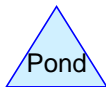
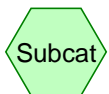


Existing 24" Culvert w
30" add



Haystack Crossing Prelim Storm Management

Prepared by Civil Engineering Associates, Inc.

HydroCAD® 10.00 s/n 00787 © 2012 HydroCAD Software Solutions LLC

Printed 12/27/2019

Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.000	77	2 acre lots, 12% imp, HSG C (1S)
16.300	72	Woods/grass comb., Good, HSG C (1S)

Haystack Crossing Prelim Storm Management

Type II 24-hr Q50 Rainfall=4.50"

Prepared by Civil Engineering Associates, Inc.

Printed 12/27/2019

HydroCAD® 10.00 s/n 00787 © 2012 HydroCAD Software Solutions LLC

Page 3

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Culvert Waterhed

Runoff Area=22.300 ac 3.23% Impervious Runoff Depth>1.71"
Flow Length=2,025' Tc=36.6 min CN=73 Runoff=31.14 cfs 3.177 af

Pond 3P: Existing 24" Culvert w 30" add

Peak Elev=2.99' Inflow=31.14 cfs 3.177 af
30.0" Round Culvert n=0.013 L=100.0' S=0.0210 '/' Outflow=31.14 cfs 3.177 af

Haystack Crossing Prelim Storm Management

Prepared by Civil Engineering Associates, Inc.

HydroCAD® 10.00 s/n 00787 © 2012 HydroCAD Software Solutions LLC

Type II 24-hr Q50 Rainfall=4.50"

Printed 12/27/2019

Page 4

Summary for Subcatchment 1S: Culvert Watershed

Runoff = 31.14 cfs @ 12.34 hrs, Volume= 3.177 af, Depth> 1.71"

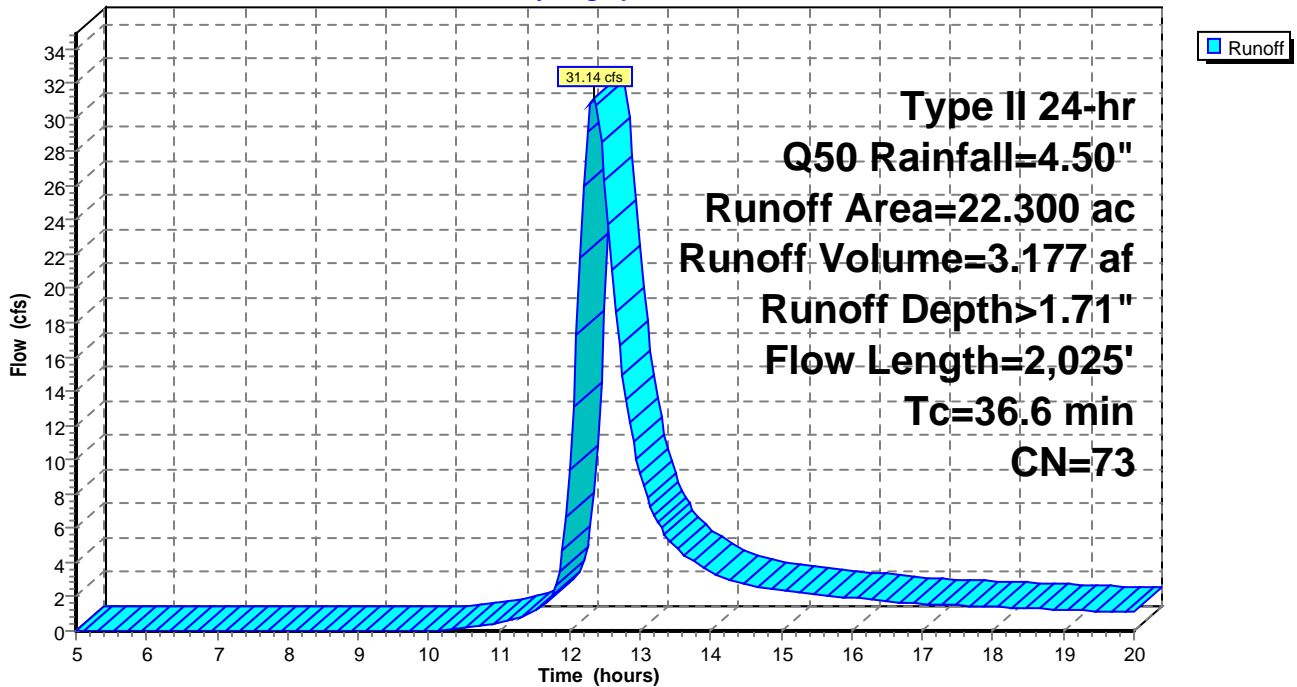
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Q50 Rainfall=4.50"

Area (ac)	CN	Description
6.000	77	2 acre lots, 12% imp, HSG C
16.300	72	Woods/grass comb., Good, HSG C
22.300	73	Weighted Average
21.580		96.77% Pervious Area
0.720		3.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.4	300	0.4000	0.15		Sheet Flow, Upper Watershed
					Woods: Dense underbrush n= 0.800 P2= 2.25"
1.5	400	0.0875	4.44		Shallow Concentrated Flow, Upper Drainage
					Grassed Waterway Kv= 15.0 fps
2.7	1,325	0.0377	8.24	65.95	Channel Flow, Stream Channel
					Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.035
36.6	2,025	Total			

Subcatchment 1S: Culvert Watershed

Hydrograph



Haystack Crossing Prelim Storm Management

Prepared by Civil Engineering Associates, Inc.

HydroCAD® 10.00 s/n 00787 © 2012 HydroCAD Software Solutions LLC

Type II 24-hr Q50 Rainfall=4.50"

Printed 12/27/2019

Page 5

Hydrograph for Subcatchment 1S: Culvert Watershed

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.28	0.00	0.00	18.00	4.14	1.63	1.42
5.25	0.30	0.00	0.00	18.25	4.16	1.65	1.38
5.50	0.32	0.00	0.00	18.50	4.18	1.66	1.34
5.75	0.34	0.00	0.00	18.75	4.20	1.67	1.30
6.00	0.36	0.00	0.00	19.00	4.22	1.69	1.25
6.25	0.38	0.00	0.00	19.25	4.24	1.70	1.21
6.50	0.40	0.00	0.00	19.50	4.25	1.71	1.16
6.75	0.42	0.00	0.00	19.75	4.27	1.72	1.12
7.00	0.45	0.00	0.00	20.00	4.28	1.73	1.07
7.25	0.47	0.00	0.00				
7.50	0.49	0.00	0.00				
7.75	0.52	0.00	0.00				
8.00	0.54	0.00	0.00				
8.25	0.57	0.00	0.00				
8.50	0.60	0.00	0.00				
8.75	0.63	0.00	0.00				
9.00	0.66	0.00	0.00				
9.25	0.70	0.00	0.00				
9.50	0.73	0.00	0.00				
9.75	0.77	0.00	0.00				
10.00	0.81	0.00	0.01				
10.25	0.86	0.00	0.06				
10.50	0.92	0.01	0.15				
10.75	0.98	0.01	0.28				
11.00	1.06	0.03	0.46				
11.25	1.15	0.04	0.72				
11.50	1.27	0.07	1.13				
11.75	1.74	0.21	2.09				
12.00	2.98	0.85	9.41				
12.25	3.18	0.97	29.13				
12.50	3.31	1.05	26.34				
12.75	3.40	1.11	14.93				
13.00	3.47	1.16	9.17				
13.25	3.54	1.21	6.35				
13.50	3.60	1.24	4.89				
13.75	3.65	1.28	4.04				
14.00	3.69	1.31	3.44				
14.25	3.73	1.34	3.04				
14.50	3.77	1.36	2.74				
14.75	3.81	1.39	2.55				
15.00	3.84	1.41	2.41				
15.25	3.87	1.44	2.29				
15.50	3.90	1.46	2.17				
15.75	3.93	1.48	2.05				
16.00	3.96	1.50	1.93				
16.25	3.99	1.52	1.82				
16.50	4.01	1.53	1.72				
16.75	4.03	1.55	1.65				
17.00	4.06	1.57	1.60				
17.25	4.08	1.59	1.55				
17.50	4.10	1.60	1.51				
17.75	4.12	1.62	1.47				

Haystack Crossing Prelim Storm Management

Prepared by Civil Engineering Associates, Inc.

HydroCAD® 10.00 s/n 00787 © 2012 HydroCAD Software Solutions LLC

Type II 24-hr Q50 Rainfall=4.50"

Printed 12/27/2019

Page 6

Summary for Pond 3P: Existing 24" Culvert w 30" add

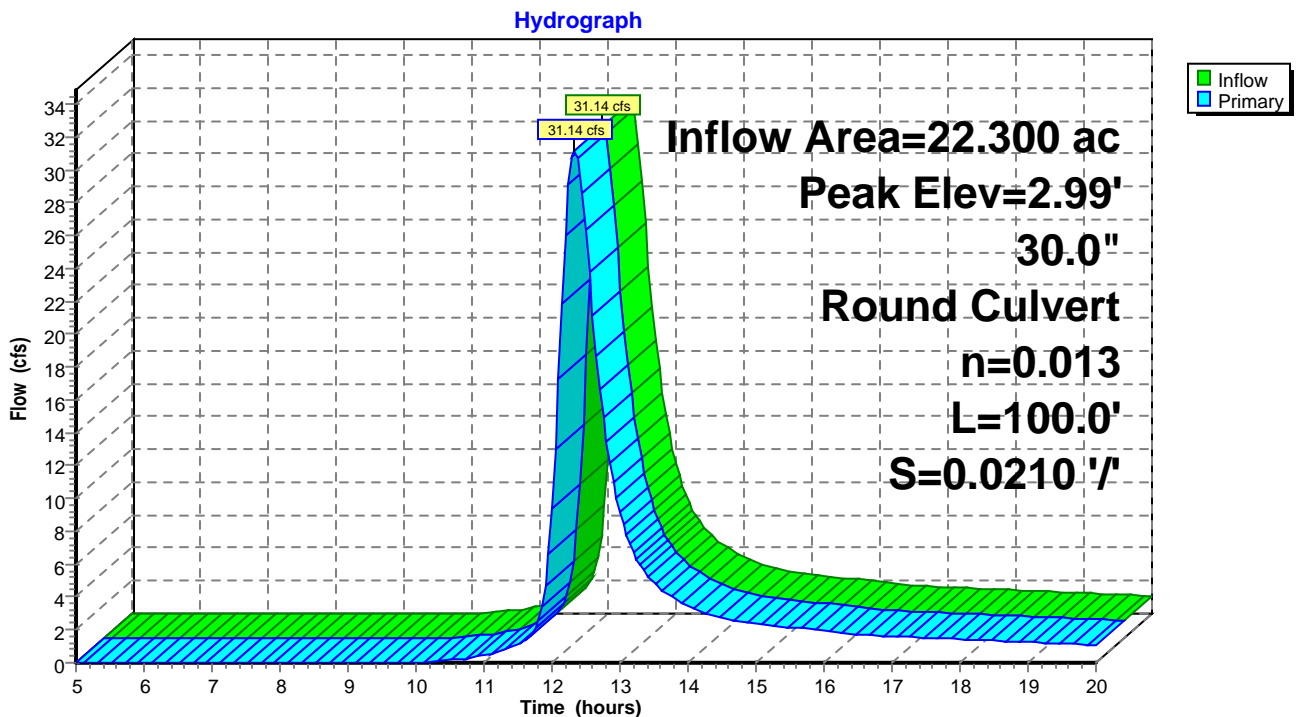
Inflow Area = 22.300 ac, 3.23% Impervious, Inflow Depth > 1.71" for Q50 event
Inflow = 31.14 cfs @ 12.34 hrs, Volume= 3.177 af
Outflow = 31.14 cfs @ 12.34 hrs, Volume= 3.177 af, Atten= 0%, Lag= 0.0 min
Primary = 31.14 cfs @ 12.34 hrs, Volume= 3.177 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 2.99' @ 12.34 hrs

Device #	Routing	Invert	Outlet Devices
1	Primary	0.00'	30.0" Round Culvert L= 100.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 0.00' / -2.10' S= 0.0210 '/ Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=31.05 cfs @ 12.34 hrs HW=2.98' (Free Discharge)
↑1=Culvert (Inlet Controls 31.05 cfs @ 6.32 fps)

Pond 3P: Existing 24" Culvert w 30" add



Haystack Crossing Prelim Storm Management

Prepared by Civil Engineering Associates, Inc.

HydroCAD® 10.00 s/n 00787 © 2012 HydroCAD Software Solutions LLC

Type II 24-hr Q50 Rainfall=4.50"

Printed 12/27/2019

Page 7

Hydrograph for Pond 3P: Existing 24" Culvert w 30" add

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.00	0.00	0.00	18.00	1.42	0.46	1.42
5.25	0.00	0.00	0.00	18.25	1.38	0.45	1.38
5.50	0.00	0.00	0.00	18.50	1.34	0.44	1.34
5.75	0.00	0.00	0.00	18.75	1.30	0.44	1.30
6.00	0.00	0.00	0.00	19.00	1.25	0.43	1.25
6.25	0.00	0.00	0.00	19.25	1.21	0.42	1.21
6.50	0.00	0.00	0.00	19.50	1.16	0.41	1.16
6.75	0.00	0.00	0.00	19.75	1.12	0.40	1.12
7.00	0.00	0.00	0.00	20.00	1.07	0.40	1.07
7.25	0.00	0.00	0.00				
7.50	0.00	0.00	0.00				
7.75	0.00	0.00	0.00				
8.00	0.00	0.00	0.00				
8.25	0.00	0.00	0.00				
8.50	0.00	0.00	0.00				
8.75	0.00	0.00	0.00				
9.00	0.00	0.00	0.00				
9.25	0.00	0.00	0.00				
9.50	0.00	0.00	0.00				
9.75	0.00	0.00	0.00				
10.00	0.01	0.04	0.01				
10.25	0.06	0.10	0.06				
10.50	0.15	0.15	0.15				
10.75	0.28	0.20	0.28				
11.00	0.46	0.26	0.46				
11.25	0.72	0.32	0.72				
11.50	1.13	0.41	1.13				
11.75	2.09	0.56	2.09				
12.00	9.41	1.26	9.41				
12.25	29.13	2.77	29.13				
12.50	26.34	2.49	26.34				
12.75	14.93	1.64	14.93				
13.00	9.17	1.24	9.17				
13.25	6.35	1.01	6.35				
13.50	4.89	0.88	4.89				
13.75	4.04	0.79	4.04				
14.00	3.44	0.73	3.44				
14.25	3.04	0.68	3.04				
14.50	2.74	0.64	2.74				
14.75	2.55	0.62	2.55				
15.00	2.41	0.60	2.41				
15.25	2.29	0.59	2.29				
15.50	2.17	0.57	2.17				
15.75	2.05	0.55	2.05				
16.00	1.93	0.54	1.93				
16.25	1.82	0.52	1.82				
16.50	1.72	0.50	1.72				
16.75	1.65	0.49	1.65				
17.00	1.60	0.49	1.60				
17.25	1.55	0.48	1.55				
17.50	1.51	0.47	1.51				
17.75	1.47	0.47	1.47				