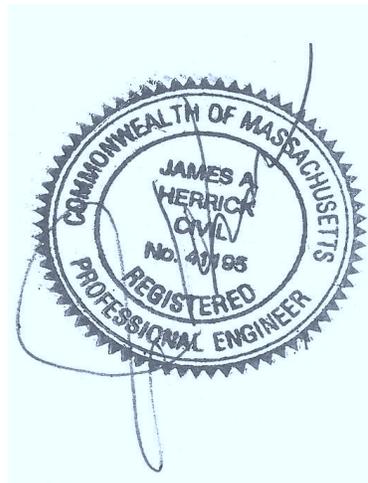


# DRAINAGE REPORT

at

41 Kernwood Avenue  
Haverhill, MA

Feb 2026



# Drainage Report

## 41 Kernwood Ave

### Haverhill, MA

February 2026

## General

This Report is Enclosed to accompany the drainage details shown on the site plan, submitted for the 41 Kernwood Avenue project. The Site is installing a paved parking lot for the Pagoda.

The soil classification for this site was derived from the USDA NRCS Web Soil Survey Web Site. According to this site, the underlying soils are Deerfield loamy fine sand or Wareham loamy sand , 0 to 3 percent slopes , which has a hydrologic soil classification of A for developed land. However a Test Pit dug onsite Reflects a Sandy Clay Loam which would be a Soil Classification of C The Rawl's Infiltration Rate for C Soils-ranges from 0.27-0.17 nches per hr. for the purpose of this report the rate of 0.17 inches per hr will be used

Drainage Analysis showing peak runoff for the 2 yr., 10 yr., 25 yr. and 100 yr. storms is provided herein.

The Stormwater runoff will be Collected on site via Catch Basins Installed at the low side of the Parking Lot which will then then flow into the site's proposed infiltration system which consists of 16 Cultec 330LXHD Infiltrators and then infiltrate into the soil or for larger more infrequent storms, overflow via the Drain overflow into the back area of the Lot, then ultimately infiltrate into the ground.

## Methodology

Hydrocad Software Solutions LLC's Hydro-Cad Software was used to analyze pre and post developed site conditions to determine time of concentration, composite runoff numbers, rainfall intensity, and storm runoff.

The table below summarize the computations for the SITE showing that the post developed flows from the construction of project do not increase the amount of flow from the existing site.

Year Storm	Existing Sub Area	Proposed Sub Area	Outflow	Difference Outflow - Existing
	4S	2S		
2Yr. 3.15"	0.15 CFS	0.46 CFS	0.00 CFS	-0.15 CFS
10 Yr. 4.86"	0.37 CFS	0.71 CFS	0.08 CFS	-0.29 CFS
25 Yr. 6.15"	0.56 CFS	0.90 CFS	0.46 CFS	-0.10 CFS
100 Yr. 8.94"	0.98 CFS	1.31 CFS	1.16 CFS	+0.18 CFS

The Net Resultant is a Reduction of Storm water flow for all Design Storms except the 100 year storm.

## GROUNDWATER RECHARGE CALCULATIONS

### IMPERVIOUS AREA

7050 sq.ft.

### INFILTRATE 1" OF RAINFALL

$7050/12 = 587.5$  CU.FT. RECHARGE CALCULATION

### 16 CULTEC 330XLHD INFILTRATOR SYSTEM VOLUME OF CHAMBER

16 Chambers x 52.2 cf = 835.2 cf Chamber Storage

### VOLUME OF STONE CALCULATION

$33.5' \times 22.83' \times 4.04' = 3089.8$  CU.FT. STONE VOLUME

$3089.82$  CU.FT. STONE VOLUME –  $835.2$  CU.FT CHAMBER VOLUME  
 $= 2254.6$  CU.FT. VOLUME STONE X  $0.4$  (VOIDS) =  $901.8$  CU.FT. TOTAL VOID STORAGE  
 $901.8$  CU.FT VOID STORAGE +  $835.2$  CU.FT. CHAMBER STORAGE =  
 $1737.0$  CU.FT. TOTAL STORAGE  
 $1737.0$  CU.FT. SYSTEM STORAGE >  $587.5$  CU.FT. REQUIRED STORAGE VOLUME

## MA Stormwater Standards Compliance

**Standard 1:** No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

The proposed project's Storm water Management system consists of 16 CULTEC 330XLHD infiltrators. No discharges of stormwater will flow offsite directly into waters or wetlands of the Commonwealth of Massachusetts.

**Standard 2:** Storm water management systems shall be designed so that the post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

The stormwater management system is designed so that the peak discharge rates do not exceed the pre-developed discharge rate for most cases. See table in the Methodology Section. For the 2, 10, 25 & 100 year storms, the peak outflow does not exceed the pre-developed discharge rate except for the 100 yr storm. The discharge of stormwater is subsurface and infiltrates naturally into the ground except for the larger more infrequent storms.

**Standard 3:** Loss of annual recharge to groundwater shall be eliminated or minimized through the use of environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Storm water Handbook.

The proposed stormwater Management System- which consists of 16 CULTEC 330XLHD Infiltrators - will infiltrate stormwater into the ground, ensuring that the annual recharge to groundwater will not be lost, in fact, this system ensures that the vast majority of stormwater from rain events are infiltrated into the ground on site.

**Standard 4:** Storm water management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).

The proposed system consisting of a deep sump catch basins and a proprietary infiltration system is designed to remove in excess of 80% TSS.

**Standard 5:** For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Storm water Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

The project is a proposed Parking area there are no higher potential pollutant loads anticipated on the site for the development.

**Standard 6:** Storm water discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or to any other critical area require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Storm water Handbook.

Project site is not in a Zone II or Interim Wellhead Protection Area or other critical areas.

**Standard 7:** A redevelopment project is required to meet the following Storm water Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Storm water Management Standards and improve existing conditions.

The proposed project is a redevelopment project, meets Standard 2 and Standard 3

The proposed project meets the pretreatment standard 4.

The proposed project meets standard 5 due to there being no anticipated higher pollutant loads from the site.

The proposed project complies with all other requirements of the Storm Water Management Standards and improves upon existing conditions.

**Standard 8:** A plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

The proposed work consists of the grading, paving and the installation of the infiltration system in the parking area, however a straw wattle will surround the work area on the site for erosion control

**Standard 9:** A Long -Term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that stormwater management systems function as designed.

A long term O & M plan will be developed and implemented to ensure that the stormwater management system functions as designed, See O & M plan.

**Standard 10:** All illicit discharges to the stormwater management system are prohibited.

There will be no illicit discharges into the stormwater management system see illicit discharge form.



**41 KERNWOOD HAVERHILL**

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Page 1

**Project Notes**

Rainfall events imported from "NRCS-Rain.txt" for 4035 MA Boston Suffolk County  
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Rainfall events imported from "NRCS-Rain.txt" for 4106 MA Gloucester Essex County  
Rainfall events imported from "NRCS-Rain.txt" for 4035 MA Boston Suffolk County  
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Rainfall events imported from "NRCS-Rain.txt" for 4035 MA Boston Suffolk County  
Rainfall events imported from "NRCS-Rain.txt" for 4175 MA Medford Middlesex County South  
Rainfall events imported from "NRCS-Rain.txt" for 4341 MA Wilmington Middlesex County Central  
Rainfall events imported from "NRCS-Rain.txt" for 4035 MA Boston Suffolk County  
Rainfall events imported from "NRCS-Rain.txt" for 4050 MA Canton Norfolk County  
Rainfall events imported from "NRCS-Rain.txt" for 4035 MA Boston Suffolk County  
Rainfall events imported from "NRCS-Rain.txt" for 4175 MA Medford Middlesex County South  
Rainfall events imported from "NRCS-Rain.txt" for 4175 MA Medford Middlesex County South  
Rainfall events imported from "NRCS-Rain.txt" for 4049 MA Cambridge Middlesex County South  
Rainfall events imported from "NRCS-Rain.txt" for 4035 MA Boston Suffolk County  
Rainfall events imported from "NRCS-Rain.txt" for 4292 MA Taunton Bristol County  
Rainfall events imported from "NRCS-Rain.txt" for 4049 MA Cambridge Middlesex County South  
Rainfall events imported from "NRCS-Rain.txt" for 4127 MA Haverhill Essex County

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41.5 kernwood proposed  
NRCC 24-hr D 1-Year Rainfall=2.63"

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**Summary for Subcatchment 4S: 41 KERNWOOD-EXISTING YARD**

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

Runoff = 0.10 cfs @ 12.13 hrs, Volume= 0.008 af, Depth> 0.60"

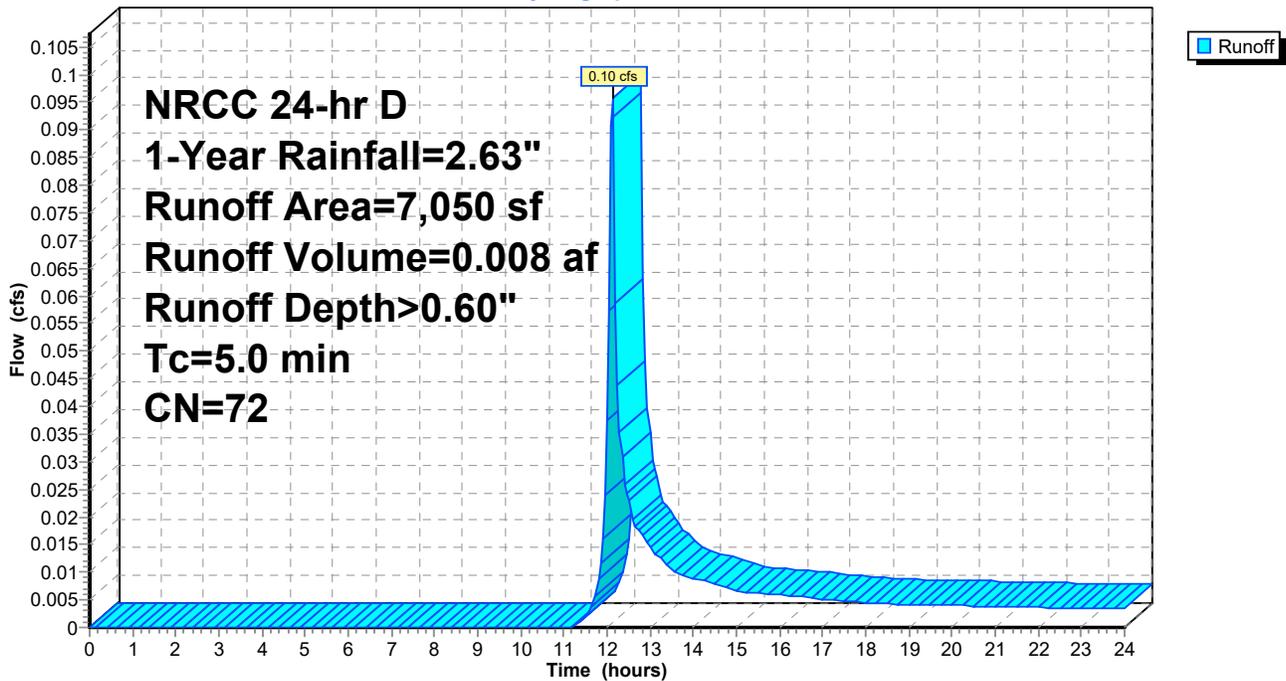
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr D 1-Year Rainfall=2.63"

Area (sf)	CN	Description
7,050	72	Dirt roads, HSG A
7,050		100.00% Pervious Area

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

**Subcatchment 4S: 41 KERNWOOD-EXISTING YARD**

Hydrograph



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Page 3

## Hydrograph for Subcatchment 4S: 41 KERNWOOD-EXISTING YARD

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	1.82	0.22	0.02
0.25	0.01	0.00	0.00	13.00	1.88	0.24	0.01
0.50	0.02	0.00	0.00	13.25	1.93	0.26	0.01
0.75	0.03	0.00	0.00	13.50	1.97	0.28	0.01
1.00	0.04	0.00	0.00	13.75	2.01	0.30	0.01
1.25	0.05	0.00	0.00	14.00	2.04	0.31	0.01
1.50	0.06	0.00	0.00	14.25	2.07	0.32	0.01
1.75	0.07	0.00	0.00	14.50	2.10	0.33	0.01
2.00	0.08	0.00	0.00	14.75	2.12	0.35	0.01
2.25	0.09	0.00	0.00	15.00	2.15	0.36	0.01
2.50	0.10	0.00	0.00	15.25	2.17	0.37	0.01
2.75	0.11	0.00	0.00	15.50	2.19	0.38	0.01
3.00	0.12	0.00	0.00	15.75	2.21	0.39	0.01
3.25	0.13	0.00	0.00	16.00	2.23	0.39	0.01
3.50	0.15	0.00	0.00	16.25	2.25	0.40	0.01
3.75	0.16	0.00	0.00	16.50	2.27	0.41	0.01
4.00	0.17	0.00	0.00	16.75	2.28	0.42	0.01
4.25	0.18	0.00	0.00	17.00	2.30	0.43	0.01
4.50	0.19	0.00	0.00	17.25	2.32	0.44	0.01
4.75	0.21	0.00	0.00	17.50	2.33	0.44	0.00
5.00	0.22	0.00	0.00	17.75	2.35	0.45	0.00
5.25	0.23	0.00	0.00	18.00	2.36	0.46	0.00
5.50	0.24	0.00	0.00	18.25	2.37	0.46	0.00
5.75	0.26	0.00	0.00	18.50	2.39	0.47	0.00
6.00	0.27	0.00	0.00	18.75	2.40	0.48	0.00
6.25	0.28	0.00	0.00	19.00	2.41	0.48	0.00
6.50	0.30	0.00	0.00	19.25	2.42	0.49	0.00
6.75	0.31	0.00	0.00	19.50	2.44	0.50	0.00
7.00	0.33	0.00	0.00	19.75	2.45	0.50	0.00
7.25	0.35	0.00	0.00	20.00	2.46	0.51	0.00
7.50	0.36	0.00	0.00	20.25	2.47	0.51	0.00
7.75	0.38	0.00	0.00	20.50	2.48	0.52	0.00
8.00	0.40	0.00	0.00	20.75	2.50	0.53	0.00
8.25	0.42	0.00	0.00	21.00	2.51	0.53	0.00
8.50	0.44	0.00	0.00	21.25	2.52	0.54	0.00
8.75	0.46	0.00	0.00	21.50	2.53	0.54	0.00
9.00	0.48	0.00	0.00	21.75	2.54	0.55	0.00
9.25	0.51	0.00	0.00	22.00	2.55	0.56	0.00
9.50	0.53	0.00	0.00	22.25	2.56	0.56	0.00
9.75	0.56	0.00	0.00	22.50	2.57	0.57	0.00
10.00	0.59	0.00	0.00	22.75	2.58	0.57	0.00
10.25	0.62	0.00	0.00	23.00	2.59	0.58	0.00
10.50	0.66	0.00	0.00	23.25	2.60	0.58	0.00
10.75	0.70	0.00	0.00	23.50	2.61	0.59	0.00
11.00	0.75	0.00	0.00	23.75	2.62	0.59	0.00
11.25	0.81	0.00	0.00	24.00	<b>2.63</b>	<b>0.60</b>	0.00
11.50	0.88	0.00	0.00				
11.75	0.99	0.01	0.01				
12.00	1.26	0.05	<b>0.04</b>				
12.25	1.64	0.16	<b>0.04</b>				
12.50	1.75	0.19	0.02				

# 41 KERNWOOD HAVERHILL

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41.5 kernwood proposed  
NRCC 24-hr D 2-Year Rainfall=3.15"

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## Summary for Subcatchment 4S: 41 KERNWOOD-EXISTING YARD

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

Runoff = 0.15 cfs @ 12.12 hrs, Volume= 0.012 af, Depth> 0.90"

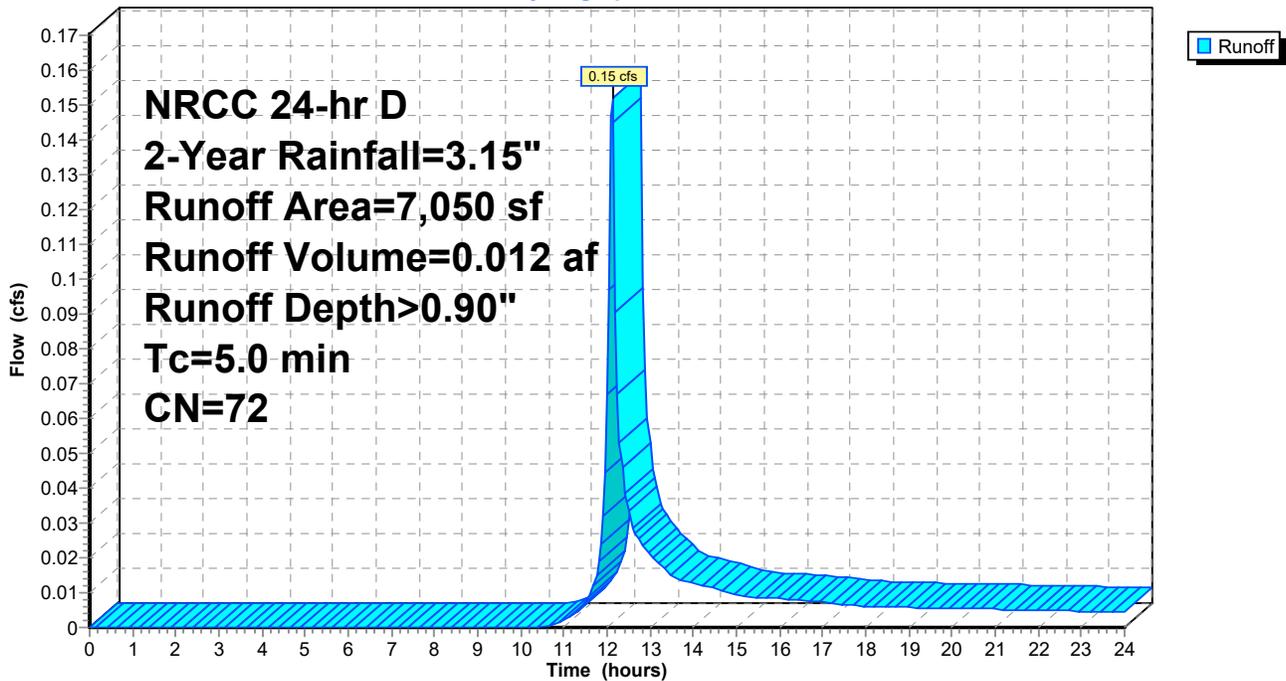
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr D 2-Year Rainfall=3.15"

Area (sf)	CN	Description
7,050	72	Dirt roads, HSG A
7,050		100.00% Pervious Area

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

## Subcatchment 4S: 41 KERNWOOD-EXISTING YARD

Hydrograph



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Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	2.18	0.37	0.03
0.25	0.01	0.00	0.00	13.00	2.26	0.41	0.02
0.50	0.02	0.00	0.00	13.25	2.31	0.43	0.02
0.75	0.03	0.00	0.00	13.50	2.36	0.46	0.02
1.00	0.05	0.00	0.00	13.75	2.40	0.48	0.01
1.25	0.06	0.00	0.00	14.00	2.44	0.50	0.01
1.50	0.07	0.00	0.00	14.25	2.48	0.52	0.01
1.75	0.08	0.00	0.00	14.50	2.51	0.54	0.01
2.00	0.09	0.00	0.00	14.75	2.54	0.55	0.01
2.25	0.11	0.00	0.00	15.00	2.57	0.57	0.01
2.50	0.12	0.00	0.00	15.25	2.60	0.58	0.01
2.75	0.13	0.00	0.00	15.50	2.62	0.59	0.01
3.00	0.15	0.00	0.00	15.75	2.65	0.61	0.01
3.25	0.16	0.00	0.00	16.00	2.67	0.62	0.01
3.50	0.17	0.00	0.00	16.25	2.69	0.63	0.01
3.75	0.19	0.00	0.00	16.50	2.71	0.64	0.01
4.00	0.20	0.00	0.00	16.75	2.73	0.65	0.01
4.25	0.22	0.00	0.00	17.00	2.75	0.67	0.01
4.50	0.23	0.00	0.00	17.25	2.77	0.68	0.01
4.75	0.25	0.00	0.00	17.50	2.79	0.69	0.01
5.00	0.26	0.00	0.00	17.75	2.81	0.70	0.01
5.25	0.28	0.00	0.00	18.00	2.83	0.71	0.01
5.50	0.29	0.00	0.00	18.25	2.84	0.72	0.01
5.75	0.31	0.00	0.00	18.50	2.86	0.72	0.01
6.00	0.32	0.00	0.00	18.75	2.87	0.73	0.01
6.25	0.34	0.00	0.00	19.00	2.89	0.74	0.01
6.50	0.36	0.00	0.00	19.25	2.90	0.75	0.01
6.75	0.38	0.00	0.00	19.50	2.92	0.76	0.01
7.00	0.40	0.00	0.00	19.75	2.93	0.77	0.01
7.25	0.42	0.00	0.00	20.00	2.95	0.78	0.01
7.50	0.44	0.00	0.00	20.25	2.96	0.79	0.01
7.75	0.46	0.00	0.00	20.50	2.98	0.79	0.01
8.00	0.48	0.00	0.00	20.75	2.99	0.80	0.01
8.25	0.50	0.00	0.00	21.00	3.00	0.81	0.01
8.50	0.53	0.00	0.00	21.25	3.02	0.82	0.01
8.75	0.55	0.00	0.00	21.50	3.03	0.83	0.01
9.00	0.58	0.00	0.00	21.75	3.04	0.83	0.01
9.25	0.61	0.00	0.00	22.00	3.06	0.84	0.01
9.50	0.64	0.00	0.00	22.25	3.07	0.85	0.00
9.75	0.67	0.00	0.00	22.50	3.08	0.86	0.00
10.00	0.71	0.00	0.00	22.75	3.09	0.86	0.00
10.25	0.75	0.00	0.00	23.00	3.10	0.87	0.00
10.50	0.79	0.00	0.00	23.25	3.12	0.88	0.00
10.75	0.84	0.00	0.00	23.50	3.13	0.88	0.00
11.00	0.89	0.00	0.00	23.75	3.14	0.89	0.00
11.25	0.97	0.01	0.00	24.00	<b>3.15</b>	<b>0.90</b>	0.00
11.50	1.06	0.02	0.01				
11.75	1.19	0.04	0.02				
12.00	1.51	0.12	<b>0.07</b>				
12.25	1.96	0.28	<b>0.07</b>				
12.50	2.09	0.33	0.03				

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41.5 kernwood proposed  
NRCC 24-hr D 10-Year Rainfall=4.83"

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## Summary for Subcatchment 4S: 41 KERNWOOD-EXISTING YARD

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

Runoff = 0.37 cfs @ 12.12 hrs, Volume= 0.028 af, Depth> 2.06"

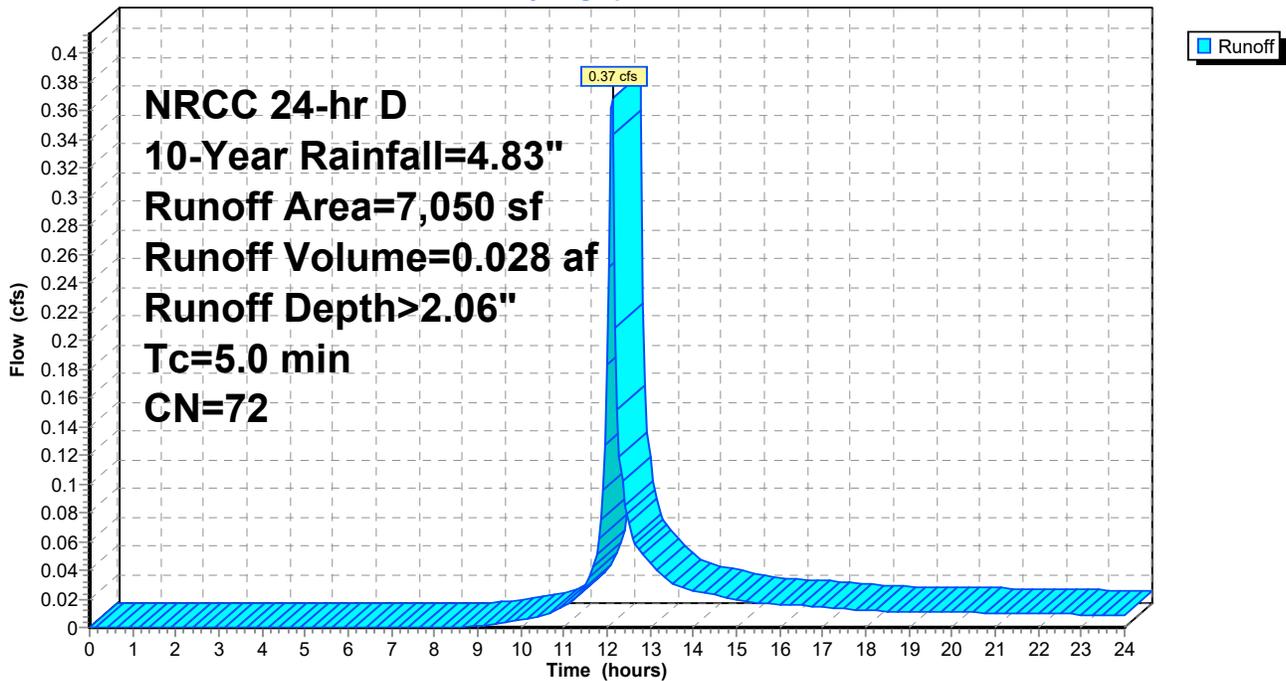
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs,  $dt= 0.05$  hrs  
NRCC 24-hr D 10-Year Rainfall=4.83"

Area (sf)	CN	Description
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7,050		100.00% Pervious Area

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

## Subcatchment 4S: 41 KERNWOOD-EXISTING YARD

Hydrograph



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Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	3.35	1.02	0.05
0.25	0.02	0.00	0.00	13.00	3.46	1.09	0.04
0.50	0.03	0.00	0.00	13.25	3.55	1.15	0.04
0.75	0.05	0.00	0.00	13.50	3.62	1.20	0.03
1.00	0.07	0.00	0.00	13.75	3.69	1.25	0.03
1.25	0.09	0.00	0.00	14.00	3.75	1.29	0.03
1.50	0.11	0.00	0.00	14.25	3.80	1.32	0.02
1.75	0.13	0.00	0.00	14.50	3.85	1.36	0.02
2.00	0.15	0.00	0.00	14.75	3.90	1.39	0.02
2.25	0.17	0.00	0.00	15.00	3.94	1.42	0.02
2.50	0.19	0.00	0.00	15.25	3.98	1.45	0.02
2.75	0.21	0.00	0.00	15.50	4.02	1.47	0.02
3.00	0.23	0.00	0.00	15.75	4.06	1.50	0.02
3.25	0.25	0.00	0.00	16.00	4.09	1.53	0.02
3.50	0.27	0.00	0.00	16.25	4.13	1.55	0.02
3.75	0.29	0.00	0.00	16.50	4.16	1.57	0.02
4.00	0.31	0.00	0.00	16.75	4.19	1.60	0.01
4.25	0.33	0.00	0.00	17.00	4.22	1.62	0.01
4.50	0.36	0.00	0.00	17.25	4.25	1.64	0.01
4.75	0.38	0.00	0.00	17.50	4.28	1.66	0.01
5.00	0.40	0.00	0.00	17.75	4.31	1.68	0.01
5.25	0.43	0.00	0.00	18.00	4.33	1.70	0.01
5.50	0.45	0.00	0.00	18.25	4.36	1.72	0.01
5.75	0.47	0.00	0.00	18.50	4.38	1.73	0.01
6.00	0.50	0.00	0.00	18.75	4.40	1.75	0.01
6.25	0.52	0.00	0.00	19.00	4.43	1.77	0.01
6.50	0.55	0.00	0.00	19.25	4.45	1.78	0.01
6.75	0.58	0.00	0.00	19.50	4.47	1.80	0.01
7.00	0.61	0.00	0.00	19.75	4.50	1.82	0.01
7.25	0.64	0.00	0.00	20.00	4.52	1.83	0.01
7.50	0.67	0.00	0.00	20.25	4.54	1.85	0.01
7.75	0.70	0.00	0.00	20.50	4.56	1.87	0.01
8.00	0.74	0.00	0.00	20.75	4.58	1.88	0.01
8.25	0.77	0.00	0.00	21.00	4.60	1.90	0.01
8.50	0.81	0.00	0.00	21.25	4.62	1.91	0.01
8.75	0.85	0.00	0.00	21.50	4.64	1.93	0.01
9.00	0.89	0.00	0.00	21.75	4.66	1.94	0.01
9.25	0.93	0.01	0.00	22.00	4.68	1.96	0.01
9.50	0.98	0.01	0.00	22.25	4.70	1.97	0.01
9.75	1.03	0.02	0.00	22.50	4.72	1.99	0.01
10.00	1.08	0.02	0.00	22.75	4.74	2.00	0.01
10.25	1.14	0.03	0.01	23.00	4.76	2.01	0.01
10.50	1.21	0.04	0.01	23.25	4.78	2.03	0.01
10.75	1.28	0.06	0.01	23.50	4.80	2.04	0.01
11.00	1.37	0.08	0.01	23.75	4.81	2.05	0.01
11.25	1.48	0.11	0.02	24.00	<b>4.83</b>	<b>2.07</b>	0.01
11.50	1.62	0.15	0.03				
11.75	1.83	0.22	0.05				
12.00	2.31	0.43	<b>0.18</b>				
12.25	3.00	0.81	<b>0.15</b>				
12.50	3.21	0.94	0.08				

# 41 KERNWOOD HAVERHILL

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41.5 kernwood proposed  
NRCC 24-hr D 25-Year Rainfall=6.16"

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## Summary for Subcatchment 4S: 41 KERNWOOD-EXISTING YARD

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

Runoff = 0.56 cfs @ 12.12 hrs, Volume= 0.042 af, Depth> 3.12"

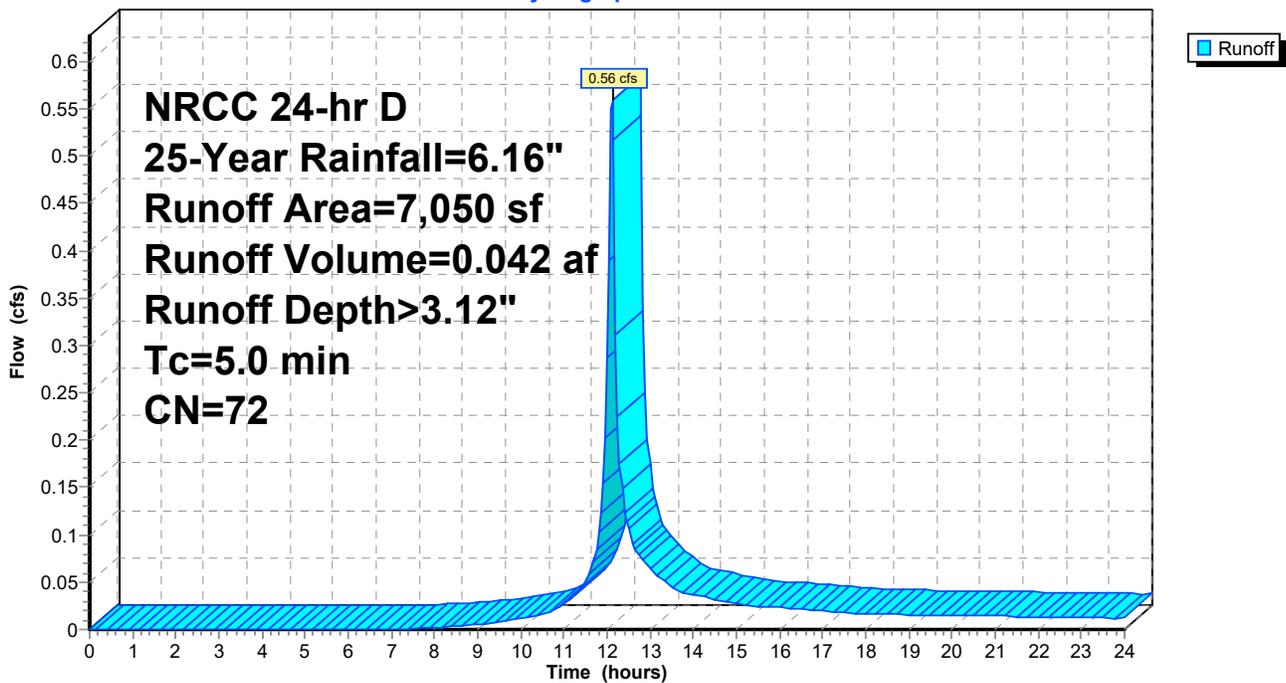
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr D 25-Year Rainfall=6.16"

Area (sf)	CN	Description
7,050	72	Dirt roads, HSG A
7,050		100.00% Pervious Area

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

## Subcatchment 4S: 41 KERNWOOD-EXISTING YARD

Hydrograph



**41 KERNWOOD HAVERHILL**

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41.5 kernwood proposed

NRCC 24-hr D 25-Year Rainfall=6.16"

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**Hydrograph for Subcatchment 4S: 41 KERNWOOD-EXISTING YARD**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	4.27	1.65	0.08
0.25	0.02	0.00	0.00	13.00	4.41	1.75	0.06
0.50	0.04	0.00	0.00	13.25	4.52	1.84	0.05
0.75	0.07	0.00	0.00	13.50	4.62	1.91	0.04
1.00	0.09	0.00	0.00	13.75	4.70	1.97	0.04
1.25	0.11	0.00	0.00	14.00	4.78	2.03	0.04
1.50	0.14	0.00	0.00	14.25	4.85	2.08	0.03
1.75	0.16	0.00	0.00	14.50	4.91	2.13	0.03
2.00	0.19	0.00	0.00	14.75	4.97	2.18	0.03
2.25	0.21	0.00	0.00	15.00	5.03	2.22	0.03
2.50	0.24	0.00	0.00	15.25	5.08	2.26	0.03
2.75	0.26	0.00	0.00	15.50	5.13	2.30	0.02
3.00	0.29	0.00	0.00	15.75	5.18	2.33	0.02
3.25	0.31	0.00	0.00	16.00	5.22	2.37	0.02
3.50	0.34	0.00	0.00	16.25	5.26	2.40	0.02
3.75	0.37	0.00	0.00	16.50	5.31	2.44	0.02
4.00	0.40	0.00	0.00	16.75	5.35	2.47	0.02
4.25	0.43	0.00	0.00	17.00	5.39	2.50	0.02
4.50	0.45	0.00	0.00	17.25	5.42	2.53	0.02
4.75	0.48	0.00	0.00	17.50	5.46	2.56	0.02
5.00	0.51	0.00	0.00	17.75	5.49	2.58	0.02
5.25	0.54	0.00	0.00	18.00	5.53	2.61	0.02
5.50	0.57	0.00	0.00	18.25	5.56	2.63	0.02
5.75	0.60	0.00	0.00	18.50	5.59	2.66	0.02
6.00	0.63	0.00	0.00	18.75	5.62	2.68	0.02
6.25	0.67	0.00	0.00	19.00	5.65	2.71	0.02
6.50	0.70	0.00	0.00	19.25	5.68	2.73	0.02
6.75	0.74	0.00	0.00	19.50	5.71	2.75	0.02
7.00	0.77	0.00	0.00	19.75	5.73	2.78	0.02
7.25	0.81	0.00	0.00	20.00	5.76	2.80	0.01
7.50	0.85	0.00	0.00	20.25	5.79	2.82	0.01
7.75	0.90	0.00	0.00	20.50	5.82	2.85	0.01
8.00	0.94	0.01	0.00	20.75	5.85	2.87	0.01
8.25	0.98	0.01	0.00	21.00	5.87	2.89	0.01
8.50	1.03	0.02	0.00	21.25	5.90	2.91	0.01
8.75	1.08	0.02	0.00	21.50	5.92	2.93	0.01
9.00	1.13	0.03	0.01	21.75	5.95	2.95	0.01
9.25	1.19	0.04	0.01	22.00	5.97	2.97	0.01
9.50	1.25	0.05	0.01	22.25	6.00	2.99	0.01
9.75	1.31	0.06	0.01	22.50	6.02	3.01	0.01
10.00	1.38	0.08	0.01	22.75	6.05	3.03	0.01
10.25	1.46	0.10	0.01	23.00	6.07	3.05	0.01
10.50	1.54	0.12	0.02	23.25	6.09	3.07	0.01
10.75	1.64	0.15	0.02	23.50	6.12	3.09	0.01
11.00	1.75	0.19	0.03	23.75	6.14	3.11	0.01
11.25	1.89	0.25	0.04	24.00	<b>6.16</b>	<b>3.12</b>	0.01
11.50	2.06	0.32	0.05				
11.75	2.33	0.44	0.08				
12.00	2.95	0.78	<b>0.29</b>				
12.25	3.83	1.34	<b>0.22</b>				
12.50	4.10	1.53	0.11				

# 41 KERNWOOD HAVERHILL

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41.5 kernwood proposed  
NRCC 24-hr D 100-Year Rainfall=8.94"

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## Summary for Subcatchment 4S: 41 KERNWOOD-EXISTING YARD

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

Runoff = 0.98 cfs @ 12.11 hrs, Volume= 0.074 af, Depth> 5.52"

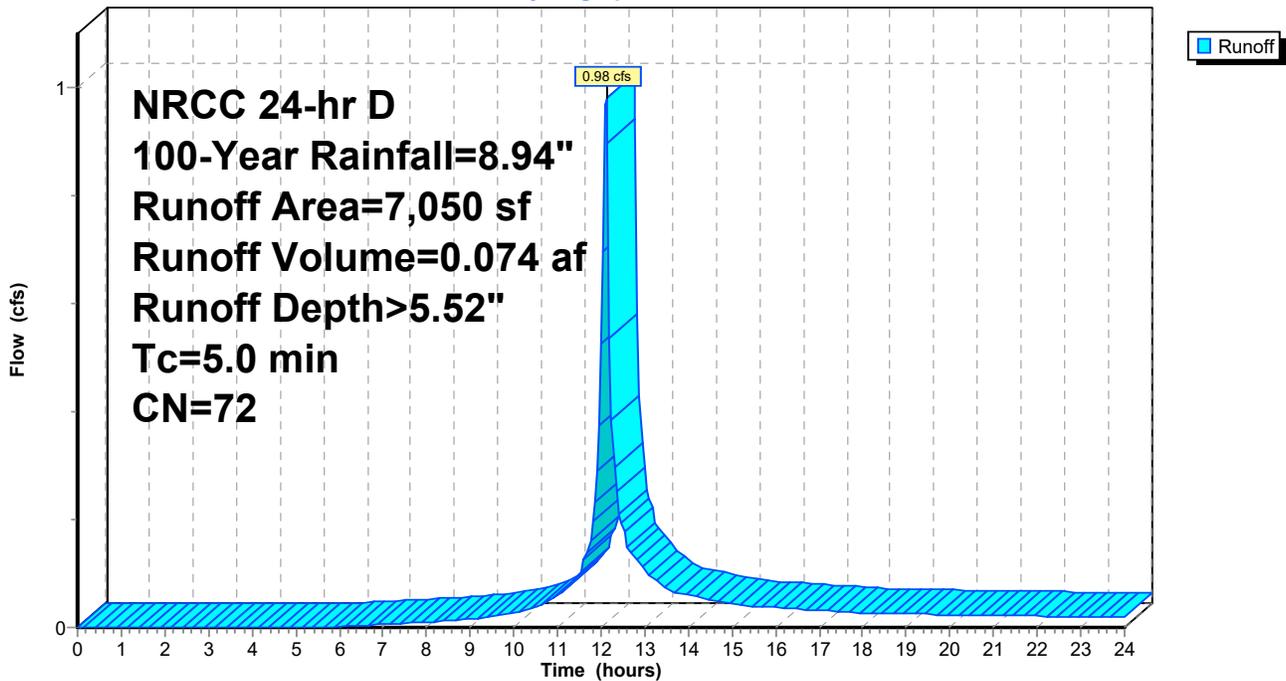
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr D 100-Year Rainfall=8.94"

Area (sf)	CN	Description
7,050	72	Dirt roads, HSG A
7,050		100.00% Pervious Area

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

## Subcatchment 4S: 41 KERNWOOD-EXISTING YARD

Hydrograph



**41 KERNWOOD HAVERHILL**

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41.5 kernwood proposed  
NRCC 24-hr D 100-Year Rainfall=8.94"

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**Hydrograph for Subcatchment 4S: 41 KERNWOOD-EXISTING YARD**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	6.19	3.15	0.13
0.25	0.03	0.00	0.00	13.00	6.40	3.32	0.11
0.50	0.06	0.00	0.00	13.25	6.57	3.46	0.09
0.75	0.10	0.00	0.00	13.50	6.71	3.58	0.07
1.00	0.13	0.00	0.00	13.75	6.82	3.68	0.06
1.25	0.16	0.00	0.00	14.00	6.94	3.77	0.06
1.50	0.20	0.00	0.00	14.25	7.04	3.86	0.06
1.75	0.23	0.00	0.00	14.50	7.13	3.94	0.05
2.00	0.27	0.00	0.00	14.75	7.22	4.02	0.05
2.25	0.31	0.00	0.00	15.00	7.30	4.09	0.04
2.50	0.34	0.00	0.00	15.25	7.37	4.15	0.04
2.75	0.38	0.00	0.00	15.50	7.44	4.21	0.04
3.00	0.42	0.00	0.00	15.75	7.51	4.27	0.04
3.25	0.46	0.00	0.00	16.00	7.58	4.33	0.04
3.50	0.50	0.00	0.00	16.25	7.64	4.38	0.04
3.75	0.54	0.00	0.00	16.50	7.70	4.43	0.03
4.00	0.58	0.00	0.00	16.75	7.76	4.48	0.03
4.25	0.62	0.00	0.00	17.00	7.82	4.53	0.03
4.50	0.66	0.00	0.00	17.25	7.87	4.58	0.03
4.75	0.70	0.00	0.00	17.50	7.92	4.63	0.03
5.00	0.74	0.00	0.00	17.75	7.97	4.67	0.03
5.25	0.79	0.00	0.00	18.00	8.02	4.71	0.03
5.50	0.83	0.00	0.00	18.25	8.06	4.75	0.03
5.75	0.88	0.00	0.00	18.50	8.11	4.79	0.03
6.00	0.92	0.01	0.00	18.75	8.15	4.83	0.03
6.25	0.97	0.01	0.00	19.00	8.20	4.87	0.02
6.50	1.02	0.01	0.00	19.25	8.24	4.90	0.02
6.75	1.07	0.02	0.00	19.50	8.28	4.94	0.02
7.00	1.12	0.03	0.01	19.75	8.32	4.98	0.02
7.25	1.18	0.04	0.01	20.00	8.36	5.02	0.02
7.50	1.24	0.05	0.01	20.25	8.40	5.05	0.02
7.75	1.30	0.06	0.01	20.50	8.44	5.09	0.02
8.00	1.36	0.08	0.01	20.75	8.48	5.12	0.02
8.25	1.43	0.09	0.01	21.00	8.52	5.16	0.02
8.50	1.50	0.11	0.01	21.25	8.56	5.19	0.02
8.75	1.57	0.13	0.01	21.50	8.60	5.22	0.02
9.00	1.64	0.16	0.02	21.75	8.63	5.26	0.02
9.25	1.72	0.18	0.02	22.00	8.67	5.29	0.02
9.50	1.81	0.22	0.02	22.25	8.71	5.32	0.02
9.75	1.90	0.25	0.02	22.50	8.74	5.35	0.02
10.00	2.00	0.29	0.03	22.75	8.78	5.38	0.02
10.25	2.12	0.34	0.03	23.00	8.81	5.41	0.02
10.50	2.23	0.40	0.04	23.25	8.84	5.44	0.02
10.75	2.37	0.46	0.05	23.50	8.88	5.47	0.02
11.00	2.54	0.55	0.06	23.75	8.91	5.50	0.02
11.25	2.75	0.66	0.08	24.00	<b>8.94</b>	<b>5.53</b>	0.02
11.50	2.99	0.81	0.10				
11.75	3.38	1.04	0.16				
12.00	4.28	1.66	<b>0.52</b>				
12.25	5.56	2.64	<b>0.38</b>				
12.50	5.95	2.95	0.18				

**41 KERNWOOD HAVERHILL**

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**Project Notes**

Rainfall events imported from "NRCS-Rain.txt" for 4035 MA Boston Suffolk County  
Rainfall events imported from "NRCS-Rain.txt" for 4035 MA Boston Suffolk County  
Rainfall events imported from "NRCS-Rain.txt" for 4106 MA Gloucester Essex County  
Rainfall events imported from "NRCS-Rain.txt" for 4035 MA Boston Suffolk County  
Rainfall events imported from "NRCS-Rain.txt" for 4035 MA Boston Suffolk County  
Rainfall events imported from "NRCS-Rain.txt" for 4035 MA Boston Suffolk County  
Rainfall events imported from "NRCS-Rain.txt" for 4035 MA Boston Suffolk County  
Rainfall events imported from "NRCS-Rain.txt" for 4175 MA Medford Middlesex County South  
Rainfall events imported from "NRCS-Rain.txt" for 4341 MA Wilmington Middlesex County Central  
Rainfall events imported from "NRCS-Rain.txt" for 4035 MA Boston Suffolk County  
Rainfall events imported from "NRCS-Rain.txt" for 4050 MA Canton Norfolk County  
Rainfall events imported from "NRCS-Rain.txt" for 4035 MA Boston Suffolk County  
Rainfall events imported from "NRCS-Rain.txt" for 4175 MA Medford Middlesex County South  
Rainfall events imported from "NRCS-Rain.txt" for 4175 MA Medford Middlesex County South  
Rainfall events imported from "NRCS-Rain.txt" for 4049 MA Cambridge Middlesex County South  
Rainfall events imported from "NRCS-Rain.txt" for 4035 MA Boston Suffolk County  
Rainfall events imported from "NRCS-Rain.txt" for 4292 MA Taunton Bristol County  
Rainfall events imported from "NRCS-Rain.txt" for 4049 MA Cambridge Middlesex County South  
Rainfall events imported from "NRCS-Rain.txt" for 4127 MA Haverhill Essex County

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**Pipe Listing (selected 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	1P	71.00	69.50	34.0	0.0441	0.010	6.0	0.0	0.0

# 41 KERNWOOD HAVERHILL

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41.5 kernwood prop  
NRCC 24-hr D 1-Year Rainfall=2.63"

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## Summary for Subcatchment 2S: 41 KERNWOOD PROPOSED PARKING

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

Runoff = 0.38 cfs @ 12.11 hrs, Volume= 0.032 af, Depth> 2.40"

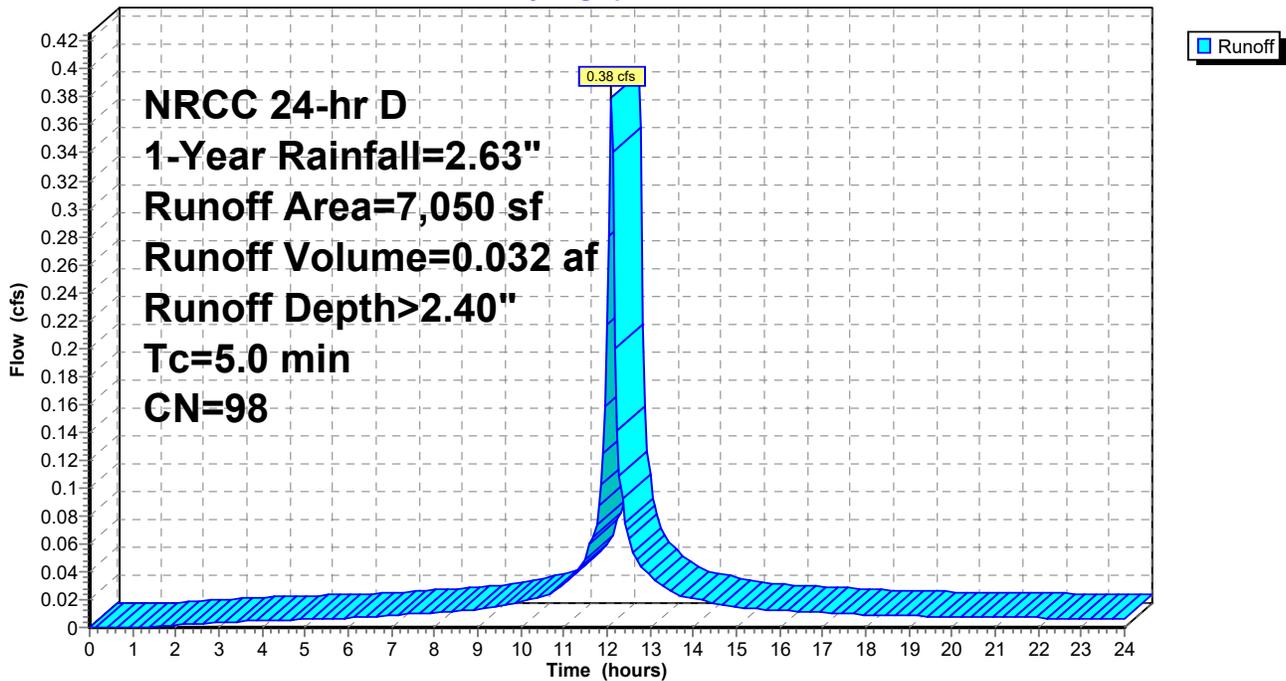
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr D 1-Year Rainfall=2.63"

Area (sf)	CN	Description
7,050	98	Paved parking, HSG A
7,050		100.00% Impervious Area

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

## Subcatchment 2S: 41 KERNWOOD PROPOSED PARKING

Hydrograph



**41 KERNWOOD HAVERHILL**

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41.5 kernwood prop

NRCC 24-hr D 1-Year Rainfall=2.63"

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**Hydrograph for Subcatchment 2S: 41 KERNWOOD PROPOSED PARKING**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	1.82	1.60	0.05
0.25	0.01	0.00	0.00	13.00	1.88	1.66	0.04
0.50	0.02	0.00	0.00	13.25	1.93	1.71	0.03
0.75	0.03	0.00	0.00	13.50	1.97	1.75	0.03
1.00	0.04	0.00	0.00	13.75	2.01	1.78	0.02
1.25	0.05	0.00	0.00	14.00	2.04	1.81	0.02
1.50	0.06	0.00	0.00	14.25	2.07	1.84	0.02
1.75	0.07	0.00	0.00	14.50	2.10	1.87	0.02
2.00	0.08	0.01	0.00	14.75	2.12	1.90	0.02
2.25	0.09	0.01	0.00	15.00	2.15	1.92	0.01
2.50	0.10	0.01	0.00	15.25	2.17	1.94	0.01
2.75	0.11	0.02	0.00	15.50	2.19	1.96	0.01
3.00	0.12	0.02	0.00	15.75	2.21	1.98	0.01
3.25	0.13	0.03	0.00	16.00	2.23	2.00	0.01
3.50	0.15	0.04	0.00	16.25	2.25	2.02	0.01
3.75	0.16	0.04	0.00	16.50	2.27	2.04	0.01
4.00	0.17	0.05	0.00	16.75	2.28	2.06	0.01
4.25	0.18	0.06	0.01	17.00	2.30	2.07	0.01
4.50	0.19	0.07	0.01	17.25	2.32	2.09	0.01
4.75	0.21	0.07	0.01	17.50	2.33	2.10	0.01
5.00	0.22	0.08	0.01	17.75	2.35	2.12	0.01
5.25	0.23	0.09	0.01	18.00	2.36	2.13	0.01
5.50	0.24	0.10	0.01	18.25	2.37	2.14	0.01
5.75	0.26	0.11	0.01	18.50	2.39	2.16	0.01
6.00	0.27	0.12	0.01	18.75	2.40	2.17	0.01
6.25	0.28	0.13	0.01	19.00	2.41	2.18	0.01
6.50	0.30	0.14	0.01	19.25	2.42	2.19	0.01
6.75	0.31	0.16	0.01	19.50	2.44	2.21	0.01
7.00	0.33	0.17	0.01	19.75	2.45	2.22	0.01
7.25	0.35	0.18	0.01	20.00	2.46	2.23	0.01
7.50	0.36	0.20	0.01	20.25	2.47	2.24	0.01
7.75	0.38	0.21	0.01	20.50	2.48	2.25	0.01
8.00	0.40	0.23	0.01	20.75	2.50	2.27	0.01
8.25	0.42	0.25	0.01	21.00	2.51	2.28	0.01
8.50	0.44	0.26	0.01	21.25	2.52	2.29	0.01
8.75	0.46	0.28	0.01	21.50	2.53	2.30	0.01
9.00	0.48	0.30	0.01	21.75	2.54	2.31	0.01
9.25	0.51	0.32	0.01	22.00	2.55	2.32	0.01
9.50	0.53	0.35	0.02	22.25	2.56	2.33	0.01
9.75	0.56	0.37	0.02	22.50	2.57	2.34	0.01
10.00	0.59	0.40	0.02	22.75	2.58	2.35	0.01
10.25	0.62	0.43	0.02	23.00	2.59	2.36	0.01
10.50	0.66	0.46	0.02	23.25	2.60	2.37	0.01
10.75	0.70	0.50	0.03	23.50	2.61	2.38	0.01
11.00	0.75	0.55	0.03	23.75	2.62	2.39	0.01
11.25	0.81	0.61	0.04	24.00	<b>2.63</b>	<b>2.40</b>	0.01
11.50	0.88	0.68	0.05				
11.75	0.99	0.78	0.07				
12.00	1.26	1.04	<b>0.22</b>				
12.25	1.64	1.41	<b>0.14</b>				
12.50	1.75	1.53	0.07				

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## Summary for Pond 1P: 330XLHD

Inflow Area = 0.162 ac, 100.00% Impervious, Inflow Depth > 2.40" for 1-Year event  
Inflow = 0.38 cfs @ 12.11 hrs, Volume= 0.032 af  
Outflow = 0.00 cfs @ 3.80 hrs, Volume= 0.005 af, Atten= 99%, Lag= 0.0 min  
Discarded = 0.00 cfs @ 3.80 hrs, Volume= 0.005 af  
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2  
Peak Elev= 70.04' @ 24.00 hrs Surf.Area= 765 sf Storage= 1,177 cf

Plug-Flow detention time= 375.2 min calculated for 0.005 af (16% of inflow)  
Center-of-Mass det. time= 36.3 min ( 800.5 - 764.2 )

Volume	Invert	Avail.Storage	Storage Description
#1A	67.50'	885 cf	<b>22.83'W x 33.50'L x 4.04'H Field A</b> 3,092 cf Overall - 879 cf Embedded = 2,212 cf x 40.0% Voids
#2A	68.50'	879 cf	<b>Cultec R-330XLHD x 16 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		1,764 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	67.50'	<b>0.170 in/hr Exfiltration over Surface area</b>
#2	Primary	71.00'	<b>6.0" Round Culvert</b> L= 34.0' Ke= 0.500 Inlet / Outlet Invert= 71.00' / 69.50' S= 0.0441 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

**Discarded OutFlow** Max=0.00 cfs @ 3.80 hrs HW=67.54' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.00 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=67.50' (Free Discharge)

↑2=Culvert ( Controls 0.00 cfs)

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**Pond 1P: 330XLHD - Chamber Wizard Field A**

**Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)**

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 4 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

4 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 29.50' Row Length +24.0" End Stone x 2 = 33.50' Base Length

4 Rows x 52.0" Wide + 6.0" Spacing x 3 + 24.0" Side Stone x 2 = 22.83' Base Width

12.0" Base + 30.5" Chamber Height + 6.0" Cover = 4.04' Field Height

16 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 4 Rows = 879.2 cf Chamber Storage

3,091.5 cf Field - 879.2 cf Chambers = 2,212.3 cf Stone x 40.0% Voids = 884.9 cf Stone Storage

Chamber Storage + Stone Storage = 1,764.1 cf = 0.040 af

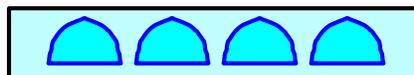
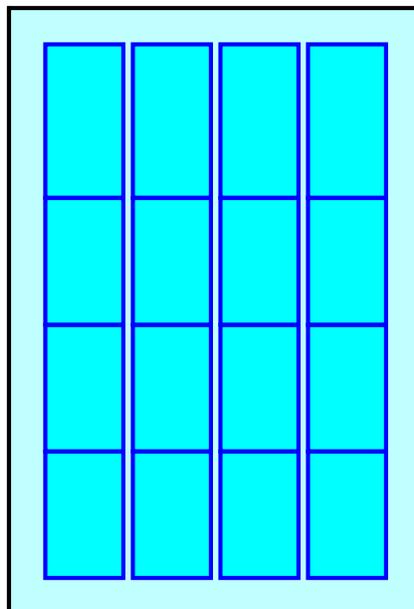
Overall Storage Efficiency = 57.1%

Overall System Size = 33.50' x 22.83' x 4.04'

16 Chambers

114.5 cy Field

81.9 cy Stone



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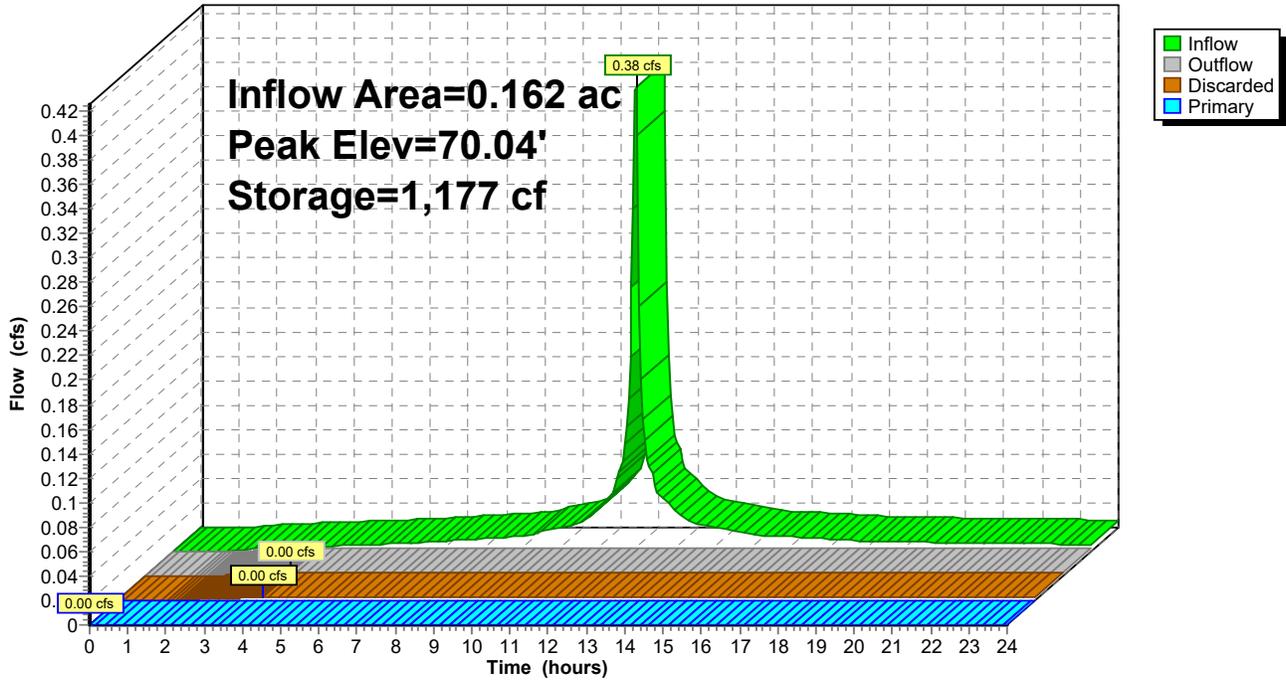
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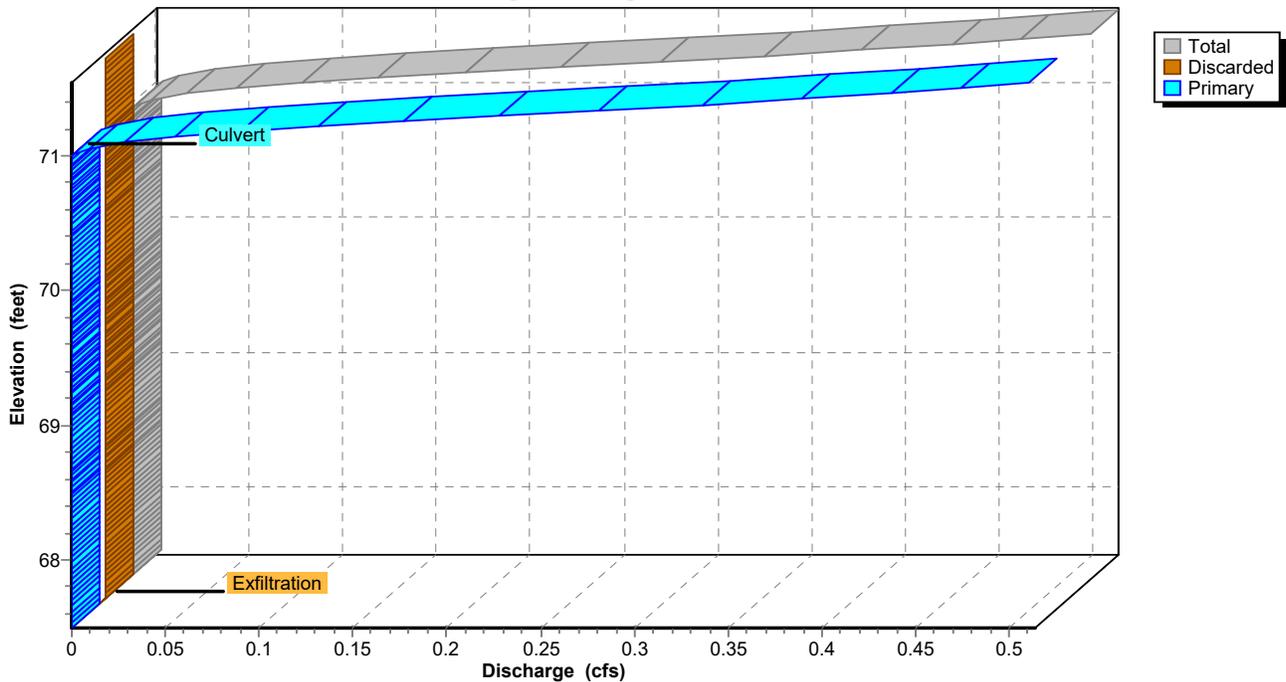
## Pond 1P: 330XLHD

### Hydrograph



## Pond 1P: 330XLHD

### Stage-Discharge



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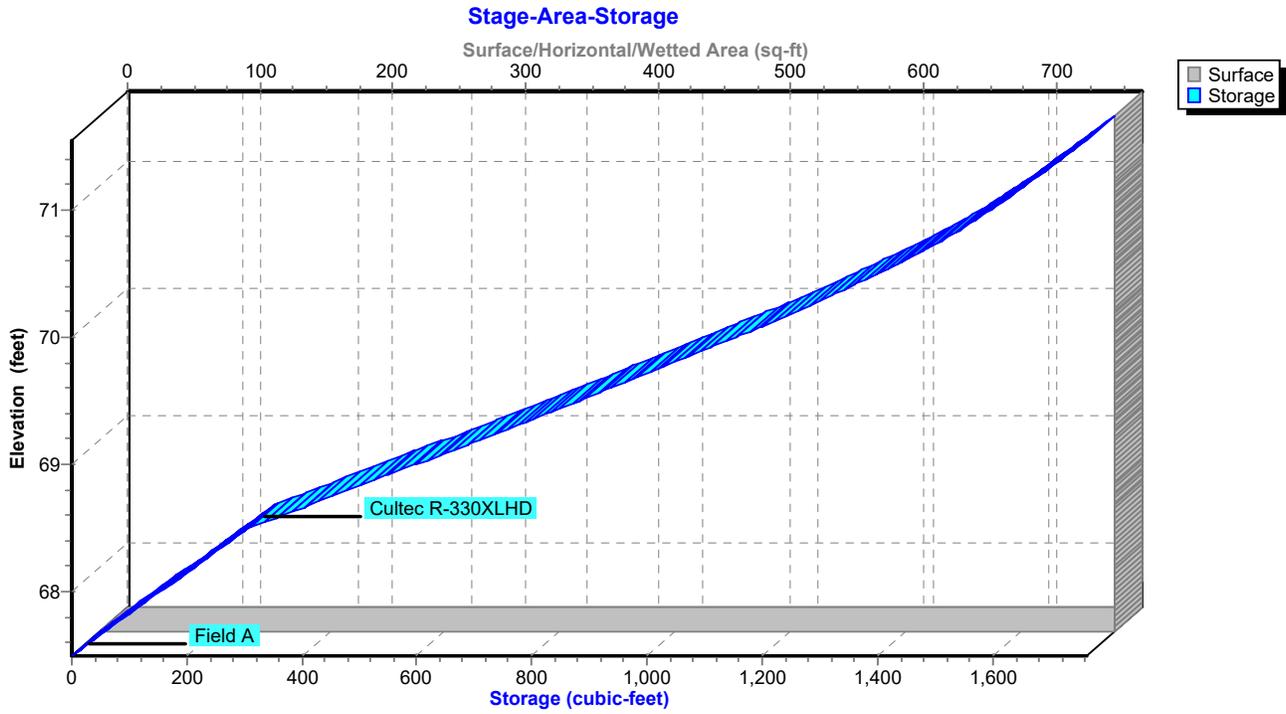
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## Pond 1P: 330XLHD



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**Hydrograph for Pond 1P: 330XLHD**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	67.50	0.00	0.00	<b>0.00</b>
0.50	0.00	0	67.50	0.00	0.00	0.00
1.00	0.00	0	67.50	0.00	0.00	0.00
1.50	0.00	1	67.50	0.00	0.00	0.00
2.00	0.00	2	67.51	0.00	0.00	0.00
2.50	0.00	5	67.52	0.00	0.00	0.00
3.00	0.00	8	67.53	0.00	0.00	0.00
3.50	0.00	11	67.53	<b>0.00</b>	<b>0.00</b>	0.00
4.00	0.00	14	67.54	<b>0.00</b>	<b>0.00</b>	0.00
4.50	0.01	17	67.56	0.00	0.00	0.00
5.00	0.01	22	67.57	0.00	0.00	0.00
5.50	0.01	27	67.59	0.00	0.00	0.00
6.00	0.01	34	67.61	0.00	0.00	0.00
6.50	0.01	41	67.63	0.00	0.00	0.00
7.00	0.01	51	67.67	0.00	0.00	0.00
7.50	0.01	62	67.70	0.00	0.00	0.00
8.00	0.01	74	67.74	0.00	0.00	0.00
8.50	0.01	89	67.79	0.00	0.00	0.00
9.00	0.01	106	67.85	0.00	0.00	0.00
9.50	0.02	125	67.91	0.00	0.00	0.00
10.00	0.02	151	67.99	0.00	0.00	0.00
10.50	0.02	181	68.09	0.00	0.00	0.00
11.00	0.03	223	68.23	0.00	0.00	0.00
11.50	0.05	288	68.44	0.00	0.00	0.00
12.00	<b>0.22</b>	449	68.74	0.00	0.00	0.00
12.50	<b>0.07</b>	772	69.31	0.00	0.00	0.00
13.00	0.04	852	69.45	0.00	0.00	0.00
13.50	0.03	902	69.54	0.00	0.00	0.00
14.00	0.02	937	69.60	0.00	0.00	0.00
14.50	0.02	967	69.65	0.00	0.00	0.00
15.00	0.01	991	69.70	0.00	0.00	0.00
15.50	0.01	1,010	69.73	0.00	0.00	0.00
16.00	0.01	1,028	69.76	0.00	0.00	0.00
16.50	0.01	1,044	69.79	0.00	0.00	0.00
17.00	0.01	1,059	69.82	0.00	0.00	0.00
17.50	0.01	1,072	69.84	0.00	0.00	0.00
18.00	0.01	1,083	69.87	0.00	0.00	0.00
18.50	0.01	1,093	69.88	0.00	0.00	0.00
19.00	0.01	1,103	69.90	0.00	0.00	0.00
19.50	0.01	1,112	69.92	0.00	0.00	0.00
20.00	0.01	1,121	69.94	0.00	0.00	0.00
20.50	0.01	1,130	69.95	0.00	0.00	0.00
21.00	0.01	1,138	69.97	0.00	0.00	0.00
21.50	0.01	1,145	69.98	0.00	0.00	0.00
22.00	0.01	1,152	70.00	0.00	0.00	0.00
22.50	0.01	1,159	70.01	0.00	0.00	0.00
23.00	0.01	1,166	70.02	0.00	0.00	0.00
23.50	0.01	1,172	70.03	0.00	0.00	0.00
24.00	0.01	<b>1,177</b>	<b>70.04</b>	0.00	0.00	0.00

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**Stage-Discharge for Pond 1P: 330XLHD**

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
67.50	0.00	<b>0.00</b>	0.00	70.05	0.00	0.00	0.00
67.55	0.00	<b>0.00</b>	0.00	70.10	0.00	0.00	0.00
67.60	0.00	0.00	0.00	70.15	0.00	0.00	0.00
67.65	0.00	0.00	0.00	70.20	0.00	0.00	0.00
67.70	0.00	0.00	0.00	70.25	0.00	0.00	0.00
67.75	0.00	0.00	0.00	70.30	0.00	0.00	0.00
67.80	0.00	0.00	0.00	70.35	0.00	0.00	0.00
67.85	0.00	0.00	0.00	70.40	0.00	0.00	0.00
67.90	0.00	0.00	0.00	70.45	0.00	0.00	0.00
67.95	0.00	0.00	0.00	70.50	0.00	0.00	0.00
68.00	0.00	0.00	0.00	70.55	0.00	0.00	0.00
68.05	0.00	0.00	0.00	70.60	0.00	0.00	0.00
68.10	0.00	0.00	0.00	70.65	0.00	0.00	0.00
68.15	0.00	0.00	0.00	70.70	0.00	0.00	0.00
68.20	0.00	0.00	0.00	70.75	0.00	0.00	0.00
68.25	0.00	0.00	0.00	70.80	0.00	0.00	0.00
68.30	0.00	0.00	0.00	70.85	0.00	0.00	0.00
68.35	0.00	0.00	0.00	70.90	0.00	0.00	0.00
68.40	0.00	0.00	0.00	70.95	0.00	0.00	0.00
68.45	0.00	0.00	0.00	71.00	0.00	0.00	0.00
68.50	0.00	0.00	0.00	71.05	0.01	0.00	0.01
68.55	0.00	0.00	0.00	71.10	0.03	0.00	0.03
68.60	0.00	0.00	0.00	71.15	0.07	0.00	0.07
68.65	0.00	0.00	0.00	71.20	0.11	0.00	0.11
68.70	0.00	0.00	0.00	71.25	0.17	0.00	0.17
68.75	0.00	0.00	0.00	71.30	0.23	0.00	0.23
68.80	0.00	0.00	0.00	71.35	0.30	0.00	0.30
68.85	0.00	0.00	0.00	71.40	0.37	0.00	0.36
68.90	0.00	0.00	0.00	71.45	0.43	0.00	0.43
68.95	0.00	0.00	0.00	71.50	<b>0.48</b>	0.00	<b>0.47</b>
69.00	0.00	0.00	0.00				
69.05	0.00	0.00	0.00				
69.10	0.00	0.00	0.00				
69.15	0.00	0.00	0.00				
69.20	0.00	0.00	0.00				
69.25	0.00	0.00	0.00				
69.30	0.00	0.00	0.00				
69.35	0.00	0.00	0.00				
69.40	0.00	0.00	0.00				
69.45	0.00	0.00	0.00				
69.50	0.00	0.00	0.00				
69.55	0.00	0.00	0.00				
69.60	0.00	0.00	0.00				
69.65	0.00	0.00	0.00				
69.70	0.00	0.00	0.00				
69.75	0.00	0.00	0.00				
69.80	0.00	0.00	0.00				
69.85	0.00	0.00	0.00				
69.90	0.00	0.00	0.00				
69.95	0.00	0.00	0.00				
70.00	0.00	0.00	0.00				

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**Stage-Area-Storage for Pond 1P: 330XLHD**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
67.50	<b>765</b>	0	70.05	765	1,181
67.55	765	15	70.10	765	1,207
67.60	765	31	70.15	765	1,232
67.65	765	46	70.20	765	1,258
67.70	765	61	70.25	765	1,283
67.75	765	76	70.30	765	1,308
67.80	765	92	70.35	765	1,332
67.85	765	107	70.40	765	1,356
67.90	765	122	70.45	765	1,380
67.95	765	138	70.50	765	1,403
68.00	765	153	70.55	765	1,426
68.05	765	168	70.60	765	1,448
68.10	765	184	70.65	765	1,470
68.15	765	199	70.70	765	1,491
68.20	765	214	70.75	765	1,511
68.25	765	229	70.80	765	1,530
68.30	765	245	70.85	765	1,548
68.35	765	260	70.90	765	1,566
68.40	765	275	70.95	765	1,583
68.45	765	291	71.00	765	1,598
68.50	765	306	71.05	765	1,614
68.55	765	335	71.10	765	1,629
68.60	765	365	71.15	765	1,644
68.65	765	394	71.20	765	1,660
68.70	765	423	71.25	765	1,675
68.75	765	452	71.30	765	1,690
68.80	765	481	71.35	765	1,706
68.85	765	510	71.40	765	1,721
68.90	765	539	71.45	765	1,736
68.95	765	568	71.50	765	<b>1,751</b>
69.00	765	597			
69.05	765	626			
69.10	765	655			
69.15	765	683			
69.20	765	712			
69.25	765	740			
69.30	765	768			
69.35	765	797			
69.40	765	825			
69.45	765	853			
69.50	765	881			
69.55	765	909			
69.60	765	937			
69.65	765	965			
69.70	765	993			
69.75	765	1,020			
69.80	765	1,048			
69.85	765	1,075			
69.90	765	1,102			
69.95	765	1,128			
70.00	765	1,155			

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## Summary for Subcatchment 2S: 41 KERNWOOD PROPOSED PARKING

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

Runoff = 0.46 cfs @ 12.11 hrs, Volume= 0.039 af, Depth> 2.92"

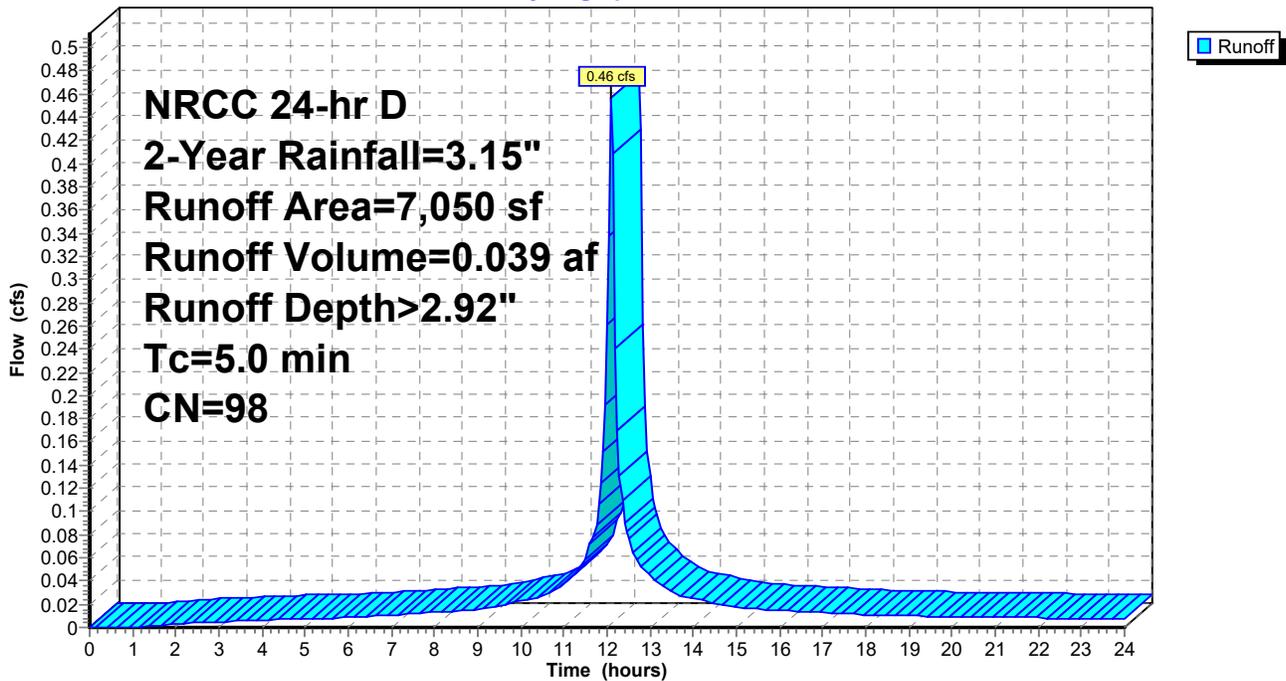
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr D 2-Year Rainfall=3.15"

Area (sf)	CN	Description
7,050	98	Paved parking, HSG A
7,050		100.00% Impervious Area

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

## Subcatchment 2S: 41 KERNWOOD PROPOSED PARKING

Hydrograph



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**Hydrograph for Subcatchment 2S: 41 KERNWOOD PROPOSED PARKING**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	2.18	1.96	0.06
0.25	0.01	0.00	0.00	13.00	2.26	2.03	0.04
0.50	0.02	0.00	0.00	13.25	2.31	2.09	0.04
0.75	0.03	0.00	0.00	13.50	2.36	2.13	0.03
1.00	0.05	0.00	0.00	13.75	2.40	2.18	0.03
1.25	0.06	0.00	0.00	14.00	2.44	2.21	0.02
1.50	0.07	0.00	0.00	14.25	2.48	2.25	0.02
1.75	0.08	0.01	0.00	14.50	2.51	2.28	0.02
2.00	0.09	0.01	0.00	14.75	2.54	2.31	0.02
2.25	0.11	0.02	0.00	15.00	2.57	2.34	0.02
2.50	0.12	0.02	0.00	15.25	2.60	2.37	0.02
2.75	0.13	0.03	0.00	15.50	2.62	2.39	0.02
3.00	0.15	0.04	0.00	15.75	2.65	2.42	0.02
3.25	0.16	0.04	0.01	16.00	2.67	2.44	0.01
3.50	0.17	0.05	0.01	16.25	2.69	2.46	0.01
3.75	0.19	0.06	0.01	16.50	2.71	2.48	0.01
4.00	0.20	0.07	0.01	16.75	2.73	2.50	0.01
4.25	0.22	0.08	0.01	17.00	2.75	2.52	0.01
4.50	0.23	0.09	0.01	17.25	2.77	2.54	0.01
4.75	0.25	0.10	0.01	17.50	2.79	2.56	0.01
5.00	0.26	0.12	0.01	17.75	2.81	2.58	0.01
5.25	0.28	0.13	0.01	18.00	2.83	2.59	0.01
5.50	0.29	0.14	0.01	18.25	2.84	2.61	0.01
5.75	0.31	0.15	0.01	18.50	2.86	2.63	0.01
6.00	0.32	0.16	0.01	18.75	2.87	2.64	0.01
6.25	0.34	0.18	0.01	19.00	2.89	2.66	0.01
6.50	0.36	0.19	0.01	19.25	2.90	2.67	0.01
6.75	0.38	0.21	0.01	19.50	2.92	2.69	0.01
7.00	0.40	0.23	0.01	19.75	2.93	2.70	0.01
7.25	0.42	0.24	0.01	20.00	2.95	2.72	0.01
7.50	0.44	0.26	0.01	20.25	2.96	2.73	0.01
7.75	0.46	0.28	0.01	20.50	2.98	2.74	0.01
8.00	0.48	0.30	0.01	20.75	2.99	2.76	0.01
8.25	0.50	0.32	0.01	21.00	3.00	2.77	0.01
8.50	0.53	0.34	0.01	21.25	3.02	2.78	0.01
8.75	0.55	0.37	0.02	21.50	3.03	2.80	0.01
9.00	0.58	0.39	0.02	21.75	3.04	2.81	0.01
9.25	0.61	0.42	0.02	22.00	3.06	2.82	0.01
9.50	0.64	0.44	0.02	22.25	3.07	2.84	0.01
9.75	0.67	0.48	0.02	22.50	3.08	2.85	0.01
10.00	0.71	0.51	0.02	22.75	3.09	2.86	0.01
10.25	0.75	0.55	0.02	23.00	3.10	2.87	0.01
10.50	0.79	0.59	0.03	23.25	3.12	2.88	0.01
10.75	0.84	0.63	0.03	23.50	3.13	2.90	0.01
11.00	0.89	0.69	0.04	23.75	3.14	2.91	0.01
11.25	0.97	0.76	0.05	24.00	<b>3.15</b>	<b>2.92</b>	0.01
11.50	1.06	0.84	0.06				
11.75	1.19	0.98	0.09				
12.00	1.51	1.29	<b>0.26</b>				
12.25	1.96	1.73	<b>0.17</b>				
12.50	2.09	1.87	0.08				

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NRCC 24-hr D 2-Year Rainfall=3.15"

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## Summary for Pond 1P: 330XLHD

Inflow Area = 0.162 ac, 100.00% Impervious, Inflow Depth > 2.92" for 2-Year event  
Inflow = 0.46 cfs @ 12.11 hrs, Volume= 0.039 af  
Outflow = 0.00 cfs @ 3.10 hrs, Volume= 0.005 af, Atten= 99%, Lag= 0.0 min  
Discarded = 0.00 cfs @ 3.10 hrs, Volume= 0.005 af  
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2  
Peak Elev= 70.66' @ 24.00 hrs Surf.Area= 765 sf Storage= 1,476 cf

Plug-Flow detention time= 407.3 min calculated for 0.005 af (14% of inflow)  
Center-of-Mass det. time= 27.7 min ( 787.1 - 759.3 )

Volume	Invert	Avail.Storage	Storage Description
#1A	67.50'	885 cf	<b>22.83'W x 33.50'L x 4.04'H Field A</b> 3,092 cf Overall - 879 cf Embedded = 2,212 cf x 40.0% Voids
#2A	68.50'	879 cf	<b>Cultec R-330XLHD x 16 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		1,764 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	67.50'	<b>0.170 in/hr Exfiltration over Surface area</b>
#2	Primary	71.00'	<b>6.0" Round Culvert</b> L= 34.0' Ke= 0.500 Inlet / Outlet Invert= 71.00' / 69.50' S= 0.0441 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

**Discarded OutFlow** Max=0.00 cfs @ 3.10 hrs HW=67.54' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.00 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=67.50' (Free Discharge)

↑2=Culvert ( Controls 0.00 cfs)

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**Pond 1P: 330XLHD - Chamber Wizard Field A**

**Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)**

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 4 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

4 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 29.50' Row Length +24.0" End Stone x 2 = 33.50' Base Length

4 Rows x 52.0" Wide + 6.0" Spacing x 3 + 24.0" Side Stone x 2 = 22.83' Base Width

12.0" Base + 30.5" Chamber Height + 6.0" Cover = 4.04' Field Height

16 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 4 Rows = 879.2 cf Chamber Storage

3,091.5 cf Field - 879.2 cf Chambers = 2,212.3 cf Stone x 40.0% Voids = 884.9 cf Stone Storage

Chamber Storage + Stone Storage = 1,764.1 cf = 0.040 af

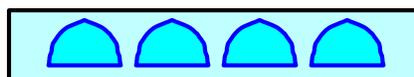
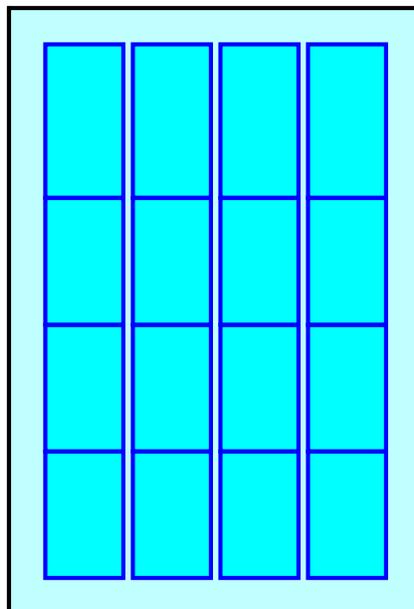
Overall Storage Efficiency = 57.1%

Overall System Size = 33.50' x 22.83' x 4.04'

16 Chambers

114.5 cy Field

81.9 cy Stone



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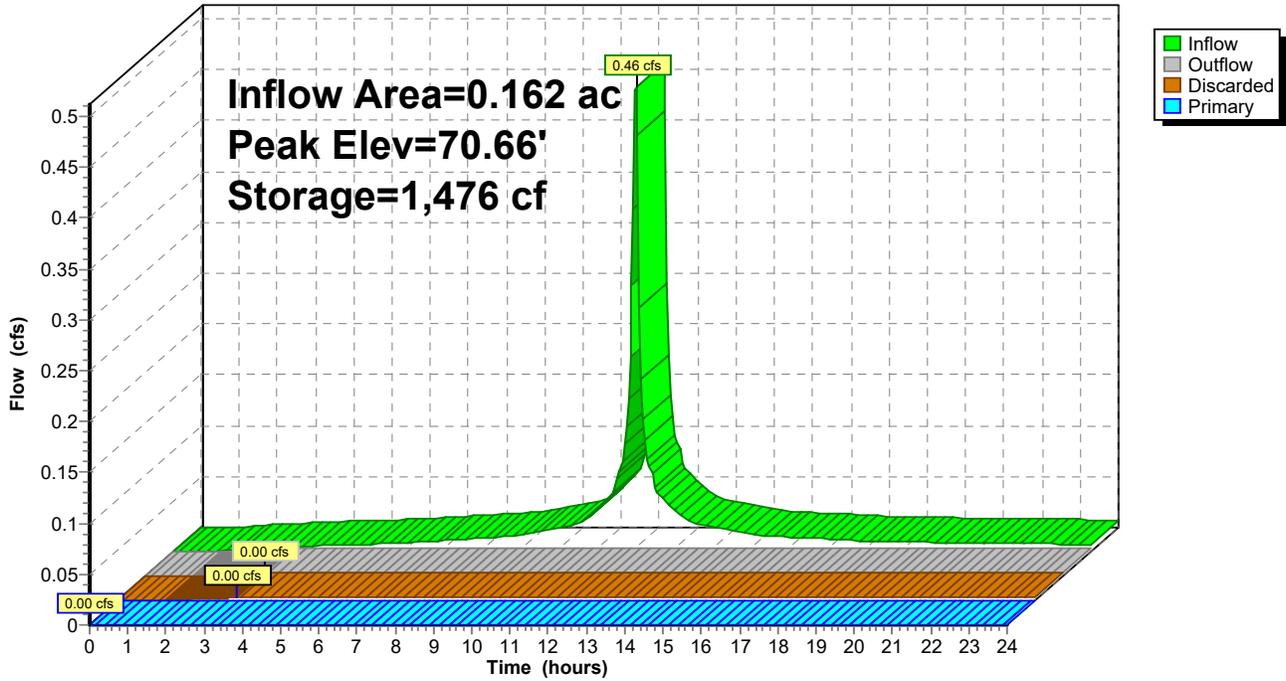
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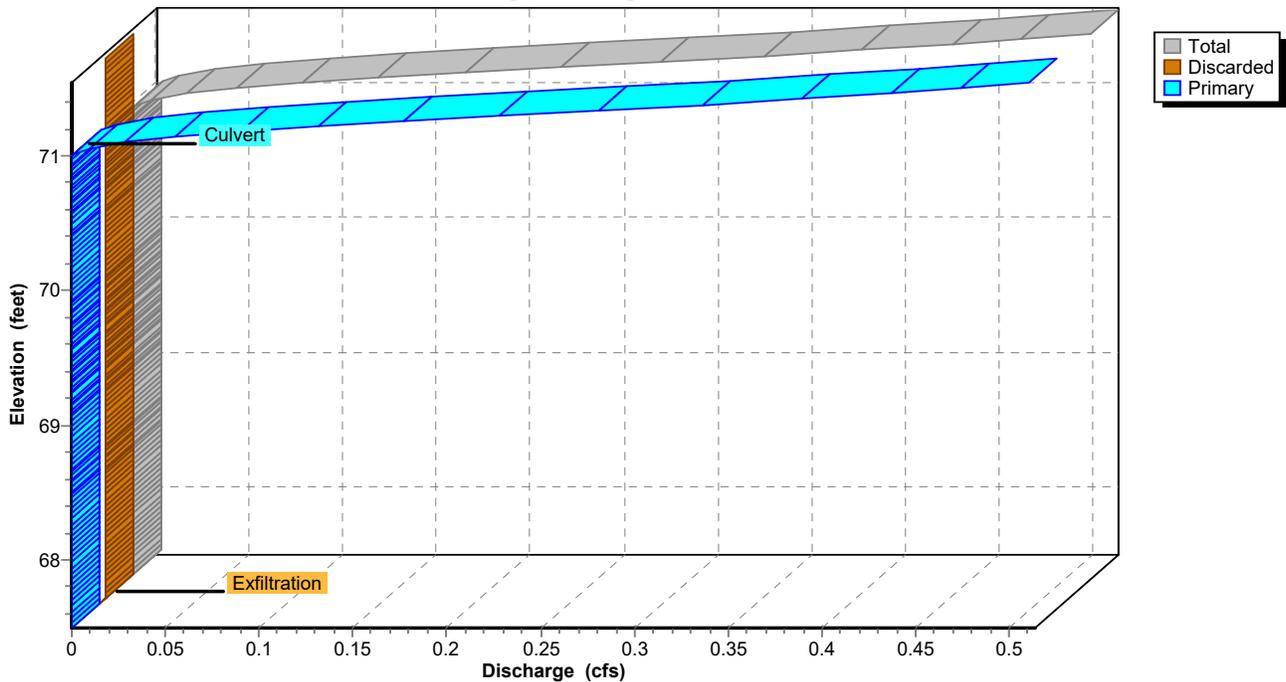
## Pond 1P: 330XLHD

Hydrograph



## Pond 1P: 330XLHD

Stage-Discharge



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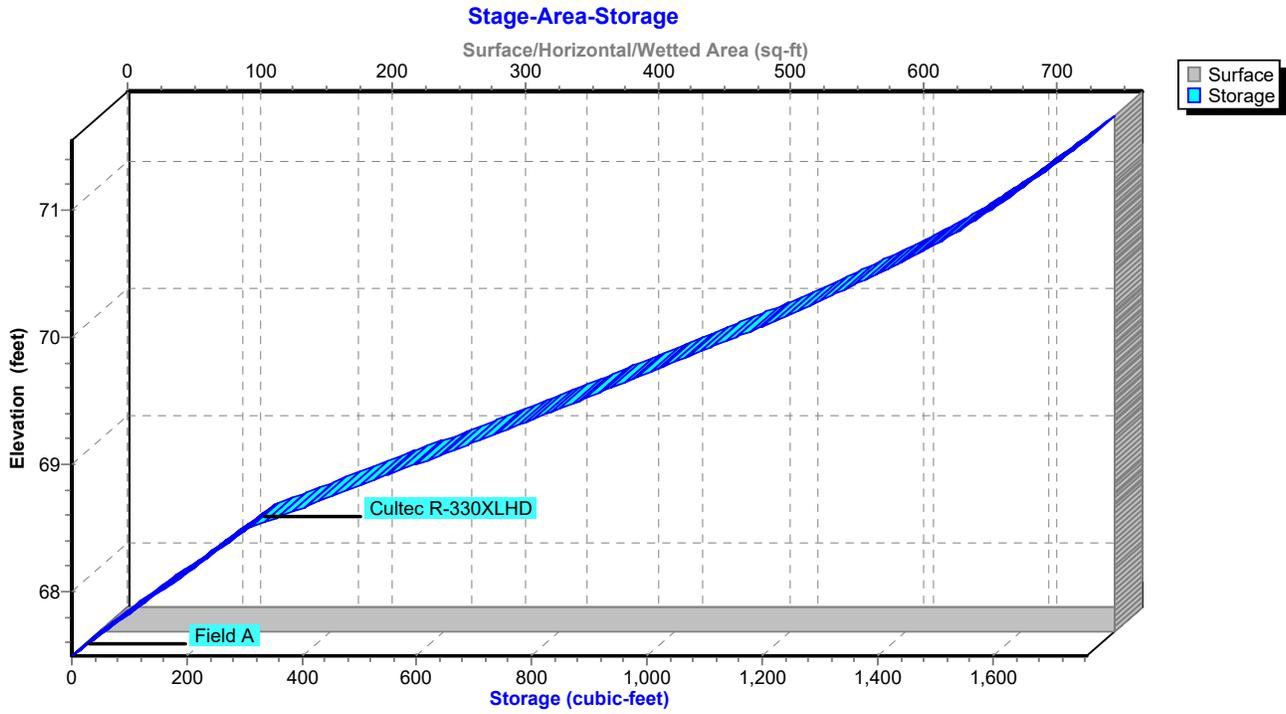
41.5 kernwood prop

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## Pond 1P: 330XLHD



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**Hydrograph for Pond 1P: 330XLHD**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	67.50	0.00	0.00	<b>0.00</b>
0.50	0.00	0	67.50	0.00	0.00	0.00
1.00	0.00	0	67.50	0.00	0.00	0.00
1.50	0.00	1	67.50	0.00	0.00	0.00
2.00	0.00	4	67.51	0.00	0.00	0.00
2.50	0.00	8	67.53	0.00	0.00	0.00
3.00	0.00	12	67.54	<b>0.00</b>	<b>0.00</b>	0.00
3.50	0.01	16	67.55	<b>0.00</b>	<b>0.00</b>	0.00
4.00	0.01	21	67.57	0.00	0.00	0.00
4.50	0.01	28	67.59	0.00	0.00	0.00
5.00	0.01	35	67.62	0.00	0.00	0.00
5.50	0.01	44	67.64	0.00	0.00	0.00
6.00	0.01	54	67.68	0.00	0.00	0.00
6.50	0.01	65	67.71	0.00	0.00	0.00
7.00	0.01	78	67.75	0.00	0.00	0.00
7.50	0.01	93	67.80	0.00	0.00	0.00
8.00	0.01	110	67.86	0.00	0.00	0.00
8.50	0.01	129	67.92	0.00	0.00	0.00
9.00	0.02	151	67.99	0.00	0.00	0.00
9.50	0.02	177	68.08	0.00	0.00	0.00
10.00	0.02	209	68.18	0.00	0.00	0.00
10.50	0.03	247	68.31	0.00	0.00	0.00
11.00	0.04	299	68.48	0.00	0.00	0.00
11.50	0.06	379	68.63	0.00	0.00	0.00
12.00	<b>0.26</b>	575	68.96	0.00	0.00	0.00
12.50	<b>0.08</b>	964	69.65	0.00	0.00	0.00
13.00	0.04	1,062	69.83	0.00	0.00	0.00
13.50	0.03	1,124	69.94	0.00	0.00	0.00
14.00	0.02	1,167	70.02	0.00	0.00	0.00
14.50	0.02	1,203	70.09	0.00	0.00	0.00
15.00	0.02	1,233	70.15	0.00	0.00	0.00
15.50	0.02	1,257	70.20	0.00	0.00	0.00
16.00	0.01	1,280	70.24	0.00	0.00	0.00
16.50	0.01	1,300	70.29	0.00	0.00	0.00
17.00	0.01	1,319	70.32	0.00	0.00	0.00
17.50	0.01	1,336	70.36	0.00	0.00	0.00
18.00	0.01	1,350	70.39	0.00	0.00	0.00
18.50	0.01	1,364	70.42	0.00	0.00	0.00
19.00	0.01	1,376	70.44	0.00	0.00	0.00
19.50	0.01	1,388	70.47	0.00	0.00	0.00
20.00	0.01	1,400	70.49	0.00	0.00	0.00
20.50	0.01	1,411	70.52	0.00	0.00	0.00
21.00	0.01	1,422	70.54	0.00	0.00	0.00
21.50	0.01	1,432	70.56	0.00	0.00	0.00
22.00	0.01	1,442	70.59	0.00	0.00	0.00
22.50	0.01	1,451	70.61	0.00	0.00	0.00
23.00	0.01	1,460	70.63	0.00	0.00	0.00
23.50	0.01	1,468	70.65	0.00	0.00	0.00
24.00	0.01	<b>1,476</b>	<b>70.66</b>	0.00	0.00	0.00

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**Stage-Discharge for Pond 1P: 330XLHD**

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
67.50	0.00	<b>0.00</b>	0.00	70.05	0.00	0.00	0.00
67.55	0.00	<b>0.00</b>	0.00	70.10	0.00	0.00	0.00
67.60	0.00	0.00	0.00	70.15	0.00	0.00	0.00
67.65	0.00	0.00	0.00	70.20	0.00	0.00	0.00
67.70	0.00	0.00	0.00	70.25	0.00	0.00	0.00
67.75	0.00	0.00	0.00	70.30	0.00	0.00	0.00
67.80	0.00	0.00	0.00	70.35	0.00	0.00	0.00
67.85	0.00	0.00	0.00	70.40	0.00	0.00	0.00
67.90	0.00	0.00	0.00	70.45	0.00	0.00	0.00
67.95	0.00	0.00	0.00	70.50	0.00	0.00	0.00
68.00	0.00	0.00	0.00	70.55	0.00	0.00	0.00
68.05	0.00	0.00	0.00	70.60	0.00	0.00	0.00
68.10	0.00	0.00	0.00	70.65	0.00	0.00	0.00
68.15	0.00	0.00	0.00	70.70	0.00	0.00	0.00
68.20	0.00	0.00	0.00	70.75	0.00	0.00	0.00
68.25	0.00	0.00	0.00	70.80	0.00	0.00	0.00
68.30	0.00	0.00	0.00	70.85	0.00	0.00	0.00
68.35	0.00	0.00	0.00	70.90	0.00	0.00	0.00
68.40	0.00	0.00	0.00	70.95	0.00	0.00	0.00
68.45	0.00	0.00	0.00	71.00	0.00	0.00	0.00
68.50	0.00	0.00	0.00	71.05	0.01	0.00	0.01
68.55	0.00	0.00	0.00	71.10	0.03	0.00	0.03
68.60	0.00	0.00	0.00	71.15	0.07	0.00	0.07
68.65	0.00	0.00	0.00	71.20	0.11	0.00	0.11
68.70	0.00	0.00	0.00	71.25	0.17	0.00	0.17
68.75	0.00	0.00	0.00	71.30	0.23	0.00	0.23
68.80	0.00	0.00	0.00	71.35	0.30	0.00	0.30
68.85	0.00	0.00	0.00	71.40	0.37	0.00	0.36
68.90	0.00	0.00	0.00	71.45	0.43	0.00	0.43
68.95	0.00	0.00	0.00	71.50	<b>0.48</b>	0.00	<b>0.47</b>
69.00	0.00	0.00	0.00				
69.05	0.00	0.00	0.00				
69.10	0.00	0.00	0.00				
69.15	0.00	0.00	0.00				
69.20	0.00	0.00	0.00				
69.25	0.00	0.00	0.00				
69.30	0.00	0.00	0.00				
69.35	0.00	0.00	0.00				
69.40	0.00	0.00	0.00				
69.45	0.00	0.00	0.00				
69.50	0.00	0.00	0.00				
69.55	0.00	0.00	0.00				
69.60	0.00	0.00	0.00				
69.65	0.00	0.00	0.00				
69.70	0.00	0.00	0.00				
69.75	0.00	0.00	0.00				
69.80	0.00	0.00	0.00				
69.85	0.00	0.00	0.00				
69.90	0.00	0.00	0.00				
69.95	0.00	0.00	0.00				
70.00	0.00	0.00	0.00				

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**Stage-Area-Storage for Pond 1P: 330XLHD**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
67.50	<b>765</b>	0	70.05	765	1,181
67.55	765	15	70.10	765	1,207
67.60	765	31	70.15	765	1,232
67.65	765	46	70.20	765	1,258
67.70	765	61	70.25	765	1,283
67.75	765	76	70.30	765	1,308
67.80	765	92	70.35	765	1,332
67.85	765	107	70.40	765	1,356
67.90	765	122	70.45	765	1,380
67.95	765	138	70.50	765	1,403
68.00	765	153	70.55	765	1,426
68.05	765	168	70.60	765	1,448
68.10	765	184	70.65	765	1,470
68.15	765	199	70.70	765	1,491
68.20	765	214	70.75	765	1,511
68.25	765	229	70.80	765	1,530
68.30	765	245	70.85	765	1,548
68.35	765	260	70.90	765	1,566
68.40	765	275	70.95	765	1,583
68.45	765	291	71.00	765	1,598
68.50	765	306	71.05	765	1,614
68.55	765	335	71.10	765	1,629
68.60	765	365	71.15	765	1,644
68.65	765	394	71.20	765	1,660
68.70	765	423	71.25	765	1,675
68.75	765	452	71.30	765	1,690
68.80	765	481	71.35	765	1,706
68.85	765	510	71.40	765	1,721
68.90	765	539	71.45	765	1,736
68.95	765	568	71.50	765	<b>1,751</b>
69.00	765	597			
69.05	765	626			
69.10	765	655			
69.15	765	683			
69.20	765	712			
69.25	765	740			
69.30	765	768			
69.35	765	797			
69.40	765	825			
69.45	765	853			
69.50	765	881			
69.55	765	909			
69.60	765	937			
69.65	765	965			
69.70	765	993			
69.75	765	1,020			
69.80	765	1,048			
69.85	765	1,075			
69.90	765	1,102			
69.95	765	1,128			
70.00	765	1,155			

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## Summary for Subcatchment 2S: 41 KERNWOOD PROPOSED PARKING

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

Runoff = 0.71 cfs @ 12.11 hrs, Volume= 0.062 af, Depth> 4.59"

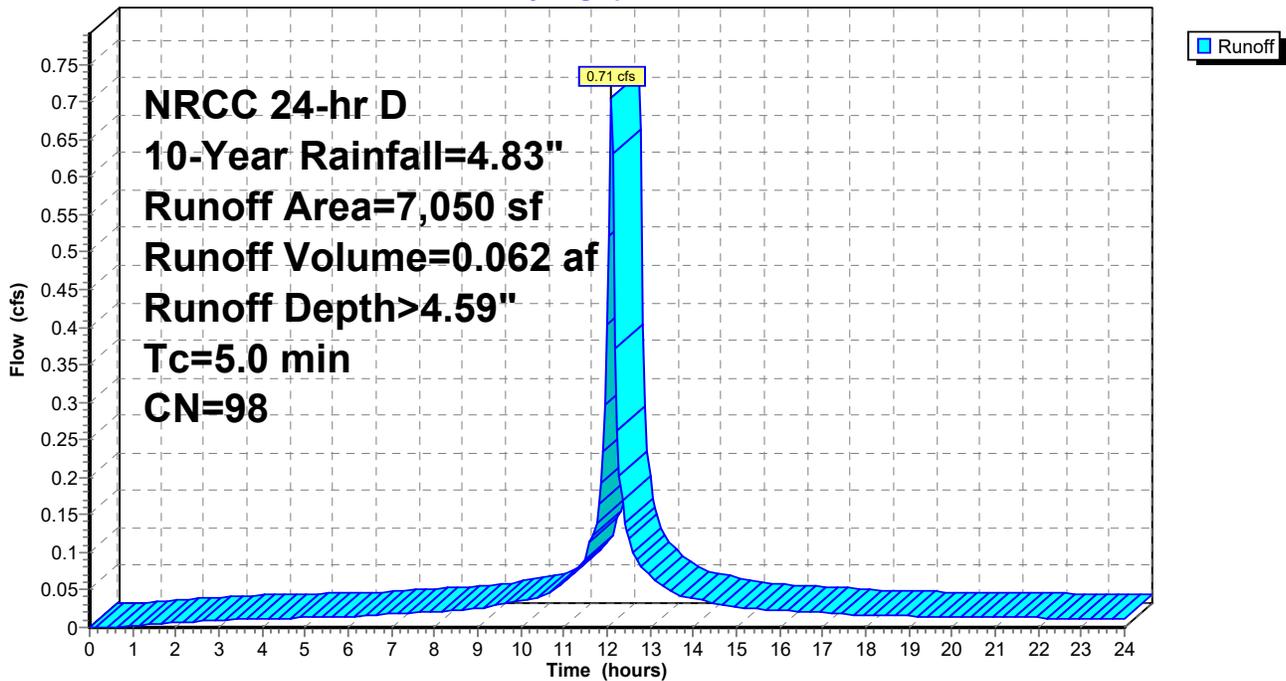
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr D 10-Year Rainfall=4.83"

Area (sf)	CN	Description
7,050	98	Paved parking, HSG A
7,050		100.00% Impervious Area

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

## Subcatchment 2S: 41 KERNWOOD PROPOSED PARKING

Hydrograph



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**Hydrograph for Subcatchment 2S: 41 KERNWOOD PROPOSED PARKING**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	3.35	3.11	0.09
0.25	0.02	0.00	0.00	13.00	3.46	3.22	0.07
0.50	0.03	0.00	0.00	13.25	3.55	3.31	0.06
0.75	0.05	0.00	0.00	13.50	3.62	3.39	0.05
1.00	0.07	0.00	0.00	13.75	3.69	3.45	0.04
1.25	0.09	0.01	0.00	14.00	3.75	3.51	0.04
1.50	0.11	0.02	0.00	14.25	3.80	3.57	0.04
1.75	0.13	0.03	0.01	14.50	3.85	3.62	0.03
2.00	0.15	0.04	0.01	14.75	3.90	3.67	0.03
2.25	0.17	0.05	0.01	15.00	3.94	3.71	0.03
2.50	0.19	0.06	0.01	15.25	3.98	3.75	0.03
2.75	0.21	0.07	0.01	15.50	4.02	3.79	0.02
3.00	0.23	0.09	0.01	15.75	4.06	3.82	0.02
3.25	0.25	0.10	0.01	16.00	4.09	3.86	0.02
3.50	0.27	0.12	0.01	16.25	4.13	3.89	0.02
3.75	0.29	0.14	0.01	16.50	4.16	3.93	0.02
4.00	0.31	0.15	0.01	16.75	4.19	3.96	0.02
4.25	0.33	0.17	0.01	17.00	4.22	3.99	0.02
4.50	0.36	0.19	0.01	17.25	4.25	4.02	0.02
4.75	0.38	0.21	0.01	17.50	4.28	4.04	0.02
5.00	0.40	0.23	0.01	17.75	4.31	4.07	0.02
5.25	0.43	0.25	0.01	18.00	4.33	4.10	0.02
5.50	0.45	0.27	0.01	18.25	4.36	4.12	0.02
5.75	0.47	0.29	0.01	18.50	4.38	4.15	0.02
6.00	0.50	0.32	0.01	18.75	4.40	4.17	0.02
6.25	0.52	0.34	0.02	19.00	4.43	4.19	0.02
6.50	0.55	0.36	0.02	19.25	4.45	4.22	0.02
6.75	0.58	0.39	0.02	19.50	4.47	4.24	0.01
7.00	0.61	0.42	0.02	19.75	4.50	4.26	0.01
7.25	0.64	0.44	0.02	20.00	4.52	4.28	0.01
7.50	0.67	0.47	0.02	20.25	4.54	4.30	0.01
7.75	0.70	0.51	0.02	20.50	4.56	4.33	0.01
8.00	0.74	0.54	0.02	20.75	4.58	4.35	0.01
8.25	0.77	0.57	0.02	21.00	4.60	4.37	0.01
8.50	0.81	0.61	0.02	21.25	4.62	4.39	0.01
8.75	0.85	0.64	0.02	21.50	4.64	4.41	0.01
9.00	0.89	0.68	0.02	21.75	4.66	4.43	0.01
9.25	0.93	0.72	0.03	22.00	4.68	4.45	0.01
9.50	0.98	0.77	0.03	22.25	4.70	4.47	0.01
9.75	1.03	0.82	0.03	22.50	4.72	4.49	0.01
10.00	1.08	0.87	0.04	22.75	4.74	4.50	0.01
10.25	1.14	0.93	0.04	23.00	4.76	4.52	0.01
10.50	1.21	0.99	0.04	23.25	4.78	4.54	0.01
10.75	1.28	1.07	0.05	23.50	4.80	4.56	0.01
11.00	1.37	1.15	0.06	23.75	4.81	4.58	0.01
11.25	1.48	1.26	0.07	24.00	<b>4.83</b>	<b>4.59</b>	0.01
11.50	1.62	1.40	0.09				
11.75	1.83	1.60	0.14				
12.00	2.31	2.09	<b>0.40</b>				
12.25	3.00	2.77	<b>0.26</b>				
12.50	3.21	2.98	0.12				

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## Summary for Pond 1P: 330XLHD

Inflow Area = 0.162 ac, 100.00% Impervious, Inflow Depth > 4.59" for 10-Year event  
Inflow = 0.71 cfs @ 12.11 hrs, Volume= 0.062 af  
Outflow = 0.08 cfs @ 12.84 hrs, Volume= 0.025 af, Atten= 89%, Lag= 43.8 min  
Discarded = 0.00 cfs @ 2.00 hrs, Volume= 0.006 af  
Primary = 0.08 cfs @ 12.84 hrs, Volume= 0.019 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2  
Peak Elev= 71.16' @ 12.84 hrs Surf.Area= 765 sf Storage= 1,648 cf

Plug-Flow detention time= 376.2 min calculated for 0.025 af (40% of inflow)  
Center-of-Mass det. time= 178.4 min ( 928.1 - 749.7 )

Volume	Invert	Avail.Storage	Storage Description
#1A	67.50'	885 cf	<b>22.83'W x 33.50'L x 4.04'H Field A</b> 3,092 cf Overall - 879 cf Embedded = 2,212 cf x 40.0% Voids
#2A	68.50'	879 cf	<b>Cultec R-330XLHD x 16 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		1,764 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	67.50'	<b>0.170 in/hr Exfiltration over Surface area</b>
#2	Primary	71.00'	<b>6.0" Round Culvert</b> L= 34.0' Ke= 0.500 Inlet / Outlet Invert= 71.00' / 69.50' S= 0.0441 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

**Discarded OutFlow** Max=0.00 cfs @ 2.00 hrs HW=67.54' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

**Primary OutFlow** Max=0.08 cfs @ 12.84 hrs HW=71.16' (Free Discharge)

↑**2=Culvert** (Inlet Controls 0.08 cfs @ 1.37 fps)

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**Pond 1P: 330XLHD - Chamber Wizard Field A**

**Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)**

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 4 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

4 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 29.50' Row Length +24.0" End Stone x 2 = 33.50' Base Length

4 Rows x 52.0" Wide + 6.0" Spacing x 3 + 24.0" Side Stone x 2 = 22.83' Base Width

12.0" Base + 30.5" Chamber Height + 6.0" Cover = 4.04' Field Height

16 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 4 Rows = 879.2 cf Chamber Storage

3,091.5 cf Field - 879.2 cf Chambers = 2,212.3 cf Stone x 40.0% Voids = 884.9 cf Stone Storage

Chamber Storage + Stone Storage = 1,764.1 cf = 0.040 af

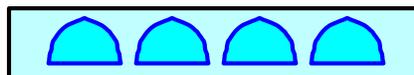
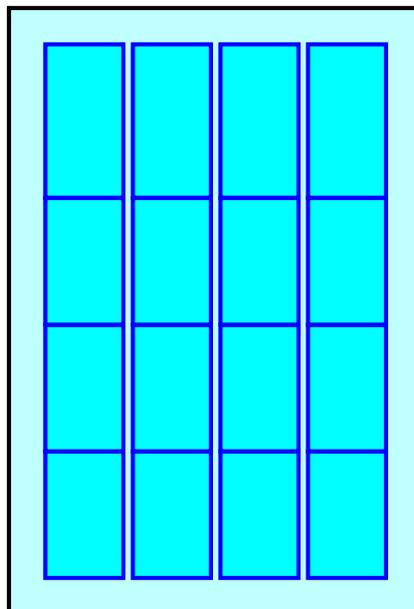
Overall Storage Efficiency = 57.1%

Overall System Size = 33.50' x 22.83' x 4.04'

16 Chambers

114.5 cy Field

81.9 cy Stone



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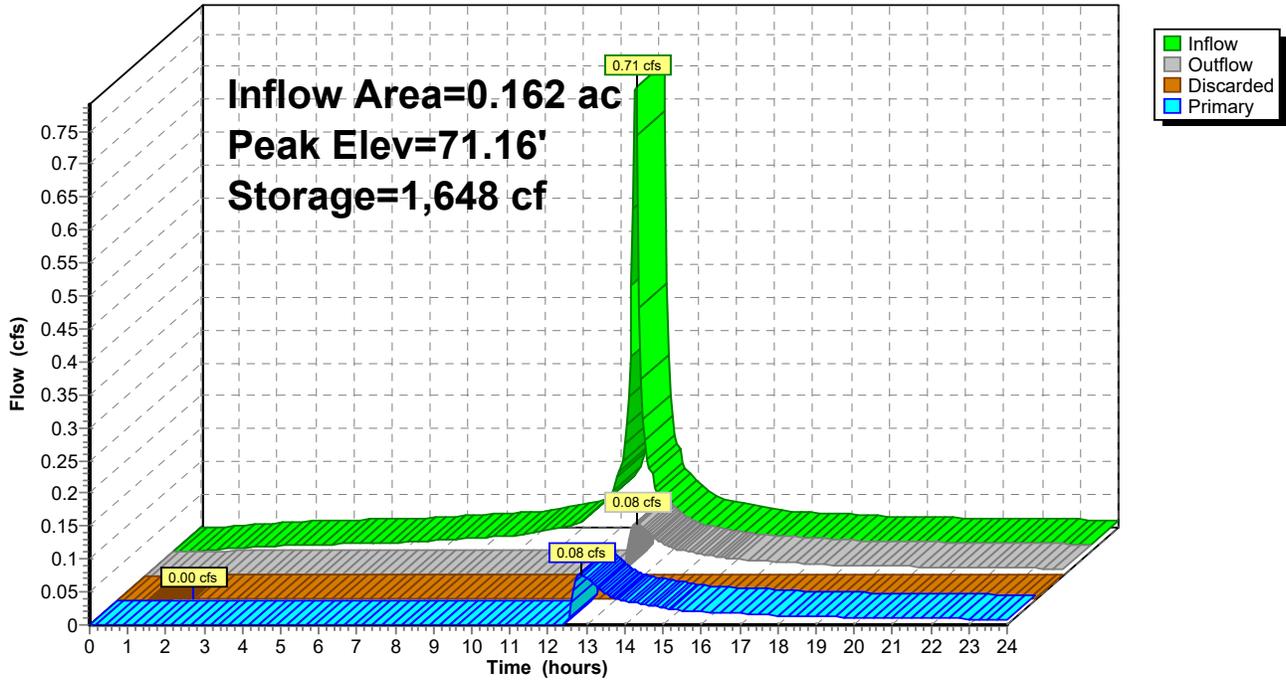
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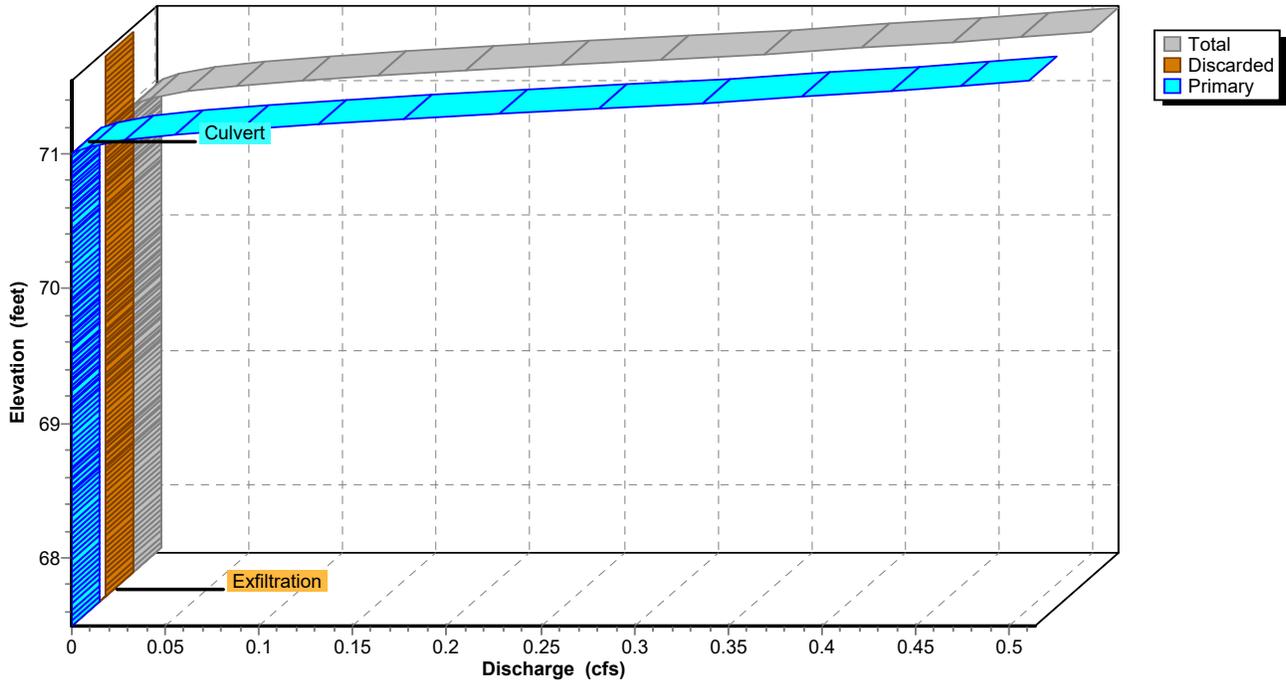
## Pond 1P: 330XLHD

Hydrograph



## Pond 1P: 330XLHD

Stage-Discharge



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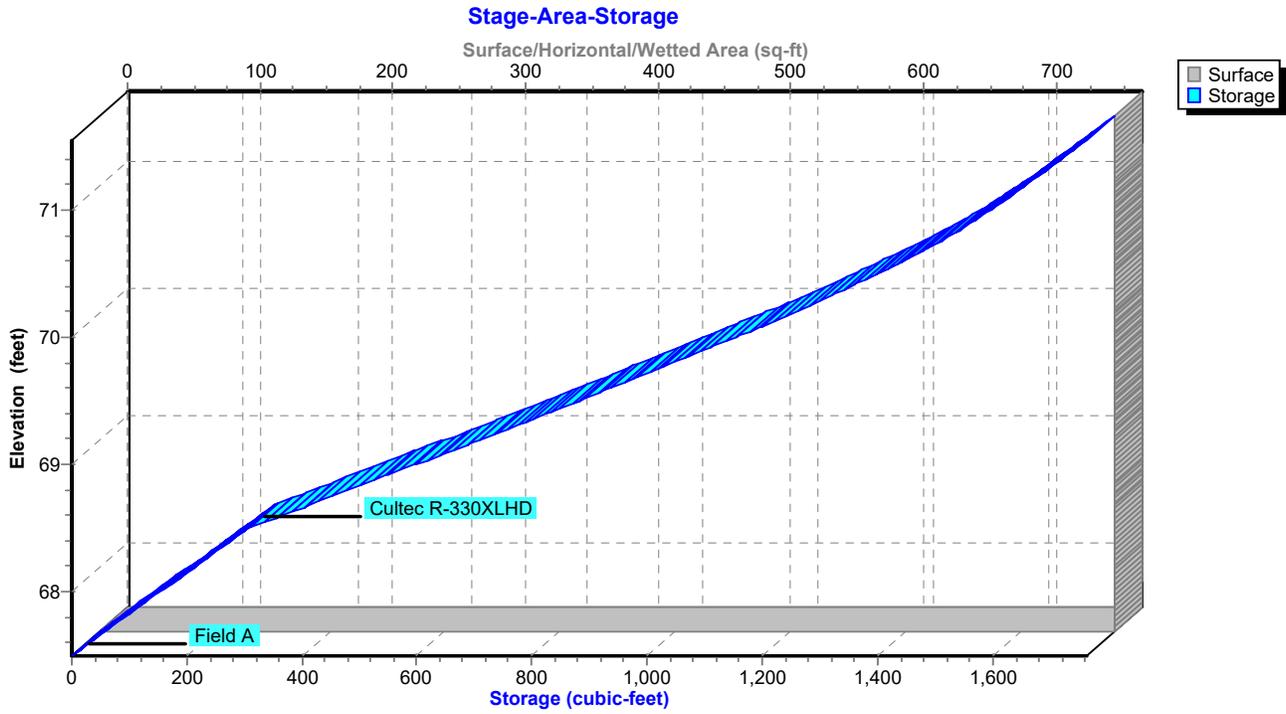
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## Pond 1P: 330XLHD



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**Hydrograph for Pond 1P: 330XLHD**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	67.50	0.00	0.00	0.00
0.50	0.00	0	67.50	0.00	0.00	0.00
1.00	0.00	1	67.50	0.00	0.00	0.00
1.50	0.00	6	67.52	0.00	0.00	0.00
2.00	0.01	13	67.54	0.00	<b>0.00</b>	0.00
2.50	0.01	21	67.57	0.00	0.00	0.00
3.00	0.01	32	67.61	0.00	0.00	0.00
3.50	0.01	45	67.65	0.00	0.00	0.00
4.00	0.01	60	67.70	0.00	0.00	0.00
4.50	0.01	76	67.75	0.00	0.00	0.00
5.00	0.01	93	67.81	0.00	0.00	0.00
5.50	0.01	112	67.87	0.00	0.00	0.00
6.00	0.01	132	67.93	0.00	0.00	0.00
6.50	0.02	154	68.00	0.00	0.00	0.00
7.00	0.02	179	68.09	0.00	0.00	0.00
7.50	0.02	208	68.18	0.00	0.00	0.00
8.00	0.02	239	68.28	0.00	0.00	0.00
8.50	0.02	274	68.39	0.00	0.00	0.00
9.00	0.02	312	68.51	0.00	0.00	0.00
9.50	0.03	356	68.58	0.00	0.00	0.00
10.00	0.04	409	68.68	0.00	0.00	0.00
10.50	0.04	473	68.79	0.00	0.00	0.00
11.00	0.06	558	68.93	0.00	0.00	0.00
11.50	0.09	686	69.16	0.00	0.00	0.00
12.00	<b>0.40</b>	992	69.70	0.00	0.00	0.00
12.50	<b>0.12</b>	<b>1,597</b>	<b>70.99</b>	<b>0.00</b>	0.00	<b>0.00</b>
13.00	0.07	<b>1,646</b>	<b>71.16</b>	<b>0.07</b>	0.00	<b>0.07</b>
13.50	0.05	1,638	71.13	0.05	0.00	0.05
14.00	0.04	1,632	71.11	0.04	0.00	0.04
14.50	0.03	1,629	71.10	0.03	0.00	0.03
15.00	0.03	1,627	71.09	0.03	0.00	0.03
15.50	0.02	1,624	71.08	0.03	0.00	0.02
16.00	0.02	1,623	71.08	0.02	0.00	0.02
16.50	0.02	1,622	71.08	0.02	0.00	0.02
17.00	0.02	1,621	71.07	0.02	0.00	0.02
17.50	0.02	1,620	71.07	0.02	0.00	0.02
18.00	0.02	1,618	71.07	0.02	0.00	0.01
18.50	0.02	1,618	71.06	0.02	0.00	0.01
19.00	0.02	1,617	71.06	0.02	0.00	0.01
19.50	0.01	1,617	71.06	0.01	0.00	0.01
20.00	0.01	1,617	71.06	0.01	0.00	0.01
20.50	0.01	1,617	71.06	0.01	0.00	0.01
21.00	0.01	1,616	71.06	0.01	0.00	0.01
21.50	0.01	1,616	71.06	0.01	0.00	0.01
22.00	0.01	1,616	71.06	0.01	0.00	0.01
22.50	0.01	1,615	71.06	0.01	0.00	0.01
23.00	0.01	1,615	71.05	0.01	0.00	0.01
23.50	0.01	1,614	71.05	0.01	0.00	0.01
24.00	0.01	1,614	71.05	0.01	0.00	0.01

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**Stage-Discharge for Pond 1P: 330XLHD**

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
67.50	0.00	<b>0.00</b>	0.00	70.05	0.00	0.00	0.00
67.55	0.00	<b>0.00</b>	0.00	70.10	0.00	0.00	0.00
67.60	0.00	0.00	0.00	70.15	0.00	0.00	0.00
67.65	0.00	0.00	0.00	70.20	0.00	0.00	0.00
67.70	0.00	0.00	0.00	70.25	0.00	0.00	0.00
67.75	0.00	0.00	0.00	70.30	0.00	0.00	0.00
67.80	0.00	0.00	0.00	70.35	0.00	0.00	0.00
67.85	0.00	0.00	0.00	70.40	0.00	0.00	0.00
67.90	0.00	0.00	0.00	70.45	0.00	0.00	0.00
67.95	0.00	0.00	0.00	70.50	0.00	0.00	0.00
68.00	0.00	0.00	0.00	70.55	0.00	0.00	0.00
68.05	0.00	0.00	0.00	70.60	0.00	0.00	0.00
68.10	0.00	0.00	0.00	70.65	0.00	0.00	0.00
68.15	0.00	0.00	0.00	70.70	0.00	0.00	0.00
68.20	0.00	0.00	0.00	70.75	0.00	0.00	0.00
68.25	0.00	0.00	0.00	70.80	0.00	0.00	0.00
68.30	0.00	0.00	0.00	70.85	0.00	0.00	0.00
68.35	0.00	0.00	0.00	70.90	0.00	0.00	0.00
68.40	0.00	0.00	0.00	70.95	0.00	0.00	0.00
68.45	0.00	0.00	0.00	71.00	0.00	0.00	0.00
68.50	0.00	0.00	0.00	71.05	0.01	0.00	0.01
68.55	0.00	0.00	0.00	71.10	0.03	0.00	0.03
68.60	0.00	0.00	0.00	71.15	0.07	0.00	0.07
68.65	0.00	0.00	0.00	71.20	0.11	0.00	0.11
68.70	0.00	0.00	0.00	71.25	0.17	0.00	0.17
68.75	0.00	0.00	0.00	71.30	0.23	0.00	0.23
68.80	0.00	0.00	0.00	71.35	0.30	0.00	0.30
68.85	0.00	0.00	0.00	71.40	0.37	0.00	0.36
68.90	0.00	0.00	0.00	71.45	0.43	0.00	0.43
68.95	0.00	0.00	0.00	71.50	<b>0.48</b>	0.00	<b>0.47</b>
69.00	0.00	0.00	0.00				
69.05	0.00	0.00	0.00				
69.10	0.00	0.00	0.00				
69.15	0.00	0.00	0.00				
69.20	0.00	0.00	0.00				
69.25	0.00	0.00	0.00				
69.30	0.00	0.00	0.00				
69.35	0.00	0.00	0.00				
69.40	0.00	0.00	0.00				
69.45	0.00	0.00	0.00				
69.50	0.00	0.00	0.00				
69.55	0.00	0.00	0.00				
69.60	0.00	0.00	0.00				
69.65	0.00	0.00	0.00				
69.70	0.00	0.00	0.00				
69.75	0.00	0.00	0.00				
69.80	0.00	0.00	0.00				
69.85	0.00	0.00	0.00				
69.90	0.00	0.00	0.00				
69.95	0.00	0.00	0.00				
70.00	0.00	0.00	0.00				

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**Stage-Area-Storage for Pond 1P: 330XLHD**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
67.50	<b>765</b>	0	70.05	765	1,181
67.55	765	15	70.10	765	1,207
67.60	765	31	70.15	765	1,232
67.65	765	46	70.20	765	1,258
67.70	765	61	70.25	765	1,283
67.75	765	76	70.30	765	1,308
67.80	765	92	70.35	765	1,332
67.85	765	107	70.40	765	1,356
67.90	765	122	70.45	765	1,380
67.95	765	138	70.50	765	1,403
68.00	765	153	70.55	765	1,426
68.05	765	168	70.60	765	1,448
68.10	765	184	70.65	765	1,470
68.15	765	199	70.70	765	1,491
68.20	765	214	70.75	765	1,511
68.25	765	229	70.80	765	1,530
68.30	765	245	70.85	765	1,548
68.35	765	260	70.90	765	1,566
68.40	765	275	70.95	765	1,583
68.45	765	291	71.00	765	1,598
68.50	765	306	71.05	765	1,614
68.55	765	335	71.10	765	1,629
68.60	765	365	71.15	765	1,644
68.65	765	394	71.20	765	1,660
68.70	765	423	71.25	765	1,675
68.75	765	452	71.30	765	1,690
68.80	765	481	71.35	765	1,706
68.85	765	510	71.40	765	1,721
68.90	765	539	71.45	765	1,736
68.95	765	568	71.50	765	<b>1,751</b>
69.00	765	597			
69.05	765	626			
69.10	765	655			
69.15	765	683			
69.20	765	712			
69.25	765	740			
69.30	765	768			
69.35	765	797			
69.40	765	825			
69.45	765	853			
69.50	765	881			
69.55	765	909			
69.60	765	937			
69.65	765	965			
69.70	765	993			
69.75	765	1,020			
69.80	765	1,048			
69.85	765	1,075			
69.90	765	1,102			
69.95	765	1,128			
70.00	765	1,155			

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## Summary for Subcatchment 2S: 41 KERNWOOD PROPOSED PARKING

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

Runoff = 0.90 cfs @ 12.11 hrs, Volume= 0.080 af, Depth> 5.92"

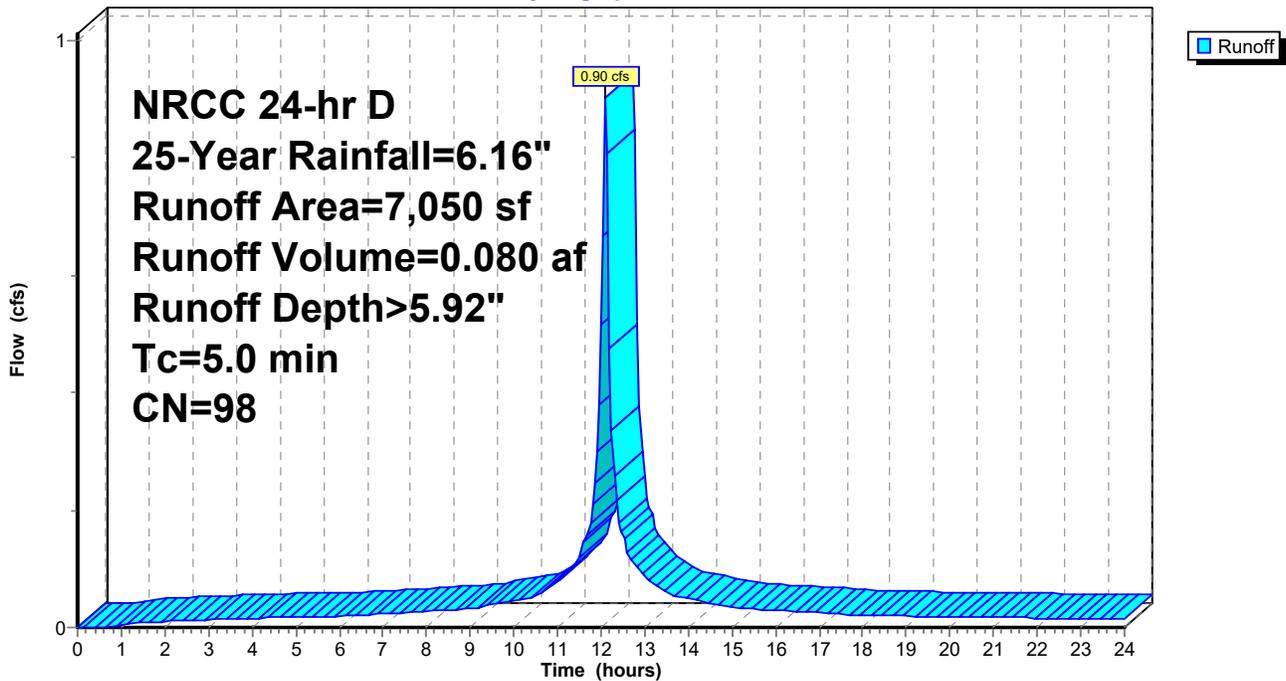
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr D 25-Year Rainfall=6.16"

Area (sf)	CN	Description
7,050	98	Paved parking, HSG A
7,050		100.00% Impervious Area

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

## Subcatchment 2S: 41 KERNWOOD PROPOSED PARKING

Hydrograph



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**Hydrograph for Subcatchment 2S: 41 KERNWOOD PROPOSED PARKING**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	4.27	4.03	0.11
0.25	0.02	0.00	0.00	13.00	4.41	4.17	0.09
0.50	0.04	0.00	0.00	13.25	4.52	4.29	0.07
0.75	0.07	0.00	0.00	13.50	4.62	4.39	0.06
1.00	0.09	0.01	0.00	13.75	4.70	4.47	0.05
1.25	0.11	0.02	0.01	14.00	4.78	4.54	0.05
1.50	0.14	0.03	0.01	14.25	4.85	4.61	0.05
1.75	0.16	0.04	0.01	14.50	4.91	4.68	0.04
2.00	0.19	0.06	0.01	14.75	4.97	4.74	0.04
2.25	0.21	0.08	0.01	15.00	5.03	4.79	0.03
2.50	0.24	0.10	0.01	15.25	5.08	4.84	0.03
2.75	0.26	0.11	0.01	15.50	5.13	4.89	0.03
3.00	0.29	0.14	0.01	15.75	5.18	4.94	0.03
3.25	0.31	0.16	0.01	16.00	5.22	4.98	0.03
3.50	0.34	0.18	0.01	16.25	5.26	5.03	0.03
3.75	0.37	0.20	0.02	16.50	5.31	5.07	0.03
4.00	0.40	0.23	0.02	16.75	5.35	5.11	0.03
4.25	0.43	0.25	0.02	17.00	5.39	5.15	0.03
4.50	0.45	0.28	0.02	17.25	5.42	5.19	0.02
4.75	0.48	0.30	0.02	17.50	5.46	5.22	0.02
5.00	0.51	0.33	0.02	17.75	5.49	5.26	0.02
5.25	0.54	0.36	0.02	18.00	5.53	5.29	0.02
5.50	0.57	0.38	0.02	18.25	5.56	5.32	0.02
5.75	0.60	0.41	0.02	18.50	5.59	5.35	0.02
6.00	0.63	0.44	0.02	18.75	5.62	5.38	0.02
6.25	0.67	0.47	0.02	19.00	5.65	5.41	0.02
6.50	0.70	0.50	0.02	19.25	5.68	5.44	0.02
6.75	0.74	0.54	0.02	19.50	5.71	5.47	0.02
7.00	0.77	0.57	0.02	19.75	5.73	5.50	0.02
7.25	0.81	0.61	0.02	20.00	5.76	5.53	0.02
7.50	0.85	0.65	0.03	20.25	5.79	5.55	0.02
7.75	0.90	0.69	0.03	20.50	5.82	5.58	0.02
8.00	0.94	0.73	0.03	20.75	5.85	5.61	0.02
8.25	0.98	0.78	0.03	21.00	5.87	5.63	0.02
8.50	1.03	0.82	0.03	21.25	5.90	5.66	0.02
8.75	1.08	0.87	0.03	21.50	5.92	5.69	0.02
9.00	1.13	0.92	0.03	21.75	5.95	5.71	0.02
9.25	1.19	0.97	0.04	22.00	5.97	5.74	0.02
9.50	1.25	1.03	0.04	22.25	6.00	5.76	0.02
9.75	1.31	1.09	0.04	22.50	6.02	5.79	0.02
10.00	1.38	1.16	0.05	22.75	6.05	5.81	0.02
10.25	1.46	1.24	0.05	23.00	6.07	5.83	0.02
10.50	1.54	1.32	0.05	23.25	6.09	5.85	0.01
10.75	1.64	1.41	0.06	23.50	6.12	5.88	0.01
11.00	1.75	1.53	0.08	23.75	6.14	5.90	0.01
11.25	1.89	1.67	0.10	24.00	<b>6.16</b>	<b>5.92</b>	0.01
11.50	2.06	1.84	0.12				
11.75	2.33	2.10	0.18				
12.00	2.95	2.72	<b>0.52</b>				
12.25	3.83	3.60	<b>0.33</b>				
12.50	4.10	3.86	0.16				

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NRCC 24-hr D 25-Year Rainfall=6.16"

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## Summary for Pond 1P: 330XLHD

Inflow Area = 0.162 ac, 100.00% Impervious, Inflow Depth > 5.92" for 25-Year event  
Inflow = 0.90 cfs @ 12.11 hrs, Volume= 0.080 af  
Outflow = 0.48 cfs @ 12.22 hrs, Volume= 0.043 af, Atten= 47%, Lag= 6.4 min  
Discarded = 0.00 cfs @ 1.55 hrs, Volume= 0.006 af  
Primary = 0.47 cfs @ 12.22 hrs, Volume= 0.037 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2  
Peak Elev= 71.50' @ 12.22 hrs Surf.Area= 765 sf Storage= 1,750 cf

Plug-Flow detention time= 295.6 min calculated for 0.043 af (54% of inflow)  
Center-of-Mass det. time= 138.4 min ( 883.7 - 745.2 )

Volume	Invert	Avail.Storage	Storage Description
#1A	67.50'	885 cf	<b>22.83'W x 33.50'L x 4.04'H Field A</b> 3,092 cf Overall - 879 cf Embedded = 2,212 cf x 40.0% Voids
#2A	68.50'	879 cf	<b>Cultec R-330XLHD x 16 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		1,764 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	67.50'	<b>0.170 in/hr Exfiltration over Surface area</b>
#2	Primary	71.00'	<b>6.0" Round Culvert</b> L= 34.0' Ke= 0.500 Inlet / Outlet Invert= 71.00' / 69.50' S= 0.0441 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

**Discarded OutFlow** Max=0.00 cfs @ 1.55 hrs HW=67.54' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

**Primary OutFlow** Max=0.45 cfs @ 12.22 hrs HW=71.48' (Free Discharge)

↑**2=Culvert** (Inlet Controls 0.45 cfs @ 2.35 fps)

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## Pond 1P: 330XLHD - Chamber Wizard Field A

### Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 4 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

4 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 29.50' Row Length +24.0" End Stone x 2 = 33.50' Base Length

4 Rows x 52.0" Wide + 6.0" Spacing x 3 + 24.0" Side Stone x 2 = 22.83' Base Width

12.0" Base + 30.5" Chamber Height + 6.0" Cover = 4.04' Field Height

16 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 4 Rows = 879.2 cf Chamber Storage

3,091.5 cf Field - 879.2 cf Chambers = 2,212.3 cf Stone x 40.0% Voids = 884.9 cf Stone Storage

Chamber Storage + Stone Storage = 1,764.1 cf = 0.040 af

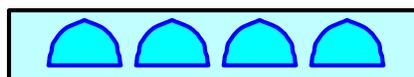
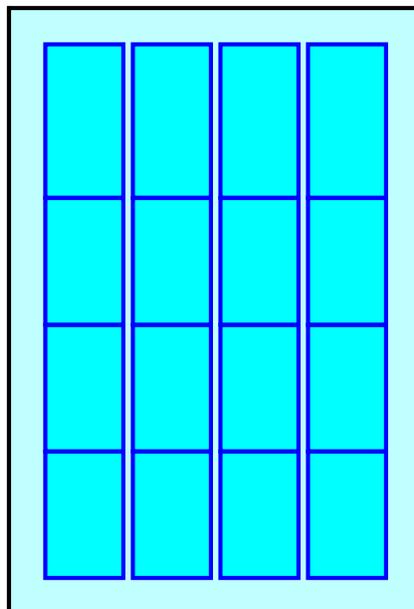
Overall Storage Efficiency = 57.1%

Overall System Size = 33.50' x 22.83' x 4.04'

16 Chambers

114.5 cy Field

81.9 cy Stone



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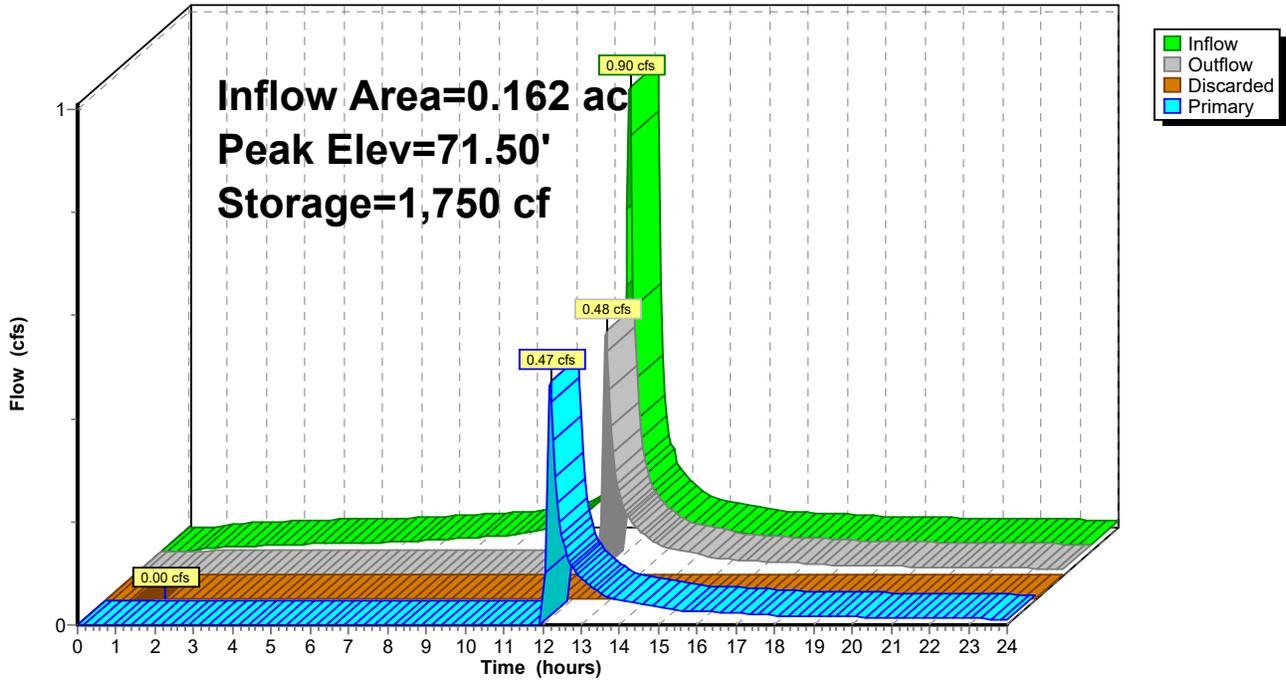
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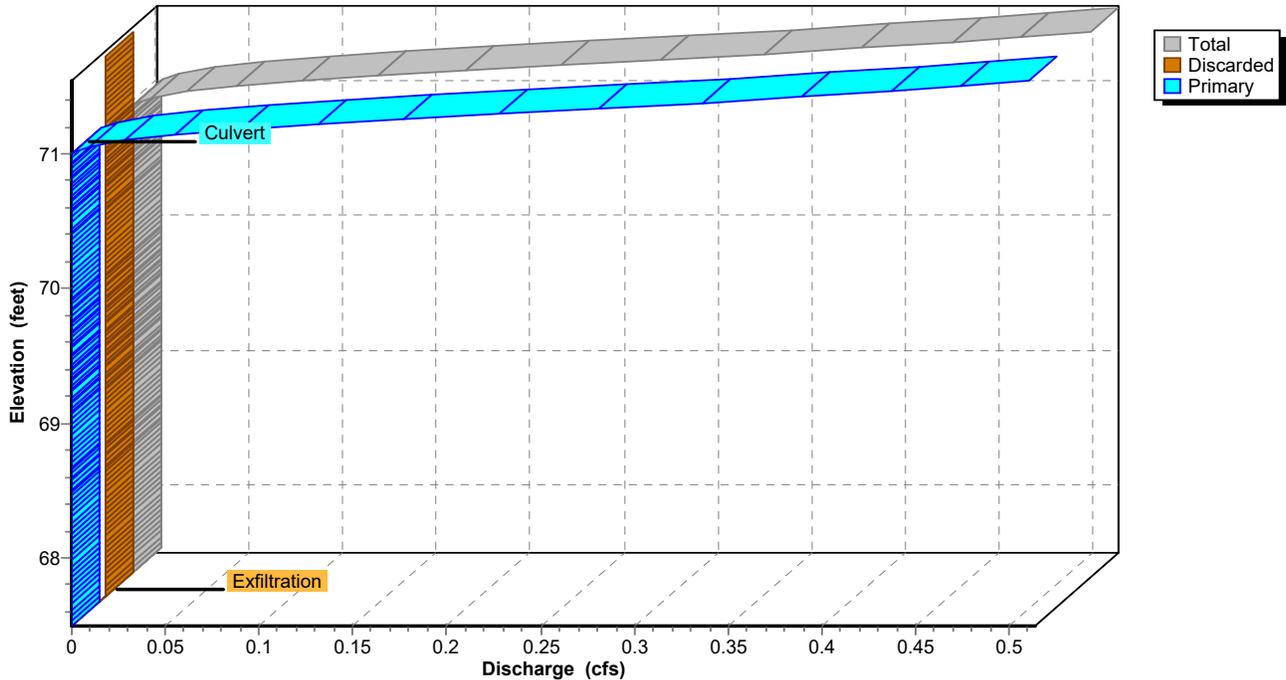
## Pond 1P: 330XLHD

Hydrograph



## Pond 1P: 330XLHD

Stage-Discharge



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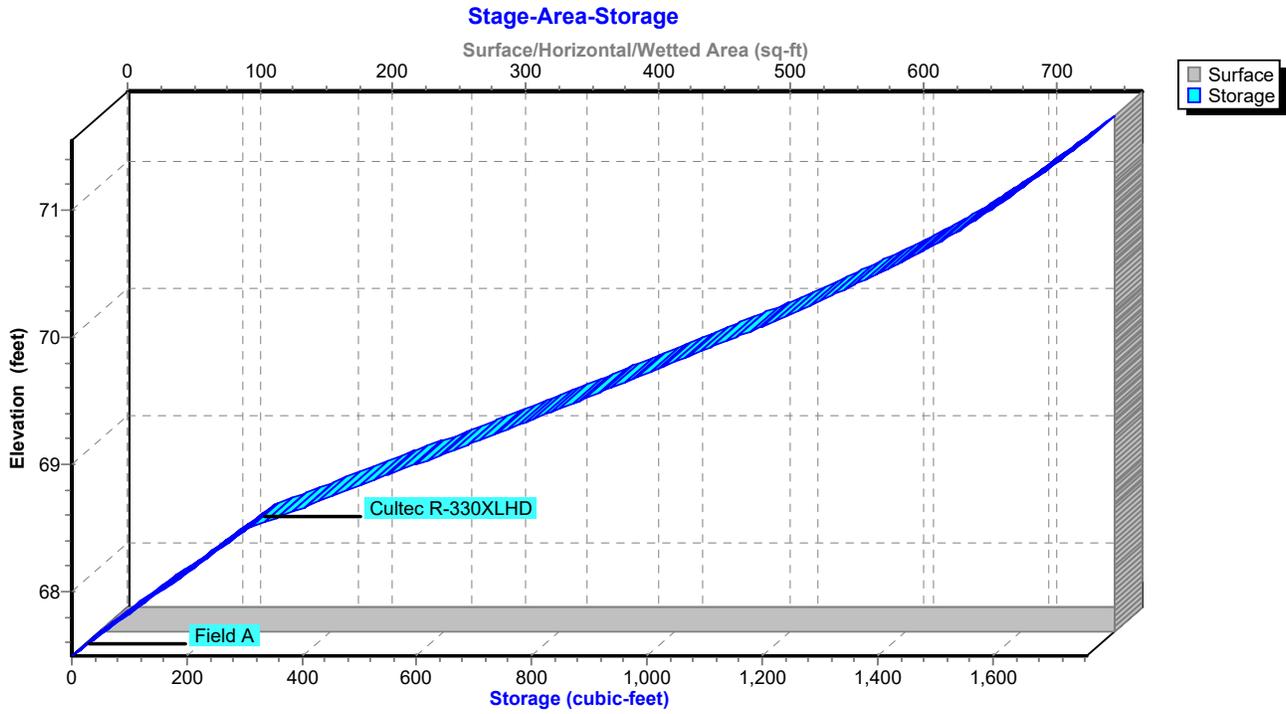
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## Pond 1P: 330XLHD



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**Hydrograph for Pond 1P: 330XLHD**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	67.50	0.00	0.00	0.00
0.50	0.00	0	67.50	0.00	0.00	0.00
1.00	0.00	4	67.51	0.00	0.00	0.00
1.50	0.01	12	67.54	0.00	<b>0.00</b>	0.00
2.00	0.01	23	67.58	0.00	<b>0.00</b>	0.00
2.50	0.01	38	67.62	0.00	0.00	0.00
3.00	0.01	56	67.68	0.00	0.00	0.00
3.50	0.01	76	67.75	0.00	0.00	0.00
4.00	0.02	98	67.82	0.00	0.00	0.00
4.50	0.02	121	67.90	0.00	0.00	0.00
5.00	0.02	147	67.98	0.00	0.00	0.00
5.50	0.02	174	68.07	0.00	0.00	0.00
6.00	0.02	202	68.16	0.00	0.00	0.00
6.50	0.02	232	68.26	0.00	0.00	0.00
7.00	0.02	267	68.37	0.00	0.00	0.00
7.50	0.03	305	68.50	0.00	0.00	0.00
8.00	0.03	348	68.57	0.00	0.00	0.00
8.50	0.03	395	68.65	0.00	0.00	0.00
9.00	0.03	445	68.74	0.00	0.00	0.00
9.50	0.04	504	68.84	0.00	0.00	0.00
10.00	0.05	575	68.96	0.00	0.00	0.00
10.50	0.05	658	69.11	0.00	0.00	0.00
11.00	0.08	769	69.30	0.00	0.00	0.00
11.50	0.12	935	69.60	0.00	0.00	0.00
12.00	<b>0.52</b>	<b>1,328</b>	<b>70.34</b>	<b>0.00</b>	0.00	<b>0.00</b>
12.50	<b>0.16</b>	<b>1,677</b>	<b>71.26</b>	<b>0.18</b>	0.00	<b>0.18</b>
13.00	0.09	1,654	71.18	0.10	0.00	0.09
13.50	0.06	1,643	71.15	0.07	0.00	0.06
14.00	0.05	1,637	71.13	0.05	0.00	0.05
14.50	0.04	1,634	71.12	0.04	0.00	0.04
15.00	0.03	1,631	71.10	0.04	0.00	0.03
15.50	0.03	1,628	71.10	0.03	0.00	0.03
16.00	0.03	1,627	71.09	0.03	0.00	0.03
16.50	0.03	1,626	71.09	0.03	0.00	0.03
17.00	0.03	1,624	71.09	0.03	0.00	0.02
17.50	0.02	1,623	71.08	0.02	0.00	0.02
18.00	0.02	1,622	71.08	0.02	0.00	0.02
18.50	0.02	1,621	71.07	0.02	0.00	0.02
19.00	0.02	1,620	71.07	0.02	0.00	0.02
19.50	0.02	1,620	71.07	0.02	0.00	0.02
20.00	0.02	1,620	71.07	0.02	0.00	0.02
20.50	0.02	1,619	71.07	0.02	0.00	0.02
21.00	0.02	1,619	71.07	0.02	0.00	0.01
21.50	0.02	1,618	71.07	0.02	0.00	0.01
22.00	0.02	1,618	71.06	0.02	0.00	0.01
22.50	0.02	1,618	71.06	0.02	0.00	0.01
23.00	0.02	1,617	71.06	0.02	0.00	0.01
23.50	0.01	1,617	71.06	0.01	0.00	0.01
24.00	0.01	1,617	71.06	0.01	0.00	0.01

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**Stage-Discharge for Pond 1P: 330XLHD**

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
67.50	0.00	<b>0.00</b>	0.00	70.05	0.00	0.00	0.00
67.55	0.00	<b>0.00</b>	0.00	70.10	0.00	0.00	0.00
67.60	0.00	0.00	0.00	70.15	0.00	0.00	0.00
67.65	0.00	0.00	0.00	70.20	0.00	0.00	0.00
67.70	0.00	0.00	0.00	70.25	0.00	0.00	0.00
67.75	0.00	0.00	0.00	70.30	0.00	0.00	0.00
67.80	0.00	0.00	0.00	70.35	0.00	0.00	0.00
67.85	0.00	0.00	0.00	70.40	0.00	0.00	0.00
67.90	0.00	0.00	0.00	70.45	0.00	0.00	0.00
67.95	0.00	0.00	0.00	70.50	0.00	0.00	0.00
68.00	0.00	0.00	0.00	70.55	0.00	0.00	0.00
68.05	0.00	0.00	0.00	70.60	0.00	0.00	0.00
68.10	0.00	0.00	0.00	70.65	0.00	0.00	0.00
68.15	0.00	0.00	0.00	70.70	0.00	0.00	0.00
68.20	0.00	0.00	0.00	70.75	0.00	0.00	0.00
68.25	0.00	0.00	0.00	70.80	0.00	0.00	0.00
68.30	0.00	0.00	0.00	70.85	0.00	0.00	0.00
68.35	0.00	0.00	0.00	70.90	0.00	0.00	0.00
68.40	0.00	0.00	0.00	70.95	0.00	0.00	0.00
68.45	0.00	0.00	0.00	71.00	0.00	0.00	0.00
68.50	0.00	0.00	0.00	71.05	0.01	0.00	0.01
68.55	0.00	0.00	0.00	71.10	0.03	0.00	0.03
68.60	0.00	0.00	0.00	71.15	0.07	0.00	0.07
68.65	0.00	0.00	0.00	71.20	0.11	0.00	0.11
68.70	0.00	0.00	0.00	71.25	0.17	0.00	0.17
68.75	0.00	0.00	0.00	71.30	0.23	0.00	0.23
68.80	0.00	0.00	0.00	71.35	0.30	0.00	0.30
68.85	0.00	0.00	0.00	71.40	0.37	0.00	0.36
68.90	0.00	0.00	0.00	71.45	0.43	0.00	0.43
68.95	0.00	0.00	0.00	71.50	<b>0.48</b>	0.00	<b>0.47</b>
69.00	0.00	0.00	0.00				
69.05	0.00	0.00	0.00				
69.10	0.00	0.00	0.00				
69.15	0.00	0.00	0.00				
69.20	0.00	0.00	0.00				
69.25	0.00	0.00	0.00				
69.30	0.00	0.00	0.00				
69.35	0.00	0.00	0.00				
69.40	0.00	0.00	0.00				
69.45	0.00	0.00	0.00				
69.50	0.00	0.00	0.00				
69.55	0.00	0.00	0.00				
69.60	0.00	0.00	0.00				
69.65	0.00	0.00	0.00				
69.70	0.00	0.00	0.00				
69.75	0.00	0.00	0.00				
69.80	0.00	0.00	0.00				
69.85	0.00	0.00	0.00				
69.90	0.00	0.00	0.00				
69.95	0.00	0.00	0.00				
70.00	0.00	0.00	0.00				

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**Stage-Area-Storage for Pond 1P: 330XLHD**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
67.50	<b>765</b>	0	70.05	765	1,181
67.55	765	15	70.10	765	1,207
67.60	765	31	70.15	765	1,232
67.65	765	46	70.20	765	1,258
67.70	765	61	70.25	765	1,283
67.75	765	76	70.30	765	1,308
67.80	765	92	70.35	765	1,332
67.85	765	107	70.40	765	1,356
67.90	765	122	70.45	765	1,380
67.95	765	138	70.50	765	1,403
68.00	765	153	70.55	765	1,426
68.05	765	168	70.60	765	1,448
68.10	765	184	70.65	765	1,470
68.15	765	199	70.70	765	1,491
68.20	765	214	70.75	765	1,511
68.25	765	229	70.80	765	1,530
68.30	765	245	70.85	765	1,548
68.35	765	260	70.90	765	1,566
68.40	765	275	70.95	765	1,583
68.45	765	291	71.00	765	1,598
68.50	765	306	71.05	765	1,614
68.55	765	335	71.10	765	1,629
68.60	765	365	71.15	765	1,644
68.65	765	394	71.20	765	1,660
68.70	765	423	71.25	765	1,675
68.75	765	452	71.30	765	1,690
68.80	765	481	71.35	765	1,706
68.85	765	510	71.40	765	1,721
68.90	765	539	71.45	765	1,736
68.95	765	568	71.50	765	<b>1,751</b>
69.00	765	597			
69.05	765	626			
69.10	765	655			
69.15	765	683			
69.20	765	712			
69.25	765	740			
69.30	765	768			
69.35	765	797			
69.40	765	825			
69.45	765	853			
69.50	765	881			
69.55	765	909			
69.60	765	937			
69.65	765	965			
69.70	765	993			
69.75	765	1,020			
69.80	765	1,048			
69.85	765	1,075			
69.90	765	1,102			
69.95	765	1,128			
70.00	765	1,155			

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## Summary for Subcatchment 2S: 41 KERNWOOD PROPOSED PARKING

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

Runoff = 1.31 cfs @ 12.11 hrs, Volume= 0.117 af, Depth> 8.69"

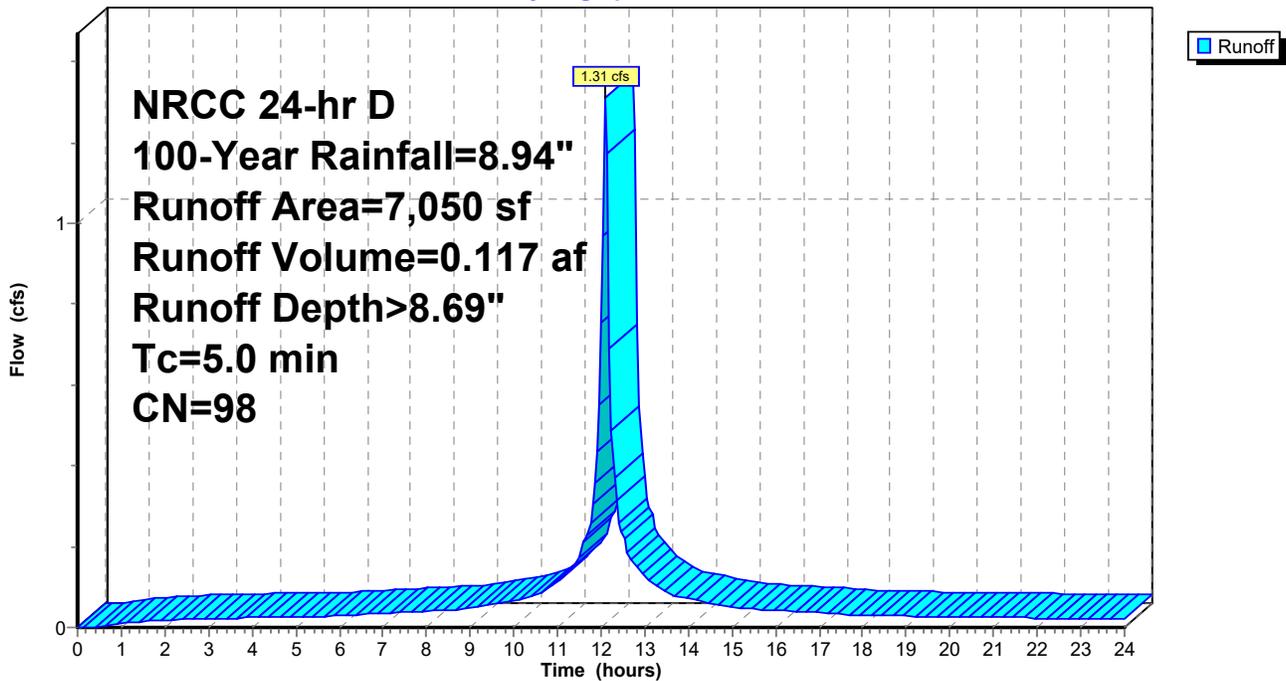
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
NRCC 24-hr D 100-Year Rainfall=8.94"

Area (sf)	CN	Description
7,050	98	Paved parking, HSG A
7,050		100.00% Impervious Area

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

## Subcatchment 2S: 41 KERNWOOD PROPOSED PARKING

Hydrograph



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**Hydrograph for Subcatchment 2S: 41 KERNWOOD PROPOSED PARKING**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	6.19	5.96	0.16
0.25	0.03	0.00	0.00	13.00	6.40	6.16	0.13
0.50	0.06	0.00	0.00	13.25	6.57	6.33	0.11
0.75	0.10	0.01	0.01	13.50	6.71	6.47	0.09
1.00	0.13	0.03	0.01	13.75	6.82	6.59	0.08
1.25	0.16	0.05	0.01	14.00	6.94	6.70	0.07
1.50	0.20	0.07	0.01	14.25	7.04	6.80	0.07
1.75	0.23	0.09	0.02	14.50	7.13	6.89	0.06
2.00	0.27	0.12	0.02	14.75	7.22	6.98	0.06
2.25	0.31	0.15	0.02	15.00	7.30	7.06	0.05
2.50	0.34	0.18	0.02	15.25	7.37	7.13	0.05
2.75	0.38	0.21	0.02	15.50	7.44	7.20	0.05
3.00	0.42	0.24	0.02	15.75	7.51	7.27	0.04
3.25	0.46	0.28	0.02	16.00	7.58	7.34	0.04
3.50	0.50	0.31	0.02	16.25	7.64	7.40	0.04
3.75	0.54	0.35	0.02	16.50	7.70	7.46	0.04
4.00	0.58	0.39	0.02	16.75	7.76	7.52	0.04
4.25	0.62	0.43	0.02	17.00	7.82	7.58	0.04
4.50	0.66	0.46	0.03	17.25	7.87	7.63	0.04
4.75	0.70	0.50	0.03	17.50	7.92	7.68	0.03
5.00	0.74	0.54	0.03	17.75	7.97	7.73	0.03
5.25	0.79	0.59	0.03	18.00	8.02	7.78	0.03
5.50	0.83	0.63	0.03	18.25	8.06	7.82	0.03
5.75	0.88	0.67	0.03	18.50	8.11	7.87	0.03
6.00	0.92	0.71	0.03	18.75	8.15	7.91	0.03
6.25	0.97	0.76	0.03	19.00	8.20	7.96	0.03
6.50	1.02	0.81	0.03	19.25	8.24	8.00	0.03
6.75	1.07	0.86	0.03	19.50	8.28	8.04	0.03
7.00	1.12	0.91	0.03	19.75	8.32	8.08	0.03
7.25	1.18	0.97	0.04	20.00	8.36	8.12	0.03
7.50	1.24	1.02	0.04	20.25	8.40	8.16	0.03
7.75	1.30	1.08	0.04	20.50	8.44	8.20	0.03
8.00	1.36	1.15	0.04	20.75	8.48	8.24	0.03
8.25	1.43	1.21	0.04	21.00	8.52	8.28	0.03
8.50	1.50	1.28	0.04	21.25	8.56	8.32	0.02
8.75	1.57	1.35	0.05	21.50	8.60	8.36	0.02
9.00	1.64	1.42	0.05	21.75	8.63	8.39	0.02
9.25	1.72	1.50	0.05	22.00	8.67	8.43	0.02
9.50	1.81	1.58	0.06	22.25	8.71	8.47	0.02
9.75	1.90	1.68	0.06	22.50	8.74	8.50	0.02
10.00	2.00	1.78	0.07	22.75	8.78	8.54	0.02
10.25	2.12	1.89	0.07	23.00	8.81	8.57	0.02
10.50	2.23	2.01	0.08	23.25	8.84	8.60	0.02
10.75	2.37	2.14	0.09	23.50	8.88	8.64	0.02
11.00	2.54	2.31	0.11	23.75	8.91	8.67	0.02
11.25	2.75	2.52	0.14	24.00	<b>8.94</b>	<b>8.70</b>	0.02
11.50	2.99	2.76	0.17				
11.75	3.38	3.15	0.26				
12.00	4.28	4.05	<b>0.75</b>				
12.25	5.56	5.32	<b>0.49</b>				
12.50	5.95	5.71	0.23				

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## Summary for Pond 1P: 330XLHD

[93] Warning: Storage range exceeded by 1.20'

Inflow Area = 0.162 ac, 100.00% Impervious, Inflow Depth > 8.69" for 100-Year event  
Inflow = 1.31 cfs @ 12.11 hrs, Volume= 0.117 af  
Outflow = 1.16 cfs @ 12.11 hrs, Volume= 0.077 af, Atten= 12%, Lag= 0.0 min  
Discarded = 0.00 cfs @ 1.10 hrs, Volume= 0.006 af  
Primary = 1.16 cfs @ 12.11 hrs, Volume= 0.071 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2  
Peak Elev= 72.74' @ 12.11 hrs Surf.Area= 765 sf Storage= 1,764 cf

Plug-Flow detention time= 246.3 min calculated for 0.077 af (66% of inflow)  
Center-of-Mass det. time= 115.9 min ( 855.6 - 739.7 )

Volume	Invert	Avail.Storage	Storage Description
#1A	67.50'	885 cf	<b>22.83'W x 33.50'L x 4.04'H Field A</b> 3,092 cf Overall - 879 cf Embedded = 2,212 cf x 40.0% Voids
#2A	68.50'	879 cf	<b>Cultec R-330XLHD x 16 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		1,764 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	67.50'	<b>0.170 in/hr Exfiltration over Surface area</b>
#2	Primary	71.00'	<b>6.0" Round Culvert</b> L= 34.0' Ke= 0.500 Inlet / Outlet Invert= 71.00' / 69.50' S= 0.0441 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

**Discarded OutFlow** Max=0.00 cfs @ 1.10 hrs HW=67.54' (Free Discharge)

↑1=**Exfiltration** (Exfiltration Controls 0.00 cfs)

**Primary OutFlow** Max=1.12 cfs @ 12.11 hrs HW=72.65' (Free Discharge)

↑2=**Culvert** (Inlet Controls 1.12 cfs @ 5.71 fps)

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## Pond 1P: 330XLHD - Chamber Wizard Field A

### Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 4 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

4 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 29.50' Row Length +24.0" End Stone x 2 = 33.50' Base Length

4 Rows x 52.0" Wide + 6.0" Spacing x 3 + 24.0" Side Stone x 2 = 22.83' Base Width

12.0" Base + 30.5" Chamber Height + 6.0" Cover = 4.04' Field Height

16 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 4 Rows = 879.2 cf Chamber Storage

3,091.5 cf Field - 879.2 cf Chambers = 2,212.3 cf Stone x 40.0% Voids = 884.9 cf Stone Storage

Chamber Storage + Stone Storage = 1,764.1 cf = 0.040 af

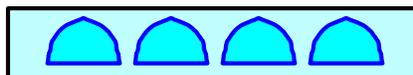
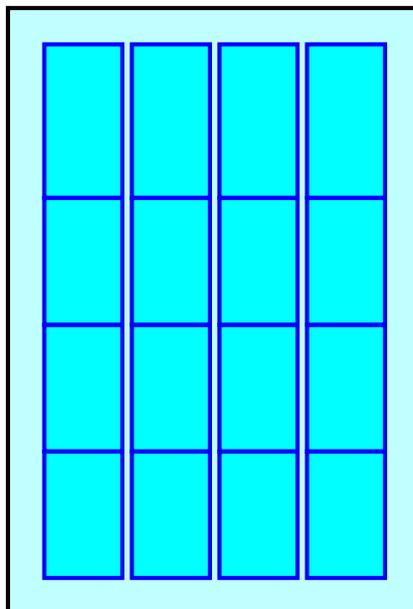
Overall Storage Efficiency = 57.1%

Overall System Size = 33.50' x 22.83' x 4.04'

16 Chambers

114.5 cy Field

81.9 cy Stone



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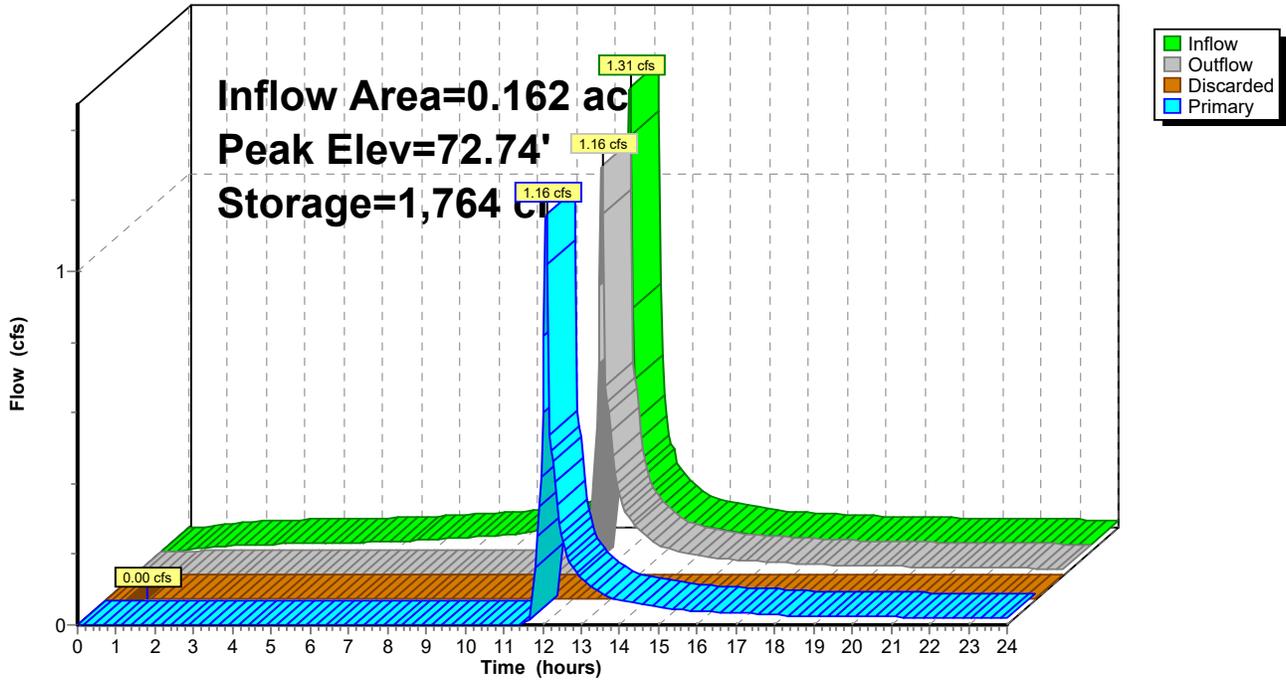
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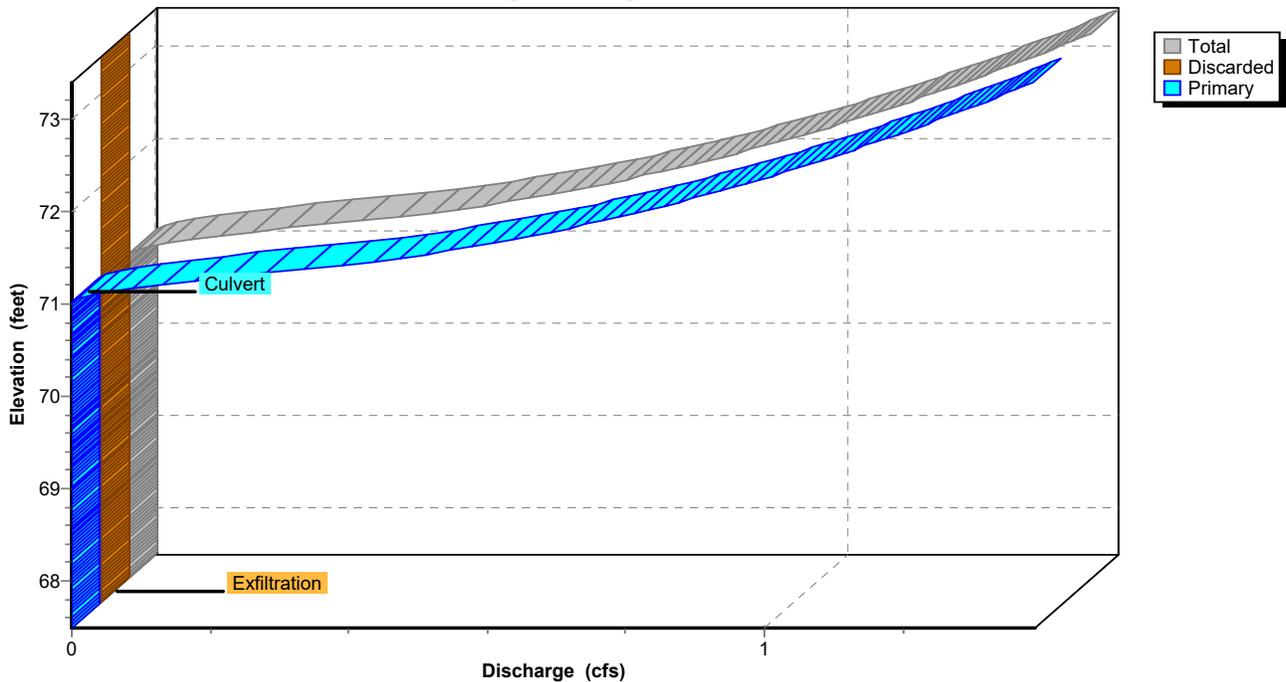
## Pond 1P: 330XLHD

Hydrograph



## Pond 1P: 330XLHD

Stage-Discharge



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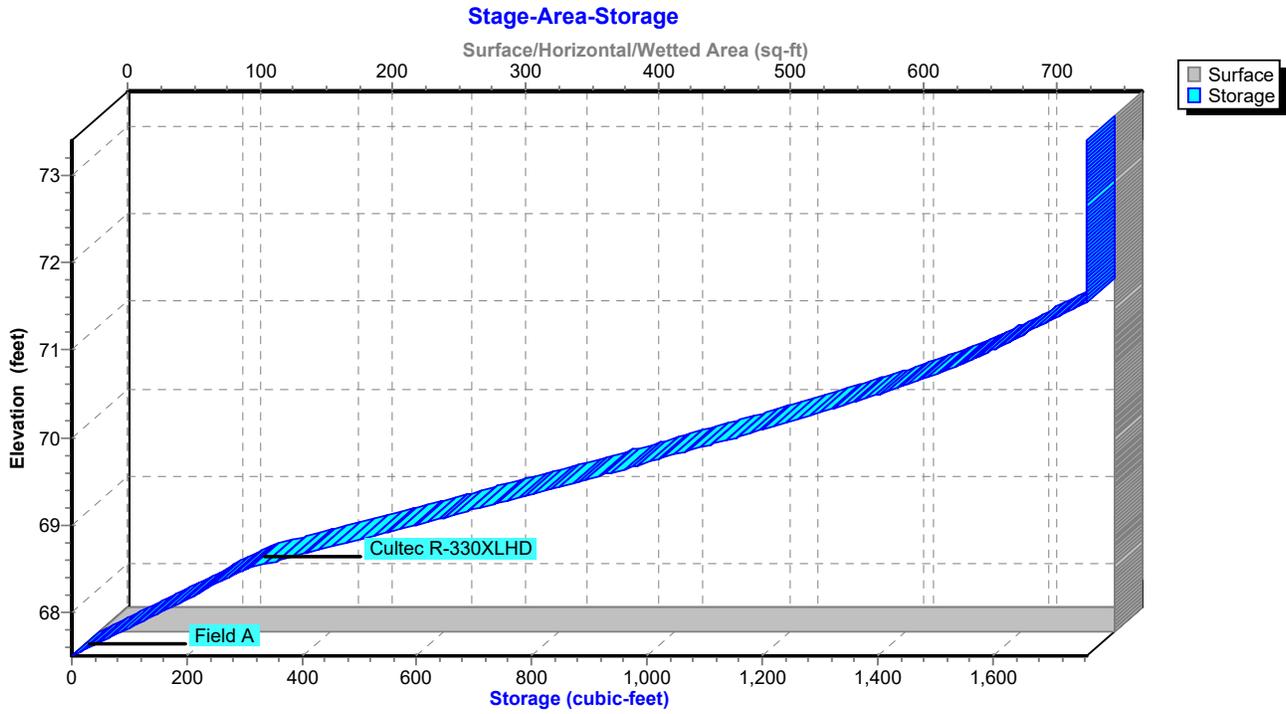
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## Pond 1P: 330XLHD



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**Hydrograph for Pond 1P: 330XLHD**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	67.50	0.00	0.00	0.00
0.50	0.00	1	67.50	0.00	0.00	0.00
1.00	0.01	11	67.54	0.00	<b>0.00</b>	0.00
1.50	0.01	29	67.59	0.00	<b>0.00</b>	0.00
2.00	0.02	53	67.67	0.00	0.00	0.00
2.50	0.02	82	67.77	0.00	0.00	0.00
3.00	0.02	114	67.87	0.00	0.00	0.00
3.50	0.02	149	67.99	0.00	0.00	0.00
4.00	0.02	186	68.11	0.00	0.00	0.00
4.50	0.03	226	68.24	0.00	0.00	0.00
5.00	0.03	267	68.37	0.00	0.00	0.00
5.50	0.03	310	68.51	0.00	0.00	0.00
6.00	0.03	355	68.58	0.00	0.00	0.00
6.50	0.03	404	68.67	0.00	0.00	0.00
7.00	0.03	458	68.76	0.00	0.00	0.00
7.50	0.04	518	68.86	0.00	0.00	0.00
8.00	0.04	583	68.98	0.00	0.00	0.00
8.50	0.04	655	69.10	0.00	0.00	0.00
9.00	0.05	732	69.23	0.00	0.00	0.00
9.50	0.06	820	69.39	0.00	0.00	0.00
10.00	0.07	927	69.58	0.00	0.00	0.00
10.50	0.08	1,052	69.81	0.00	0.00	0.00
11.00	0.11	1,215	70.12	0.00	0.00	0.00
11.50	0.17	1,460	70.63	0.00	0.00	0.00
12.00	<b>0.75</b>	<b>1,764</b>	<b>71.65</b>	<b>0.60</b>	0.00	<b>0.60</b>
12.50	<b>0.23</b>	1,696	<b>71.32</b>	<b>0.26</b>	0.00	<b>0.26</b>
13.00	0.13	1,666	71.22	0.14	0.00	0.13
13.50	0.09	1,653	71.18	0.09	0.00	0.09
14.00	0.07	1,646	71.15	0.07	0.00	0.07
14.50	0.06	1,642	71.14	0.06	0.00	0.06
15.00	0.05	1,638	71.13	0.05	0.00	0.05
15.50	0.05	1,635	71.12	0.05	0.00	0.04
16.00	0.04	1,634	71.12	0.04	0.00	0.04
16.50	0.04	1,632	71.11	0.04	0.00	0.04
17.00	0.04	1,631	71.11	0.04	0.00	0.03
17.50	0.03	1,629	71.10	0.03	0.00	0.03
18.00	0.03	1,628	71.10	0.03	0.00	0.03
18.50	0.03	1,627	71.09	0.03	0.00	0.03
19.00	0.03	1,626	71.09	0.03	0.00	0.03
19.50	0.03	1,626	71.09	0.03	0.00	0.02
20.00	0.03	1,625	71.09	0.03	0.00	0.02
20.50	0.03	1,625	71.09	0.03	0.00	0.02
21.00	0.03	1,624	71.08	0.03	0.00	0.02
21.50	0.02	1,624	71.08	0.02	0.00	0.02
22.00	0.02	1,623	71.08	0.02	0.00	0.02
22.50	0.02	1,623	71.08	0.02	0.00	0.02
23.00	0.02	1,622	71.08	0.02	0.00	0.02
23.50	0.02	1,622	71.08	0.02	0.00	0.02
24.00	0.02	1,621	71.07	0.02	0.00	0.02

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**Stage-Discharge for Pond 1P: 330XLHD**

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
67.50	0.00	<b>0.00</b>	0.00	72.60	1.10	0.00	1.10
67.60	0.00	<b>0.00</b>	0.00	72.70	1.14	0.00	1.14
67.70	0.00	0.00	0.00	72.80	1.18	0.00	1.18
67.80	0.00	0.00	0.00	72.90	1.22	0.00	1.21
67.90	0.00	0.00	0.00	73.00	1.25	0.00	1.25
68.00	0.00	0.00	0.00	73.10	1.29	0.00	1.29
68.10	0.00	0.00	0.00	73.20	1.32	0.00	1.32
68.20	0.00	0.00	0.00	73.30	1.36	0.00	1.35
68.30	0.00	0.00	0.00	73.40	<b>1.39</b>	0.00	<b>1.39</b>
68.40	0.00	0.00	0.00				
68.50	0.00	0.00	0.00				
68.60	0.00	0.00	0.00				
68.70	0.00	0.00	0.00				
68.80	0.00	0.00	0.00				
68.90	0.00	0.00	0.00				
69.00	0.00	0.00	0.00				
69.10	0.00	0.00	0.00				
69.20	0.00	0.00	0.00				
69.30	0.00	0.00	0.00				
69.40	0.00	0.00	0.00				
69.50	0.00	0.00	0.00				
69.60	0.00	0.00	0.00				
69.70	0.00	0.00	0.00				
69.80	0.00	0.00	0.00				
69.90	0.00	0.00	0.00				
70.00	0.00	0.00	0.00				
70.10	0.00	0.00	0.00				
70.20	0.00	0.00	0.00				
70.30	0.00	0.00	0.00				
70.40	0.00	0.00	0.00				
70.50	0.00	0.00	0.00				
70.60	0.00	0.00	0.00				
70.70	0.00	0.00	0.00				
70.80	0.00	0.00	0.00				
70.90	0.00	0.00	0.00				
71.00	0.00	0.00	0.00				
71.10	0.03	0.00	0.03				
71.20	0.11	0.00	0.11				
71.30	0.23	0.00	0.23				
71.40	0.37	0.00	0.36				
71.50	0.48	0.00	0.47				
71.60	0.56	0.00	0.56				
71.70	0.64	0.00	0.63				
71.80	0.70	0.00	0.70				
71.90	0.77	0.00	0.76				
72.00	0.82	0.00	0.82				
72.10	0.87	0.00	0.87				
72.20	0.92	0.00	0.92				
72.30	0.97	0.00	0.97				
72.40	1.02	0.00	1.01				
72.50	1.06	0.00	1.06				

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**Stage-Area-Storage for Pond 1P: 330XLHD**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
67.50	<b>765</b>	0	72.60	765	1,764
67.60	765	31	72.70	765	1,764
67.70	765	61	72.80	765	1,764
67.80	765	92	72.90	765	1,764
67.90	765	122	73.00	765	1,764
68.00	765	153	73.10	765	1,764
68.10	765	184	73.20	765	1,764
68.20	765	214	73.30	765	1,764
68.30	765	245	73.40	765	1,764
68.40	765	275			
68.50	765	306			
68.60	765	365			
68.70	765	423			
68.80	765	481			
68.90	765	539			
69.00	765	597			
69.10	765	655			
69.20	765	712			
69.30	765	768			
69.40	765	825			
69.50	765	881			
69.60	765	937			
69.70	765	993			
69.80	765	1,048			
69.90	765	1,102			
70.00	765	1,155			
70.10	765	1,207			
70.20	765	1,258			
70.30	765	1,308			
70.40	765	1,356			
70.50	765	1,403			
70.60	765	1,448			
70.70	765	1,491			
70.80	765	1,530			
70.90	765	1,566			
71.00	765	1,598			
71.10	765	1,629			
71.20	765	1,660			
71.30	765	1,690			
71.40	765	1,721			
71.50	765	<b>1,751</b>			
71.60	765	<b>1,764</b>			
71.70	765	1,764			
71.80	765	1,764			
71.90	765	1,764			
72.00	765	1,764			
72.10	765	1,764			
72.20	765	1,764			
72.30	765	1,764			
72.40	765	1,764			
72.50	765	1,764			