MarksEngineering
42 Beeman St.
Canandaigua, NY 14424

Engineer's Report

Prepared for:

Preliminary Overall Subdivision

SUNSET RIDGE ESTATES / LAKEWOOD CUSTOM HOMES

3535 STATE ROUTE 364

TOWN OF CANANDAIGUA, NY 14424

Date:

February 1, 2022

Updated:

12/20/22

Prepared by:

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Engineer's Report

SUNSET RIDGE ESTATES / LAKEWOOD CUSTOM HOMES

RESIDENTIAL DEVELOPMENT:

April 26, 2022

Marks Engineering, P.C. (Marks Engineering) has prepared this Engineer's Report for the new facility noted above located:

Tax Map # 98.19-1-20.10
3535 State Route 364
Town of Canandaigua
Ontario County
New York

Project Description/Intent:

The subject property(s) as outlined above shall consist of the "project site" or "site". The "project" is proposed 31 single family home development within the Town of Canandaigua and 9 single family residential lots in the Town of Hopewell. The project will include the development of approximately 1581 and 1742 linear feet of new dedicated road in Canandaigua and Hopewell, respectively.

The property is zoned R-1-20 with scenic viewshed overlay district present. Nineteen (19) lots will be located within the R-1-20 zoning and will include 20,000 square feet minimum size lots. Twelve (12) lots will be located within the scenic viewshed overlay district and will include 1-acre minimum size lots. The single family lots will be marketed for sale to be developed by the developer or the purchaser of the lot.

Access to the project will be provided via connection to both New York State Route 364 and to Ontario County Road18 (CR18). All public roads, sanitary sewers and watermains will be dedicated to the Town upon completion. Sidewalks will be installed along both sides of the dedicated road throughout the development for pedestrian circulation. The proposed sanitary sewer will connect to the existing gravity sanitary sewer within the project site. The water supply will be provided via connection to the existing 12" main located along New York State Route 364. Stormwater drainage will be managed through installation of a storm sewer network, open swales and ponding areas. Two stormwater management facilities will be constructed to manage runoff from the developed areas of the project.

In total this development will provide housing for more than 120 people. This is broken down by 93 people in Canandaigua and 27 people in Hopewell.

The following report provides the technical data to support the proposed action, The report includes discussion on the water, sanitary sewer services, stormwater management, construction erosion control and other site components.

Permits:

This project will require several permits and approvals from various agencies. The following is a preliminary list of required permits and approvals:

- SEQR Review – Completed type 1 action – Lead agency Town of Canandaigua Planning Board.
- The project will be required to receive approval for site plan & subdivision from the Town of Canandaigua & Town of Hopewell
- The project will require an approval for sanitary sewer utility extension and sanitary sewer district extension (Hopewell) to the Canandaigua Lake County Sewer District.
- The project will require an approval to connect to extend the Town of Canandaigua & Town of Hopewell Watermains.

- The project will require a NYSDEC permit to extend the Public Sewer System.
- The project will require a permit for a new NYSDOT entrance on to Route 364.
- The project will require a permit for a new entrance onto County Rd 18.
- The project will require a permit from the NYSDEC SPDES stormwater discharge.

Existing Conditions:

Currently the site is vacant brush land and a fallow field. There are few mature hardwood trees at the northeast corner of the Canandaigua property. The site is adjacent to the Town of Gorham and agricultural lands on the south side as well as residential properties on the east, west, and north side. A mobile home park borders the property along the northside at the State Route. The site slopes from east to west with most slopes less than 15%. There is a section near the center of the site with 18-25% slopes. The site is zoned asR-1-20 with Mixed Use and Scenic Viewshed Overlays in Canandaigua. The site does not occupy any jurisdictional State wetlands or any FEMA floodplains.

Water Supply:

The Town of Canandaigua operates Water District WD248 and a 12” water main that runs down State Route 364 (SR364). This watermain is supplied by a connection to the City of Canandaigua water distribution system at the corner of Lakeshore Drive and SR364.

Water Improvements:

The Canandaigua development will include +/- 1791’ L.F. 8” PVC DR-14 watermain. The watermain installation will be completed by the developer and will include individual lot water services up to the dedicated right of way limits, fire hydrants, valves and other required watermain appurtenances. The system will be constructed to the Town’s standards and will be offered in dedication upon competition of construction. An 8” branch extends off the existing 12” main and continues throughout the site to serve the proposed homes. The proposed 8” main extends up the hill intil lot 29, where the minimm pressure of 35 psi will be met. Each residential building will be supplied by a 1” (or 1.5” service for lots 22, 23, 2, 27, 28 and 29) HDPE (200PSI CTS), tap and curb stop off the new watermain. The estimated average daily demand for this project (Canandaigua side) is 8,100 gallons per day (based on 300 gpd per unit).

Flow test information was provided by the Town, which has been utilized for the water supply calculations. A domestic and fire scenario was modeled to show the approximate pressures available. Hydraulic calculations for the system have been included in Appendix 1.

Domestic demand 405 gpm (27 units at 15 gpm per unit)

Lowest domestic pressure = +/- 46 psi at lots #22 & 29

Fire demand = 581 gpm (500 gpm at hydrant #4 and 27 units at 3 gpm)

Lowest Fire Pressure=39 psi at hydrant #4

Lots above Lot #22 & 29 do not have the minimum 35 PSI required under fire flow demands so they will not be connected to the public main. Instead, these lots will be supplied by private wells or possible out of district connections to the Hopewell Water District.

Sanitary Sewers:

The site is serviced by an existing 18" ACP Sanitary Sewer that passes through the site from the south to north approximately 300 feet east of State Route 364, which is currently located within an easement. The sewer is owned and operated by the Canandaigua Lake County Sewer District (CLCSD) and it is part of the G1 Area 1 District as identified in the Town of Canandaigua's Sewer Master Plan dated Feb. 2016. Per this report the SR364 corridor sewer has the reserve capacity for this area of the town. The 18" sewer flows north form this site to the City of Canandaigua interceptor sewer located on Lakeshore Drive.

Plans call for addition of approximately 1950 linear feet of 8" PVC sewer main and manholes. A doghouse manhole is proposed near existing manhole No. 205, where it will extend east, turn south and then tun east to head up the hill to serve the upper lots and extend into Hopewell to serve those lots. Proposed connection to manhole No. 207 will extend east around the loop to serve the ret of the buildings. Lots numbers 1, 2, 3, 6, 18 & 19 sanitary services will connect directly into the existing 18" main line.

Sanitary Sewer Analysis:

Total sewer flows – 6,200 GPD
Peak Factor – 4 (Ten States Standards)
Peak Hour Wastewater Flows – 6,200 GPD/24 hrs. x 4 = 1,033 GPH
Instantaneous Peak – 1,033GPH/60 mins = 17.2GPM

The most restrictive section of this branch of the CLCSD has been identified between MH #194 & 195, where the sewer crosses under County Rd 18 and enters the FLCC parking lot. This section of sewer is 381 feet of 18" ACP at 0.11% grade. Marks Engineering witnessed this invert in MH 194 on 3/25/21 at 4:00PM and recorded the pipe flow to be at approximately 50% of the pipe diameter. Using manning's equation, we calculate base flows to be approximately 510 GPM (9" flow depth) at this time. If we add 17.2 GPM to this the flow depth will increase to 9.3" or 52% of pipe capacity. These figures are preliminary and based on recorded measurement on 3/25/21.

Stormwater Management:

Stormwater runoff associated with the proposed project will be treated during and after construction to meet the New York State Department of Environment Conservation (NYSDEC) water quality and quantity requirements under enhance phosphorus removal conditions. Two permanent stormwater management facilities will be constructed to capture and detain runoff from the developed areas of the property, then release the runoff to a downstream area at a controlled rate. The stormwater management plan for the project is designed in accordance with the current rules and regulations set in the NYSDEC Stormwater Management Design Manual (January 2015) and the Town of Canandaigua requirements.

Methodology
The NYSDEC Stormwater Management Design Manual provides specification and sizing criteria for the stormwater management practices for stormwater discharges. The proposed stormwater management for this project has been designed to meet the five key criteria outlines in the design manual:

- Water Quality volume (WQv) to meet pollutant removal goals
- Runoff reduction volume (RRv) by application of runoff reduction practices to replicate pre-development flows.
- Channel protection volume (Cpv) to reduce channel erosion
- Overbank flood protection (Qp) to prevent overbank flooding
- Extreme storm protection (Qf) to help control extreme floods

The existing and proposed drainage conditions at the project site were analyzed following the methods outlines in Soil Conservation Service Technical Release No. 20 & 55. Peak runoff rates for existing and post-development conditions were modeled for the 1, 10, and 100-year storm events using the HydroCAD V10 software. Runoff rates were determined based on the hydrologic characteristics of the site (soil conditions, existing and proposed land cover, time of concentration for contributing drainage areas). Appendix 2 contains the stormwater hydrographs and sub area information, These stormwater hydrographs reports show the subarea routings, subarea data, stormwater management facility ad outlet structure sizing, estimated detention times storage volumes, peak ponding elevations, and discharge rates.

Existing Conditions

The analyzed watershed for the project totals approximately 149.0 acres and under existing conditions consists of 2 drainage areas (see Figure 5A existing drainage map). Table 1 below provides a summary of the existing sub areas.

Table 1: Existing Conditions

Sub Area	Area	Curve Number	Time of Concentration
Existing Area #1 (site drainage area)	74.7 AC	75	80.5
Existing Area #2 (off-site drainage Area)	74.3 AC	75	31.3

Proposed Conditions

The drainage sub areas for post development conditions (see Figure 6 proposed drainage map) have been delineated per the proposed grading of the site development. The analyzed drainage area includes approximately 149.0 AC, which is consistent with the existing area analyzed and is comprised of 5 subareas. Table 2 below provides summary of the proposed subareas.

Table 2: Proposed Conditions

Sub Area	Area	Curve Number	Time of Concentration
Hopewell Drainage Areas	8.05 AC (combined for 10 drainage areas within Hopewell portion of project)	83 (typical for 10 drainage areas within Hopewell portion of project)	6 mins (typical for 10 drainage areas within Hopewell portion of project)
Drainage Area #1 (lower pond)	14.3 AC	83	7.7 mins
Drainage Area #3 (lower pond)	23.8 AC	79	37.7 mins
Drainage Area #2 (Upper pond)	24.1 AC	78	15.8 mins
Off-site drainage Area	78.75 AC	75	35.7 mins

Stormwater Management Facility

The upper and lower stormwater management facilities (SWMF) are designed as stormwater wet ponds with a combination of shallow water marshes and open water areas. The upper pond will receive runoff from Drainage area #2 which includes approximately 24.1 AC. The lower pond will receive runoff from Drainage area #1 & #3 which totals approximately 38.1 AC. The proposed facilities will detain and treat runoff from the development, then discharge stormwater through an engineered outlet structure downstream.

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The pond outlet structures are designed to control the rate at which runoff is discharged from the site, ensuring that runoff rates are at or below those for the existing conditions. The upper outlet structure consists of a 4'x4" reinforced concrete structure with a 24" main outlet pipe. The structure is also equipped with a 3" low flow orifice. The lower pond outlet structure consists of 4'x4' reinforced concrete structure with a 18" main outlet pipe. The structure is also equipped with a 3" low flow orifice. Detailed CPv calculations are provided within Appendix 2. Details of the outlet structures have been provided on the design plans.

Table 3 & 4 below summarizes the design information for both the upper & lower stormwater facilities at each storm event.

Table 3: Lower SWMF Summary

Design Storm Event	Post-Development Inflow (cfs)	Post Development Outflow (cfs)	Ponding elevation (ft)	Storage Volume (cf)
1-year	13.84	0.41	703.16	56,865
2-year	19.34	1.71	703.58	67,361
5-year	29.41	11.37	703.76	71,896
10-year	39.12	22.67	703.89	75,807
25-year	55.70	38.66	704.11	81,899
50-year	71.07	51.27	704.26	86,040
100-year	89.57	67.82	704.43	91,323
18" outlet pipe elev.	700.0		Total Available storage Volume at elev. 704.6	124,144
3" low flow orifice elev.	700.00			
4'x4' Grate elev.	703.50			
Spillway elev.	703.60			
Top of Berm elev.	705.5			

Table 4: Upper SWMF Summary

Design Storm Event	Post-Development Inflow (cfs)	Post Development Outflow (cfs)	Ponding elevation (ft)	Storage Volume (cf)
1-year	15.22	0.39	740.34	41,386
2-year	22.25	0.45	741.33	59,710
5-year	35.23	4.91	741.69	67,042
10-year	47.99	15.19	741.93	71,975

25-year	68.85	24.58	742.73	89,847
50-year	85.76	48.35	743.42	106,375
100-year	106.60	85.32	743.78	115,573
24" outlet pipe elev.	736.0		Total Available storage Volume at elev. 744.50	149,518
3" low flow orifice elev.	736.0			
4'x4' Grate elev.	741.50			
Spillway elev.	743.00			
Top of Berm elev.	744.80			

Stormwater Quality

The August 2015 NYSDEC Stormwater Management Design Manual outlines numerous practices that can be constructed to improve the water quality and reduce the runoff volume of stormwater runoff. Reduced Runoff Volume (RRv) is the reduction of the total Water Quality Volume (WQv) by application of green infrastructure techniques and standard management practices to replicate pre-development hydrology. To meet the WQv and minimum RRv requirements for enhanced phosphorus removal requirements, the stormwater plan includes a SWMF facility, conservation of natural areas, two dry swales and rain gardens.

The intent of the new green infrastructure measures is to replicate the pre-construction infiltration, peak runoff flow and discharge volume, as well as minimization of concentrated flow by using runoff control techniques to provide treatment in a distributed manner before runoff reaches offsite discharge locations. The green infrastructure practices have been designed to comply with the NYSDEC guidelines for enhanced phosphorus removal requirements. Calculations were completed to show that the project site can effectively meet the overall WQv and minimum RRv requirements and these calculations have been provided within Appendix 2. The calculations have also been summarized below.

Conservation of Natural Areas

Area reduced=4.1 AC
Impervious area reduced=4.1
RRv provided=5,706 cf

Dry Swale #1 – Located near the lower stormwater facility will receive runoff from upland areas to be treated and filtered prior to entering the SWNF facility.
RRv provided = 227 CF
WQv provided = 905 CF

Dry Swale #2 – Located along the rear of lots 11-15 will receive runoff from upland areas that will be treated and filtered prior to entering storm sewer facilities and being conveyed to the lower SWMF.
RRv Provided = 1,520 CF
WQv Provided = 6,060 CF

Rain Gardens (Lower lots) - Will receive rooftop runoff from 13 of the lower Canandaigua lots
RRv Provided = 2,593 CF
WQv Provided = 15,600 CF

Rain Gardens (Lower lots) - Will receive rooftop runoff from 9 of the Upper Canandaigua lots
RRv Provided = 1,777 CF
WQv Provided = 23,400 CF

Stormwater Management facilities
The SWMF's provide additional water quality volume for the project, which is accounted for in the deep pools of the facility and the permanent pools of the facility. Detailed pond calculations are provided within Appendix 2 and the WQv provided is summarized below.

WQv Provided in Lower Pond deep pool = 14,409 cf
WQv Provided in Lower Pond Permanent Pool = 9,691 cf
WQv Provided in Upper Pond deep pool=6,039 cf
WQv provided in Upper Pond permanent pool= 22,724 cf

Stormwater Quality Summary
The proposed stormwater quality practice in conjunction with the stormwater management facilities satisfy both of the NYSDEC stormwater design manual key criteria relating to stormwater quality for enhanced phosphorus removal. The total provided WQv and RRv are summarized below;

WQv required=109,030 cf
Minimum allowable RRv= 8,473 cf

Total WQv provided = 110,651 cf
Total RRv provided = 11,823 cf

Channel Protection
The 2015 NYSDEC stormwater design manual defines the CPv requirement as extended detention of the post-developed 1-year, 24-hour storm event. This requirement is intended to protect stream channels from erosion. To show compliance with the current standards for enhanced phosphorus removal requirements the required Channel protection volume was calculated based upon the contributing drainage area to the stormwater facility under proposed conditions and is equal to the 1-year runoff volume for the total site. These calculations are provided in Appendix 2 and summarized below.

CPv Required for Upper Pond = 37,070 cf

Total CPv provided in SWMF=53,365 cf

CPv Required for Lower Pond=71, 918 cf

Total Cpv provided in SWMF=77,253 cf

Stormwater Quantity and Quality Analysis and Results

The calculations provided within the appendices show that the proposed project results in a reduction of stormwater runoff rates for both the 10-year and 100-year events as required by the NSDEC stormwater Design Manual quantity criteria. A summary of the existing vs. proposed runoff rates has been summarized with Table 5 and 6 below. The

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previous sections showed that the project satisfies the other key criteria, including WQv, RRv and CPv. These values have been summarized in table 6 below.

Table 5: comparison of Existing and Proposed Peak Runoff Rates

Offsite discharge	Design storm	Existing peak runoff rate (cfs)	Proposed peak runoff rate (cfs)
Off-site discharge	1-year	14.94	4.79
	2-year	24.28	7.54
	5-year	42.94	26.83
	10-year	62.70	48.29
	25-year	99.06	81.31
	50-year	134.37	111.31
	100-year	178.55	164.57

Table 6: Compliance with NYSDEC Sizing Requirements

New York State Sizing Criteria	Compliance
Water Quality Volume (WQv)	WQv Required = 109,030 cf WQv Provided = 110,651 cf > 109,030 cf **OK**
Runoff Reduction Volume (RRv)	RRv Required = 8,473 cf RRv Provided = 11,823 cf > 8,473 cf **OK**
Channel Protection Volume (Cpv) Upper Pond	CPv required = 37,070 cf Cpv Provided = 53,365 cf > 37,070 cf **OK**
Channel Protection Volume (Cpv) Lower Pond	CPv required = 71,918 cf Cpv Provided = 77,253 cf > 71,918 cf **OK**
Overbank Flood Protection *Control peak discharge from 10-year storm to 10-year pre-development rates*	Total flows from site; 48.09 proposed < 62.70 existing **OK**
Extreme Storm Protection (Qf) *Control peak discharge from the 100-year storm to 100-year pre-development rates*	Total flows from site; 164.57 proposed < 178.55 Existing **OK**

Based on the above information, the proposed stormwater management design for the project satisfies the key criteria of the Stormwater Management Design Manual guidelines.

Erosion Control:

The proposed stormwater management facility and comprehensive erosion control plan have been designed to control sediment runoff and provide water quality treatment during and after the site construction, As required by the NYSDEC the project will include a Stormwater Pollution Prevention Plan (SWPPP) that will combine the design presented in the report and on the plans with the requirements of NYSDEC GP 0-20-001 to outline how the owner will address the construction and post construction stormwater conditions. The construction erosion control plan has been designed per the New York Standards and Specifications for Erosion and Sediment Control.

Erosion control measures will be implemented during construction to control silt and minimize disturbance to the existing swales and drainage conditions. Typical practices include the installation and maintenance of silt fence, stone check dams, rip rap outlet protection, and filter fabric inlet protection. The disturbed areas will be seeded and mulches as soon as possible to control the erosion. Pipe outlet control rip-rap measures are also provided with the storm sewer system. Appropriate sediment and erosion control facilities will be provided at the right of way disturbances to include stabilized construction entrance and silt fence as appropriate.

The final component of the erosion control plan will be maintenance. The contractor will be responsible for installing the erosion control features, as well as maintaining and replacing them as necessary throughout the construction. An owners representative and the Town of Canandaigua will review the erosion control measures to determine their efficiency, need for replacement, or need for additional measures. A SWPPP will be prepared for the project and is to be kept on-site throughout the soil disturbing activities and until groundcover is established.

Landscaping:

The overall landscape plan incorporates native plant material to be used as street trees, ornamental accents for the proposed houses, and screening along SR364 and certain adjacent parcels. The plant materials were chosen based on their hardiness in the build environment and their ornamental characteristics. Seed mixes were chosen to be used within the green infrastructure throughout the site. These mixes incorporate native plant species that are well suited for places inundated with water or have year long standing water (i.e. stormwater pond.)

Lighting:

The light fixture chosen for this project is the Lumina series by Greenshine. The Lumina is a solar powered LED light fixture that houses its own internal battery and does not have to be hooked up to an external electrical grid. The light fixtures have been placed at all driveway entrances and around the mail kiosk. These light fixtures are all dark sky compliant and do not provide light to any adjoining parcels.

Traffic Analysis:

The site will be accessed by two new intersections on adjoining public roads. At the west side of the site there will be a new intersection to the NYSDOT Route 364 (SR364). At the east side of the site there will be a new intersection to Ontario County Road18 (CR18). Per the International Transportation Engineering Trip Generation Manual, 10th Edition each new residential unit will generate 0.99 trips during PM peak hour. Therefore, it is expected that the SR364 entrance will generate and additional 19 cars during PM peak hour traffic and the CR18 entrance will generate and additional 21 cars per PM peak hour. These few cars during peak hour traffic does not merit the need for a Traffic Impact Study per the NYSDOT PERM 33-COM permit requirements.

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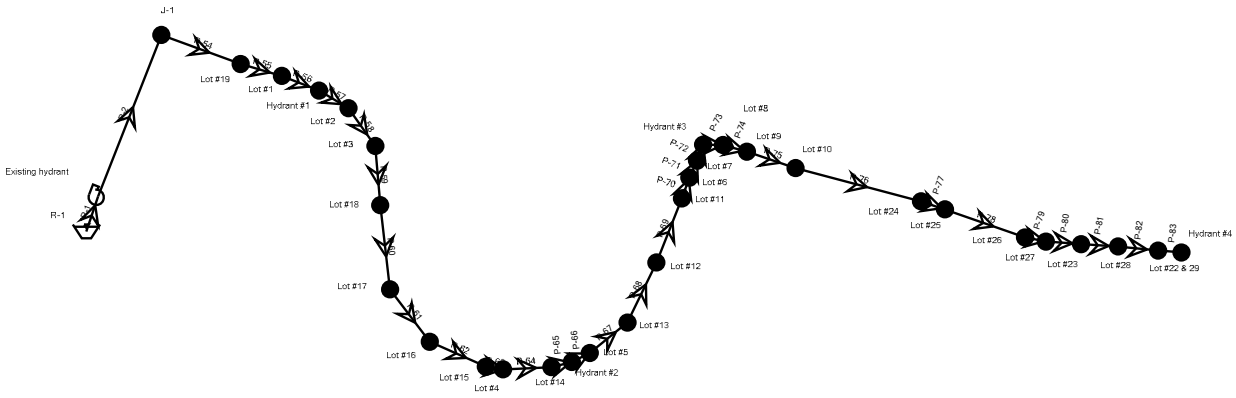
Appendix 1

Water Supply Calculations

Scenario: Domestic



Scenario: Domestic
Current Time Step: 0.000 h
FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Has User Defined Length?	Headloss (Friction) (ft)
P-1	49	R-1	Existing hydrant	48.0	Ductile Iron	130.0	405	0.07	0.000	True	0.00
P-2	228	Existing hydrant	J-1	12.0	Ductile Iron	130.0	405	1.15	0.000	False	0.11
P-54	111	J-1	Lot #19	8.0	PVC	150.0	405	2.59	0.003	False	0.29
P-55	57	Lot #19	Lot #1	8.0	PVC	150.0	390	2.49	0.002	False	0.14
P-56	53	Lot #1	Hydrant #1	8.0	PVC	150.0	375	2.39	0.002	False	0.12
P-57	45	Hydrant #1	Lot #2	8.0	PVC	150.0	375	2.39	0.002	False	0.10
P-58	61	Lot #2	Lot #3	8.0	PVC	150.0	360	2.30	0.002	False	0.13
P-59	78	Lot #3	Lot #18	8.0	PVC	150.0	345	2.20	0.002	False	0.15
P-60	112	Lot #18	Lot #17	8.0	PVC	150.0	330	2.11	0.002	False	0.20
P-61	86	Lot #17	Lot #16	8.0	PVC	150.0	315	2.01	0.002	False	0.14
P-62	81	Lot #16	Lot #15	8.0	PVC	150.0	300	1.91	0.002	False	0.12
P-63	23	Lot #15	Lot #4	8.0	PVC	150.0	285	1.82	0.001	False	0.03
P-64	63	Lot #4	Lot #14	8.0	PVC	150.0	270	1.72	0.001	False	0.08
P-65	28	Lot #14	Hydrant #2	8.0	PVC	150.0	255	1.63	0.001	False	0.03
P-66	27	Hydrant #2	Lot #5	8.0	PVC	150.0	255	1.63	0.001	False	0.03
P-67	64	Lot #5	Lot #13	8.0	PVC	150.0	240	1.53	0.001	False	0.06
P-68	88	Lot #13	Lot #12	8.0	PVC	150.0	225	1.44	0.001	False	0.08
P-69	91	Lot #12	Lot #11	8.0	PVC	150.0	210	1.34	0.001	False	0.07
P-70	29	Lot #11	Lot #6	8.0	PVC	150.0	195	1.24	0.001	False	0.02
P-71	25	Lot #6	Lot #7	8.0	PVC	150.0	180	1.15	0.001	False	0.01
P-72	22	Lot #7	Hydrant #3	8.0	PVC	150.0	165	1.05	0.000	False	0.01
P-73	26	Hydrant #3	Lot #8	8.0	PVC	150.0	165	1.05	0.000	False	0.01
P-74	33	Lot #8	Lot #9	8.0	PVC	150.0	150	0.96	0.000	False	0.01
P-75	68	Lot #9	Lot #10	8.0	PVC	150.0	135	0.86	0.000	False	0.02
P-76	171	Lot #10	Lot #24	8.0	PVC	150.0	120	0.77	0.000	False	0.05
P-77	33	Lot #24	Lot #25	8.0	PVC	150.0	105	0.67	0.000	False	0.01
P-78	111	Lot #25	Lot #26	8.0	PVC	150.0	90	0.57	0.000	False	0.02
P-79	28	Lot #26	Lot #27	8.0	PVC	150.0	75	0.48	0.000	False	0.00
P-80	46	Lot #27	Lot #23	8.0	PVC	150.0	60	0.38	0.000	False	0.00
P-81	49	Lot #23	Lot #28	8.0	PVC	150.0	45	0.29	0.000	False	0.00
P-82	53	Lot #28	Lot #22 & 29	8.0	PVC	150.0	30	0.19	0.000	False	0.00
P-83	31	Lot #22 & 29	Hydrant #4	8.0	PVC	150.0	0	0.00	0.000	False	0.00

Scenario: Domestic
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
33	Hydrant #1	712.50	<None>	<Collection: 0 items>	0	862.63	65
170	Hydrant #2	709.00	<None>	<Collection: 0 items>	0	861.64	66
190	Hydrant #3	708.00	<None>	<Collection: 0 items>	0	861.36	66
188	Hydrant #4	758.00	<None>	<Collection: 0 items>	0	861.22	45
32	J-1	715.00	<None>	<Collection: 0 items>	0	863.18	64
163	Lot #1	715.00	<None>	<Collection: 1 item>	15	862.75	64
189	Lot #2	711.00	<None>	<Collection: 1 item>	15	862.53	66
164	Lot #3	708.50	<None>	<Collection: 1 item>	15	862.40	67
168	Lot #4	708.50	<None>	<Collection: 1 item>	15	861.75	66
175	Lot #5	709.00	<None>	<Collection: 1 item>	15	861.61	66
176	Lot #6	708.00	<None>	<Collection: 1 item>	15	861.38	66
177	Lot #7	708.00	<None>	<Collection: 1 item>	15	861.37	66
180	Lot #8	708.50	<None>	<Collection: 1 item>	15	861.34	66
179	Lot #9	708.50	<None>	<Collection: 1 item>	15	861.33	66
178	Lot #10	715.00	<None>	<Collection: 1 item>	15	861.31	63
173	Lot #11	715.00	<None>	<Collection: 1 item>	15	861.40	63
172	Lot #12	710.00	<None>	<Collection: 1 item>	15	861.47	66
171	Lot #13	709.00	<None>	<Collection: 1 item>	15	861.55	66
169	Lot #14	709.00	<None>	<Collection: 1 item>	15	861.67	66
174	Lot #15	708.50	<None>	<Collection: 1 item>	15	861.78	66
167	Lot #16	708.00	<None>	<Collection: 1 item>	15	861.91	67
166	Lot #17	708.00	<None>	<Collection: 1 item>	15	862.05	67
165	Lot #18	707.00	<None>	<Collection: 1 item>	15	862.25	67
162	Lot #19	715.00	<None>	<Collection: 1 item>	15	862.89	64
187	Lot #22 & 29	756.00	<None>	<Collection: 1 item>	30	861.22	46
185	Lot #23	745.00	<None>	<Collection: 1 item>	15	861.23	50
182	Lot #24	740.00	<None>	<Collection: 1 item>	15	861.26	52
181	Lot #25	738.00	<None>	<Collection: 1 item>	15	861.25	53
183	Lot #26	745.00	<None>	<Collection: 1 item>	15	861.23	50
184	Lot #27	745.00	<None>	<Collection: 1 item>	15	861.23	50
186	Lot #28	745.00	<None>	<Collection: 1 item>	15	861.23	50

C:\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Calcs\20-243 WaterCAD 8-24-22.wtg

Scenario: Domestic
Current Time Step: 0.000 h
FlexTable: Pump Table

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
31	Existing hydrant	711.00	Ex. hydrant	On	711.00	863.29	405	152.29

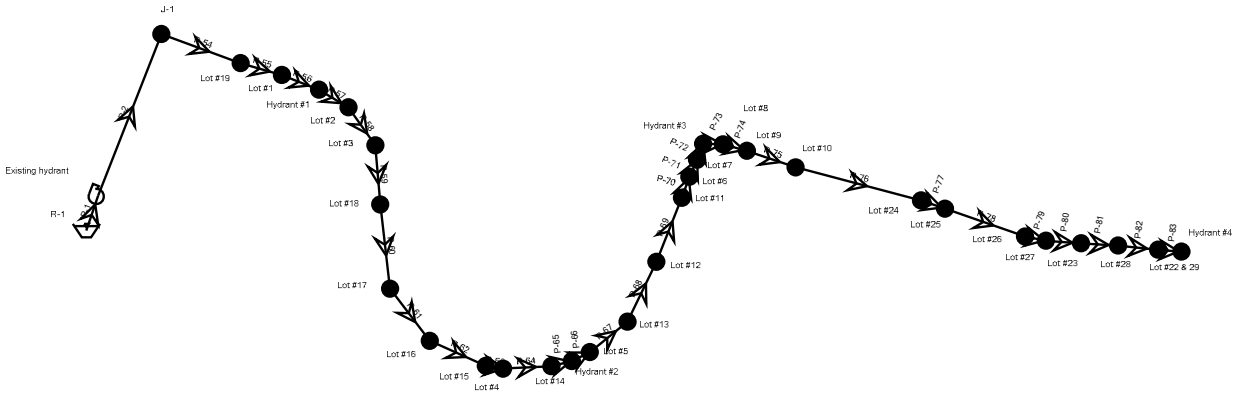
C:\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Calcs\20-243 WaterCAD 8-24-22.wtg

Scenario: Domestic
Current Time Step: 0.000 h
FlexTable: Reservoir Table

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
30	R-1	711.00	<None>	405	711.00

C:\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Calcs\20-243 WaterCAD 8-24-22.wtg

Scenario: Fire



Scenario: Fire
Current Time Step: 0.000 h
FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Has User Defined Length?	Headloss (Friction) (ft)
P-1	49	R-1	Existing hydrant	48.0	Ductile Iron	130.0	581	0.10	0.000	True	0.00
P-2	228	Existing hydrant	J-1	12.0	Ductile Iron	130.0	581	1.65	0.001	False	0.21
P-54	111	J-1	Lot #19	8.0	PVC	150.0	581	3.71	0.005	False	0.57
P-55	57	Lot #19	Lot #1	8.0	PVC	150.0	578	3.69	0.005	False	0.29
P-56	53	Lot #1	Hydrant #1	8.0	PVC	150.0	575	3.67	0.005	False	0.26
P-57	45	Hydrant #1	Lot #2	8.0	PVC	150.0	575	3.67	0.005	False	0.23
P-58	61	Lot #2	Lot #3	8.0	PVC	150.0	572	3.65	0.005	False	0.30
P-59	78	Lot #3	Lot #18	8.0	PVC	150.0	569	3.63	0.005	False	0.39
P-60	112	Lot #18	Lot #17	8.0	PVC	150.0	566	3.61	0.005	False	0.54
P-61	86	Lot #17	Lot #16	8.0	PVC	150.0	563	3.59	0.005	False	0.42
P-62	81	Lot #16	Lot #15	8.0	PVC	150.0	560	3.57	0.005	False	0.39
P-63	23	Lot #15	Lot #4	8.0	PVC	150.0	557	3.56	0.005	False	0.11
P-64	63	Lot #4	Lot #14	8.0	PVC	150.0	554	3.54	0.005	False	0.30
P-65	28	Lot #14	Hydrant #2	8.0	PVC	150.0	551	3.52	0.005	False	0.13
P-66	27	Hydrant #2	Lot #5	8.0	PVC	150.0	551	3.52	0.005	False	0.12
P-67	64	Lot #5	Lot #13	8.0	PVC	150.0	548	3.50	0.005	False	0.29
P-68	88	Lot #13	Lot #12	8.0	PVC	150.0	545	3.48	0.005	False	0.40
P-69	91	Lot #12	Lot #11	8.0	PVC	150.0	542	3.46	0.005	False	0.41
P-70	29	Lot #11	Lot #6	8.0	PVC	150.0	539	3.44	0.004	False	0.13
P-71	25	Lot #6	Lot #7	8.0	PVC	150.0	536	3.42	0.004	False	0.11
P-72	22	Lot #7	Hydrant #3	8.0	PVC	150.0	533	3.40	0.004	False	0.10
P-73	26	Hydrant #3	Lot #8	8.0	PVC	150.0	533	3.40	0.004	False	0.11
P-74	33	Lot #8	Lot #9	8.0	PVC	150.0	530	3.38	0.004	False	0.14
P-75	68	Lot #9	Lot #10	8.0	PVC	150.0	527	3.36	0.004	False	0.29
P-76	171	Lot #10	Lot #24	8.0	PVC	150.0	524	3.34	0.004	False	0.72
P-77	33	Lot #24	Lot #25	8.0	PVC	150.0	521	3.33	0.004	False	0.14
P-78	111	Lot #25	Lot #26	8.0	PVC	150.0	518	3.31	0.004	False	0.46
P-79	28	Lot #26	Lot #27	8.0	PVC	150.0	515	3.29	0.004	False	0.12
P-80	46	Lot #27	Lot #23	8.0	PVC	150.0	512	3.27	0.004	False	0.19
P-81	49	Lot #23	Lot #28	8.0	PVC	150.0	509	3.25	0.004	False	0.20
P-82	53	Lot #28	Lot #22 & 29	8.0	PVC	150.0	506	3.23	0.004	False	0.21
P-83	31	Lot #22 & 29	Hydrant #4	8.0	PVC	150.0	500	3.19	0.004	False	0.12

Scenario: Fire
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
33	Hydrant #1	712.50	<None>	<Collection: 0 items>	0	854.27	61
170	Hydrant #2	709.00	<None>	<Collection: 0 items>	0	851.47	62
190	Hydrant #3	708.00	<None>	<Collection: 0 items>	0	849.91	61
188	Hydrant #4	758.00	<None>	<Collection: 1 item>	500	847.21	39
32	J-1	715.00	<None>	<Collection: 0 items>	0	855.39	61
163	Lot #1	715.00	<None>	<Collection: 1 item>	3	854.53	60
189	Lot #2	711.00	<None>	<Collection: 1 item>	3	854.04	62
164	Lot #3	708.50	<None>	<Collection: 1 item>	3	853.74	63
168	Lot #4	708.50	<None>	<Collection: 1 item>	3	851.90	62
175	Lot #5	709.00	<None>	<Collection: 1 item>	3	851.34	62
176	Lot #6	708.00	<None>	<Collection: 1 item>	3	850.11	61
177	Lot #7	708.00	<None>	<Collection: 1 item>	3	850.01	61
180	Lot #8	708.50	<None>	<Collection: 1 item>	3	849.79	61
179	Lot #9	708.50	<None>	<Collection: 1 item>	3	849.65	61
178	Lot #10	715.00	<None>	<Collection: 1 item>	3	849.36	58
173	Lot #11	715.00	<None>	<Collection: 1 item>	3	850.24	59
172	Lot #12	710.00	<None>	<Collection: 1 item>	3	850.65	61
171	Lot #13	709.00	<None>	<Collection: 1 item>	3	851.05	61
169	Lot #14	709.00	<None>	<Collection: 1 item>	3	851.60	62
174	Lot #15	708.50	<None>	<Collection: 1 item>	3	852.00	62
167	Lot #16	708.00	<None>	<Collection: 1 item>	3	852.39	62
166	Lot #17	708.00	<None>	<Collection: 1 item>	3	852.81	63
165	Lot #18	707.00	<None>	<Collection: 1 item>	3	853.35	63
162	Lot #19	715.00	<None>	<Collection: 1 item>	3	854.82	60
187	Lot #22 & 29	756.00	<None>	<Collection: 1 item>	6	847.33	40
185	Lot #23	745.00	<None>	<Collection: 1 item>	3	847.74	44
182	Lot #24	740.00	<None>	<Collection: 1 item>	3	848.64	47
181	Lot #25	738.00	<None>	<Collection: 1 item>	3	848.50	48
183	Lot #26	745.00	<None>	<Collection: 1 item>	3	848.04	45
184	Lot #27	745.00	<None>	<Collection: 1 item>	3	847.92	45
186	Lot #28	745.00	<None>	<Collection: 1 item>	3	847.54	44

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Scenario: Fire
Current Time Step: 0.000 h
FlexTable: Pump Table

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
31	Existing hydrant	711.00	Ex. hydrant	On	711.00	855.60	581	144.60

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Scenario: Fire
Current Time Step: 0.000 h
FlexTable: Reservoir Table

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
30	R-1	711.00	<None>	581	711.00

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Lot #	Road Elevation	House Elevation	Delta	elevation headloss	Public portion	Owners portion	friction headloss	PSI in main	PSI at house
1	715	719.33	4.33	1.87489	52	59	5.55	64	56.57511
2	711	715.33	4.33	1.87489	52	59	5.55	67	59.57511
3	708.5	713.33	4.83	2.09139	52	59	5.55	67	59.35861
4	708.5	715.33	6.83	2.95739	52	59	5.55	67	58.49261
5	709	716.33	7.33	3.17389	52	59	5.55	66	57.27611
6	708	711.33	3.33	1.44189	153	77	11.5	68	55.05811
7	708	714.33	6.33	2.74089	128	64	9.6	67	54.65911
8	708.5	718.33	9.83	4.25639	20	303	16.15	67	46.59361
9	708.5	723.33	14.83	6.42139	20	188	10.4	67	50.17861
10	715	721.33	6.33	2.74089	0	40	2	67	62.25911
11	715	721.33	6.33	2.74089	5	65	3.5	67	60.75911
12	710	722.33	12.33	5.33889	5	65	3.5	66	57.16111
13	709	724.33	15.33	6.63789	5	65	3.5	66	55.86211
14	709	717.33	8.33	3.60689	5	65	3.5	66	58.89311
15	708.5	715.33	6.83	2.95739	5	65	3.5	67	60.54261
16	708	715.33	7.33	3.17389	5	65	3.5	67	60.32611
17	708	712.33	4.33	1.87489	5	65	3.5	67	61.62511
18	707	711.33	4.33	1.87489	5	65	3.5	67	61.62511
19	715	718.33	3.33	1.44189	5	65	3.5	64	59.05811
23	745	757.33	12.33	5.33889	117	119	1.5812	51	44.07991 1.5"
24	740	754.33	14.33	6.20489	10	104	5.7	54	42.09511
25	738	746.33	8.33	3.60689	10	5	0.75	53	48.64311
26	745	743.33	-1.67	0.72311	20	280	2.01	51	48.26689 1.5"
27	745	743.33	-1.67	0.72311	20	460	3.216	51	47.06089 1.5"
28	745	756.33	11.33	4.90589	10	250	1.742	49	42.35211 1.5"
22	756	766.33	10.33	4.47289	51	137	1.2596	45	39.26751 1.5"
29	756	768.33	12.33	5.33889	10	130	0.938	45	38.72311 1.5"

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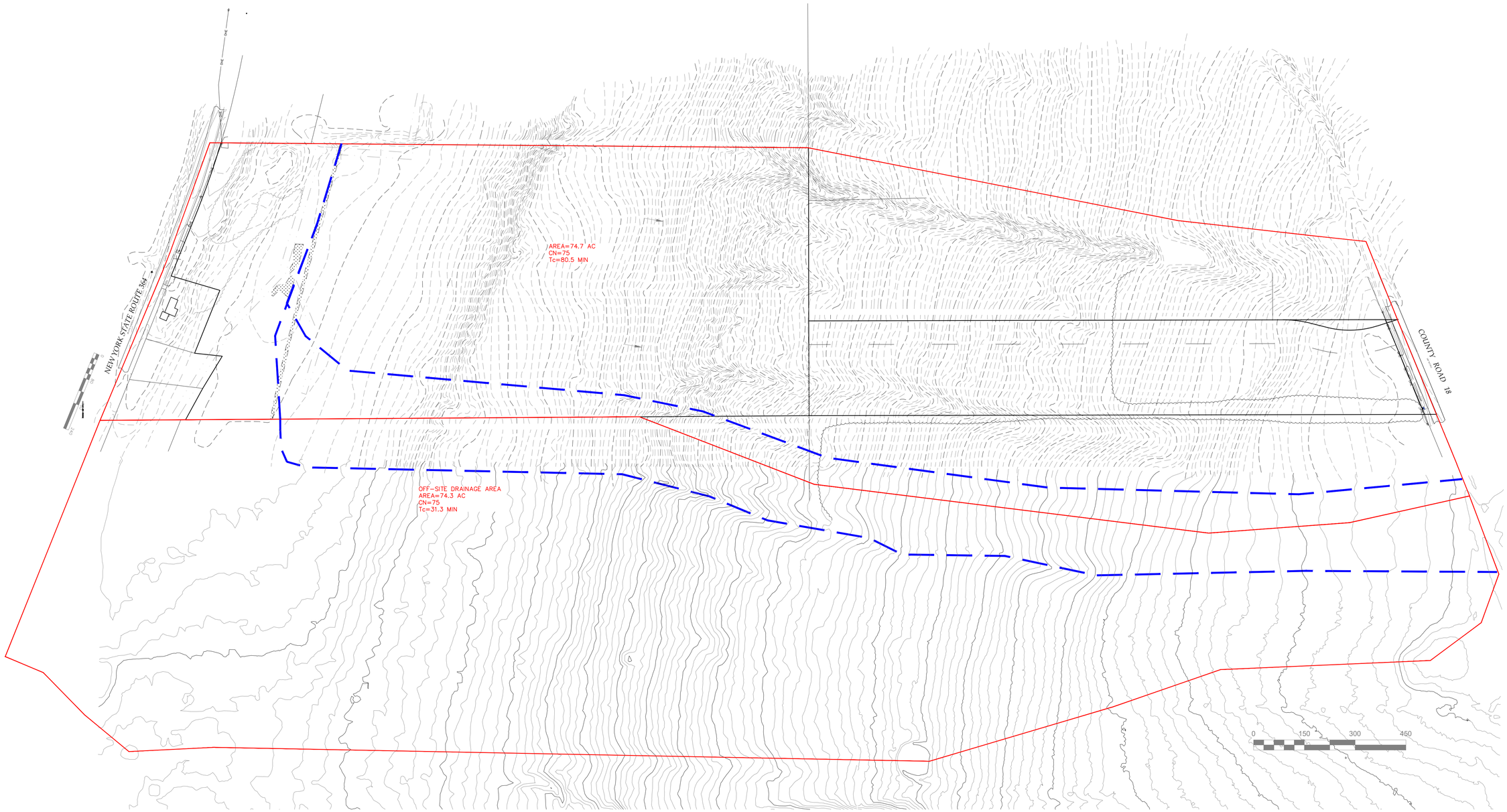
42 Beeman St.
Canandaigua, NY 14424

Appendix 2

Stormwater Management Calcs



1 FIGURE 5A – EXISTING DRAINAGE AREA MAP
1"=150'

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BRENNAN A MARKS
093182
LICENSED PROFESSIONAL ENGINEER
STAMP

STAMP

REVISIONS

NO.	DATE	DESCRIPTION OF REVISION	BY
1			
2			
3			
4			
5			
6			
7	12/19/22	PER ABH COMMENTS	BAM

SITE DEVELOPMENT PLANS PREPARED FOR:
SUNSET RIDGE ESTATES/ LAKEWOOD CUSTOM HOMES
RESIDENTIAL DEVELOPMENT
SHOWING LAND IN:
3535 STATE ROUTE 364 /0000 COUNTY ROAD 18
TOWN OF CANANDAIGUA/HOPEWELL
COUNTY OF ONTARIO
STATE OF NEW YORK

DRAWING TITLE:
SWPPP FIGURE

DRAWN BY:	XXX
DESIGNED BY:	XXX
CHECKED BY:	BAM
SCALE:	AS NOTED
JOB NO.:	20-243
DATE:	02/01/2023
TAX MAP#:	98.19-1-20.10

FIG. 5A

1 FIGURE 6 – PROPOSED DRAINAGE AREA MAP
1"=150'

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REVISIONS

NO.	DATE	DESCRIPTION OF REVISION	BY
1			
2			
3			
4			
5			
6		PER MRB COMMENTS	BAM
7	12/19/22		

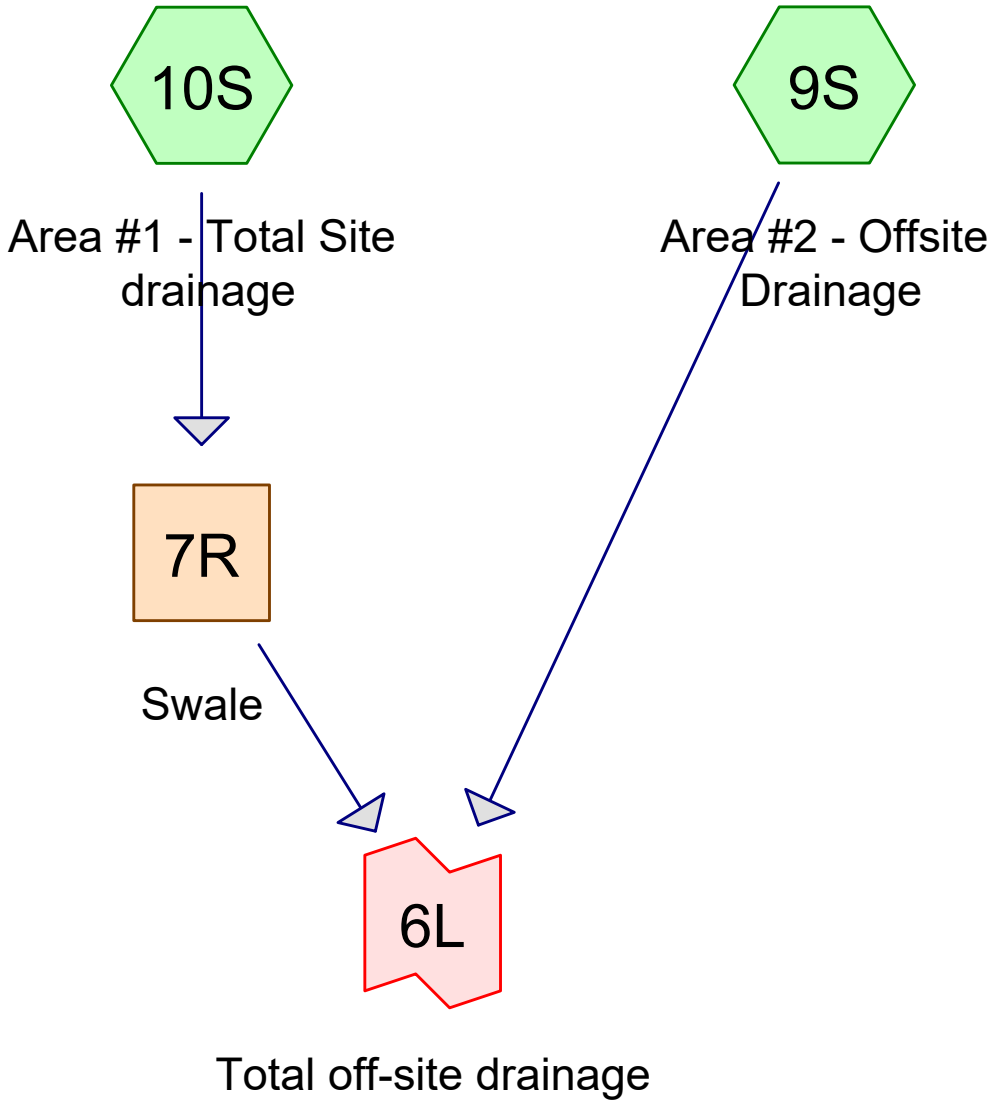
SITE DEVELOPMENT PLANS PREPARED FOR:
SUNSET RIDGE ESTATES/ LAKEWOOD CUSTOM HOMES
RESIDENTIAL DEVELOPMENT
SHOWING LAND IN:
3535 STATE ROUTE 364 /0000 COUNTY ROAD 18
TOWN OF CANANDAIGUA/HOPEWELL
COUNTY OF ONTARIO
STATE OF NEW YORK

DRAWING TITLE:
SWPPP FIGURE

DRAWN BY:	JPS
DESIGNED BY:	XXX
CHECKED BY:	BAM
SCALE:	AS NOTED
JOB NO.:	20-243
DATE:	02/01/2023
TAX MAP#:	98.19-1-20.10

FIG. 6

Exsiting Drainage



Subcat Reach Pond Link

Routing Diagram for 20-243 SWPPPBASE EX 9.1
Prepared by {enter your company name here}, Printed 2/27/2023

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.570	61	>75% Grass cover, Good, HSG B (10S)
7.100	80	>75% Grass cover, Good, HSG D (9S, 10S)
99.830	73	Brush, Good, HSG D (9S, 10S)
39.900	78	Meadow, non-grazed, HSG D (9S, 10S)
1.600	98	Paved parking, HSG D (9S, 10S)
149.000	**75**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.570	HSG B	10S
0.000	HSG C	
148.430	HSG D	9S, 10S
0.000	Other	
149.000		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.570	0.000	7.100	0.000	7.670	>75% Grass cover, Good	9S, 10S
0.000	0.000	0.000	99.830	0.000	99.830	Brush, Good	9S, 10S
0.000	0.000	0.000	39.900	0.000	39.900	Meadow, non-grazed	9S, 10S
0.000	0.000	0.000	1.600	0.000	1.600	Paved parking	9S, 10S
0.000	**0.570**	**0.000**	**148.430**	**0.000**	**149.000**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.10 hrs, 241 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment9S: Area #2 - Offsite Runoff Area=74.300 ac 0.67% Impervious Runoff Depth>0.33"
Flow Length=3,745' Tc=31.3 min CN=75 Runoff=14.58 cfs 2.014 af

Subcatchment10S: Area #1 - Total Site Runoff Area=74.700 ac 1.47% Impervious Runoff Depth>0.32"
Flow Length=4,104' Tc=80.5 min CN=75 Runoff=8.53 cfs 1.988 af

Reach 7R: Swale Avg. Flow Depth=0.18' Max Vel=0.93 fps Inflow=8.53 cfs 1.988 af
n=0.030 L=847.0' S=0.0060 '/' Capacity=181.24 cfs Outflow=8.13 cfs 1.960 af

Link 6L: Total off-site drainage Inflow=14.94 cfs 3.974 af
Primary=14.94 cfs 3.974 af

Total Runoff Area = 149.000 ac Runoff Volume = 4.002 af Average Runoff Depth = 0.32"
98.93% Pervious = 147.400 ac 1.07% Impervious = 1.600 ac

Summary for Subcatchment 9S: Area #2 - Offsite Drainage

CarlsonPlanXYPos|642280.8804|1040430.0233|
CarlsonSurface||

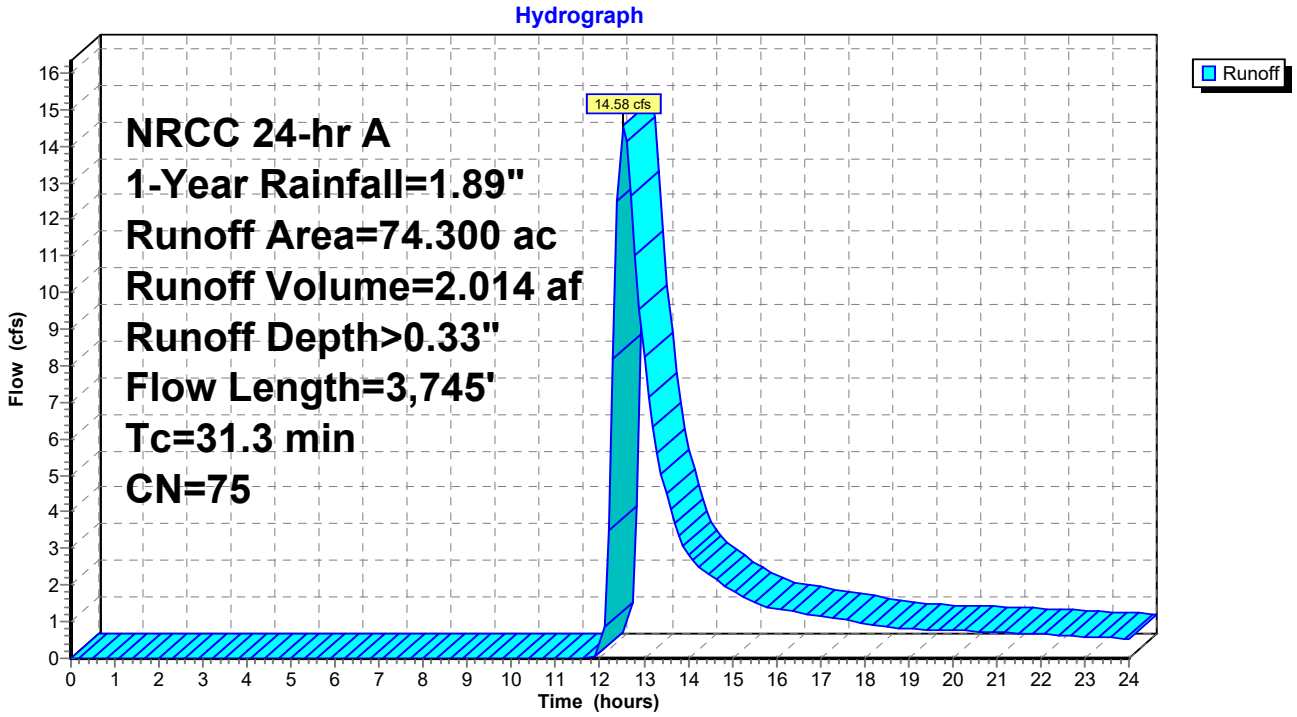
Runoff = 14.58 cfs @ 12.54 hrs, Volume= 2.014 af, Depth> 0.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.500	98	Paved parking, HSG D
22.000	78	Meadow, non-grazed, HSG D
3.200	80	>75% Grass cover, Good, HSG D
48.600	73	Brush, Good, HSG D
74.300	75	Weighted Average
73.800		99.33% Pervious Area
0.500		0.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.78		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.19"
10.8	1,165	0.0400	1.80		**Shallow Concentrated Flow, Shallow Concentrated** Cultivated Straight Rows Kv= 9.0 fps
1.2	1,445	0.0850	19.33	1,352.84	**Channel Flow, Channel Flow** Area= 70.0 sf Perim= 72.0' r= 0.97' n= 0.022 Earth, clean & straight
7.3	560	0.0650	1.27		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
1.2	115	0.1000	1.58		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
10.5	445	0.0200	0.71		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
31.3	3,745	Total			

Subcatchment 9S: Area #2 - Offsite Drainage



Summary for Subcatchment 10S: Area #1 - Total Site drainage

CarlsonPlanXYPos|641529.7843|1041282.6220|
CarlsonSurface||

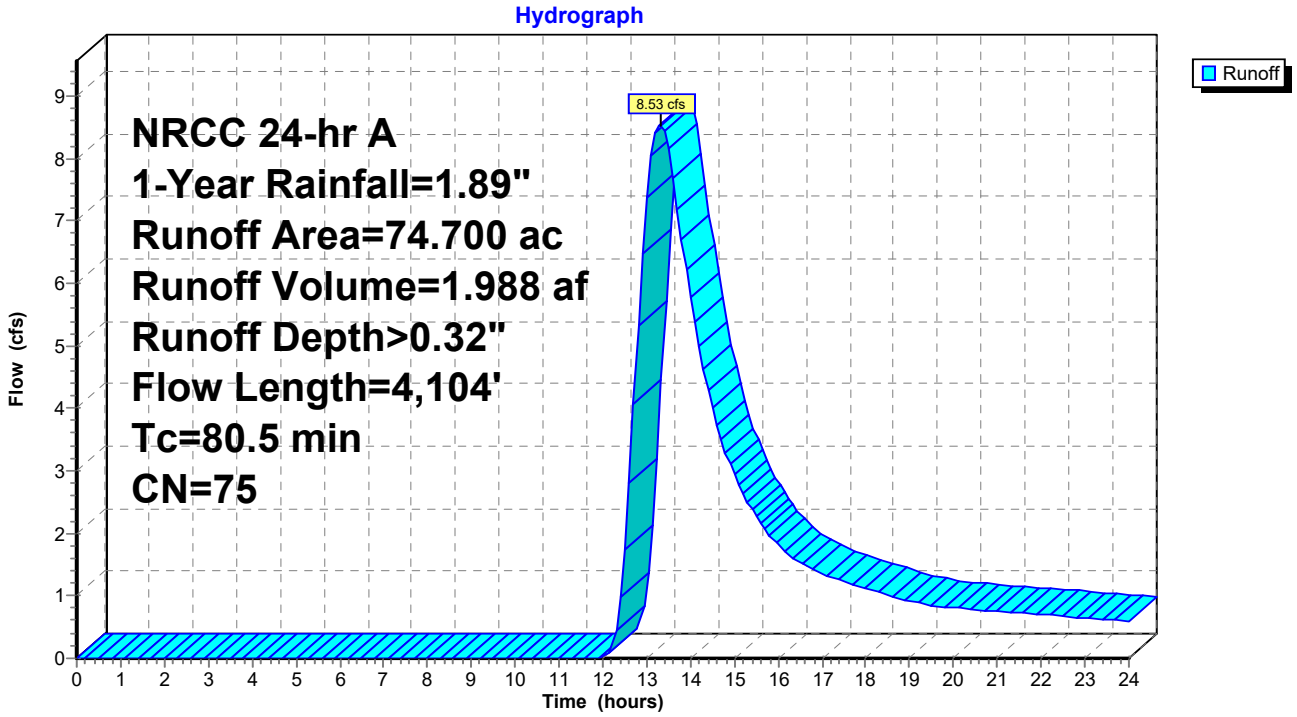
Runoff = 8.53 cfs @ 13.31 hrs, Volume= 1.988 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.570	61	>75% Grass cover, Good, HSG B
1.100	98	Paved parking, HSG D
17.900	78	Meadow, non-grazed, HSG D
51.230	73	Brush, Good, HSG D
3.900	80	>75% Grass cover, Good, HSG D
74.700	75	Weighted Average
73.600		98.53% Pervious Area
1.100		1.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.78		**Sheet Flow, Sheet flow** Smooth surfaces n= 0.011 P2= 2.19"
11.5	85	0.0200	0.12		**Sheet Flow, Sheet flow** Cultivated: Residue>20% n= 0.170 P2= 2.19"
5.0	385	0.0200	1.27		**Shallow Concentrated Flow, Shallow concentrated** Cultivated Straight Rows Kv= 9.0 fps
10.2	1,400	0.0640	2.28		**Shallow Concentrated Flow, Shallow concentrated** Cultivated Straight Rows Kv= 9.0 fps
3.9	307	0.0700	1.32		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
3.2	323	0.1100	1.66		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
5.7	395	0.0530	1.15		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
2.0	184	0.0920	1.52		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
7.1	367	0.0300	0.87		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
15.3	145	0.0010	0.16		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
16.3	498	0.0070	0.51	29.22	**Channel Flow, Channel Flow** Area= 57.5 sf Perim= 220.0' r= 0.26' n= 0.100 Heavy timber, flow below branches
80.5	4,104	Total			

Subcatchment 10S: Area #1 - Total Site drainage



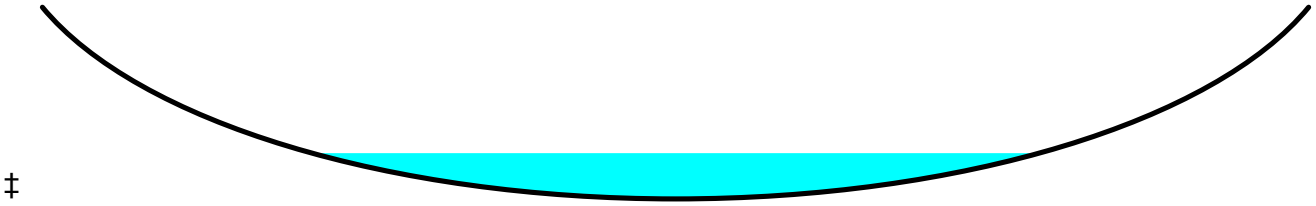
Summary for Reach 7R: Swale

Inflow Area = 74.700 ac, 1.47% Impervious, Inflow Depth > 0.32" for 1-Year event
Inflow = 8.53 cfs @ 13.31 hrs, Volume= 1.988 af
Outflow = 8.13 cfs @ 13.51 hrs, Volume= 1.960 af, Atten= 5%, Lag= 12.1 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 0.93 fps, Min. Travel Time= 15.2 min
Avg. Velocity = 0.54 fps, Avg. Travel Time= 25.9 min

Peak Storage= 7,404 cf @ 13.51 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.75' Flow Area= 75.0 sf, Capacity= 181.24 cfs

150.00' x 0.75' deep Parabolic Channel, n= 0.030 Short grass
Length= 847.0' Slope= 0.0060 '/'
Inlet Invert= 705.50', Outlet Invert= 700.42'



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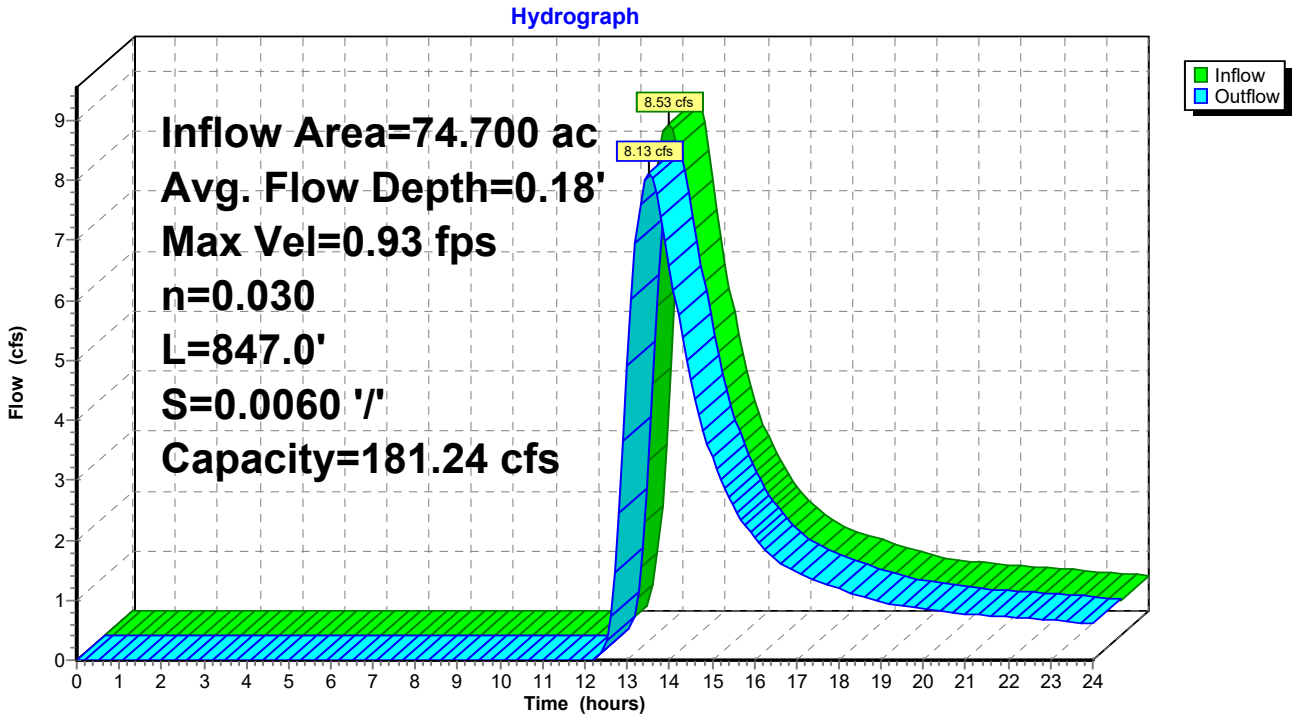
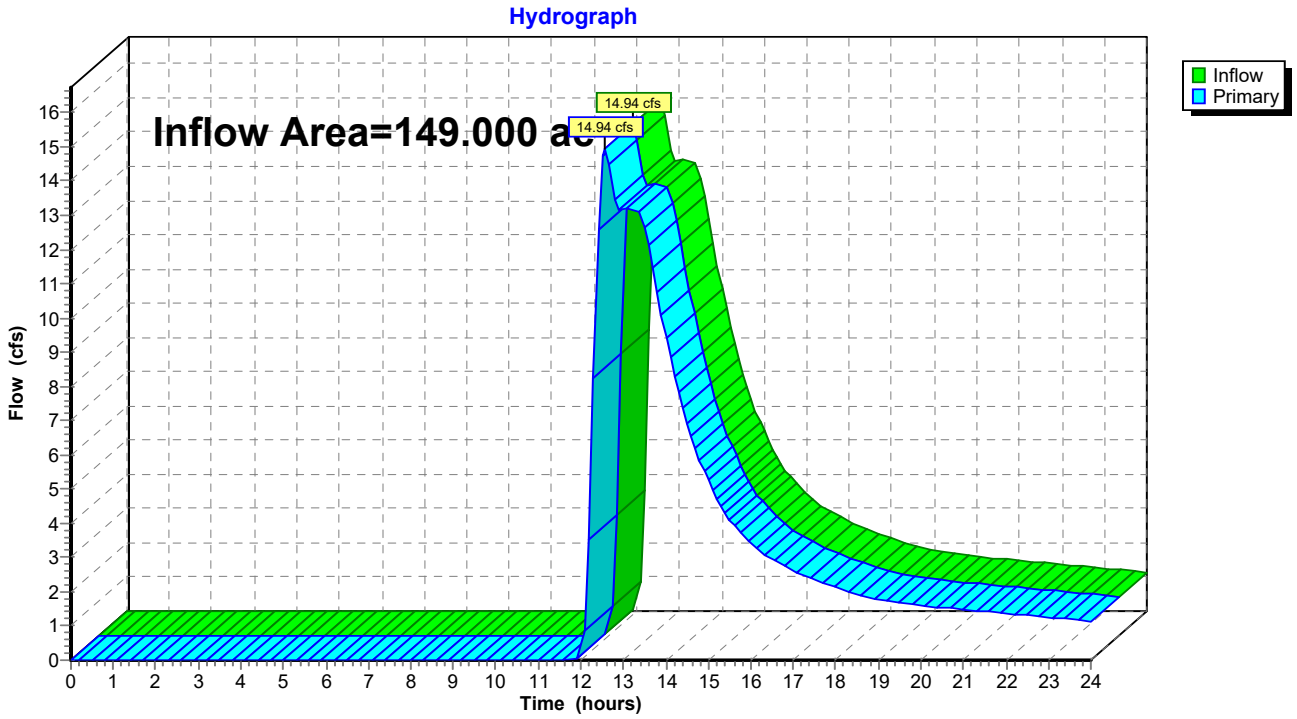


Summary for Link 6L: Total off-site drainage

Inflow Area = 149.000 ac, 1.07% Impervious, Inflow Depth > 0.32" for 1-Year event
Inflow = 14.94 cfs @ 12.56 hrs, Volume= 3.974 af
Primary = 14.94 cfs @ 12.56 hrs, Volume= 3.974 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Link 6L: Total off-site drainage



Time span=0.00-24.00 hrs, dt=0.10 hrs, 241 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment9S: Area #2 - Offsite Runoff Area=74.300 ac 0.67% Impervious Runoff Depth>1.05"
Flow Length=3,745' Tc=31.3 min CN=75 Runoff=57.37 cfs 6.475 af

Subcatchment10S: Area #1 - Total Site Runoff Area=74.700 ac 1.47% Impervious Runoff Depth>1.03"
Flow Length=4,104' Tc=80.5 min CN=75 Runoff=32.54 cfs 6.423 af

Reach 7R: Swale Avg. Flow Depth=0.34' Max Vel=1.42 fps Inflow=32.54 cfs 6.423 af
n=0.030 L=847.0' S=0.0060 '/' Capacity=181.24 cfs Outflow=31.83 cfs 6.372 af

Link 6L: Total off-site drainage Inflow=62.70 cfs 12.847 af
Primary=62.70 cfs 12.847 af

Total Runoff Area = 149.000 ac Runoff Volume = 12.898 af Average Runoff Depth = 1.04"
98.93% Pervious = 147.400 ac 1.07% Impervious = 1.600 ac

Summary for Subcatchment 9S: Area #2 - Offsite Drainage

CarlsonPlanXYPos|642280.8804|1040430.0233|
CarlsonSurface||

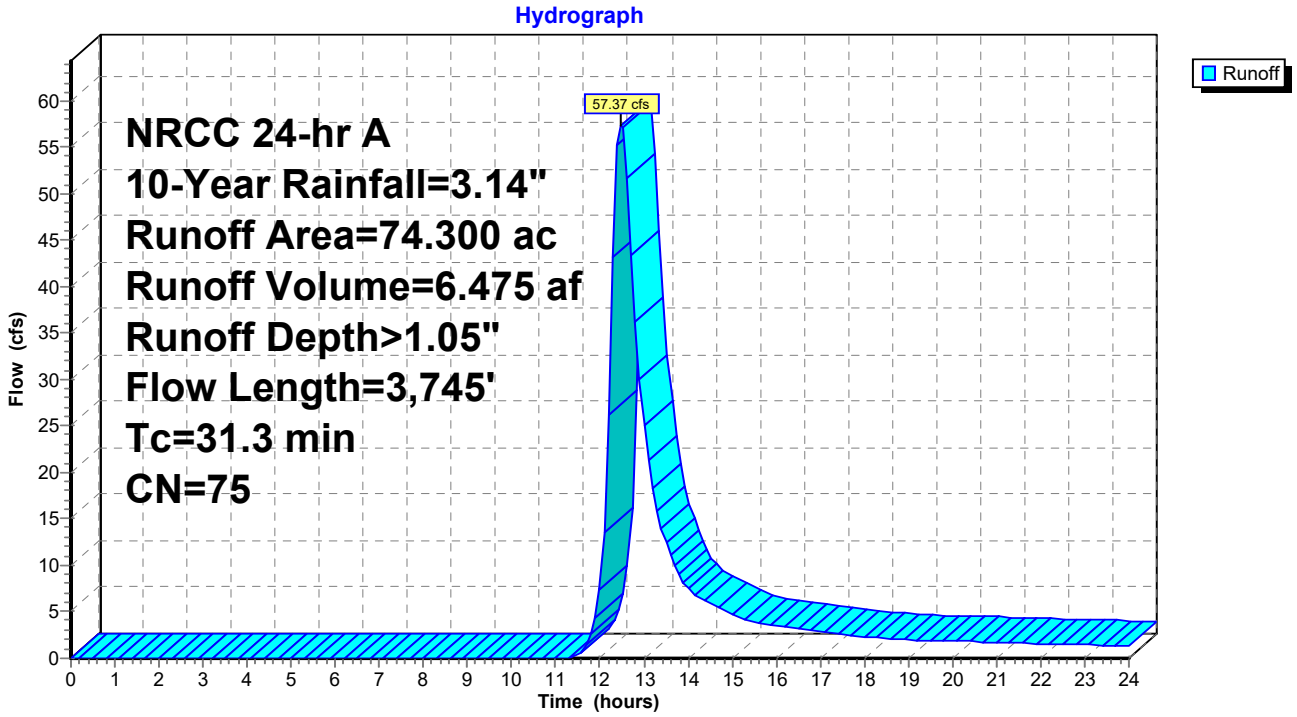
Runoff = 57.37 cfs @ 12.48 hrs, Volume= 6.475 af, Depth> 1.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.500	98	Paved parking, HSG D
22.000	78	Meadow, non-grazed, HSG D
3.200	80	>75% Grass cover, Good, HSG D
48.600	73	Brush, Good, HSG D
74.300	75	Weighted Average
73.800		99.33% Pervious Area
0.500		0.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.78		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.19"
10.8	1,165	0.0400	1.80		**Shallow Concentrated Flow, Shallow Concentrated** Cultivated Straight Rows Kv= 9.0 fps
1.2	1,445	0.0850	19.33	1,352.84	**Channel Flow, Channel Flow** Area= 70.0 sf Perim= 72.0' r= 0.97' n= 0.022 Earth, clean & straight
7.3	560	0.0650	1.27		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
1.2	115	0.1000	1.58		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
10.5	445	0.0200	0.71		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
31.3	3,745	Total			

Subcatchment 9S: Area #2 - Offsite Drainage



Summary for Subcatchment 10S: Area #1 - Total Site drainage

CarlsonPlanXYPos|641529.7843|1041282.6220|
CarlsonSurface||

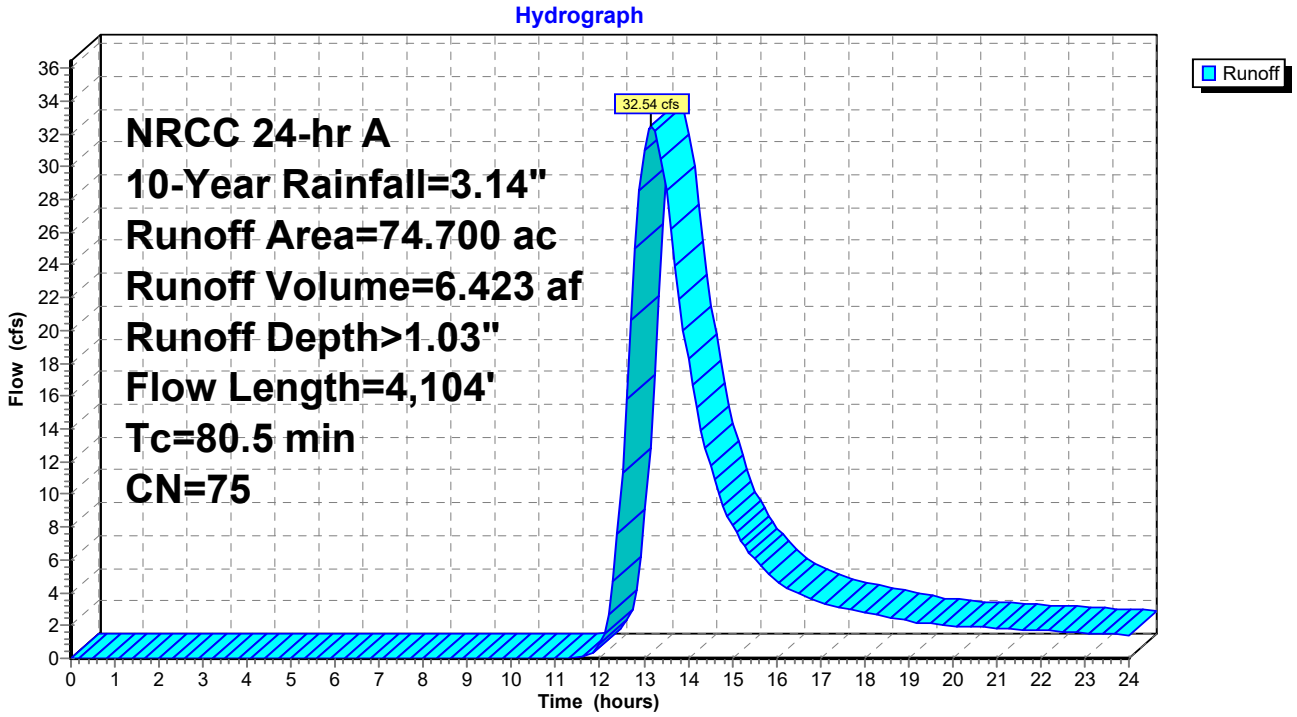
Runoff = 32.54 cfs @ 13.18 hrs, Volume= 6.423 af, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.570	61	>75% Grass cover, Good, HSG B
1.100	98	Paved parking, HSG D
17.900	78	Meadow, non-grazed, HSG D
51.230	73	Brush, Good, HSG D
3.900	80	>75% Grass cover, Good, HSG D
74.700	75	Weighted Average
73.600		98.53% Pervious Area
1.100		1.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.78		**Sheet Flow, Sheet flow** Smooth surfaces n= 0.011 P2= 2.19"
11.5	85	0.0200	0.12		**Sheet Flow, Sheet flow** Cultivated: Residue>20% n= 0.170 P2= 2.19"
5.0	385	0.0200	1.27		**Shallow Concentrated Flow, Shallow concentrated** Cultivated Straight Rows Kv= 9.0 fps
10.2	1,400	0.0640	2.28		**Shallow Concentrated Flow, Shallow concentrated** Cultivated Straight Rows Kv= 9.0 fps
3.9	307	0.0700	1.32		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
3.2	323	0.1100	1.66		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
5.7	395	0.0530	1.15		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
2.0	184	0.0920	1.52		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
7.1	367	0.0300	0.87		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
15.3	145	0.0010	0.16		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
16.3	498	0.0070	0.51	29.22	**Channel Flow, Channel Flow** Area= 57.5 sf Perim= 220.0' r= 0.26' n= 0.100 Heavy timber, flow below branches
80.5	4,104	Total			

Subcatchment 10S: Area #1 - Total Site drainage



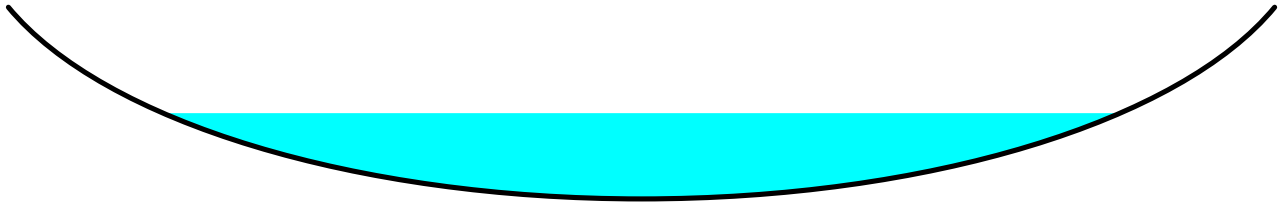
Summary for Reach 7R: Swale

Inflow Area = 74.700 ac, 1.47% Impervious, Inflow Depth > 1.03" for 10-Year event
Inflow = 32.54 cfs @ 13.18 hrs, Volume= 6.423 af
Outflow = 31.83 cfs @ 13.31 hrs, Volume= 6.372 af, Atten= 2%, Lag= 7.7 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.42 fps, Min. Travel Time= 10.0 min
Avg. Velocity = 0.72 fps, Avg. Travel Time= 19.5 min

Peak Storage= 19,054 cf @ 13.31 hrs
Average Depth at Peak Storage= 0.34'
Bank-Full Depth= 0.75' Flow Area= 75.0 sf, Capacity= 181.24 cfs

150.00' x 0.75' deep Parabolic Channel, n= 0.030 Short grass
Length= 847.0' Slope= 0.0060 '/'
Inlet Invert= 705.50', Outlet Invert= 700.42'



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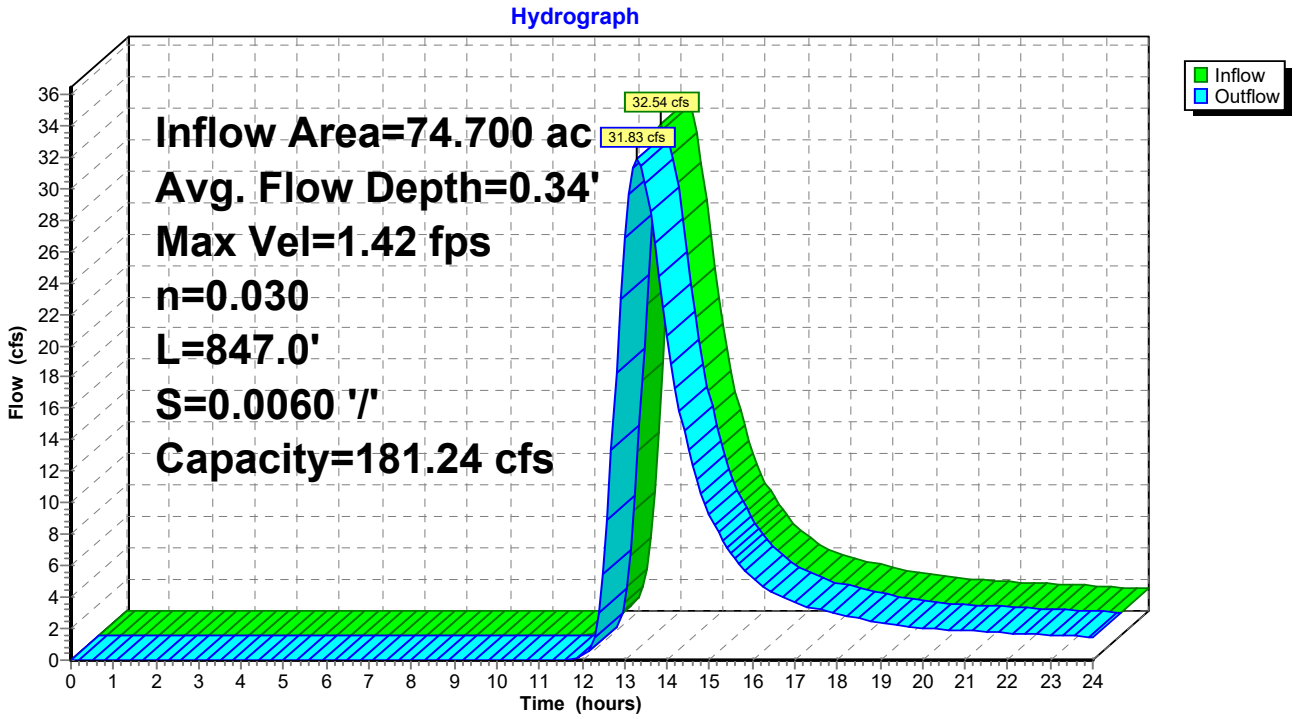
Reach 7R: Swale

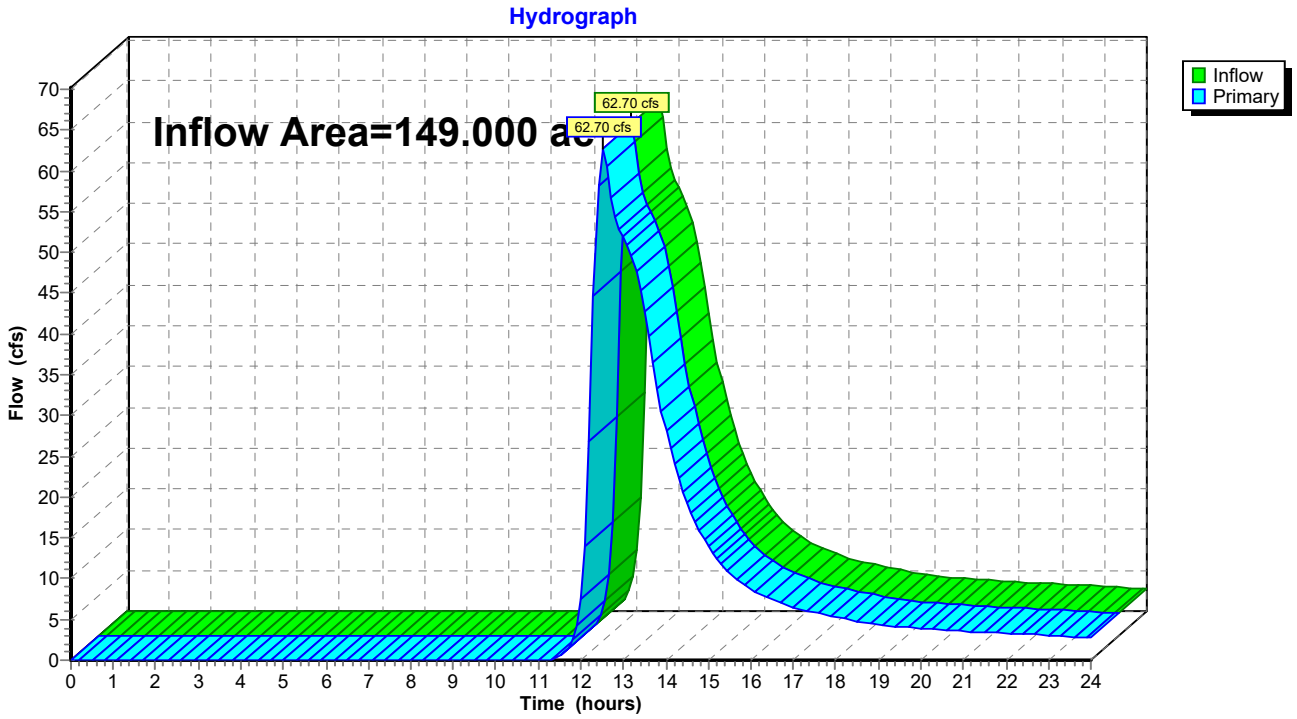


Summary for Link 6L: Total off-site drainage

Inflow Area = 149.000 ac, 1.07% Impervious, Inflow Depth > 1.03" for 10-Year event
Inflow = 62.70 cfs @ 12.52 hrs, Volume= 12.847 af
Primary = 62.70 cfs @ 12.52 hrs, Volume= 12.847 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Link 6L: Total off-site drainage



Time span=0.00-24.00 hrs, dt=0.10 hrs, 241 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment9S: Area #2 - Offsite Runoff Area=74.300 ac 0.67% Impervious Runoff Depth>2.67"
Flow Length=3,745' Tc=31.3 min CN=75 Runoff=154.27 cfs 16.534 af

Subcatchment10S: Area #1 - Total Site Runoff Area=74.700 ac 1.47% Impervious Runoff Depth>2.64"
Flow Length=4,104' Tc=80.5 min CN=75 Runoff=87.44 cfs 16.443 af

Reach 7R: Swale Avg. Flow Depth=0.53' Max Vel=1.92 fps Inflow=87.44 cfs 16.443 af
n=0.030 L=847.0' S=0.0060 '/' Capacity=181.24 cfs Outflow=86.45 cfs 16.358 af

Link 6L: Total off-site drainage Inflow=178.55 cfs 32.893 af
Primary=178.55 cfs 32.893 af

Total Runoff Area = 149.000 ac Runoff Volume = 32.978 af Average Runoff Depth = 2.66"
98.93% Pervious = 147.400 ac 1.07% Impervious = 1.600 ac

Summary for Subcatchment 9S: Area #2 - Offsite Drainage

CarlsonPlanXYPos|642280.8804|1040430.0233|
CarlsonSurface||

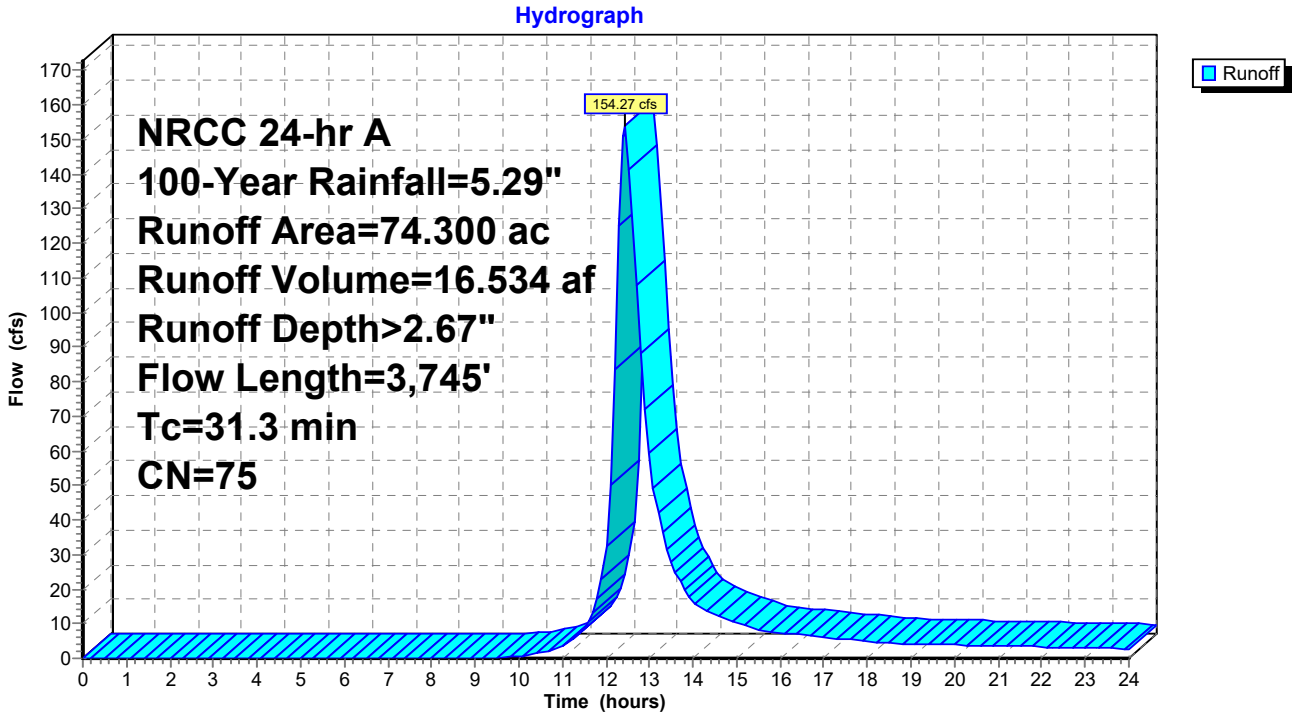
Runoff = 154.27 cfs @ 12.45 hrs, Volume= 16.534 af, Depth> 2.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.500	98	Paved parking, HSG D
22.000	78	Meadow, non-grazed, HSG D
3.200	80	>75% Grass cover, Good, HSG D
48.600	73	Brush, Good, HSG D
74.300	75	Weighted Average
73.800		99.33% Pervious Area
0.500		0.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.78		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.19"
10.8	1,165	0.0400	1.80		**Shallow Concentrated Flow, Shallow Concentrated** Cultivated Straight Rows Kv= 9.0 fps
1.2	1,445	0.0850	19.33	1,352.84	**Channel Flow, Channel Flow** Area= 70.0 sf Perim= 72.0' r= 0.97' n= 0.022 Earth, clean & straight
7.3	560	0.0650	1.27		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
1.2	115	0.1000	1.58		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
10.5	445	0.0200	0.71		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
31.3	3,745	Total			

Subcatchment 9S: Area #2 - Offsite Drainage



Summary for Subcatchment 10S: Area #1 - Total Site drainage

CarlsonPlanXYPos|641529.7843|1041282.6220|
CarlsonSurface||

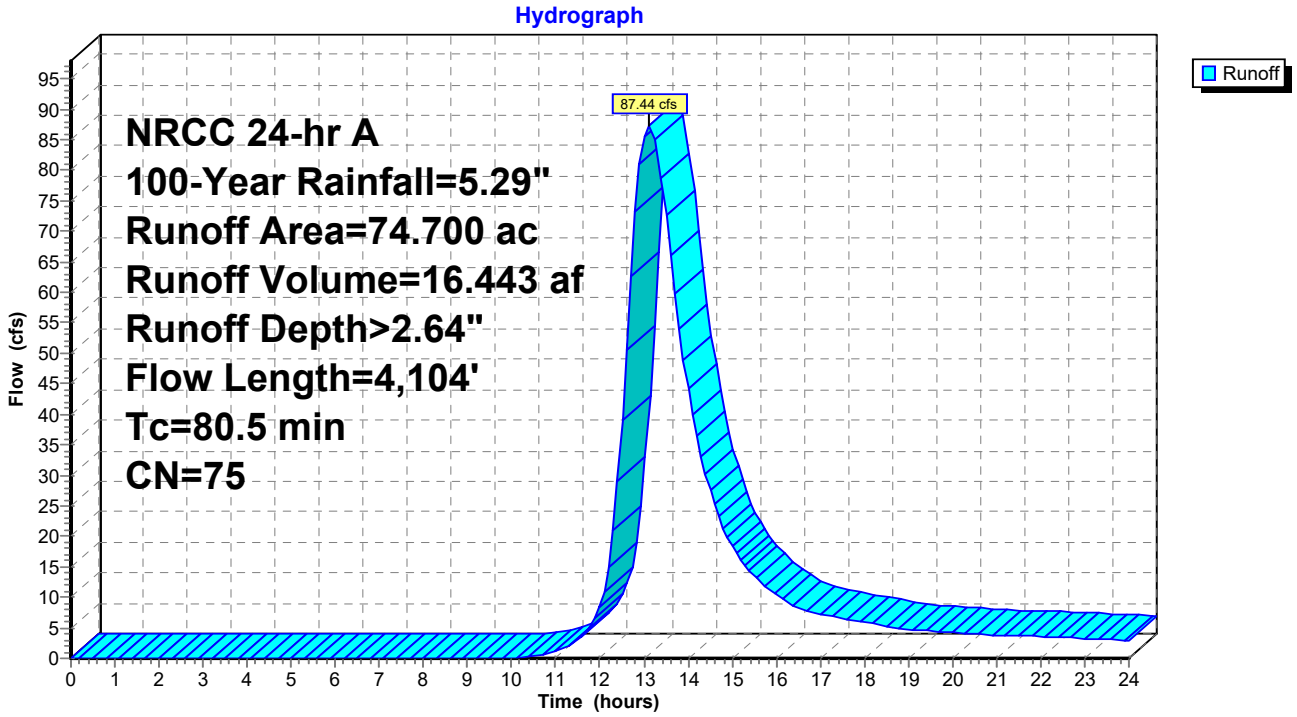
Runoff = 87.44 cfs @ 13.12 hrs, Volume= 16.443 af, Depth> 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.570	61	>75% Grass cover, Good, HSG B
1.100	98	Paved parking, HSG D
17.900	78	Meadow, non-grazed, HSG D
51.230	73	Brush, Good, HSG D
3.900	80	>75% Grass cover, Good, HSG D
74.700	75	Weighted Average
73.600		98.53% Pervious Area
1.100		1.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.78		**Sheet Flow, Sheet flow** Smooth surfaces n= 0.011 P2= 2.19"
11.5	85	0.0200	0.12		**Sheet Flow, Sheet flow** Cultivated: Residue>20% n= 0.170 P2= 2.19"
5.0	385	0.0200	1.27		**Shallow Concentrated Flow, Shallow concentrated** Cultivated Straight Rows Kv= 9.0 fps
10.2	1,400	0.0640	2.28		**Shallow Concentrated Flow, Shallow concentrated** Cultivated Straight Rows Kv= 9.0 fps
3.9	307	0.0700	1.32		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
3.2	323	0.1100	1.66		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
5.7	395	0.0530	1.15		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
2.0	184	0.0920	1.52		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
7.1	367	0.0300	0.87		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
15.3	145	0.0010	0.16		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
16.3	498	0.0070	0.51	29.22	**Channel Flow, Channel Flow** Area= 57.5 sf Perim= 220.0' r= 0.26' n= 0.100 Heavy timber, flow below branches
80.5	4,104	Total			

Subcatchment 10S: Area #1 - Total Site drainage



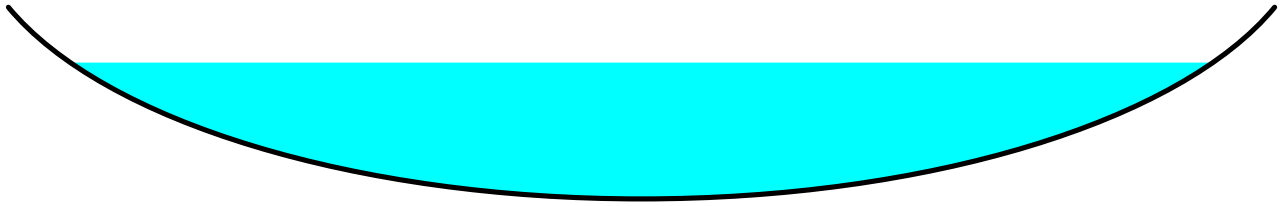
Summary for Reach 7R: Swale

Inflow Area = 74.700 ac, 1.47% Impervious, Inflow Depth > 2.64" for 100-Year event
Inflow = 87.44 cfs @ 13.12 hrs, Volume= 16.443 af
Outflow = 86.45 cfs @ 13.21 hrs, Volume= 16.358 af, Atten= 1%, Lag= 5.5 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.92 fps, Min. Travel Time= 7.3 min
Avg. Velocity = 0.89 fps, Avg. Travel Time= 15.9 min

Peak Storage= 38,051 cf @ 13.21 hrs
Average Depth at Peak Storage= 0.53'
Bank-Full Depth= 0.75' Flow Area= 75.0 sf, Capacity= 181.24 cfs

150.00' x 0.75' deep Parabolic Channel, n= 0.030 Short grass
Length= 847.0' Slope= 0.0060 '/'
Inlet Invert= 705.50', Outlet Invert= 700.42'



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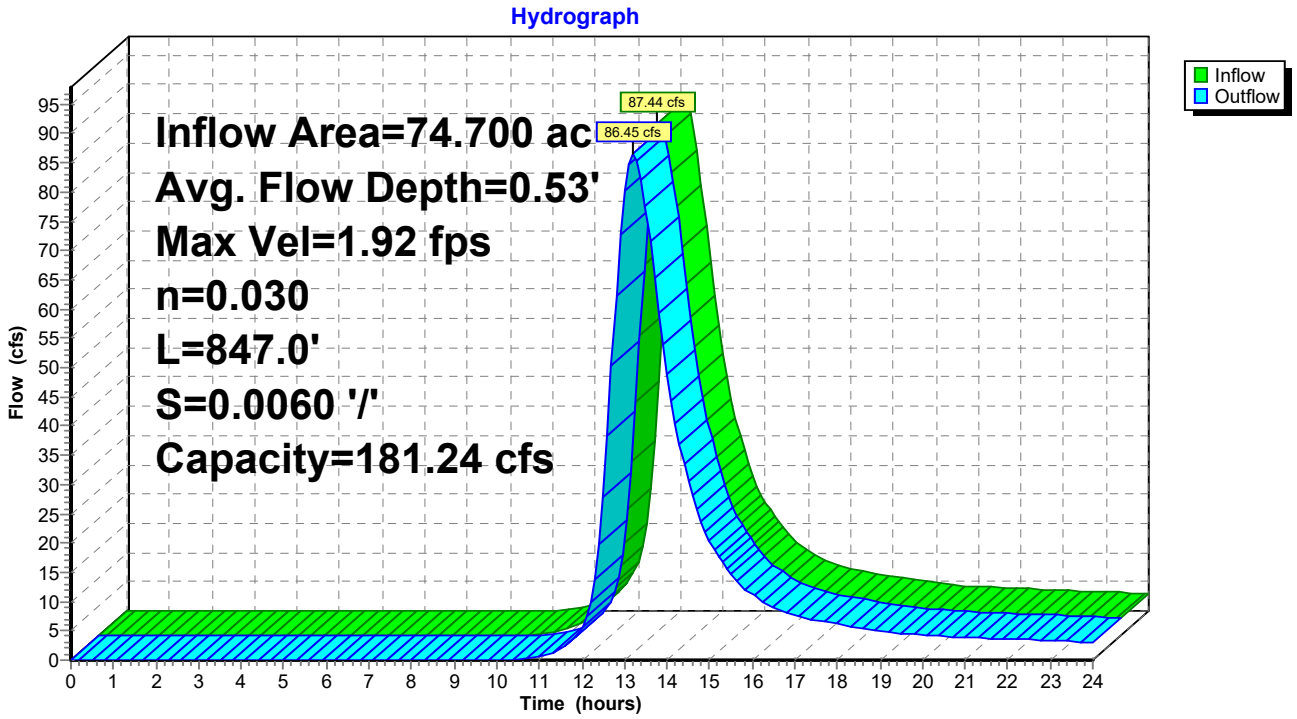
Reach 7R: Swale

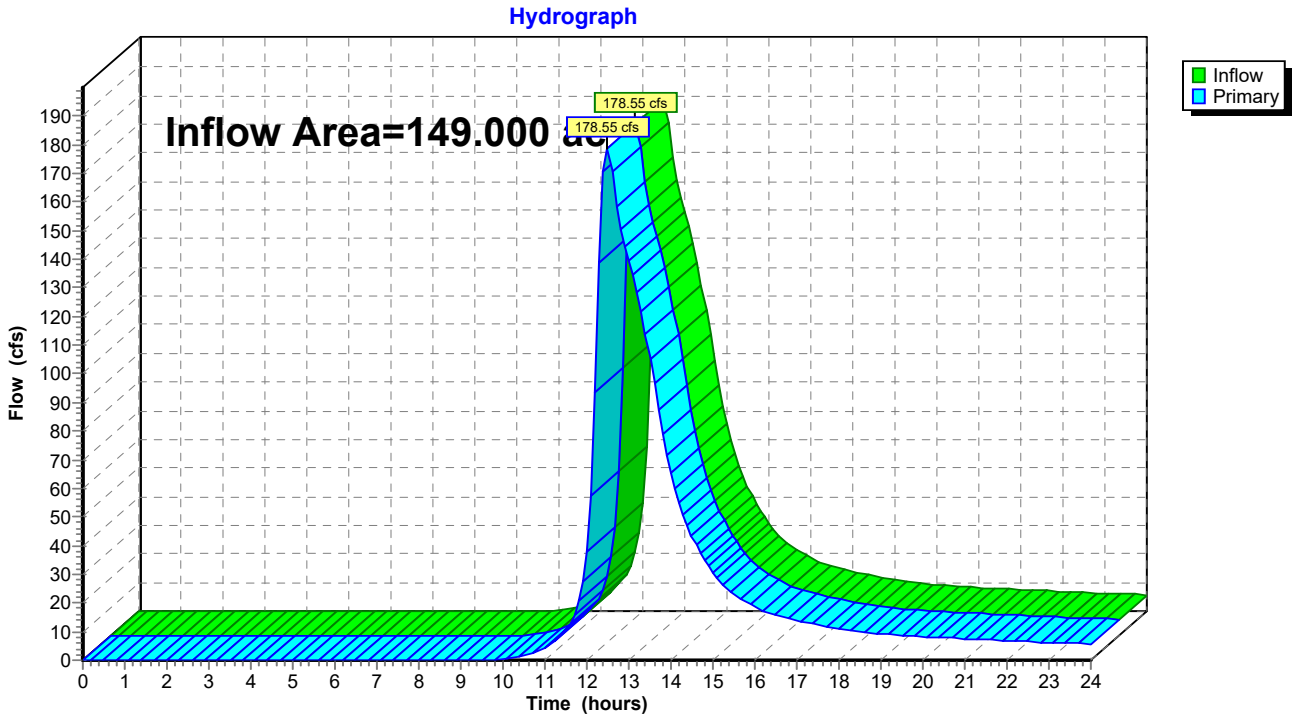


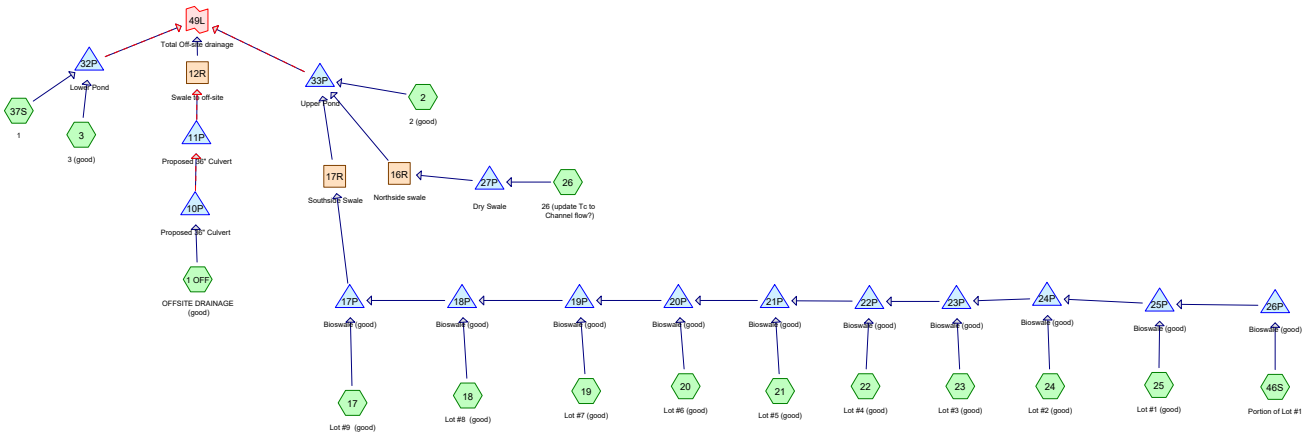
Summary for Link 6L: Total off-site drainage

Inflow Area = 149.000 ac, 1.07% Impervious, Inflow Depth > 2.65" for 100-Year event
Inflow = 178.55 cfs @ 12.50 hrs, Volume= 32.893 af
Primary = 178.55 cfs @ 12.50 hrs, Volume= 32.893 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Link 6L: Total off-site drainage





Subcat Reach Pond Link

Routing Diagram for 20-243 SWPPPBASE PRO 1.19.22 Canandaigua JJ

Prepared by {enter your company name here}, Printed 2/28/2023

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.100	61	>75% Grass cover, Good, HSG B (37S)
36.170	80	>75% Grass cover, Good, HSG D (1 OFF, 2, 3, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 37S, 46S)
68.210	73	Brush, Good, HSG D (1 OFF, 2, 3, 37S)
33.760	78	Meadow, non-grazed, HSG D (1 OFF, 2, 3)
1.860	98	Paved parking HSG B (37S)
1.340	98	Paved parking HSG C (37S)
0.090	98	Paved parking HSG D (2)
5.780	98	Paved parking, HSG D (1 OFF, 2, 3, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 46S)
0.260	98	Water Surface HSG B (37S)
0.430	98	Water Surface, HSG D (2)
149.000	**77**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.220	HSG B	37S
1.340	HSG C	37S
144.440	HSG D	1 OFF, 2, 3, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 37S, 46S
0.000	Other	
149.000		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	1.100	0.000	36.170	0.000	37.270	>75% Grass cover, Good	1 OFF, 2, 3, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 37S, 46S
0.000	0.000	0.000	68.210	0.000	68.210	Brush, Good	1 OFF, 2, 3, 37S
0.000	0.000	0.000	33.760	0.000	33.760	Meadow, non-grazed	1 OFF, 2, 3
0.000	1.860	1.340	5.870	0.000	9.070	Paved parking	1 OFF, 2, 3, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 37S, 46S
0.000	0.260	0.000	0.430	0.000	0.690	Water Surface	2, 37S
0.000	**3.220**	**1.340**	**144.440**	**0.000**	**149.000**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	37S	0.00	0.00	114.0	0.0040	0.012	15.0	0.0	0.0
2	37S	0.00	0.00	113.0	0.0040	0.012	18.0	0.0	0.0
3	37S	0.00	0.00	35.0	0.0040	0.012	24.0	0.0	0.0
4	37S	0.00	0.00	279.0	0.0080	0.012	24.0	0.0	0.0
5	10P	704.50	704.00	122.0	0.0041	0.012	36.0	0.0	0.0
6	11P	703.30	703.00	65.0	0.0046	0.012	36.0	0.0	0.0
7	18P	812.50	812.00	46.0	0.0109	0.012	24.0	0.0	0.0
8	19P	827.50	827.00	46.0	0.0109	0.012	18.0	0.0	0.0
9	20P	842.50	840.50	46.0	0.0435	0.012	15.0	0.0	0.0
10	21P	856.50	854.00	47.0	0.0532	0.012	15.0	0.0	0.0
11	22P	867.50	866.00	47.0	0.0319	0.012	12.0	0.0	0.0
12	23P	878.50	877.00	45.0	0.0333	0.012	12.0	0.0	0.0
13	24P	889.50	888.00	45.0	0.0333	0.012	12.0	0.0	0.0
14	25P	901.50	901.00	58.0	0.0086	0.012	12.0	0.0	0.0
15	26P	905.50	905.00	58.0	0.0086	0.012	12.0	0.0	0.0
16	32P	700.00	699.80	21.0	0.0095	0.020	18.0	0.0	0.0
17	33P	737.50	735.00	35.0	0.0714	0.020	24.0	0.0	0.0

Time span=0.00-37.00 hrs, dt=0.01 hrs, 3701 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 OFF: OFFSITE DRAINAGE Runoff Area=78.750 ac 0.89% Impervious Runoff Depth=0.33"
Flow Length=4,105' Tc=35.7 min CN=75 Runoff=14.52 cfs 2.155 af

Subcatchment2: 2 (good) Runoff Area=24.100 ac 9.34% Impervious Runoff Depth=0.42"
Flow Length=2,474' Tc=15.8 min CN=78 Runoff=9.78 cfs 0.851 af

Subcatchment3: 3 (good) Runoff Area=23.800 ac 3.66% Impervious Runoff Depth=0.46"
Flow Length=3,643' Tc=37.7 min CN=79 Runoff=6.74 cfs 0.911 af

Subcatchment17: Lot #9 (good) Runoff Area=0.840 ac 26.19% Impervious Runoff Depth=0.72"
Slope=0.0866 '/' Tc=6.0 min CN=85 Runoff=0.94 cfs 0.050 af

Subcatchment18: Lot #8 (good) Runoff Area=0.750 ac 29.33% Impervious Runoff Depth=0.72"
Slope=0.0953 '/' Tc=6.0 min CN=85 Runoff=0.84 cfs 0.045 af

Subcatchment19: Lot #7 (good) Runoff Area=0.810 ac 27.16% Impervious Runoff Depth=0.72"
Slope=0.0933 '/' Tc=6.0 min CN=85 Runoff=0.91 cfs 0.048 af

Subcatchment20: Lot #6 (good) Runoff Area=0.800 ac 27.50% Impervious Runoff Depth=0.72"
Slope=0.0759 '/' Tc=6.0 min CN=85 Runoff=0.90 cfs 0.048 af

Subcatchment21: Lot #5 (good) Runoff Area=0.800 ac 27.50% Impervious Runoff Depth=0.72"
Slope=0.0663 '/' Tc=6.0 min CN=85 Runoff=0.90 cfs 0.048 af

Subcatchment22: Lot #4 (good) Runoff Area=0.820 ac 26.83% Impervious Runoff Depth=0.72"
Slope=0.0589 '/' Tc=6.0 min CN=85 Runoff=0.92 cfs 0.049 af

Subcatchment23: Lot #3 (good) Runoff Area=0.830 ac 26.51% Impervious Runoff Depth=0.72"
Slope=0.0568 '/' Tc=6.0 min CN=85 Runoff=0.93 cfs 0.049 af

Subcatchment24: Lot #2 (good) Runoff Area=0.560 ac 39.29% Impervious Runoff Depth=0.82"
Slope=0.0563 '/' Tc=6.0 min CN=87 Runoff=0.72 cfs 0.038 af

Subcatchment25: Lot #1 (good) Runoff Area=0.380 ac 52.63% Impervious Runoff Depth=0.94"
Flow Length=120' Slope=0.0700 '/' Tc=7.3 min CN=89 Runoff=0.53 cfs 0.030 af

Subcatchment26: 26 (update Tc to Runoff Area=1.310 ac 37.40% Impervious Runoff Depth=0.82"
Tc=8.0 min CN=87 Runoff=1.55 cfs 0.090 af

Subcatchment37S: 1 Runoff Area=14.300 ac 24.20% Impervious Runoff Depth=0.62"
Flow Length=932' Tc=7.7 min CN=83 Runoff=12.74 cfs 0.740 af

Subcatchment46S: Portion of Lot #1 Runoff Area=0.150 ac 20.00% Impervious Runoff Depth=0.67"
Tc=6.0 min CN=84 Runoff=0.16 cfs 0.008 af

Reach 12R: Swale to off-site Avg. Flow Depth=0.29' Max Vel=1.37 fps Inflow=4.06 cfs 2.139 af
n=0.030 L=293.0' S=0.0068 '/' Capacity=58.17 cfs Outflow=4.06 cfs 2.138 af

Reach 16R: Northside swale Avg. Flow Depth=0.09' Max Vel=2.23 fps Inflow=0.66 cfs 0.046 af
n=0.030 L=655.0' S=0.0885 '/' Capacity=111.61 cfs Outflow=0.59 cfs 0.046 af

Reach 17R: Southside Swale Avg. Flow Depth=0.28' Max Vel=4.69 fps Inflow=7.60 cfs 0.408 af
n=0.030 L=710.0' S=0.0831 '/' Capacity=108.12 cfs Outflow=7.07 cfs 0.408 af

Pond 10P: Proposed 36" Culvert Peak Elev=705.35' Storage=34,005 cf Inflow=14.52 cfs 2.155 af
Primary=4.06 cfs 2.140 af Secondary=0.00 cfs 0.000 af Outflow=4.06 cfs 2.140 af

Pond 11P: Proposed 36" Culvert Peak Elev=704.16' Storage=1,062 cf Inflow=4.06 cfs 2.140 af
Primary=4.06 cfs 2.139 af Secondary=0.00 cfs 0.000 af Outflow=4.06 cfs 2.139 af

Pond 17P: Bioswale (good) Peak Elev=807.68' Storage=237 cf Inflow=7.61 cfs 0.412 af
Discarded=0.00 cfs 0.002 af Primary=7.60 cfs 0.408 af Outflow=7.60 cfs 0.410 af

Pond 18P: Bioswale (good) Peak Elev=815.13' Storage=184 cf Inflow=6.70 cfs 0.362 af
Discarded=0.00 cfs 0.000 af Primary=6.69 cfs 0.361 af Outflow=6.69 cfs 0.362 af

Pond 19P: Bioswale (good) Peak Elev=829.79' Storage=84 cf Inflow=5.88 cfs 0.317 af
Discarded=0.00 cfs 0.000 af Primary=5.88 cfs 0.317 af Outflow=5.88 cfs 0.317 af

Pond 20P: Bioswale (good) Peak Elev=844.76' Storage=76 cf Inflow=4.99 cfs 0.269 af
Discarded=0.00 cfs 0.000 af Primary=4.99 cfs 0.269 af Outflow=4.99 cfs 0.269 af

Pond 21P: Bioswale (good) Peak Elev=858.73' Storage=67 cf Inflow=4.11 cfs 0.222 af
Discarded=0.00 cfs 0.000 af Primary=4.11 cfs 0.222 af Outflow=4.11 cfs 0.222 af

Pond 22P: Bioswale (good) Peak Elev=869.69' Storage=57 cf Inflow=3.23 cfs 0.174 af
Discarded=0.00 cfs 0.000 af Primary=3.22 cfs 0.174 af Outflow=3.23 cfs 0.174 af

Pond 23P: Bioswale (good) Peak Elev=880.66' Storage=46 cf Inflow=2.32 cfs 0.126 af
Outflow=2.32 cfs 0.126 af

Pond 24P: Bioswale (good) Peak Elev=891.61' Storage=31 cf Inflow=1.40 cfs 0.076 af
Discarded=0.00 cfs 0.000 af Primary=1.40 cfs 0.076 af Outflow=1.40 cfs 0.076 af

Pond 25P: Bioswale (good) Peak Elev=903.59' Storage=12 cf Inflow=0.69 cfs 0.038 af
Discarded=0.00 cfs 0.000 af Primary=0.69 cfs 0.038 af Outflow=0.69 cfs 0.038 af

Pond 26P: Bioswale (good) Peak Elev=907.53' Storage=7 cf Inflow=0.16 cfs 0.008 af
Discarded=0.00 cfs 0.000 af Primary=0.15 cfs 0.008 af Outflow=0.15 cfs 0.008 af

Pond 27P: Dry Swale Peak Elev=807.67' Storage=1,403 cf Inflow=1.55 cfs 0.090 af
Discarded=0.02 cfs 0.032 af Primary=0.66 cfs 0.046 af Outflow=0.68 cfs 0.079 af

Pond 32P: Lower Pond Peak Elev=703.16' Storage=56,865 cf Inflow=13.84 cfs 1.651 af
Primary=0.41 cfs 0.898 af Secondary=0.00 cfs 0.000 af Outflow=0.41 cfs 0.898 af

Pond 33P: Upper Pond Peak Elev=740.34' Storage=41,386 cf Inflow=15.22 cfs 1.306 af
Primary=0.39 cfs 0.742 af Secondary=0.00 cfs 0.000 af Outflow=0.39 cfs 0.742 af

Link 49L: Total Off-site drainage

Inflow=4.79 cfs 3.779 af
Primary=4.79 cfs 3.779 af

Total Runoff Area = 149.000 ac Runoff Volume = 5.161 af Average Runoff Depth = 0.42"
93.45% Pervious = 139.240 ac 6.55% Impervious = 9.760 ac

Summary for Subcatchment 1 OFF: OFFSITE DRAINAGE (good)

CarlsonPlanXYPos|642280.8804|1040430.0233|
CarlsonSurface||

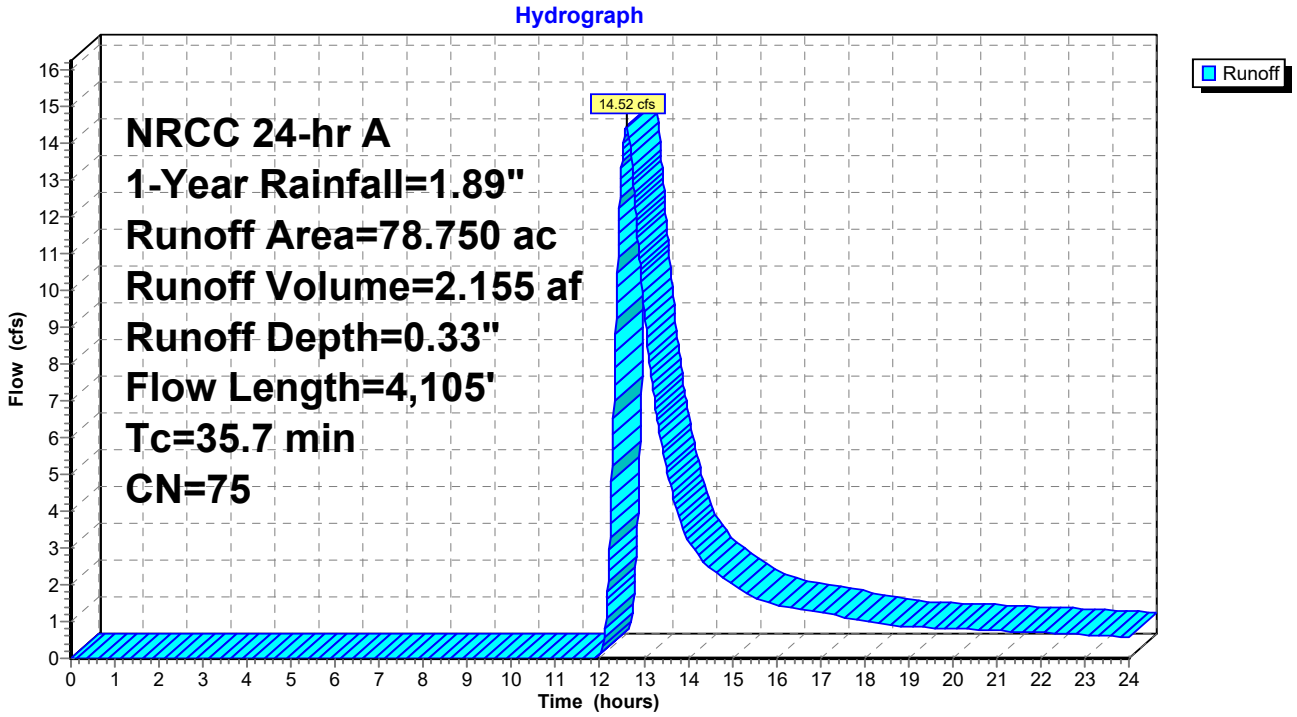
Runoff = 14.52 cfs @ 12.61 hrs, Volume= 2.155 af, Depth= 0.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.700	98	Paved parking, HSG D
18.800	78	Meadow, non-grazed, HSG D
5.000	80	>75% Grass cover, Good, HSG D
54.250	73	Brush, Good, HSG D
78.750	75	Weighted Average
78.050		99.11% Pervious Area
0.700		0.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.78		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.19"
10.8	1,165	0.0400	1.80		**Shallow Concentrated Flow, Shallow Concentrated** Cultivated Straight Rows Kv= 9.0 fps
1.2	1,445	0.0850	19.33	1,352.84	**Channel Flow, Channel Flow** Area= 70.0 sf Perim= 72.0' r= 0.97' n= 0.022 Earth, clean & straight
7.3	560	0.0650	1.27		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
1.2	115	0.1000	1.58		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
12.6	535	0.0200	0.71		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
2.3	270	0.0150	1.97		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
35.7	4,105	Total			

Subcatchment 1 OFF: OFFSITE DRAINAGE (good)



Summary for Subcatchment 2: 2 (good)

CarlsonPlanXYPos|642014.4586|1041354.4458|
CarlsonSurface||

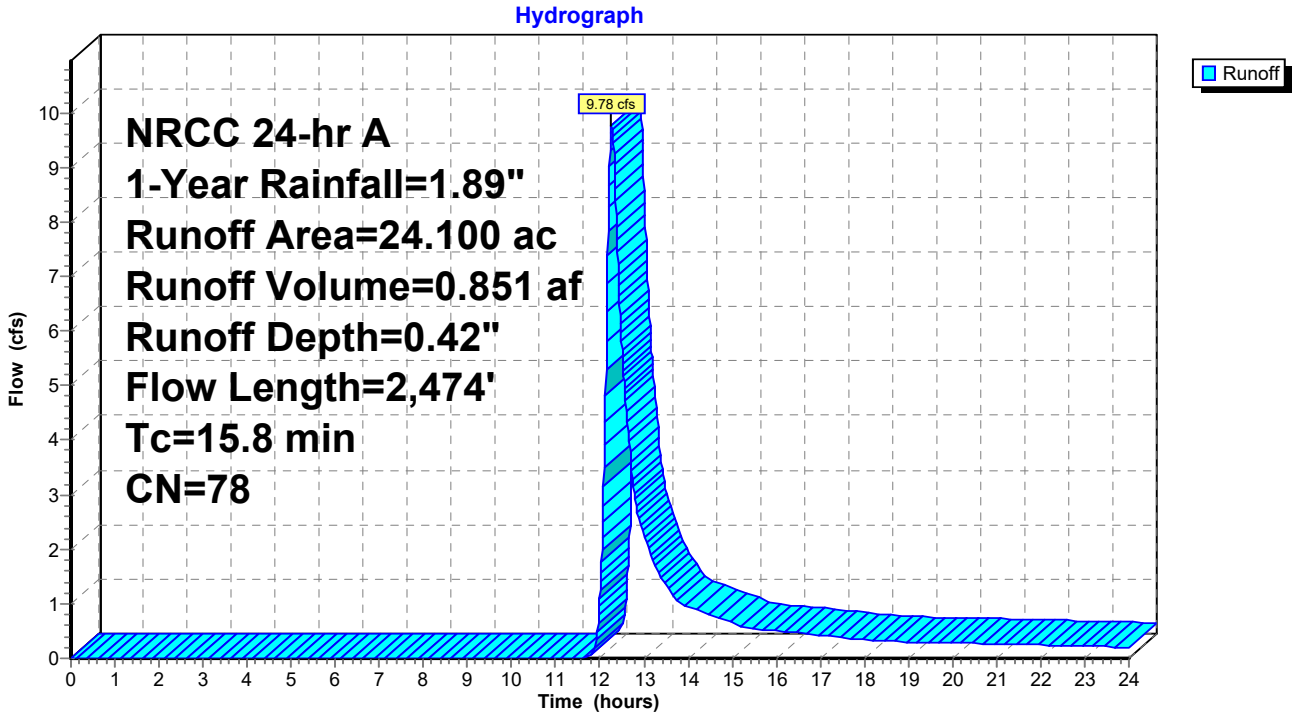
Runoff = 9.78 cfs @ 12.27 hrs, Volume= 0.851 af, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.430	98	Water Surface, HSG D
1.730	98	Paved parking, HSG D
0.090	98	Paved parking HSG D
2.150	80	>75% Grass cover, Good, HSG D
2.300	78	Meadow, non-grazed, HSG D
10.900	73	Brush, Good, HSG D
6.000	80	>75% Grass cover, Good, HSG D
0.500	80	>75% Grass cover, Good, HSG D
24.100	78	Weighted Average
21.850		90.66% Pervious Area
2.250		9.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0350	0.18		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.19"
0.7	192	0.0830	4.64		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
0.8	230	0.0870	4.75		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
1.1	180	0.0280	2.69		**Shallow Concentrated Flow, Shallow concentrated** Unpaved Kv= 16.1 fps
1.1	1,194	0.0750	17.98	413.55	**Channel Flow, Channel Flow** Area= 23.0 sf Perim= 24.0' r= 0.96' n= 0.022 Earth, clean & straight
2.2	165	0.0600	1.22		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
0.4	413	0.0720	17.36	260.42	**Channel Flow, Channel Flow** Area= 15.0 sf Perim= 16.0' r= 0.94' n= 0.022 Earth, clean & straight
15.8	2,474	Total			

Subcatchment 2: 2 (good)



Summary for Subcatchment 3: 3 (good)

CarlsonPlanXYPos|641681.4005|1041128.2504|
CarlsonSurface||

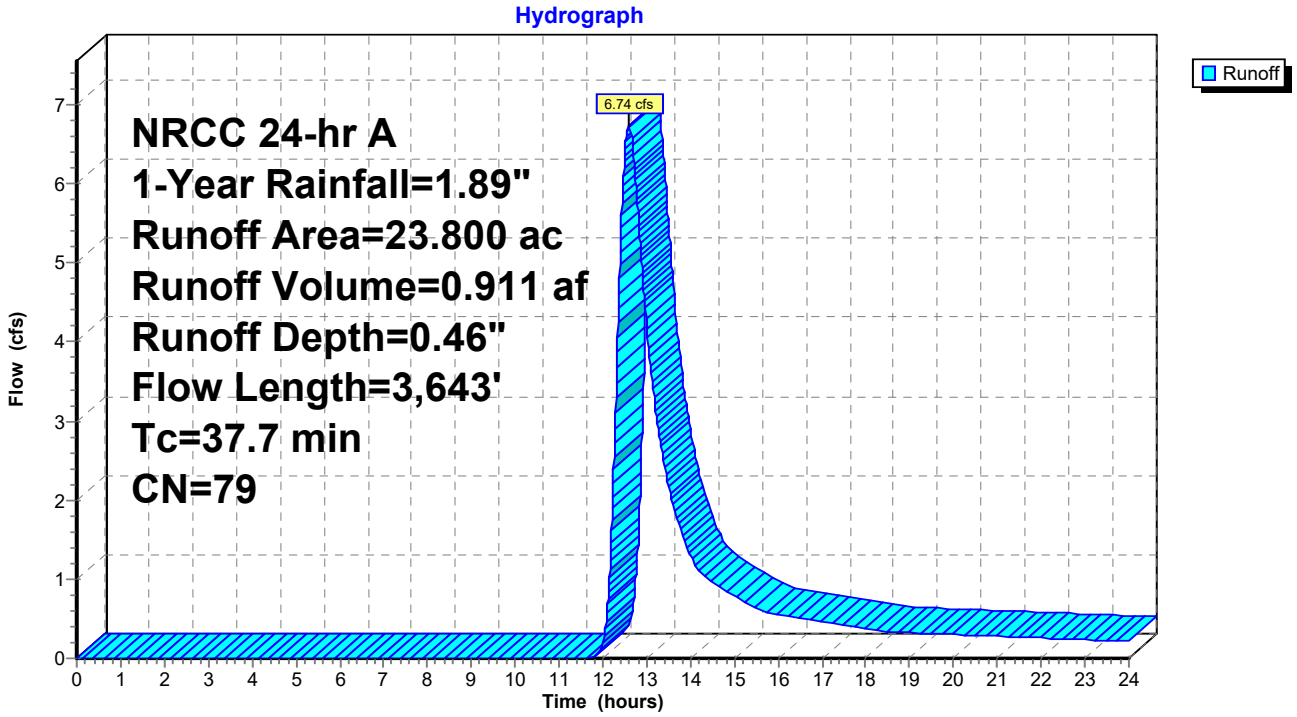
Runoff = 6.74 cfs @ 12.61 hrs, Volume= 0.911 af, Depth= 0.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.440	98	Paved parking, HSG D
0.530	80	>75% Grass cover, Good, HSG D
0.430	98	Paved parking, HSG D
12.660	78	Meadow, non-grazed, HSG D
2.500	73	Brush, Good, HSG D
5.720	80	>75% Grass cover, Good, HSG D
1.520	80	>75% Grass cover, Good, HSG D
23.800	79	Weighted Average
22.930		96.34% Pervious Area
0.870		3.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.78		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.19"
11.5	85	0.0200	0.12		**Sheet Flow, Sheet Flow** Cultivated: Residue>20% n= 0.170 P2= 2.19"
5.0	385	0.0200	1.27		**Shallow Concentrated Flow, Shallow Concentrated** Cultivated Straight Rows Kv= 9.0 fps
10.2	1,400	0.0640	2.28		**Shallow Concentrated Flow, Shallow Concentrated** Cultivated Straight Rows Kv= 9.0 fps
6.4	560	0.0840	1.45		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
0.4	435	0.0640	16.37	245.52	**Channel Flow, Channel Flow** Area= 15.0 sf Perim= 16.0' r= 0.94' n= 0.022 Earth, clean & straight
0.9	209	0.0570	3.84		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
2.2	197	0.0870	1.47		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
0.2	125	0.0320	11.48	286.96	**Channel Flow, Channel Flow** Area= 25.0 sf Perim= 27.0' r= 0.93' n= 0.022 Earth, clean & straight
0.6	232	0.0100	6.42	160.42	**Channel Flow, Channel Flow** Area= 25.0 sf Perim= 27.0' r= 0.93' n= 0.022 Earth, clean & straight
37.7	3,643	Total			

Subcatchment 3: 3 (good)



Summary for Subcatchment 17: Lot #9 (good)

CarlsonPlanXYPos|642702.7045|1040980.9144|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

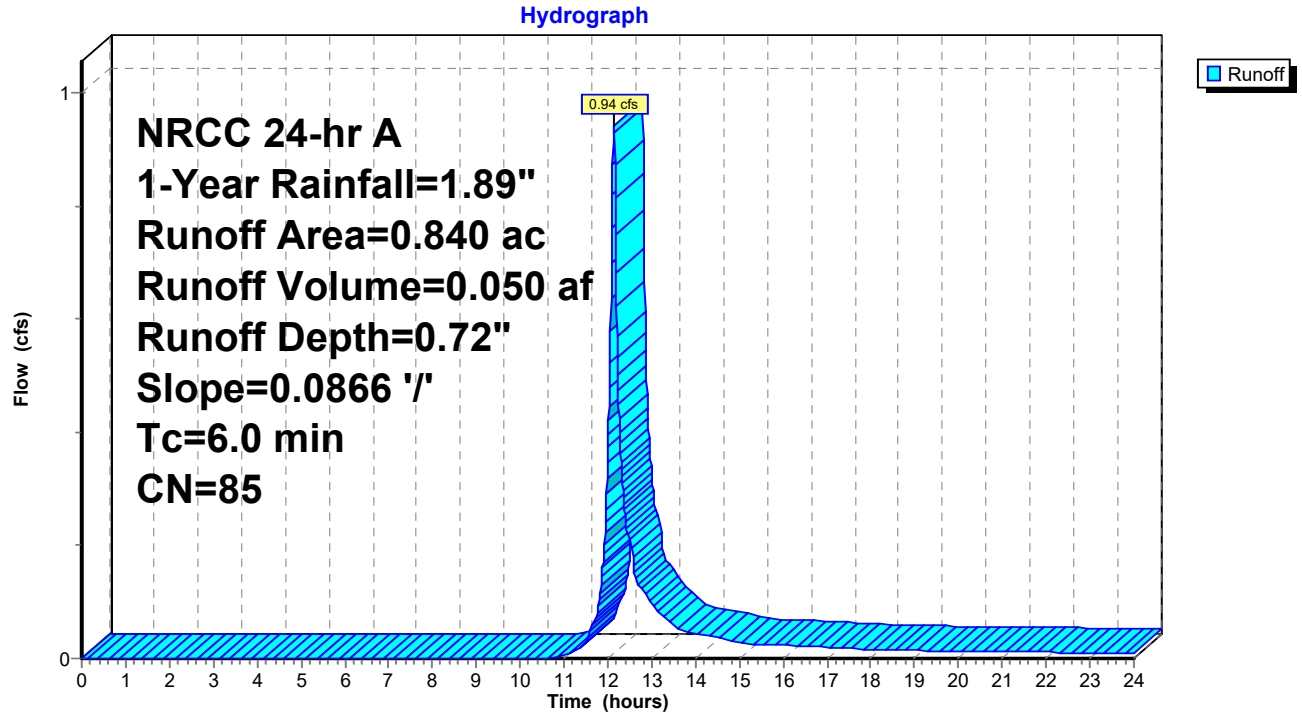
Runoff = 0.94 cfs @ 12.14 hrs, Volume= 0.050 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.540	80	>75% Grass cover, Good, HSG D
0.080	80	>75% Grass cover, Good, HSG D
0.840	85	Weighted Average
0.620		73.81% Pervious Area
0.220		26.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0866			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 17: Lot #9 (good)



Summary for Subcatchment 18: Lot #8 (good)

CarlsonPlanXYPos|642920.0895|1040980.2941|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

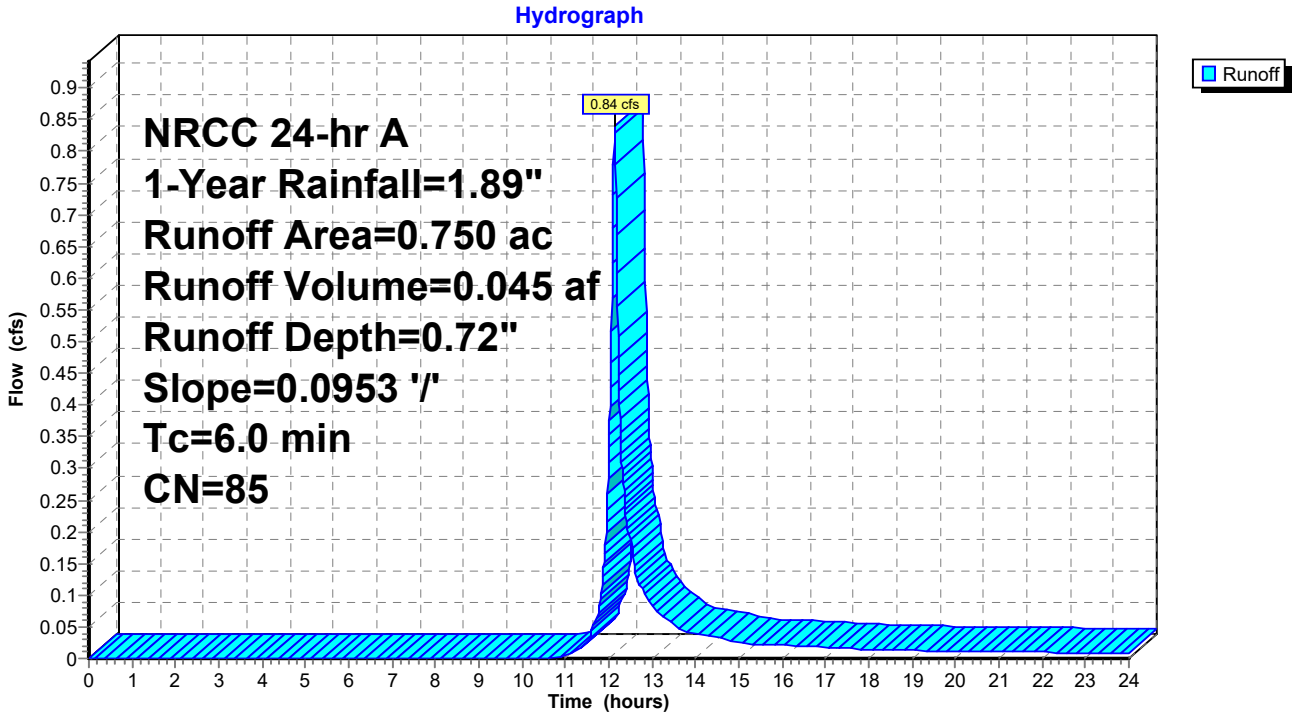
Runoff = 0.84 cfs @ 12.14 hrs, Volume= 0.045 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.480	80	>75% Grass cover, Good, HSG D
0.050	80	>75% Grass cover, Good, HSG D
0.750	85	Weighted Average
0.530		70.67% Pervious Area
0.220		29.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0953			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 18: Lot #8 (good)



Summary for Subcatchment 19: Lot #7 (good)

CarlsonPlanXYPos|643107.1559|1040981.5048|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

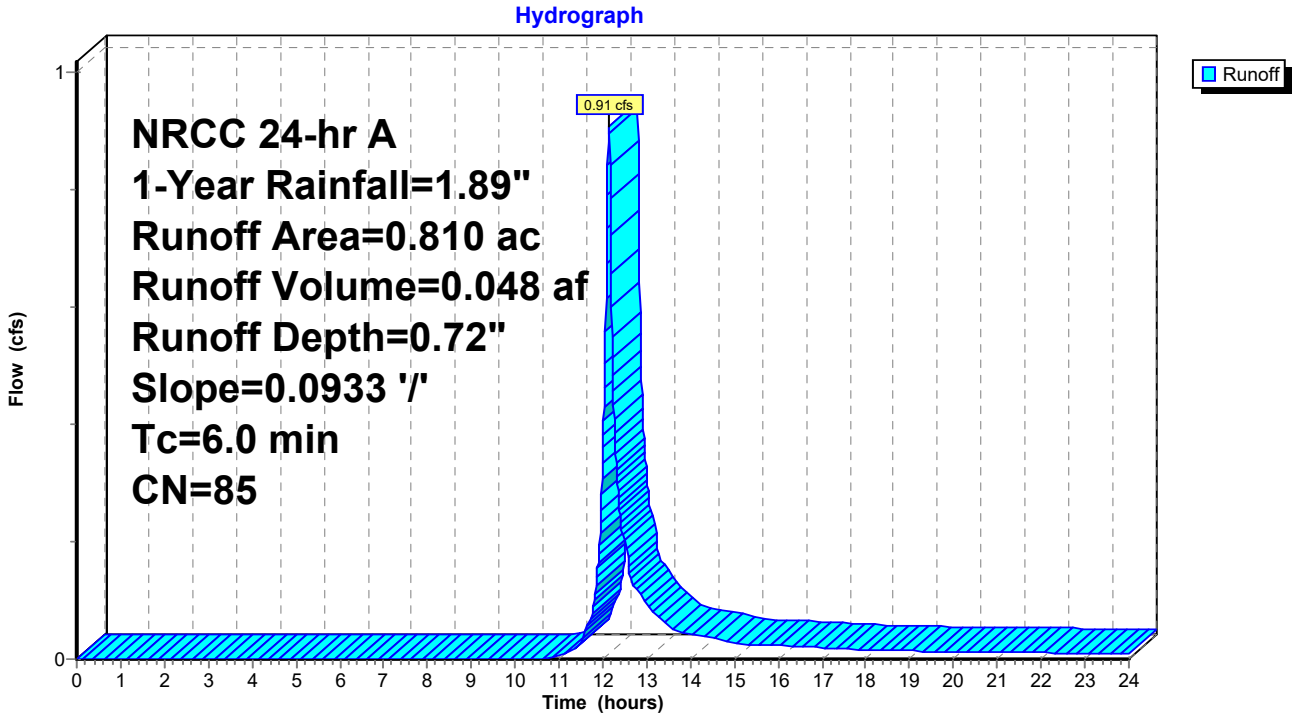
Runoff = 0.91 cfs @ 12.14 hrs, Volume= 0.048 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.590	80	>75% Grass cover, Good, HSG D
0.810	85	Weighted Average
0.590		72.84% Pervious Area
0.220		27.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0933			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 19: Lot #7 (good)



Summary for Subcatchment 20: Lot #6 (good)

CarlsonPlanXYPos|643312.2303|1040980.2663|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

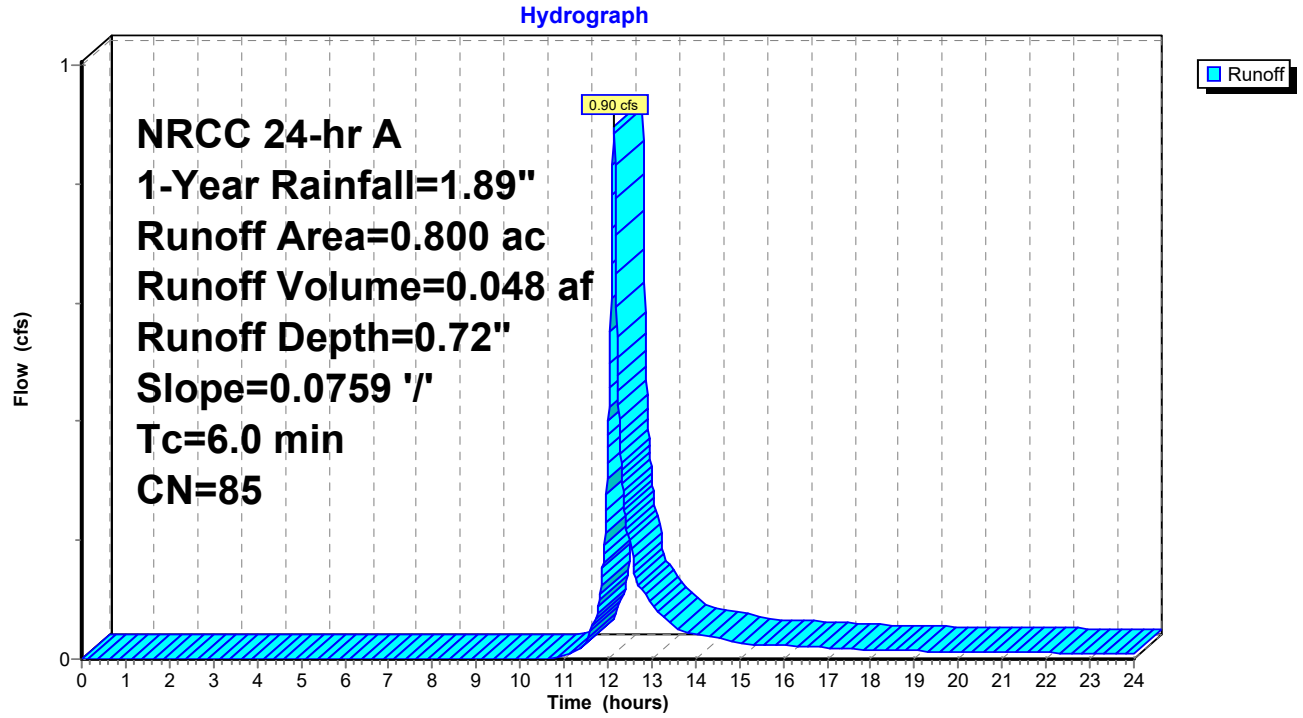
Runoff = 0.90 cfs @ 12.14 hrs, Volume= 0.048 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.580	80	>75% Grass cover, Good, HSG D
0.800	85	Weighted Average
0.580		72.50% Pervious Area
0.220		27.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0759			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 20: Lot #6 (good)



Summary for Subcatchment 21: Lot #5 (good)

CarlsonPlanXYPos|643492.4579|1040982.7482|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

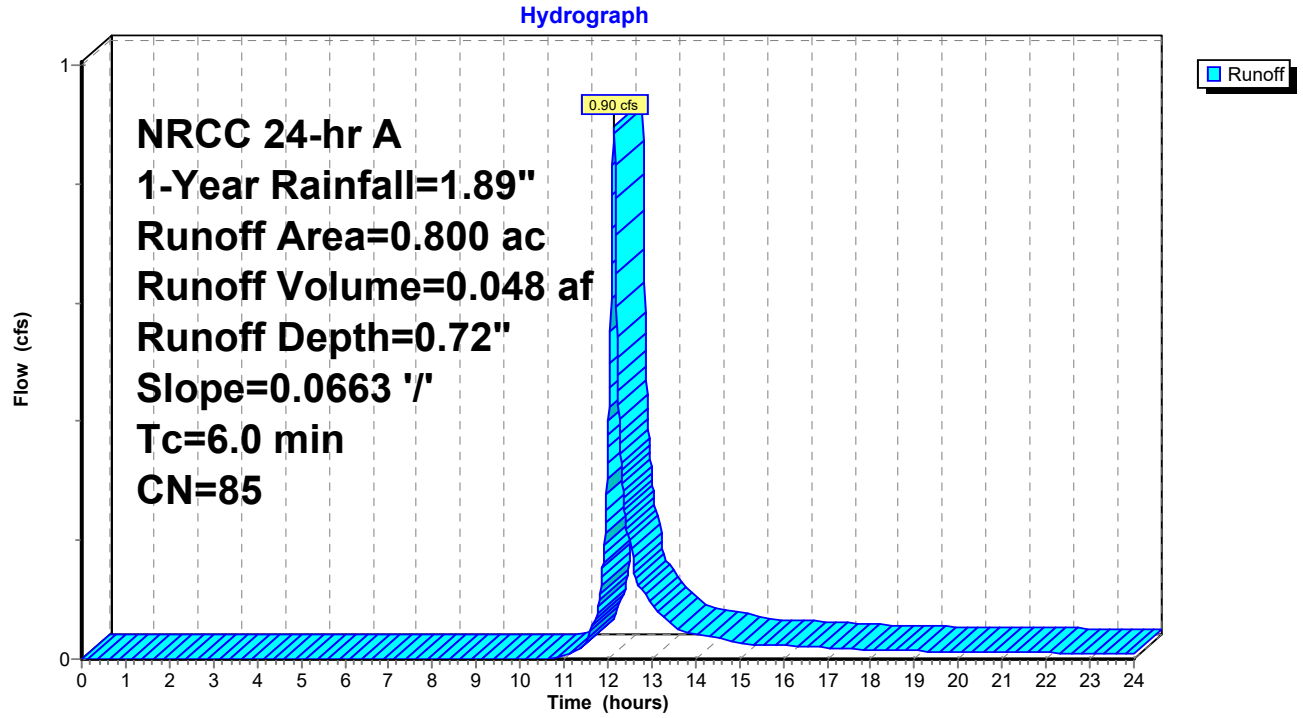
Runoff = 0.90 cfs @ 12.14 hrs, Volume= 0.048 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.580	80	>75% Grass cover, Good, HSG D
0.800	85	Weighted Average
0.580		72.50% Pervious Area
0.220		27.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0663			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 21: Lot #5 (good)



Summary for Subcatchment 22: Lot #4 (good)

CarlsonPlanXYPos|643706.8551|1040983.3562|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

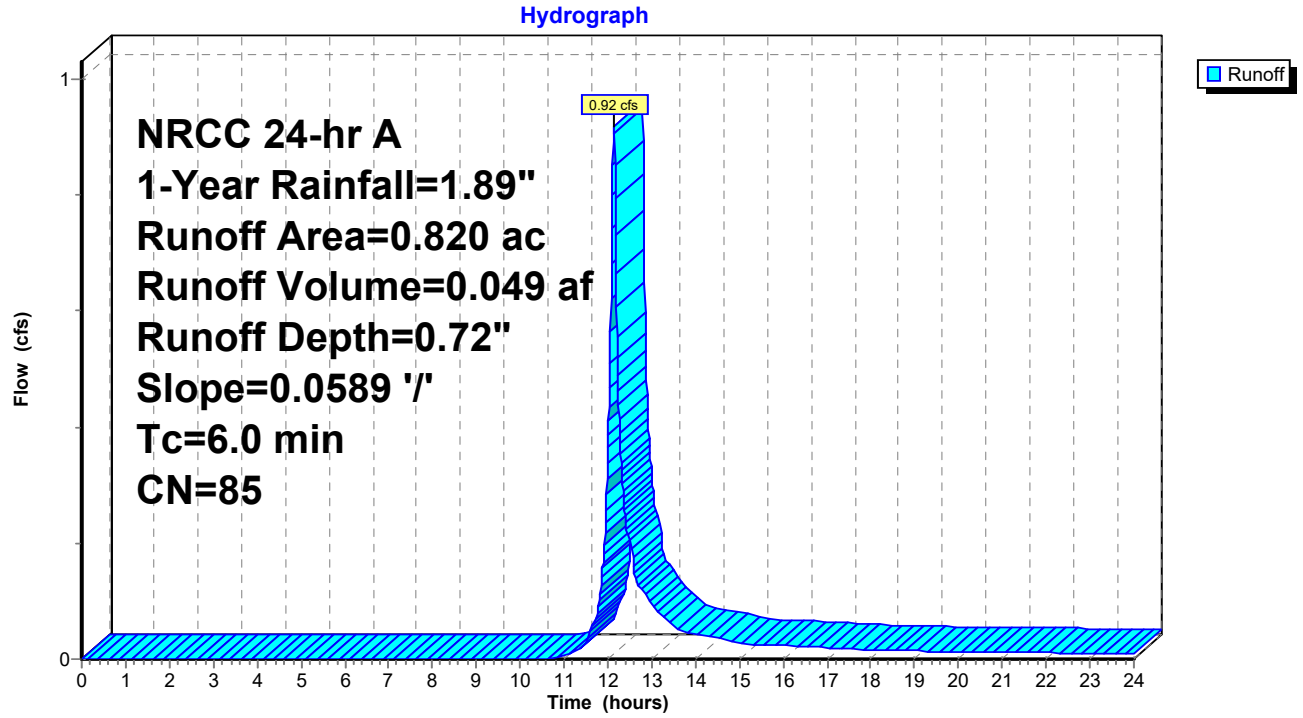
Runoff = 0.92 cfs @ 12.14 hrs, Volume= 0.049 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.600	80	>75% Grass cover, Good, HSG D
0.820	85	Weighted Average
0.600		73.17% Pervious Area
0.220		26.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0589			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 22: Lot #4 (good)



Summary for Subcatchment 23: Lot #3 (good)

CarlsonPlanXYPos|643896.4054|1040980.2593|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

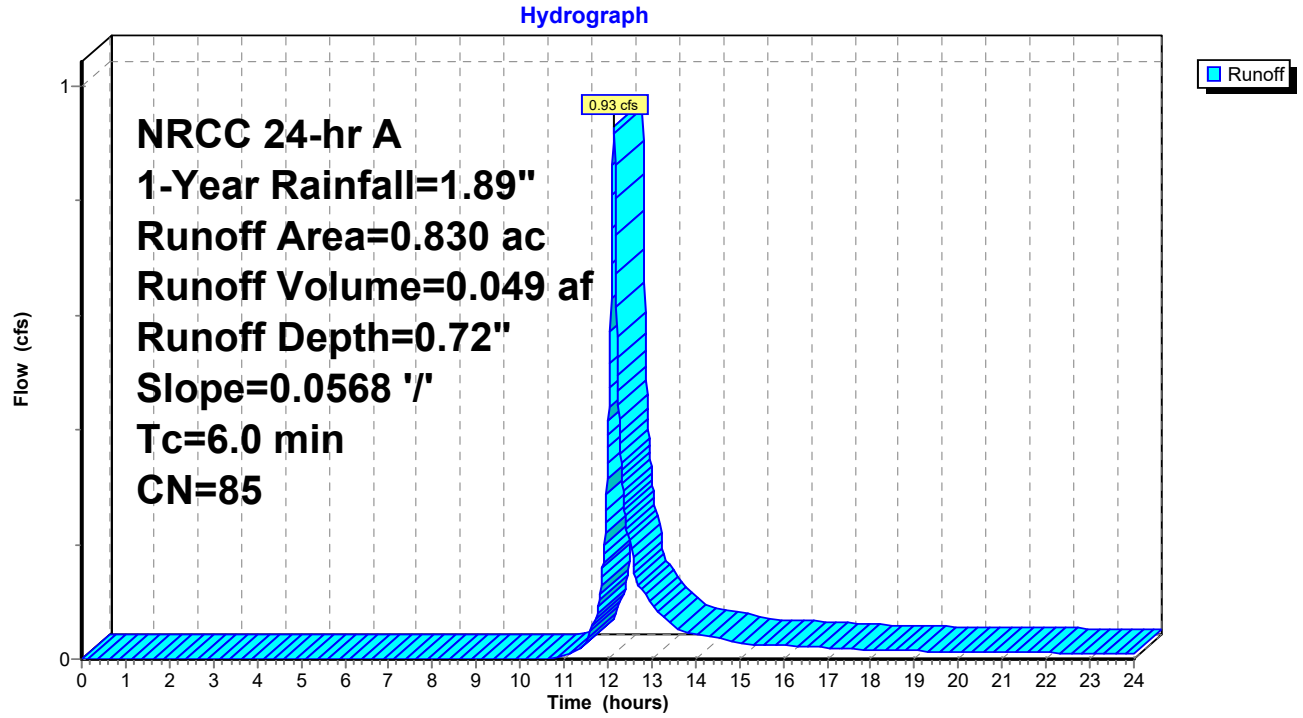
Runoff = 0.93 cfs @ 12.14 hrs, Volume= 0.049 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.610	80	>75% Grass cover, Good, HSG D
0.830	85	Weighted Average
0.610		73.49% Pervious Area
0.220		26.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0568			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 23: Lot #3 (good)



Summary for Subcatchment 24: Lot #2 (good)

CarlsonPlanXYPos|644102.7886|1040984.5776|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

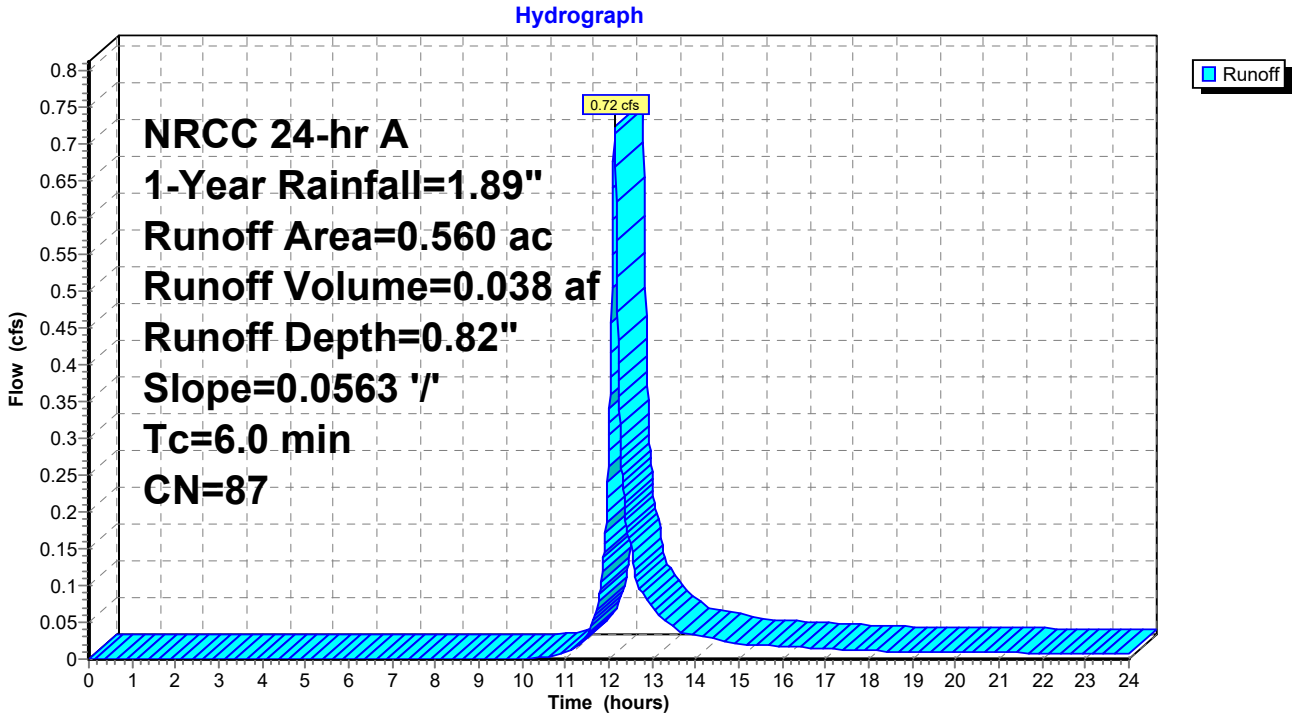
Runoff = 0.72 cfs @ 12.14 hrs, Volume= 0.038 af, Depth= 0.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.340	80	>75% Grass cover, Good, HSG D
0.560	87	Weighted Average
0.340		60.71% Pervious Area
0.220		39.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0563			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 24: Lot #2 (good)



Summary for Subcatchment 25: Lot #1 (good)

CarlsonPlanXYPos|644284.7705|1040971.5435|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

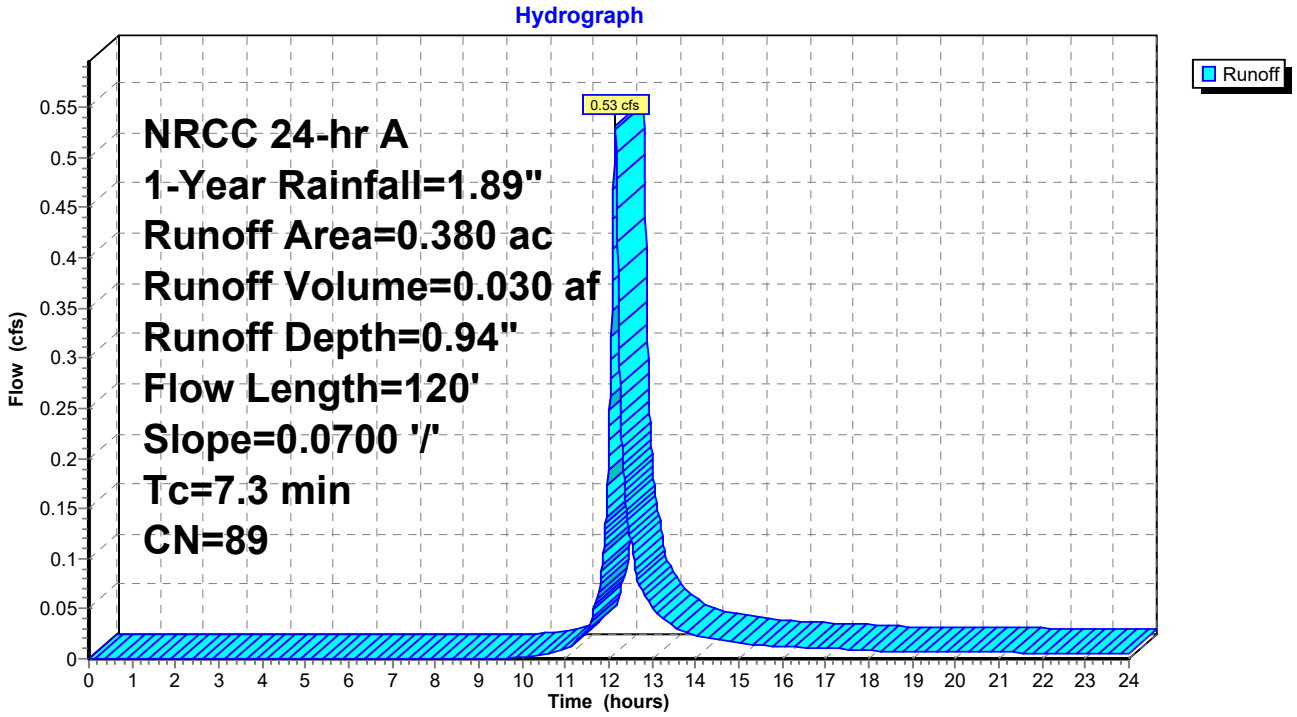
Runoff = 0.53 cfs @ 12.15 hrs, Volume= 0.030 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.200	98	Paved parking, HSG D
0.180	80	>75% Grass cover, Good, HSG D
0.380	89	Weighted Average
0.180		47.37% Pervious Area
0.200		52.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.0700	0.23		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.19"
0.1	20	0.0700	4.26		**Shallow Concentrated Flow, Shallow Concentated** Unpaved Kv= 16.1 fps
7.3	120	Total			

Subcatchment 25: Lot #1 (good)



Summary for Subcatchment 26: 26 (update Tc to Channel flow?)

CarlsonPlanXYPos|644192.3159|1041141.7328|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

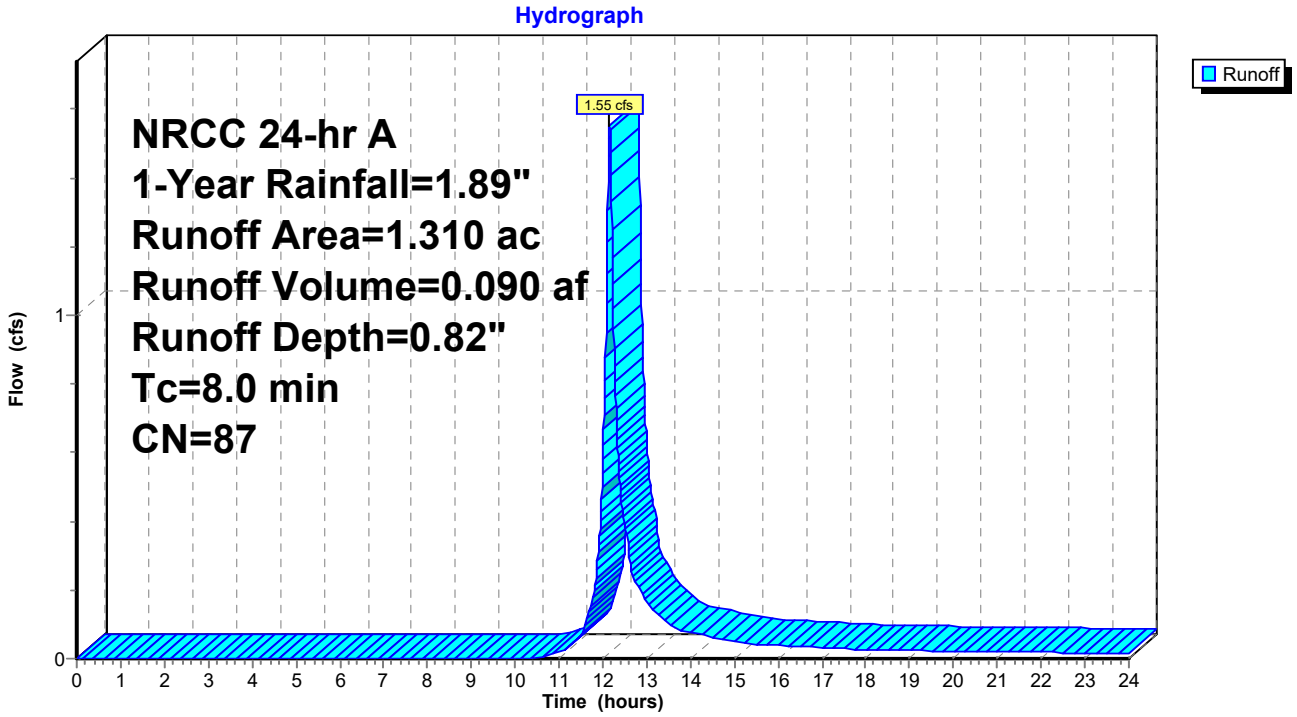
Runoff = 1.55 cfs @ 12.16 hrs, Volume= 0.090 af, Depth= 0.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.490	98	Paved parking, HSG D
0.820	80	>75% Grass cover, Good, HSG D
1.310	87	Weighted Average
0.820		62.60% Pervious Area
0.490		37.40% Impervious Area

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

Subcatchment 26: 26 (update Tc to Channel flow?)



Summary for Subcatchment 37S: 1

CarlsonPlanXYPos|641307.9585|1041455.1221|
CarlsonSurface||

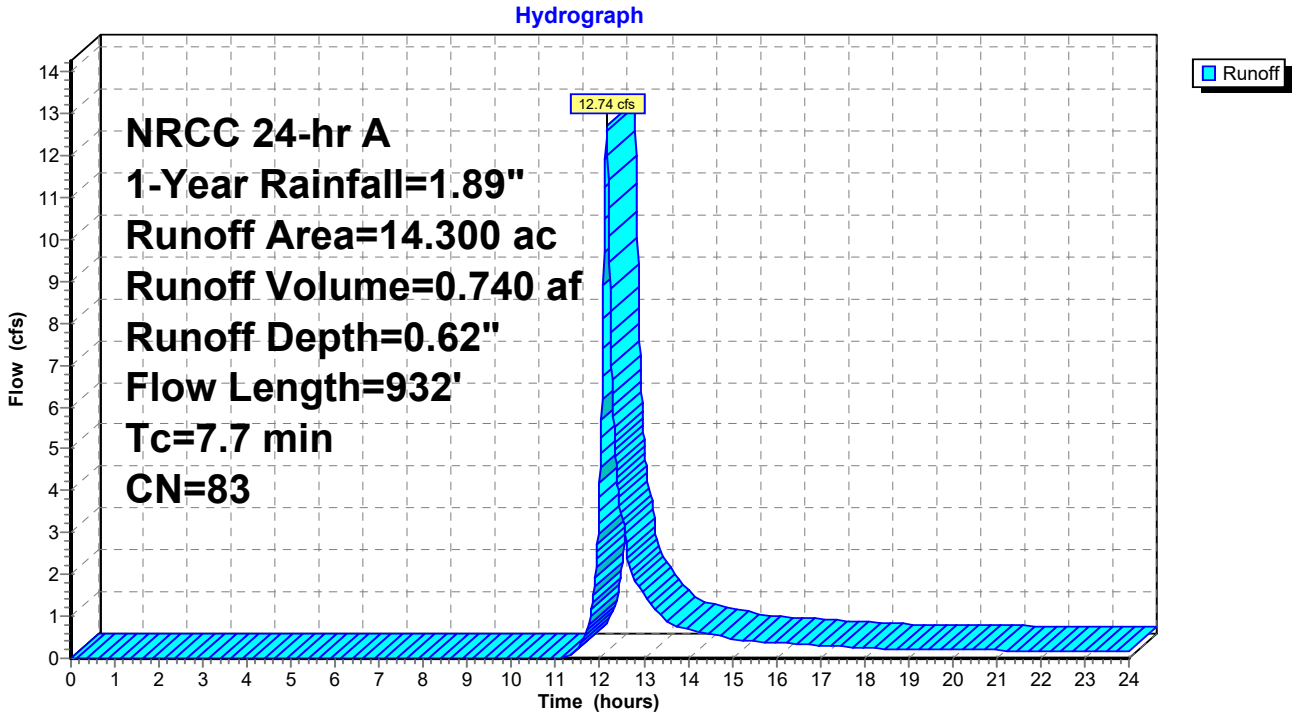
Runoff = 12.74 cfs @ 12.16 hrs, Volume= 0.740 af, Depth= 0.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.260	98	Water Surface HSG B
1.860	98	Paved parking HSG B
1.340	98	Paved parking HSG C
1.100	61	>75% Grass cover, Good, HSG B
9.180	80	>75% Grass cover, Good, HSG D
0.560	73	Brush, Good, HSG D
14.300	83	Weighted Average
10.840		75.80% Pervious Area
3.460		24.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.78		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.19"
3.9	25	0.0200	0.11		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.19"
0.3	81	0.0150	5.11	89.50	**Channel Flow, Channel Flow** Area= 17.5 sf Perim= 36.0' r= 0.49' n= 0.022
0.1	58	0.0340	7.70	134.75	**Channel Flow, Channel Flow** Area= 17.5 sf Perim= 36.0' r= 0.49' n= 0.022
0.2	132	0.0600	10.23	179.01	**Channel Flow, Channel Flow** Area= 17.5 sf Perim= 36.0' r= 0.49' n= 0.022
1.1	80	0.0060	1.16		**Shallow Concentrated Flow, Shallow Concentrated** Grassed Waterway Kv= 15.0 fps
0.5	114	0.0040	3.61	4.43	**Pipe Channel, Pipe Channel** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Corrugated PP, smooth interior
0.5	113	0.0040	4.07	7.20	**Pipe Channel, Pipe Channel** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012 Corrugated PP, smooth interior
0.1	35	0.0040	4.93	15.50	**Pipe Channel, Pipe Channel** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 Corrugated PP, smooth interior
0.7	279	0.0080	6.98	21.92	**Pipe Channel, Pipe Channel** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 Corrugated PP, smooth interior
7.7	932	Total			

Subcatchment 37S: 1



Summary for Subcatchment 46S: Portion of Lot #1

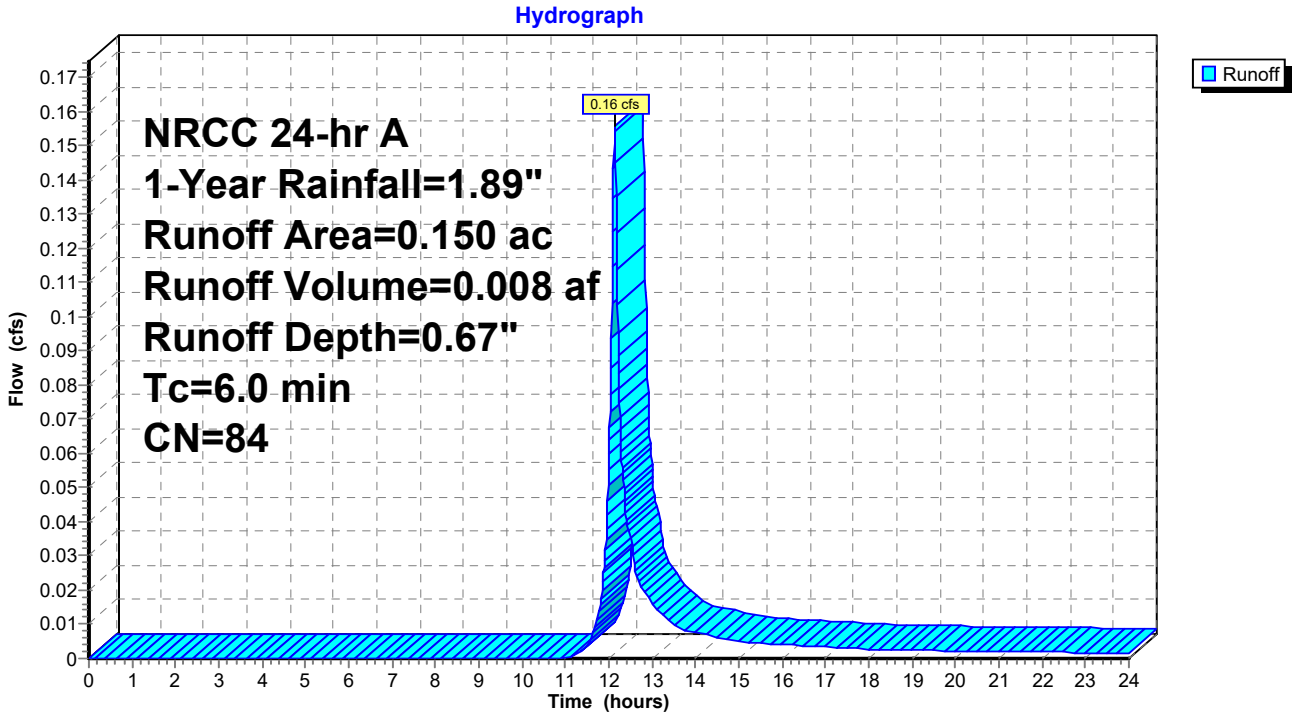
Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.008 af, Depth= 0.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.030	98	Paved parking, HSG D
0.120	80	>75% Grass cover, Good, HSG D
0.150	84	Weighted Average
0.120		80.00% Pervious Area
0.030		20.00% Impervious Area

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

Subcatchment 46S: Portion of Lot #1



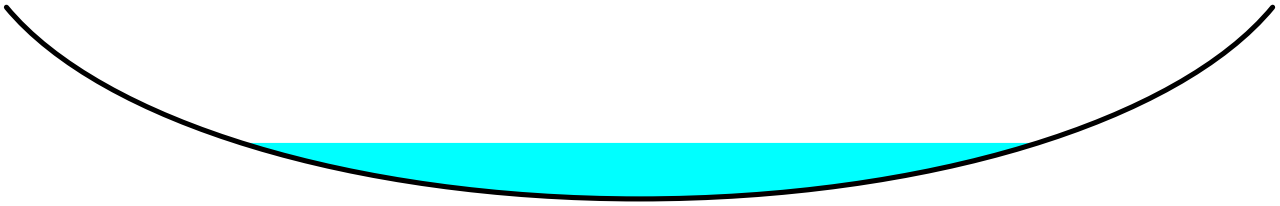
Summary for Reach 12R: Swale to off-site

Inflow Area = 78.750 ac, 0.89% Impervious, Inflow Depth > 0.33" for 1-Year event
Inflow = 4.06 cfs @ 13.81 hrs, Volume= 2.139 af
Outflow = 4.06 cfs @ 13.85 hrs, Volume= 2.138 af, Atten= 0%, Lag= 2.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.37 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 0.75 fps, Avg. Travel Time= 6.5 min

Peak Storage= 864 cf @ 13.85 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 1.00' Flow Area= 18.7 sf, Capacity= 58.17 cfs

28.00' x 1.00' deep Parabolic Channel, n= 0.030 Short grass
Length= 293.0' Slope= 0.0068 '/'
Inlet Invert= 703.00', Outlet Invert= 701.00'



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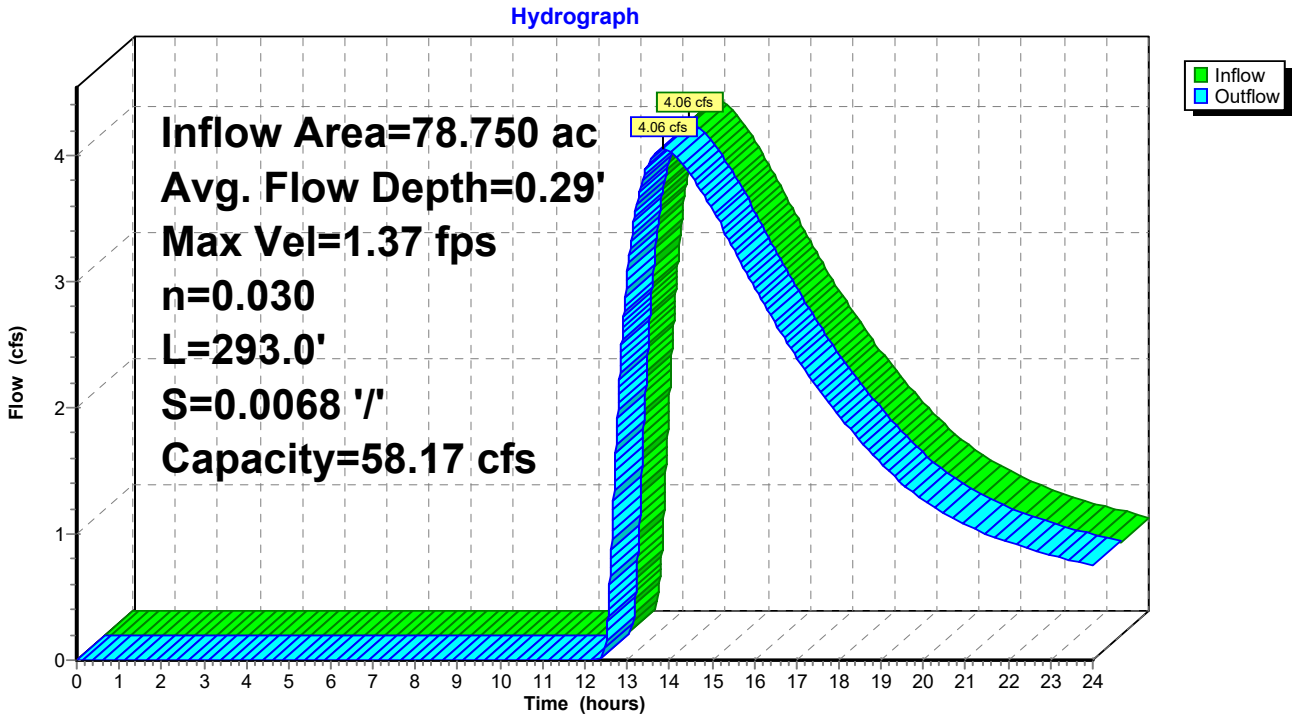
Reach 12R: Swale to off-site



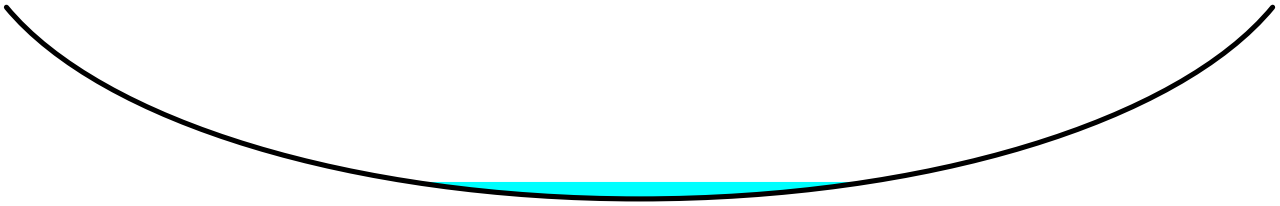
Summary for Reach 16R: Northside swale

Inflow Area = 1.310 ac, 37.40% Impervious, Inflow Depth = 0.43" for 1-Year event
Inflow = 0.66 cfs @ 12.31 hrs, Volume= 0.046 af
Outflow = 0.59 cfs @ 12.40 hrs, Volume= 0.046 af, Atten= 11%, Lag= 5.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.23 fps, Min. Travel Time= 4.9 min
Avg. Velocity = 0.83 fps, Avg. Travel Time= 13.2 min

Peak Storage= 172 cf @ 12.40 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 1.00' Flow Area= 10.0 sf, Capacity= 111.61 cfs

15.00' x 1.00' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 655.0' Slope= 0.0885 '/'
Inlet Invert= 804.00', Outlet Invert= 746.00'



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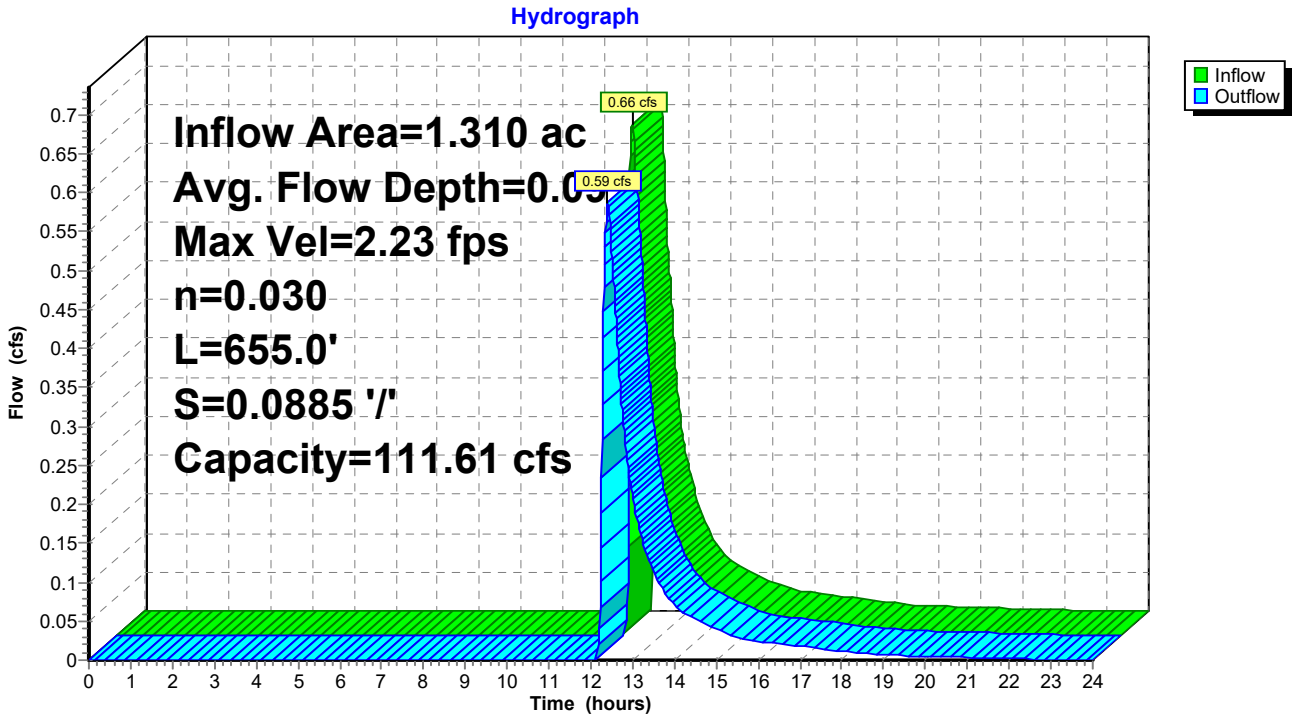
Reach 16R: Northside swale



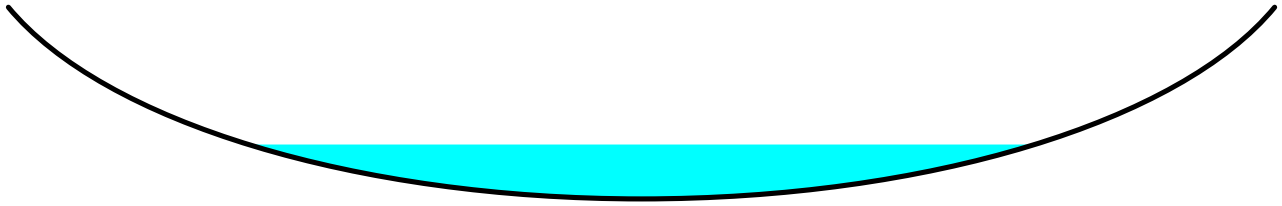
Summary for Reach 17R: Southside Swale

Inflow Area = 6.740 ac, 29.53% Impervious, Inflow Depth = 0.73" for 1-Year event
Inflow = 7.60 cfs @ 12.15 hrs, Volume= 0.408 af
Outflow = 7.07 cfs @ 12.18 hrs, Volume= 0.408 af, Atten= 7%, Lag= 1.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.69 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 8.1 min

Peak Storage= 1,070 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00' Flow Area= 10.0 sf, Capacity= 108.12 cfs

15.00' x 1.00' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 710.0' Slope= 0.0831 '/'
Inlet Invert= 804.00', Outlet Invert= 745.00'



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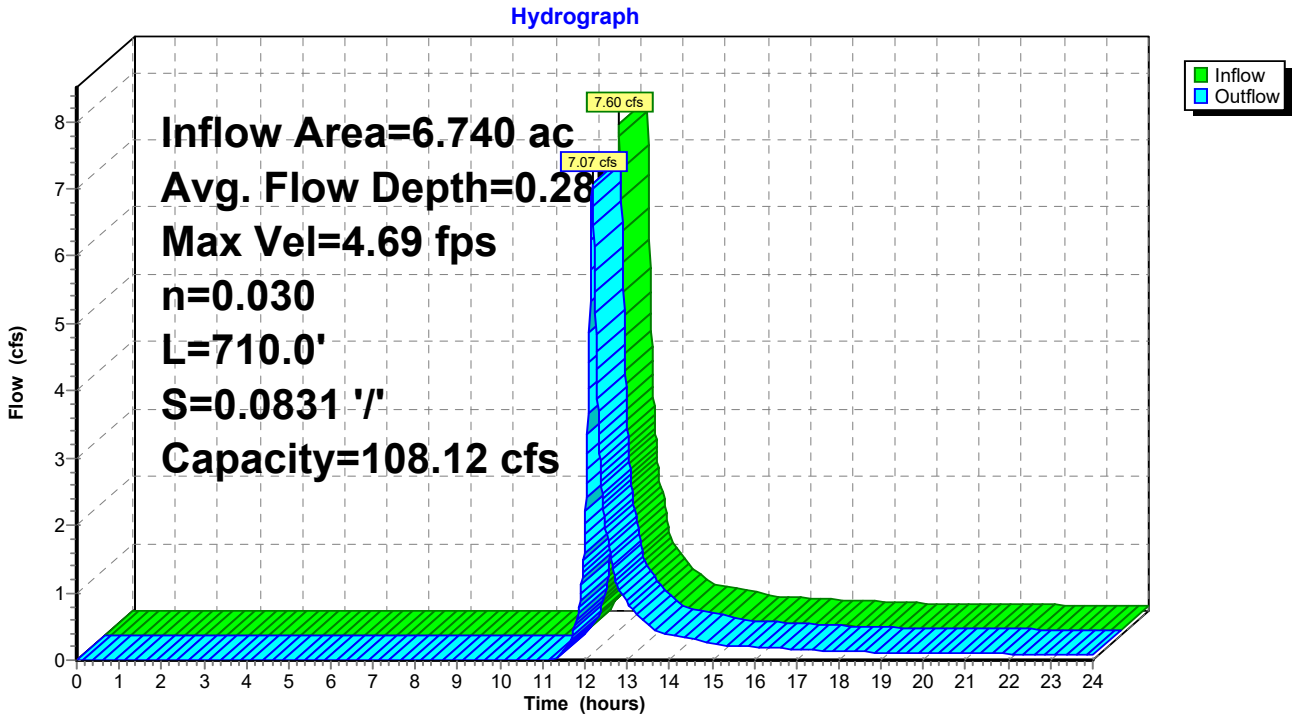
Reach 17R: Southside Swale



Summary for Pond 10P: Proposed 36" Culvert

Inflow Area = 78.750 ac, 0.89% Impervious, Inflow Depth = 0.33" for 1-Year event
Inflow = 14.52 cfs @ 12.61 hrs, Volume= 2.155 af
Outflow = 4.06 cfs @ 13.75 hrs, Volume= 2.140 af, Atten= 72%, Lag= 68.4 min
Primary = 4.06 cfs @ 13.75 hrs, Volume= 2.140 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 705.35' @ 13.75 hrs Surf.Area= 85,358 sf Storage= 34,005 cf

Plug-Flow detention time= 142.3 min calculated for 2.139 af (99% of inflow)
Center-of-Mass det. time= 138.3 min (1,045.9 - 907.6)

Volume	Invert	Avail.Storage	Storage Description
#1	704.50'	609,456 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

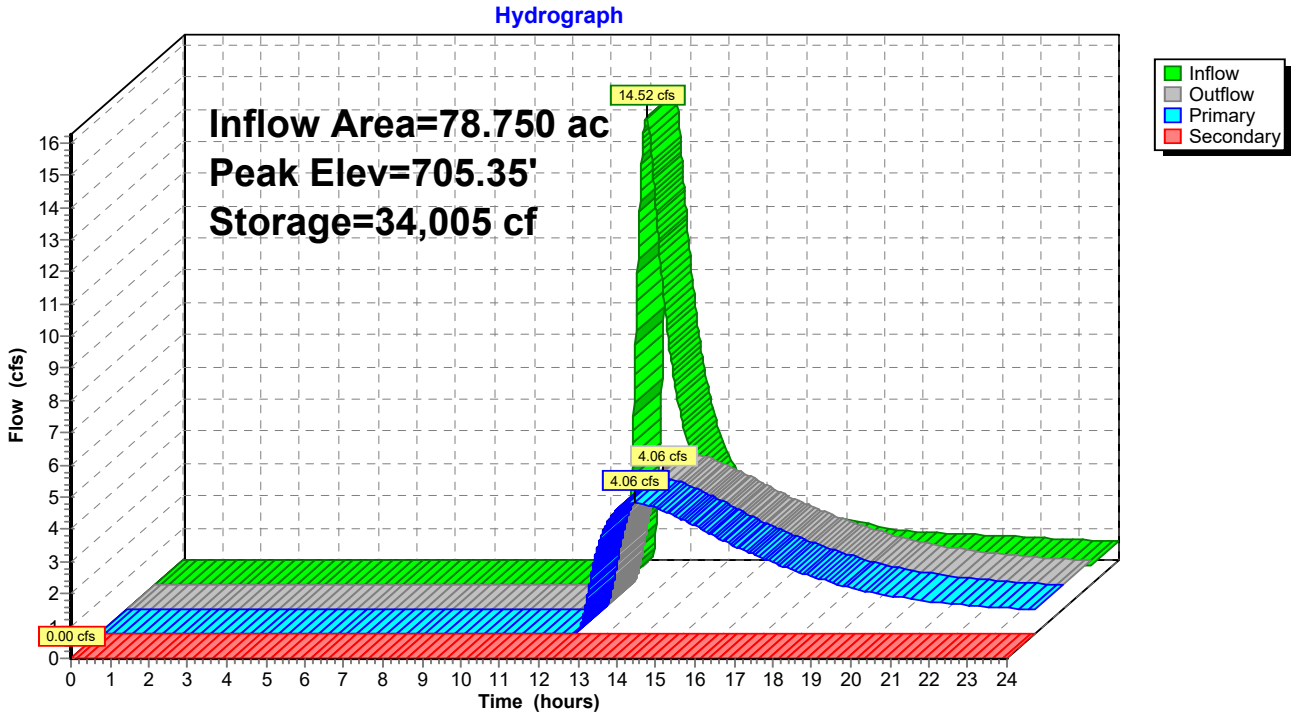
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
704.50	9,287	0	0
705.00	39,370	12,164	12,164
706.00	170,682	105,026	117,190
707.00	256,925	213,804	330,994
708.00	300,000	278,463	609,456

Device	Routing	Invert	Outlet Devices
#1	Primary	704.50'	**36.0" Round 36" Culvert** L= 122.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 704.50' / 704.00' S= 0.0041 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Secondary	705.50'	**10.0' 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=4.06 cfs @ 13.75 hrs HW=705.35' TW=704.16' (Dynamic Tailwater)
↑—**1=36" Culvert** (Barrel Controls 4.06 cfs @ 3.70 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=704.50' TW=703.30' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 10P: Proposed 36" Culvert



Summary for Pond 11P: Proposed 36" Culvert

Inflow Area = 78.750 ac, 0.89% Impervious, Inflow Depth > 0.33" for 1-Year event
Inflow = 4.06 cfs @ 13.75 hrs, Volume= 2.140 af
Outflow = 4.06 cfs @ 13.81 hrs, Volume= 2.139 af, Atten= 0%, Lag= 3.5 min
Primary = 4.06 cfs @ 13.81 hrs, Volume= 2.139 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 704.16' @ 13.81 hrs Surf.Area= 1,780 sf Storage= 1,062 cf

Plug-Flow detention time= 5.7 min calculated for 2.138 af (100% of inflow)
Center-of-Mass det. time= 5.2 min (1,051.1 - 1,045.9)

Volume	Invert	Avail.Storage	Storage Description
#1	703.30'	12,772 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

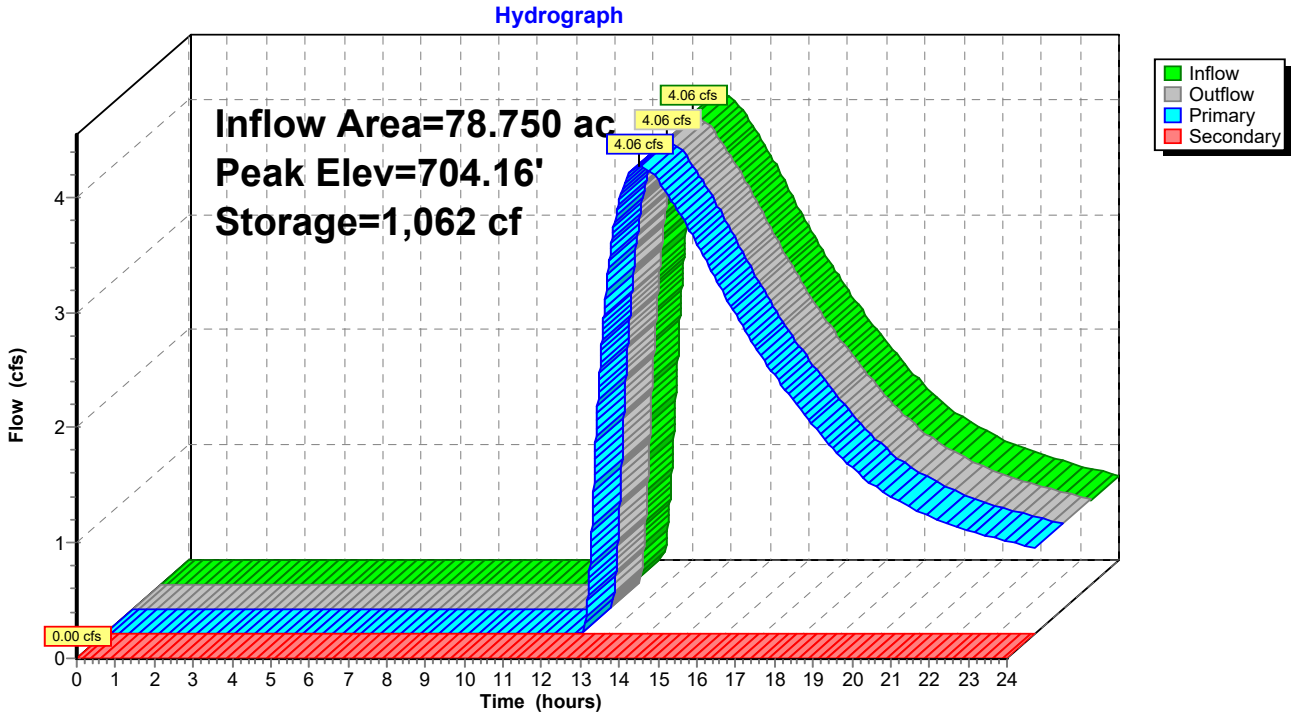
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
703.30	707	0	0
704.00	1,575	799	799
705.00	2,882	2,229	3,027
706.00	4,304	3,593	6,620
707.00	8,000	6,152	12,772

Device	Routing	Invert	Outlet Devices
#1	Primary	703.30'	**36.0" Round 36" cuvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 703.30' / 703.00' S= 0.0046 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Secondary	706.80'	**20.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.06 cfs @ 13.81 hrs HW=704.16' TW=703.29' (Dynamic Tailwater)
↑—**1=36" cuvert** (Barrel Controls 4.06 cfs @ 3.65 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=703.30' TW=703.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 11P: Proposed 36" Culvert



Summary for Pond 17P: Bioswale (good)

Inflow Area = 6.740 ac, 29.53% Impervious, Inflow Depth = 0.73" for 1-Year event
Inflow = 7.61 cfs @ 12.15 hrs, Volume= 0.412 af
Outflow = 7.60 cfs @ 12.15 hrs, Volume= 0.410 af, Atten= 0%, Lag= 0.2 min
Discarded = 0.00 cfs @ 12.15 hrs, Volume= 0.002 af
Primary = 7.60 cfs @ 12.15 hrs, Volume= 0.408 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 807.68' @ 12.15 hrs Surf.Area= 284 sf Storage= 237 cf

Plug-Flow detention time= 5.7 min calculated for 0.410 af (100% of inflow)
Center-of-Mass det. time= 3.1 min (842.1 - 838.9)

Volume	Invert	Avail.Storage	Storage Description
#1	806.50'	2,012 cf	**SWALE STORAGE ABOVE BOTTOM (Conic)** Listed below

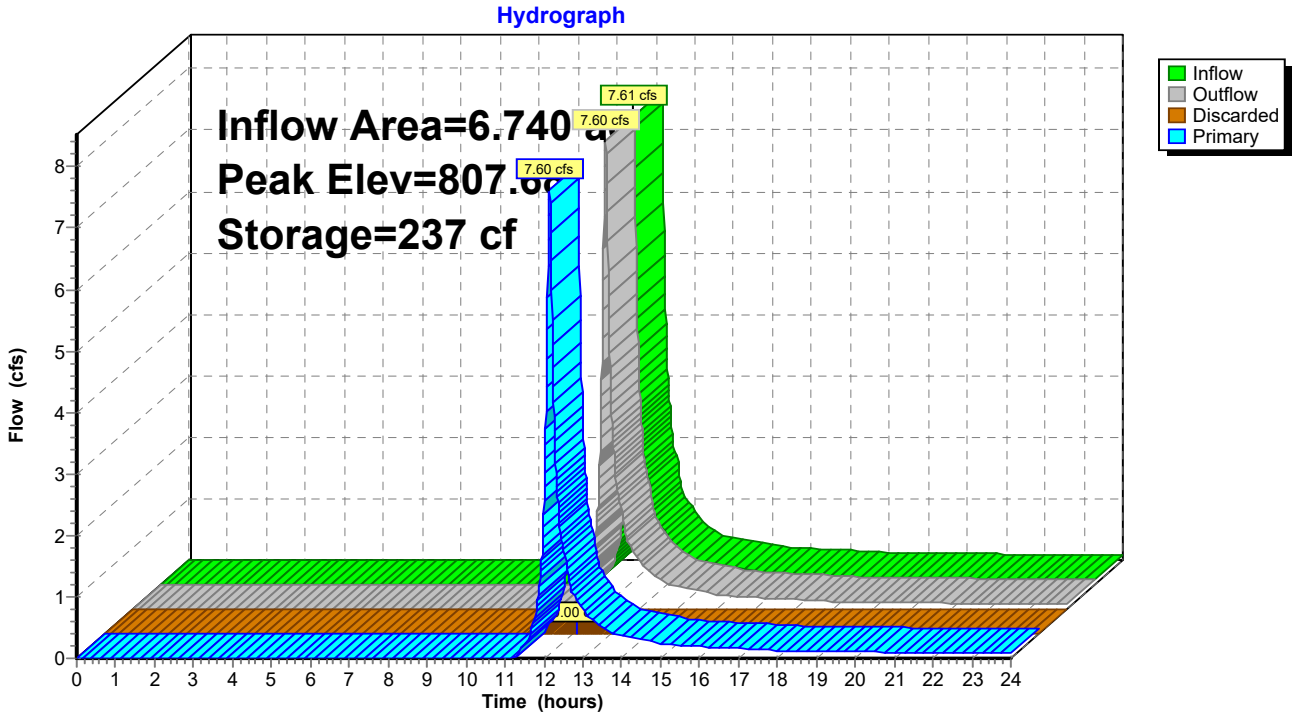
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
806.50	0	0	0	0
809.00	600	500	500	610
809.50	6,500	1,512	2,012	6,510

Device	Routing	Invert	Outlet Devices
#1	Discarded	806.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 750.00'
#2	Primary	807.00'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.15 hrs HW=807.68' (Free Discharge)
1=Exfiltration (Controls 0.00 cfs)

Primary OutFlow Max=7.59 cfs @ 12.15 hrs HW=807.68' TW=804.28' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 7.59 cfs @ 2.22 fps)

Pond 17P: Bioswale (good)



Summary for Pond 18P: Bioswale (good)

Inflow Area = 5.900 ac, 30.00% Impervious, Inflow Depth = 0.74" for 1-Year event
Inflow = 6.70 cfs @ 12.15 hrs, Volume= 0.362 af
Outflow = 6.69 cfs @ 12.15 hrs, Volume= 0.362 af, Atten= 0%, Lag= 0.2 min
Discarded = 0.00 cfs @ 12.15 hrs, Volume= 0.000 af
Primary = 6.69 cfs @ 12.15 hrs, Volume= 0.361 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 815.13' @ 12.15 hrs Surf.Area= 220 sf Storage= 184 cf

Plug-Flow detention time= 1.5 min calculated for 0.362 af (100% of inflow)
Center-of-Mass det. time= 1.5 min (839.2 - 837.6)

Volume	Invert	Avail.Storage	Storage Description
#1	814.50'	3,041 cf	**SWALE STORAGE (Conic)** Listed below

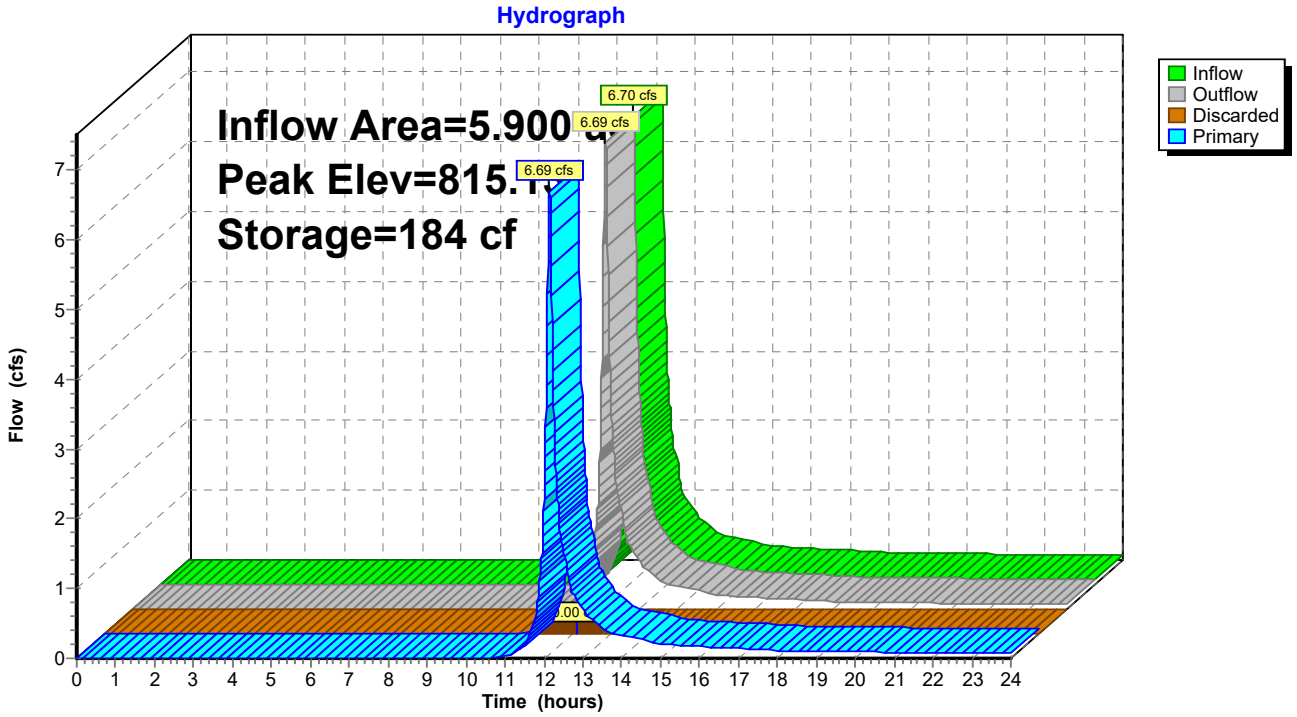
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
814.50	0	0	0	0
817.00	880	733	733	890
817.50	10,000	2,308	3,041	10,010

Device	Routing	Invert	Outlet Devices
#1	Discarded	814.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 750.00'
#2	Device 3	814.50'	**24.0" W x 24.0" H Vert. Orifice/Grate** C= 0.600
#3	Primary	812.50'	**24.0" Round Culvert** L= 46.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 812.50' / 812.00' S= 0.0109 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#4	Primary	814.70'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.15 hrs HW=815.13' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=6.69 cfs @ 12.15 hrs HW=815.13' TW=807.68' (Dynamic Tailwater)
└**3=Culvert** (Passes 3.18 cfs of 15.23 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 3.18 cfs @ 2.54 fps)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 3.51 cfs @ 1.65 fps)

Pond 18P: Bioswale (good)



Summary for Pond 19P: Bioswale (good)

Inflow Area = 5.150 ac, 30.10% Impervious, Inflow Depth = 0.74" for 1-Year event
Inflow = 5.88 cfs @ 12.15 hrs, Volume= 0.317 af
Outflow = 5.88 cfs @ 12.15 hrs, Volume= 0.317 af, Atten= 0%, Lag= 0.2 min
Discarded = 0.00 cfs @ 12.15 hrs, Volume= 0.000 af
Primary = 5.88 cfs @ 12.15 hrs, Volume= 0.317 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 829.79' @ 12.15 hrs Surf.Area= 505 sf Storage= 84 cf

Plug-Flow detention time= 0.6 min calculated for 0.317 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (837.7 - 837.2)

Volume	Invert	Avail.Storage	Storage Description
#1	829.50'	11,685 cf	**SWALE STORAGE (Conic)** Listed below

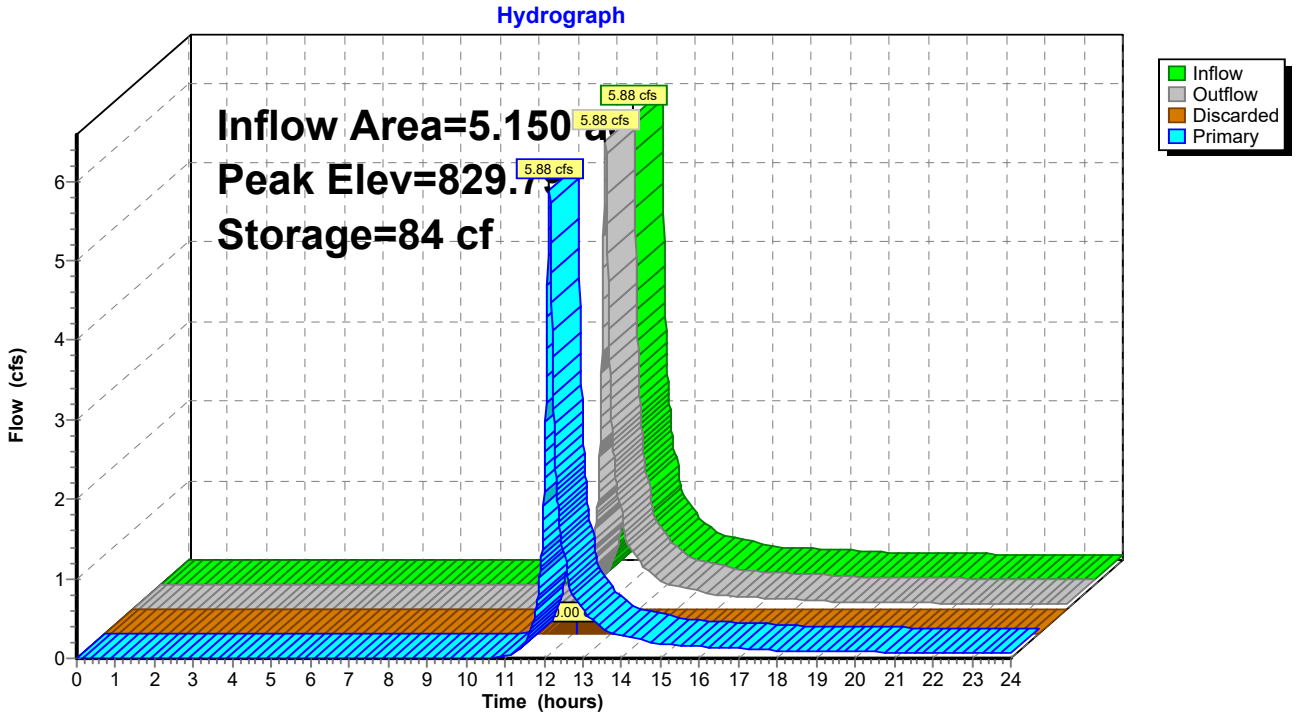
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
829.50	0	0	0	0
830.00	880	147	147	880
832.50	10,000	11,539	11,685	10,018

Device	Routing	Invert	Outlet Devices
#1	Discarded	829.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 0.01'
#2	Device 3	829.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	827.50'	**18.0" Round Culvert** L= 46.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 827.50' / 827.00' S= 0.0109 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#4	Primary	829.50'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.15 hrs HW=829.79' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=5.86 cfs @ 12.15 hrs HW=829.79' TW=815.13' (Dynamic Tailwater)
├**3=Culvert** (Passes 4.02 cfs of 8.33 cfs potential flow)
│ └**2=Orifice/Grate** (Weir Controls 4.02 cfs @ 1.75 fps)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 1.85 cfs @ 1.29 fps)

Pond 19P: Bioswale (good)



Summary for Pond 20P: Bioswale (good)

Inflow Area = 4.340 ac, 30.65% Impervious, Inflow Depth = 0.74" for 1-Year event
Inflow = 4.99 cfs @ 12.14 hrs, Volume= 0.269 af
Outflow = 4.99 cfs @ 12.15 hrs, Volume= 0.269 af, Atten= 0%, Lag= 0.2 min
Discarded = 0.00 cfs @ 12.15 hrs, Volume= 0.000 af
Primary = 4.99 cfs @ 12.15 hrs, Volume= 0.269 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 844.76' @ 12.15 hrs Surf.Area= 454 sf Storage= 76 cf

Plug-Flow detention time= 0.6 min calculated for 0.269 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (837.2 - 836.6)

Volume	Invert	Avail.Storage	Storage Description
#1	844.50'	11,685 cf	**SWALE STORAGE (Conic)** Listed below

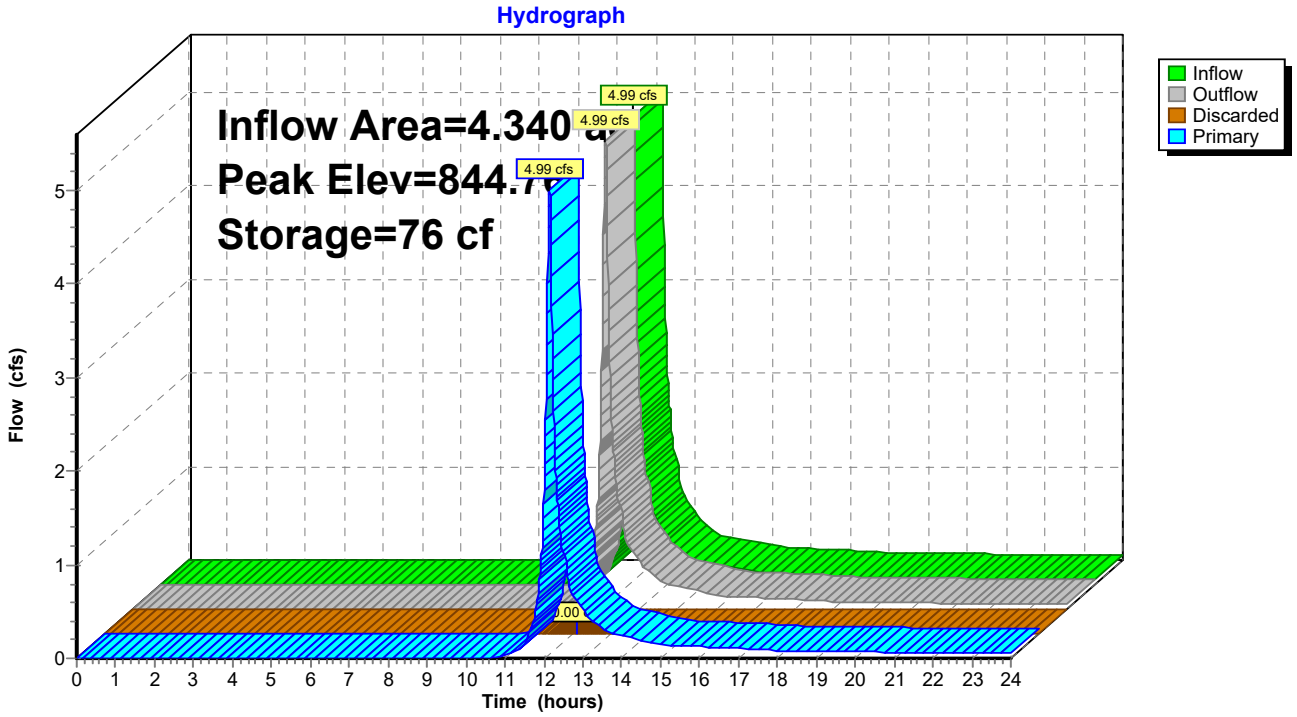
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
844.50	0	0	0	0
845.00	880	147	147	880
847.50	10,000	11,539	11,685	10,018

Device	Routing	Invert	Outlet Devices
#1	Discarded	844.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 800.00'
#2	Device 3	844.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	842.50'	**15.0" Round Culvert** L= 46.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 842.50' / 840.50' S= 0.0435 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#4	Primary	844.50'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.15 hrs HW=844.76' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=4.97 cfs @ 12.15 hrs HW=844.76' TW=829.79' (Dynamic Tailwater)
├**3=Culvert** (Passes 3.42 cfs of 5.96 cfs potential flow)
│ └**2=Orifice/Grate** (Weir Controls 3.42 cfs @ 1.66 fps)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 1.56 cfs @ 1.21 fps)

Pond 20P: Bioswale (good)



Summary for Pond 21P: Bioswale (good)

Inflow Area = 3.540 ac, 31.36% Impervious, Inflow Depth = 0.75" for 1-Year event
Inflow = 4.11 cfs @ 12.14 hrs, Volume= 0.222 af
Outflow = 4.11 cfs @ 12.15 hrs, Volume= 0.222 af, Atten= 0%, Lag= 0.2 min
Discarded = 0.00 cfs @ 12.15 hrs, Volume= 0.000 af
Primary = 4.11 cfs @ 12.15 hrs, Volume= 0.222 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 858.73' @ 12.15 hrs Surf.Area= 400 sf Storage= 67 cf

Plug-Flow detention time= 0.6 min calculated for 0.222 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (836.5 - 835.8)

Volume	Invert	Avail.Storage	Storage Description
#1	858.50'	11,685 cf	**SWALE STORAGE (Conic)** Listed below

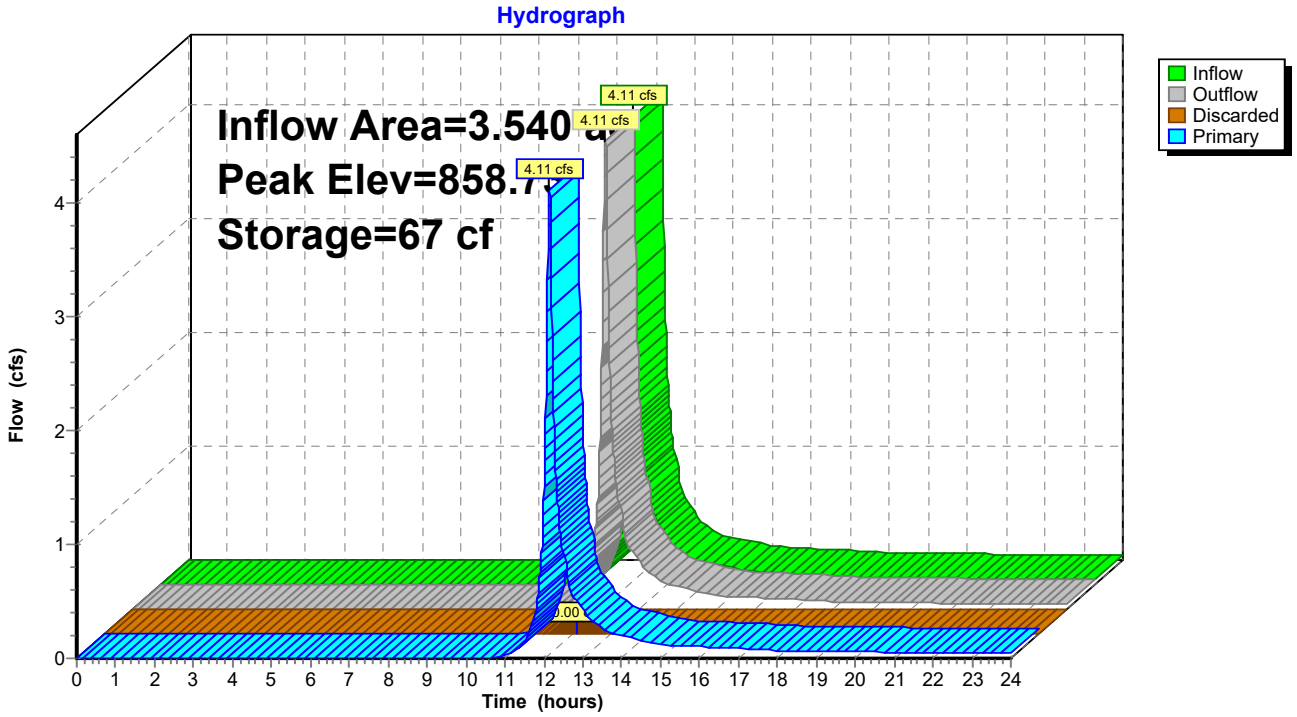
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
858.50	0	0	0	0
859.00	880	147	147	880
861.50	10,000	11,539	11,685	10,018

Device	Routing	Invert	Outlet Devices
#1	Device 3	858.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	858.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 750.00'
#3	Primary	856.50'	**15.0" Round Culvert** L= 47.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 856.50' / 854.00' S= 0.0532 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#4	Primary	858.50'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.15 hrs HW=858.73' (Free Discharge)
└**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=4.10 cfs @ 12.15 hrs HW=858.73' TW=844.76' (Dynamic Tailwater)
├**3=Culvert** (Passes 2.82 cfs of 5.90 cfs potential flow)
│└**1=Orifice/Grate** (Weir Controls 2.82 cfs @ 1.56 fps)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 1.27 cfs @ 1.12 fps)

Pond 21P: Bioswale (good)



Summary for Pond 22P: Bioswale (good)

Inflow Area = 2.740 ac, 32.48% Impervious, Inflow Depth = 0.76" for 1-Year event
Inflow = 3.23 cfs @ 12.14 hrs, Volume= 0.174 af
Outflow = 3.23 cfs @ 12.15 hrs, Volume= 0.174 af, Atten= 0%, Lag= 0.2 min
Discarded = 0.00 cfs @ 12.15 hrs, Volume= 0.000 af
Primary = 3.22 cfs @ 12.15 hrs, Volume= 0.174 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 869.69' @ 12.15 hrs Surf.Area= 341 sf Storage= 57 cf

Plug-Flow detention time= 0.7 min calculated for 0.174 af (100% of inflow)
Center-of-Mass det. time= 0.7 min (835.4 - 834.8)

Volume	Invert	Avail.Storage	Storage Description
#1	869.50'	13,006 cf	**SWALE STORAGE (Conic)** Listed below

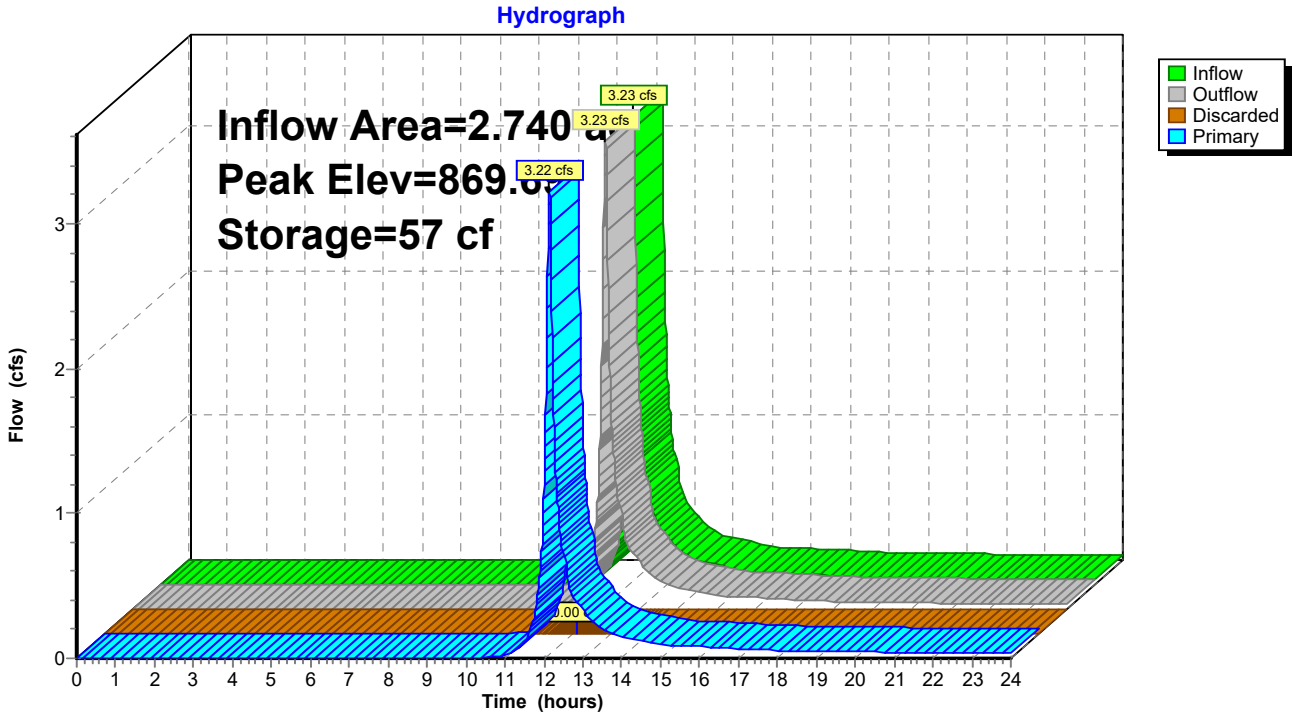
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
869.50	0	0	0	0
870.00	880	147	147	880
872.00	14,800	12,859	13,006	14,811

Device	Routing	Invert	Outlet Devices
#1	Discarded	869.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 750.00'
#2	Device 3	869.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	867.50'	**12.0" Round CMP_Round 12"** L= 47.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 867.50' / 866.00' S= 0.0319 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	869.50'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.15 hrs HW=869.69' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=3.21 cfs @ 12.15 hrs HW=869.69' TW=858.73' (Dynamic Tailwater)
├**3=CMP_Round 12"** (Passes 2.22 cfs of 3.88 cfs potential flow)
│└**2=Orifice/Grate** (Weir Controls 2.22 cfs @ 1.44 fps)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 0.99 cfs @ 1.03 fps)

Pond 22P: Bioswale (good)



Summary for Pond 23P: Bioswale (good)

Inflow Area = 1.920 ac, 34.90% Impervious, Inflow Depth = 0.79" for 1-Year event
Inflow = 2.32 cfs @ 12.14 hrs, Volume= 0.126 af
Outflow = 2.32 cfs @ 12.15 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.2 min
Primary = 2.32 cfs @ 12.15 hrs, Volume= 0.126 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 880.66' @ 12.15 hrs Surf.Area= 273 sf Storage= 46 cf

Plug-Flow detention time= 0.8 min calculated for 0.126 af (100% of inflow)
Center-of-Mass det. time= 0.7 min (833.6 - 832.9)

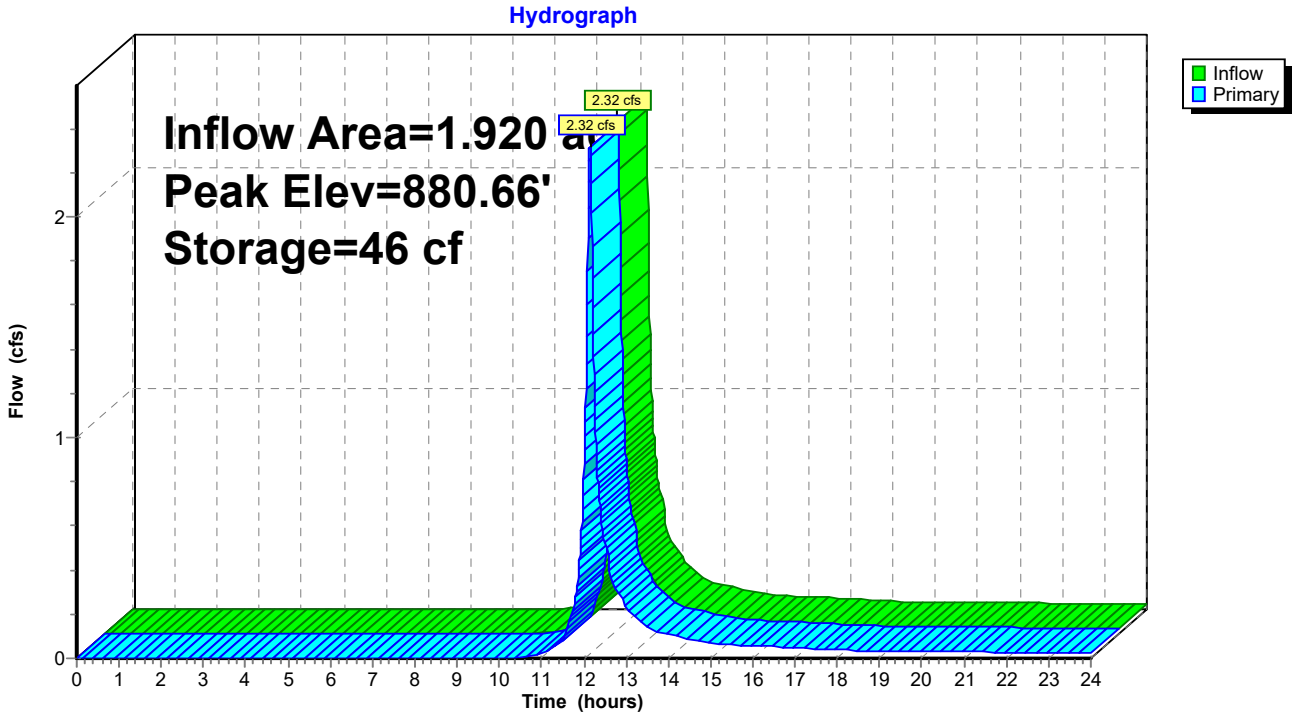
Volume	Invert	Avail.Storage	Storage Description
#1	880.50'	4,762 cf	**SWALE STORAGE (Conic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
880.50	0	0	0	0
881.00	880	147	147	880
882.00	10,000	4,615	4,762	10,003

Device	Routing	Invert	Outlet Devices
#1	Device 3	880.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 800.00'
#2	Device 3	880.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	878.50'	**12.0" Round CMP_Round 12"** L= 45.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 878.50' / 877.00' S= 0.0333 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	880.50'	**5.0' 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=2.31 cfs @ 12.15 hrs HW=880.65' TW=869.69' (Dynamic Tailwater)
- **3=CMP_Round 12"** (Passes 1.60 cfs of 3.84 cfs potential flow)
  - **1=Exfiltration** (Controls 0.00 cfs)
  - **2=Orifice/Grate** (Weir Controls 1.60 cfs @ 1.29 fps)
- **4=Broad-Crested Rectangular Weir** (Weir Controls 0.71 cfs @ 0.92 fps)

Pond 23P: Bioswale (good)



Summary for Pond 24P: Bioswale (good)

Inflow Area = 1.090 ac, 41.28% Impervious, Inflow Depth = 0.84" for 1-Year event
Inflow = 1.40 cfs @ 12.14 hrs, Volume= 0.076 af
Outflow = 1.40 cfs @ 12.15 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.2 min
Discarded = 0.00 cfs @ 12.15 hrs, Volume= 0.000 af
Primary = 1.40 cfs @ 12.15 hrs, Volume= 0.076 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 891.61' @ 12.15 hrs Surf.Area= 184 sf Storage= 31 cf

Plug-Flow detention time= 0.9 min calculated for 0.076 af (100% of inflow)
Center-of-Mass det. time= 0.8 min (829.9 - 829.1)

Volume	Invert	Avail.Storage	Storage Description
#1	891.50'	5,468 cf	**SWALE STORAGE (Conic)** Listed below

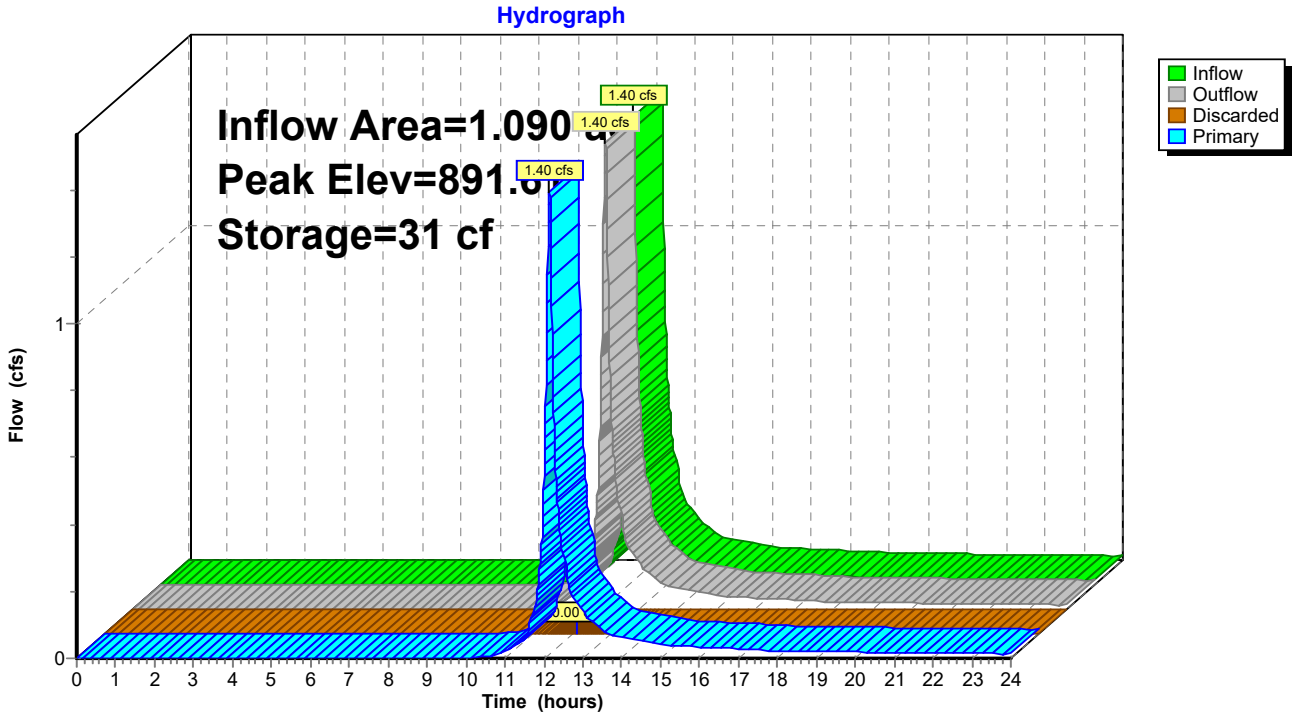
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
891.50	0	0	0	0
892.00	831	139	139	831
893.00	12,000	5,330	5,468	12,003

Device	Routing	Invert	Outlet Devices
#1	Discarded	891.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 800.00'
#2	Device 3	891.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	889.50'	**12.0" Round Culvert** L= 45.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 889.50' / 888.00' S= 0.0333 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	891.50'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.15 hrs HW=891.61' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=1.39 cfs @ 12.15 hrs HW=891.61' TW=880.65' (Dynamic Tailwater)
├**3=Culvert** (Passes 0.96 cfs of 3.79 cfs potential flow)
│ └**2=Orifice/Grate** (Weir Controls 0.96 cfs @ 1.09 fps)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 0.43 cfs @ 0.78 fps)

Pond 24P: Bioswale (good)



Summary for Pond 25P: Bioswale (good)

Inflow Area = 0.530 ac, 43.40% Impervious, Inflow Depth = 0.86" for 1-Year event
Inflow = 0.69 cfs @ 12.15 hrs, Volume= 0.038 af
Outflow = 0.69 cfs @ 12.15 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.2 min
Discarded = 0.00 cfs @ 12.15 hrs, Volume= 0.000 af
Primary = 0.69 cfs @ 12.15 hrs, Volume= 0.038 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 903.59' @ 12.15 hrs Surf.Area= 70 sf Storage= 12 cf

Plug-Flow detention time= 0.6 min calculated for 0.038 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (828.2 - 827.6)

Volume	Invert	Avail.Storage	Storage Description
#1	903.50'	2,142 cf	**SWALE STORAGE (Conic)** Listed below

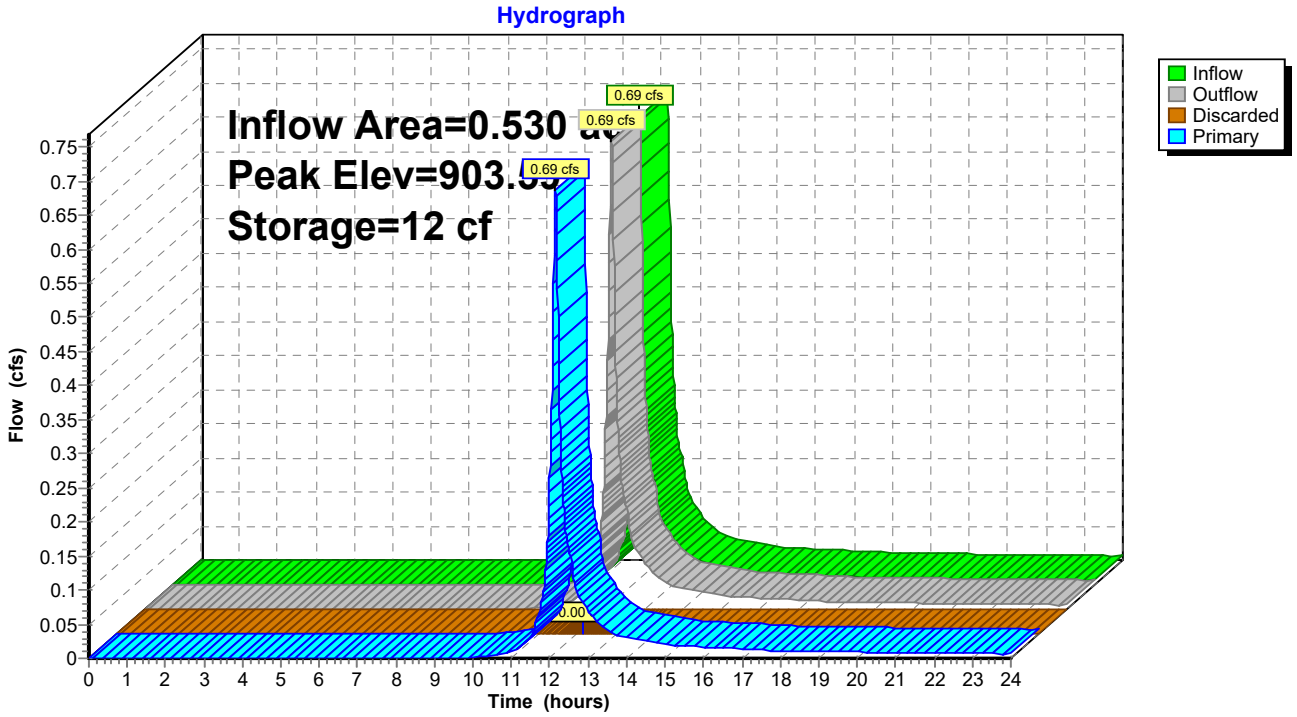
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
903.50	0	0	0	0
904.00	395	66	66	395
905.00	4,500	2,076	2,142	4,503

Device	Routing	Invert	Outlet Devices
#1	Discarded	903.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 800.00'
#2	Device 3	903.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	901.50'	**12.0" Round CMP_Round 12"** L= 58.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 901.50' / 901.00' S= 0.0086 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	903.70'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.15 hrs HW=903.59' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.69 cfs @ 12.15 hrs HW=903.59' TW=891.61' (Dynamic Tailwater)
├**3=CMP_Round 12"** (Passes 0.69 cfs of 3.76 cfs potential flow)
└**2=Orifice/Grate** (Weir Controls 0.69 cfs @ 0.97 fps)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 25P: Bioswale (good)



Summary for Pond 26P: Bioswale (good)

Inflow Area = 0.150 ac, 20.00% Impervious, Inflow Depth = 0.67" for 1-Year event
Inflow = 0.16 cfs @ 12.14 hrs, Volume= 0.008 af
Outflow = 0.15 cfs @ 12.14 hrs, Volume= 0.008 af, Atten= 1%, Lag= 0.5 min
Discarded = 0.00 cfs @ 12.14 hrs, Volume= 0.000 af
Primary = 0.15 cfs @ 12.14 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 907.53' @ 12.14 hrs Surf.Area= 41 sf Storage= 7 cf

Plug-Flow detention time= 1.8 min calculated for 0.008 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (843.2 - 841.5)

Volume	Invert	Avail.Storage	Storage Description
#1	907.50'	2,578 cf	**SWALE STORAGE (Conic)** Listed below

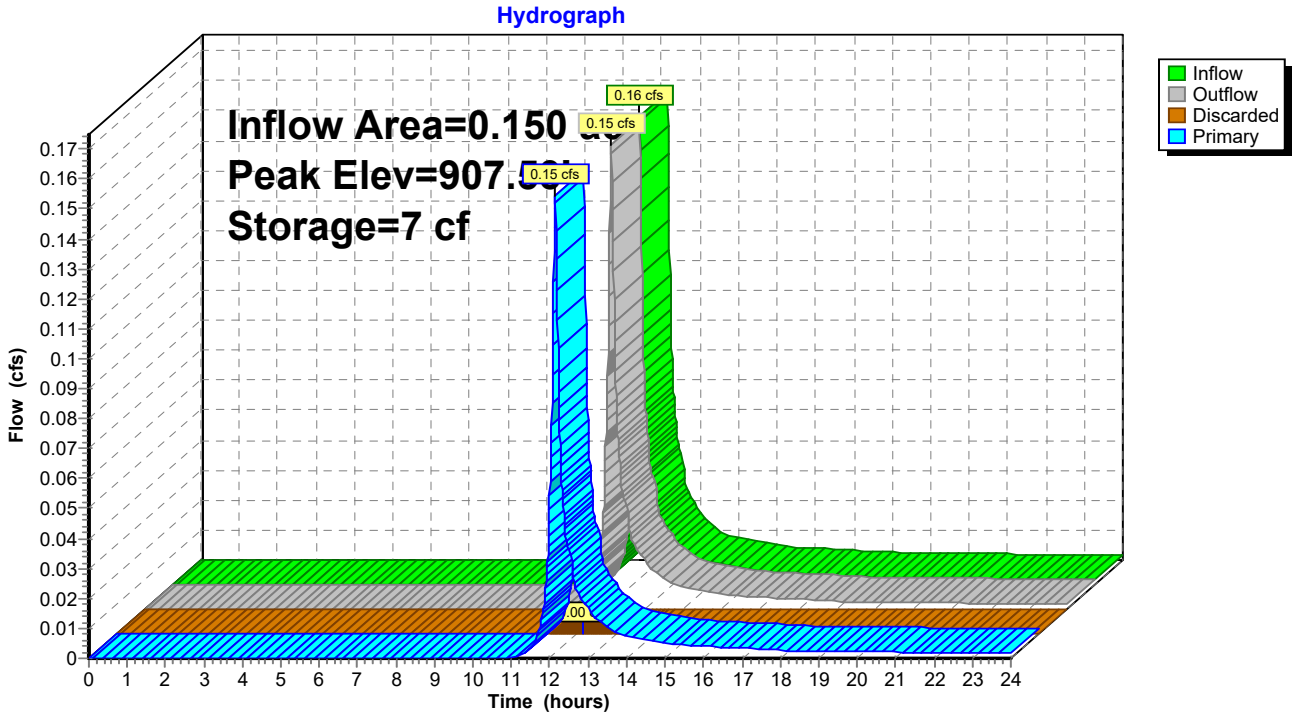
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
907.50	0	0	0	0
908.00	635	106	106	635
909.00	5,000	2,472	2,578	5,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	907.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 800.00'
#2	Device 3	907.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	905.50'	**12.0" Round CMP_Round 12"** L= 58.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 905.50' / 905.00' S= 0.0086 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	907.70'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.14 hrs HW=907.53' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.15 cfs @ 12.14 hrs HW=907.53' TW=903.59' (Dynamic Tailwater)
├**3=CMP_Round 12"** (Passes 0.15 cfs of 3.70 cfs potential flow)
└**2=Orifice/Grate** (Weir Controls 0.15 cfs @ 0.59 fps)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 26P: Bioswale (good)



Summary for Pond 27P: Dry Swale

Inflow Area = 1.310 ac, 37.40% Impervious, Inflow Depth = 0.82" for 1-Year event
Inflow = 1.55 cfs @ 12.16 hrs, Volume= 0.090 af
Outflow = 0.68 cfs @ 12.31 hrs, Volume= 0.079 af, Atten= 56%, Lag= 9.5 min
Discarded = 0.02 cfs @ 12.31 hrs, Volume= 0.032 af
Primary = 0.66 cfs @ 12.31 hrs, Volume= 0.046 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 807.67' @ 12.31 hrs Surf.Area= 4,210 sf Storage= 1,403 cf

Plug-Flow detention time= 260.9 min calculated for 0.079 af (88% of inflow)
Center-of-Mass det. time= 205.7 min (1,037.6 - 831.9)

Volume	Invert	Avail.Storage	Storage Description
#1	807.00'	10,179 cf	**Custom Stage Data (Conic)** Listed below

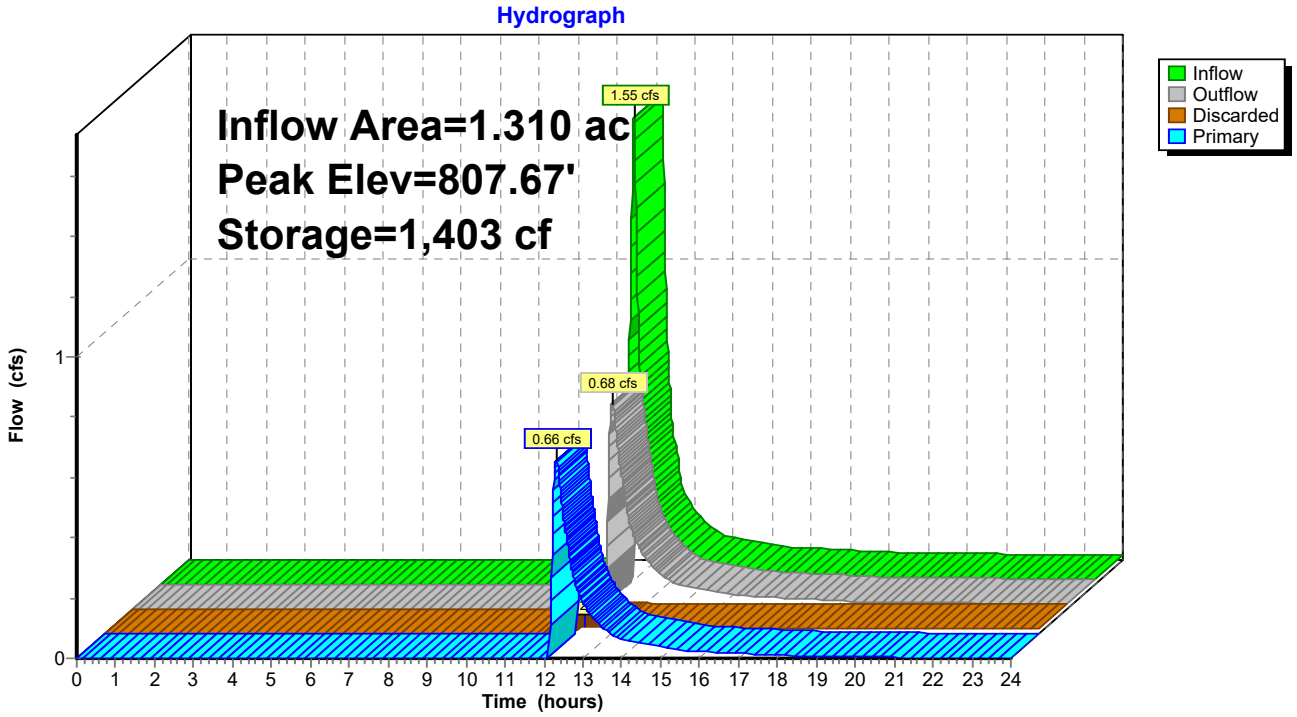
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
807.00	0	0	0	0
808.00	6,300	2,100	2,100	6,302
809.00	10,000	8,079	10,179	10,015

Device	Routing	Invert	Outlet Devices
#1	Primary	807.50'	**4.0' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Discarded	807.00'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 700.00'

Discarded OutFlow Max=0.02 cfs @ 12.31 hrs HW=807.67' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.66 cfs @ 12.31 hrs HW=807.67' TW=804.08' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.66 cfs @ 0.98 fps)

Pond 27P: Dry Swale



Summary for Pond 32P: Lower Pond

Inflow Area = 38.100 ac, 11.36% Impervious, Inflow Depth = 0.52" for 1-Year event
Inflow = 13.84 cfs @ 12.16 hrs, Volume= 1.651 af
Outflow = 0.41 cfs @ 22.53 hrs, Volume= 0.898 af, Atten= 97%, Lag= 622.0 min
Primary = 0.41 cfs @ 22.53 hrs, Volume= 0.898 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Starting Elev= 700.50' Surf.Area= 14,196 sf Storage= 6,497 cf
Peak Elev= 703.16' @ 22.53 hrs Surf.Area= 23,385 sf Storage= 56,865 cf (50,368 cf above start)

Plug-Flow detention time= 770.4 min calculated for 0.749 af (45% of inflow)
Center-of-Mass det. time= 468.8 min (1,340.0 - 871.2)

Volume	Invert	Avail.Storage	Storage Description
#1	700.00'	124,144 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

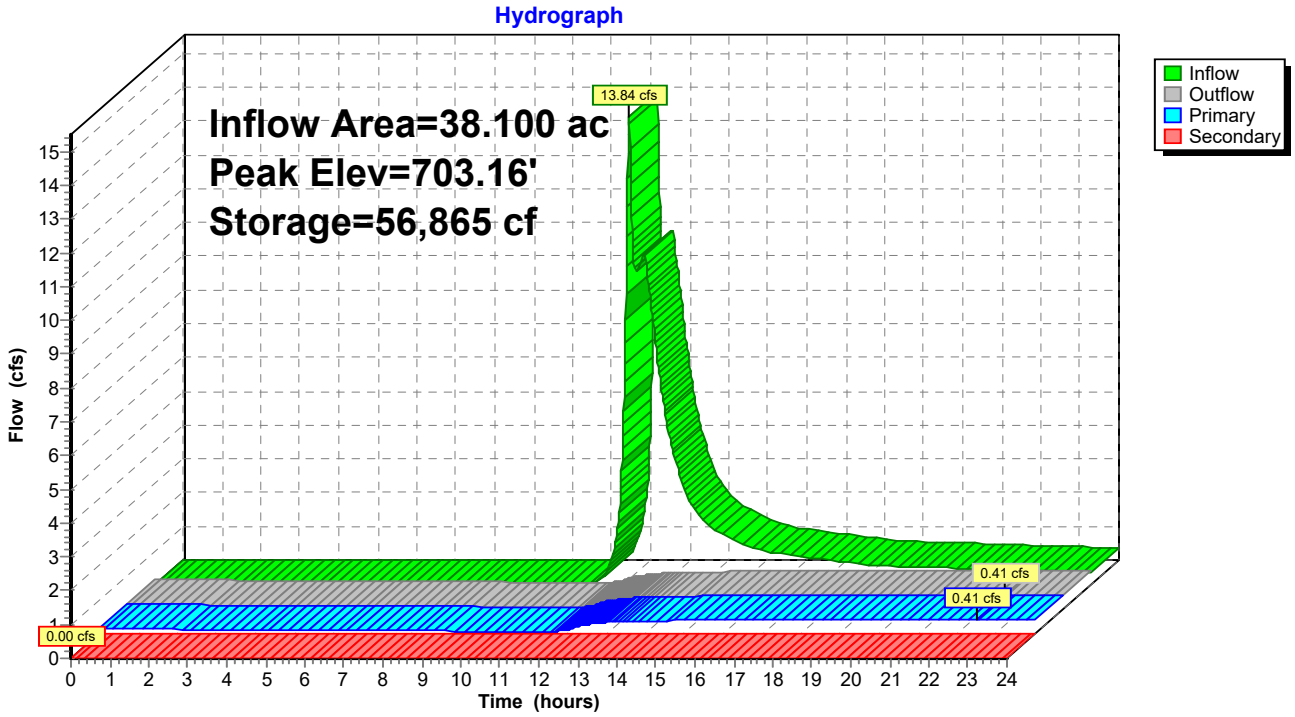
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
700.00	11,792	0	0
701.00	16,599	14,196	14,196
702.00	19,522	18,061	32,256
703.00	22,479	21,001	53,257
704.00	28,237	25,358	78,615
705.00	34,230	31,234	109,848
705.40	37,252	14,296	124,144

Device	Routing	Invert	Outlet Devices
#1	Secondary	703.60'	**27.0' 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
#2	Device 4	703.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 4	700.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#4	Primary	700.00'	**18.0" Round Culvert** L= 21.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 700.00' / 699.80' S= 0.0095 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.41 cfs @ 22.53 hrs HW=703.16' TW=0.00' (Dynamic Tailwater)
└**4=Culvert** (Passes 0.41 cfs of 10.42 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**3=Orifice/Grate** (Orifice Controls 0.41 cfs @ 8.38 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=700.50' TW=0.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 32P: Lower Pond



Summary for Pond 33P: Upper Pond

Inflow Area = 32.150 ac, 14.71% Impervious, Inflow Depth = 0.49" for 1-Year event
Inflow = 15.22 cfs @ 12.22 hrs, Volume= 1.306 af
Outflow = 0.39 cfs @ 20.13 hrs, Volume= 0.742 af, Atten= 97%, Lag= 474.3 min
Primary = 0.39 cfs @ 20.13 hrs, Volume= 0.742 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Starting Elev= 705.00' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 740.34' @ 20.13 hrs Surf.Area= 17,478 sf Storage= 41,386 cf

Plug-Flow detention time= 711.5 min calculated for 0.742 af (57% of inflow)
Center-of-Mass det. time= 594.4 min (1,458.0 - 863.6)

Volume	Invert	Avail.Storage	Storage Description
#1	737.50'	149,518 cf	**prop (Conic)** Listed below (Recalc)

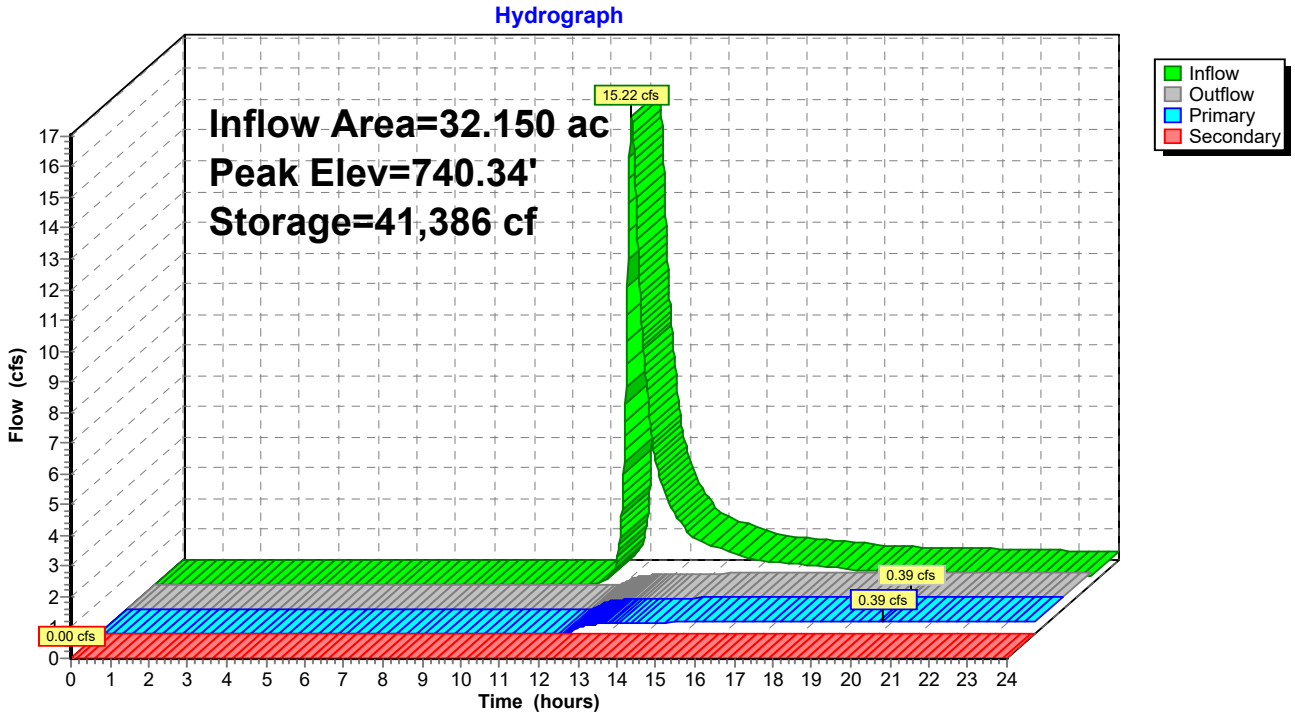
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
737.50	11,903	0	0	11,903
738.00	12,777	6,169	6,169	12,799
739.00	14,602	13,679	19,848	14,670
740.00	16,711	15,645	35,493	16,825
741.00	18,984	17,835	53,328	19,147
742.00	21,350	20,155	73,484	21,566
743.00	23,873	22,600	96,083	24,145
744.00	26,452	25,151	121,235	26,784
745.00	30,154	28,283	149,518	30,534

Device	Routing	Invert	Outlet Devices
#1	Secondary	743.00'	**31.0' 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
#2	Device 4	741.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 4	737.50'	**3.0" Vert. Orifice/Grate** C= 0.600
#4	Primary	737.50'	**24.0" Round Culvert** L= 35.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 737.50' / 735.00' S= 0.0714 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.39 cfs @ 20.13 hrs HW=740.34' TW=0.00' (Dynamic Tailwater)
└─**4=Culvert** (Passes 0.39 cfs of 16.22 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Orifice Controls 0.39 cfs @ 7.94 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=737.50' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 33P: Upper Pond

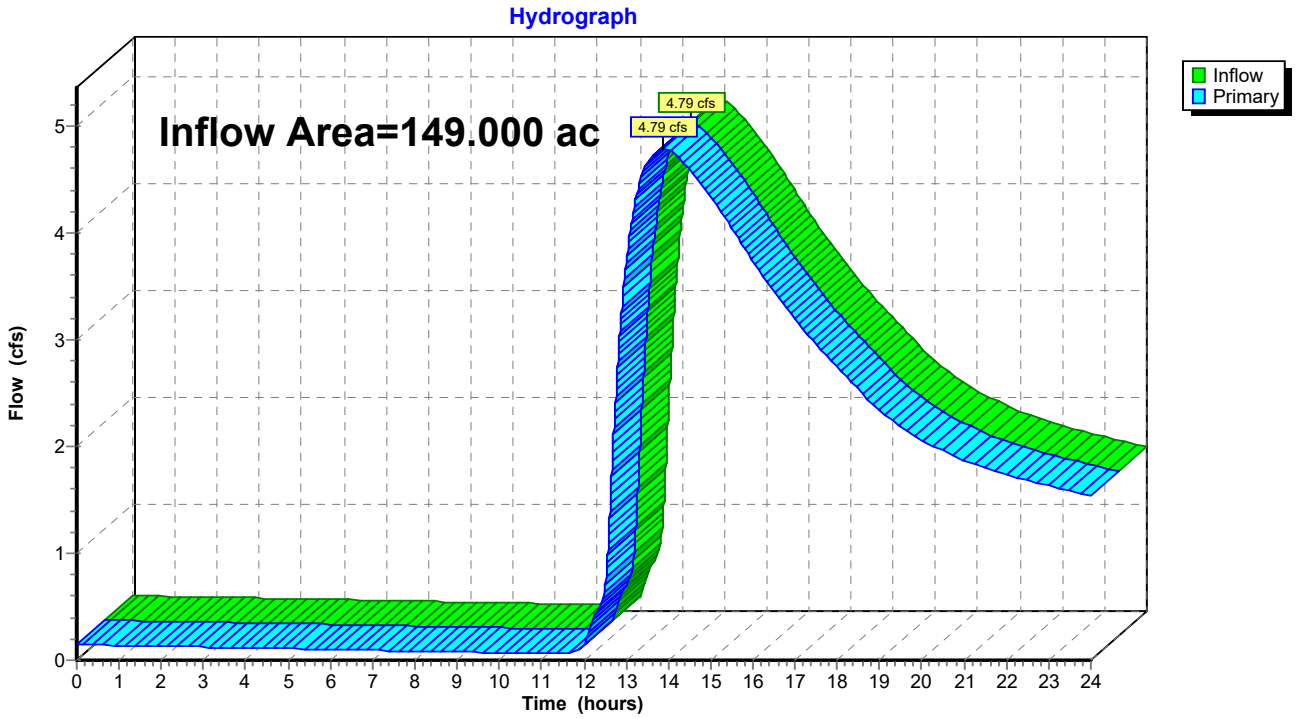


Summary for Link 49L: Total Off-site drainage

Inflow Area = 149.000 ac, 6.55% Impervious, Inflow Depth > 0.30" for 1-Year event
Inflow = 4.79 cfs @ 13.88 hrs, Volume= 3.779 af
Primary = 4.79 cfs @ 13.88 hrs, Volume= 3.779 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs

Link 49L: Total Off-site drainage



Time span=0.00-37.00 hrs, dt=0.01 hrs, 3701 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 OFF: OFFSITE DRAINAGE Runoff Area=78.750 ac 0.89% Impervious Runoff Depth=1.05"
Flow Length=4,105' Tc=35.7 min CN=75 Runoff=57.03 cfs 6.914 af

Subcatchment2: 2 (good) Runoff Area=24.100 ac 9.34% Impervious Runoff Depth=1.23"
Flow Length=2,474' Tc=15.8 min CN=78 Runoff=31.92 cfs 2.469 af

Subcatchment3: 3 (good) Runoff Area=23.800 ac 3.66% Impervious Runoff Depth=1.29"
Flow Length=3,643' Tc=37.7 min CN=79 Runoff=21.11 cfs 2.562 af

Subcatchment17: Lot #9 (good) Runoff Area=0.840 ac 26.19% Impervious Runoff Depth=1.71"
Slope=0.0866 '/' Tc=6.0 min CN=85 Runoff=2.25 cfs 0.119 af

Subcatchment18: Lot #8 (good) Runoff Area=0.750 ac 29.33% Impervious Runoff Depth=1.71"
Slope=0.0953 '/' Tc=6.0 min CN=85 Runoff=2.01 cfs 0.107 af

Subcatchment19: Lot #7 (good) Runoff Area=0.810 ac 27.16% Impervious Runoff Depth=1.71"
Slope=0.0933 '/' Tc=6.0 min CN=85 Runoff=2.17 cfs 0.115 af

Subcatchment20: Lot #6 (good) Runoff Area=0.800 ac 27.50% Impervious Runoff Depth=1.71"
Slope=0.0759 '/' Tc=6.0 min CN=85 Runoff=2.14 cfs 0.114 af

Subcatchment21: Lot #5 (good) Runoff Area=0.800 ac 27.50% Impervious Runoff Depth=1.71"
Slope=0.0663 '/' Tc=6.0 min CN=85 Runoff=2.14 cfs 0.114 af

Subcatchment22: Lot #4 (good) Runoff Area=0.820 ac 26.83% Impervious Runoff Depth=1.71"
Slope=0.0589 '/' Tc=6.0 min CN=85 Runoff=2.19 cfs 0.117 af

Subcatchment23: Lot #3 (good) Runoff Area=0.830 ac 26.51% Impervious Runoff Depth=1.71"
Slope=0.0568 '/' Tc=6.0 min CN=85 Runoff=2.22 cfs 0.118 af

Subcatchment24: Lot #2 (good) Runoff Area=0.560 ac 39.29% Impervious Runoff Depth=1.86"
Slope=0.0563 '/' Tc=6.0 min CN=87 Runoff=1.62 cfs 0.087 af

Subcatchment25: Lot #1 (good) Runoff Area=0.380 ac 52.63% Impervious Runoff Depth=2.03"
Flow Length=120' Slope=0.0700 '/' Tc=7.3 min CN=89 Runoff=1.13 cfs 0.064 af

Subcatchment26: 26 (update Tc to Runoff Area=1.310 ac 37.40% Impervious Runoff Depth=1.86"
Tc=8.0 min CN=87 Runoff=3.50 cfs 0.203 af

Subcatchment37S: 1 Runoff Area=14.300 ac 24.20% Impervious Runoff Depth=1.56"
Flow Length=932' Tc=7.7 min CN=83 Runoff=32.73 cfs 1.859 af

Subcatchment46S: Portion of Lot #1 Runoff Area=0.150 ac 20.00% Impervious Runoff Depth=1.63"
Tc=6.0 min CN=84 Runoff=0.38 cfs 0.020 af

Reach 12R: Swale to off-site Avg. Flow Depth=0.60' Max Vel=2.21 fps Inflow=18.93 cfs 6.894 af
n=0.030 L=293.0' S=0.0068 '/' Capacity=58.17 cfs Outflow=18.92 cfs 6.893 af

Reach 16R: Northside swale Avg. Flow Depth=0.18' Max Vel=3.61 fps Inflow=3.00 cfs 0.157 af
n=0.030 L=655.0' S=0.0885 '/' Capacity=111.61 cfs Outflow=2.82 cfs 0.157 af

Reach 17R: Southside Swale Avg. Flow Depth=0.42' Max Vel=6.13 fps Inflow=17.47 cfs 0.969 af
n=0.030 L=710.0' S=0.0831 '/' Capacity=108.12 cfs Outflow=16.89 cfs 0.969 af

Pond 10P: Proposed 36" Culvert Peak Elev=705.99' Storage=115,778 cf Inflow=57.03 cfs 6.914 af
Primary=10.03 cfs 5.449 af Secondary=9.05 cfs 1.446 af Outflow=18.96 cfs 6.895 af

Pond 11P: Proposed 36" Culvert Peak Elev=705.33' Storage=4,071 cf Inflow=18.96 cfs 6.895 af
Primary=18.93 cfs 6.894 af Secondary=0.00 cfs 0.000 af Outflow=18.93 cfs 6.894 af

Pond 17P: Bioswale (good) Peak Elev=808.20' Storage=340 cf Inflow=17.46 cfs 0.972 af
Discarded=0.00 cfs 0.002 af Primary=17.47 cfs 0.969 af Outflow=17.47 cfs 0.970 af

Pond 18P: Bioswale (good) Peak Elev=815.47' Storage=285 cf Inflow=15.22 cfs 0.853 af
Discarded=0.00 cfs 0.000 af Primary=15.23 cfs 0.853 af Outflow=15.23 cfs 0.853 af

Pond 19P: Bioswale (good) Peak Elev=829.99' Storage=143 cf Inflow=13.26 cfs 0.747 af
Discarded=0.00 cfs 0.001 af Primary=13.24 cfs 0.746 af Outflow=13.25 cfs 0.747 af

Pond 20P: Bioswale (good) Peak Elev=845.01' Storage=202 cf Inflow=11.65 cfs 0.632 af
Discarded=0.01 cfs 0.001 af Primary=11.19 cfs 0.632 af Outflow=11.20 cfs 0.632 af

Pond 21P: Bioswale (good) Peak Elev=858.91' Storage=121 cf Inflow=9.59 cfs 0.519 af
Discarded=0.00 cfs 0.001 af Primary=9.55 cfs 0.519 af Outflow=9.56 cfs 0.519 af

Pond 22P: Bioswale (good) Peak Elev=869.91' Storage=121 cf Inflow=7.50 cfs 0.406 af
Discarded=0.00 cfs 0.000 af Primary=7.47 cfs 0.405 af Outflow=7.47 cfs 0.406 af

Pond 23P: Bioswale (good) Peak Elev=880.77' Storage=79 cf Inflow=5.32 cfs 0.289 af
Outflow=5.32 cfs 0.289 af

Pond 24P: Bioswale (good) Peak Elev=891.69' Storage=52 cf Inflow=3.12 cfs 0.171 af
Discarded=0.00 cfs 0.000 af Primary=3.11 cfs 0.171 af Outflow=3.11 cfs 0.171 af

Pond 25P: Bioswale (good) Peak Elev=903.65' Storage=20 cf Inflow=1.51 cfs 0.085 af
Discarded=0.00 cfs 0.000 af Primary=1.51 cfs 0.084 af Outflow=1.51 cfs 0.085 af

Pond 26P: Bioswale (good) Peak Elev=907.56' Storage=13 cf Inflow=0.38 cfs 0.020 af
Discarded=0.00 cfs 0.000 af Primary=0.38 cfs 0.020 af Outflow=0.38 cfs 0.020 af

Pond 27P: Dry Swale Peak Elev=807.94' Storage=1,973 cf Inflow=3.50 cfs 0.203 af
Discarded=0.03 cfs 0.035 af Primary=3.00 cfs 0.157 af Outflow=3.03 cfs 0.192 af

Pond 32P: Lower Pond Peak Elev=703.89' Storage=75,607 cf Inflow=39.12 cfs 4.421 af
Primary=11.91 cfs 2.820 af Secondary=10.76 cfs 0.661 af Outflow=22.67 cfs 3.481 af

Pond 33P: Upper Pond Peak Elev=741.93' Storage=71,975 cf Inflow=47.99 cfs 3.595 af
Primary=15.19 cfs 2.593 af Secondary=0.00 cfs 0.000 af Outflow=15.19 cfs 2.593 af

Link 49L: Total Off-site drainage

Inflow=48.29 cfs 12.967 af
Primary=48.29 cfs 12.967 af

Total Runoff Area = 149.000 ac Runoff Volume = 14.982 af Average Runoff Depth = 1.21"
93.45% Pervious = 139.240 ac 6.55% Impervious = 9.760 ac

Summary for Subcatchment 1 OFF: OFFSITE DRAINAGE (good)

CarlsonPlanXYPos|642280.8804|1040430.0233|
CarlsonSurface||

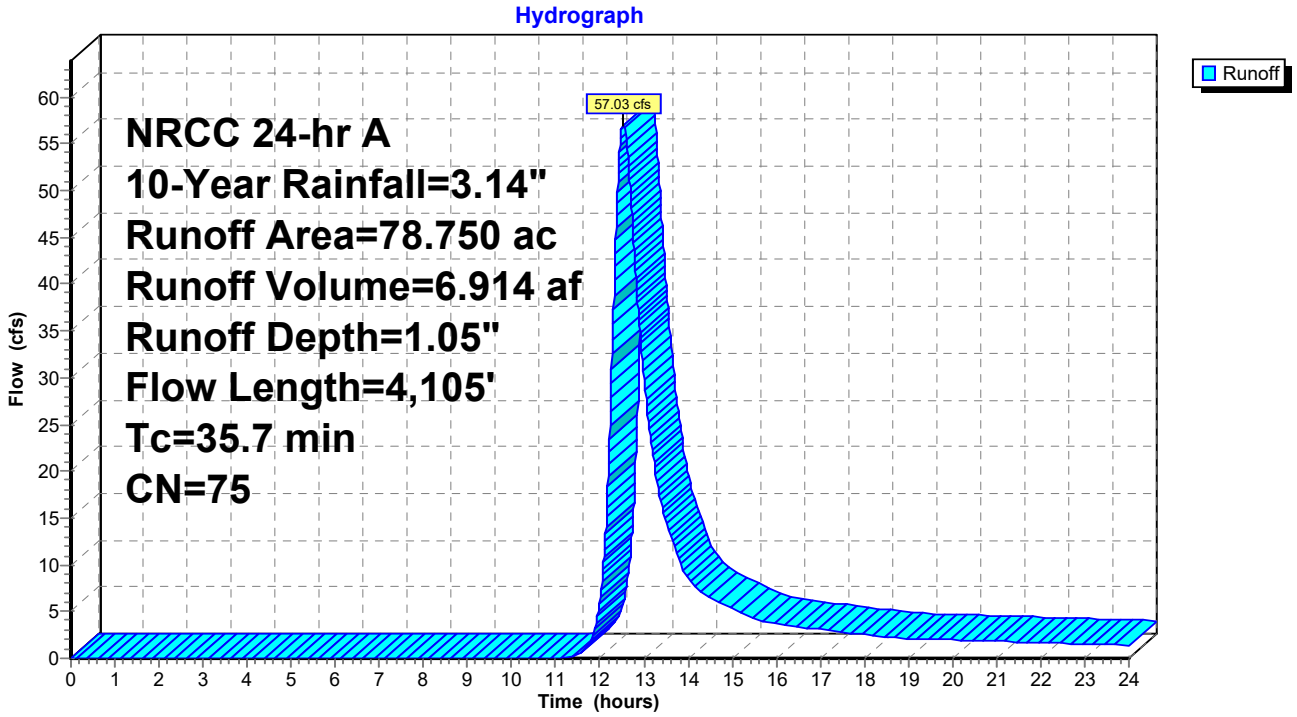
Runoff = 57.03 cfs @ 12.54 hrs, Volume= 6.914 af, Depth= 1.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.700	98	Paved parking, HSG D
18.800	78	Meadow, non-grazed, HSG D
5.000	80	>75% Grass cover, Good, HSG D
54.250	73	Brush, Good, HSG D
78.750	75	Weighted Average
78.050		99.11% Pervious Area
0.700		0.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.78		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.19"
10.8	1,165	0.0400	1.80		**Shallow Concentrated Flow, Shallow Concentrated** Cultivated Straight Rows Kv= 9.0 fps
1.2	1,445	0.0850	19.33	1,352.84	**Channel Flow, Channel Flow** Area= 70.0 sf Perim= 72.0' r= 0.97' n= 0.022 Earth, clean & straight
7.3	560	0.0650	1.27		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
1.2	115	0.1000	1.58		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
12.6	535	0.0200	0.71		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
2.3	270	0.0150	1.97		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
35.7	4,105	Total			

Subcatchment 1 OFF: OFFSITE DRAINAGE (good)



Summary for Subcatchment 2: 2 (good)

CarlsonPlanXYPos|642014.4586|1041354.4458|
CarlsonSurface||

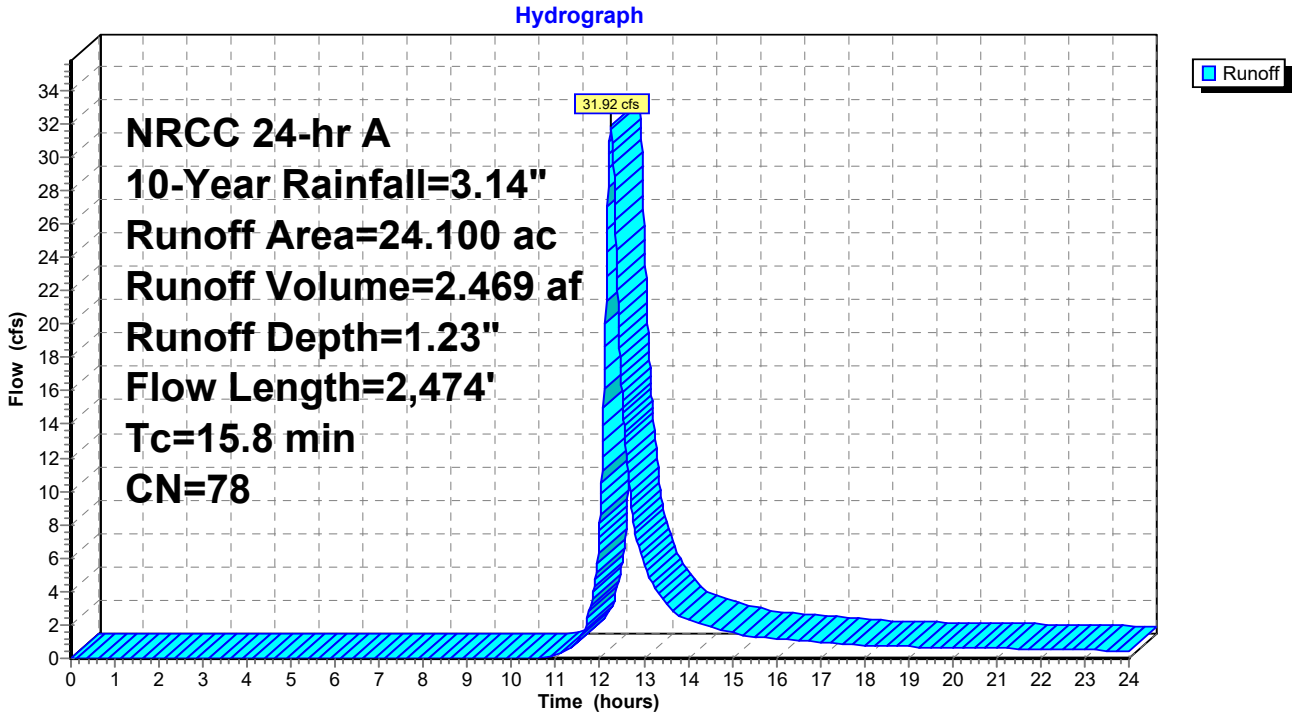
Runoff = 31.92 cfs @ 12.25 hrs, Volume= 2.469 af, Depth= 1.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.430	98	Water Surface, HSG D
1.730	98	Paved parking, HSG D
0.090	98	Paved parking HSG D
2.150	80	>75% Grass cover, Good, HSG D
2.300	78	Meadow, non-grazed, HSG D
10.900	73	Brush, Good, HSG D
6.000	80	>75% Grass cover, Good, HSG D
0.500	80	>75% Grass cover, Good, HSG D
24.100	78	Weighted Average
21.850		90.66% Pervious Area
2.250		9.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0350	0.18		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.19"
0.7	192	0.0830	4.64		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
0.8	230	0.0870	4.75		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
1.1	180	0.0280	2.69		**Shallow Concentrated Flow, Shallow concentrated** Unpaved Kv= 16.1 fps
1.1	1,194	0.0750	17.98	413.55	**Channel Flow, Channel Flow** Area= 23.0 sf Perim= 24.0' r= 0.96' n= 0.022 Earth, clean & straight
2.2	165	0.0600	1.22		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
0.4	413	0.0720	17.36	260.42	**Channel Flow, Channel Flow** Area= 15.0 sf Perim= 16.0' r= 0.94' n= 0.022 Earth, clean & straight
15.8	2,474	Total			

Subcatchment 2: 2 (good)



Summary for Subcatchment 3: 3 (good)

CarlsonPlanXYPos|641681.4005|1041128.2504|
CarlsonSurface||

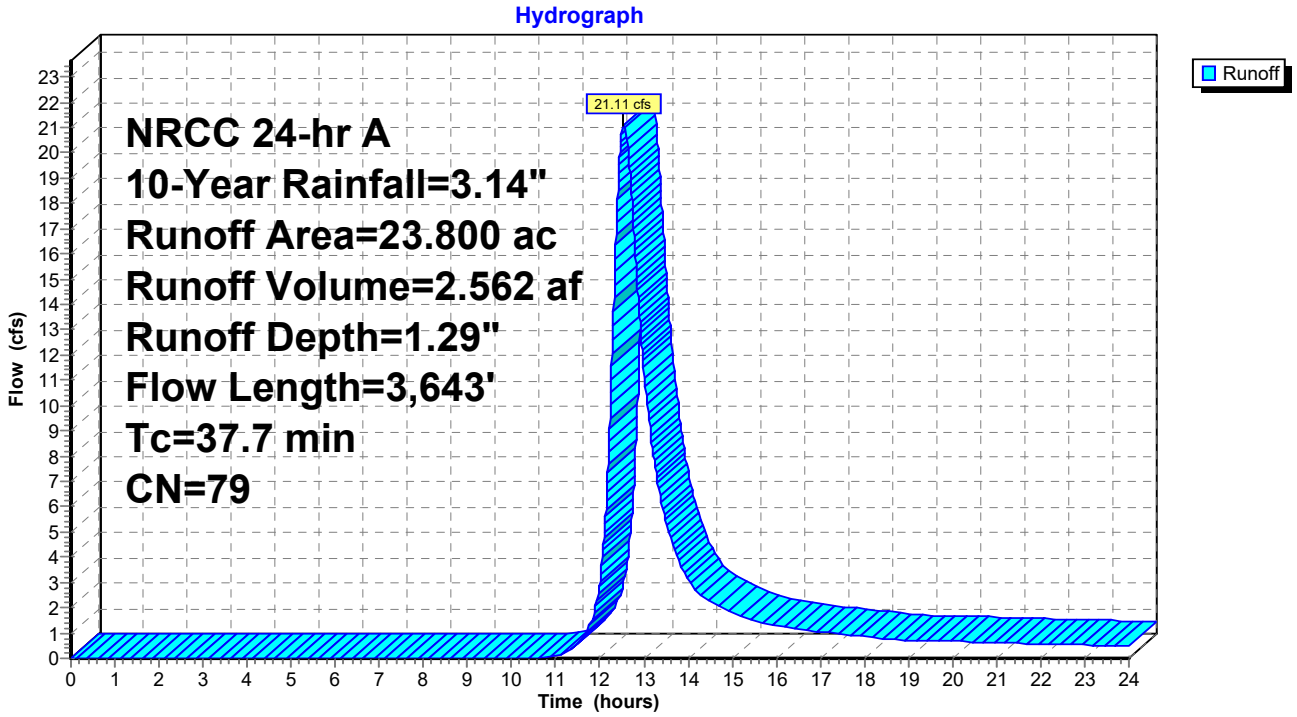
Runoff = 21.11 cfs @ 12.53 hrs, Volume= 2.562 af, Depth= 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.440	98	Paved parking, HSG D
0.530	80	>75% Grass cover, Good, HSG D
0.430	98	Paved parking, HSG D
12.660	78	Meadow, non-grazed, HSG D
2.500	73	Brush, Good, HSG D
5.720	80	>75% Grass cover, Good, HSG D
1.520	80	>75% Grass cover, Good, HSG D
23.800	79	Weighted Average
22.930		96.34% Pervious Area
0.870		3.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.78		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.19"
11.5	85	0.0200	0.12		**Sheet Flow, Sheet Flow** Cultivated: Residue>20% n= 0.170 P2= 2.19"
5.0	385	0.0200	1.27		**Shallow Concentrated Flow, Shallow Concentrated** Cultivated Straight Rows Kv= 9.0 fps
10.2	1,400	0.0640	2.28		**Shallow Concentrated Flow, Shallow Concentrated** Cultivated Straight Rows Kv= 9.0 fps
6.4	560	0.0840	1.45		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
0.4	435	0.0640	16.37	245.52	**Channel Flow, Channel Flow** Area= 15.0 sf Perim= 16.0' r= 0.94' n= 0.022 Earth, clean & straight
0.9	209	0.0570	3.84		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
2.2	197	0.0870	1.47		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
0.2	125	0.0320	11.48	286.96	**Channel Flow, Channel Flow** Area= 25.0 sf Perim= 27.0' r= 0.93' n= 0.022 Earth, clean & straight
0.6	232	0.0100	6.42	160.42	**Channel Flow, Channel Flow** Area= 25.0 sf Perim= 27.0' r= 0.93' n= 0.022 Earth, clean & straight
37.7	3,643	Total			

Subcatchment 3: 3 (good)



Summary for Subcatchment 17: Lot #9 (good)

CarlsonPlanXYPos|642702.7045|1040980.9144|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

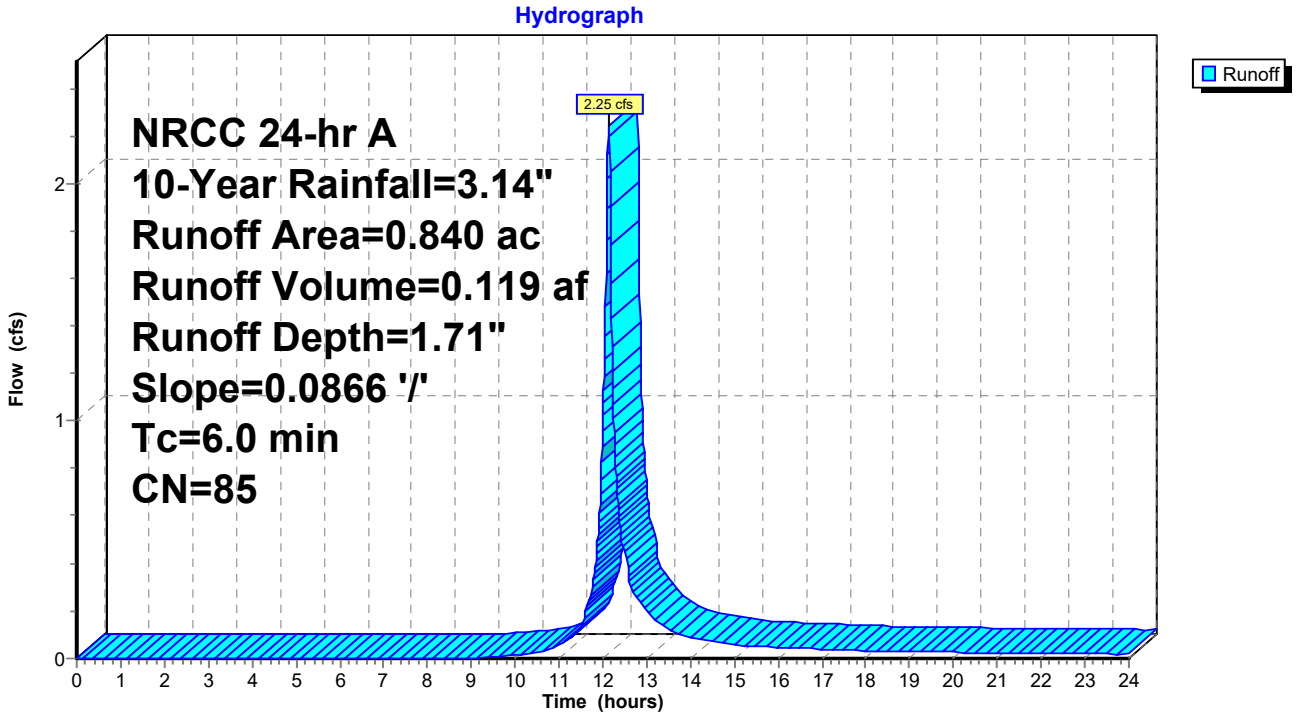
Runoff = 2.25 cfs @ 12.13 hrs, Volume= 0.119 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.540	80	>75% Grass cover, Good, HSG D
0.080	80	>75% Grass cover, Good, HSG D
0.840	85	Weighted Average
0.620		73.81% Pervious Area
0.220		26.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0866			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 17: Lot #9 (good)



Summary for Subcatchment 18: Lot #8 (good)

CarlsonPlanXYPos|642920.0895|1040980.2941|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

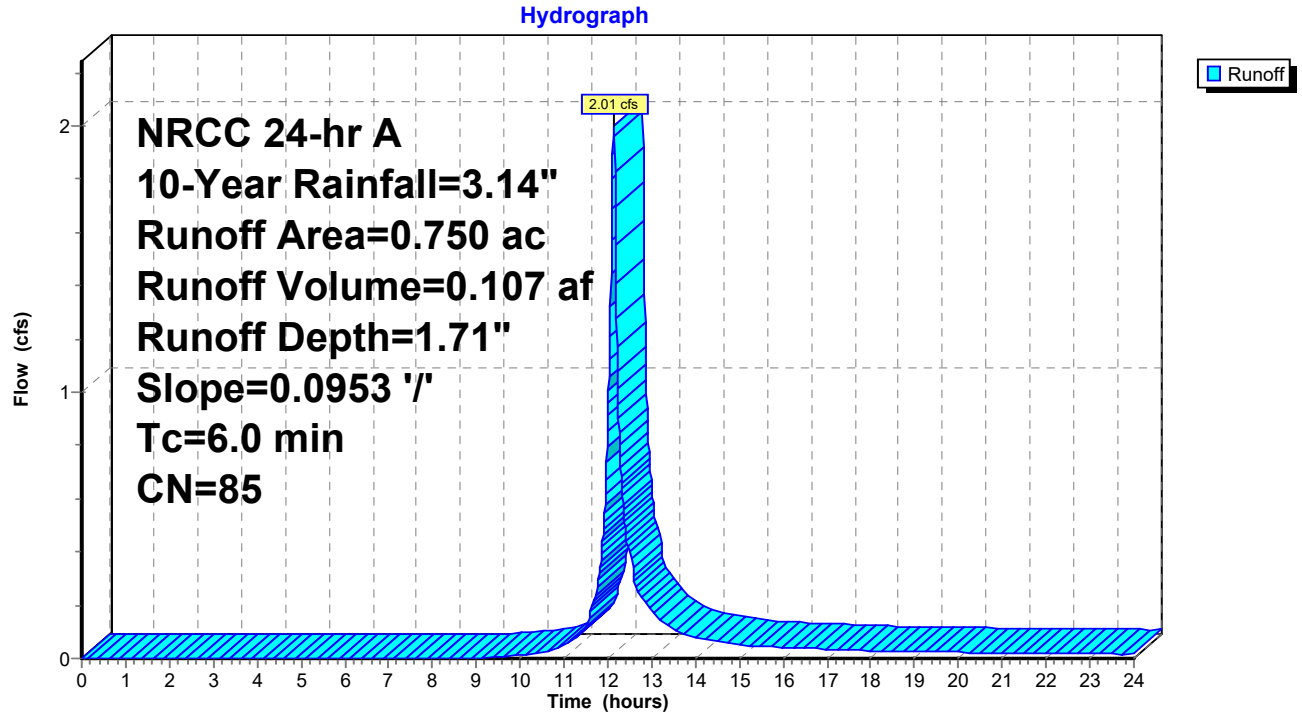
Runoff = 2.01 cfs @ 12.13 hrs, Volume= 0.107 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.480	80	>75% Grass cover, Good, HSG D
0.050	80	>75% Grass cover, Good, HSG D
0.750	85	Weighted Average
0.530		70.67% Pervious Area
0.220		29.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0953			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 18: Lot #8 (good)



Summary for Subcatchment 19: Lot #7 (good)

CarlsonPlanXYPos|643107.1559|1040981.5048|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

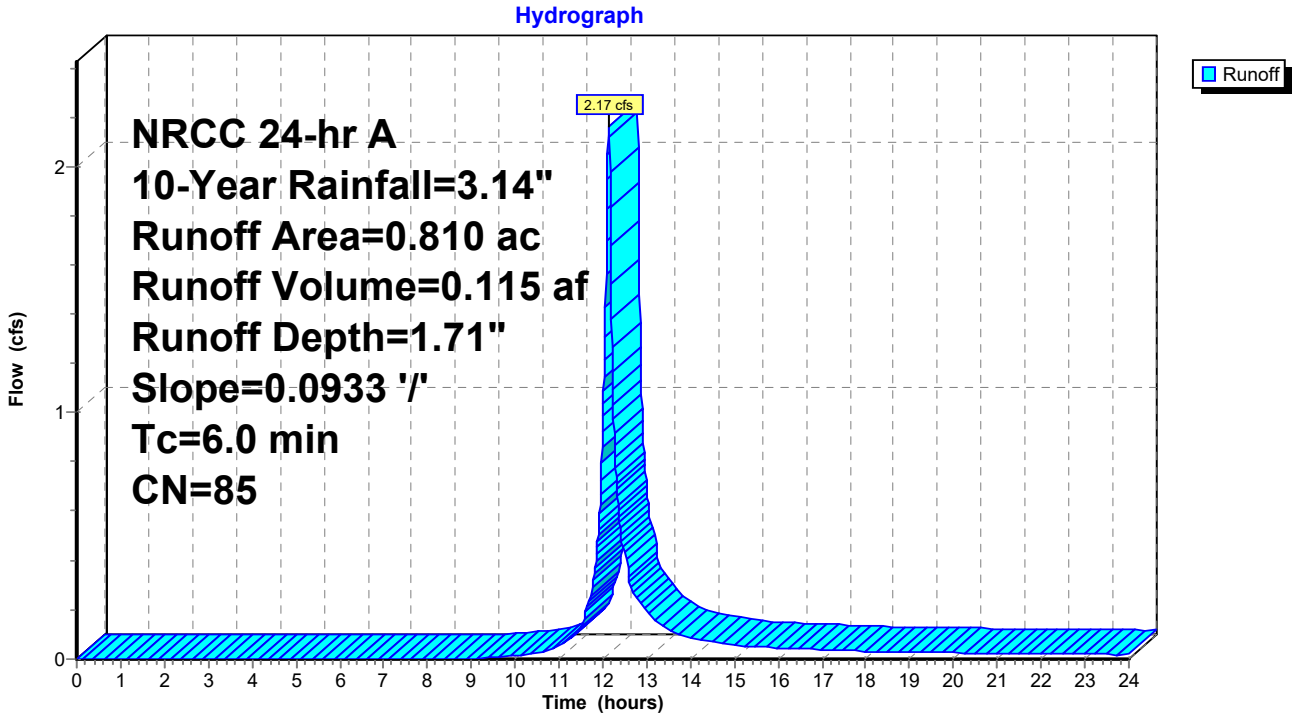
Runoff = 2.17 cfs @ 12.13 hrs, Volume= 0.115 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.590	80	>75% Grass cover, Good, HSG D
0.810	85	Weighted Average
0.590		72.84% Pervious Area
0.220		27.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0933			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 19: Lot #7 (good)



Summary for Subcatchment 20: Lot #6 (good)

CarlsonPlanXYPos|643312.2303|1040980.2663|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

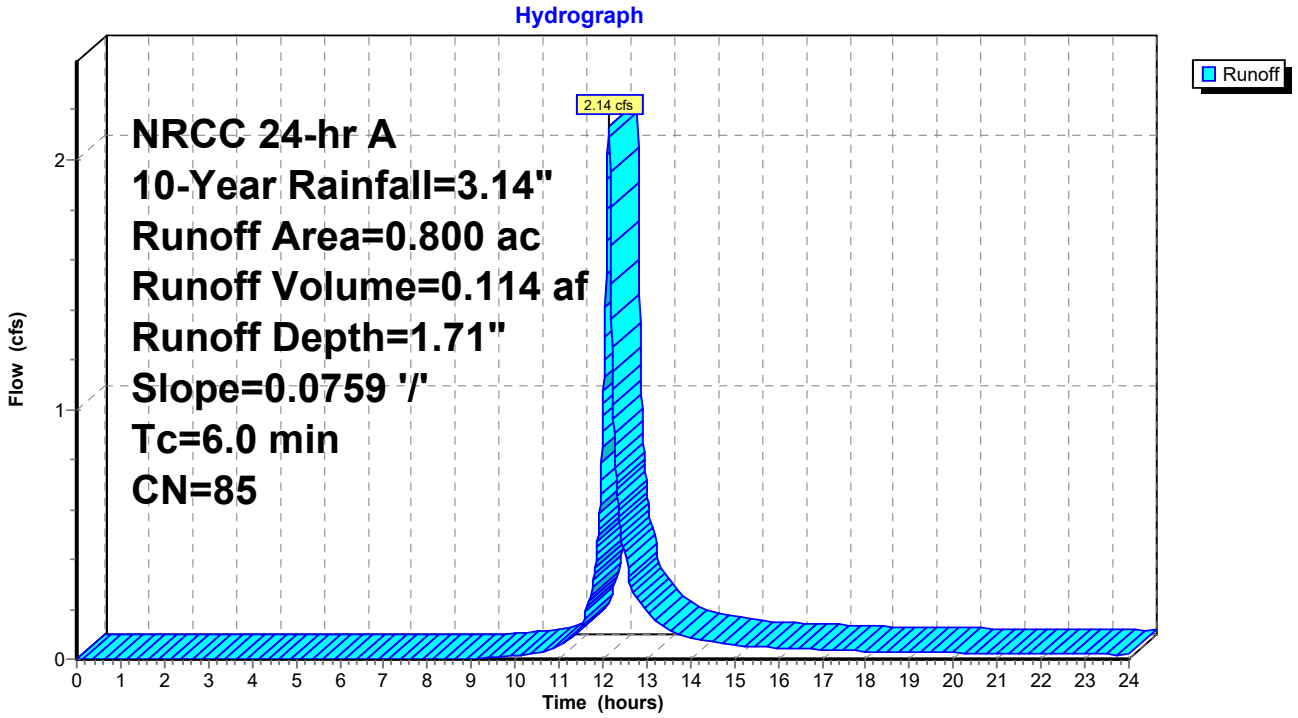
Runoff = 2.14 cfs @ 12.13 hrs, Volume= 0.114 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.580	80	>75% Grass cover, Good, HSG D
0.800	85	Weighted Average
0.580		72.50% Pervious Area
0.220		27.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0759			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 20: Lot #6 (good)



Summary for Subcatchment 21: Lot #5 (good)

CarlsonPlanXYPos|643492.4579|1040982.7482|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

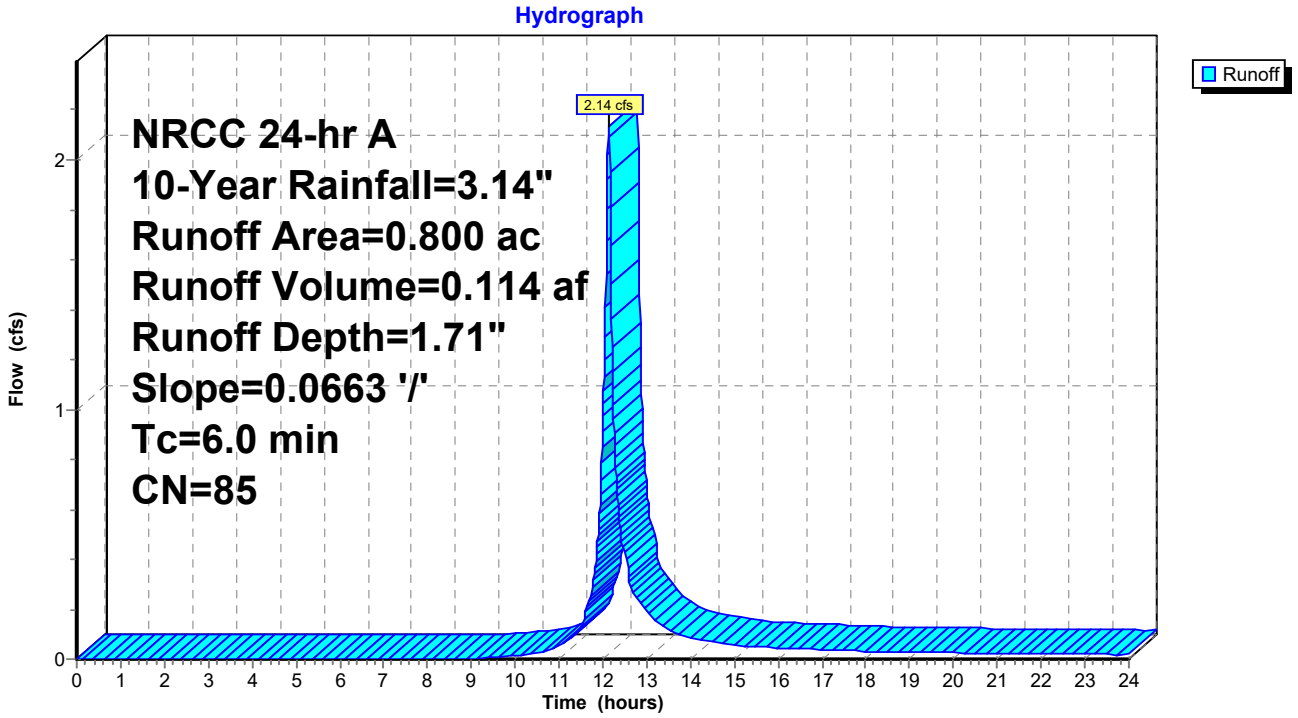
Runoff = 2.14 cfs @ 12.13 hrs, Volume= 0.114 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.580	80	>75% Grass cover, Good, HSG D
0.800	85	Weighted Average
0.580		72.50% Pervious Area
0.220		27.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0663			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 21: Lot #5 (good)



Summary for Subcatchment 22: Lot #4 (good)

CarlsonPlanXYPos|643706.8551|1040983.3562|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

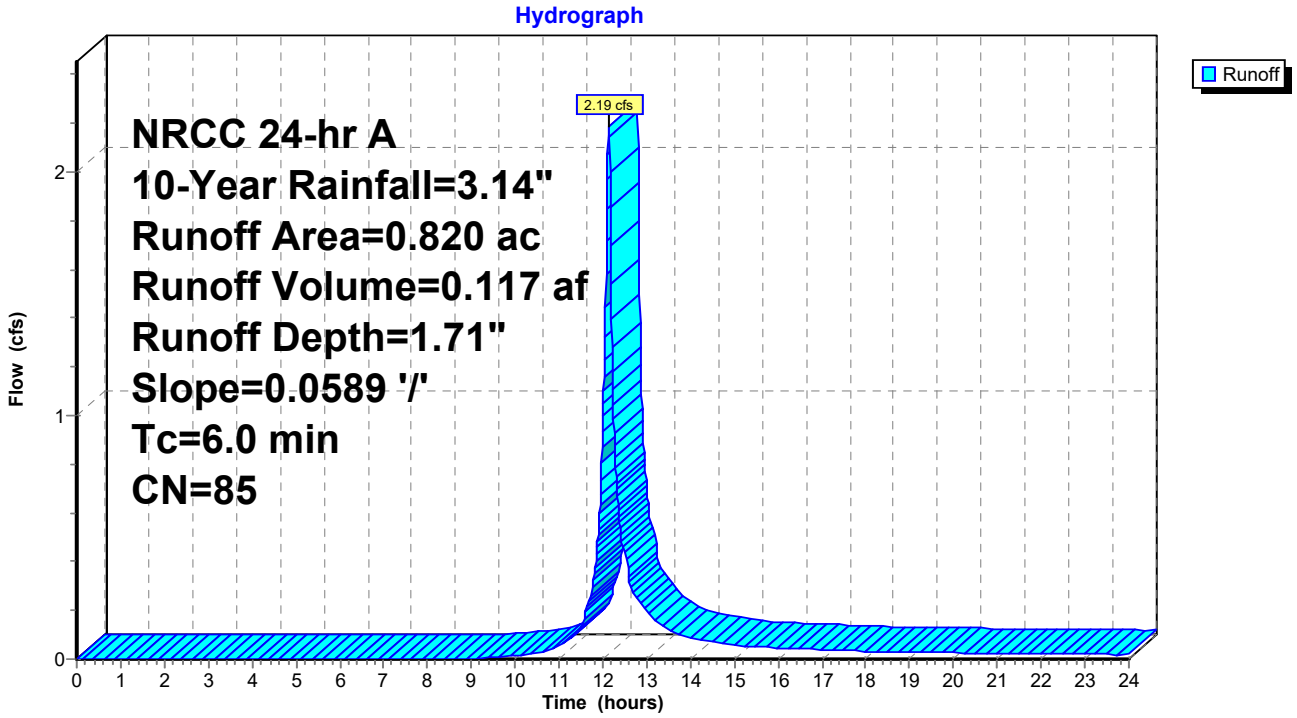
Runoff = 2.19 cfs @ 12.13 hrs, Volume= 0.117 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.600	80	>75% Grass cover, Good, HSG D
0.820	85	Weighted Average
0.600		73.17% Pervious Area
0.220		26.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0589			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 22: Lot #4 (good)



Summary for Subcatchment 23: Lot #3 (good)

CarlsonPlanXYPos|643896.4054|1040980.2593|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

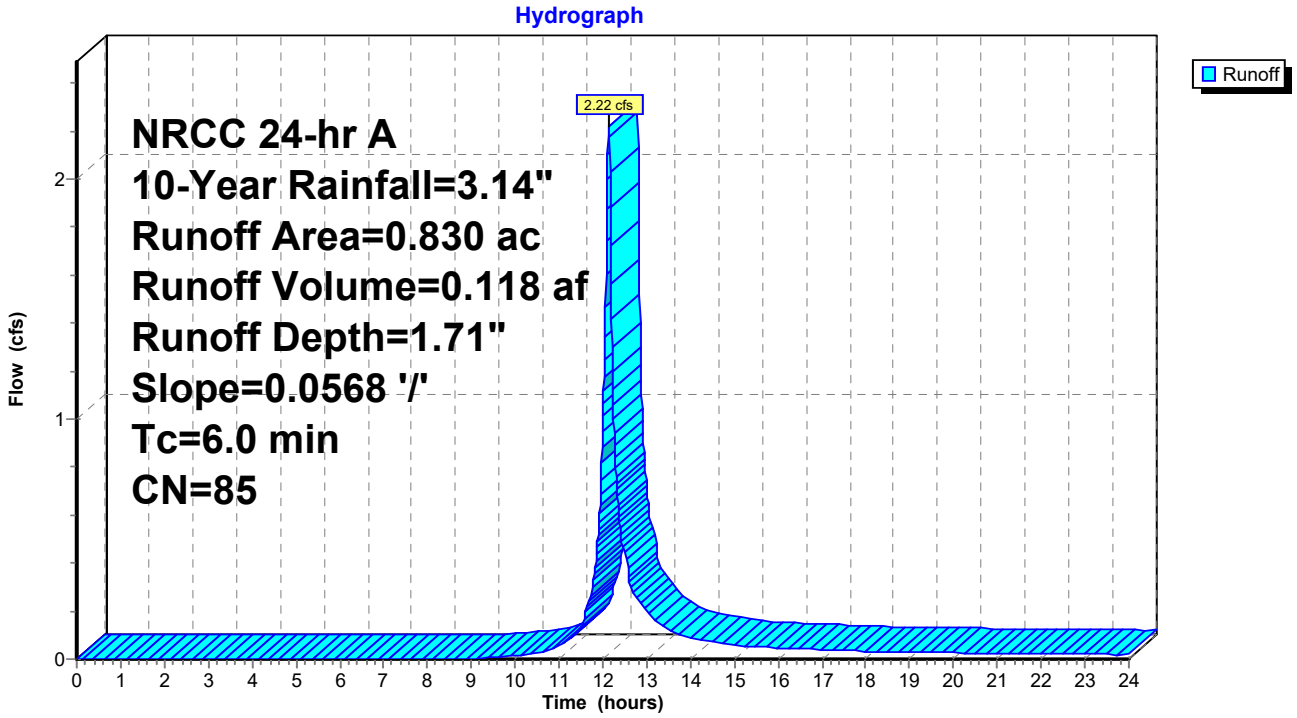
Runoff = 2.22 cfs @ 12.13 hrs, Volume= 0.118 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.610	80	>75% Grass cover, Good, HSG D
0.830	85	Weighted Average
0.610		73.49% Pervious Area
0.220		26.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0568			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 23: Lot #3 (good)



Summary for Subcatchment 24: Lot #2 (good)

CarlsonPlanXYPos|644102.7886|1040984.5776|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

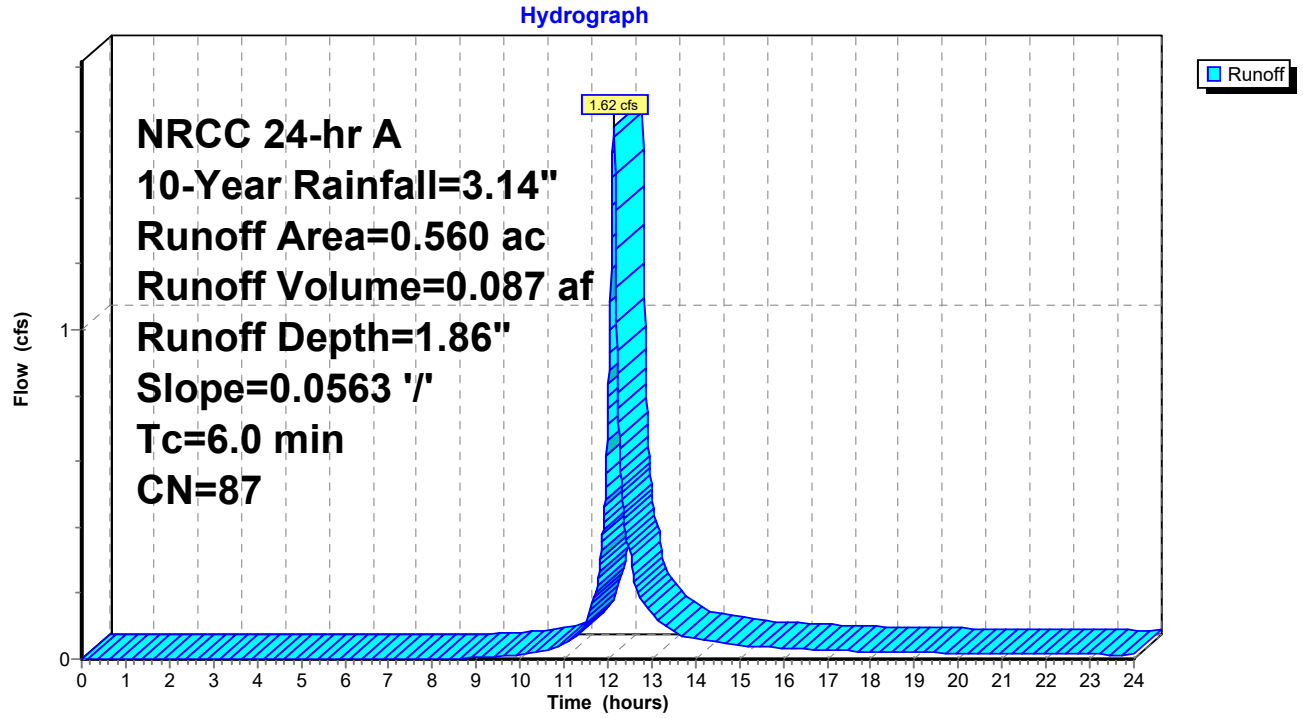
Runoff = 1.62 cfs @ 12.13 hrs, Volume= 0.087 af, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.340	80	>75% Grass cover, Good, HSG D
0.560	87	Weighted Average
0.340		60.71% Pervious Area
0.220		39.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0563			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 24: Lot #2 (good)



Summary for Subcatchment 25: Lot #1 (good)

CarlsonPlanXYPos|644284.7705|1040971.5435|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

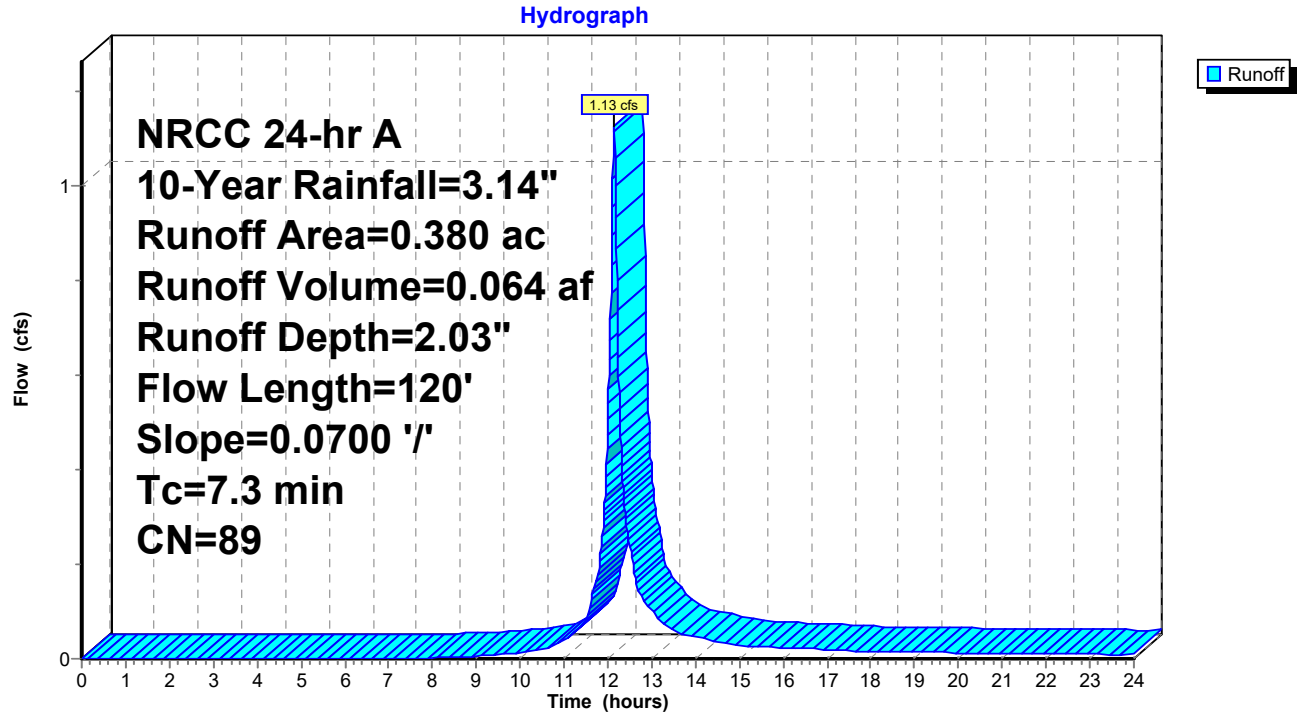
Runoff = 1.13 cfs @ 12.15 hrs, Volume= 0.064 af, Depth= 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.200	98	Paved parking, HSG D
0.180	80	>75% Grass cover, Good, HSG D
0.380	89	Weighted Average
0.180		47.37% Pervious Area
0.200		52.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.0700	0.23		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.19"
0.1	20	0.0700	4.26		**Shallow Concentrated Flow, Shallow Concentated** Unpaved Kv= 16.1 fps
7.3	120	Total			

Subcatchment 25: Lot #1 (good)



Summary for Subcatchment 26: 26 (update Tc to Channel flow?)

CarlsonPlanXYPos|644192.3159|1041141.7328|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

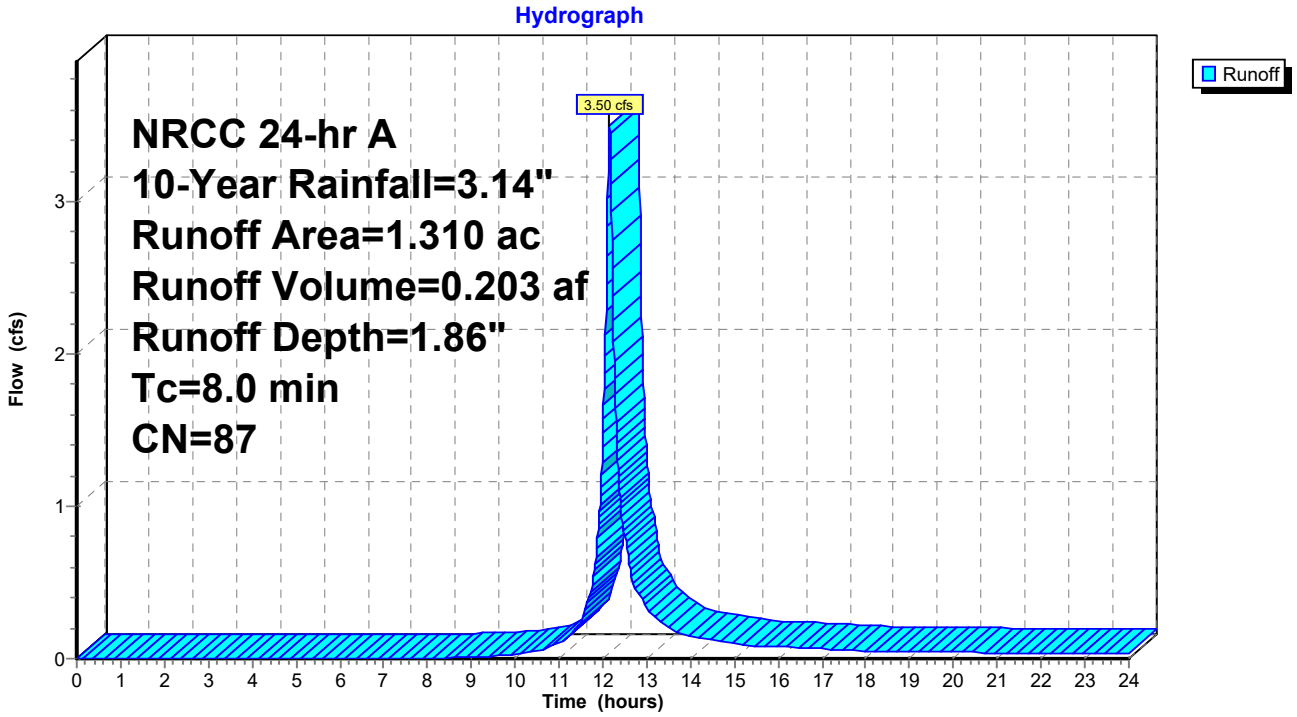
Runoff = 3.50 cfs @ 12.15 hrs, Volume= 0.203 af, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.490	98	Paved parking, HSG D
0.820	80	>75% Grass cover, Good, HSG D
1.310	87	Weighted Average
0.820		62.60% Pervious Area
0.490		37.40% Impervious Area

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

Subcatchment 26: 26 (update Tc to Channel flow?)



Summary for Subcatchment 37S: 1

CarlsonPlanXYPos|641307.9585|1041455.1221|
CarlsonSurface||

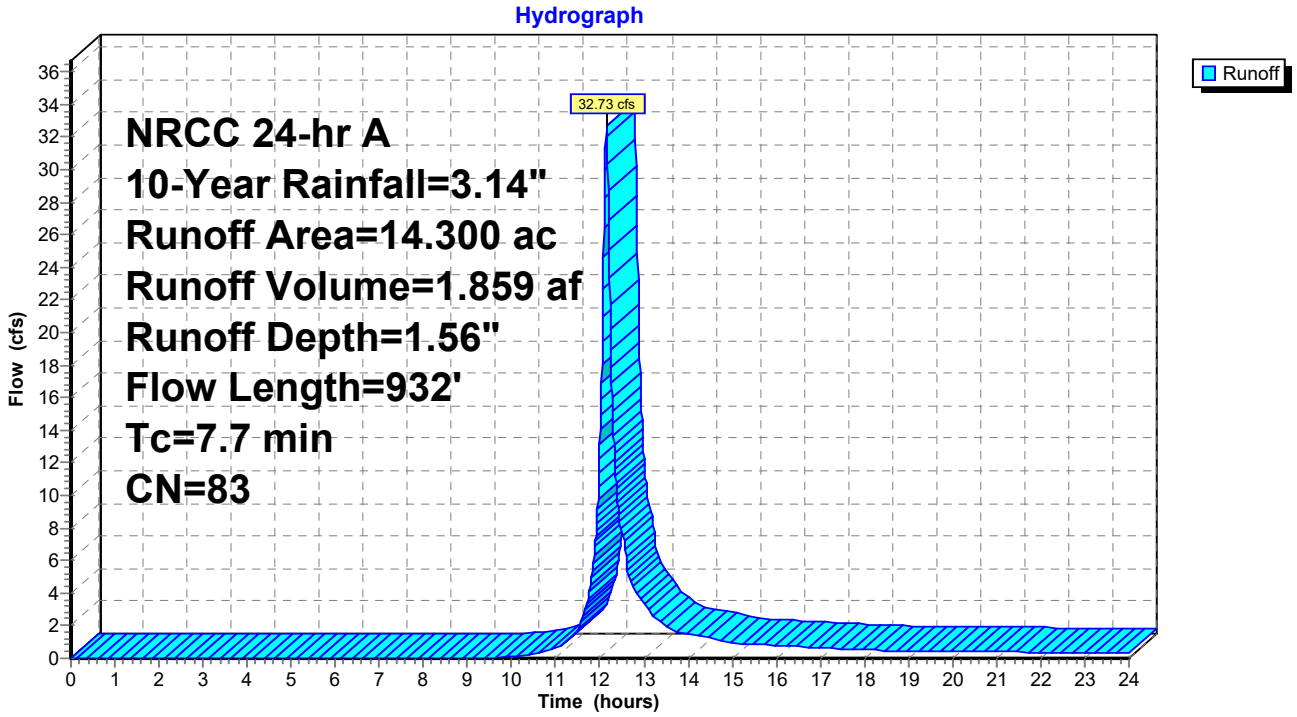
Runoff = 32.73 cfs @ 12.15 hrs, Volume= 1.859 af, Depth= 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.260	98	Water Surface HSG B
1.860	98	Paved parking HSG B
1.340	98	Paved parking HSG C
1.100	61	>75% Grass cover, Good, HSG B
9.180	80	>75% Grass cover, Good, HSG D
0.560	73	Brush, Good, HSG D
14.300	83	Weighted Average
10.840		75.80% Pervious Area
3.460		24.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.78		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.19"
3.9	25	0.0200	0.11		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.19"
0.3	81	0.0150	5.11	89.50	**Channel Flow, Channel Flow** Area= 17.5 sf Perim= 36.0' r= 0.49' n= 0.022
0.1	58	0.0340	7.70	134.75	**Channel Flow, Channel Flow** Area= 17.5 sf Perim= 36.0' r= 0.49' n= 0.022
0.2	132	0.0600	10.23	179.01	**Channel Flow, Channel Flow** Area= 17.5 sf Perim= 36.0' r= 0.49' n= 0.022
1.1	80	0.0060	1.16		**Shallow Concentrated Flow, Shallow Concentrated** Grassed Waterway Kv= 15.0 fps
0.5	114	0.0040	3.61	4.43	**Pipe Channel, Pipe Channel** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Corrugated PP, smooth interior
0.5	113	0.0040	4.07	7.20	**Pipe Channel, Pipe Channel** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012 Corrugated PP, smooth interior
0.1	35	0.0040	4.93	15.50	**Pipe Channel, Pipe Channel** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 Corrugated PP, smooth interior
0.7	279	0.0080	6.98	21.92	**Pipe Channel, Pipe Channel** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 Corrugated PP, smooth interior
7.7	932	Total			

Subcatchment 37S: 1



Summary for Subcatchment 46S: Portion of Lot #1

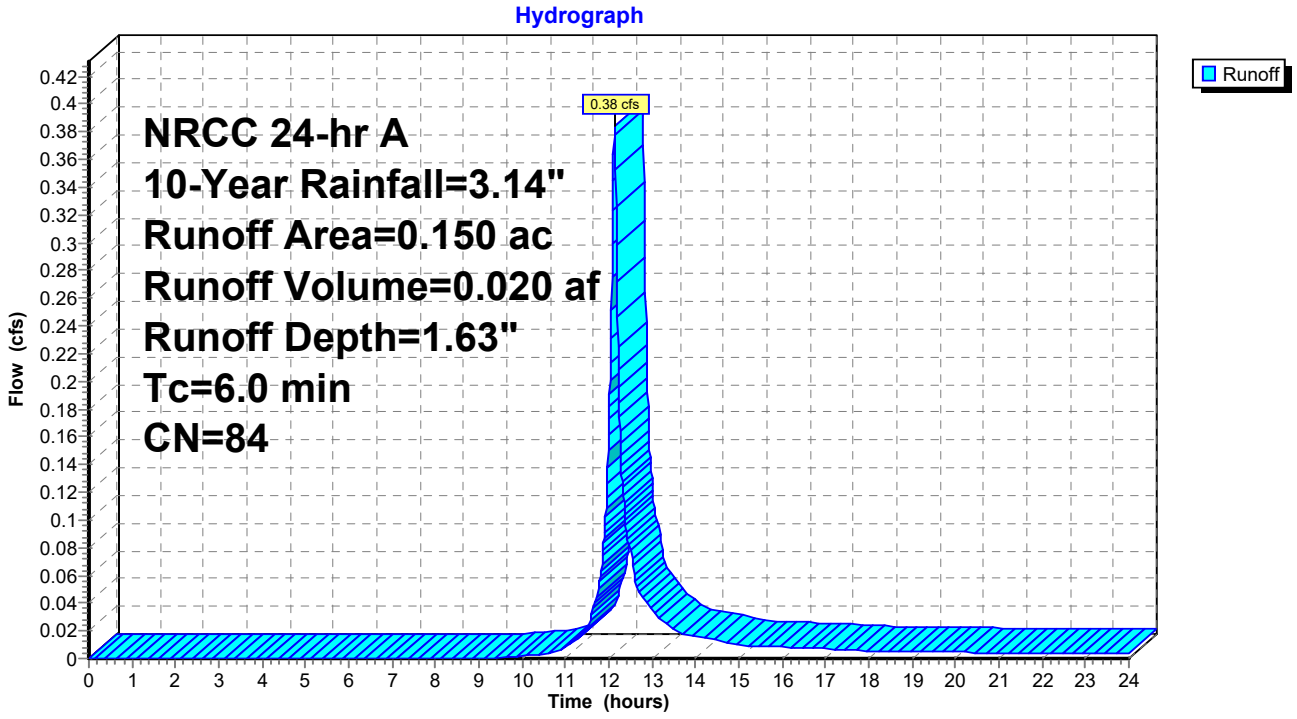
Runoff = 0.38 cfs @ 12.13 hrs, Volume= 0.020 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.030	98	Paved parking, HSG D
0.120	80	>75% Grass cover, Good, HSG D
0.150	84	Weighted Average
0.120		80.00% Pervious Area
0.030		20.00% Impervious Area

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

Subcatchment 46S: Portion of Lot #1



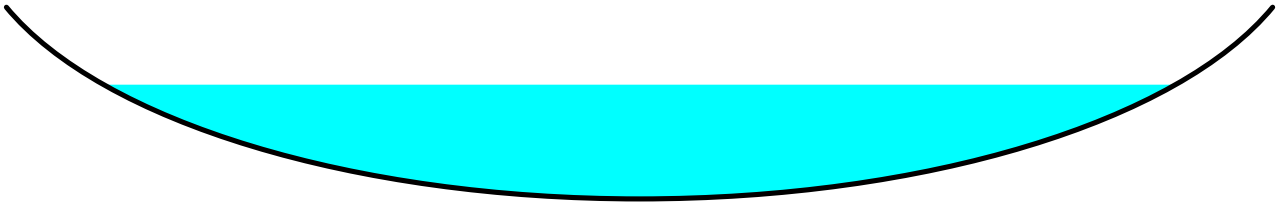
Summary for Reach 12R: Swale to off-site

Inflow Area = 78.750 ac, 0.89% Impervious, Inflow Depth > 1.05" for 10-Year event
Inflow = 18.93 cfs @ 13.34 hrs, Volume= 6.894 af
Outflow = 18.92 cfs @ 13.37 hrs, Volume= 6.893 af, Atten= 0%, Lag= 1.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.21 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 1.00 fps, Avg. Travel Time= 4.9 min

Peak Storage= 2,512 cf @ 13.37 hrs
Average Depth at Peak Storage= 0.60'
Bank-Full Depth= 1.00' Flow Area= 18.7 sf, Capacity= 58.17 cfs

28.00' x 1.00' deep Parabolic Channel, n= 0.030 Short grass
Length= 293.0' Slope= 0.0068 '/'
Inlet Invert= 703.00', Outlet Invert= 701.00'



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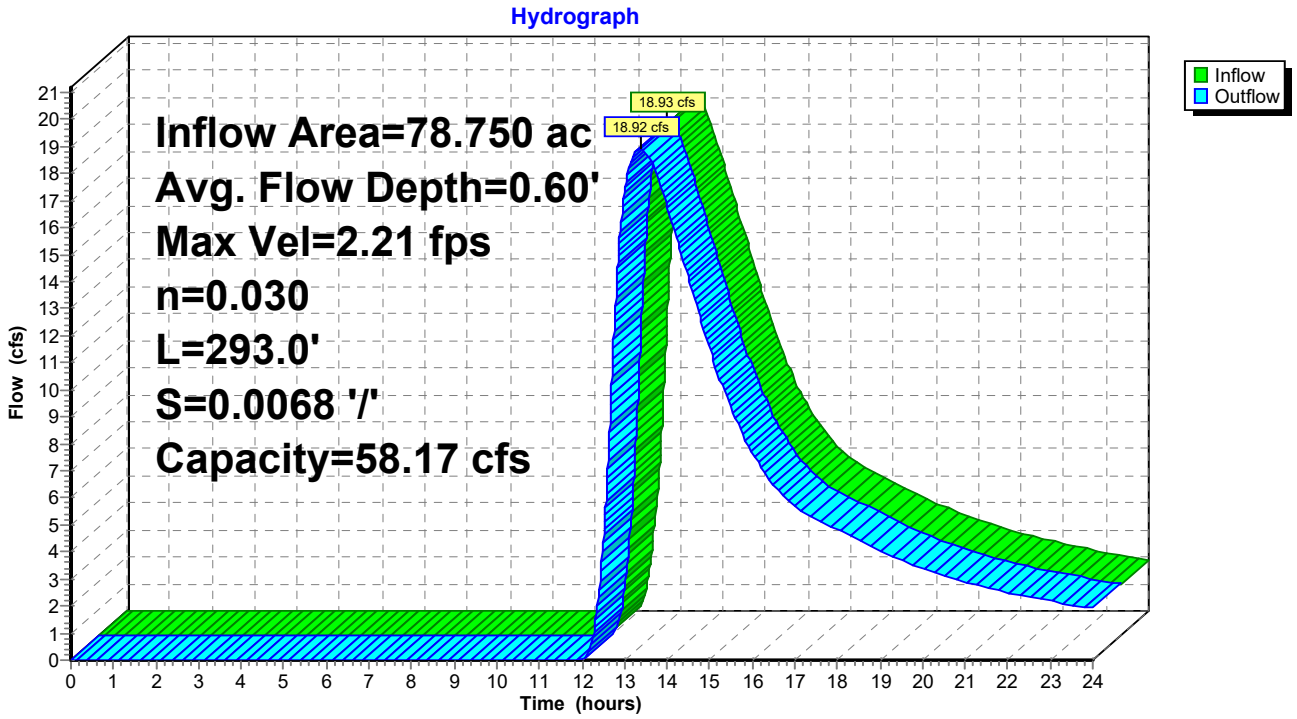
Reach 12R: Swale to off-site



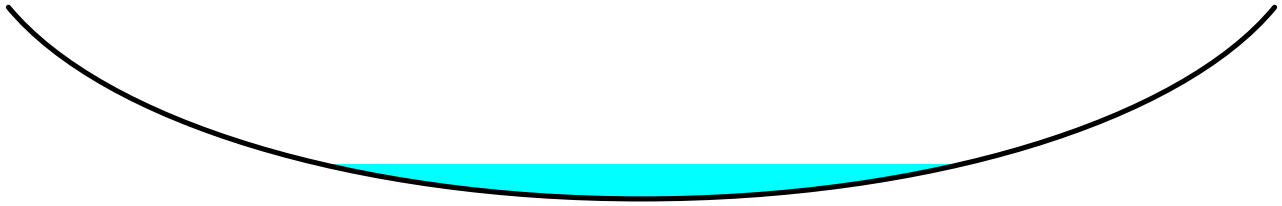
Summary for Reach 16R: Northside swale

Inflow Area = 1.310 ac, 37.40% Impervious, Inflow Depth = 1.44" for 10-Year event
Inflow = 3.00 cfs @ 12.20 hrs, Volume= 0.157 af
Outflow = 2.82 cfs @ 12.23 hrs, Volume= 0.157 af, Atten= 6%, Lag= 2.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.61 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 1.08 fps, Avg. Travel Time= 10.1 min

Peak Storage= 510 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 1.00' Flow Area= 10.0 sf, Capacity= 111.61 cfs

15.00' x 1.00' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 655.0' Slope= 0.0885 '/'
Inlet Invert= 804.00', Outlet Invert= 746.00'



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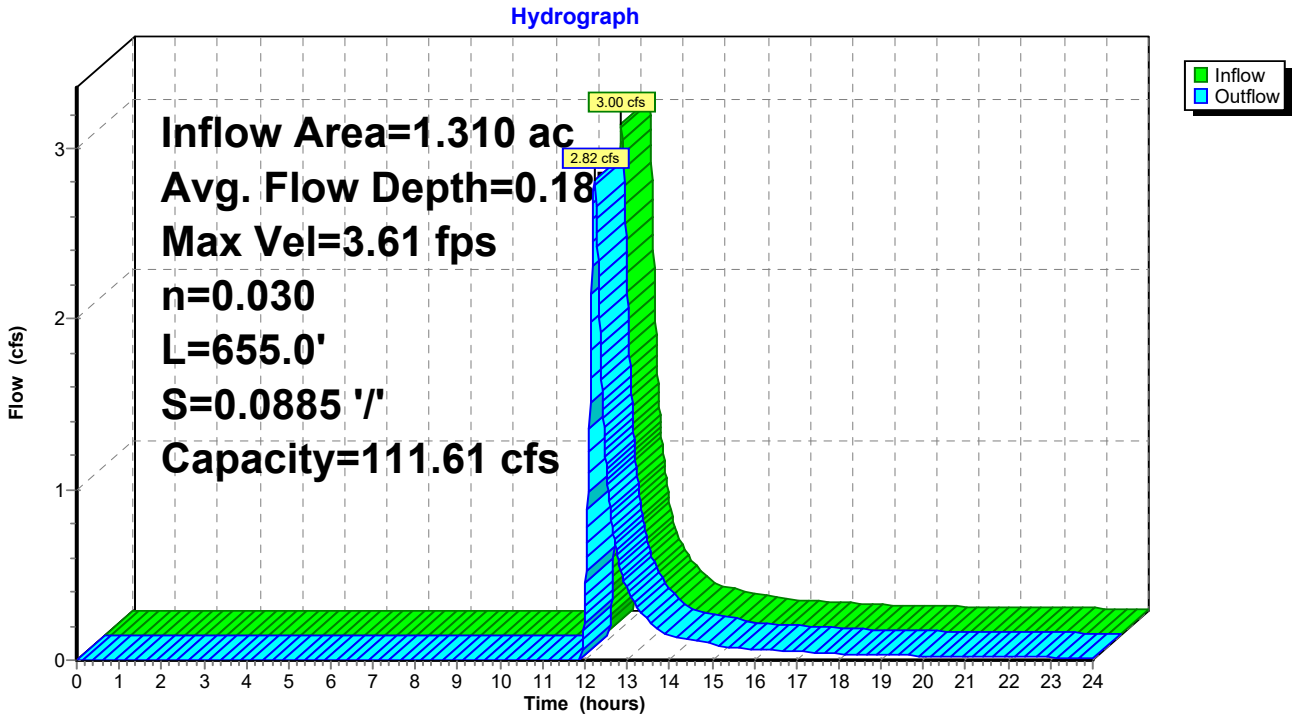
Reach 16R: Northside swale



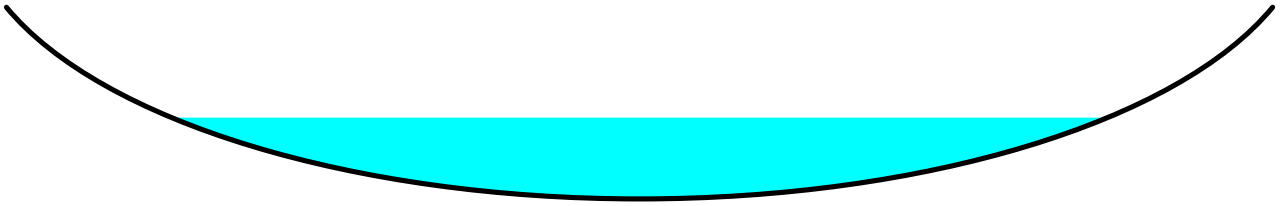
Summary for Reach 17R: Southside Swale

Inflow Area = 6.740 ac, 29.53% Impervious, Inflow Depth = 1.72" for 10-Year event
Inflow = 17.47 cfs @ 12.14 hrs, Volume= 0.969 af
Outflow = 16.89 cfs @ 12.17 hrs, Volume= 0.969 af, Atten= 3%, Lag= 1.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.13 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 1.78 fps, Avg. Travel Time= 6.6 min

Peak Storage= 1,957 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.42'
Bank-Full Depth= 1.00' Flow Area= 10.0 sf, Capacity= 108.12 cfs

15.00' x 1.00' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 710.0' Slope= 0.0831 '/'
Inlet Invert= 804.00', Outlet Invert= 745.00'



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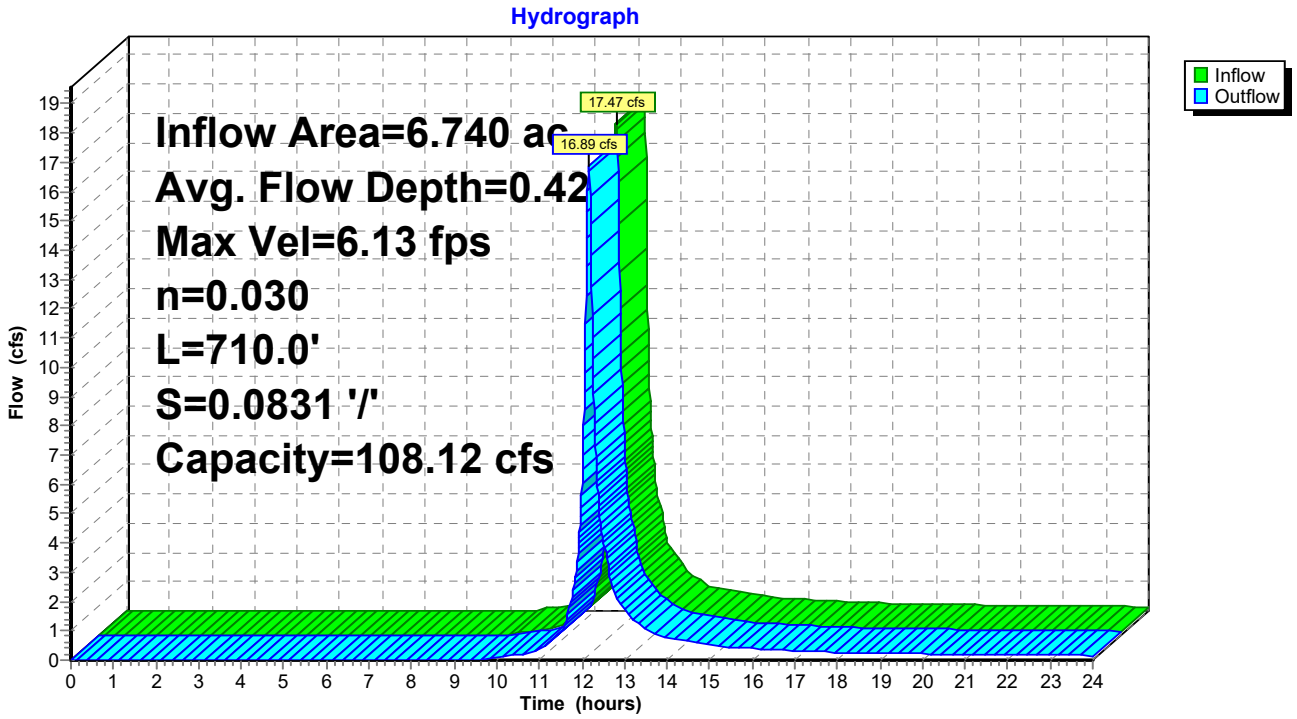
Reach 17R: Southside Swale



Summary for Pond 10P: Proposed 36" Culvert

Inflow Area = 78.750 ac, 0.89% Impervious, Inflow Depth = 1.05" for 10-Year event
Inflow = 57.03 cfs @ 12.54 hrs, Volume= 6.914 af
Outflow = 18.96 cfs @ 13.27 hrs, Volume= 6.895 af, Atten= 67%, Lag= 44.3 min
Primary = 10.03 cfs @ 12.83 hrs, Volume= 5.449 af
Secondary = 9.05 cfs @ 13.30 hrs, Volume= 1.446 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 705.99' @ 13.30 hrs Surf.Area= 169,592 sf Storage= 115,778 cf

Plug-Flow detention time= 122.2 min calculated for 6.893 af (100% of inflow)
Center-of-Mass det. time= 120.7 min (992.5 - 871.8)

Volume	Invert	Avail.Storage	Storage Description
#1	704.50'	609,456 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

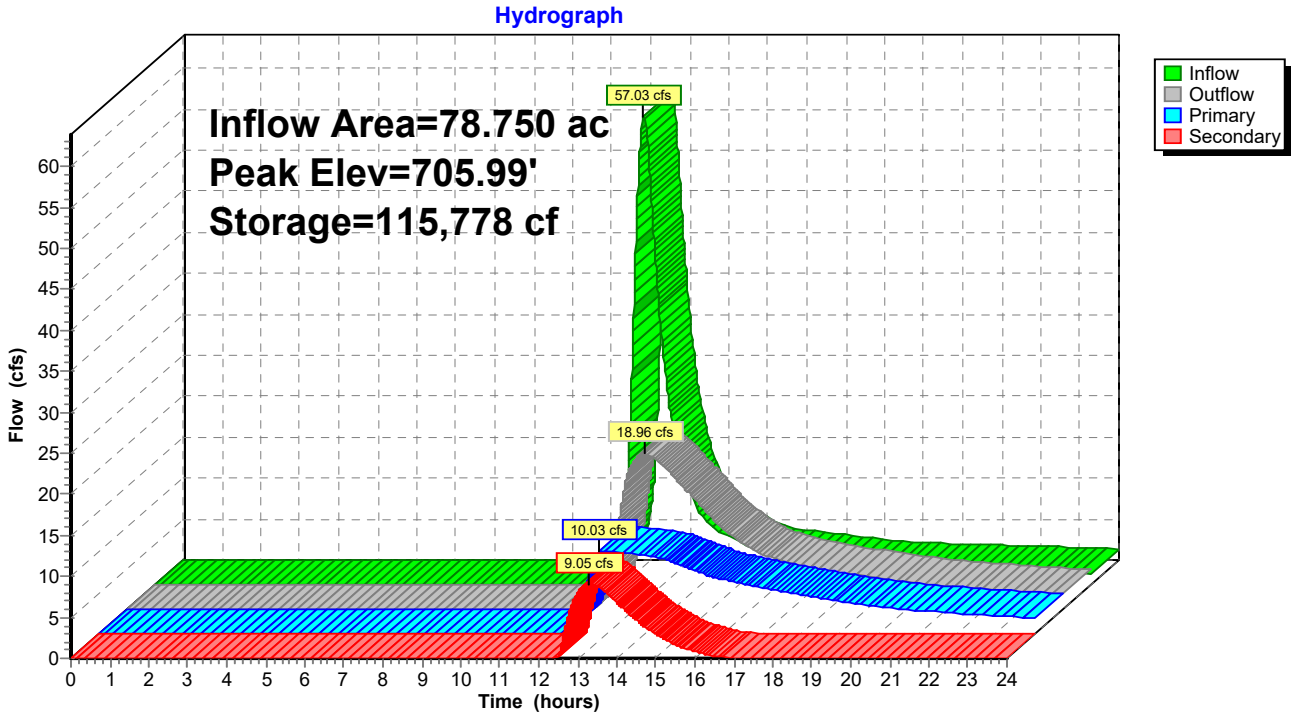
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
704.50	9,287	0	0
705.00	39,370	12,164	12,164
706.00	170,682	105,026	117,190
707.00	256,925	213,804	330,994
708.00	300,000	278,463	609,456

Device	Routing	Invert	Outlet Devices
#1	Primary	704.50'	**36.0" Round 36" Culvert** L= 122.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 704.50' / 704.00' S= 0.0041 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Secondary	705.50'	**10.0' 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=9.93 cfs @ 12.83 hrs HW=705.89' TW=705.07' (Dynamic Tailwater)
↑—**1=36" Culvert** (Outlet Controls 9.93 cfs @ 4.54 fps)

Secondary OutFlow Max=9.05 cfs @ 13.30 hrs HW=705.99' TW=705.33' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 9.05 cfs @ 1.84 fps)

Pond 10P: Proposed 36" Culvert



Summary for Pond 11P: Proposed 36" Culvert

Inflow Area = 78.750 ac, 0.89% Impervious, Inflow Depth > 1.05" for 10-Year event
Inflow = 18.96 cfs @ 13.27 hrs, Volume= 6.895 af
Outflow = 18.93 cfs @ 13.34 hrs, Volume= 6.894 af, Atten= 0%, Lag= 3.9 min
Primary = 18.93 cfs @ 13.34 hrs, Volume= 6.894 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 705.33' @ 13.34 hrs Surf.Area= 3,358 sf Storage= 4,071 cf

Plug-Flow detention time= 4.2 min calculated for 6.894 af (100% of inflow)
Center-of-Mass det. time= 4.0 min (996.5 - 992.5)

Volume	Invert	Avail.Storage	Storage Description
#1	703.30'	12,772 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

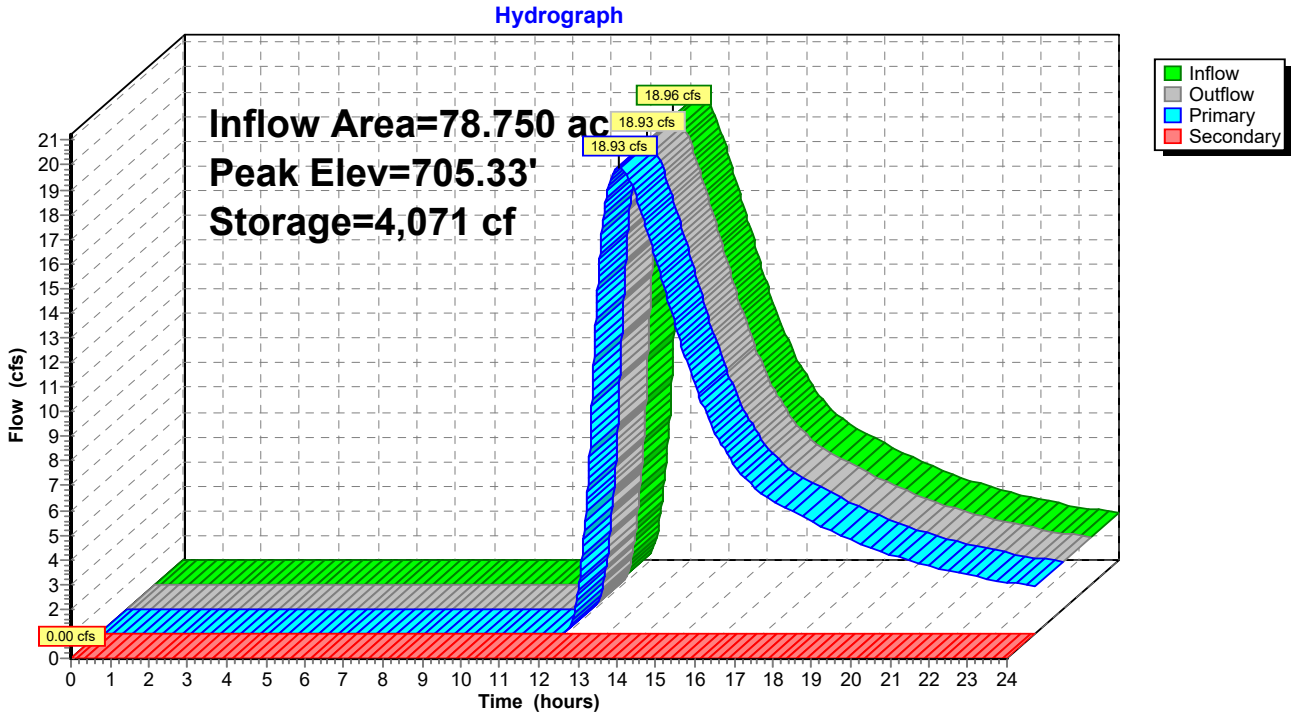
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
703.30	707	0	0
704.00	1,575	799	799
705.00	2,882	2,229	3,027
706.00	4,304	3,593	6,620
707.00	8,000	6,152	12,772

Device	Routing	Invert	Outlet Devices
#1	Primary	703.30'	**36.0" Round 36" cuvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 703.30' / 703.00' S= 0.0046 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Secondary	706.80'	**20.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=18.93 cfs @ 13.34 hrs HW=705.33' TW=703.60' (Dynamic Tailwater)
↑—**1=36" cuvert** (Barrel Controls 18.93 cfs @ 5.24 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=703.30' TW=703.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 11P: Proposed 36" Culvert



Summary for Pond 17P: Bioswale (good)

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

Inflow Area = 6.740 ac, 29.53% Impervious, Inflow Depth = 1.73" for 10-Year event
Inflow = 17.46 cfs @ 12.14 hrs, Volume= 0.972 af
Outflow = 17.47 cfs @ 12.14 hrs, Volume= 0.970 af, Atten= 0%, Lag= 0.2 min
Discarded = 0.00 cfs @ 12.14 hrs, Volume= 0.002 af
Primary = 17.47 cfs @ 12.14 hrs, Volume= 0.969 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 808.20' @ 12.14 hrs Surf.Area= 408 sf Storage= 340 cf

Plug-Flow detention time= 2.7 min calculated for 0.970 af (100% of inflow)
Center-of-Mass det. time= 1.8 min (818.9 - 817.1)

Volume	Invert	Avail.Storage	Storage Description
#1	806.50'	2,012 cf	**SWALE STORAGE ABOVE BOTTOM (Conic)** Listed below

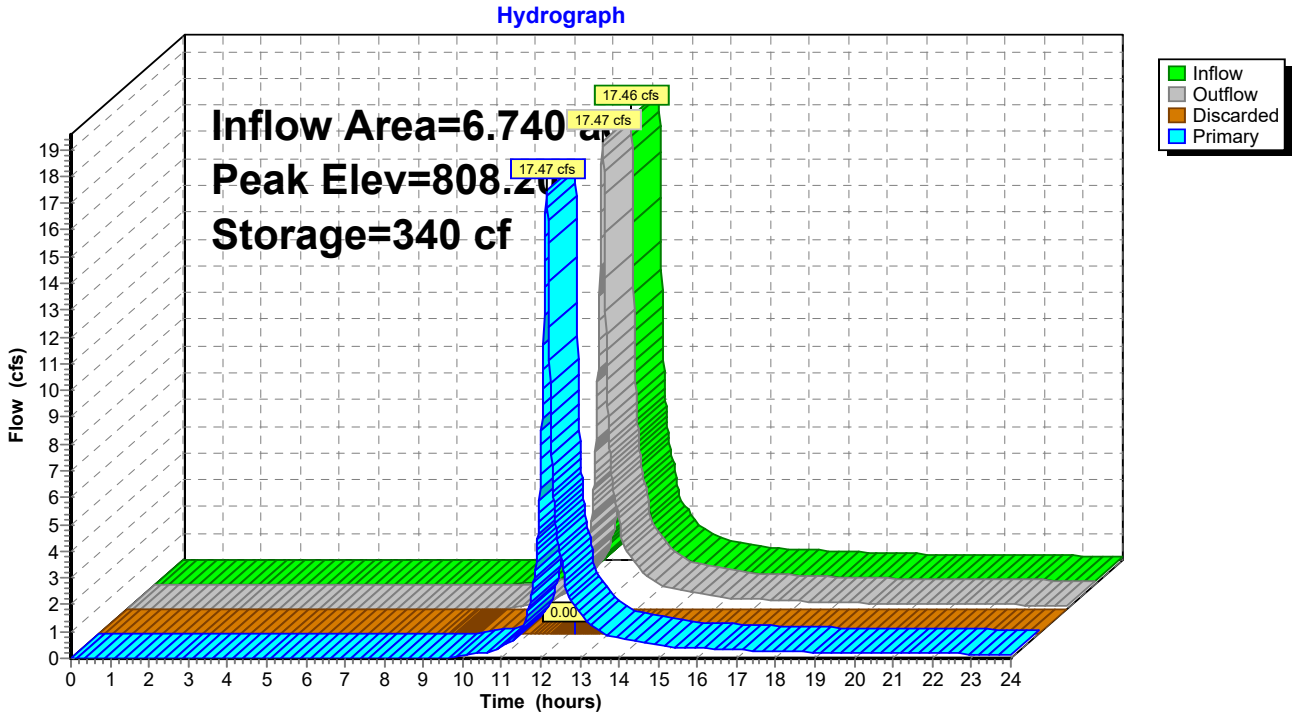
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
806.50	0	0	0	0
809.00	600	500	500	610
809.50	6,500	1,512	2,012	6,510

Device	Routing	Invert	Outlet Devices
#1	Discarded	806.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 750.00'
#2	Primary	807.00'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.14 hrs HW=808.20' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=17.44 cfs @ 12.14 hrs HW=808.20' TW=804.42' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 17.44 cfs @ 2.91 fps)

Pond 17P: Bioswale (good)



Summary for Pond 18P: Bioswale (good)

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

Inflow Area = 5.900 ac, 30.00% Impervious, Inflow Depth = 1.73" for 10-Year event
Inflow = 15.22 cfs @ 12.14 hrs, Volume= 0.853 af
Outflow = 15.23 cfs @ 12.14 hrs, Volume= 0.853 af, Atten= 0%, Lag= 0.2 min
Discarded = 0.00 cfs @ 12.14 hrs, Volume= 0.000 af
Primary = 15.23 cfs @ 12.14 hrs, Volume= 0.853 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 815.47' @ 12.14 hrs Surf.Area= 342 sf Storage= 285 cf

Plug-Flow detention time= 1.1 min calculated for 0.853 af (100% of inflow)
Center-of-Mass det. time= 1.1 min (817.3 - 816.2)

Volume	Invert	Avail.Storage	Storage Description
#1	814.50'	3,041 cf	**SWALE STORAGE (Conic)** Listed below

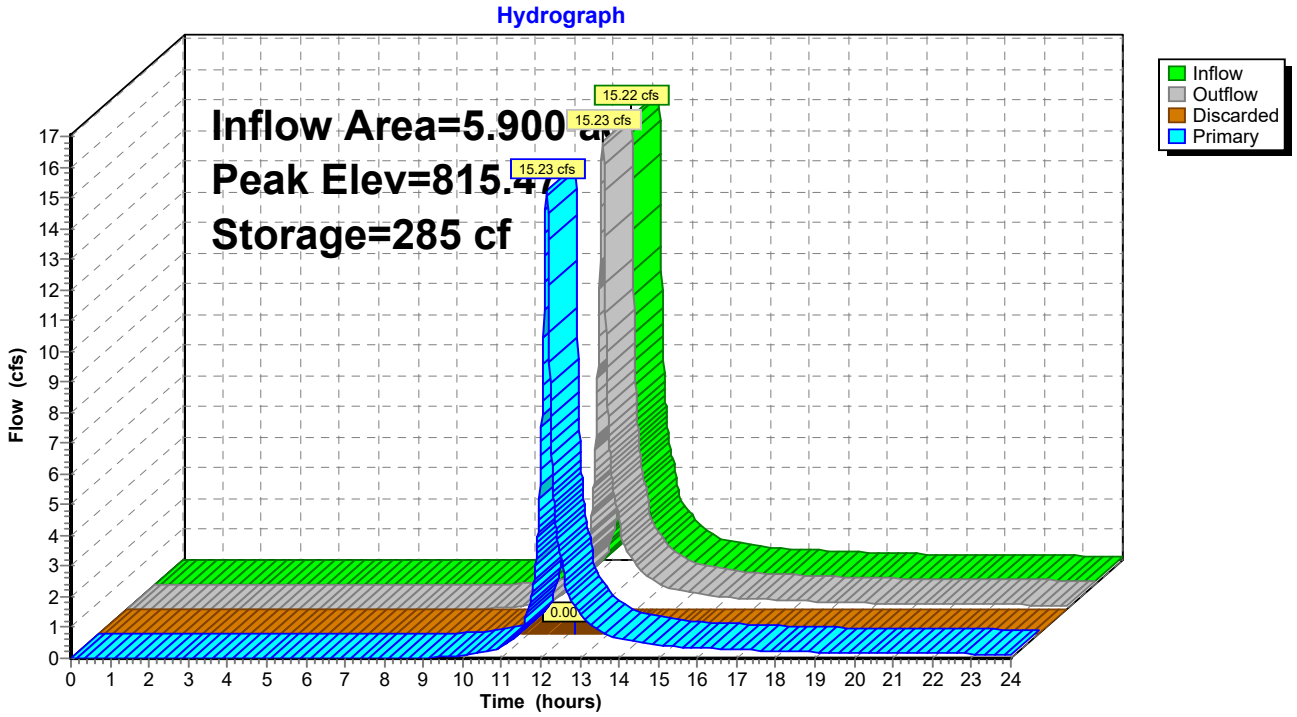
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
814.50	0	0	0	0
817.00	880	733	733	890
817.50	10,000	2,308	3,041	10,010

Device	Routing	Invert	Outlet Devices
#1	Discarded	814.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 750.00'
#2	Device 3	814.50'	**24.0" W x 24.0" H Vert. Orifice/Grate** C= 0.600
#3	Primary	812.50'	**24.0" Round Culvert** L= 46.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 812.50' / 812.00' S= 0.0109 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#4	Primary	814.70'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.14 hrs HW=815.47' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=15.21 cfs @ 12.14 hrs HW=815.47' TW=808.20' (Dynamic Tailwater)
├**3=Culvert** (Passes 6.14 cfs of 16.76 cfs potential flow)
│└**2=Orifice/Grate** (Orifice Controls 6.14 cfs @ 3.16 fps)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 9.07 cfs @ 2.36 fps)

Pond 18P: Bioswale (good)



Summary for Pond 19P: Bioswale (good)

Inflow Area = 5.150 ac, 30.10% Impervious, Inflow Depth = 1.74" for 10-Year event
Inflow = 13.26 cfs @ 12.15 hrs, Volume= 0.747 af
Outflow = 13.25 cfs @ 12.15 hrs, Volume= 0.747 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.00 cfs @ 12.15 hrs, Volume= 0.001 af
Primary = 13.24 cfs @ 12.15 hrs, Volume= 0.746 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 829.99' @ 12.15 hrs Surf.Area= 856 sf Storage= 143 cf

Plug-Flow detention time= 0.4 min calculated for 0.747 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (816.3 - 815.9)

Volume	Invert	Avail.Storage	Storage Description
#1	829.50'	11,685 cf	**SWALE STORAGE (Conic)** Listed below

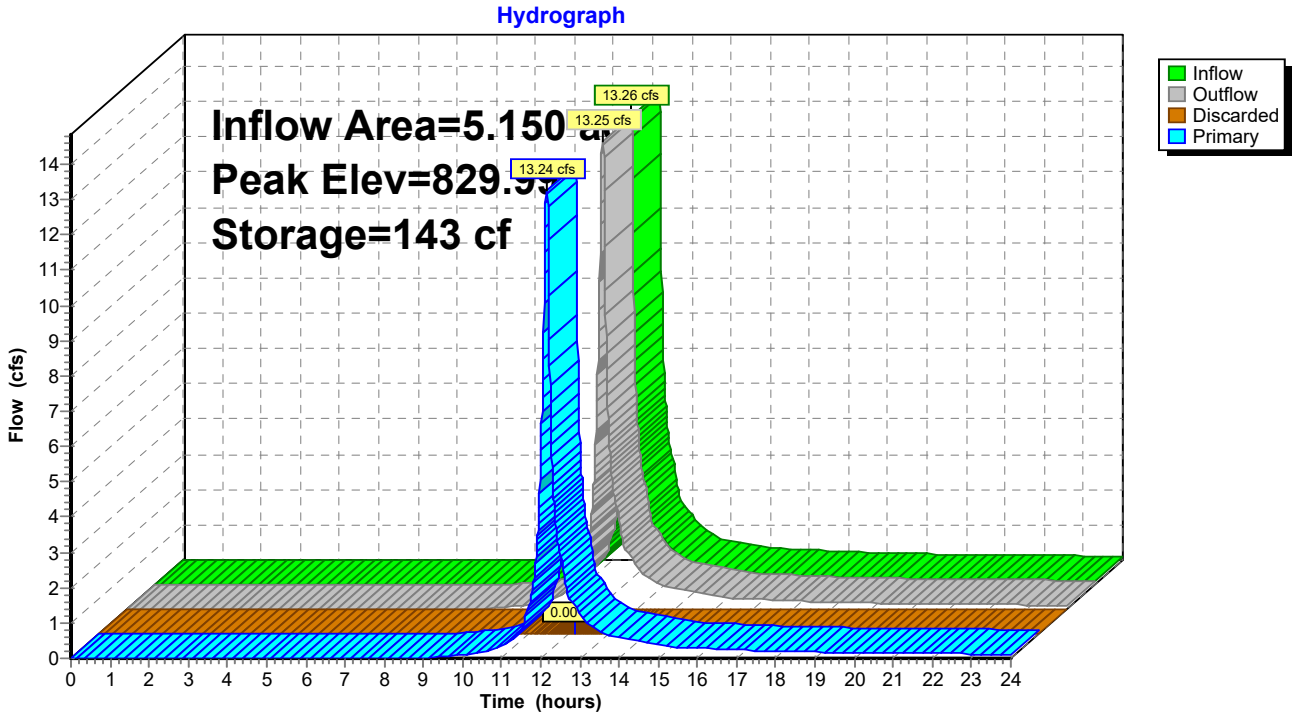
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
829.50	0	0	0	0
830.00	880	147	147	880
832.50	10,000	11,539	11,685	10,018

Device	Routing	Invert	Outlet Devices
#1	Discarded	829.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 0.01'
#2	Device 3	829.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	827.50'	**18.0" Round Culvert** L= 46.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 827.50' / 827.00' S= 0.0109 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#4	Primary	829.50'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.15 hrs HW=829.99' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=13.24 cfs @ 12.15 hrs HW=829.99' TW=815.47' (Dynamic Tailwater)
├**3=Culvert** (Inlet Controls 8.85 cfs @ 5.01 fps)
│ └**2=Orifice/Grate** (Passes 8.85 cfs of 8.87 cfs potential flow)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 4.39 cfs @ 1.80 fps)

Pond 19P: Bioswale (good)



Summary for Pond 20P: Bioswale (good)

Inflow Area = 4.340 ac, 30.65% Impervious, Inflow Depth = 1.75" for 10-Year event
Inflow = 11.65 cfs @ 12.14 hrs, Volume= 0.632 af
Outflow = 11.20 cfs @ 12.16 hrs, Volume= 0.632 af, Atten= 4%, Lag= 1.0 min
Discarded = 0.01 cfs @ 12.16 hrs, Volume= 0.001 af
Primary = 11.19 cfs @ 12.16 hrs, Volume= 0.632 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 845.01' @ 12.16 hrs Surf.Area= 924 sf Storage= 202 cf

Plug-Flow detention time= 0.5 min calculated for 0.632 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (815.9 - 815.4)

Volume	Invert	Avail.Storage	Storage Description
#1	844.50'	11,685 cf	**SWALE STORAGE (Conic)** Listed below

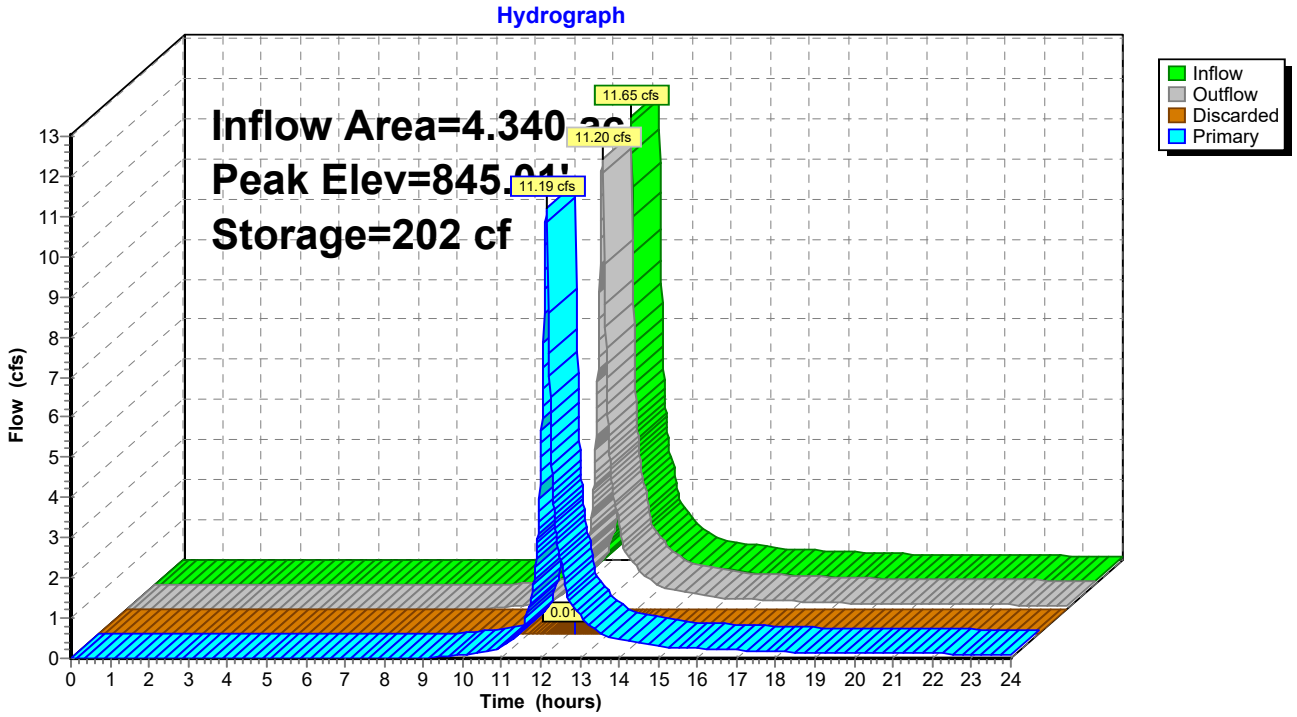
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
844.50	0	0	0	0
845.00	880	147	147	880
847.50	10,000	11,539	11,685	10,018

Device	Routing	Invert	Outlet Devices
#1	Discarded	844.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 800.00'
#2	Device 3	844.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	842.50'	**15.0" Round Culvert** L= 46.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 842.50' / 840.50' S= 0.0435 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#4	Primary	844.50'	**5.0' 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

Discarded OutFlow Max=0.01 cfs @ 12.16 hrs HW=845.01' (Free Discharge)
└**1=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=11.19 cfs @ 12.16 hrs HW=845.01' TW=829.98' (Dynamic Tailwater)
├**3=Culvert** (Inlet Controls 6.41 cfs @ 5.22 fps)
│ └**2=Orifice/Grate** (Passes 6.41 cfs of 9.58 cfs potential flow)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 4.78 cfs @ 1.87 fps)

Pond 20P: Bioswale (good)



Summary for Pond 21P: Bioswale (good)

Inflow Area = 3.540 ac, 31.36% Impervious, Inflow Depth = 1.76" for 10-Year event
Inflow = 9.59 cfs @ 12.14 hrs, Volume= 0.519 af
Outflow = 9.56 cfs @ 12.15 hrs, Volume= 0.519 af, Atten= 0%, Lag= 0.3 min
Discarded = 0.00 cfs @ 12.15 hrs, Volume= 0.001 af
Primary = 9.55 cfs @ 12.15 hrs, Volume= 0.519 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 858.91' @ 12.15 hrs Surf.Area= 724 sf Storage= 121 cf

Plug-Flow detention time= 0.5 min calculated for 0.519 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (815.3 - 814.8)

Volume	Invert	Avail.Storage	Storage Description
#1	858.50'	11,685 cf	**SWALE STORAGE (Conic)** Listed below

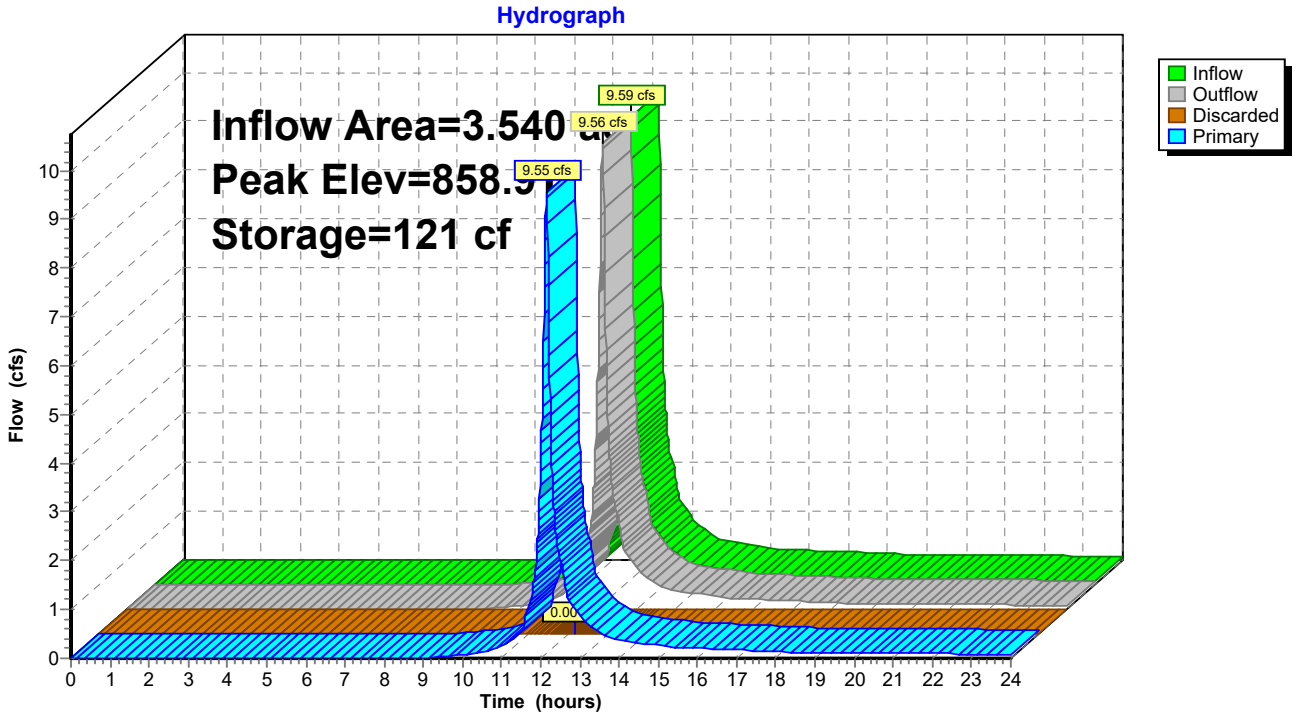
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
858.50	0	0	0	0
859.00	880	147	147	880
861.50	10,000	11,539	11,685	10,018

Device	Routing	Invert	Outlet Devices
#1	Device 3	858.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	858.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 750.00'
#3	Primary	856.50'	**15.0" Round Culvert** L= 47.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 856.50' / 854.00' S= 0.0532 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#4	Primary	858.50'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.15 hrs HW=858.91' (Free Discharge)
└**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=9.53 cfs @ 12.15 hrs HW=858.91' TW=845.01' (Dynamic Tailwater)
├**3=Culvert** (Inlet Controls 6.23 cfs @ 5.08 fps)
│└**1=Orifice/Grate** (Passes 6.23 cfs of 6.87 cfs potential flow)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 3.29 cfs @ 1.61 fps)

Pond 21P: Bioswale (good)



Summary for Pond 22P: Bioswale (good)

Inflow Area = 2.740 ac, 32.48% Impervious, Inflow Depth = 1.78" for 10-Year event
Inflow = 7.50 cfs @ 12.14 hrs, Volume= 0.406 af
Outflow = 7.47 cfs @ 12.14 hrs, Volume= 0.406 af, Atten= 0%, Lag= 0.3 min
Discarded = 0.00 cfs @ 12.14 hrs, Volume= 0.000 af
Primary = 7.47 cfs @ 12.14 hrs, Volume= 0.405 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 869.91' @ 12.14 hrs Surf.Area= 727 sf Storage= 121 cf

Plug-Flow detention time= 0.5 min calculated for 0.406 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (814.5 - 814.0)

Volume	Invert	Avail.Storage	Storage Description
#1	869.50'	13,006 cf	**SWALE STORAGE (Conic)** Listed below

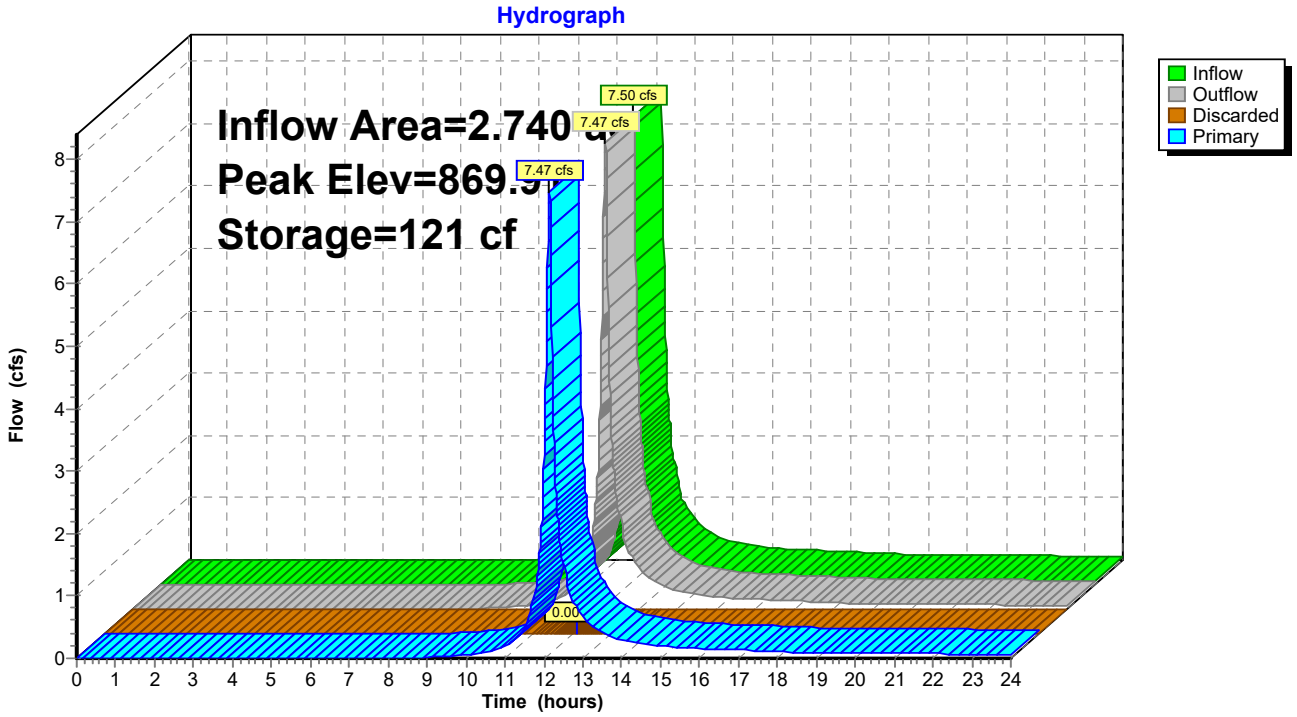
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
869.50	0	0	0	0
870.00	880	147	147	880
872.00	14,800	12,859	13,006	14,811

Device	Routing	Invert	Outlet Devices
#1	Discarded	869.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 750.00'
#2	Device 3	869.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	867.50'	**12.0" Round CMP_Round 12"** L= 47.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 867.50' / 866.00' S= 0.0319 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	869.50'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.14 hrs HW=869.91' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=7.45 cfs @ 12.14 hrs HW=869.91' TW=858.91' (Dynamic Tailwater)
├**3=CMP_Round 12"** (Inlet Controls 4.13 cfs @ 5.26 fps)
└**2=Orifice/Grate** (Passes 4.13 cfs of 6.92 cfs potential flow)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 3.32 cfs @ 1.61 fps)

Pond 22P: Bioswale (good)



Summary for Pond 23P: Bioswale (good)

Inflow Area = 1.920 ac, 34.90% Impervious, Inflow Depth = 1.81" for 10-Year event
Inflow = 5.32 cfs @ 12.14 hrs, Volume= 0.289 af
Outflow = 5.32 cfs @ 12.14 hrs, Volume= 0.289 af, Atten= 0%, Lag= 0.2 min
Primary = 5.32 cfs @ 12.14 hrs, Volume= 0.289 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 880.77' @ 12.14 hrs Surf.Area= 473 sf Storage= 79 cf

Plug-Flow detention time= 0.6 min calculated for 0.289 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (813.1 - 812.6)

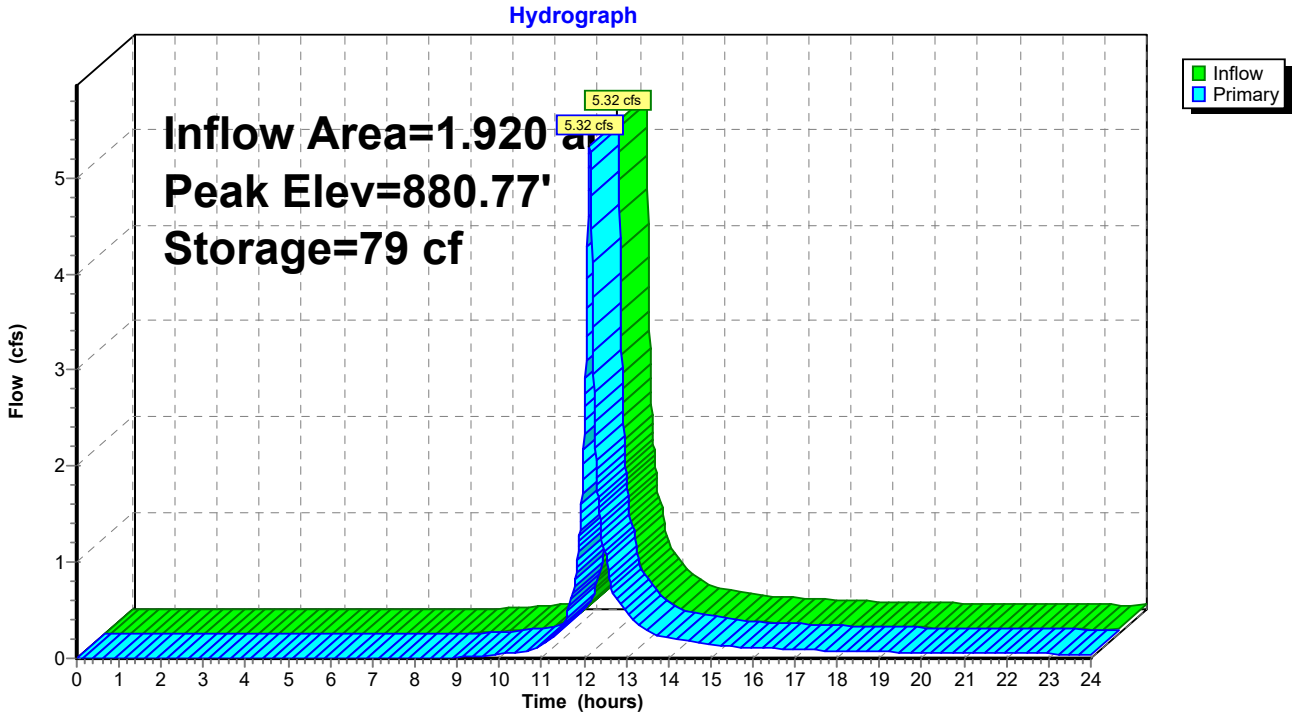
Volume	Invert	Avail.Storage	Storage Description
#1	880.50'	4,762 cf	**SWALE STORAGE (Conic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
880.50	0	0	0	0
881.00	880	147	147	880
882.00	10,000	4,615	4,762	10,003

Device	Routing	Invert	Outlet Devices
#1	Device 3	880.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 800.00'
#2	Device 3	880.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	878.50'	**12.0" Round CMP_Round 12"** L= 45.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 878.50' / 877.00' S= 0.0333 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	880.50'	**5.0' 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=5.31 cfs @ 12.14 hrs HW=880.77' TW=869.91' (Dynamic Tailwater)
- **3=CMP_Round 12"** (Passes 3.65 cfs of 3.97 cfs potential flow)
  - **1=Exfiltration** (Controls 0.00 cfs)
  - **2=Orifice/Grate** (Weir Controls 3.64 cfs @ 1.69 fps)
- **4=Broad-Crested Rectangular Weir** (Weir Controls 1.67 cfs @ 1.24 fps)

Pond 23P: Bioswale (good)



Summary for Pond 24P: Bioswale (good)

Inflow Area = 1.090 ac, 41.28% Impervious, Inflow Depth = 1.89" for 10-Year event
Inflow = 3.12 cfs @ 12.14 hrs, Volume= 0.171 af
Outflow = 3.11 cfs @ 12.14 hrs, Volume= 0.171 af, Atten= 0%, Lag= 0.2 min
Discarded = 0.00 cfs @ 12.14 hrs, Volume= 0.000 af
Primary = 3.11 cfs @ 12.14 hrs, Volume= 0.171 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 891.69' @ 12.14 hrs Surf.Area= 314 sf Storage= 52 cf

Plug-Flow detention time= 0.7 min calculated for 0.171 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (810.2 - 809.5)

Volume	Invert	Avail.Storage	Storage Description
#1	891.50'	5,468 cf	**SWALE STORAGE (Conic)** Listed below

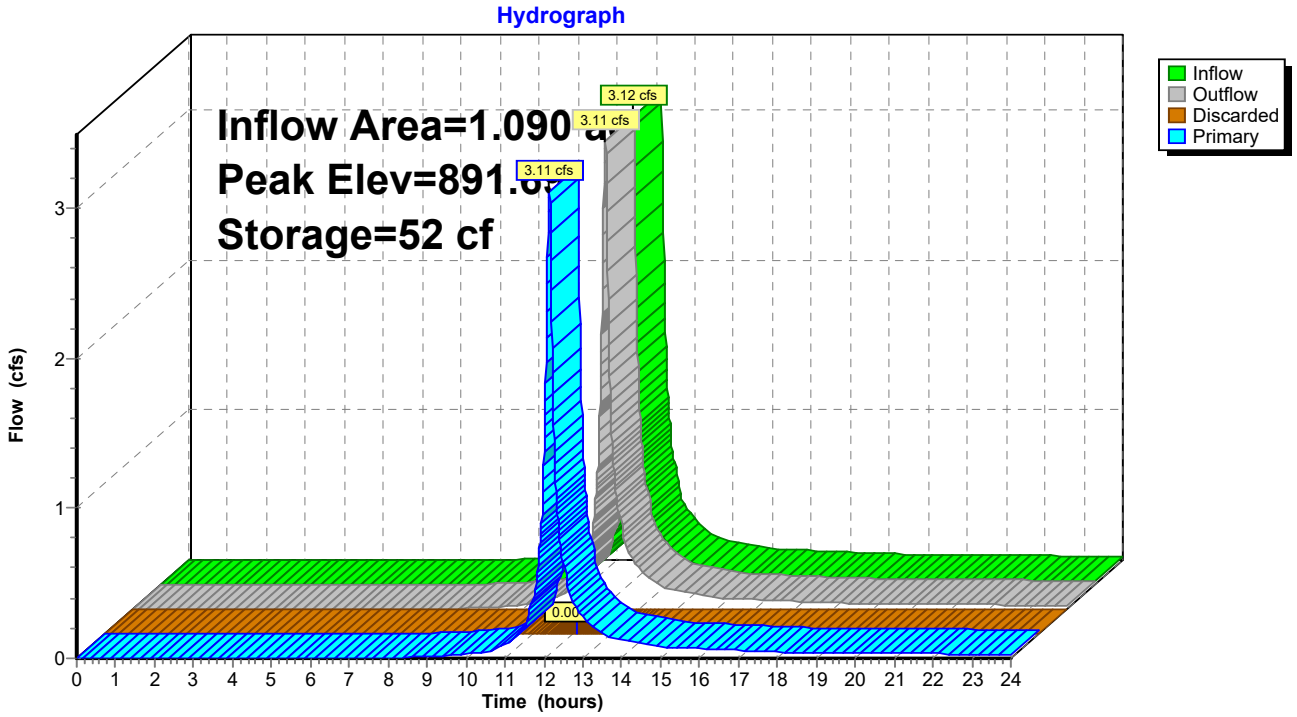
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
891.50	0	0	0	0
892.00	831	139	139	831
893.00	12,000	5,330	5,468	12,003

Device	Routing	Invert	Outlet Devices
#1	Discarded	891.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 800.00'
#2	Device 3	891.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	889.50'	**12.0" Round Culvert** L= 45.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 889.50' / 888.00' S= 0.0333 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	891.50'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.14 hrs HW=891.69' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=3.11 cfs @ 12.14 hrs HW=891.69' TW=880.77' (Dynamic Tailwater)
├**3=Culvert** (Passes 2.15 cfs of 3.88 cfs potential flow)
│ └**2=Orifice/Grate** (Weir Controls 2.15 cfs @ 1.42 fps)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 0.96 cfs @ 1.02 fps)

Pond 24P: Bioswale (good)



Summary for Pond 25P: Bioswale (good)

Inflow Area = 0.530 ac, 43.40% Impervious, Inflow Depth = 1.91" for 10-Year event
Inflow = 1.51 cfs @ 12.14 hrs, Volume= 0.085 af
Outflow = 1.51 cfs @ 12.15 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.2 min
Discarded = 0.00 cfs @ 12.15 hrs, Volume= 0.000 af
Primary = 1.51 cfs @ 12.15 hrs, Volume= 0.084 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 903.65' @ 12.15 hrs Surf.Area= 118 sf Storage= 20 cf

Plug-Flow detention time= 0.5 min calculated for 0.085 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (809.0 - 808.5)

Volume	Invert	Avail.Storage	Storage Description
#1	903.50'	2,142 cf	**SWALE STORAGE (Conic)** Listed below

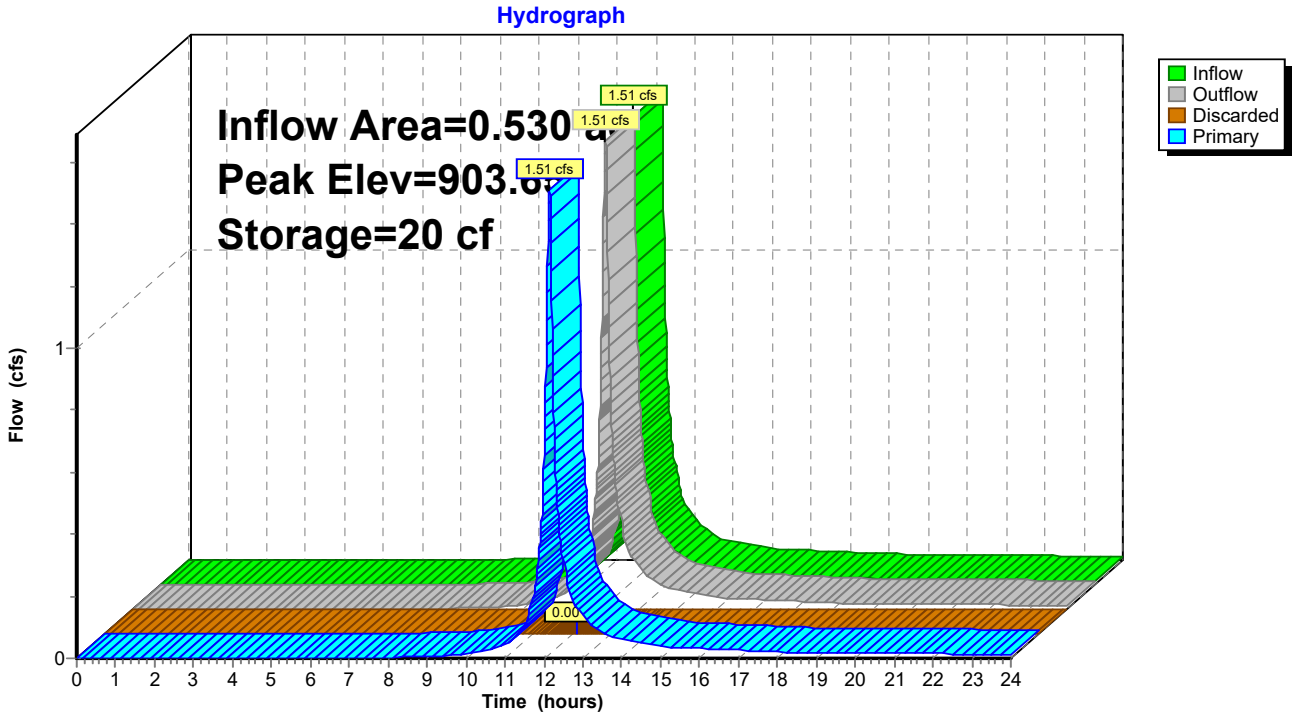
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
903.50	0	0	0	0
904.00	395	66	66	395
905.00	4,500	2,076	2,142	4,503

Device	Routing	Invert	Outlet Devices
#1	Discarded	903.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 800.00'
#2	Device 3	903.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	901.50'	**12.0" Round CMP_Round 12"** L= 58.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 901.50' / 901.00' S= 0.0086 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	903.70'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.15 hrs HW=903.65' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=1.50 cfs @ 12.15 hrs HW=903.65' TW=891.69' (Dynamic Tailwater)
├**3=CMP_Round 12"** (Passes 1.50 cfs of 3.83 cfs potential flow)
│└**2=Orifice/Grate** (Weir Controls 1.50 cfs @ 1.26 fps)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 25P: Bioswale (good)



Summary for Pond 26P: Bioswale (good)

Inflow Area = 0.150 ac, 20.00% Impervious, Inflow Depth = 1.63" for 10-Year event
Inflow = 0.38 cfs @ 12.13 hrs, Volume= 0.020 af
Outflow = 0.38 cfs @ 12.14 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.3 min
Discarded = 0.00 cfs @ 12.14 hrs, Volume= 0.000 af
Primary = 0.38 cfs @ 12.14 hrs, Volume= 0.020 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 907.56' @ 12.14 hrs Surf.Area= 76 sf Storage= 13 cf

Plug-Flow detention time= 1.2 min calculated for 0.020 af (100% of inflow)
Center-of-Mass det. time= 1.3 min (820.4 - 819.1)

Volume	Invert	Avail.Storage	Storage Description
#1	907.50'	2,578 cf	**SWALE STORAGE (Conic)** Listed below

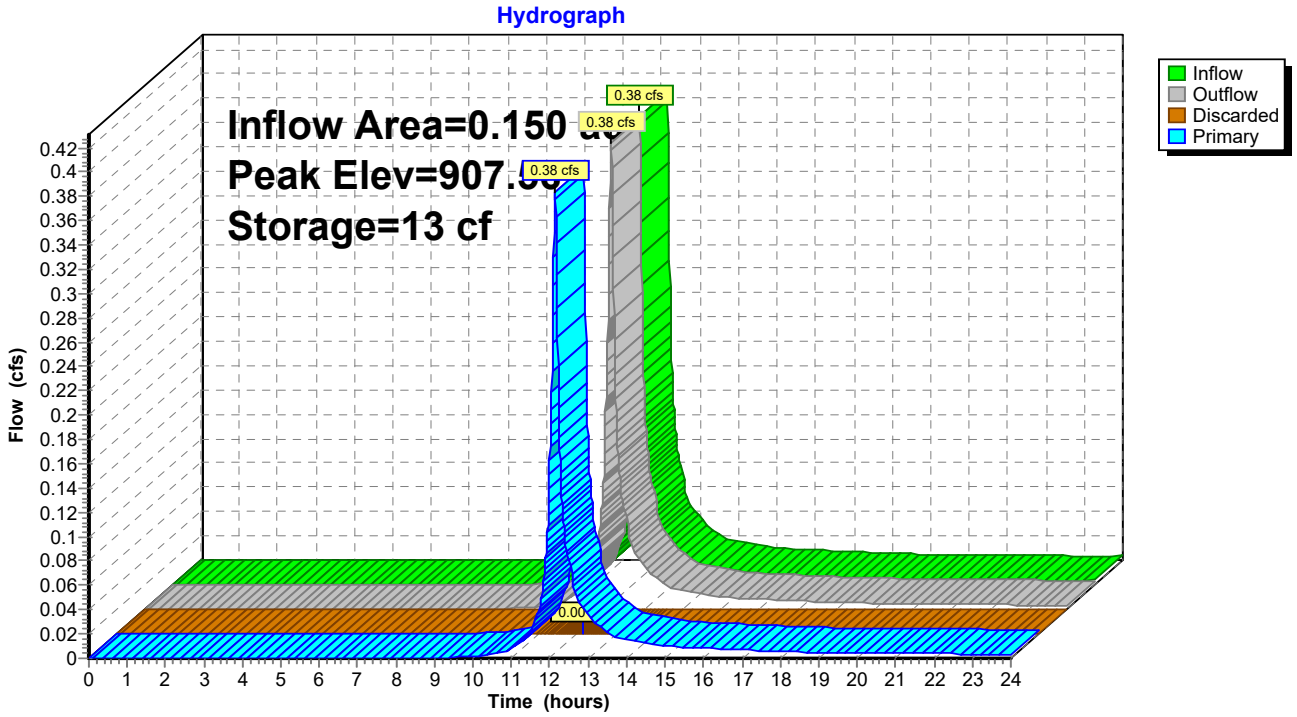
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
907.50	0	0	0	0
908.00	635	106	106	635
909.00	5,000	2,472	2,578	5,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	907.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 800.00'
#2	Device 3	907.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	905.50'	**12.0" Round CMP_Round 12"** L= 58.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 905.50' / 905.00' S= 0.0086 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	907.70'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.14 hrs HW=907.56' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.38 cfs @ 12.14 hrs HW=907.56' TW=903.65' (Dynamic Tailwater)
├**3=CMP_Round 12"** (Passes 0.38 cfs of 3.73 cfs potential flow)
└**2=Orifice/Grate** (Weir Controls 0.38 cfs @ 0.80 fps)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 26P: Bioswale (good)



Summary for Pond 27P: Dry Swale

Inflow Area = 1.310 ac, 37.40% Impervious, Inflow Depth = 1.86" for 10-Year event
Inflow = 3.50 cfs @ 12.15 hrs, Volume= 0.203 af
Outflow = 3.03 cfs @ 12.20 hrs, Volume= 0.192 af, Atten= 13%, Lag= 2.6 min
Discarded = 0.03 cfs @ 12.20 hrs, Volume= 0.035 af
Primary = 3.00 cfs @ 12.20 hrs, Volume= 0.157 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 807.94' @ 12.20 hrs Surf.Area= 5,920 sf Storage= 1,973 cf

Plug-Flow detention time= 122.6 min calculated for 0.192 af (95% of inflow)
Center-of-Mass det. time= 93.4 min (905.4 - 812.0)

Volume	Invert	Avail.Storage	Storage Description
#1	807.00'	10,179 cf	**Custom Stage Data (Conic)** Listed below

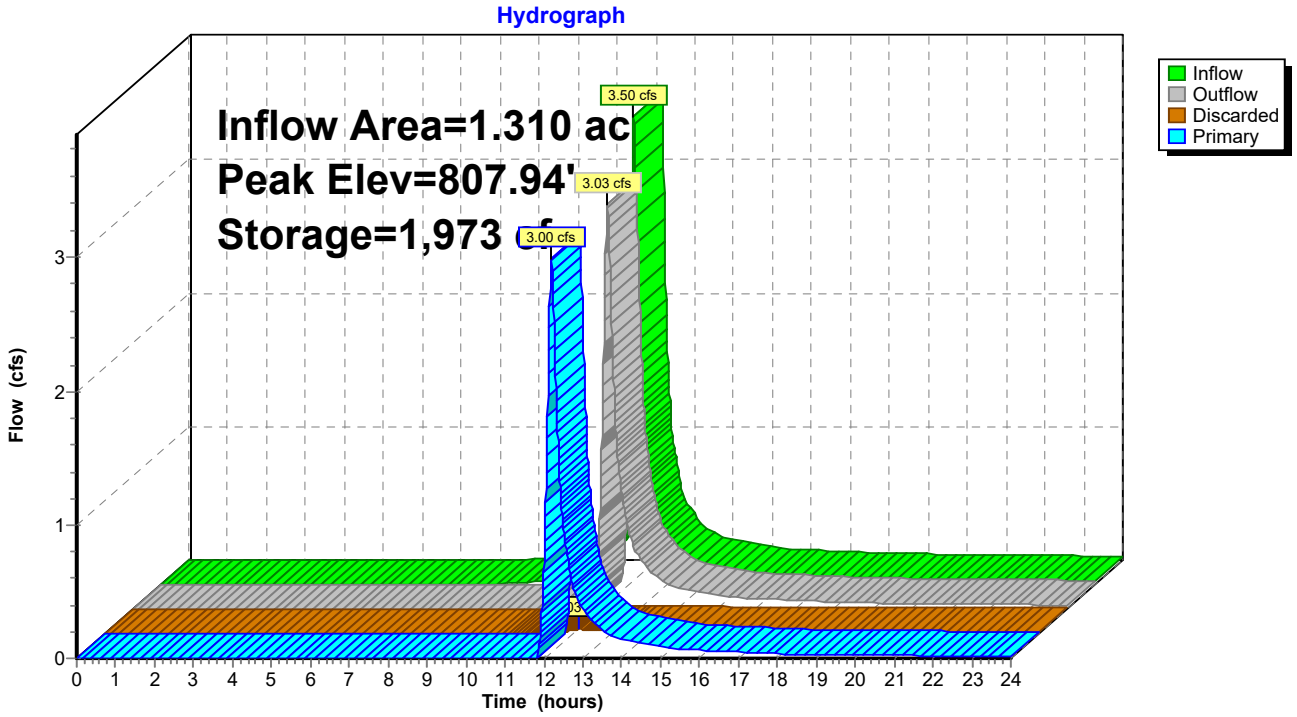
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
807.00	0	0	0	0
808.00	6,300	2,100	2,100	6,302
809.00	10,000	8,079	10,179	10,015

Device	Routing	Invert	Outlet Devices
#1	Primary	807.50'	**4.0' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Discarded	807.00'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 700.00'

Discarded OutFlow Max=0.03 cfs @ 12.20 hrs HW=807.94' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=2.99 cfs @ 12.20 hrs HW=807.94' TW=804.18' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 2.99 cfs @ 1.70 fps)

Pond 27P: Dry Swale



Summary for Pond 32P: Lower Pond

Inflow Area = 38.100 ac, 11.36% Impervious, Inflow Depth = 1.39" for 10-Year event
Inflow = 39.12 cfs @ 12.16 hrs, Volume= 4.421 af
Outflow = 22.67 cfs @ 12.73 hrs, Volume= 3.481 af, Atten= 42%, Lag= 34.2 min
Primary = 11.91 cfs @ 12.73 hrs, Volume= 2.820 af
Secondary = 10.76 cfs @ 12.73 hrs, Volume= 0.661 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Starting Elev= 700.50' Surf.Area= 14,196 sf Storage= 6,497 cf
Peak Elev= 703.89' @ 12.73 hrs Surf.Area= 27,617 sf Storage= 75,607 cf (69,111 cf above start)

Plug-Flow detention time= 274.6 min calculated for 3.332 af (75% of inflow)
Center-of-Mass det. time= 164.0 min (1,010.1 - 846.1)

Volume	Invert	Avail.Storage	Storage Description
#1	700.00'	124,144 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

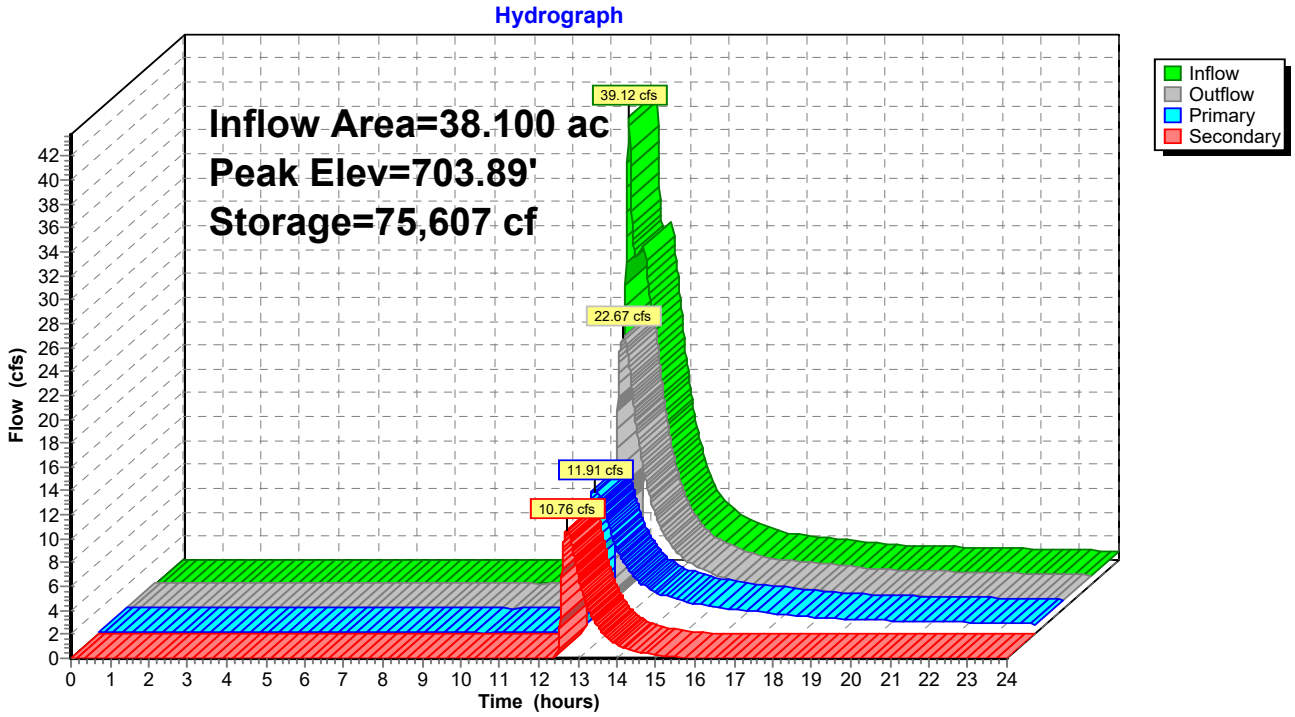
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
700.00	11,792	0	0
701.00	16,599	14,196	14,196
702.00	19,522	18,061	32,256
703.00	22,479	21,001	53,257
704.00	28,237	25,358	78,615
705.00	34,230	31,234	109,848
705.40	37,252	14,296	124,144

Device	Routing	Invert	Outlet Devices
#1	Secondary	703.60'	**27.0' 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
#2	Device 4	703.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 4	700.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#4	Primary	700.00'	**18.0" Round Culvert** L= 21.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 700.00' / 699.80' S= 0.0095 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf

Primary OutFlow Max=11.91 cfs @ 12.73 hrs HW=703.89' TW=0.00' (Dynamic Tailwater)
└**4=Culvert** (Inlet Controls 11.91 cfs @ 6.74 fps)
  ├**2=Orifice/Grate** (Passes < 12.86 cfs potential flow)
  └**3=Orifice/Grate** (Passes < 0.46 cfs potential flow)

Secondary OutFlow Max=10.76 cfs @ 12.73 hrs HW=703.89' TW=0.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 10.76 cfs @ 1.36 fps)

Pond 32P: Lower Pond



Summary for Pond 33P: Upper Pond

Inflow Area = 32.150 ac, 14.71% Impervious, Inflow Depth = 1.34" for 10-Year event
Inflow = 47.99 cfs @ 12.20 hrs, Volume= 3.595 af
Outflow = 15.19 cfs @ 12.64 hrs, Volume= 2.593 af, Atten= 68%, Lag= 25.9 min
Primary = 15.19 cfs @ 12.64 hrs, Volume= 2.593 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Starting Elev= 705.00' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 741.93' @ 12.64 hrs Surf.Area= 21,178 sf Storage= 71,975 cf

Plug-Flow detention time= 334.7 min calculated for 2.593 af (72% of inflow)
Center-of-Mass det. time= 244.9 min (1,082.4 - 837.5)

Volume	Invert	Avail.Storage	Storage Description
#1	737.50'	149,518 cf	**prop (Conic)** Listed below (Recalc)

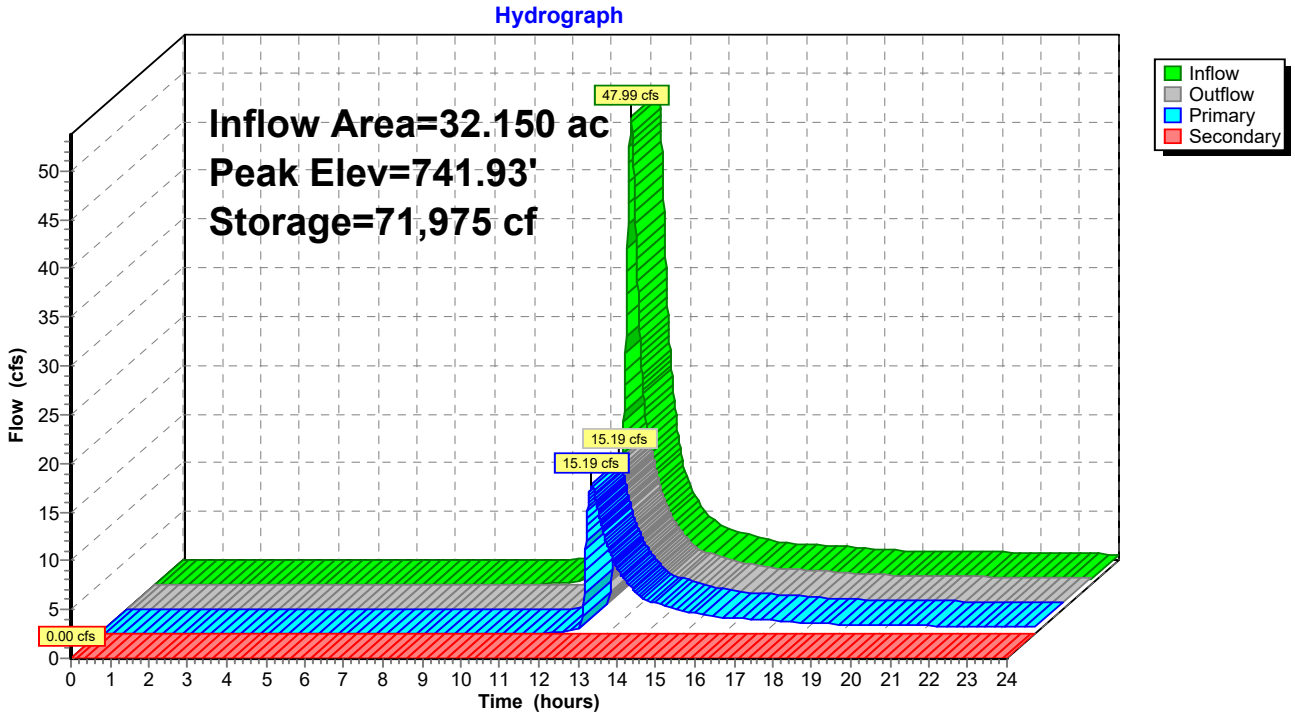
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
737.50	11,903	0	0	11,903
738.00	12,777	6,169	6,169	12,799
739.00	14,602	13,679	19,848	14,670
740.00	16,711	15,645	35,493	16,825
741.00	18,984	17,835	53,328	19,147
742.00	21,350	20,155	73,484	21,566
743.00	23,873	22,600	96,083	24,145
744.00	26,452	25,151	121,235	26,784
745.00	30,154	28,283	149,518	30,534

Device	Routing	Invert	Outlet Devices
#1	Secondary	743.00'	**31.0' 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
#2	Device 4	741.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 4	737.50'	**3.0" Vert. Orifice/Grate** C= 0.600
#4	Primary	737.50'	**24.0" Round Culvert** L= 35.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 737.50' / 735.00' S= 0.0714 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 3.14 sf

Primary OutFlow Max=15.19 cfs @ 12.64 hrs HW=741.93' TW=0.00' (Dynamic Tailwater)
└─**4=Culvert** (Passes 15.19 cfs of 22.11 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 14.70 cfs @ 2.14 fps)
  └─**3=Orifice/Grate** (Orifice Controls 0.49 cfs @ 9.99 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=737.50' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 33P: Upper Pond

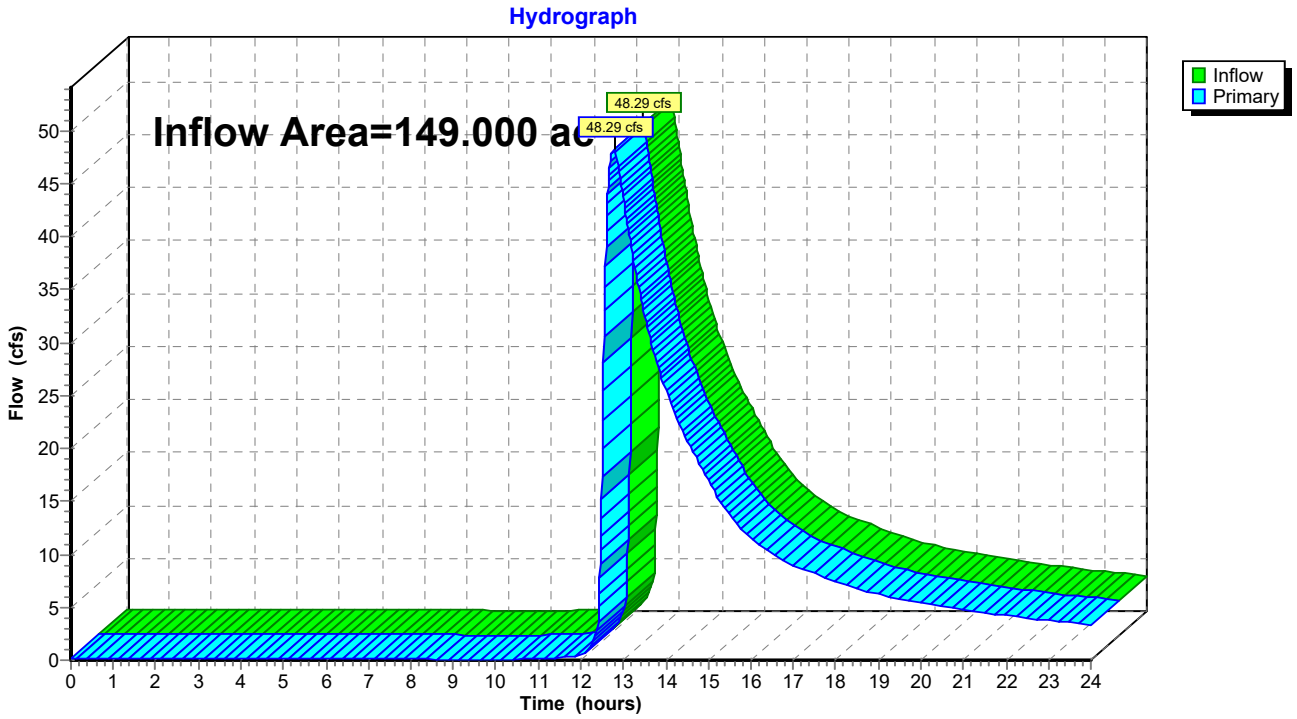


Summary for Link 49L: Total Off-site drainage

Inflow Area = 149.000 ac, 6.55% Impervious, Inflow Depth > 1.04" for 10-Year event
Inflow = 48.29 cfs @ 12.78 hrs, Volume= 12.967 af
Primary = 48.29 cfs @ 12.78 hrs, Volume= 12.967 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs

Link 49L: Total Off-site drainage



Time span=0.00-37.00 hrs, dt=0.01 hrs, 3701 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 OFF: OFFSITE DRAINAGE Runoff Area=78.750 ac 0.89% Impervious Runoff Depth=2.69"
Flow Length=4,105' Tc=35.7 min CN=75 Runoff=152.87 cfs 17.630 af

Subcatchment2: 2 (good) Runoff Area=24.100 ac 9.34% Impervious Runoff Depth=2.96"
Flow Length=2,474' Tc=15.8 min CN=78 Runoff=78.27 cfs 5.944 af

Subcatchment3: 3 (good) Runoff Area=23.800 ac 3.66% Impervious Runoff Depth=3.05"
Flow Length=3,643' Tc=37.7 min CN=79 Runoff=51.04 cfs 6.055 af

Subcatchment17: Lot #9 (good) Runoff Area=0.840 ac 26.19% Impervious Runoff Depth=3.64"
Slope=0.0866 '/' Tc=6.0 min CN=85 Runoff=4.65 cfs 0.255 af

Subcatchment18: Lot #8 (good) Runoff Area=0.750 ac 29.33% Impervious Runoff Depth=3.64"
Slope=0.0953 '/' Tc=6.0 min CN=85 Runoff=4.15 cfs 0.227 af

Subcatchment19: Lot #7 (good) Runoff Area=0.810 ac 27.16% Impervious Runoff Depth=3.64"
Slope=0.0933 '/' Tc=6.0 min CN=85 Runoff=4.48 cfs 0.245 af

Subcatchment20: Lot #6 (good) Runoff Area=0.800 ac 27.50% Impervious Runoff Depth=3.64"
Slope=0.0759 '/' Tc=6.0 min CN=85 Runoff=4.43 cfs 0.242 af

Subcatchment21: Lot #5 (good) Runoff Area=0.800 ac 27.50% Impervious Runoff Depth=3.64"
Slope=0.0663 '/' Tc=6.0 min CN=85 Runoff=4.43 cfs 0.242 af

Subcatchment22: Lot #4 (good) Runoff Area=0.820 ac 26.83% Impervious Runoff Depth=3.64"
Slope=0.0589 '/' Tc=6.0 min CN=85 Runoff=4.54 cfs 0.249 af

Subcatchment23: Lot #3 (good) Runoff Area=0.830 ac 26.51% Impervious Runoff Depth=3.64"
Slope=0.0568 '/' Tc=6.0 min CN=85 Runoff=4.59 cfs 0.252 af

Subcatchment24: Lot #2 (good) Runoff Area=0.560 ac 39.29% Impervious Runoff Depth=3.84"
Slope=0.0563 '/' Tc=6.0 min CN=87 Runoff=3.23 cfs 0.179 af

Subcatchment25: Lot #1 (good) Runoff Area=0.380 ac 52.63% Impervious Runoff Depth=4.05"
Flow Length=120' Slope=0.0700 '/' Tc=7.3 min CN=89 Runoff=2.17 cfs 0.128 af

Subcatchment26: 26 (update Tc to Runoff Area=1.310 ac 37.40% Impervious Runoff Depth=3.84"
Tc=8.0 min CN=87 Runoff=7.01 cfs 0.419 af

Subcatchment37S: 1 Runoff Area=14.300 ac 24.20% Impervious Runoff Depth=3.44"
Flow Length=932' Tc=7.7 min CN=83 Runoff=70.74 cfs 4.097 af

Subcatchment46S: Portion of Lot #1 Runoff Area=0.150 ac 20.00% Impervious Runoff Depth=3.54"
Tc=6.0 min CN=84 Runoff=0.81 cfs 0.044 af

Reach 12R: Swale to off-site Avg. Flow Depth=0.85' Max Vel=2.81 fps Inflow=41.42 cfs 17.606 af
n=0.030 L=293.0' S=0.0068 '/' Capacity=58.17 cfs Outflow=41.41 cfs 17.605 af

Reach 16R: Northside swale Avg. Flow Depth=0.24' Max Vel=4.31 fps Inflow=5.10 cfs 0.369 af
n=0.030 L=655.0' S=0.0885 '/' Capacity=111.61 cfs Outflow=5.01 cfs 0.369 af

Reach 17R: Southside Swale Avg. Flow Depth=0.51' Max Vel=6.91 fps Inflow=25.42 cfs 2.055 af
n=0.030 L=710.0' S=0.0831 '/' Capacity=108.12 cfs Outflow=25.05 cfs 2.055 af

Pond 10P: Proposed 36" Culvert Peak Elev=706.99' Storage=329,245 cf Inflow=152.87 cfs 17.630 af
Primary=13.16 cfs 9.131 af Secondary=28.51 cfs 8.476 af Outflow=41.58 cfs 17.607 af

Pond 11P: Proposed 36" Culvert Peak Elev=706.73' Storage=10,762 cf Inflow=41.58 cfs 17.607 af
Primary=41.42 cfs 17.606 af Secondary=0.00 cfs 0.000 af Outflow=41.42 cfs 17.606 af

Pond 17P: Bioswale (good) Peak Elev=808.54' Storage=409 cf Inflow=25.43 cfs 2.059 af
Discarded=0.00 cfs 0.002 af Primary=25.42 cfs 2.055 af Outflow=25.42 cfs 2.057 af

Pond 18P: Bioswale (good) Peak Elev=815.68' Storage=346 cf Inflow=21.19 cfs 1.805 af
Discarded=0.00 cfs 0.001 af Primary=21.19 cfs 1.804 af Outflow=21.19 cfs 1.805 af

Pond 19P: Bioswale (good) Peak Elev=830.27' Storage=1,394 cf Inflow=19.71 cfs 1.579 af
Discarded=0.01 cfs 0.001 af Primary=18.62 cfs 1.578 af Outflow=18.63 cfs 1.579 af

Pond 20P: Bioswale (good) Peak Elev=845.31' Storage=1,563 cf Inflow=17.78 cfs 1.334 af
Discarded=0.01 cfs 0.001 af Primary=16.60 cfs 1.333 af Outflow=16.61 cfs 1.334 af

Pond 21P: Bioswale (good) Peak Elev=859.19' Storage=1,027 cf Inflow=15.61 cfs 1.093 af
Discarded=0.01 cfs 0.001 af Primary=14.43 cfs 1.092 af Outflow=14.44 cfs 1.093 af

Pond 22P: Bioswale (good) Peak Elev=870.18' Storage=1,334 cf Inflow=14.03 cfs 0.851 af
Discarded=0.01 cfs 0.001 af Primary=12.04 cfs 0.850 af Outflow=12.05 cfs 0.851 af

Pond 23P: Bioswale (good) Peak Elev=881.05' Storage=398 cf Inflow=10.72 cfs 0.603 af
Outflow=9.76 cfs 0.603 af

Pond 24P: Bioswale (good) Peak Elev=891.81' Storage=87 cf Inflow=6.19 cfs 0.351 af
Discarded=0.00 cfs 0.000 af Primary=6.16 cfs 0.351 af Outflow=6.16 cfs 0.351 af

Pond 25P: Bioswale (good) Peak Elev=903.73' Storage=30 cf Inflow=2.98 cfs 0.172 af
Discarded=0.00 cfs 0.000 af Primary=2.98 cfs 0.172 af Outflow=2.98 cfs 0.172 af

Pond 26P: Bioswale (good) Peak Elev=907.60' Storage=21 cf Inflow=0.81 cfs 0.044 af
Discarded=0.00 cfs 0.000 af Primary=0.81 cfs 0.044 af Outflow=0.81 cfs 0.044 af

Pond 27P: Dry Swale Peak Elev=808.11' Storage=2,973 cf Inflow=7.01 cfs 0.419 af
Discarded=0.04 cfs 0.039 af Primary=5.10 cfs 0.369 af Outflow=5.14 cfs 0.408 af

Pond 32P: Lower Pond Peak Elev=704.43' Storage=91,323 cf Inflow=89.57 cfs 10.151 af
Primary=12.89 cfs 4.682 af Secondary=54.93 cfs 4.519 af Outflow=67.82 cfs 9.201 af

Pond 33P: Upper Pond Peak Elev=743.78' Storage=115,573 cf Inflow=106.60 cfs 8.368 af
Primary=27.45 cfs 5.945 af Secondary=57.87 cfs 1.412 af Outflow=85.32 cfs 7.357 af

Link 49L: Total Off-site drainage

Inflow=164.57 cfs 34.163 af
Primary=164.57 cfs 34.163 af

Total Runoff Area = 149.000 ac Runoff Volume = 36.209 af Average Runoff Depth = 2.92"
93.45% Pervious = 139.240 ac 6.55% Impervious = 9.760 ac

Summary for Subcatchment 1 OFF: OFFSITE DRAINAGE (good)

CarlsonPlanXYPos|642280.8804|1040430.0233|
CarlsonSurface||

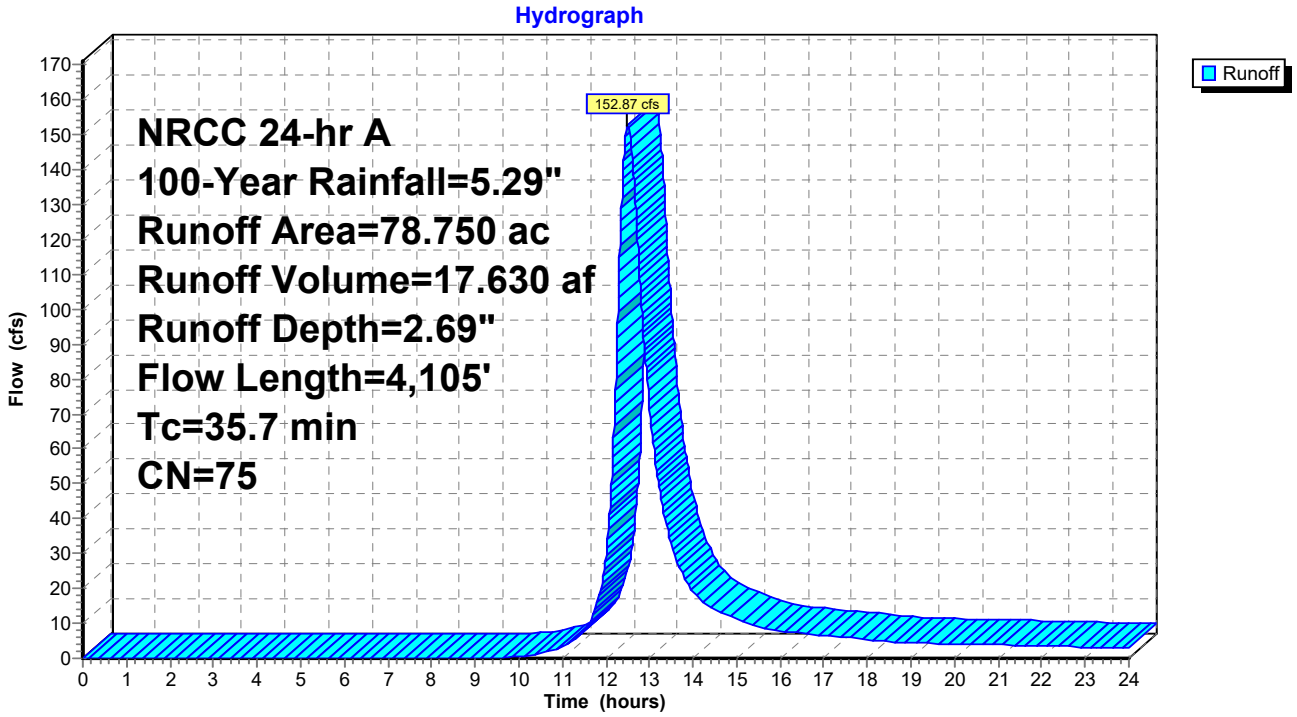
Runoff = 152.87 cfs @ 12.50 hrs, Volume= 17.630 af, Depth= 2.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.700	98	Paved parking, HSG D
18.800	78	Meadow, non-grazed, HSG D
5.000	80	>75% Grass cover, Good, HSG D
54.250	73	Brush, Good, HSG D
78.750	75	Weighted Average
78.050		99.11% Pervious Area
0.700		0.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.78		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.19"
10.8	1,165	0.0400	1.80		**Shallow Concentrated Flow, Shallow Concentrated** Cultivated Straight Rows Kv= 9.0 fps
1.2	1,445	0.0850	19.33	1,352.84	**Channel Flow, Channel Flow** Area= 70.0 sf Perim= 72.0' r= 0.97' n= 0.022 Earth, clean & straight
7.3	560	0.0650	1.27		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
1.2	115	0.1000	1.58		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
12.6	535	0.0200	0.71		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
2.3	270	0.0150	1.97		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
35.7	4,105	Total			

Subcatchment 1 OFF: OFFSITE DRAINAGE (good)



Summary for Subcatchment 2: 2 (good)

CarlsonPlanXYPos|642014.4586|1041354.4458|
CarlsonSurface||

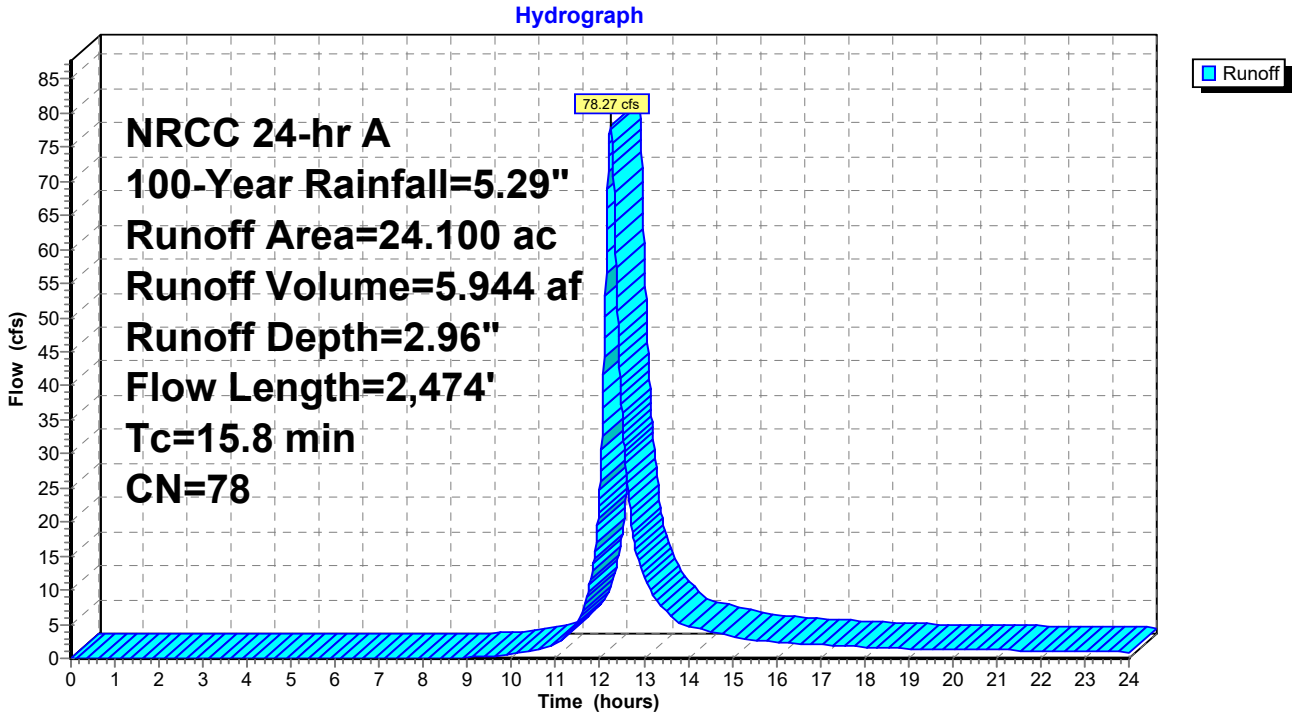
Runoff = 78.27 cfs @ 12.24 hrs, Volume= 5.944 af, Depth= 2.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.430	98	Water Surface, HSG D
1.730	98	Paved parking, HSG D
0.090	98	Paved parking HSG D
2.150	80	>75% Grass cover, Good, HSG D
2.300	78	Meadow, non-grazed, HSG D
10.900	73	Brush, Good, HSG D
6.000	80	>75% Grass cover, Good, HSG D
0.500	80	>75% Grass cover, Good, HSG D
24.100	78	Weighted Average
21.850		90.66% Pervious Area
2.250		9.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0350	0.18		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.19"
0.7	192	0.0830	4.64		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
0.8	230	0.0870	4.75		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
1.1	180	0.0280	2.69		**Shallow Concentrated Flow, Shallow concentrated** Unpaved Kv= 16.1 fps
1.1	1,194	0.0750	17.98	413.55	**Channel Flow, Channel Flow** Area= 23.0 sf Perim= 24.0' r= 0.96' n= 0.022 Earth, clean & straight
2.2	165	0.0600	1.22		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
0.4	413	0.0720	17.36	260.42	**Channel Flow, Channel Flow** Area= 15.0 sf Perim= 16.0' r= 0.94' n= 0.022 Earth, clean & straight
15.8	2,474	Total			

Subcatchment 2: 2 (good)



Summary for Subcatchment 3: 3 (good)

CarlsonPlanXYPos|641681.4005|1041128.2504|
CarlsonSurface||

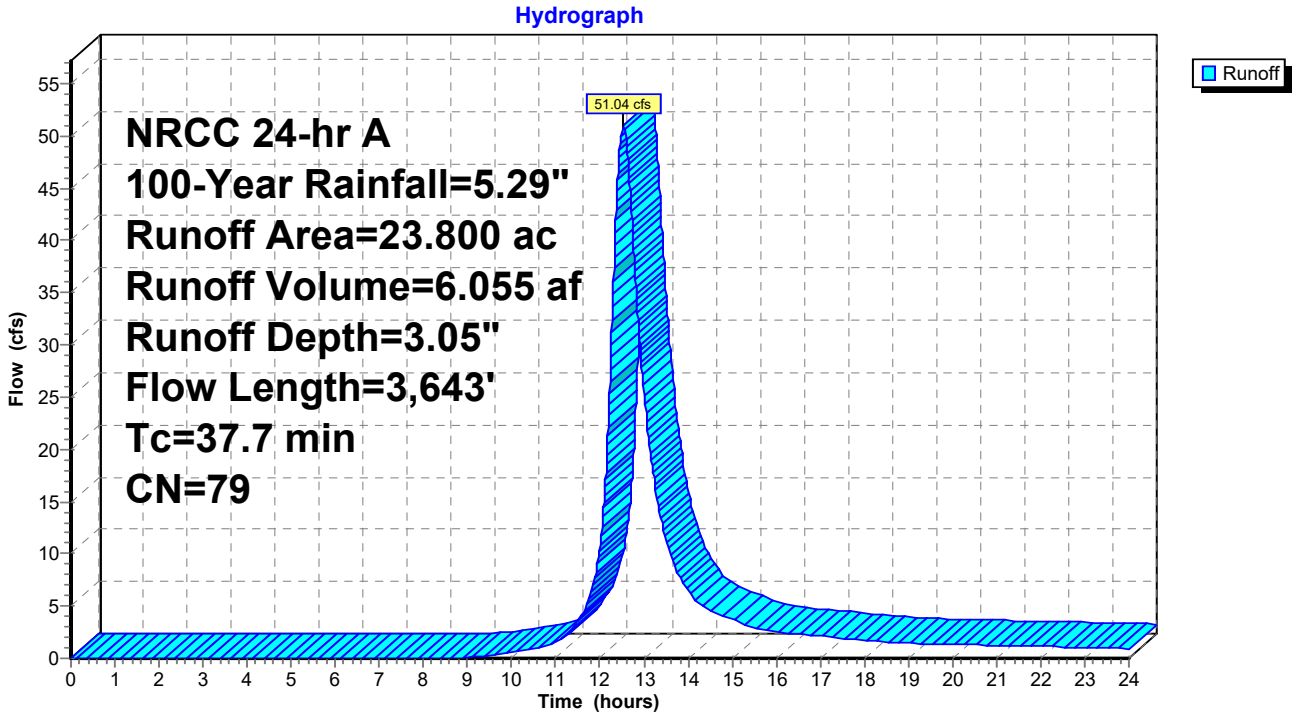
Runoff = 51.04 cfs @ 12.53 hrs, Volume= 6.055 af, Depth= 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.440	98	Paved parking, HSG D
0.530	80	>75% Grass cover, Good, HSG D
0.430	98	Paved parking, HSG D
12.660	78	Meadow, non-grazed, HSG D
2.500	73	Brush, Good, HSG D
5.720	80	>75% Grass cover, Good, HSG D
1.520	80	>75% Grass cover, Good, HSG D
23.800	79	Weighted Average
22.930		96.34% Pervious Area
0.870		3.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.78		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.19"
11.5	85	0.0200	0.12		**Sheet Flow, Sheet Flow** Cultivated: Residue>20% n= 0.170 P2= 2.19"
5.0	385	0.0200	1.27		**Shallow Concentrated Flow, Shallow Concentrated** Cultivated Straight Rows Kv= 9.0 fps
10.2	1,400	0.0640	2.28		**Shallow Concentrated Flow, Shallow Concentrated** Cultivated Straight Rows Kv= 9.0 fps
6.4	560	0.0840	1.45		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
0.4	435	0.0640	16.37	245.52	**Channel Flow, Channel Flow** Area= 15.0 sf Perim= 16.0' r= 0.94' n= 0.022 Earth, clean & straight
0.9	209	0.0570	3.84		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
2.2	197	0.0870	1.47		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
0.2	125	0.0320	11.48	286.96	**Channel Flow, Channel Flow** Area= 25.0 sf Perim= 27.0' r= 0.93' n= 0.022 Earth, clean & straight
0.6	232	0.0100	6.42	160.42	**Channel Flow, Channel Flow** Area= 25.0 sf Perim= 27.0' r= 0.93' n= 0.022 Earth, clean & straight
37.7	3,643	Total			

Subcatchment 3: 3 (good)



Summary for Subcatchment 17: Lot #9 (good)

CarlsonPlanXYPos|642702.7045|1040980.9144|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

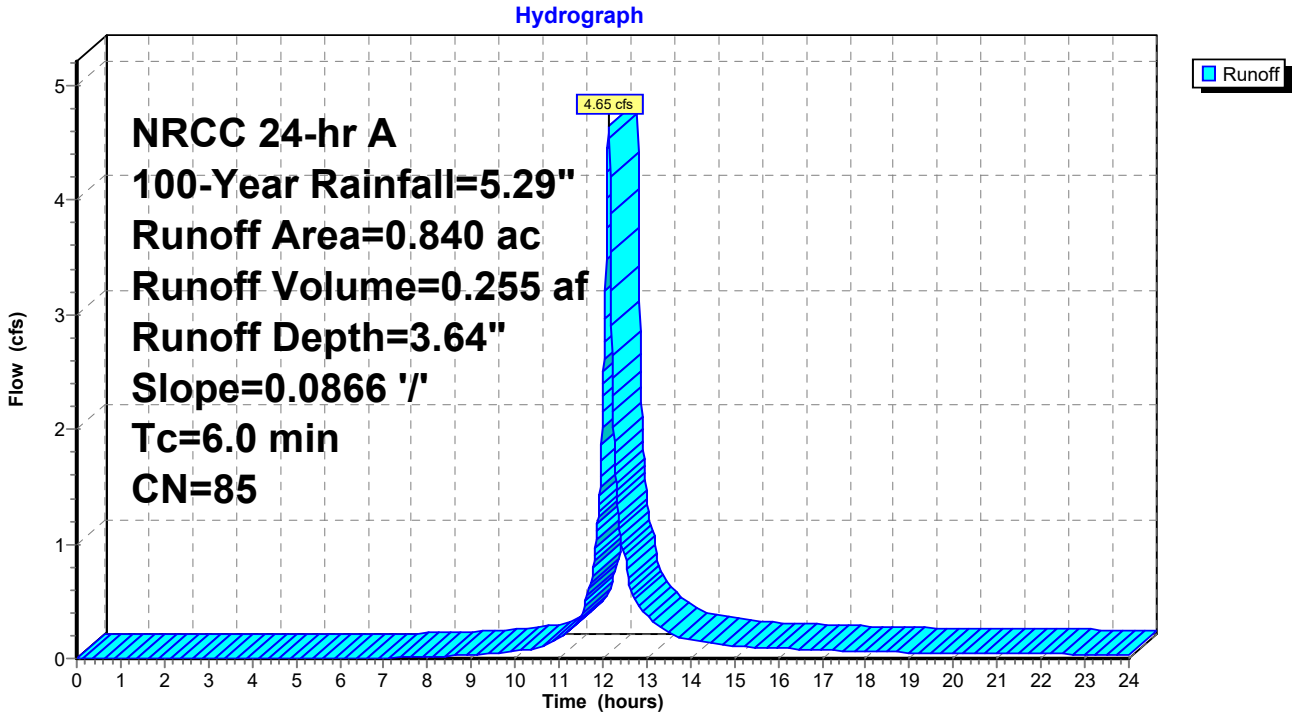
Runoff = 4.65 cfs @ 12.13 hrs, Volume= 0.255 af, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.540	80	>75% Grass cover, Good, HSG D
0.080	80	>75% Grass cover, Good, HSG D
0.840	85	Weighted Average
0.620		73.81% Pervious Area
0.220		26.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0866			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 17: Lot #9 (good)



Summary for Subcatchment 18: Lot #8 (good)

CarlsonPlanXYPos|642920.0895|1040980.2941|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

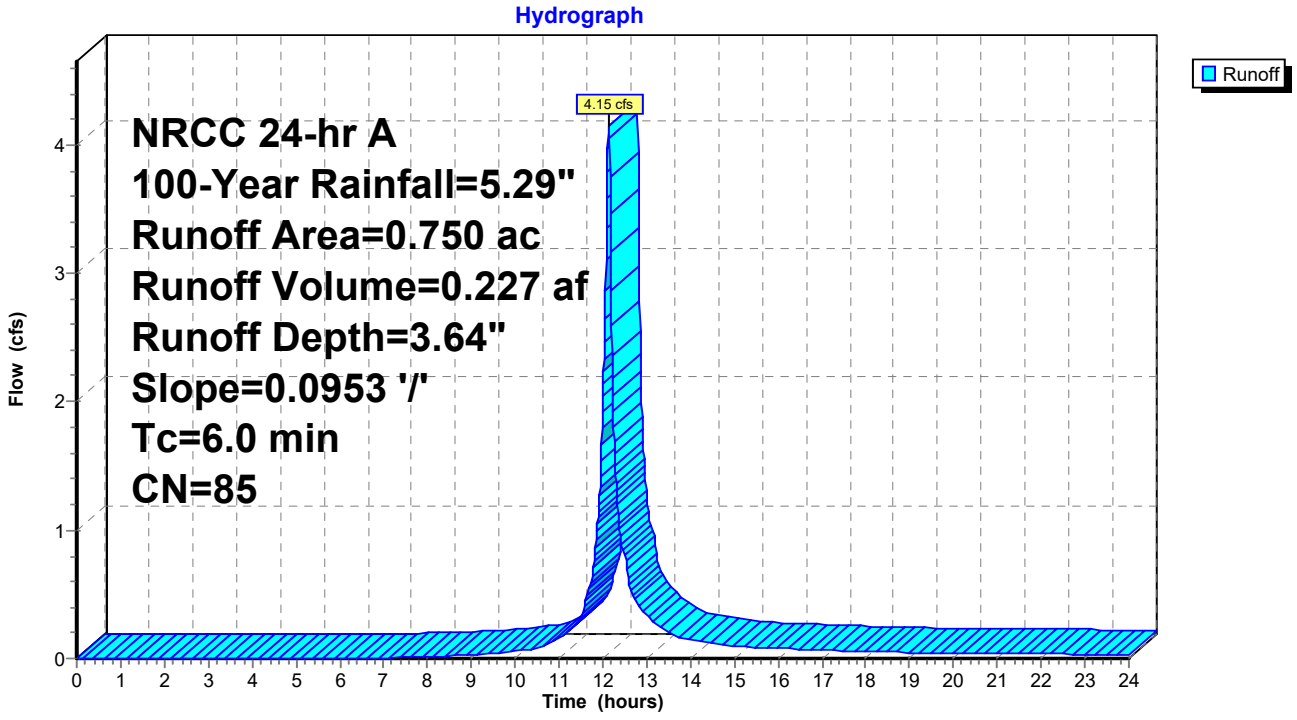
Runoff = 4.15 cfs @ 12.13 hrs, Volume= 0.227 af, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.480	80	>75% Grass cover, Good, HSG D
0.050	80	>75% Grass cover, Good, HSG D
0.750	85	Weighted Average
0.530		70.67% Pervious Area
0.220		29.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0953			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 18: Lot #8 (good)



Summary for Subcatchment 19: Lot #7 (good)

CarlsonPlanXYPos|643107.1559|1040981.5048|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

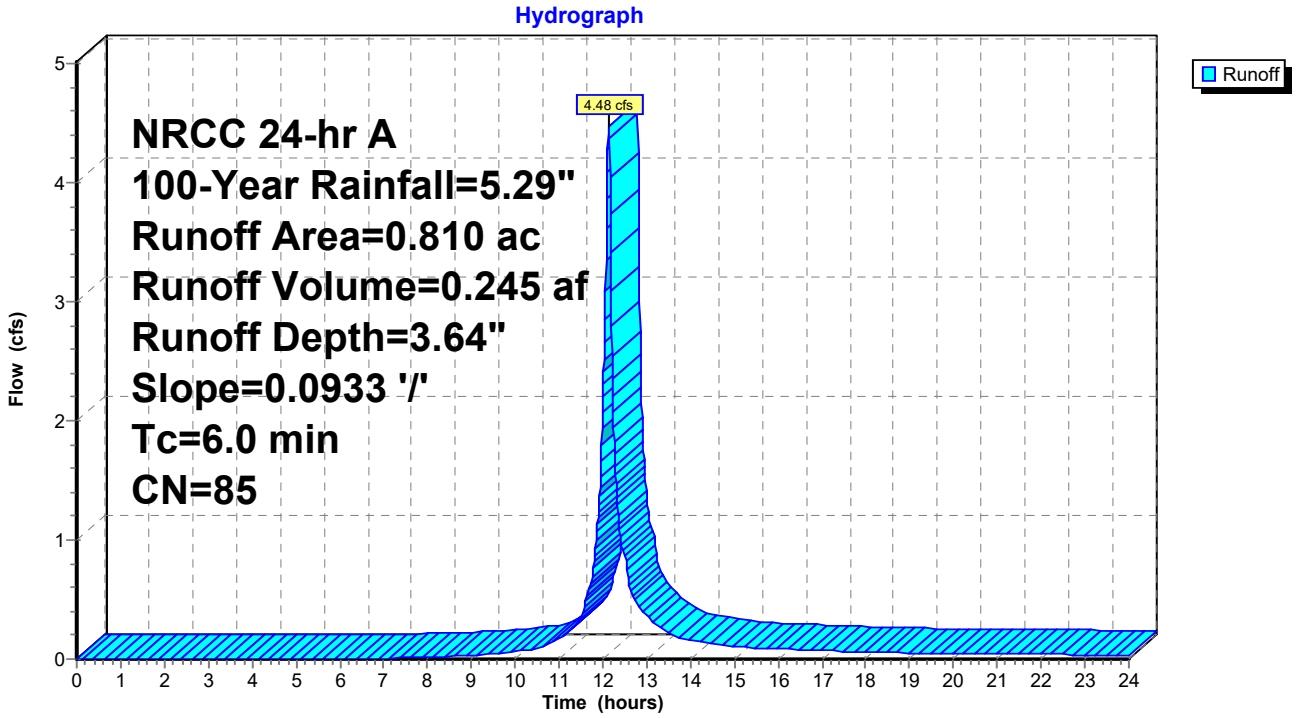
Runoff = 4.48 cfs @ 12.13 hrs, Volume= 0.245 af, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.590	80	>75% Grass cover, Good, HSG D
0.810	85	Weighted Average
0.590		72.84% Pervious Area
0.220		27.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0933			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 19: Lot #7 (good)



Summary for Subcatchment 20: Lot #6 (good)

CarlsonPlanXYPos|643312.2303|1040980.2663|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

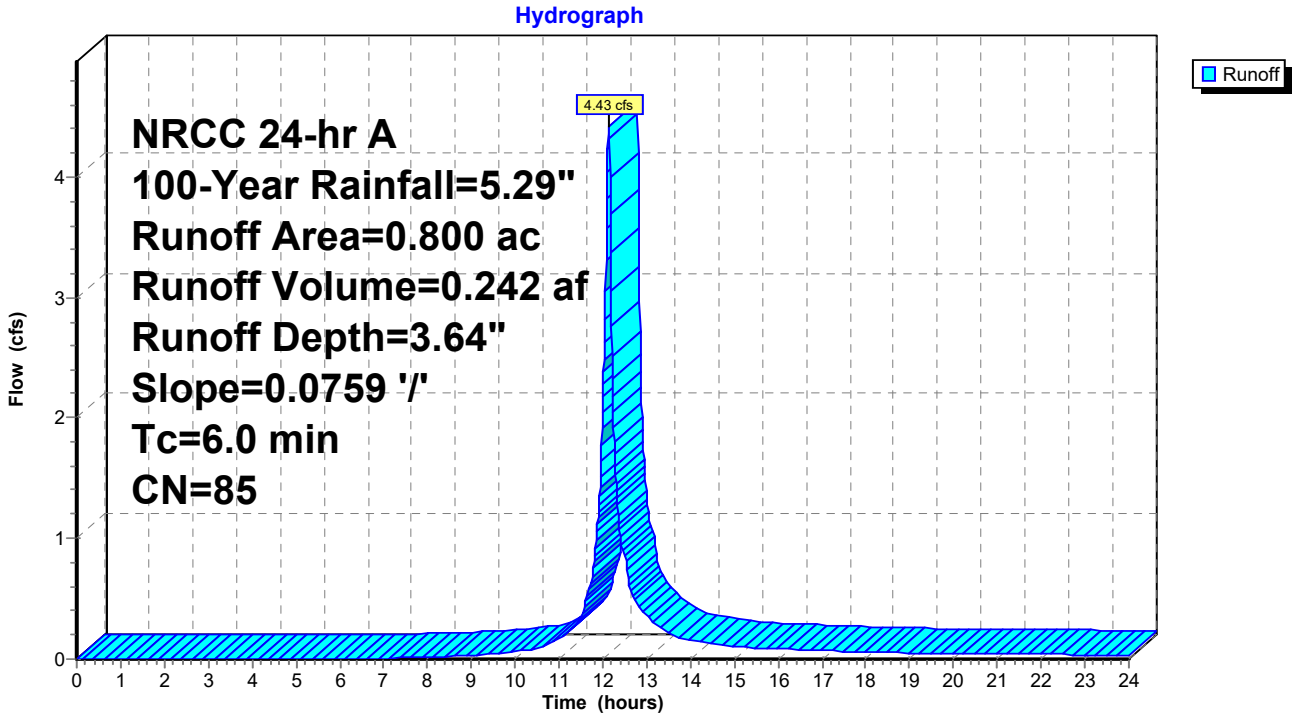
Runoff = 4.43 cfs @ 12.13 hrs, Volume= 0.242 af, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.580	80	>75% Grass cover, Good, HSG D
0.800	85	Weighted Average
0.580		72.50% Pervious Area
0.220		27.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0759			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 20: Lot #6 (good)



Summary for Subcatchment 21: Lot #5 (good)

CarlsonPlanXYPos|643492.4579|1040982.7482|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

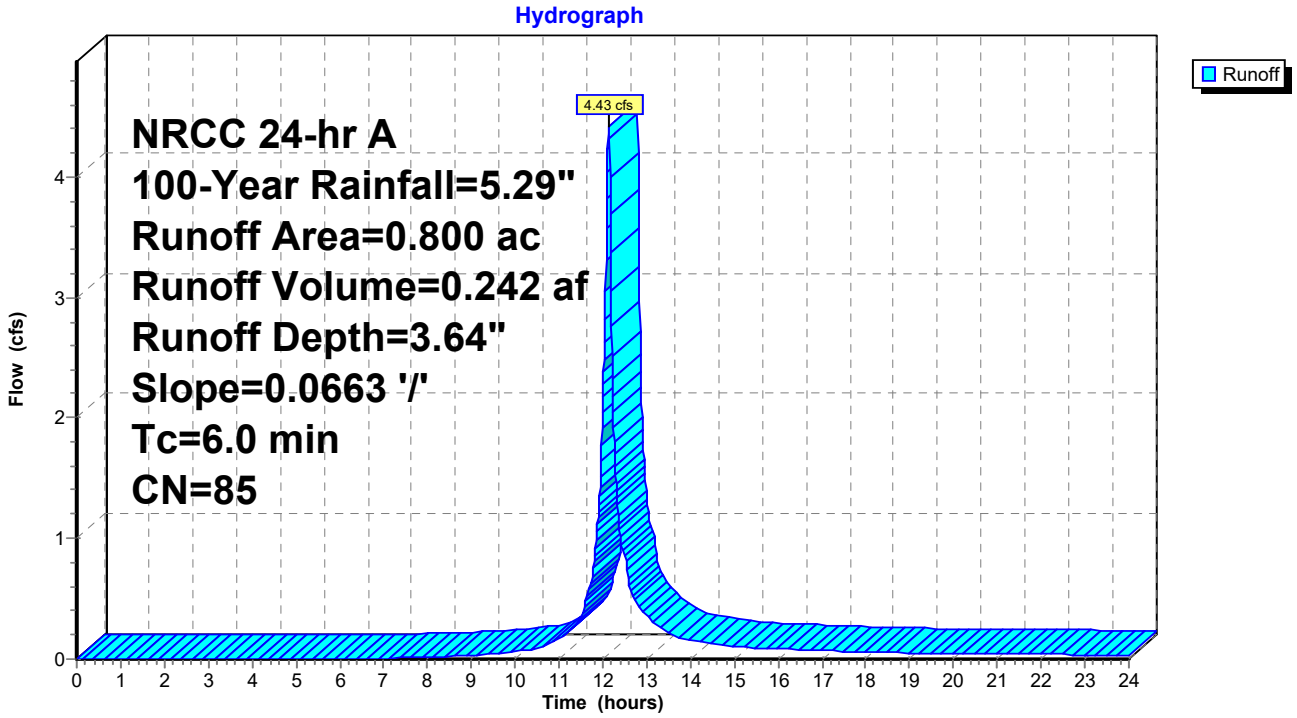
Runoff = 4.43 cfs @ 12.13 hrs, Volume= 0.242 af, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.580	80	>75% Grass cover, Good, HSG D
0.800	85	Weighted Average
0.580		72.50% Pervious Area
0.220		27.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0663			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 21: Lot #5 (good)



Summary for Subcatchment 22: Lot #4 (good)

CarlsonPlanXYPos|643706.8551|1040983.3562|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

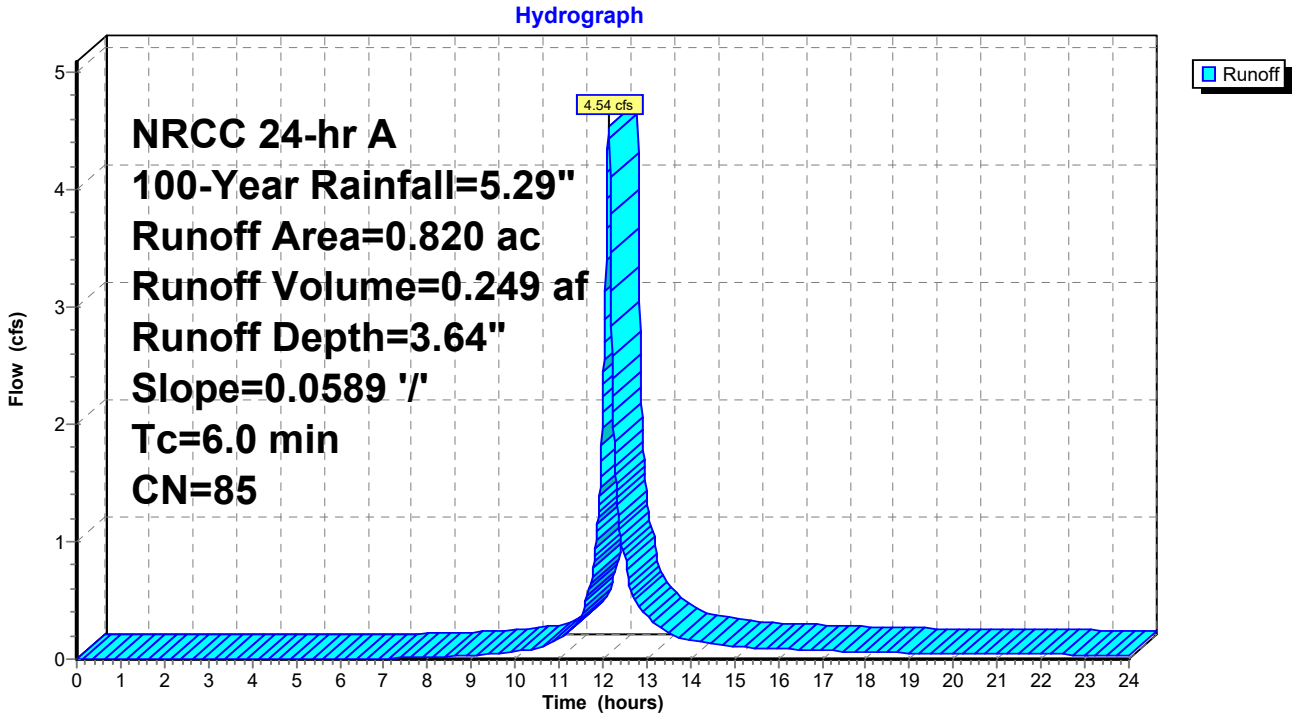
Runoff = 4.54 cfs @ 12.13 hrs, Volume= 0.249 af, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.600	80	>75% Grass cover, Good, HSG D
0.820	85	Weighted Average
0.600		73.17% Pervious Area
0.220		26.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0589			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 22: Lot #4 (good)



Summary for Subcatchment 23: Lot #3 (good)

CarlsonPlanXYPos|643896.4054|1040980.2593|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

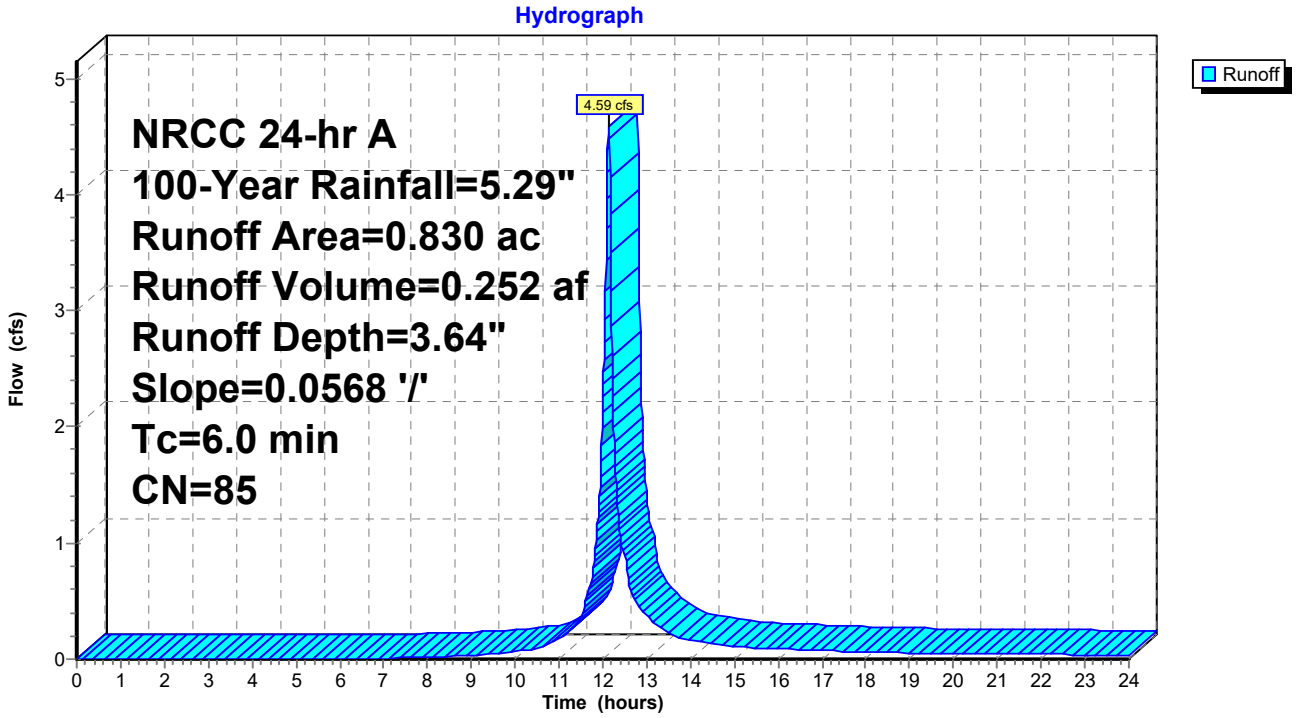
Runoff = 4.59 cfs @ 12.13 hrs, Volume= 0.252 af, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.610	80	>75% Grass cover, Good, HSG D
0.830	85	Weighted Average
0.610		73.49% Pervious Area
0.220		26.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0568			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 23: Lot #3 (good)



Summary for Subcatchment 24: Lot #2 (good)

CarlsonPlanXYPos|644102.7886|1040984.5776|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

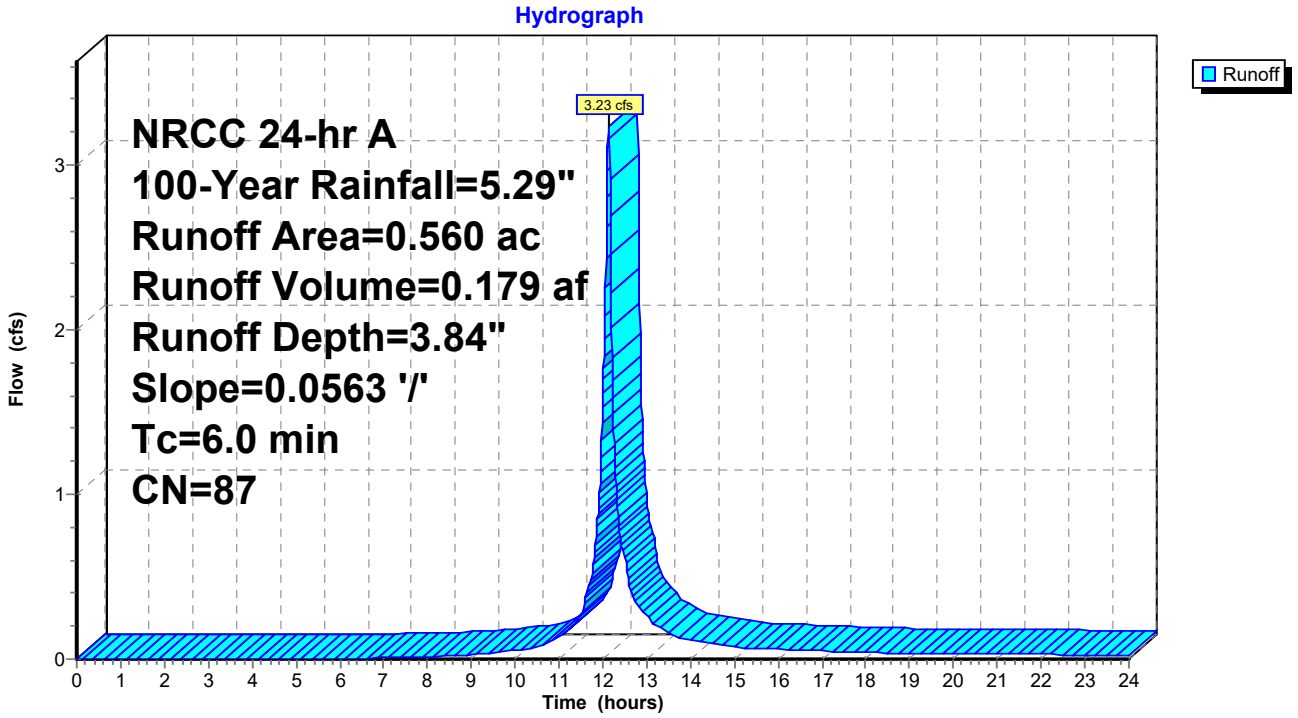
Runoff = 3.23 cfs @ 12.13 hrs, Volume= 0.179 af, Depth= 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.220	98	Paved parking, HSG D
0.340	80	>75% Grass cover, Good, HSG D
0.560	87	Weighted Average
0.340		60.71% Pervious Area
0.220		39.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0563			**Lag/CN Method,**
6.0					**Direct Entry,**
6.0	0	Total			

Subcatchment 24: Lot #2 (good)



Summary for Subcatchment 25: Lot #1 (good)

CarlsonPlanXYPos|644284.7705|1040971.5435|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

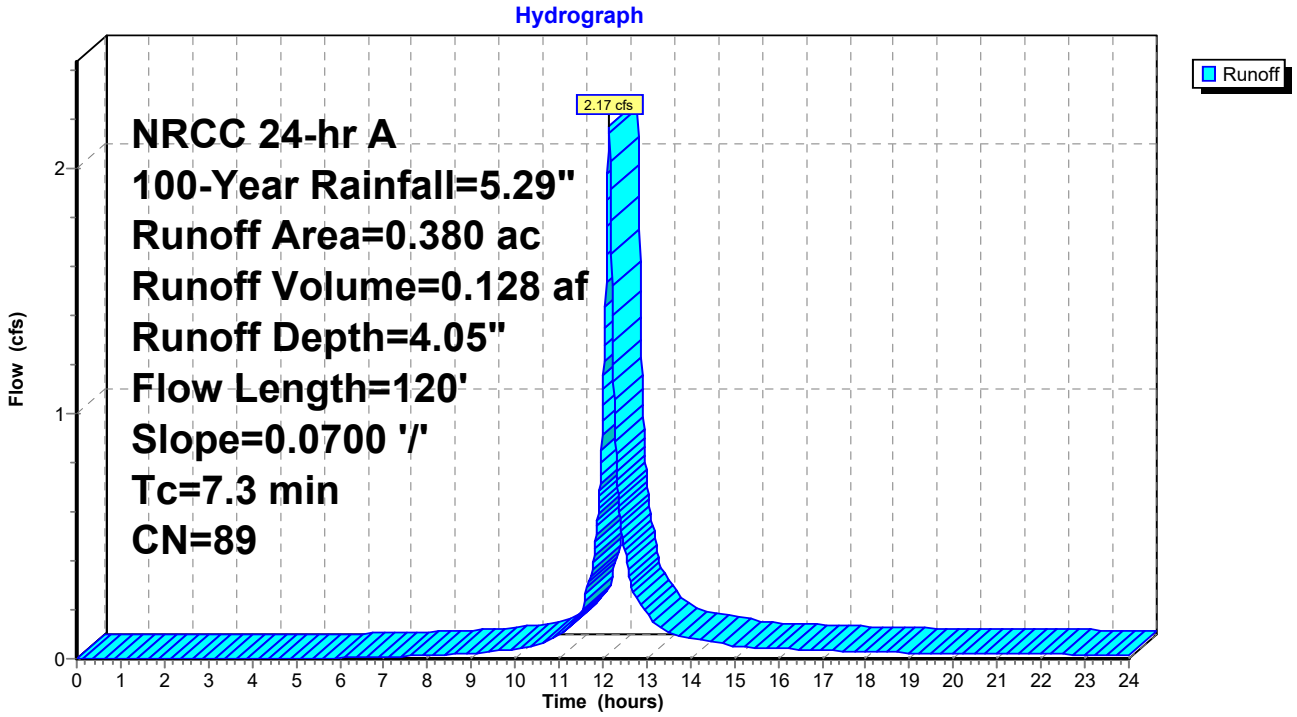
Runoff = 2.17 cfs @ 12.14 hrs, Volume= 0.128 af, Depth= 4.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.200	98	Paved parking, HSG D
0.180	80	>75% Grass cover, Good, HSG D
0.380	89	Weighted Average
0.180		47.37% Pervious Area
0.200		52.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.0700	0.23		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.19"
0.1	20	0.0700	4.26		**Shallow Concentrated Flow, Shallow Concentated** Unpaved Kv= 16.1 fps
7.3	120	Total			

Subcatchment 25: Lot #1 (good)



Summary for Subcatchment 26: 26 (update Tc to Channel flow?)

CarlsonPlanXYPos|644192.3159|1041141.7328|
CarlsonSurface|C:\Users\Office 2\Dropbox (Marks Engineering)\2020 PROJECTS\20-243 Licciardello, Angelo - 3535 East Lake Rd. - To Cdga To Hopewell\Carlson Files\ex topo.tin|

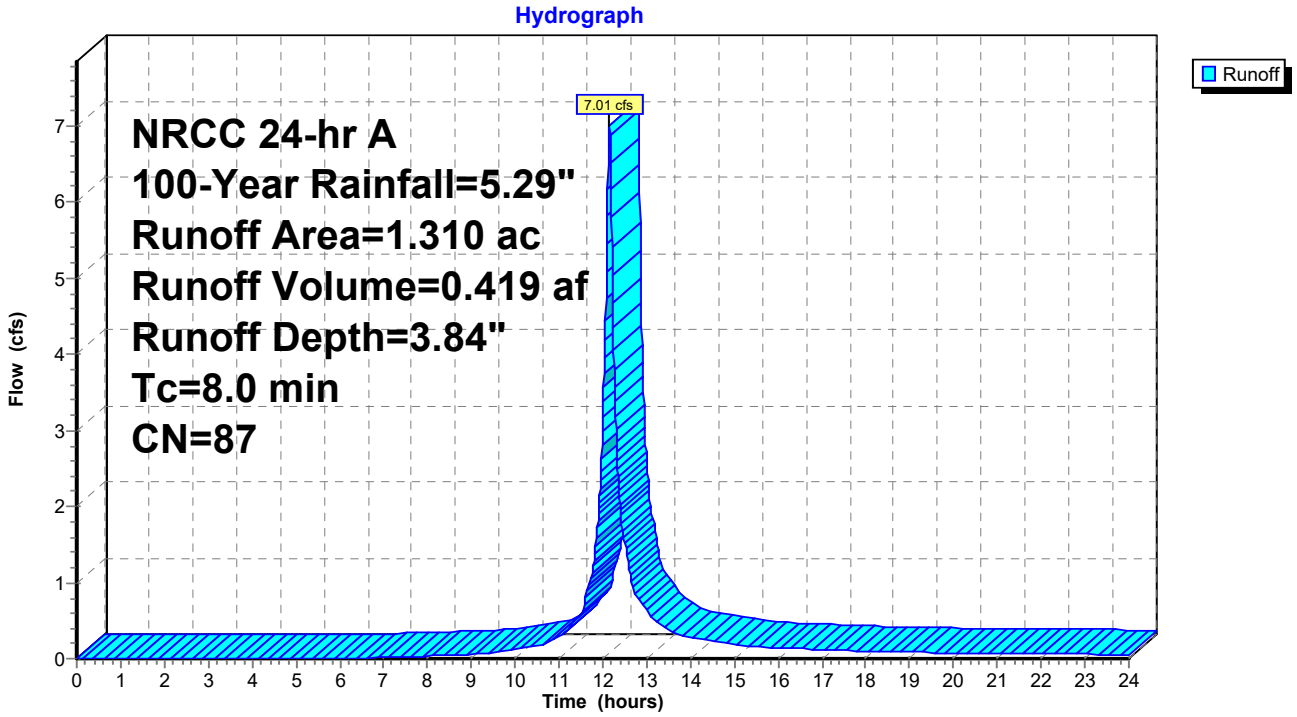
Runoff = 7.01 cfs @ 12.15 hrs, Volume= 0.419 af, Depth= 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.490	98	Paved parking, HSG D
0.820	80	>75% Grass cover, Good, HSG D
1.310	87	Weighted Average
0.820		62.60% Pervious Area
0.490		37.40% Impervious Area

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

Subcatchment 26: 26 (update Tc to Channel flow?)



Summary for Subcatchment 37S: 1

CarlsonPlanXYPos|641307.9585|1041455.1221|
CarlsonSurface||

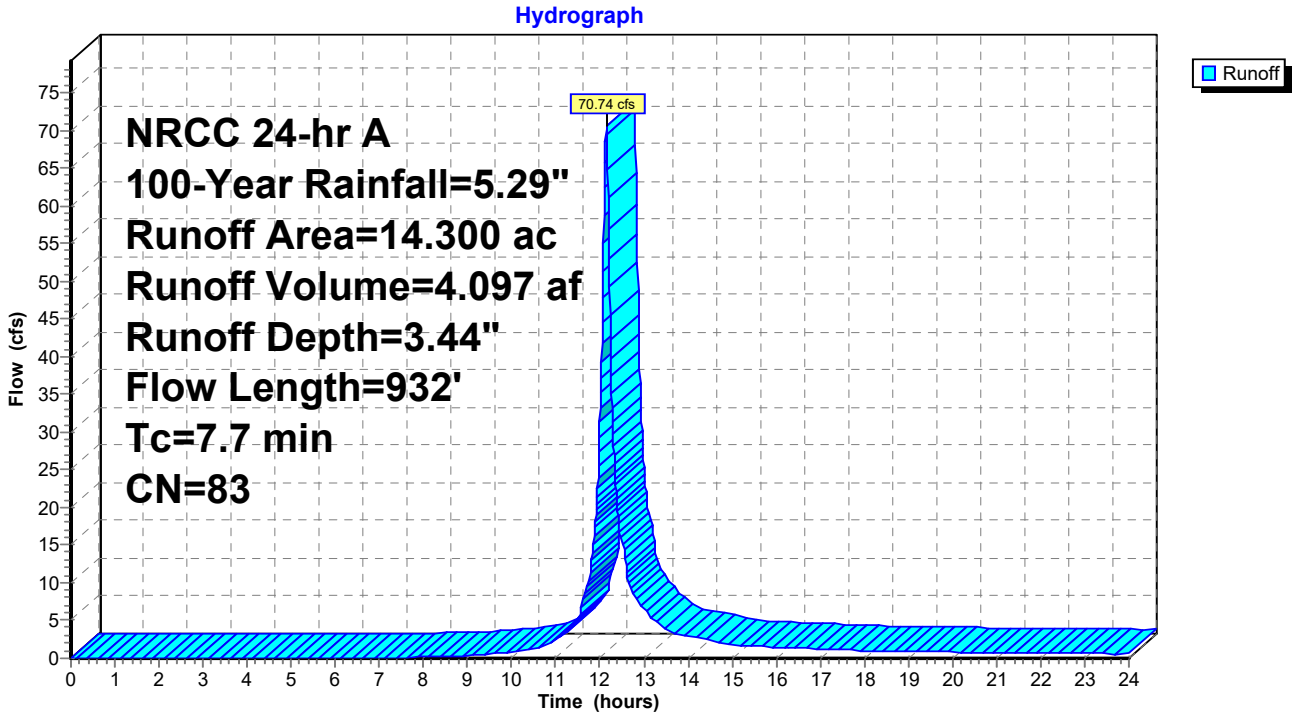
Runoff = 70.74 cfs @ 12.15 hrs, Volume= 4.097 af, Depth= 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.260	98	Water Surface HSG B
1.860	98	Paved parking HSG B
1.340	98	Paved parking HSG C
1.100	61	>75% Grass cover, Good, HSG B
9.180	80	>75% Grass cover, Good, HSG D
0.560	73	Brush, Good, HSG D
14.300	83	Weighted Average
10.840		75.80% Pervious Area
3.460		24.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.78		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.19"
3.9	25	0.0200	0.11		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.19"
0.3	81	0.0150	5.11	89.50	**Channel Flow, Channel Flow** Area= 17.5 sf Perim= 36.0' r= 0.49' n= 0.022
0.1	58	0.0340	7.70	134.75	**Channel Flow, Channel Flow** Area= 17.5 sf Perim= 36.0' r= 0.49' n= 0.022
0.2	132	0.0600	10.23	179.01	**Channel Flow, Channel Flow** Area= 17.5 sf Perim= 36.0' r= 0.49' n= 0.022
1.1	80	0.0060	1.16		**Shallow Concentrated Flow, Shallow Concentrated** Grassed Waterway Kv= 15.0 fps
0.5	114	0.0040	3.61	4.43	**Pipe Channel, Pipe Channel** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Corrugated PP, smooth interior
0.5	113	0.0040	4.07	7.20	**Pipe Channel, Pipe Channel** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012 Corrugated PP, smooth interior
0.1	35	0.0040	4.93	15.50	**Pipe Channel, Pipe Channel** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 Corrugated PP, smooth interior
0.7	279	0.0080	6.98	21.92	**Pipe Channel, Pipe Channel** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 Corrugated PP, smooth interior
7.7	932	Total			

Subcatchment 37S: 1



Summary for Subcatchment 46S: Portion of Lot #1

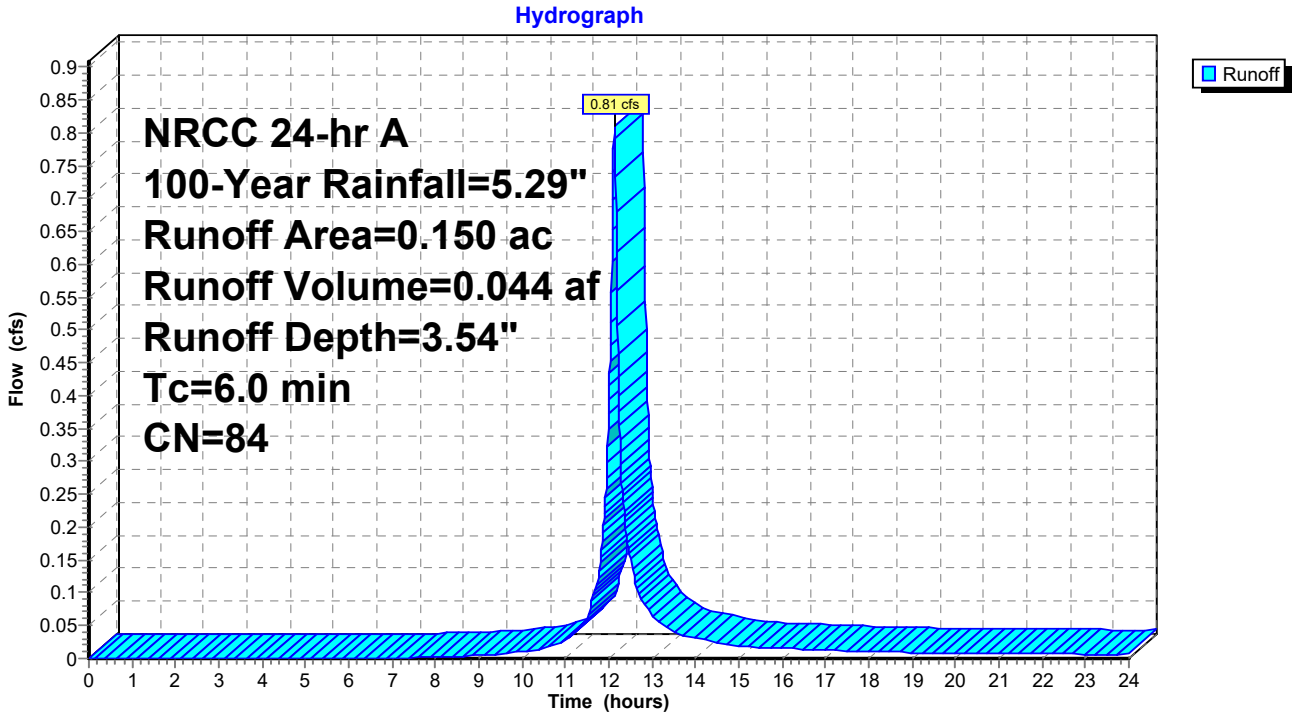
Runoff = 0.81 cfs @ 12.13 hrs, Volume= 0.044 af, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.030	98	Paved parking, HSG D
0.120	80	>75% Grass cover, Good, HSG D
0.150	84	Weighted Average
0.120		80.00% Pervious Area
0.030		20.00% Impervious Area

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

Subcatchment 46S: Portion of Lot #1



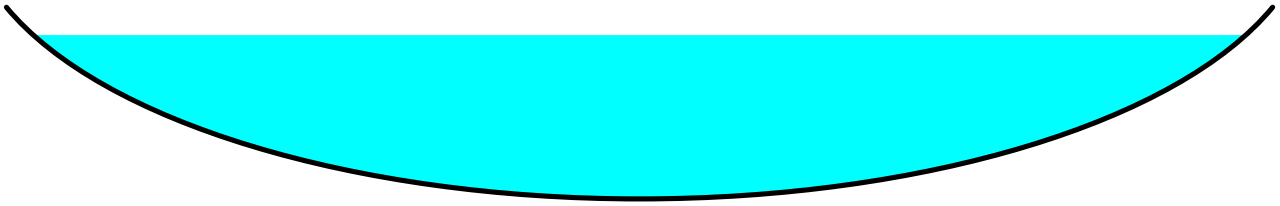
Summary for Reach 12R: Swale to off-site

Inflow Area = 78.750 ac, 0.89% Impervious, Inflow Depth > 2.68" for 100-Year event
Inflow = 41.42 cfs @ 13.35 hrs, Volume= 17.606 af
Outflow = 41.41 cfs @ 13.37 hrs, Volume= 17.605 af, Atten= 0%, Lag= 1.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.81 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 3.9 min

Peak Storage= 4,322 cf @ 13.37 hrs
Average Depth at Peak Storage= 0.85'
Bank-Full Depth= 1.00' Flow Area= 18.7 sf, Capacity= 58.17 cfs

28.00' x 1.00' deep Parabolic Channel, n= 0.030 Short grass
Length= 293.0' Slope= 0.0068 '/'
Inlet Invert= 703.00', Outlet Invert= 701.00'



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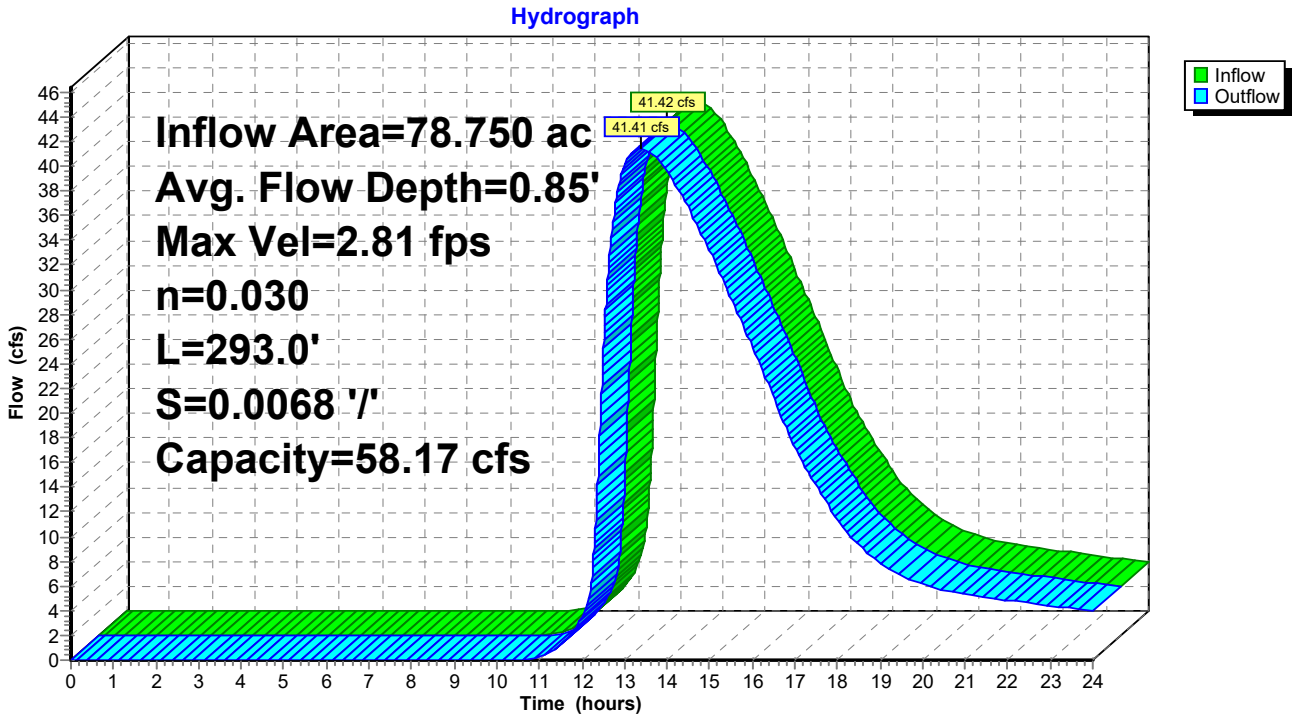
Reach 12R: Swale to off-site



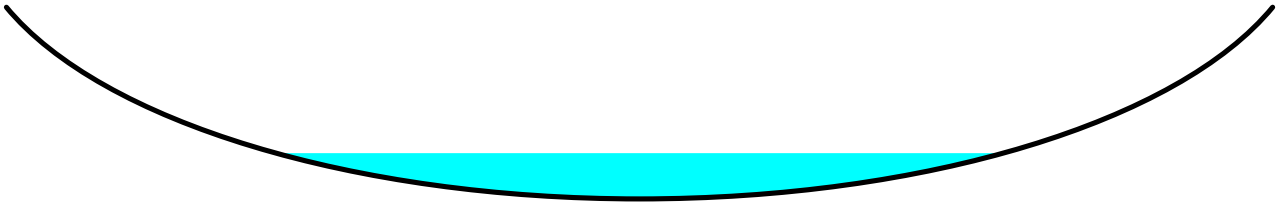
Summary for Reach 16R: Northside swale

Inflow Area = 1.310 ac, 37.40% Impervious, Inflow Depth = 3.38" for 100-Year event
Inflow = 5.10 cfs @ 12.22 hrs, Volume= 0.369 af
Outflow = 5.01 cfs @ 12.25 hrs, Volume= 0.369 af, Atten= 2%, Lag= 1.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.31 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 1.37 fps, Avg. Travel Time= 7.9 min

Peak Storage= 761 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 1.00' Flow Area= 10.0 sf, Capacity= 111.61 cfs

15.00' x 1.00' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 655.0' Slope= 0.0885 '/'
Inlet Invert= 804.00', Outlet Invert= 746.00'



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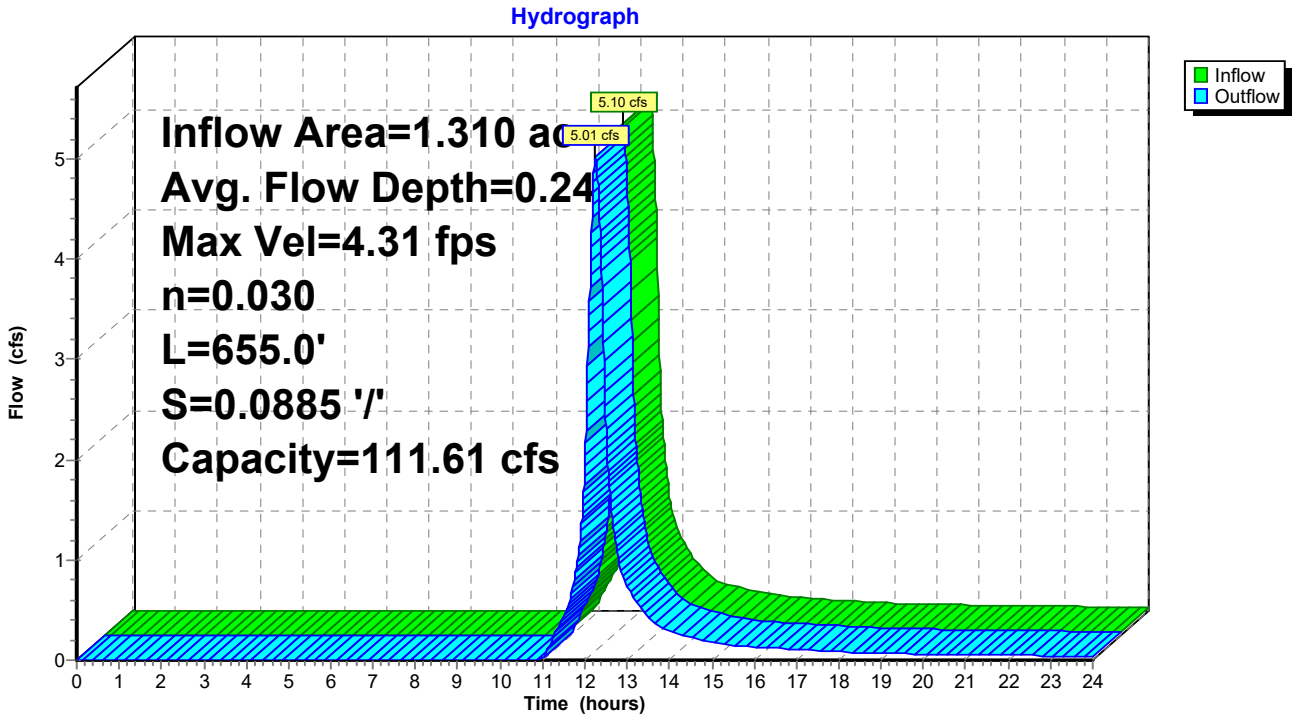
Reach 16R: Northside swale



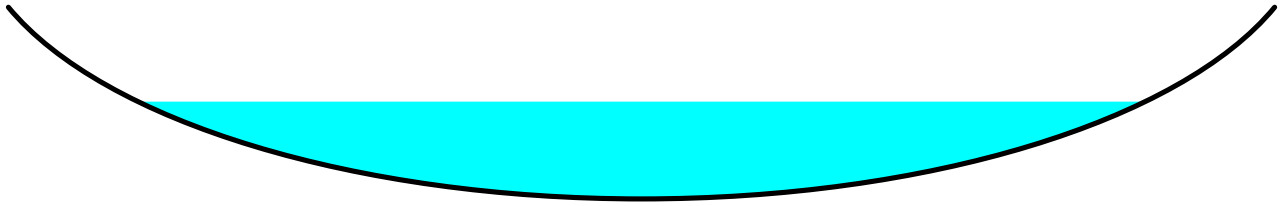
Summary for Reach 17R: Southside Swale

Inflow Area = 6.740 ac, 29.53% Impervious, Inflow Depth = 3.66" for 100-Year event
Inflow = 25.42 cfs @ 12.15 hrs, Volume= 2.055 af
Outflow = 25.05 cfs @ 12.17 hrs, Volume= 2.055 af, Atten= 1%, Lag= 1.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.91 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 2.12 fps, Avg. Travel Time= 5.6 min

Peak Storage= 2,573 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.51'
Bank-Full Depth= 1.00' Flow Area= 10.0 sf, Capacity= 108.12 cfs

15.00' x 1.00' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 710.0' Slope= 0.0831 '/'
Inlet Invert= 804.00', Outlet Invert= 745.00'



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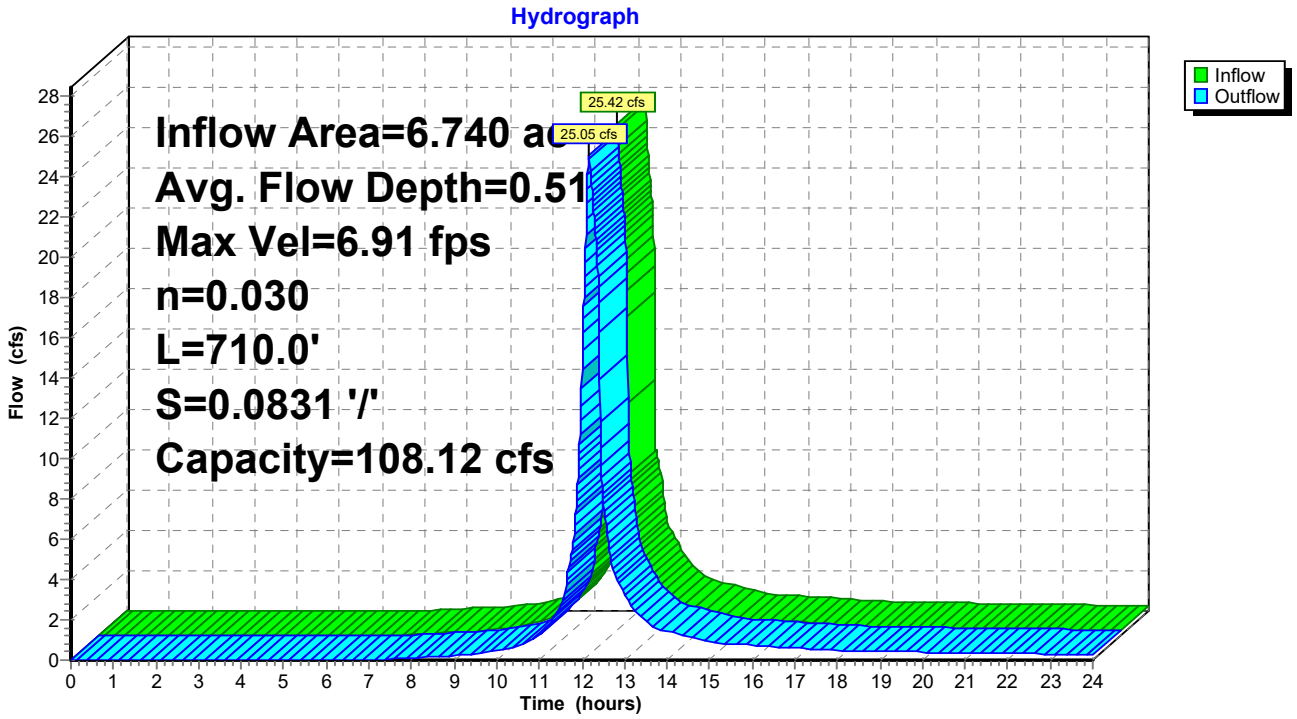
Reach 17R: Southside Swale



Summary for Pond 10P: Proposed 36" Culvert

Inflow Area = 78.750 ac, 0.89% Impervious, Inflow Depth = 2.69" for 100-Year event
Inflow = 152.87 cfs @ 12.50 hrs, Volume= 17.630 af
Outflow = 41.58 cfs @ 13.19 hrs, Volume= 17.607 af, Atten= 73%, Lag= 41.6 min
Primary = 13.16 cfs @ 12.92 hrs, Volume= 9.131 af
Secondary = 28.51 cfs @ 13.23 hrs, Volume= 8.476 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 706.99' @ 13.34 hrs Surf.Area= 256,337 sf Storage= 329,245 cf

Plug-Flow detention time= 121.2 min calculated for 17.607 af (100% of inflow)
Center-of-Mass det. time= 120.4 min (968.6 - 848.2)

Volume	Invert	Avail.Storage	Storage Description
#1	704.50'	609,456 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

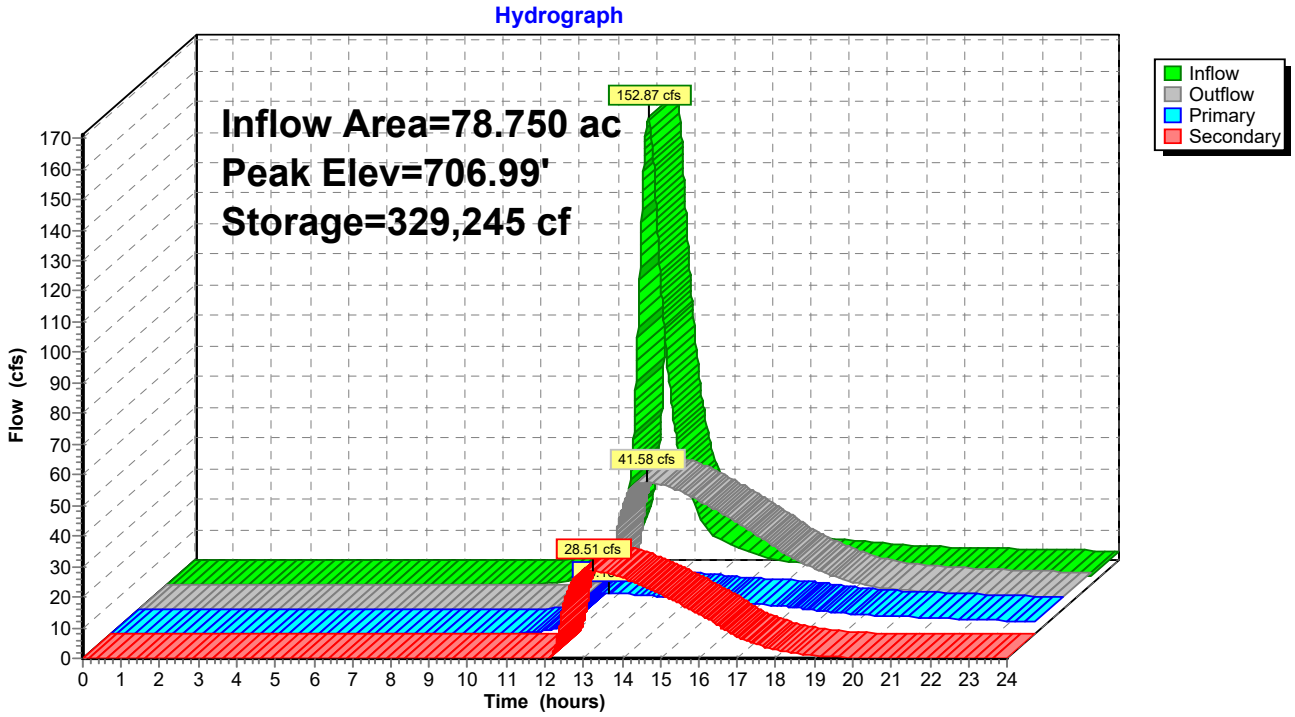
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
704.50	9,287	0	0
705.00	39,370	12,164	12,164
706.00	170,682	105,026	117,190
707.00	256,925	213,804	330,994
708.00	300,000	278,463	609,456

Device	Routing	Invert	Outlet Devices
#1	Primary	704.50'	**36.0" Round 36" Culvert** L= 122.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 704.50' / 704.00' S= 0.0041 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Secondary	705.50'	**10.0' 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=12.99 cfs @ 12.92 hrs HW=706.89' TW=706.60' (Dynamic Tailwater)
↑—**1=36" Culvert** (Outlet Controls 12.99 cfs @ 2.95 fps)

Secondary OutFlow Max=28.45 cfs @ 13.23 hrs HW=706.99' TW=706.72' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 28.45 cfs @ 1.91 fps)

Pond 10P: Proposed 36" Culvert



Summary for Pond 11P: Proposed 36" Culvert

Inflow Area = 78.750 ac, 0.89% Impervious, Inflow Depth > 2.68" for 100-Year event
Inflow = 41.58 cfs @ 13.19 hrs, Volume= 17.607 af
Outflow = 41.42 cfs @ 13.35 hrs, Volume= 17.606 af, Atten= 0%, Lag= 9.6 min
Primary = 41.42 cfs @ 13.35 hrs, Volume= 17.606 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 706.73' @ 13.35 hrs Surf.Area= 7,010 sf Storage= 10,762 cf

Plug-Flow detention time= 4.1 min calculated for 17.606 af (100% of inflow)
Center-of-Mass det. time= 4.0 min (972.6 - 968.6)

Volume	Invert	Avail.Storage	Storage Description
#1	703.30'	12,772 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

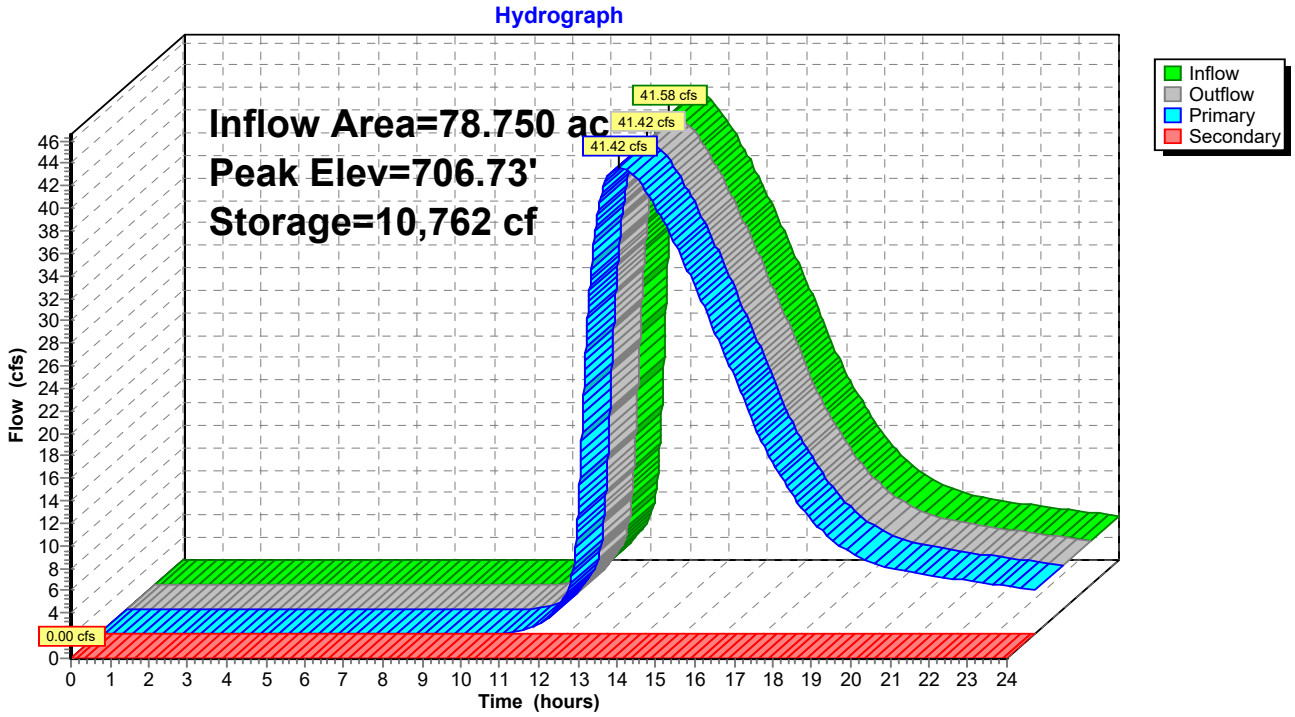
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
703.30	707	0	0
704.00	1,575	799	799
705.00	2,882	2,229	3,027
706.00	4,304	3,593	6,620
707.00	8,000	6,152	12,772

Device	Routing	Invert	Outlet Devices
#1	Primary	703.30'	**36.0" Round 36" cuvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 703.30' / 703.00' S= 0.0046 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Secondary	706.80'	**20.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=41.42 cfs @ 13.35 hrs HW=706.73' TW=703.85' (Dynamic Tailwater)
↑—**1=36" cuvert** (Barrel Controls 41.42 cfs @ 6.42 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=703.30' TW=703.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 11P: Proposed 36" Culvert



Summary for Pond 17P: Bioswale (good)

Inflow Area = 6.740 ac, 29.53% Impervious, Inflow Depth = 3.67" for 100-Year event
Inflow = 25.43 cfs @ 12.15 hrs, Volume= 2.059 af
Outflow = 25.42 cfs @ 12.15 hrs, Volume= 2.057 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.00 cfs @ 12.15 hrs, Volume= 0.002 af
Primary = 25.42 cfs @ 12.15 hrs, Volume= 2.055 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 808.54' @ 12.15 hrs Surf.Area= 491 sf Storage= 409 cf

Plug-Flow detention time= 1.7 min calculated for 2.057 af (100% of inflow)
Center-of-Mass det. time= 1.2 min (800.6 - 799.4)

Volume	Invert	Avail.Storage	Storage Description
#1	806.50'	2,012 cf	**SWALE STORAGE ABOVE BOTTOM (Conic)** Listed below

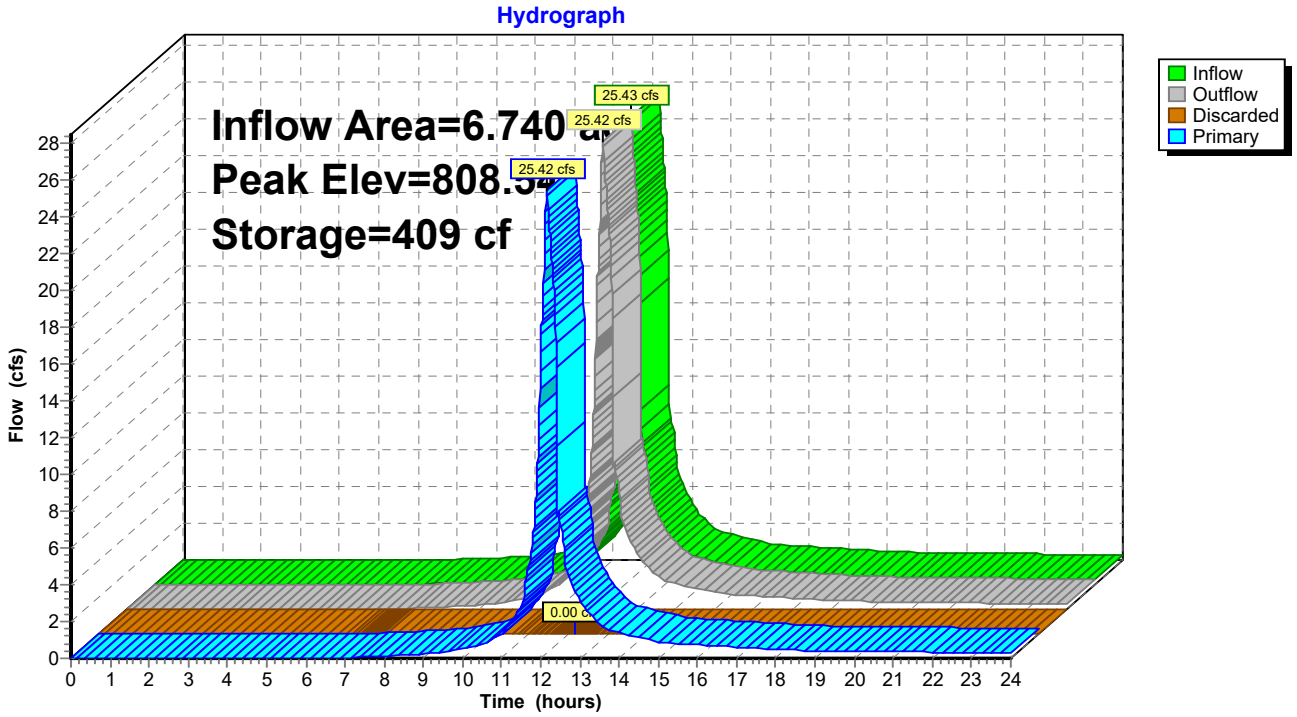
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
806.50	0	0	0	0
809.00	600	500	500	610
809.50	6,500	1,512	2,012	6,510

Device	Routing	Invert	Outlet Devices
#1	Discarded	806.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 750.00'
#2	Primary	807.00'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.15 hrs HW=808.54' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=25.39 cfs @ 12.15 hrs HW=808.54' TW=804.50' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 25.39 cfs @ 3.29 fps)

Pond 17P: Bioswale (good)



Summary for Pond 18P: Bioswale (good)

Inflow Area = 5.900 ac, 30.00% Impervious, Inflow Depth = 3.67" for 100-Year event
Inflow = 21.19 cfs @ 12.17 hrs, Volume= 1.805 af
Outflow = 21.19 cfs @ 12.17 hrs, Volume= 1.805 af, Atten= 0%, Lag= 0.2 min
Discarded = 0.00 cfs @ 12.17 hrs, Volume= 0.001 af
Primary = 21.19 cfs @ 12.17 hrs, Volume= 1.804 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 815.68' @ 12.17 hrs Surf.Area= 415 sf Storage= 346 cf

Plug-Flow detention time= 0.9 min calculated for 1.805 af (100% of inflow)
Center-of-Mass det. time= 0.8 min (799.6 - 798.8)

Volume	Invert	Avail.Storage	Storage Description
#1	814.50'	3,041 cf	**SWALE STORAGE (Conic)** Listed below

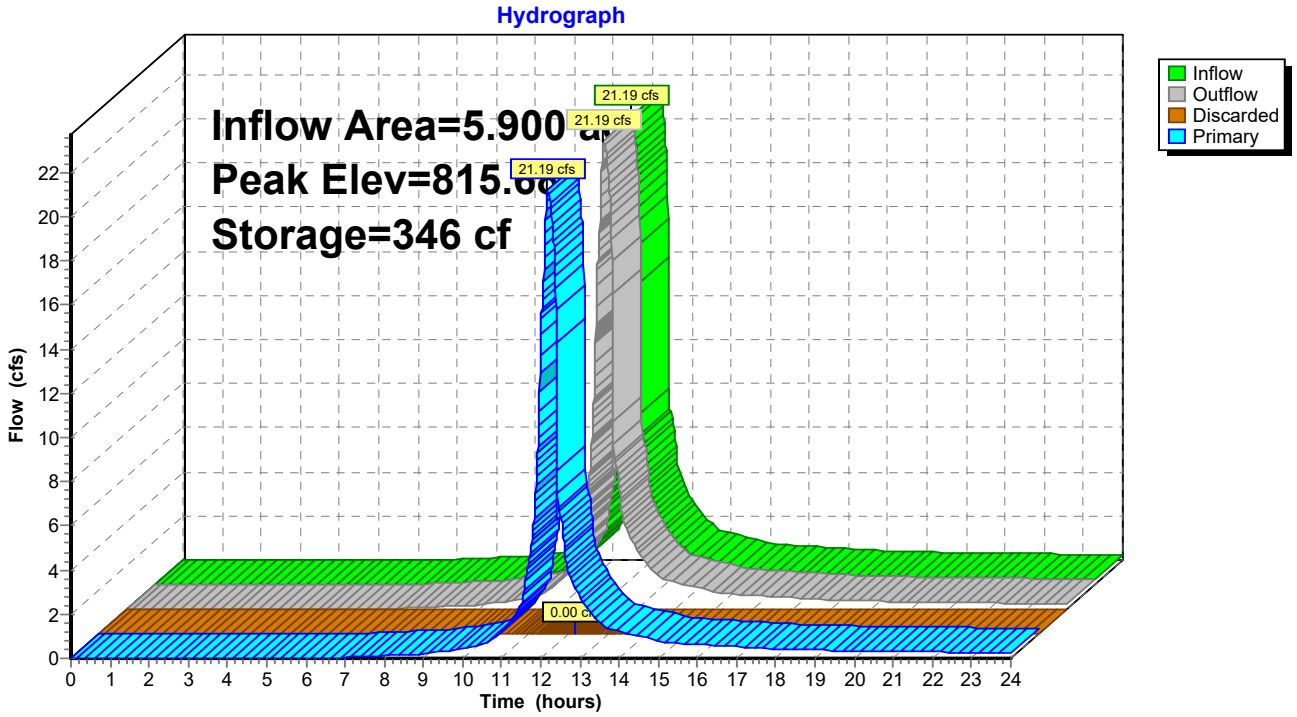
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
814.50	0	0	0	0
817.00	880	733	733	890
817.50	10,000	2,308	3,041	10,010

Device	Routing	Invert	Outlet Devices
#1	Discarded	814.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 750.00'
#2	Device 3	814.50'	**24.0" W x 24.0" H Vert. Orifice/Grate** C= 0.600
#3	Primary	812.50'	**24.0" Round Culvert** L= 46.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 812.50' / 812.00' S= 0.0109 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#4	Primary	814.70'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.17 hrs HW=815.68' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=21.18 cfs @ 12.17 hrs HW=815.68' TW=808.53' (Dynamic Tailwater)
└**3=Culvert** (Passes 8.21 cfs of 17.63 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 8.21 cfs @ 3.48 fps)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 12.97 cfs @ 2.65 fps)

Pond 18P: Bioswale (good)



Summary for Pond 19P: Bioswale (good)

Inflow Area = 5.150 ac, 30.10% Impervious, Inflow Depth = 3.68" for 100-Year event
Inflow = 19.71 cfs @ 12.16 hrs, Volume= 1.579 af
Outflow = 18.63 cfs @ 12.24 hrs, Volume= 1.579 af, Atten= 6%, Lag= 4.7 min
Discarded = 0.01 cfs @ 12.24 hrs, Volume= 0.001 af
Primary = 18.62 cfs @ 12.24 hrs, Volume= 1.578 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 830.27' @ 12.24 hrs Surf.Area= 1,866 sf Storage= 1,394 cf

Plug-Flow detention time= 0.6 min calculated for 1.579 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (799.0 - 798.4)

Volume	Invert	Avail.Storage	Storage Description
#1	829.50'	11,685 cf	**SWALE STORAGE (Conic)** Listed below

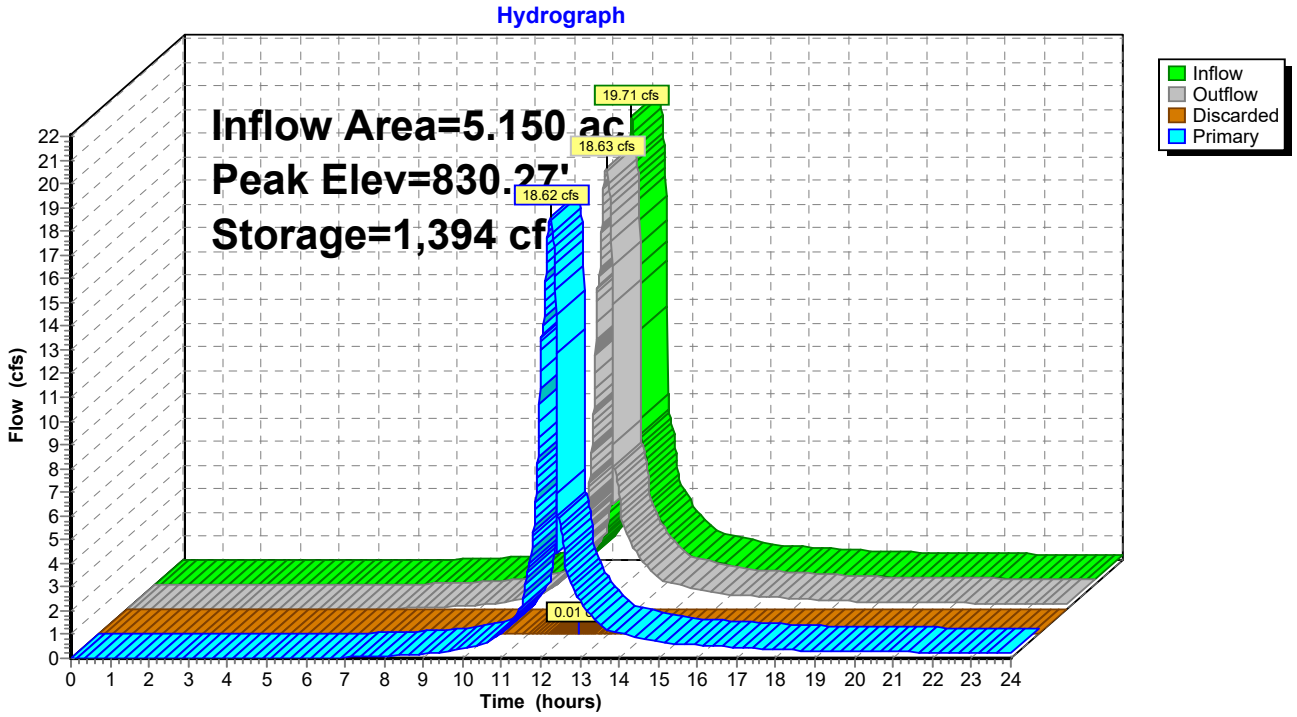
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
829.50	0	0	0	0
830.00	880	147	147	880
832.50	10,000	11,539	11,685	10,018

Device	Routing	Invert	Outlet Devices
#1	Discarded	829.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 0.01'
#2	Device 3	829.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	827.50'	**18.0" Round Culvert** L= 46.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 827.50' / 827.00' S= 0.0109 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#4	Primary	829.50'	**5.0' 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

Discarded OutFlow Max=0.01 cfs @ 12.24 hrs HW=830.27' (Free Discharge)
└**1=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=18.62 cfs @ 12.24 hrs HW=830.27' TW=815.66' (Dynamic Tailwater)
├**3=Culvert** (Inlet Controls 9.55 cfs @ 5.40 fps)
│ └**2=Orifice/Grate** (Passes 9.55 cfs of 16.90 cfs potential flow)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 9.07 cfs @ 2.35 fps)

Pond 19P: Bioswale (good)



Summary for Pond 20P: Bioswale (good)

Inflow Area = 4.340 ac, 30.65% Impervious, Inflow Depth = 3.69" for 100-Year event
Inflow = 17.78 cfs @ 12.16 hrs, Volume= 1.334 af
Outflow = 16.61 cfs @ 12.23 hrs, Volume= 1.334 af, Atten= 7%, Lag= 4.2 min
Discarded = 0.01 cfs @ 12.23 hrs, Volume= 0.001 af
Primary = 16.60 cfs @ 12.23 hrs, Volume= 1.333 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 845.31' @ 12.23 hrs Surf.Area= 1,999 sf Storage= 1,563 cf

Plug-Flow detention time= 0.7 min calculated for 1.334 af (100% of inflow)
Center-of-Mass det. time= 0.7 min (798.5 - 797.8)

Volume	Invert	Avail.Storage	Storage Description
#1	844.50'	11,685 cf	**SWALE STORAGE (Conic)** Listed below

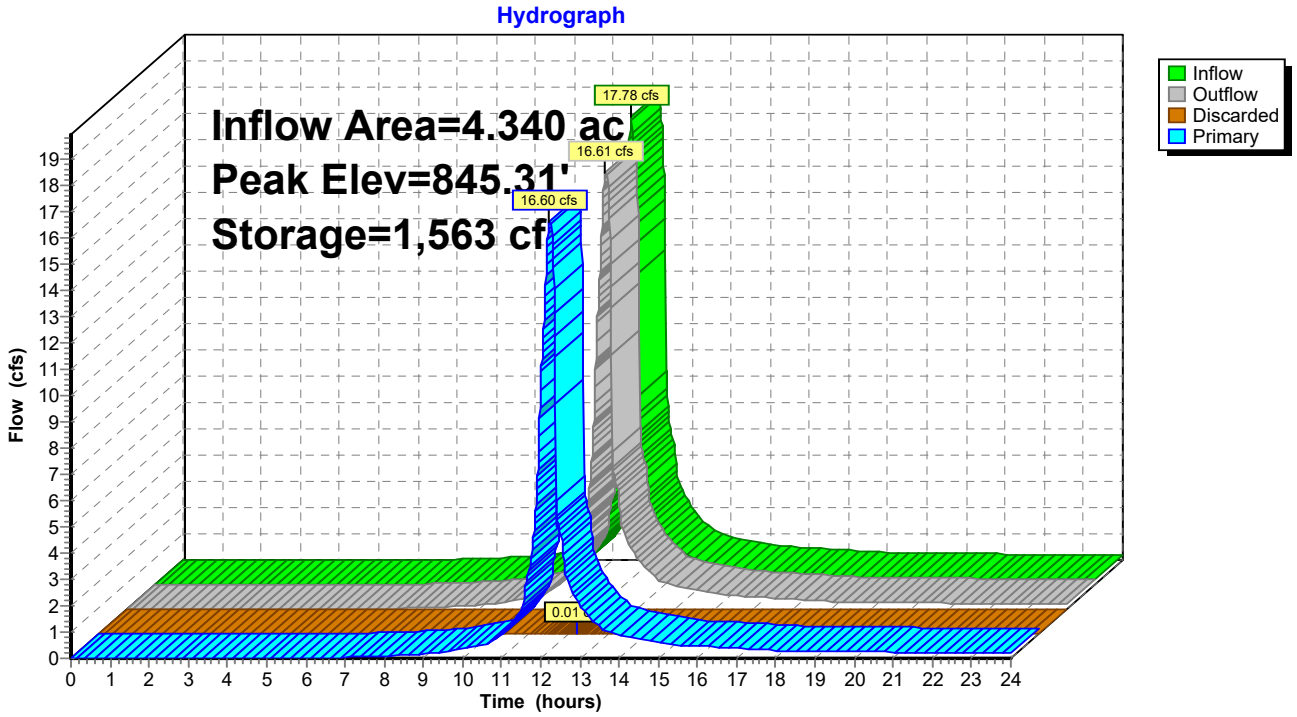
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
844.50	0	0	0	0
845.00	880	147	147	880
847.50	10,000	11,539	11,685	10,018

Device	Routing	Invert	Outlet Devices
#1	Discarded	844.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 800.00'
#2	Device 3	844.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	842.50'	**15.0" Round Culvert** L= 46.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 842.50' / 840.50' S= 0.0435 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#4	Primary	844.50'	**5.0' 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

Discarded OutFlow Max=0.01 cfs @ 12.23 hrs HW=845.31' (Free Discharge)
└**1=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=16.60 cfs @ 12.23 hrs HW=845.31' TW=830.27' (Dynamic Tailwater)
└**3=Culvert** (Inlet Controls 6.89 cfs @ 5.61 fps)
└**2=Orifice/Grate** (Passes 6.89 cfs of 17.30 cfs potential flow)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 9.71 cfs @ 2.41 fps)

Pond 20P: Bioswale (good)



Summary for Pond 21P: Bioswale (good)

Inflow Area = 3.540 ac, 31.36% Impervious, Inflow Depth = 3.70" for 100-Year event
Inflow = 15.61 cfs @ 12.15 hrs, Volume= 1.093 af
Outflow = 14.44 cfs @ 12.21 hrs, Volume= 1.093 af, Atten= 8%, Lag= 3.5 min
Discarded = 0.01 cfs @ 12.21 hrs, Volume= 0.001 af
Primary = 14.43 cfs @ 12.21 hrs, Volume= 1.092 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 859.19' @ 12.21 hrs Surf.Area= 1,576 sf Storage= 1,027 cf

Plug-Flow detention time= 0.6 min calculated for 1.093 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (797.8 - 797.2)

Volume	Invert	Avail.Storage	Storage Description
#1	858.50'	11,685 cf	**SWALE STORAGE (Conic)** Listed below

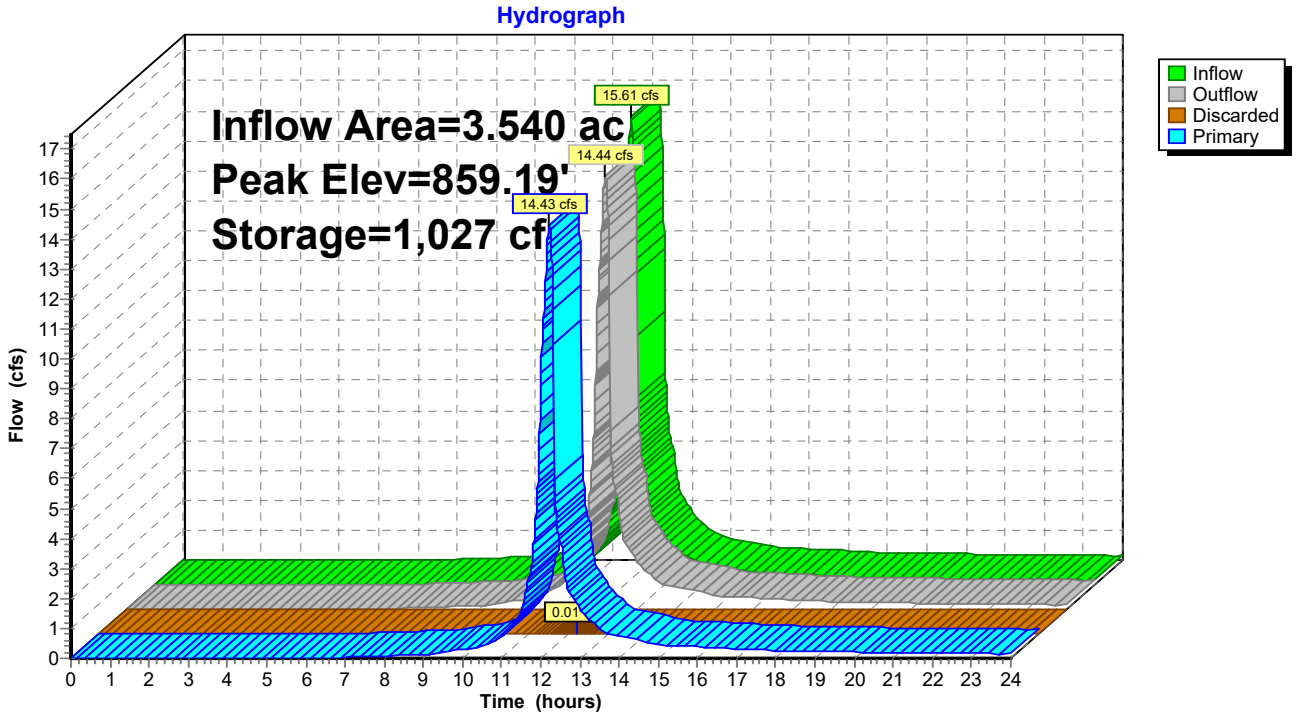
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
858.50	0	0	0	0
859.00	880	147	147	880
861.50	10,000	11,539	11,685	10,018

Device	Routing	Invert	Outlet Devices
#1	Device 3	858.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	858.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 750.00'
#3	Primary	856.50'	**15.0" Round Culvert** L= 47.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 856.50' / 854.00' S= 0.0532 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#4	Primary	858.50'	**5.0' 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

Discarded OutFlow Max=0.01 cfs @ 12.21 hrs HW=859.19' (Free Discharge)
└**2=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=14.43 cfs @ 12.21 hrs HW=859.19' TW=845.31' (Dynamic Tailwater)
├**3=Culvert** (Inlet Controls 6.70 cfs @ 5.46 fps)
│ └**1=Orifice/Grate** (Passes 6.70 cfs of 15.01 cfs potential flow)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 7.72 cfs @ 2.24 fps)

Pond 21P: Bioswale (good)



Summary for Pond 22P: Bioswale (good)

Inflow Area = 2.740 ac, 32.48% Impervious, Inflow Depth = 3.73" for 100-Year event
Inflow = 14.03 cfs @ 12.14 hrs, Volume= 0.851 af
Outflow = 12.05 cfs @ 12.20 hrs, Volume= 0.851 af, Atten= 14%, Lag= 3.4 min
Discarded = 0.01 cfs @ 12.20 hrs, Volume= 0.001 af
Primary = 12.04 cfs @ 12.20 hrs, Volume= 0.850 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 870.18' @ 12.20 hrs Surf.Area= 2,165 sf Storage= 1,334 cf

Plug-Flow detention time= 0.7 min calculated for 0.851 af (100% of inflow)
Center-of-Mass det. time= 0.7 min (797.0 - 796.3)

Volume	Invert	Avail.Storage	Storage Description
#1	869.50'	13,006 cf	**SWALE STORAGE (Conic)** Listed below

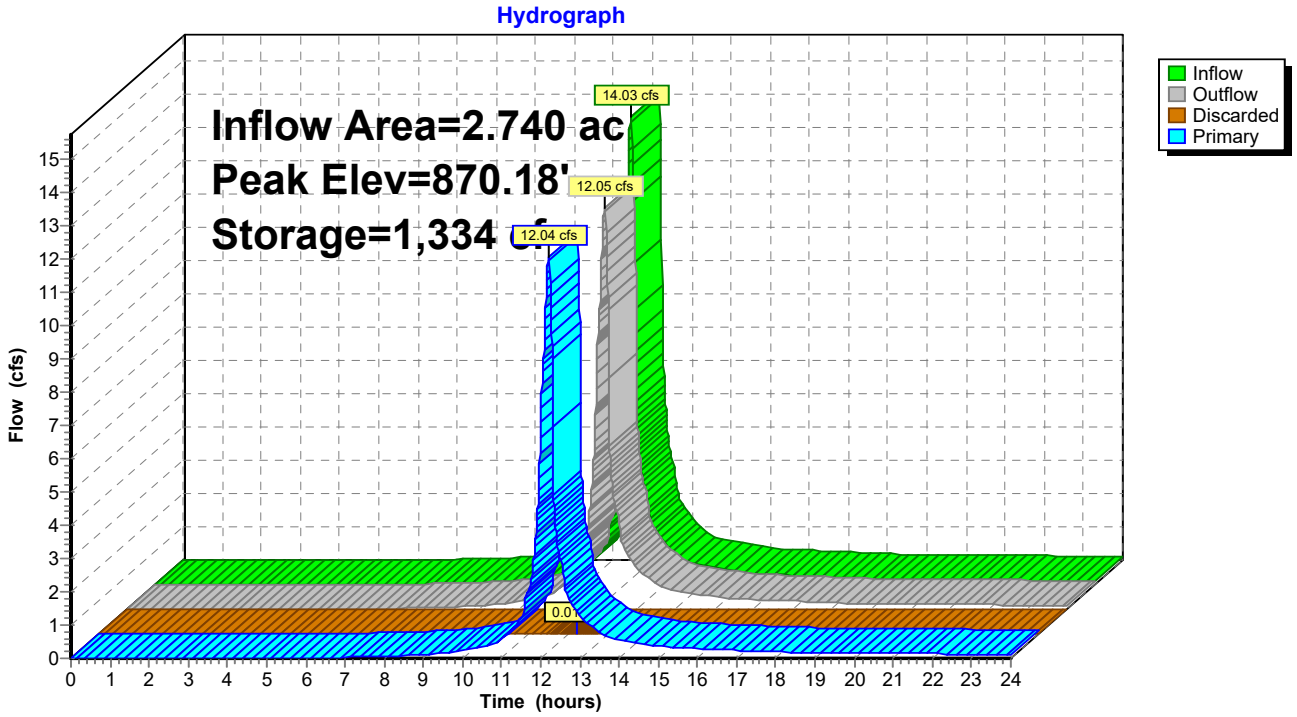
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
869.50	0	0	0	0
870.00	880	147	147	880
872.00	14,800	12,859	13,006	14,811

Device	Routing	Invert	Outlet Devices
#1	Discarded	869.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 750.00'
#2	Device 3	869.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	867.50'	**12.0" Round CMP_Round 12"** L= 47.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 867.50' / 866.00' S= 0.0319 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	869.50'	**5.0' 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

Discarded OutFlow Max=0.01 cfs @ 12.20 hrs HW=870.18' (Free Discharge)
└**1=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=12.04 cfs @ 12.20 hrs HW=870.18' TW=859.19' (Dynamic Tailwater)
├**3=CMP_Round 12"** (Inlet Controls 4.41 cfs @ 5.62 fps)
└**2=Orifice/Grate** (Passes 4.41 cfs of 14.82 cfs potential flow)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 7.62 cfs @ 2.23 fps)

Pond 22P: Bioswale (good)



Summary for Pond 23P: Bioswale (good)

Inflow Area = 1.920 ac, 34.90% Impervious, Inflow Depth = 3.77" for 100-Year event
Inflow = 10.72 cfs @ 12.14 hrs, Volume= 0.603 af
Outflow = 9.76 cfs @ 12.17 hrs, Volume= 0.603 af, Atten= 9%, Lag= 1.7 min
Primary = 9.76 cfs @ 12.17 hrs, Volume= 0.603 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 881.05' @ 12.17 hrs Surf.Area= 1,376 sf Storage= 398 cf

Plug-Flow detention time= 0.5 min calculated for 0.603 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (795.6 - 795.0)

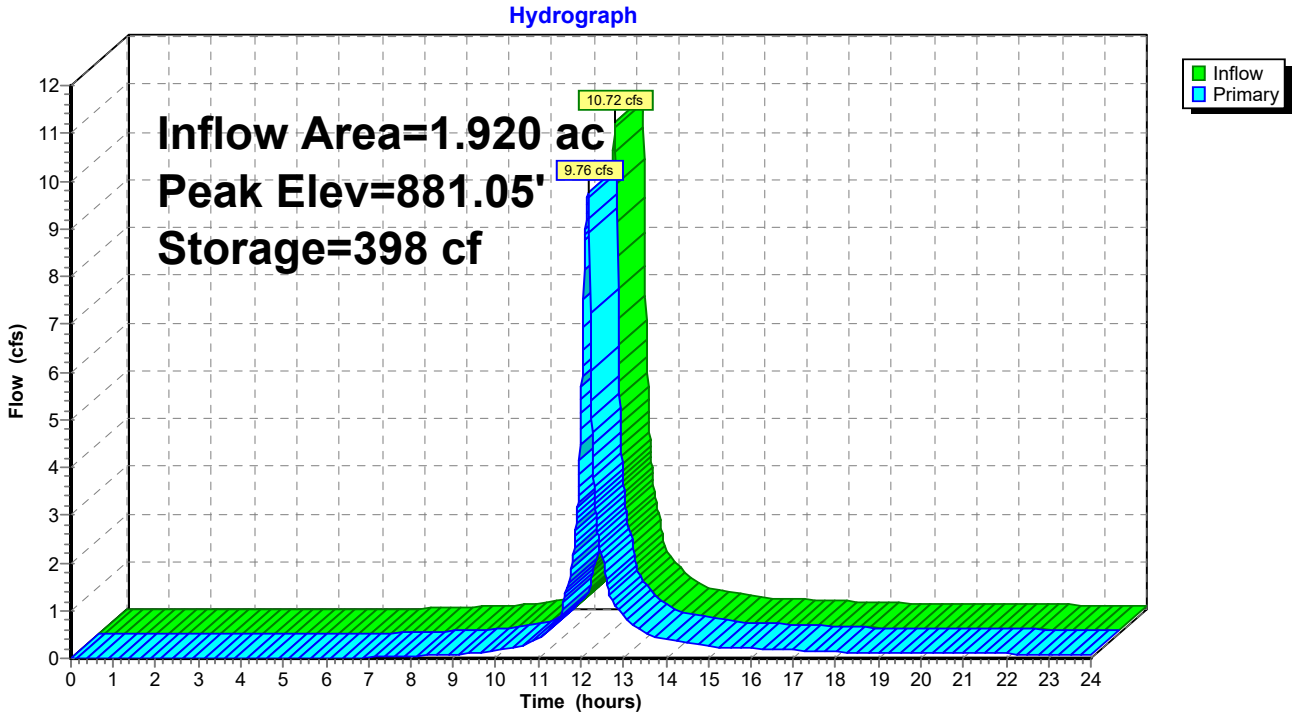
Volume	Invert	Avail.Storage	Storage Description
#1	880.50'	4,762 cf	**SWALE STORAGE (Conic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
880.50	0	0	0	0
881.00	880	147	147	880
882.00	10,000	4,615	4,762	10,003

Device	Routing	Invert	Outlet Devices
#1	Device 3	880.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 800.00'
#2	Device 3	880.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	878.50'	**12.0" Round CMP_Round 12"** L= 45.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 878.50' / 877.00' S= 0.0333 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	880.50'	**5.0' 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=9.75 cfs @ 12.17 hrs HW=881.05' TW=870.16' (Dynamic Tailwater)
- **3=CMP_Round 12"** (Inlet Controls 4.28 cfs @ 5.45 fps)
  - **1=Exfiltration** (Passes < 0.01 cfs potential flow)
  - **2=Orifice/Grate** (Passes < 10.78 cfs potential flow)
- **4=Broad-Crested Rectangular Weir** (Weir Controls 5.47 cfs @ 1.97 fps)

Pond 23P: Bioswale (good)



Summary for Pond 24P: Bioswale (good)

Inflow Area = 1.090 ac, 41.28% Impervious, Inflow Depth = 3.87" for 100-Year event
Inflow = 6.19 cfs @ 12.14 hrs, Volume= 0.351 af
Outflow = 6.16 cfs @ 12.14 hrs, Volume= 0.351 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.00 cfs @ 12.14 hrs, Volume= 0.000 af
Primary = 6.16 cfs @ 12.14 hrs, Volume= 0.351 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 891.81' @ 12.14 hrs Surf.Area= 522 sf Storage= 87 cf

Plug-Flow detention time= 0.5 min calculated for 0.351 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (792.9 - 792.4)

Volume	Invert	Avail.Storage	Storage Description
#1	891.50'	5,468 cf	**SWALE STORAGE (Conic)** Listed below

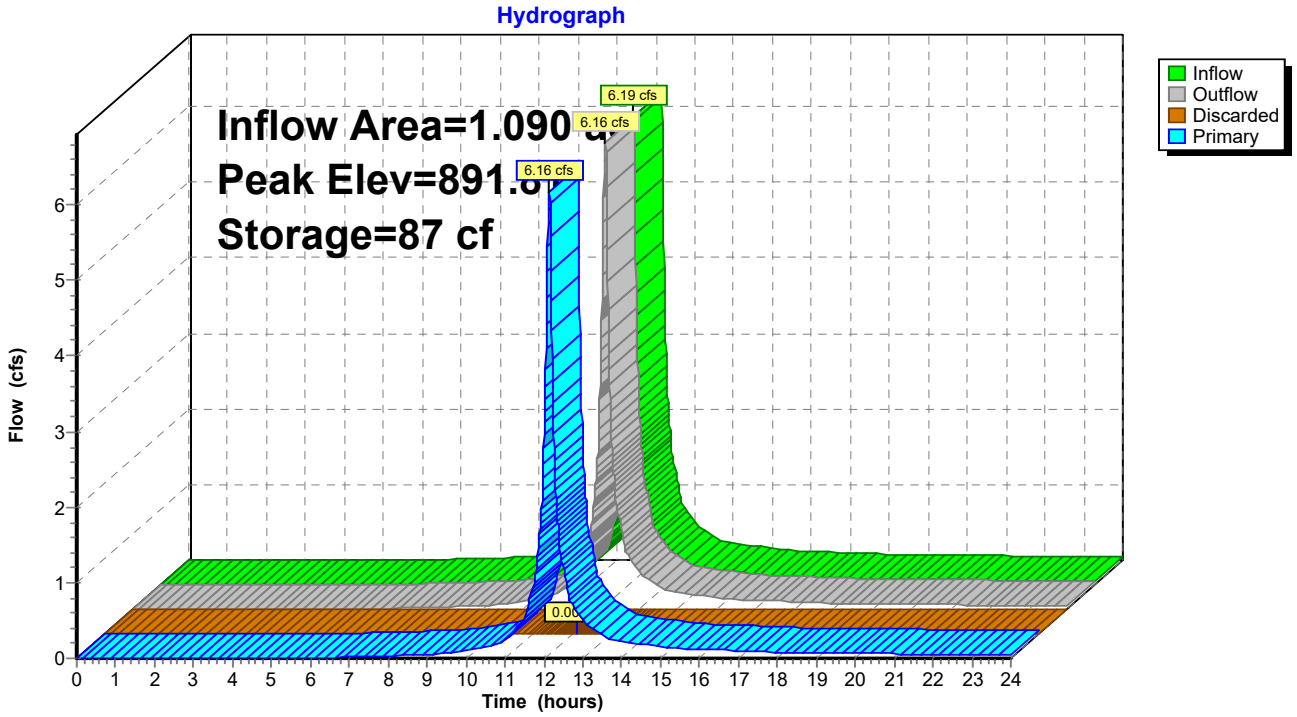
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
891.50	0	0	0	0
892.00	831	139	139	831
893.00	12,000	5,330	5,468	12,003

Device	Routing	Invert	Outlet Devices
#1	Discarded	891.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 800.00'
#2	Device 3	891.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	889.50'	**12.0" Round Culvert** L= 45.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 889.50' / 888.00' S= 0.0333 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	891.50'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.14 hrs HW=891.81' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=6.15 cfs @ 12.14 hrs HW=891.81' TW=881.04' (Dynamic Tailwater)
├**3=Culvert** (Inlet Controls 4.02 cfs @ 5.12 fps)
│ └**2=Orifice/Grate** (Passes 4.02 cfs of 4.58 cfs potential flow)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 2.13 cfs @ 1.36 fps)

Pond 24P: Bioswale (good)



Summary for Pond 25P: Bioswale (good)

Inflow Area = 0.530 ac, 43.40% Impervious, Inflow Depth = 3.90" for 100-Year event
Inflow = 2.98 cfs @ 12.14 hrs, Volume= 0.172 af
Outflow = 2.98 cfs @ 12.14 hrs, Volume= 0.172 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.00 cfs @ 12.14 hrs, Volume= 0.000 af
Primary = 2.98 cfs @ 12.14 hrs, Volume= 0.172 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 903.73' @ 12.14 hrs Surf.Area= 183 sf Storage= 30 cf

Plug-Flow detention time= 0.4 min calculated for 0.172 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (792.0 - 791.6)

Volume	Invert	Avail.Storage	Storage Description
#1	903.50'	2,142 cf	**SWALE STORAGE (Conic)** Listed below

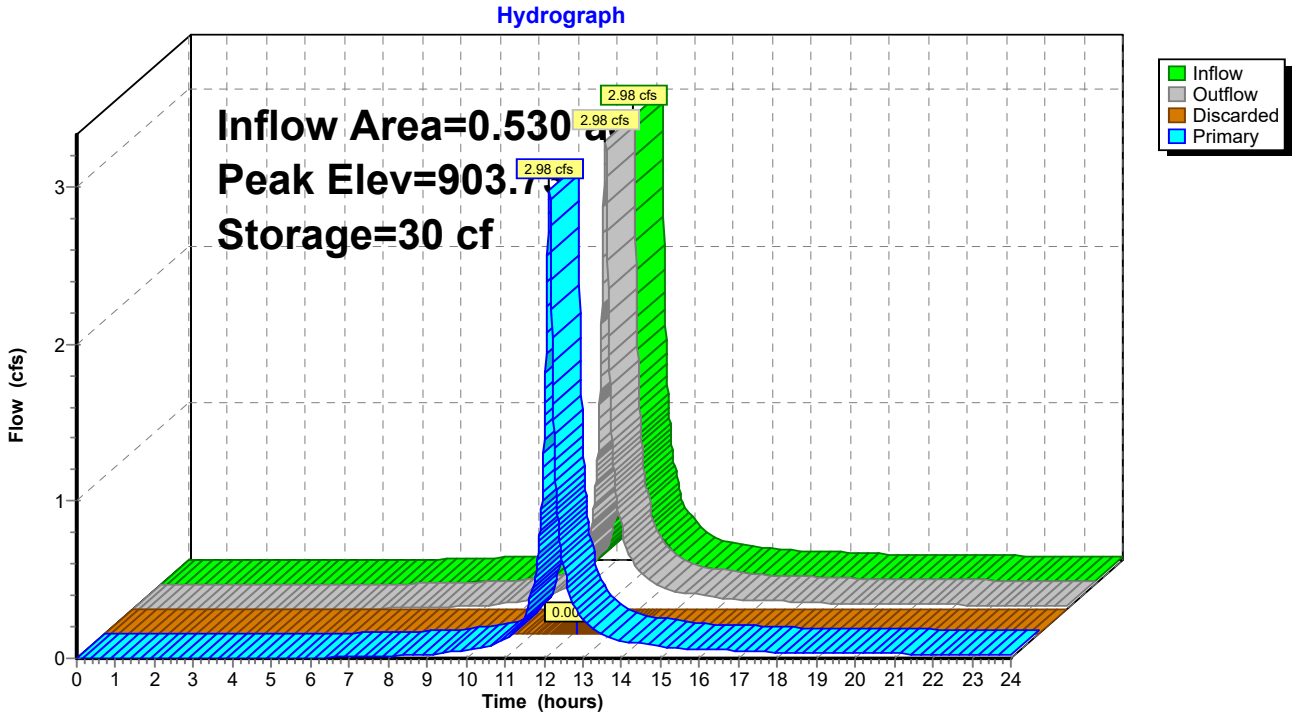
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
903.50	0	0	0	0
904.00	395	66	66	395
905.00	4,500	2,076	2,142	4,503

Device	Routing	Invert	Outlet Devices
#1	Discarded	903.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 800.00'
#2	Device 3	903.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	901.50'	**12.0" Round CMP_Round 12"** L= 58.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 901.50' / 901.00' S= 0.0086 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	903.70'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.14 hrs HW=903.73' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=2.97 cfs @ 12.14 hrs HW=903.73' TW=891.81' (Dynamic Tailwater)
├**3=CMP_Round 12"** (Passes 2.91 cfs of 3.93 cfs potential flow)
│└**2=Orifice/Grate** (Weir Controls 2.91 cfs @ 1.57 fps)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 0.06 cfs @ 0.41 fps)

Pond 25P: Bioswale (good)



Summary for Pond 26P: Bioswale (good)

Inflow Area = 0.150 ac, 20.00% Impervious, Inflow Depth = 3.54" for 100-Year event
Inflow = 0.81 cfs @ 12.13 hrs, Volume= 0.044 af
Outflow = 0.81 cfs @ 12.14 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.3 min
Discarded = 0.00 cfs @ 12.14 hrs, Volume= 0.000 af
Primary = 0.81 cfs @ 12.14 hrs, Volume= 0.044 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 907.60' @ 12.14 hrs Surf.Area= 125 sf Storage= 21 cf

Plug-Flow detention time= 1.0 min calculated for 0.044 af (100% of inflow)
Center-of-Mass det. time= 1.0 min (801.6 - 800.6)

Volume	Invert	Avail.Storage	Storage Description
#1	907.50'	2,578 cf	**SWALE STORAGE (Conic)** Listed below

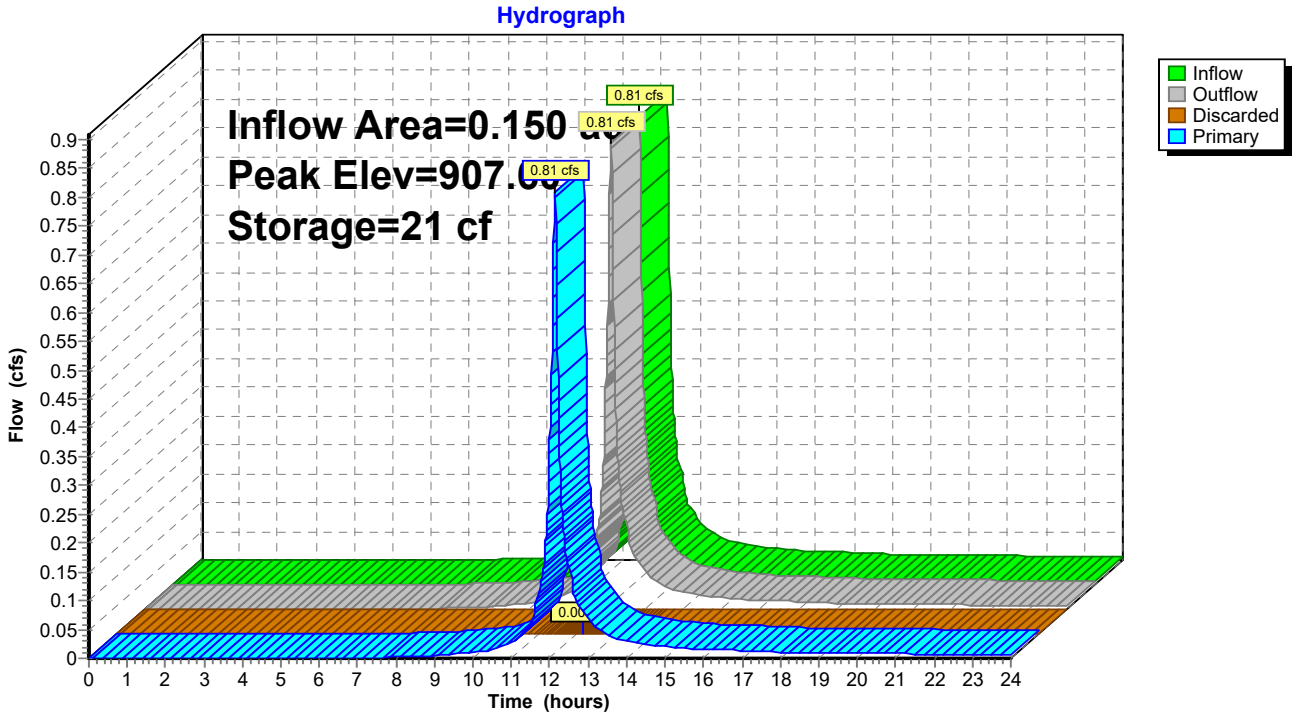
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
907.50	0	0	0	0
908.00	635	106	106	635
909.00	5,000	2,472	2,578	5,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	907.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 800.00'
#2	Device 3	907.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	905.50'	**12.0" Round CMP_Round 12"** L= 58.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 905.50' / 905.00' S= 0.0086 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	907.70'	**5.0' 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

Discarded OutFlow Max=0.00 cfs @ 12.14 hrs HW=907.60' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.81 cfs @ 12.14 hrs HW=907.60' TW=903.73' (Dynamic Tailwater)
├**3=CMP_Round 12"** (Passes 0.81 cfs of 3.77 cfs potential flow)
│└**2=Orifice/Grate** (Weir Controls 0.81 cfs @ 1.03 fps)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 26P: Bioswale (good)



Summary for Pond 27P: Dry Swale

Inflow Area = 1.310 ac, 37.40% Impervious, Inflow Depth = 3.84" for 100-Year event
Inflow = 7.01 cfs @ 12.15 hrs, Volume= 0.419 af
Outflow = 5.14 cfs @ 12.22 hrs, Volume= 0.408 af, Atten= 27%, Lag= 4.0 min
Discarded = 0.04 cfs @ 12.22 hrs, Volume= 0.039 af
Primary = 5.10 cfs @ 12.22 hrs, Volume= 0.369 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Peak Elev= 808.11' @ 12.22 hrs Surf.Area= 6,700 sf Storage= 2,973 cf

Plug-Flow detention time= 68.9 min calculated for 0.408 af (97% of inflow)
Center-of-Mass det. time= 53.1 min (847.8 - 794.7)

Volume	Invert	Avail.Storage	Storage Description
#1	807.00'	10,179 cf	**Custom Stage Data (Conic)** Listed below

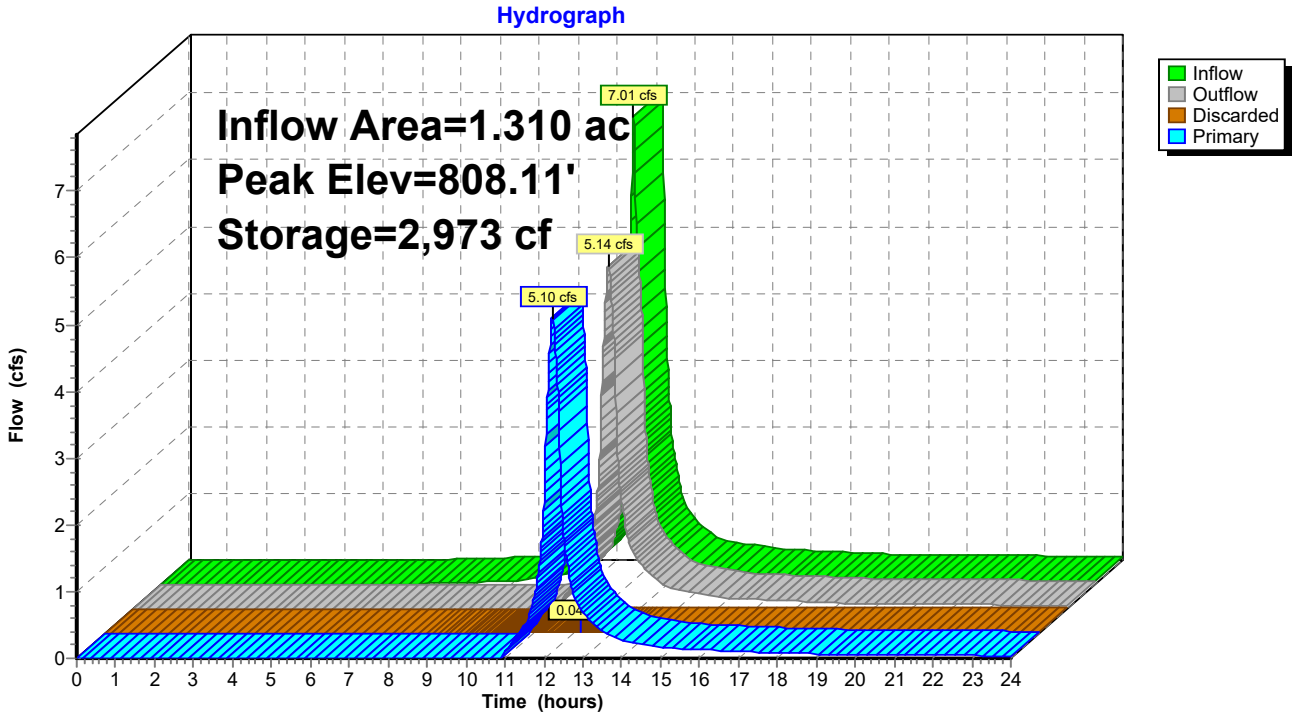
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
807.00	0	0	0	0
808.00	6,300	2,100	2,100	6,302
809.00	10,000	8,079	10,179	10,015

Device	Routing	Invert	Outlet Devices
#1	Primary	807.50'	**4.0' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Discarded	807.00'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 700.00'

Discarded OutFlow Max=0.04 cfs @ 12.22 hrs HW=808.11' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=5.10 cfs @ 12.22 hrs HW=808.11' TW=804.24' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 5.10 cfs @ 2.10 fps)

Pond 27P: Dry Swale



Summary for Pond 32P: Lower Pond

Inflow Area = 38.100 ac, 11.36% Impervious, Inflow Depth = 3.20" for 100-Year event
Inflow = 89.57 cfs @ 12.16 hrs, Volume= 10.151 af
Outflow = 67.82 cfs @ 12.26 hrs, Volume= 9.201 af, Atten= 24%, Lag= 6.0 min
Primary = 12.89 cfs @ 12.26 hrs, Volume= 4.682 af
Secondary = 54.93 cfs @ 12.26 hrs, Volume= 4.519 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Starting Elev= 700.50' Surf.Area= 14,196 sf Storage= 6,497 cf
Peak Elev= 704.43' @ 12.26 hrs Surf.Area= 30,816 sf Storage= 91,323 cf (84,826 cf above start)

Plug-Flow detention time= 128.9 min calculated for 9.049 af (89% of inflow)
Center-of-Mass det. time= 70.7 min (897.3 - 826.6)

Volume	Invert	Avail.Storage	Storage Description
#1	700.00'	124,144 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

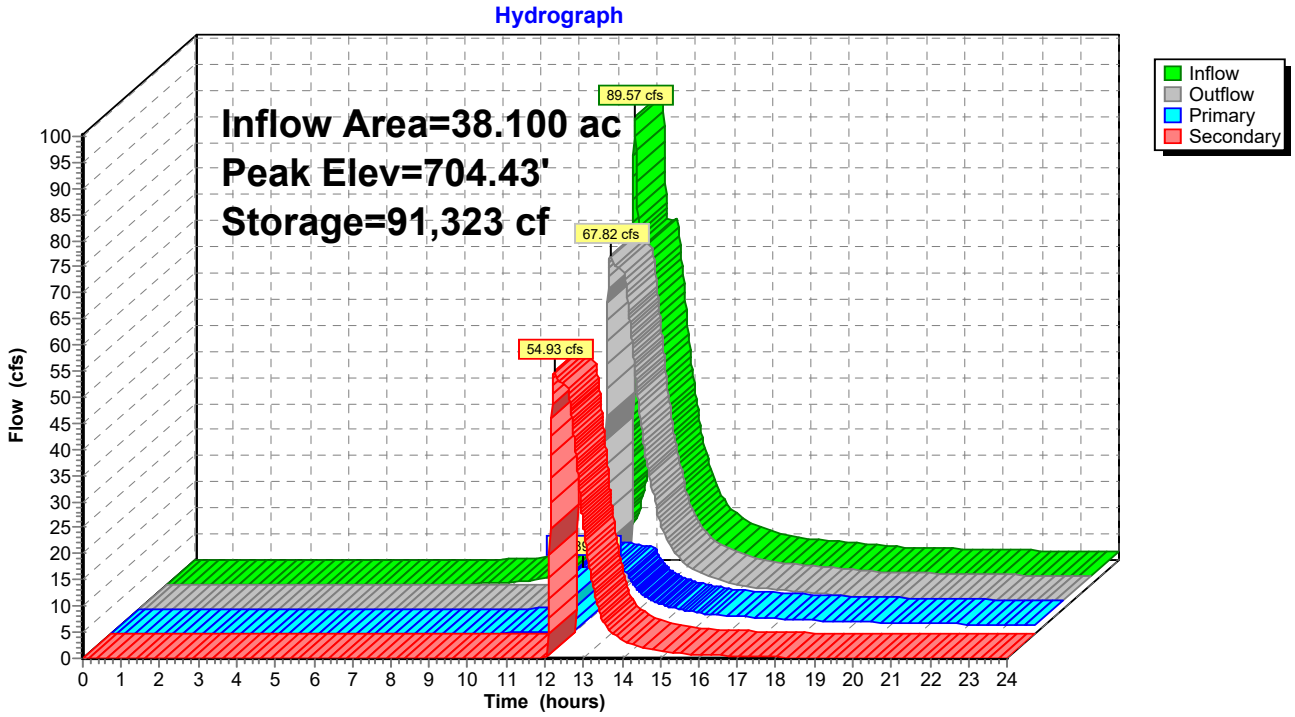
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
700.00	11,792	0	0
701.00	16,599	14,196	14,196
702.00	19,522	18,061	32,256
703.00	22,479	21,001	53,257
704.00	28,237	25,358	78,615
705.00	34,230	31,234	109,848
705.40	37,252	14,296	124,144

Device	Routing	Invert	Outlet Devices
#1	Secondary	703.60'	**27.0' 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
#2	Device 4	703.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 4	700.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#4	Primary	700.00'	**18.0" Round Culvert** L= 21.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 700.00' / 699.80' S= 0.0095 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf

Primary OutFlow Max=12.89 cfs @ 12.26 hrs HW=704.43' TW=0.00' (Dynamic Tailwater)
└**4=Culvert** (Inlet Controls 12.89 cfs @ 7.29 fps)
  ├**2=Orifice/Grate** (Passes < 46.94 cfs potential flow)
  └**3=Orifice/Grate** (Passes < 0.49 cfs potential flow)

Secondary OutFlow Max=54.92 cfs @ 12.26 hrs HW=704.43' TW=0.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 54.92 cfs @ 2.45 fps)

Pond 32P: Lower Pond



Summary for Pond 33P: Upper Pond

Inflow Area = 32.150 ac, 14.71% Impervious, Inflow Depth = 3.12" for 100-Year event
Inflow = 106.60 cfs @ 12.24 hrs, Volume= 8.368 af
Outflow = 85.32 cfs @ 12.35 hrs, Volume= 7.357 af, Atten= 20%, Lag= 7.0 min
Primary = 27.45 cfs @ 12.35 hrs, Volume= 5.945 af
Secondary = 57.87 cfs @ 12.35 hrs, Volume= 1.412 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs
Starting Elev= 705.00' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 743.78' @ 12.35 hrs Surf.Area= 25,883 sf Storage= 115,573 cf

Plug-Flow detention time= 153.7 min calculated for 7.355 af (88% of inflow)
Center-of-Mass det. time= 99.5 min (917.3 - 817.8)

Volume	Invert	Avail.Storage	Storage Description
#1	737.50'	149,518 cf	**prop (Conic)** Listed below (Recalc)

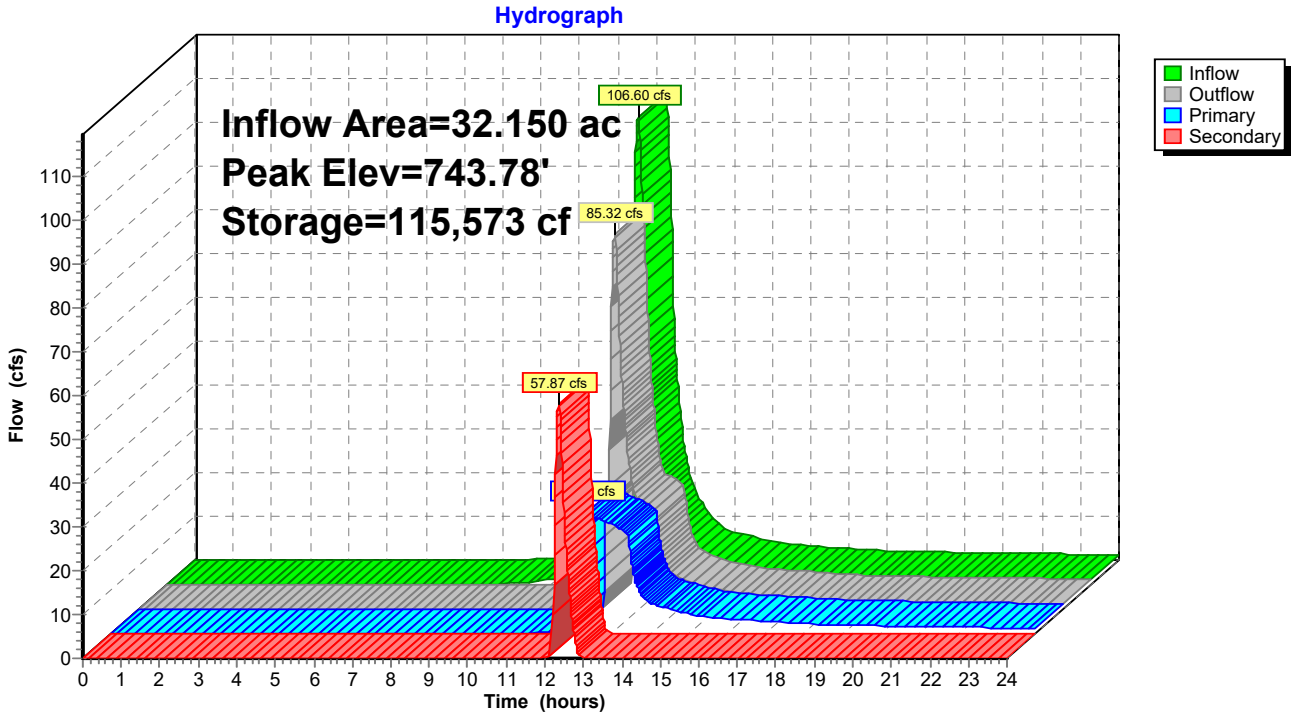
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
737.50	11,903	0	0	11,903
738.00	12,777	6,169	6,169	12,799
739.00	14,602	13,679	19,848	14,670
740.00	16,711	15,645	35,493	16,825
741.00	18,984	17,835	53,328	19,147
742.00	21,350	20,155	73,484	21,566
743.00	23,873	22,600	96,083	24,145
744.00	26,452	25,151	121,235	26,784
745.00	30,154	28,283	149,518	30,534

Device	Routing	Invert	Outlet Devices
#1	Secondary	743.00'	**31.0' 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
#2	Device 4	741.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 4	737.50'	**3.0" Vert. Orifice/Grate** C= 0.600
#4	Primary	737.50'	**24.0" Round Culvert** L= 35.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 737.50' / 735.00' S= 0.0714 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 3.14 sf

Primary OutFlow Max=27.45 cfs @ 12.35 hrs HW=743.78' TW=0.00' (Dynamic Tailwater)
└**4=Culvert** (Inlet Controls 27.45 cfs @ 8.74 fps)
  ├**2=Orifice/Grate** (Passes < 116.41 cfs potential flow)
  └**3=Orifice/Grate** (Passes < 0.59 cfs potential flow)

Secondary OutFlow Max=57.81 cfs @ 12.35 hrs HW=743.78' TW=0.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 57.81 cfs @ 2.38 fps)

Pond 33P: Upper Pond

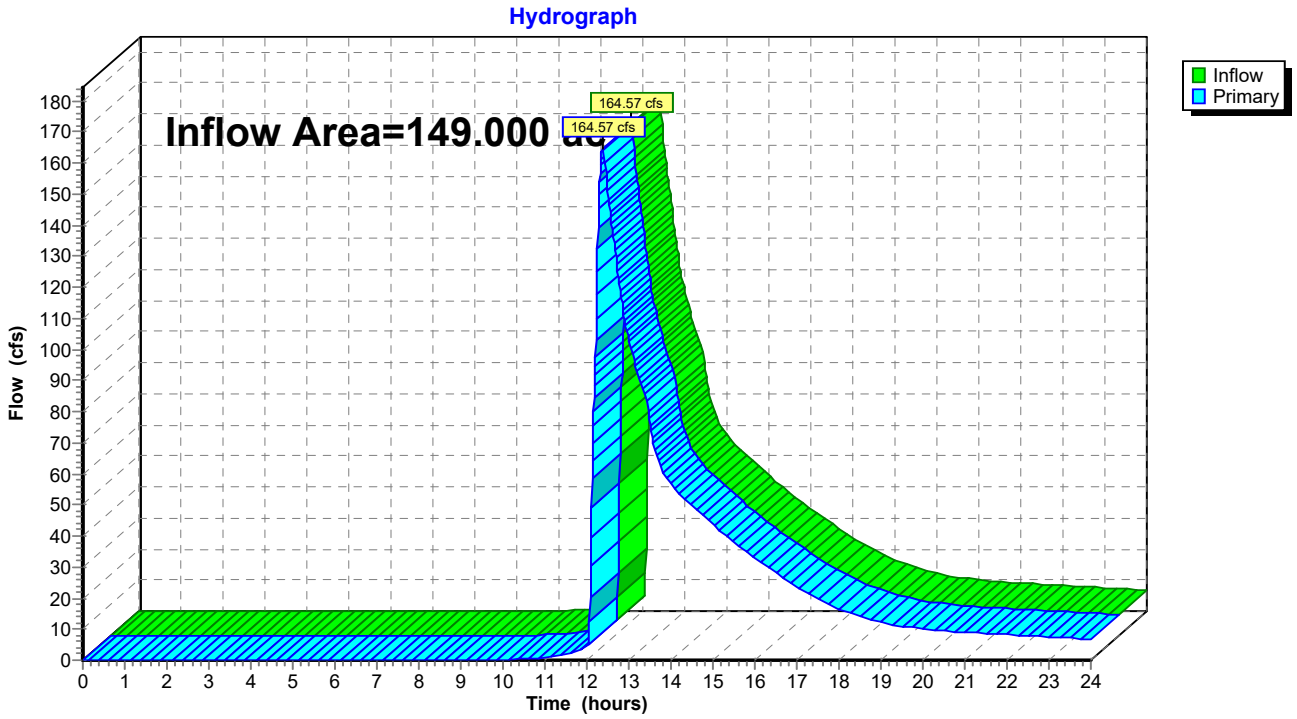


Summary for Link 49L: Total Off-site drainage

Inflow Area = 149.000 ac, 6.55% Impervious, Inflow Depth > 2.75" for 100-Year event
Inflow = 164.57 cfs @ 12.37 hrs, Volume= 34.163 af
Primary = 164.57 cfs @ 12.37 hrs, Volume= 34.163 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-37.00 hrs, dt= 0.01 hrs

Link 49L: Total Off-site drainage



	CALCULATIONS :	Project No.: 20-243
		Date: 9/21/2022
	Project: Sunset Ridge	By: JWJ
	Overall WQv & RRv Calculations	Sheet 1 of 2

Subarea A

P (90% Rainfall Event) =	**1.00**	**inches**
Water Quality Area =	**62.2**	**acres** Total Contributng area
Impervious Area =	**6.5**	**acres**
I = % Impervious =	**10.5**	%
Weighted S Value =	**0.21**	

Hydrologic Soil Group (HSG) Specific Reduction Factor "S" =

Soil Classification	Area (ac)	S Factor	Weighted #
A Soils	**0**	0.5	0
B Soils	**1.1**	0.4	0.44
C Soils	**0**	0.3	0
D Soils	**62.3**	0.2	12.46

Total Area = 62.2 acres
Total Weighted # = 12.9

Weighted S Value = **0.21**

Rv = 0.05 + 0.009(I)

Rv = 0.1440514

Required WQv - based on Enhanced Phosphorus removal (Chapter 10) of NYSDEC Design Manual
Req WQv = (Total drainage area)(1-year runoff volume)

2.503 af (inflow volume from hydrocad for contributing areas) **109,030 cf**

Minimum Allowable RRv for enhanced Phosphorous Removal

RRv= P1-yr * Rv* Aic*S	0.1945125	**8473 cf**
P1-yr=	1.89	
Rv=.05+.009(I)	0.95	
Aic=	6.5	
S=	0.2	

	CALCULATIONS:	Project No.: 20-243
		Date: 9/21/2022
	Project: Sunset Ridge	By: JWJ
	Area Reduction Calculations	Sheet 2 of 3

Subarea A

P (90% Rainfall Event) =	**1**	**inches**
Water Quality Area (Disturbed Area) =	**62.20**	**acres**
Impervious Area =	**6.50**	**acres**
I = % Impervious =	**10.5**	%

	Area Reduction Pratices	Impervious Area Reduced		Total Area Reduced	
1)		**ac**			ac
2)	**Conservation Easment Areas**	**4.1**	ac	**4.1**	ac
3)			ac		ac
4)			ac		ac
5)			ac		ac
6)			ac		ac
7)			ac		ac
8)			ac		ac
9)			ac		ac
10)			ac		ac
11)			ac		ac
12)			ac		ac
	Total	4.10	ac	4.10	ac

Adjusted Area	58.10	**acres**
Adjusted Impervious Area	2.40	**acres**
Recalculated I	**4.1**	%

Rv = 0.05 + 0.009(I)

Rv = 0.0871773

WQv = (Total drainage area)(1-year runoff volume)

WQv Provided = (59.30AC x0.48")x(1/12) 2.3 **103,324**

WQv Required = P * Area * Rv / 12
WQv = 0.42 AC-FT

WQv = 18386 CF

RRv Provided = (WQv from Page 1) - (WQv Above)

RRv Provided From Area Reduction Pratices= 5706 CF

	CALCULATIONS:	Project No.: 20-243
		Date: 9/21/2022
	Project: Sunset Ridge	By: JWJ
	WQv and RRv Summary	Sheet 2 of 2

Overall Required WQv = **109030 cf**

Minimum Allowable RRv = **8473 cf**

WQv Total

WQv Provided by Deep Pool (lower pond)	**14,409 cf**
WQv provided in Permanent Pool (lower pond)	**9,691 cf**
WQv provided by deep pool (Upper pond)	**6,039 cf**
WQv provided in Permanet Pool (Upper Pond)	**22,724 cf**
WQv provided by dry swale #1	**905 cf**
WQv provided by dry swale #2	**6,060 cf**
WQv provided by rain garden (lower lots)	**15,600 cf**
WQv provided by rain garden (upper lots)	**23,400 cf**
Total WQv Provided =	**98,828 cf**

RRv Total

RRv Provided by conservation areas	**5,706 cf**
RRv Provided by dry swale #1	**227 cf**
RRv Provided by dry swale #2	**1,520 cf**
RRv provided by rain gardens (lower lots)	**2,593 cf**
RRv provided by rain gardens (upper lots)	**1,777 cf**
Total RRv Provided =	**11,823 cf**

Total WQv Provided =	**110,651 cf**	**>**	**109,030 cf**	
Total RRv Provided =	**11,823 cf**	**>**	**8,473 cf**	

	CALCULATIONS **:**	Project No.: **20-243**
		Date: **9/21/2022**
	Project: **Channel Protection Volume Calculations**	By: **JWJ**
	Sunset Ridge LOWER POND	Sheet **1 of 5**

COMPUTE CHANNEL PROTECTION STORAGE VOLUME - STORMWATER MANAGEMENT FACILITY

Vs value per hydrocad 1-year design storm for Lower Pond

Vs **Vs VALUE =** **1.651** **ac-ft**
71918 **CF**

CPv = 71918 CF

Release Rate over 24 Hours 71918 ft^3 / [(24 hr) (3600 sec / hr)] = **0.832 cfs**

CHANNEL PROTECTION VOLUME PROVIDED

ELEVATION (ft)	CONTOUR AREA (ft^2)	TOTAL STORAGE (ft^3)
700.00	11286	0
700.5	13,088	12,187
702.5	23,925	49,200
703.5	32,180	77,253

77,253 > 71,918
OK

	CALCULATIONS **:**	Project No.: **20-243**
		Date: **9/21/2022**
	Project: **Orifice / Spillway Calculations**	By: **JWJ**
	Sunset Ridge LOWER POND	Sheet **2 of 5**

COMPUTE OFIFICE DIAMETER

Required Channel Protection Volume (RCPv)= **71918** **cf**

Elevation at RCPv = **703.2**

Flow Required to release RCPv over 24 Hrs.= **0.83** **cfs**

OUTLET ORIFICE = **3** **inch dimeter**

Invert @ Orifice = **700** Average Head = **1.54** **ft**

Center of Orifice = **0.125** **FT**

Q = CA[2GH]1/2= **Q=** **0.29** **cfs**

Where C= 0.6

If Avearge Outflow Rate using oriface < Rate to release RCPv over 24 hrs "OK"

*(unless using smallest recommended orifice of 3")

0.293 < 0.83

OK

SPILLWAY CALCULATION

Extreme Flood Protection, Q of undetained 100-year inflow Hydrograph

100-year Storm Event Inflow (Q) to SMWF = **89.6** cfs

Height (H) from Spillway Invert to Top of Berm= **1.00** ft

Q =(0.666)*C*L*((2g)^.5)H^(3/2) L = **33.50** ft **Use L = 34 ft**

Where C= 0.5

FOREBAY SPILLWAY CALCULATION

Extreme Flood Protection, Q of undetained 100-year inflow Hydrograph

10-year Storm Event Inflow (Q) to SMWF = **39** cfs

Height (H) from Spillway Invert to Top of Berm= **1.00** ft

Q =(0.666)*C*L*((2g)^.5)H^(3/2) L = **14.58** ft **Use L = 15 ft**

Where C= 0.5

CALCULATIONS:	Project No.:	**20243.00**
	Date:	**9/21/2022**
Project: **Forebay/Deep Pool Sizing Calculations**	By:	**JWJ**
Sunset Ridge LOWER POND	Sheet	**3 of 5**

WATER QUALITY VOLUME, WQv

Note: WQv calculated for the SWMF is to be used for pond sizing calcsulations only and is calculated based on contributing drainage area. The Calculated WQv shown below does not apply to the overall WQv requirements.

WATER QUALITY VOLUME, WQv

DRAINAGE AREA (A) TO FACILITY=	**38.20**	**acres**	
IMPERVIOUS AREA =	**3.63**	**acres**	
90 PERCENTILE RAINFALL EVENT =	**1.00**	**inches**	
CURVE NUMBER (CN) =	**75.0**		
TIME OF CONCENTRATION (Tc) =	**0.620**	**hours**	
IMPERVIOUS COVER (I) =	**0.10**		
RUNOFF COEFFICENT (Rv) = Rv = 0.05 + (I)(0.9)	**0.14**		
WATER QUALITY VOLUME (WQv) = WQv = P * Rv * A / 12	**0.431**	**acre-ft**	**18793 cf**

Pre-treatment volume (10% WQv) = 1879.251 cf (required)

ELEVATION (ft)	CONTOUR AREA (ft^2)	TOTAL STORAGE (ft^3)
699.00	174	0
700.00	618	396
701.00	1,200	1,305
702.00	1,893	2,852
		2,852 > 1,879 OK

Deep Pool Volume (50% WQv) = 9396.255 cf (required)

ELEVATION (ft)	CONTOUR AREA (ft^2)	TOTAL STORAGE (ft^3)
694.00	2,068	0
695.00	2,976	2,522
696.00	4,017	6,019
697.00	5,191	10,623
698.00	6,538	16,488
699.00	8,095	23,805
		23,805 > 9,396 OK

Permanent Pool Volume (between 699 and 700.8)

ELEVATION (ft)	CONTOUR AREA (ft^2)	TOTAL STORAGE (ft^3)
699.00	8,095	0
700.00	11,286	9,691
		9,691 > 0 OK

	CALCULATIONS **:**	Project No.: **20-243**
		Date: **9/21/2022**
	Project: **Channel Protection Volume Calculations**	By: **JWJ**
	Sunset Ridge (upper Pond)	Sheet **1 of 5**

COMPUTE CHANNEL PROTECTION STORAGE VOLUME - STORMWATER MANAGEMENT FACILITY

Vs value per hydrocad 1-year design storm for Upper Pond

Vs **Vs VALUE =** **0.851** **ac-ft**
37070 **CF**

CPv = **37070** **CF**

Release Rate over 24 Hours 37070 ft^3 / [(24 hr) (3600 sec / hr)] = **0.429** **cfs**

CHANNEL PROTECTION VOLUME PROVIDED

ELEVATION (ft)	CONTOUR AREA (ft^2)	TOTAL STORAGE (ft^3)
737.5	11903	0
738	12,777	6,170
739	14,602	19,860
740	16,711	35,517
741.00	18,984	53,365

53,365	>	37,070
	OK	

	CALCULATIONS **:**	Project No.: **20-243**
		Date: **9/21/2022**
	Project: **Orifice / Spillway Calculations**	By: **JWJ**
	Sunset Ridge (upper Pond)	Sheet **2 of 5**

COMPUTE OFIFICE DIAMETER

Required Channel Protection Volume (RCPv)= **37070** **cf**

Elevation at RCPv = **740.2**

Flow Required to release RCPv over 24 Hrs.= **0.43** **cfs**

OUTLET ORIFICE = **3** **inch dimeter**

Invert @ Orifice = **737.5** Average Head = **1.29** **ft**

Center of Orifice = **0.125** **FT**

Q = CA[2GH]1/2= **Q=** **0.27** **cfs**

Where C= 0.6

If Avearge Outflow Rate using oriface < Rate to release RCPv over 24 hrs "OK"

*(unless using smallest recommended orifice of 3")

0.268 < 0.43

OK

SPILLWAY CALCULATION

Extreme Flood Protection, Q of undetained 100-year inflow Hydrograph

100-year Storm Event Inflow (Q) to SMWF = **106.6** cfs

Height (H) from Spillway Invert to Top of Berm= **1.20** ft

Q =(0.666)*C*L*((2g)^.5)H^(3/2) L = **30.32** ft **Use L =** **31** **ft**

Where C= 0.5

Forebay Spillway Calculations

10-year storm event inflow (Q) to SWMF = **48** cfs

Height (H) from spillway Invert to Top of Berm **1** ft

Q =(0.666)*C*L*((2g)^.5)H^(3/2) L= 17.94 **Use L =** **18** **ft**

Where C= 0.50

CALCULATIONS:	Project No.:	**20243.00**
	Date:	**9/21/2022**
Project: Forebay/Deep Pool Sizing Calculations	By:	**JWJ**
Sunset Ridge (upper pond)	Sheet	**3 of 5**

WATER QUALITY VOLUME, WQv

Note: WQv calculated for the SWMF is to be used for pond sizing calcsulations only and is calculated based on contributing drainage area. The Calculated WQv shown below does not apply to the overall WQv requirements.

WATER QUALITY VOLUME, WQv

DRAINAGE AREA (A) TO FACILITY=	**32.16**	**acres**	
IMPERVIOUS AREA =	**4.30**	**acres**	
90 PERCENTILE RAINFALL EVENT =	**1.00**	**inches**	
CURVE NUMBER (CN) =	**77.0**		
TIME OF CONCENTRATION (Tc) =	**0.260**	**hours**	
IMPERVIOUS COVER (I) =	**0.13**		
RUNOFF COEFFICENT (Rv) = Rv = 0.05 + (I)(0.9)	**0.17**		
WATER QUALITY VOLUME (WQv) = WQv = P * Rv * A / 12	**0.457**	**acre-ft**	**19885 cf**

Pre-treatment volume (10% WQv) = 1989 cf (required)

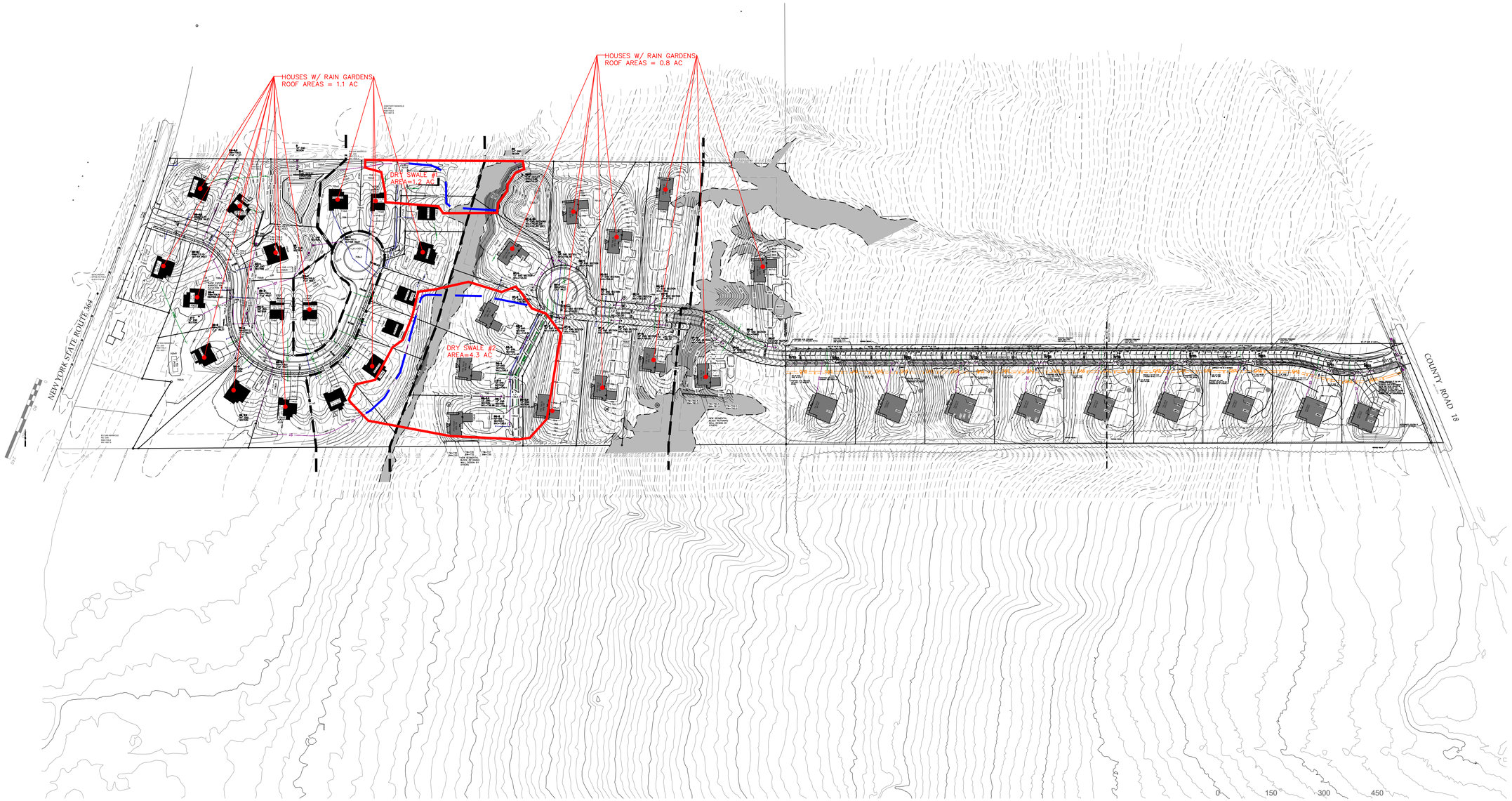
ELEVATION (ft)	CONTOUR AREA (ft^2)	TOTAL STORAGE (ft^3)
741.00	87	0
742.00	365	226
743.00	795	806
744.00	1,570	1,989
		1,995 > 1,989 OK

Deep Pool Volume (50% WQv) = 9943 cf (required)

ELEVATION (ft)	CONTOUR AREA (ft^2)	TOTAL STORAGE (ft^3)
732.00	1,957	0
733.00	2,867	2,412
734.00	3,903	5,797
735.00	5,062	10,280
736.00	6,342	15,982
		15,982 > 9,943 OK

Permanent Pool Volume (between 736 and 737.5)

ELEVATION (ft)	CONTOUR AREA (ft^2)	TOTAL STORAGE (ft^3)
736.00	9,435	0
737.00	11,055	10,245
737.50	13,903	22,724
		22,724 > 0 OK



1 FIGURE 7 – WQv MAP
1"=150'

MarksEngineering
4 J BRENAN ST
CANANDAIGUA, NY 14424
Phone 585-905-0360
Fax: 585-485-6205
www.marksengineering.com bmarks@marksengineering.com

STATE OF NEW YORK
BRENNAN A MARKS
093182
LICENSED PROFESSIONAL ENGINEER
STAMP

STAMP

REVISIONS

NO.	DATE	DESCRIPTION OF REVISION	BY
1			
2			
3			
4			
5			
6			
7	12/19/22	PER MRB COMMENTS	BAM

SITE DEVELOPMENT PLANS PREPARED FOR:
SUNSET RIDGE ESTATES/ LAKEWOOD CUSTOM HOMES
RESIDENTIAL DEVELOPMENT
SHOWING LAND IN:
3535 STATE ROUTE 364 /0000 COUNTY ROAD 18
TOWN OF CANANDAIGUA/HOPEWELL
COUNTY OF ONTARIO
STATE OF NEW YORK

DRAWING TITLE:
WQv MAP

DRAWN BY:	JPS
DESIGNED BY:	XXX
CHECKED BY:	BAM
SCALE:	AS NOTED
JOB NO.:	20-243
DATE:	02/01/2023
TAX MAP#:	98.19-1-20.10

FIG. 7

	CALCULATIONS :	Project No.: 20-243
		Date: 9/21/2022
	Project: Sunset Ridge	By: JWJ
	WQv calcs for Dry swales	Sheet 1 of 2

Dry Swale #1

Water Quality Area =	**1.20 acres**	Area= Treatment area
Impervious Area =	**0.13 acres**	
I = % Impervious =	**10.8** %	
Weighted S Value =	**0.20**	

Hydrologic Soil Group (HSG) Specific Reduction Factor "S" =

Soil Classification	Area (ac)	S Factor	Weighted #
A Soils	**0**	0.5	0
B Soils	**0**	0.4	0
C Soils	**0**	0.3	0
D Soils	**1.2**	0.2	0.24

Total Area = 1.2 acres
Total Weighted # = 0.24

Weighted S Value = **0.20**

Rv = 0.05 + 0.009(I)

Rv = 0.1475

Required WQv - based on Enhanced Phosphorus removal (Chapter 10) of NYSDEC Design Manual
Req WQv = (Total drainage area)(1-year runoff volume)

0.026 af (Per hydrocad model) **1133** cf

Minimum Allowable RRv for enhanced Phosphorous Removal

RRv= P1-yr * Rv* Aic*S	0.0038903	**169** cf
P1-yr=	1.89	
Rv=.05+.009(I)	0.95	
Aic=	0.13	
S=	0.2	

	CALCULATIONS :	Project No.: 20-243
		Date: 9/21/2022
	Project: Sunset Ridge	By: JWJ
	WQv calcs for Dry swaes	Sheet 1 of 2

Dry Swale #2

Water Quality Area =	**4.3 acres**	Area= Treatment area
Impervious Area =	**0.5 acres**	
I = % Impervious =	**10.9** %	
Weighted S Value =	**0.20**	

Hydrologic Soil Group (HSG) Specific Reduction Factor "S" =

Soil Classification	Area (ac)	S Factor	Weighted #
A Soils	**0**	0.5	0
B Soils	**0**	0.4	0
C Soils	**0**	0.3	0
D Soils	**4.3**	0.2	0.86

Total Area = 4.3 acres
Total Weighted # = 0.86

Weighted S Value = **0.20**

Rv = 0.05 + 0.009(I)

Rv = 0.1483721

Required WQv - based on Enhanced Phosphorus removal (Chapter 10) of NYSDEC Design Manual
Req WQv = (Total drainage area)(1-year runoff volume)

0.174 af **7579.44 cf**

Minimum Allowable RRv for enhanced Phosphorous Removal

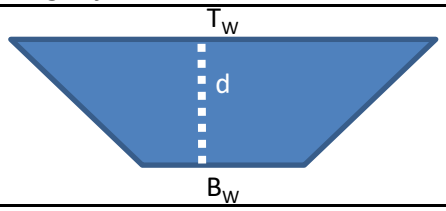
RRv= P1-yr * Rv* Aic*S	0.0140648	**613 cf**
P1-yr=	1.89	
Rv=.05+.009(I)	0.95	
Aic=	0.47	
S=	0.2	

Dry Swale Worksheet

Design Point:	

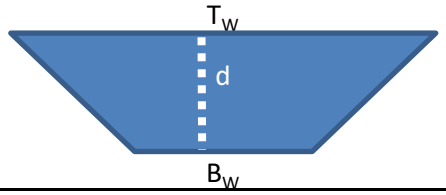
Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
1	1.20	0.13	.11	0.15	1132.56	1.00	Dry Swale
Enter Impervious Area Reduced by Disconnection of Rooftops		0.00	11%	0.15	1,133	<<WQv after adjusting for Disconnected Rooftops	

Pretreatment Provided			Pretreatment Technique
Pretreatment (10% of WQv)	113	ft^3	

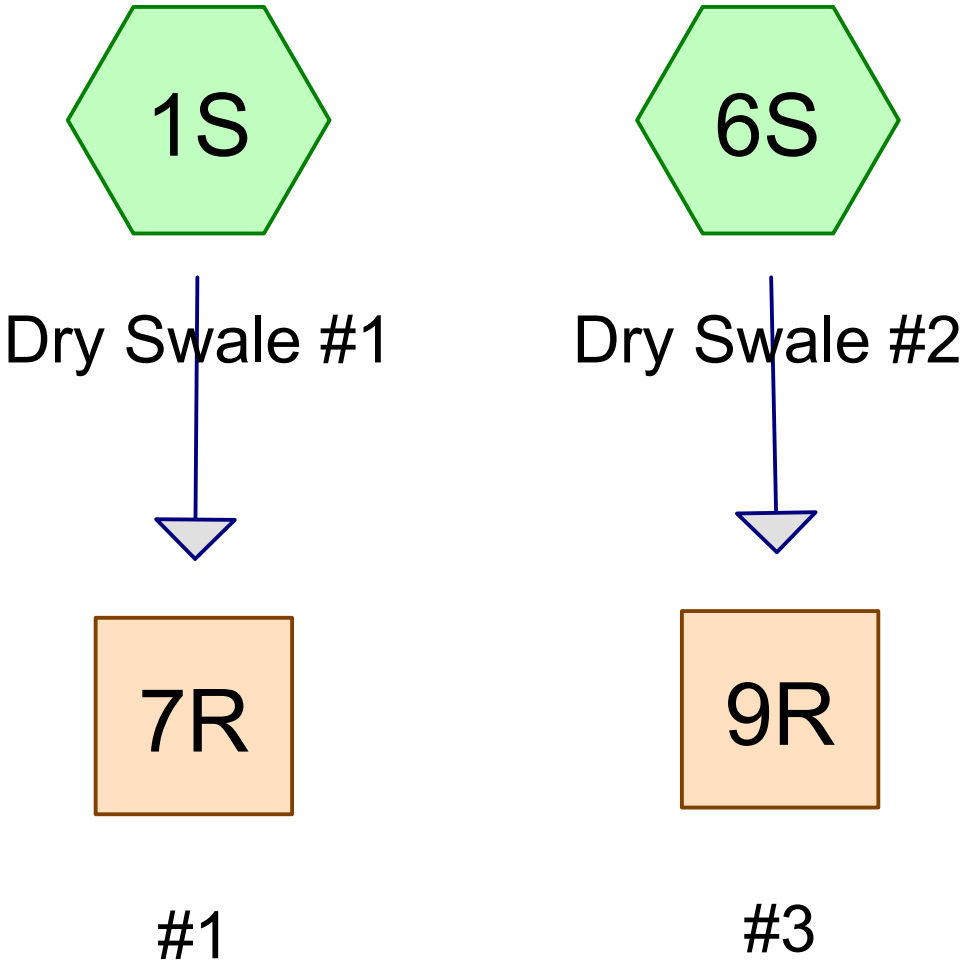
Calculate Available Storage Capacity			
Bottom Width	6.7	*ft*	Design with a bottom width no greater than eight feet to avoid potential gullying and channel braiding, but no less than two feet
Side Slope (X:1)	4	*Okay*	Channels shall be designed with moderate side slopes (flatter than 3:1) for most conditions. 2:1 is the absolute maximum side slope
Longitudinal Slope	3%	*Okay*	*Maximum longitudinal slope shall be 4%*
Flow Depth	0.5	*ft*	*Maximum ponding depth of one foot at the mid-point of the channel, and a maximum depth of 18" at the end point of the channel (for storage of the WQv)*
Top Width	10.7	*ft*	
Area	4.35	*sf*	
Minimum Length	234	*ft*	
Actual Length	235	*ft*	
End Point Depth check	1.50	*Okay*	*A maximum depth of 18" at the end point of the channel (for storage of the WQv)*
Storage Capacity	1,136	ft^3	
Soil Group (HSG)		C	

Runoff Reduction				
Is the Dry Swale contributing flow to another practice?		No	Select Practice	N/A
RRv	**227**	ft^3	**Runnoff Reduction equals 40% in HSG A and B and 20% in HSG C and D up to the WQv**	
Volume Treated	905	ft^3	This is the difference between the WQv calculated and the runoff reduction achieved in the swale	
Volume Directed	0	ft^3	This volume is directed another practice	
Volume √	*Okay*		Check to be sure that channel is long enough to store WQv	

Dry Swale Worksheet

Design Point:							
Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
5	4.30	0.50	.11	.15	7579.44	1.00	Dry Swale
Enter Impervious Area Reduced by Disconnection of Rooftops			53%	0.53	7,579	<<WQv after adjusting for Disconnected Rooftops	
Pretreatment Provided					**Pretreatment Technique**		
Pretreatment (10% of WQv)			758	*ft^3*			
Calculate Available Storage Capacity							
Bottom Width	8	*ft*	Design with a bottom width no greater than eight feet to avoid potential gullying and channel braiding, but no less than two feet				
Side Slope (X:1)	10	*Okay*	Channels shall be designed with moderate side slopes (flatter than 3:1) for most conditions. 2:1 is the absolute maximum side slope				
Longitudinal Slope	2%	*Okay*	*Maximum longitudinal slope shall be 4%*				
Flow Depth	1	*ft*	*Maximum ponding depth of one foot at the mid-point of the channel, and a maximum depth of 18" at the end point of the channel (for storage of the WQv)*				
Top Width	28	*ft*					
Area	18.00	*sf*					
Minimum Length	379	*ft*					
Actual Length	380	*ft*					
End Point Depth check	1.50	*Okay*	*A maximum depth of 18" at the end point of the channel (for storage of the WQv)*				
Storage Capacity	7,598	*ft^3*					
Soil Group (HSG)			C				
Runoff Reduction							
Is the Dry Swale contributing flow to another practice?			No	Select Practice			
RRv	**1,520**	***ft^3***	**Runnoff Reduction equals 40% in HSG A and B and 20% in HSG C and D up to the WQv**				
Volume Treated	6,060	*ft^3*	This is the difference between the WQv calculated and the runoff reduction achieved in the swale				
Volume Directed	0	*ft^3*	This volume is directed another practice				

Dry Swales



Subcat Reach Pond Link

Routing Diagram for dryswales
Prepared by {enter your company name here}, Printed 2/27/2023
HydroCAD® 10.00-26 s/n 09315 © 2020 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.760	74	>75% Grass cover, Good, HSG C (1S)
3.230	80	>75% Grass cover, Good, HSG D (6S)
0.310	65	Brush, Good, HSG C (1S)
0.630	73	Brush, Good, HSG D (6S)
0.600	98	Paved parking, HSG D (1S, 6S)
5.530	**79**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
1.070	HSG C	1S
4.460	HSG D	1S, 6S
0.000	Other	
5.530		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.760	3.230	0.000	3.990	>75% Grass cover, Good	1S, 6S
0.000	0.000	0.310	0.630	0.000	0.940	Brush, Good	1S, 6S
0.000	0.000	0.000	0.600	0.000	0.600	Paved parking	1S, 6S
0.000	**0.000**	**1.070**	**4.460**	**0.000**	**5.530**	**TOTAL AREA**	

Time span=0.00-20.00 hrs, dt=0.01 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Dry Swale #1 Runoff Area=1.200 ac 10.83% Impervious Runoff Depth>0.26"
Flow Length=345' Tc=17.5 min CN=74 Runoff=0.32 cfs 0.026 af

Subcatchment6S: Dry Swale #2 Runoff Area=4.330 ac 10.85% Impervious Runoff Depth>0.48"
Flow Length=743' Tc=14.6 min CN=81 Runoff=2.86 cfs 0.172 af

Reach 7R: #1 Avg. Flow Depth=0.09' Max Vel=1.16 fps Inflow=0.32 cfs 0.026 af
n=0.030 L=140.0' S=0.0236 '/' Capacity=12.99 cfs Outflow=0.31 cfs 0.026 af

Reach 9R: #3 Avg. Flow Depth=0.20' Max Vel=1.64 fps Inflow=2.86 cfs 0.172 af
n=0.030 L=362.0' S=0.0166 '/' Capacity=90.64 cfs Outflow=2.67 cfs 0.171 af

Total Runoff Area = 5.530 ac Runoff Volume = 0.198 af Average Runoff Depth = 0.43"
89.15% Pervious = 4.930 ac 10.85% Impervious = 0.600 ac

Summary for Subcatchment 1S: Dry Swale #1

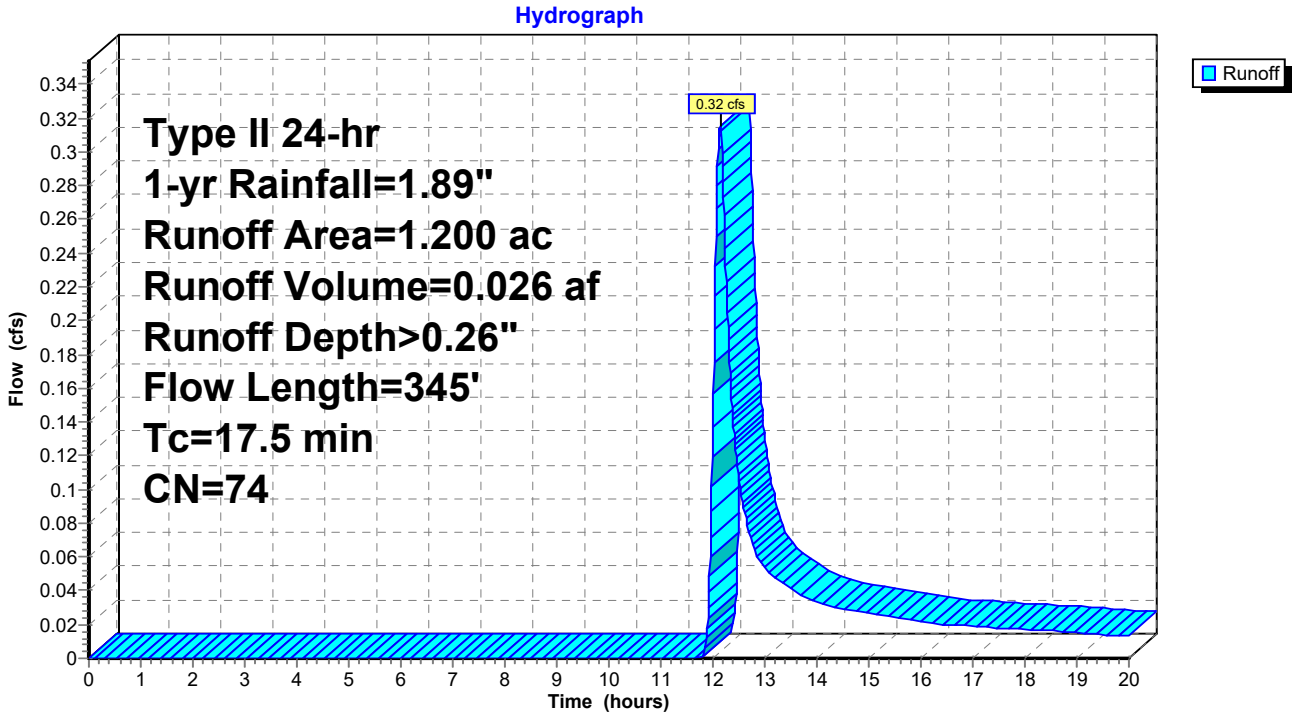
Runoff = 0.32 cfs @ 12.14 hrs, Volume= 0.026 af, Depth> 0.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.89"

Area (ac)	CN	Description
0.130	98	Paved parking, HSG D
0.310	65	Brush, Good, HSG C
0.760	74	>75% Grass cover, Good, HSG C
1.200	74	Weighted Average
1.070		89.17% Pervious Area
0.130		10.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	28	0.5000	0.44		**Sheet Flow, Sheet Flow** Range n= 0.130 P2= 2.19"
16.0	72	0.1400	0.08		**Sheet Flow, Sheet Flow** Woods: Dense underbrush n= 0.800 P2= 2.19"
0.1	45	0.1100	5.34		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
0.3	200	0.0550	10.91	87.27	**Channel Flow, Channel Flow** Area= 8.0 sf Perim= 14.0' r= 0.57' n= 0.022 Earth, clean & straight
17.5	345	Total			

Subcatchment 1S: Dry Swale #1



Summary for Subcatchment 6S: Dry Swale #2

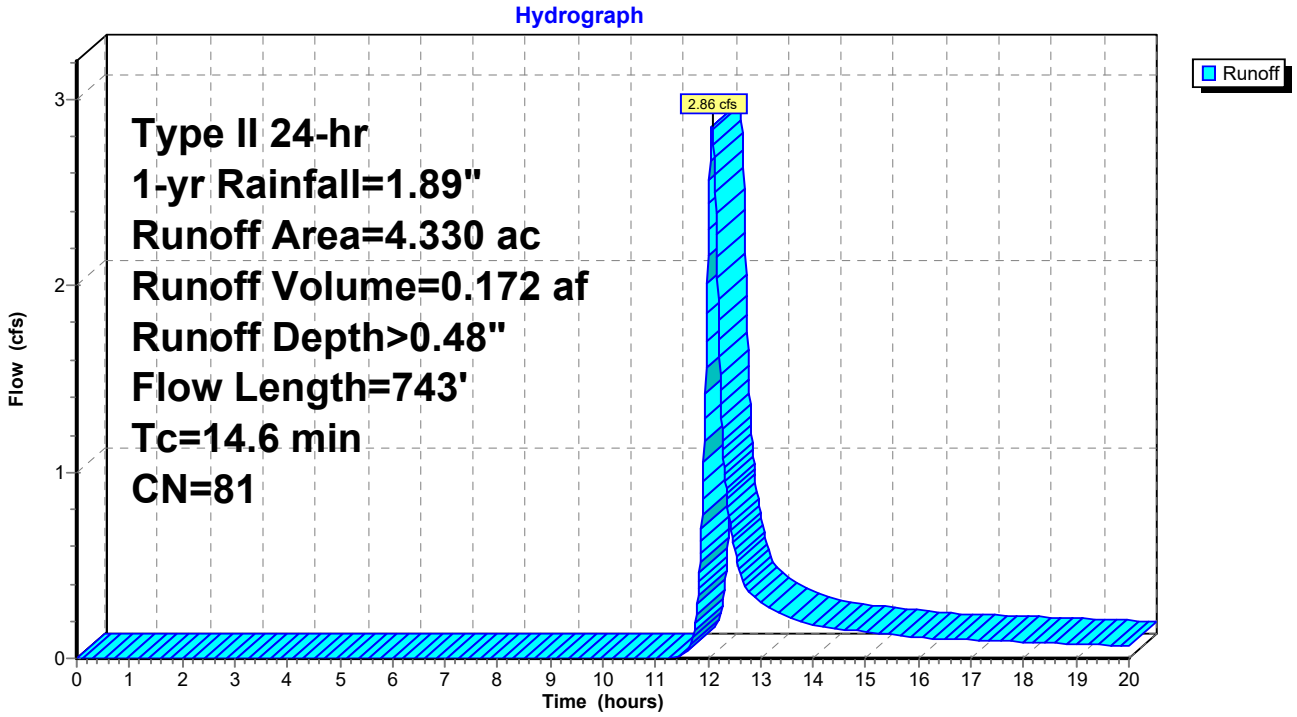
Runoff = 2.86 cfs @ 12.08 hrs, Volume= 0.172 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.89"

Area (ac)	CN	Description
0.470	98	Paved parking, HSG D
0.630	73	Brush, Good, HSG D
3.230	80	>75% Grass cover, Good, HSG D
4.330	81	Weighted Average
3.860		89.15% Pervious Area
0.470		10.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	75	0.0130	0.11		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.19"
0.2	57	0.1200	5.58		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
0.7	110	0.0270	2.65		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
0.6	81	0.1850	2.15		**Shallow Concentrated Flow, Shallow Concentrated** Woodland Kv= 5.0 fps
0.4	40	0.0100	1.61		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
1.5	380	0.0200	4.26	76.62	**Channel Flow, Channel Flow** Area= 18.0 sf Perim= 38.0' r= 0.47' n= 0.030 Earth, grassed & winding
14.6	743	Total			

Subcatchment 6S: Dry Swale #2



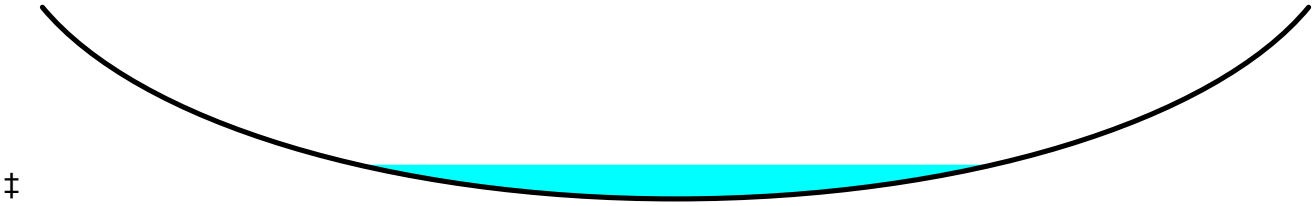
Summary for Reach 7R: #1

Inflow Area = 1.200 ac, 10.83% Impervious, Inflow Depth > 0.26" for 1-yr event
Inflow = 0.32 cfs @ 12.14 hrs, Volume= 0.026 af
Outflow = 0.31 cfs @ 12.20 hrs, Volume= 0.026 af, Atten= 2%, Lag= 3.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.16 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.56 fps, Avg. Travel Time= 4.2 min

Peak Storage= 38 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 0.50' Flow Area= 3.6 sf, Capacity= 12.99 cfs

10.70' x 0.50' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 140.0' Slope= 0.0236 '/'
Inlet Invert= 707.50', Outlet Invert= 704.20'



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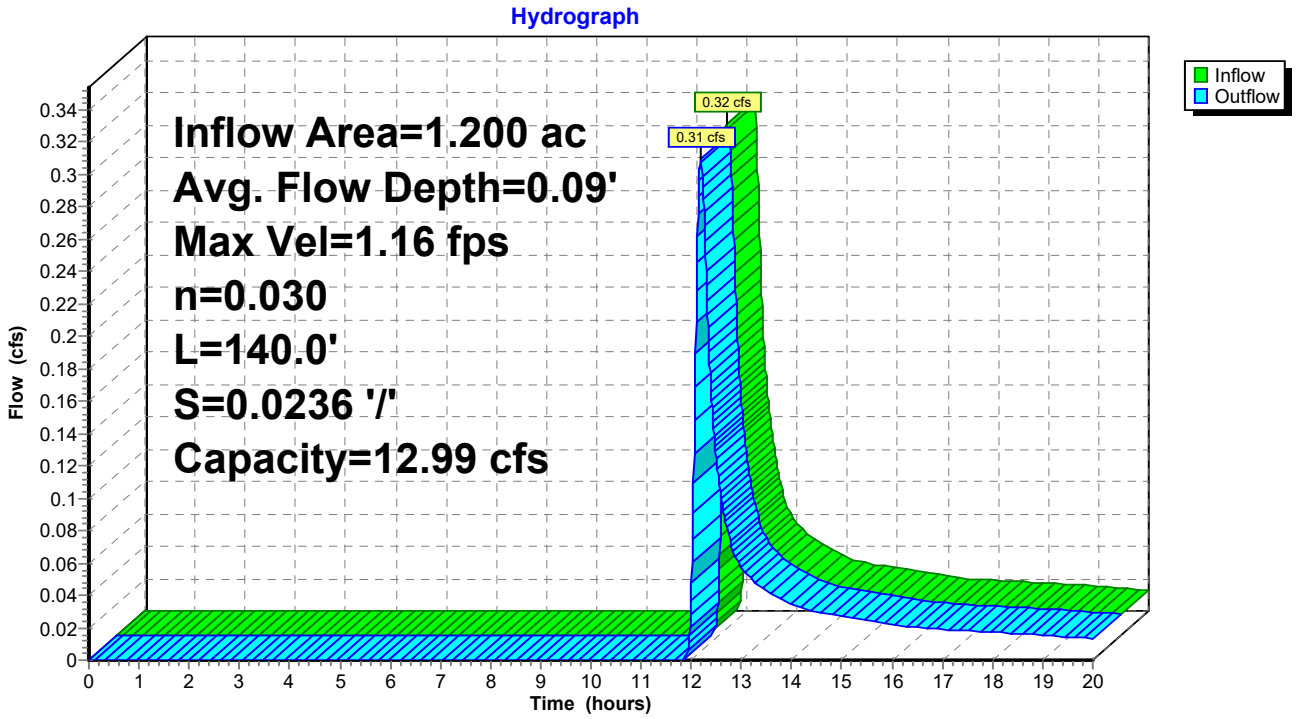
Reach 7R: #1



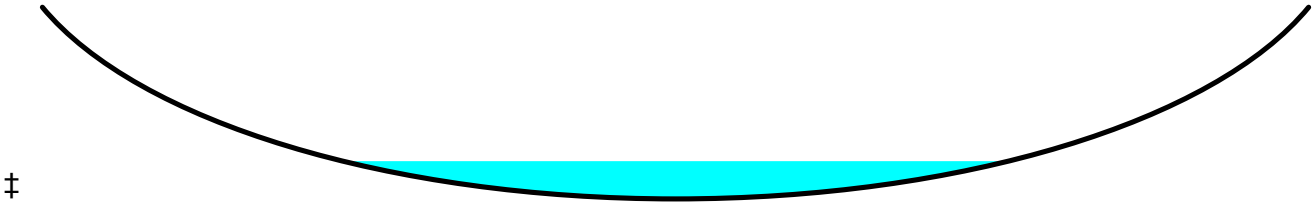
Summary for Reach 9R: #3

Inflow Area = 4.330 ac, 10.85% Impervious, Inflow Depth > 0.48" for 1-yr event
Inflow = 2.86 cfs @ 12.08 hrs, Volume= 0.172 af
Outflow = 2.67 cfs @ 12.18 hrs, Volume= 0.171 af, Atten= 7%, Lag= 6.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.64 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 0.69 fps, Avg. Travel Time= 8.8 min

Peak Storage= 588 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00' Flow Area= 18.7 sf, Capacity= 90.64 cfs

28.00' x 1.00' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 362.0' Slope= 0.0166 '/'
Inlet Invert= 717.00', Outlet Invert= 711.00'



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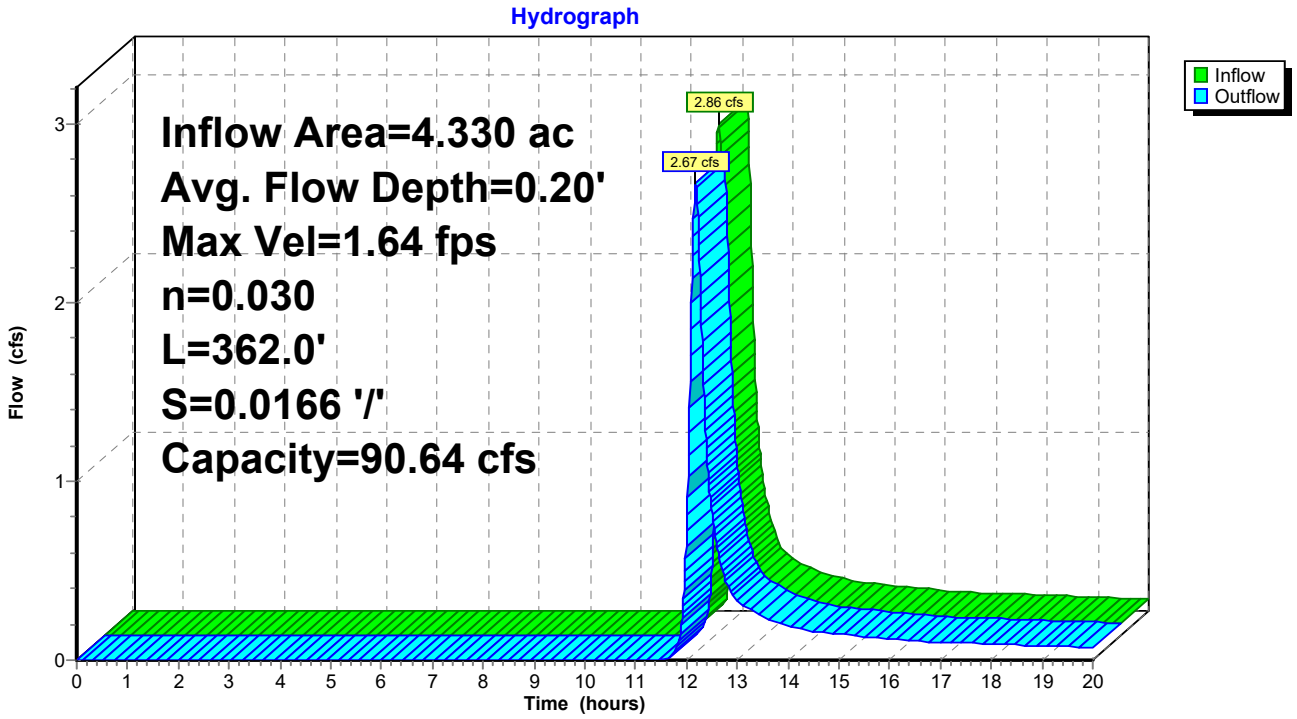
Reach 9R: #3



CALCULATIONS :	Project No.:	20-243
	Date:	9/21/2022
Project: **Sunset Ridge**	By:	JWJ
WQv calcs for Rain Gardens (lower portion lots)	Sheet	1 of 2

Rain Garden

Water Quality Area =	**1.1 acres**	Area= Treatment area
Impervious Area =	**1.1 acres**	
I = % Impervious =	**100.0** %	
Weighted S Value =	**0.20**	

Hydrologic Soil Group (HSG) Specific Reduction Factor "S" =

Soil Classification	Area (ac)	S Factor	Weighted #
A Soils	**0**	0.5	0
B Soils	**0**	0.4	0
C Soils	**0**	0.3	0
D Soils	**1.05**	0.2	0.21

Total Area = 1.1 acres
Total Weighted # = 0.21

Weighted S Value = **0.20**

Rv = 0.05 + 0.009(I)

Rv = 0.95

Required WQv - based on Enhanced Phosphorus removal (Chapter 10) of NYSDEC Design Manual
Req WQv = (Total drainage area)(1-year runoff volume)

0.138 af **6011.28 cf**

Minimum Allowable RRv for enhanced Phosphorous Removal

RRv= P1-yr * Rv* Aic*S	0.0329175	**1434 cf**
P1-yr=	1.89	
Rv=.05+.009(I)	0.95	
Aic=	1.1	
S=	0.2	

	CALCULATIONS :	Project No.: 20-243
		Date: 9/21/2022
	Project: Sunset Ridge	By: JWJ
	WQv calcs for Rain Gardens (lower portion lots)	Sheet 1 of 2

Rain Garden

Water Quality Area =	**0.8 acres**	Area= Treatment area
Impervious Area =	**0.8 acres**	
I = % Impervious =	**100.0** %	
Weighted S Value =	**0.20**	

Hydrologic Soil Group (HSG) Specific Reduction Factor "S" =

Soil Classification	Area (ac)	S Factor	Weighted #
A Soils	**0**	0.5	0
B Soils	**0**	0.4	0
C Soils	**0**	0.3	0
D Soils	**0.78**	0.2	0.156

Total Area = 0.8 acres
Total Weighted # = 0.156

Weighted S Value = **0.20**

Rv = 0.05 + 0.009(I)

Rv = 0.95

Required WQv - based on Enhanced Phosphorus removal (Chapter 10) of NYSDEC Design Manual
Req WQv = (Total drainage area)(1-year runoff volume)

0.102 af **4443.12 cf**

Minimum Allowable RRv for enhanced Phosphorous Removal

RRv= P1-yr * Rv* Aic*S	0.0233415	**1017 cf**
P1-yr=	1.89	
Rv=.05+.009(I)	0.95	
Aic=	0.78	
S=	0.2	

Rain Garden Worksheet

WQv ≤ VSM + VDL + (DP x ARG)
VSM = ARG x DSM x nSM
VDL (optional) = ARG x DDL x nDL

Design Point:	

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
3	1.10	1.10	100%	0.95	6011.28	1.00	Rain Garden
Enter Impervious Area Reduced by Disconnection of Rooftops			87%	0.84	6,011	<<WQv after adjusting for Disconnected Rooftops	

Soil Information			
Soil Group	D		
Using Underdrains	*No*	*Okay*	
Infiltration Rate	0.50	*in/hour*	*Okay*

Rain Garden Parameters				
Enter number of Rain Gardens		13		
Enter area of each Rain Garden		1,000		
Enter Rain Garden Surface area	ARG	13,000	*sf*	
Enter depth of Soil Media	DSM	1.50	*ft*	*1 to 1.50*
Enter depth of drainage layer	DDL	1.00	*ft*	*≥ 0.50 ft*
Enter ponding depth above surface	DP	0.50	*ft*	*≤ 0.50*
Enter porosity of Soil Media	nSM	0.20		*≥20%, enter as a decimal*
Enter porosity of Drainage Layer	nDL	0.40		*≥ 40%, enter as a decimal*
Volume Provided In Soil Media	VSM	3,900	ft^3	
Volume Provided in Drainage Layer	VDL	5,200	ft^3	
Volume Provided In Ponding Area		6,500	ft^3	
Total Volume Provided		15,600	ft^3	

Determine Runoff Reduction			
Percent Reduction	40%		
Runoff Reduction	**2,405**	***ft^3***	
WQv ≤ VSM + VDL + (DP x ARG) √	OK		

Rain Garden Worksheet

WQv ≤ VSM + VDL + (DP x ARG)
VSM = ARG x DSM x nSM
VDL (optional) = ARG x DDL x nDL

Design Point:	

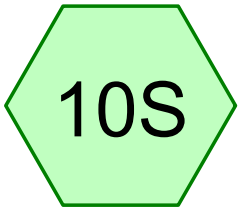
Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
4	0.8	0.8	100%	0.95	4443.12	1.00	Rain Garden
Enter Impervious Area Reduced by Disconnection of Rooftops			78%	0.76	4,443	<<WQv after adjusting for Disconnected Rooftops	

Soil Information			
Soil Group	D		
Using Underdrains	*No*	*Okay*	
Infiltration Rate	0.50	*in/hour*	

Rain Garden Parameters				
Enter number of Rain Gardens		9		
Enter area of each Rain Garden		2,000		
Enter Rain Garden Surface	ARG	18,000	*sf*	
Enter depth of Soil Media	DSM	2.00	*ft*	*1 to 1.5*
Enter depth of drainage layer	DDL	1.00	*ft*	*≥ 0.5 ft*
Enter ponding depth above surface	DP	0.50	*ft*	*≤ 0.5*
Enter porosity of Soil Media	nSM	0.20		*≥20%, enter as a decimal*
Enter porosity of Drainage Layer	nDL	0.40		*≥ 40%, enter as a decimal*
Volume Provided In Soil Media	VSM	7,200	ft^3	
Volume Provided in Drainage Layer	VDL	7,200	ft^3	
Volume Provided In Ponding Area		9,000	ft^3	
Total Volume Provided		23,400	ft^3	

Determine Runoff Reduction			
Percent Reduction	40%		
Runoff Reduction	**1,777**	***ft^3***	
WQv ≤ VSM + VDL + (DP x ARG) √	OK		

Rain Gardens



13 lots (lower portion)

9 Lots Upper Portion

Subcat Reach Pond Link

Routing Diagram for dryswales

Prepared by {enter your company name here}, Printed 2/28/2023

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.830	98	Paved parking, HSG D (10S, 12S)
1.830	**98**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
1.830	HSG D	10S, 12S
0.000	Other	
1.830		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	1.830	0.000	1.830	Paved parking	10S, 12S
0.000	**0.000**	**0.000**	**1.830**	**0.000**	**1.830**	**TOTAL AREA**	

Time span=0.00-20.00 hrs, dt=0.01 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10S: 13 lots (lower portion) Runoff Area=1.050 ac 100.00% Impervious Runoff Depth>1.57"
Tc=6.0 min CN=98 Runoff=2.75 cfs 0.138 af

Subcatchment12S: 9 Lots Upper Portion Runoff Area=0.780 ac 100.00% Impervious Runoff Depth>1.57"
Tc=6.0 min CN=98 Runoff=2.04 cfs 0.102 af

Total Runoff Area = 1.830 ac Runoff Volume = 0.240 af Average Runoff Depth = 1.57"
0.00% Pervious = 0.000 ac 100.00% Impervious = 1.830 ac

Summary for Subcatchment 10S: 13 lots (lower portion)

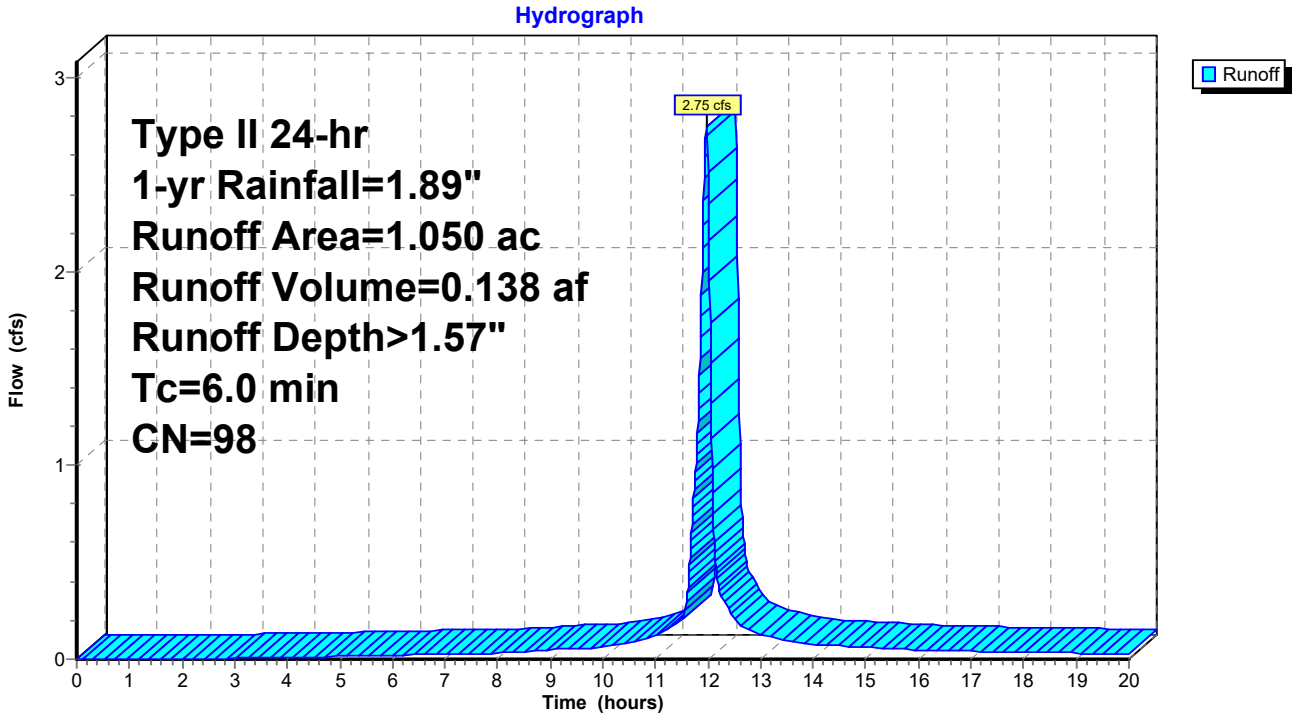
Runoff = 2.75 cfs @ 11.97 hrs, Volume= 0.138 af, Depth> 1.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.89"

Area (ac)	CN	Description
1.050	98	Paved parking, HSG D
1.050		100.00% Impervious Area

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

Subcatchment 10S: 13 lots (lower portion)



Summary for Subcatchment 12S: 9 Lots Upper Portion

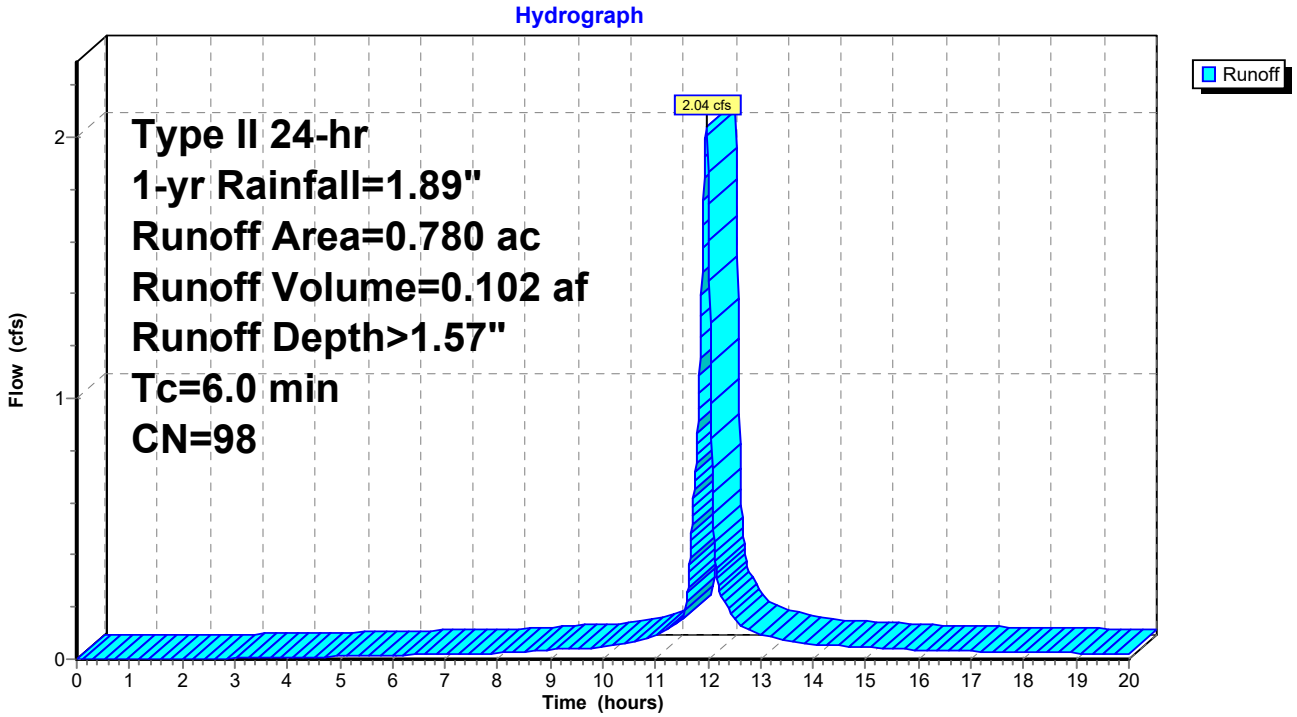
Runoff = 2.04 cfs @ 11.97 hrs, Volume= 0.102 af, Depth> 1.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.89"

Area (ac)	CN	Description
0.780	98	Paved parking, HSG D
0.780		100.00% Impervious Area

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

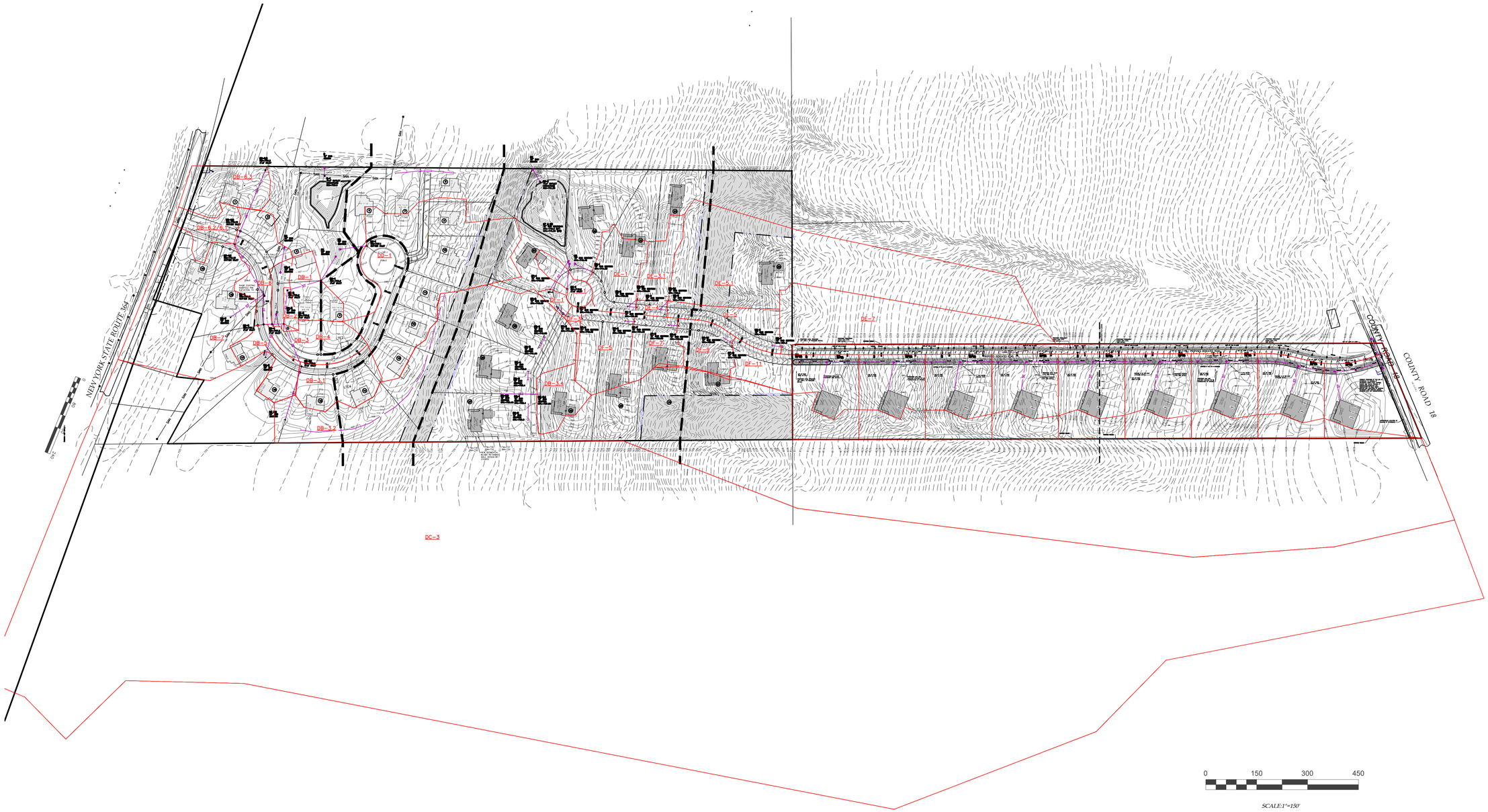
Subcatchment 12S: 9 Lots Upper Portion



MarksEngineering
42 Beeman St.
Canandaigua, NY 14424

Appendix 3

Stormsewer Calcs



1 STORM SEWER MAP
1"=150'

MarksEngineering
4 2 BEEMAN ST
CANANDAIGUA, NY 14424
Phone 585-905-0360
Fax: 585-485-6205
www.marksengineering.com bmarks@marksengineering.com

STATE OF NEW YORK
BRENNAN A. MARKS
093182
LICENSED PROFESSIONAL ENGINEER
STAMP

STAMP

REVISIONS

NO.	DATE	DESCRIPTION OF REVISION	BY
1	2/16/22	PER TOWN PRC MEETING	BAM
2	4/26/22	PER TOWN ENGINEER COMMENTS	BAM
3	5/3/22	PER TOWN ENGINEER COMMENTS	BAM
4	5/17/22	PER PLANNING BOARD COMMENTS	BAM
5	6/22/22	PER WATER SUPERVISOR COMMENTS	BAM
6	9/28/22	PER MRI COMMENTS	BAM
7	12/19/22	PER MRI COMMENTS	BAM

SITE DEVELOPMENT PLANS PREPARED FOR:
SUNSET RIDGE ESTATES/ LAKEWOOD CUSTOM HOMES
RESIDENTIAL DEVELOPMENT
SHOWING LAND IN:
3535 STATE ROUTE 364 /0000 COUNTY ROAD 18
TOWN OF CANANDAIGUA/HOPEWELL
COUNTY OF ONTARIO
STATE OF NEW YORK

DRAWING TITLE:
STORM SEWER AREAS

DRAWN BY:	JWJ
DESIGNED BY:	JWJ
CHECKED BY:	BAM
SCALE:	AS NOTED
JOB NO.:	20-243
DATE:	09/01/2022
TAX MAP#:	98.19-1-20.10

Project: Canandaigua Shores
Project No: 20-243
Date: 02/01/22
By: JWJ
Sheet 1 of 3

STORM SEWER NETWORK CALCULATIONS

	Drainage Structure		Local				Upstream contribution			Total cA	Controlling Tc	I	Q (cfs)	Pipe			Length of pipe (ft.)	% slope	Diff. In INV	Capacity (cfs)	Ratio of liquid to dia of pipe	velocity (fps)	flow time (min)	Next Point	
	From	To	Tc	c	A	cA	From	Tc	cA					DIA (in)	MATL	n								To	Tc
MH	DB-7	DB-6	15.0	0.3	2.72	0.76				0.76	15.0	3.80	2.89	15	CPP	0.012	114	0.40	0.46	4.44	0.61	3.89	0.5	DB-6	15.5
INV	704.50	704.04																							
MH	DB-6.3	DB-6.2	10.0	0.3	0.71	0.22				0.22	10.0	4.43	0.98	12	CPP	0.012	212	0.40	0.85	2.45	0.43	2.92	1.2	DB-6.2	11.2
INV	705.20	704.35																							
MH	DB-6.2	DB-6.1	6.0	0.6	0.41	0.24	DB-6.3	11.2	0.22	0.46	11.2	4.26	1.95	12	CPP	0.012	24	0.40	0.10	2.45	0.71	3.50	0.1	DB-6.1	11.3
INV	704.35	704.25																							
MH	DB-6.1	DB-6	0.0	0	0.00	0.00	DB-6.2	11.3	0.46	0.46	11.3	4.25	1.94	12	CPP	0.012	170	0.40	0.68	2.45	0.71	3.50	0.8	DB-6	12.1
INV	704.25	703.57																							
MH	DB-6	DB-5	10.0	0.5	0.74	0.37	DB-7	15.5	0.76	1.59	15.5	3.75	5.96	18	CPP	0.012	88	0.40	0.35	7.21	0.73	4.61	0.3	DB-5	15.8
INV	703.57	703.22					DB-6.1	12.1	0.46																
MH	DB-5	DB-4	6.0	0.5	0.49	0.26	DB-6	15.8	1.59	1.85	15.8	3.71	6.87	18	CPP	0.012	25	0.40	0.10	7.21	0.90	4.59	0.1	DB-4	15.9
INV	703.22	703.12																							
MH	DB-4	DB-3	6.0	0.4	0.61	0.24	DB-5	15.9	1.85	2.09	15.9	3.71	7.76	24	CPP	0.012	35	0.40	0.14	15.53	0.50	4.95	0.1	DB-3	16.0
INV	701.90	701.76																							
MH	DB-3.2	DB-3.1	37.7	0.2	24.60	4.92	DB-3.4	10.6	0.16	5.08	37.7	2.31	11.71	24	CPP	0.012	157	0.60	0.94	19.02	0.58	6.43	0.4	DB-3.1	38.1
INV	704.50	703.56																							
MH	DB-3.1	DB-3	6.0	0.5	0.73	0.37	DB-3.2	38.1	5.08	5.45	38.1	2.29	12.46	24	CPP	0.012	135	1.25	1.69	27.46	0.47	8.52	0.3	DB-3	38.4
INV	703.56	701.87																							
MH	DB-3	DB-2	6.0	0.2	0.01	0.00	DB-4	16.0	2.09	7.54	38.4	2.28	17.18	24	CPP	0.012	99	0.80	0.79	21.97	0.70	7.83	0.2	DB-2	38.6
INV	701.76	700.97					DB-3.1	38.4	5.45																
MH	DB-2	DB-1	6.0	0.2	0.09	0.02	DB-3	38.6	7.54	7.56	38.6	2.27	17.16	24	CPP	0.012	103	0.80	0.82	21.97	0.70	7.83	0.2	DB-1	38.8
INV	700.97	700.15																							
MH	DB-1	DB	6.0	0.5	0.49	0.25	DB-2	38.8	7.56	7.80	38.8	2.26	17.65	24	CPP	0.012	77	0.80	0.62	21.97	0.71	7.86	0.2	DB	39.0
INV	700.15	699.53																							

Project: Canandaigua Shores
Project No: 20-243
Date: 02/01/22
By: JWJ
Sheet 2 of 3

STORM SEWER NETWORK CALCULATIONS

	Drainage Structure		Local				Upstream contribution			Total cA	Controlling Tc	I	Q (cfs)	Pipe			Length of pipe (ft.)	% slope	Diff. In INV	Capacity (cfs)	Ratio of liquid to dia of pipe	velocity (fps)	flow time (min)	Next Point	
	From	To	Tc	c	A	cA	From	Tc	cA					DIA (in)	MATL	n								To	Tc
MH	DF-11	DF-10	15.0	0.3	0.44	0.13				0.13	15.0	3.80	7.00	12	CPP	0.012	25	8.00	2.00	10.94	0.60	14.94	0.0	DF-10	15.0
INV	790.50	788.50																							
MH	DF-9	DF-8	15.0	0.4	0.52	0.20	DF-11	15.0	0.13	0.33	15.0	3.80	1.25	12	CPP	0.012	25	8.00	2.00	10.94	0.24	9.44	0.0	DF-8	15.1
INV	772.50	770.50																							
MH	DF-7	DF-6	15.0	0.4	0.00	0.00	DF-9	15.1	0.33	0.33	15.1	3.79	1.25	12	CPP	0.012	25	8.00	2.00	10.94	0.24	9.44	0.0	DF-6	15.1
INV	761.00	759.00																							
MH	DF-5	DF-4	15.0	0.3	0.85	0.26	DF-7	15.1	0.33	0.59	15.1	3.79	2.25	15	CPP	0.012	25	6.00	1.50	17.18	0.25	9.75	0.0	DF-4	15.2
INV	748.00	746.50																							
MH	DF-3	DF-2	15.0	0.6	0.21	0.12	DF-5	15.2	0.59	0.71	15.2	3.78	2.70	18	CPP	0.012	61	1.50	0.91	13.97	0.29	6.03	0.2	DF-2	15.3
INV	743.50	742.59																							
MH	DF-1	DF	15.0	0.5	0.09	0.05	DF-3	15.3	0.71	0.76	15.3	3.76	2.86	30	CPP	0.012	94	1.00	0.94	44.53	0.17	5.08	0.3	DF	15.6
INV	743.00	742.06																							
MH						0.00				0.00	0.0	0.00	0.00		CPP	0.012			0.00	#DIV/0!	#DIV/0!	#####	####	0.00	####
INV		0.00																							
MH	DB-3.4	DB-3.3	10.0	0.4	0.40	0.16				0.16	10.0	4.43	0.71	12	CPP	0.012	104	0.50	0.52	2.74	0.34	2.87	0.6	DB-3.3	10.6
INV	737.50	736.98																							
MH						0.00				0.00	0.0	0.00	0.00		CPP	0.012			0.00	#DIV/0!	#DIV/0!	#####	####	0.00	####
INV		0.00																							
MH	DG-6	DG-5	6.0	0.4	0.25	0.10				0.10	6.0	5.12	0.51	12	CPP	0.012	25	2.00	0.50	5.47	0.20	4.32	0.1	DG-5	6.1
INV	472.50	472.00																							
MH	DG-4	DG-3	6.0	0.5	0.15	0.08	DG-6	6.1	0.10	0.18	6.1	5.10	0.89	12	CPP	0.012	20	2.00	0.40	5.47	0.27	5.09	0.1	DG-3	6.2
INV	738.80	738.40																							
MH	DG-2	DG-1	6.0	0.6	0.13	0.08				0.08	6.0	5.12	0.40	12	CPP	0.012	44	1.00	0.44	3.87	0.23	3.27	0.2	DG-1	6.2
INV	738.80	738.36																							

Project: Canandaigua Shores
Project No: 20-243
Date: 02/01/22
By: JWJ
Sheet 3 of 3

STORM SEWER NETWORK CALCULATIONS

	Drainage Structure		Local				Upstream contribution			Total cA	Controlling Tc	I	Q (cfs)	Pipe			Length of pipe (ft.)	% slope	Diff. In INV	Capacity (cfs)	Ratio of liquid to dia of pipe	velocity (fps)	flow time (min)	Next Point	
	From	To	Tc	c	A	cA	From	Tc	cA					DIA (in)	MATL	n								To	Tc
MH	DE-7	DE-6	15.0	0.2	2.17	0.43				0.43	15.0	3.80	7.00	12	CPP	0.012	25	8.00	2.00	10.94	0.60	14.94	0.0	DE-6	15.0
INV	801.50	799.50																							
MH	DE-5.1	DE-4	15.0	0.2	4.42	0.97				0.97	15.0	3.80	3.70	12	CPP	0.012	35	2.00	0.70	5.47	0.62	7.57	0.1	DE-4	15.1
INV	768.50	767.80																							
MH	DE-5	DE-4	15.0	0.4	0.59	0.24	DE-5.1	15.1	0.97	1.64	15.1	3.79	6.23	12	CPP	0.012	23	10.00	2.30	12.23	0.51	15.69	0.0	DE-4	15.1
INV	770.00	767.70					DE-7	15.0	0.43																
MH	DE-3.1	DE-2	15.0	0.4	0.45	0.16				0.16	15.0	3.80	0.60	12	CPP	0.012	34	2.00	0.68	5.47	0.23	4.68	0.1	DE-2	15.1
INV	759.50	758.82																							
MH	DE-3	DE-2	15.0	0.5	0.10	0.05	DE-3.1	15.1	0.16	1.85	15.1	3.79	7.01	18	CPP	0.012	25	2.70	0.67	18.74	0.41	9.75	0.0	DE-2	15.2
INV	759.50	758.83					DE-5	15.1	1.64																
MH	DE-1	DE	15.0	0.4	0.72	0.30	DE-3	15.2	1.85	2.15	15.2	3.78	8.14	30	CPP	0.012	106	2.00	2.12	62.98	0.25	8.91	0.2	DE	15.4
INV	742.50	740.38																							
MH						0.00				0.00	0.0	0.00	0.00		CPP	0.012			0.00	####	#DIV/0!	#####	####	0.00	####
INV		0.00																							
MH	DH-1	DH	10.0	0.4	0.25	0.11				0.11	10.0	4.43	0.49	12	CPP	0.012	70	0.50	0.35	2.74	0.28	2.60	0.4	DH	10.4
INV	742.20	741.85																							
MH						0.00				0.00	0.0	0.00	0.00		CPP	0.012			0.00	####	#DIV/0!	#####	####	0.00	####
INV		0.00																							
MH	DC-3	DC-2	35.7	0.2	67.75	13.55				13.55	35.7	2.39	32.35	36	CPP	0.012	122	0.40	0.49	45.80	0.65	7.11	0.3	DC-2	36.0
INV	704.50	704.01																							
MH	DC-1	DC	0.0	0.0	0.00	0.00	DC-3	36.0	13.55	13.55	36.0	2.38	32.19	36	CPP	0.012	65	0.40	0.26	45.80	0.64	7.10	0.2	DC	36.1
INV	703.30	703.04																							
MH	DD-1	DD	10.0	0.5	3.30	1.68				1.68	10.0	4.43	7.46	18	CPP	0.012	73	1.00	0.73	11.40	0.61	6.96	0.2	DD	10.2
INV	704.10	703.37																							

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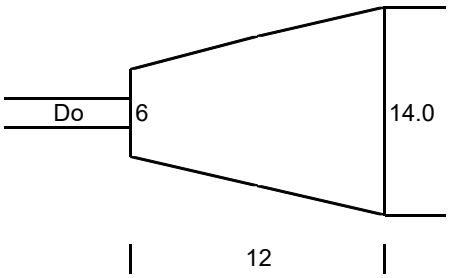
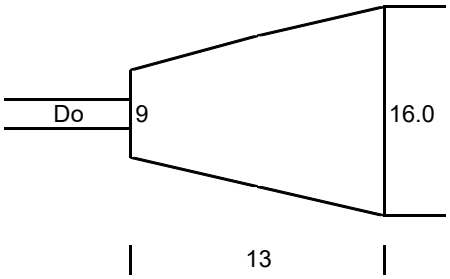
DESIGNATION	**DB**	
Do-DIA. OF PIPE	24	in
DISCHARGE	18.0	cfs
d50 RIP-RAP SIZE	0.4	ft
La-LENGTH OF APRON	12.0	ft
W=Do+La	14.0	ft
SY OF RIP RAP	13	sy
MIN BLANKET THICKNESS	11	in
AVE WEIGHT	50	lbs



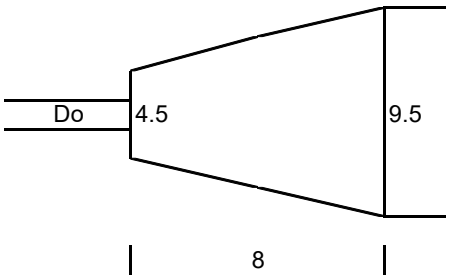
NOTES:

DESIGNATION	**DC**	
Do-DIA. OF PIPE	36	in
DISCHARGE	33.0	cfs
d50 RIP-RAP SIZE	0.2	ft
La-LENGTH OF APRON	13.0	ft
W=Do+La	16.0	ft
SY OF RIP RAP	18	sy
MIN BLANKET THICKNESS	5	in
AVE WEIGHT	50	lbs



NOTES:

DESIGNATION	**DD**	
Do-DIA. OF PIPE	18	in
DISCHARGE	7.5	cfs
d50 RIP-RAP SIZE	0.3	ft
La-LENGTH OF APRON	8.0	ft
W=Do+La	9.5	ft
SY OF RIP RAP	6	sy
MIN BLANKET THICKNESS	8	in
AVE WEIGHT	50	lbs



NOTES:

	CALCULATIONS **:**	Project No.: 20-243
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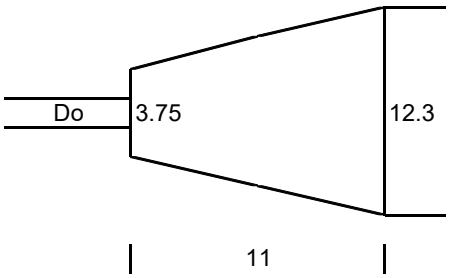
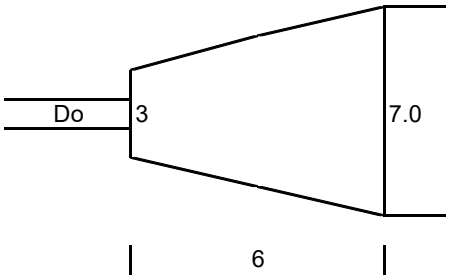
DESIGNATION	**DE**	
Do-DIA. OF PIPE	15	in
DISCHARGE	8.1	cfs
d50 RIP-RAP SIZE	0.1	ft
La-LENGTH OF APRON	11.0	ft
W=Do+La	12.3	ft
SY OF RIP RAP	10	sy
MIN BLANKET THICKNESS	3	in
AVE WEIGHT	50	lbs



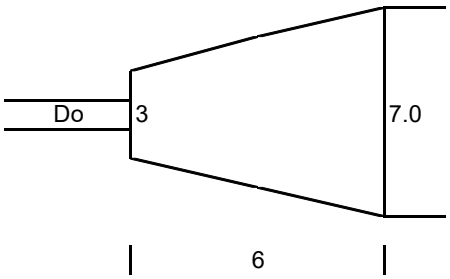
NOTES:

DESIGNATION	**DF**	
Do-DIA. OF PIPE	12	in
DISCHARGE	3.0	cfs
d50 RIP-RAP SIZE	0.1	ft
La-LENGTH OF APRON	6.0	ft
W=Do+La	7.0	ft
SY OF RIP RAP	5	sy
MIN BLANKET THICKNESS	3	in
AVE WEIGHT	50	lbs



NOTES:

DESIGNATION	**DH**	
Do-DIA. OF PIPE	12	in
DISCHARGE	0.5	cfs
d50 RIP-RAP SIZE	0.1	ft
La-LENGTH OF APRON	6.0	ft
W=Do+La	7.0	ft
SY OF RIP RAP	5	sy
MIN BLANKET THICKNESS	3	in
AVE WEIGHT	50	lbs



NOTES:

	CALCULATIONS **:**	Project No.: 20-243
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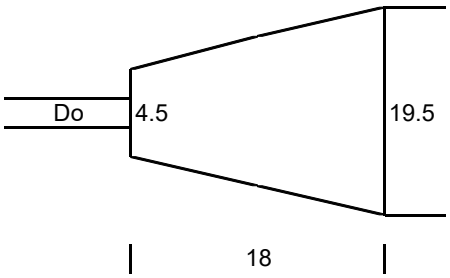
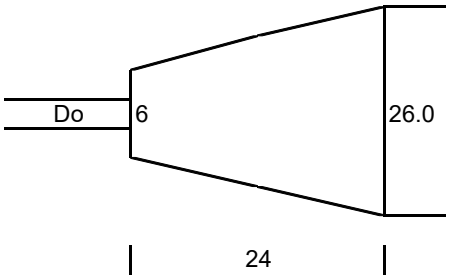
DESIGNATION	**D (lower pond outlet)**	
Do-DIA. OF PIPE	18	in
DISCHARGE	22.0	cfs
d50 RIP-RAP SIZE	0.7	ft
La-LENGTH OF APRON	18.0	ft
W=Do+La	19.5	ft
SY OF RIP RAP	24	sy
MIN BLANKET THICKNESS	19	in
AVE WEIGHT	75	lbs



NOTES:

DESIGNATION	**DG (Upper pond outlet)**	
Do-DIA. OF PIPE	24	in
DISCHARGE	48.0	cfs
d50 RIP-RAP SIZE	1.0	ft
La-LENGTH OF APRON	24.0	ft
W=Do+La	26.0	ft
SY OF RIP RAP	43	sy
MIN BLANKET THICKNESS	27	in
AVE WEIGHT	150	lbs



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