STORMWATER MANAGEMENT PLAN

FOR

FOUR SEVENTY TWO PEPPER STREET LLC

472 PEPPER STREET

MONROE, CONNECTICUT

September 1,2020

Prepared by
J. Edwards & Associates, LLC
227 Stepney Road, Easton, CT 06612

_____

Larry Edwards P.E. #10937

PROJECT NARRATIVE

This project consists of a 10.1-acre parcel located at 472 Pepper Street in Monroe Ct... The site presently has 3 small industrial building. It is proposed to expand the parking and outside storage areas. A new drainage system will also be installed which will discharge to one of 3 water quality areas. Utility services will also be upgraded.

Upland soils in the proposed development area consist of Charlton soil types (soil group B). The wetland soils consist primarily of Ridgebury soils. The proposed development of the site will create an addtional 30,400 square feet of impervious area.

The storm water management system will consist of a 2 water quality stormwater basins and one rain garden. The runoff from the building roof will separated and discharged to an infiltration system. The runoff from the pavement and roof areas will.be collected by a drainage system which will discharge to one of water quality areas. Each catchbasin will have a 2' minimum sump with the last basin in the system equipped with a hooded trap.

The drainage analysis for the project was performed using the SCS TR55 computer model using NOAA IDF data. Storm frequencies of 2, 10, 25 and 100 years have been evaluated. The basin outlet has been sized to handle a 100 year storm.

STORM WATER QUALITY CALCULATIONS

Water Quality Volume

This volume represents the amount of storm water runoff that should be captured and treated in order to remove the majority pollutants on an average annual basis. The study area includes the total project site along with any offsite area passing through. The building runoff will be collected separately and discharged to an infiltration system.

The total drainage area flowing to the water quality basin, including undisturbed areas will be 4.7 acres. This includes all of the proposed development area.

WQV = (1")(R)(A)/12
R = (0.05) + (0.009)(% impervious)

WQ Basin	Area	Imperv. Area	% Imperv.	R	WQV Required (cf)	WQV Proposed (cf)	FORBAY Proposed (cf)
1	0.6	0.4	67.7	0.66	1435	1632	N/A
2	0.7	1.1	80.3	0.77	1963	2968	345
3	1.5	1.3	86.7	0.83	4519	6022	810

Ground Water Recharge Volume
This requirement is intended to maintain pre-development annual groundwater recharge volume by capturing and infiltrating the storm water runoff.
Ground water recharge will be provided through the water quality basin

GWV = DxAxI/12

Soil recharge depth calculation:
Soil group B D =0.25

Site	Area	% Imperv.	GWV Required (cf)	GWV Proposed (cf)
2	0.7	80.3%	510	2968
3	1.5	86.7%	1180	6022

Stream Channel Protection
The design criteria will be to limit the 2 year 24 hour post development flow rate to 50% of the pre development 2 year 24 hour flow rate.

WQ Basin	2yr Exist	2yr Prop
2	2.13	0.01
3	3.98	0.17

Outlet Protection
The water quality basin outlet will be protected with a rip rap pad sized in accordance with the Connecticut Erosion Control guidelines

Outlet basin #2
2- 5" pipes
Q 10yr =0.39cfs each
Pad length (La) =(1.7)(Q)/Do2/3 +8Do =(1.7)(0.39)/(0.55) + 8(0.42) =4.6'
Pad width =3D +La =1.26 + 4.56 =5.8'
Use 6'x6' rip rap pad

Outlet Basin #3
1-12" pipe
Q 10yr =0.95cfs
Pad length (La) =(1.7)(Q)/Do2/3 +8Do =(1.7)(0.95)/(1.0) + 8(1.0) =9.6' 10' provided
Pad width =3D +La =3 + 9.6 =10.6' 12' provided

Conveyance Protection
In accordance with the Monroe land use regulations, all project drainage improvements have been designed to handle a minimum 25 year storm event with outlet overflow from the basin

designed to handle a 100 year storm. Reference is made to complete drainage report for supporting documentation.

Peak Runoff Attenuation
The storm management system for this project will control post development peak runoff for the 2, 10, 25 and 100 year storm events to levels less than or equal to the pre development rates...

Emergency Outlet Protection
The emergency outlet control have been designed to handle a 100 year storm event. See Drainage Summary Addendum attached to this report as well as the complete Drainage Report for supporting documentation.

Outlet capacity Q =(A)(1.49/n)(R@0.67)(S@0.5)

Use 4' wide x 0.5' high at 1% slope
Q = (3)(1.49/0.03)(0.61)(0.1) =9.12cfs

Downstream Analysis
The drainage study for this project has also looked at the overall project impact to downstream off site water courses. Peak runoff from the total site will not exceed pre development levels. See Drainage Summary Addendum attached to this report as well as the complete Drainage Report for supporting documentation.

SUMMARY TOTAL STUDY AREA

	2 YR EXIST	**2 YR PROP**	10 YR EXIST	**10 YR PROP**	25 YR EXIST	**25 YR PROP**	100 YR EXIST	**100 YR PROP**
BASIN 1	1.2	**0.44**	2.21	**1.09**	2.85	**2.70**	**3.83**	**3.68**
BASIN 2	2.13	**0.01**	3.67	**2.23**	4.62	**1.84**	6.09	**2.50**
BASIN 3	3.98	**0.17**	6.68	**2.30**	8.35	**3.80**	10.91	**7.38**
TOTAL SITE	6.19	**3.31**	18.51	**15.96**	27.37	**24.47**	42.01	**40.07**

ADDENDUM #1
EROSION AND SEDIMENT CONTROL PLAN

A. GENERAL STATEMENT

This project consists of a 10.1acre industrial parcel which will be expanded to include additional parking and outside storage.

1. Work on this project is expected to commence upon approval by the Planning and Zoning Commission. Final stabilization shall be completed as soon as possible after completion of work. In all cases disturbed areas shall be stabilized by the end of the growing season so that grass cover can be established. Construction shall be completed in accordance with the attached schedule.

2. The Storm Pollution control program for this site shall include the following as shown on the approved map:

a. Installation of a filter fence as shown on the plan.
b. Installation of anti-tracking apron on the driveways and at entrance to the roads.
c. Installation of detention/sediment basins and traps

3. Prior to any construction on the site, a pre-construction meeting shall be held with the owner, contractor, design engineer, and the authorized town official to review the site and the required erosion/ sedimentation and storm pollution control program.

4. The approved site plans, erosion control plan, engineering report and land use applications are considered part of this plan.

B. SCHEDULING OF GRADING AND CONSTRUCTION ACTIVITIES

Prior to starting construction on the site, all erosion and sediment control measures shall be installed as directed by the design engineer, permittee and/or authorized town agent. Detailed plans have been provided. Detailed construction sequencing has been included on the sheet for each phase.

Construction sequence:
A detailed construction sequence has been included on the Erosion Control Plan.

C. MEASURES TO BE USED DURING CONSTRUCTION

1. SILT FENCE

Silt fence consists of wooden post and filter fabric. Fences will be secured in place by wood posts set a maximum of five feet on-center. The filter fabric will be three feet in height. Fabric at the base of the fence will be buried at least six inches into the ground. Twine will be used to secure the fence on the uphill side to prevent overturning. The purpose of silt fences is to intercept and detain sediment contained in overland runoff from disturbed areas of limited extent. (Envirofence by Mirafi Inc. is an acceptable alternative to the system described above.)

Installation and Maintenance shall conform to the following:

Sediment will be removed from behind silt fences when sediment has accumulated to 50% of original height of the fence.

2. ANTI-TRACKING APRON

A ramp of crushed stone extending a minimum distance of 50 feet will be installed at the point of ingress and egress to the site. The purpose of the device is to minimize the potential of tracking mud from

the site onto public right-of-way.

Installation and Maintenance shall conform to the following:
Minimum length will be 50 feet.
Stone size will meet CT DOT standards for two inch crushed gravel.
Stone will be placed upon the full width of the entrance roads.
Thickness of stone will be four inches or greater.
All sediment spilled, dropped, washed, or tracked onto public right-of-way will be removed immediately.

3. TEMPORARY WATER BREAKS

This temporary device consists of a swale constructed across proposed roadways. The purpose of this device is to direct runoff away from the road surface and minimize sediment from entering the drainage system. This shortens the length of disturbed slope by intercepting runoff and diverting it away from the roadway catch basins.

Installation and Maintenance shall conform to the following:
Swales will be placed across roads, which are to be constructed in fill:
Every 200 feet on slopes of 5-10%
Every 300 feet on slopes less than 5%
Contributory drainage areas, which are less than five acres.
Swales drain to hay bale check dams.

4. HAY BALE CHECK DAMS

Hay bale check dams of tightly bound, steel pin anchored, hay bales embedded four inches below grade in drainage swales adjacent to roadways or at the toe of an exposed slope. The purpose of a hay bale check dam is to reduce runoff velocity, and promote deposition and filtering of sediment from runoff. Hay bale check dams will be used where the runoff velocities will be less than three feet per second.

Installation and Maintenance shall conform to the following:
Compacted backfill will be placed against the up slope side of the Hay bales to a height of 4" above the ground.
Check dams will be placed in drainage swales:
Every 100 feet on slopes greater than 10%
Every 200 feet on slopes 5-10%
Every 300 feet on slopes less than 5%
Sediment shall be removed from hay bale check dams when sediment has accumulated to 50% of the original height.

5. TEMPORARY SEDIMENT TRAPS

Runoff collected in roadway interceptor swales or other swales will be directed to a sediment trap. The trap consists of a small excavation and/or embankment. The purpose of the trap is to collect runoff, promote settling of sediment, and de-concentrate and distribute clean runoff overland through natural vegetation before it enters existing watercourses and wetlands.

Installation and Maintenance shall conform to the following:
Contributory drainage areas that are less than or equal to five acres.
Utilized as part of swales prior to discharge to natural slopes.
Traps will be placed such that runoff discharging from the trap will flow at least 30 feet overland through natural vegetation before entering stream channels or wetlands.
Traps will be designed before construction.
Trap sides shall be compacted during construction.
The trap outlet shall have crushed stone rip-rap hand placed for energy dissipation.
Traps will be cleaned when sediment has accumulated to 50% of design volume.

Remove sediment deposited upland and treat to reduce potential erosion.

6. CATCH BASIN FILTERS

Temporary catch basin filters will be utilized to prevent the deposition of sediment into the storm sewer system prior to the stabilization of exposed areas with vegetation and/or pavement. These filters will consist of tightly bound, pin-anchored hay bales embedded four inches below grade, surrounding each catch basin inlet.

Installation and Maintenance shall conform to the following:
Placed around each catch basin inlet prior to paving or stabilization with vegetation.
Sediment shall be removed from the filters when sediment has accumulated to 50% of the filter's original height.

7. TEMPORARY GRADE TO DRAINS

This is a temporary raised berm of compacted soil, placed across a disturbed slope that intercepts runoff from disturbed areas and directs it to an appropriate outlet. This device will be used mostly on steep slopes above deep excavations.

Installation and Maintenance shall conform to the following:
Temporary grade to drains may be placed on cut and fill slopes exceeding 10 feet in height.
Contributory drainage area should not be greater than one acre.
Runoff will be diverted overland by the berms to sediment traps, sedimentation basins, swales, or check dams.
On slopes over 5%, additional stabilization is required in the form of stone rip-rap eight inches vertically up the upslope side of the berm and seven feet upslope from the upslope toe of the berm.
Top width of berm will be two feet. Side slopes will be 2:1 or flatter.
All berms shall be machine compacted.

8. RIP-RAP OUTFALL PROTECTION

As a permanent erosion control measure to protect the soil surface from the erosive forces and to slow the velocity of concentrated runoff while enhancing the potential for infiltration, velocity reducers in the form of crushed stone rip-rap will be used at the outfalls of all drainage structures that discharge to wetlands or other sensitive areas. The minimum thickness of the rip-rap layer will be 1.5 times the maximum stone diameter but not less than six inches. Sizing the stone and determining the dimensions of the rip-rap pads will be completed upon further design of the project using the methods described in the Connecticut Guidelines for Soil Erosion and Sediment Control.

9. Names, addresses and phone numbers of all persons and organizations that will be responsible for the installation and maintenance of the erosion and sedimentation devices will be provided prior to any earth moving or any other construction activity.

10. Construction area to be kept clean from all litter, debris and other building materials collected and disposed of offsite in approved manner. All fuels, oils and other controlled chemicals to be stored in approved areas. Such areas to be bermed as necessary to prevent spills from entering open watercourses. Fueling of equipment shall not be allowed in other than approved areas. In the event of a fuel or chemical spill, immediate measures to be taken to control damage and local and state officials are to be notified immediately.

11. Where construction activities have permanently ceased or have temporarily been suspended for more than seven days, or when final grades are reached in any portion of the site, stabilization practices shall be implemented within three days. Areas that remain disturbed but inactive for at least thirty days shall receive temporary seeding in accordance with the guidelines.

D. MAINTENANCE PROGRAM DURING CONSTRUCTION

1. The designated site monitor will inspect disturbed areas of the construction activity that have not been finally stabilized, structural control measures, and locations where vehicles enter or exit the site at least once every seven calendar days and within 24 hours of the end of a storm that is 0.1 inches or grater. Where sites have been temporarily or finally stabilized, such inspection shall be conducted at least once every month for three months.

2. Additional control measures will be installed and the plan revised as appropriate as soon as practicable after such inspection. Such modifications shall provide for timely implementation of any changes to the site within 24 hours and implementation of any changes to the plan with 3 calendar days following the inspection. The plan shall be revised and the site controls updated in accordance with sound engineering practices, and applicable state and local regulations.

3. All control measures shall be maintained in effective working condition throughout the construction period.

4. Control measures found to be in disrepair shall be repaired or replaced immediately.

5. Sediment removed from control structures will be disposed of in a neat manner and disposed of in areas designated by the authorized town official or design engineer.

6. A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Stormwater Pollution Control Plan, and actions taken shall be made and retained as part of the Plan for at least three years after the date of inspection. The permittee, or his authorized representative shall sign the report.

7. 472 Peeper Street LLC, Owner, or his designated agent is assigned the responsibility for implementing this erosion and storm pollution control plan. This responsibility includes site inspections, preparation of reports, the installation and maintenance of control measures, informing all parties engaged on the construction site of the requirements and objectives of the plan, notifying the Planning and Zoning Commission of any transfer of this responsibility, and for conveying a copy of the Erosion and Sediment Control Plan and the Implementation Schedule for Erosion and Sedimentation Control if the title to the land is transferred.

E. POST-CONSTRUCTION STORM MANAGEMENT

1. After completion of site disturbance and satisfactory stabilization, all permanent control structures including detention basins, storm water ditches, and catch basins to be cleaned of all sediment and debris. At time of transfer of ownership and/or responsibility for controls, the new owner or designated agent shall be advised of the sedimentation control maintenance requirements for the project.

MAINTENANCE PROGRAM

Seasonal Site Inspection/Maintenance

1. In the spring sweep sand deposits from the driveway areas and deposit at approved site. Inspect the water quality areas for excessive sediment buildup and remove as required.
2. In the fall, remove leaf debris from the site to avoid excessive loading of the water quality areas and rain gardens. Mow area, as required eliminating unwanted plant species.
3. All catchbasins to be inspected and cleaned yearly.
4. The infiltration gallery system to be inspected yearly. If there is significant sediment accumulation in sytem, the cleaning schedule for the catchbasins to be increased to 2 times per year.

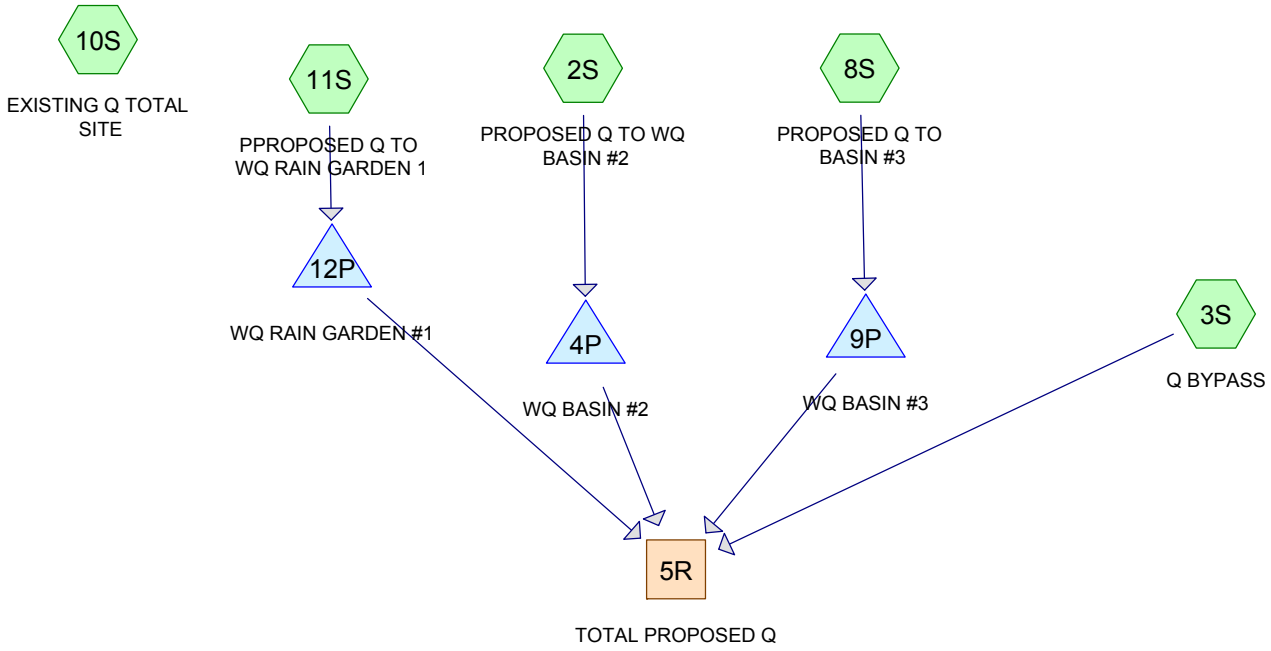
F. REPORTING AND RECORD KEEPING REQUIREMENTS

1. The permittee shall retain copies of Stormwater Pollution Control Plans and all reports required by this general permit, and records of all data used to complete the registration to be authorized by this general permit, for a period of at least three years from the date that construction at the site is completed unless the commissioner specifies another time period in writing.

2. The permittee shall retain an updated copy of the Stormwater Pollution Control Plan required by this general permit at the construction site from the date construction is initiated at the site until the date construction at the site is completed.

3. Upon completion of construction, for sites authorized by the General Permit for the Discharge of Stormwater Associated with Commercial Activity or the General Permit for the Discharge of Stormwater Associated with Industrial Activity, the Stormwater Pollution Control Plan shall be kept as an appendix to the Stormwater Management Plan or Stormwater Pollution Prevention Plan (as applicable) for a period of at least three years from the date of completion of construction. A notice of termination form shall be completed by the permittee and forwarded to DEP upon completion of all site construction.

ADDENDUM #2
DRAINGE ANALYSIS



Subcat Reach Pond Link

Drainage Diagram for 2775
Prepared by Microsoft, Printed 9/29/2020

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.147	61	>75% Grass cover, Good, HSG B (2S)
16.015	65	Woods/grass comb., Fair, HSG B (3S, 10S, 11S)
0.259	69	50-75% Grass cover, Fair, HSG B (8S)
3.859	98	Unconnected pavement, HSG B (2S, 8S, 10S, 11S)
20.280	71	**TOTAL AREA**

Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2S: PROPOSED Q TO WQ Runoff Area=32,540 sf 80.33% Impervious Runoff Depth>6.56"
Flow Length=200' Tc=2.8 min CN=91 Runoff=6.09 cfs 0.409 af

Subcatchment 3S: Q BYPASS Runoff Area=315,458 sf 0.00% Impervious Runoff Depth>3.59"
Tc=11.1 min CN=65 Runoff=27.48 cfs 2.167 af

Subcatchment 8S: PROPOSED Q TO Runoff Area=67,127 sf 83.20% Impervious Runoff Depth>6.79"
Flow Length=500' Tc=7.9 min CN=93 Runoff=10.91 cfs 0.872 af

Subcatchment 10S: EXISTING Q TOTAL Runoff Area=441,698 sf 15.54% Impervious Runoff Depth>3.92"
Flow Length=500' Tc=11.1 min UI Adjusted CN=68 Runoff=42.01 cfs 3.312 af

Subcatchment 11S: PPROPOSED Q TO Runoff Area=26,573 sf 65.80% Impervious Runoff Depth>6.08"
Flow Length=100' Slope=0.0200 '/' Tc=9.6 min CN=87 Runoff=3.83 cfs 0.309 af

Reach 5R: TOTAL PROPOSED Q Inflow=40.07 cfs 3.077 af
Outflow=40.07 cfs 3.077 af

Pond 4P: WQ BASIN #2 Peak Elev=411.92' Storage=6,443 cf Inflow=6.09 cfs 0.409 af
Discarded=0.20 cfs 0.137 af Primary=2.13 cfs 0.212 af Outflow=2.34 cfs 0.349 af

Pond 9P: WQ BASIN #3 Peak Elev=403.96' Storage=12,151 cf Inflow=10.91 cfs 0.872 af
Discarded=0.34 cfs 0.263 af Primary=7.38 cfs 0.478 af Outflow=7.72 cfs 0.741 af

Pond 12P: WQ RAIN GARDEN #1 Peak Elev=416.25' Storage=2,060 cf Inflow=3.83 cfs 0.309 af
Discarded=0.06 cfs 0.055 af Primary=3.68 cfs 0.219 af Outflow=3.74 cfs 0.274 af

Total Runoff Area = 20.280 ac Runoff Volume = 7.069 af Average Runoff Depth = 4.18"
80.97% Pervious = 16.421 ac 19.03% Impervious = 3.859 ac

Summary for Subcatchment 2S: PROPOSED Q TO WQ BASIN #2

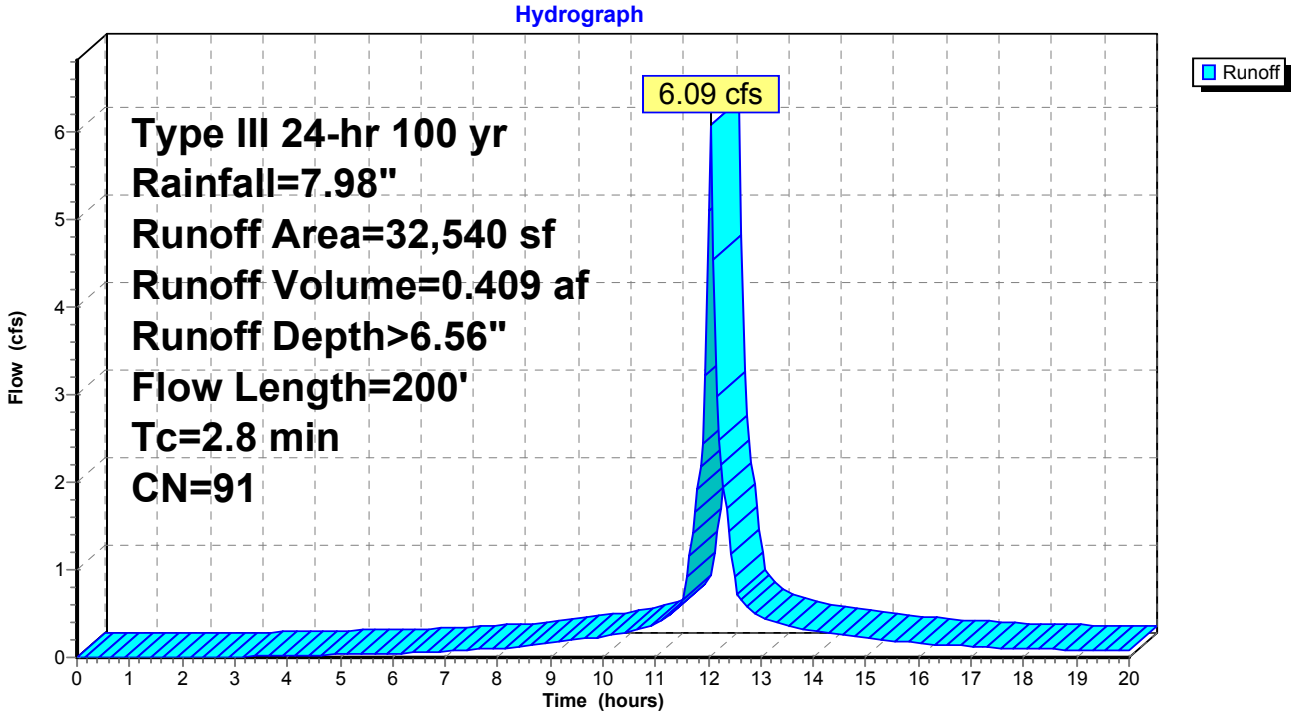
Runoff = 6.09 cfs @ 12.04 hrs, Volume= 0.409 af, Depth> 6.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=7.98"

Area (sf)	CN	Description
26,140	98	Unconnected pavement, HSG B
6,400	61	>75% Grass cover, Good, HSG B
32,540	91	Weighted Average
6,400		19.67% Pervious Area
26,140		80.33% Impervious Area
26,140		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	25	0.1500	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
1.4	175	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.8	200	Total			

Subcatchment 2S: PROPOSED Q TO WQ BASIN #2



Summary for Subcatchment 3S: Q BYPASS

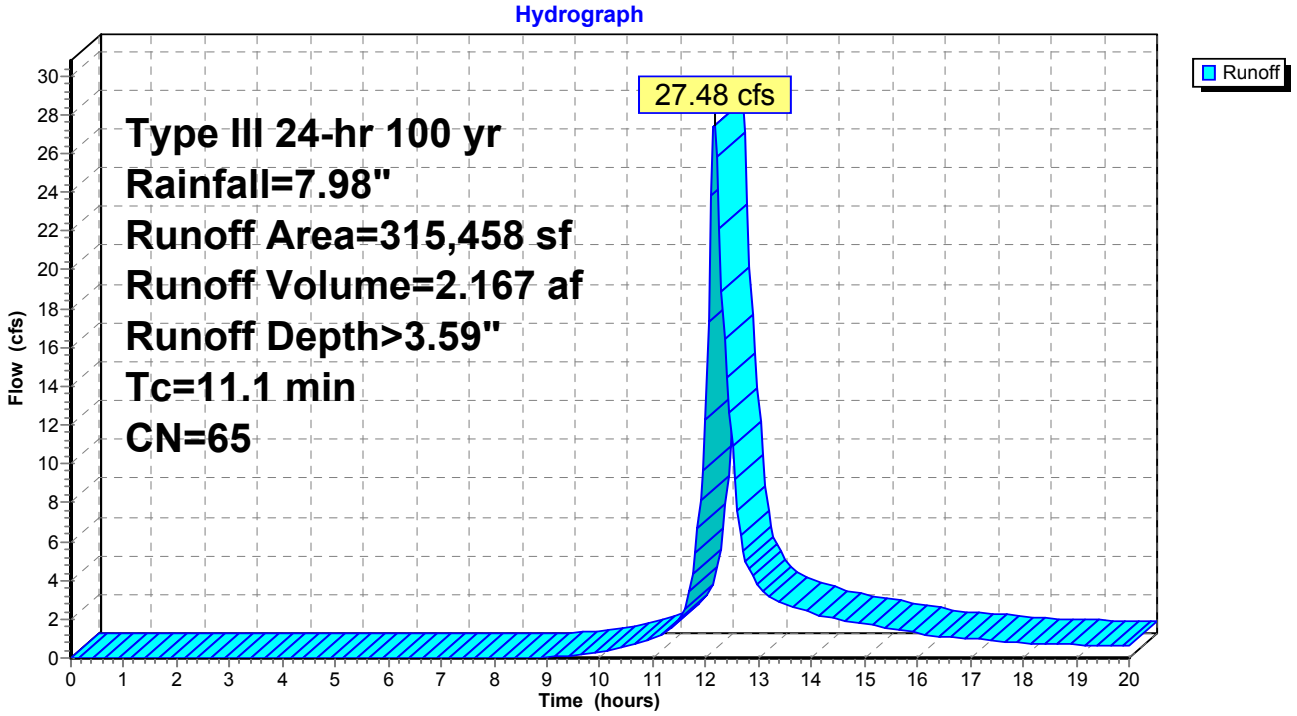
Runoff = 27.48 cfs @ 12.16 hrs, Volume= 2.167 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=7.98"

Area (sf)	CN	Description
315,458	65	Woods/grass comb., Fair, HSG B
315,458		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1					**Direct Entry, SAME AS EXISTING**

Subcatchment 3S: Q BYPASS



Summary for Subcatchment 8S: PROPOSED Q TO BASIN #3

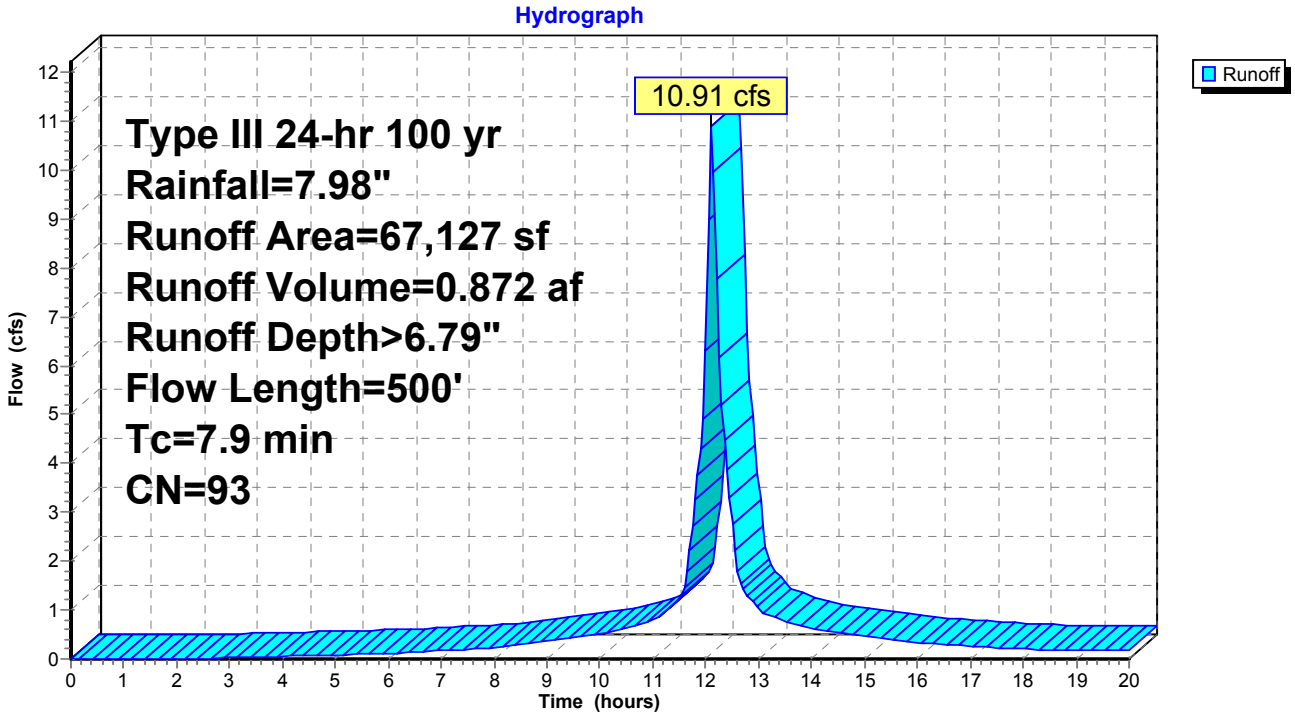
Runoff = 10.91 cfs @ 12.11 hrs, Volume= 0.872 af, Depth> 6.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=7.98"

Area (sf)	CN	Description
11,275	69	50-75% Grass cover, Fair, HSG B
55,852	98	Unconnected pavement, HSG B
67,127	93	Weighted Average
11,275		16.80% Pervious Area
55,852		83.20% Impervious Area
55,852		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1300	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
1.2	100	0.0200	1.40		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.30"
1.0	350	0.0100	5.90	4.63	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
7.9	500	Total			

Subcatchment 8S: PROPOSED Q TO BASIN #3



Summary for Subcatchment 10S: EXISTING Q TOTAL SITE

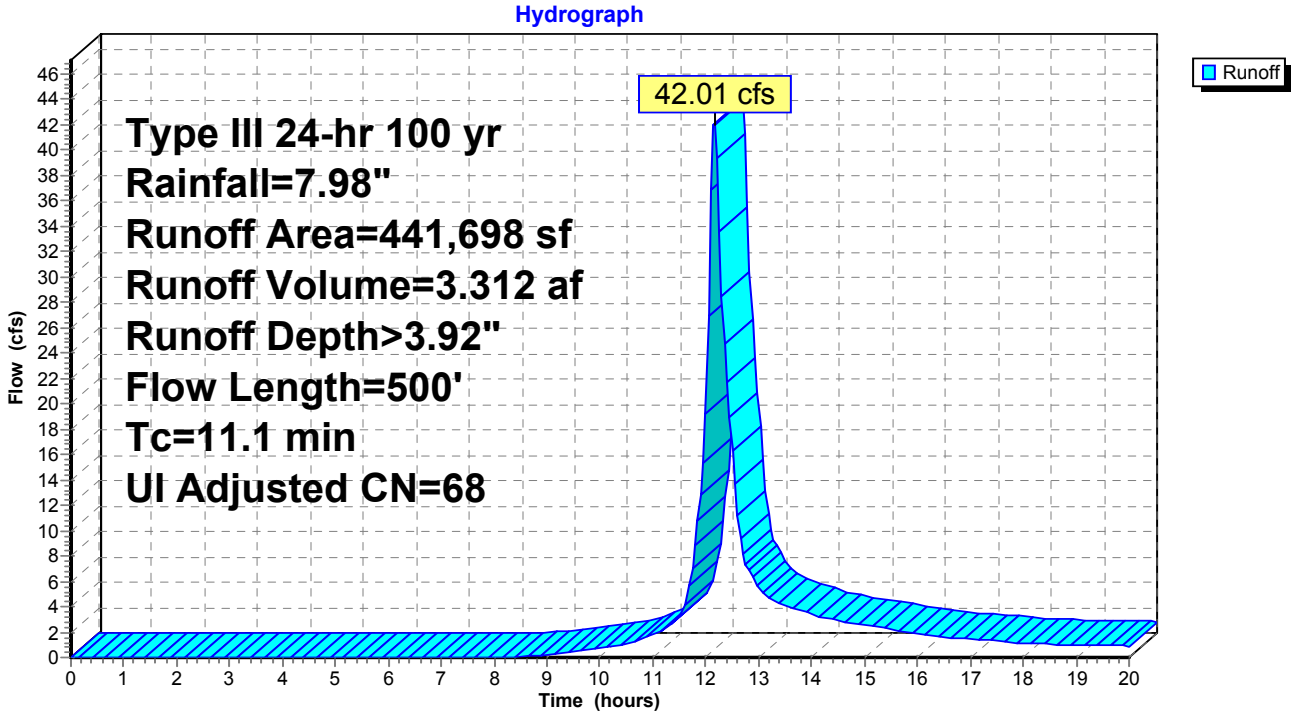
Runoff = 42.01 cfs @ 12.16 hrs, Volume= 3.312 af, Depth> 3.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=7.98"

Area (sf)	CN	Description
373,078	65	Woods/grass comb., Fair, HSG B
68,620	98	Unconnected pavement, HSG B
441,698	70	Weighted Average, UI Adjusted CN = 68
373,078		84.46% Pervious Area
68,620		15.54% Impervious Area
68,620		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	170	0.0050	0.89		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.30"
1.9	150	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.0	180	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.1	500	Total			

Subcatchment 10S: EXISTING Q TOTAL SITE



Summary for Subcatchment 11S: PPROPOSED Q TO WQ RAIN GARDEN 1

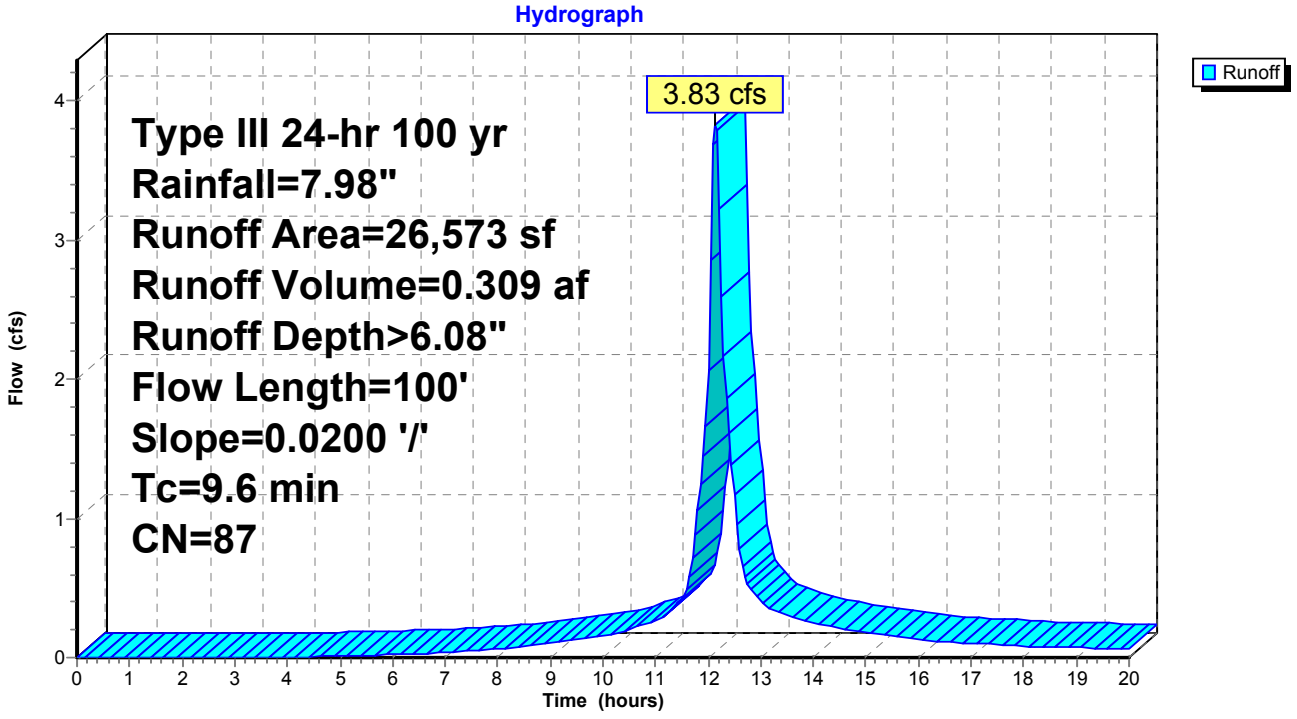
Runoff = 3.83 cfs @ 12.13 hrs, Volume= 0.309 af, Depth> 6.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 yr Rainfall=7.98"

Area (sf)	CN	Description
17,484	98	Unconnected pavement, HSG B
9,089	65	Woods/grass comb., Fair, HSG B
26,573	87	Weighted Average
9,089		34.20% Pervious Area
17,484		65.80% Impervious Area
17,484		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"

Subcatchment 11S: PPROPOSED Q TO WQ RAIN GARDEN 1

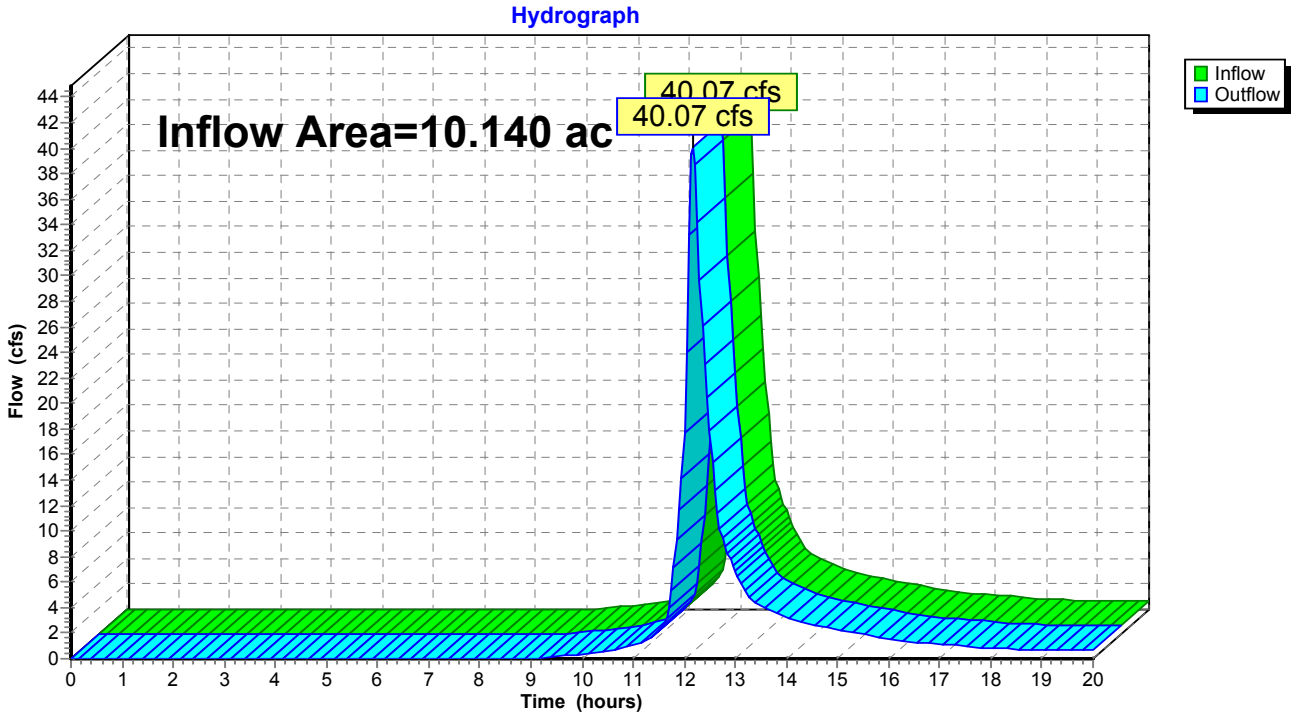


Summary for Reach 5R: TOTAL PROPOSED Q

Inflow Area = 10.140 ac, 22.52% Impervious, Inflow Depth > 3.64" for 100 yr event
Inflow = 40.07 cfs @ 12.17 hrs, Volume= 3.077 af
Outflow = 40.07 cfs @ 12.17 hrs, Volume= 3.077 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: TOTAL PROPOSED Q



Summary for Pond 4P: WQ BASIN #2

Inflow Area = 0.747 ac, 80.33% Impervious, Inflow Depth > 6.56" for 100 yr event
Inflow = 6.09 cfs @ 12.04 hrs, Volume= 0.409 af
Outflow = 2.34 cfs @ 12.23 hrs, Volume= 0.349 af, Atten= 62%, Lag= 11.0 min
Discarded = 0.20 cfs @ 12.23 hrs, Volume= 0.137 af
Primary = 2.13 cfs @ 12.23 hrs, Volume= 0.212 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 411.92' @ 12.23 hrs Surf.Area= 2,944 sf Storage= 6,443 cf

Plug-Flow detention time= 94.9 min calculated for 0.349 af (85% of inflow)
Center-of-Mass det. time= 49.9 min (791.4 - 741.5)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	8,280 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

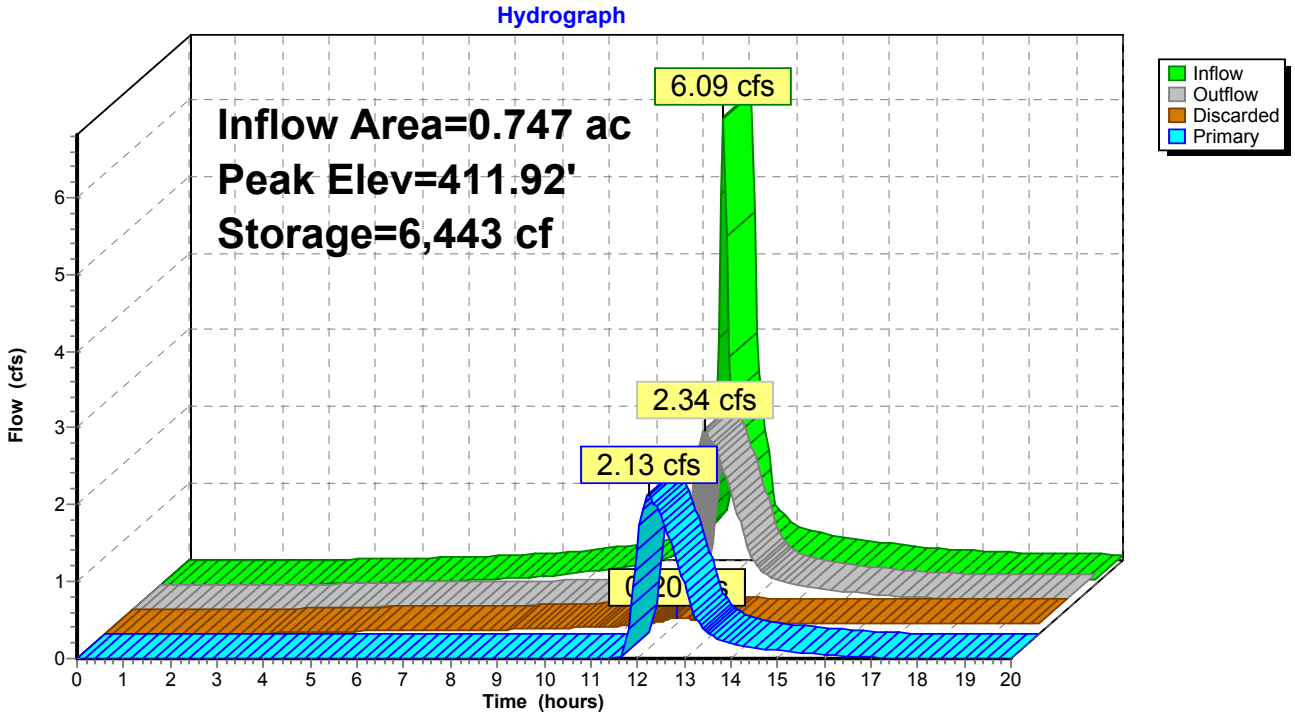
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	480	0	0
410.00	1,600	2,080	2,080
412.00	3,000	4,600	6,680
412.50	3,400	1,600	8,280

Device	Routing	Invert	Outlet Devices
#1	Primary	410.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#2	Discarded	408.00'	**3.000 in/hr Exfiltration over Surface area**
#3	Primary	411.90'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**
			Head (feet) 0.00 1.00
			Width (feet) 9.00 13.00

Discarded OutFlow Max=0.20 cfs @ 12.23 hrs HW=411.92' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=2.12 cfs @ 12.23 hrs HW=411.92' (Free Discharge)
├**1=Orifice/Grate** (Orifice Controls 2.04 cfs @ 5.21 fps)
└**3=Custom Weir/Orifice** (Weir Controls 0.08 cfs @ 0.45 fps)

Pond 4P: WQ BASIN #2



Summary for Pond 9P: WQ BASIN #3

Inflow Area = 1.541 ac, 83.20% Impervious, Inflow Depth > 6.79" for 100 yr event
Inflow = 10.91 cfs @ 12.11 hrs, Volume= 0.872 af
Outflow = 7.72 cfs @ 12.21 hrs, Volume= 0.741 af, Atten= 29%, Lag= 6.2 min
Discarded = 0.34 cfs @ 12.21 hrs, Volume= 0.263 af
Primary = 7.38 cfs @ 12.21 hrs, Volume= 0.478 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 403.96' @ 12.21 hrs Surf.Area= 4,911 sf Storage= 12,151 cf

Plug-Flow detention time= 89.8 min calculated for 0.741 af (85% of inflow)
Center-of-Mass det. time= 44.0 min (782.9 - 738.9)

Volume	Invert	Avail.Storage	Storage Description
#1	400.00'	17,825 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

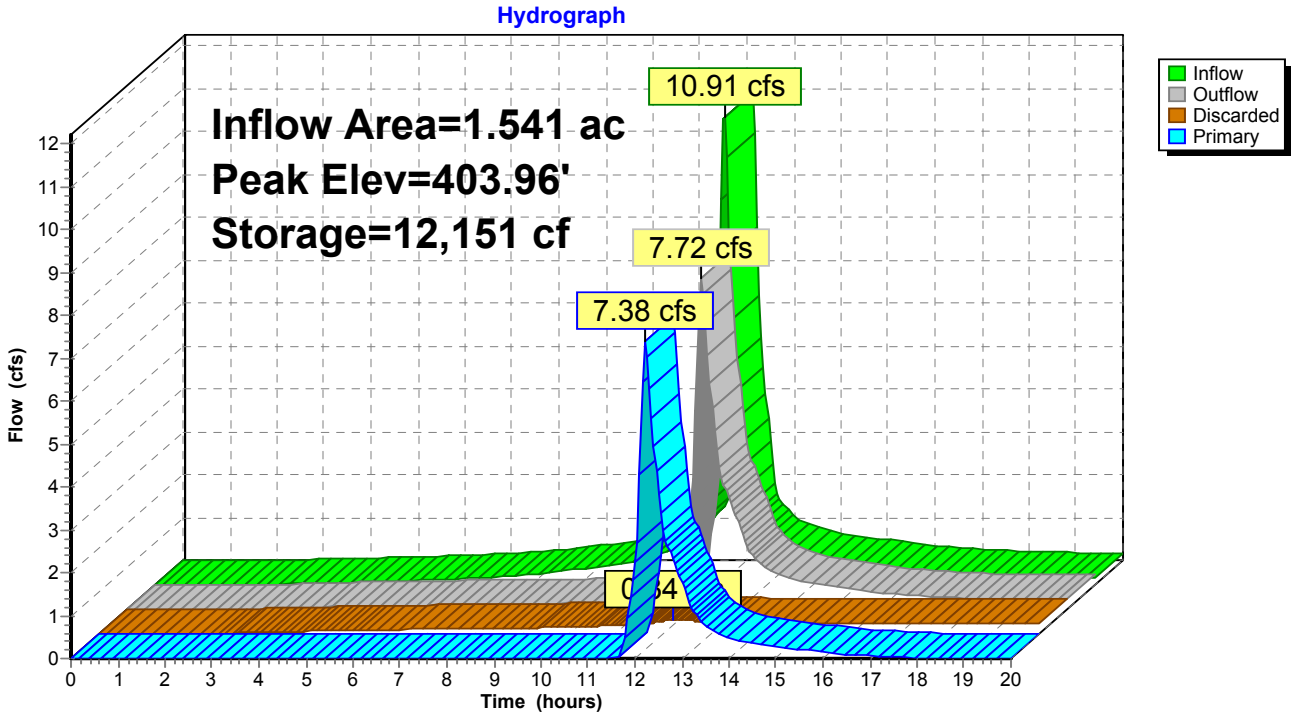
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
400.00	1,400	0	0
402.00	3,000	4,400	4,400
404.00	4,950	7,950	12,350
405.00	6,000	5,475	17,825

Device	Routing	Invert	Outlet Devices
#1	Discarded	400.00'	**3.000 in/hr Exfiltration over Surface area**
#2	Primary	402.50'	**8.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Primary	403.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**
			Head (feet) 0.00 0.50
			Width (feet) 3.00 5.00

Discarded OutFlow Max=0.34 cfs @ 12.21 hrs HW=403.95' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.34 cfs)

Primary OutFlow Max=7.27 cfs @ 12.21 hrs HW=403.95' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 3.56 cfs @ 5.09 fps)
└**3=Custom Weir/Orifice** (Weir Controls 3.71 cfs @ 2.10 fps)

Pond 9P: WQ BASIN #3



Summary for Pond 12P: WQ RAIN GARDEN #1

Inflow Area = 0.610 ac, 65.80% Impervious, Inflow Depth > 6.08" for 100 yr event
Inflow = 3.83 cfs @ 12.13 hrs, Volume= 0.309 af
Outflow = 3.74 cfs @ 12.16 hrs, Volume= 0.274 af, Atten= 2%, Lag= 1.7 min
Discarded = 0.06 cfs @ 12.16 hrs, Volume= 0.055 af
Primary = 3.68 cfs @ 12.16 hrs, Volume= 0.219 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 416.25' @ 12.16 hrs Surf.Area= 1,275 sf Storage= 2,060 cf

Plug-Flow detention time= 59.4 min calculated for 0.274 af (88% of inflow)
Center-of-Mass det. time= 23.5 min (781.8 - 758.3)

Volume	Invert	Avail.Storage	Storage Description
#1	414.00'	2,388 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

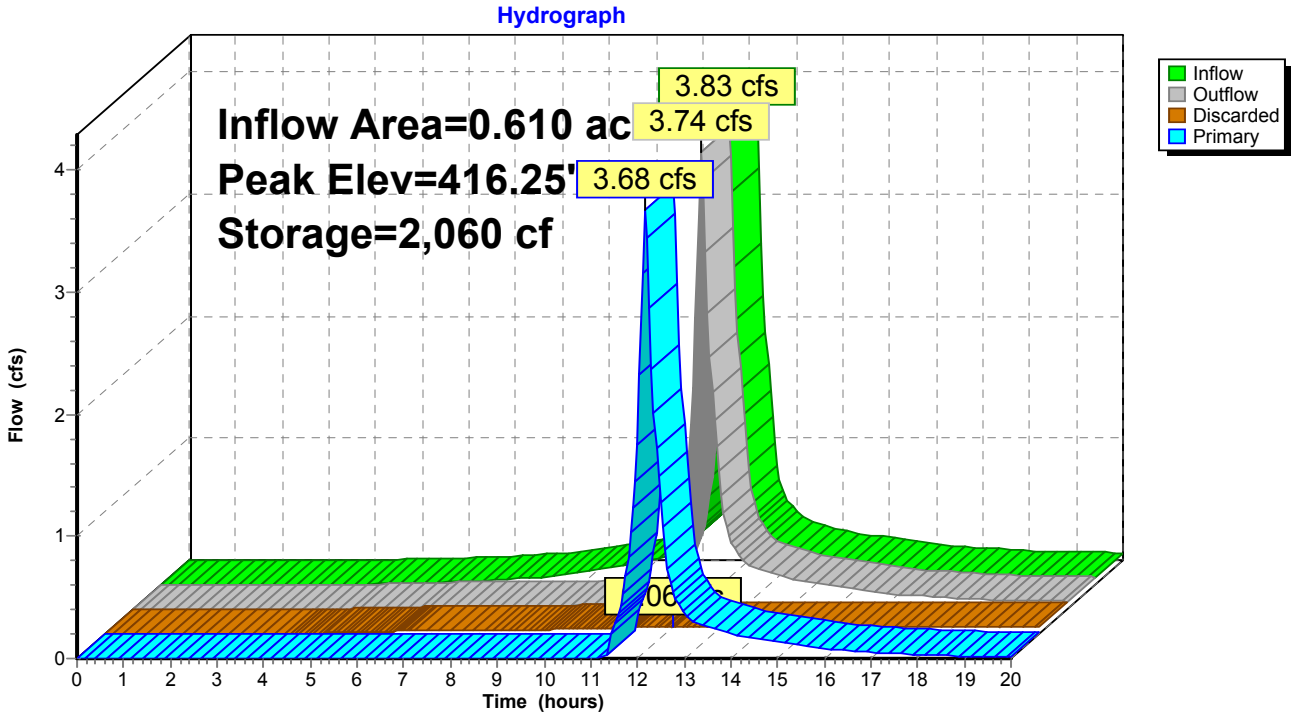
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
414.00	550	0	0
416.00	1,200	1,750	1,750
416.50	1,350	638	2,388

Device	Routing	Invert	Outlet Devices
#1	Primary	415.80'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 Width (feet) 3.00 5.00
#2	Discarded	414.00'	**2.000 in/hr Exfiltration over Surface area**

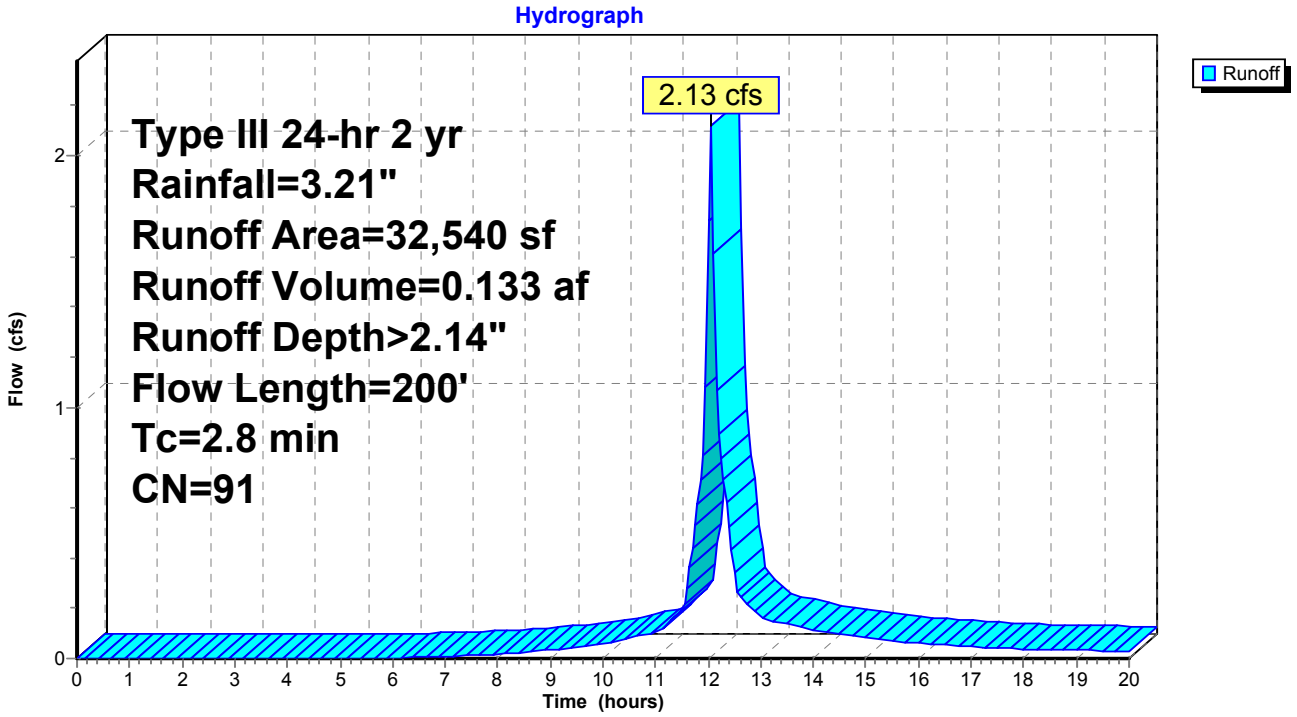
Discarded OutFlow Max=0.06 cfs @ 12.16 hrs HW=416.25' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=3.62 cfs @ 12.16 hrs HW=416.25' (Free Discharge)
↑—**1=Custom Weir/Orifice** (Weir Controls 3.62 cfs @ 2.09 fps)

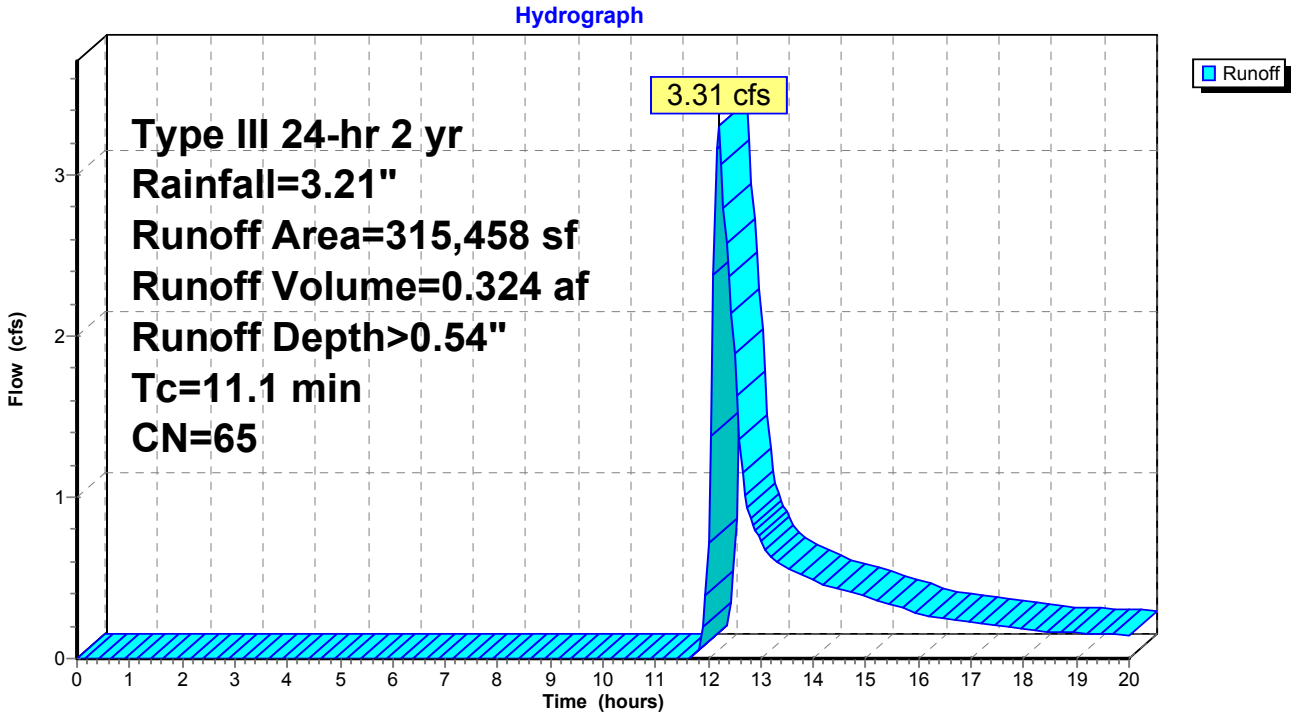
Pond 12P: WQ RAIN GARDEN #1



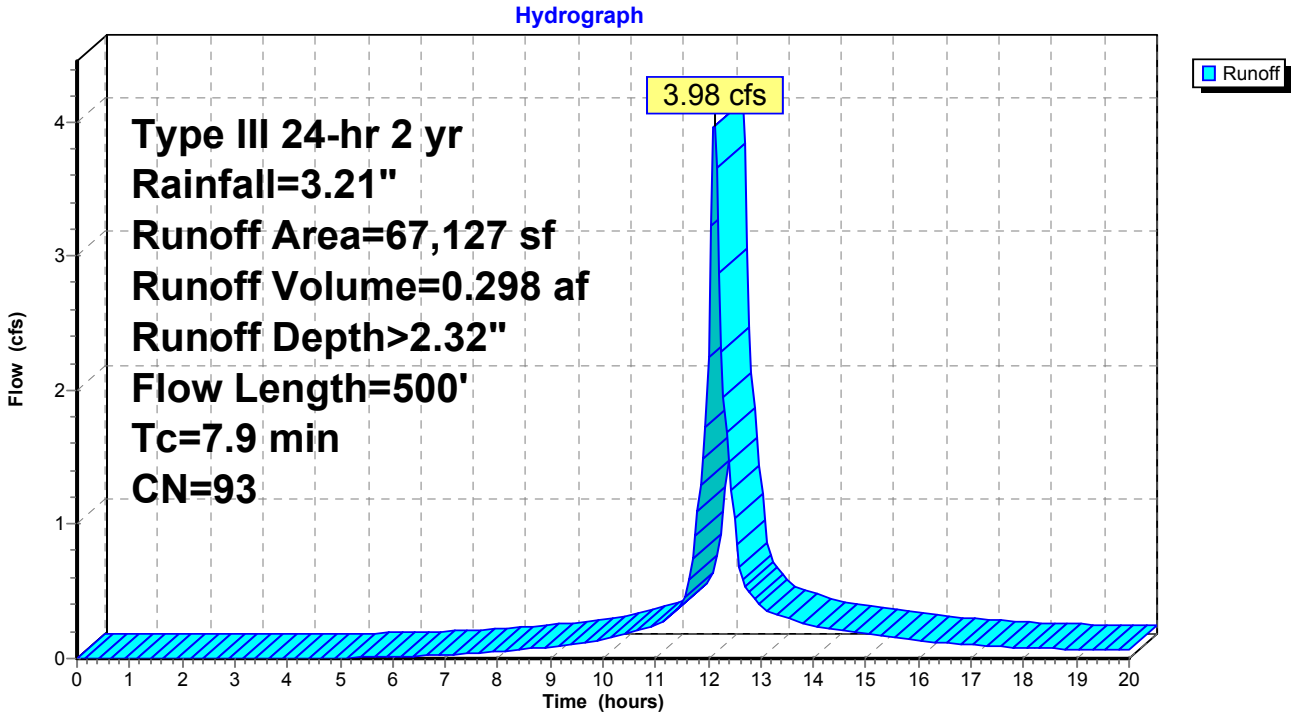
Subcatchment 2S: PROPOSED Q TO WQ BASIN #2



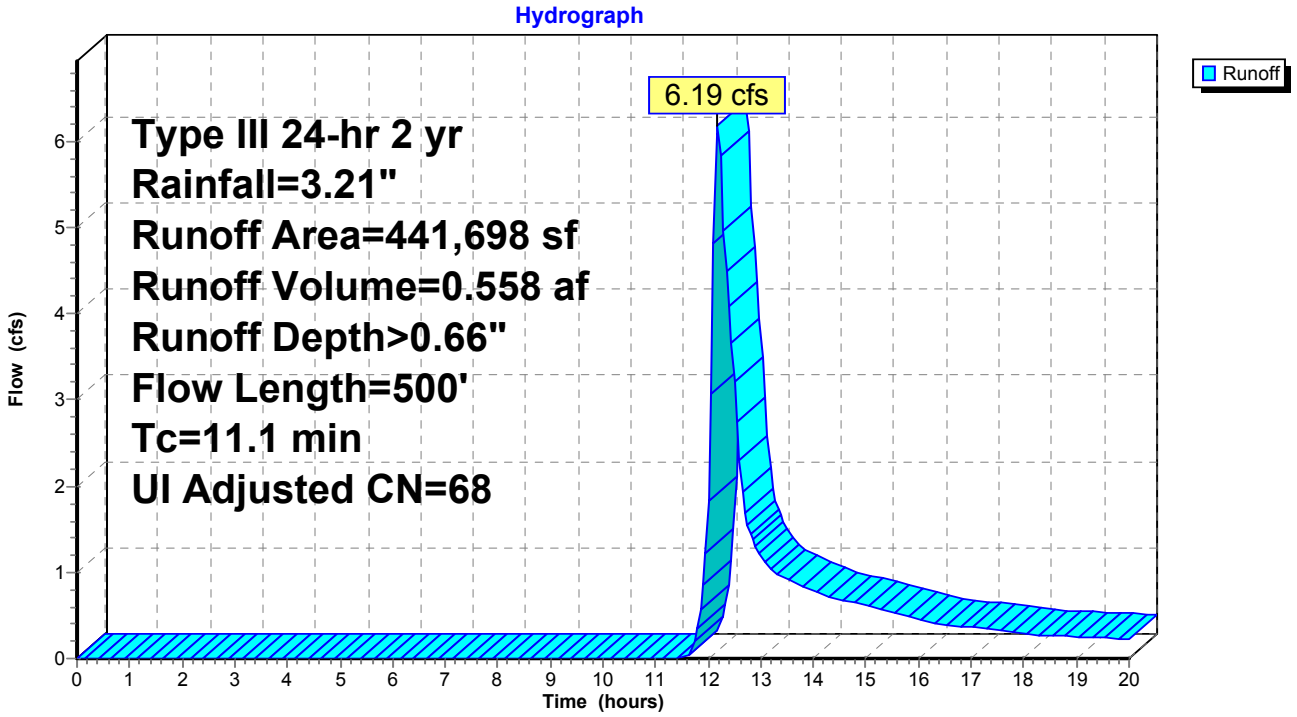
Subcatchment 3S: Q BYPASS



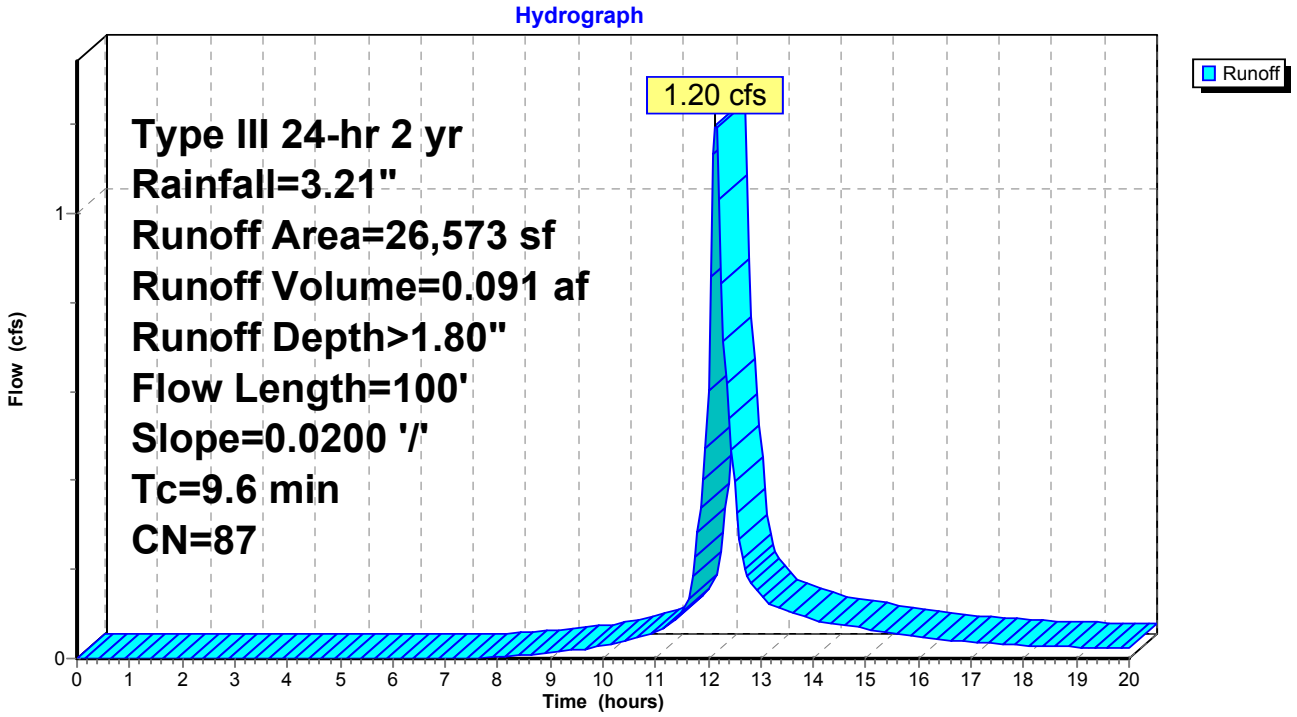
Subcatchment 8S: PROPOSED Q TO BASIN #3



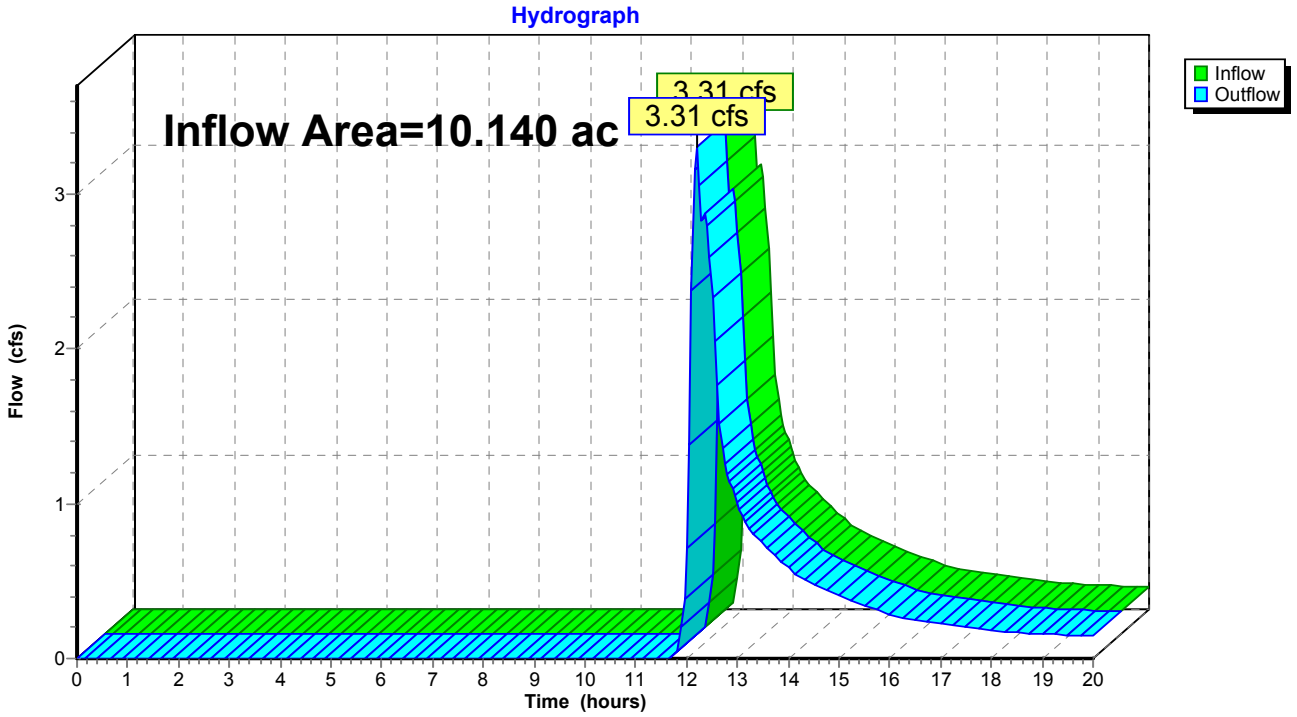
Subcatchment 10S: EXISTING Q TOTAL SITE



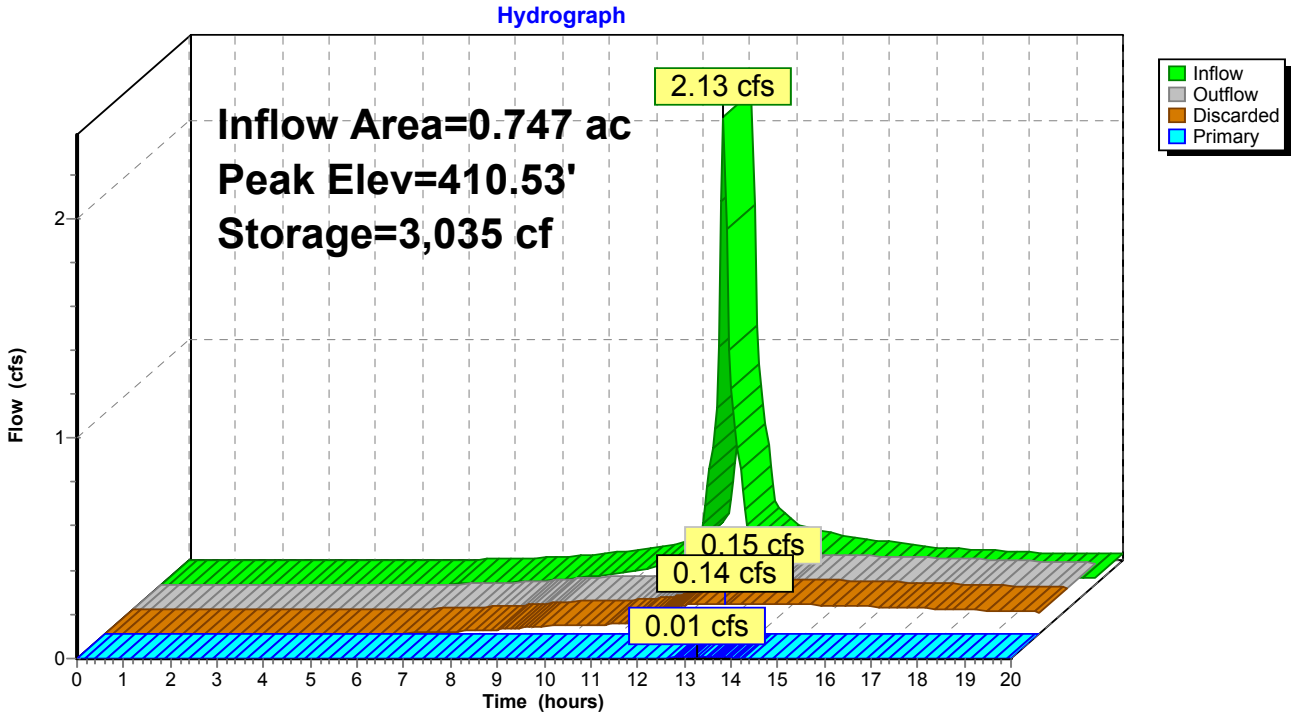
Subcatchment 11S: PPROPOSED Q TO WQ RAIN GARDEN 1



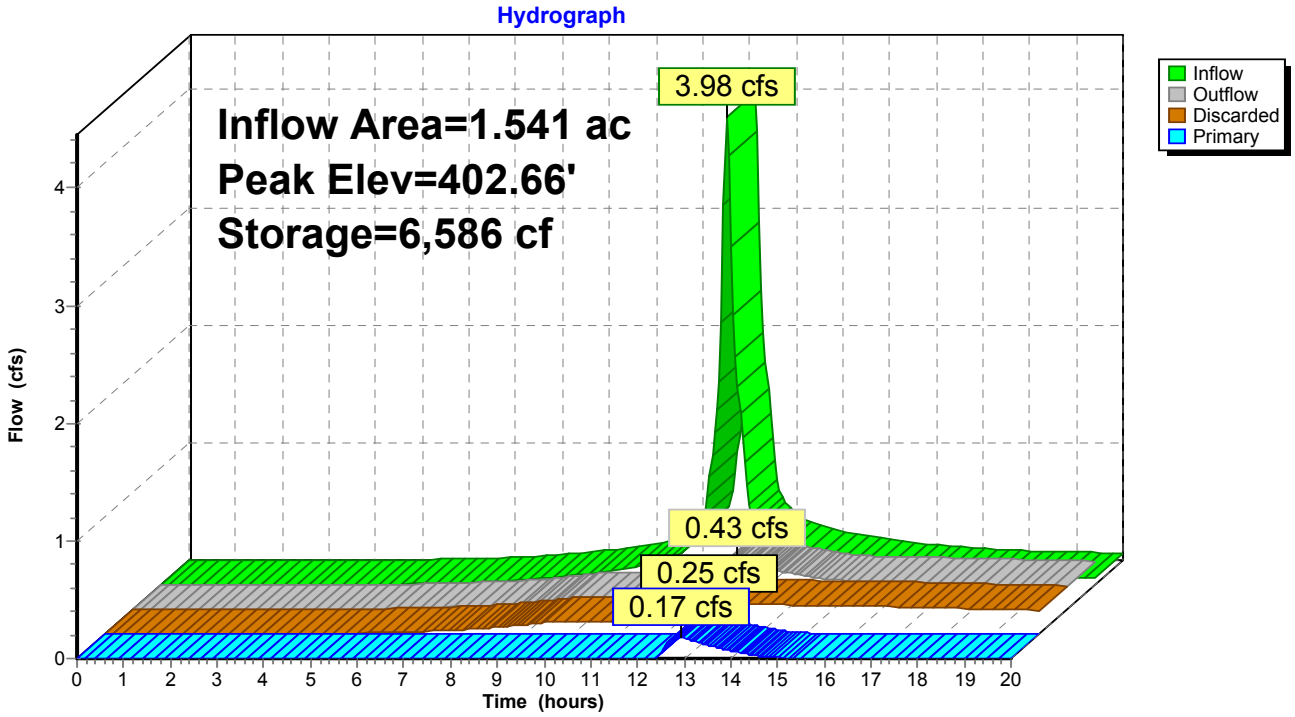
Reach 5R: TOTAL PROPOSED Q



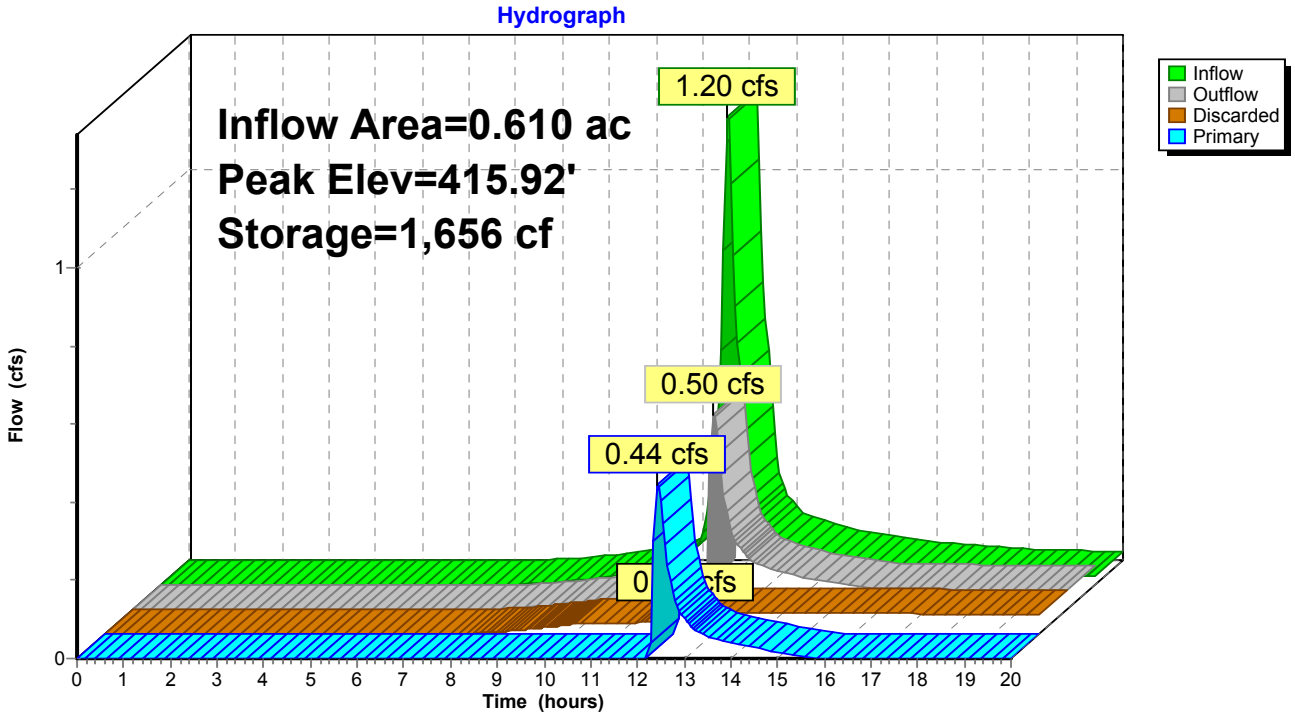
Pond 4P: WQ BASIN #2



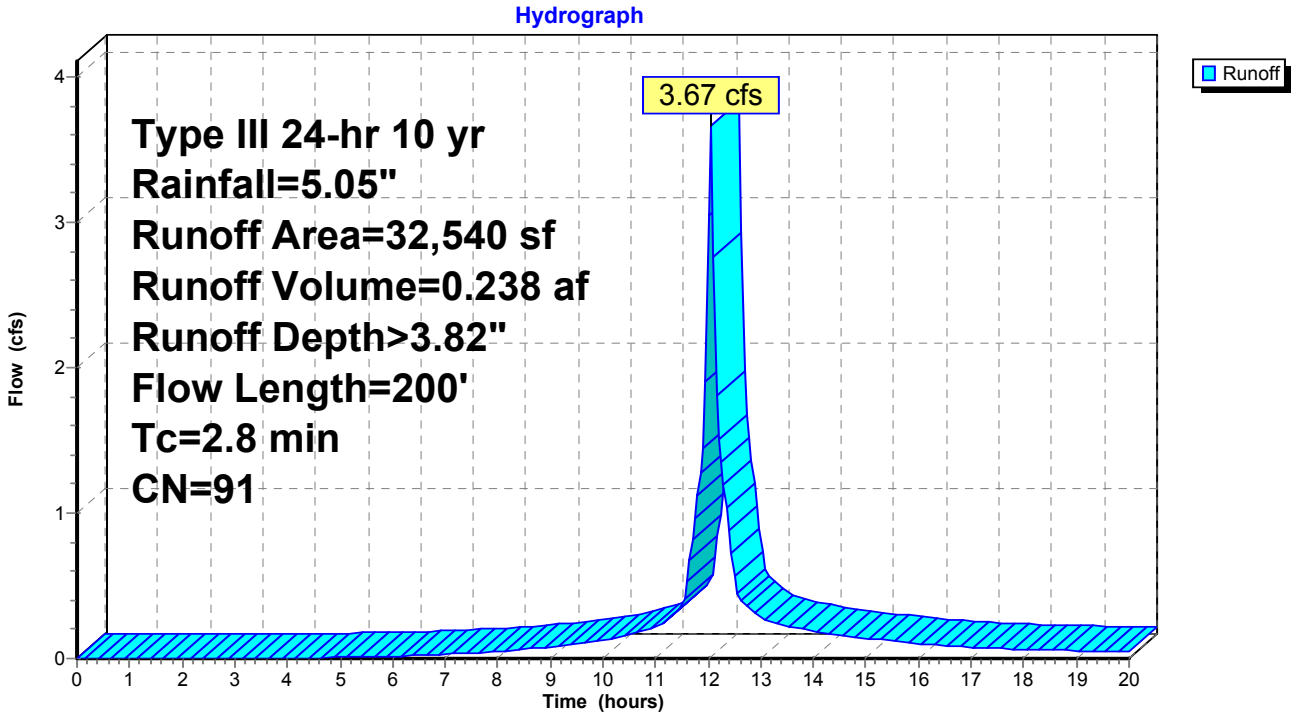
Pond 9P: WQ BASIN #3



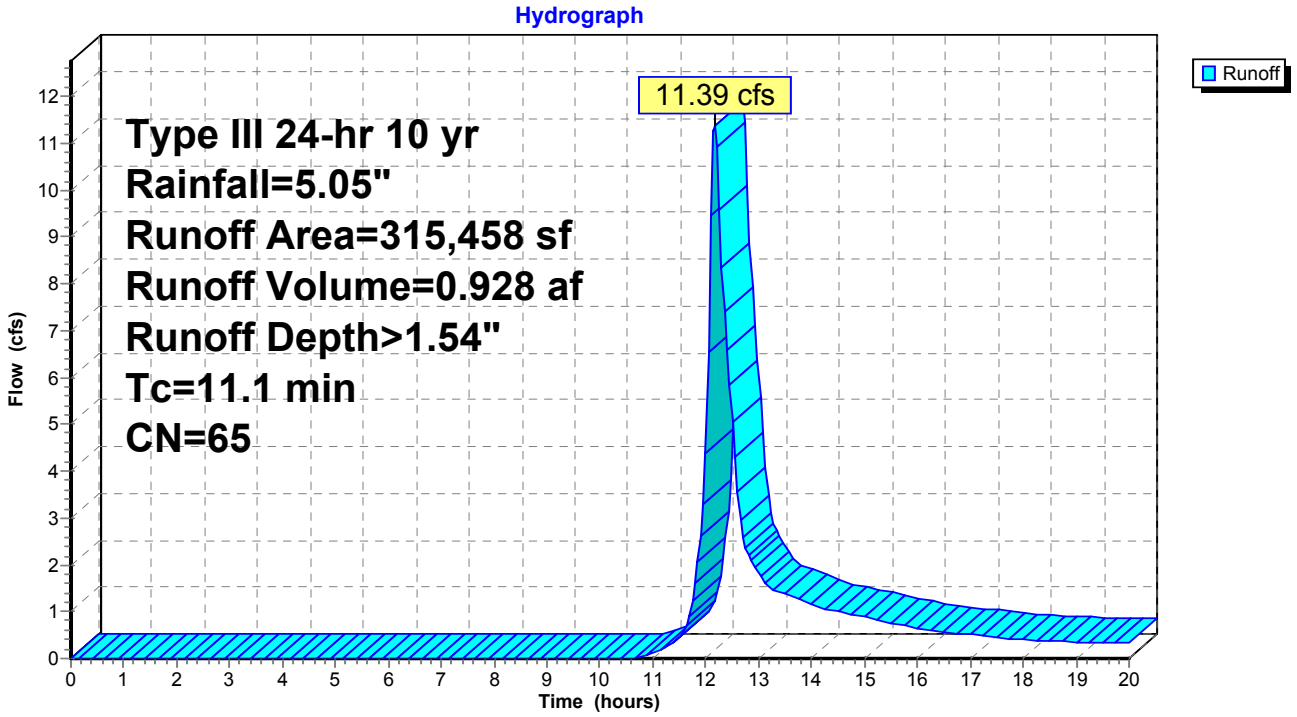
Pond 12P: WQ RAIN GARDEN #1



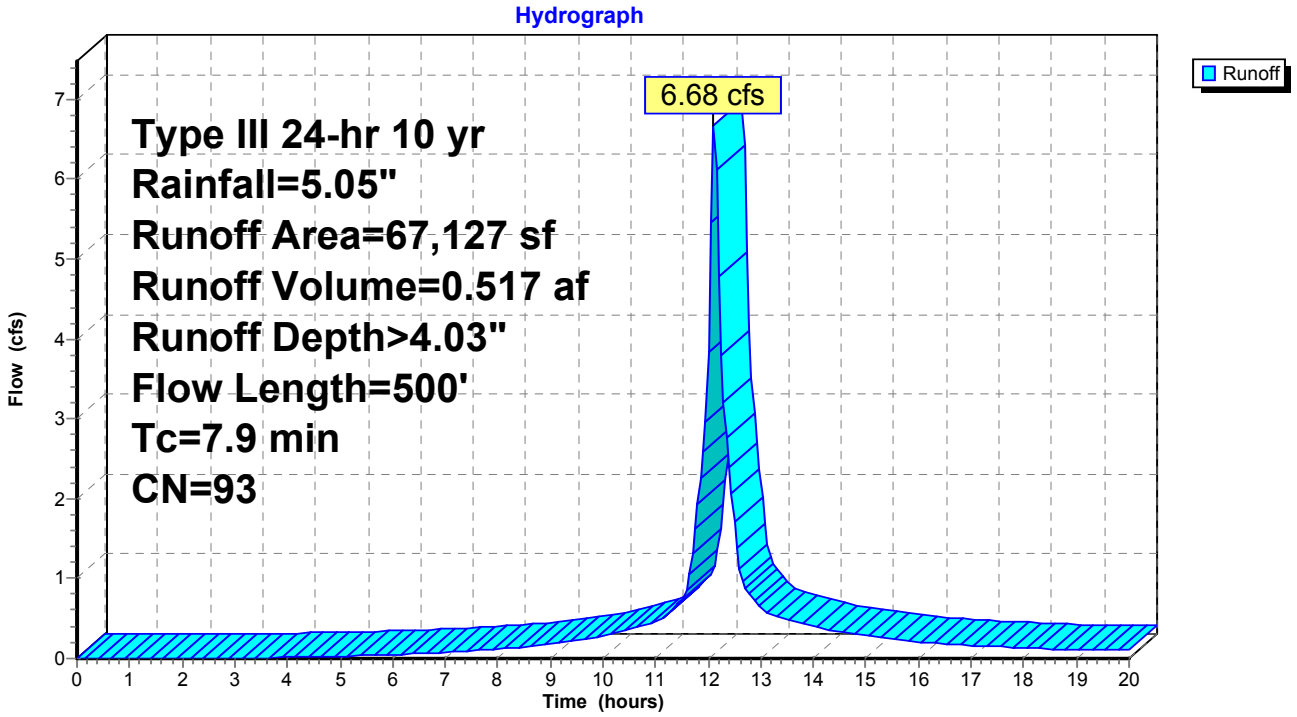
Subcatchment 2S: PROPOSED Q TO WQ BASIN #2



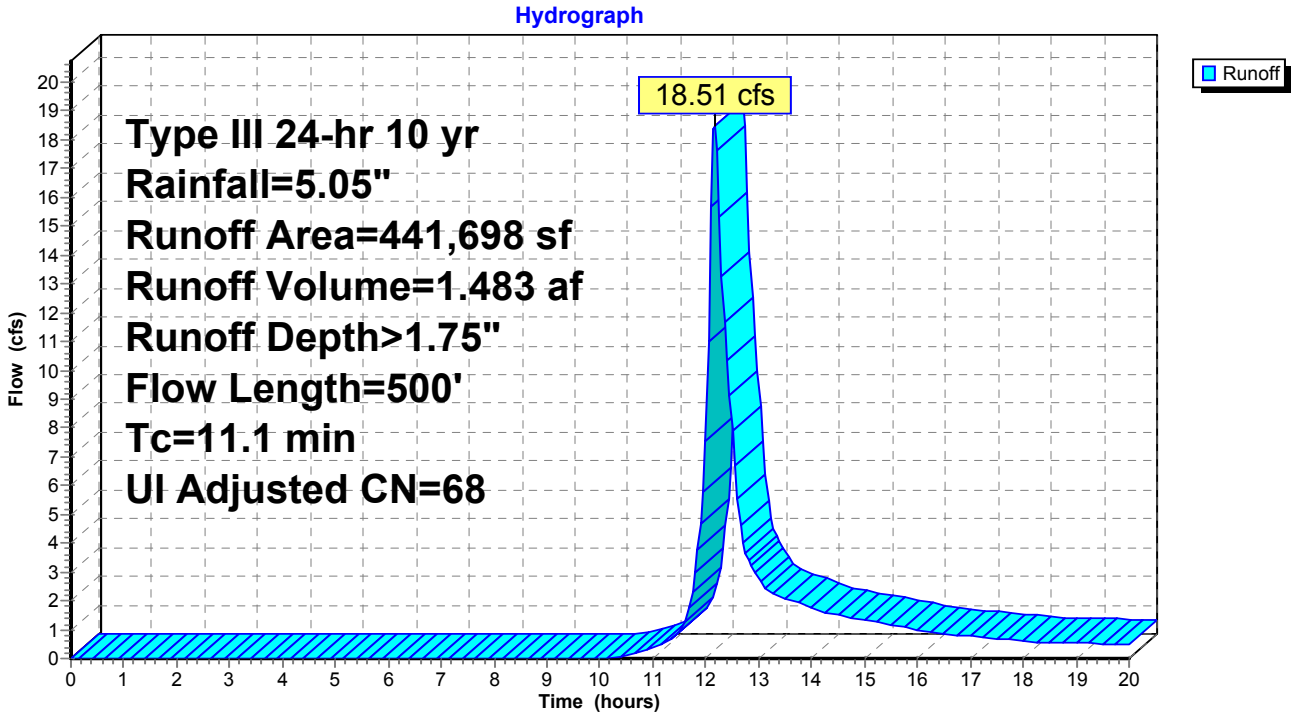
Subcatchment 3S: Q BYPASS



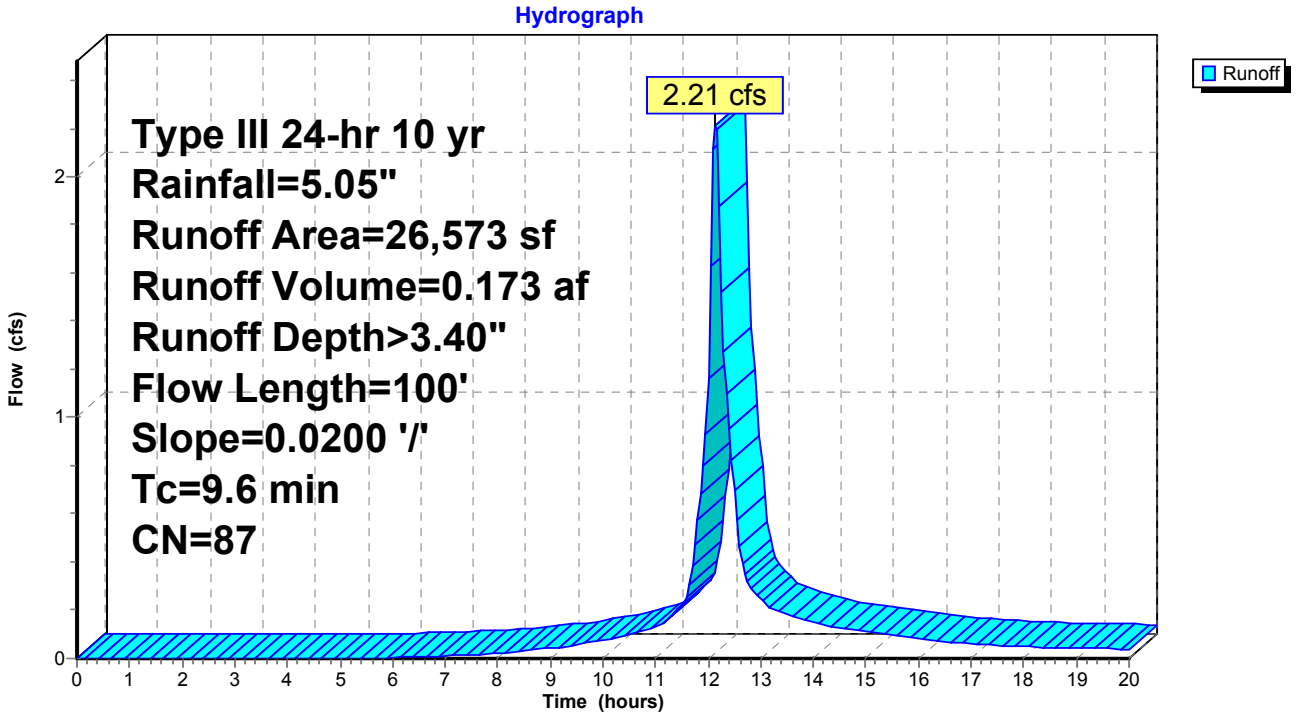
Subcatchment 8S: PROPOSED Q TO BASIN #3



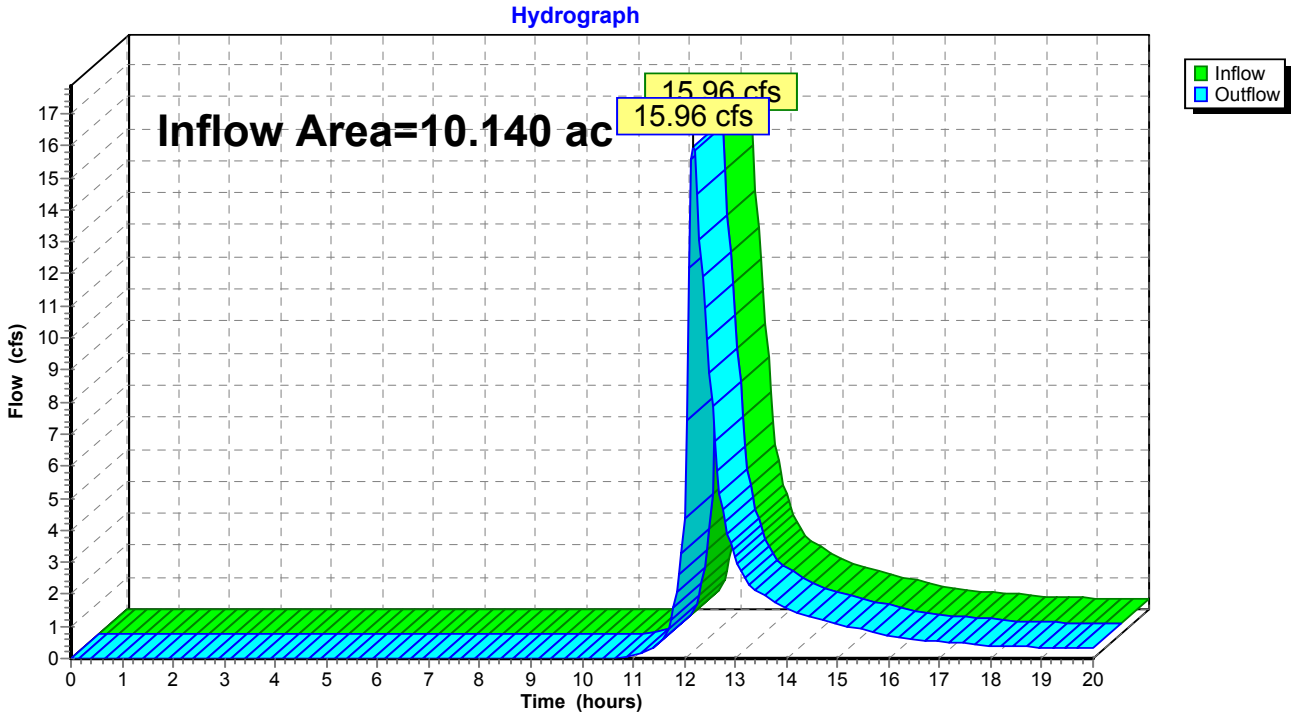
Subcatchment 10S: EXISTING Q TOTAL SITE



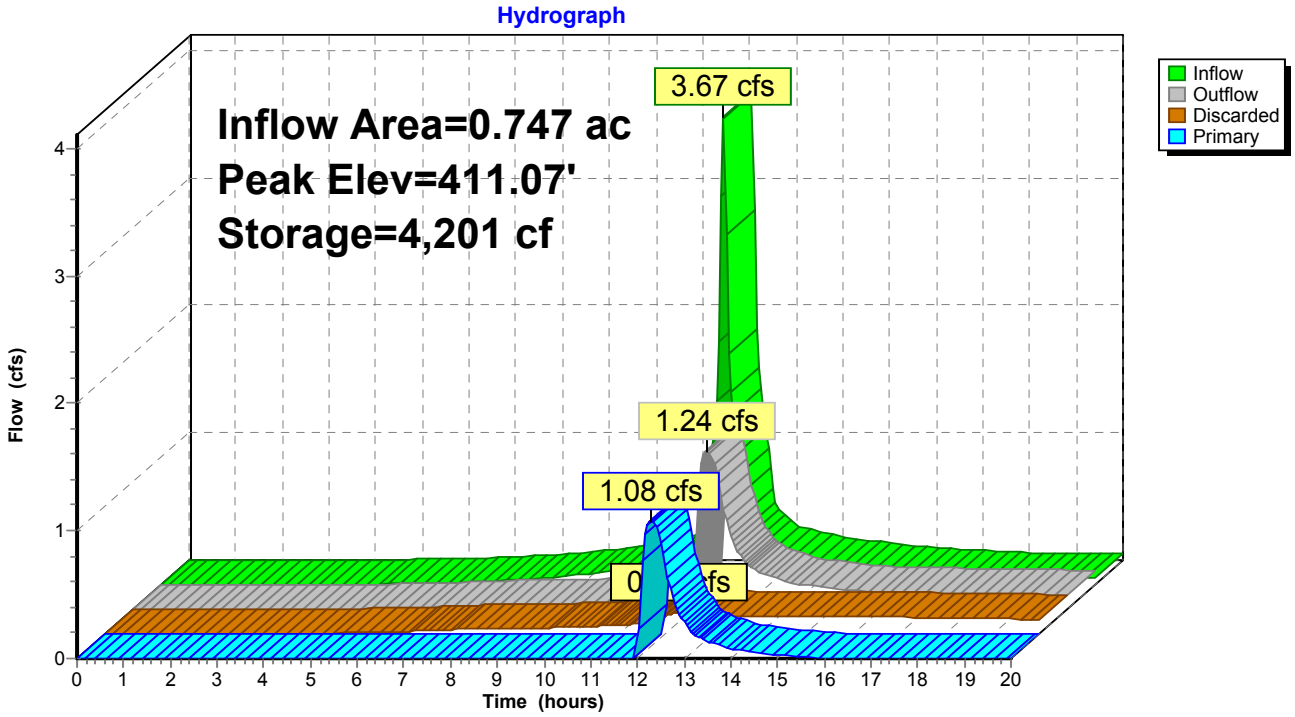
Subcatchment 11S: PPROPOSED Q TO WQ RAIN GARDEN 1



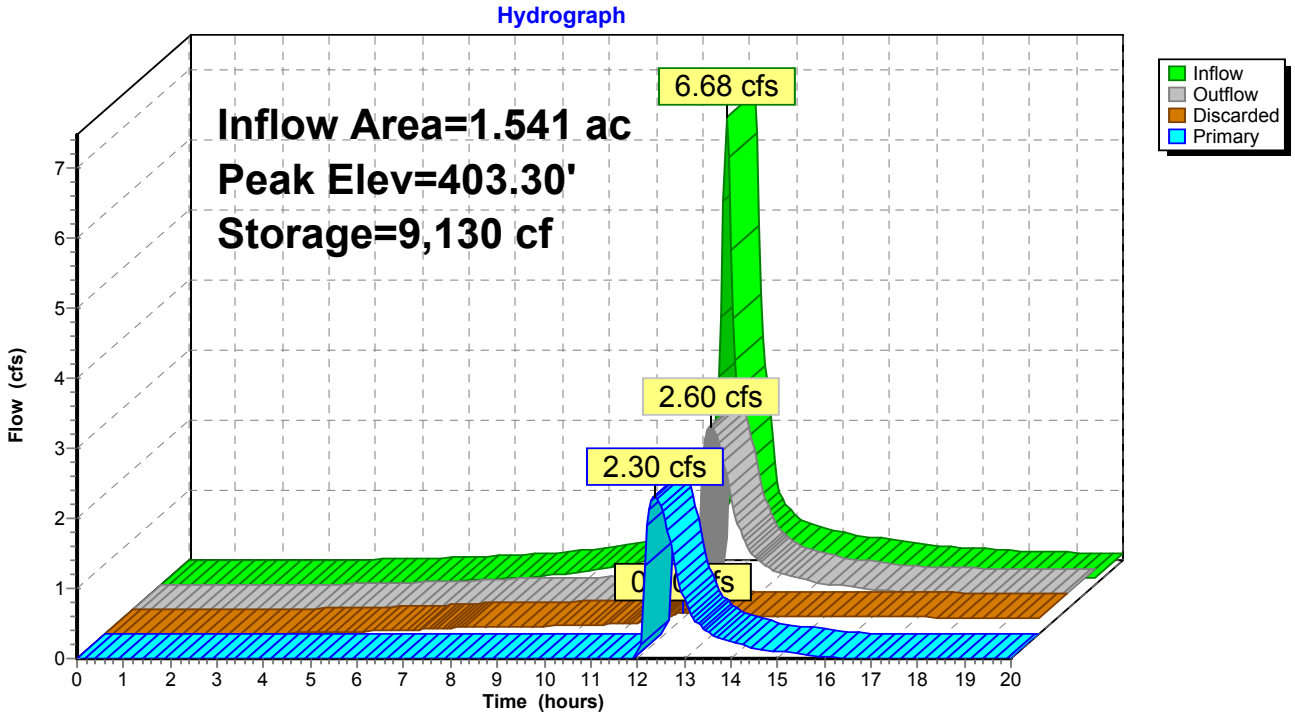
Reach 5R: TOTAL PROPOSED Q



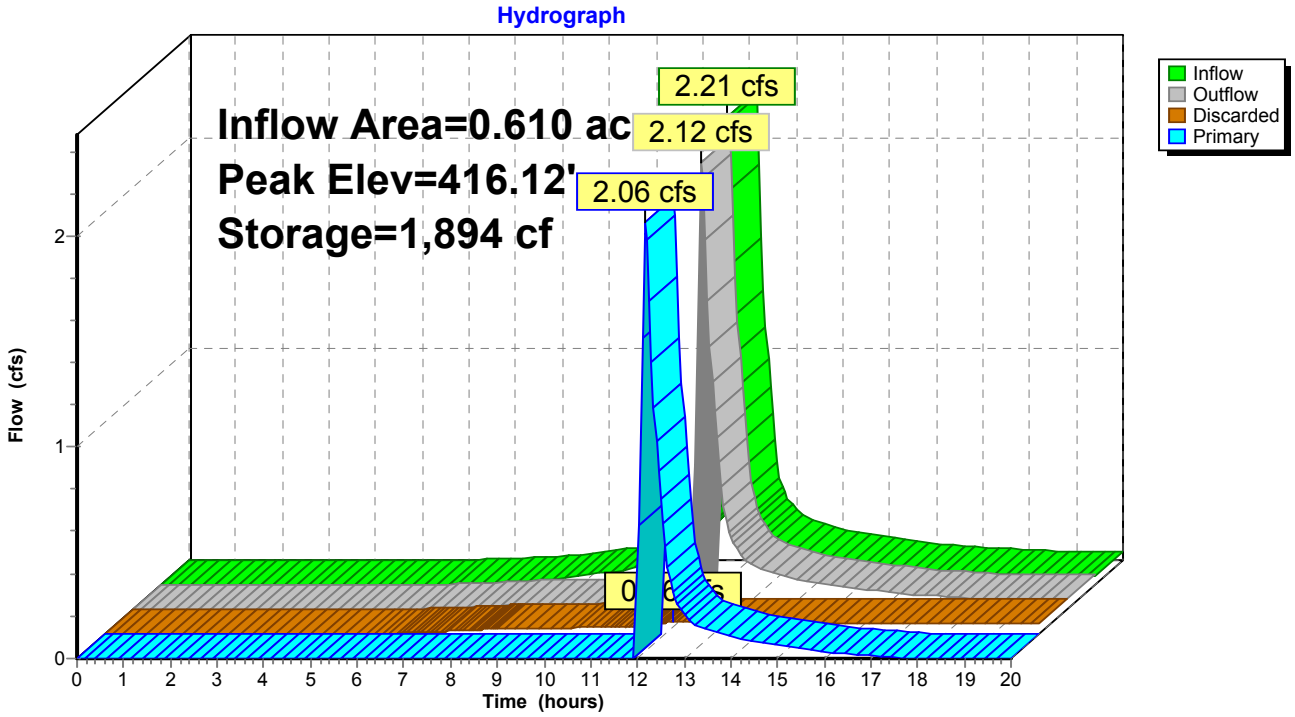
Pond 4P: WQ BASIN #2



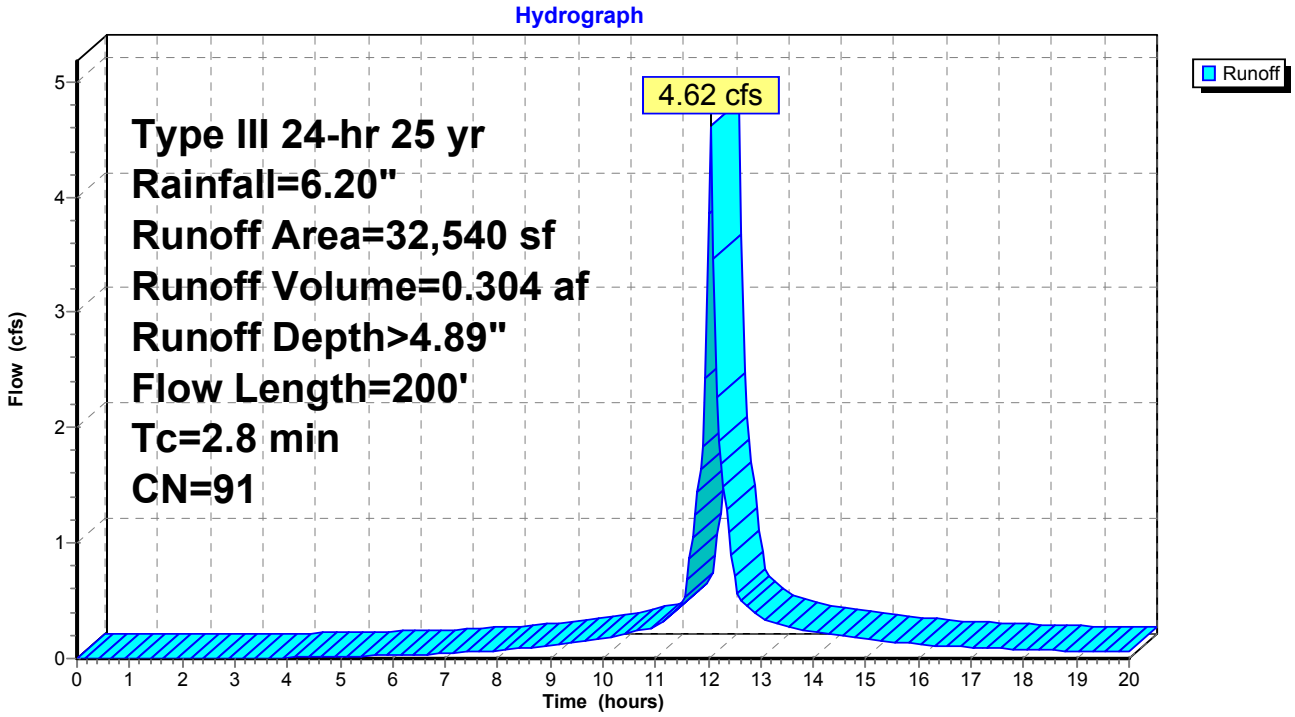
Pond 9P: WQ BASIN #3



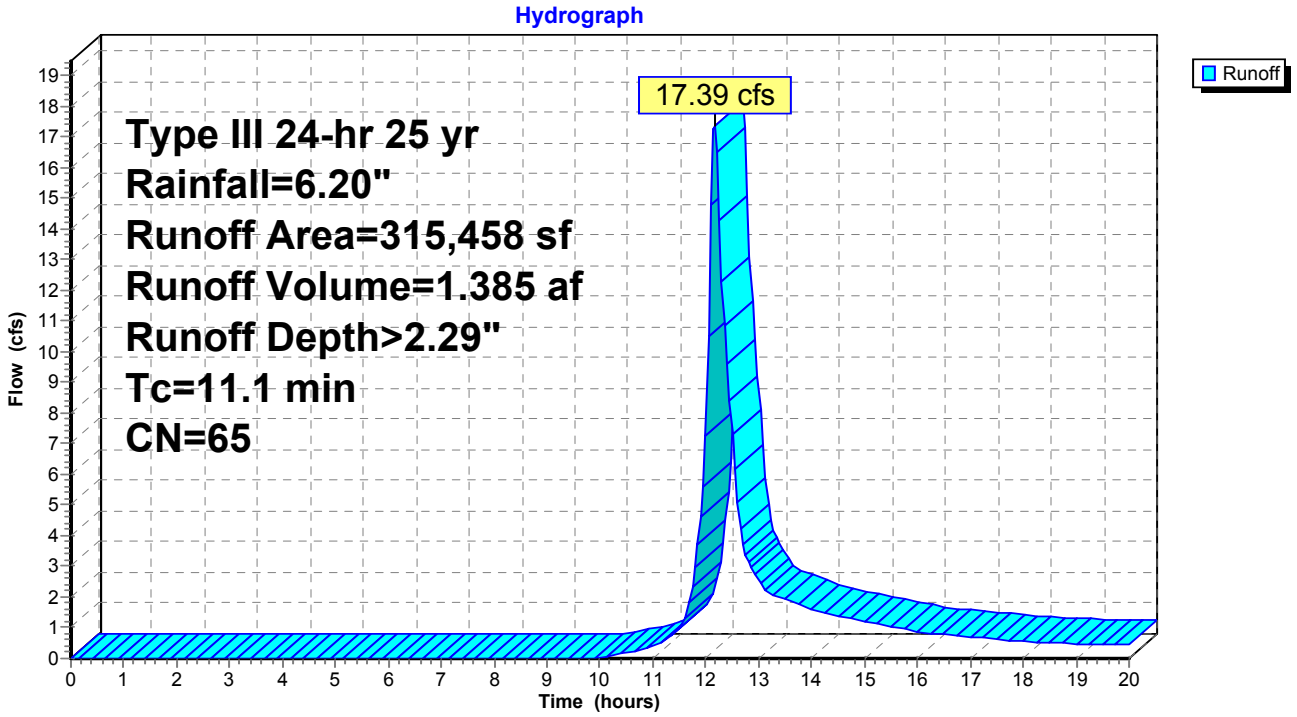
Pond 12P: WQ RAIN GARDEN #1



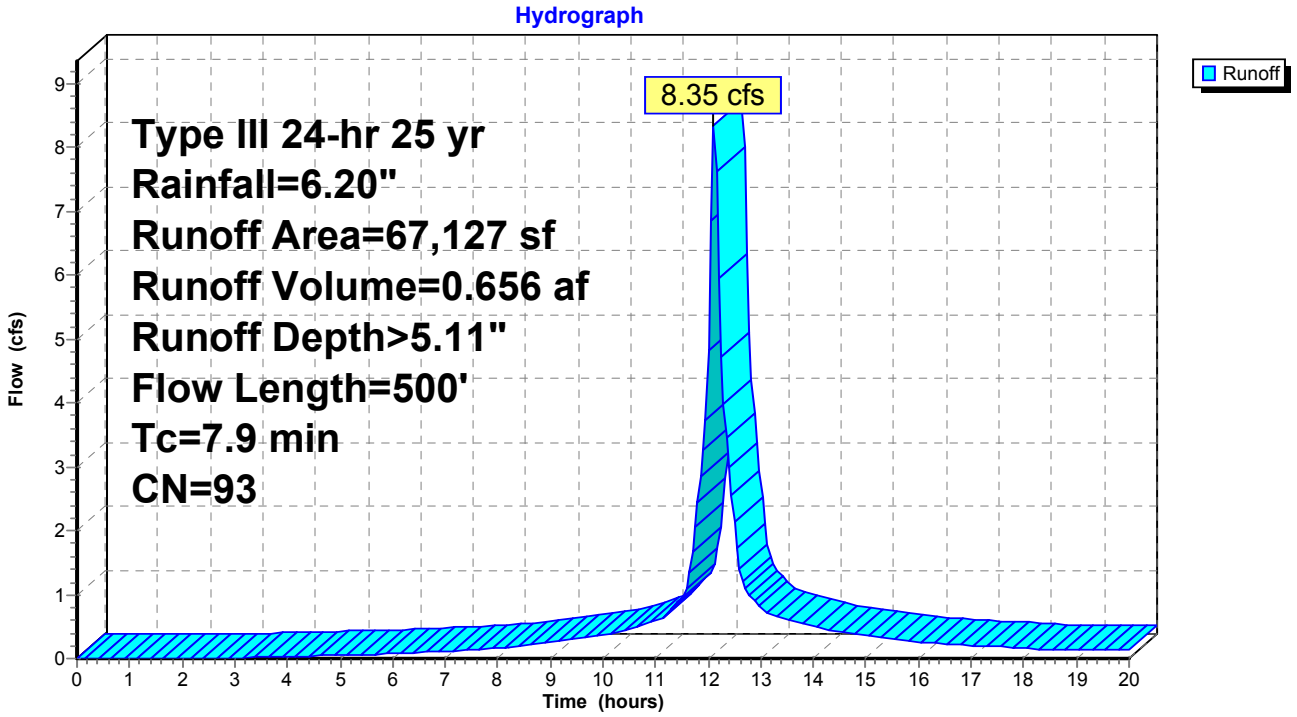
Subcatchment 2S: PROPOSED Q TO WQ BASIN #2



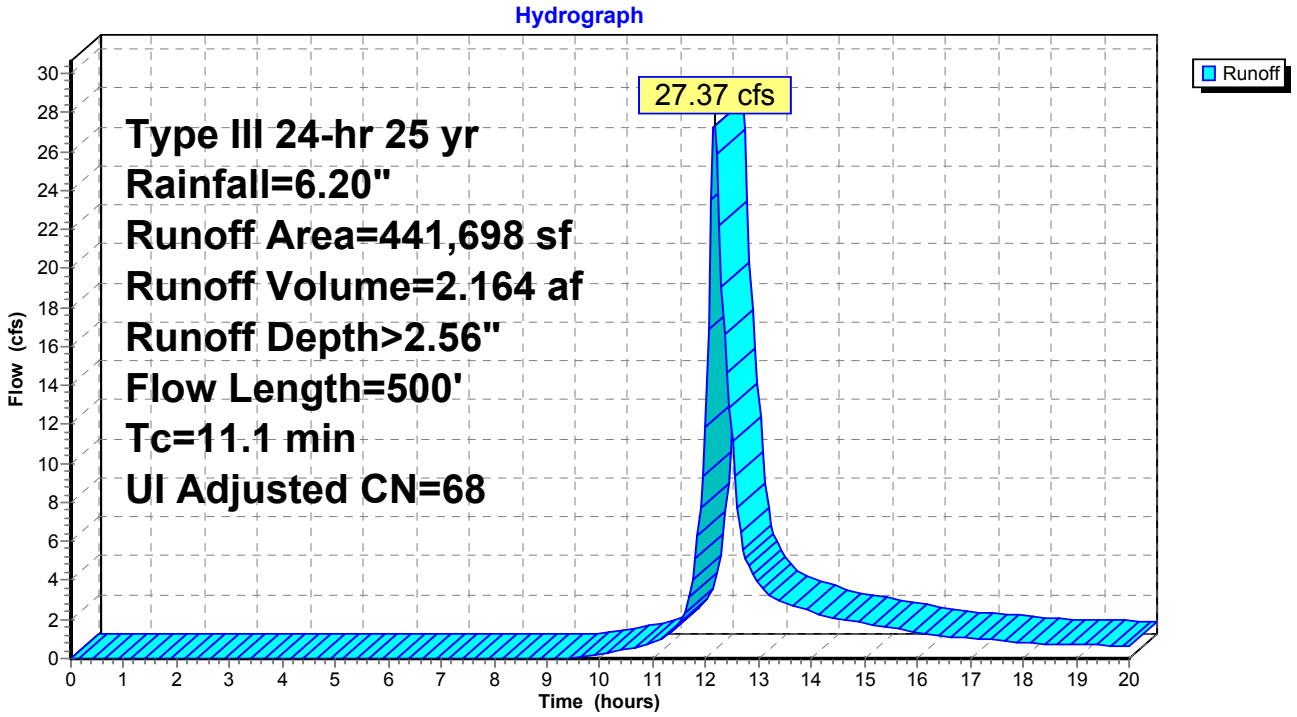
Subcatchment 3S: Q BYPASS



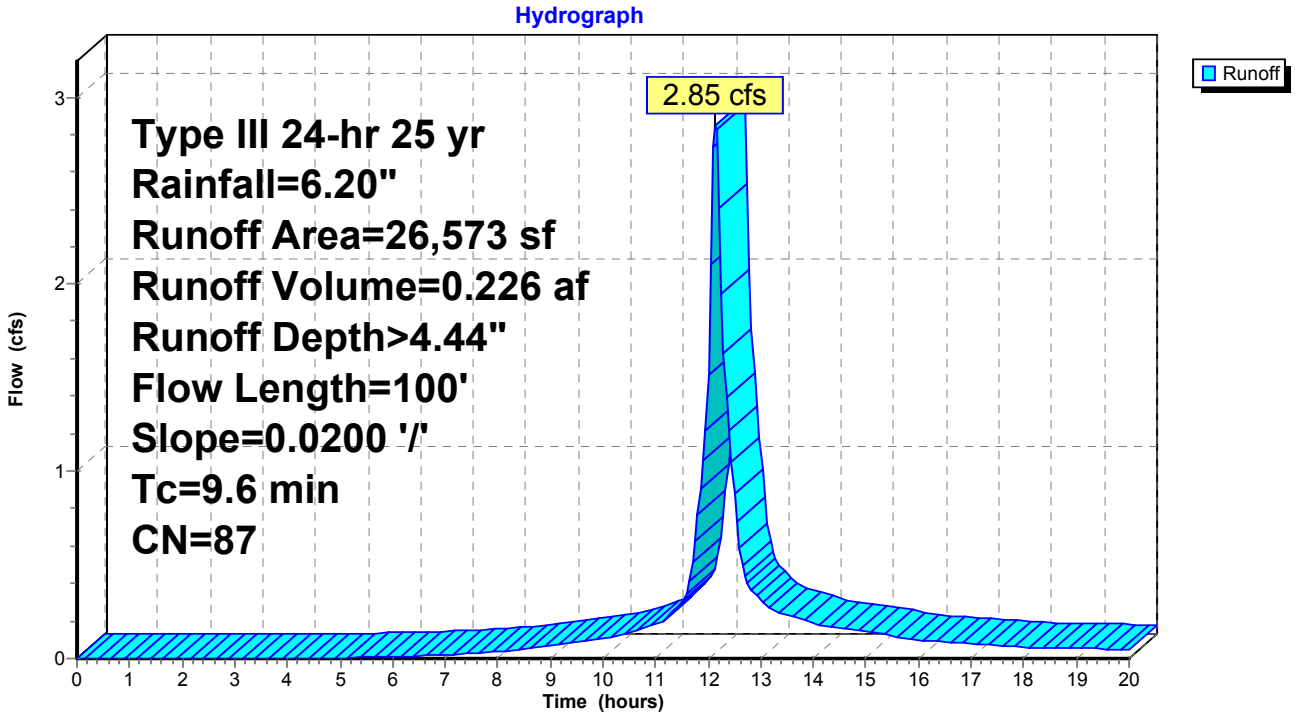
Subcatchment 8S: PROPOSED Q TO BASIN #3



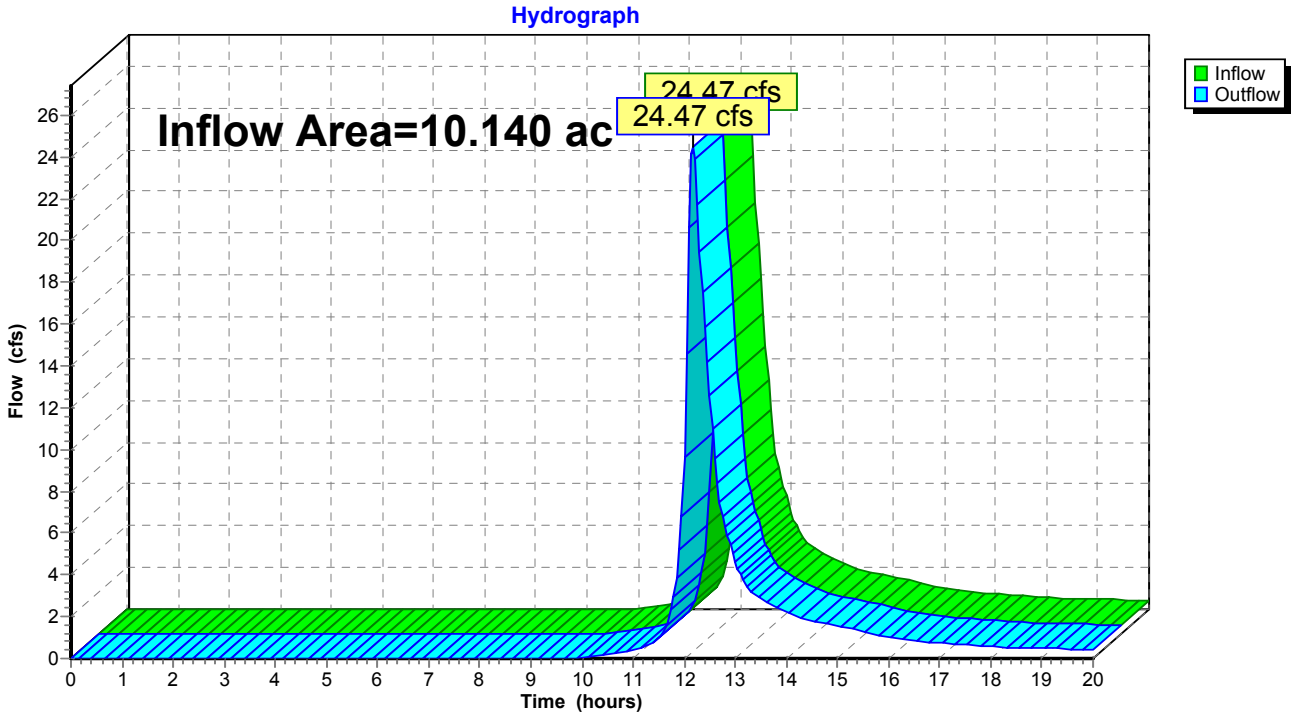
Subcatchment 10S: EXISTING Q TOTAL SITE



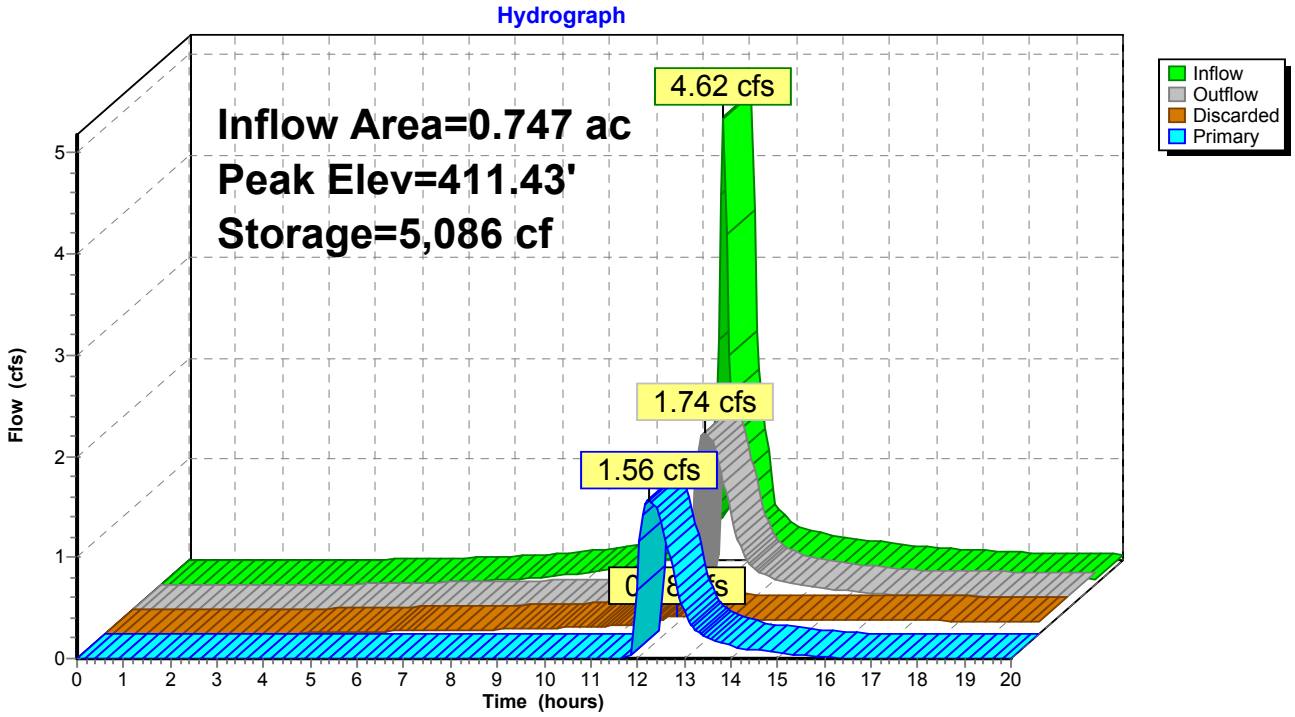
Subcatchment 11S: PPROPOSED Q TO WQ RAIN GARDEN 1



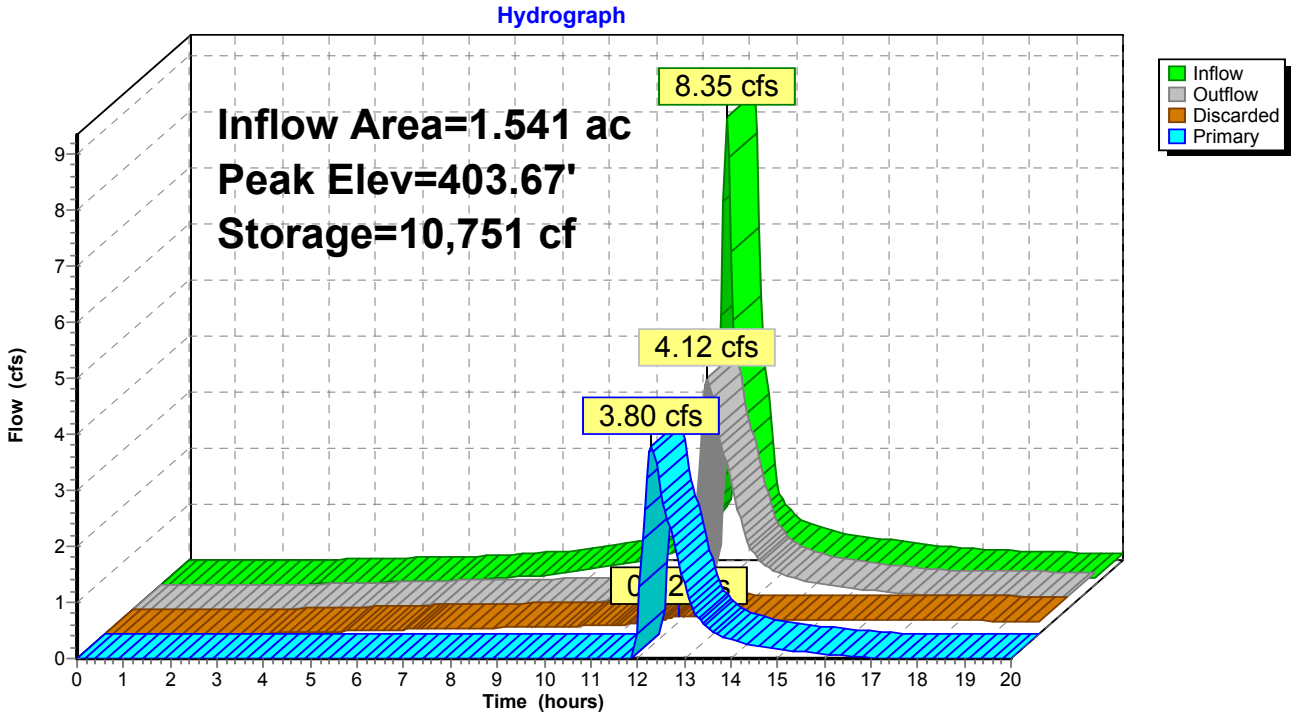
Reach 5R: TOTAL PROPOSED Q



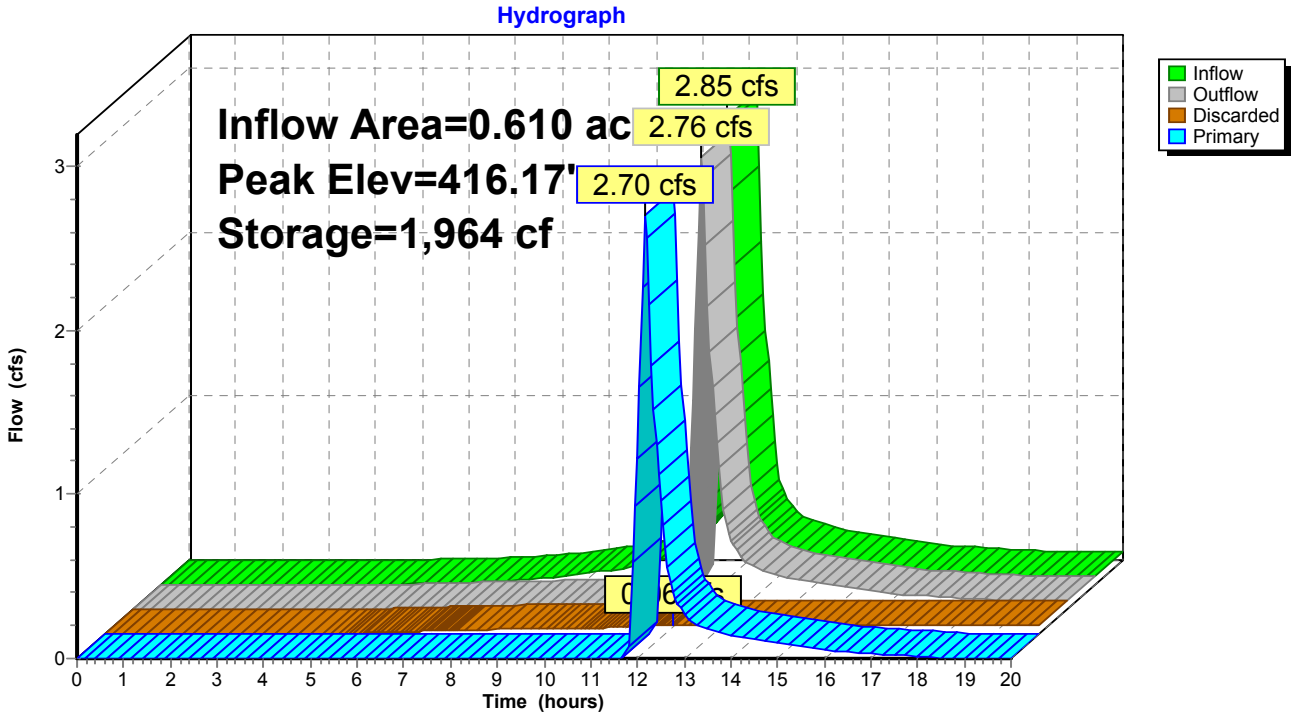
Pond 4P: WQ BASIN #2



Pond 9P: WQ BASIN #3



Pond 12P: WQ RAIN GARDEN #1



J. EDWARDS & ASSOCIATES, LLC
227 Stepney Road • Easton, CT • 06612
Phone:203.268.4205 • Fax: 203.268.5604
www.jedwardsassoc.com

PROJECT 472 PEPPER STREET

DATE 8/24/20

DRAINAGE CHART

LOCATION		AREA		C	TIME FLOW			I	Q		DESIGN			PROFILE				
from	to	inc	total		to in	pipe	total		incr.	total	pipe size	slope %	capacity full	length (ft)	drop (ft)	invert in	invert out	vel. (fps)
1	2	0.38	0.38	0.80			10	6.3	25YR	1.9	12"	1.1	3.5					
2	3	0.17	0.55	0.80	10	1	11	6.2		2.8	12"	0.8	2.9					
3	4	0.25	0.8	0.80	11	1	12	6.1		3.9	15"	0.5	4.3					
4	5	0.36	1.16	0.85	12	1	13	6.0		5.9	15	1.0	6.2					
6	7	0.74	0.74	0.90			15	5.8		3.9	12"	>2%	5.0					

HDPE PIPE n =0.011