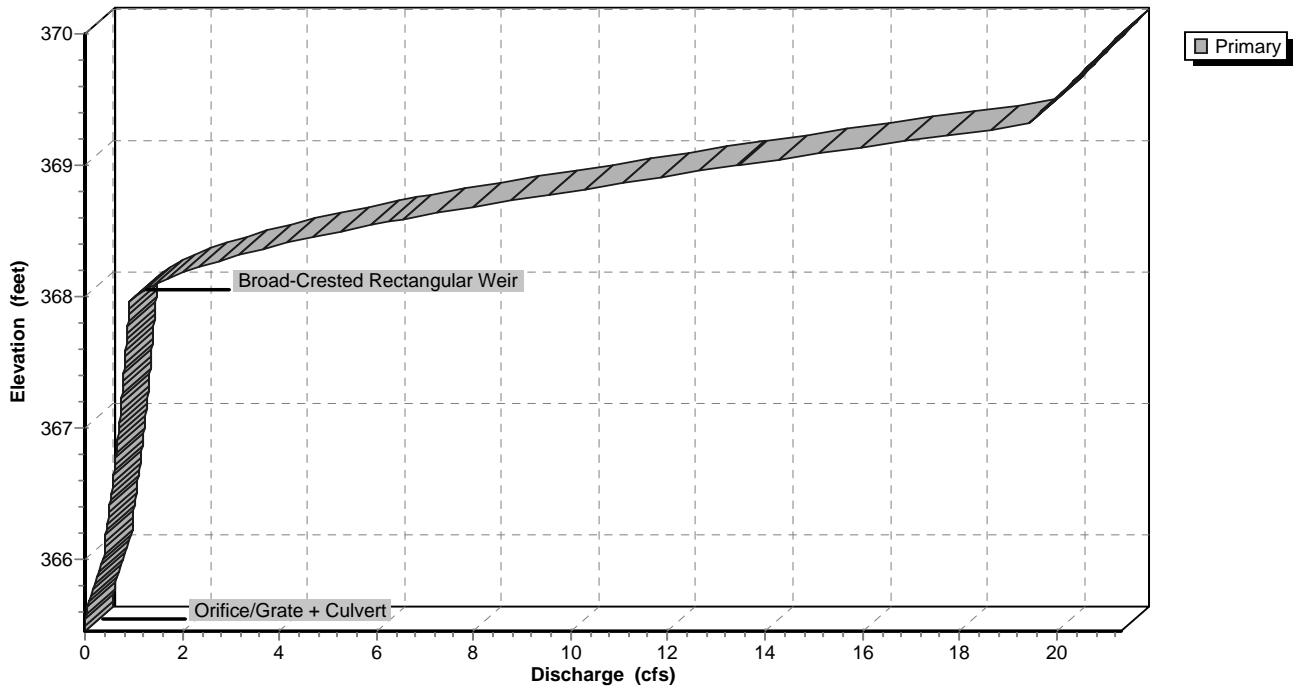
## Pond 2P: Silva Cell

Hydrograph



## Pond 2P: Silva Cell

Stage-Discharge



# Silva Cell

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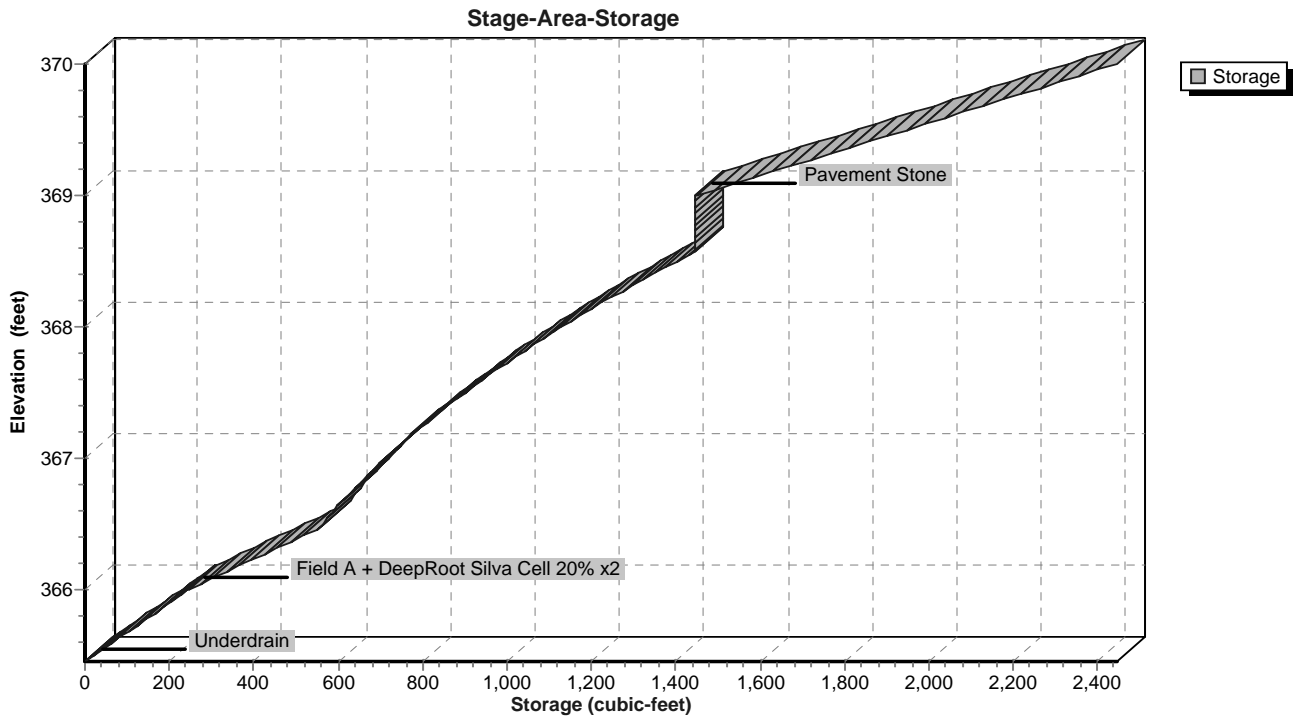
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## Pond 2P: Silva Cell



**Silva Cell**

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**Hydrograph for Pond 2P: Silva Cell**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.01	1	365.46	0.00
2.00	0.04	67	365.61	0.03
3.00	0.05	86	365.65	0.05
4.00	0.06	94	365.67	0.06
5.00	0.08	102	365.69	0.08
6.00	0.09	110	365.70	0.09
7.00	0.10	116	365.72	0.10
8.00	0.12	123	365.73	0.11
9.00	0.17	144	365.78	0.16
10.00	0.21	163	365.82	0.20
11.00	<b>0.38</b>	<b>235</b>	<b>365.98</b>	<b>0.34</b>
12.00	<b>6.58</b>	<b>1,445</b>	<b>368.57</b>	<b>6.22</b>
13.00	0.36	524	366.42	0.51
14.00	0.21	179	365.86	0.23
15.00	0.17	151	365.79	0.17
16.00	0.13	132	365.75	0.13
17.00	0.11	124	365.73	0.12
18.00	0.10	116	365.72	0.10
19.00	0.09	109	365.70	0.09
20.00	0.07	102	365.69	0.07
21.00	0.07	99	365.68	0.07
22.00	0.07	97	365.67	0.07
23.00	0.06	95	365.67	0.06
24.00	0.06	93	365.67	0.06
25.00	0.00	34	365.54	0.01
26.00	0.00	22	365.51	0.00
27.00	0.00	17	365.50	0.00
28.00	0.00	14	365.49	0.00
29.00	0.00	11	365.48	0.00
30.00	0.00	9	365.48	0.00
31.00	0.00	7	365.47	0.00
32.00	0.00	5	365.47	0.00
33.00	0.00	4	365.47	0.00
34.00	0.00	3	365.47	0.00
35.00	0.00	3	365.47	0.00
36.00	0.00	2	365.46	0.00
37.00	0.00	2	365.46	0.00
38.00	0.00	1	365.46	0.00
39.00	0.00	1	365.46	0.00
40.00	0.00	1	365.46	0.00
41.00	0.00	1	365.46	0.00
42.00	0.00	1	365.46	0.00
43.00	0.00	0	365.46	0.00
44.00	0.00	0	365.46	0.00
45.00	0.00	0	365.46	0.00
46.00	0.00	0	365.46	0.00
47.00	0.00	0	365.46	0.00
48.00	0.00	0	365.46	0.00
49.00	0.00	0	365.46	0.00
50.00	0.00	0	365.46	0.00



**Silva Cell**

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**Stage-Discharge for Pond 2P: Silva Cell**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
365.46	0.00	368.11	1.52
365.51	0.00	368.16	1.84
365.56	0.01	368.21	2.21
365.61	0.03	368.26	2.63
365.66	0.06	368.31	3.09
365.71	0.09	368.36	3.59
365.76	0.14	368.41	4.14
365.81	0.19	368.46	4.73
365.86	0.23	368.51	5.37
365.91	0.28	368.56	6.05
365.96	0.33	368.61	6.80
366.01	0.37	368.66	7.59
366.06	0.40	368.71	8.44
366.11	0.41	368.76	9.34
366.16	0.40	368.81	10.15
366.21	0.43	368.86	10.98
366.26	0.45	368.91	11.84
366.31	0.47	368.96	12.73
366.36	0.49	369.01	13.62
366.41	0.51	369.06	14.53
366.46	0.53	369.11	15.46
366.51	0.54	369.16	16.42
366.56	0.56	369.21	17.39
366.61	0.58	369.26	18.38
366.66	0.59	369.31	19.39
366.71	0.61	369.36	19.55
366.76	0.63	369.41	19.70
366.81	0.64	369.46	19.84
366.86	0.66	369.51	19.98
366.91	0.67	369.56	20.12
366.96	0.68	369.61	20.26
367.01	0.70	369.66	20.40
367.06	0.71	369.71	20.54
367.11	0.72	369.76	20.68
367.16	0.74	369.81	20.81
367.21	0.75	369.86	20.95
367.26	0.76	369.91	21.08
367.31	0.78	369.96	<b>21.22</b>
367.36	0.79		
367.41	0.80		
367.46	0.81		
367.51	0.82		
367.56	0.83		
367.61	0.85		
367.66	0.86		
367.71	0.87		
367.76	0.88		
367.81	0.89		
367.86	0.90		
367.91	0.91		
367.96	0.92		
368.01	1.04		
368.06	1.25		

**Silva Cell**

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**Stage-Area-Storage for Pond 2P: Silva Cell**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
365.46	0	368.11	1,185
365.51	23	368.16	1,211
365.56	45	368.21	1,238
365.61	68	368.26	1,265
365.66	90	368.31	1,293
365.71	113	368.36	1,321
365.76	135	368.41	1,350
365.81	158	368.46	1,379
365.86	180	368.51	1,408
365.91	203	368.56	1,438
365.96	226	368.61	1,447
366.01	250	368.66	1,447
366.06	282	368.71	1,447
366.11	314	368.76	1,447
366.16	347	368.81	1,447
366.21	380	368.86	1,447
366.26	413	368.91	1,447
366.31	447	368.96	1,447
366.36	481	369.01	1,457
366.41	516	369.06	1,507
366.46	551	369.11	1,557
366.51	563	369.16	1,607
366.56	577	369.21	1,657
366.61	590	369.26	1,707
366.66	604	369.31	1,757
366.71	618	369.36	1,807
366.76	633	369.41	1,857
366.81	648	369.46	1,906
366.86	664	369.51	1,956
366.91	680	369.56	2,006
366.96	696	369.61	2,056
367.01	713	369.66	2,106
367.06	730	369.71	2,156
367.11	747	369.76	2,206
367.16	765	369.81	2,256
367.21	783	369.86	2,306
367.26	802	369.91	2,356
367.31	821	369.96	<b>2,406</b>
367.36	841		
367.41	861		
367.46	881		
367.51	902		
367.56	923		
367.61	945		
367.66	967		
367.71	989		
367.76	1,012		
367.81	1,036		
367.86	1,059		
367.91	1,084		
367.96	1,108		
368.01	1,133		
368.06	1,159		

**Summary for Pond 3P: Underdrains**

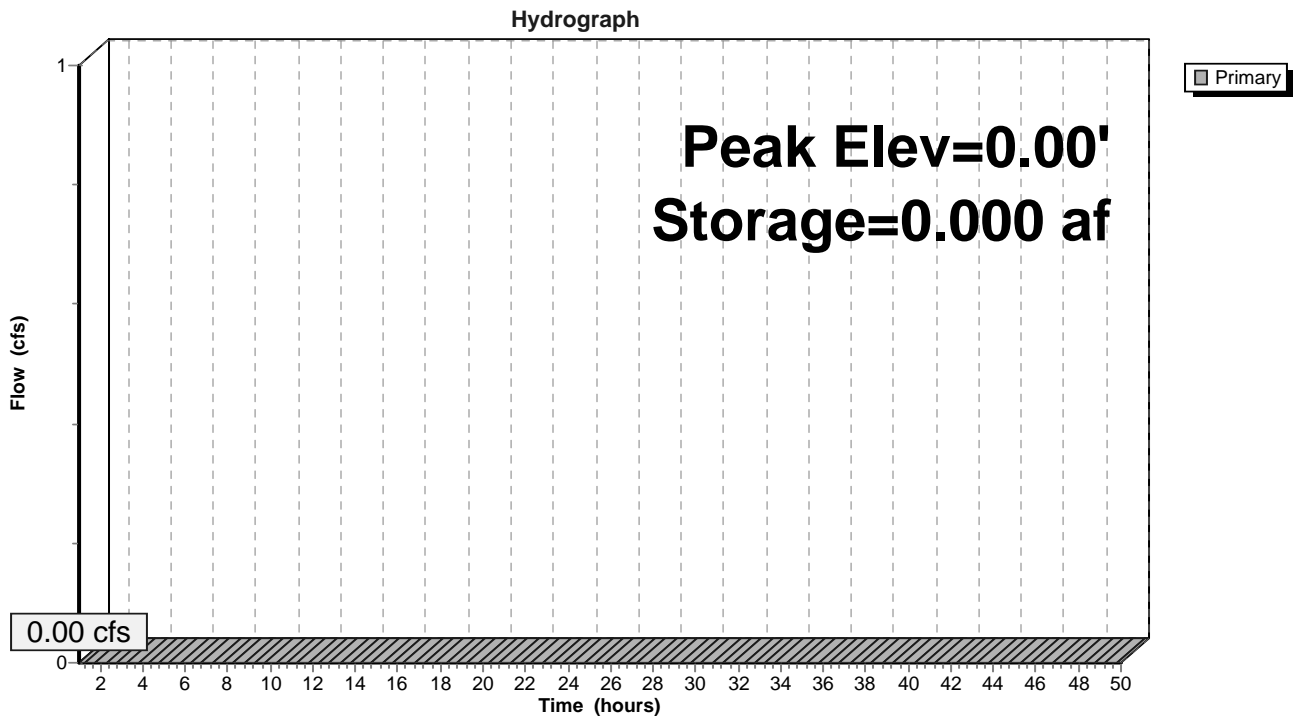
[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	366.00'	0.010 af	<b>12.00'W x 94.00'L x 1.00'H Prismatic</b> 0.026 af Overall x 40.0% Voids

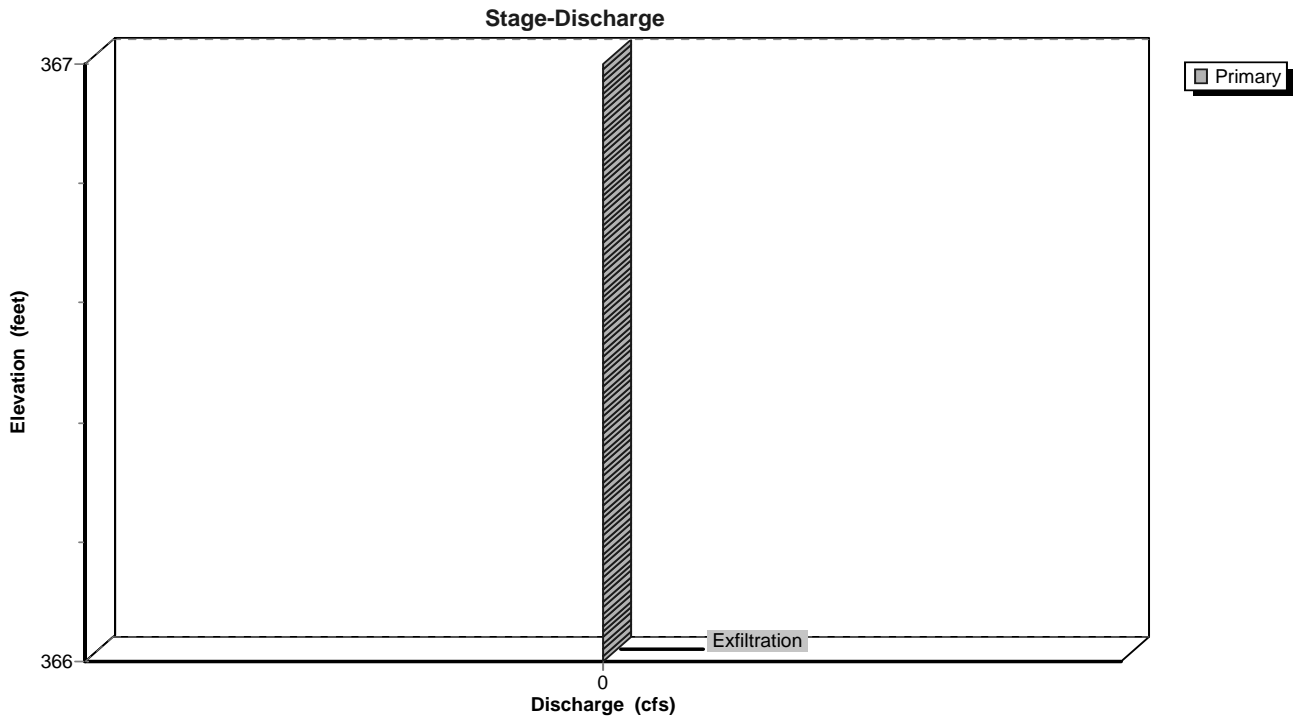
Device	Routing	Invert	Outlet Devices
#1	Primary	366.00'	<b>10.000 in/hr Exfiltration over Surface area above 366.00'</b> Conductivity to Groundwater Elevation = 0.00' Excluded Surface area = 0.026 ac

**Primary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=0.00' (Free Discharge)  
 ↳ **1=Exfiltration** ( Controls 0.00 cfs)

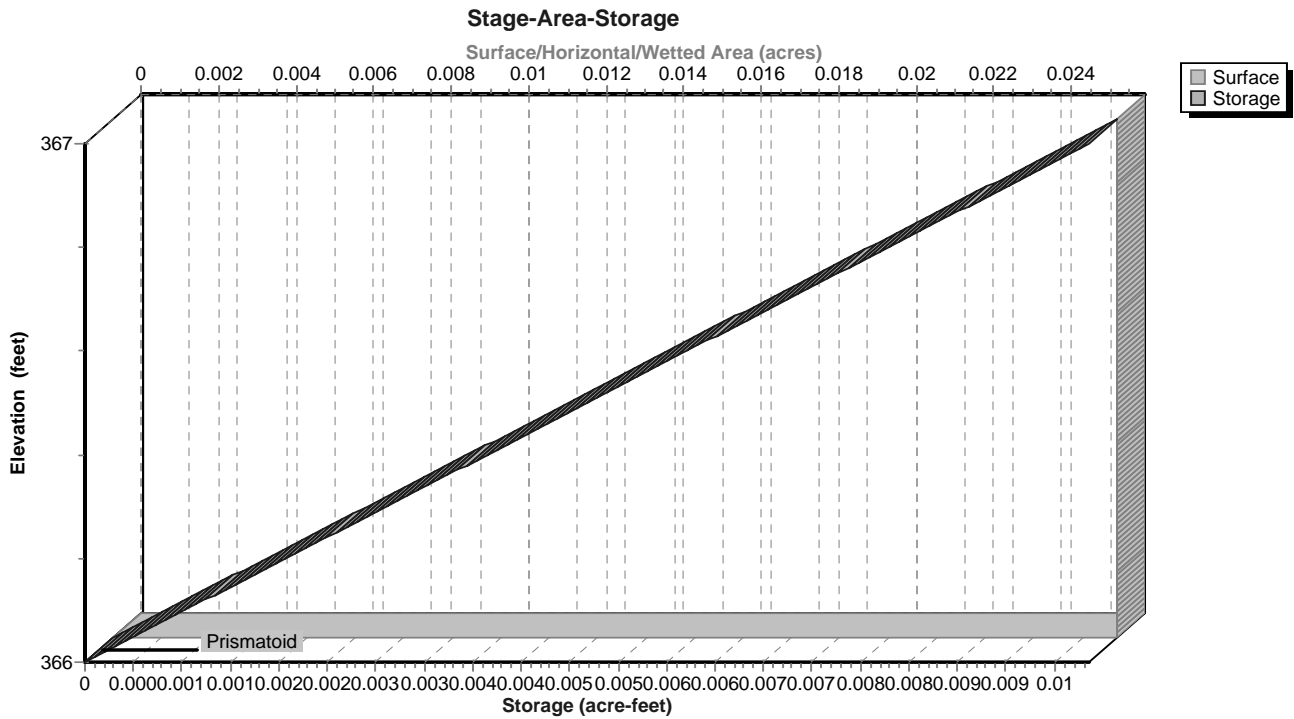
**Pond 3P: Underdrains**



### Pond 3P: Underdrains



### Pond 3P: Underdrains



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**Stage-Discharge for Pond 3P: Underdrains**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
366.00	<b>0.00</b>	366.53	0.00
366.01	0.00	366.54	0.00
366.02	0.00	366.55	0.00
366.03	0.00	366.56	0.00
366.04	0.00	366.57	0.00
366.05	0.00	366.58	0.00
366.06	0.00	366.59	0.00
366.07	0.00	366.60	0.00
366.08	0.00	366.61	0.00
366.09	0.00	366.62	0.00
366.10	0.00	366.63	0.00
366.11	0.00	366.64	0.00
366.12	0.00	366.65	0.00
366.13	0.00	366.66	0.00
366.14	0.00	366.67	0.00
366.15	0.00	366.68	0.00
366.16	0.00	366.69	0.00
366.17	0.00	366.70	0.00
366.18	0.00	366.71	0.00
366.19	0.00	366.72	0.00
366.20	0.00	366.73	0.00
366.21	0.00	366.74	0.00
366.22	0.00	366.75	0.00
366.23	0.00	366.76	0.00
366.24	0.00	366.77	0.00
366.25	0.00	366.78	0.00
366.26	0.00	366.79	0.00
366.27	0.00	366.80	0.00
366.28	0.00	366.81	0.00
366.29	0.00	366.82	0.00
366.30	0.00	366.83	0.00
366.31	0.00	366.84	0.00
366.32	0.00	366.85	0.00
366.33	0.00	366.86	0.00
366.34	0.00	366.87	0.00
366.35	0.00	366.88	0.00
366.36	0.00	366.89	0.00
366.37	0.00	366.90	0.00
366.38	0.00	366.91	0.00
366.39	0.00	366.92	0.00
366.40	0.00	366.93	0.00
366.41	0.00	366.94	0.00
366.42	0.00	366.95	0.00
366.43	0.00	366.96	0.00
366.44	0.00	366.97	0.00
366.45	0.00	366.98	0.00
366.46	0.00	366.99	0.00
366.47	0.00	367.00	0.00
366.48	0.00		
366.49	0.00		
366.50	0.00		
366.51	0.00		
366.52	0.00		

**Stage-Area-Storage for Pond 3P: Underdrains**

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
366.00	<b>0.026</b>	0.000	366.53	0.026	0.005
366.01	0.026	0.000	366.54	0.026	0.006
366.02	0.026	0.000	366.55	0.026	0.006
366.03	0.026	0.000	366.56	0.026	0.006
366.04	0.026	0.000	366.57	0.026	0.006
366.05	0.026	0.001	366.58	0.026	0.006
366.06	0.026	0.001	366.59	0.026	0.006
366.07	0.026	0.001	366.60	0.026	0.006
366.08	0.026	0.001	366.61	0.026	0.006
366.09	0.026	0.001	366.62	0.026	0.006
366.10	0.026	0.001	366.63	0.026	0.007
366.11	0.026	0.001	366.64	0.026	0.007
366.12	0.026	0.001	366.65	0.026	0.007
366.13	0.026	0.001	366.66	0.026	0.007
366.14	0.026	0.001	366.67	0.026	0.007
366.15	0.026	0.002	366.68	0.026	0.007
366.16	0.026	0.002	366.69	0.026	0.007
366.17	0.026	0.002	366.70	0.026	0.007
366.18	0.026	0.002	366.71	0.026	0.007
366.19	0.026	0.002	366.72	0.026	0.007
366.20	0.026	0.002	366.73	0.026	0.008
366.21	0.026	0.002	366.74	0.026	0.008
366.22	0.026	0.002	366.75	0.026	0.008
366.23	0.026	0.002	366.76	0.026	0.008
366.24	0.026	0.002	366.77	0.026	0.008
366.25	0.026	0.003	366.78	0.026	0.008
366.26	0.026	0.003	366.79	0.026	0.008
366.27	0.026	0.003	366.80	0.026	0.008
366.28	0.026	0.003	366.81	0.026	0.008
366.29	0.026	0.003	366.82	0.026	0.008
366.30	0.026	0.003	366.83	0.026	0.009
366.31	0.026	0.003	366.84	0.026	0.009
366.32	0.026	0.003	366.85	0.026	0.009
366.33	0.026	0.003	366.86	0.026	0.009
366.34	0.026	0.004	366.87	0.026	0.009
366.35	0.026	0.004	366.88	0.026	0.009
366.36	0.026	0.004	366.89	0.026	0.009
366.37	0.026	0.004	366.90	0.026	0.009
366.38	0.026	0.004	366.91	0.026	0.009
366.39	0.026	0.004	366.92	0.026	0.010
366.40	0.026	0.004	366.93	0.026	0.010
366.41	0.026	0.004	366.94	0.026	0.010
366.42	0.026	0.004	366.95	0.026	0.010
366.43	0.026	0.004	366.96	0.026	0.010
366.44	0.026	0.005	366.97	0.026	0.010
366.45	0.026	0.005	366.98	0.026	0.010
366.46	0.026	0.005	366.99	0.026	0.010
366.47	0.026	0.005	367.00	0.026	<b>0.010</b>
366.48	0.026	0.005			
366.49	0.026	0.005			
366.50	0.026	0.005			
366.51	0.026	0.005			
366.52	0.026	0.005			