

SITE RUNOFF CALCULATIONS

**LAKE VIEW ESTATES
DYERSVILLE, IOWA**

ENGINEER

**BUESING & ASSOCIATES, INC.
Engineers and Surveyors**

1212 LOCUST STREET
DUBUQUE, IA 52001
(563) 556-4389

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Buesing & Associates Inc.
Engineers & Surveyors

1212 Locust St.
Dubuque, IA 52001
(563) 556-4389

May 23, 2024

SITE RUNOFF CALCULATIONS
LAKE VIEW ESTATES

Lake View Estates is a proposed residential development in the City of Dyersville, Iowa, consisting of 21 residential lots around 1/2 acre in size, on what was historically farmed with row crops. (Please see the Improvement Plans and Final Plat of Lake View Estates)

First the pre-developed site was analyzed. Please see the attached Pre-Developed Site Runoff Drainage Areas drawing. Curve Numbers (CNs) were assumed based on the types of ground cover, and flow paths were determined for use in the time of concentration calculations. The pre-developed rate of runoff was then calculated using HydroCAD software. Please see the attached HydroCAD reports.

The post-developed site was analyzed. Please see the attached Post-Developed Site Runoff Drainage Areas drawing. Curve Numbers (CNs) were assumed based on the types of ground cover, and flow paths were determined for use in the time of concentration calculations. The post-developed rate of runoff was then calculated using HydroCAD software. Please see the attached HydroCAD reports.

The results of these calculations, as shown on the Summary page, show a reduction in the rate of storm water runoff for post-development, to a rate less than that of the pre-developed rate.

SUMMARY

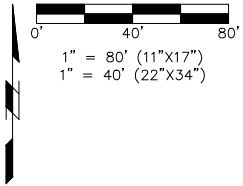
LAKE VIEW ESTATES

STORM EVENT	PRE-DEVELOPED RUNOFF	POST-DEVELOPED RUNOFF
2 yr	11.30 cfs	7.45 cfs
10 yr	23.55 cfs	19.41 cfs
100 yr	43.27 cfs	40.32 cfs

332ND AVE

12.3 AC
ROW CROPS, STRAIGHT ROW
W/ GOOD CROP RESIDUE
HSG-B, CN-78

PRE-DEVELOPED
SITE RUNOFF
DRAINAGE AREAS
LAKEVIEW ESTATES
DYERSVILLE, IOWA

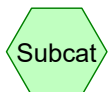
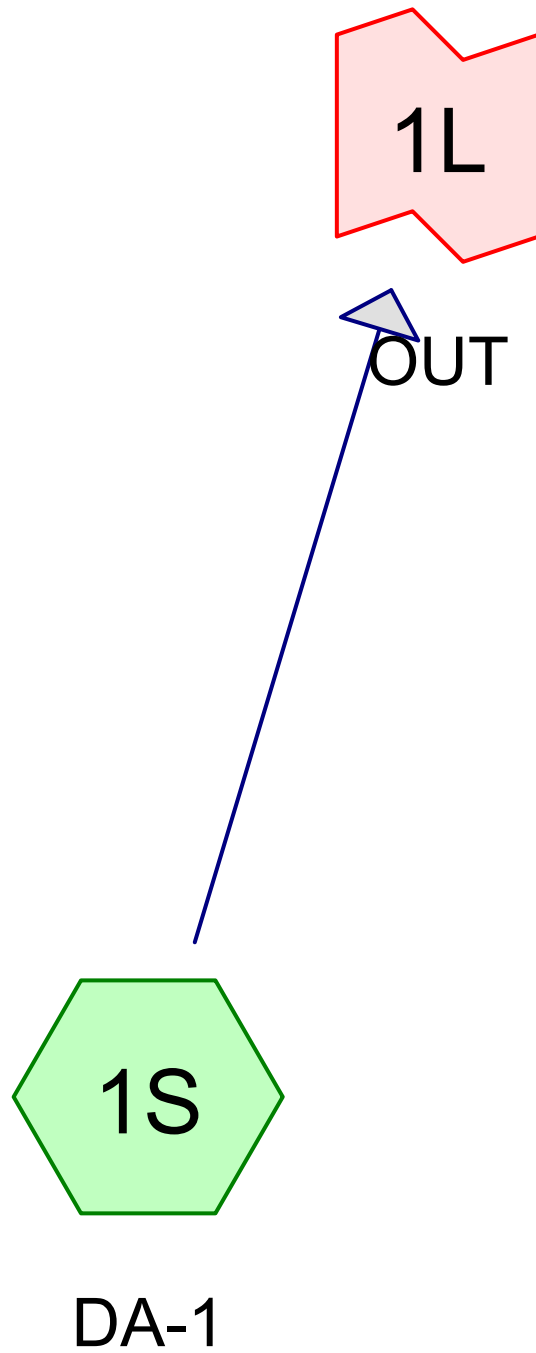


PRE-DEVELOPED
DRAINAGE AREAS
LAKEVIEW ESTATES

PROJECT NO. 23225
PREPARED FOR:
LAKEVIEW ESTATES LLC
C/O BILL HERMSEN
2104 332ND AVE.
DYERSVILLE, IA 52040

BUESING
ASSOCIATES INC.
ENGINEERS AND SURVEYORS
1212 LOCUST ST, DUBUQUE, IA
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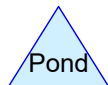
DATE	REVISIONS	DRAWN BY:
5/23/24		TPL
SCALE:	SEE BAR	CHECKED BY:
		PJN



Subcat



Reach



Pond



Link

Routing Diagram for 23225-pre
Prepared by HP Inc., Printed 5/23/2024
HydroCAD® 10.00-26 s/n 07743 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 1S: DA-1

Runoff = 11.30 cfs @ 12.24 hrs, Volume= 1.092 af, Depth= 1.07"

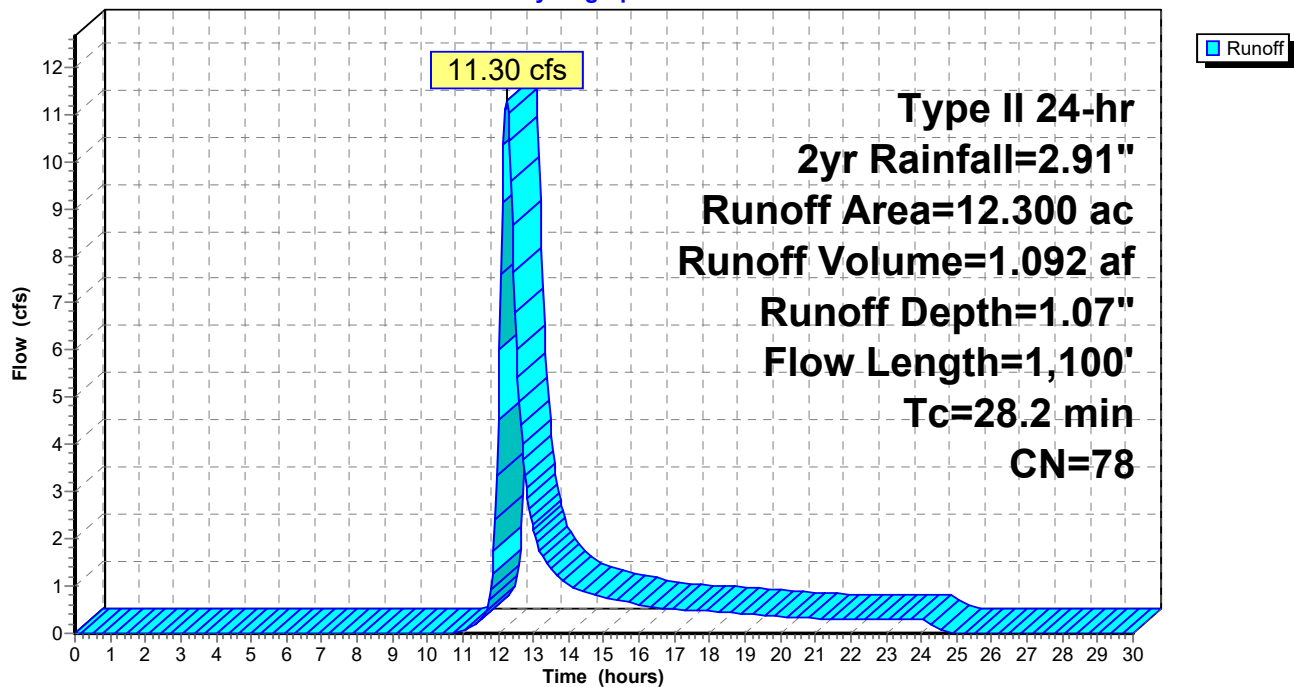
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs
Type II 24-hr 2yr Rainfall=2.91"

Area (ac)	CN	Description
12.300	78	Row crops, straight row, Good, HSG B
12.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.0300	0.17		Sheet Flow, Crops Cultivated: Residue>20% n= 0.170 P2= 2.91"
18.5	1,000	0.0100	0.90		Shallow Concentrated Flow, Crops Cultivated Straight Rows Kv= 9.0 fps
28.2	1,100	Total			

Subcatchment 1S: DA-1

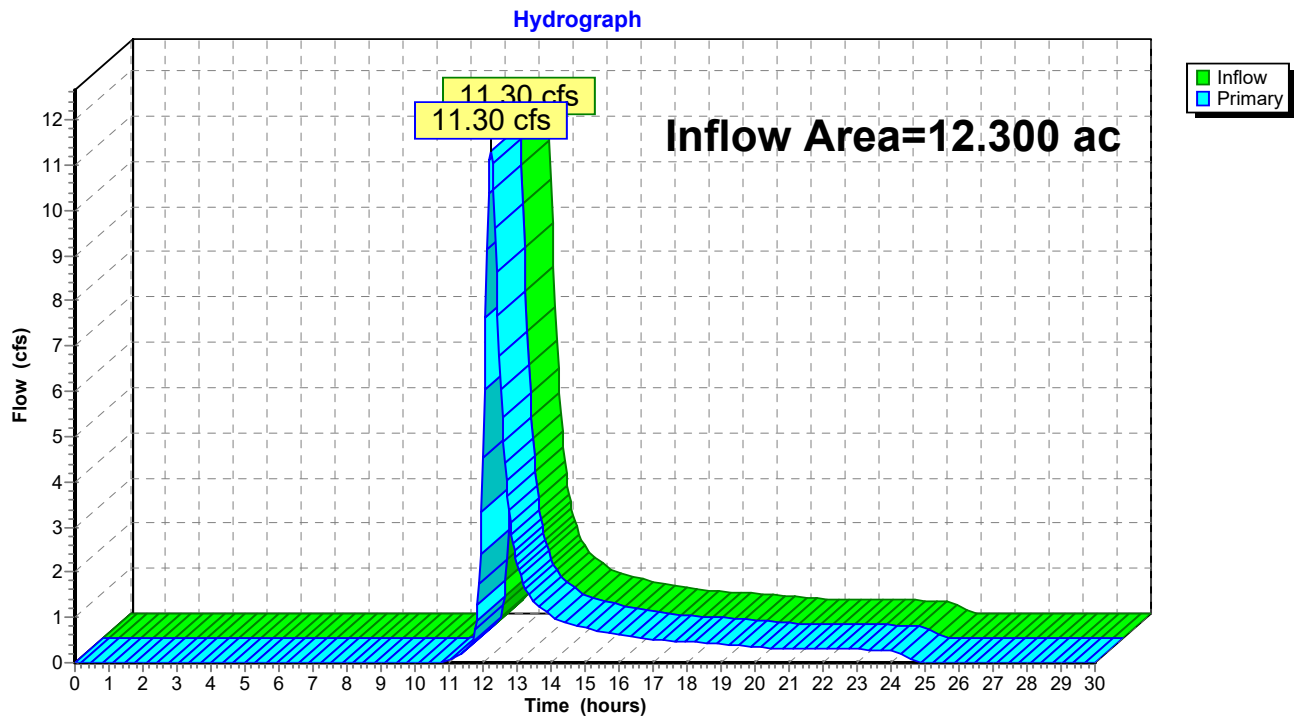
Hydrograph



Summary for Link 1L: OUT

Inflow Area = 12.300 ac, 0.00% Impervious, Inflow Depth = 1.07" for 2yr event
Inflow = 11.30 cfs @ 12.24 hrs, Volume= 1.092 af
Primary = 11.30 cfs @ 12.24 hrs, Volume= 1.092 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs

Link 1L: OUT

Summary for Subcatchment 1S: DA-1

Runoff = 23.55 cfs @ 12.23 hrs, Volume= 2.190 af, Depth= 2.14"

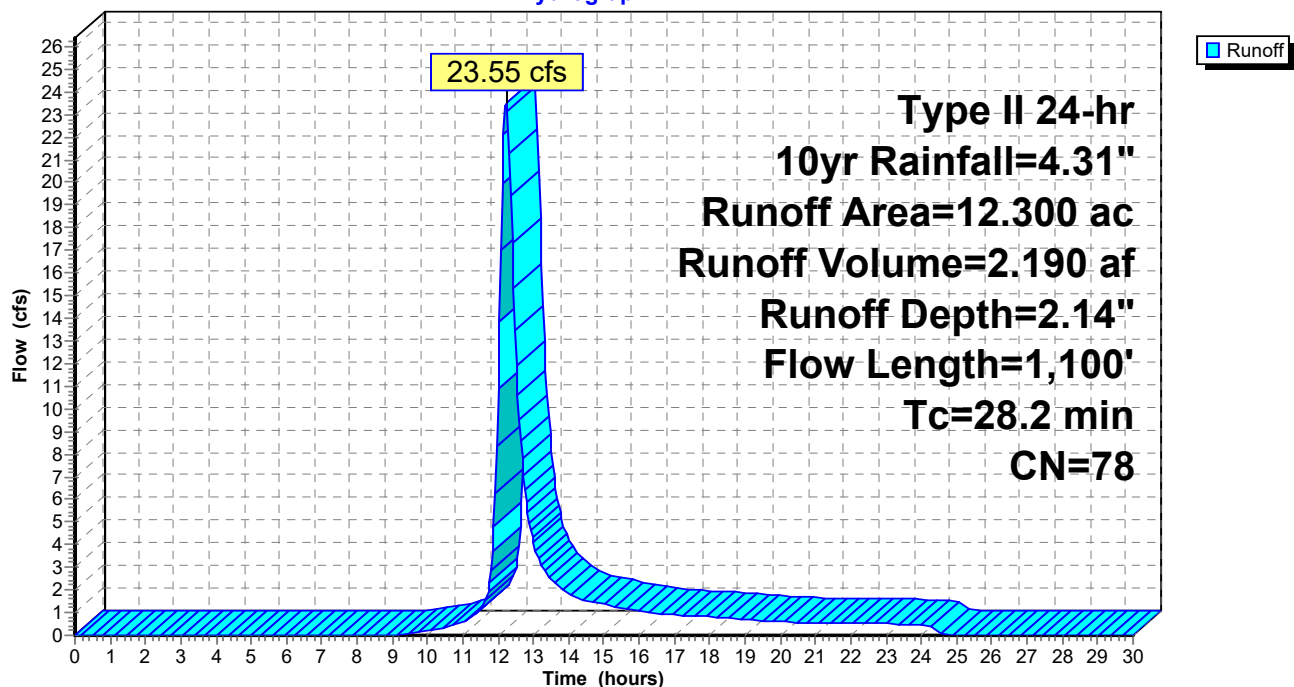
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs
Type II 24-hr 10yr Rainfall=4.31"

Area (ac)	CN	Description
12.300	78	Row crops, straight row, Good, HSG B
12.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.0300	0.17		Sheet Flow, Crops Cultivated: Residue>20% n= 0.170 P2= 2.91"
18.5	1,000	0.0100	0.90		Shallow Concentrated Flow, Crops Cultivated Straight Rows Kv= 9.0 fps
28.2	1,100	Total			

Subcatchment 1S: DA-1

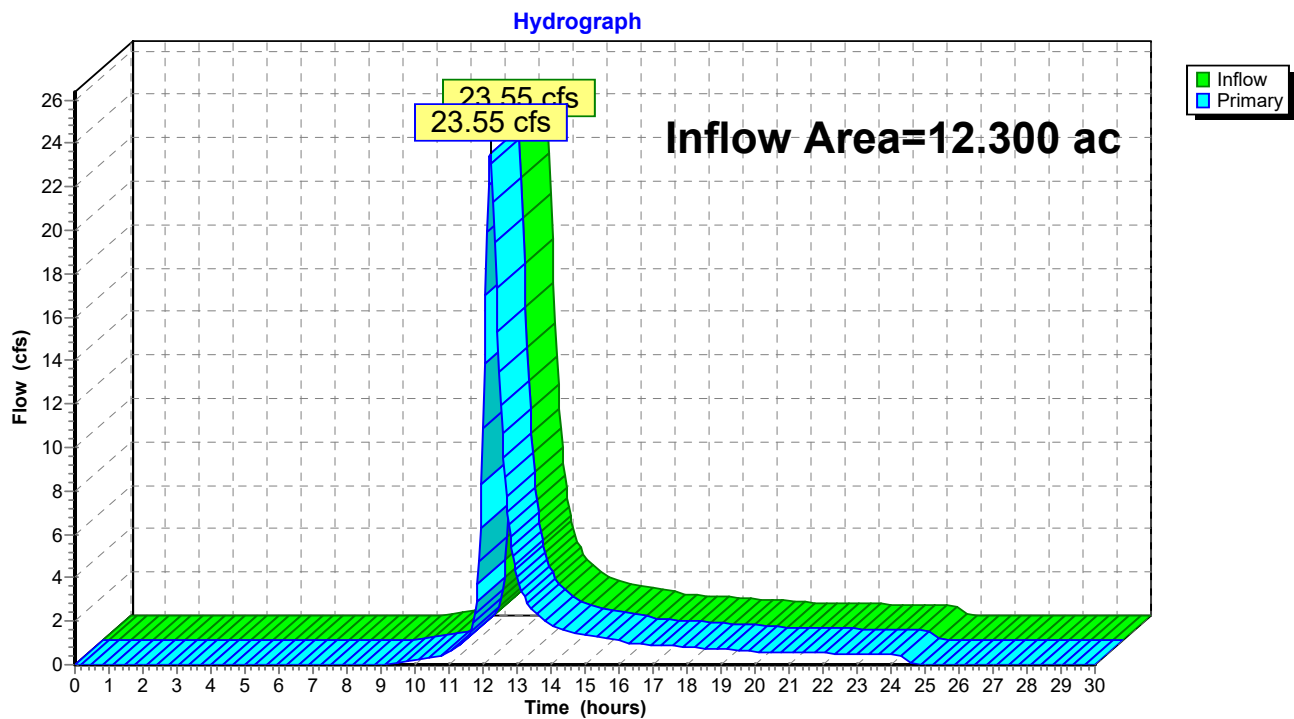
Hydrograph



Summary for Link 1L: OUT

Inflow Area = 12.300 ac, 0.00% Impervious, Inflow Depth = 2.14" for 10yr event
Inflow = 23.55 cfs @ 12.23 hrs, Volume= 2.190 af
Primary = 23.55 cfs @ 12.23 hrs, Volume= 2.190 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs

Link 1L: OUT

Summary for Subcatchment 1S: DA-1

Runoff = 43.27 cfs @ 12.22 hrs, Volume= 3.996 af, Depth= 3.90"

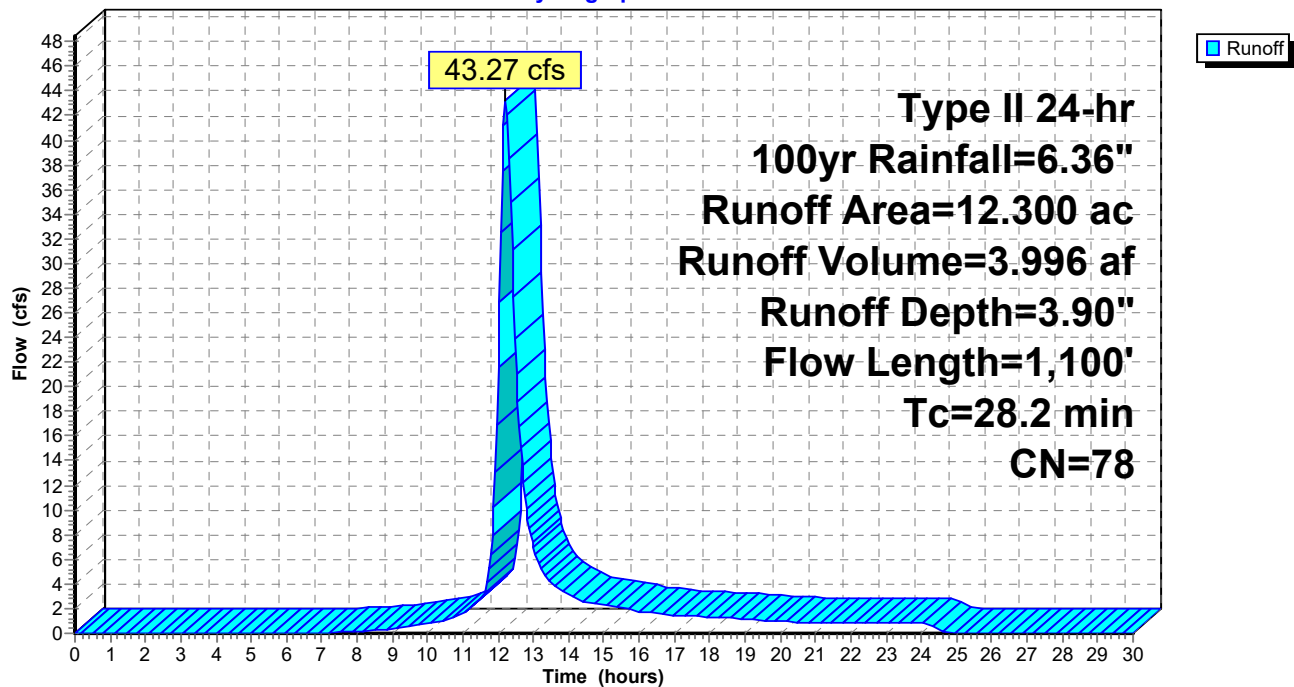
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs
Type II 24-hr 100yr Rainfall=6.36"

Area (ac)	CN	Description
12.300	78	Row crops, straight row, Good, HSG B
12.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.0300	0.17		Sheet Flow, Crops Cultivated: Residue>20% n= 0.170 P2= 2.91"
18.5	1,000	0.0100	0.90		Shallow Concentrated Flow, Crops Cultivated Straight Rows Kv= 9.0 fps
28.2	1,100	Total			

Subcatchment 1S: DA-1

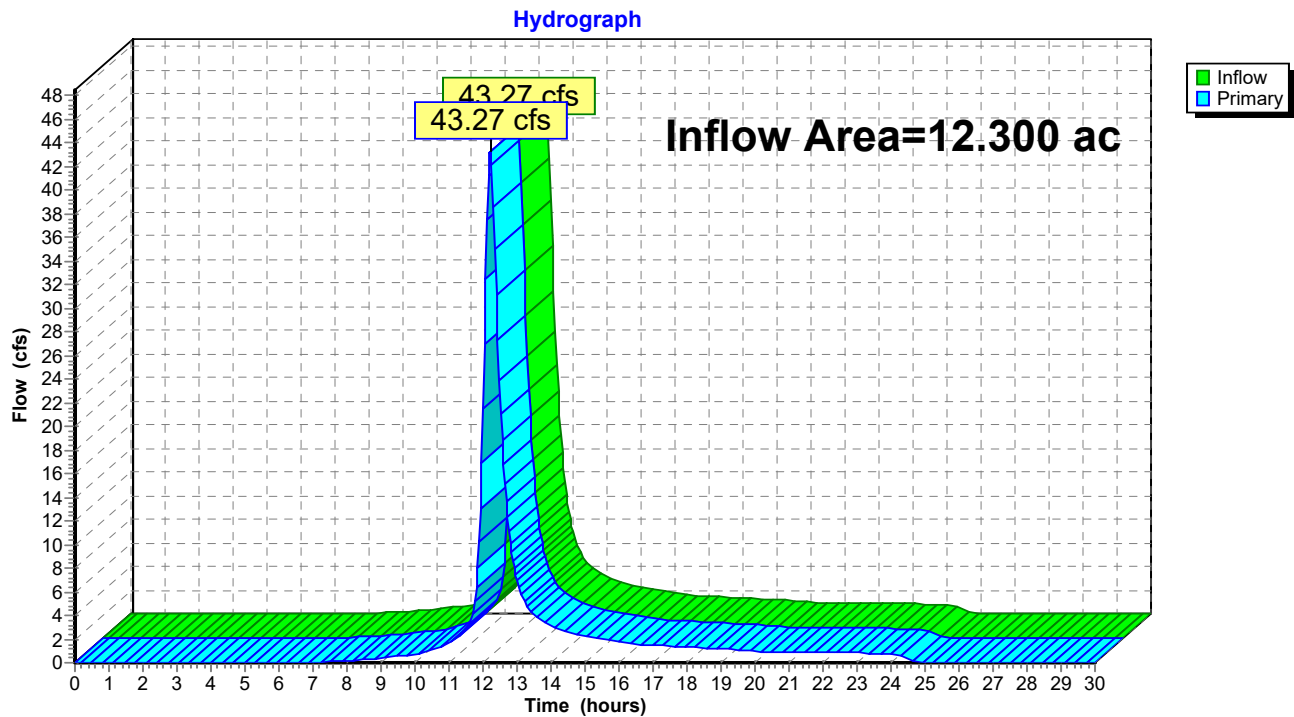
Hydrograph

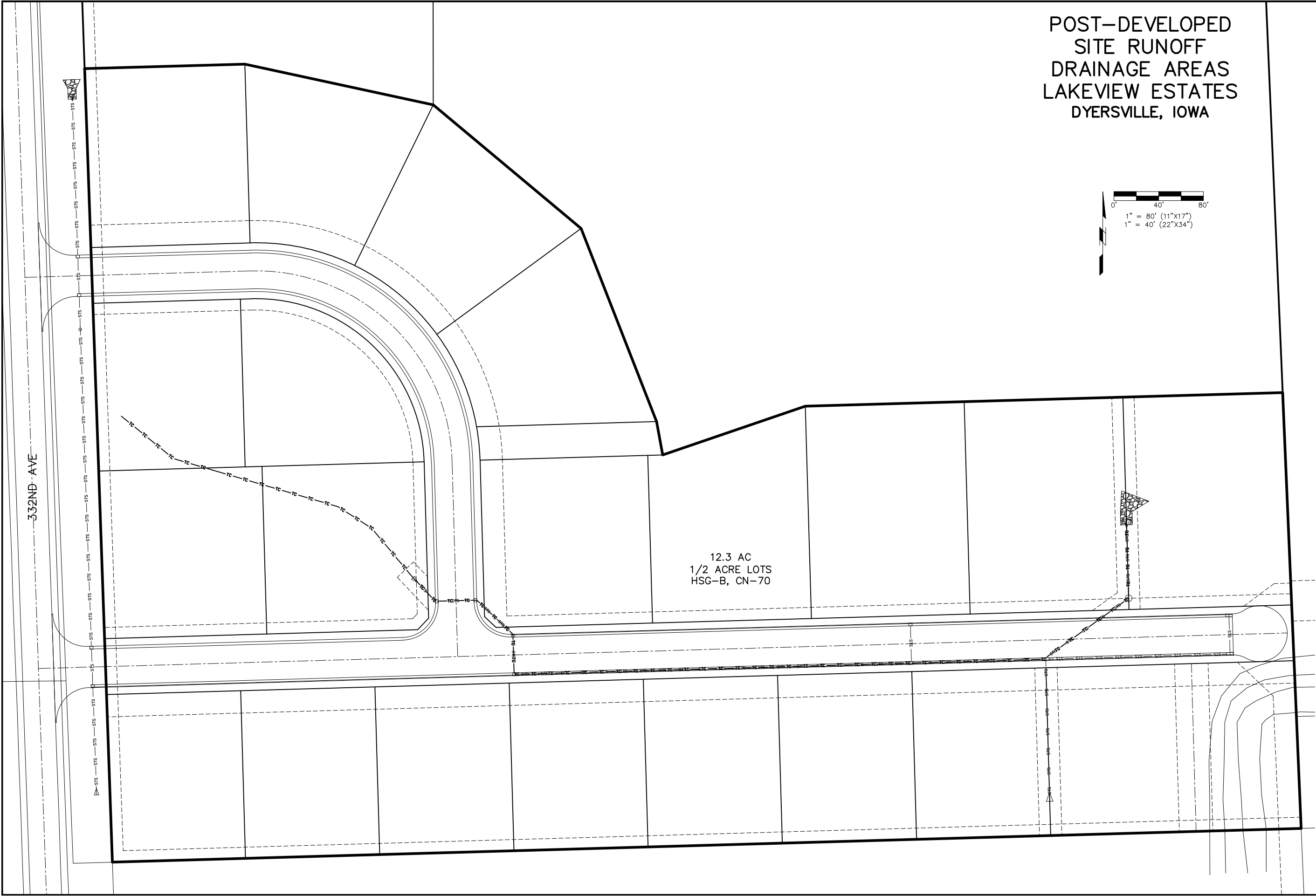


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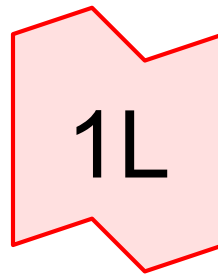
Inflow Area = 12.300 ac, 0.00% Impervious, Inflow Depth = 3.90" for 100yr event
Inflow = 43.27 cfs @ 12.22 hrs, Volume= 3.996 af
Primary = 43.27 cfs @ 12.22 hrs, Volume= 3.996 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs

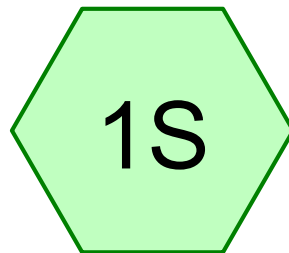
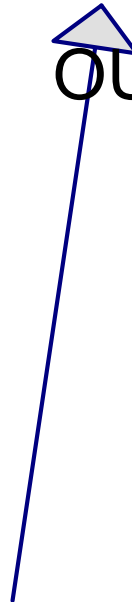
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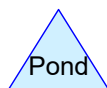
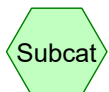
1/1	SHEET TITLE	PROJECT	NO. 23225	<				
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OUT



DA-1



23225-post

Prepared by HP Inc.

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Type II 24-hr 2yr Rainfall=2.91"

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Summary for Subcatchment 1S: DA-1

Runoff = 7.45 cfs @ 12.17 hrs, Volume= 0.681 af, Depth= 0.66"

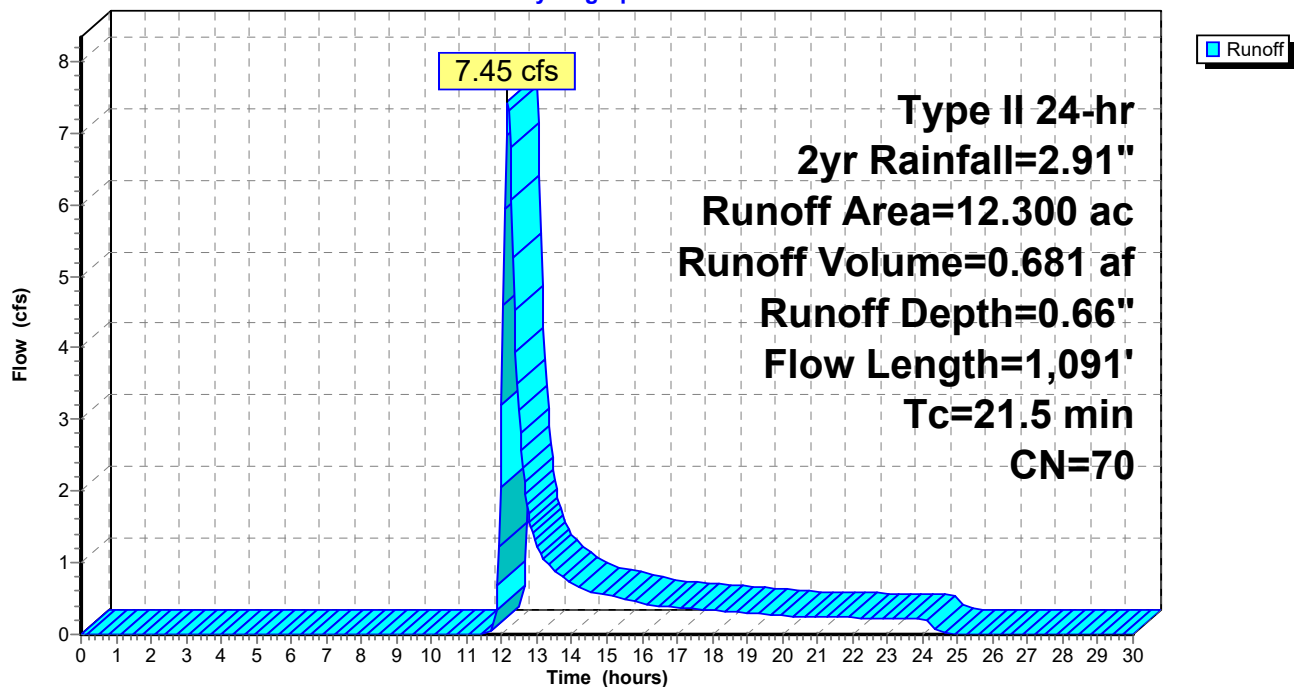
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs
Type II 24-hr 2yr Rainfall=2.91"

Area (ac)	CN	Description
12.300	70	1/2 acre lots, 25% imp, HSG B
9.225		75.00% Pervious Area
3.075		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	100	0.0100	0.12		Sheet Flow, Lawn Grass: Short n= 0.150 P2= 2.91"
4.9	207	0.0100	0.70		Shallow Concentrated Flow, Lawn Short Grass Pasture Kv= 7.0 fps
3.0	784	0.0050	4.41	13.86	Pipe Channel, pipe 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.015 Concrete sewer w/manholes & inlets
21.5	1,091	Total			

Subcatchment 1S: DA-1

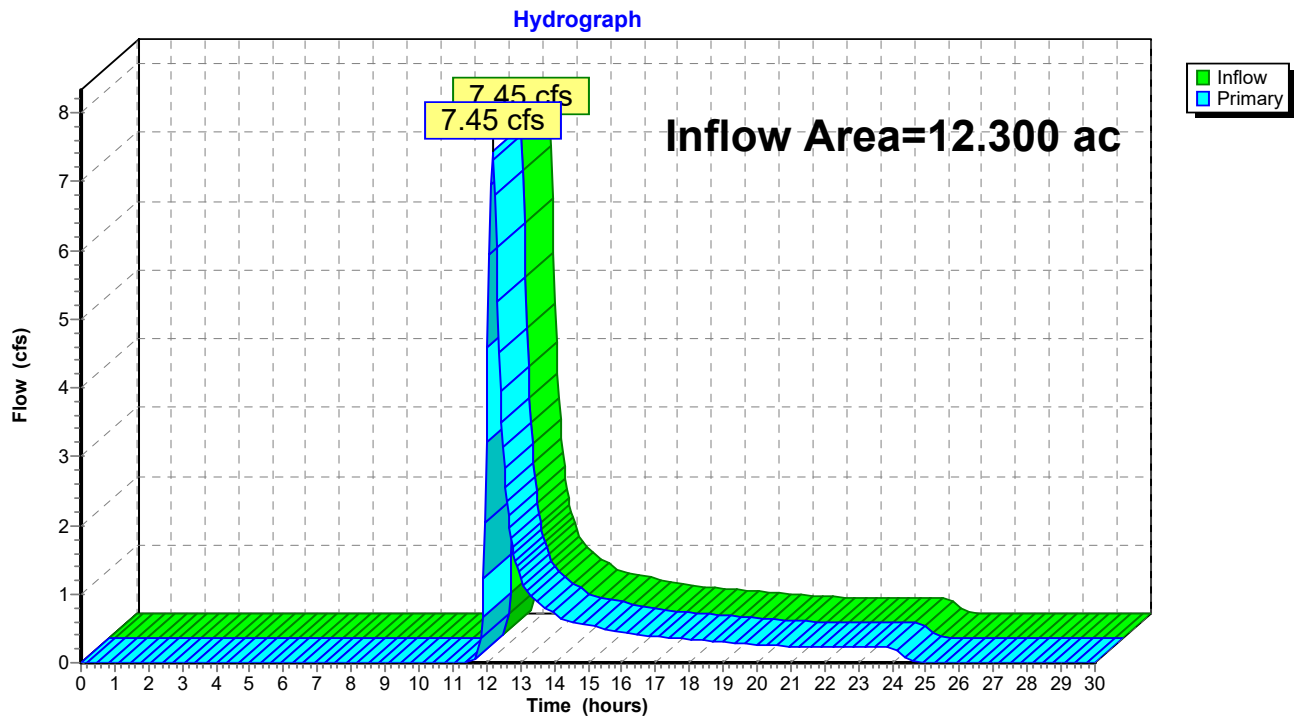
Hydrograph



Summary for Link 1L: OUT

Inflow Area = 12.300 ac, 25.00% Impervious, Inflow Depth = 0.66" for 2yr event
Inflow = 7.45 cfs @ 12.17 hrs, Volume= 0.681 af
Primary = 7.45 cfs @ 12.17 hrs, Volume= 0.681 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs

Link 1L: OUT

23225-post

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Type II 24-hr 10yr Rainfall=4.31"

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Summary for Subcatchment 1S: DA-1

Runoff = 19.41 cfs @ 12.16 hrs, Volume= 1.579 af, Depth= 1.54"

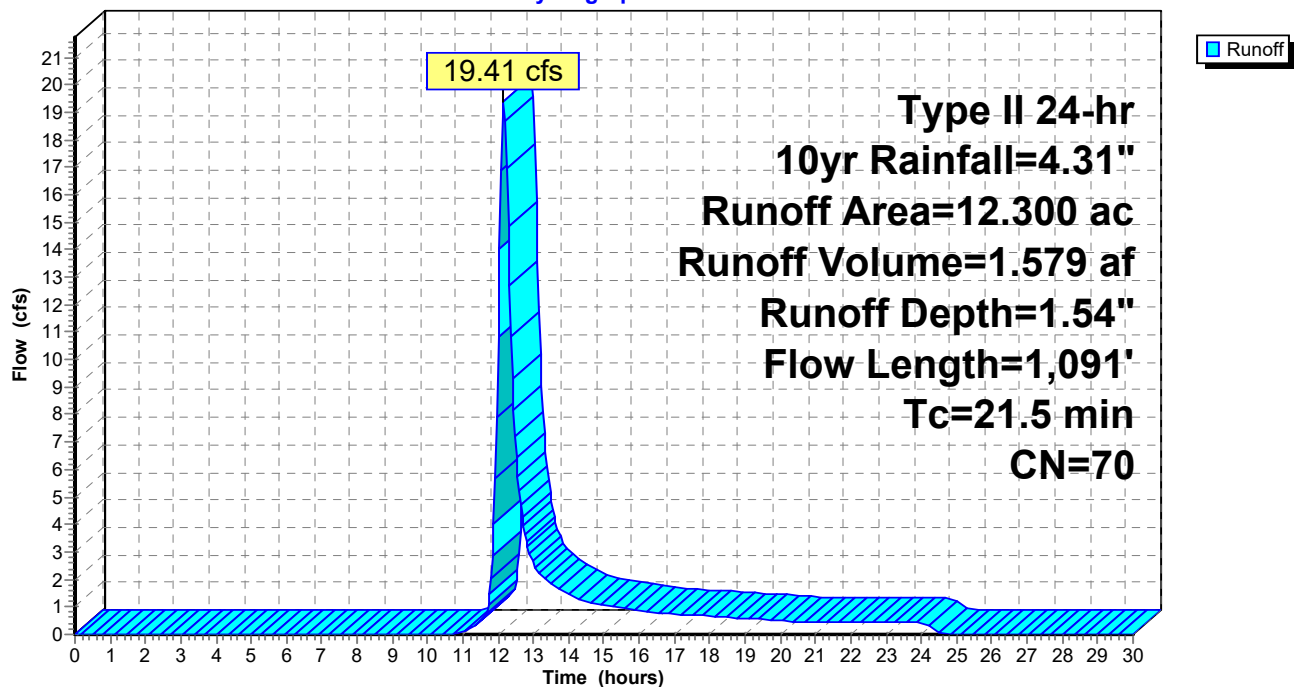
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs
Type II 24-hr 10yr Rainfall=4.31"

Area (ac)	CN	Description
12.300	70	1/2 acre lots, 25% imp, HSG B
9.225		75.00% Pervious Area
3.075		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	100	0.0100	0.12		Sheet Flow, Lawn Grass: Short n= 0.150 P2= 2.91"
4.9	207	0.0100	0.70		Shallow Concentrated Flow, Lawn Short Grass Pasture Kv= 7.0 fps
3.0	784	0.0050	4.41	13.86	Pipe Channel, pipe 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.015 Concrete sewer w/manholes & inlets
21.5	1,091	Total			

Subcatchment 1S: DA-1

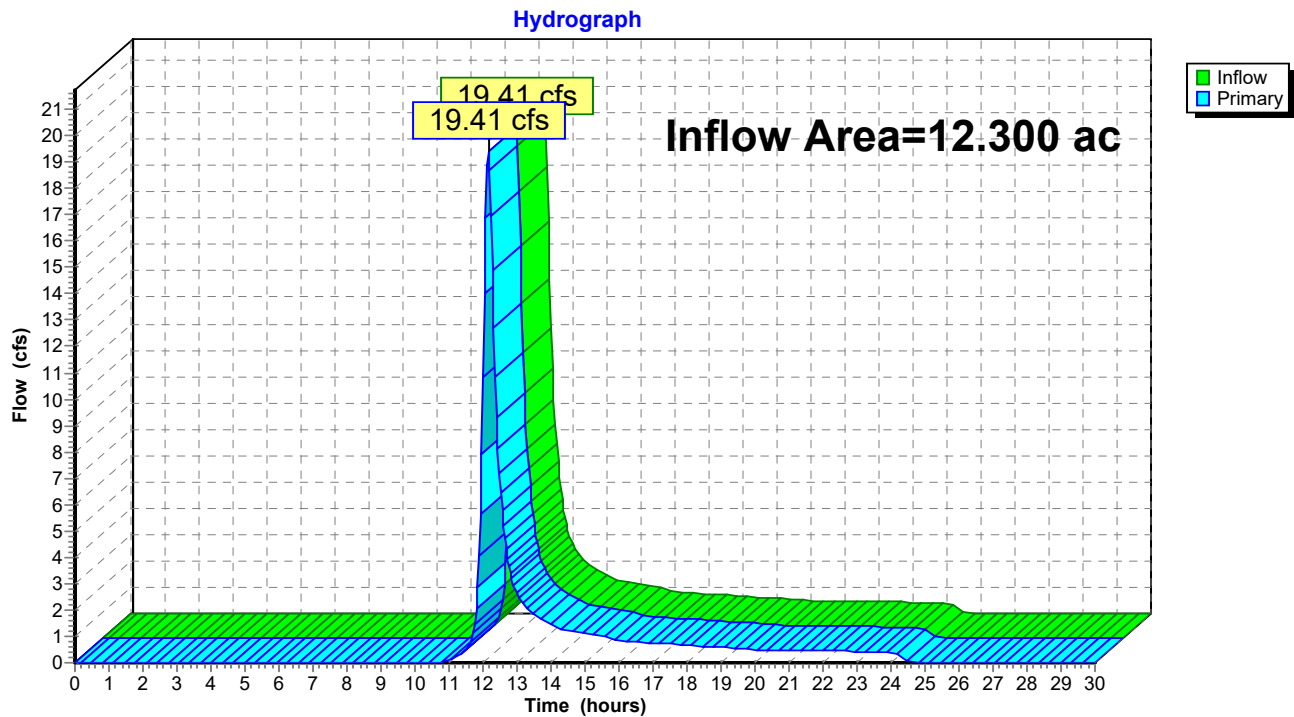
Hydrograph



Summary for Link 1L: OUT

Inflow Area = 12.300 ac, 25.00% Impervious, Inflow Depth = 1.54" for 10yr event
Inflow = 19.41 cfs @ 12.16 hrs, Volume= 1.579 af
Primary = 19.41 cfs @ 12.16 hrs, Volume= 1.579 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs

Link 1L: OUT

Summary for Subcatchment 1S: DA-1

Runoff = 40.32 cfs @ 12.15 hrs, Volume= 3.171 af, Depth= 3.09"

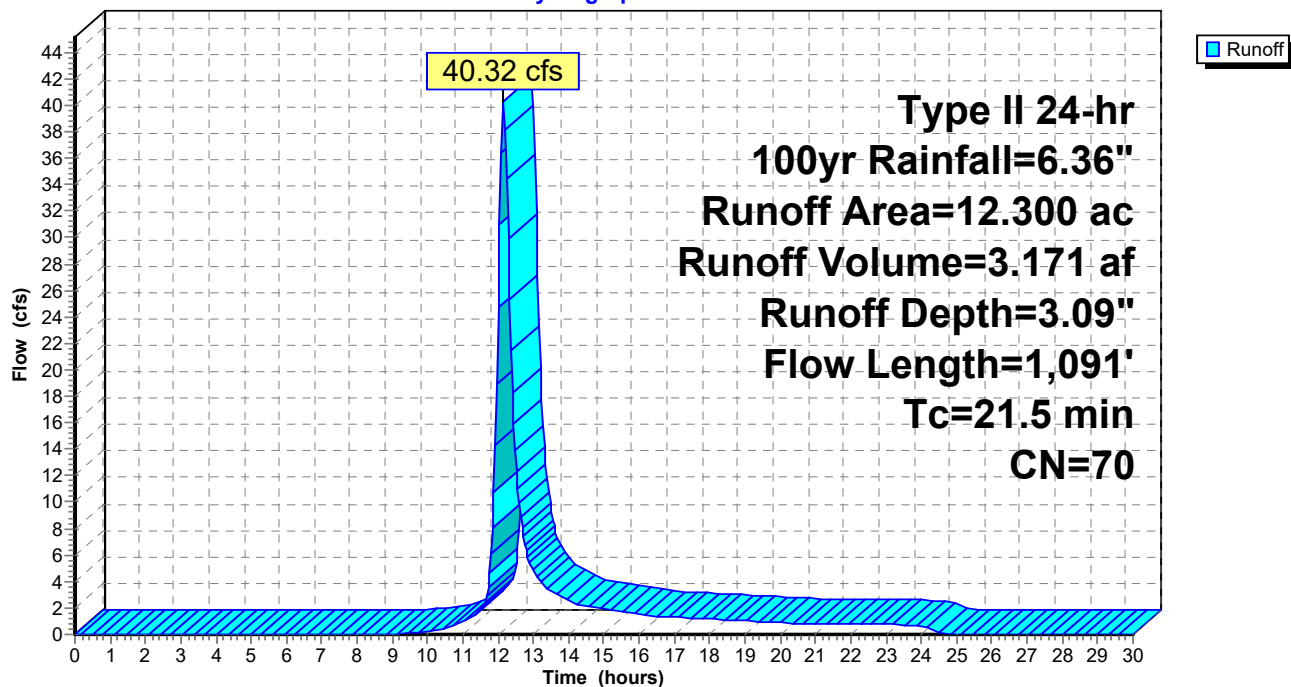
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs
Type II 24-hr 100yr Rainfall=6.36"

Area (ac)	CN	Description
12.300	70	1/2 acre lots, 25% imp, HSG B
9.225		75.00% Pervious Area
3.075		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	100	0.0100	0.12		Sheet Flow, Lawn Grass: Short n= 0.150 P2= 2.91"
4.9	207	0.0100	0.70		Shallow Concentrated Flow, Lawn Short Grass Pasture Kv= 7.0 fps
3.0	784	0.0050	4.41	13.86	Pipe Channel, pipe 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.015 Concrete sewer w/manholes & inlets
21.5	1,091	Total			

Subcatchment 1S: DA-1

Hydrograph



Summary for Link 1L: OUT

Inflow Area = 12.300 ac, 25.00% Impervious, Inflow Depth = 3.09" for 100yr event
Inflow = 40.32 cfs @ 12.15 hrs, Volume= 3.171 af
Primary = 40.32 cfs @ 12.15 hrs, Volume= 3.171 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs

Link 1L: OUT