JSD Professional Services, Inc.
• Engineers • Surveyors • Planners
MILWAUKEE ▌ MADISON ▌ KENOSHA

MILWAUKEE REGIONAL OFFICE
W238 N1610 BUSSE ROAD, SUITE 100
WAUKESHA, WI 53188
PHONE: (262) 513-0666 ▌ FAX: (262) 513 -1232

www.jsdinc.com

June 10, 2019

Re: Storm Water Management Plan
Clearwater Apartments

The following memo is provided as a summary of the approach used in the storm water management of a redeveloped site located on Clearwater Dr. in the City of Waukesha. The proposed project is a redesign of the previously proposed apartment complex. The redevelopment is a parking lot addition and two apartment buildings increasing the total impervious area by 0.37 acres from the previously proposed plan. It will also shift ~0.09 acres from draining directly to Basin B and instead send them to Basin C, and a rain garden will be added to the west side of the site providing some detention and quality control although quality control is not required for this redevelopment. This memo will address the quantity control measures put in place on our site.

Design Criteria

The existing site has known ponding issues between basins A and B, in order to prevent increased issues in the future the site has been modeled to maintain or reduce discharge from the previously approved SWMP in the event of the 2-yr, 10-yr, and 100-yr storms, with an emphasis on the 100-yr storm.

Design

The proposed project will include construction of a parking lot addition and two apartment buildings. Storm water runoff will drain off the site to the west into a rain garden before sheet draining to basin B and then to basin C. The east portion of the site will drain into existing storm sewers and then to Basin B.

A HydroCAD model was designed based on the previously approved SWMP design using the same drainage area and basin information. A second HydroCAD model was created to represent the changes in Drainage areas B and C from the previously approved design. The detention basins were analyzed to reduce or maintain existing discharges from the site for the 2, 10, and 100-yr events from the previously approved SWMP design.

Exhibits have been included to show the changes to the drainage basins.

Analysis

HydroCAD® Stormwater Modeling System (Version 10.00) software has been used to analyze the storm water characteristics for the Walleye development. HydroCAD® uses the accepted TR-55 methodology for determining peak runoff discharge rates and volumes. Storm water modeling was conducted for the 2-year, 10-year, and 100-year storm events. The rainfall depths utilized in the HydroCAD® model were based on Chapter 32 of the Waukesha Municipal Code. The pertinent rainfall depths are shown below in Table 1. HydroCAD data and results have also been included in an appendix to this memo.

Table 1 – Rainfall Depths

Storm Event	Rainfall Depth
2-year	2.7”
10-year	4.0”
100-year	5.6”

The proposed stormwater facilities have been analyzed to show a reduction in the post-development peak discharge rates for the 2, 10, and 100-year storm events. Tables 2 and 3 summarize the post-development hydrologic characteristics of the site. A comparison of the previously plan design and post-development peak discharge rates is provided in Table 4.

Table 2 – Proposed Drainage Area Hydrologic Characteristics

Drainage Area (HydroCAD Node)		Area (acres)	Curve Number	Runoff (cfs)		
				2-year	10-year	100-year
N1	Prop Area to Basin C	13.447	71	4.51	12.32	23.89
N2	Area B	42.610	76	17.52	40.32	72.16
N3	New Development	1.040	92	3.32	5.34	7.81

Table 3 – Proposed Storm Water Facility Characteristics

Contributing Areas	Storm Water Facility		2-year	10-year	100-year
• New Development	RG	Peak Inflow (cfs)	3.32	5.34	7.81
		Peak Outflow (cfs)	3.28	5.29	7.74
		Peak Water Surface Elevation	24.66	24.72	24.79
		Top of Berm Elevation	26.00		

Contributing Areas	Storm Water Facility		2-year	10-year	100-year
• Area A	2	Peak Inflow (cfs)	8.56	20.04	36.17
		Peak Outflow (cfs)	2.87	3.18	14.60
		Peak Water Surface Elevation	14.01	15.85	16.86
		Top of Berm Elevation	17.50		

Contributing Areas	Storm Water Facility		2-year	10-year	100-year
• Revised Area C • Rain Garden • Infil D	19	Peak Inflow (cfs)	4.84	13.15	25.08
		Peak Outflow (cfs)	0.68	4.97	13.29
		Peak Water Surface Elevation	12.99	14.38	15.77
		Top of Berm Elevation	17.00		

Contributing Areas	Storm Water Facility		2-year	10-year	100-year
• Basin A • Area B • Basin C	24	Peak Inflow (cfs)	20.76	43.77	92.42
		Peak Outflow (cfs)	13.34	23.98	77.31
		Peak Water Surface Elevation	12.23	14.33	15.78
		Top of Berm Elevation	16.50		

Table 4 – Peak Discharge Rates from site (cfs)

Storm Event	Basin C Overflow		Basin B		Site Total	
	Pre	Post	Pre	Post	Pre	Post
2-yr	0.00	0.00	13.34	13.34	13.34	13.34
10-yr	0.00	0.00	24.02	23.98	24.02	23.98
100-yr	9.97	9.06	77.00	77.31	84.25	82.47

Conclusion

The storm water facilities for the proposed site have been designed and modeled for water quantity. The design changes cause no increase in ponding for both Basin A and Basin B, and decreases the total discharge from the site for the 2-yr, 10-yr, and 100-yr storm events.

(Appendices Follow)

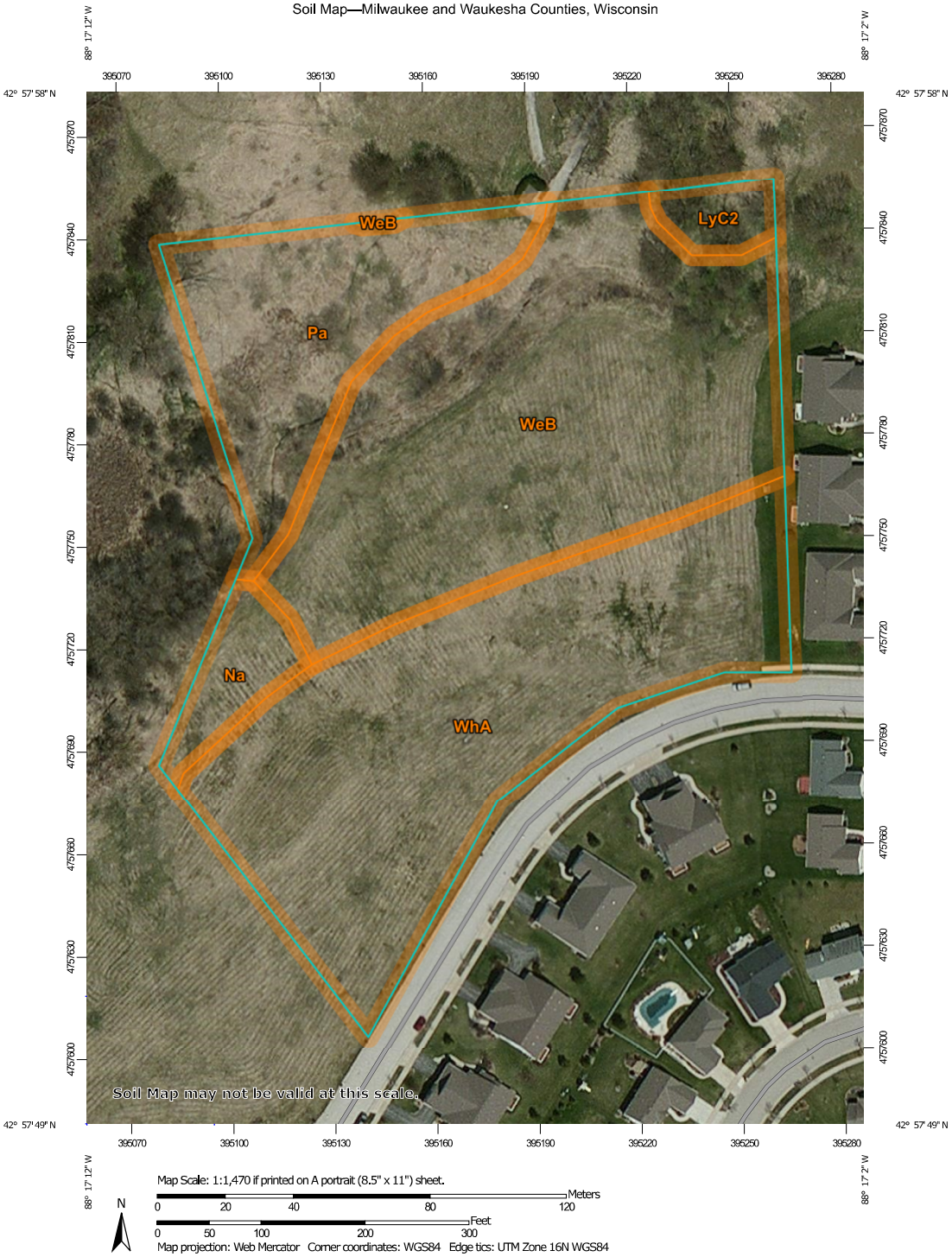
APPENDIX 1

Maps

- Location Map
- NRCS Soil Map
- DNR Surface Water Map

LOCATION MAP

Soil Map—Milwaukee and Waukesha Counties, Wisconsin



Map Scale: 1:1,470 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Milwaukee and Waukesha Counties, Wisconsin
Survey Area Data: Version 14, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

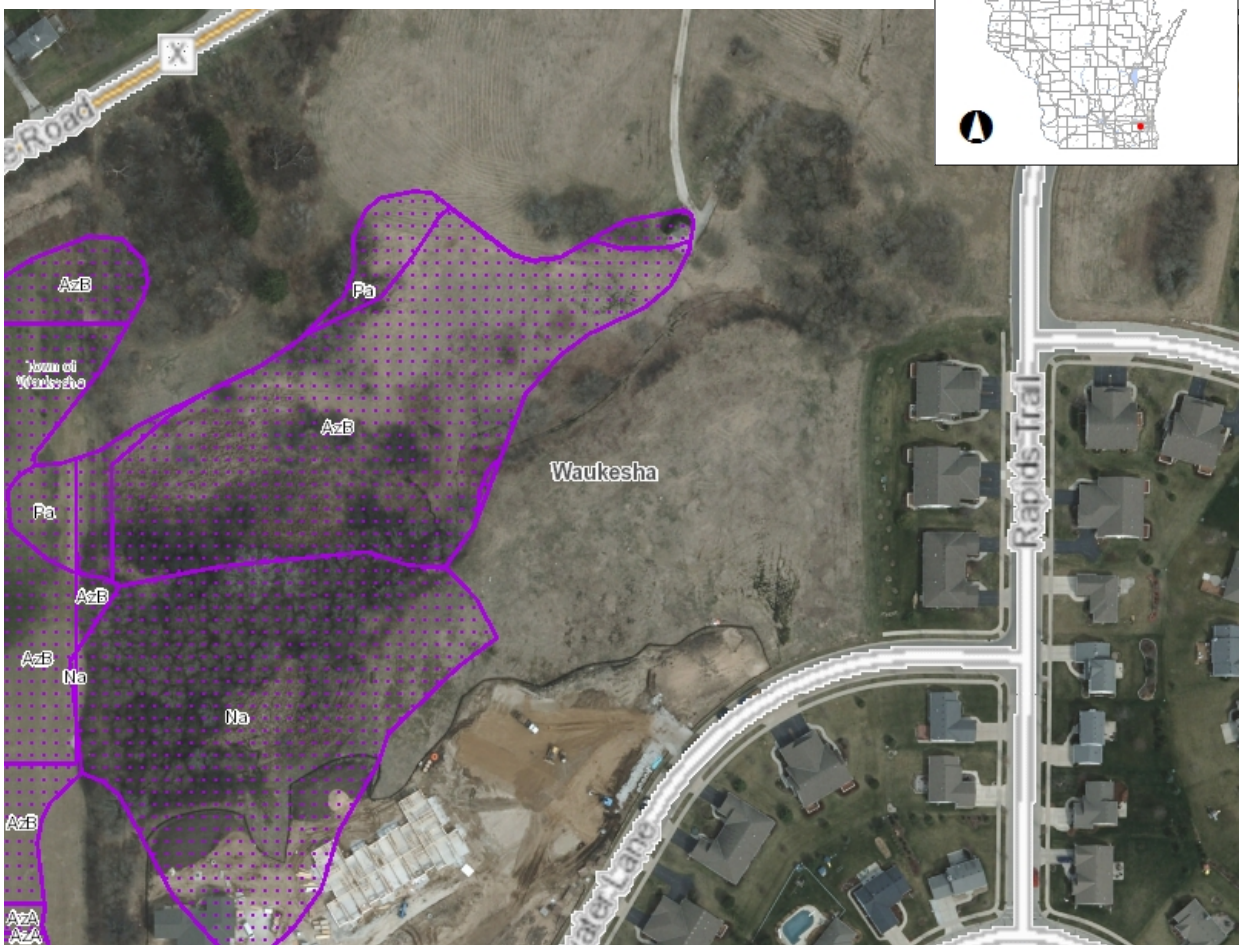
Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
LyC2	Lorenzo loam, 6 to 12 percent slopes, eroded	0.2	2.2%
Na	Navan silt loam	0.3	3.7%
Pa	Palms muck, 0 to 2 percent slopes	1.2	16.4%
WeB	Warsaw loam, 2 to 6 percent slopes	3.0	40.0%
WhA	Warsaw silt loam, 0 to 2 percent slopes	2.9	37.7%
Totals for Area of Interest		**7.6**	**100.0%**

Surface Water Data Viewer Map



Legend

- Dams
  - Dams with FERC License
  - Dams
- Floodplain Analysis Lines
  - Other
  - Flood Insurance Study
  - Letter of Map Revision
  - Case By Case Analysis
  - Bridge
- Floodplain Analysis Points
  - Other
  - Flood Insurance Study
  - Letter of Map Revision
  - Case By Case Analysis
  - Bridge
- Floodplain Storage
- FERC Project Area Boundaries
- Cross Sections
- Floodplains
  - Flood Fringe
  - Floodway
- NRCS Wetspots
- Maximum Extent Wetland Indicators
- Intermittent Streams
- 24K Hydrography Streams and Rivers
- 24K Hydrography Lakes and Open Water
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway

Notes

0.1 0 0.03 0.1 Miles

NAD_1983_HARN_Wisconsin_TM

1: 1,980

APPENDIX 2

Civil Plans

- Site Plan
- Erosion Control Plan
- Grading Plan
- Utility Plan
- Notes & Details

SITE INFORMATION BLOCK

SITE ADDRESS	2900 CLEARWATER LANE
PROPERTY AREA	(349,709 SF) 8.03 ACRES
PHASE II AREA	(141,362 SF) 3.25 ACRES
NUMBER OF PHASE II BUILDINGS	2
TOTAL PHASE II BUILDING SQUARE FOOTAGE	18,270 SF
NUMBER OF EXTERIOR PARKING STALLS	37
STANDARD	35
ACCESSIBLE	2
EXISTING VS. PROPOSED PHASE II SITE COVERAGE	
EXISTING IMPERVIOUS SURFACE AREA	0 SF
EXISTING PERVIOUS SURFACE AREA	141,362 SF
EXISTING IMPERVIOUS SURFACE AREA RATIO	0.00
PROPOSED IMPERVIOUS SURFACE AREA	53,236 SF
PROPOSED PERVIOUS SURFACE AREA	87,965 SF
PROPOSED IMPERVIOUS SURFACE AREA RATIO	0.39

north

SCALE IN FEET
20' 0 20'

BUILDING A
F.F.E 31.50

BUILDING B
F.F.E 30.00

GARAGE
1,417 SQ. FT.
EXTERIOR FOOTPRINT
FFE=22.3

TOTAL WETLAND DISTURBANCE 2,279 SF

WETLAND DELINEATED BY DAVE MEYER OF WETLAND & WATERWAY CONSULTING, LLC ON DEC. 3, 2018. FIELD LOCATED BY JSD PROFESSIONAL SERVICES

CLEARWATER LN.

LEGEND

MH	MANHOLE, TYPE UNKNOWN	WV	WATER VALVE
S	SANITARY MANHOLE		FIRE HYDRANT
ST	STORM MANHOLE		TELEPHONE PEDESTAL
	CATCH BASIN ROUND		SIGN
	CATCH BASIN SQUARE		ELECTRICAL PED/TRANSFORMER
	METAL POST	GV	GAS VALVE
	BOLLARD		ASPHALT DEMO
M	MAILBOX		CONCRETE SIDEWALK
CMP	CORRUGATED METAL PIPE		HEAVY DUTY ASPHALT PAVEMENT
RCP	REINFORCED CONCRETE PIPE		STANDARD DUTY ASPHALT PAVEMENT
PVC	POLYVINYL CHLORIDE (PIPE)		WETLAND DISTURBANCE
CPP	CORRUGATED PLASTIC PIPE		
	POST INDICATOR VALVE		
	SIAMESE		
	OUTFALL PIPE		
	LIGHT POLE		
	FLOOD LIGHT		
	SPRINKLER CONTROL VALVE		

DIGGERS HOTLINE
Toll Free (800) 242-8511

File: R:\2018\18-8890 Clearwater Apartments\Dwg\18-8890 C1.0 - Site Plan.dwg Layout: C1.0 User: pmartens Plotted: Jun 07, 2019 - 2:36pm Xref's:

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KENOSHA | APPLETON | WAUSAU

MILWAUKEE REGIONAL OFFICE
W238N1610 BUSSE ROAD, SUITE 100
WAUKESHA, WISCONSIN 53188
P. 262.513.0666

CLIENT:
PURE ARCHITECTURE STUDIO, LLC

CLIENT ADDRESS:
735 N. WATER STREET, SUITE 1228
MILWAUKEE, WI 53202

PROJECT:
CLEARWATER APARTMENT PHASE 2

PROJECT LOCATION:
CITY OF WAUKESHA
WAUKESHA COUNTY, WISCONSIN

PLAN MODIFICATIONS:

#	Date:	Description:
1	03/22/19	Municipal Review
2	05/20/19	Common Council Submittal
3	06/10/19	Planning Commission Submittal
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Design/Drawn: APM
Approved: RWI

SHEET TITLE:
SITE PLAN

NOT FOR CONSTRUCTION

SHEET NUMBER:
C1.0

JSD PROJECT NO: 18-8890

north

SCALE IN FEET
20' 0 20'

BUILDING A
F.F.E 31.50

BUILDING B
F.F.E 30.00

EXISTING ENVIRONMENTAL CORRIDOR (APPROXIMATE LOCATION FROM WAUKESHA COUNTY GIS)

EXISTING ENVIRONMENTAL CORRIDOR

LIMITS OF DISTURBANCE

INLET PROTECTION TYP.

EROSION MATTING TYP.

SILT FENCE TYP.

EROSION BALES TYP.

PROPOSED RAIN GARDEN

RIPRAP AT ENDSECTION

TEMPORARY TOPSOIL STOCK PILE

WETLAND DISTURBANCE 150 SF

WETLAND DISTURBANCE 372 SF

WETLAND DISTURBANCE 32 SF

WETLAND DISTURBANCE 586 SF

WETLAND DISTURBANCE 382 SF

WETLAND DISTURBANCE 49 SF

WETLAND DISTURBANCE 37 SF

WETLAND DISTURBANCE 109 SF

WETLAND DISTURBANCE 562 SF

TOTAL WETLAND DISTURBANCE 2,279 SF

WETLAND DELINEATED BY DAVE MEYER OF WETLAND & WATERWAY CONSULTING, LLC ON DEC. 3, 2018. FIELD LOCATED BY JSD PROFESSIONAL SERVICES

30' WATERMAIN EASEMENT PROPOSED

30' WATERMAIN EASEMENT PER CSM NO. 11254

30' WIDE SANITARY SEWER EASEMENT PER CSM NO. 11254

12' WIDE DISTRIBUTION EASEMENT DOC NO. 4156563

NOT PART OF THIS PROJECT

GARAGE
1,417 SQ. FT.
EXTERIOR FOOTPRINT
FFE=22.3

ROOF DOWN-SPOUTS

DOG BAG POST

BBQ GRILL

BM-1
CHISELED CROSS
20.56

CLEARWATER LN.

STONE TRACKING PAD

TRANSFORMERS ON CONC. PAD

LEGEND

MH	MANHOLE, TYPE UNKNOWN	WV	WATER VALVE
S	SANITARY MANHOLE	FH	FIRE HYDRANT
ST	STORM MANHOLE	TP	TELEPHONE PEDESTAL
CB	CATCH BASIN ROUND	S	SIGN
CB	CATCH BASIN SQUARE	E	ELECTRICAL PED/TRANSFORMER
	METAL POST	GV	GAS VALVE
	BOLLARD		EROSION MATTING
P	MAILBOX		STONE TRACKING PAD
CMP	CORRUGATED METAL PIPE	W	WATER MAIN
RCP	REINFORCED CONCRETE PIPE	SAN	SANITARY SEWER
PVC	POLYVINYL CHLORIDE (PIPE)	ST	STORM SEWER
CPP	CORRUGATED PLASTIC PIPE	FIB	FIBER OPTIC
	POST INDICATOR VALVE	T	UNDERGROUND TELEPHONE
	SIAMESE	E	UNDERGROUND ELECTRIC
	OUTFALL PIPE	G	UNDERGROUND GAS
	LIGHT POLE	OH	OVERHEAD UTILITY
	FLOOD LIGHT	SF	SILT FENCE
	SPRINKLER CONTROL VALVE		

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10		
11		
12		
13		
14		
15		

Design/Drawn: APM
Approved: RWI

SHEET TITLE:
EROSION CONTROL PLAN

NOT FOR CONSTRUCTION

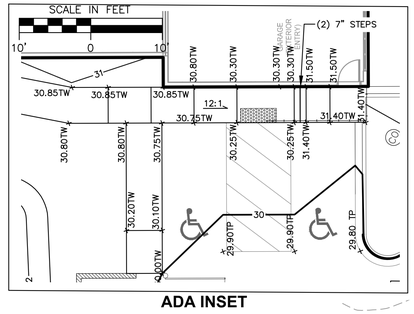
SHEET NUMBER:
C2.0

JSD PROJECT NO: 18-8890

File: R:\2018\18-8890 Clearwater Apartments\Dwg\18-8890 C2.0 - Erosion Control Plan.dwg Layout: C2.0 User: pmartens Plotted: Jun 07, 2019 - 2:37pm Xref's:

LEGEND

MANHOLE, TYPE UNKNOWN	POST INDICATOR VALVE	WATER VALVE	W — WATER MAIN
SANITARY MANHOLE	SIAMESE	FIRE HYDRANT	SAN — SANITARY SEWER
STORM MANHOLE	OUTFALL PIPE	TELEPHONE PEDESTAL	ST — STORM SEWER
CATCH BASIN ROUND	LIGHT POLE	SIGN	FIB — FIBER OPTIC
CATCH BASIN SQUARE	FLOOD LIGHT	ELECTRICAL PED /TRANSFORMER	T — UNDERGROUND TELEPHONE
METAL POST	SPRINKLER CONTROL VALVE	GAS VALVE	E — UNDERGROUND ELECTRIC
BOLLARD			G — UNDERGROUND GAS
			OH — OVERHEAD UTILITY
			X — FENCE LINE



ADA INSET

×28.80	SPOT ELEVATION – FINISH GRADE
×28.80 TOW	SPOT ELEVATION – TOP OF WALL GRADE
×28.80 BOW	SPOT ELEVATION – BOTTOM OF WALL GRADE
×RIM 28.80	SPOT ELEVATION – RIM GRADE
×28.80 TW	SPOT ELEVATION – TOP OF WALK
×28.80 TP	SPOT ELEVATION – TOP OF PAVEMENT
×28.80 BOC	SPOT ELEVATION – BACK OF CURB

north

SCALE IN FEET
20' 0 20'

BUILDING A
F.F.E 31.50

BUILDING B
F.F.E 30.00

RETAINING WALL (TYP.)

OVERLAND RELIEF ROUTE (TYP.)

WETLAND DISTURBANCE 150 SF

EXISTING ENVIRONMENTAL CORRIDOR (APPROXIMATE LOCATION FROM WAUKESHA COUNTY GIS)

PROPOSED RAIN GARDEN

90' WIDE WATERMAN SANITARY SEWER EASEMENT PER CSM NO 11253

PROPOSED 30' WATERMAN EASEMENT

WETLAND DISTURBANCE 372 SF

WETLAND DISTURBANCE 32 SF

WETLAND DISTURBANCE 586 SF

WETLAND DISTURBANCE 382 SF

WETLAND DISTURBANCE 49 SF

WETLAND DISTURBANCE 37 SF

WETLAND DISTURBANCE 109 SF

WETLAND DISTURBANCE 562 SF

TOTAL WETLAND DISTURBANCE 2,279 SF

WETLAND DELINEATED BY DAVE MEYER OF WETLAND & WATERWAY CONSULTING, LLC ON DEC. 3, 2018. FIELD LOCATED BY JSD PROFESSIONAL SERVICES

GRADING (BY OTHERS)

GARAGE 1,417 SQ. FT. EXTERIOR FOOTPRINT FFE=22.3

ROOF DOWN SPOUTS

DOG BAG POST

BM-1 CHISELED CROSS 20.56

CLEARWATER LN.

SAN MH RIM=20.57 10.71 8"NE 10.71 8"SW

SAN MH RIM=20.28 12.20 8"NE

TRANSFORMERS ON CONC. PAD

12' WIDE DISTRIBUTION EASEMENT DOC NO. 4158263

EXISTING SOUTH WETLAND LINE TABLE

LINE TABLE		
LINE	BEARING	DISTANCE
L1	S76°55'45"W	55.34'
L2	S48°24'20"W	34.93'
L3	S64°44'45"W	40.74'
L4	N87°00'53"W	22.96'
L5	S43°00'17"W	24.82'
L6	N86°51'52"W	20.48'
L7	N82°39'59"W	23.65'
L8	N65°46'45"W	26.99'
L9	S38°49'36"W	24.30'
L10	S35°21'09"W	30.97'
L11	N31°17'07"W	15.34'
L12	S77°01'39"W	15.47'
L13	S6°59'54"W	31.27'
L14	S74°05'16"W	17.60'
L15	S64°38'49"W	16.87'
L16	N27°39'32"W	15.58'
L17	S76°57'05"W	11.27'
L18	S5°26'27"W	50.68'
L19	S88°16'46"W	15.42'
L20	N73°00'24"W	26.67'
L21	S54°29'01"W	29.72'

LINE TABLE		
LINE	BEARING	DISTANCE
L22	N86°12'35"W	20.83'
L23	N55°29'05"W	23.11'
L24	S27°17'53"W	26.74'
L25	S58°11'46"W	26.21'
L26	N5°35'18"W	28.61'
L27	N65°03'18"W	7.96'
L28	N5°16'18"W	18.95'
L29	N12°43'33"E	13.68'
L30	N6°57'57"E	21.08'
L31	N14°56'23"E	17.10'
L32	N4°11'03"E	20.90'
L33	N31°07'46"E	29.92'
L34	N2°06'24"W	31.23'
L35	N14°41'18"W	20.18'
L36	S86°07'50"E	12.33'
L37	N14°31'48"E	17.56'
L38	S3°39'59"E	13.11'
L39	S8°05'28"E	25.01'
L40	S65°08'11"E	34.87'
L41	N88°01'48"E	32.29'
L42	S34°24'36"E	16.51'

LINE TABLE		
LINE	BEARING	DISTANCE
L43	S34°13'47"E	8.71'
L44	S5°47'19"W	14.23'
L45	N81°39'43"E	10.10'
L46	S80°31'57"E	18.66'
L47	N40°20'07"W	25.67'
L48	N69°30'42"E	12.48'
L49	S55°58'58"E	23.69'
L50	N10°29'26"E	10.01'
L51	N52°44'07"W	24.40'
L52	N50°15'11"W	21.93'
L53	N69°46'45"E	31.38'
L54	N80°55'10"E	22.56'
L55	N69°47'27"E	15.00'
L56	S40°38'40"E	18.29'
L57	N59°22'55"E	25.85'
L58	N87°41'10"E	31.65'
L59	N10°29'50"E	25.56'
L60	N70°16'52"E	35.41'
L61	S76°40'44"E	24.25'
L62	S71°13'58"E	32.00'
L63	N62°35'14"E	38.81'

EXISTING NORTH WETLAND LINE TABLE

LINE TABLE		
LINE	BEARING	DISTANCE
L64	S52°32'09"E	61.80'
L65	S41°50'07"E	21.40'
L66	S64°13'23"E	35.18'
L67	N42°25'06"E	16.48'
L68	S87°25'01"E	35.88'
L69	N68°42'22"E	25.28'
L70	N50°59'54"E	22.40'
L71	N60°39'59"E	19.37'
L72	S76°03'11"E	14.98'
L73	N69°22'50"E	27.99'
L74	N38°25'00"E	32.54'
L75	N13°10'17"W	14.56'
L76	N21°43'16"W	10.34'

LINE TABLE		
LINE	BEARING	DISTANCE
L77	N66°22'34"E	36.85'
L78	N88°18'59"E	12.76'
L79	N54°50'32"E	25.48'
L80	N66°39'44"E	32.30'
L81	N77°12'26"E	51.93'
L82	N61°36'02"E	26.95'
L83	N36°27'12"E	31.86'
L84	N14°39'23"W	34.53'
L85	N4°43'07"W	21.63'
L86	N18°15'43"E	36.85'
L87	N40°56'56"E	27.02'
L88	N54°49'41"E	12.63'

DIGGERS HOTLINE
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W238N1610 BUSSE ROAD, SUITE 100
WAUKESHA, WISCONSIN 53188
P. 262.513.0666

CLIENT:
PURE ARCHITECTURE STUDIO, LLC

CLIENT ADDRESS:
735 N. WATER STREET, SUITE 1228
MILWAUKEE, WI 53202

PROJECT:
CLEARWATER APARTMENT PHASE 2

PROJECT LOCATION:
CITY OF WAUKESHA
WAUKESHA COUNTY, WISCONSIN

PLAN MODIFICATIONS:

#	Date:	Description:
1	03/22/19	Municipal Review
2	05/20/19	Common Council Submittal
3	06/10/19	Planning Commission Submittal
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Design/Drawn: APM
Approved: RWI

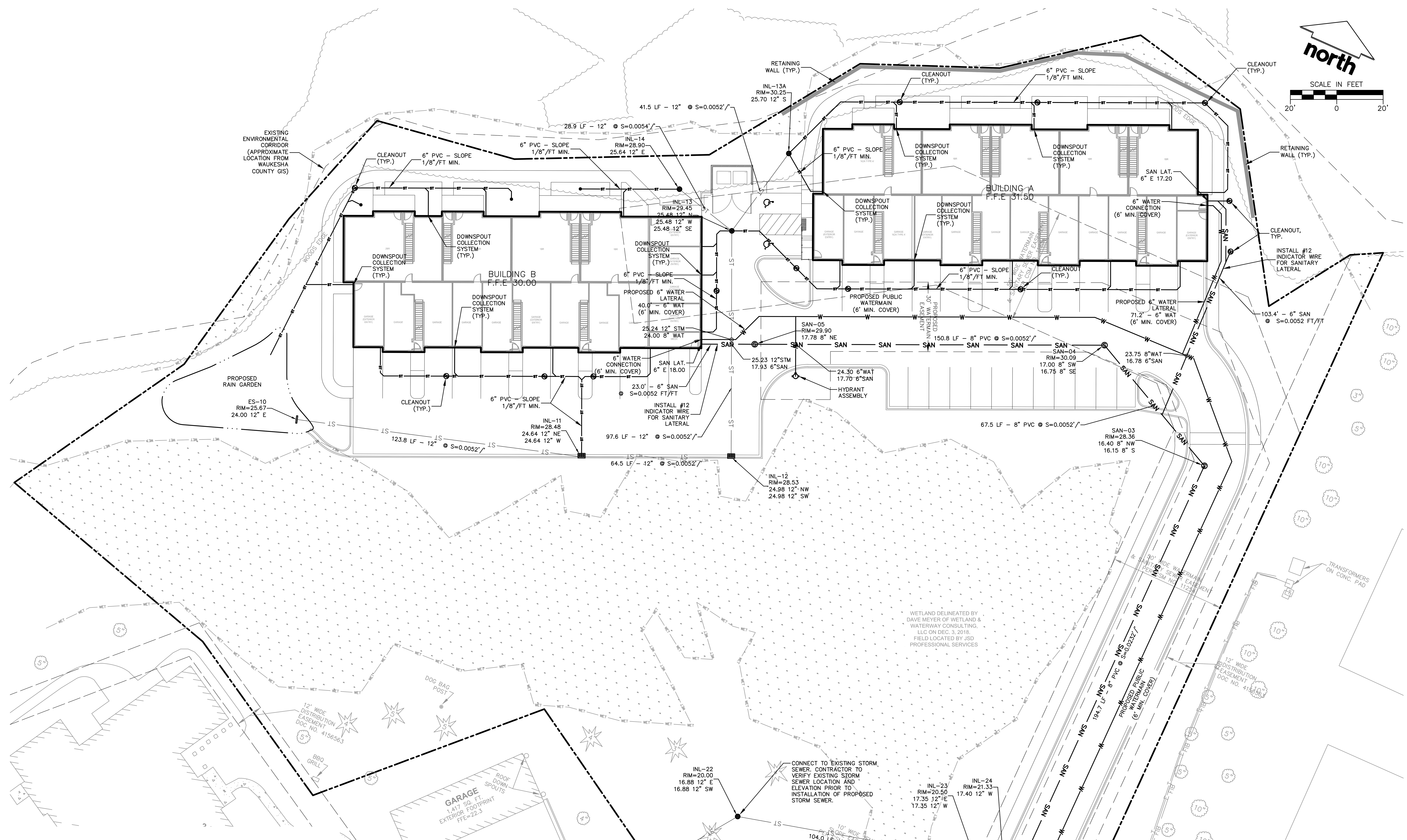
SHEET TITLE:
GRADING PLAN

NOT FOR CONSTRUCTION

SHEET NUMBER:
C3.0

JSD PROJECT NO: 18-8890

File: R:\2018\18-8890 Clearwater Apartments\Dwg\18-8890 C3.0 - Grading Plan.dwg Layout: C3.0 User: pmartens Plotted: Jun 07, 2019 - 2:39pm Xref's:



LEGEND

	MANHOLE, TYPE UNKNOWN		WATER VALVE
	SANITARY MANHOLE		FIRE HYDRANT
	STORM MANHOLE		TELEPHONE PEDESTAL
	CATCH BASIN ROUND		SIGN
	CATCH BASIN SQUARE		ELECTRICAL PED/TRANSFORMER
	METAL POST		GAS VALVE
	BOLLARD	W	WATER MAIN
	POST INDICATOR VALVE	SAN	SANITARY SEWER
	SIAMESE	ST	STORM SEWER
	OUTFALL PIPE	FIB	FIBER OPTIC
	LIGHT POLE	T	UNDERGROUND TELEPHONE
	FLOOD LIGHT	E	UNDERGROUND ELECTRIC
	SPRINKLER CONTROL VALVE	G	UNDERGROUND GAS
		OH	OVERHEAD UTILITY
		X	FENCE LINE

NOTE: EXISTING VALVES SHALL BE OPERATED ONLY BY WAUKESHA WATER UTILITY PERSONNEL AND THE CONTRACTOR SHALL PROVIDE 24 HOURS NOTICE FOR THIS ACTIVITY.

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Design/Drawn:
Approved:

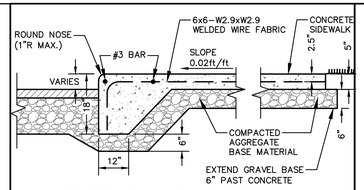
SHEET TITLE:
UTILITY PLAN

NOT FOR CONSTRUCTION

SHEET NUMBER:
C4.0

JSD PROJECT NO: 18-8890

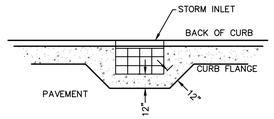
File: R:\2018\18-8890 Clearwater Apartments\Dwg\18-8890 C4.0 - Utility Plan.dwg Layout: C4.0 User: pmartens Plotted: Jun 07, 2019 - 2:55pm Xrefs:



INTEGRAL CONCRETE CURB & WALK

N.T.S.

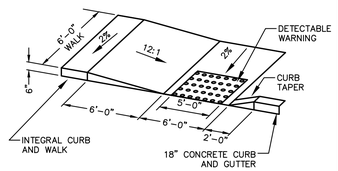
REV. 11–20–2018



CONCRETE INLET COLLAR

N.T.S.

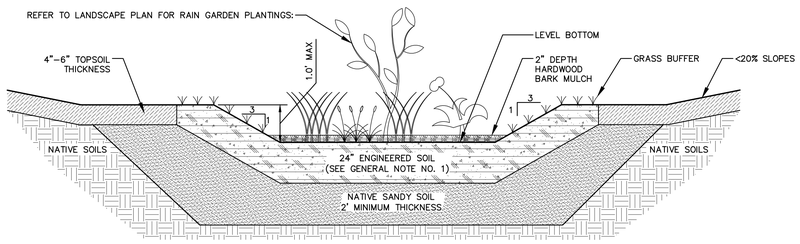
REV. 11–20–2018



ADA ACCESSIBLE RAMP

N.T.S.

REV. 11–20–2018



CONSTRUCTION NOTES:

1. CONTRACTOR SHALL OVER EXCAVATE RAIN GARDENS TO A MINIMUM DEPTH OF 2–FEET BELOW FINISH GRADE AND 4" OF COMPOST SHALL BE TILLED IN AT THAT DEPTH UNTIL WELL–MIXED.
2. IF CLAY IS ENCOUNTERED DURING RAIN GARDEN CONSTRUCTION (CLAY BEING DEFINED AS ANY SOIL THAT HAS >40% FINES PASSING A NO. 200 SIEVE ANALYSIS), THE CONTRACTOR SHALL EXCAVATE, REMOVE AND REPLACE WITH CLEAN ON–SITE SAND/TOPSOIL MIX TO A DEPTH OF 5 FEET BELOW THE LOWEST ELEVATION OF THE RAIN GARDEN, OR AS APPROVED BY THE ENGINEER SO THAT THE RAIN GARDEN IS HYDRAULICALLY CONNECTED TO ACCEPTABLE PERMEABLE LAYER.
3. RAIN GARDEN SUBBASE SHALL BE INSPECTED AND APPROVED BY THE ENGINEER PRIOR TO PLACEMENT OF SANDY AND ENGINEERED SOIL BASES.
4. CONTRACTOR SHALL USE CONSTRUCTION MEANS AS NOT TO COMPACT RAIN GARDEN AREAS.
5. RAIN GARDEN WORKING DEPTH SHALL BE DEFINED ON GRADING DETAIL PLAN SHEET AS ESTABLISHED BY ENGINEER.

GENERAL NOTES:

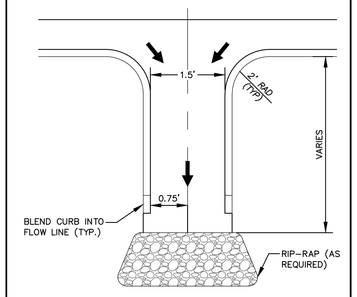
1. OWNER MUST CONSULT LANDSCAPE ARCHITECT OR ECOLOGICAL PLANNING AGENCY FOR APPROPRIATE PLANTS AND PLANTING CONFIGURATIONS.
2. CONTRACTOR SHALL INSTALL 24" OF ENGINEERED SOIL CONSISTING OF: 50% CLEAN SAND, 30% CERTIFIED COMPOST (SEE GENERAL NOTE 3), AND 20% REGIONAL NATIVE SOIL (SANDY LOAM, LOAMY SAND, OR SAND).
3. CERTIFIED COMPOST SHALL CONSIST OF: >40% ORGANIC MATTER, <60% ASH CONTENT, pH OF 6–8, AND MOISTURE CONTENT OF 35–50% BY WEIGHT.
4. RAIN GARDEN WATER MUST INFILTRATE WITHIN 48–HOURS*. RAIN GARDENS UNABLE TO MAINTAIN THESE RATES MUST BE DEEP TILLED, REGRADED, AND REPLANTED BY OWNER TO RESTORE ORIGINAL INFILTRATION RATES.
5. REFER TO THE LANDSCAPE PLAN THE SEED MIX IN THE AREAS SURROUNDING RAIN GARDEN, ON SIDE SLOPES OF RAIN GARDEN, AND OVER ANY LAND THAT DISCHARGES INTO THE RAIN GARDEN FOR EROSION CONTROL.
6. STRAW MULCH SHALL BE PLACED IN THE RAIN GARDEN AREAS THAT HAVE BEEN NEWLY SEEDED USING WISCONSIN DOT SPECIFICATION 627.3.2.1 (METHOD A) LOCATED IN STANDARD SPECIFICATIONS FOR HIGHWAY AND STRUCTURE CONSTRUCTION.
7. ALL WORK TO BE CONDUCTED IN CONFORMANCE WITH THE STORM WATER MANAGEMENT PLAN FOR THE PROJECT SITE AS APPROVED BY THE LOCAL REVIEW AGENCY'S ENGINEER. *CITY OF WAUKESHA REQUIRES INFILTRATION WITHIN 36–HOURS

(REFERENCES: THE WISCONSIN STORM WATER MANUAL: INFILTRATION BASINS; ROGER BANNERMAN–WDNR WATER RESOURCES MANAGEMENT SPECIALIST; MADISON PROVISIONAL RAIN GARDEN SPECS.; WDNR POST CONSTRUCTION STORM WATER MANAGEMENT SPECS.; WDNR RAIN GARDEN DEISGN MANUAL)

RAIN GARDEN CROSS SECTION

N.T.S.

REV. 12–06–2018



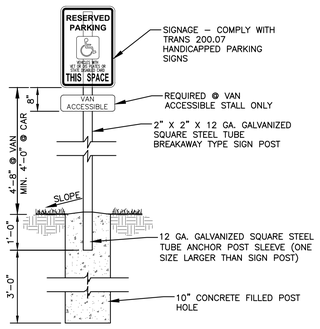
GENERAL NOTES:

1. PITCH CONCRETE/ASPHALT AT 2% FROM FLOW LINE OF GUTTER SECTION TO C/L OF FLUME
2. REFER TO C1.0 FOR GEOMETRY AND LENGTH OF FLUMES

FLUME DETAIL

N.T.S.

REV. 11–26–2018



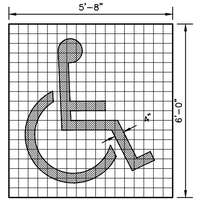
NOTE:

OPTION: DRIVEN POST MAY BE UTILIZED IN LIEU OF CONCRETE BASE. PROVIDE MIN. 3'–0" LONG ANCHOR POST SLEEVE.

ADA SIGN

N.T.S.

REV. 11–26–2018



4"x4" GRID FOR LAYOUT PURPOSES ONLY FOR ALL ACCESSIBLE AND VAN ACCESSIBLE SPACES

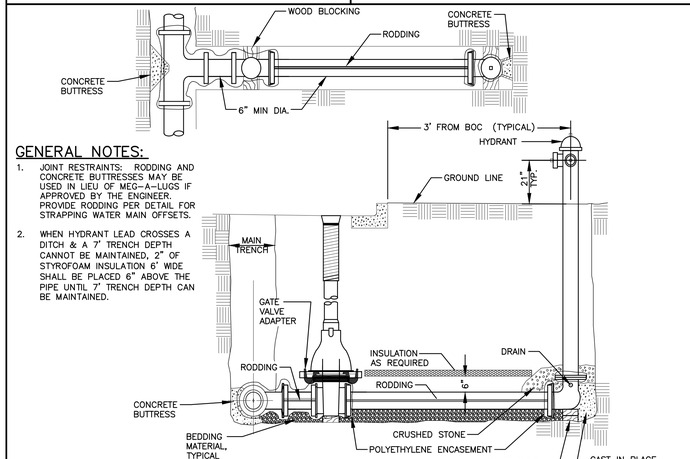
NOTE:

SYMBOL DETAILS ARE SHOWN FOR INTENT ONLY. CONTRACTOR SHALL VERIFY EXACT REQUIREMENTS PRIOR TO CONSTRUCTION.

ADA PARKING STALL MARKING

N.T.S.

REV. 11–20–2018

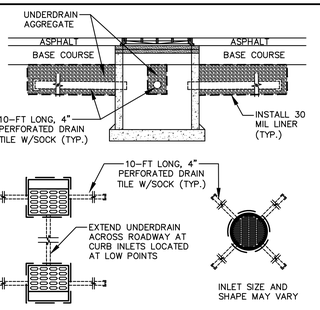


GENERAL NOTES:

1. JOINT RESTRAINTS: RODDING AND CONCRETE BUTTRESSES MAY BE USED IN LIEU OF MEG–A–LUGS IF APPROVED BY THE ENGINEER. PROVIDE RODDING PER DETAIL FOR STRAPPING WATER MAIN OFFSETS.
2. WHEN HYDRANT LEAD CROSSES A DITCH & A 7' TRENCH DEPTH CANNOT BE MAINTAINED, 2" OF STYROFOAM INSULATION 6' WIDE SHALL BE PLACED 6" ABOVE THE PIPE UNTIL 7' TRENCH DEPTH CAN BE MAINTAINED.

FIRE HYDRANT AND VALVE ASSEMBLY

N.T.S.



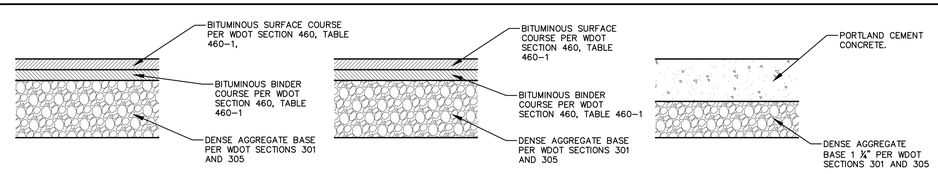
GENERAL NOTES:

1. UNDERDRAINS SHALL BE INSTALLED ON ALL INLET/CATCH BASINS LOCATED WITHIN IMPERVIOUS PAVEMENTS.
2. UNDERDRAIN CONNECTIONS SHALL BE CORED ONSITE.
3. UNDERDRAIN VERTICAL LOCATION MAY VARY DEPENDING ON STORM SEWER PIPE LOCATION.
4. ALTERNATIVE DESIGN MAY BE SUBSTITUTED IF SHOP DRAWINGS ARE SUBMITTED AND APPROVED BY THE CITY OF WAUKESHA.

CATCH BASIN/INLET UNDERDRAIN

N.T.S.

REV. 12–7–2018



STANDARD ASPHALT PAVEMENT SECTION

HEAVY DUTY ASPHALT PAVEMENT SECTION

CONCRETE SIDEWALK SECTION

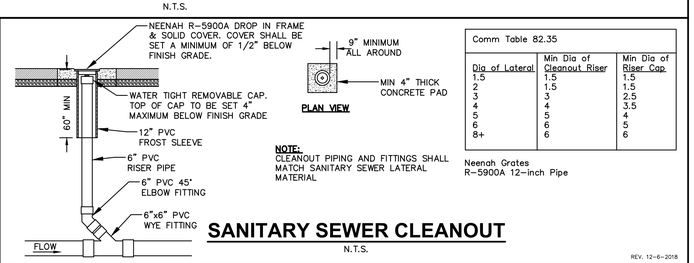
GENERAL NOTES:

1. REFER TO PAVEMENT RECOMMENDATIONS IN THE GEOTECHNICAL INVESTIGATION REPORT. IF THERE ARE ANY DISCREPANCIES BETWEEN THIS DETAIL AND THE PAVEMENT RECOMMENDATIONS PROVIDED IN THE GEOTECHINCAL INVESTIGATION REPORT, THE GEOTECHNICAL REPORT SHALL GOVERN.
2. WSDOT STANDARD SPECIFICATIONS FOR HIGHWAY AND STRUCTURE CONSTRUCTION, INCLUDING SUPPLEMENTAL SPECIFICATIONS, COMPACTION REQUIREMENTS:
   – BITUMINOUS CONCRETE: REFER TO SECTION 460–3.
   – BASE COURSE: REFER TO SECTION 301.3.4.2, STANDARD COMPACTION.
3. CONCRETE EQUIPMENT PADS SHALL HAVE PORTLAND CEMENTER CONCRETE OVER COMPACTED DENSE GRADED BASE WITH REINFORCEMENT FOR CRACK CONTROL.

PAVEMENT SECTIONS

N.T.S.

REV. 12–17–2018



NOTE:
CLEANOUT PIPING AND FITTINGS SHALL MATCH SANITARY SEWER LATERAL MATERIAL

Comm Table 82.35

Dia of Lateral	Min Dia of Cleanout Riser	Min Dia of Riser Cap
1.5	1.5	1.5
2	1.5	1.5
3	3	2.5
4	4	3.5
5	5	4
6	6	5
8+	6	6

Neenah Grates
R–5900A 12–inch Pipe

SANITARY SEWER CLEANOUT

N.T.S.

REV. 12–6–2018

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PROJECT:
CLEARWATER APARTMENT PHASE 2

PROJECT LOCATION:
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WAUKESHA COUNTY, WISCONSIN

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Design/Drawn: APM
Approved: RWI

SHEET TITLE:
DETAILS

SHEET NUMBER:
C5.2

JSD PROJECT NO: 18-8890

File: R:\2018\18-8890 Clearwater Apartments\Dwg\18-8890 C5.0 - Details.dwg Layout: C5.2 User: pmartens Plotted: Jun 10, 2019 - 8:19am Xref's:

APPENDIX 3

Calculations

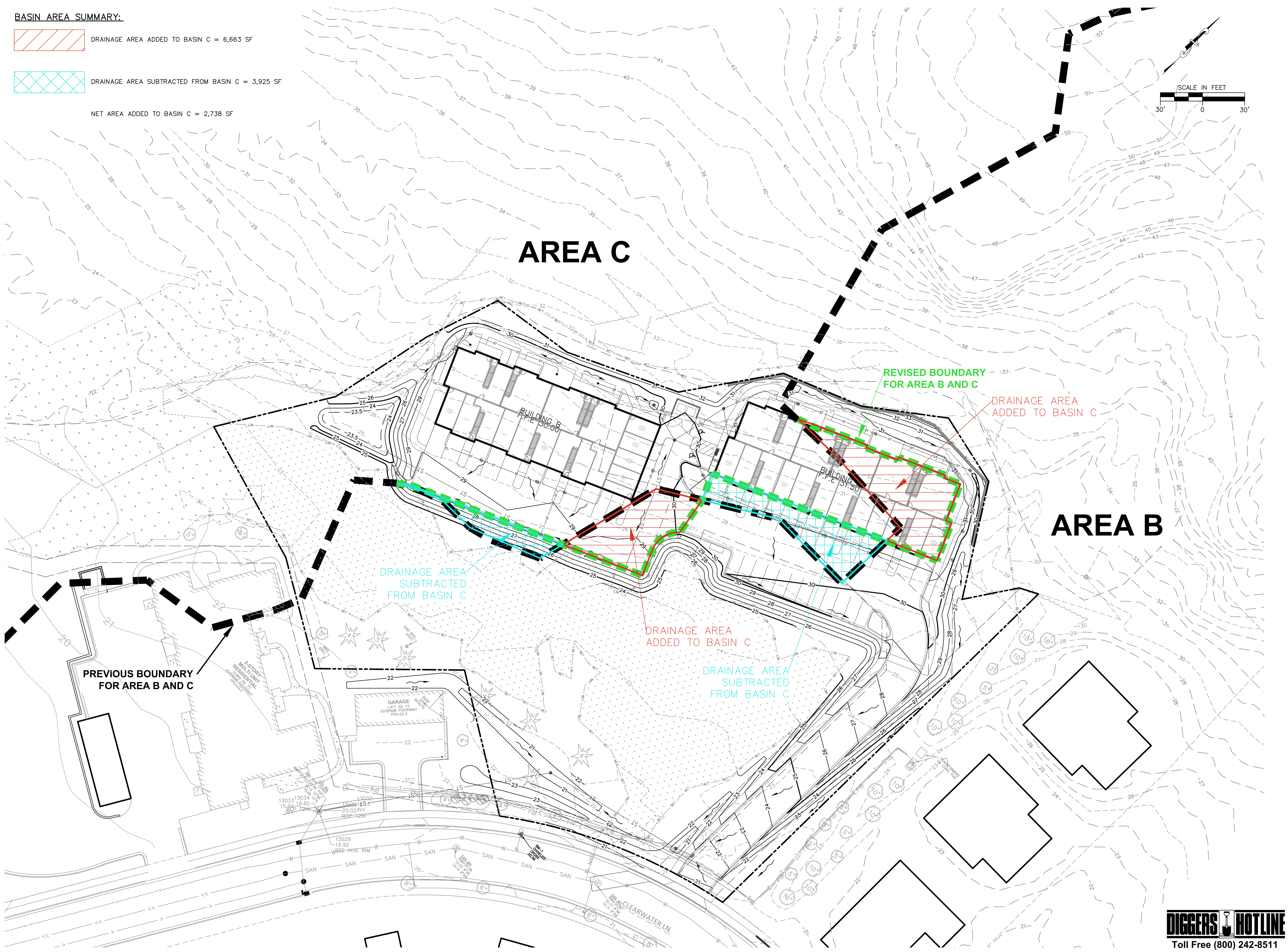
- Drainage Exhibits
- Existing HydroCAD Report
- Proposed HydroCAD Report

BASIN AREA SUMMARY:

DRAINAGE AREA ADDED TO BASIN C = 6,663 SF

DRAINAGE AREA SUBTRACTED FROM BASIN C = 3,925 SF

NET AREA ADDED TO BASIN C = 2,738 SF



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Design/Drawn: PSM
Approved: RWI

SHEET TITLE:
DRAINAGE BASIN EXHIBIT

SHEET NUMBER:
EX-1

JSD PROJECT NO: 18-8890

File: R:\2018\18-8890 Clearwater Apartments\Dwg\18-8890 Impervious Area.dwg Layout: EX-2 User: inewman Plotted: Jun 10, 2019 - 9:43am Xref's:

BASIN AREA SUMMARY:

PREVIOUS IMPERVIOUS SURFACE BASIN C = 0.52 Acres

PREVIOUS IMPERVIOUS SURFACE BASIN B = 0.40 Acres

SCALE IN FEET
30' 0 30'

AREA C

AREA B

PREVIOUS IMPERVIOUS FOR AREA C

REVISED BOUNDARY FOR AREA B AND C

PREVIOUS BOUNDARY FOR AREA B AND C

PREVIOUS IMPERVIOUS FOR AREA B

2-STORY MULTI UNIT RESIDENTIAL

GARAGE 1,417 SQ. FT. EXTERIOR FOOTPRINT FFE=22.3

CLEARWATER LN.

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File: R:\2018\18-8890 Clearwater Apartments\Dwg\18-8890 Impervious Area.dwg Layout: EX-3 User: lnewman Plotted: Jun 10, 2019 - 9:43am Xref's:

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Design/Drawn: PSM
Approved: RWI

SHEET TITLE:
PREVIOUS IMPERVIOUS AREA

SHEET NUMBER:
EX-2

JSD PROJECT NO: 18-8890

BASIN AREA SUMMARY:

CURRENT IMPERVIOUS SURFACE BASIN C = 0.80 Acres

CURRENT IMPERVIOUS SURFACE BASIN B = 0.49 Acres

SCALE IN FEET
30' 0 30'

AREA C

CURRENT IMPERVIOUS FOR AREA C

REVISED BOUNDARY FOR AREA B AND C

PREVIOUS BOUNDARY FOR AREA B AND C

CURRENT IMPERVIOUS FOR AREA B

AREA B

BUILDING C F.F. 00.00

BUILDING B F.F. 00.00

2-STORY MULTI UNIT RESIDENTIAL

GARAGE 1,417 SQ. FT. EXTERIOR FOOTPRINT FFE=22.3

CLEARWATER LN.

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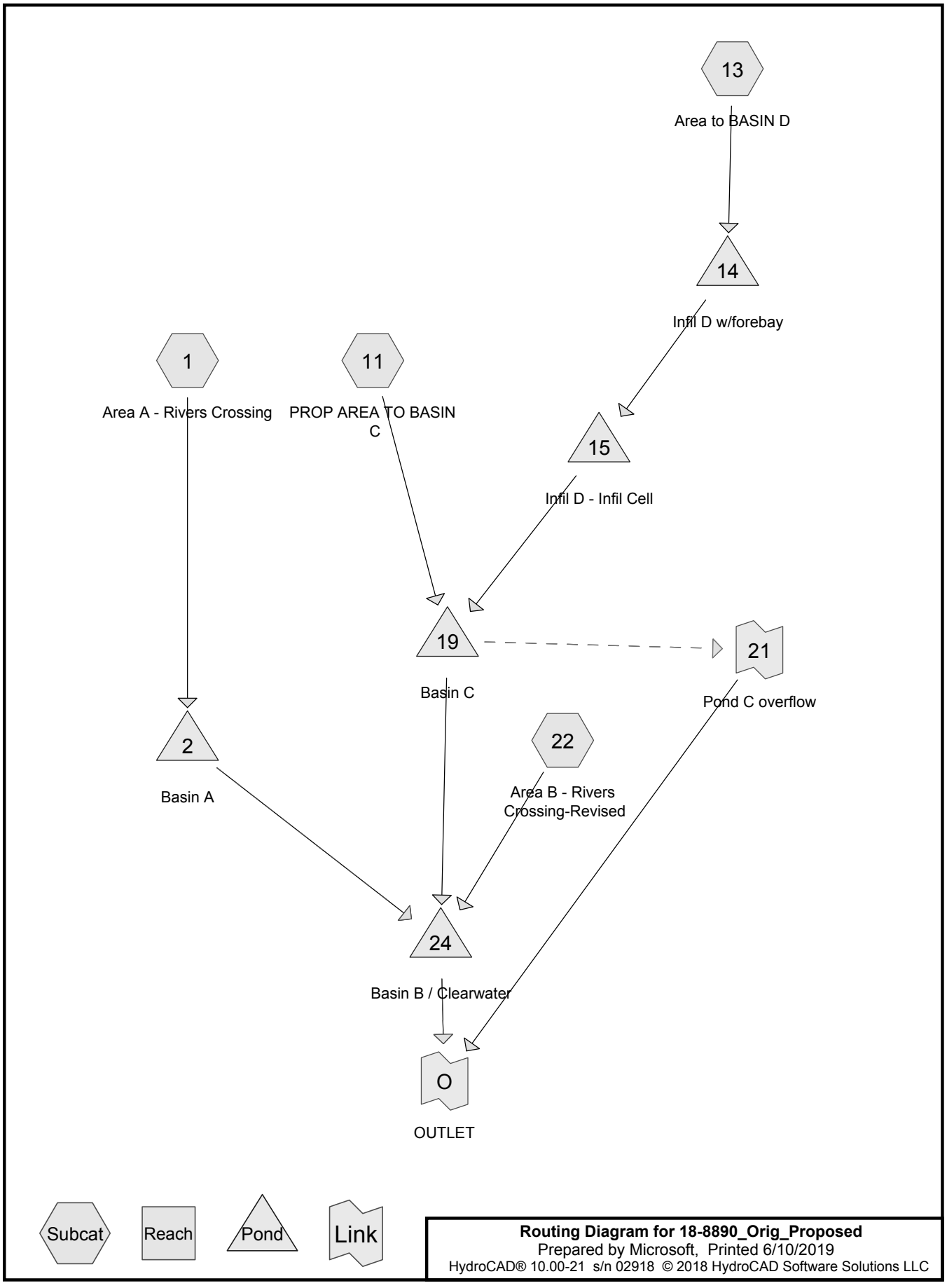
Design/Drawn: PSM
Approved: RWI

SHEET TITLE:
CURRENT IMPERVIOUS AREA

SHEET NUMBER:
EX-3

JSD PROJECT NO: 18-8890

File: R:\2018\18-8890 Clearwater Apartments\Dwg\18-8890 Impervious Area.dwg Layout: EX-4 User: lnewman Plotted: Jun 10, 2019 - 9:44am Xref's:



Routing Diagram for 18-8890_Orig_Proposed
Prepared by Microsoft, Printed 6/10/2019

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
51.300	75	1/4 Acre Lots Residential District (1, 22)
0.500	85	Apartments-Condos (22)
2.700	92	Commercial Lands (22)
3.150	98	Impervious (11, 13)
9.250	61	Open - Good Condition (B-Soils) (11, 13, 22)
5.500	78	Open Space - Meadow (D-Soils) (11)
72.400	**75**	**TOTAL AREA**

Time span=5.00-20.00 hrs, dt=0.03 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Area A - Rivers Crossing Runoff Area=13.800 ac 0.00% Impervious Runoff Depth>0.68"
Tc=28.7 min CN=75 Runoff=8.56 cfs 0.785 af

Subcatchment11: PROP AREA TO BASIN Runoff Area=14.400 ac 13.89% Impervious Runoff Depth>0.59"
Tc=41.2 min CN=73 Runoff=5.83 cfs 0.712 af

Subcatchment13: Area to BASIN D Runoff Area=1.500 ac 76.67% Impervious Runoff Depth>1.51"
Tc=10.0 min CN=89 Runoff=3.72 cfs 0.189 af

Subcatchment22: Area B - Rivers Runoff Area=42.700 ac 0.00% Impervious Runoff Depth>0.72"
Tc=56.4 min CN=76 Runoff=17.55 cfs 2.552 af

Pond 2: Basin A Peak Elev=14.01' Storage=9,020 cf Inflow=8.56 cfs 0.785 af
Primary=2.87 cfs 0.784 af Secondary=0.00 cfs 0.000 af Outflow=2.87 cfs 0.784 af

Pond 14: Infil D w/forebay Peak Elev=16.01' Storage=2,331 cf Inflow=3.72 cfs 0.189 af
Outflow=2.60 cfs 0.179 af

Pond 15: Infil D - Infil Cell Peak Elev=15.11' Storage=3,358 cf Inflow=2.60 cfs 0.179 af
Discarded=0.31 cfs 0.177 af Primary=0.03 cfs 0.002 af Outflow=0.33 cfs 0.179 af

Pond 19: Basin C Peak Elev=13.02' Storage=17,198 cf Inflow=5.83 cfs 0.714 af
Primary=0.69 cfs 0.404 af Secondary=0.00 cfs 0.000 af Outflow=0.69 cfs 0.404 af

Pond 24: Basin B / Clearwater Peak Elev=12.23' Storage=35,947 cf Inflow=20.77 cfs 3.741 af
Primary=13.34 cfs 3.360 af Secondary=0.00 cfs 0.000 af Outflow=13.34 cfs 3.360 af

Link 21: Pond C overflow Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link O: OUTLET Inflow=13.34 cfs 3.360 af
Primary=13.34 cfs 3.360 af

Total Runoff Area = 72.400 ac Runoff Volume = 4.238 af Average Runoff Depth = 0.70"
95.65% Pervious = 69.250 ac 4.35% Impervious = 3.150 ac

Summary for Subcatchment 1: Area A - Rivers Crossing

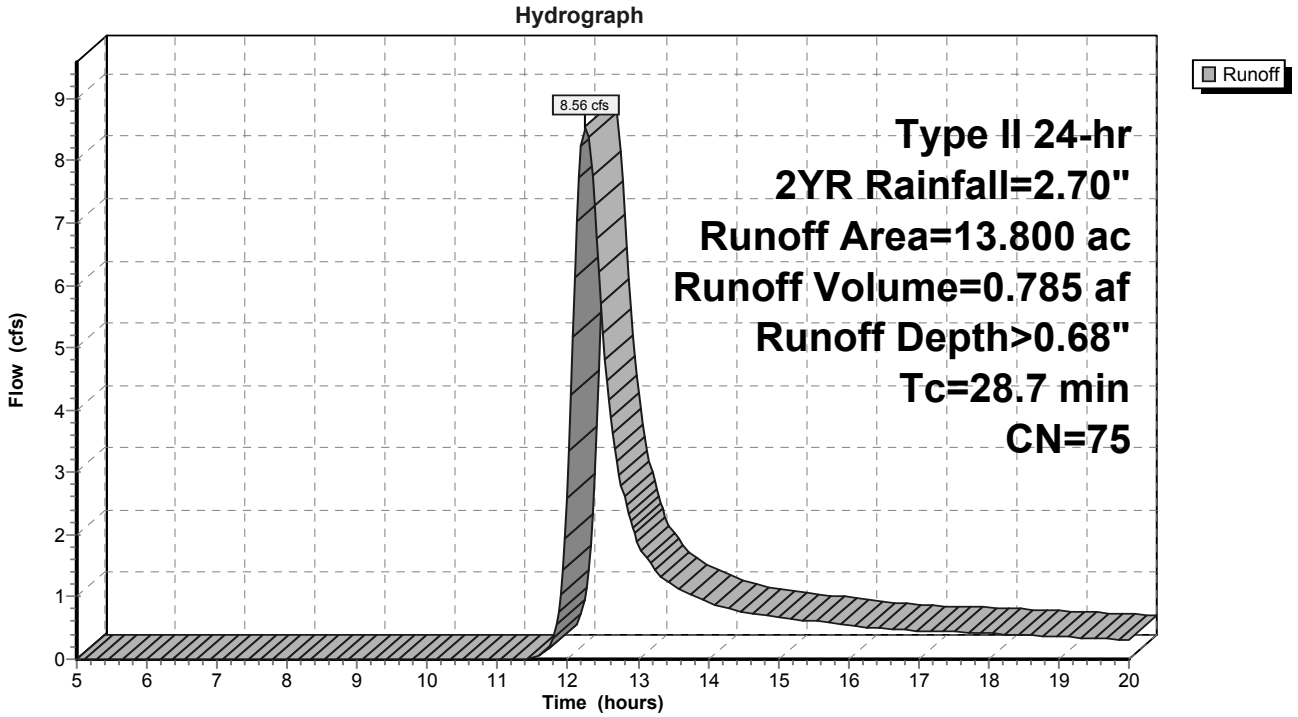
Runoff = 8.56 cfs @ 12.25 hrs, Volume= 0.785 af, Depth> 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 2YR Rainfall=2.70"

	Area (ac)	CN	Description
*	13.800	75	1/4 Acre Lots Residential District
	13.800		100.00% Pervious Area

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

Subcatchment 1: Area A - Rivers Crossing



Summary for Subcatchment 11: PROP AREA TO BASIN C

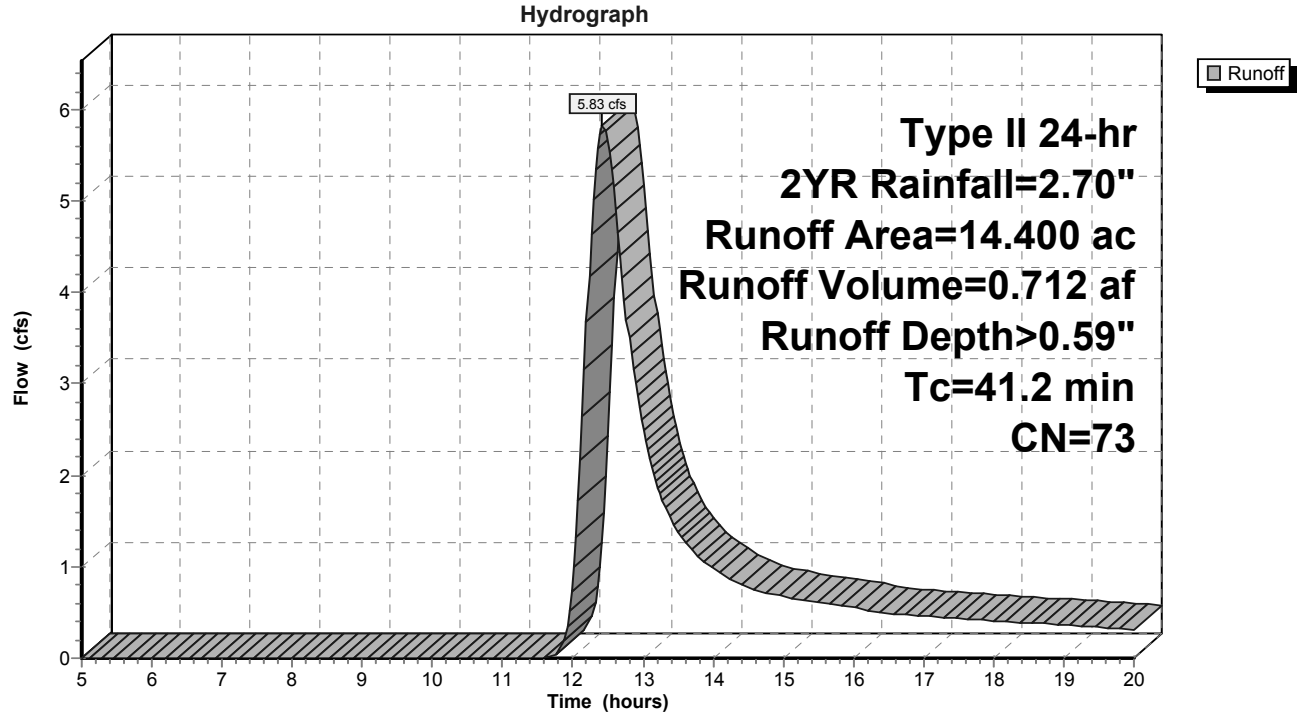
Runoff = 5.83 cfs @ 12.42 hrs, Volume= 0.712 af, Depth> 0.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 2YR Rainfall=2.70"

	Area (ac)	CN	Description
*	2.000	98	Impervious
*	6.900	61	Open - Good Condition (B-Soils)
*	5.500	78	Open Space - Meadow (D-Soils)
	14.400	73	Weighted Average
	12.400		86.11% Pervious Area
	2.000		13.89% Impervious Area

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

Subcatchment 11: PROP AREA TO BASIN C



Summary for Subcatchment 13: Area to BASIN D

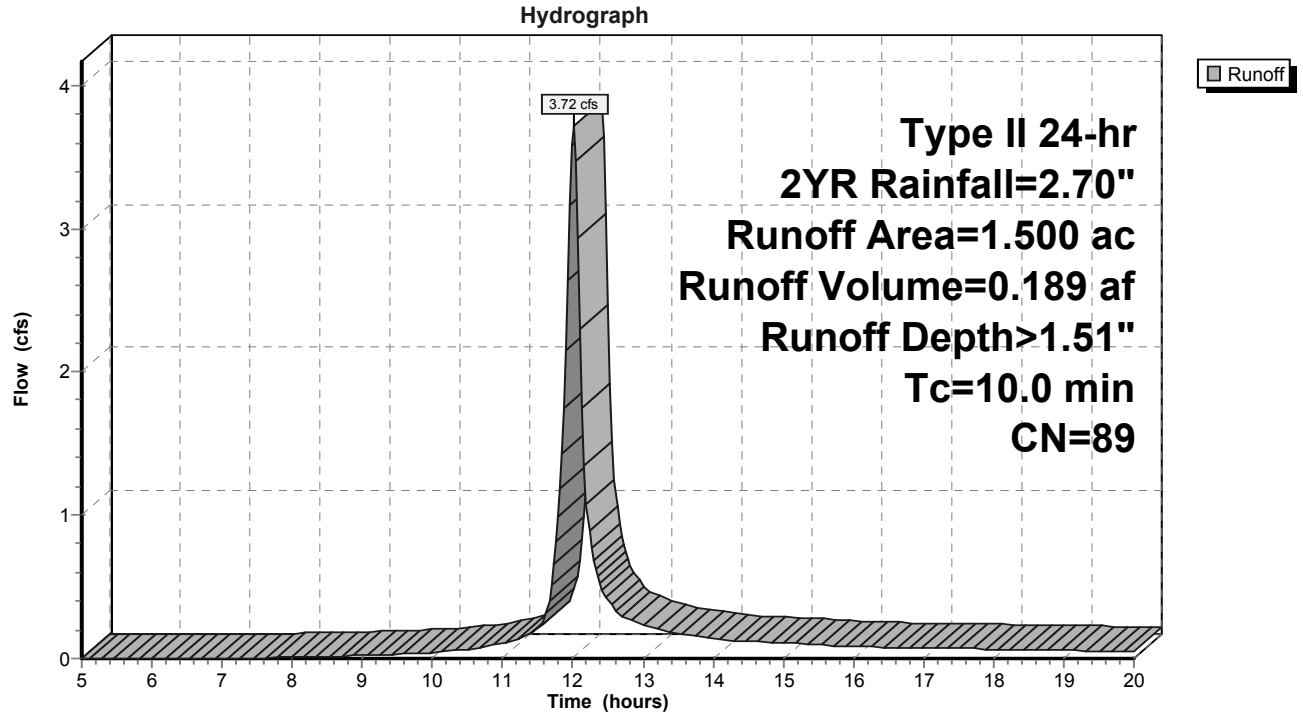
Runoff = 3.72 cfs @ 12.02 hrs, Volume= 0.189 af, Depth> 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 2YR Rainfall=2.70"

	Area (ac)	CN	Description
*	1.150	98	Impervious
*	0.350	61	Open - Good Condition (B-Soils)
	1.500	89	Weighted Average
	0.350		23.33% Pervious Area
	1.150		76.67% Impervious Area

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

Subcatchment 13: Area to BASIN D



Summary for Subcatchment 22: Area B - Rivers Crossing-Revised

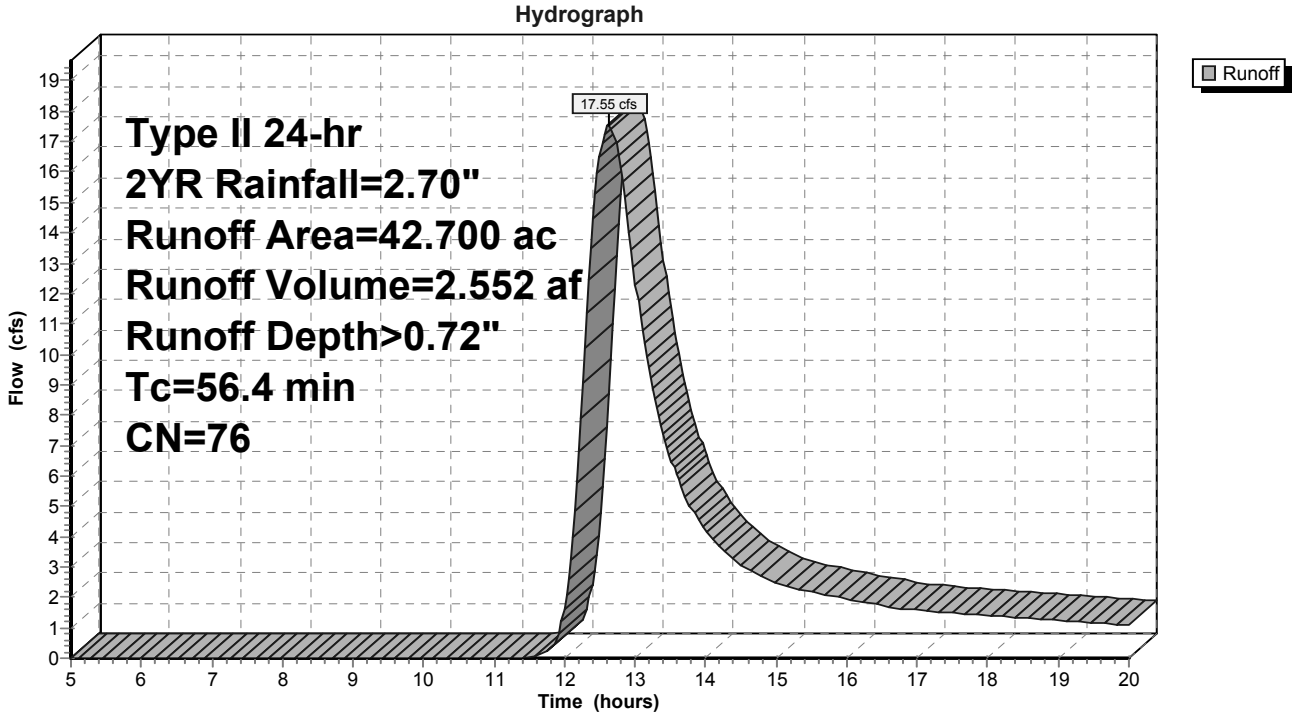
Runoff = 17.55 cfs @ 12.62 hrs, Volume= 2.552 af, Depth> 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 2YR Rainfall=2.70"

	Area (ac)	CN	Description
*	37.500	75	1/4 Acre Lots Residential District
*	2.700	92	Commercial Lands
*	0.500	85	Apartments-Condos
*	2.000	61	Open - Good Condition (B-Soils)
	42.700	76	Weighted Average
	42.700		100.00% Pervious Area

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

Subcatchment 22: Area B - Rivers Crossing-Revised



Summary for Pond 2: Basin A

Inflow Area = 13.800 ac, 0.00% Impervious, Inflow Depth > 0.68" for 2YR event
Inflow = 8.56 cfs @ 12.25 hrs, Volume= 0.785 af
Outflow = 2.87 cfs @ 12.49 hrs, Volume= 0.784 af, Atten= 66%, Lag= 14.3 min
Primary = 2.87 cfs @ 12.49 hrs, Volume= 0.784 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 14.01' @ 12.82 hrs Surf.Area= 10,430 sf Storage= 9,020 cf

Plug-Flow detention time= 28.3 min calculated for 0.784 af (100% of inflow)
Center-of-Mass det. time= 27.9 min (858.6 - 830.7)

Volume	Invert	Avail.Storage	Storage Description
#1	10.89'	64,797 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

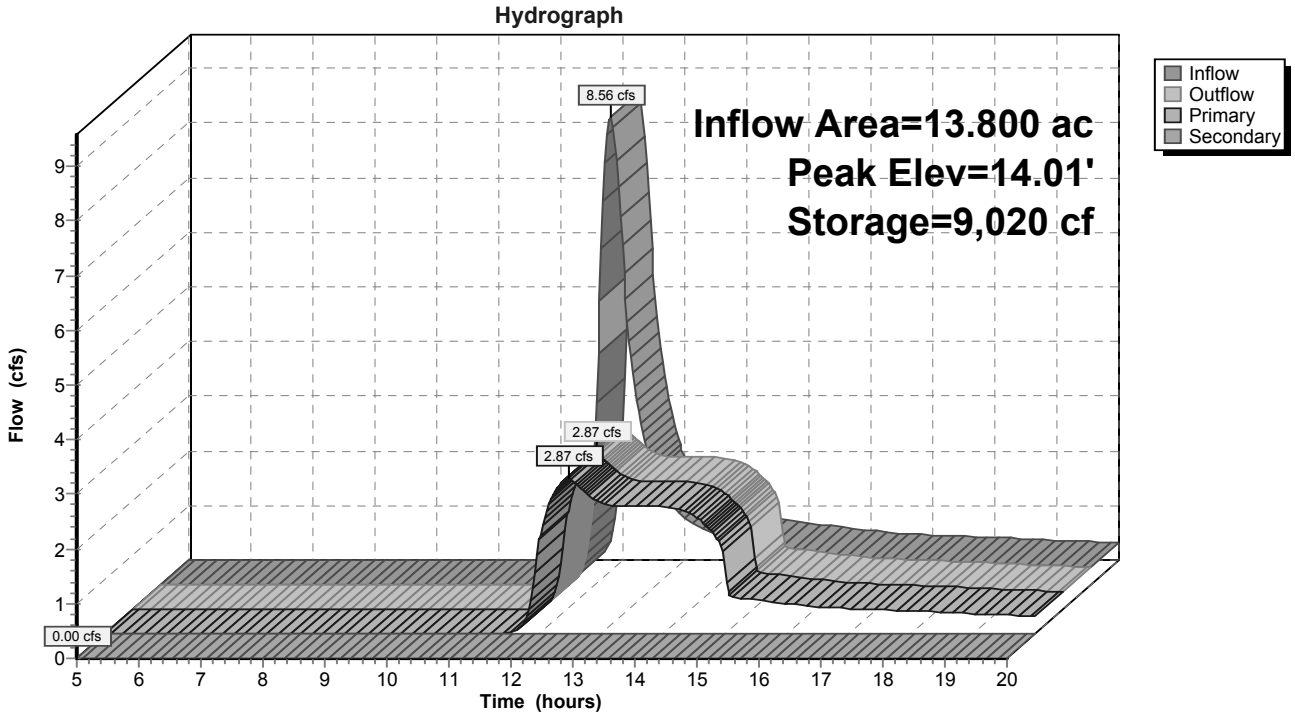
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.89	10	0	0
11.00	31	2	2
12.00	299	165	167
13.00	3,378	1,839	2,006
14.00	10,388	6,883	8,889
15.00	13,733	12,061	20,949
16.00	16,663	15,198	36,147
17.00	19,924	18,294	54,441
17.50	21,500	10,356	64,797

Device	Routing	Invert	Outlet Devices
#1	Primary	10.89'	**12.0" Round Culvert** L= 345.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 10.89' / 10.34' S= 0.0016 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Secondary	16.40'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.83 cfs @ 12.49 hrs HW=13.90' TW=11.41' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.83 cfs @ 3.60 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=10.89' TW=10.10' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2: Basin A



Summary for Pond 14: Infil D w/forebay

Inflow Area = 1.500 ac, 76.67% Impervious, Inflow Depth > 1.51" for 2YR event
Inflow = 3.72 cfs @ 12.02 hrs, Volume= 0.189 af
Outflow = 2.60 cfs @ 12.10 hrs, Volume= 0.179 af, Atten= 30%, Lag= 5.1 min
Primary = 2.60 cfs @ 12.10 hrs, Volume= 0.179 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 16.01' @ 12.10 hrs Surf.Area= 2,698 sf Storage= 2,331 cf

Plug-Flow detention time= 48.2 min calculated for 0.179 af (95% of inflow)
Center-of-Mass det. time= 28.0 min (807.1 - 779.1)

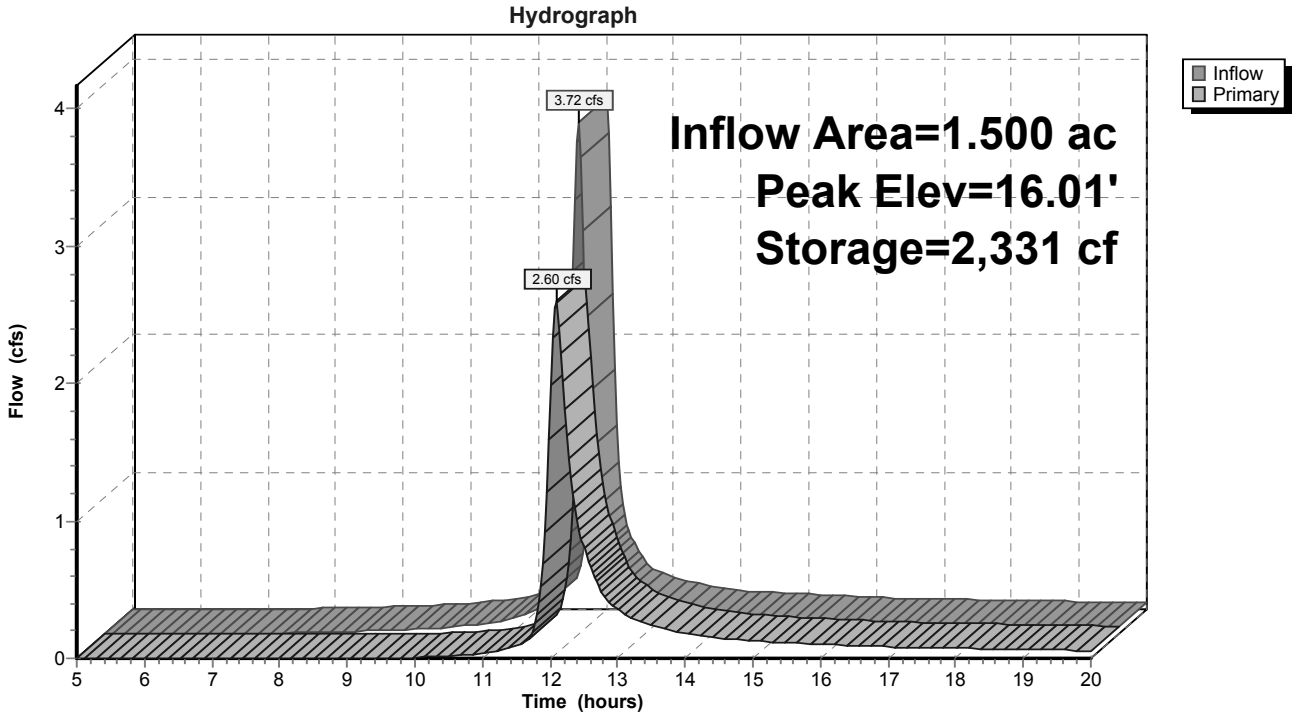
Volume	Invert	Avail.Storage	Storage Description
#1	15.00'	8,313 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
15.00	1,975	0	0
16.00	2,650	2,313	2,313
17.00	9,350	6,000	8,313

Device	Routing	Invert	Outlet Devices
#1	Primary	15.00'	**90.0 deg Sharp-Crested Vee/Trap Weir** Cv= 2.50 (C= 3.13)
#2	Primary	16.00'	**60.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=2.57 cfs @ 12.10 hrs HW=16.00' TW=14.44' (Dynamic Tailwater)
- **1=Sharp-Crested Vee/Trap Weir** (Weir Controls 2.53 cfs @ 2.51 fps)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 0.05 cfs @ 0.16 fps)

Pond 14: Infil D w/forebay



Summary for Pond 15: Infil D - Infil Cell

Inflow Area = 1.500 ac, 76.67% Impervious, Inflow Depth > 1.43" for 2YR event
Inflow = 2.60 cfs @ 12.10 hrs, Volume= 0.179 af
Outflow = 0.33 cfs @ 13.07 hrs, Volume= 0.179 af, Atten= 87%, Lag= 58.0 min
Discarded = 0.31 cfs @ 13.07 hrs, Volume= 0.177 af
Primary = 0.03 cfs @ 13.07 hrs, Volume= 0.002 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 15.11' @ 13.07 hrs Surf.Area= 3,663 sf Storage= 3,358 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 111.8 min (918.9 - 807.1)

Volume	Invert	Avail.Storage	Storage Description
#1	14.00'	14,176 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

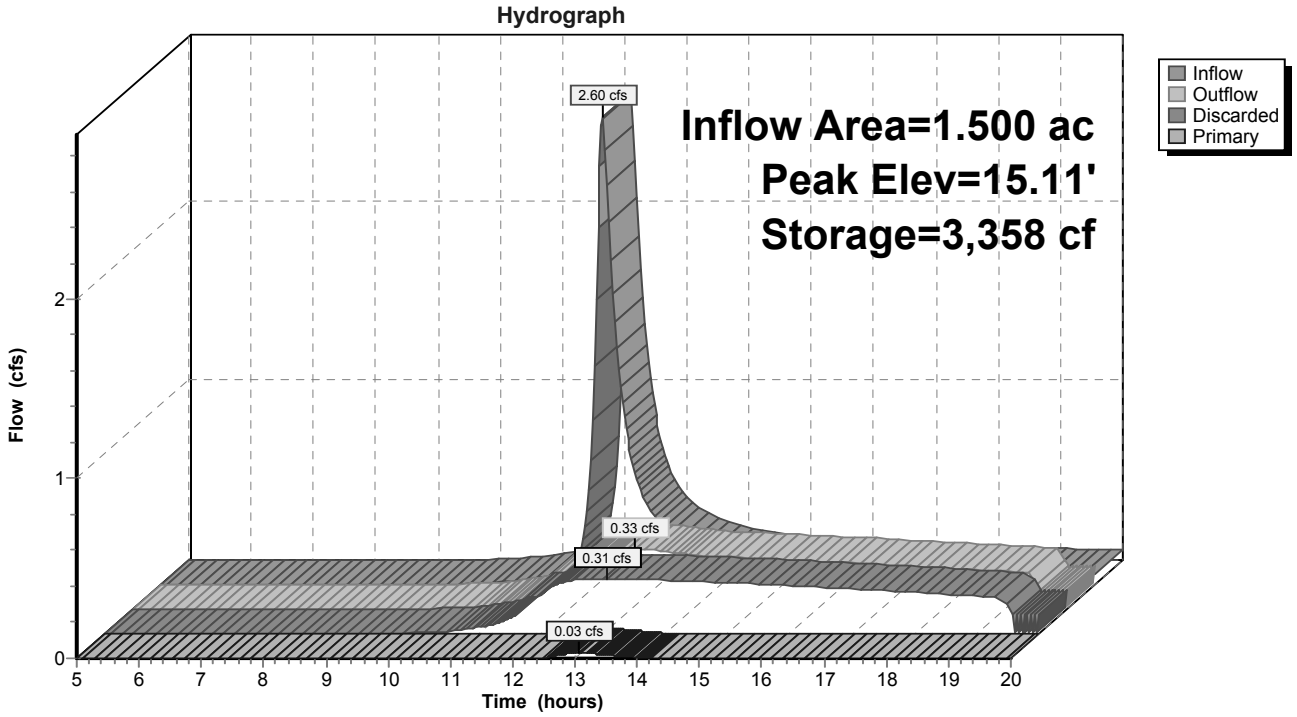
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
14.00	2,400	0	0
15.00	3,525	2,963	2,963
16.00	4,776	4,151	7,113
17.00	9,350	7,063	14,176

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**12.0" Round Culvert** L= 51.0' Ke= 0.600 Inlet / Outlet Invert= 14.00' / 13.74' S= 0.0051 '/' Cc= 0.900 n= 0.130, Flow Area= 0.79 sf
#2	Device 1	15.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	14.00'	**3.600 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.31 cfs @ 13.07 hrs HW=15.11' (Free Discharge)
↑—**3=Exfiltration** (Exfiltration Controls 0.31 cfs)

Primary OutFlow Max=0.03 cfs @ 13.07 hrs HW=15.11' TW=12.78' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.03 cfs of 0.37 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 1.13 fps)

Pond 15: Infil D - Infil Cell



Summary for Pond 19: Basin C

Inflow Area = 15.900 ac, 19.81% Impervious, Inflow Depth > 0.54" for 2YR event
Inflow = 5.83 cfs @ 12.42 hrs, Volume= 0.714 af
Outflow = 0.69 cfs @ 14.89 hrs, Volume= 0.404 af, Atten= 88%, Lag= 148.1 min
Primary = 0.69 cfs @ 14.89 hrs, Volume= 0.404 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 13.02' @ 14.89 hrs Surf.Area= 13,932 sf Storage= 17,198 cf

Plug-Flow detention time= 217.8 min calculated for 0.404 af (57% of inflow)
Center-of-Mass det. time= 130.4 min (975.2 - 844.8)

Volume	Invert	Avail.Storage	Storage Description
#1	11.70'	75,034 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

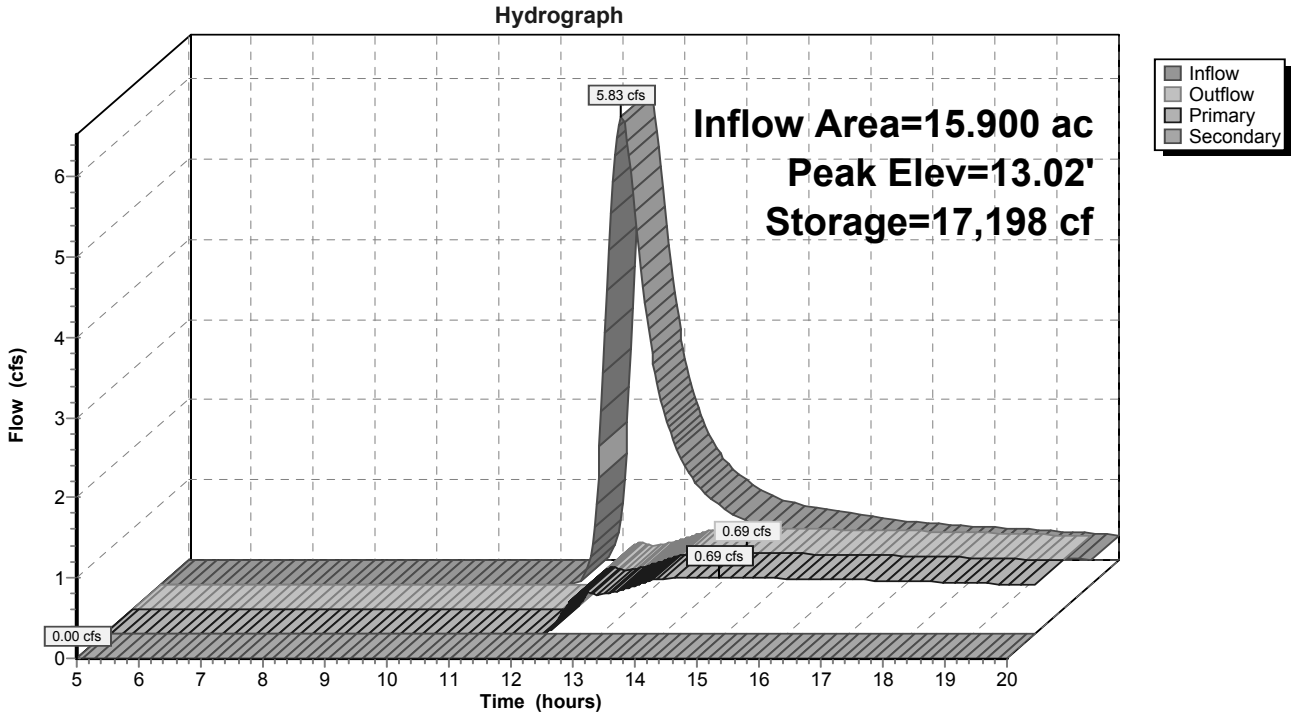
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
11.70	12,100	0	0
12.00	12,500	3,690	3,690
13.00	13,900	13,200	16,890
14.00	15,325	14,613	31,503
15.00	16,850	16,088	47,590
16.00	18,425	17,638	65,228
16.50	20,800	9,806	75,034

Device	Routing	Invert	Outlet Devices
#1	Primary	11.70'	**24.0" Round Culvert** L= 106.0' Ke= 0.600 Inlet / Outlet Invert= 11.70' / 11.44' S= 0.0025 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	11.70'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	14.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	15.50'	**25.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.69 cfs @ 14.89 hrs HW=13.02' TW=11.46' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.69 cfs of 5.60 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.69 cfs @ 5.08 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=11.70' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 19: Basin C



Summary for Pond 24: Basin B / Clearwater

Inflow Area = 72.400 ac, 4.35% Impervious, Inflow Depth > 0.62" for 2YR event
Inflow = 20.77 cfs @ 12.61 hrs, Volume= 3.741 af
Outflow = 13.34 cfs @ 13.12 hrs, Volume= 3.360 af, Atten= 36%, Lag= 30.6 min
Primary = 13.34 cfs @ 13.12 hrs, Volume= 3.360 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 12.23' @ 13.12 hrs Surf.Area= 20,458 sf Storage= 35,947 cf

Plug-Flow detention time= 59.6 min calculated for 3.353 af (90% of inflow)
Center-of-Mass det. time= 28.9 min (893.2 - 864.3)

Volume	Invert	Avail.Storage	Storage Description
#1	10.10'	143,778 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

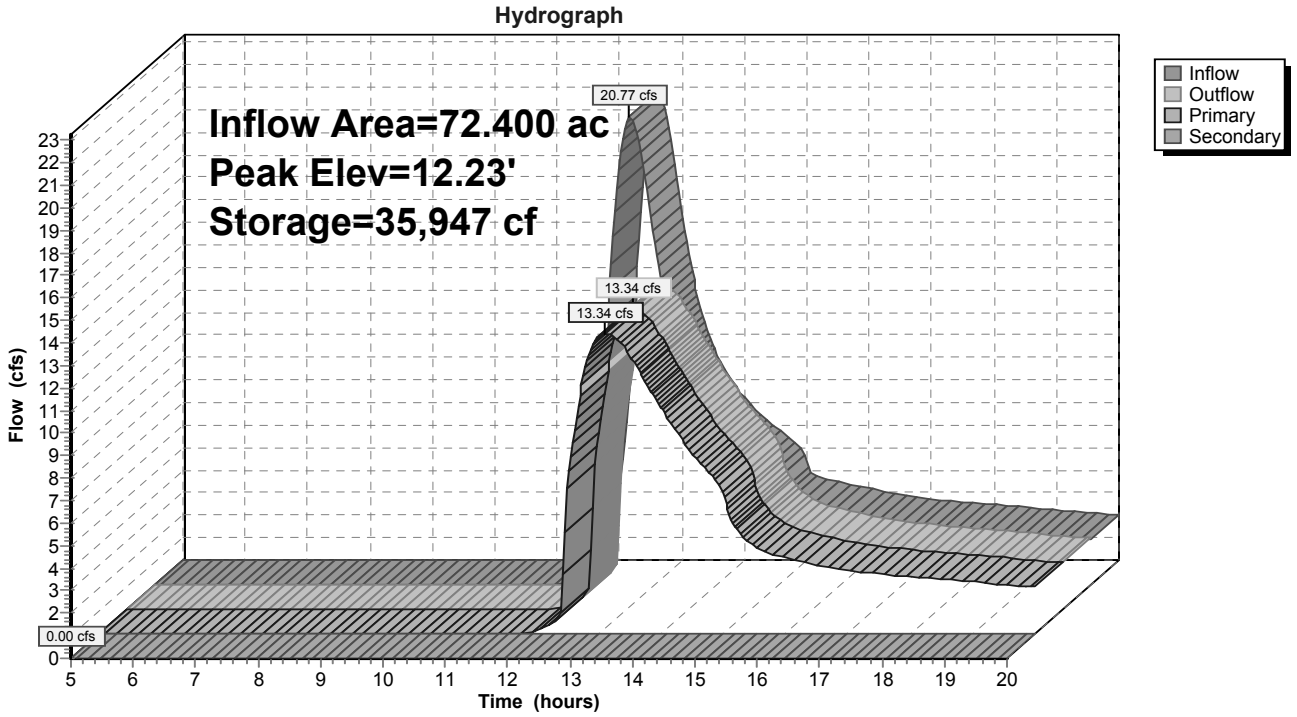
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.10	0	0	0
10.40	16,000	2,400	2,400
11.00	17,667	10,100	12,500
12.00	19,950	18,809	31,309
13.00	22,164	21,057	52,366
14.00	24,361	23,263	75,628
15.00	26,639	25,500	101,128
16.00	28,940	27,790	128,918
16.50	30,500	14,860	143,778

Device	Routing	Invert	Outlet Devices
#1	Primary	10.10'	**24.0" Round RCP_Round 24"** L= 120.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 10.10' / 9.62' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	10.10'	**6.0" Round Culvert** L= 24.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 10.10' / 9.98' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#3	Device 1	11.10'	**9.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Secondary	15.20'	**40.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=13.34 cfs @ 13.12 hrs HW=12.23' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 24"** (Barrel Controls 13.34 cfs @ 4.96 fps)
  ├─**2=Culvert** (Passes < 1.13 cfs potential flow)
  └─**3=Sharp-Crested Rectangular Weir** (Passes < 34.44 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=10.10' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 24: Basin B / Clearwater

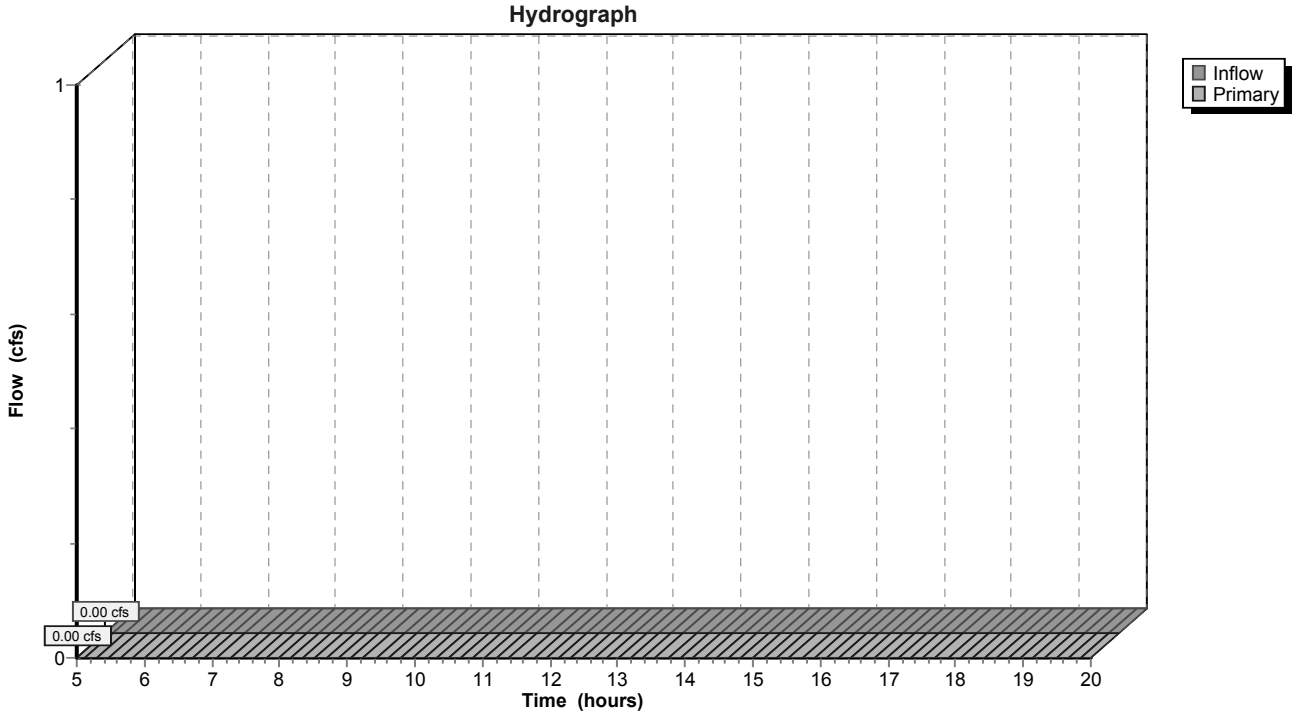


Summary for Link 21: Pond C overflow

Inflow	=	0.00 cfs @	5.00 hrs,	Volume=	0.000 af
Primary	=	0.00 cfs @	5.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link 21: Pond C overflow

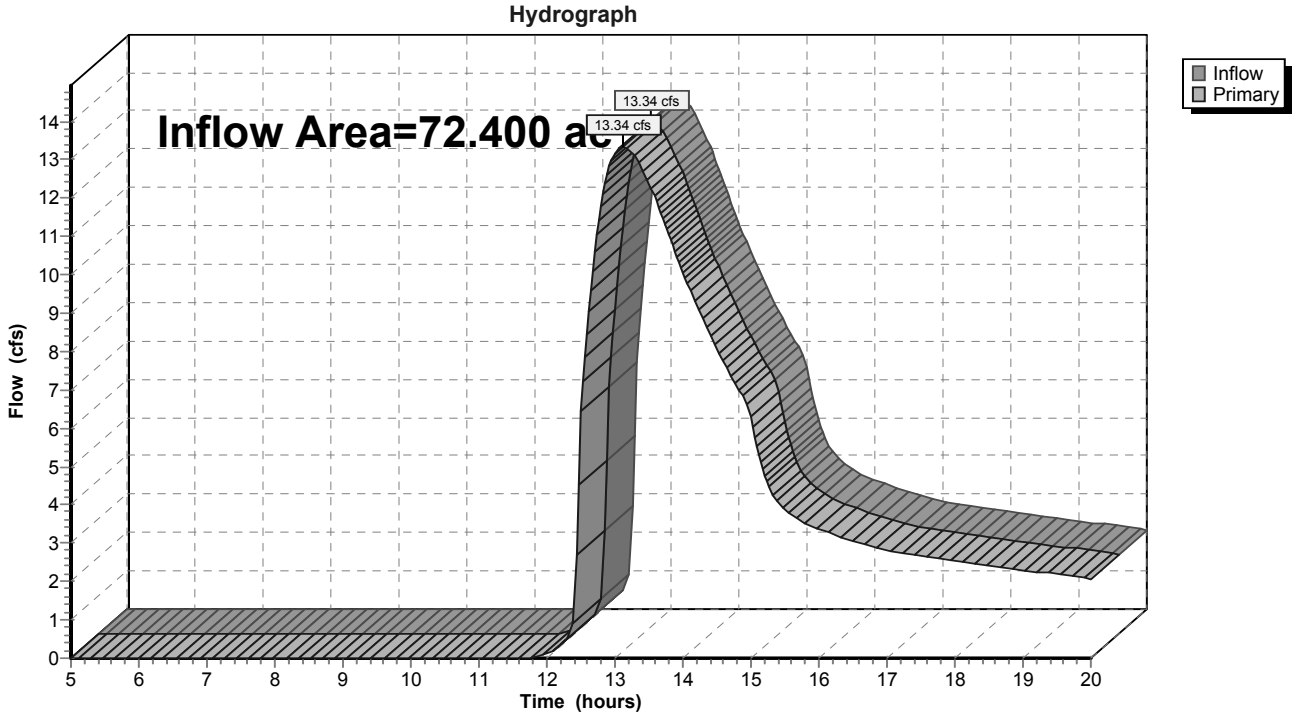


Summary for Link O: OUTLET

Inflow Area = 72.400 ac, 4.35% Impervious, Inflow Depth > 0.56" for 2YR event
Inflow = 13.34 cfs @ 13.12 hrs, Volume= 3.360 af
Primary = 13.34 cfs @ 13.12 hrs, Volume= 3.360 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link O: OUTLET



Time span=5.00-20.00 hrs, dt=0.03 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Area A - Rivers Crossing Runoff Area=13.800 ac 0.00% Impervious Runoff Depth>1.51"
Tc=28.7 min CN=75 Runoff=20.04 cfs 1.733 af

Subcatchment11: PROP AREA TO BASIN Runoff Area=14.400 ac 13.89% Impervious Runoff Depth>1.37"
Tc=41.2 min CN=73 Runoff=14.73 cfs 1.640 af

Subcatchment13: Area to BASIN D Runoff Area=1.500 ac 76.67% Impervious Runoff Depth>2.64"
Tc=10.0 min CN=89 Runoff=6.30 cfs 0.330 af

Subcatchment22: Area B - Rivers Runoff Area=42.700 ac 0.00% Impervious Runoff Depth>1.56"
Tc=56.4 min CN=76 Runoff=40.41 cfs 5.537 af

Pond 2: Basin A Peak Elev=15.85' Storage=33,719 cf Inflow=20.04 cfs 1.733 af
Primary=3.17 cfs 1.731 af Secondary=0.00 cfs 0.000 af Outflow=3.17 cfs 1.731 af

Pond 14: Infil D w/forebay Peak Elev=16.08' Storage=2,547 cf Inflow=6.30 cfs 0.330 af
Outflow=6.23 cfs 0.317 af

Pond 15: Infil D - Infil Cell Peak Elev=15.70' Storage=5,735 cf Inflow=6.23 cfs 0.317 af
Discarded=0.37 cfs 0.230 af Primary=0.31 cfs 0.064 af Outflow=0.67 cfs 0.294 af

Pond 19: Basin C Peak Elev=14.40' Storage=37,688 cf Inflow=15.02 cfs 1.704 af
Primary=5.16 cfs 1.030 af Secondary=0.00 cfs 0.000 af Outflow=5.16 cfs 1.030 af

Pond 24: Basin B / Clearwater Peak Elev=14.34' Storage=84,013 cf Inflow=43.83 cfs 8.298 af
Primary=24.02 cfs 7.884 af Secondary=0.00 cfs 0.000 af Outflow=24.02 cfs 7.884 af

Link 21: Pond C overflow Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link O: OUTLET Inflow=24.02 cfs 7.884 af
Primary=24.02 cfs 7.884 af

Total Runoff Area = 72.400 ac Runoff Volume = 9.240 af Average Runoff Depth = 1.53"
95.65% Pervious = 69.250 ac 4.35% Impervious = 3.150 ac

Summary for Subcatchment 1: Area A - Rivers Crossing

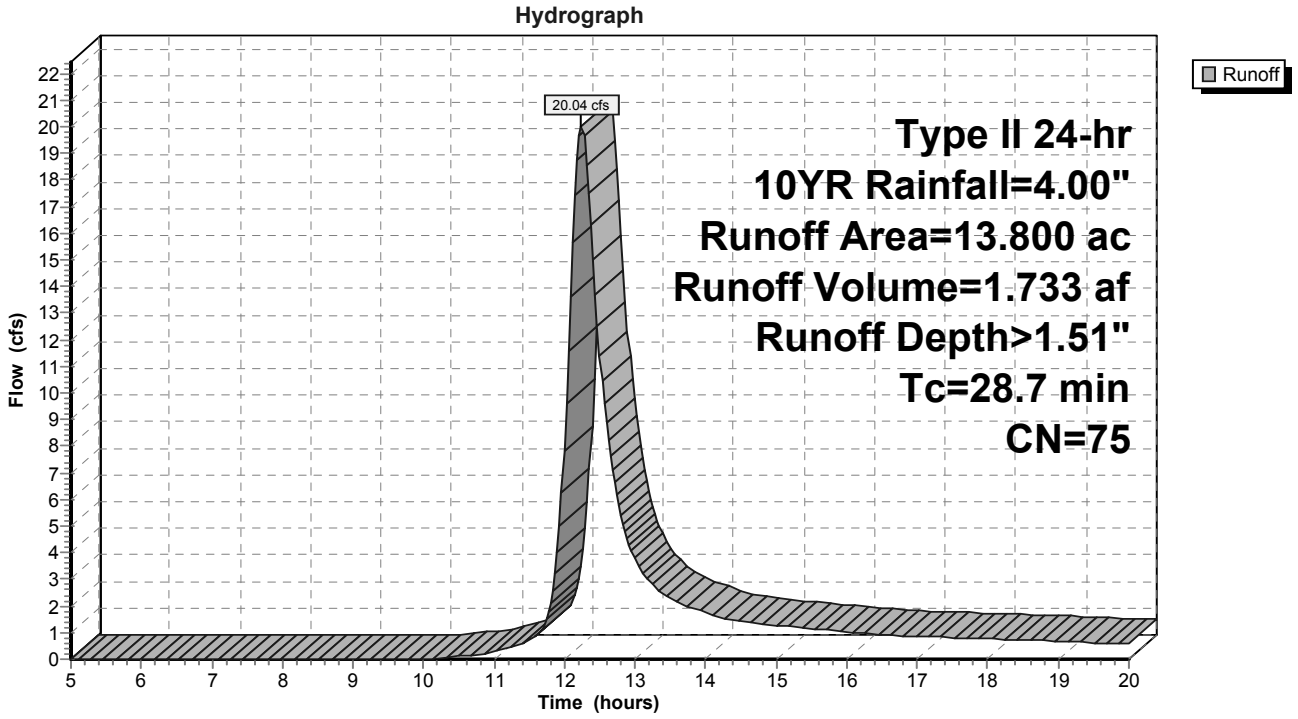
Runoff = 20.04 cfs @ 12.24 hrs, Volume= 1.733 af, Depth> 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 10YR Rainfall=4.00"

	Area (ac)	CN	Description
*	13.800	75	1/4 Acre Lots Residential District
	13.800		100.00% Pervious Area

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

Subcatchment 1: Area A - Rivers Crossing



Summary for Subcatchment 11: PROP AREA TO BASIN C

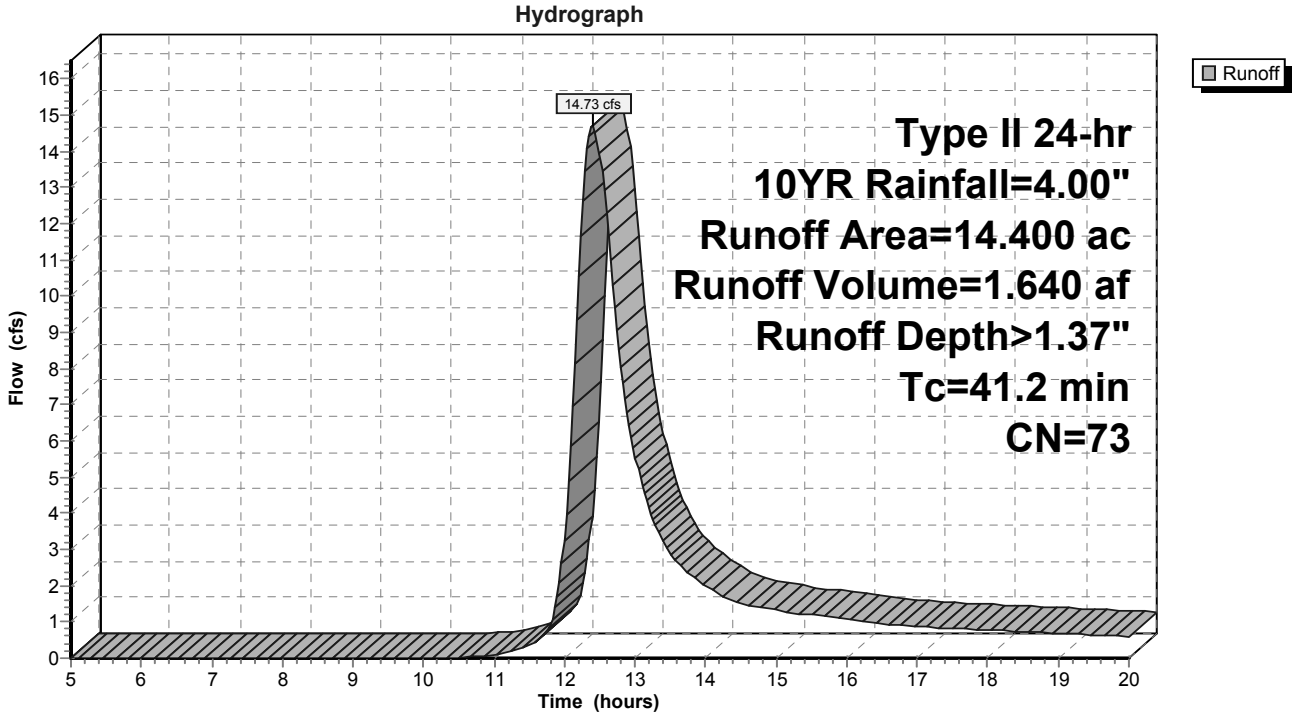
Runoff = 14.73 cfs @ 12.40 hrs, Volume= 1.640 af, Depth> 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 10YR Rainfall=4.00"

	Area (ac)	CN	Description
*	2.000	98	Impervious
*	6.900	61	Open - Good Condition (B-Soils)
*	5.500	78	Open Space - Meadow (D-Soils)
	14.400	73	Weighted Average
	12.400		86.11% Pervious Area
	2.000		13.89% Impervious Area

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

Subcatchment 11: PROP AREA TO BASIN C



Summary for Subcatchment 13: Area to BASIN D

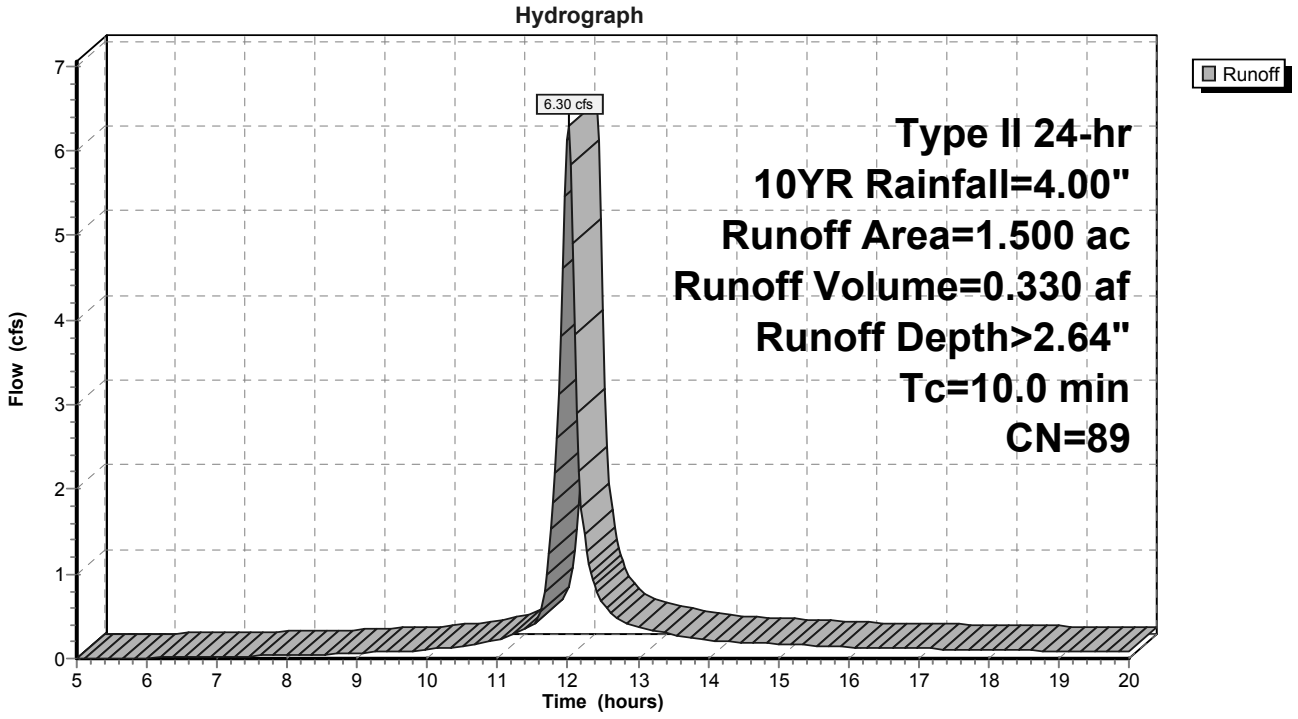
Runoff = 6.30 cfs @ 12.01 hrs, Volume= 0.330 af, Depth> 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 10YR Rainfall=4.00"

	Area (ac)	CN	Description
*	1.150	98	Impervious
*	0.350	61	Open - Good Condition (B-Soils)
	1.500	89	Weighted Average
	0.350		23.33% Pervious Area
	1.150		76.67% Impervious Area

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

Subcatchment 13: Area to BASIN D



Summary for Subcatchment 22: Area B - Rivers Crossing-Revised

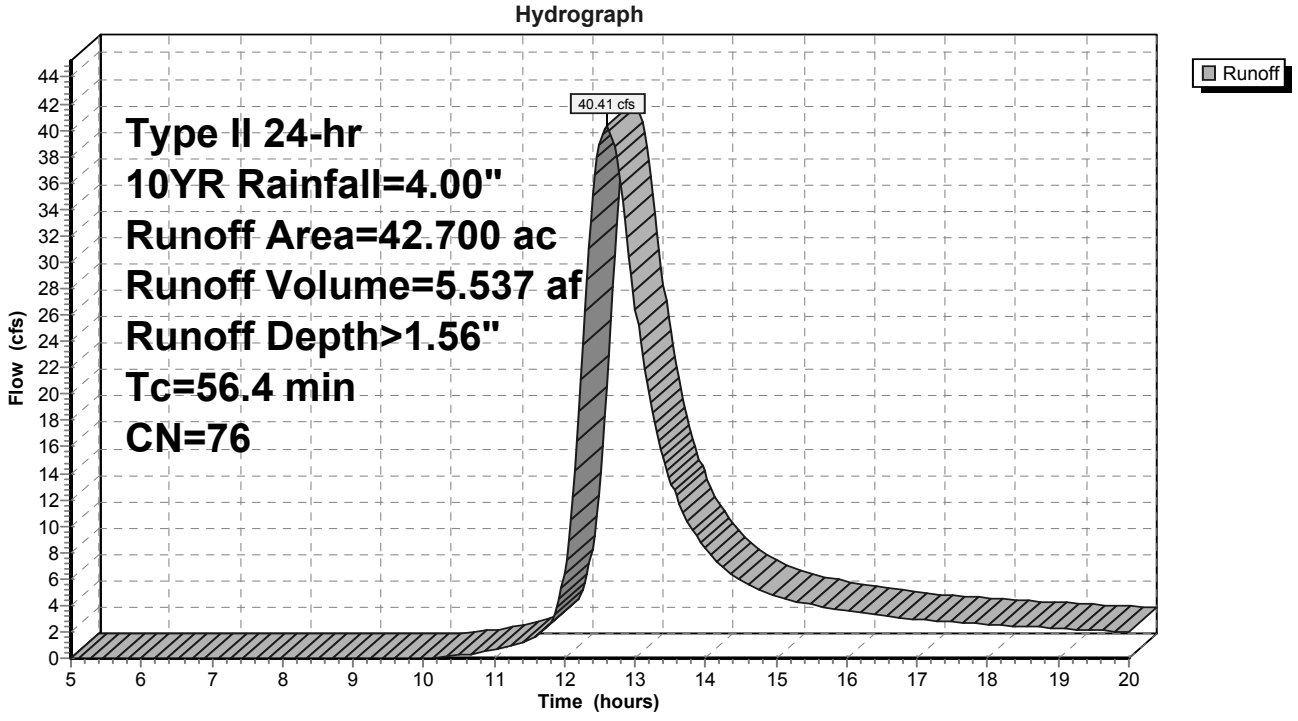
Runoff = 40.41 cfs @ 12.59 hrs, Volume= 5.537 af, Depth> 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 10YR Rainfall=4.00"

	Area (ac)	CN	Description
*	37.500	75	1/4 Acre Lots Residential District
*	2.700	92	Commercial Lands
*	0.500	85	Apartments-Condos
*	2.000	61	Open - Good Condition (B-Soils)
	42.700	76	Weighted Average
	42.700		100.00% Pervious Area

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

Subcatchment 22: Area B - Rivers Crossing-Revised



Summary for Pond 2: Basin A

Inflow Area = 13.800 ac, 0.00% Impervious, Inflow Depth > 1.51" for 10YR event
Inflow = 20.04 cfs @ 12.24 hrs, Volume= 1.733 af
Outflow = 3.17 cfs @ 15.85 hrs, Volume= 1.731 af, Atten= 84%, Lag= 217.0 min
Primary = 3.17 cfs @ 15.85 hrs, Volume= 1.731 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 15.85' @ 13.52 hrs Surf.Area= 16,230 sf Storage= 33,719 cf

Plug-Flow detention time= 112.2 min calculated for 1.731 af (100% of inflow)
Center-of-Mass det. time= 111.8 min (926.3 - 814.4)

Volume	Invert	Avail.Storage	Storage Description
#1	10.89'	64,797 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

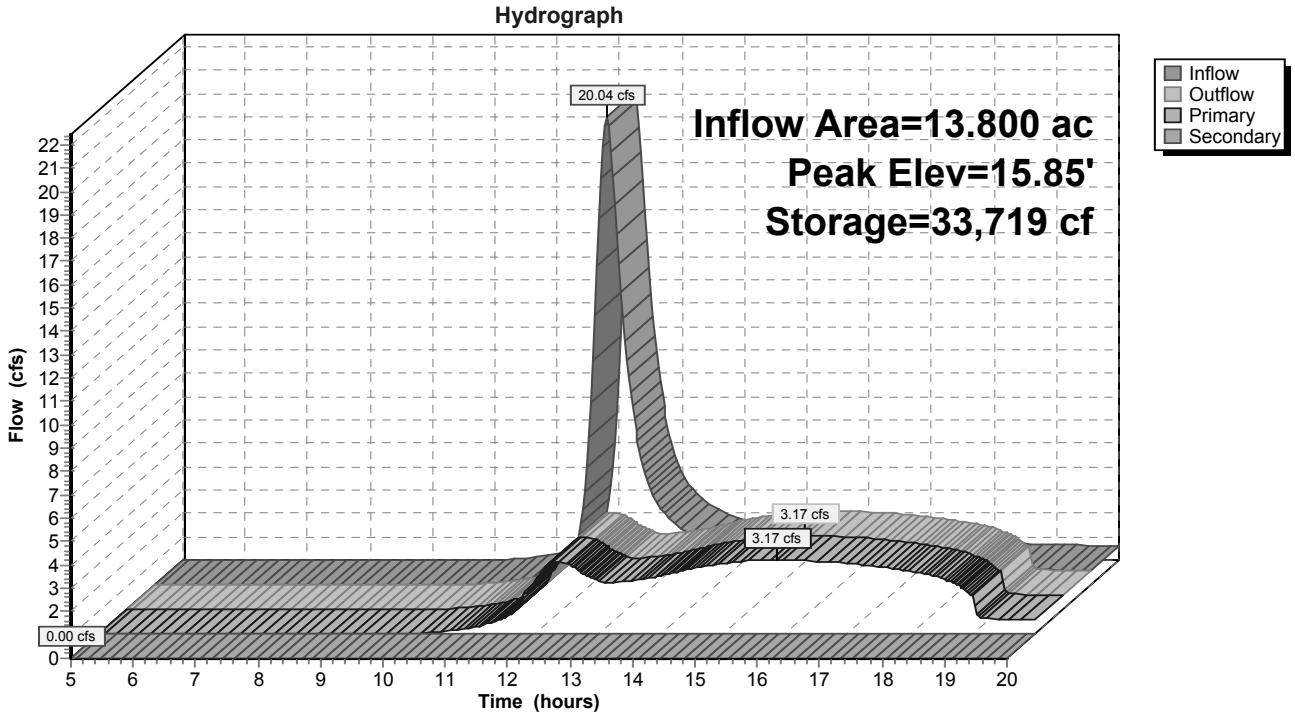
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.89	10	0	0
11.00	31	2	2
12.00	299	165	167
13.00	3,378	1,839	2,006
14.00	10,388	6,883	8,889
15.00	13,733	12,061	20,949
16.00	16,663	15,198	36,147
17.00	19,924	18,294	54,441
17.50	21,500	10,356	64,797

Device	Routing	Invert	Outlet Devices
#1	Primary	10.89'	**12.0" Round Culvert** L= 345.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 10.89' / 10.34' S= 0.0016 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Secondary	16.40'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=3.18 cfs @ 15.85 hrs HW=15.10' TW=11.96' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.18 cfs @ 4.05 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=10.89' TW=10.10' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2: Basin A



Summary for Pond 14: Infil D w/forebay

Inflow Area = 1.500 ac, 76.67% Impervious, Inflow Depth > 2.64" for 10YR event
Inflow = 6.30 cfs @ 12.01 hrs, Volume= 0.330 af
Outflow = 6.23 cfs @ 12.03 hrs, Volume= 0.317 af, Atten= 1%, Lag= 0.8 min
Primary = 6.23 cfs @ 12.03 hrs, Volume= 0.317 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 16.08' @ 12.03 hrs Surf.Area= 3,189 sf Storage= 2,547 cf

Plug-Flow detention time= 40.8 min calculated for 0.317 af (96% of inflow)
Center-of-Mass det. time= 26.3 min (792.7 - 766.4)

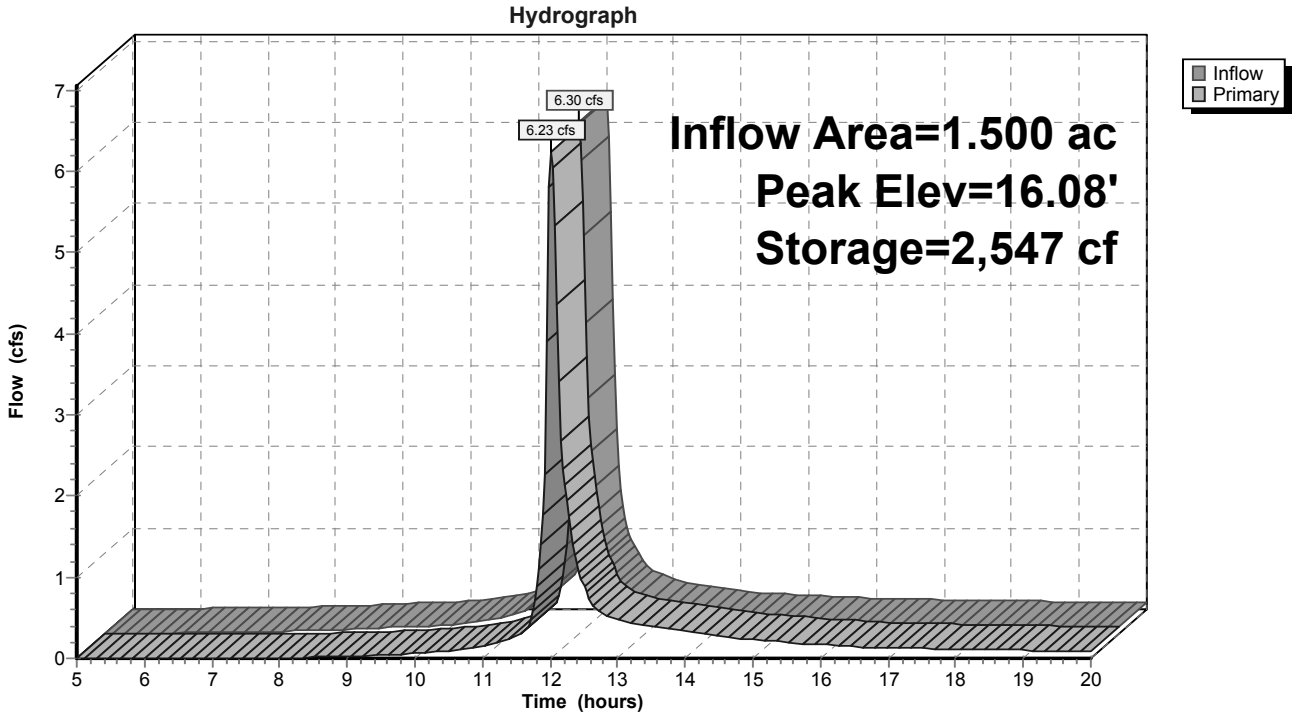
Volume	Invert	Avail.Storage	Storage Description
#1	15.00'	8,313 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
15.00	1,975	0	0
16.00	2,650	2,313	2,313
17.00	9,350	6,000	8,313

Device	Routing	Invert	Outlet Devices
#1	Primary	15.00'	**90.0 deg Sharp-Crested Vee/Trap Weir** Cv= 2.50 (C= 3.13)
#2	Primary	16.00'	**60.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=6.18 cfs @ 12.03 hrs HW=16.08' TW=14.83' (Dynamic Tailwater)
- **1=Sharp-Crested Vee/Trap Weir** (Weir Controls 3.03 cfs @ 2.60 fps)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 3.16 cfs @ 0.66 fps)

Pond 14: Infil D w/forebay



Summary for Pond 15: Infil D - Infil Cell

Inflow Area = 1.500 ac, 76.67% Impervious, Inflow Depth > 2.54" for 10YR event
Inflow = 6.23 cfs @ 12.03 hrs, Volume= 0.317 af
Outflow = 0.67 cfs @ 12.62 hrs, Volume= 0.294 af, Atten= 89%, Lag= 35.7 min
Discarded = 0.37 cfs @ 12.62 hrs, Volume= 0.230 af
Primary = 0.31 cfs @ 12.62 hrs, Volume= 0.064 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 15.70' @ 12.62 hrs Surf.Area= 4,400 sf Storage= 5,735 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 94.2 min (886.9 - 792.7)

Volume	Invert	Avail.Storage	Storage Description
#1	14.00'	14,176 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

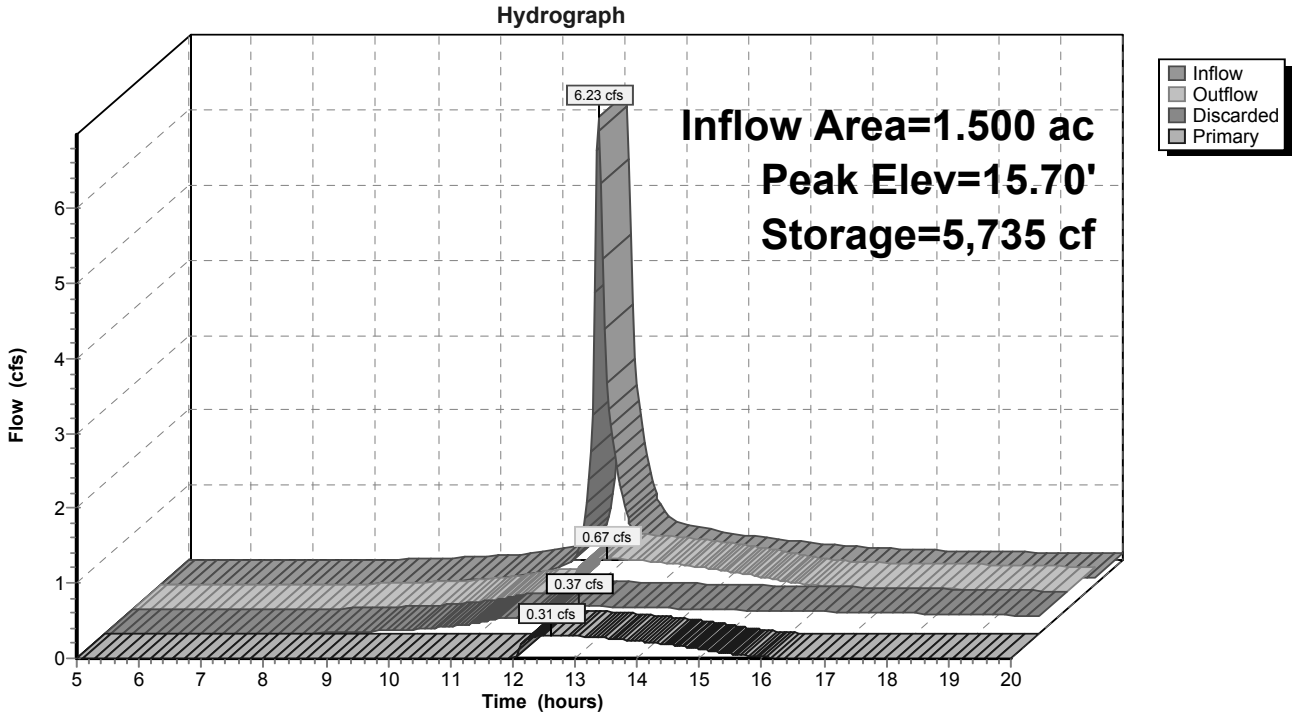
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
14.00	2,400	0	0
15.00	3,525	2,963	2,963
16.00	4,776	4,151	7,113
17.00	9,350	7,063	14,176

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**12.0" Round Culvert** L= 51.0' Ke= 0.600 Inlet / Outlet Invert= 14.00' / 13.74' S= 0.0051 '/' Cc= 0.900 n= 0.130, Flow Area= 0.79 sf
#2	Device 1	15.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	14.00'	**3.600 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.37 cfs @ 12.62 hrs HW=15.70' (Free Discharge)
↑—**3=Exfiltration** (Exfiltration Controls 0.37 cfs)

Primary OutFlow Max=0.31 cfs @ 12.62 hrs HW=15.70' TW=13.71' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.31 cfs of 0.49 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.31 cfs @ 3.52 fps)

Pond 15: Infil D - Infil Cell



Summary for Pond 19: Basin C

Inflow Area = 15.900 ac, 19.81% Impervious, Inflow Depth > 1.29" for 10YR event
Inflow = 15.02 cfs @ 12.40 hrs, Volume= 1.704 af
Outflow = 5.16 cfs @ 13.72 hrs, Volume= 1.030 af, Atten= 66%, Lag= 78.9 min
Primary = 5.16 cfs @ 13.72 hrs, Volume= 1.030 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 14.40' @ 13.35 hrs Surf.Area= 15,929 sf Storage= 37,688 cf

Plug-Flow detention time= 162.1 min calculated for 1.030 af (60% of inflow)
Center-of-Mass det. time= 86.3 min (913.5 - 827.3)

Volume	Invert	Avail.Storage	Storage Description
#1	11.70'	75,034 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

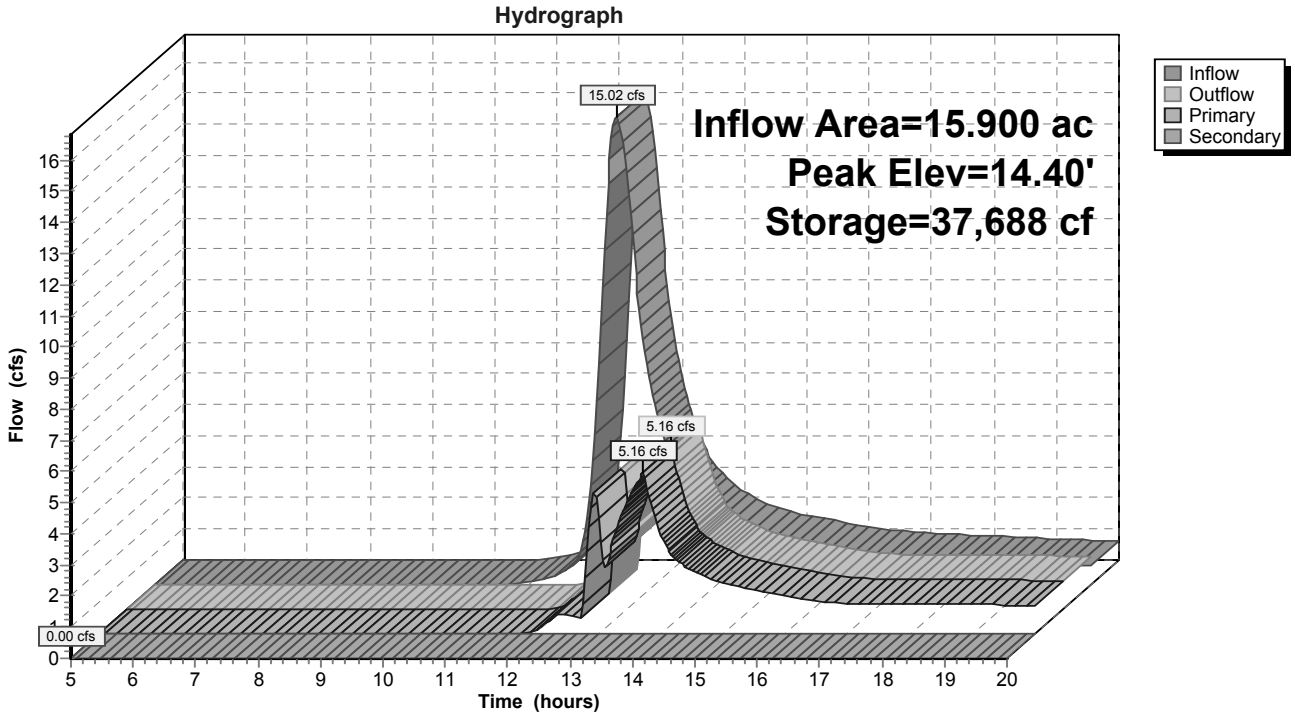
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
11.70	12,100	0	0
12.00	12,500	3,690	3,690
13.00	13,900	13,200	16,890
14.00	15,325	14,613	31,503
15.00	16,850	16,088	47,590
16.00	18,425	17,638	65,228
16.50	20,800	9,806	75,034

Device	Routing	Invert	Outlet Devices
#1	Primary	11.70'	**24.0" Round Culvert** L= 106.0' Ke= 0.600 Inlet / Outlet Invert= 11.70' / 11.44' S= 0.0025 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	11.70'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	14.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	15.50'	**25.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=5.51 cfs @ 13.72 hrs HW=14.28' TW=14.13' (Dynamic Tailwater)
└─**1=Culvert** (Passes 5.51 cfs of 5.55 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.26 cfs @ 1.88 fps)
  └─**3=Orifice/Grate** (Weir Controls 5.26 cfs @ 1.50 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=11.70' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 19: Basin C



Summary for Pond 24: Basin B / Clearwater

Inflow Area = 72.400 ac, 4.35% Impervious, Inflow Depth > 1.38" for 10YR event
Inflow = 43.83 cfs @ 12.59 hrs, Volume= 8.298 af
Outflow = 24.02 cfs @ 13.24 hrs, Volume= 7.884 af, Atten= 45%, Lag= 38.8 min
Primary = 24.02 cfs @ 13.24 hrs, Volume= 7.884 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 14.34' @ 13.24 hrs Surf.Area= 25,133 sf Storage= 84,013 cf

Plug-Flow detention time= 51.9 min calculated for 7.868 af (95% of inflow)
Center-of-Mass det. time= 36.4 min (899.1 - 862.7)

Volume	Invert	Avail.Storage	Storage Description
#1	10.10'	143,778 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

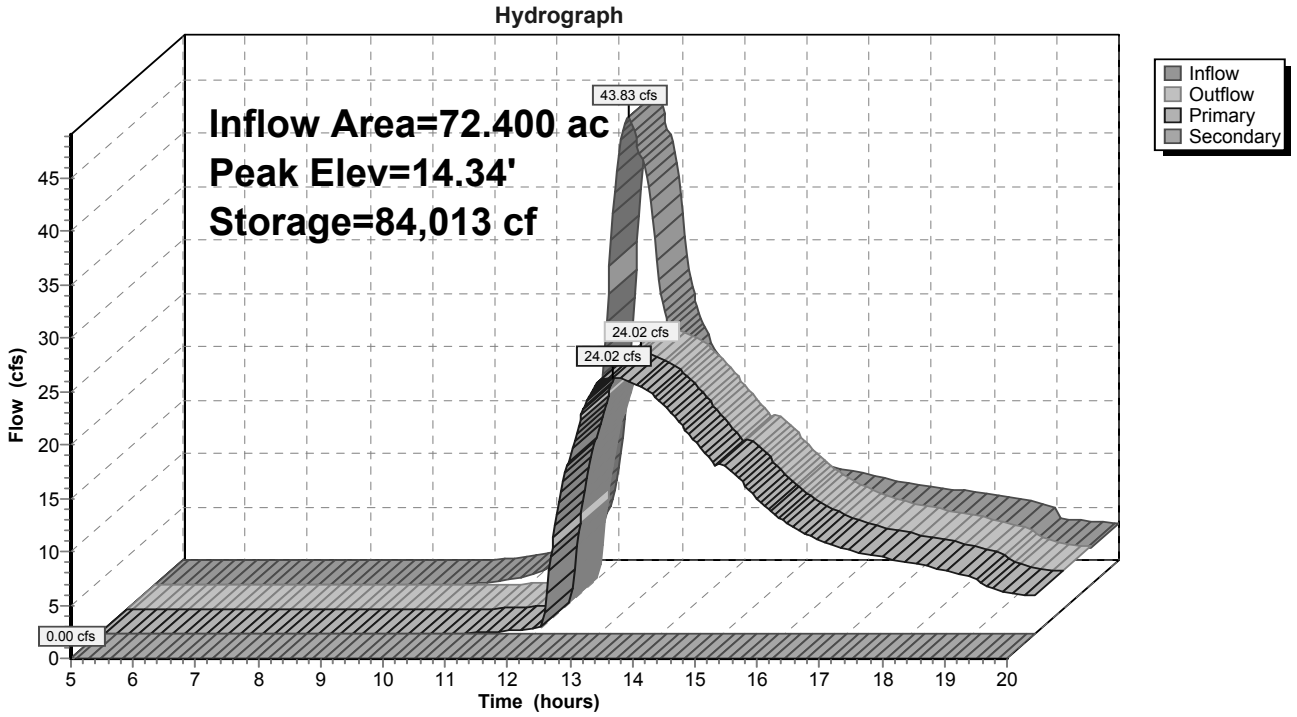
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.10	0	0	0
10.40	16,000	2,400	2,400
11.00	17,667	10,100	12,500
12.00	19,950	18,809	31,309
13.00	22,164	21,057	52,366
14.00	24,361	23,263	75,628
15.00	26,639	25,500	101,128
16.00	28,940	27,790	128,918
16.50	30,500	14,860	143,778

Device	Routing	Invert	Outlet Devices
#1	Primary	10.10'	**24.0" Round RCP_Round 24"** L= 120.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 10.10' / 9.62' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	10.10'	**6.0" Round Culvert** L= 24.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 10.10' / 9.98' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#3	Device 1	11.10'	**9.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Secondary	15.20'	**40.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=24.02 cfs @ 13.24 hrs HW=14.34' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 24"** (Barrel Controls 24.02 cfs @ 7.64 fps)
  ├─**2=Culvert** (Passes < 1.68 cfs potential flow)
  └─**3=Sharp-Crested Rectangular Weir** (Passes < 159.17 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=10.10' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 24: Basin B / Clearwater

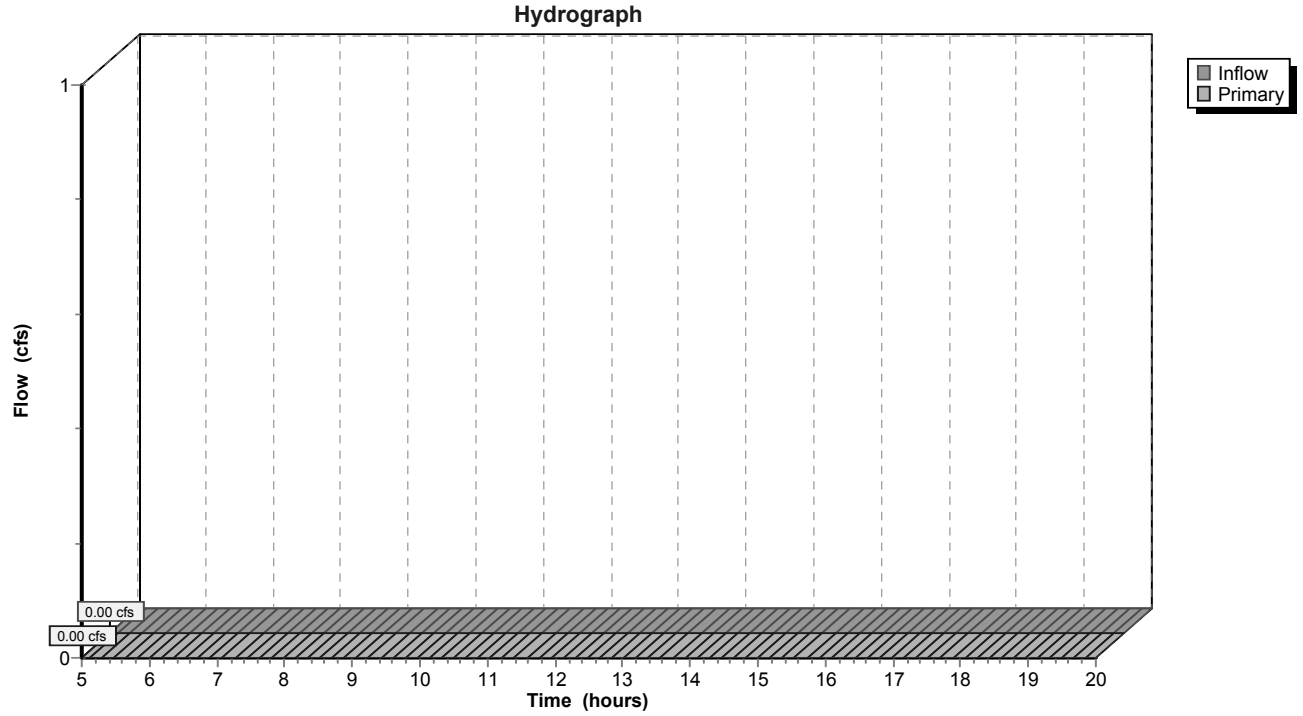


Summary for Link 21: Pond C overflow

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link 21: Pond C overflow

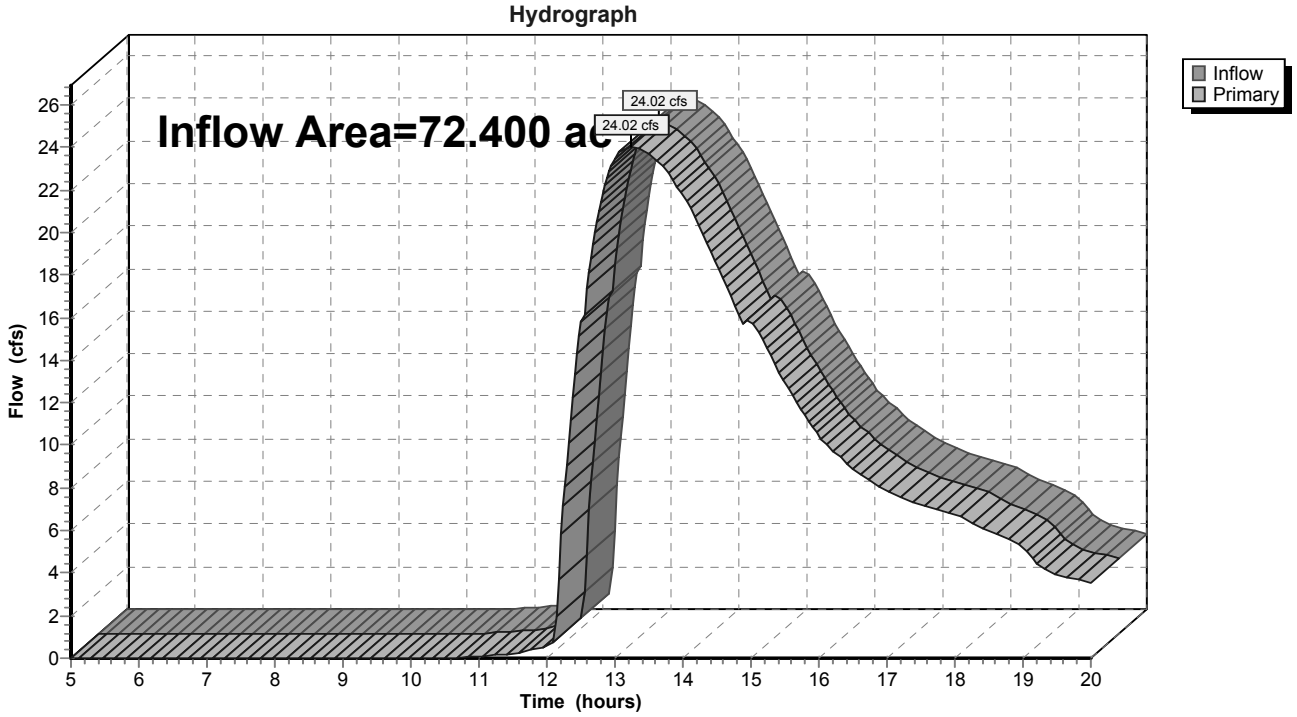


Summary for Link O: OUTLET

Inflow Area = 72.400 ac, 4.35% Impervious, Inflow Depth > 1.31" for 10YR event
Inflow = 24.02 cfs @ 13.24 hrs, Volume= 7.884 af
Primary = 24.02 cfs @ 13.24 hrs, Volume= 7.884 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link O: OUTLET



Time span=5.00-20.00 hrs, dt=0.03 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Area A - Rivers Crossing Runoff Area=13.800 ac 0.00% Impervious Runoff Depth>2.69"
Tc=28.7 min CN=75 Runoff=36.17 cfs 3.097 af

Subcatchment11: PROP AREA TO BASIN Runoff Area=14.400 ac 13.89% Impervious Runoff Depth>2.50"
Tc=41.2 min CN=73 Runoff=27.53 cfs 3.005 af

Subcatchment13: Area to BASIN D Runoff Area=1.500 ac 76.67% Impervious Runoff Depth>4.07"
Tc=10.0 min CN=89 Runoff=9.47 cfs 0.509 af

Subcatchment22: Area B - Rivers Runoff Area=42.700 ac 0.00% Impervious Runoff Depth>2.75"
Tc=56.4 min CN=76 Runoff=72.31 cfs 9.797 af

Pond 2: Basin A Peak Elev=16.86' Storage=51,704 cf Inflow=36.17 cfs 3.097 af
Primary=3.40 cfs 2.088 af Secondary=12.22 cfs 0.771 af Outflow=14.60 cfs 2.859 af

Pond 14: Infil D w/forebay Peak Elev=16.25' Storage=3,182 cf Inflow=9.47 cfs 0.509 af
Outflow=9.37 cfs 0.495 af

Pond 15: Infil D - Infil Cell Peak Elev=16.25' Storage=8,445 cf Inflow=9.37 cfs 0.495 af
Discarded=0.49 cfs 0.296 af Primary=0.44 cfs 0.144 af Outflow=0.93 cfs 0.440 af

Pond 19: Basin C Peak Elev=15.79' Storage=61,435 cf Inflow=27.97 cfs 3.149 af
Primary=12.65 cfs 2.059 af Secondary=9.97 cfs 0.362 af Outflow=12.75 cfs 2.421 af

Pond 24: Basin B / Clearwater Peak Elev=15.78' Storage=122,573 cf Inflow=92.95 cfs 14.715 af
Primary=29.71 cfs 12.007 af Secondary=47.30 cfs 2.191 af Outflow=77.00 cfs 14.198 af

Link 21: Pond C overflow Inflow=9.97 cfs 0.362 af
Primary=9.97 cfs 0.362 af

Link O: OUTLET Inflow=84.25 cfs 14.560 af
Primary=84.25 cfs 14.560 af

Total Runoff Area = 72.400 ac Runoff Volume = 16.409 af Average Runoff Depth = 2.72"
95.65% Pervious = 69.250 ac 4.35% Impervious = 3.150 ac

Summary for Subcatchment 1: Area A - Rivers Crossing

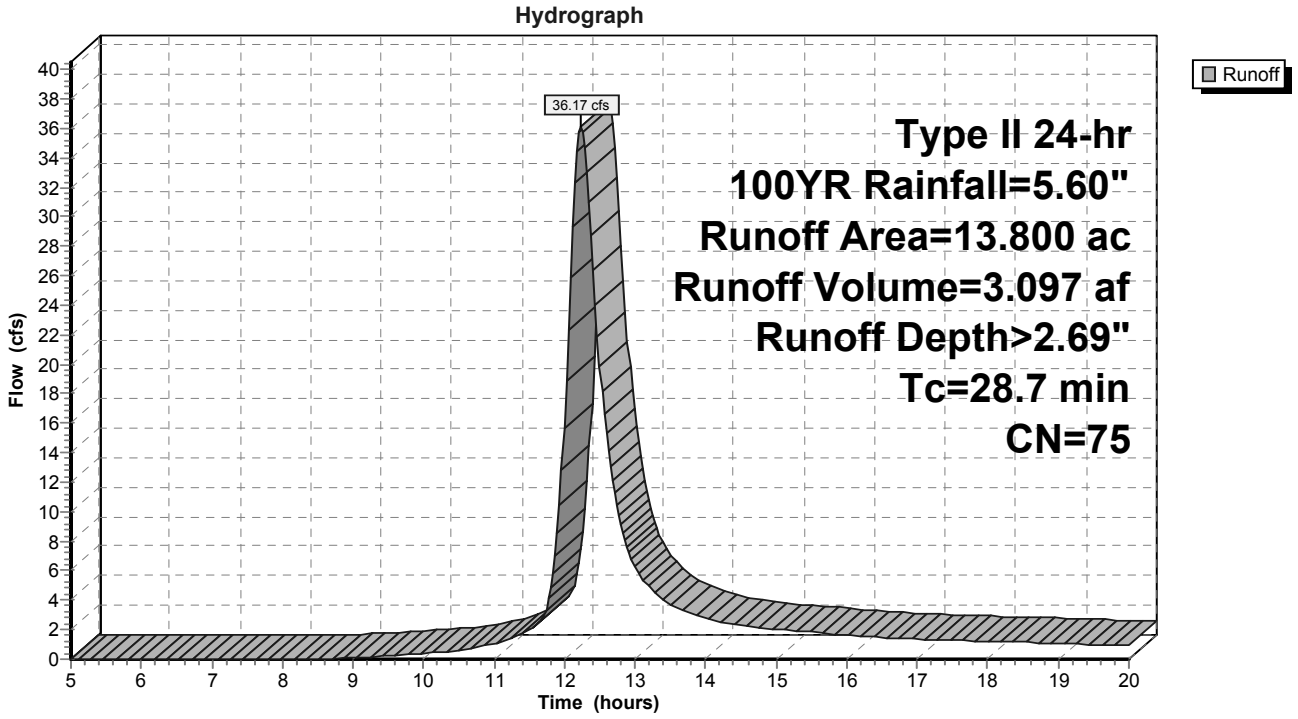
Runoff = 36.17 cfs @ 12.23 hrs, Volume= 3.097 af, Depth> 2.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 100YR Rainfall=5.60"

	Area (ac)	CN	Description
*	13.800	75	1/4 Acre Lots Residential District
	13.800		100.00% Pervious Area

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

Subcatchment 1: Area A - Rivers Crossing



Summary for Subcatchment 11: PROP AREA TO BASIN C

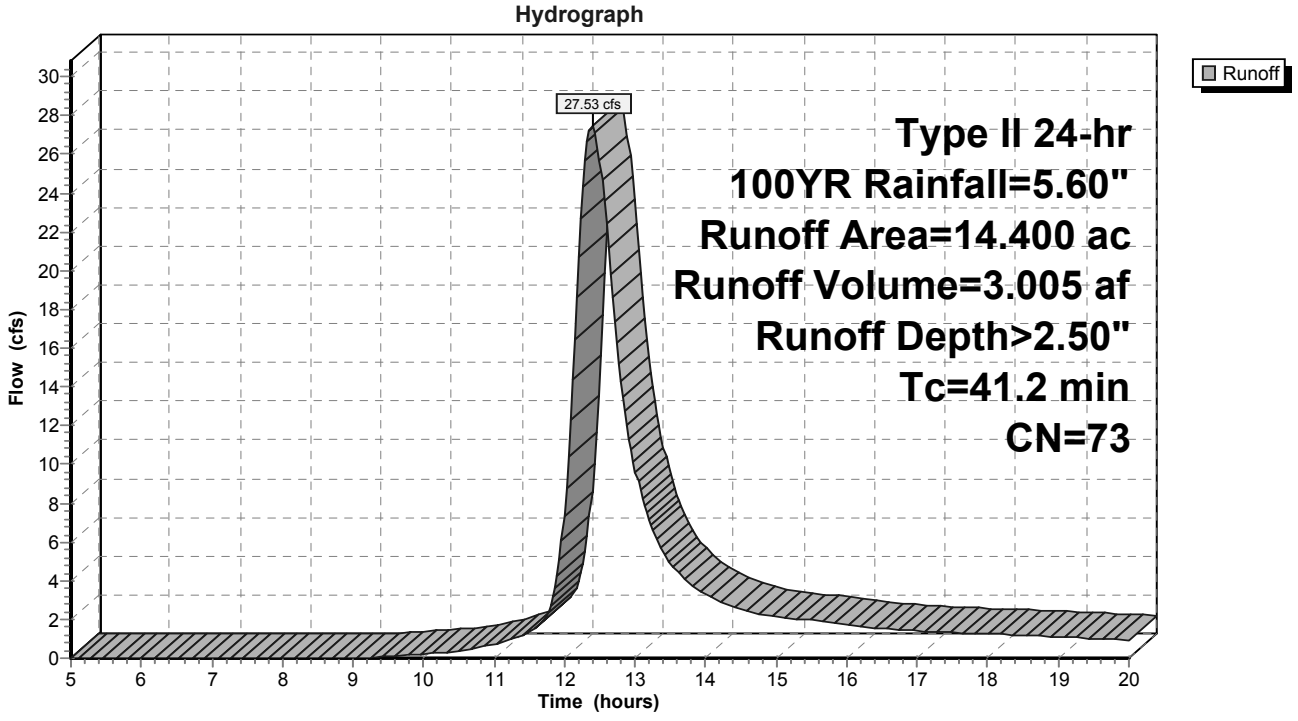
Runoff = 27.53 cfs @ 12.39 hrs, Volume= 3.005 af, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 100YR Rainfall=5.60"

	Area (ac)	CN	Description
*	2.000	98	Impervious
*	6.900	61	Open - Good Condition (B-Soils)
*	5.500	78	Open Space - Meadow (D-Soils)
	14.400	73	Weighted Average
	12.400		86.11% Pervious Area
	2.000		13.89% Impervious Area

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

Subcatchment 11: PROP AREA TO BASIN C



Summary for Subcatchment 13: Area to BASIN D

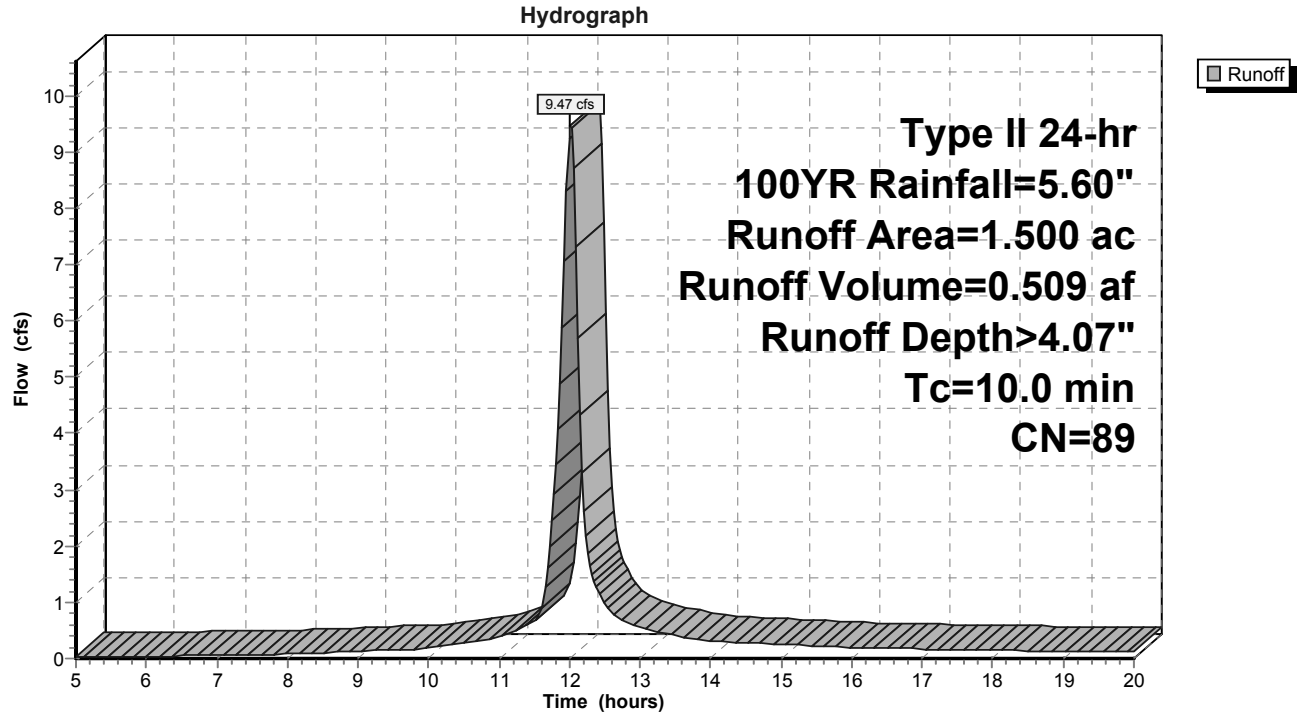
Runoff = 9.47 cfs @ 12.01 hrs, Volume= 0.509 af, Depth> 4.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 100YR Rainfall=5.60"

	Area (ac)	CN	Description
*	1.150	98	Impervious
*	0.350	61	Open - Good Condition (B-Soils)
	1.500	89	Weighted Average
	0.350		23.33% Pervious Area
	1.150		76.67% Impervious Area

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

Subcatchment 13: Area to BASIN D



Summary for Subcatchment 22: Area B - Rivers Crossing-Revised

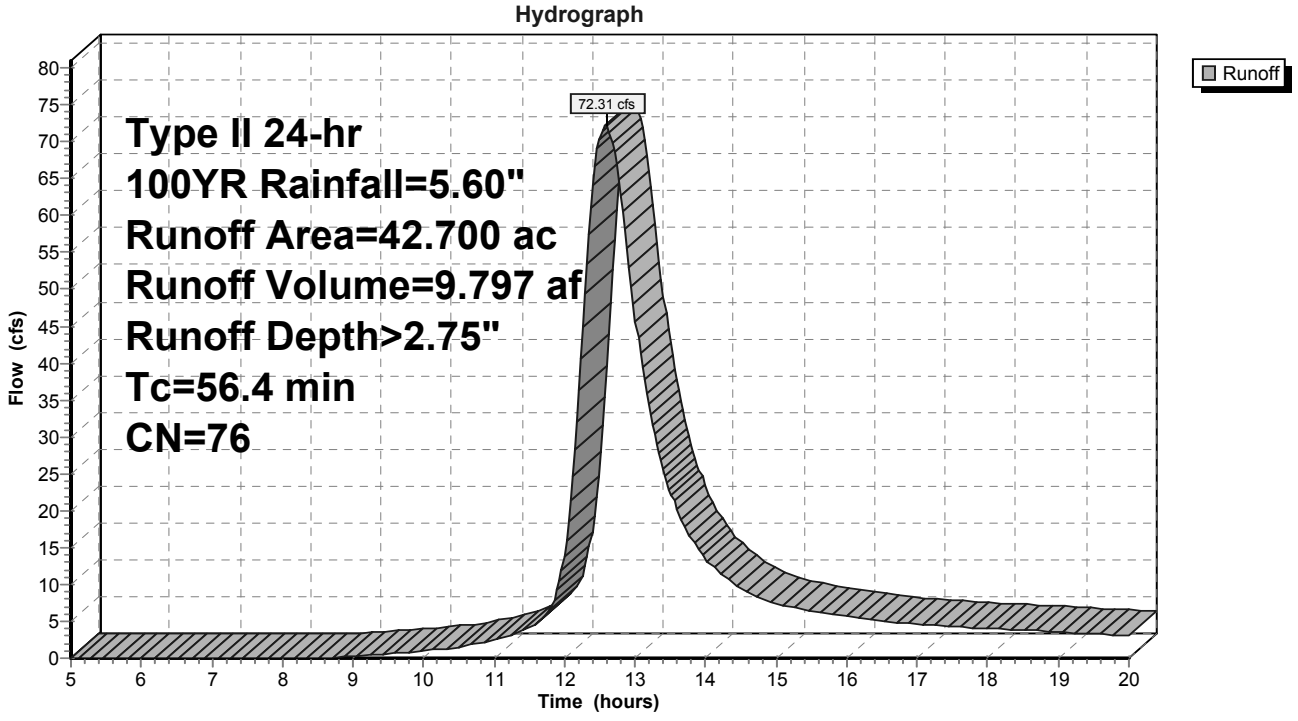
Runoff = 72.31 cfs @ 12.59 hrs, Volume= 9.797 af, Depth> 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 100YR Rainfall=5.60"

	Area (ac)	CN	Description
*	37.500	75	1/4 Acre Lots Residential District
*	2.700	92	Commercial Lands
*	0.500	85	Apartments-Condos
*	2.000	61	Open - Good Condition (B-Soils)
	42.700	76	Weighted Average
	42.700		100.00% Pervious Area

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

Subcatchment 22: Area B - Rivers Crossing-Revised



Summary for Pond 2: Basin A

Inflow Area = 13.800 ac, 0.00% Impervious, Inflow Depth > 2.69" for 100YR event
Inflow = 36.17 cfs @ 12.23 hrs, Volume= 3.097 af
Outflow = 14.60 cfs @ 12.59 hrs, Volume= 2.859 af, Atten= 60%, Lag= 21.9 min
Primary = 3.40 cfs @ 17.33 hrs, Volume= 2.088 af
Secondary = 12.22 cfs @ 12.61 hrs, Volume= 0.771 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 16.86' @ 12.61 hrs Surf.Area= 19,471 sf Storage= 51,704 cf

Plug-Flow detention time= 125.5 min calculated for 2.859 af (92% of inflow)
Center-of-Mass det. time= 99.2 min (901.7 - 802.5)

Volume	Invert	Avail.Storage	Storage Description
#1	10.89'	64,797 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

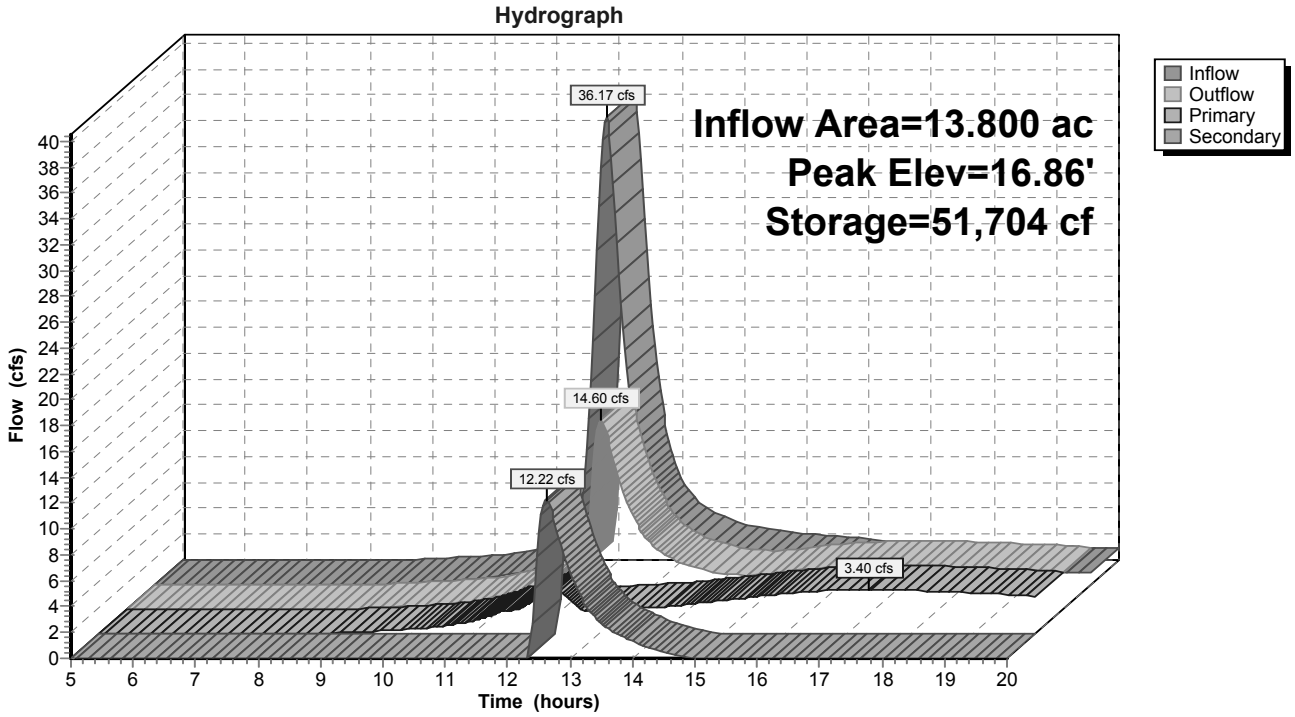
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.89	10	0	0
11.00	31	2	2
12.00	299	165	167
13.00	3,378	1,839	2,006
14.00	10,388	6,883	8,889
15.00	13,733	12,061	20,949
16.00	16,663	15,198	36,147
17.00	19,924	18,294	54,441
17.50	21,500	10,356	64,797

Device	Routing	Invert	Outlet Devices
#1	Primary	10.89'	**12.0" Round Culvert** L= 345.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 10.89' / 10.34' S= 0.0016 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Secondary	16.40'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=3.40 cfs @ 17.33 hrs HW=15.65' TW=12.06' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.40 cfs @ 4.33 fps)

Secondary OutFlow Max=12.20 cfs @ 12.61 hrs HW=16.86' TW=15.41' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 12.20 cfs @ 1.77 fps)

Pond 2: Basin A



Summary for Pond 14: Infil D w/forebay

Inflow Area = 1.500 ac, 76.67% Impervious, Inflow Depth > 4.07" for 100YR event
Inflow = 9.47 cfs @ 12.01 hrs, Volume= 0.509 af
Outflow = 9.37 cfs @ 12.02 hrs, Volume= 0.495 af, Atten= 1%, Lag= 0.6 min
Primary = 9.37 cfs @ 12.02 hrs, Volume= 0.495 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 16.25' @ 12.53 hrs Surf.Area= 4,321 sf Storage= 3,182 cf

Plug-Flow detention time= 45.8 min calculated for 0.494 af (97% of inflow)
Center-of-Mass det. time= 34.4 min (791.1 - 756.7)

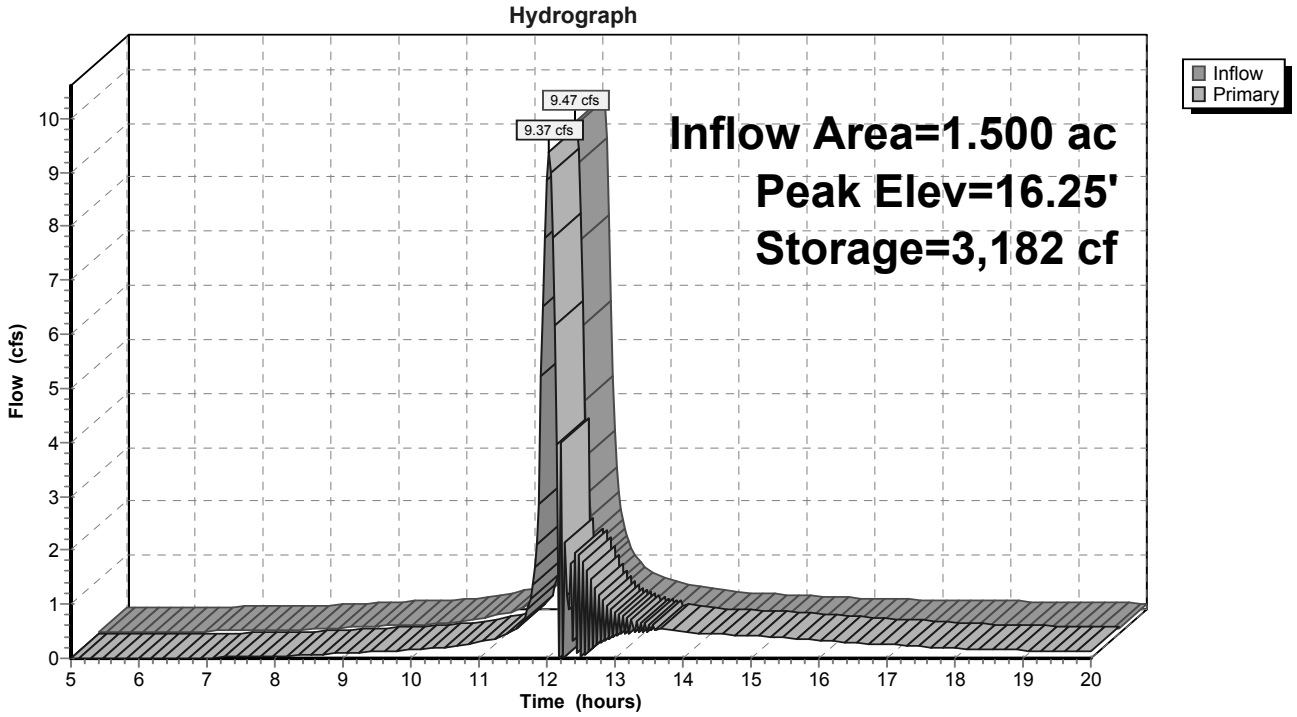
Volume	Invert	Avail.Storage	Storage Description
#1	15.00'	8,313 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
15.00	1,975	0	0
16.00	2,650	2,313	2,313
17.00	9,350	6,000	8,313

Device	Routing	Invert	Outlet Devices
#1	Primary	15.00'	**90.0 deg Sharp-Crested Vee/Trap Weir** Cv= 2.50 (C= 3.13)
#2	Primary	16.00'	**60.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=9.18 cfs @ 12.02 hrs HW=16.12' TW=15.54' (Dynamic Tailwater)
- **1=Sharp-Crested Vee/Trap Weir** (Weir Controls 3.12 cfs @ 2.47 fps)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 6.06 cfs @ 0.82 fps)

Pond 14: Infil D w/forebay



Summary for Pond 15: Infil D - Infil Cell

Inflow Area = 1.500 ac, 76.67% Impervious, Inflow Depth > 3.96" for 100YR event
Inflow = 9.37 cfs @ 12.02 hrs, Volume= 0.495 af
Outflow = 0.93 cfs @ 12.50 hrs, Volume= 0.440 af, Atten= 90%, Lag= 28.9 min
Discarded = 0.49 cfs @ 12.50 hrs, Volume= 0.296 af
Primary = 0.44 cfs @ 12.50 hrs, Volume= 0.144 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 16.25' @ 12.50 hrs Surf.Area= 5,915 sf Storage= 8,445 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 86.9 min (878.0 - 791.1)

Volume	Invert	Avail.Storage	Storage Description
#1	14.00'	14,176 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

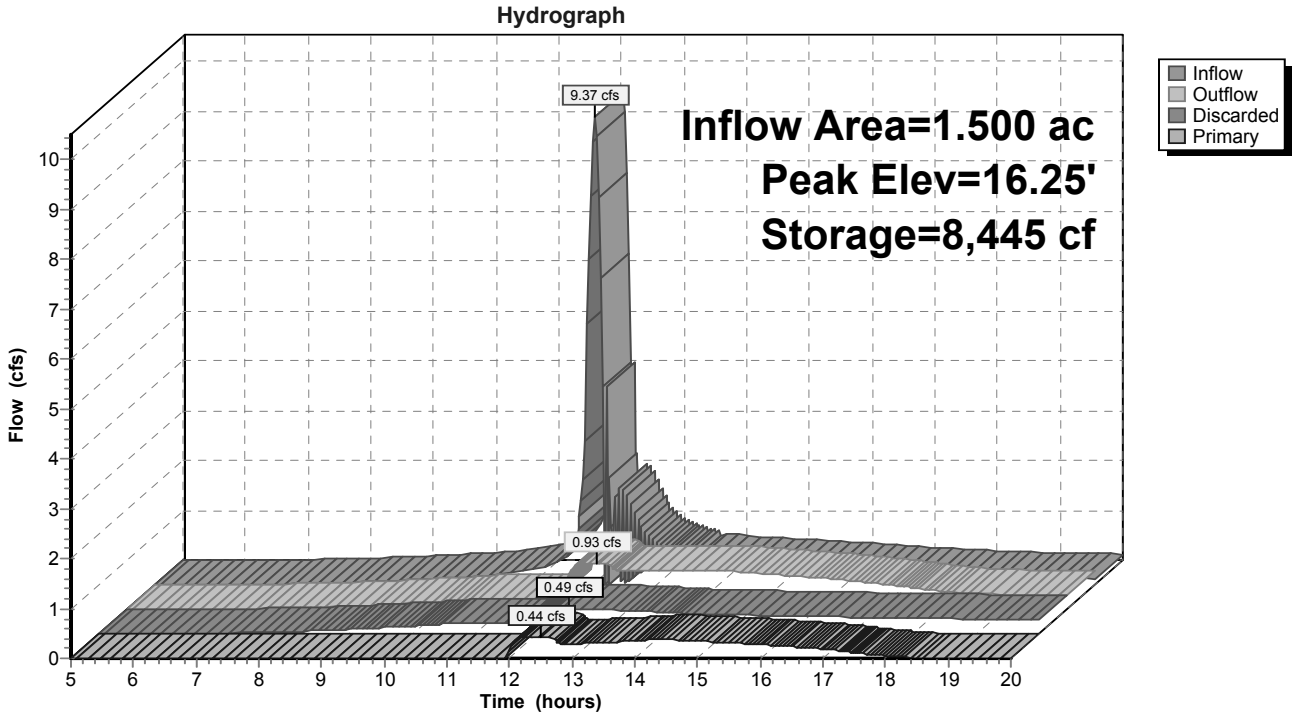
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
14.00	2,400	0	0
15.00	3,525	2,963	2,963
16.00	4,776	4,151	7,113
17.00	9,350	7,063	14,176

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**12.0" Round Culvert** L= 51.0' Ke= 0.600 Inlet / Outlet Invert= 14.00' / 13.74' S= 0.0051 '/' Cc= 0.900 n= 0.130, Flow Area= 0.79 sf
#2	Device 1	15.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	14.00'	**3.600 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.49 cfs @ 12.50 hrs HW=16.25' (Free Discharge)
↑└**3=Exfiltration** (Exfiltration Controls 0.49 cfs)

Primary OutFlow Max=0.44 cfs @ 12.50 hrs HW=16.25' TW=14.66' (Dynamic Tailwater)
↑└**1=Culvert** (Passes 0.44 cfs of 0.61 cfs potential flow)
↑└**2=Orifice/Grate** (Orifice Controls 0.44 cfs @ 5.01 fps)

Pond 15: Infil D - Infil Cell



Summary for Pond 19: Basin C

Inflow Area = 15.900 ac, 19.81% Impervious, Inflow Depth > 2.38" for 100YR event
Inflow = 27.97 cfs @ 12.39 hrs, Volume= 3.149 af
Outflow = 12.75 cfs @ 12.91 hrs, Volume= 2.421 af, Atten= 54%, Lag= 30.8 min
Primary = 12.65 cfs @ 12.45 hrs, Volume= 2.059 af
Secondary = 9.97 cfs @ 12.88 hrs, Volume= 0.362 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 15.79' @ 12.88 hrs Surf.Area= 18,098 sf Storage= 61,435 cf

Plug-Flow detention time= 120.9 min calculated for 2.421 af (77% of inflow)
Center-of-Mass det. time= 63.8 min (882.1 - 818.3)

Volume	Invert	Avail.Storage	Storage Description
#1	11.70'	75,034 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

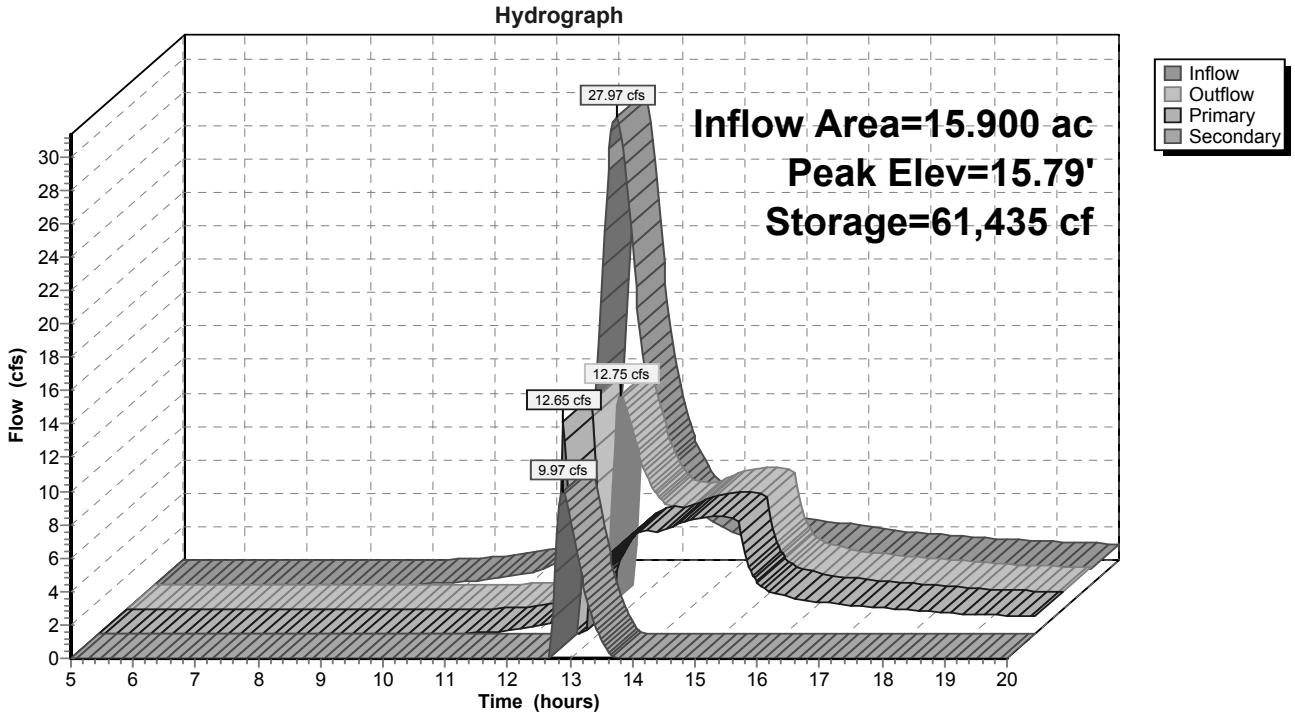
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
11.70	12,100	0	0
12.00	12,500	3,690	3,690
13.00	13,900	13,200	16,890
14.00	15,325	14,613	31,503
15.00	16,850	16,088	47,590
16.00	18,425	17,638	65,228
16.50	20,800	9,806	75,034

Device	Routing	Invert	Outlet Devices
#1	Primary	11.70'	**24.0" Round Culvert** L= 106.0' Ke= 0.600 Inlet / Outlet Invert= 11.70' / 11.44' S= 0.0025 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	11.70'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	14.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	15.50'	**25.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=9.90 cfs @ 12.45 hrs HW=14.47' TW=13.98' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 9.90 cfs @ 3.15 fps)
  ├─**2=Orifice/Grate** (Passes < 0.46 cfs potential flow)
  └─**3=Orifice/Grate** (Passes < 13.18 cfs potential flow)

Secondary OutFlow Max=9.94 cfs @ 12.88 hrs HW=15.79' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 9.94 cfs @ 1.36 fps)

Pond 19: Basin C



Summary for Pond 24: Basin B / Clearwater

Inflow Area = 72.400 ac, 4.35% Impervious, Inflow Depth > 2.44" for 100YR event
Inflow = 92.95 cfs @ 12.52 hrs, Volume= 14.715 af
Outflow = 77.00 cfs @ 12.77 hrs, Volume= 14.198 af, Atten= 17%, Lag= 15.5 min
Primary = 29.71 cfs @ 12.77 hrs, Volume= 12.007 af
Secondary = 47.30 cfs @ 12.77 hrs, Volume= 2.191 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 15.78' @ 12.77 hrs Surf.Area= 28,431 sf Storage= 122,573 cf

Plug-Flow detention time= 48.3 min calculated for 14.198 af (96% of inflow)
Center-of-Mass det. time= 36.4 min (884.8 - 848.4)

Volume	Invert	Avail.Storage	Storage Description
#1	10.10'	143,778 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

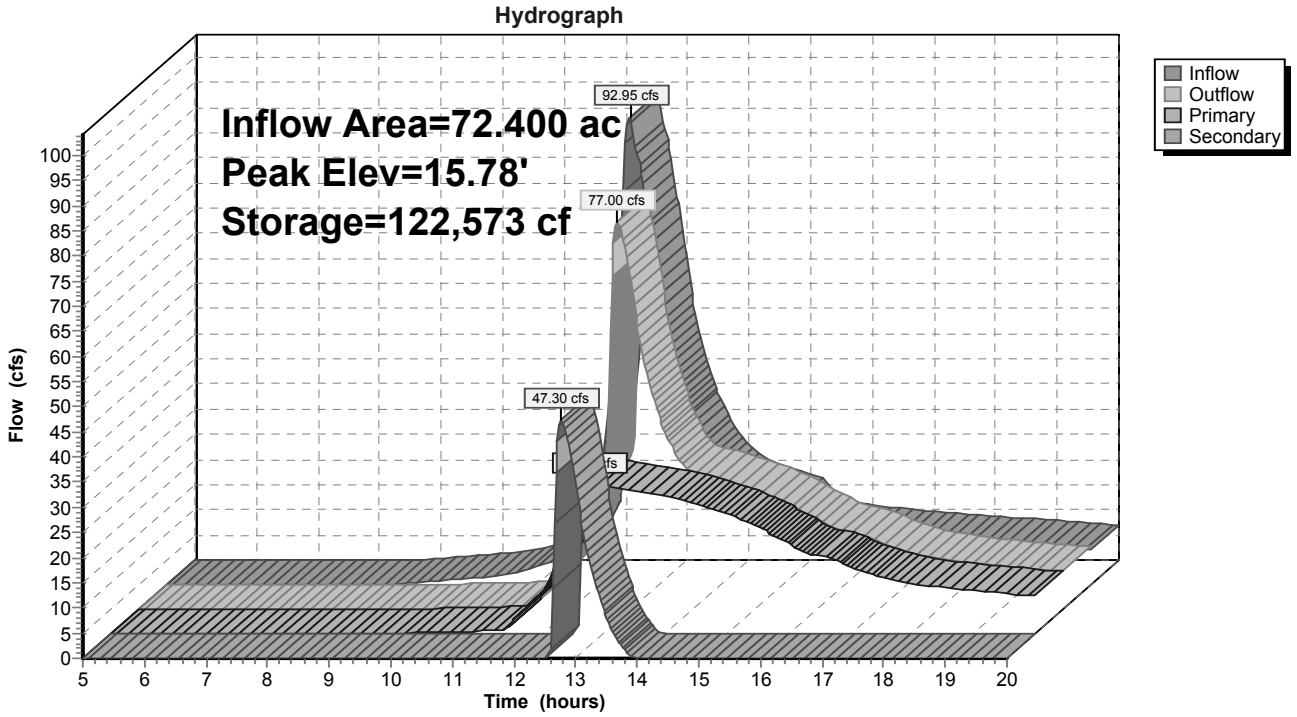
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.10	0	0	0
10.40	16,000	2,400	2,400
11.00	17,667	10,100	12,500
12.00	19,950	18,809	31,309
13.00	22,164	21,057	52,366
14.00	24,361	23,263	75,628
15.00	26,639	25,500	101,128
16.00	28,940	27,790	128,918
16.50	30,500	14,860	143,778

Device	Routing	Invert	Outlet Devices
#1	Primary	10.10'	**24.0" Round RCP_Round 24"** L= 120.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 10.10' / 9.62' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	10.10'	**6.0" Round Culvert** L= 24.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 10.10' / 9.98' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#3	Device 1	11.10'	**9.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Secondary	15.20'	**40.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=29.70 cfs @ 12.77 hrs HW=15.78' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 24"** (Barrel Controls 29.70 cfs @ 9.45 fps)
  ├─**2=Culvert** (Passes < 1.97 cfs potential flow)
  └─**3=Sharp-Crested Rectangular Weir** (Passes < 266.82 cfs potential flow)

Secondary OutFlow Max=47.20 cfs @ 12.77 hrs HW=15.78' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 47.20 cfs @ 2.04 fps)

Pond 24: Basin B / Clearwater

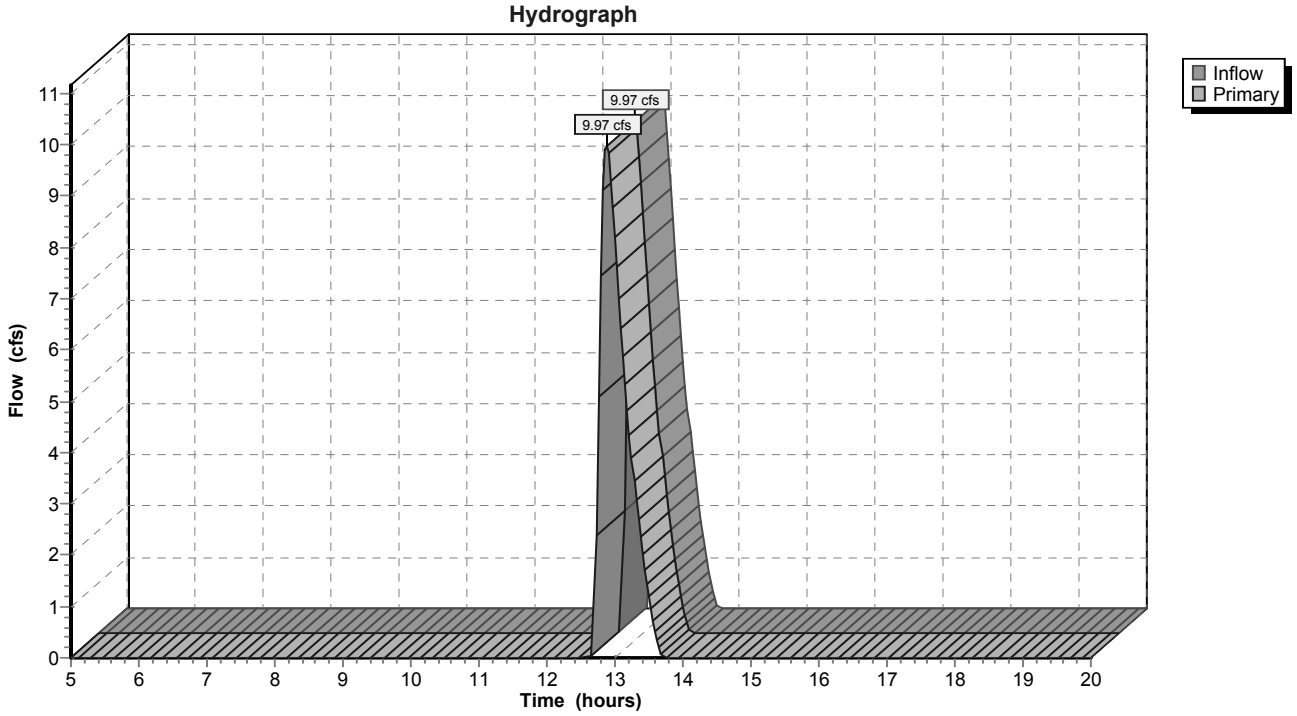


Summary for Link 21: Pond C overflow

Inflow = 9.97 cfs @ 12.88 hrs, Volume= 0.362 af
Primary = 9.97 cfs @ 12.88 hrs, Volume= 0.362 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link 21: Pond C overflow

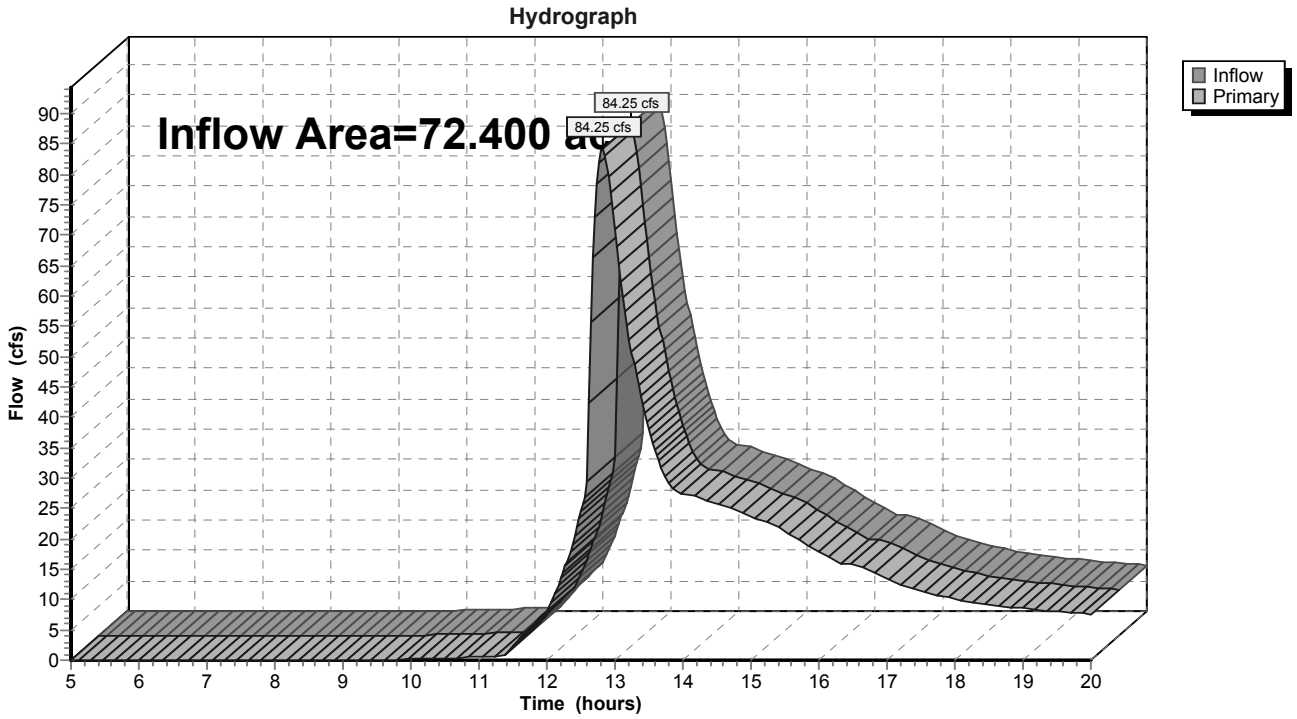


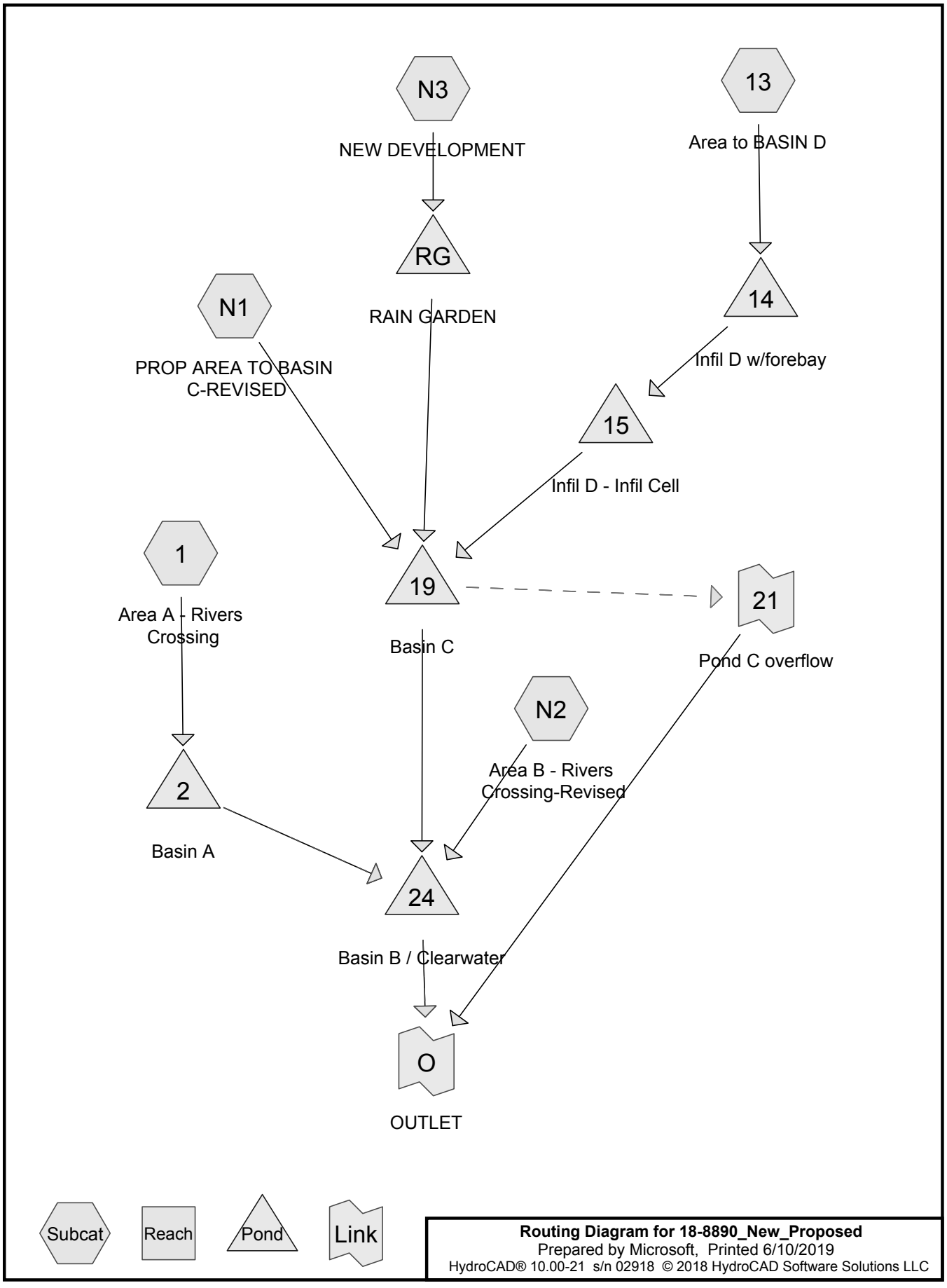
Summary for Link O: OUTLET

Inflow Area = 72.400 ac, 4.35% Impervious, Inflow Depth > 2.41" for 100YR event
Inflow = 84.25 cfs @ 12.82 hrs, Volume= 14.560 af
Primary = 84.25 cfs @ 12.82 hrs, Volume= 14.560 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link O: OUTLET





Routing Diagram for 18-8890_New_Proposed
Prepared by Microsoft, Printed 6/10/2019

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
51.300	75	1/4 Acre Lots Residential District (1, N2)
0.240	74	>75% Grass cover, Good, HSG C (N3)
0.410	85	Apartments-Condos (N2)
2.700	92	Commercial Lands (N2)
2.627	98	Impervious (13, N1)
9.250	61	Open - Good Condition (B-Soils) (13, N1, N2)
5.070	78	Open Space - Meadow (D-Soils) (N1)
0.800	98	Paved parking, HSG D (N3)
72.397	**75**	**TOTAL AREA**

Time span=5.00-20.00 hrs, dt=0.03 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Area A - Rivers Crossing Runoff Area=13.800 ac 0.00% Impervious Runoff Depth>0.68"
Tc=28.7 min CN=75 Runoff=8.56 cfs 0.785 af

Subcatchment13: Area to BASIN D Runoff Area=1.500 ac 76.67% Impervious Runoff Depth>1.51"
Tc=10.0 min CN=89 Runoff=3.72 cfs 0.189 af

SubcatchmentN1: PROP AREA TO BASIN Runoff Area=13.447 ac 10.98% Impervious Runoff Depth>0.51"
Tc=41.2 min CN=71 Runoff=4.51 cfs 0.577 af

SubcatchmentN2: Area B - Rivers Runoff Area=42.610 ac 0.00% Impervious Runoff Depth>0.72"
Tc=56.4 min CN=76 Runoff=17.52 cfs 2.547 af

SubcatchmentN3: NEW DEVELOPMENT Runoff Area=1.040 ac 76.92% Impervious Runoff Depth>1.76"
Tc=6.0 min CN=92 Runoff=3.32 cfs 0.152 af

Pond 2: Basin A Peak Elev=14.01' Storage=9,024 cf Inflow=8.56 cfs 0.785 af
Primary=2.87 cfs 0.784 af Secondary=0.00 cfs 0.000 af Outflow=2.87 cfs 0.784 af

Pond 14: Infil D w/forebay Peak Elev=16.01' Storage=2,331 cf Inflow=3.72 cfs 0.189 af
Outflow=2.60 cfs 0.179 af

Pond 15: Infil D - Infil Cell Peak Elev=15.11' Storage=3,358 cf Inflow=2.60 cfs 0.179 af
Discarded=0.31 cfs 0.177 af Primary=0.03 cfs 0.002 af Outflow=0.33 cfs 0.179 af

Pond 19: Basin C Peak Elev=12.99' Storage=16,817 cf Inflow=4.84 cfs 0.705 af
Primary=0.68 cfs 0.405 af Secondary=0.00 cfs 0.000 af Outflow=0.68 cfs 0.405 af

Pond 24: Basin B / Clearwater Peak Elev=12.23' Storage=35,965 cf Inflow=20.76 cfs 3.736 af
Primary=13.34 cfs 3.356 af Secondary=0.00 cfs 0.000 af Outflow=13.34 cfs 3.356 af

Pond RG: RAIN GARDEN Peak Elev=24.66' Storage=1,363 cf Inflow=3.32 cfs 0.152 af
Outflow=3.28 cfs 0.126 af

Link 21: Pond C overflow Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link O: OUTLET Inflow=13.34 cfs 3.356 af
Primary=13.34 cfs 3.356 af

Total Runoff Area = 72.397 ac Runoff Volume = 4.250 af Average Runoff Depth = 0.70"
95.27% Pervious = 68.970 ac 4.73% Impervious = 3.427 ac

Summary for Subcatchment 1: Area A - Rivers Crossing

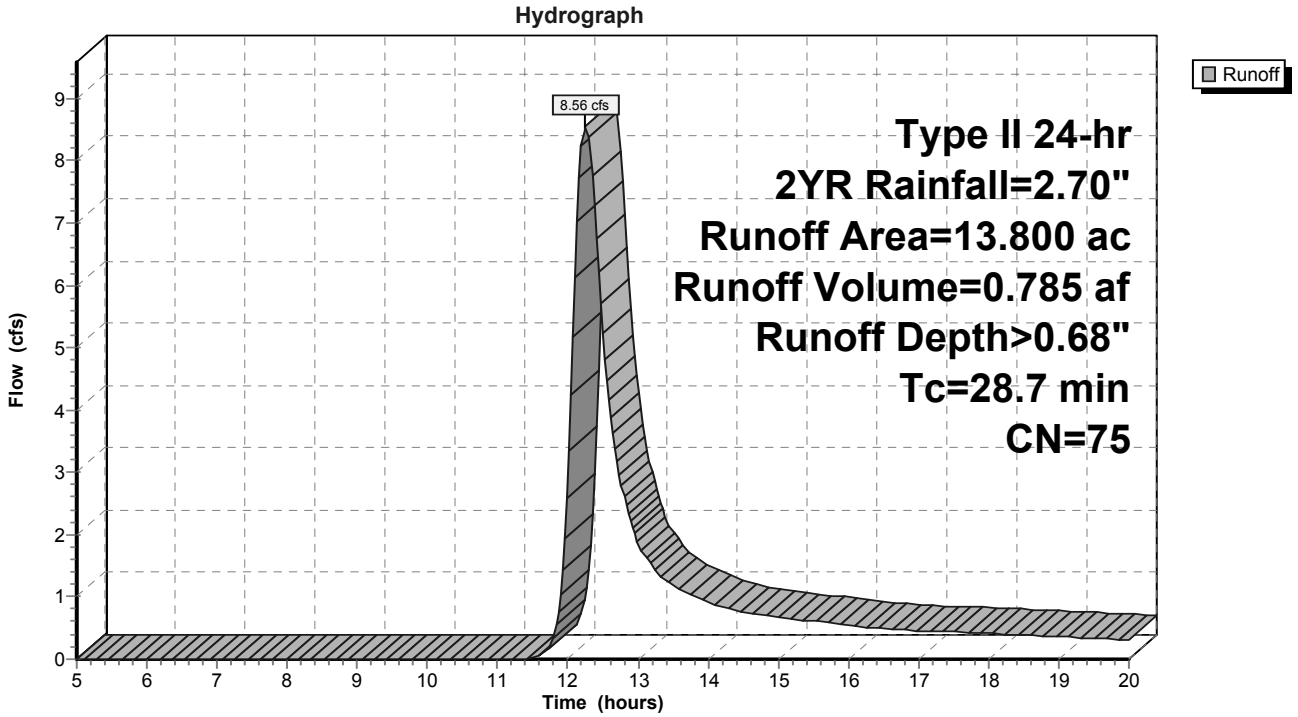
Runoff = 8.56 cfs @ 12.25 hrs, Volume= 0.785 af, Depth> 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 2YR Rainfall=2.70"

	Area (ac)	CN	Description
*	13.800	75	1/4 Acre Lots Residential District
	13.800		100.00% Pervious Area

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

Subcatchment 1: Area A - Rivers Crossing



Summary for Subcatchment 13: Area to BASIN D

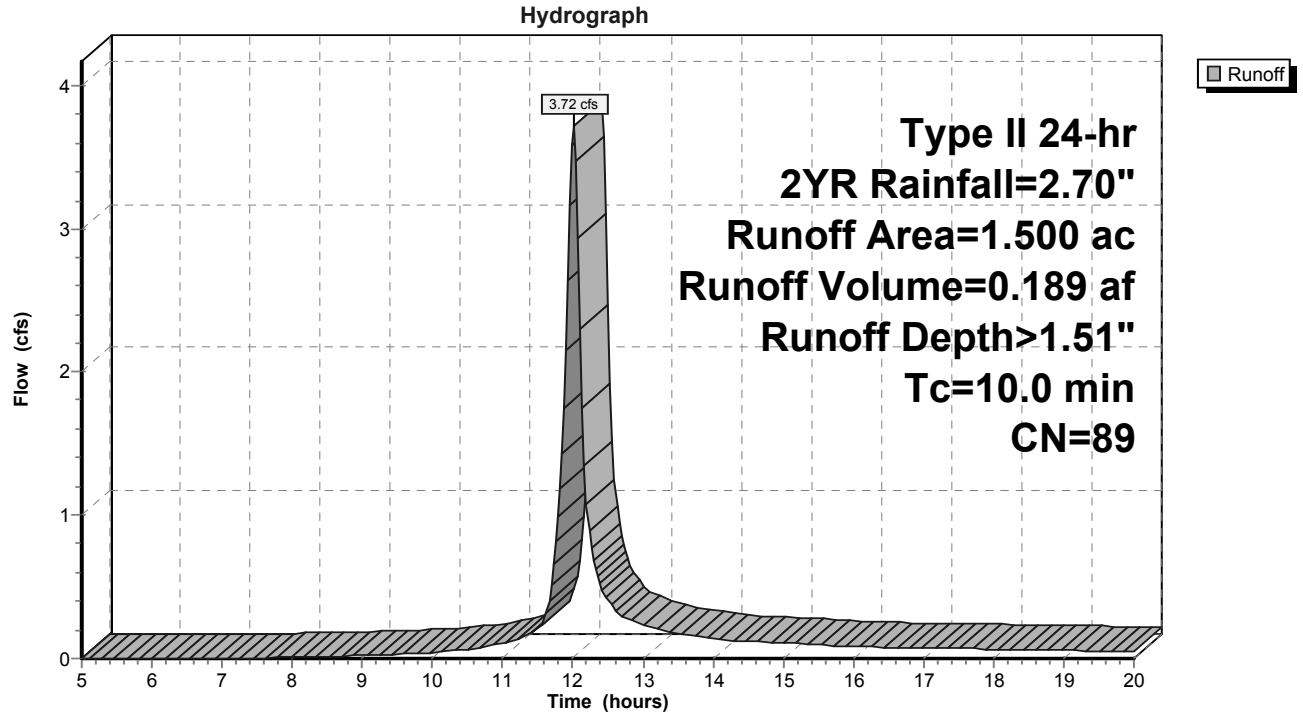
Runoff = 3.72 cfs @ 12.02 hrs, Volume= 0.189 af, Depth> 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 2YR Rainfall=2.70"

	Area (ac)	CN	Description
*	1.150	98	Impervious
*	0.350	61	Open - Good Condition (B-Soils)
	1.500	89	Weighted Average
	0.350		23.33% Pervious Area
	1.150		76.67% Impervious Area

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

Subcatchment 13: Area to BASIN D



Summary for Subcatchment N1: PROP AREA TO BASIN C-REVISED

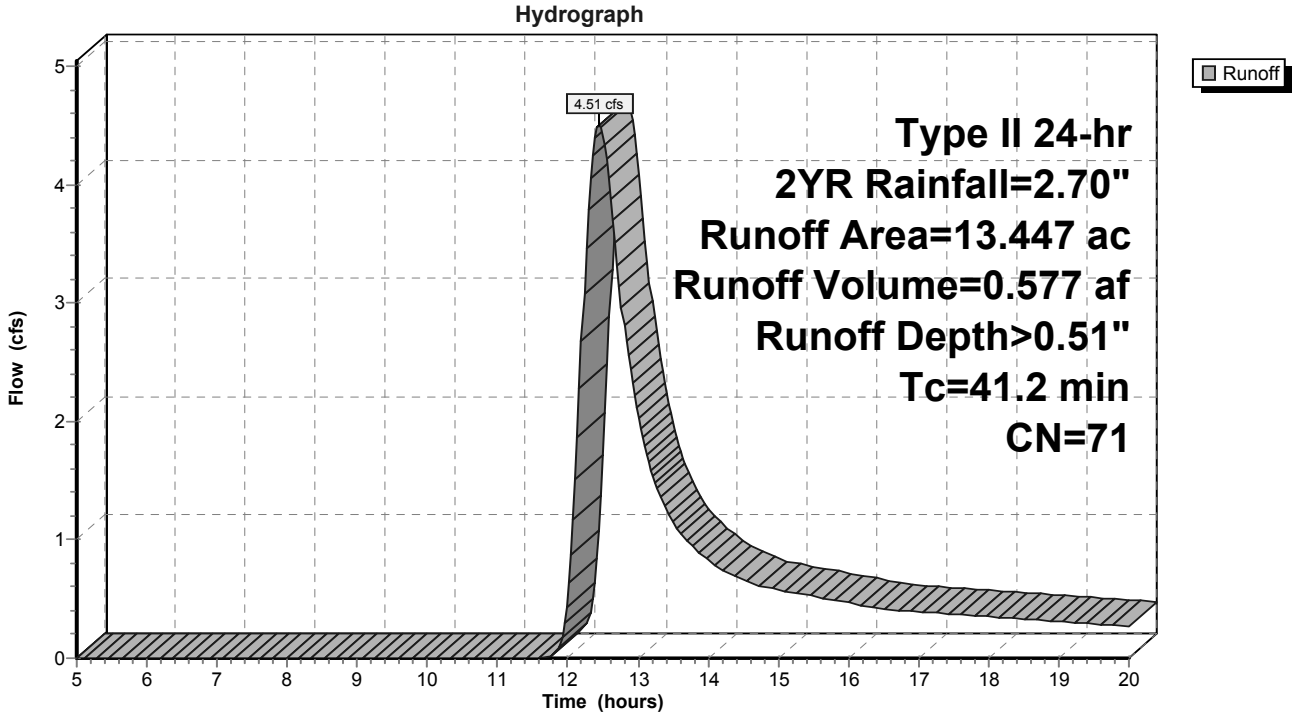
Runoff = 4.51 cfs @ 12.44 hrs, Volume= 0.577 af, Depth> 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 2YR Rainfall=2.70"

	Area (ac)	CN	Description
*	1.477	98	Impervious
*	6.900	61	Open - Good Condition (B-Soils)
*	5.070	78	Open Space - Meadow (D-Soils)
	13.447	71	Weighted Average
	11.970		89.02% Pervious Area
	1.477		10.98% Impervious Area

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

Subcatchment N1: PROP AREA TO BASIN C-REVISED



Summary for Subcatchment N2: Area B - Rivers Crossing-Revised

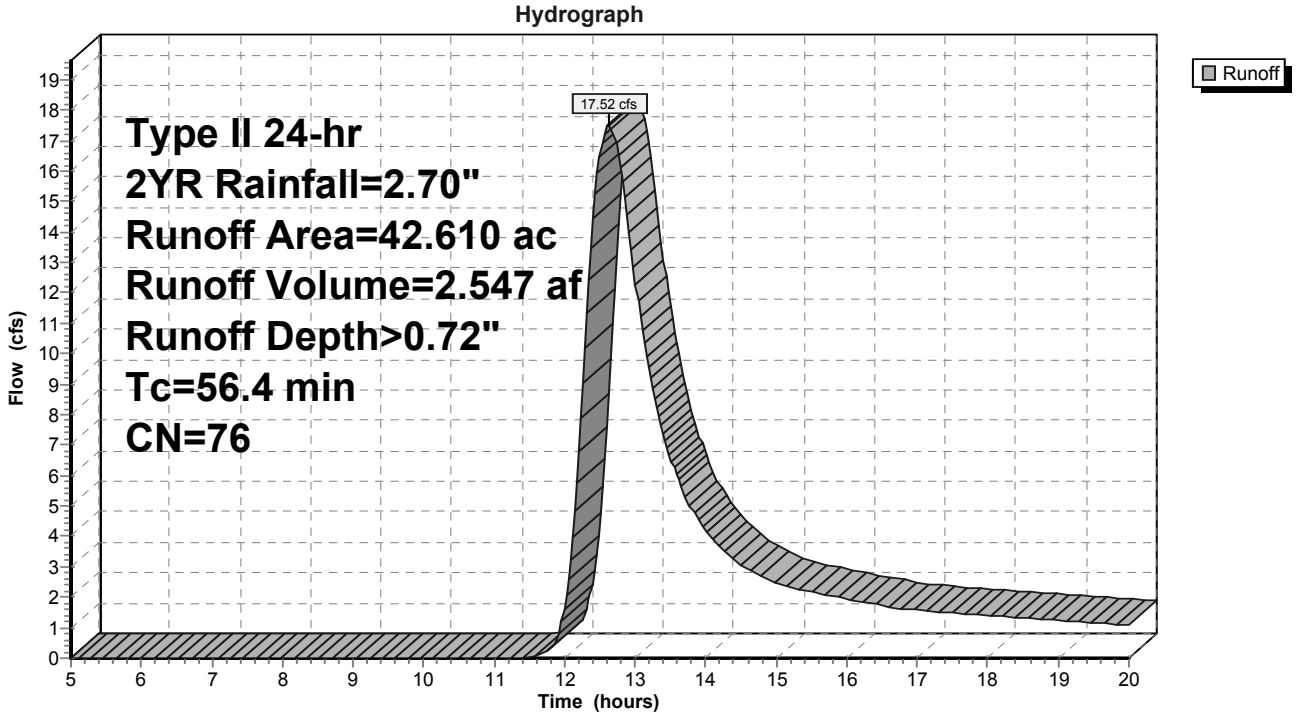
Runoff = 17.52 cfs @ 12.62 hrs, Volume= 2.547 af, Depth> 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 2YR Rainfall=2.70"

	Area (ac)	CN	Description
*	37.500	75	1/4 Acre Lots Residential District
*	2.700	92	Commercial Lands
*	0.410	85	Apartments-Condos
*	2.000	61	Open - Good Condition (B-Soils)
	42.610	76	Weighted Average
	42.610		100.00% Pervious Area

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

Subcatchment N2: Area B - Rivers Crossing-Revised



Summary for Subcatchment N3: NEW DEVELOPMENT

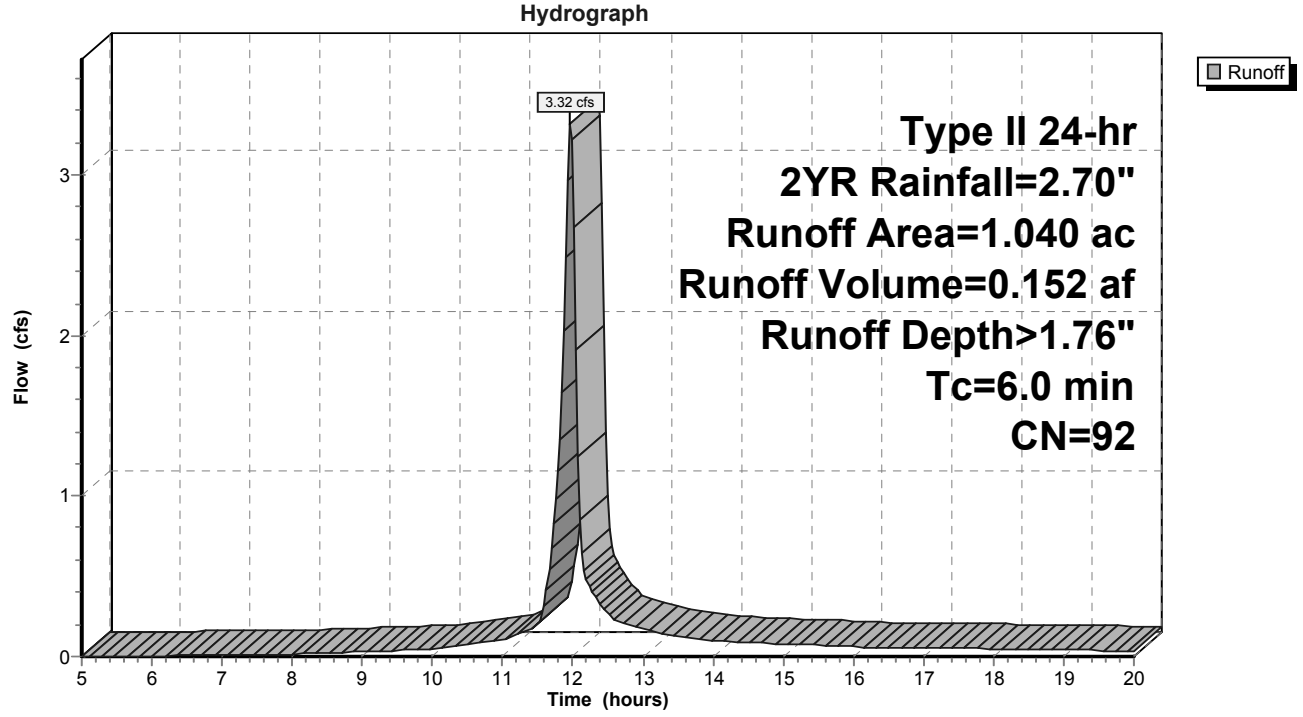
Runoff = 3.32 cfs @ 11.97 hrs, Volume= 0.152 af, Depth> 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 2YR Rainfall=2.70"

Area (ac)	CN	Description
0.800	98	Paved parking, HSG D
0.240	74	>75% Grass cover, Good, HSG C
1.040	92	Weighted Average
0.240		23.08% Pervious Area
0.800		76.92% Impervious Area

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

Subcatchment N3: NEW DEVELOPMENT



Summary for Pond 2: Basin A

Inflow Area = 13.800 ac, 0.00% Impervious, Inflow Depth > 0.68" for 2YR event
Inflow = 8.56 cfs @ 12.25 hrs, Volume= 0.785 af
Outflow = 2.87 cfs @ 12.49 hrs, Volume= 0.784 af, Atten= 67%, Lag= 14.1 min
Primary = 2.87 cfs @ 12.49 hrs, Volume= 0.784 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 14.01' @ 12.82 hrs Surf.Area= 10,431 sf Storage= 9,024 cf

Plug-Flow detention time= 28.3 min calculated for 0.784 af (100% of inflow)
Center-of-Mass det. time= 27.9 min (858.6 - 830.7)

Volume	Invert	Avail.Storage	Storage Description
#1	10.89'	64,797 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

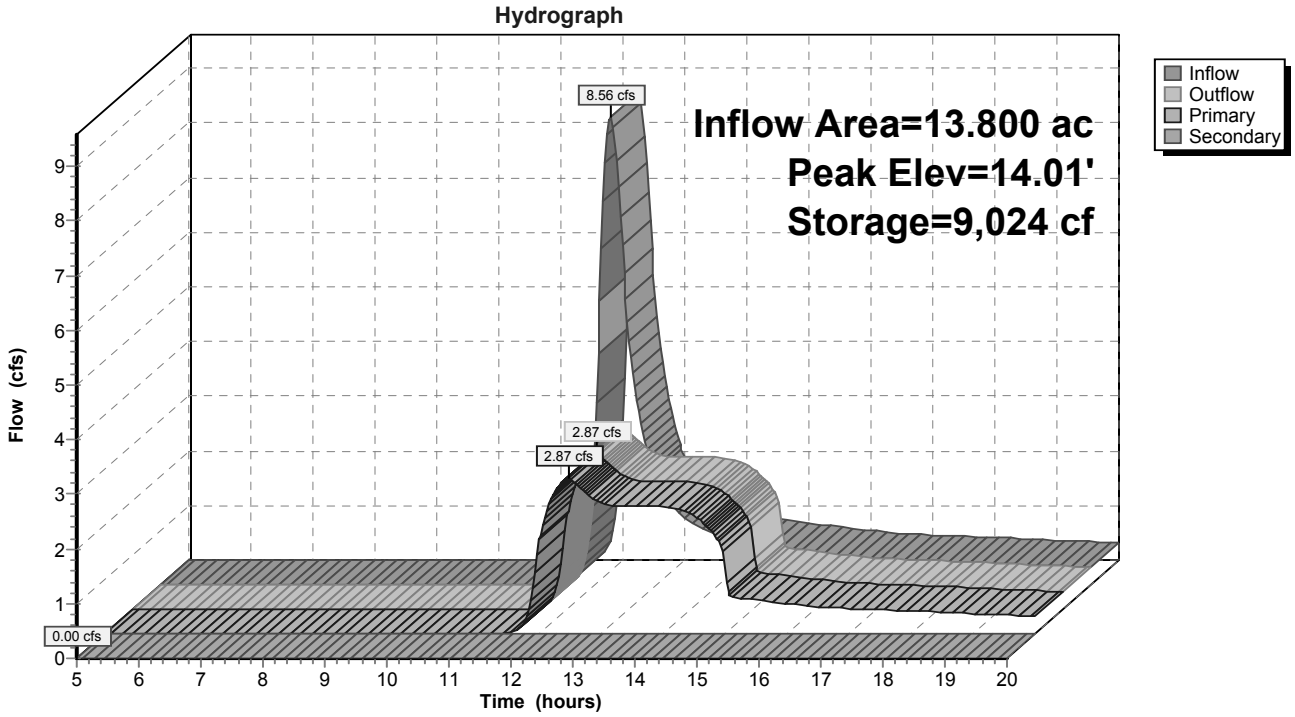
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.89	10	0	0
11.00	31	2	2
12.00	299	165	167
13.00	3,378	1,839	2,006
14.00	10,388	6,883	8,889
15.00	13,733	12,061	20,949
16.00	16,663	15,198	36,147
17.00	19,924	18,294	54,441
17.50	21,500	10,356	64,797

Device	Routing	Invert	Outlet Devices
#1	Primary	10.89'	**12.0" Round Culvert** L= 345.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 10.89' / 10.34' S= 0.0016 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Secondary	16.40'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.83 cfs @ 12.49 hrs HW=13.89' TW=11.41' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.83 cfs @ 3.60 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=10.89' TW=10.10' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2: Basin A



Summary for Pond 14: Infil D w/forebay

Inflow Area = 1.500 ac, 76.67% Impervious, Inflow Depth > 1.51" for 2YR event
Inflow = 3.72 cfs @ 12.02 hrs, Volume= 0.189 af
Outflow = 2.60 cfs @ 12.10 hrs, Volume= 0.179 af, Atten= 30%, Lag= 5.1 min
Primary = 2.60 cfs @ 12.10 hrs, Volume= 0.179 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 16.01' @ 12.10 hrs Surf.Area= 2,698 sf Storage= 2,331 cf

Plug-Flow detention time= 48.2 min calculated for 0.179 af (95% of inflow)
Center-of-Mass det. time= 28.0 min (807.1 - 779.1)

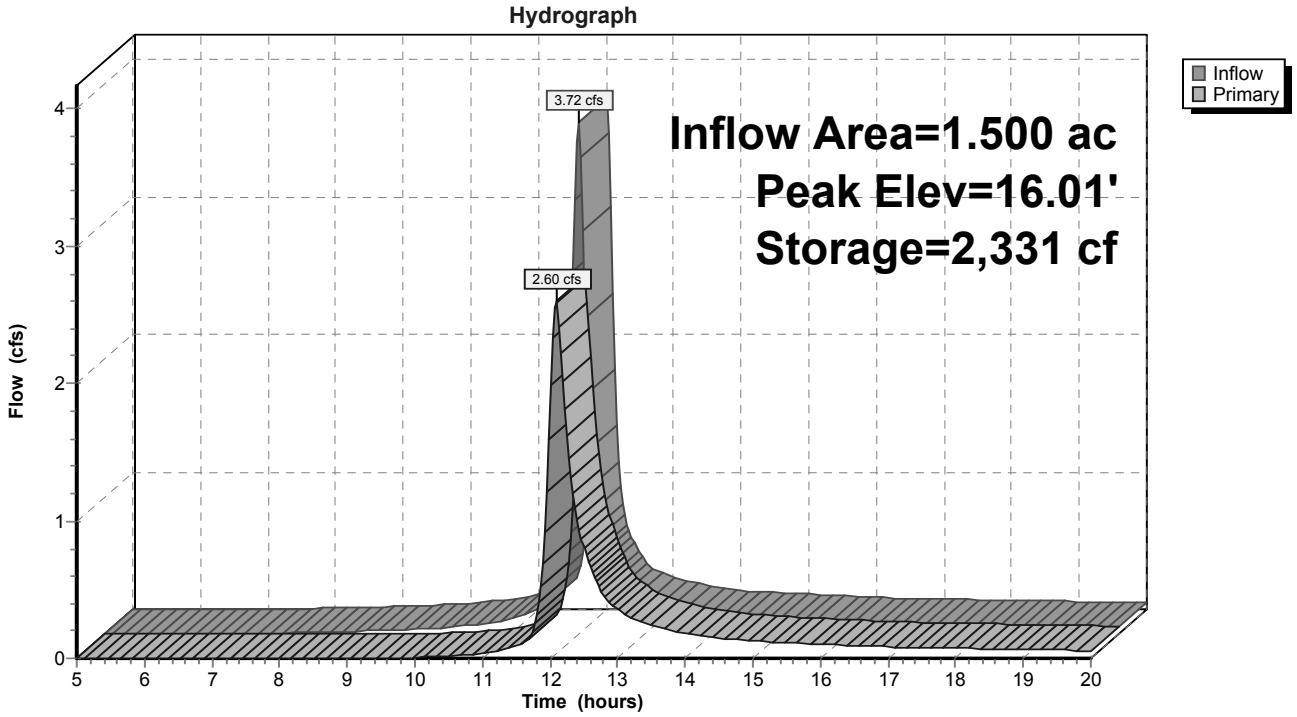
Volume	Invert	Avail.Storage	Storage Description
#1	15.00'	8,313 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
15.00	1,975	0	0
16.00	2,650	2,313	2,313
17.00	9,350	6,000	8,313

Device	Routing	Invert	Outlet Devices
#1	Primary	15.00'	**90.0 deg Sharp-Crested Vee/Trap Weir** Cv= 2.50 (C= 3.13)
#2	Primary	16.00'	**60.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=2.57 cfs @ 12.10 hrs HW=16.00' TW=14.44' (Dynamic Tailwater)
- **1=Sharp-Crested Vee/Trap Weir** (Weir Controls 2.53 cfs @ 2.51 fps)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 0.05 cfs @ 0.16 fps)

Pond 14: Infil D w/forebay



Summary for Pond 15: Infil D - Infil Cell

Inflow Area = 1.500 ac, 76.67% Impervious, Inflow Depth > 1.43" for 2YR event
Inflow = 2.60 cfs @ 12.10 hrs, Volume= 0.179 af
Outflow = 0.33 cfs @ 13.07 hrs, Volume= 0.179 af, Atten= 87%, Lag= 58.0 min
Discarded = 0.31 cfs @ 13.07 hrs, Volume= 0.177 af
Primary = 0.03 cfs @ 13.07 hrs, Volume= 0.002 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 15.11' @ 13.07 hrs Surf.Area= 3,663 sf Storage= 3,358 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 111.8 min (918.9 - 807.1)

Volume	Invert	Avail.Storage	Storage Description
#1	14.00'	14,176 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

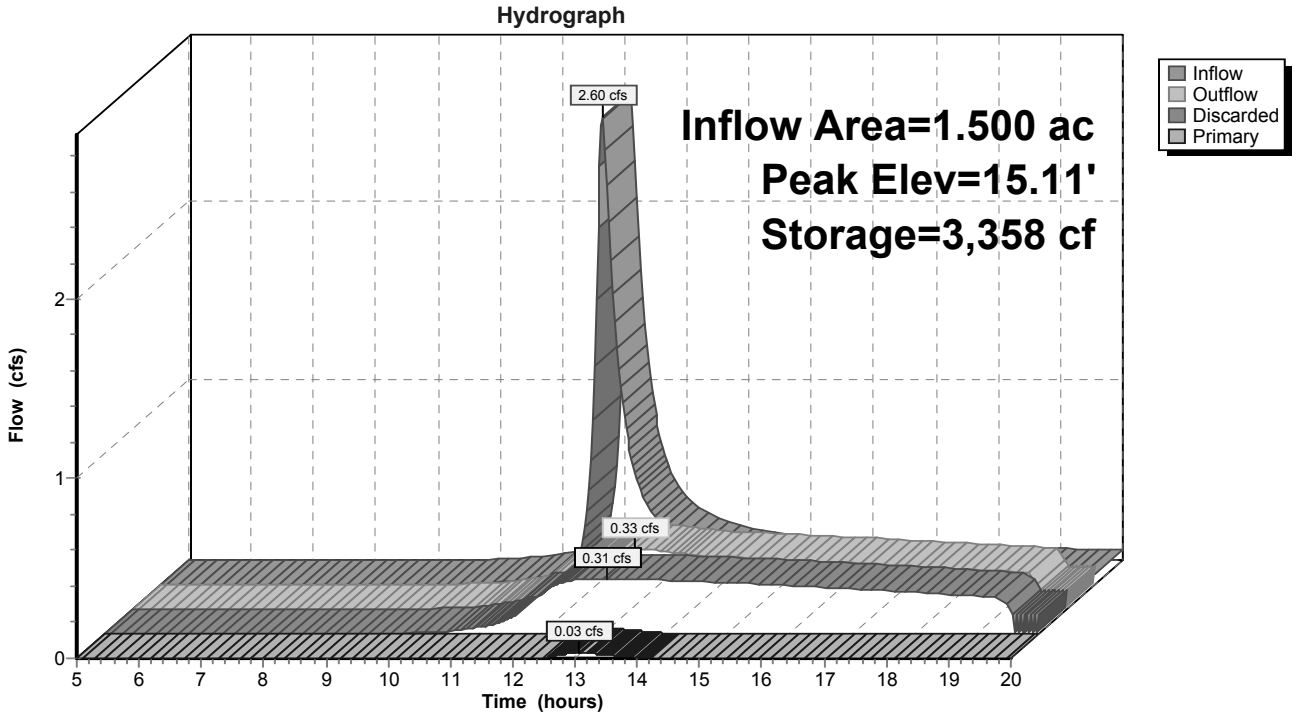
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
14.00	2,400	0	0
15.00	3,525	2,963	2,963
16.00	4,776	4,151	7,113
17.00	9,350	7,063	14,176

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**12.0" Round Culvert** L= 51.0' Ke= 0.600 Inlet / Outlet Invert= 14.00' / 13.74' S= 0.0051 '/' Cc= 0.900 n= 0.130, Flow Area= 0.79 sf
#2	Device 1	15.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	14.00'	**3.600 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.31 cfs @ 13.07 hrs HW=15.11' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.31 cfs)

Primary OutFlow Max=0.03 cfs @ 13.07 hrs HW=15.11' TW=12.79' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.03 cfs of 0.37 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 1.13 fps)

Pond 15: Infil D - Infil Cell



Summary for Pond 19: Basin C

Inflow Area = 15.987 ac, 21.44% Impervious, Inflow Depth > 0.53" for 2YR event
Inflow = 4.84 cfs @ 12.42 hrs, Volume= 0.705 af
Outflow = 0.68 cfs @ 14.81 hrs, Volume= 0.405 af, Atten= 86%, Lag= 143.0 min
Primary = 0.68 cfs @ 14.81 hrs, Volume= 0.405 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 12.99' @ 14.81 hrs Surf.Area= 13,893 sf Storage= 16,817 cf

Plug-Flow detention time= 219.5 min calculated for 0.405 af (57% of inflow)
Center-of-Mass det. time= 131.0 min (971.1 - 840.1)

Volume	Invert	Avail.Storage	Storage Description
#1	11.70'	75,034 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

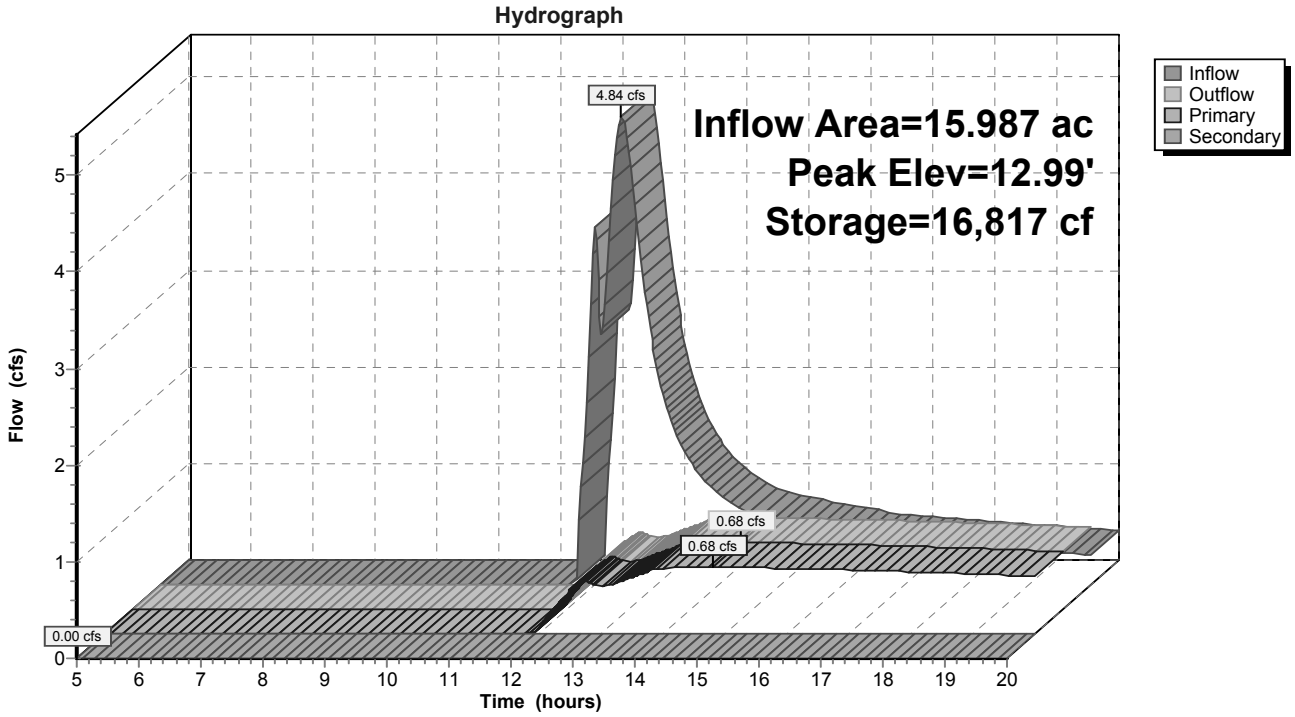
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
11.70	12,100	0	0
12.00	12,500	3,690	3,690
13.00	13,900	13,200	16,890
14.00	15,325	14,613	31,503
15.00	16,850	16,088	47,590
16.00	18,425	17,638	65,228
16.50	20,800	9,806	75,034

Device	Routing	Invert	Outlet Devices
#1	Primary	11.70'	**24.0" Round Culvert** L= 106.0' Ke= 0.600 Inlet / Outlet Invert= 11.70' / 11.44' S= 0.0025 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	11.70'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	14.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	15.50'	**25.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.68 cfs @ 14.81 hrs HW=12.99' TW=11.49' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.68 cfs of 5.40 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.68 cfs @ 5.02 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=11.70' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 19: Basin C



Summary for Pond 24: Basin B / Clearwater

Inflow Area = 72.397 ac, 4.73% Impervious, Inflow Depth > 0.62" for 2YR event
Inflow = 20.76 cfs @ 12.61 hrs, Volume= 3.736 af
Outflow = 13.34 cfs @ 13.12 hrs, Volume= 3.356 af, Atten= 36%, Lag= 30.6 min
Primary = 13.34 cfs @ 13.12 hrs, Volume= 3.356 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 12.23' @ 13.12 hrs Surf.Area= 20,460 sf Storage= 35,965 cf

Plug-Flow detention time= 59.7 min calculated for 3.349 af (90% of inflow)
Center-of-Mass det. time= 28.9 min (892.9 - 863.9)

Volume	Invert	Avail.Storage	Storage Description
#1	10.10'	143,778 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

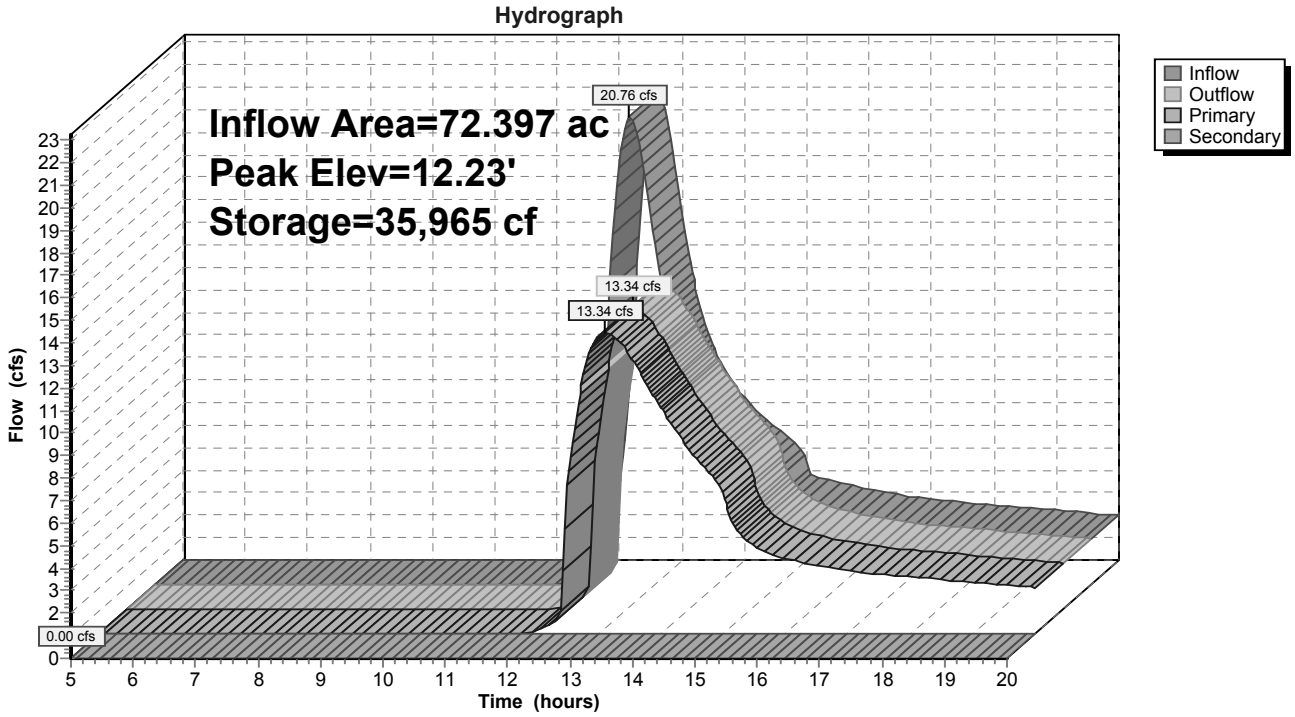
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.10	0	0	0
10.40	16,000	2,400	2,400
11.00	17,667	10,100	12,500
12.00	19,950	18,809	31,309
13.00	22,164	21,057	52,366
14.00	24,361	23,263	75,628
15.00	26,639	25,500	101,128
16.00	28,940	27,790	128,918
16.50	30,500	14,860	143,778

Device	Routing	Invert	Outlet Devices
#1	Primary	10.10'	**24.0" Round RCP_Round 24"** L= 120.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 10.10' / 9.62' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	10.10'	**6.0" Round Culvert** L= 24.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 10.10' / 9.98' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#3	Device 1	11.10'	**9.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Secondary	15.20'	**40.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=13.34 cfs @ 13.12 hrs HW=12.23' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 24"** (Barrel Controls 13.34 cfs @ 4.96 fps)
  ├─**2=Culvert** (Passes < 1.13 cfs potential flow)
  └─**3=Sharp-Crested Rectangular Weir** (Passes < 34.47 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=10.10' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 24: Basin B / Clearwater



Summary for Pond RG: RAIN GARDEN

Inflow Area = 1.040 ac, 76.92% Impervious, Inflow Depth > 1.76" for 2YR event
Inflow = 3.32 cfs @ 11.97 hrs, Volume= 0.152 af
Outflow = 3.28 cfs @ 11.98 hrs, Volume= 0.126 af, Atten= 1%, Lag= 0.8 min
Primary = 3.28 cfs @ 11.98 hrs, Volume= 0.126 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 24.66' @ 11.98 hrs Surf.Area= 1,496 sf Storage= 1,363 cf

Plug-Flow detention time= 78.8 min calculated for 0.126 af (83% of inflow)
Center-of-Mass det. time= 29.2 min (793.7 - 764.5)

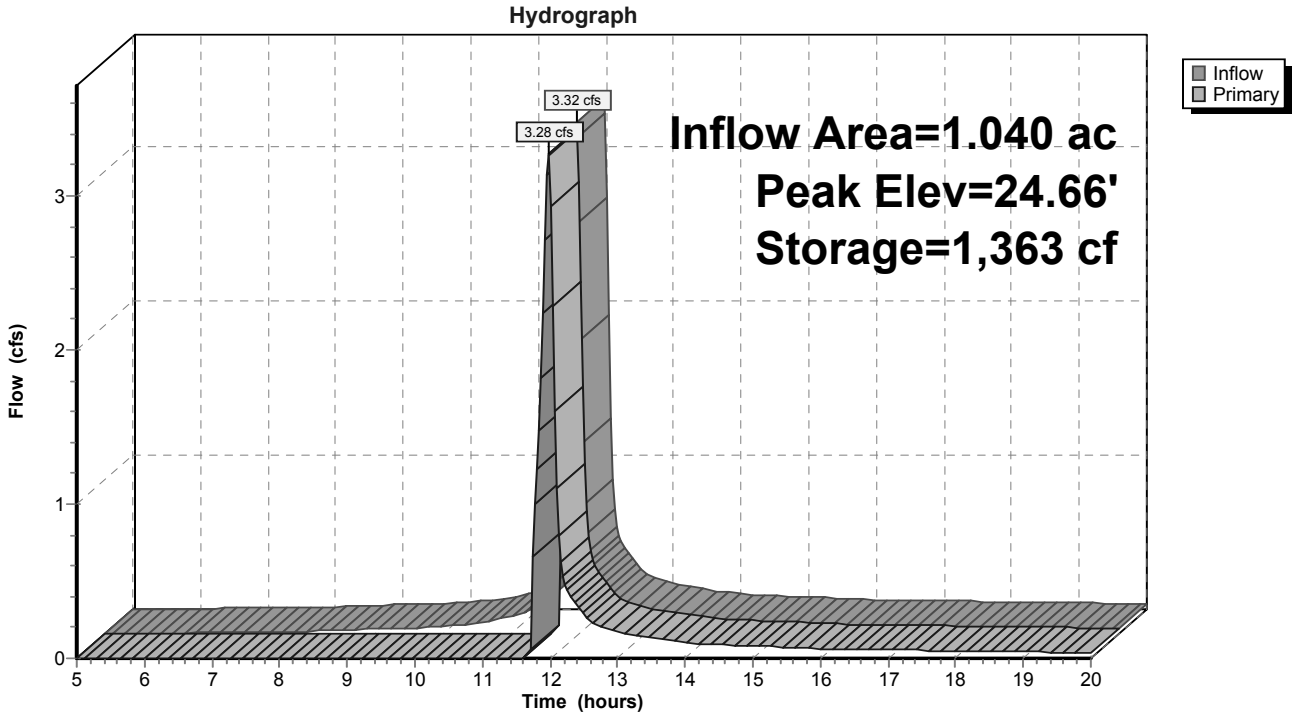
Volume	Invert	Avail.Storage	Storage Description
#1	23.50'	1,894 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
23.50	738	0	0
24.00	1,173	478	478
25.00	1,660	1,417	1,894

Device	Routing	Invert	Outlet Devices
#1	Primary	24.50'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=3.24 cfs @ 11.98 hrs HW=24.66' TW=11.84' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 3.24 cfs @ 1.00 fps)

Pond RG: RAIN GARDEN

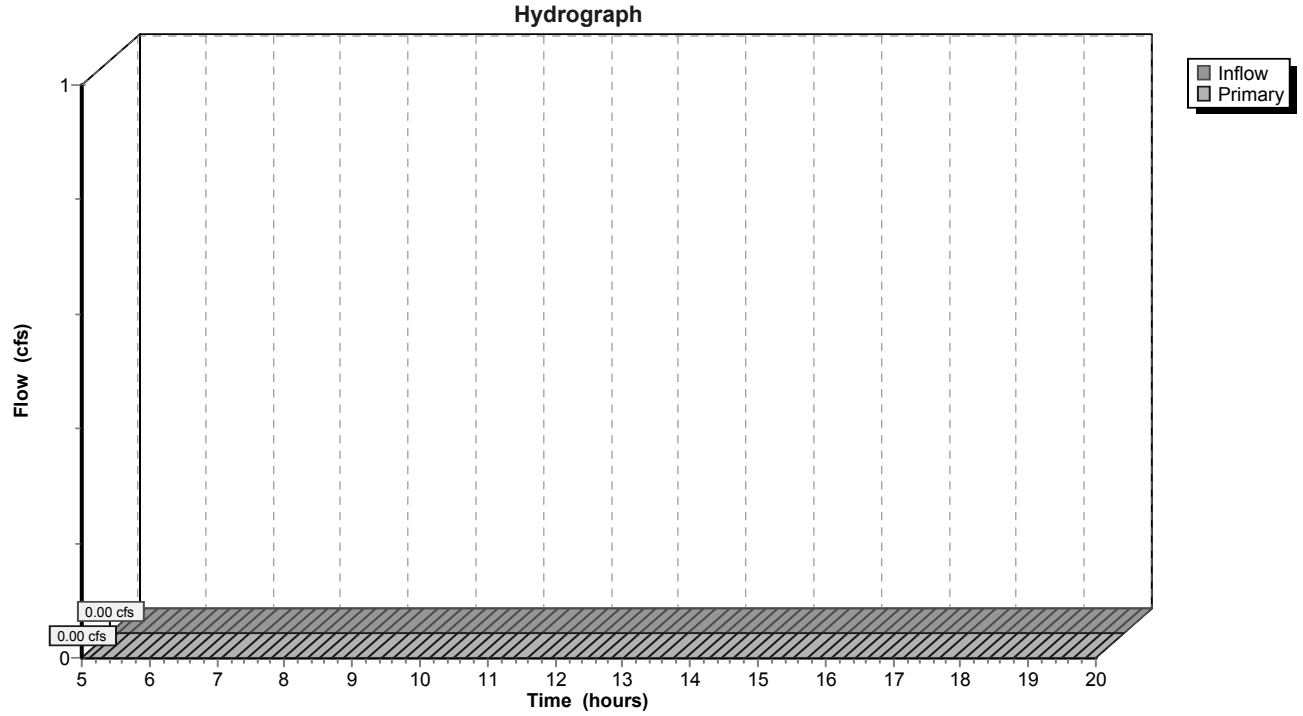


Summary for Link 21: Pond C overflow

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link 21: Pond C overflow

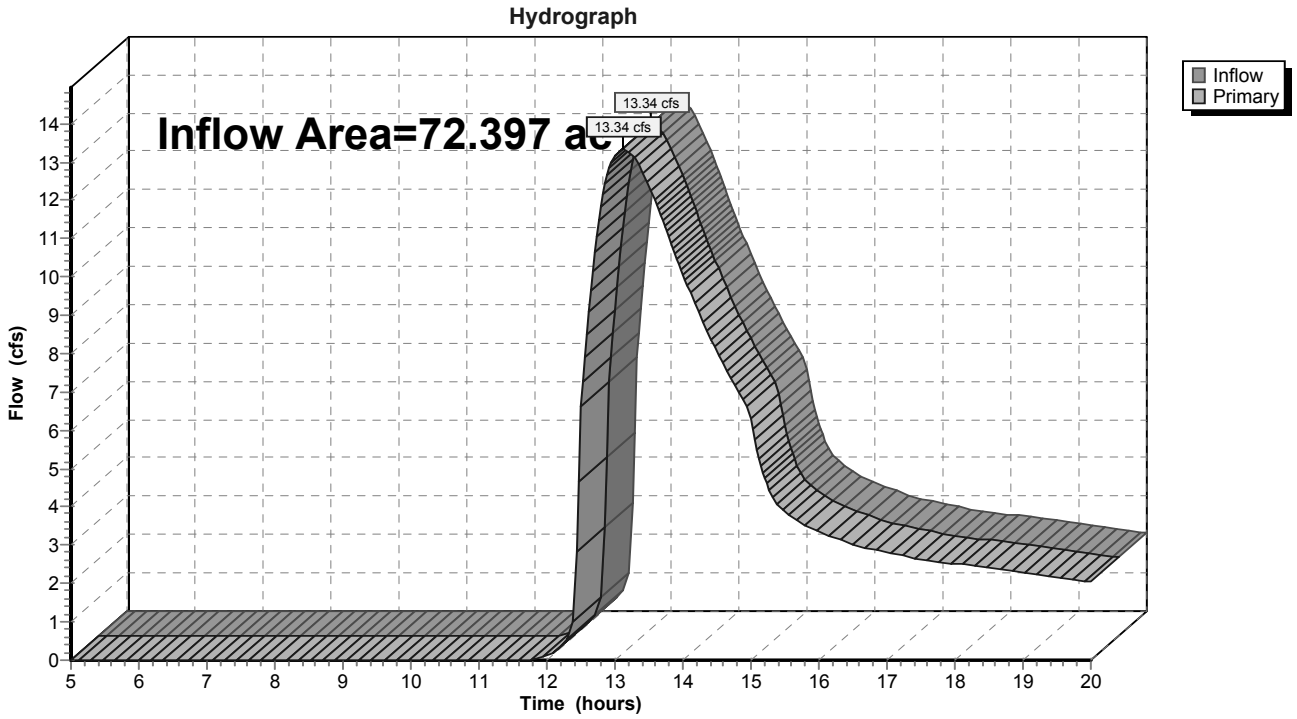


Summary for Link O: OUTLET

Inflow Area = 72.397 ac, 4.73% Impervious, Inflow Depth > 0.56" for 2YR event
Inflow = 13.34 cfs @ 13.12 hrs, Volume= 3.356 af
Primary = 13.34 cfs @ 13.12 hrs, Volume= 3.356 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link O: OUTLET



Time span=5.00-20.00 hrs, dt=0.03 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Area A - Rivers Crossing Runoff Area=13.800 ac 0.00% Impervious Runoff Depth>1.51"
Tc=28.7 min CN=75 Runoff=20.04 cfs 1.733 af

Subcatchment13: Area to BASIN D Runoff Area=1.500 ac 76.67% Impervious Runoff Depth>2.64"
Tc=10.0 min CN=89 Runoff=6.30 cfs 0.330 af

SubcatchmentN1: PROP AREA TO BASIN Runoff Area=13.447 ac 10.98% Impervious Runoff Depth>1.24"
Tc=41.2 min CN=71 Runoff=12.32 cfs 1.391 af

SubcatchmentN2: Area B - Rivers Runoff Area=42.610 ac 0.00% Impervious Runoff Depth>1.56"
Tc=56.4 min CN=76 Runoff=40.32 cfs 5.525 af

SubcatchmentN3: NEW DEVELOPMENT Runoff Area=1.040 ac 76.92% Impervious Runoff Depth>2.92"
Tc=6.0 min CN=92 Runoff=5.34 cfs 0.253 af

Pond 2: Basin A Peak Elev=15.85' Storage=33,717 cf Inflow=20.04 cfs 1.733 af
Primary=3.18 cfs 1.731 af Secondary=0.00 cfs 0.000 af Outflow=3.18 cfs 1.731 af

Pond 14: Infil D w/forebay Peak Elev=16.08' Storage=2,547 cf Inflow=6.30 cfs 0.330 af
Outflow=6.23 cfs 0.317 af

Pond 15: Infil D - Infil Cell Peak Elev=15.70' Storage=5,735 cf Inflow=6.23 cfs 0.317 af
Discarded=0.37 cfs 0.230 af Primary=0.31 cfs 0.064 af Outflow=0.67 cfs 0.294 af

Pond 19: Basin C Peak Elev=14.38' Storage=37,438 cf Inflow=13.15 cfs 1.682 af
Primary=4.97 cfs 1.012 af Secondary=0.00 cfs 0.000 af Outflow=4.97 cfs 1.012 af

Pond 24: Basin B / Clearwater Peak Elev=14.33' Storage=83,790 cf Inflow=43.77 cfs 8.268 af
Primary=23.98 cfs 7.854 af Secondary=0.00 cfs 0.000 af Outflow=23.98 cfs 7.854 af

Pond RG: RAIN GARDEN Peak Elev=24.72' Storage=1,454 cf Inflow=5.34 cfs 0.253 af
Outflow=5.29 cfs 0.227 af

Link 21: Pond C overflow Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link O: OUTLET Inflow=23.98 cfs 7.854 af
Primary=23.98 cfs 7.854 af

Total Runoff Area = 72.397 ac Runoff Volume = 9.232 af Average Runoff Depth = 1.53"
95.27% Pervious = 68.970 ac 4.73% Impervious = 3.427 ac

Summary for Subcatchment 1: Area A - Rivers Crossing

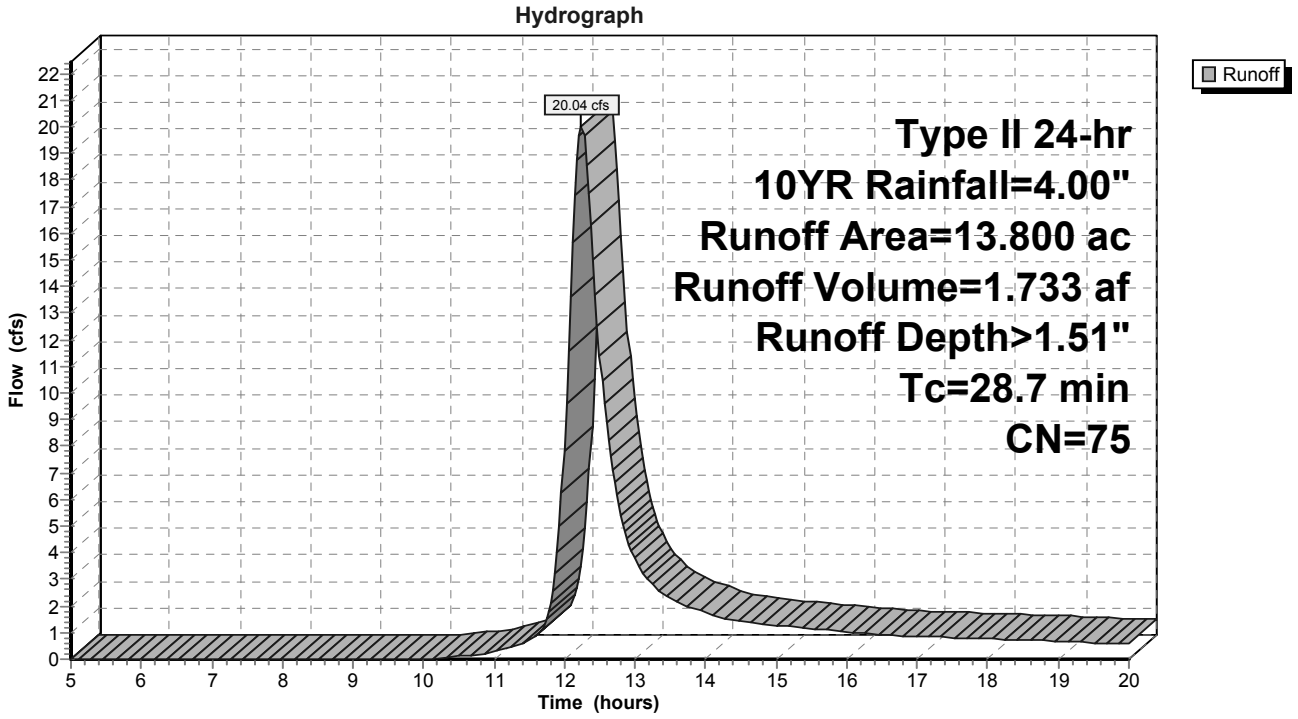
Runoff = 20.04 cfs @ 12.24 hrs, Volume= 1.733 af, Depth> 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 10YR Rainfall=4.00"

	Area (ac)	CN	Description
*	13.800	75	1/4 Acre Lots Residential District
	13.800		100.00% Pervious Area

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

Subcatchment 1: Area A - Rivers Crossing



Summary for Subcatchment 13: Area to BASIN D

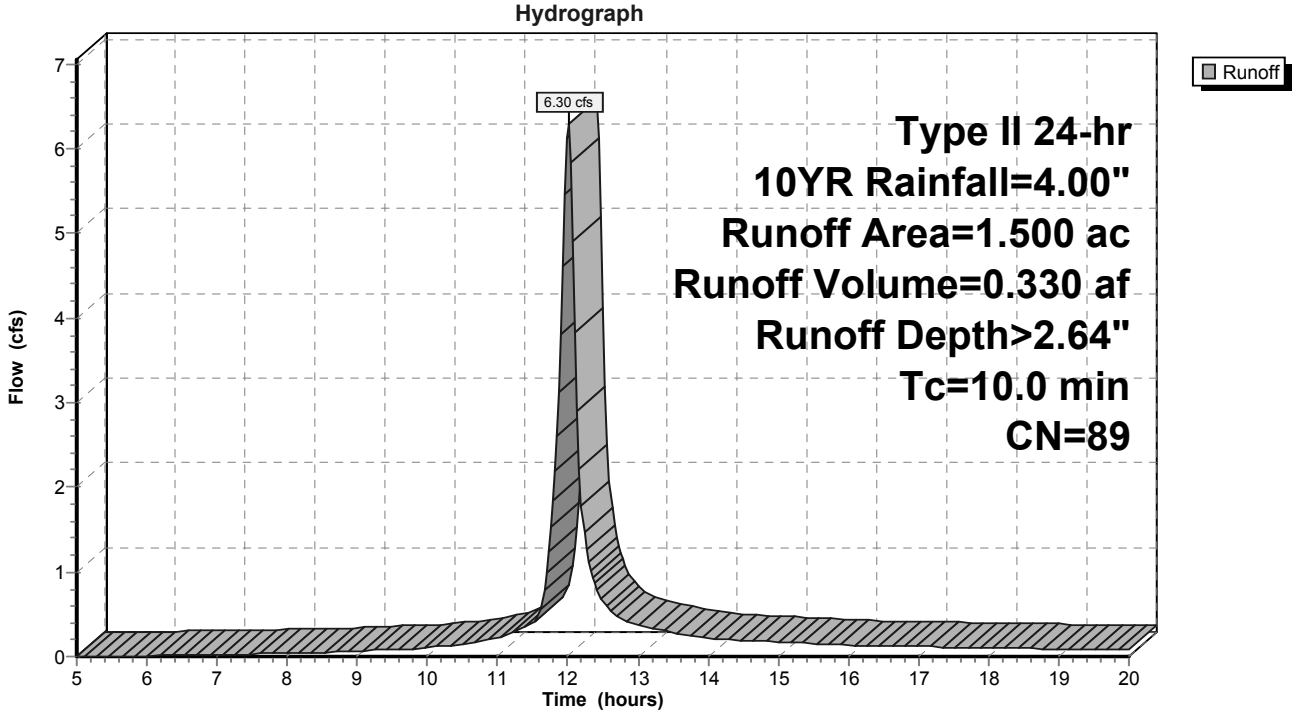
Runoff = 6.30 cfs @ 12.01 hrs, Volume= 0.330 af, Depth> 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 10YR Rainfall=4.00"

	Area (ac)	CN	Description
*	1.150	98	Impervious
*	0.350	61	Open - Good Condition (B-Soils)
	1.500	89	Weighted Average
	0.350		23.33% Pervious Area
	1.150		76.67% Impervious Area

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

Subcatchment 13: Area to BASIN D



Summary for Subcatchment N1: PROP AREA TO BASIN C-REVISED

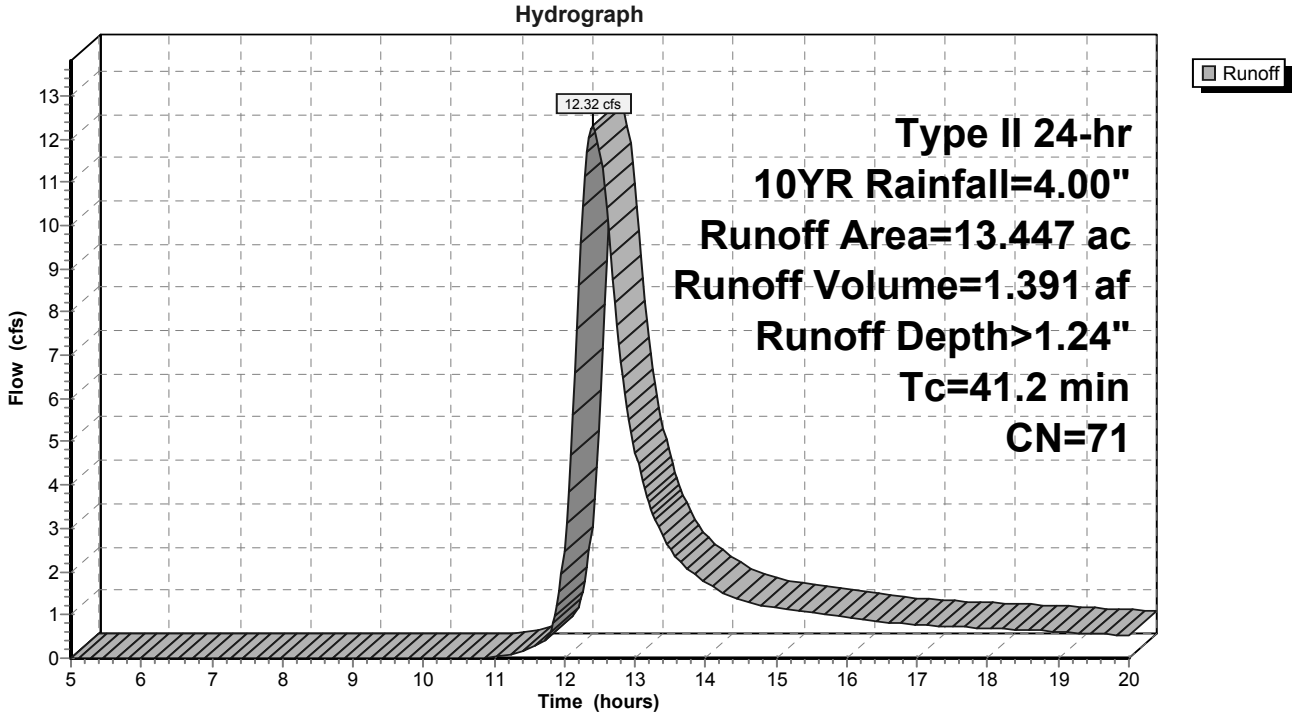
Runoff = 12.32 cfs @ 12.41 hrs, Volume= 1.391 af, Depth> 1.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 10YR Rainfall=4.00"

	Area (ac)	CN	Description
*	1.477	98	Impervious
*	6.900	61	Open - Good Condition (B-Soils)
*	5.070	78	Open Space - Meadow (D-Soils)
	13.447	71	Weighted Average
	11.970		89.02% Pervious Area
	1.477		10.98% Impervious Area

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

Subcatchment N1: PROP AREA TO BASIN C-REVISED



Summary for Subcatchment N2: Area B - Rivers Crossing-Revised

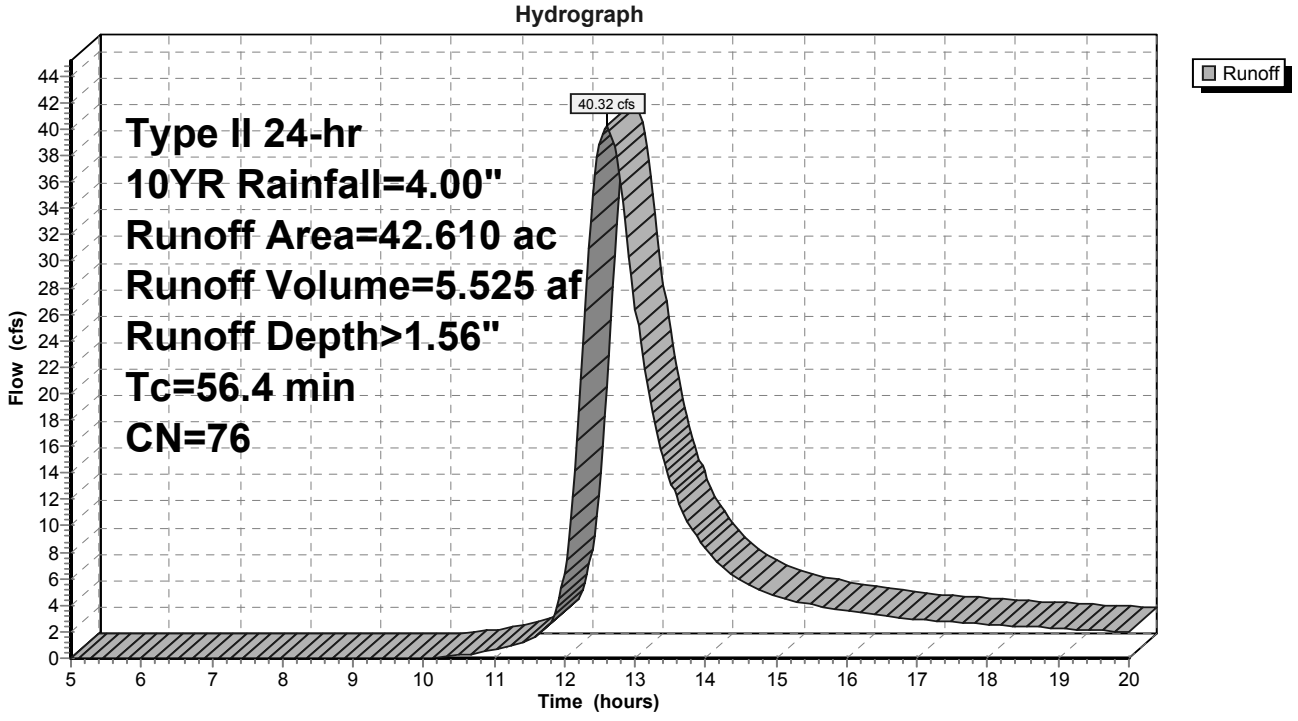
Runoff = 40.32 cfs @ 12.59 hrs, Volume= 5.525 af, Depth> 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 10YR Rainfall=4.00"

	Area (ac)	CN	Description
*	37.500	75	1/4 Acre Lots Residential District
*	2.700	92	Commercial Lands
*	0.410	85	Apartments-Condos
*	2.000	61	Open - Good Condition (B-Soils)
	42.610	76	Weighted Average
	42.610		100.00% Pervious Area

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

Subcatchment N2: Area B - Rivers Crossing-Revised



Summary for Subcatchment N3: NEW DEVELOPMENT

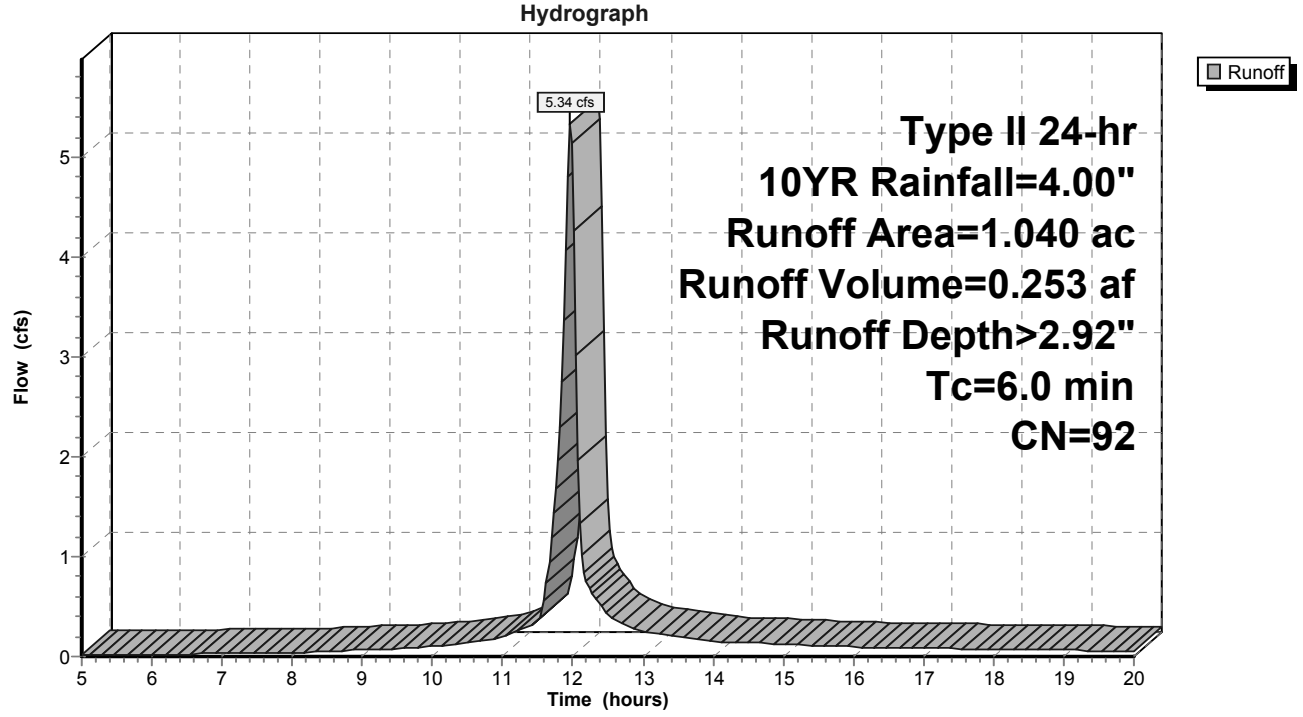
Runoff = 5.34 cfs @ 11.97 hrs, Volume= 0.253 af, Depth> 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 10YR Rainfall=4.00"

Area (ac)	CN	Description
0.800	98	Paved parking, HSG D
0.240	74	>75% Grass cover, Good, HSG C
1.040	92	Weighted Average
0.240		23.08% Pervious Area
0.800		76.92% Impervious Area

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

Subcatchment N3: NEW DEVELOPMENT



Summary for Pond 2: Basin A

Inflow Area = 13.800 ac, 0.00% Impervious, Inflow Depth > 1.51" for 10YR event
Inflow = 20.04 cfs @ 12.24 hrs, Volume= 1.733 af
Outflow = 3.18 cfs @ 15.84 hrs, Volume= 1.731 af, Atten= 84%, Lag= 216.0 min
Primary = 3.18 cfs @ 15.84 hrs, Volume= 1.731 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 15.85' @ 13.51 hrs Surf.Area= 16,230 sf Storage= 33,717 cf

Plug-Flow detention time= 111.9 min calculated for 1.731 af (100% of inflow)
Center-of-Mass det. time= 111.6 min (926.0 - 814.4)

Volume	Invert	Avail.Storage	Storage Description
#1	10.89'	64,797 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

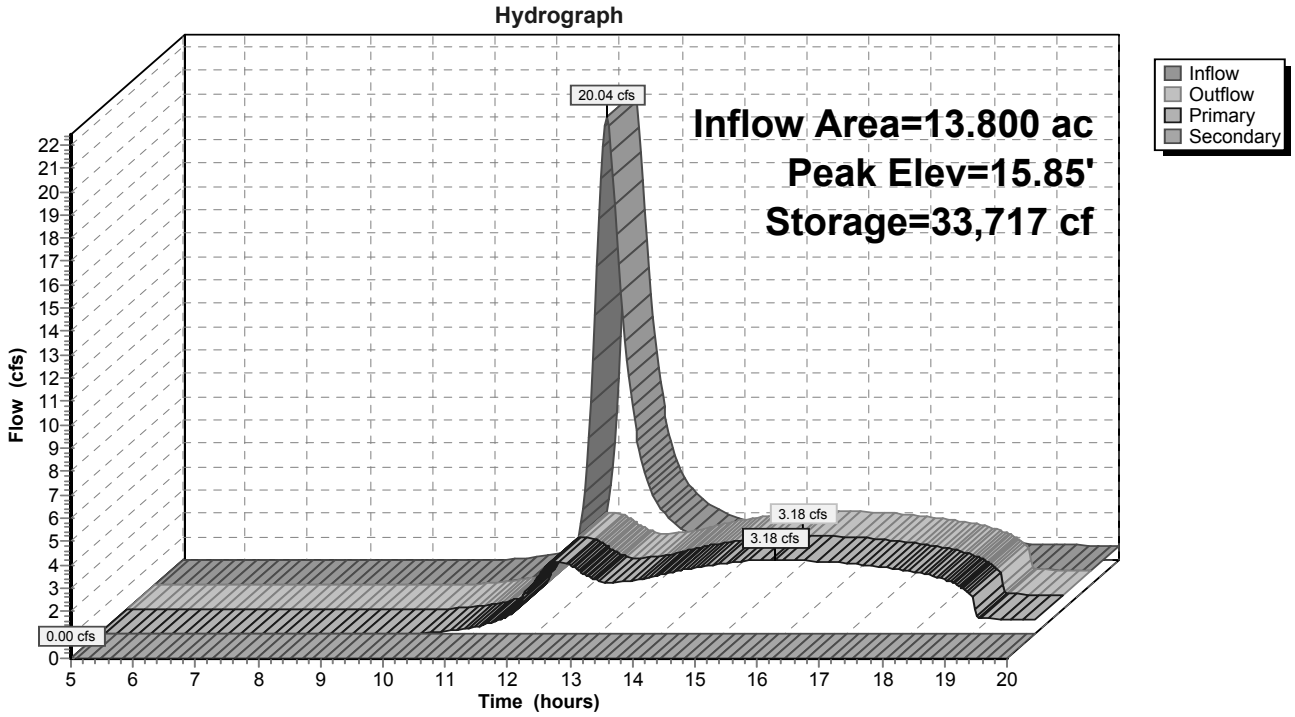
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.89	10	0	0
11.00	31	2	2
12.00	299	165	167
13.00	3,378	1,839	2,006
14.00	10,388	6,883	8,889
15.00	13,733	12,061	20,949
16.00	16,663	15,198	36,147
17.00	19,924	18,294	54,441
17.50	21,500	10,356	64,797

Device	Routing	Invert	Outlet Devices
#1	Primary	10.89'	**12.0" Round Culvert** L= 345.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 10.89' / 10.34' S= 0.0016 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Secondary	16.40'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=3.18 cfs @ 15.84 hrs HW=15.10' TW=11.95' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.18 cfs @ 4.05 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=10.89' TW=10.10' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2: Basin A



Summary for Pond 14: Infil D w/forebay

Inflow Area = 1.500 ac, 76.67% Impervious, Inflow Depth > 2.64" for 10YR event
Inflow = 6.30 cfs @ 12.01 hrs, Volume= 0.330 af
Outflow = 6.23 cfs @ 12.03 hrs, Volume= 0.317 af, Atten= 1%, Lag= 0.8 min
Primary = 6.23 cfs @ 12.03 hrs, Volume= 0.317 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 16.08' @ 12.03 hrs Surf.Area= 3,189 sf Storage= 2,547 cf

Plug-Flow detention time= 40.8 min calculated for 0.317 af (96% of inflow)
Center-of-Mass det. time= 26.3 min (792.7 - 766.4)

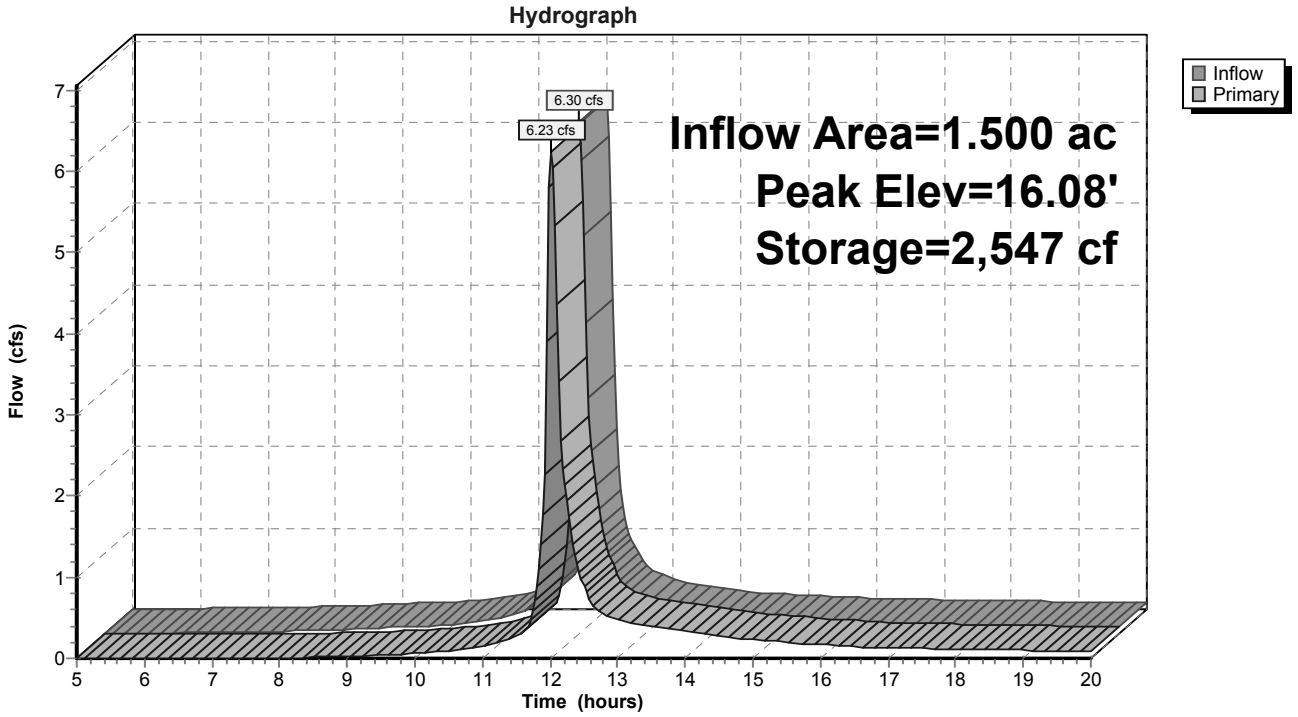
Volume	Invert	Avail.Storage	Storage Description
#1	15.00'	8,313 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
15.00	1,975	0	0
16.00	2,650	2,313	2,313
17.00	9,350	6,000	8,313

Device	Routing	Invert	Outlet Devices
#1	Primary	15.00'	**90.0 deg Sharp-Crested Vee/Trap Weir** Cv= 2.50 (C= 3.13)
#2	Primary	16.00'	**60.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=6.18 cfs @ 12.03 hrs HW=16.08' TW=14.83' (Dynamic Tailwater)
- **1=Sharp-Crested Vee/Trap Weir** (Weir Controls 3.03 cfs @ 2.60 fps)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 3.16 cfs @ 0.66 fps)

Pond 14: Infil D w/forebay



Summary for Pond 15: Infil D - Infil Cell

Inflow Area = 1.500 ac, 76.67% Impervious, Inflow Depth > 2.54" for 10YR event
Inflow = 6.23 cfs @ 12.03 hrs, Volume= 0.317 af
Outflow = 0.67 cfs @ 12.62 hrs, Volume= 0.294 af, Atten= 89%, Lag= 35.7 min
Discarded = 0.37 cfs @ 12.62 hrs, Volume= 0.230 af
Primary = 0.31 cfs @ 12.62 hrs, Volume= 0.064 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 15.70' @ 12.62 hrs Surf.Area= 4,400 sf Storage= 5,735 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 94.2 min (886.9 - 792.7)

Volume	Invert	Avail.Storage	Storage Description
#1	14.00'	14,176 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

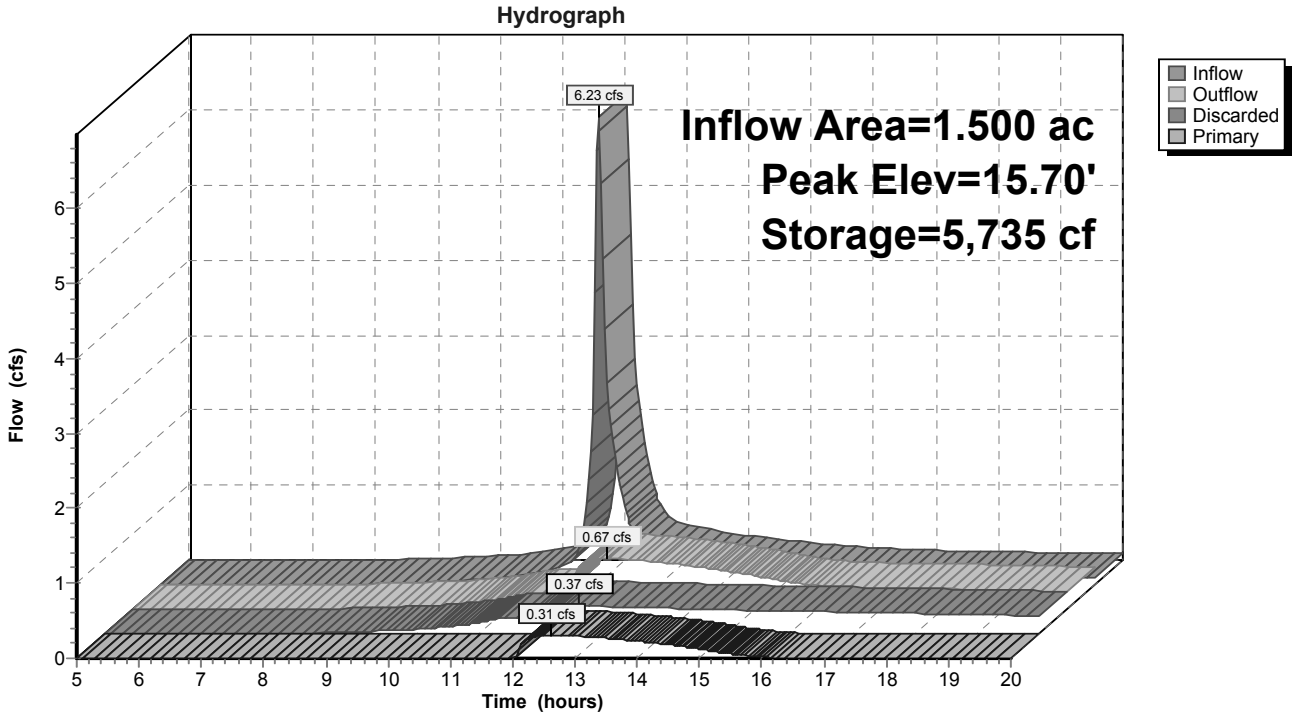
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
14.00	2,400	0	0
15.00	3,525	2,963	2,963
16.00	4,776	4,151	7,113
17.00	9,350	7,063	14,176

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**12.0" Round Culvert** L= 51.0' Ke= 0.600 Inlet / Outlet Invert= 14.00' / 13.74' S= 0.0051 '/' Cc= 0.900 n= 0.130, Flow Area= 0.79 sf
#2	Device 1	15.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	14.00'	**3.600 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.37 cfs @ 12.62 hrs HW=15.70' (Free Discharge)
↑—**3=Exfiltration** (Exfiltration Controls 0.37 cfs)

Primary OutFlow Max=0.31 cfs @ 12.62 hrs HW=15.70' TW=13.79' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.31 cfs of 0.49 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.31 cfs @ 3.52 fps)

Pond 15: Infil D - Infil Cell



Summary for Pond 19: Basin C

Inflow Area = 15.987 ac, 21.44% Impervious, Inflow Depth > 1.26" for 10YR event
Inflow = 13.15 cfs @ 12.40 hrs, Volume= 1.682 af
Outflow = 4.97 cfs @ 13.69 hrs, Volume= 1.012 af, Atten= 62%, Lag= 77.1 min
Primary = 4.97 cfs @ 13.69 hrs, Volume= 1.012 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 14.38' @ 13.34 hrs Surf.Area= 15,905 sf Storage= 37,438 cf

Plug-Flow detention time= 166.9 min calculated for 1.012 af (60% of inflow)
Center-of-Mass det. time= 89.6 min (913.5 - 823.9)

Volume	Invert	Avail.Storage	Storage Description
#1	11.70'	75,034 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

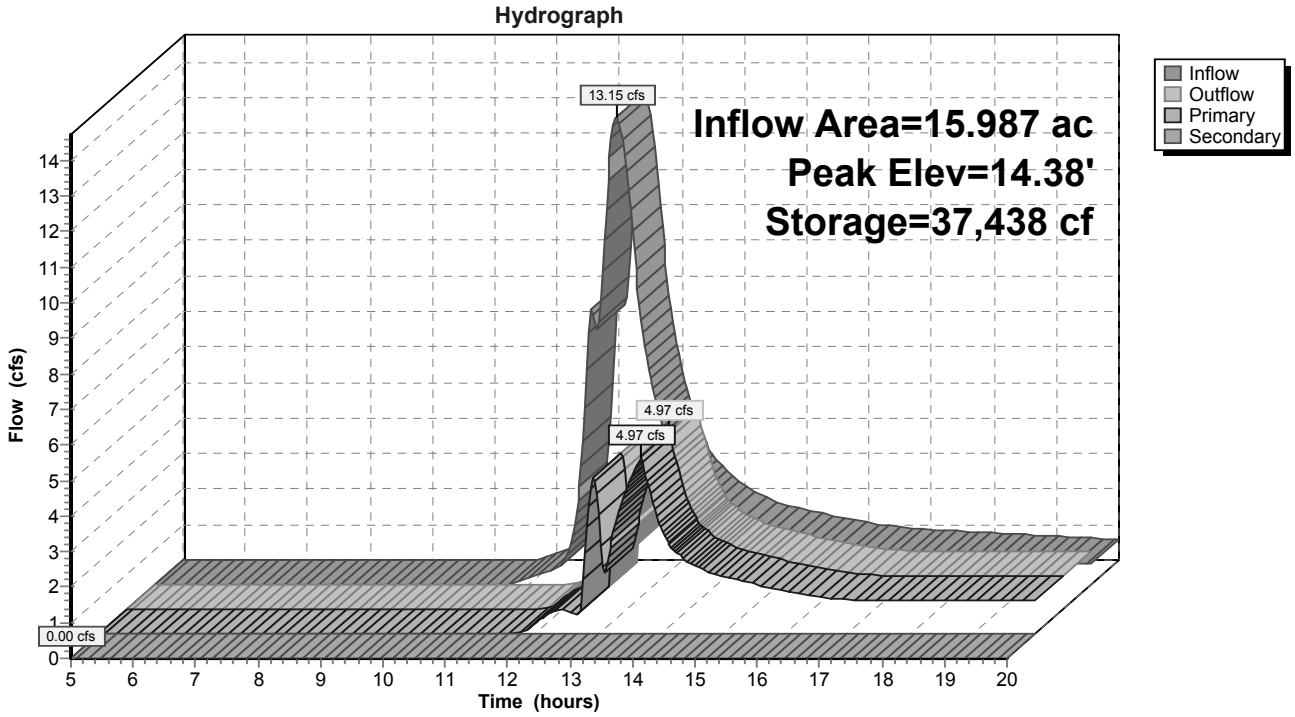
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
11.70	12,100	0	0
12.00	12,500	3,690	3,690
13.00	13,900	13,200	16,890
14.00	15,325	14,613	31,503
15.00	16,850	16,088	47,590
16.00	18,425	17,638	65,228
16.50	20,800	9,806	75,034

Device	Routing	Invert	Outlet Devices
#1	Primary	11.70'	**24.0" Round Culvert** L= 106.0' Ke= 0.600 Inlet / Outlet Invert= 11.70' / 11.44' S= 0.0025 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	11.70'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	14.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	15.50'	**25.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=5.32 cfs @ 13.69 hrs HW=14.27' TW=14.13' (Dynamic Tailwater)
└─**1=Culvert** (Passes 5.32 cfs of 5.38 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.25 cfs @ 1.83 fps)
  └─**3=Orifice/Grate** (Weir Controls 5.07 cfs @ 1.47 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=11.70' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 19: Basin C



Summary for Pond 24: Basin B / Clearwater

Inflow Area = 72.397 ac, 4.73% Impervious, Inflow Depth > 1.37" for 10YR event
Inflow = 43.77 cfs @ 12.59 hrs, Volume= 8.268 af
Outflow = 23.98 cfs @ 13.23 hrs, Volume= 7.854 af, Atten= 45%, Lag= 38.3 min
Primary = 23.98 cfs @ 13.23 hrs, Volume= 7.854 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 14.33' @ 13.23 hrs Surf.Area= 25,113 sf Storage= 83,790 cf

Plug-Flow detention time= 51.9 min calculated for 7.854 af (95% of inflow)
Center-of-Mass det. time= 36.3 min (898.9 - 862.6)

Volume	Invert	Avail.Storage	Storage Description
#1	10.10'	143,778 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

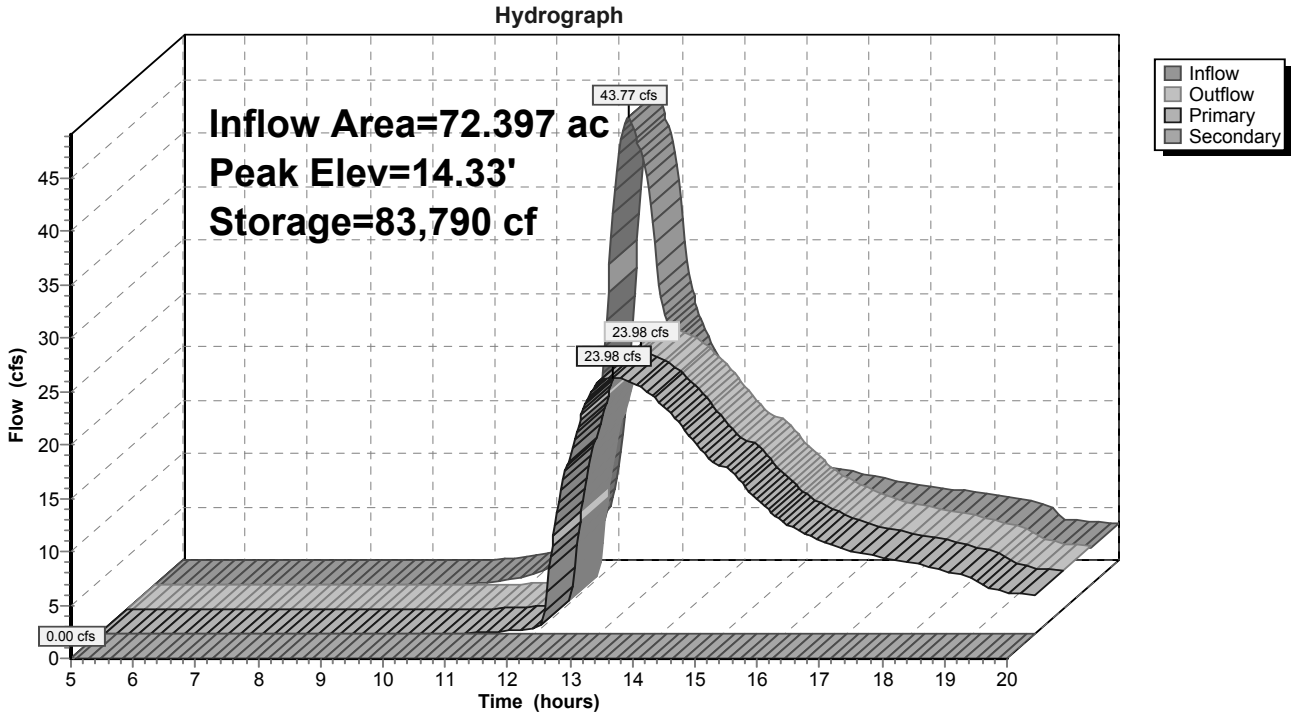
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.10	0	0	0
10.40	16,000	2,400	2,400
11.00	17,667	10,100	12,500
12.00	19,950	18,809	31,309
13.00	22,164	21,057	52,366
14.00	24,361	23,263	75,628
15.00	26,639	25,500	101,128
16.00	28,940	27,790	128,918
16.50	30,500	14,860	143,778

Device	Routing	Invert	Outlet Devices
#1	Primary	10.10'	**24.0" Round RCP_Round 24"** L= 120.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 10.10' / 9.62' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	10.10'	**6.0" Round Culvert** L= 24.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 10.10' / 9.98' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#3	Device 1	11.10'	**9.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Secondary	15.20'	**40.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=23.98 cfs @ 13.23 hrs HW=14.33' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 24"** (Barrel Controls 23.98 cfs @ 7.63 fps)
  ├─**2=Culvert** (Passes < 1.68 cfs potential flow)
  └─**3=Sharp-Crested Rectangular Weir** (Passes < 158.56 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=10.10' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 24: Basin B / Clearwater



Summary for Pond RG: RAIN GARDEN

Inflow Area = 1.040 ac, 76.92% Impervious, Inflow Depth > 2.92" for 10YR event
Inflow = 5.34 cfs @ 11.97 hrs, Volume= 0.253 af
Outflow = 5.29 cfs @ 11.98 hrs, Volume= 0.227 af, Atten= 1%, Lag= 0.7 min
Primary = 5.29 cfs @ 11.98 hrs, Volume= 0.227 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 24.72' @ 11.98 hrs Surf.Area= 1,526 sf Storage= 1,454 cf

Plug-Flow detention time= 61.1 min calculated for 0.227 af (90% of inflow)
Center-of-Mass det. time= 25.6 min (778.8 - 753.2)

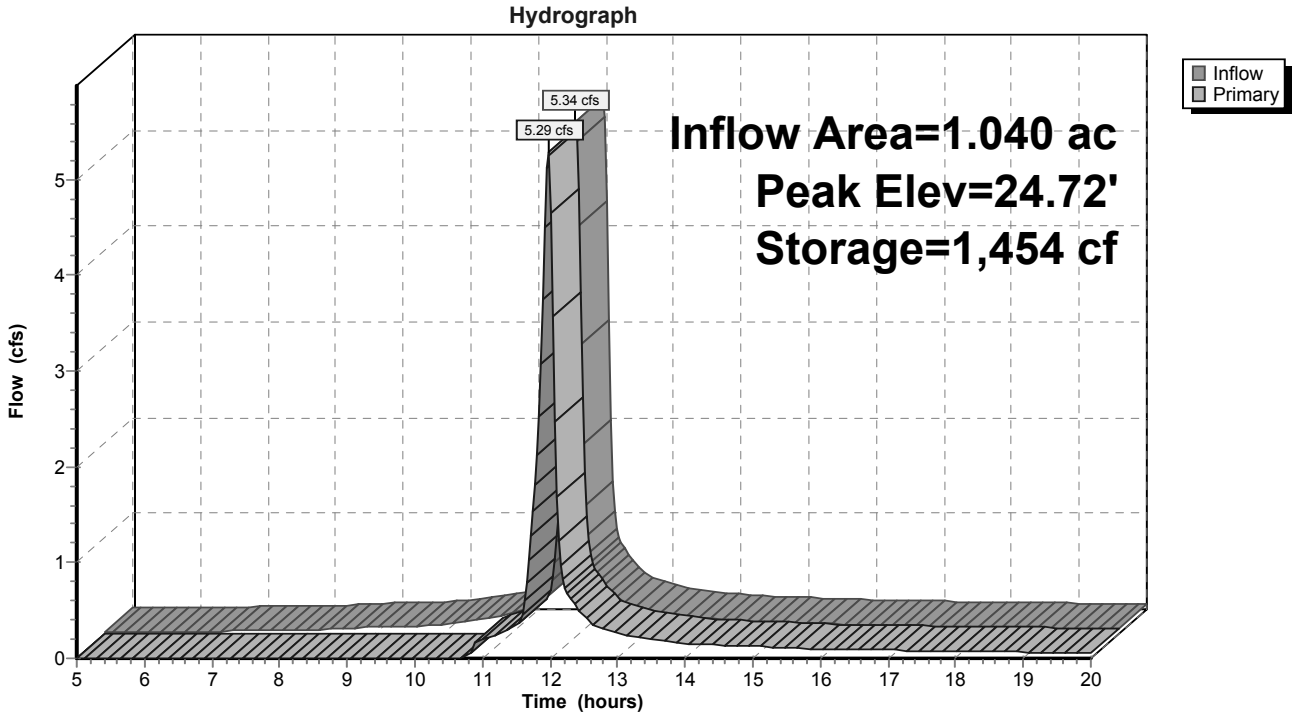
Volume	Invert	Avail.Storage	Storage Description
#1	23.50'	1,894 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
23.50	738	0	0
24.00	1,173	478	478
25.00	1,660	1,417	1,894

Device	Routing	Invert	Outlet Devices
#1	Primary	24.50'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=5.21 cfs @ 11.98 hrs HW=24.72' TW=12.11' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 5.21 cfs @ 1.18 fps)

Pond RG: RAIN GARDEN

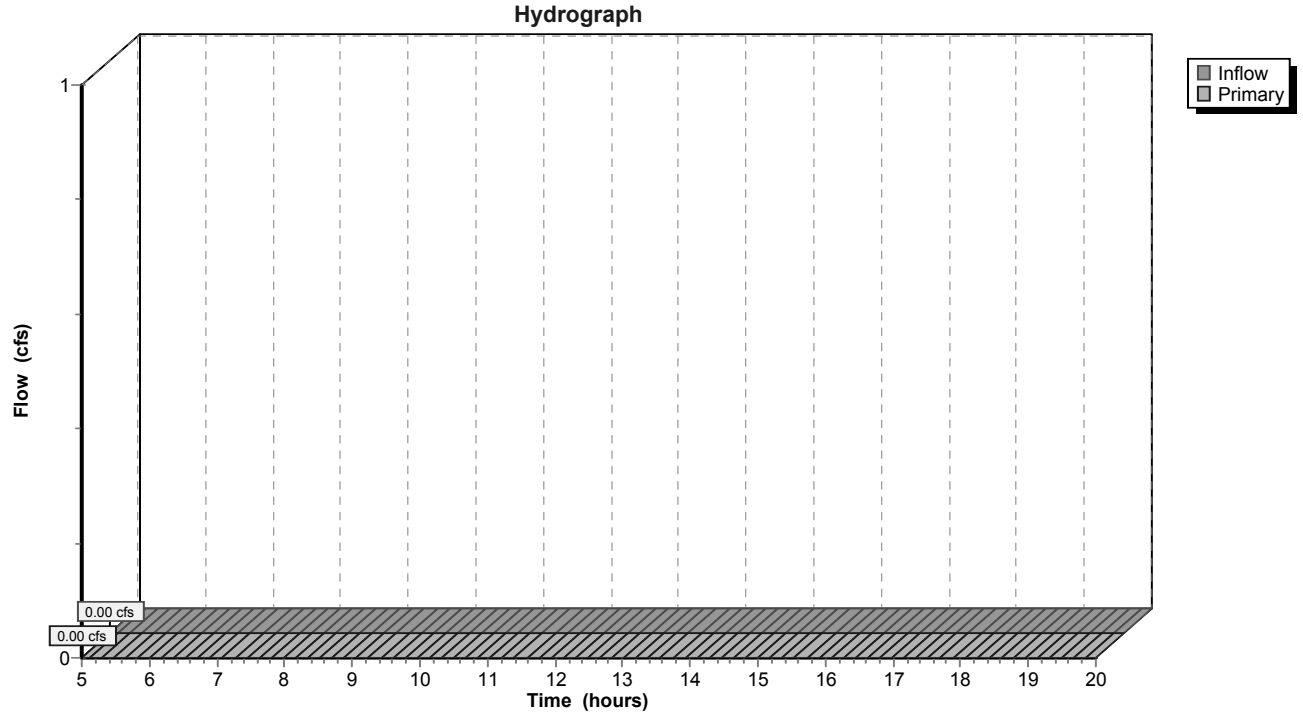


Summary for Link 21: Pond C overflow

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link 21: Pond C overflow

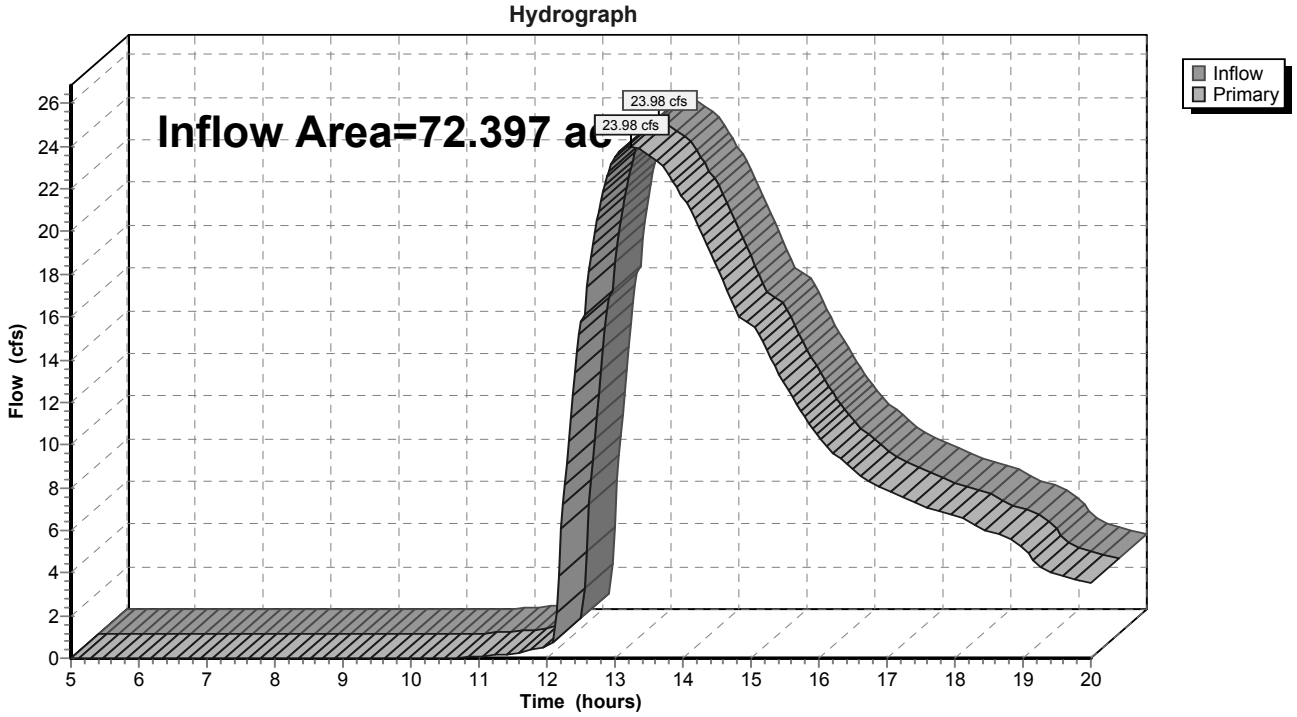


Summary for Link O: OUTLET

Inflow Area = 72.397 ac, 4.73% Impervious, Inflow Depth > 1.30" for 10YR event
Inflow = 23.98 cfs @ 13.23 hrs, Volume= 7.854 af
Primary = 23.98 cfs @ 13.23 hrs, Volume= 7.854 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link O: OUTLET



Time span=5.00-20.00 hrs, dt=0.03 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Area A - Rivers Crossing Runoff Area=13.800 ac 0.00% Impervious Runoff Depth>2.69"
Tc=28.7 min CN=75 Runoff=36.17 cfs 3.097 af

Subcatchment13: Area to BASIN D Runoff Area=1.500 ac 76.67% Impervious Runoff Depth>4.07"
Tc=10.0 min CN=89 Runoff=9.47 cfs 0.509 af

SubcatchmentN1: PROP AREA TO BASIN Runoff Area=13.447 ac 10.98% Impervious Runoff Depth>2.33"
Tc=41.2 min CN=71 Runoff=23.89 cfs 2.614 af

SubcatchmentN2: Area B - Rivers Runoff Area=42.610 ac 0.00% Impervious Runoff Depth>2.75"
Tc=56.4 min CN=76 Runoff=72.16 cfs 9.777 af

SubcatchmentN3: NEW DEVELOPMENT Runoff Area=1.040 ac 76.92% Impervious Runoff Depth>4.38"
Tc=6.0 min CN=92 Runoff=7.81 cfs 0.380 af

Pond 2: Basin A Peak Elev=16.86' Storage=51,720 cf Inflow=36.17 cfs 3.097 af
Primary=3.40 cfs 2.089 af Secondary=12.26 cfs 0.771 af Outflow=14.60 cfs 2.860 af

Pond 14: Infil D w/forebay Peak Elev=16.25' Storage=3,182 cf Inflow=9.47 cfs 0.509 af
Outflow=9.37 cfs 0.495 af

Pond 15: Infil D - Infil Cell Peak Elev=16.25' Storage=8,445 cf Inflow=9.37 cfs 0.495 af
Discarded=0.49 cfs 0.296 af Primary=0.44 cfs 0.144 af Outflow=0.93 cfs 0.440 af

Pond 19: Basin C Peak Elev=15.77' Storage=61,119 cf Inflow=25.08 cfs 3.111 af
Primary=13.29 cfs 2.066 af Secondary=9.06 cfs 0.318 af Outflow=13.29 cfs 2.384 af

Pond 24: Basin B / Clearwater Peak Elev=15.78' Storage=122,635 cf Inflow=92.42 cfs 14.703 af
Primary=29.71 cfs 11.989 af Secondary=47.59 cfs 2.198 af Outflow=77.31 cfs 14.187 af

Pond RG: RAIN GARDEN Peak Elev=24.79' Storage=1,552 cf Inflow=7.81 cfs 0.380 af
Outflow=7.74 cfs 0.353 af

Link 21: Pond C overflow Inflow=9.06 cfs 0.318 af
Primary=9.06 cfs 0.318 af

Link O: OUTLET Inflow=82.47 cfs 14.505 af
Primary=82.47 cfs 14.505 af

Total Runoff Area = 72.397 ac Runoff Volume = 16.377 af Average Runoff Depth = 2.71"
95.27% Pervious = 68.970 ac 4.73% Impervious = 3.427 ac

Summary for Subcatchment 1: Area A - Rivers Crossing

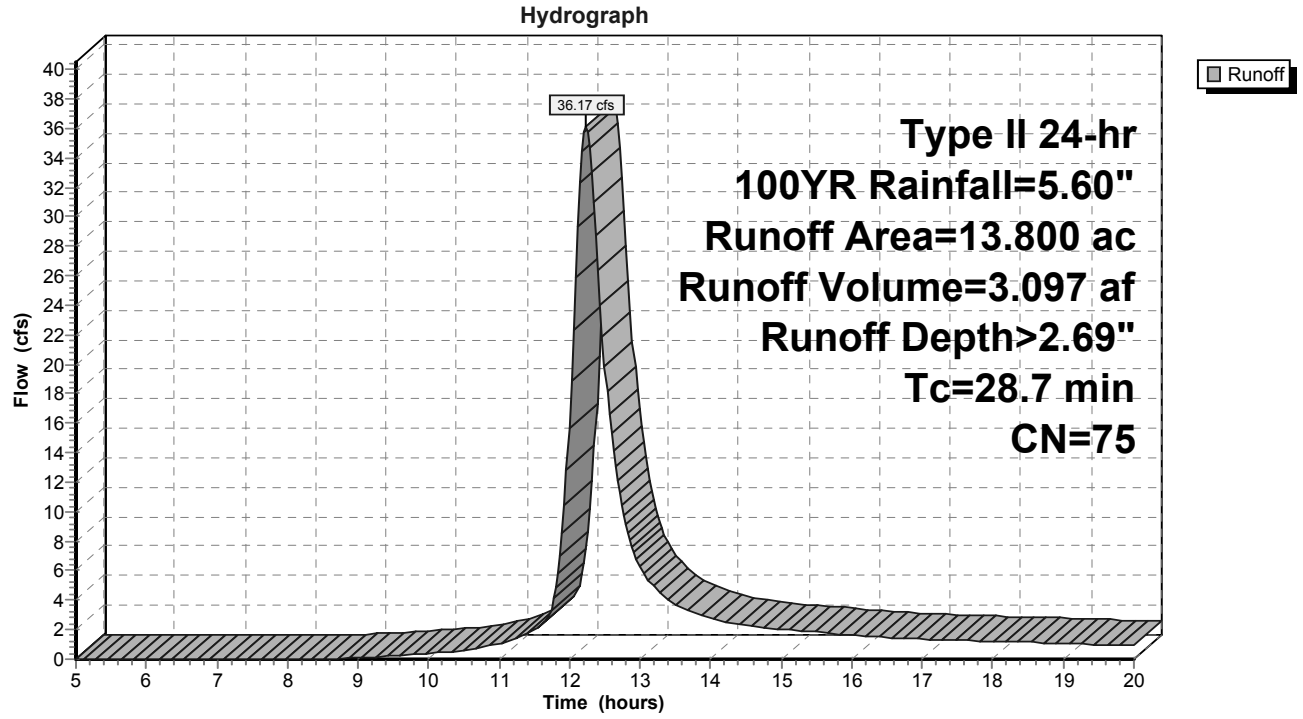
Runoff = 36.17 cfs @ 12.23 hrs, Volume= 3.097 af, Depth> 2.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 100YR Rainfall=5.60"

	Area (ac)	CN	Description
*	13.800	75	1/4 Acre Lots Residential District
	13.800		100.00% Pervious Area

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

Subcatchment 1: Area A - Rivers Crossing



Summary for Subcatchment 13: Area to BASIN D

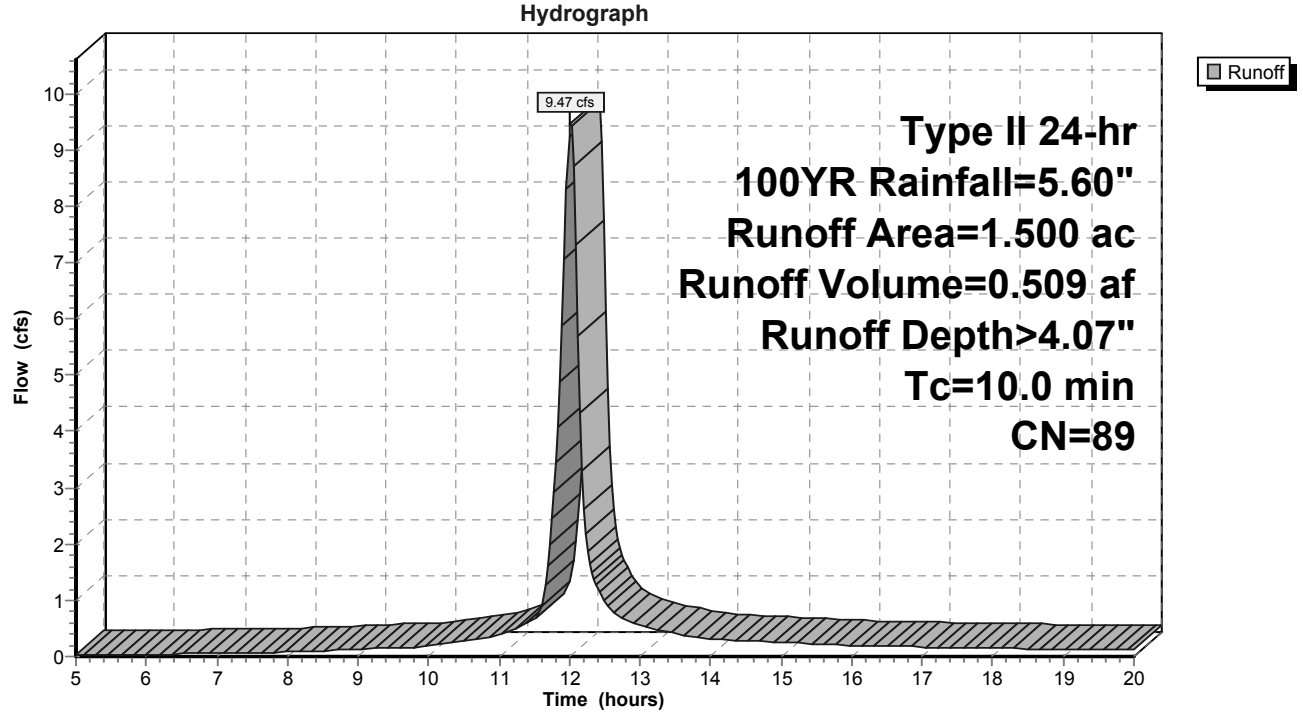
Runoff = 9.47 cfs @ 12.01 hrs, Volume= 0.509 af, Depth> 4.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 100YR Rainfall=5.60"

	Area (ac)	CN	Description
*	1.150	98	Impervious
*	0.350	61	Open - Good Condition (B-Soils)
	1.500	89	Weighted Average
	0.350		23.33% Pervious Area
	1.150		76.67% Impervious Area

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

Subcatchment 13: Area to BASIN D



Summary for Subcatchment N1: PROP AREA TO BASIN C-REVISED

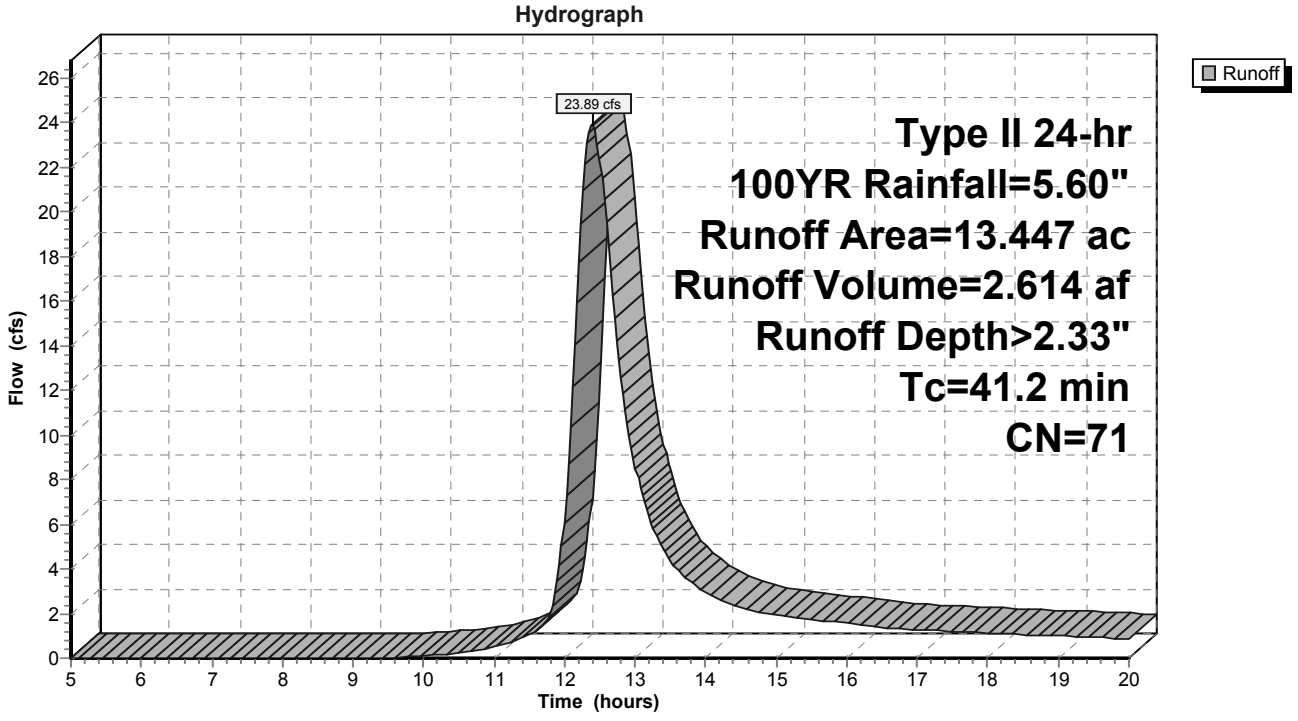
Runoff = 23.89 cfs @ 12.40 hrs, Volume= 2.614 af, Depth> 2.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 100YR Rainfall=5.60"

	Area (ac)	CN	Description
*	1.477	98	Impervious
*	6.900	61	Open - Good Condition (B-Soils)
*	5.070	78	Open Space - Meadow (D-Soils)
	13.447	71	Weighted Average
	11.970		89.02% Pervious Area
	1.477		10.98% Impervious Area

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

Subcatchment N1: PROP AREA TO BASIN C-REVISED



Summary for Subcatchment N2: Area B - Rivers Crossing-Revised

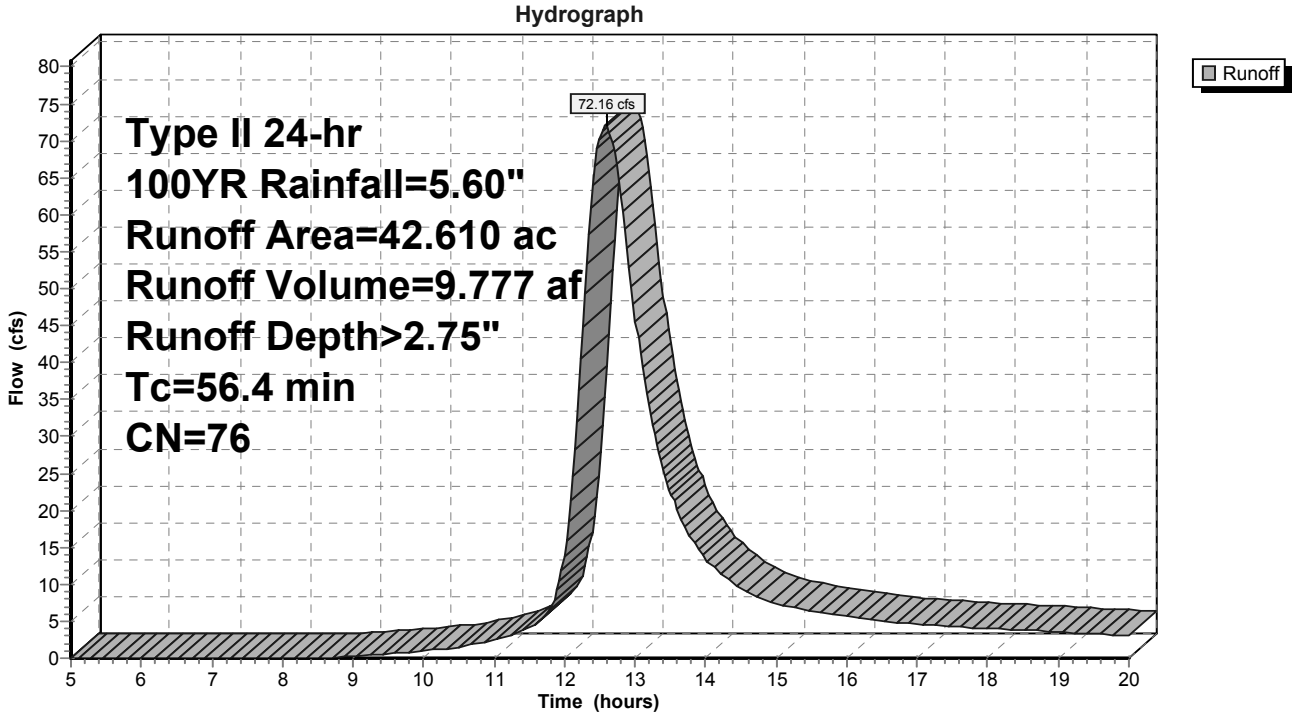
Runoff = 72.16 cfs @ 12.59 hrs, Volume= 9.777 af, Depth> 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 100YR Rainfall=5.60"

	Area (ac)	CN	Description
*	37.500	75	1/4 Acre Lots Residential District
*	2.700	92	Commercial Lands
*	0.410	85	Apartments-Condos
*	2.000	61	Open - Good Condition (B-Soils)
	42.610	76	Weighted Average
	42.610		100.00% Pervious Area

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

Subcatchment N2: Area B - Rivers Crossing-Revised



Summary for Subcatchment N3: NEW DEVELOPMENT

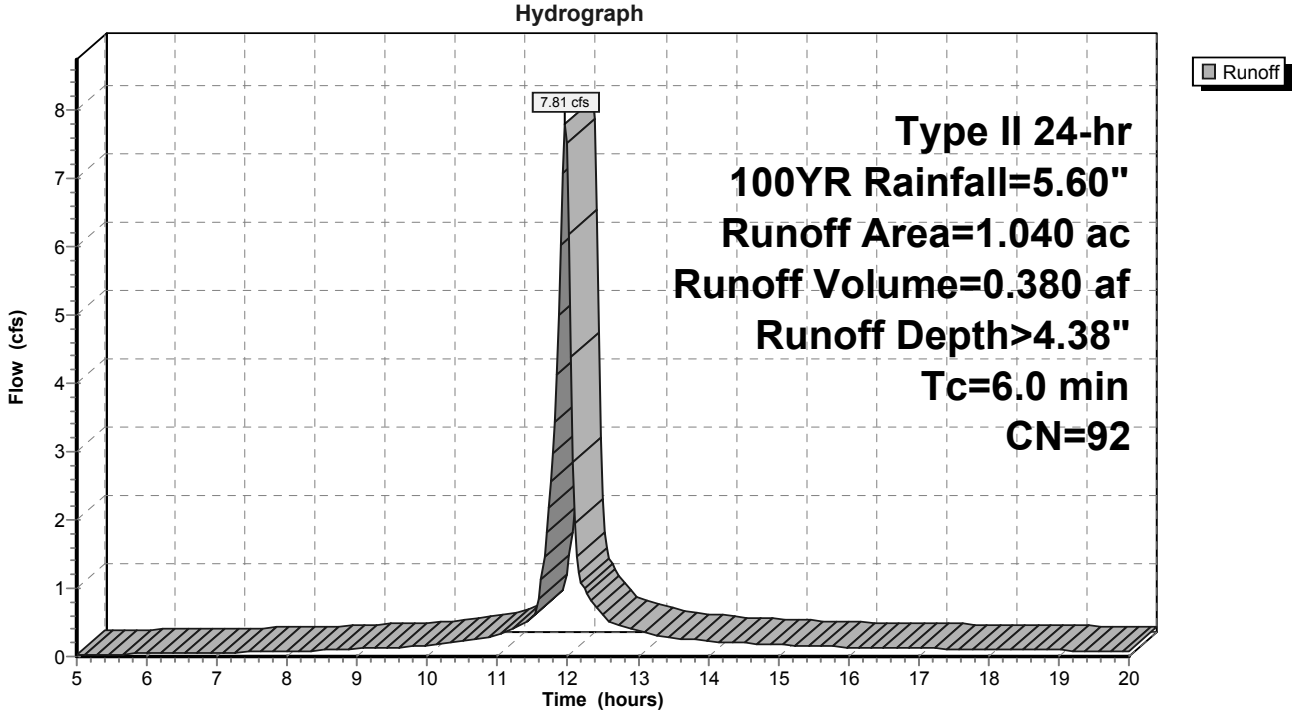
Runoff = 7.81 cfs @ 11.97 hrs, Volume= 0.380 af, Depth> 4.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type II 24-hr 100YR Rainfall=5.60"

Area (ac)	CN	Description
0.800	98	Paved parking, HSG D
0.240	74	>75% Grass cover, Good, HSG C
1.040	92	Weighted Average
0.240		23.08% Pervious Area
0.800		76.92% Impervious Area

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

Subcatchment N3: NEW DEVELOPMENT



Summary for Pond 2: Basin A

Inflow Area = 13.800 ac, 0.00% Impervious, Inflow Depth > 2.69" for 100YR event
Inflow = 36.17 cfs @ 12.23 hrs, Volume= 3.097 af
Outflow = 14.60 cfs @ 12.59 hrs, Volume= 2.860 af, Atten= 60%, Lag= 21.9 min
Primary = 3.40 cfs @ 17.32 hrs, Volume= 2.089 af
Secondary = 12.26 cfs @ 12.61 hrs, Volume= 0.771 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 16.86' @ 12.61 hrs Surf.Area= 19,474 sf Storage= 51,720 cf

Plug-Flow detention time= 125.3 min calculated for 2.855 af (92% of inflow)
Center-of-Mass det. time= 99.2 min (901.7 - 802.5)

Volume	Invert	Avail.Storage	Storage Description
#1	10.89'	64,797 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

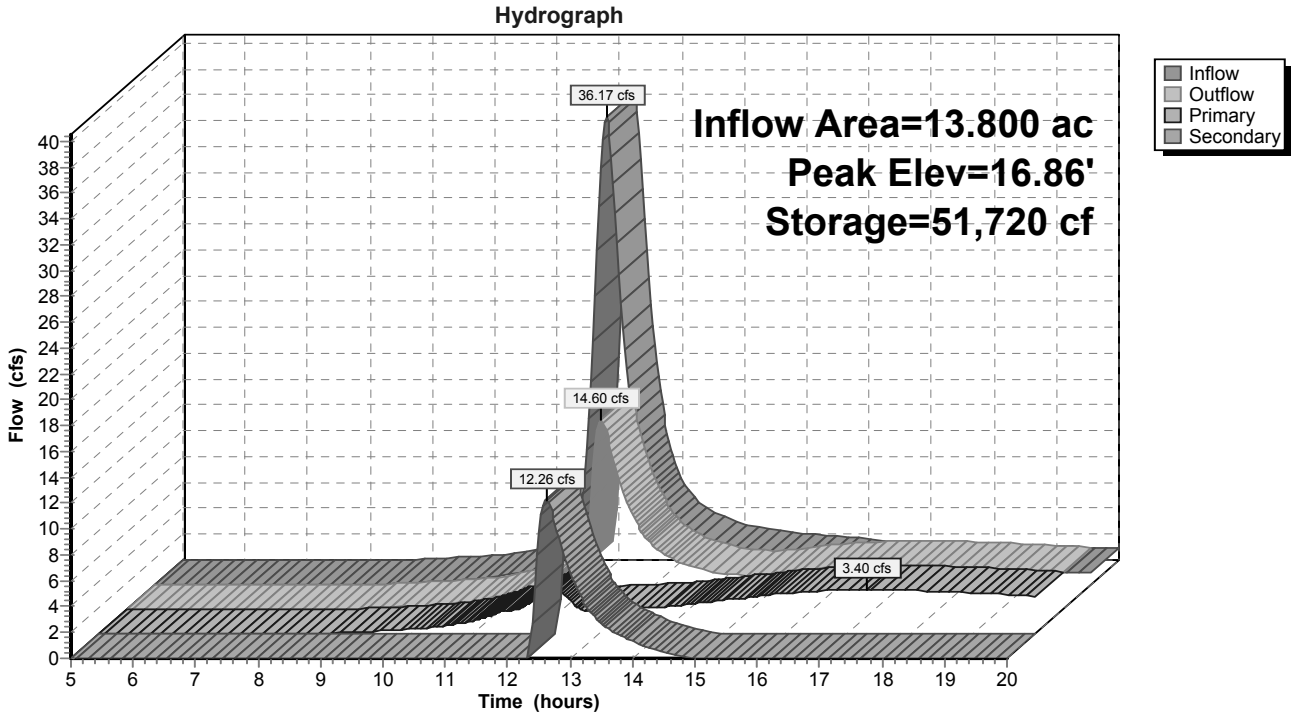
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.89	10	0	0
11.00	31	2	2
12.00	299	165	167
13.00	3,378	1,839	2,006
14.00	10,388	6,883	8,889
15.00	13,733	12,061	20,949
16.00	16,663	15,198	36,147
17.00	19,924	18,294	54,441
17.50	21,500	10,356	64,797

Device	Routing	Invert	Outlet Devices
#1	Primary	10.89'	**12.0" Round Culvert** L= 345.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 10.89' / 10.34' S= 0.0016 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Secondary	16.40'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=3.41 cfs @ 17.32 hrs HW=15.66' TW=12.06' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.41 cfs @ 4.34 fps)

Secondary OutFlow Max=12.24 cfs @ 12.61 hrs HW=16.86' TW=15.45' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 12.24 cfs @ 1.77 fps)

Pond 2: Basin A



Summary for Pond 14: Infil D w/forebay

Inflow Area = 1.500 ac, 76.67% Impervious, Inflow Depth > 4.07" for 100YR event
Inflow = 9.47 cfs @ 12.01 hrs, Volume= 0.509 af
Outflow = 9.37 cfs @ 12.02 hrs, Volume= 0.495 af, Atten= 1%, Lag= 0.6 min
Primary = 9.37 cfs @ 12.02 hrs, Volume= 0.495 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 16.25' @ 12.53 hrs Surf.Area= 4,321 sf Storage= 3,182 cf

Plug-Flow detention time= 45.8 min calculated for 0.495 af (97% of inflow)
Center-of-Mass det. time= 34.3 min (791.0 - 756.7)

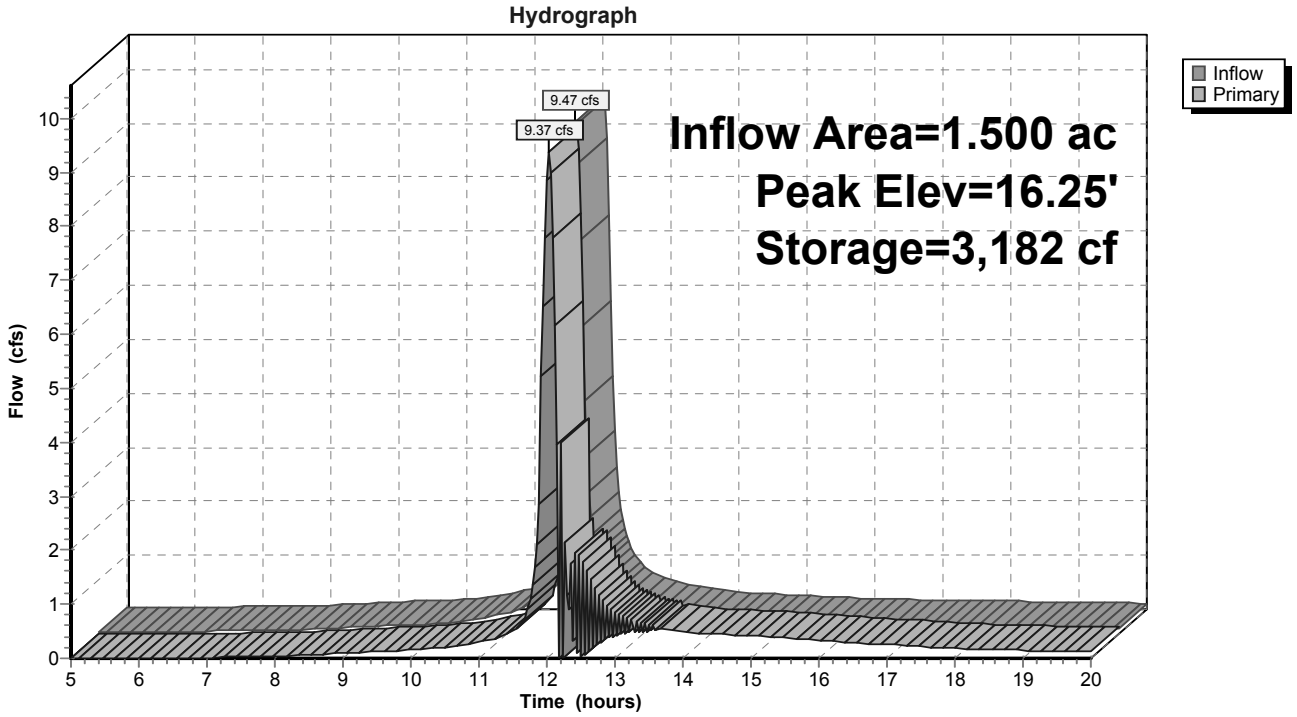
Volume	Invert	Avail.Storage	Storage Description
#1	15.00'	8,313 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
15.00	1,975	0	0
16.00	2,650	2,313	2,313
17.00	9,350	6,000	8,313

Device	Routing	Invert	Outlet Devices
#1	Primary	15.00'	**90.0 deg Sharp-Crested Vee/Trap Weir** Cv= 2.50 (C= 3.13)
#2	Primary	16.00'	**60.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=9.18 cfs @ 12.02 hrs HW=16.12' TW=15.54' (Dynamic Tailwater)
└─**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 3.12 cfs @ 2.47 fps)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 6.06 cfs @ 0.82 fps)

Pond 14: Infil D w/forebay



Summary for Pond 15: Infil D - Infil Cell

Inflow Area = 1.500 ac, 76.67% Impervious, Inflow Depth > 3.96" for 100YR event
Inflow = 9.37 cfs @ 12.02 hrs, Volume= 0.495 af
Outflow = 0.93 cfs @ 12.50 hrs, Volume= 0.440 af, Atten= 90%, Lag= 28.9 min
Discarded = 0.49 cfs @ 12.50 hrs, Volume= 0.296 af
Primary = 0.44 cfs @ 12.50 hrs, Volume= 0.144 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 16.25' @ 12.50 hrs Surf.Area= 5,915 sf Storage= 8,445 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 86.8 min (877.8 - 791.0)

Volume	Invert	Avail.Storage	Storage Description
#1	14.00'	14,176 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

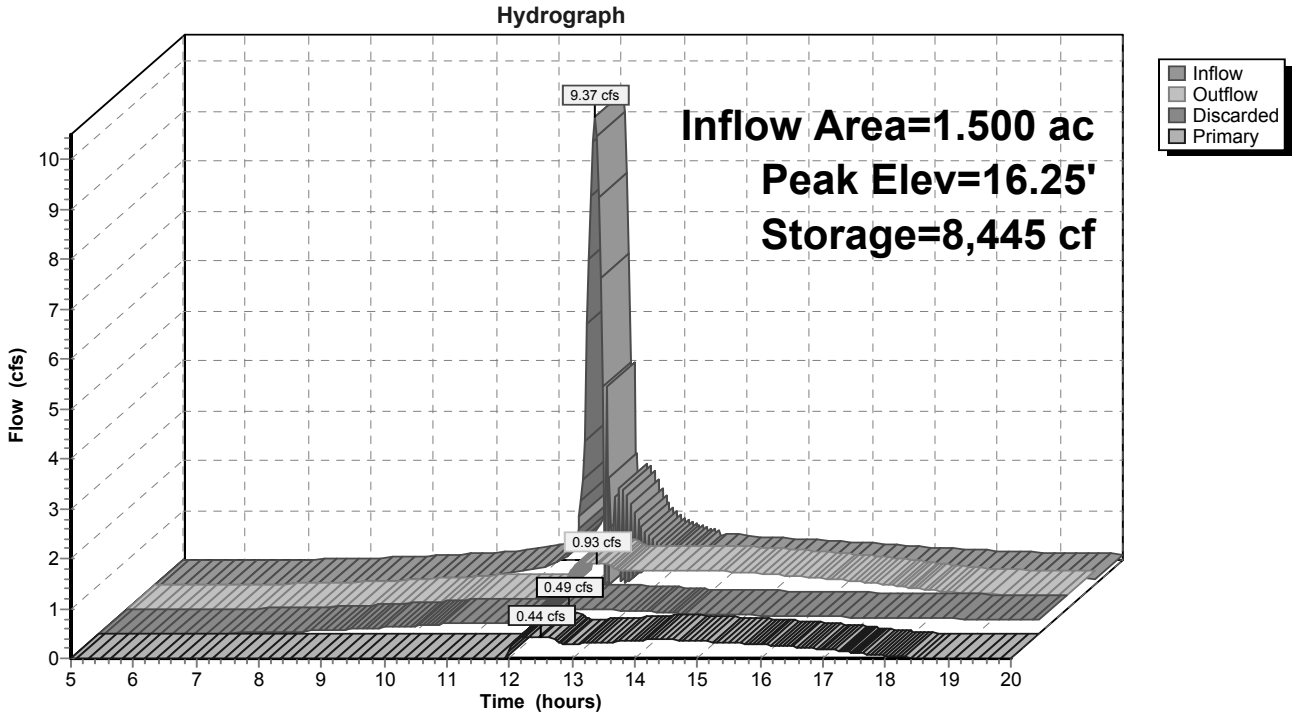
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
14.00	2,400	0	0
15.00	3,525	2,963	2,963
16.00	4,776	4,151	7,113
17.00	9,350	7,063	14,176

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**12.0" Round Culvert** L= 51.0' Ke= 0.600 Inlet / Outlet Invert= 14.00' / 13.74' S= 0.0051 '/' Cc= 0.900 n= 0.130, Flow Area= 0.79 sf
#2	Device 1	15.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	14.00'	**3.600 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.49 cfs @ 12.50 hrs HW=16.25' (Free Discharge)
↑—**3=Exfiltration** (Exfiltration Controls 0.49 cfs)

Primary OutFlow Max=0.44 cfs @ 12.50 hrs HW=16.25' TW=14.71' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.44 cfs of 0.61 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.44 cfs @ 5.01 fps)

Pond 15: Infil D - Infil Cell



Summary for Pond 19: Basin C

Inflow Area = 15.987 ac, 21.44% Impervious, Inflow Depth > 2.34" for 100YR event
Inflow = 25.08 cfs @ 12.39 hrs, Volume= 3.111 af
Outflow = 13.29 cfs @ 12.43 hrs, Volume= 2.384 af, Atten= 47%, Lag= 2.1 min
Primary = 13.29 cfs @ 12.43 hrs, Volume= 2.066 af
Secondary = 9.06 cfs @ 12.90 hrs, Volume= 0.318 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 15.77' @ 12.90 hrs Surf.Area= 18,070 sf Storage= 61,119 cf

Plug-Flow detention time= 123.2 min calculated for 2.379 af (76% of inflow)
Center-of-Mass det. time= 65.5 min (881.2 - 815.7)

Volume	Invert	Avail.Storage	Storage Description
#1	11.70'	75,034 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

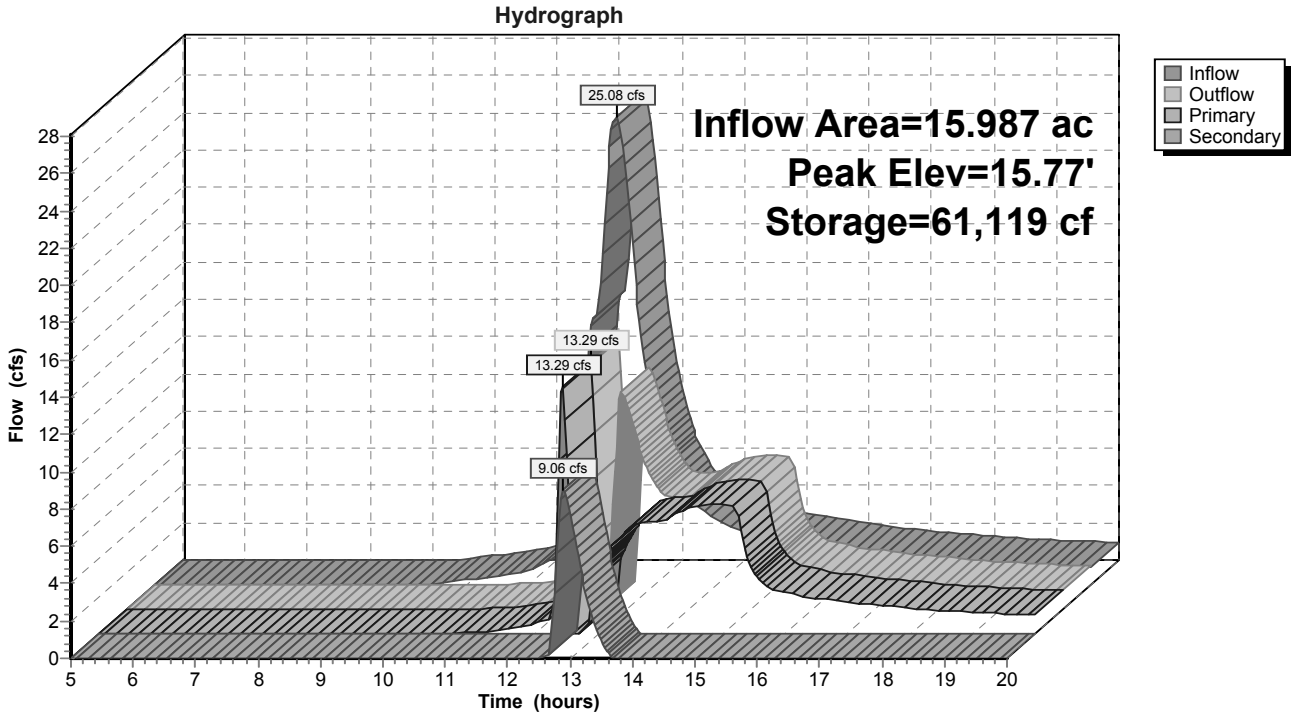
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
11.70	12,100	0	0
12.00	12,500	3,690	3,690
13.00	13,900	13,200	16,890
14.00	15,325	14,613	31,503
15.00	16,850	16,088	47,590
16.00	18,425	17,638	65,228
16.50	20,800	9,806	75,034

Device	Routing	Invert	Outlet Devices
#1	Primary	11.70'	**24.0" Round Culvert** L= 106.0' Ke= 0.600 Inlet / Outlet Invert= 11.70' / 11.44' S= 0.0025 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	11.70'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	14.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	15.50'	**25.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=11.45 cfs @ 12.43 hrs HW=14.49' TW=13.84' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 11.45 cfs @ 3.64 fps)
  ├─**2=Orifice/Grate** (Passes < 0.53 cfs potential flow)
  └─**3=Orifice/Grate** (Passes < 14.30 cfs potential flow)

Secondary OutFlow Max=9.00 cfs @ 12.90 hrs HW=15.77' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 9.00 cfs @ 1.32 fps)

Pond 19: Basin C



Summary for Pond 24: Basin B / Clearwater

Inflow Area = 72.397 ac, 4.73% Impervious, Inflow Depth > 2.44" for 100YR event
Inflow = 92.42 cfs @ 12.51 hrs, Volume= 14.703 af
Outflow = 77.31 cfs @ 12.77 hrs, Volume= 14.187 af, Atten= 16%, Lag= 15.4 min
Primary = 29.71 cfs @ 12.77 hrs, Volume= 11.989 af
Secondary = 47.59 cfs @ 12.77 hrs, Volume= 2.198 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 15.78' @ 12.77 hrs Surf.Area= 28,436 sf Storage= 122,635 cf

Plug-Flow detention time= 48.2 min calculated for 14.187 af (96% of inflow)
Center-of-Mass det. time= 36.4 min (884.4 - 848.0)

Volume	Invert	Avail.Storage	Storage Description
#1	10.10'	143,778 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

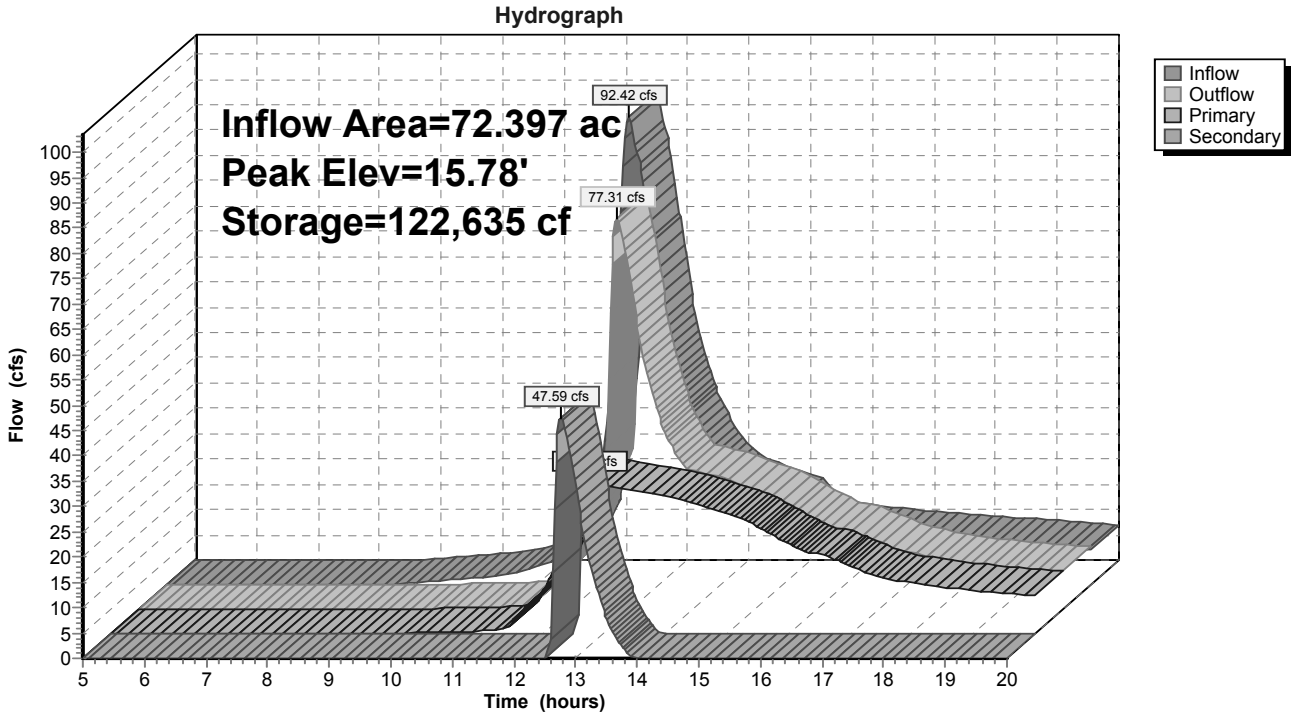
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.10	0	0	0
10.40	16,000	2,400	2,400
11.00	17,667	10,100	12,500
12.00	19,950	18,809	31,309
13.00	22,164	21,057	52,366
14.00	24,361	23,263	75,628
15.00	26,639	25,500	101,128
16.00	28,940	27,790	128,918
16.50	30,500	14,860	143,778

Device	Routing	Invert	Outlet Devices
#1	Primary	10.10'	**24.0" Round RCP_Round 24"** L= 120.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 10.10' / 9.62' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	10.10'	**6.0" Round Culvert** L= 24.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 10.10' / 9.98' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#3	Device 1	11.10'	**9.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Secondary	15.20'	**40.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=29.71 cfs @ 12.77 hrs HW=15.78' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 24"** (Barrel Controls 29.71 cfs @ 9.46 fps)
  ├─**2=Culvert** (Passes < 1.97 cfs potential flow)
  └─**3=Sharp-Crested Rectangular Weir** (Passes < 267.05 cfs potential flow)

Secondary OutFlow Max=47.59 cfs @ 12.77 hrs HW=15.78' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 47.59 cfs @ 2.05 fps)

Pond 24: Basin B / Clearwater



Summary for Pond RG: RAIN GARDEN

Inflow Area = 1.040 ac, 76.92% Impervious, Inflow Depth > 4.38" for 100YR event
Inflow = 7.81 cfs @ 11.97 hrs, Volume= 0.380 af
Outflow = 7.74 cfs @ 11.98 hrs, Volume= 0.353 af, Atten= 1%, Lag= 0.7 min
Primary = 7.74 cfs @ 11.98 hrs, Volume= 0.353 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 24.79' @ 11.98 hrs Surf.Area= 1,556 sf Storage= 1,552 cf

Plug-Flow detention time= 47.9 min calculated for 0.353 af (93% of inflow)
Center-of-Mass det. time= 21.8 min (767.4 - 745.7)

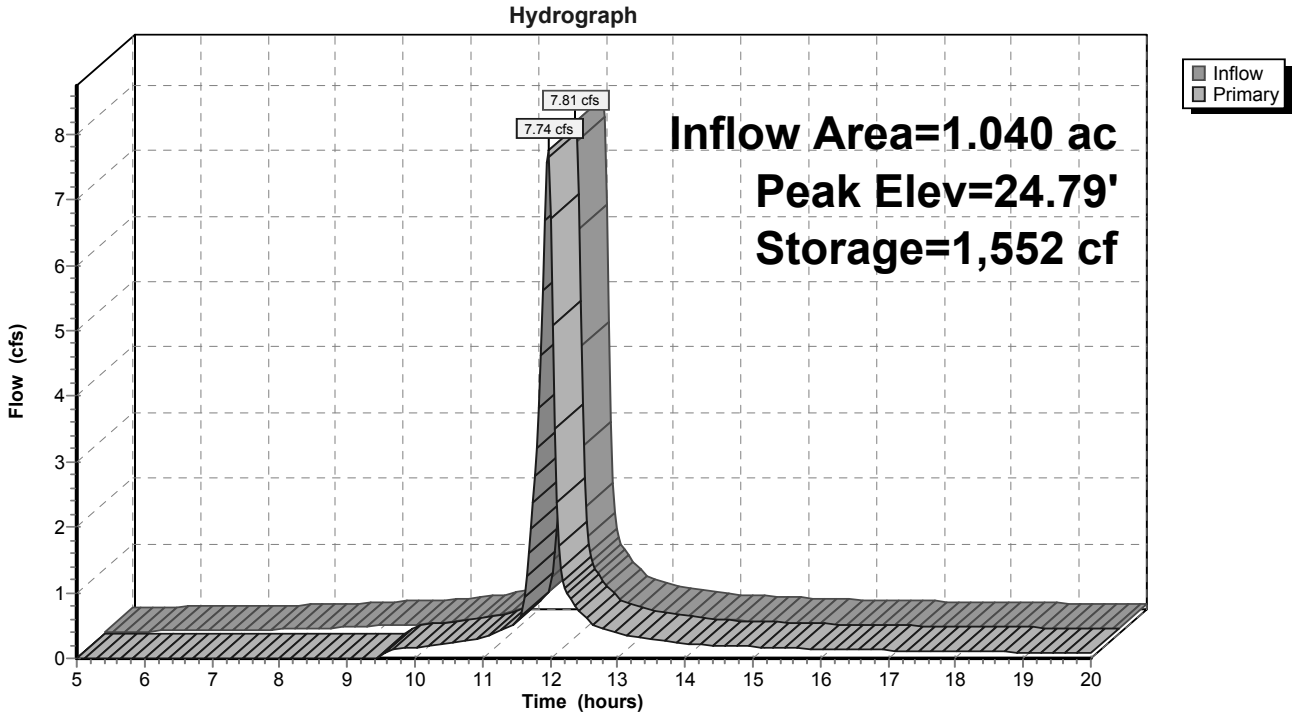
Volume	Invert	Avail.Storage	Storage Description
#1	23.50'	1,894 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
23.50	738	0	0
24.00	1,173	478	478
25.00	1,660	1,417	1,894

Device	Routing	Invert	Outlet Devices
#1	Primary	24.50'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=7.62 cfs @ 11.98 hrs HW=24.78' TW=12.64' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 7.62 cfs @ 1.34 fps)

Pond RG: RAIN GARDEN

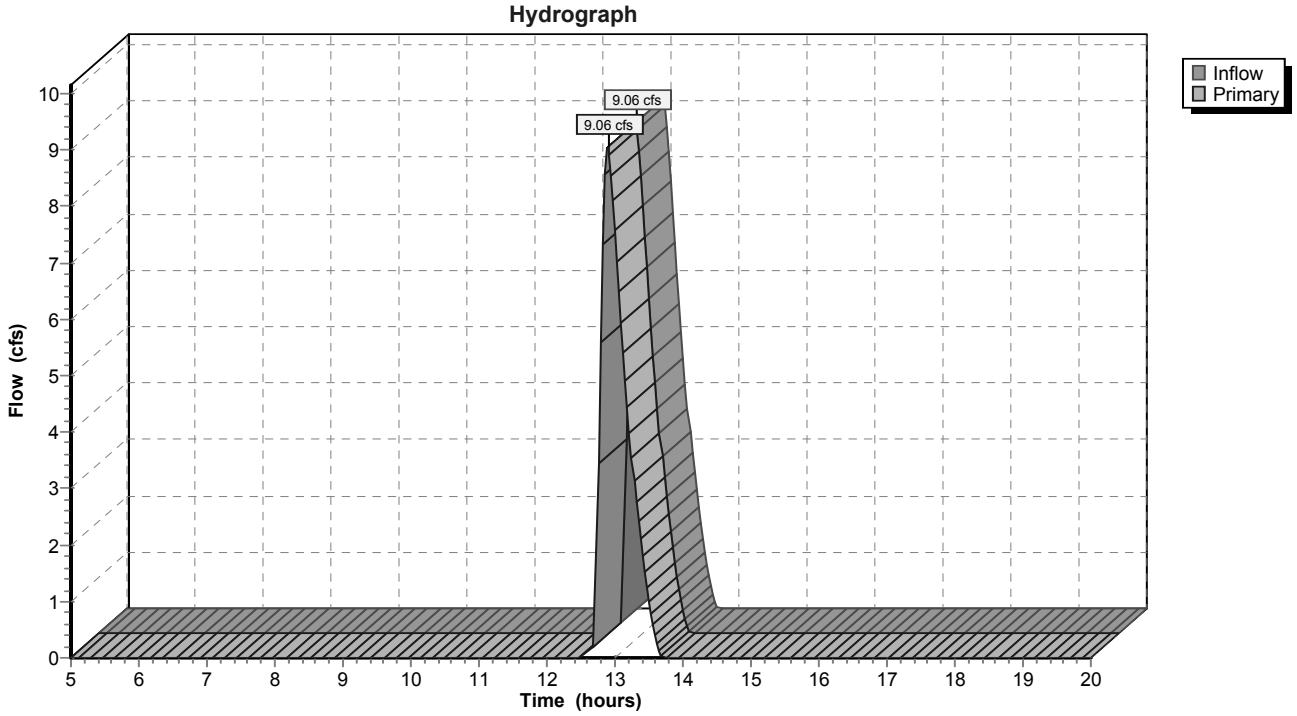


Summary for Link 21: Pond C overflow

Inflow = 9.06 cfs @ 12.90 hrs, Volume= 0.318 af
Primary = 9.06 cfs @ 12.90 hrs, Volume= 0.318 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link 21: Pond C overflow

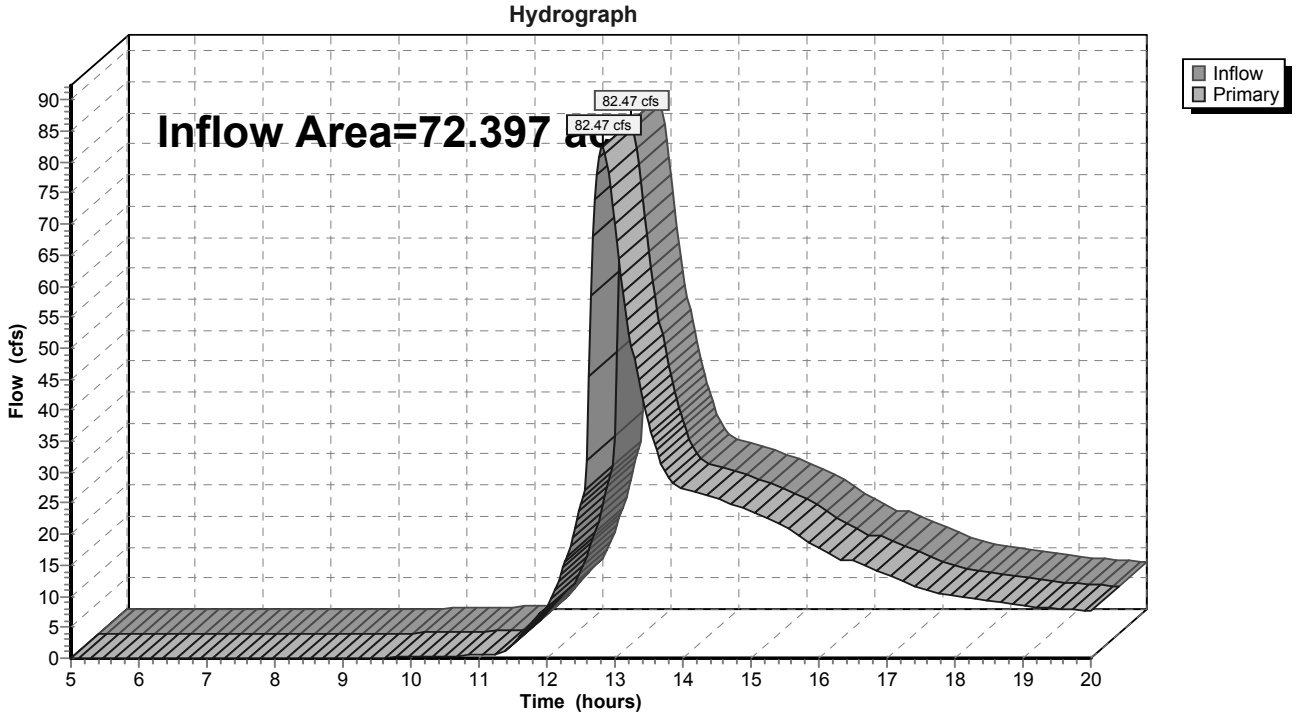


Summary for Link O: OUTLET

Inflow Area = 72.397 ac, 4.73% Impervious, Inflow Depth > 2.40" for 100YR event
Inflow = 82.47 cfs @ 12.82 hrs, Volume= 14.505 af
Primary = 82.47 cfs @ 12.82 hrs, Volume= 14.505 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link O: OUTLET



APPENDIX 3

Maintenance Agreement

Storm Water Management Practice Maintenance Agreement

Document Number

Clearwater Apartments, as "Owner" of the property described below, in accordance with Chapter 14 Waukesha County Code of Ordinances, agrees to install and maintain storm water management practice(s) on the subject property in accordance with approved plans and Storm Water Permit conditions. The owner further agrees to the terms stated in this document to ensure that the storm water management practice(s) continues serving the intended functions in perpetuity. This Agreement includes the following exhibits:

Exhibit A: Legal Description of the real estate for which this Agreement applies ("Property").
Exhibit B: Location Map(s) – shows an accurate location of each storm water management practice affected by this Agreement.
Exhibit C: Maintenance Plan – prescribes those activities that must be carried out to maintain compliance with this Agreement.

Note: After construction verification has been accepted by Waukesha County for all planned storm water management practices, an addendum(s) to this agreement shall be recorded by the Owner showing design and construction details. The addendum may contain several additional exhibits, as described below.

Through this Agreement, the Owner hereby subjects the Property to the following covenants, conditions and restrictions:

Name and Return Address

Land Resources Division
515 W Moreland Blvd, Rm AC260
Waukesha, WI 53188

Parcel Identification Number(s) – (PIN)

1. The Owner shall be responsible for the routine and extraordinary maintenance and repair of the storm water management practice(s) and drainage easements identified in Exhibit B in accordance with the maintenance plan contained in Exhibit C.
2. Upon written notification by City of Waukesha or their designee, the Owner(s) shall, at their own cost and within a reasonable time period determined by the City of Waukesha, have an inspection of the storm water management practice conducted by a qualified professional, file a report with the City of Waukesha and complete any maintenance or repair work recommended in the report. The Owner(s) shall be liable for the failure to undertake any maintenance or repairs.
3. In addition, and independent of the requirements under paragraph 2 above, the City of Waukesha, or its designee, is authorized to access the property as necessary to conduct inspections of the storm water management practices or drainage easements to ascertain compliance with the intent of this Agreement and the activities prescribed in Exhibit C. The City of Waukesha may require work to be done which differs from the report described in paragraph 2 above, if the City of Waukesha reasonably concludes that such work is necessary and consistent with the intent of this agreement. Upon notification by the City of Waukesha of required maintenance or repairs, the Owner(s) shall complete the specified maintenance or repairs within a reasonable time frame determined by the City of Waukesha.
4. If the Owner(s) do not complete an inspection under 2 above or required maintenance or repairs under 3. above within the specified time period, the City of Waukesha is authorized, but not required, to perform the specified inspections, maintenance or repairs. In the case of an emergency situation, as determined by the City of Waukesha, no notice shall be required prior to the City of Waukesha performing emergency maintenance or repairs. The City of Waukesha may levy the costs and expenses of such inspections, maintenance or repair related actions as a special charge against the Property and collected as such in accordance with the procedures under s. 66.0627 Wis. Stats. or subch. VII of ch. 66 Wis. Stats.
5. This Agreement shall run with the Property and be binding upon all heirs, successors and assigns. After the Owner records the addendum noted above, the City of Waukesha shall have the sole authority to modify this agreement upon a 30-day notice to the current Owner(s).

Dated this____day of_____, 20 .

Owner:

_____
(Owners Signature)

_____
(Owners Typed Name)

Acknowledgements

State of Wisconsin:
County of Waukesha

Personally came before me this____day of_____, 20 , the above named [Owners name] to me known to be the person who executed the foregoing instrument and acknowledged the same.

_____.
[Name]
Notary Public, Waukesha County, WI
My commission expires:_____.

This document was drafted by:

[Name and address of drafter]

For Certification Stamp

Exhibit A – Legal Description

The following description and reduced copy map identifies the land parcel(s) affected by this Agreement. For a larger scale view of the referenced document, contact the Waukesha County Register of Deeds office.

Date of Recording: Nov 25th, 2014
Map Produced By: Keith A Kindred
Legal Description: All of Lot 2 of Certified Survey Map No. 8945 and a part of Lot 1 of Certified Survey Map No. 8781, located in the NW. 1/4 of the SW. 1/4 of Section 20, T.06N,R 19E., City of Waukesha, Waukesha County, Wisconsin

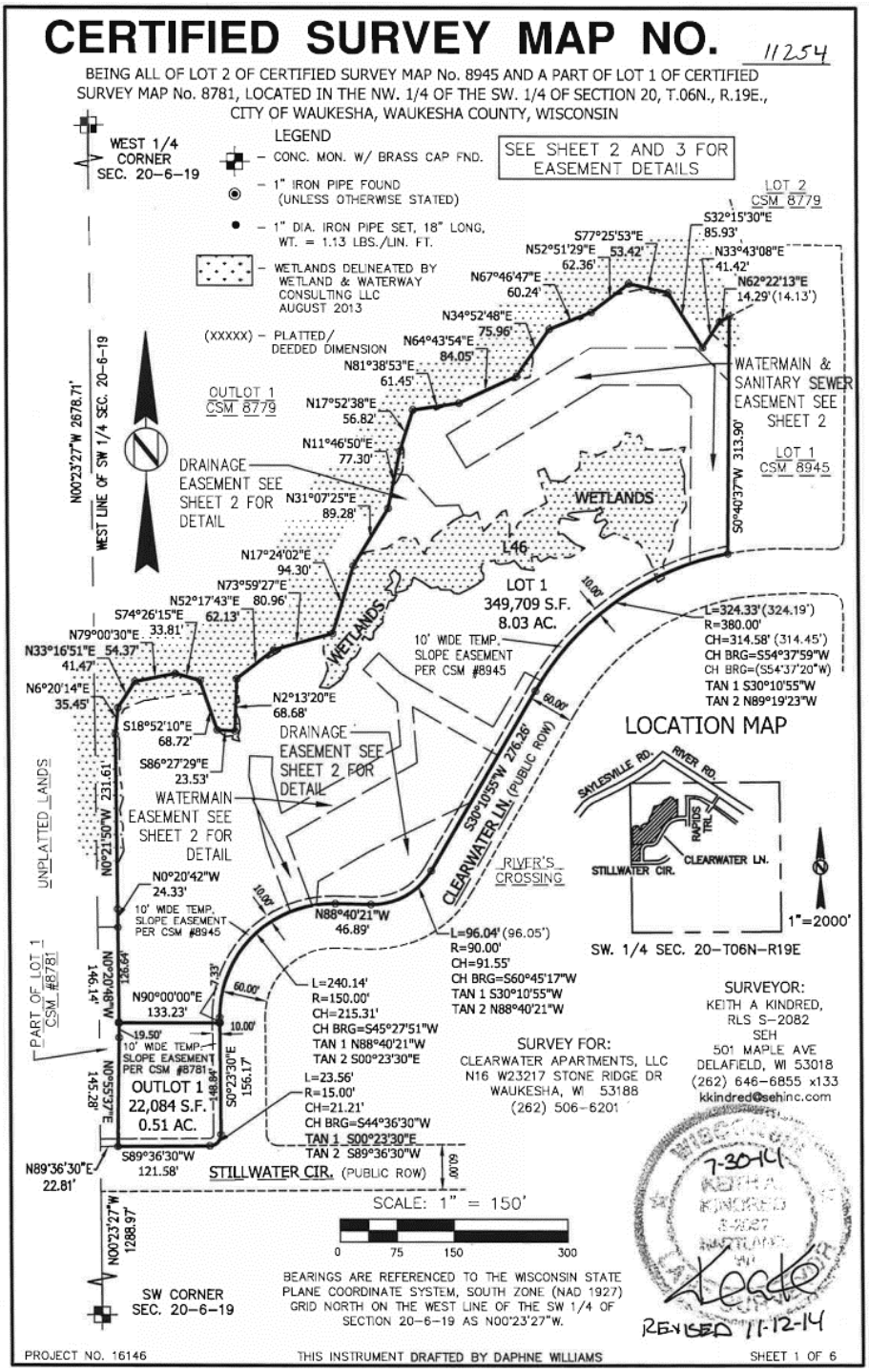


Exhibit B - Location Map
Storm Water Management Practices Covered by this Agreement

The storm water management practices covered by this Agreement are depicted in the reduced copy of a portion of the construction plans, as shown below. All of the noted storm water management practices are located within a drainage easement, as noted in Exhibit A.

Storm water Practices: Catch basins and Rain Garden
Location of Practices: Catch Basins located throughout the site with the Rain Garden located in the northwest corner of the site

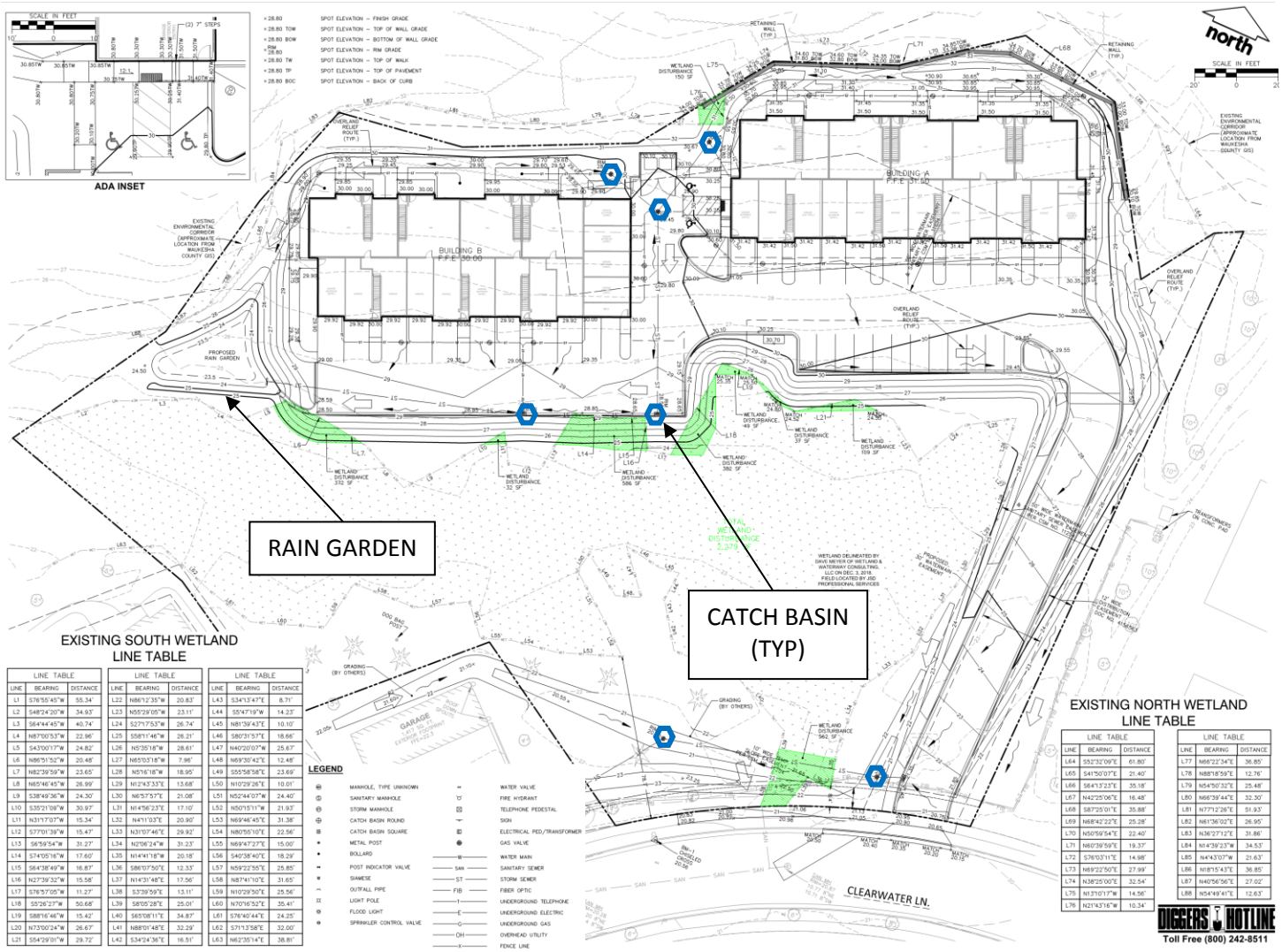


Exhibit C
Storm Water Practice Maintenance Plan

This exhibit explains the basic function of each of the storm water practices listed in Exhibit B and prescribes the minimum maintenance requirements to remain compliant with this Agreement. The maintenance activities listed below are aimed to ensure these practices continue serving their intended functions in perpetuity. The list of activities is not all inclusive, but rather indicates the minimum type of maintenance that can be expected for this particular site. Access to the stormwater practices for maintenance vehicles is shown in Exhibit B. Any failure of a storm water practice that is caused by a lack of maintenance will subject the Owner(s) to enforcement of the provisions listed on page 1 of this Agreement by the City of Waukesha.

System Description:
The proposed apartment site will encompass approximately 3.3 acres. The development will include installation of private utilities, construction of the buildings with associated parking, and construction of a storm water rain garden. Stormwater runoff will be conveyed to the rain garden via overland flow and proposed storm sewers.

"As-built" construction drawings of the basin, showing actual dimensions, elevations, outlet structures, etc. will be recorded as an addendum(s) to this agreement within 60 days after Waukesha County accepts verification of construction from the project engineer.

Minimum Maintenance Requirements:
To ensure the proper long-term function of the storm water management practices described above, the following activities must be completed:

1. All outlet pipes must be checked monthly to ensure there is no blockage from floating debris or ice, especially the washed stone in front of the 3-inch orifice and the trash rack on the riser in the main basin. Any blockage must be removed immediately. The washed stone must be replaced when it becomes clogged.
2. Grass swales shall be preserved to allow free flowing of surface runoff in accordance with approved grading plans. No buildings or other structures are allowed in these areas. No grading or filling is allowed that may interrupt flows in any way.
3. Grass swales, inlets and outlets must be checked after heavy rains (minimum of annually) for signs of erosion. Any eroding areas must be repaired immediately to prevent premature sediment build-up in the downstream forebays or basin. Erosion matting is recommended for repairing grassed areas.
4. NO trees are to be planted or allowed to grow on the earthen berms. Tree root systems can reduce soil compaction and cause berm failure. The berms must be inspected annually and any woody vegetation removed.
5. Invasive plant and animal species shall be managed in compliance with Wisconsin Administrative Code Chapter NR 40. This may require eradication of invasive species in some cases.
6. If the permanent pool falls below the safety shelf, a review shall be performed to determine whether the cause is liner leakage or an insufficient water budget. If the cause is leakage, the liner shall be repaired. Leakage due to muskrat burrows may require removal of the animals, repair of the liner with clay, and embedding wire mesh in the liner to deter further burrowing. If the permanent pool cannot be sustained at the design elevation, benching of the safety shelf may be necessary.
7. If floating algae or weed growth becomes a nuisance (decay odors, etc.), it must be removed from the basin or the forebay and deposited where it cannot drain back into the basin. Removal of the vegetation from the water reduces regrowth the following season (by harvesting the nutrients). Wetland vegetation must be maintained along the waters edge for safety and pollutant removal purposes.
8. If mosquitoes become a nuisance, the use of mosquito larvicide containing naturally-occurring Bti soil bacteria is recommended.
9. When sediment in the forebays or the basin has accumulated to an elevation of three feet below the outlet elevation, it must be removed (see Exhibit D). All removed sediment must be placed in an appropriate upland disposal site and stabilized (grass cover) to prevent sediment from washing back into the basin. The forebays will likely need sediment removal first. Failure to remove sediment from the forebays will cause resuspension of previously trapped sediments and increase downstream deposition.
10. No grading or filling of the basin or berm other than for sediment removal is allowed, unless otherwise approved by the City of Waukesha.
11. Periodic mowing of the grass swales will encourage vigorous grass cover and allow better inspections for erosion. Waiting until after August 1 will avoid disturbing nesting wildlife. Mowing around the basin or

the forebays may attract nuisance populations of geese to the property and is not necessary or recommended.

12. Any other repair or maintenance needed to ensure the continued function of the storm water practices or as ordered by the City of Waukesha under the provisions listed on page 1 of this Agreement.

RAIN GARDEN FACILITIES OPERATION AND MAINTENANCE

Rain garden facilities are designed to hold and slowly release stormwater via infiltration through a special mixture of engineered soil (made up of sand, loam, and compost). For small storm events (2-yr, 24-hour storm or less), water will be infiltrated through the engineered soil. For larger storm events, a weir will help to drain stormwater. Rain Garden facilities provide water quality benefits by removing Total Suspended Solids (TSS).

Outcomes

- Avoid or minimize sediment and pollutant discharges from the work area
- Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- Avoid or minimize vegetation removal
- Maintain or restore the intended infrastructure function
- Prevent or reduce flooding
- Meet public expectations for aesthetics

Operation and Maintenance Practices

Inspection

Inspect at least twice per year except as noted.
Identify and report pollutant sources to the facility. Inspect the facility for oil and other pollutants and remove any pollutants greater in volume than a surface sheen.
Check after each significant rainfall event (0.5-inches or more) to ensure facility is draining properly.
Check for visible signs of sediment accumulation.
Check for insect and/or odor problems.
Check for the presence of burrowing animals.
Check for differential settlement and overall slope stability.
Check for visible signs of damage to the embankments.
Check for vegetation blocking or impeding outlet pipes.
Inspect outfalls and embankments for signs of erosion.
Inspect underdrain and standpipe for signs of breakage or clogging.
Cleaning
Trash and debris is removed.
Remove sediment when noticeable accumulation is present, or once per year at a minimum.
Remove vegetation and debris from outlet pipes.

Material Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations.

Vegetation Management

Control vegetation to match surrounding area.
Repair and revegetate eroded areas.
Trees should not be allowed to grow on emergency overflows or near outlet pipes. Trees can block flows and roots can lead to berm failure.

Repairs

Repair and seed bare areas. Repair eroded slopes when rills form, where the cause of damage is present, or there is potential for future erosion.
Re-mulch void areas.
Rodent holes on a berm can pipe water. Remove the rodents, preferably by trapping, and repair the berm.
If berms show signs of settlement or sinkholes, serious problems may be occurring.
Consult a licensed professional engineer to determine the cause of the settlement or sinkhole.
Spillway areas should be completely covered by rip-rap.
Remove sediment when noticeable accumulation occurs.