Appendix A

CORRESPONDENCE

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, Albany, New York 12233-4757
Phone: (518) 402-8935 • **FAX:** (518) 402-8925
www.dec.state.ny.us

Alexander B. Grannis
Commissioner

May 29, 2008

Brian Bury
Tim Miller Associates
10 North Street
Cold Spring, NY 10516

Dear Mr. Bury:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to an Environmental Assessment for the proposed Putnam Community Foundation Development - Senior Housing, Recreational Facility, Etc., site as indicated on the map you provided, located in the Town of Carmel, Putnam County.

Enclosed is a report of rare or state-listed animals and plants, significant natural communities, and other significant habitats, which our databases indicate occur, or may occur, on your site or in the immediate vicinity of your site. The information contained in this report is considered sensitive and should not be released to the public without permission from the New York Natural Heritage Program.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, at the enclosed address.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our databases. We cannot provide a definitive statement on the presence or absence of all rare or state-listed species or significant natural communities. This information should not be substituted for on-site surveys that may be required for environment impact assessment.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

Sincerely,
Tara Seoane jp
Tara Seoane, Information Services
New York Natural Heritage Program

cc:

Natural Heritage Report on Rare Species and Ecological Communities

NY Natural Heritage Program, NYS DEC, 625 Broadway, 5th Floor,
Albany, NY 12233-4757
(518) 402-8935

HISTORICAL RECORDS

The following plants and animals were documented in the vicinity of the project site at one time, but have not been documented there since 1979 or earlier.
There is no recent information on these plants and animals in the vicinity of the project site and their current status there is unknown. In most cases the precise location of the plant or animal in this vicinity at the time it was last documented is also unknown and therefore location maps are generally not provided.
If appropriate habitat for these plants or animals is present in the vicinity of the project site, it is possible that they may still occur there.

Natural Heritage Report on Rare Species and Ecological Communities

VASCULAR PLANTS

Liparis liliifolia

					Office Use
Large Twayblade	**NY Legal Status:**	Endangered	**NYS Rank:**	S1 - Critically imperiled	8701

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1 Records Processed

More detailed information about many of the rare and listed animals and plants in New York, including biology, identification, habitat, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.acris.nynhp.org, from NatureServe Explorer at http://www.natureserve.org/explorer, from NYSDEC at http://www.dec.ny.gov/animals/7494.html (for animals), and from USDA's Plants Database at http://plants.usda.gov/index.html (for plants).

PHC

Putnam Hospital Center

Health Quest affiliate

Donna M. McGregor, CPA, FHFMA
President and
Chief Executive Officer

845-279-5711
Ext. 2143
(FAX) 845-279-7482

May 19th, 2008

Frederick A Thomas, Esq.
General Counsel & Vice President
for Legal Services
Health Quest Systems, Inc.
Putnam Hospital Center
45 Read Place
Poughkeepsie, New York 12601

Re: *Senior Housing Project*
670 Stoneleigh Avenue, Carmel, New York

Dear Rick:

As I explained to you on the phone this past Friday, Putnam Community Foundation is in the process of completing and submitting its Final Environmental Impact Statement (FEIS) in regard to the above referenced project. The Foundation needs to incorporate into the FEIS those alternative access measures the Foundation is investigating to mitigate any environmental impact the project may have. In that regard, the Foundation would like to be able to discuss with applicable authorities that the Foundation and the Putnam Hospital Center are in discussions for the Foundation to obtain alternative access to the Foundation's property via the Hospital's property and, also, to include this information in the FEIS.

Please confirm that the Hospital has no objection to the foregoing disclosures by having an authorized signatory of the Hospital sign a counterpart of this letter where indicated below and faxing a copy back to me.

Thank you for your cooperation.

Very truly yours,

Michael L. Katz

CONFIRMED AND AGREED:

Putnam Hospital Center

By: Donna McGregor
Name: Donna M. McGregor
Title: President + CEO

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Appendix B

WRITTEN COMMENTS RECEIVED ON THE DEIS

The City of New York
Department of Environmental Protection

Emily Lloyd
Commissioner

Bureau of Water Supply
465 Columbus Avenue
Valhalla, New York 10595-1336

Paul V. Rush, P.E.
Deputy Commissioner

Tel (914) 742-2099
Fax (914) 741-0231

Marilyn Shanahan, Chief
SEQRA Coordination Section

Tel (914) 742-2071
Fax (914) 773-0342

www.nyc.gov/dep
(718) DEP-HELP

September 21, 2007

Mr. Harold Gary, Chairman
Town of Carmel Planning Board
60 McAlpin Avenue
Mahopac, New York 10541

Re: Putnam Community Foundation
Senior Housing Development
Stoneleigh Avenue, Town of Camel, Putnam County
Tax Map No.: 66-2-58
DEP Log No.: 2001-CF-0722-SQ.1

Dear Mr. Gary and Members of the Board:

The New York City Department of Environmental Protection (DEP) has reviewed the Town of Carmel Planning Board's (the Board) Draft Environmental Impact Statement (DEIS), prepared by Tim Miller Associates, Inc., accepted August 8, 2007, for the above-referenced project.

The project site is located within the Croton Falls Reservoir basin of New York City's Water Supply System. As you are aware, the New York City Water Supply system is an unfiltered, surface water resource that provides high quality drinking water to almost half the population of New York State – over eight million consumers in New York City and nearly one million consumers in Westchester and Putnam Counties.

Based on review of the materials received, NYCDEP respectfully submits the following comments for your consideration:

General Comments on the DEIS

1. It appears that the document does not fully convey the importance of impacts to Croton Falls Reservoir by failing to stress the proximity of the proposed action to the reservoir and by failing to note that runoff from the site is currently conveyed to Croton Falls reservoir via culverts under Stoneleigh Avenue. Both during and after construction, these culverts will provide a means by which turbid or pollutant laden water could be conveyed directly to the reservoir in a very short time if adequate protective measures are not implemented. The DEIS should be revised to adequately address concerns regarding the proximity to the reservoir.

2. The document states that the Croton Falls Reservoirs is part of the Croton Water Supply System which provides only 10% of New York City's drinking water. In fact, the Croton Falls Reservoir is considered part of the Delaware Water Supply System as water can be pumped from this reservoir into the Delaware Aqueduct. The Delaware System provides about 90% of New York City's drinking water and will remain unfiltered under the latest Filtration Avoidance Determination. As such, maintenance of water quality in this area is a high priority to NYCDEP.

3. As noted in the DEIS, the project will require a variance from the Watershed Regulations to construct new impervious surfaces within 300 feet of Croton Falls Reservoir. However, while the DEIS discusses the variance application that would need to be submitted to NYCDEP, the document does not fully discuss or assess the impacts associated with adding impervious surfaces within the limiting distance to the reservoir or measures proposed to mitigate the addition of these impervious surfaces. In fact, no measures are proposed to mitigate the impacts of the impervious surfaces within the limiting distances at all. Runoff from these impervious surfaces will be conveyed directly to the reservoir without mitigation via the existing culvert in the vicinity. Granting of variances is not simply an administrative process. Among other things, an applicant must demonstrate mitigation that is as protective of the water supply of the regulation that cannot be met. The 300 foot limiting distance was established in the Watershed Regulations to address particular impacts to water quality. These must be addressed in the DEIS.

   Other factors to note regarding variances that may not specifically apply to the water quality impacts discussed herein are the facts that a variance applicant must demonstrate that compliance with the regulations would create a substantial hardship due to site constraints or limitations and that granting of variances is purely discretionary. The DEIS should more fully address these issues.

4. Appendix C, "Senior Housing Market Analysis" includes substantial discussion of the unavailability of housing units for seniors in Carmel and Putnam County. No reference is made to the number of age restricted housing projects that have recently been constructed, are currently under construction or are currently approved for construction in the area. Since the Watershed Regulations were promulgated in 1997, NYCDEP has approved a number of this type of housing project and others are currently under review. Among those approved (some of which are occupied or nearing completion) are Hughson Commons, Mahopac Hills, Stoneleigh Woods, Carmel Centre Senior Housing, and Stonecrest Senior Residence. Projects currently under review include Hillcrest Commons. It is recommended that the DEIS be revised to reflect the senior housing that will be available in the near future and its impact on the need for this action.

5. The document states in several places that NYCDEP's authority to review and approve SPPPs is the result of an agreement with NYSDEC. This is not the case. NYCDEP has review and approval authority independent of NYSDEC under the Watershed

Regulations which were promulgated pursuant to public health law. The document must be revised throughout for accuracy throughout.

Section 2.2 – Approvals and Involved Agencies

1. The DEIS fails to note that NYCDEP approval will be required for the proposed sewage system/sewage connection pursuant to Section 18-37(e) of the *Rules and Regulations for the Protection from Contamination, Degradation, and Pollution of the New York City Water Supply and its Sources* (Watershed Rules and Regulations). The applicant should note this permit requirement.

Section 3.1 – Geology, Soils, and Topography

1. Steep slopes and erosive soils found on the site are discussed in various sections relating to soils and topography (sections 1.3.1, 2.5 and 3.1). However, very little emphasis is put on the fact that these conditions are immediately across the street from the Croton Falls Reservoir. While disturbance on the steep slopes is minimal compared to the amount of disturbance that will take place in the flatter areas that are somewhat further from the reservoir, the disturbance on steep slopes having erosive soils immediately across the street and hydrologically connected to the reservoir through drainage culverts should be emphasized in the DEIS. Emphasis should be given to the location of these steep slopes and erosive soils relative to the reservoir and their hydrologic connection through existing (and proposed) drainage structures. Based on the tables in section 3.0, about 40%of the steeply sloping areas with erosive soil areas will be disturbed for construction. These are all closely connected to Croton Falls Reservoir through the existing culvert system in Stoneleigh Avenue. Additional information is necessary to demonstrate that these areas can be developed without impacts to the reservoir.

2. The section notes that there will be an excess of cut material from the proposed project and states that "if the excess material cannot be used onsite the resulting 32,000 CY of excess material would be removed from the site and transported …". Onsite areas designated to receive excess material must be identified and the associated impacts with additional clearing and grubbing, possibly on steep slopes or close to watercourses, should be fully addressed and mitigated.

3. An erosion and sediment control drawing is included as Figure 3.1-5. This drawing will require substantial revision before mitigation of construction impacts can be demonstrated. For instance, the initial staging area is in the vicinity of a future detention basin along Stoneleigh Avenue. The area is very steep, having slopes over 20%. In addition, it is immediately upslope of a culvert carrying runoff into Croton Falls Reservoir. The alignment of the temporary haul road from this area extends uphill through areas that are sloped on the order of 40%.

4. Impacts of dewatering excavations or groundwater leaching from cut sections should be fully addressed in the DEIS. In addition, construction during freeze/thaw conditions should also be addressed.

Section 3.3 – Water Resources

1. As noted above, this section briefly refers to the proximity of the Croton Falls Reservoir to the project site, and discusses the relative small percent of the watershed that the project site occupies. Emphasis must be given to the importance of maintaining the water quality in the reservoir.

2. Both this section and the SPPP to which it refers (Appendix D) note that the stormwater analysis was conducted along a 'design line' encompassing the section of the Croton Falls Reservoir shoreline immediately downhill of the site. Since stormwater flows to the reservoir through two distinct conveyances – the watercourse flowing through a culvert roughly in the middle of the frontage and a culvert conveying runoff at the south end of the site - it is recommended that the analysis be revised to analyze the localized changes at these two distinct points. In this way relative impacts of diverting stormwater volumes, peaks and pollutant transport can be more clearly analyzed.

3. The section refers to the source of flow in the watercourse identified onsite as "sheet flow". This is not entirely correct. While the watercourse does convey as significant amount of surface runoff, it also has groundwater seepage as a source. This is part the reason it is considered a watercourse under the Watershed Regulations.

4. The stormwater analysis shows that peak flows are maintained or reduced for the post development condition. Review of the SPPP indicates that although the peaks are reduced, the volume is discharged over such a long period of time that stormwater management basins are not likely to adequately drain before the next rainfall event during wetter seasons. The long drainage period is also associated with elevated temperatures in the discharge. These impacts must be addressed in the document.

5. Changes in volume of stormwater runoff must be fully addressed in the DEIS and avoided or mitigated to the extent practicable.

6. The section includes a relatively long discussion of Phosphorus TMDL limitations for Croton Falls Reservoir, but does not discuss whether or not the project can address the issues of phosphorus reduction other than to note that adjunct practices are proposed to increase the pollutant reduction from the site post-development. This may demonstrate the phosphorus loading can be reducing to roughly predevelopment conditions, but it does not address TMDL issues. The section must be revised for clarity. The applicant should clearly identify any actions propose regarding TMDL mandates for the reservoir.

7. Low Impact Development (LID) measures are discussed, but it is unclear from the documentation provided exactly which measures are proposed and how significant they

will be in providing source control. The locations and extend of buffer strips, grass swales, rainwater reuse, infiltration, etc. must be provided to demonstrate that the measures are feasible for the project and that a sufficient amount of the practices will be employed to be effective. It is recommended that a table be provided listing locations and dimensions of each proposed LID practice.

8. In order to reduce potential adverse impacts from stormwater runoff, the applicant intends to reduce the use of road salt, use no phosphorus fertilizers for landscape maintenance, and install porous pavers in some areas of the site. The FEIS should clearly indicate how these measures will be legally enforced in perpetuity.

Section 3.6 – Community Services and Socioeconomics

1. The DEIS indicates that seniors from within the Town of Carmel would reside in the proposed senior housing and claims that the project would not generate additional school age children nor would there be any significant secondary impacts. However, without a demographic analysis presenting the number of children with and without the project, a conclusion with regard to the number of new school-age children is unsupported. Similarly, the applicant suggests that secondary impacts are not significant despite no evidence within the DEIS. The Final EIS should include additional documentation to support the conclusions outlined in the DEIS.

Section 4.0 – Alternatives

1. Alternative C, the Reduced Scale Alternative, includes less disturbance but also included more housing units than proposed under the Preferred Alternative. From the materials received, it is unclear as to why the Reduced Scale Alternative did not include a similar number of units as the Preferred Alternative, which would allow for a more meaningful comparison.

In this letter, NYCDEP has identified what it considers the potential impacts of this project and submits this letter to you as lead agency as part of a coordinated SEQRA review. SEQRA requires that the Lead Agency take a hard look at potential impacts of the whole action and identify all relevant impacts. In making a SEQRA determination, the lead agency must specifically identify all potential adverse impacts with a reasoned elaboration. This should include: an assessment of the likelihood and significance of each potential impact; what possible measures could eliminate or mitigate potential adverse impacts; and a description of the information you relied upon to reach your conclusions.

NYCDEP is available for further consultation on the matters raised in this letter and expects to be fully involved in the SEQRA process. Please notify me of any public meetings or meetings you are aware of between any involved agency and the applicant regarding this project so that NYCDEP may participate fully in this process. In addition, please copy me on behalf of NYCDEP on all correspondence related to the SEQRA review between your agency and the applicant.

Thank you for the opportunity to provide comments. Please contact me at (914) 742-2071 if you have any questions or care to discuss the matter further.

Sincerely,

Marilyn Shanahan

Marilyn Shanahan, Chief
SEQRA Coordination Section

xc: Joseph DiVestea, Putnam Community Foundation
David S. Warne, NYCDEP

VIA FAX AND MAIL

October 12, 2007

Mr. Harold Gary, Chairman
Town of Carmel Planning Board and Members of the Planning Board
Town Hall
60 McAlpin Avenue
Mahopac, New York 10541

RE: Comments - Putnam Community Foundation Senior Development

Dear Mr. Gary:

Minutes of last month's Planning Board meeting held on September 12th and my initial letter more than adequately represent the concerns of the Coalition to Preserve Open Space including the nullification of the 2006 senior housing code and therefore, I will not repeat them here aside from that which pertains to the SEQRA mandated serious examination of alternatives by the applicant and assessment of their suitability by the Planning Board.

In response to questions that I raised, the applicant's representative stated that the DEIS covered alternatives aside from "No Build." They were a denser version of that which was designed and "seven houses." I considered the last as a throwaway meant to fill up space and not a recommendation of consequence to be used as a basis for further discussion.

In light of the applicant's stated advocacy for open space and the intense development now occurring along Stoneleigh Avenue necessitating infrastructure changes, Putnam Hospital's considerable expansion, the construction of Countryscapes, and the glut of senior housing development in the Hamlet, I countered that the land should be kept as open space in perpetuity. This was not a recommendation made frivolously but most seriously in light of the factors that I enumerated in the previous sentences.

As in past correspondences, I wish to express the appreciation of the Coalition for your unfailing courtesy and that of the Planning Board as you consider our oral and written comments.

Sincerely,

Ann Fanizzi, Chair
Putnam County Coalition to Preserve Open Space
CC: Dr. Marian Rose, President Emeritus, CWCWC
Fay Muir, President, CWCWC
Jim Bacon, Attorney

Margaret Ross
106 Vista on the Lake,
Carmel, NY 10512

Town of Carmel Planning Board,
McAlpin Avenue,
Mahopac, NY 10541

Ladies and Gentlemen:

I am writing to you to express my concerns about the information received regarding the Putnam Community Foundation plans for TM 66.-2-58.

My concerns are:

1. Can Stoneleigh Avenue handle all the extra traffic that will be generated by the 120 new units? Stoneleigh Avenue is already a traffic nightmare at certain times of the day. There have been several accidents on the stretch of road between the Drewville Road intersection and Vista on the Lake. This will only get worse. With the increasing traffic flow in and out of the of the Putnam Hospital with each addition, the new homes built at the Drewville Road intersection, the town houses that will soon be built adjacent to Vista on the Lake, the new homes being built near the Carmel end of the road, and now the possibility of 120 new homes, where will the traffic go? How many accidents will there be as residents attempt to gain access onto Stoneleigh Avenue? Every time I slow down to turn into Vista on the Lake I worry about being rear ended by an impatient driver. It is not safe to walk or ride a bike on Stoneleigh Avenue.

2. With the addition of 120 homes where will the run off go? Will all the salt that will be used on the roads in the winter end up in the reservoir so polluting the water even more than it is now?

3. With more traffic there will be more gas/diesel fumes creating more air pollution.

4. Can the Town of Carmel Water District support another large community? With 120 units, all the sports activities, and the resulting visitors, how much water can Carmel provide? Will there be a reduction in pressure for all users at peak times?

5. Can the Town of Carmel Sewer District handle all the extra sewage that will be generated?

6. With all the building going on along Stoneleigh Avenue what is happening to our environment? Where are all the wild life species going?

Thank you for your consideration of my concerns. I know that many Vista residents feel the same way.

Sincerely,
Margaret Ross
Margaret Ross.

October 11, 2006

VIA FAX AND MAIL

Mr. Harold Gary, Chairman, Town of Carmel Planning Board and
Members of the Planning Board
Town Hall
60 McAlpin Avenue
Mahopac, New York 10541

RE: Putnam Community Foundation - Senior Housing

Dear Mr. Gary:

Prior to commenting on portions of the Scoping Document, I wish to register my objection to the statement contained in the September 15, 2006, letter by Chris Robbins, Project Manager, wherein he states, "Written comments should be submitted to the Planning Board prior to the October 11th public scoping session." As you are aware, it has been the practice of this Planning Board and Planning Board of other Putnam County Towns to accept oral or written comments at the Scoping Public Hearing and then grant 10-days for further written comments to be entered into the record. I respectfully request that that procedure be followed in this instance also.

On Friday, October 6th, I came to the Planning Board and requested the file. Unfortunately, it could not be located until Tuesday, October 10th and in the interim I could not give it the attention that this project deserves. Therefore, my comments will be short and limited to those areas which the present document appears to have neglected or glossed over.

1. SURVEY - Without benefit of a credible and valid survey, 120 units of senior housing are being proposed, partially funded by New York State Division of Housing and Community Renewal. For almost three years, I have attempted to obtain a survey that was initially proposed by the Putnam County Housing Corporation that would have provided definitive data that there is indeed a need for subsidized housing in Putnam County and that residents of the highest salaried county would fufill the income eligibility requirements.

Today, I spoke to Connie Fagin who informed me that the survey was moribund but who in response to questions concerning types of programs, eligibility requirements and percentage of Putnam County residents actually inhabiting residences under the Housing Corporation, offered most helpful information which I am now requesting to be included in the Scoping document.

A. Under what program- Ms. Fagin indicated that there were many - will be the proposed senior housing be developed?

B. How many Putnam County residents will be eligible for the senior housing proposed?

C. What will be the ratio of contribution from the State and Community Renewal programs?

B. ENVIRONMENTAL - The proposed senior housing development will be located not 300 ft from the Croton Falls Reservoir, designated by the Department of Environmental Protection Agency as one of the most phosphorous-impaired and in times of drought a significant replacement for the Catskill/Delaware system which provides 90% of water to 9 million New York City inhabitants and yet, a 2,500 ft linear road is contemplated as an access to the project; 30% of construction on slopes exceeding 15% and 22 acres will be deforested and "converted to impervious surfaces and landscaped acres," further compounding the problem of nutrient loading. On this basis alone, the project should be rejected without further comment.

C. ALTERNATIVES - As proposed, the project represents one of the most egregious examples of sprawl development, criticized for its wasteful use of land and resources. The applicant should provide an alternative compact site design which minimizes land use and fragmentation of open space, thereby eliminating the extraordinary 2,500 linear access road and reducing the potential destructive water quality impacts of impervious surfaces and phosphorous loading.

On such environmentally fragile land and with such potential devastating long-range impacts to water quality, this project should not be built, let alone approved in even modified form.

D. COMPLIANCE WITH LOCAL LAW - One of the requirements of the recently enacted Town of Carmel Local Law regulating Multi-Family Housing for the Elderly, stipulates that the distance between senior housing and shopping centers be no more than 2,400 ft. The rationale for the adoption of such a stipulation was to provide convenient shopping opportunities within walking distances of proposed complexes and thereby reduce senior auto dependency. This project does the reverse: it is distant from shopping opportunities and compels seniors to travel by auto. Statistics have pinpointed seniors in addition to youngsters between the ages of 18-21, as the most accident prone. Yet the applicant chooses to ignore these statistics by creating conditions that are inimical to seniors safety and in violation of the Local Law.

There are further significant issues, among them the lack of data on disturbance of wildlife habitat, possible presence of endangered species that need to be presented but due to time constraints, I have not been able to adequately address them.

Please accept the appreciation of the Coalition and my own for your consideration of our comments.

Sincerely,

Ann Fanizzi, Chair
Putnam County Coalition to Preserve Open Space (PCCPOS)
CC: Hon. Connie Munday, Supervisor, Town of Carmel
Dr. Marian R. Rose, President, Croton Watershed Clean Water Coalition(CWCWC)
Jim Bacon, Attorney, CWCWC and PCCPOS)

Appendix C

PUBLIC HEARING TRANSCRIPT

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TOWN OF CARMEL
PLANNING BOARD
- -X

PUTNAM COMMUNITY FOUNDATION

- -X

September 12, 2007
7:05 p.m.
Town Hall
Mahopac, New York

B E F O R E :
HAROLD GARY, Chairman
EMMA KOUNINE, Vice Chairman
CARL GREENWOOD, Board Member
FRANK LOMBARDI, Board Member
JOHN MALLEGOL, Board Member
GREGORY L. FOLCHETTI, ESQ.,
Attorney for the Planning Board
PEGGY MOORE, Secretary

ALSO PRESENT:
MICHAEL CARNAZZA, Building Inspector
PAT CLEARY, Town Planner

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A P P E A R A N C E S :

FOR THE APPLICANT:

CHRIS ROBBINS, Tim Miller Associates, Inc.

PETER A. KARIS, JR., RLA, Insite Engineering, Surveying & Landscape Architecture, P.C.

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MR. GARY: Putnam Community Foundation public hearing.

MR. CARNAZZA: As I said, there's ongoing comments about the retail sales and services within 2500 feet of the site, a variance is required or an interpretation of the zoning board of appeals.

MR. GARY: All right. Is there anything from Jack?
MR. CARNAZZA: I don't have anything from Jack on this.
MS. MOORE: Did he e-mail it to you?
MR. LOMBARDI: I have something from him.
MR. CLEARY: He e-mailed me, not on this.
MS. MOORE: Yeah, it's on Putnam Community Foundation.
MR. GARY: Pat?
MR. CLEARY: This is on for public hearing. I have no comments at this time.
MR. GARY: I see in my notes here something from Greg, he's got some

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comments.
MR. FOLCHETTI: Not on the project itself, but generally we're conducting a public hearing in this matter, I understand this is scheduled for both SEQRA and for site plan. SEQRA, my understanding is that we're ready to have a public hearing. Typically, my experience with this board, and the board's practice and procedures have been, when a -- when a project has contemplated zoning board intervention, that the public hearing and site plan and subdivision, as the case may be, would not be held until after the determination with a completion of the zoning board proceedings. Mr. Carnazza has indicated in several memos that the project doesn't meet minimum zoning requirements. So my understanding or my -- I would understand it would be referred to the zoning board for further interpretation or for a variance, as the case may be. And if the board wants to have the site plan public hearing, I would

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say that it's not typical with the board's practices and procedures, but if the board wants to go ahead, it can go ahead.
MR. GARY: Matt -- not Matt. Mike, what's the ZBA's --
MR. CARNAZZA: An interpretation that there is a retail service within the area or a use variance that says that it does not -- well, it doesn't apply to that, which are requirements of the special use permit.
MR. GARY: Didn't -- didn't we go through that?
MR. CARNAZZA: Several times, but they don't have zoning board interpretation and they can't go for a use variance until they're done with SEQRA.
MR. GARY: Shouldn't it go to have site plan, as long as it's going -- as

long as it's going to the ZBA, is that what you're saying, Greg?

MR. FOLCHETTI: I'm -- I'm saying that you typically don't hold a public hearing on a site plan and subdivision if

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the project itself is going to have ZBA intervention, because it may change the layout -- it may change the configuration or layout or the particulars of the development. The SEQRA, I mean, according to Patrick and it's my understanding, is that we're ready to do.

MR. GARY: Well, Pat, what is your interpretation?

MR. CLEARY: You have several options, you can hold this public hearing, but if it go to the zoning board, I think Greg's point is, and the zoning board denies that, makes a different interpretation or denies the use variance, that would affect the layout and configuration of the plan, which means you have another public hearing. So I think you're hearing the argument that either don't have a public hearing, let the zoning board act. The alternative is to have two public hearings. The SEQRA action on this case, if it were a use variance --

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MR. GARY: The point is to have a SEQRA public hearing.

MR. CLEARY: If there was a use variance requirement. So if the zoning board of appeals says Mike's interpretation, and the interpretation of this requirement of retail use can't be done as an interpretation, it requires a use variance, SEQRA has to be completed before they can act on that use variance. So this public hearing on the -- on the environmental impact statement must be completed in order for the zoning board to act. That's not tomorrow, that's going to take a bit of time. So it's very clear that this environmental impact statement, public hearing has to happen. And I think it's really your practice in the past has been not to have those site plan hearings, but you can have two, you have an option.

MR. GARY: Do you recommend that we have these two hearings?

MR. CLEARY: I recommend that we have a public hearing on the impact

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statement.

MR. GARY: Two hearings: one on SEQRA and one on site plan?

MR. CLEARY: We've often done them

concurrently. I wasn't very specific about it though. I recommend we move to the public hearing stage.
MR. GARY: Let's go around the board. All right. Any comment, Frank?
MR. LOMBARDI: Based on what Gregg is saying about SEQRA, it's --
MR. CLEARY: Mr. Chairman, one other thing I should point out, the code requires you to have the public hearing on the site plan within 45 days of your acceptance of the site plan. Now, as a matter of routine, applicants will often allow you to extend that deadline. But that should be in the record if that's what you chose to do in this instance.
MR. GARY: In other words, if we do not hold a public hearing --
MR. CLEARY: On site plan.
MR. GARY: -- you have to request

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one from the applicant?
MR. CLEARY: An extension.
MR. GARY: An extension.
MR. CLEARY: That's correct.
MR. KARIS: Mr. Chairman, if I could just speak on one point.
MR. GARY: Just one second. Do you have anything, John?
MR. MALLEGOL: No, nothing.
MR. GARY: Carl.
MR. GREENWOOD: I would just say, to save ourselves problems in the future, that we're probably -- it would probably be smart just to hold the public hearing.
MS. MOORE: I can't hear you, Carl.
MR. GARY: He said that I'm going to -- he said probably the best thing to do is to get the whole public hearing on the SEQRA to save us problems in the future, that's the last thing we need. And let's fix it.
MS. KOUNINE: The last meeting of the planning board was three weeks ago; correct?

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MS. MOORE: Yes.
MS. KOUNINE: At that meeting the applicant came before us and asked for a public hearing. Pat, you agree on that point?
MR. CLEARY: Yes.
MS. KOUNINE: Mike Carnazza was here and Mr. Folchetti was here. The applicant asked at that time for the public hearing to be both, cover both instances. We said we'd have a public hearing, and we agreed to the public hearing, right. And in the interim I spoke to the planner and I had asked that we would do both of them, and at that time you had said that would make

more sense, you would get them both done. The secretary of this board worked with the applicant in sending notices out to the public. The notices, from what I understood, were to cover both the SEQRA and the site plan. Why yesterday after three weeks somebody decided this was not the right way to do it? Public notices were out, things were in the paper.

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Somebody had three weeks to figure out if this was not the proper procedure, and it wasn't done until yesterday, which I find very strange, very strange, but that's beside the point. We already have a public notice, the public's been notified of this meeting and what it's for. I think it's late in the day to change your mind what this public hearing could cover. I don't think it's fair to the public. A public hearing is nothing more than to give the public the opportunity to express their opinion on the site plan, on the SEQRA, on any problems they perceived with any application. There is no action taken tonight. There is no approvals to this application. The board takes no action at a public hearing. So I don't know why this came up at the 11th hour in the 55th minute, but it did. And I find it very curious when we had guidance three weeks ago that it was perfectly okay to do this.

MR. FOLCHETTI: I have no recollection of being asked that the board

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was going to have two meetings together. My recollection is that it was a SEQRA --

MS. KOUNINE: The applicant asked for it, Greg, at the last meeting.

MR. FOLCHETTI: They may have, and I may not have been here because --

MS. KOUNINE: Well, it could be you weren't here, but that's what --

MR. FOLCHETTI: My only -- my only issue is what the practices and procedures of the board are in the past.

MS. KOUNINE: And I'm telling you that it was kind of mentioned at the last meeting, Greg. When he asked for two issues to be covered by this public hearing, it was agreed to, and we scheduled a public hearing for it. Now, if you're not informed of it or you don't read the minutes of it or something happened, I don't know, but that's what went on.

MR. FOLCHETTI: Well, it's not matter of me --

MS. KOUNINE: Greg, maybe you should

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have been informed before the notices were sent out.
MR. FOLCHETTI: I brought it up when I saw the agenda, and really I just brought it up --
MS. KOUNINE: You brought it up yesterday because it was brought up yesterday, and that's kind of late in the day to do this. I don't think it's fair what went on. I think we should hold a public hearing as we said we would. And from now on we should notify everyone as to what the public hearing exactly what will cover or only will cover.
MR. GARY: I think that -- I think that issue is not severe as we're terming it. I think what it is, if I can follow all three of you, I think what the issue is, is that not whether the -- the public hearing on the SEQRA and the site plan has been authorized, but -- but what would be the validity of it in the long run. We are still on the record, we can go ahead and have a public hearing on both of them,

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and then we can turn around again and have a public hearing again on whatever happens to it. The -- but that's one of the issues flying out there, and the issue is what the board has to decide now. The issue which our attorney has brought up is a practice of the board. Practice of the board, are we going to have a public hearing on issue that has to wind up in the zoning board of appeals. I think we just solved that issue, then we can move ahead with these public hearings. Peter, you have something you want to say?
MR. KARIS: I just wanted to make one comment on the Hillcrest Commons project, which is the subdivision, senior housing project site plan, and SEQRA process, we simultaneously held the DEIS public hearing and the site plan and subdivision public hearing. And the site plan subdivision public hearing were held open until SEQRA was concluded.
MR. CLEARY: Was -- was there a variance required?

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MR. KARIS: But the only difference is there wasn't a variance required.
MR. GARY: Okay? Peter, you have it all. It's up to the board. Let's go back.
MR. MALLEGOL: I guess the point is there is a major change that has to be made to the plan. We can always have another public hearing. Therefore, we're all here, public's been notified of it.
MR. GARY: Okay.

MR. LOMBARDI: Yeah, I would agree with that. I guess, if it was the practice in the past perhaps we should leave --

MR. GARY: The practice in the past was --

MR. LOMBARDI: Well, we have to stay with the tradition that we've had before. Should we leave the public hearing open until after it comes back from the zoning board?

MR. GARY: No, no, we have -- they haven't been to the zoning board. There

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is no such thing, we cannot authorize leaving a public hearing open on the ZBA. All we can authorize is leaving the public hearing open on the planning board. This has not been, if I am correct, this has not been to the ZBA.

MS. KOUNINE: It can't.

MR. CARNAZZA: It can't go to the ZBA until they get the SEQRA process concluded.

MR. GARY: Carl.

MR. GREENWOOD: My only question is to Greg. By doing this, is this creating an open door for something to cause a further delay in the entire process?

MR. FOLCHETTI: The only -- the only further delay I can conceive of, you would have to have another public hearing.

MR. GREENWOOD: So there's no legal benefit that an outside party could raise that --

MR. GARY: Can I answer that for you? As long as you only ask the questions after you (inaudible).

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MR. GREENWOOD: That's always good to ask where you're going to end up before then.

MR. GARY: The question is whether you can do something with it, whether it's foolish or incorrect. You -- you can -- certainly, he will get us out of it.

MR. GREENWOOD: My point is only in the best interest of the applicant and the process -- is whether it does open doors that could cause further problems, that's all.

MR. GARY: Now, just get this in the right perspective, Peter.

MR. KARIS: Yes, sir.

MR. GARY: If we have a public hearing, and I must conclude that it has been the practice of the board in the past, I think, as long as I have been here, that you do not hold a public hearing on any issue that has to proceed to the ZBA. But I have to conclude that the planning board itself issue that this will be seen tonight as two public

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hearings. If we do, you have to understand that this may have to be rescinded and go to another public hearing.
MR. KARIS: Okay.
MR. GARY: We'll have to have an additional public hearing or extend the one we had, another one. That is another legal question we have too, what is the legality one way or the other if there has to be another public hearing.
MR. KARIS: So what you're saying is that you guys may be in a position to hold the second public hearing on the site plan if there's a drastic change in the plan as part of the SEQRA process.
MR. GARY: Not that we'll be expecting, we would be required to.
MR. KARIS: We understand that, and we accept the board's position on that.
MR. GARY: Then I guess I'm hearing the board that they want to hold a public hearing, are you in agreement?
MR. GREENWOOD: I don't have a

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problem.
MR. GARY: Okay. Anything else you want to say?
MR. KARIS: No.
MR. GARY: This is a public hearing on SEQRA for Putnam Community Foundation. Anyone in the audience wish to be heard? You have to come up, ma'am.
MS. KOUNINE: Stand by the microphone so they can hear you.
MS. ROSS: Okay. This is the same letter that --
MR. GARY: And could you state your name.
MS. ROSS: Oh, my name is Margaret Ross, and I live in Vista On the Lake. It would directly impacted by this.
MR. GARY: Okay.
MS. ROSS: I presented this letter to scoping session, and I want to know if the concerns in here have being addressed, which -- concerning sewer, water. Is the water district to be -- if the Carmel district would be able to handle all the

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increase. I also wanted to know if it would be any problem with the sewer lines extended along Stoneleigh. If ever there was a backup, would it actually backup into our facility. I think it would be on the same line. And what is being done about the environment, the runoff into the

reservoir, and more or less, my same concerns as I expressed before, and have they been addressed.
MR. GARY: I think that the person who could answer that from the -- from the town's perspective would be the engineer, who's not here tonight. However, Pat --
MR. CLEARY: Can I just add a point to clarify how this process works? While there are two simultaneous public hearings going on now, the public hearing that's held for the environmental impact statement, unfortunately for you doesn't include the answers to your questions yet. What happens is all of your questions are collected, and they're responded to in what's called the final environmental

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impact statement. Now, the issues you just raised, and I don't remember that letter, but all the issues that I just heard you describe were included in the scope and were addressed in the draft environmental impact statement. We're all going to review that and determine if they've been addressed satisfactorily. And if they are any other questions, they'll be addressed in the final environmental impact statement. So, unfortunately, you're not going to get your answers tonight, but you're going to get your answers in a more durable permanent forum, again, that's the final environmental impact statement. So you got to hang with us in this process a little longer.
MS. ROSS: Can I leave you this copy?
MR. GARY: Sure.
MS. ROSS: Just to make sure you have it. Okay. Thank you very much.
MR. GARY: You're welcome. Anyone

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else who wishes to be heard?
MS. HENWOOD: Do I have to address who I am?
MR. GARY: Please.
MS. HENWOOD: My name is Joann Henwood. I'm past president of --
MS. MOORE: Spell that for me.
MS. HENWOOD: Henwood, H-E-N-W-O-O-D, I'm the past --
MS. MOORE: W-O what?
MS. HENWOOD: W-O-O-D. I'm the past president of Clearing in the Woods, I'm concerned homeowner. We're right off Stoneleigh on Drew Lane. Being handicapped, I've been home during the times when we had a lot of blasting, that has been ongoing with all of these ongoing projects. And during that time a lot -- a

lot of building have been shaking. I read in the paper over the last week that one of the areas where the blasting was going on, they do have cracks in the foundation. And I have a real concern that no one really has checked on our foundations. I

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don't know who is legally responsible when those situations. We were not told about any of the blasting going on at that time either. So as I was home during that time frame, we didn't even know what was going on. There was no notices, there was nothing on the roads to say blasting was going on. And it happened twice, I was on phone with Margaret, and she was aware, she had some situations with her blasting that they felt also, as well as the new condos that are adjacent to the barn. I was not on the board at that time, I'm no longer on the board, but as a concerned homeowner, when those townhouses sprung up, they were on top of our buildings. And from what I understand, unless you come to these meetings there's nothing you can do to prevent that from happening. In the wintertime you can almost reach out and touch the next building. And I don't know whether anybody on the board has been over to see the close proximity to where Clearing is to the barns and those brand

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new condominiums that have gone up that I heard are in excess of $600,000. But I think it's -- I don't know if I want to say it's a detriment to our community, because we've been in Clearing in the Woods for over close to 30 years. And to have public hearings, nobody from Clearing's here except myself, and that's only because, number one, I'm going to start coming to these meetings and become more concerned, but also because of how the community is working with Vista and trying to keep the traffic that's now going to be processing going through our community. I -- I foresee there's going to be at least four lanes of traffic that's going to be needed for that one on Stoneleigh Avenue between the hospital. I had to go up to the hospital today, and from Stoneleigh Avenue you do not see what has happened up at the -- at the hospital. But I have to tell you, I have been sitting home every day wondering what all of this noise has been and I now know,

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it's all construction that has been ongoing. The ground has been shaking, and my -- my complex, and nobody has known.

And I, because I'm home, I kept saying to our managing agent, what is going on. But he doesn't live in the area, so he doesn't care. But being a homeowner I care and I am one who is home to feel the effects of what is happening in our town. And I don't know what that is, what's happening underneath our grounds from all of the shaking and all of the movement that is going on. I have seen wolfs that are running in our backyards, up to our backdoors, and this is also impacting the wildlife. So these are all things that are going to be coming down. We're going to have people that are going to be coming into the town hall and it's going to be a lot bigger than we even imagine at this time.

MR. GARY: I have two questions.

MS. HENWOOD: Yes.

MR. GARY: You said there's

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blasting, where is the blasting at?

MS. HENWOOD: The what?

MR. GARY: Where is the blasting being done at?

MS. HENWOOD: I guess -- well, this is when they did the townhouses that went up in --

MR. GARY: There was blasting in there?

MS. HENWOOD: Yes. I was sitting on my couch, I almost fell off. The whole building shook. And nobody knew who to call. And from what I understand, I read in the newspaper just over the weekend, that I guess off of Fair -- not -- over by Friendly's I guess.

MR. GARY: Yes.

MS. HENWOOD: Their foundation has a problem. Nobody's checked our building. I mean, we just don't know. I mean, I know what I felt, I was home. And, you know, there's that possibility down the road. And, you know, can you prove it? I mean, maybe somebody should have come out

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right away, but the blasting that occurred was in November of last year, November 2006. I had written e-mails regarding it, not -- not just the board, but internally to the community and wondering, you know, did anybody know what was going on, because we didn't know about those townhouses.

MR. GARY: There is -- there is quite a monitoring process that the town itself is --

MS. HENWOOD: I didn't receive anything in the mail.

MR. GARY: But they're monitoring

the blasting.

MS. HENWOOD: Uh-huh.

MR. GARY: And you can, if you experience that, all you have to do is contact --

MS. HENWOOD: The police didn't know.

MR. GARY: You have to contact your building department.

MS. HENWOOD: The building

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department?

MR. GARY: Yes.

MS. HENWOOD: But the police didn't know. Is that something that could be -- if you're going to be blasting, perhaps the police could be advised so that they can handle some of those phone calls?

MR. GARY: The police doesn't know, but the building department knows.

MS. HENWOOD: Okay. And that's 628-1500.

MR. CARNAZZA: And the police should have known, and the building department didn't know, and that law is being rewritten now.

MS. HENWOOD: Thank you.

MR. CARNAZZA: And we're trying to do it a different way. We're trying to issue permits and things like that and check all the insurance out and require preblast surveys, that's what we're working on with the town board.

MS. HENWOOD: But that isn't --

MR. GARY: Did you say you have

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wolves out there?

MS. HENWOOD: Wolves, yes, and red foxes.

MR. GARY: Anything else?

MR. CARNAZZA: I think they're coyotes.

MS. HENWOOD: And they're big too, like a German Shepherd.

MR. GARY: Well, I'll observe it from the road.

MS. HENWOOD: Thank you for your time.

MR. GARY: Thank you. Anyone else wish to be heard?

MS. FANIZZI: Good evening, sir. My name is Ann Fanizzi, and I'm chairman of the Putnam County Coalition to Preserve Open Space. I want to say that I'm in a very uncomfortable position, a very ironic one. Because not three weeks ago I was at a farm, along with many members, congratulating Senator Liebel on his, really, groundbreaking legislative attempt to preserve open space. And he and

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another legislator were there, and we were all very, very commendatory of his efforts. And here we have a foundation, established by Senator Liebel proposing a development that is so egregious in terms of its environmental impact, that it -- it just -- it just almost leaves me speechless, absolutely speechless. Here we have a EAF that absolutely says that 30 percent of the construction is going to be occurring on steep slopes. Here we have an EAF that says 24 -- 22 acres will be deforested for the project. Here we have an EAF that says that these 22 acres are going to be converted to impervious surfaces. Now, this is so bad, so bad, because this particular development impacts the Croton Falls Reservoir, a reservoir that now the DEP is looking into, and deforesting land and so forth, that is declared to be phosphorous impaired. Now, just what are we doing here? I mean, what are we -- what are we doing? Are we taking with one hand and

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giving them another? Additionally, the overdevelopment that Ms. Henwood and Ms. Ross referred to on Stoneleigh Avenue is putting tremendous, tremendous pressure on the infrastructure of that particular road. We have yet to see the full build out of that particular -- of all of the projects along that particular road. And, again, I say to Senator Liebel, stand up, say you're for open space and preserve that land and not build this development. We don't need this development. Down the block we have 381 houses, we don't need another. We have Mr. Carmada not three, four miles away building another 300 house. We have -- even though we won a case, we will have Hillcrest Commons with another 150. Do we need another 120? We don't need it. But we do need our open space, we do need our water quality, and we do need our vistas. And we have to stop, we have to stop destroying our landscape. What is going on in that hospital section is -- I was there

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yesterday, was unbelievable. And why, because this board, it was this board who said, yes, you can build the impervious surfaces. And I stood here and said build some other garage. And they are just clearing land like you would not believe, and now we have more of this. How much can this watershed sustain itself? And I think it's about time that we take responsibility. You, sir, and you were

right, you said we are responsible for the health and welfare of our residents. Well, yes, we are. And I say to you and this board and Mr. Liebel, stand up, and be responsible. This is a project that is not only violative of the environment, of the quality of life of every single resident, but it is against the law. I have here, 1998, a law that was passed in 1998 that says that multifamily senior housing shall be 2,500 feet away from retail. May I ask where is the retail? That's all I have to say. Thank you.
MR. GARY: Thank you. Anyone else

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wish to be heard? Pat, I just want to get something clarified.
MR. CLEARY: Sure.
MR. GARY: The comments that have been presented this evening.
MR. CLEARY: Uh-huh.
MR. GARY: There's no further action that could be taken upon those -- those statements until the hearing is closed; am I correct?
MR. CLEARY: That's correct, at the close of public hearing all comments that are delivered orally at the public hearing and also in written form by agencies and neighbors and people who have an interest in the project, then get collected, distributed to the applicant, and they respond in the FEIS.
MR. GARY: I just want to make one comment to Ms. Fanizzi. I do extend a comment on her dedication to the cause of which she pursues. And I appreciate the way that she goes about it, but I just wanted to defend the board in its action.

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The board does not have the right to regulate nor to deny an applicant to -- right to utilize any piece of property that he has, unless as you so stated it has an impact, whether it's tremendous or small upon the community in which you resided in. The board will decide after all consideration has been made on the public hearing, whether the project is in whole or in part has any kind of major impact upon that area. The hospital is expanding and building, and to that I say that's a good thing, because we all will, sooner or later, have need of it one way or the other. I don't think that would be critical of the expansion of the hospital. But I do understand your criticism of anything else that goes on. But I have to say that the board cannot act in any kind of derogatory manner against any applicant who is pursuing to the use of his land, as

long as the impact, and that's what where we are now, is not sufficient to deny.
Anybody else have anything they want

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to say?
MR. MALLEGOL: I think we seen in, especially some recent projects, we've taken some very hard lines with regard to the impact to neighbors, one being up near Hill and Dale Country Club, that neighborhood we took a hard line regarding roads, those buildings, and I think that kind of represents the kind of line we've taken, taking a good hard look and looking out for the impacts, things like that. I think that Ann's comments are very well taken and very, they're very well stated and (inaudible).
MR. GARY: Anyone else? Do I hear a motion on the hearing?
MR. MALLEGOL: As no further comments coming from the public, close the public hearing.
MR. GARY: Do I have a second? Yes.
MS. FANIZZI: I just wanted to request that the board -- oh.
MS. KOUNINE: You have to use the microphone.

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MS. FANIZZI: Yes, thank you. I just wanted to request of the board that we be given ten days in order to give written comments.
MR. GARY: Absolutely.
MS. FANIZZI: Thank you very much.
MR. CLEARY: Mr. Chairman, you can set that written comment period for anytime you chose. I think ten days might be a little short, I think you my want to extend that perhaps up to 30 days.
MS. FANIZZI: Excuse me, yeah, thank you very much, that would be -- that would be good.
MR. GARY: Unless you only want five or ten days.
MS. FANIZZI: That would be good.
MR. GARY: The board, inasmuch as we're closing the hearing, do you wish to set the time period 30 days for response?
MR. MALLEGOL: Make a motion to extend the period to 30 days for response.
MR. GARY: All in favor?

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(Board in favor.)

MR. GARY: Now, we have a public hearing on the site plan. This is open public hearing on the site plan. Did we close the hearing?

MR. CLEARY: Well, I'm going to say you have to specify. So I think if you want to close that public hearing, I would make a separate motion, just to be clear on it.

MR. MALLEGOL: Move to close the public hearing clear.

MR. GREENWOOD: Second.

MR. CLEARY: Just to be clear.

MR. GARY: Second by Carl. Can I ask you a question: Did you write it down that I closed the public hearing?

MS. MOORE: I'm a little confused which hearing.

MR. CLEARY: I heard public hearing.

MR. GARY: We closed it; did we not?

MS. MOORE: Yes, you did.

MR. CLEARY: You voted on it?

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MR. GARY: We voted on it. I would -- I would appreciate if all you would pay attention. It's closed, everyone understand.

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C E R T I F I C A T E

I, Michael McAliney, a Court Reporter and Notary Public of the State of New York, do hereby certify that the transcript of the foregoing proceedings, taken at the time and place aforesaid, is a true and correct transcription of my shorthand notes.

____

Michael McAliney
Court Reporter

Appendix D

STORMWATER POLLUTION PREVENTION PLAN

INSITE
ENGINEERING, SURVEYING &
LANDSCAPE ARCHITECTURE, P.C.

STORMWATER POLLUTION PREVENTION PLAN

For

The Putnam Community Foundation
Stoneleigh Avenue Senior Housing
Town of Carmel, New York

August 8, 2008

NOTE: This report, in conjunction with the project plans, makes up the complete Stormwater Pollution Prevention Plan.

Prepared by:
Insite Engineering, Surveying & Landscape Architecture, P.C.
3 Garrett Place
Carmel, New York 10512

CONTENTS

1.0 INTRODUCTION

1.1 Project Description

The project is proposed on two parcels of land located along Stoneleigh Avenue in the Town of Carmel, New York. The first parcel is the Putnam Community Foundations (PCF) 35.2 ± acre parcel of vacant land designated as Town of Carmel Tax Map Parcel #66.-2-58. The second parcel is a 43.2 ± acre parcel of land containing the existing Putnam Hospital Center (PHC). The hospital parcel is designated as Town of Carmel Tax Map Parcel #66.-2-57. The subject parcels are located in the R (residential) zoning district. The parcels and their surroundings are delineated on Figure 1. It is proposed to create 120 single bedroom senior housing units on the PCF parcel. It is proposed to create an access driveway on the hospital lot to provide access to both the hospital and the proposed senior housing development.

There are no known enforcement actions, including lawsuits or administrative proceedings, commenced against the applicant, or any principle affiliate of the applicant, for any alleged violations of law related to the applicant of the site, in the five years preceding this application.

The following permits are required for the subject project.

Agency	Approval Required	Status
Town of Carmel Planning Board	Site Plan - Special Exception Use Permit	Under Review
New York City Department of Environmental Protection	Stormwater Pollution Prevention Plan & Sewer Connection	Pending
New York State Department of Environmental Conservation	Stormwater SPDES GP-0-08-001	NOI to be filed and coverage obtained prior to start of work
Town of Carmel Building Department	Individual Building Permits	To be filed on an individual basis
County of Putnam Department of Highways and Facilities	Highway Work Permit	To be filed
Putnam County Health Department	Sewer and water	To be filed

1.2 Existing Conditions

The PCF parcel is characterized by a ridgeline with a high point elevation of approximately 516 near the southeast corner. This ridgeline intersects the property along the north south axis. The approximately 7.6 acres to the east of the ridge drains to the northeast to the Croton Falls Reservoir. Approximately 28.7 acres to the west of the ridge drains to the west under Stoneleigh Avenue also discharging to the Croton Falls Reservoir. Steep slopes comprise the western third of the property with a low point elevation of approximately 330 at the northwest corner. A NYCDEP intermittent watercourse conveys water down the western slope to a culvert under Stoneleigh Avenue to the Croton Falls Reservoir. The portions of the intermittent watercourse that are within 500’ of the Croton Falls Reservoir are considered a reservoir stem requiring a 300’ buffer to any impervious surface. The watercourse and buffer are shown on Figures 2 & 3. According to the *Soil Survey of Putnam and Westchester Counties, New York* prepared by The United States Department of Agriculture, the soils onsite consist of Paxton fine sandy loams (PnB, PnC, and PnD), and Charlton loam (ChE). The Paxton loam is in hydrologic group C, the Charlton loam is in hydrologic group B both are generally deep and well drained.

The Putnam Hospital Center parcel is characterized by a gently sloping knoll in the center of the site with relatively steep slopes along the fringes of the eastern, southern, and western boundaries. The ridge along the knoll causes drainage to flow in easterly and westerly directions. The property varies in elevation from approximate elevation 334 at the northeast corner of the parcel to a high point of approximate elevation 444 along the central southern boundary. The majority of development on the subject parcel is located in the southern and central portions. The property currently contains a community hospital and medical offices, related accessory buildings and structures, an access road and surface parking areas. Soils onsite consist of Paxton fine sandy loams (PnB, PnB, and PnD), Woodbridge loam (WdB), and Urban land (Uf) in the developed area. The Paxton and Woodbridge loams are in hydrologic group C and are generally deep and well drained.

Existing stormwater management facilities on the PHC parcel consist of a collection system composed of concrete catch basins and HDPE pipe, and four stormwater management ponds. Three ponds are situated on the west side of the site and collect runoff from the western and southern parking areas. These ponds discharge to a stormwater collection system in Stoneleigh Avenue. The other stormwater pond is located on the east side of the site and collects runoff from the northern parking area. This pond discharges to a channel which carries the runoff to the Croton Falls Reservoir. Runoff from the eastern parking areas is untreated and generally flows overland to the east, and off the site towards the reservoir.

1.3 Proposed Conditions

It is proposed to build 120 single bedroom senior housing units on the PCF parcel. The project will also add a sports court, community building, and parking. An access driveway and additional hospital parking is proposed on the Putnam Hospital Center parcel. The access driveway will provide access to both the proposed senior housing development and existing hospital and serve as the ambulance entrance for the hospital. Two treatment trains consisting of two stormwater practices (a P-1 micropool extended detention pond discharging to a dry extended detention pond) are proposed for the northeast and southeast corners of the senior housing development to treat the stormwater from runoff from the proposed housing area. Stormwater runoff from the development will also pass through grass swales to further enhance pollutant removal.

The proposed construction of the access road and hospital parking will result in the reconfiguration of the three existing stormwater ponds on the southwest portion of the Putnam Hospital Center parcel. The oldest pond is proposed to be relocated. This pond was originally, designed in 1999 and approved by the NYCDEP. The relocated pond will have essentially the same contributing area and will provide the same treatment volume as the previously approved design. The proposed action will result in the enlargement of the two other ponds. These ponds were originally designed in 2006 as a NYSDEC P-1 micropool extended detention basin and a NYCDEP extended detention basin. The ponds were approved by NYSDEC under GP-02-01 and by the NYCDEP. The contributing area to the two ponds will be increased by the proposed development. It is proposed to expand these two existing ponds to provide treatment and attenuation for the additional stormwater runoff from the proposed parking and access driveway.

The development of the two parcels will alter the local hydrology on the site somewhat, directing slightly more contributing area to the west than in the existing condition. Refer to Figures 2 and 3 at the end of this report for more details. Both the east and west sides of the site drain however to the Croton Falls Reservoir, meaning that the overall area draining to the reservoir will remain unchanged.

2.0 STORMWATER MANAGEMENT

The proposed project will require coverage under the New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit No. GP-0-08-001. In order to meet the requirements set forth by this permit, the latest edition of the NYSDEC *New York State Stormwater Design Manual* (NYSSDM) was referenced for the design of the proposed stormwater management system. As the project is located within a TMDL Phosphorus Watershed (NYCDEP East of Hudson) the latest version of Chapter 10 – Enhanced Phosphorus Removal Standards was followed.

As the site is proposed to disturb more than two acres, approval of the Stormwater Pollution Prevention Plan is required by the New York City Department of Environmental Protection (NYCDEP). To meet NYCDEP requirements, the stormwater management system has been designed to meet the requirements set forth in Section 18-39 of the *Rules and Regulations for the Protection from Contamination, Degradation, and Pollution of the New York City Water Supply and Its Sources*.

“HydroCAD” by HydroCAD Software Solutions LLC of Tamworth, New Hampshire was used to model and assess the stormwater flows for the subject project. HydroCAD is a computer-aided design program for modeling the hydrology and hydraulics of stormwater runoff. It is based primarily on hydrology techniques developed by the United States Department of Agriculture, Soil Conservation Service (USDA, SCS) TR-20 method combined with standard hydraulic calculations. The program was used to analyze the 1-year, 2-year, 10-year, 25-year and 100-year, 24-hour design storms. Peak flows were calculated for both the pre-development condition and the post-development condition. The input requirements for the HydroCAD computer program are as follows:

Subcatchments (contributing watershed/sub-watersheds)

- Design storm rainfall in inches
- CN (runoff curve number) values which are based on soil type and land use/ground cover
- Tc (time of concentration) flow path information

Stormwater Practices

- Surface area at appropriate elevations
- Flood elevation
- Outlet structure information

For detailed information for each subcatchment and practice, see Appendices A & B.

The precipitation values for the various design storms analyzed were obtained from the local County Soil and Water Conservation District office. The values provided are for 24-hour design storms in Putnam County.

Design Storm	24-Hour Rainfall
1-Year	2.7”
2-Year	3.5”
10-Year	5.0”
25-Year	6.0”
100-Year	7.5”

The CN (runoff curve number) values utilized in this report were referenced from the USDA, SCS publication *Urban Hydrology for Small Watersheds*. The following is a summary of the various land uses/ground covers and their associated CN values utilized in this report.

Land Use/Ground Cover	CN Value
Brush, Good, HSG C	65
Woods, Good, HSG B	55
Woods, Good, HSG C	70
>75% Grass cover, Good, HSG C	74
50-75% Grass cover, Fair, HSG C	79
1/8 acre lots, 65% imp, HSG C	90
Paved Parking and roofs	98

The existing and proposed drainage areas analyzed are depicted in Figures 2 and 3.

2.1 NYSDEC Water Quality Volume, WQ_v

The water quality volume (WQ_v) is intended to improve water quality by sizing the stormwater management practices to fully capture and treat a specified quantity of water. Chapter 10 of the NYSSDM specifies that the WQ_v in a Phosphorus TMDL watershed shall be the estimated run off from the 1-year 24-hour design storm. Stormwater ponds 1.1P, 2.1P, and 3.1P are proposed as P-1 micropool extended detention basins to meet the NYSDEC WQ_v treatment requirements. For a P-1 micropool design to meet the NYSSDM Chapter 10 requirements, it is required to hold 50% of the WQ_v within its permanent pool.

The treatment of the WQ_v for the lower portion of the access road will be accomplished by passing the 1-year, 24-hour Design Storm through a Stormfilter by Contech. The Stormfilter is on the New York State Verified Proprietary Stormwater Management Practices list released May 2007 and found at http://www.dec.ny.gov/chemical/29089.html. Per the list the Stormfilter with ZPG media is verified for new development. The peak flow for the 1-year 24-hour design rainfall for the contributing area to the Stormfilter is 0.61 cfs. The Specified Stormfilter with 37 cartridges is capable of filtering 0.62 cfs. Peak discharge and Stormfilter sizing calculations can be found in appendix G. Deep sump catch basins are proposed as pretreatment for the unit. By passing the water quality rainfall through a verified technology sized to treat the water quality rainfall it is assumed that the water quality objectives of the NYSDEC have been met.

WATER QUALITY VOLUME (WQ_v) CALCULATION SUMMARY

Pond Providing Treatment	NYSDEC Practice Designation	Minimum % WQ_v Required in Permanent Pool	WQ_v (cf)	Volume of Permanent Pool (cf)	% WQ_v Provided in Permanent Pool
1.1P	P-1	50%	30,500	15,480	51%
2.1P	P-1	50%	37,500	26,000	69%
3.1P	P-1	50%	39,300	26,700	68%

As shown in the tables above the necessary permanent pool volumes within the NYSDEC stormwater practices have been provided. For details of the calculated stormwater runoff for the 1-year 24-hour design storm and the volumes held in the permanent pools of the proposed stormwater ponds see Appendix B. It is assumed that by meeting the water quality volume requirements through employment of P-1 ponds, the water quality objectives of the NYSDEC have been met for the subject project.

2.2 NYCDEP Water Quality Requirement

To meet the requirements of the NYCDEP, pollutant runoff amounts were analyzed for both the Pre Development and Post Development conditions. The pollutant loading coefficient method was utilized to calculate the annual export of Biological Oxygen Demand (BOD), Total Phosphorus (TP), Total Nitrogen (TN), and Total Suspended Solids (TSS). The publication *Fundamentals of Urban Runoff Management: Technical and Institutional Issues* produced by the Terrene Institute was referenced to determine the appropriate loading rates for TP, TN, and TSS. The New York State Department of Environmental Conservation (NYSDEC) publication *Reducing the Impacts of Stormwater Runoff from New Development* (*Impacts*) was referenced to determine appropriate loading rates for BOD. The appropriate loading rates were then utilized to calculate the annual pollutant export values. Variables involved with this calculation include soil type and land use/ground cover characteristics.

The following table summarizes the pollutant loading rates utilized for the subject project.

SUMMARY OF POLLUTANT LOADING RATES (LBS/ACRE/YEAR)

Land Use/Ground Cover	BOD	TP	TN	TSS
Woods	6.0	0.10	1.8	77
Grass	6.0	0.12	3.7	308
Pavement	111.0	0.98	2.1	446
Multifamily Residential	50.0	0.63	5.0	395

Stormwater ponds and grass swales will be used to treat stormwater runoff from the proposed project. A low flow outlet and broad crested weir have been sized to provide 24-hour plug-flow detention of the 2-year, 24-hour storm over 24 hours or more as required by the NYCDEP. The following pollutant removal efficiencies are referenced from the publication *Reducing the Impacts of Stormwater Runoff from New Development*, prepared by the NYSDEC.

LONG TERM POLLUTANT REMOVAL EFFICIENCIES

Treatment Method	BOD	TP	TN	TSS
Design 2 Extended Detention Pond (Micropool Extended Detention Pond P-1)	40%-60%	40%-60%	20%-40%	80%-100%
Design 14 Grassed Swale	20%-40%	20%-40%	20%-40%	20%-40%
StormFilter	40%	40%*	40%	80%*

*Pollutant removal efficiencies are based on those of the F-4 organic filter in the NYSDEC Stormwater Management Design Manual

The following table summarizes the estimated pre-development and post-development annual pollutant loads to the Croton Falls Reservoir (calculated in Appendix C) calculated for the subject project. Note that the pollutant loads from subcatchment 1.3S and Pond 1.3P are taken from original design.

ANNUAL POLLUTANT SUMMARY

	Annual Loads (lb/yr)			
	BOD	**TP**	**TN**	**TSS**
Total Pollutants Pre-Development	503.0 to 468.5	6.03 to 5.70	101.6 to 99.3	3778 to 3712
Mean	485.8	5.87	100.5	3745
Total Pollutants Post-Development	634.3 to 444.8	6.87 to 4.78	109.3 to 83.7	2945 to 2570
Mean	539.6	5.82	96.5	2757

As seen in the above summary the post-development mean pollutant loads are comparable to the pre-development loads as required by the NYCDEP regulations.

With respect to phosphorous, which is the pollutant of concern in the subject TMDL watershed, the SWPPP for the project is expected to achieve better than the calculated mean removal efficiencies due to adjunct stormwater treatment practices that have been incorporated into the project design, but not considered in the stormwater treatment calculations. These adjuncts include catch basin/drain inlet sumps, turf filter strips, forested filter strips, and rain gardens. Based on the proposed SWPPP the applicant believes the project will not impact the Town of Carmel's ability to achieve the established TMDL, and the SWPPP does propose stormwater measures to reduce phosphorous loading to the maximum extent practicable.

The burden for reducing current phosphorous loading to achieve the TMDL presently lies with the Town of Carmel and its regional partners. The program for phosphorous reduction has been established in the NYSDEC draft document entitled *New York City Watershed Croton Reservoir System Phase II Phosphorous TMDL Nonpoint Source Implementation Plan* (TMDL Implementation Plan). This plan clearly states that for simplicity and ease of local government administration the plan is largely structured to use existing programs to achieve phosphorous reductions. These programs include:

- NYSDEC SPDES General Permit for Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s) Permit No. GP-0-08-02.
- Putnam and Westchester County "Croton Plans".
- NYCDEP "Croton Strategy".

- NYCDEP EOH Water Quality Investment Funds, including the Putnam County Septic Repair Program.

The subject project is consistent with the TMDL Implementation Plan and applicable portions of the above-cited programs.

Based on the fact that the applicant's analysis indicates a mean reduction in post development phosphorous, and the project's consistency with the TMDL Implementation Plan, it is clear that the project will not have any reservoir basin wide impacts, and the project will not impact the Town of Carmel's ability to achieve the TMDL.

2.3 NYSDEC Stream Channel Protection Volume, CP_v

To meet the Stream Channel Protection (Cp_v) requirements of the NYSDEC 24 hours of center of mass detention for the 1-Year, 24-hour design storm has been provided in each of the proposed treatment trains. The following table summarizes the center of mass detention times of each treatment train prior to discharging out of the stormwater management system.

CENTER OF MASS DETENTION TIME (MIN) FOR 1-YEAR, 24 HOUR DESIGN STORM

Treatment Train	Center of Mass Time IN to Treatment Train (Min)	Center of Mass Time OUT of Treatment Train (Min)	Total Center of Mass Detention (Min)
1.1P – 1.2P	818.9	2,913.7	2,094.8
2.1P – 2.2P	843.4	3,221.7	2,378.3
3.1P – 3.2P	844.8	4,181.0	3,336.2

The data for the table above was taken from Appendix B of this SWPPP. As shown in the table above a minimum of 24 hours or 1,440 minutes has been provided within each treatment train prior to discharge from the site. By providing 24 hours of detention of the center of mass for the 1-Year, 24-hour design storm the NYSDEC requirements for Stream Channel Protection (Cp_v) have been met.

2.4 NYSDEC Overbank Flood Control, Q_p, and Extreme Flood Control, Q_f

Two Design Lines and Three Design Points were chosen to quantitatively analyze the stormwater runoff from the proposed development. Design Point 1 includes the areas contributing to the three existing stormwater basins and the areas above and below the proposed access drive that contribute to a catch basin that conveys stormwater runoff under Stoneleigh Avenue. Design Point 2 is the first catch basin in Stoneleigh Avenue to the north of the property line between the two subject parcels. Design Point 3 is the entrance to a culvert that conveys water under Stoneleigh Avenue along the western border of the PCF property. Design line 4 is along Stoneleigh Avenue near the southwest corner of the PCF property. Design Line 5 is along the eastern boarder of the two subject parcels. The Design Line and Design Points and their contributing areas are delineated on Figures 2 & 3.

The NYSDEC Overbank Flood Control ($Q_{p)}$) requirement is intended to prevent an increase in the frequency and magnitude of out-of-bank flooding events generated by urban development. Overbank control requires storage to attenuate the post-development 10-year, 24-hour peak discharge to pre-development rates. The Extreme Flood Control (Q_p) requirement is intended to (a) prevent the increased risk of flood damage from large storm events, (b) maintain the boundaries of the pre-development 100-year flood plain, and (c) protect the physical integrity of stormwater management practices. Extreme flood control requires storage to attenuate the post-development 100-year, 24-hour peak discharge to pre-development rates. The dry extended detention basins have been sized to meet both of these requirements (see Appendix B). The table at the end of section 2.5 below provides a comparison of existing and proposed peak flows.

2.5 NYCDEP Quantity Requirements

As required per the NYCDEP, the attenuation of peak flows from the 2-year, 10-year, 25-year, and 100-year storms to pre-development levels is accomplished with the P-1 micropool extended detention and the dry extended detention basins. Table 2.5 below summarizes the pre and post development peak flows expected for the proposed project.

PEAK FLOW SUMMARY (C.F.S.)

24-HOUR DESIGN STORM								
	2-YEAR		10-YEAR (Overbank Flood Control)		25-YEAR		100-YEAR (Extreme Flood Control)	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Design Point 1	2.75	2.48	5.63	4.91	10.28	10.27	25.90	23.40
Design Point 2	7.19	4.91	15.47	10.52	21.60	14.66	31.32	27.66
Design Point 3	4.02	2.57	8.66	5.67	12.09	9.82	17.53	16.93
Design Line 4	10.13	6.16	22.40	13.62	31.56	19.19	46.28	28.14
Design Line 5	5.73	2.62	12.32	5.31	17.25	7.25	25.01	10.28

As seen by the above summary, the post-development peak flows for the 2-year, 10-year, 25-year, and 100-year design storms have been attenuated to rates less than the pre-development peak flows to meet the requirements of the NYSDEC (10-year and 100-year) and the NYCDEP (2-year, 10-year, 25-year, and 100-year). For detailed information see Appendix B.

3.0 STORMWATER CONVEYANCE SYSTEM

The stormwater collection and conveyance systems for the project will consist of drain inlets, catch basins, and HDPE pipe. The systems will be sized to collect and convey at minimum the 10-year, 1-hour design storm using the Rational Method. The Rational Method is a standard method used by engineers to develop flow rates for sizing collection systems. The Rational Method calculates flows based on a one-hour design storm.

4.0 EROSION AND SEDIMENT CONTROL

Erosion and sediment control should be accomplished by four basic principles: diversion of clean water, containment of sediment, treatment of dirty water, and stabilization of disturbed areas. Diversion of clean water should be accomplished with swales. This diverted water should be safely conveyed around the construction area as necessary and discharged downstream of the disturbed areas. Sediment should be contained with the use of silt fence at the toe of disturbed slopes and excavation of temporary sediment basins. Disturbed areas should be permanently stabilized within 14 days of final grading to limit the required length of time that the temporary facilities must be utilized. The Putnam Community Foundation (PCF) will be responsible for the maintenance of the temporary erosion control facilities.

4.1 Temporary Erosion and Sediment Control Facilities

Temporary erosion and sediment control facilities should be installed and maintained as required to reduce the impacts to off-site properties. PCF will be required to provide maintenance for the temporary erosion and sediment control facilities. In general, the following temporary methods and materials should be used to control erosion and sedimentation from the project site:

- Stabilized Construction Entrance
- Silt Fence Barriers
- Storm Drain Inlet Protection
- Sediment Basins

A stabilized construction entrance should be installed at the entrance to the site and construction areas as shown on the plan. The design drawings include details to guide the contractor in the construction of this entrance. The intent of the stabilized construction entrance is to prevent the "tracking" of soil from the site. Dust control should be accomplished with water sprinkling trucks if required. During dry periods, sprinkler trucks should wet all exposed earth surfaces as required to prevent the transport of air-borne particles to adjoining areas.

Silt fence constructed of geosynthetic filter cloth should be installed liberally at the toe of all disturbed slopes. The intent of this fence is to contain silt and sediment at the source and inhibit its transport by stormwater runoff. The siltation barriers will also help reduce the rate of runoff by creating filters through which the stormwater must pass. Inlet protection should also be installed around catch basins and drain inlets. The intent of these barriers is to prevent silt and sedimentation from entering the stormwater collection system.

The proposed stormwater ponds will also act as temporary sediment basins during construction of the proposed road and utilities. Most stormwater runoff from disturbed areas will be directed to the sediment basins. These basins have been sized in accordance with the publication, *New York State Standards and Specifications for Erosion and Sediment Control* printed by the Empire State Chapter Soil and Water Conservation Society. See Appendix F for details.

A list of dewatering equipment to be kept at the site in the event that dewatering becomes necessary will be provided on the plan. The contractor should notify the engineer if dewatering is necessary to choose a suitable location and method to discharge the water.

4.2 Permanent Erosion and Sediment Control Facilities

Permanent erosion and sediment control is proposed to be accomplished by diverting stormwater runoff from steep slopes, controlling/reducing stormwater runoff velocities and volumes, and vegetative and structural surface stabilization. All of the permanent facilities are relatively maintenance free and only require periodic inspections. PCF will provide maintenance for all the permanent erosion and sediment control facilities.

The temporary sediment basins should be cleaned of all sediment and debris, excavated to their final elevations and dimensions, and stabilized with the vegetation as indicated on the plans. Rip rap aprons will be used at the discharge end of all piped drainage systems. Runoff velocities will be reduced to levels that are non-erosive to the receiving water bodies through use of these aprons.

Other than the buildings and paved surfaces, the primary method for permanently stabilizing disturbed surfaces at the subject site is with vegetation. The vegetation will control stormwater runoff by preventing soil erosion, reducing runoff volume and velocities, and providing a filter medium. Permanent seeding should optimally be undertaken in the spring from March 21st through May 20thand in late summer from August 15th to October 15th. The stormwater basins will allow for settlement of suspended sediment that is generated by stormwater runoff from the site. These facilities provide a central collection area for sediment deposition and eventual disposal.

5.0 IMPLEMENTATION AND MAINTENANCE

5.1 Construction Phase

Details associated with the implementation and maintenance of the proposed stormwater facilities and erosion control measures during construction are shown on the project plans. A construction sequence will be provided to guide the contractor in the installation of the erosion control measures as well as the site plan features. The erosion control plan includes associated details and notes to aid the contractor in implementing the plan.

During construction a Site Log Book, Appendix E, is required to be kept per NYSDEC SPDES General Permit. Erosion and sediment control inspections are required to be conducted as necessary under coverage of the permit (minimum once a week) and an updated logbook is required to be kept on site for the duration of the construction activities. The Construction Site Log Book is an appendix taken from the *New York State Standards and Specifications for Erosion and Sediment Control* (Blue Book).

The stormwater basins have limited routine maintenance requirements. Initially the basins should receive regular maintenance until the permanent vegetation is established. Vegetation should be inspected every 30 days and after every major storm event until established, after which inspections should take place on a quarterly basis and after every large storm event. Damaged areas should be immediately re-seeded and re-mulched. The floor of the basins (excluding permanent pool areas) should be planted with a seed mixture that contains plants that are tolerant of occasional flooding. The seed mixtures contain several plant species that vary slightly in their needs for survival. It is expected that not all of the species will survive within each basin due to variations within each basin such as water, nutrients, and light. During the initial year of planting, the plants may require watering to germinate and become established. Note that several seedings may be required during the first year to completely establish vegetation within the basins. After the initial year of establishment, the basins do not need to be fertilized or watered. A natural selection process will occur over the first few years, such that the species within the seed mixture most suitable to the conditions will survive.

5.2 Long Term Maintenance Plan

The Putnam Community Foundation will be responsible for the maintenance of the permanent erosion control and stormwater facilities. Initially the stormwater facilities should have an increased maintenance and inspection schedule until all portions of the site are stable. Each spring the paved areas should be cleaned to remove the winter's accumulation of traction sand. After this is completed, all drain inlets sumps should be cleaned. All pipes should be checked for debris and blockages and cleaned as required. During the cleaning process, the drain inlets and pipes should be inspected for structural integrity and overall condition; repairs and/or replacement will be made as required.

Once the desired vegetative cover is established in the basins, only limited maintenance is required. The basins and outlet structures should be inspected after major storm events and semi-annually. During the inspections, the following should be checked:

- Evidence of clogging of outlet structure.
- Erosion of the flow path through the detention basin.
- Subsidence, erosion, cracking or tree growth on the embankment/berm.
- Condition of the emergency spillway.
- Accumulation of sediment around the outlet structure.
- Adequacy of upstream/downstream channel erosion control measures.
- Erosion of the basin bed and banks.
- Sources of erosion in the contributory drainage, which should be stabilized.

The grass swales, graded basin accesses, and the side slopes and berms of the basins should be mowed annually to prevent the establishment of woody plants within the swales, accesses, or basin berms. The bottoms of the basins should not be mowed. During the mowing operations, debris and litter should be removed from all parts of the swales, accesses, and basins. Accumulated sediment will need to be removed from the swales and basins approximately every 10 to 20 years, or when 50 percent of their capacity has been reached.

APPENDIX A
Pre-Development Computer Data

Summary for Subcatchment 1.1S:

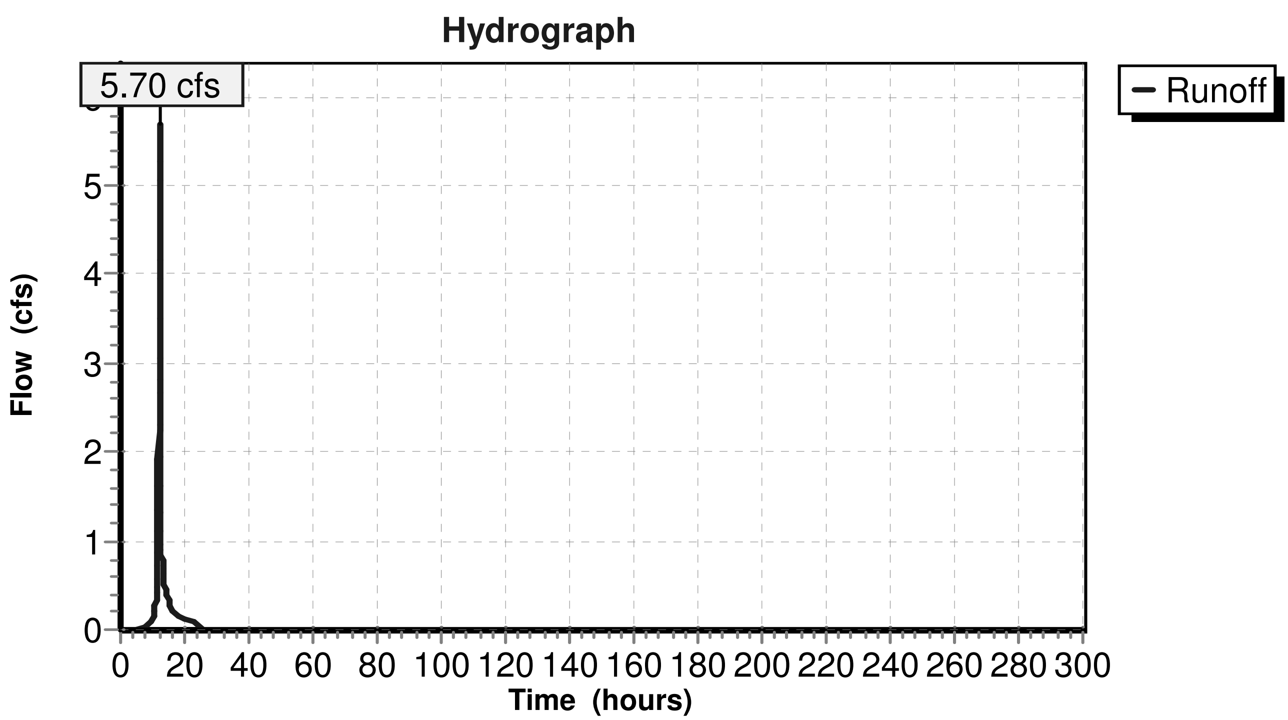
Runoff = 5.70 cfs @ 12.15 hrs, Volume= 0.473 af, Depth= 2.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
1.500	98	Paved parking & roofs
0.700	70	Woods, Good, HSG C
0.400	74	>75% Grass cover, Good, HSG C
2.600	87	Weighted Average
1.100		Pervious Area
1.500		Impervious Area

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

Subcatchment 1.1S:



Summary for Subcatchment 1.2S:

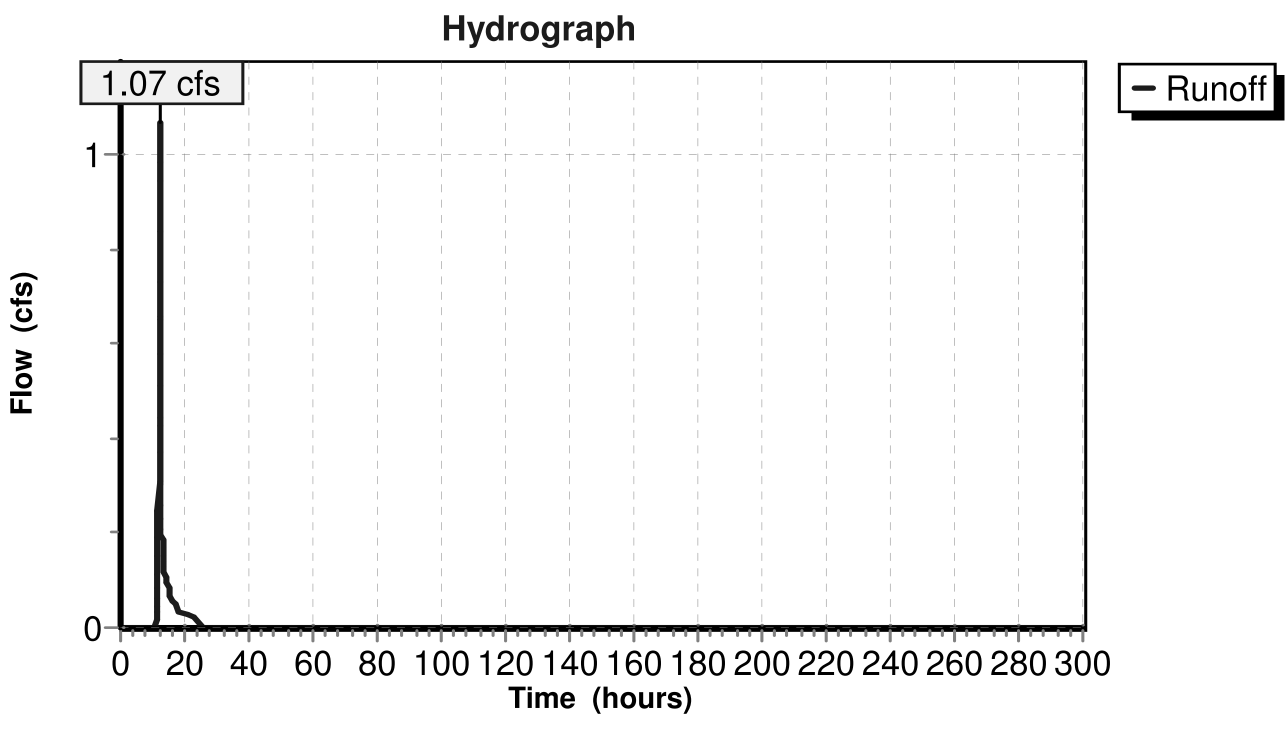
Runoff = 1.07 cfs @ 12.15 hrs, Volume= 0.093 af, Depth= 1.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
0.500	74	>75% Grass cover, Good, HSG C
0.500	70	Woods, Good, HSG C
1.000	72	Weighted Average
1.000		Pervious Area

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

Subcatchment 1.2S:



Summary for Subcatchment 1.3S:

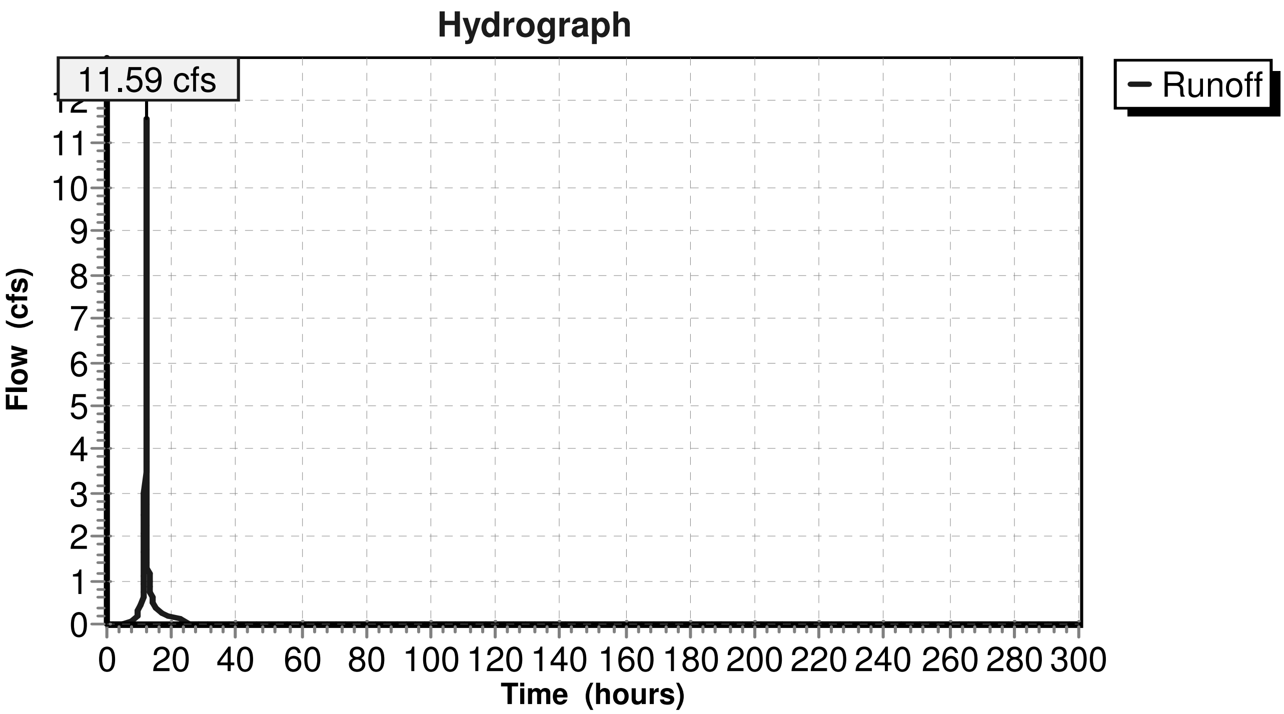
Runoff = 11.59 cfs @ 12.04 hrs, Volume= 0.771 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
0.660	79	50-75% Grass cover, Fair, HSG C
0.370	65	Brush, Good, HSG C
2.610	98	Paved parking & roofs
3.640	91	Weighted Average
1.030		Pervious Area
2.610		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.50"
0.2	60	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	305	0.0370	10.97	13.46	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	130	0.0920	17.30	21.23	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	60	0.0650	14.54	17.84	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
2.2	655	Total			

Subcatchment 1.3S:



Summary for Subcatchment 1.4S:

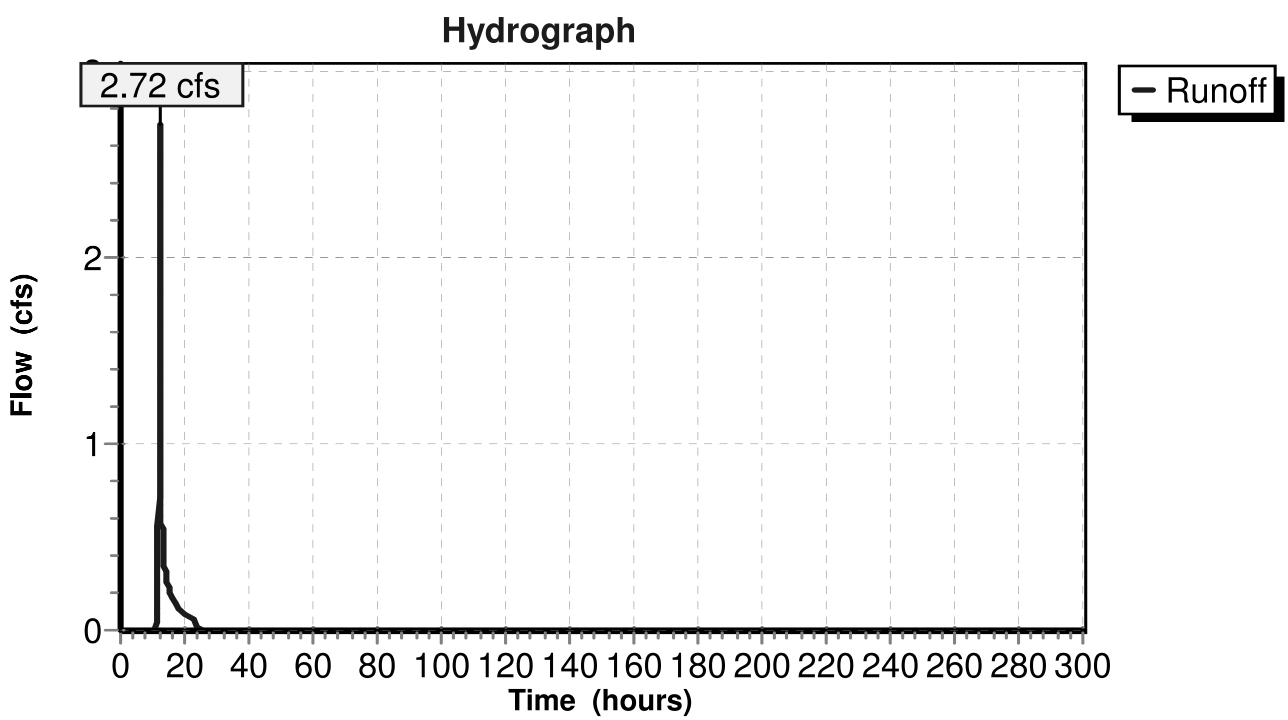
Runoff = 2.72 cfs @ 12.20 hrs, Volume= 0.262 af, Depth= 1.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
1.500	70	Woods, Good, HSG C
1.300	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking & roofs
2.800	72	Weighted Average
2.800		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.5	250	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	350	Total			

Subcatchment 1.4S:



Summary for Subcatchment 2.0S:

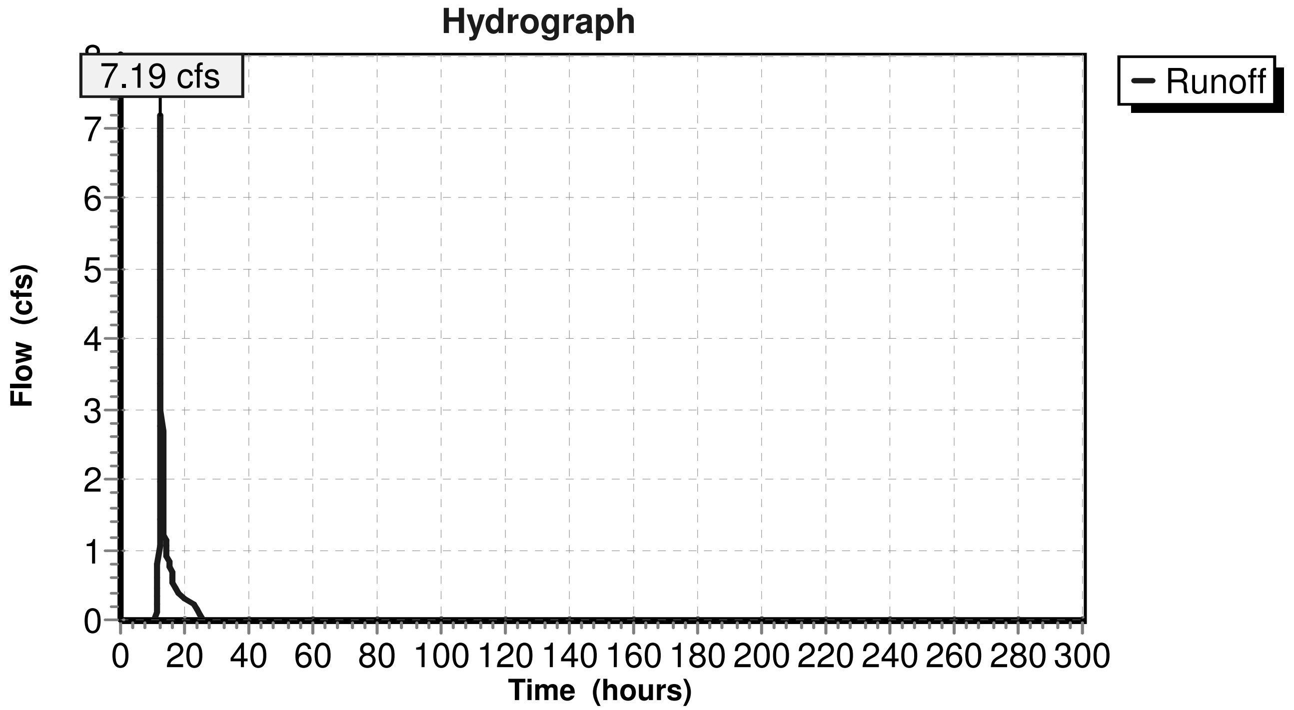
Runoff = 7.19 cfs @ 12.37 hrs, Volume= 0.890 af, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
10.600	70	Woods, Good, HSG C
10.600		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0600	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
10.6	1,100	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.8	1,200	Total			

Subcatchment 2.0S:



Summary for Subcatchment 3.0S:

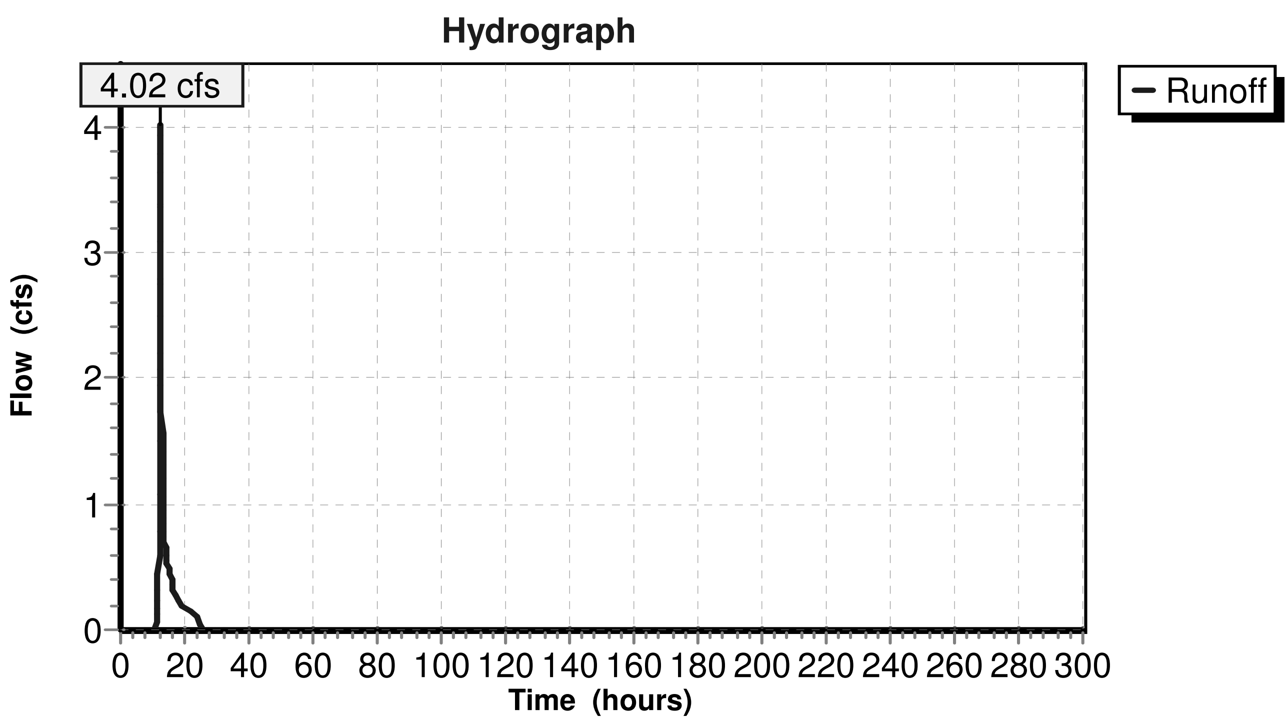
Runoff = 4.02 cfs @ 12.38 hrs, Volume= 0.504 af, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
6.000	70	Woods, Good, HSG C
6.000		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.0350	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
8.1	940	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
24.5	1,040	Total			

Subcatchment 3.0S:



Summary for Subcatchment 4.0S:

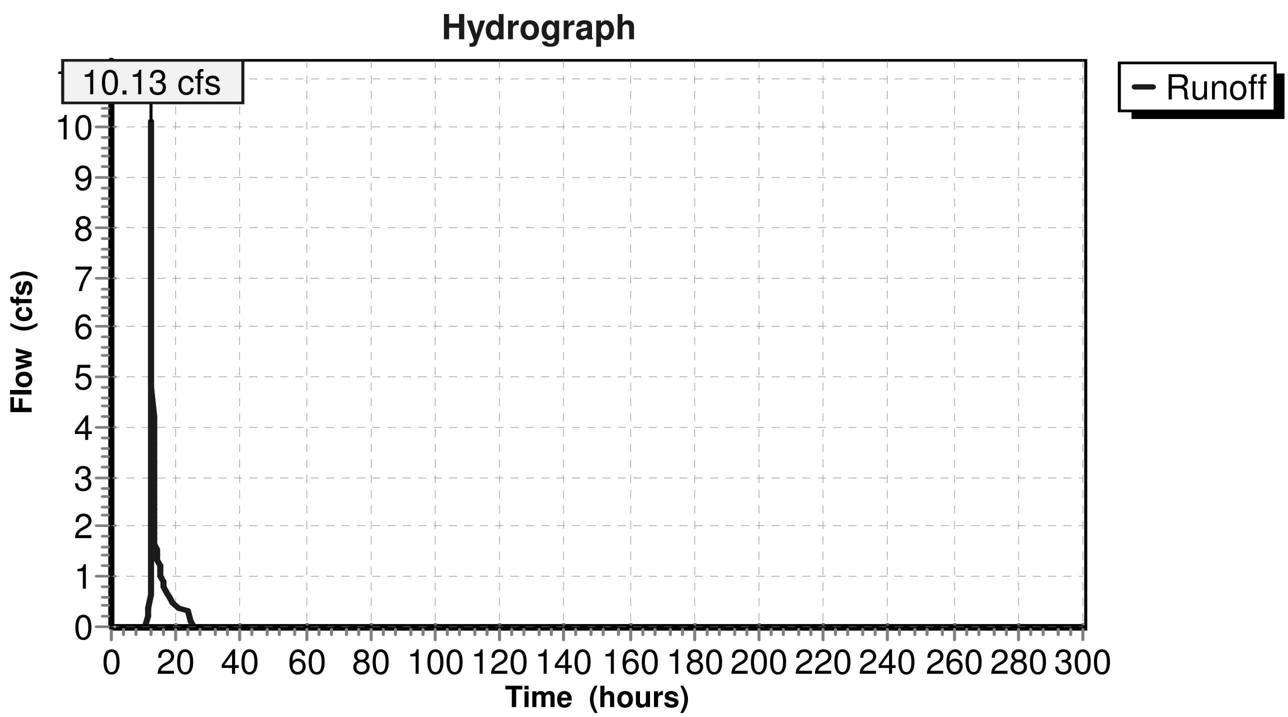
Runoff = 10.13 cfs @ 12.30 hrs, Volume= 1.177 af, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
14.100	70	Woods, Good, HSG C
0.700	55	Woods, Good, HSG B
14.800	69	Weighted Average
14.800		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
8.2	980	0.1600	2.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.5	1,080	Total			

Subcatchment 4.0S:



Summary for Subcatchment 5.0S:

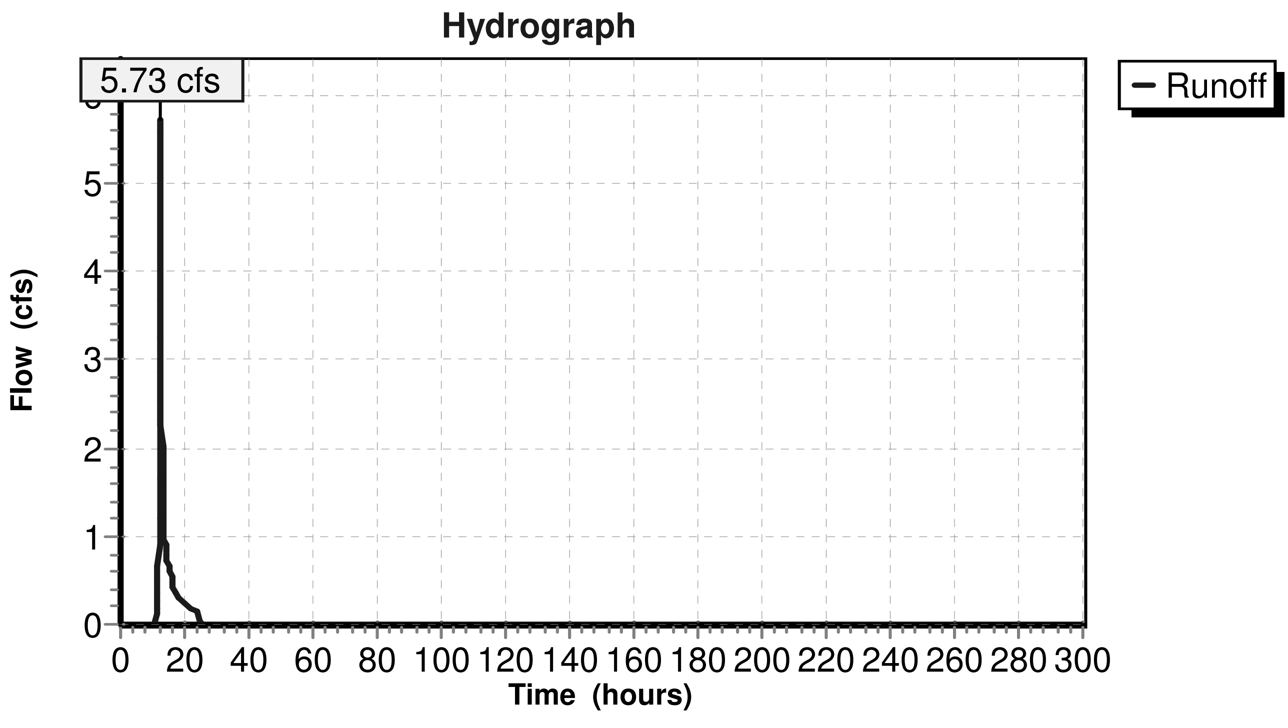
Runoff = 5.73 cfs @ 12.35 hrs, Volume= 0.697 af, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
8.300	70	Woods, Good, HSG C
8.300		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.3	140	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.8	240	Total			

Subcatchment 5.0S:

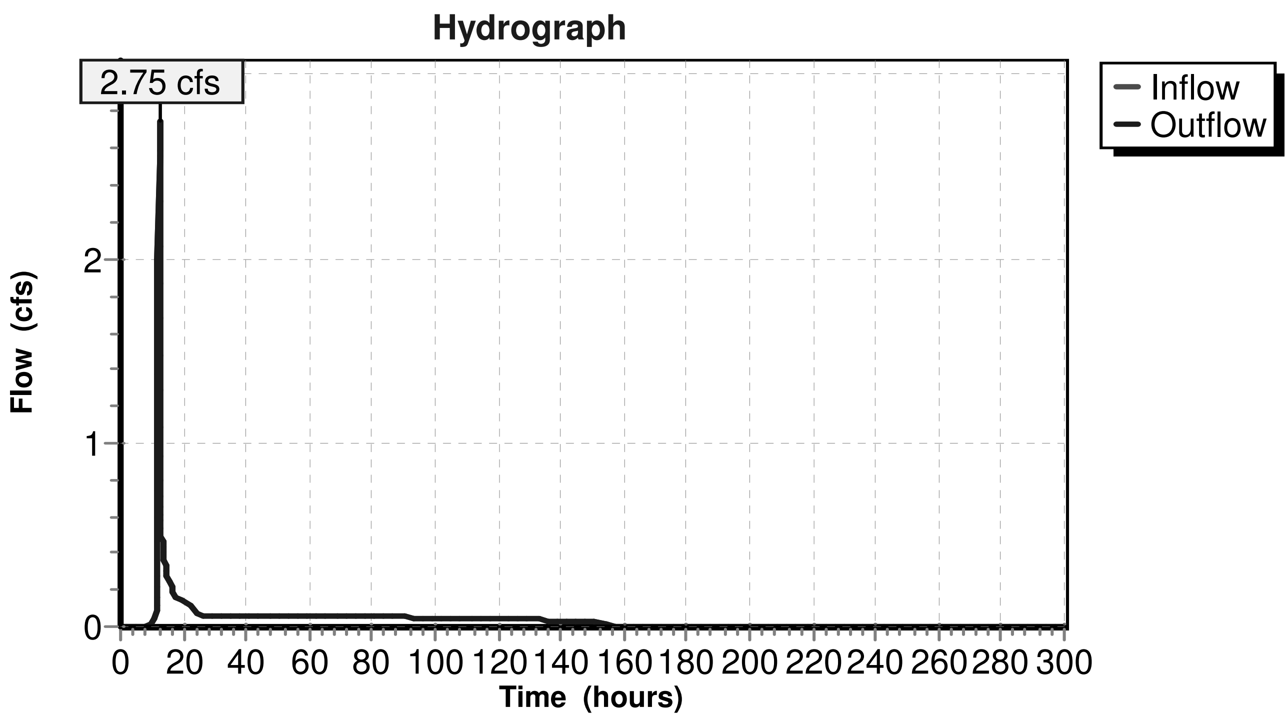


Summary for Reach DP 1:

Inflow Area = 10.040 ac, 40.94% Impervious, Inflow Depth = 0.99" for 2 year event
Inflow = 2.75 cfs @ 12.20 hrs, Volume= 0.828 af
Outflow = 2.75 cfs @ 12.20 hrs, Volume= 0.828 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

Reach DP 1:



Summary for Pond 1.1P:

Inflow Area = 2.600 ac, 57.69% Impervious, Inflow Depth = 2.18" for 2 year event
Inflow = 5.70 cfs @ 12.15 hrs, Volume= 0.473 af
Outflow = 1.27 cfs @ 12.62 hrs, Volume= 0.473 af, Atten= 78%, Lag= 28.4 min
Primary = 1.27 cfs @ 12.62 hrs, Volume= 0.473 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 403.00' Surf.Area= 2,630 sf Storage= 4,100 cf
Peak Elev= 405.20' @ 12.62 hrs Surf.Area= 6,988 sf Storage= 14,790 cf (10,690 cf above start)

Plug-Flow detention time= 1,574.3 min calculated for 0.379 af (80% of inflow)
Center-of-Mass det. time= 1,188.8 min (2,007.8 - 819.0)

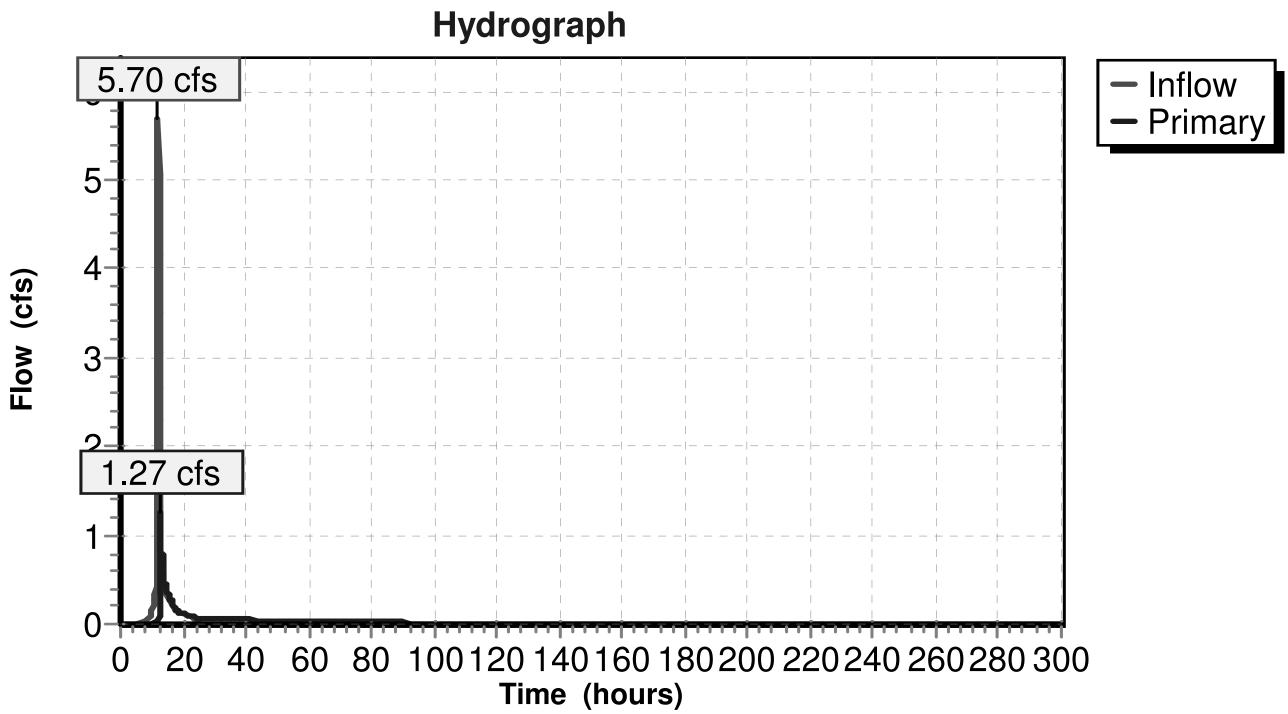
Volume	Invert	Avail.Storage	Storage Description
#1	399.00'	29,730 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
399.00	70	0	0
401.00	700	770	770
403.00	2,630	3,330	4,100
405.00	6,700	9,330	13,430
407.00	9,600	16,300	29,730

Device	Routing	Invert	Outlet Devices
#1	Device 3	403.00'	**1.2" Vert. Orifice/Grate** C= 0.600
#2	Device 3	405.00'	**5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Primary	399.00'	**15.0" x 60.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 388.00' S= 0.1833 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=1.24 cfs @ 12.62 hrs HW=405.20' (Free Discharge)
└─**3=Culvert** (Passes 1.24 cfs of 13.95 cfs potential flow)
  ├─**1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 7.06 fps)
  └─**2=Broad-Crested Rectangular Weir** (Weir Controls 1.18 cfs @ 1.20 fps)

Pond 1.1P:


Hydrograph
5.70 cfs
1.27 cfs
Inflow
Primary
Flow (cfs)
0
1
2
3
4
5
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Time (hours)

Summary for Pond 1.2P:

Inflow Area = 3.600 ac, 41.67% Impervious, Inflow Depth = 1.89" for 2 year event
Inflow = 1.59 cfs @ 12.57 hrs, Volume= 0.566 af
Outflow = 0.06 cfs @ 24.31 hrs, Volume= 0.566 af, Atten= 96%, Lag= 704.4 min
Primary = 0.06 cfs @ 24.31 hrs, Volume= 0.566 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 368.69' @ 24.31 hrs Surf.Area= 5,250 sf Storage= 12,876 cf

Plug-Flow detention time= 2,740.9 min calculated for 0.566 af (100% of inflow)
Center-of-Mass det. time= 2,740.5 min (4,560.1 - 1,819.5)

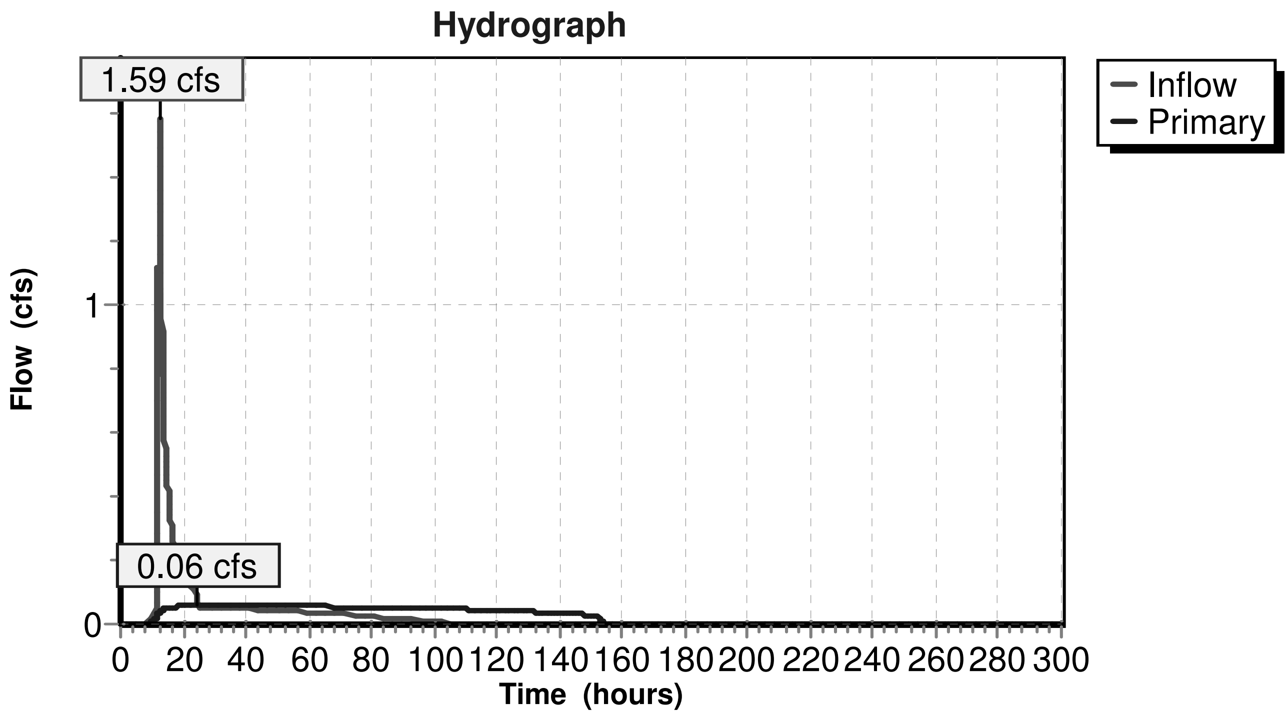
Volume	Invert	Avail.Storage	Storage Description
#1	365.00'	27,830 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
365.00	1,800	0	0
367.00	3,590	5,390	5,390
369.00	5,550	9,140	14,530
371.00	7,750	13,300	27,830

Device	Routing	Invert	Outlet Devices
#1	Device 3	364.00'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Device 3	369.00'	**4.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Primary	363.00'	**15.0" x 90.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 360.00' S= 0.0333 '/' Cc= 0.900 n= 0.010 PVC, smooth interior

Primary OutFlow Max=0.06 cfs @ 24.31 hrs HW=368.69' (Free Discharge)
└─**3=Culvert** (Passes 0.06 cfs of 13.30 cfs potential flow)
  ├─**1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 10.39 fps)
  └─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1.2P:


Hydrograph
1.59 cfs
0.06 cfs
Inflow
Primary
Flow (cfs)
1
0
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Time (hours)

Summary for Pond 1.3P:

Inflow Area = 3.640 ac, 71.70% Impervious, Inflow Depth = 2.54" for 2 year event
Inflow = 11.59 cfs @ 12.04 hrs, Volume= 0.771 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 386.29' @ 24.20 hrs Surf.Area= 9,316 sf Storage= 33,576 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

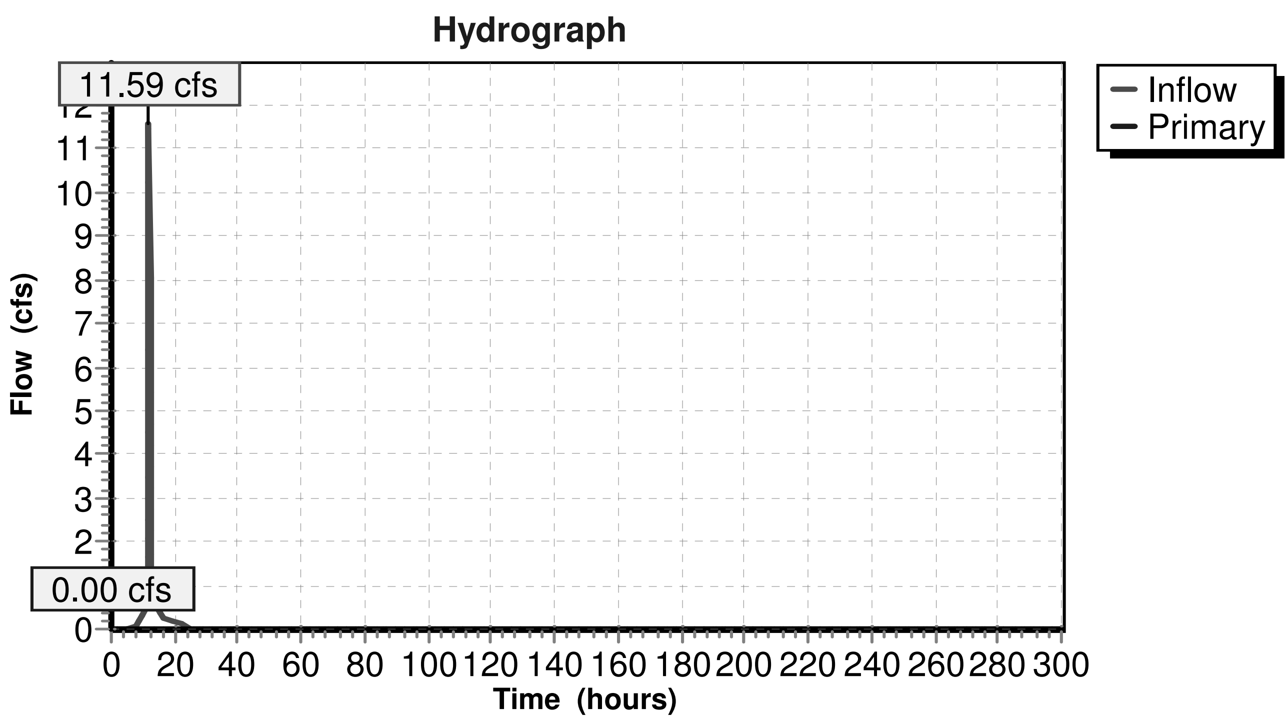
Volume	Invert	Avail.Storage	Storage Description
#1	378.00'	51,706 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
378.00	190	0	0
380.00	1,384	1,574	1,574
382.00	3,580	4,964	6,538
384.20	6,224	10,784	17,322
386.00	8,864	13,579	30,902
388.00	11,940	20,804	51,706

Device	Routing	Invert	Outlet Devices
#1	Primary	386.40'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	387.00'	**10.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=378.00' (Free Discharge)
├─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1.3P:


Hydrograph
11.59 cfs
0.00 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

Summary for Subcatchment 1.1S:

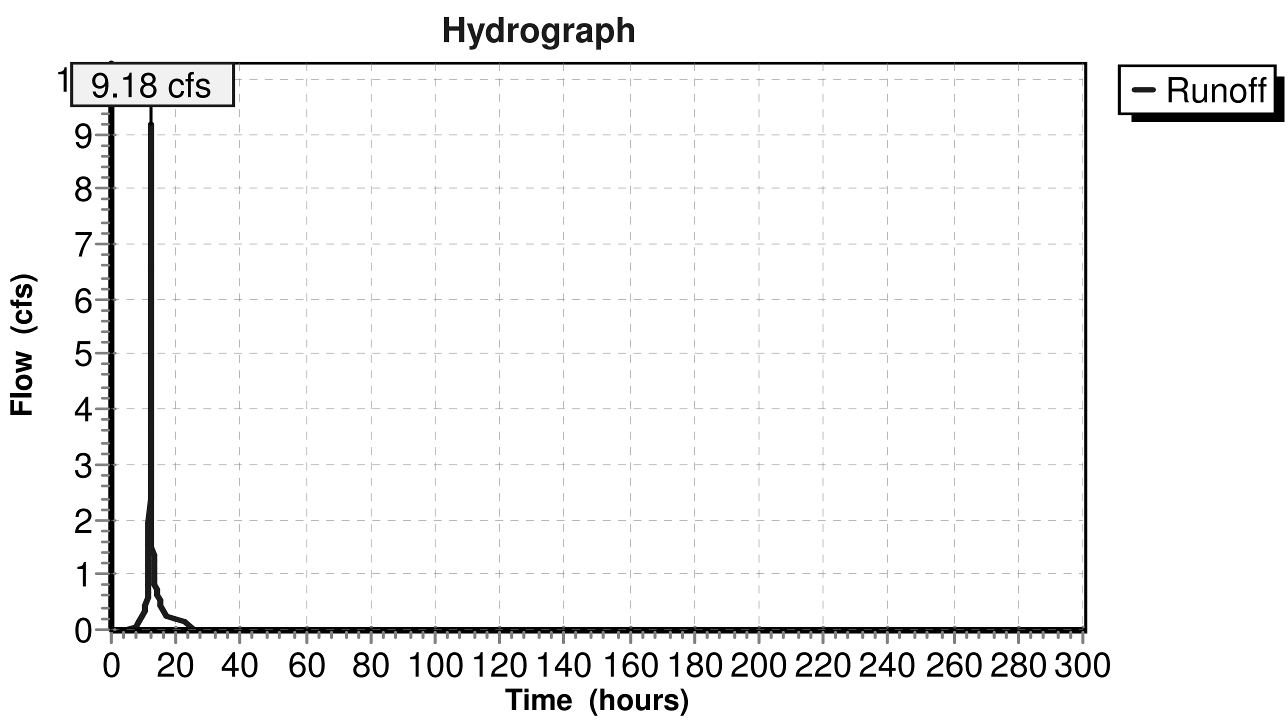
Runoff = 9.18 cfs @ 12.14 hrs, Volume= 0.773 af, Depth= 3.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
1.500	98	Paved parking & roofs
0.700	70	Woods, Good, HSG C
0.400	74	>75% Grass cover, Good, HSG C
2.600	87	Weighted Average
1.100		Pervious Area
1.500		Impervious Area

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

Subcatchment 1.1S:



Summary for Subcatchment 1.2S:

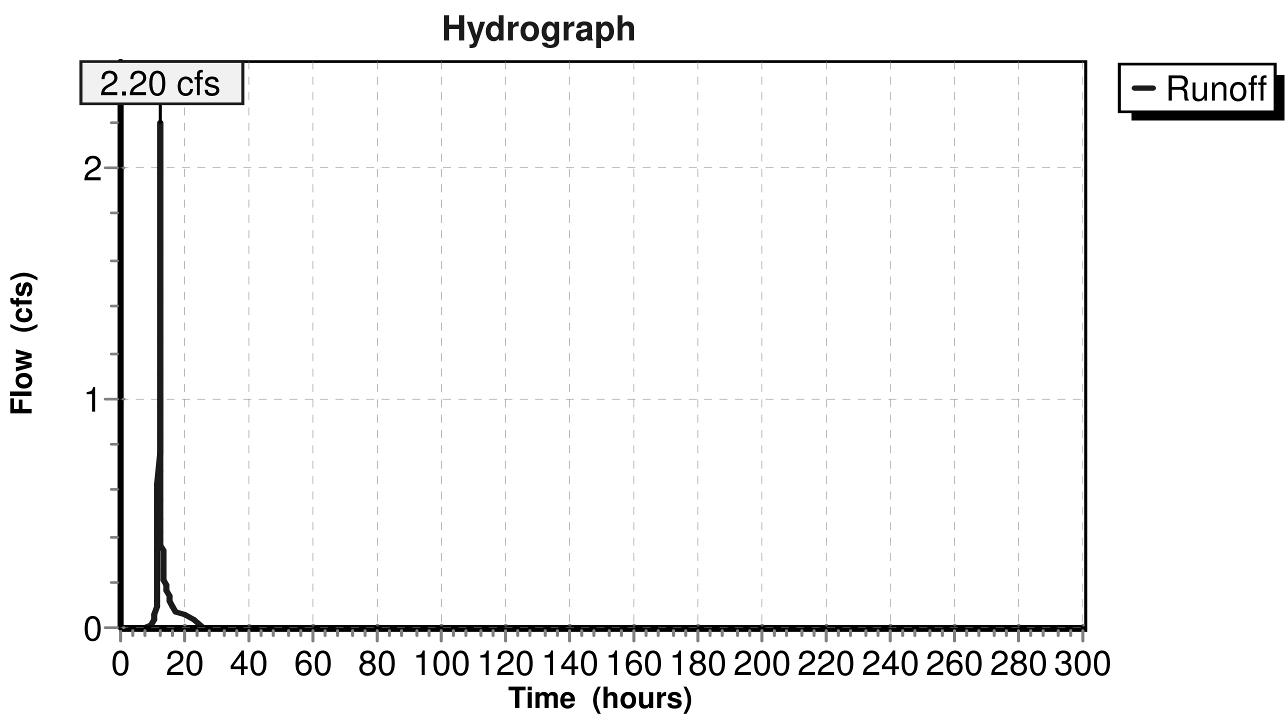
Runoff = 2.20 cfs @ 12.15 hrs, Volume= 0.183 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
0.500	74	>75% Grass cover, Good, HSG C
0.500	70	Woods, Good, HSG C
1.000	72	Weighted Average
1.000		Pervious Area

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

Subcatchment 1.2S:



Summary for Subcatchment 1.3S:

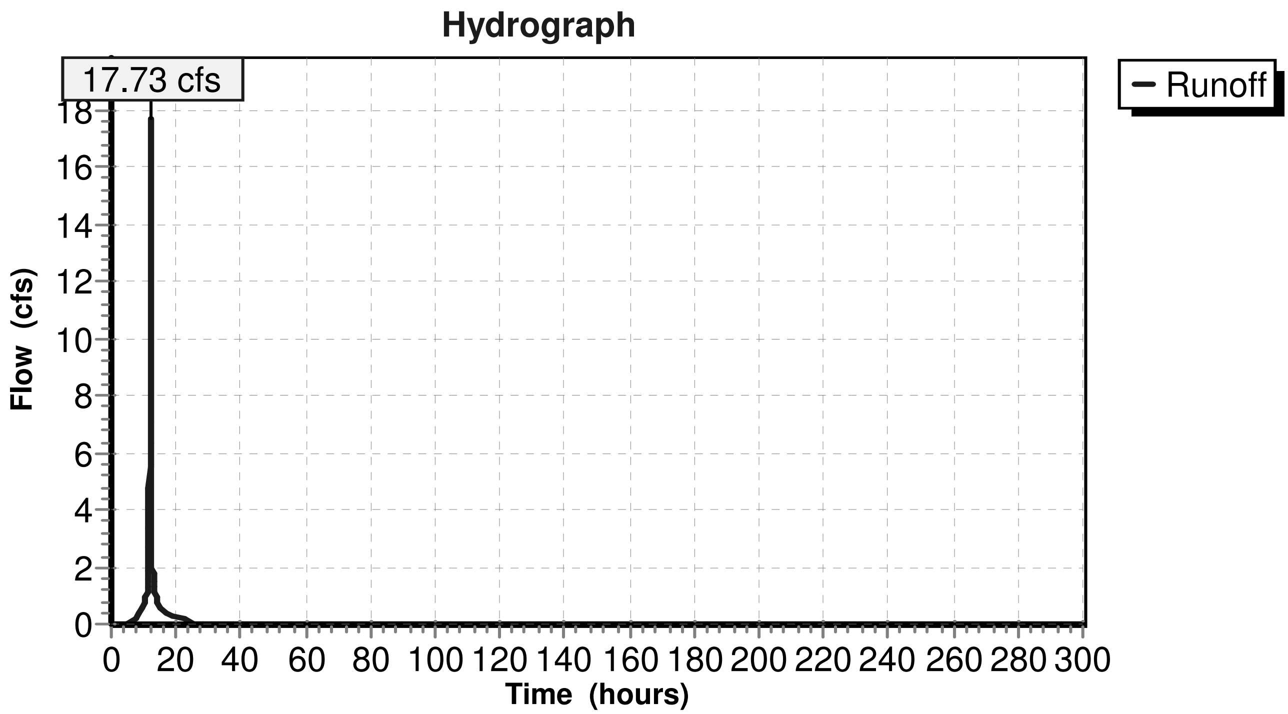
Runoff = 17.73 cfs @ 12.04 hrs, Volume= 1.208 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
0.660	79	50-75% Grass cover, Fair, HSG C
0.370	65	Brush, Good, HSG C
2.610	98	Paved parking & roofs
3.640	91	Weighted Average
1.030		Pervious Area
2.610		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.50"
0.2	60	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	305	0.0370	10.97	13.46	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	130	0.0920	17.30	21.23	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	60	0.0650	14.54	17.84	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
2.2	655	Total			

Subcatchment 1.3S:



Summary for Subcatchment 1.4S:

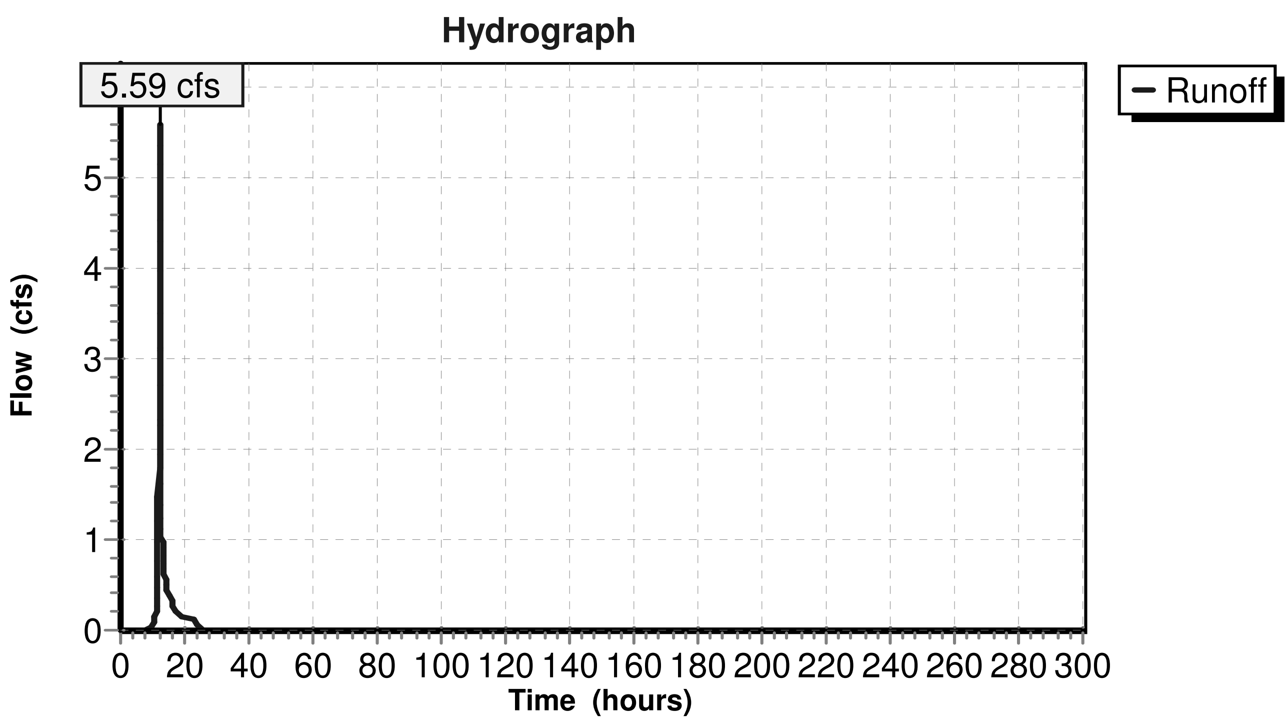
Runoff = 5.59 cfs @ 12.19 hrs, Volume= 0.513 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
1.500	70	Woods, Good, HSG C
1.300	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking & roofs
2.800	72	Weighted Average
2.800		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.5	250	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	350	Total			

Subcatchment 1.4S:



Summary for Subcatchment 2.0S:

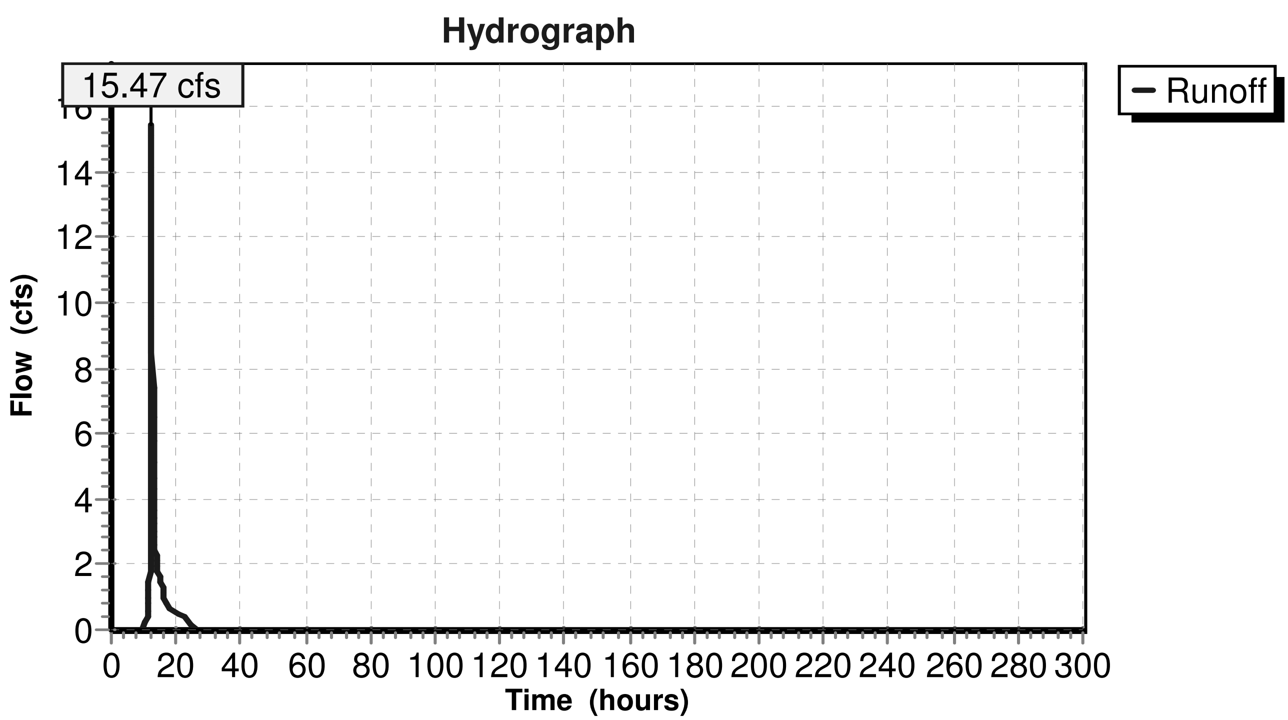
Runoff = 15.47 cfs @ 12.35 hrs, Volume= 1.799 af, Depth= 2.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
10.600	70	Woods, Good, HSG C
10.600		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0600	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
10.6	1,100	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.8	1,200	Total			

Subcatchment 2.0S:



Summary for Subcatchment 3.0S:

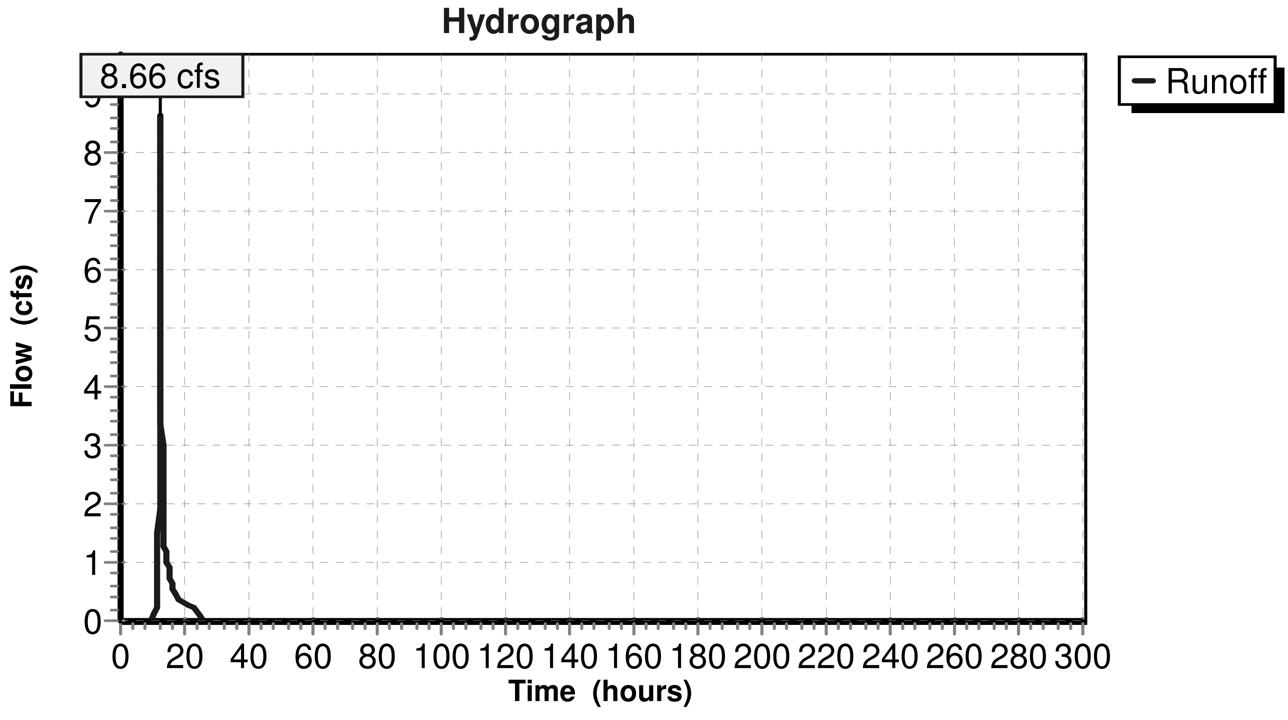
Runoff = 8.66 cfs @ 12.36 hrs, Volume= 1.018 af, Depth= 2.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
6.000	70	Woods, Good, HSG C
6.000		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.0350	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
8.1	940	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
24.5	1,040	Total			

Subcatchment 3.0S:



Summary for Subcatchment 4.0S:

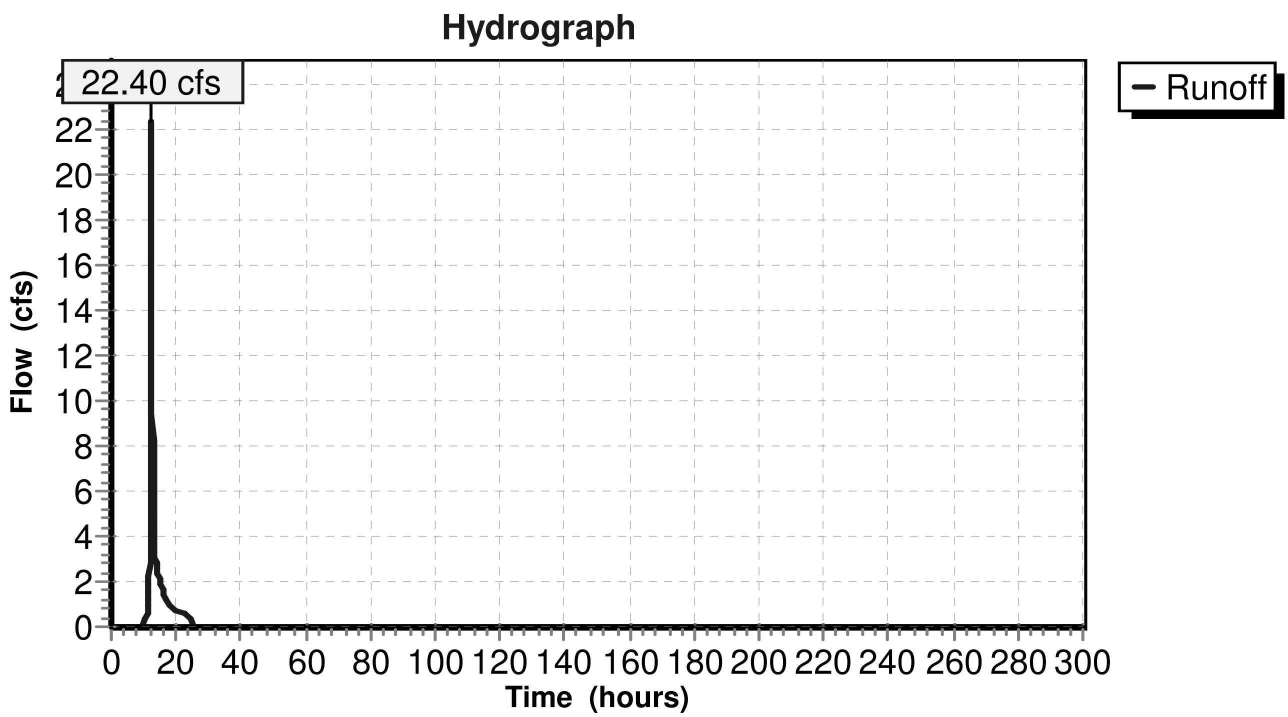
Runoff = 22.40 cfs @ 12.28 hrs, Volume= 2.414 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
14.100	70	Woods, Good, HSG C
0.700	55	Woods, Good, HSG B
14.800	69	Weighted Average
14.800		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
8.2	980	0.1600	2.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.5	1,080	Total			

Subcatchment 4.0S:



Summary for Subcatchment 5.0S:

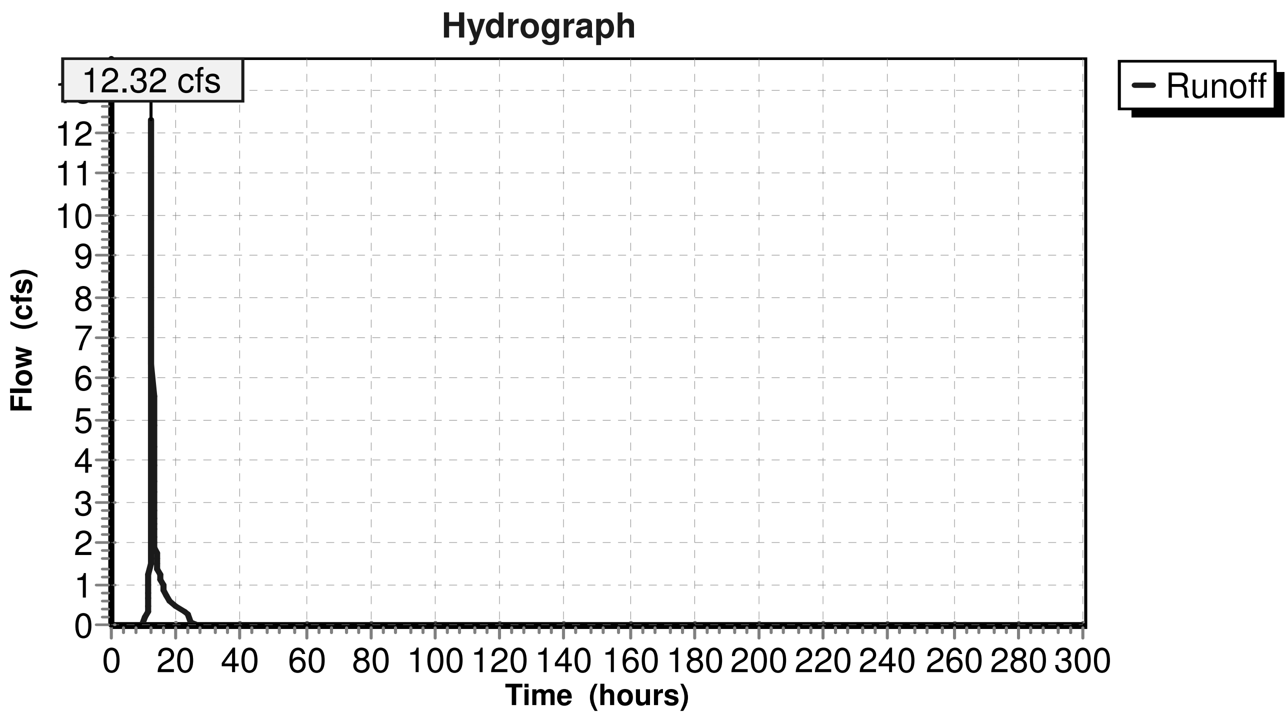
Runoff = 12.32 cfs @ 12.33 hrs, Volume= 1.408 af, Depth= 2.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
8.300	70	Woods, Good, HSG C
8.300		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.3	140	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.8	240	Total			

Subcatchment 5.0S:

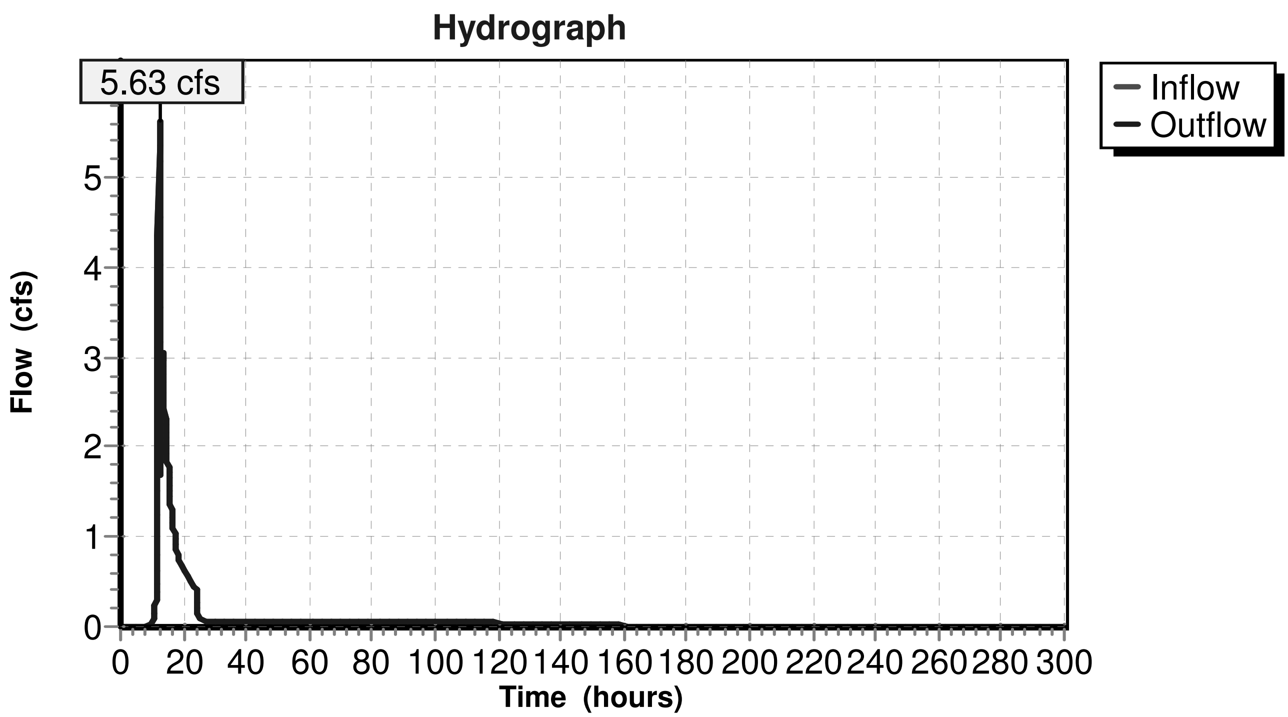


Summary for Reach DP 1:

Inflow Area = 10.040 ac, 40.94% Impervious, Inflow Depth = 2.25" for 10 year event
Inflow = 5.63 cfs @ 12.19 hrs, Volume= 1.883 af
Outflow = 5.63 cfs @ 12.19 hrs, Volume= 1.883 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

Reach DP 1:



Summary for Pond 1.1P:

Inflow Area = 2.600 ac, 57.69% Impervious, Inflow Depth = 3.57" for 10 year event
Inflow = 9.18 cfs @ 12.14 hrs, Volume= 0.773 af
Outflow = 5.45 cfs @ 12.31 hrs, Volume= 0.773 af, Atten= 41%, Lag= 10.3 min
Primary = 5.45 cfs @ 12.31 hrs, Volume= 0.773 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 403.00' Surf.Area= 2,630 sf Storage= 4,100 cf
Peak Elev= 405.54' @ 12.31 hrs Surf.Area= 7,477 sf Storage= 17,229 cf (13,129 cf above start)

Plug-Flow detention time= 918.4 min calculated for 0.679 af (88% of inflow)
Center-of-Mass det. time= 746.9 min (1,552.0 - 805.1)

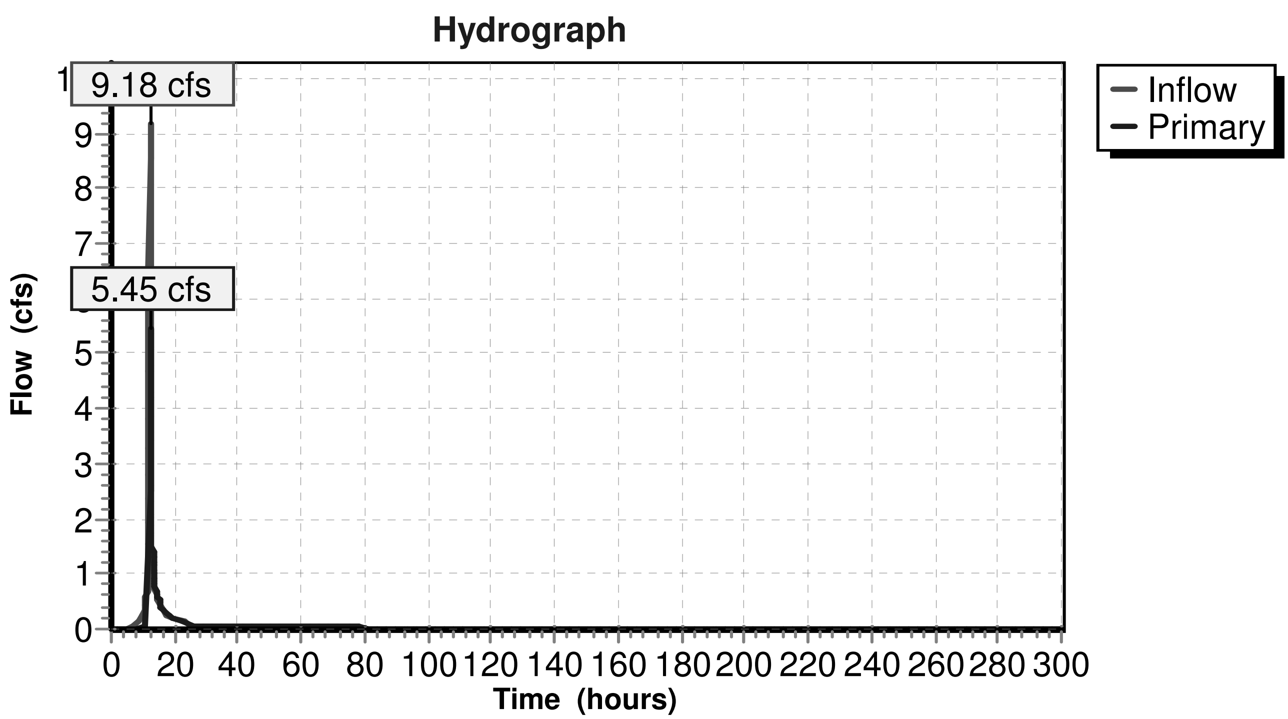
Volume	Invert	Avail.Storage	Storage Description
#1	399.00'	29,730 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
399.00	70	0	0
401.00	700	770	770
403.00	2,630	3,330	4,100
405.00	6,700	9,330	13,430
407.00	9,600	16,300	29,730

Device	Routing	Invert	Outlet Devices
#1	Device 3	403.00'	**1.2" Vert. Orifice/Grate** C= 0.600
#2	Device 3	405.00'	**5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Primary	399.00'	**15.0" x 60.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 388.00' S= 0.1833 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=5.40 cfs @ 12.31 hrs HW=405.53' (Free Discharge)
└─**3=Culvert** (Passes 5.40 cfs of 14.36 cfs potential flow)
  ├─**1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 7.59 fps)
  └─**2=Broad-Crested Rectangular Weir** (Weir Controls 5.34 cfs @ 2.00 fps)

Pond 1.1P:


Hydrograph
9.18 cfs
5.45 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
7
8
9
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

Summary for Pond 1.2P:

Inflow Area = 3.600 ac, 41.67% Impervious, Inflow Depth = 3.19" for 10 year event
Inflow = 6.87 cfs @ 12.28 hrs, Volume= 0.956 af
Outflow = 1.22 cfs @ 13.36 hrs, Volume= 0.956 af, Atten= 82%, Lag= 64.8 min
Primary = 1.22 cfs @ 13.36 hrs, Volume= 0.956 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 369.23' @ 13.36 hrs Surf.Area= 5,798 sf Storage= 15,808 cf

Plug-Flow detention time= 1,945.2 min calculated for 0.956 af (100% of inflow)
Center-of-Mass det. time= 1,945.1 min (3,361.9 - 1,416.8)

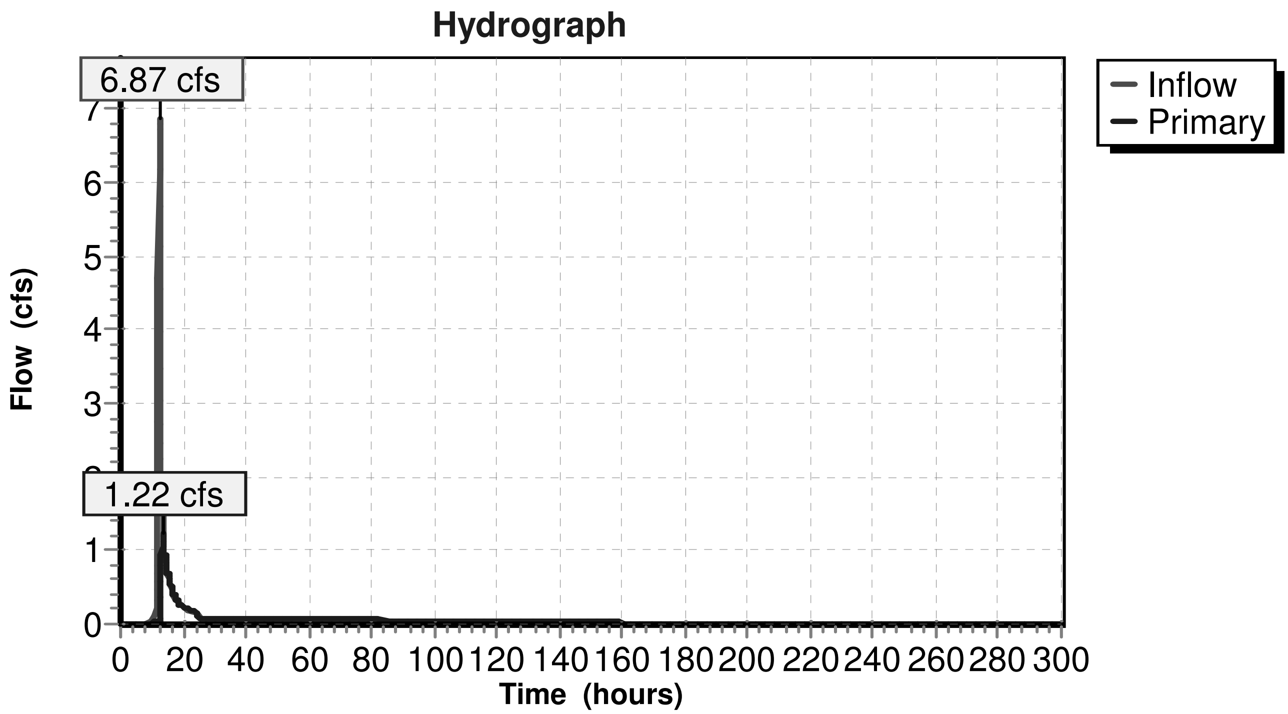
Volume	Invert	Avail.Storage	Storage Description
#1	365.00'	27,830 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
365.00	1,800	0	0
367.00	3,590	5,390	5,390
369.00	5,550	9,140	14,530
371.00	7,750	13,300	27,830

Device	Routing	Invert	Outlet Devices
#1	Device 3	364.00'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Device 3	369.00'	**4.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Primary	363.00'	**15.0" x 90.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 360.00' S= 0.0333 '/' Cc= 0.900 n= 0.010 PVC, smooth interior

Primary OutFlow Max=1.21 cfs @ 13.36 hrs HW=369.23' (Free Discharge)
└─**3=Culvert** (Passes 1.21 cfs of 13.98 cfs potential flow)
  ├─**1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 10.96 fps)
  └─**2=Broad-Crested Rectangular Weir** (Weir Controls 1.15 cfs @ 1.28 fps)

Pond 1.2P:


Hydrograph
6.87 cfs
1.22 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
3
4
5
6
7
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300

Summary for Pond 1.3P:

Inflow Area = 3.640 ac, 71.70% Impervious, Inflow Depth = 3.98" for 10 year event
Inflow = 17.73 cfs @ 12.04 hrs, Volume= 1.208 af
Outflow = 1.18 cfs @ 13.26 hrs, Volume= 0.414 af, Atten= 93%, Lag= 73.6 min
Primary = 1.18 cfs @ 13.26 hrs, Volume= 0.414 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 386.54' @ 13.26 hrs Surf.Area= 9,689 sf Storage= 35,880 cf

Plug-Flow detention time= 347.2 min calculated for 0.414 af (34% of inflow)
Center-of-Mass det. time= 207.6 min (991.0 - 783.3)

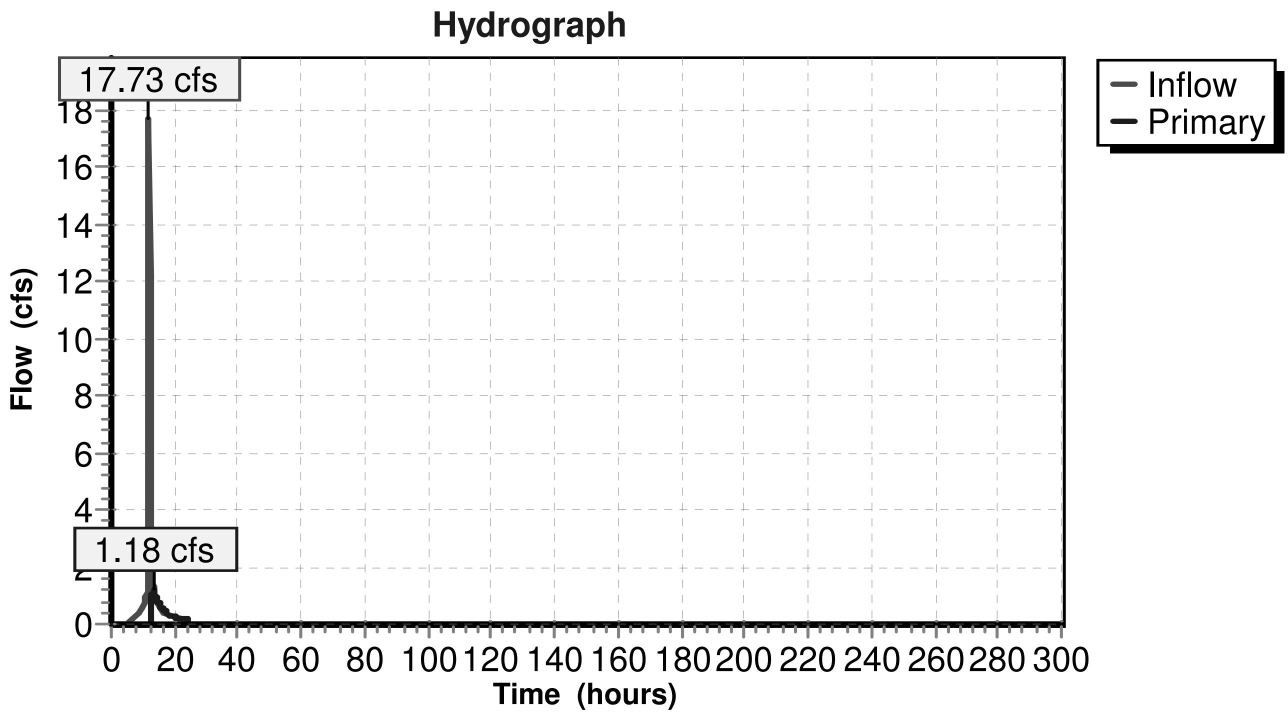
Volume	Invert	Avail.Storage	Storage Description
#1	378.00'	51,706 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
378.00	190	0	0
380.00	1,384	1,574	1,574
382.00	3,580	4,964	6,538
384.20	6,224	10,784	17,322
386.00	8,864	13,579	30,902
388.00	11,940	20,804	51,706

Device	Routing	Invert	Outlet Devices
#1	Primary	386.40'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	387.00'	**10.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.13 cfs @ 13.26 hrs HW=386.54' (Free Discharge)
├─**1=Broad-Crested Rectangular Weir** (Weir Controls 1.13 cfs @ 1.03 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1.3P:


Hydrograph
17.73 cfs
1.18 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
2
4
6
8
10
12
14
16
18
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300

Summary for Subcatchment 1.1S:

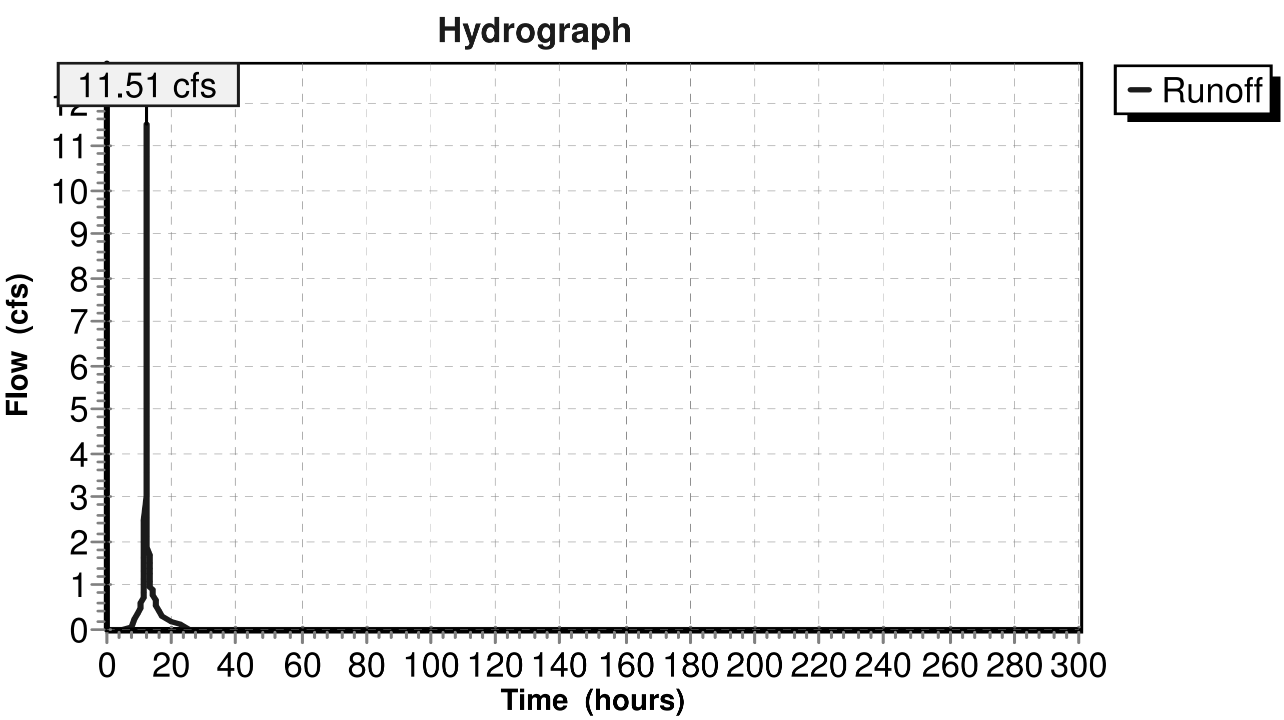
Runoff = 11.51 cfs @ 12.14 hrs, Volume= 0.979 af, Depth= 4.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
1.500	98	Paved parking & roofs
0.700	70	Woods, Good, HSG C
0.400	74	>75% Grass cover, Good, HSG C
2.600	87	Weighted Average
1.100		Pervious Area
1.500		Impervious Area

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

Subcatchment 1.1S:



Summary for Subcatchment 1.2S:

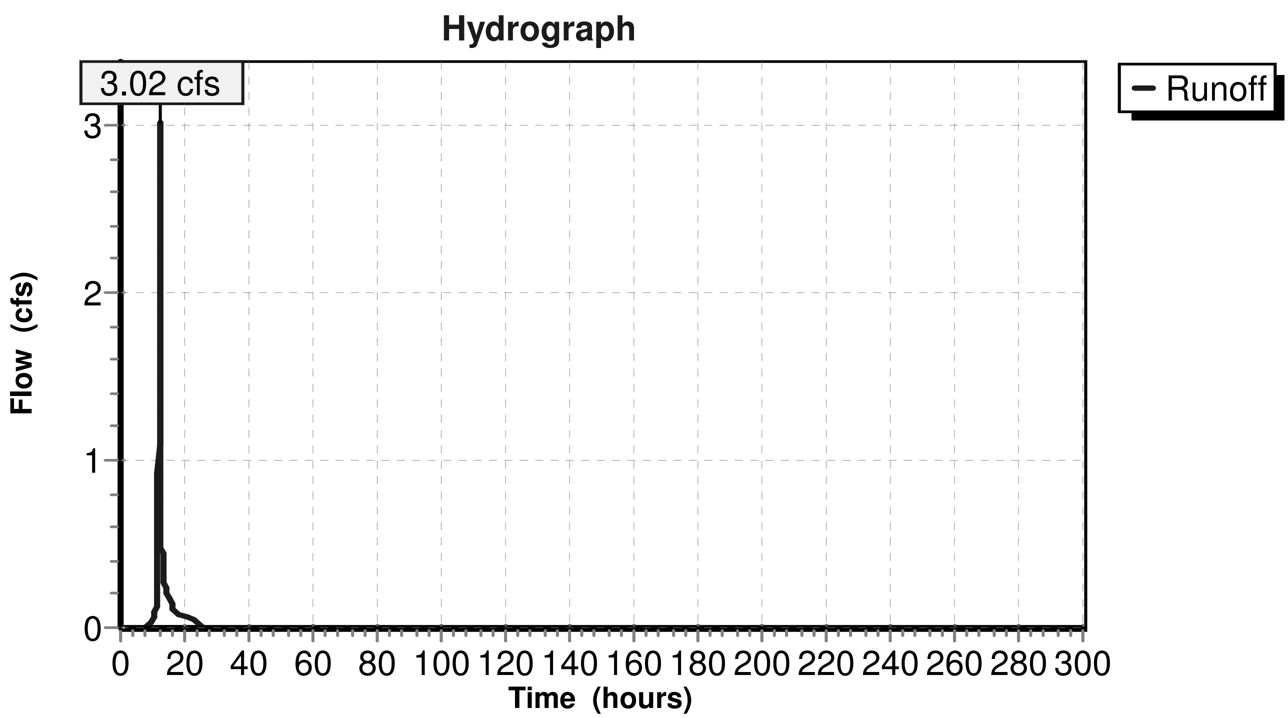
Runoff = 3.02 cfs @ 12.15 hrs, Volume= 0.249 af, Depth= 2.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
0.500	74	>75% Grass cover, Good, HSG C
0.500	70	Woods, Good, HSG C
1.000	72	Weighted Average
1.000		Pervious Area

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

Subcatchment 1.2S:



Summary for Subcatchment 1.3S:

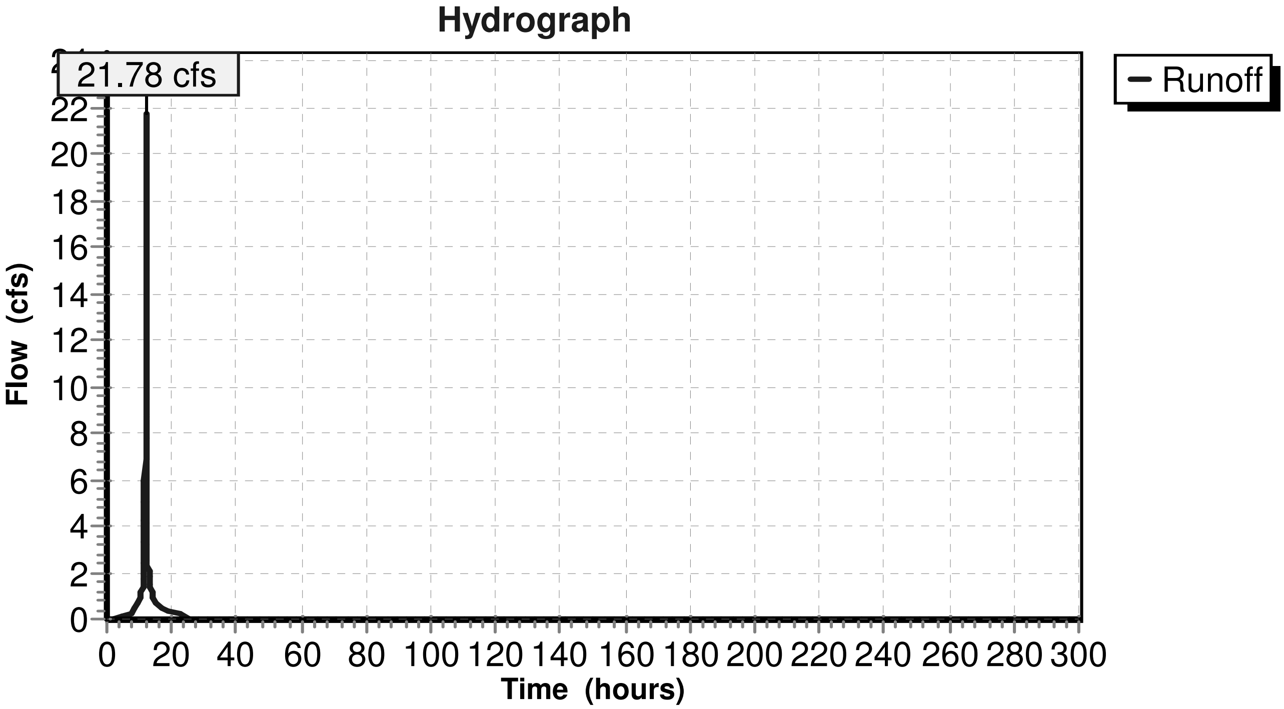
Runoff = 21.78 cfs @ 12.04 hrs, Volume= 1.504 af, Depth= 4.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
0.660	79	50-75% Grass cover, Fair, HSG C
0.370	65	Brush, Good, HSG C
2.610	98	Paved parking & roofs
3.640	91	Weighted Average
1.030		Pervious Area
2.610		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.50"
0.2	60	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	305	0.0370	10.97	13.46	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	130	0.0920	17.30	21.23	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	60	0.0650	14.54	17.84	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
2.2	655	Total			

Subcatchment 1.3S:



Summary for Subcatchment 1.4S:

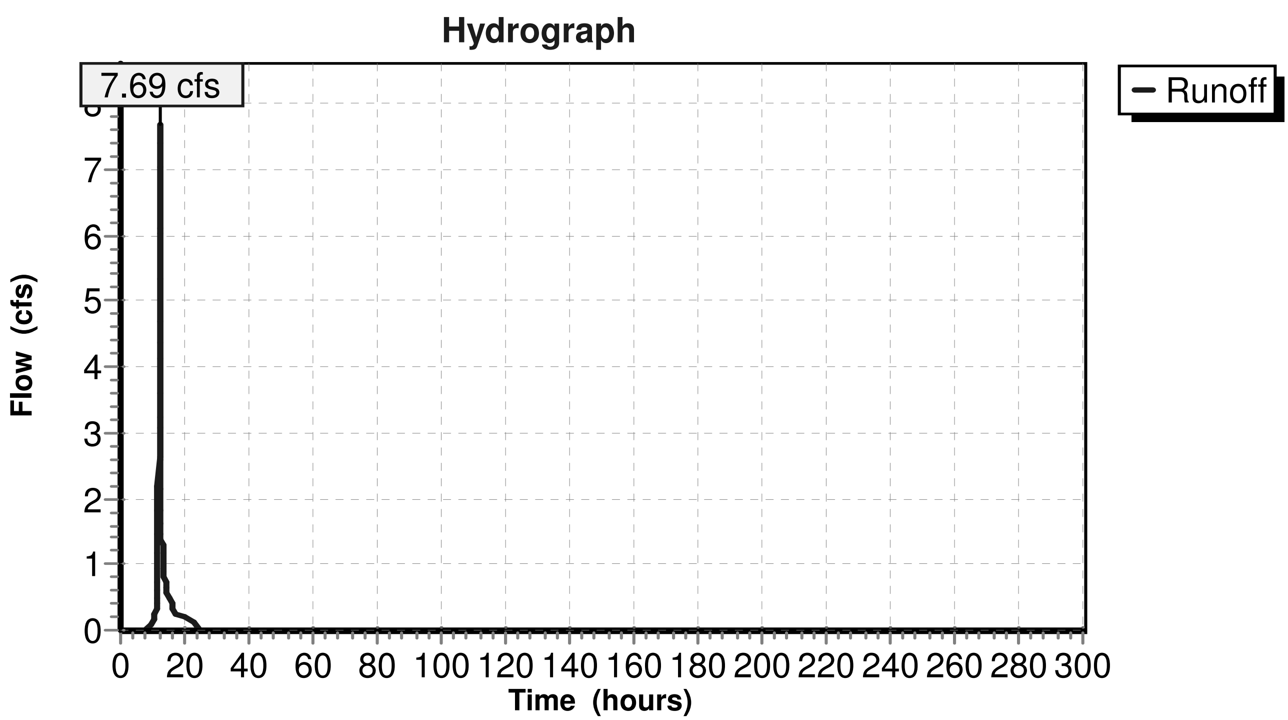
Runoff = 7.69 cfs @ 12.19 hrs, Volume= 0.698 af, Depth= 2.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
1.500	70	Woods, Good, HSG C
1.300	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking & roofs
2.800	72	Weighted Average
2.800		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.5	250	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	350	Total			

Subcatchment 1.4S:



Summary for Subcatchment 2.0S:

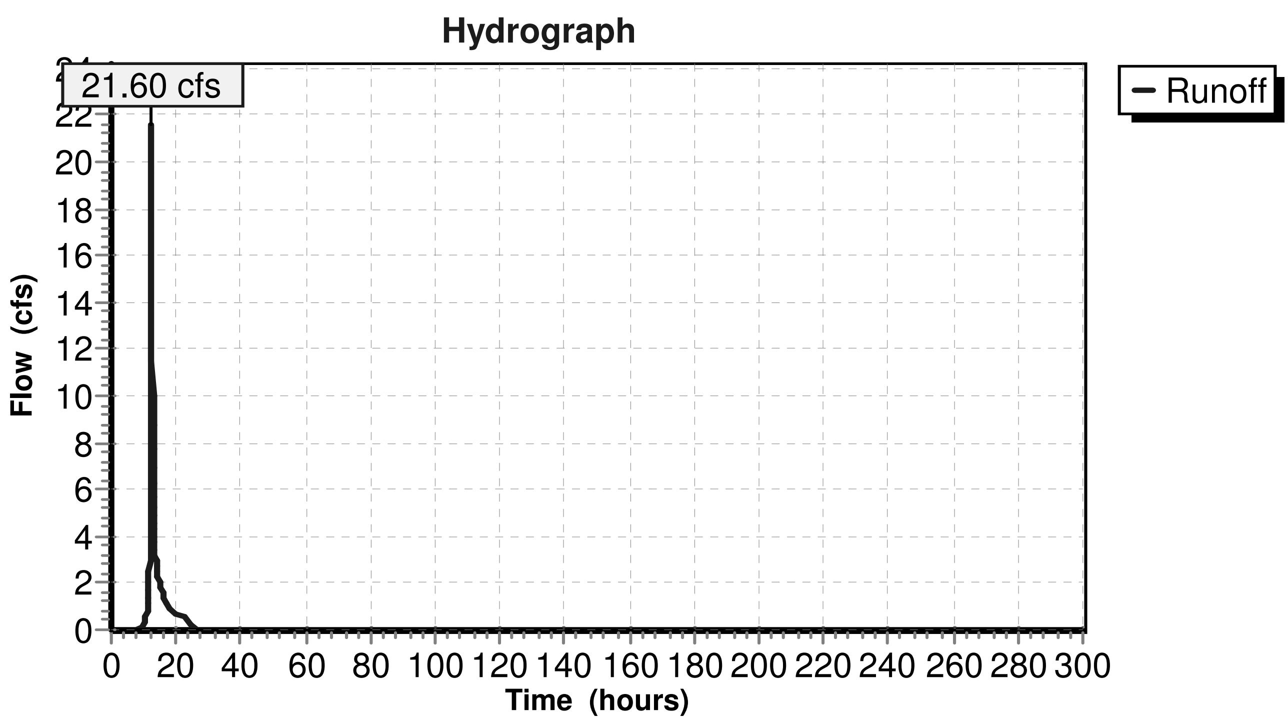
Runoff = 21.60 cfs @ 12.34 hrs, Volume= 2.478 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
10.600	70	Woods, Good, HSG C
10.600		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0600	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
10.6	1,100	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.8	1,200	Total			

Subcatchment 2.0S:



Summary for Subcatchment 3.0S:

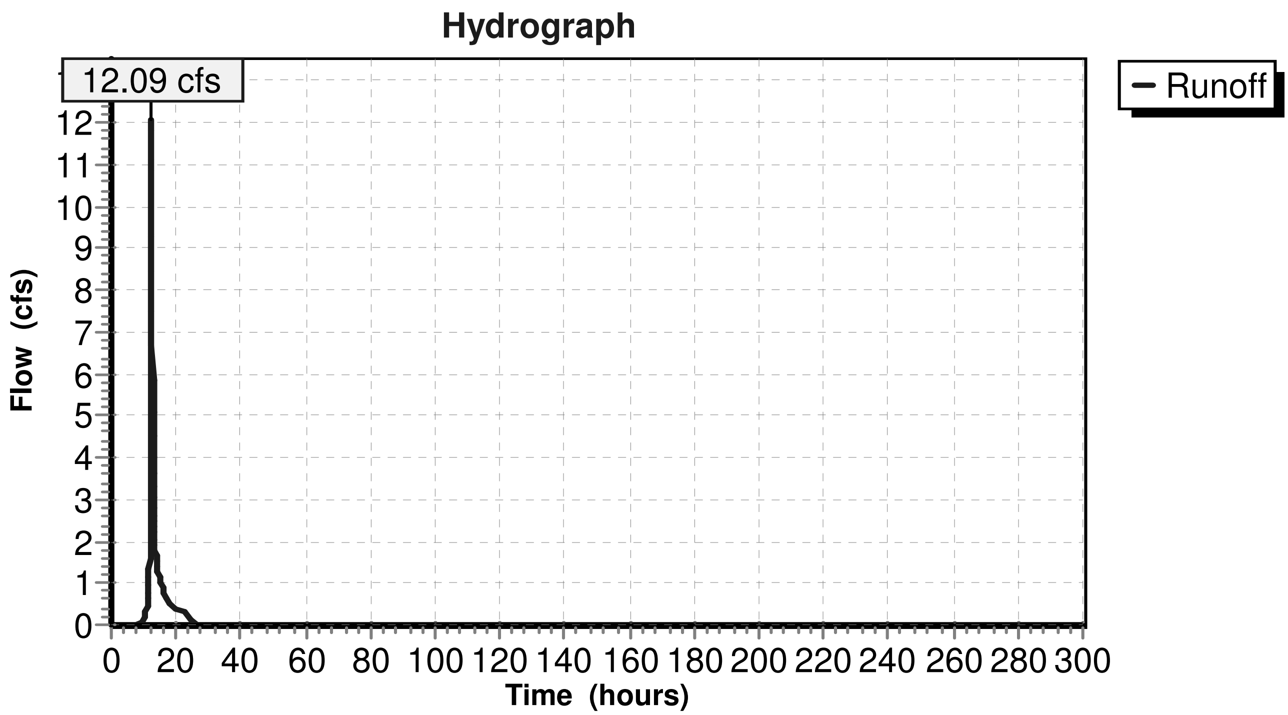
Runoff = 12.09 cfs @ 12.35 hrs, Volume= 1.403 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
6.000	70	Woods, Good, HSG C
6.000		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.0350	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
8.1	940	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
24.5	1,040	Total			

Subcatchment 3.0S:



Summary for Subcatchment 4.0S:

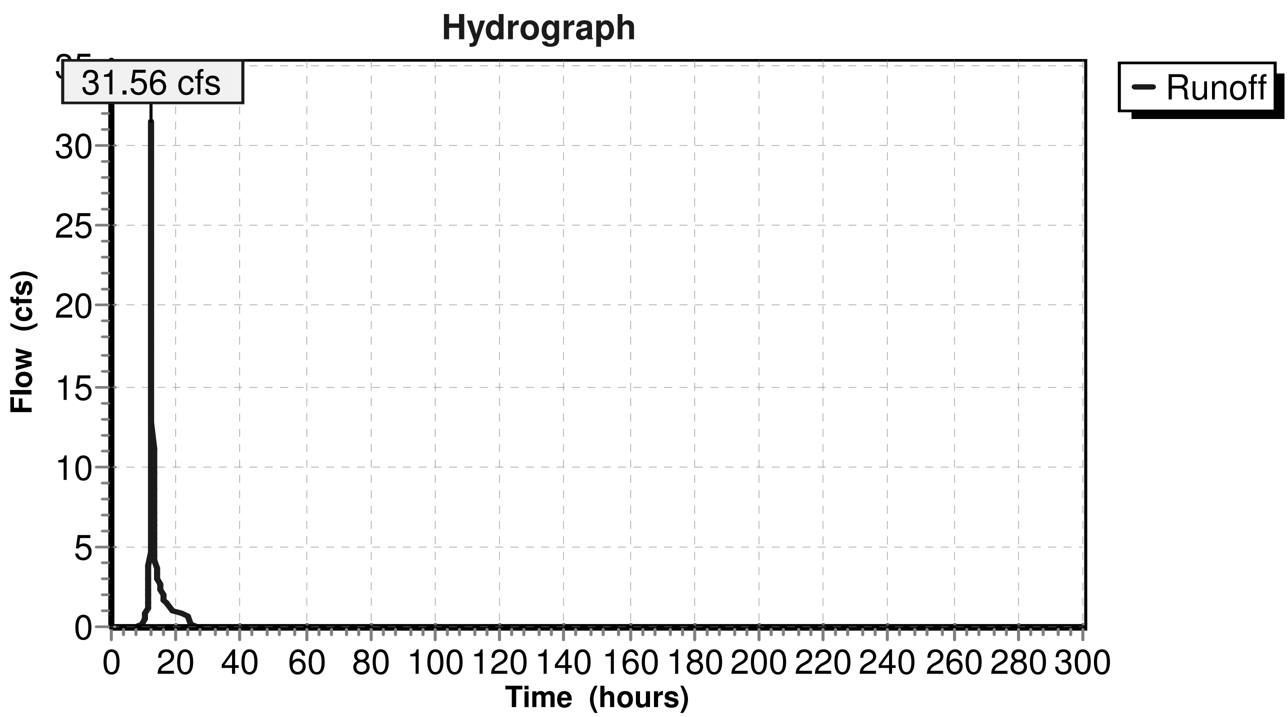
Runoff = 31.56 cfs @ 12.28 hrs, Volume= 3.345 af, Depth= 2.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
14.100	70	Woods, Good, HSG C
0.700	55	Woods, Good, HSG B
14.800	69	Weighted Average
14.800		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
8.2	980	0.1600	2.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.5	1,080	Total			

Subcatchment 4.0S:



Summary for Subcatchment 5.0S:

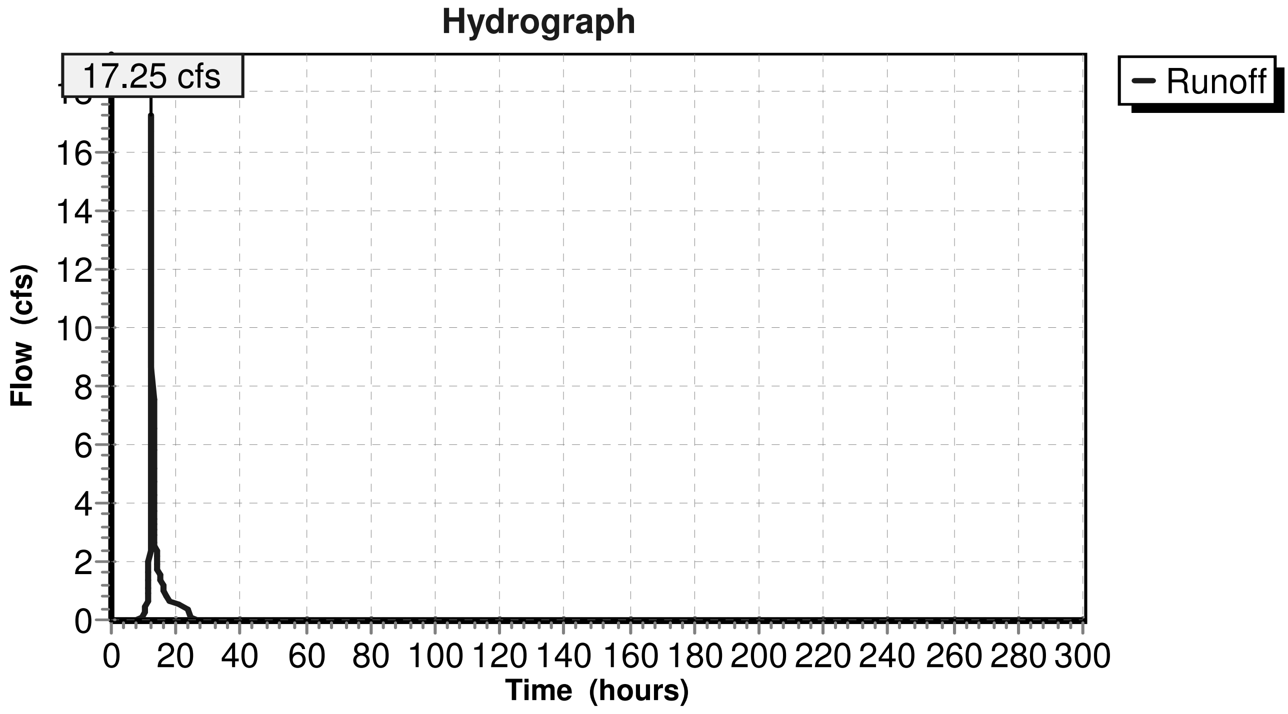
Runoff = 17.25 cfs @ 12.32 hrs, Volume= 1.940 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
8.300	70	Woods, Good, HSG C
8.300		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.3	140	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.8	240	Total			

Subcatchment 5.0S:

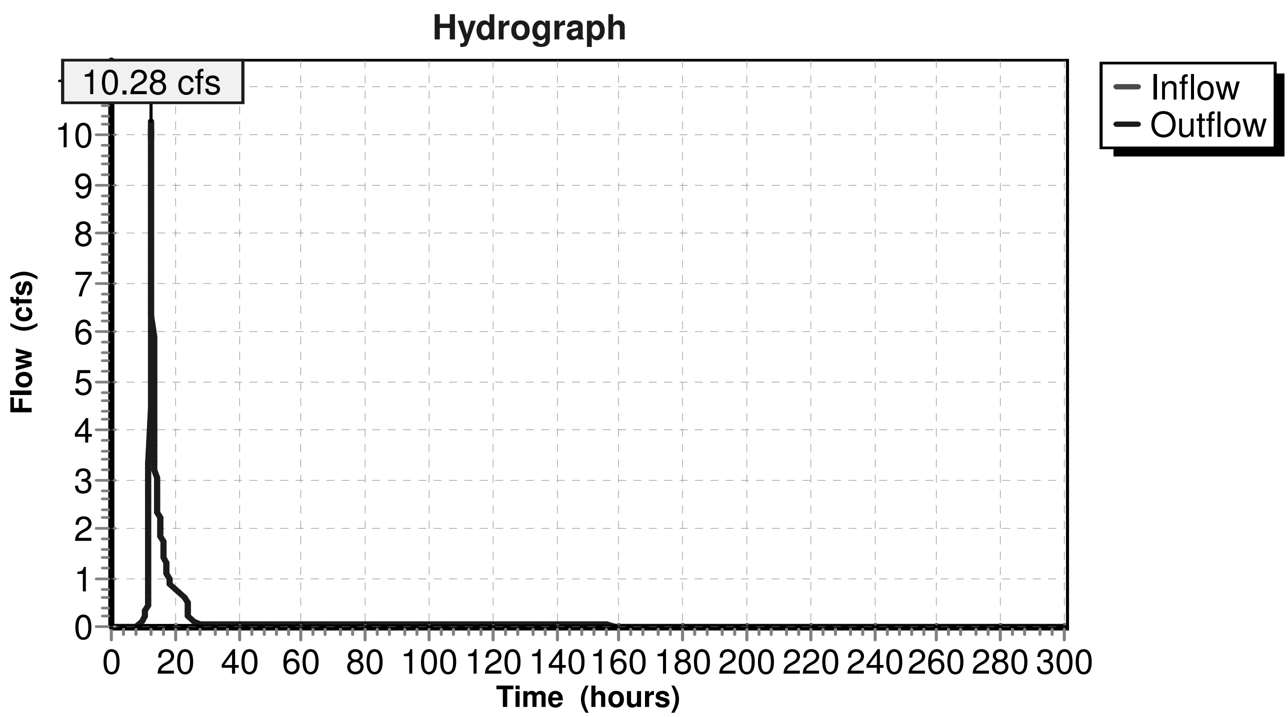


Summary for Reach DP 1:

Inflow Area = 10.040 ac, 40.94% Impervious, Inflow Depth = 3.15" for 25 year event
Inflow = 10.28 cfs @ 12.53 hrs, Volume= 2.637 af
Outflow = 10.28 cfs @ 12.53 hrs, Volume= 2.637 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

Reach DP 1:



Summary for Pond 1.1P:

Inflow Area = 2.600 ac, 57.69% Impervious, Inflow Depth = 4.52" for 25 year event
Inflow = 11.51 cfs @ 12.14 hrs, Volume= 0.979 af
Outflow = 8.46 cfs @ 12.25 hrs, Volume= 0.979 af, Atten= 26%, Lag= 6.7 min
Primary = 8.46 cfs @ 12.25 hrs, Volume= 0.979 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 403.00' Surf.Area= 2,630 sf Storage= 4,100 cf
Peak Elev= 405.71' @ 12.25 hrs Surf.Area= 7,730 sf Storage= 18,554 cf (14,454 cf above start)

Plug-Flow detention time= 719.2 min calculated for 0.884 af (90% of inflow)
Center-of-Mass det. time= 599.9 min (1,398.5 - 798.5)

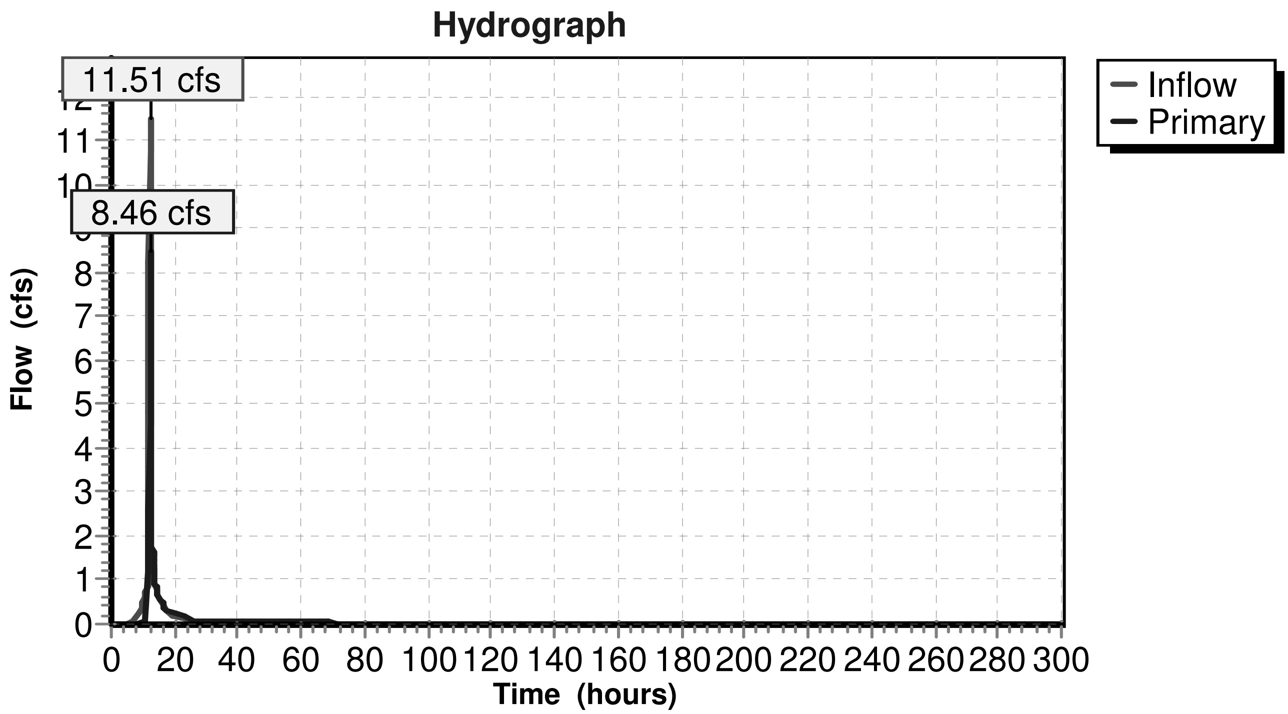
Volume	Invert	Avail.Storage	Storage Description
#1	399.00'	29,730 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
399.00	70	0	0
401.00	700	770	770
403.00	2,630	3,330	4,100
405.00	6,700	9,330	13,430
407.00	9,600	16,300	29,730

Device	Routing	Invert	Outlet Devices
#1	Device 3	403.00'	**1.2" Vert. Orifice/Grate** C= 0.600
#2	Device 3	405.00'	**5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Primary	399.00'	**15.0" x 60.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 388.00' S= 0.1833 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=8.44 cfs @ 12.25 hrs HW=405.71' (Free Discharge)
└─**3=Culvert** (Passes 8.44 cfs of 14.57 cfs potential flow)
  ├─**1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 7.85 fps)
  └─**2=Broad-Crested Rectangular Weir** (Weir Controls 8.38 cfs @ 2.36 fps)

Pond 1.1P:


Hydrograph
11.51 cfs
8.46 cfs
Inflow
Primary
Flow (cfs)
0
1
2
3
4
5
6
7
8
10
11
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Time (hours)

Summary for Pond 1.2P:

Inflow Area = 3.600 ac, 41.67% Impervious, Inflow Depth = 4.09" for 25 year event
Inflow = 10.88 cfs @ 12.22 hrs, Volume= 1.228 af
Outflow = 4.13 cfs @ 12.67 hrs, Volume= 1.228 af, Atten= 62%, Lag= 26.9 min
Primary = 4.13 cfs @ 12.67 hrs, Volume= 1.228 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 369.52' @ 12.67 hrs Surf.Area= 6,118 sf Storage= 17,541 cf

Plug-Flow detention time= 1,522.6 min calculated for 1.228 af (100% of inflow)
Center-of-Mass det. time= 1,522.7 min (2,807.2 - 1,284.5)

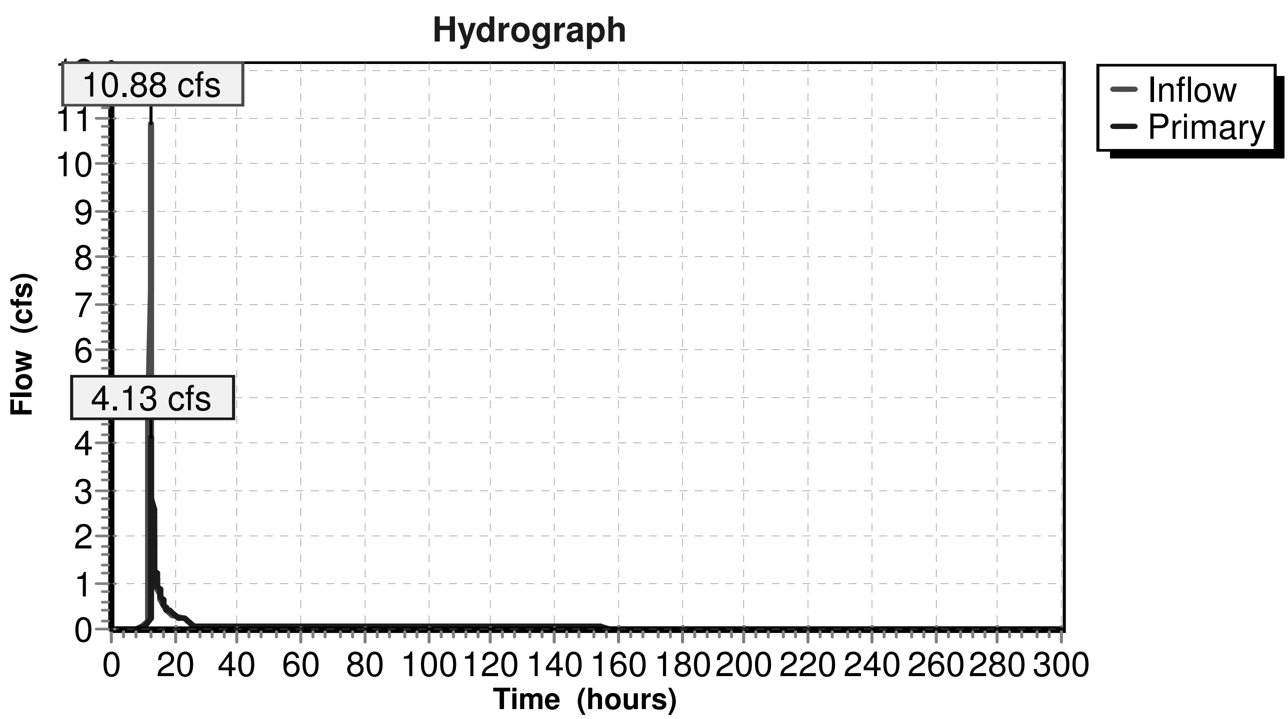
Volume	Invert	Avail.Storage	Storage Description
#1	365.00'	27,830 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
365.00	1,800	0	0
367.00	3,590	5,390	5,390
369.00	5,550	9,140	14,530
371.00	7,750	13,300	27,830

Device	Routing	Invert	Outlet Devices
#1	Device 3	364.00'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Device 3	369.00'	**4.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Primary	363.00'	**15.0" x 90.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 360.00' S= 0.0333 '/' Cc= 0.900 n= 0.010 PVC, smooth interior

Primary OutFlow Max=4.09 cfs @ 12.67 hrs HW=369.51' (Free Discharge)
└─**3=Culvert** (Passes 4.09 cfs of 14.34 cfs potential flow)
  ├─**1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 11.26 fps)
  └─**2=Broad-Crested Rectangular Weir** (Weir Controls 4.03 cfs @ 1.96 fps)

Pond 1.2P:


Hydrograph
10.88 cfs
4.13 cfs
Inflow
Primary
Flow (cfs)
0
1
2
3
4
6
7
8
9
10
11
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Time (hours)

Summary for Pond 1.3P:

Inflow Area = 3.640 ac, 71.70% Impervious, Inflow Depth = 4.96" for 25 year event
Inflow = 21.78 cfs @ 12.04 hrs, Volume= 1.504 af
Outflow = 4.98 cfs @ 12.41 hrs, Volume= 0.710 af, Atten= 77%, Lag= 22.1 min
Primary = 4.98 cfs @ 12.41 hrs, Volume= 0.710 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 386.76' @ 12.41 hrs Surf.Area= 10,028 sf Storage= 38,049 cf

Plug-Flow detention time= 263.4 min calculated for 0.710 af (47% of inflow)
Center-of-Mass det. time= 143.3 min (920.8 - 777.5)

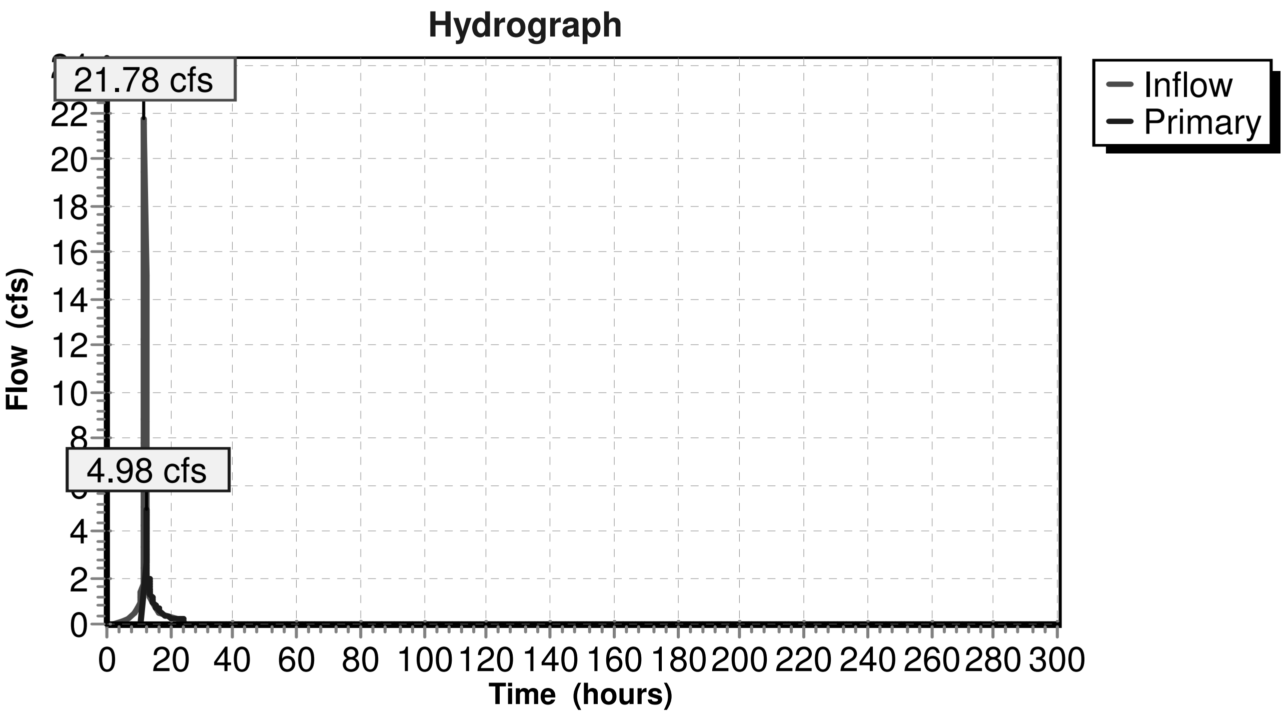
Volume	Invert	Avail.Storage	Storage Description
#1	378.00'	51,706 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
378.00	190	0	0
380.00	1,384	1,574	1,574
382.00	3,580	4,964	6,538
384.20	6,224	10,784	17,322
386.00	8,864	13,579	30,902
388.00	11,940	20,804	51,706

Device	Routing	Invert	Outlet Devices
#1	Primary	386.40'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	387.00'	**10.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=4.91 cfs @ 12.41 hrs HW=386.76' (Free Discharge)
├─**1=Broad-Crested Rectangular Weir** (Weir Controls 4.91 cfs @ 1.73 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1.3P:


Hydrograph
21.78 cfs
4.98 cfs
Inflow
Primary
Flow (cfs)
0
2
4
8
10
12
14
16
18
20
22
Time (hours)
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300

Summary for Subcatchment 1.1S:

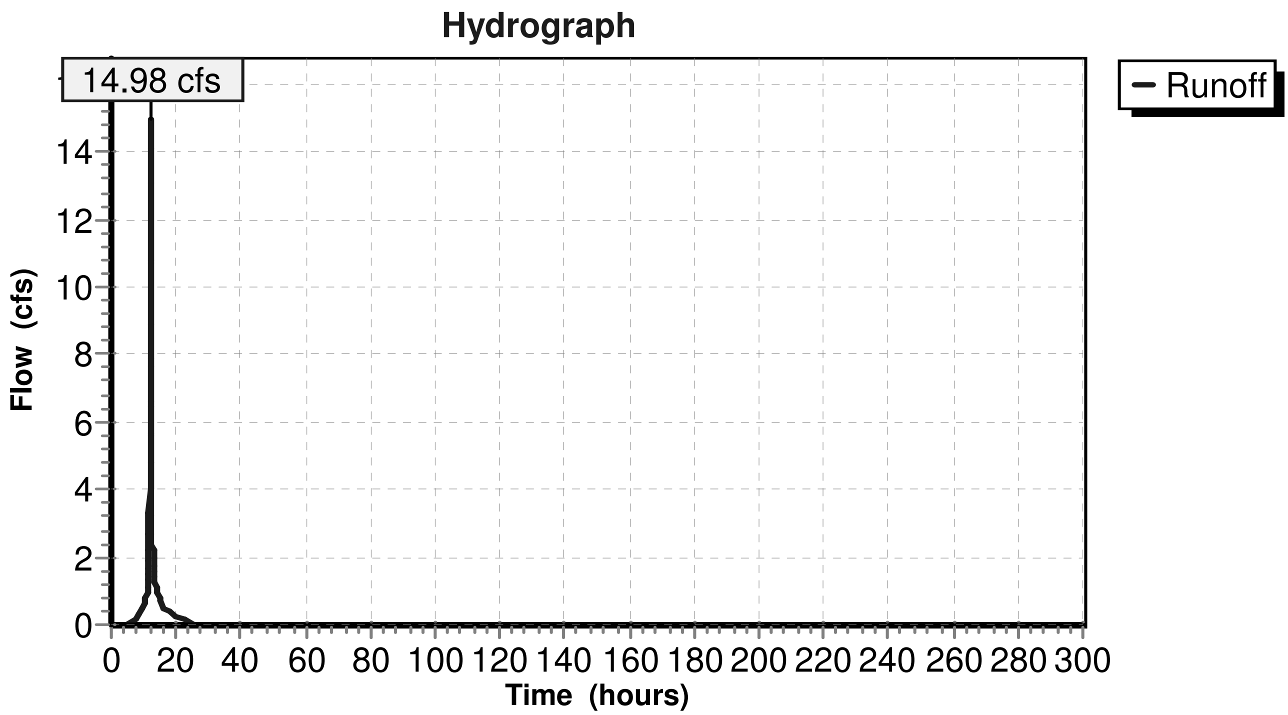
Runoff = 14.98 cfs @ 12.14 hrs, Volume= 1.292 af, Depth= 5.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
1.500	98	Paved parking & roofs
0.700	70	Woods, Good, HSG C
0.400	74	>75% Grass cover, Good, HSG C
2.600	87	Weighted Average
1.100		Pervious Area
1.500		Impervious Area

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

Subcatchment 1.1S:



Summary for Subcatchment 1.2S:

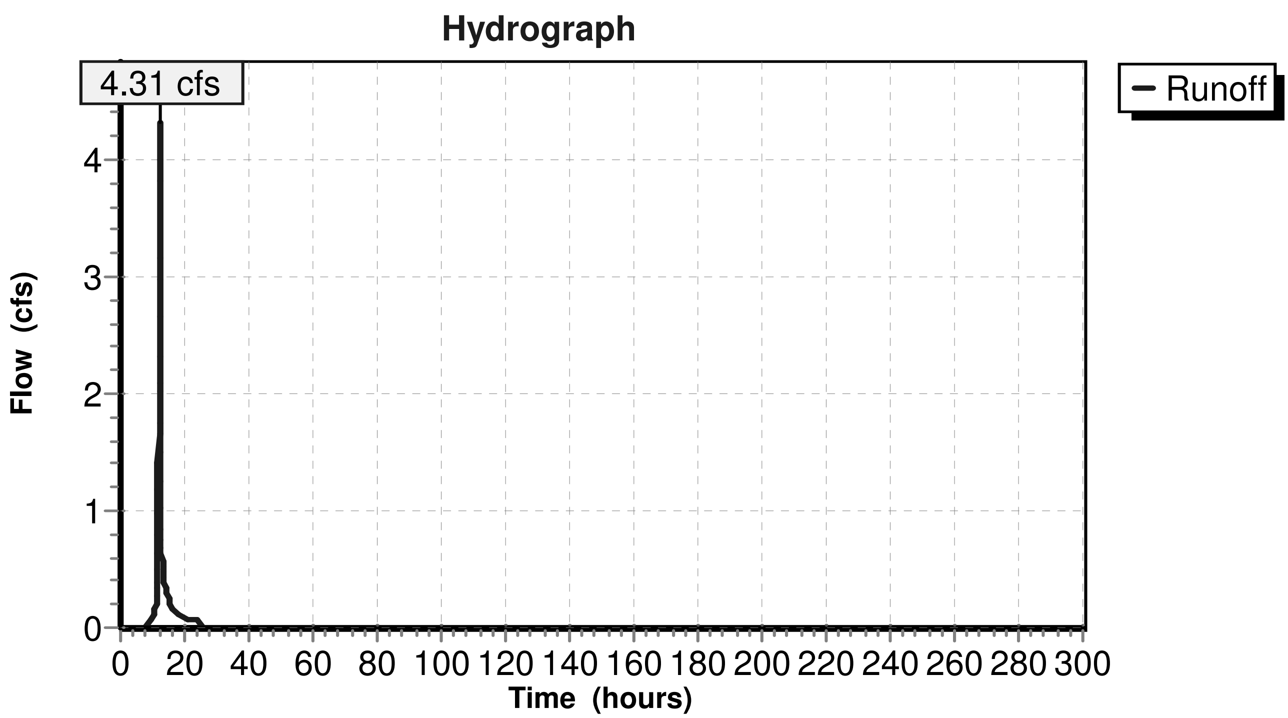
Runoff = 4.31 cfs @ 12.14 hrs, Volume= 0.355 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
0.500	74	>75% Grass cover, Good, HSG C
0.500	70	Woods, Good, HSG C
1.000	72	Weighted Average
1.000		Pervious Area

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

Subcatchment 1.2S:



Summary for Subcatchment 1.3S:

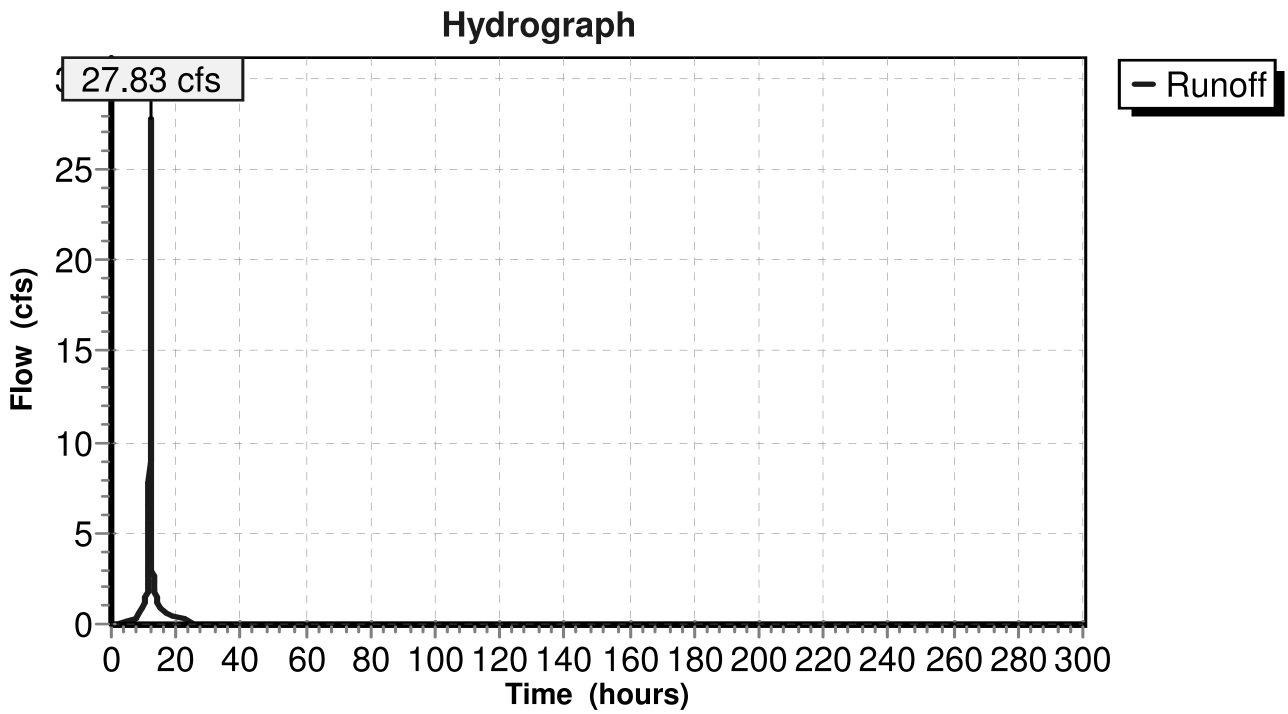
Runoff = 27.83 cfs @ 12.04 hrs, Volume= 1.951 af, Depth= 6.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
0.660	79	50-75% Grass cover, Fair, HSG C
0.370	65	Brush, Good, HSG C
2.610	98	Paved parking & roofs
3.640	91	Weighted Average
1.030		Pervious Area
2.610		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.50"
0.2	60	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	305	0.0370	10.97	13.46	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	130	0.0920	17.30	21.23	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	60	0.0650	14.54	17.84	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
2.2	655	Total			

Subcatchment 1.3S:



Summary for Subcatchment 1.4S:

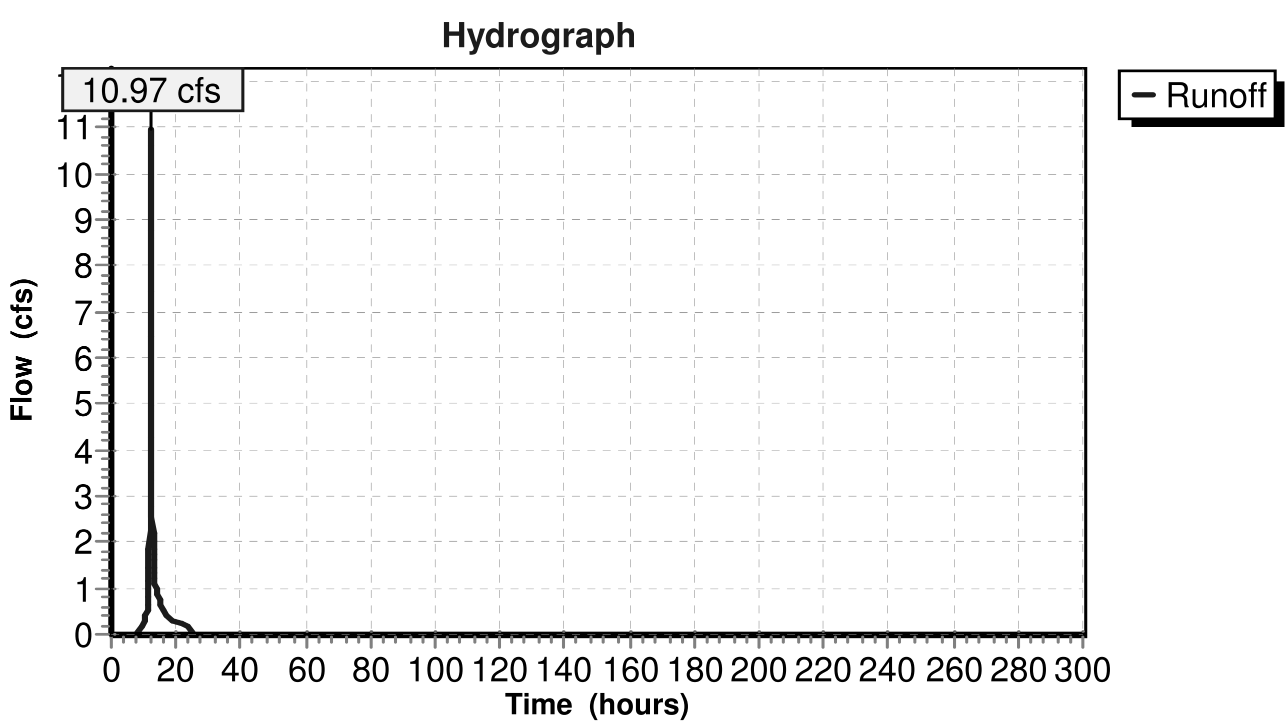
Runoff = 10.97 cfs @ 12.19 hrs, Volume= 0.994 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
1.500	70	Woods, Good, HSG C
1.300	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking & roofs
2.800	72	Weighted Average
2.800		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.5	250	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	350	Total			

Subcatchment 1.4S:



Summary for Subcatchment 2.0S:

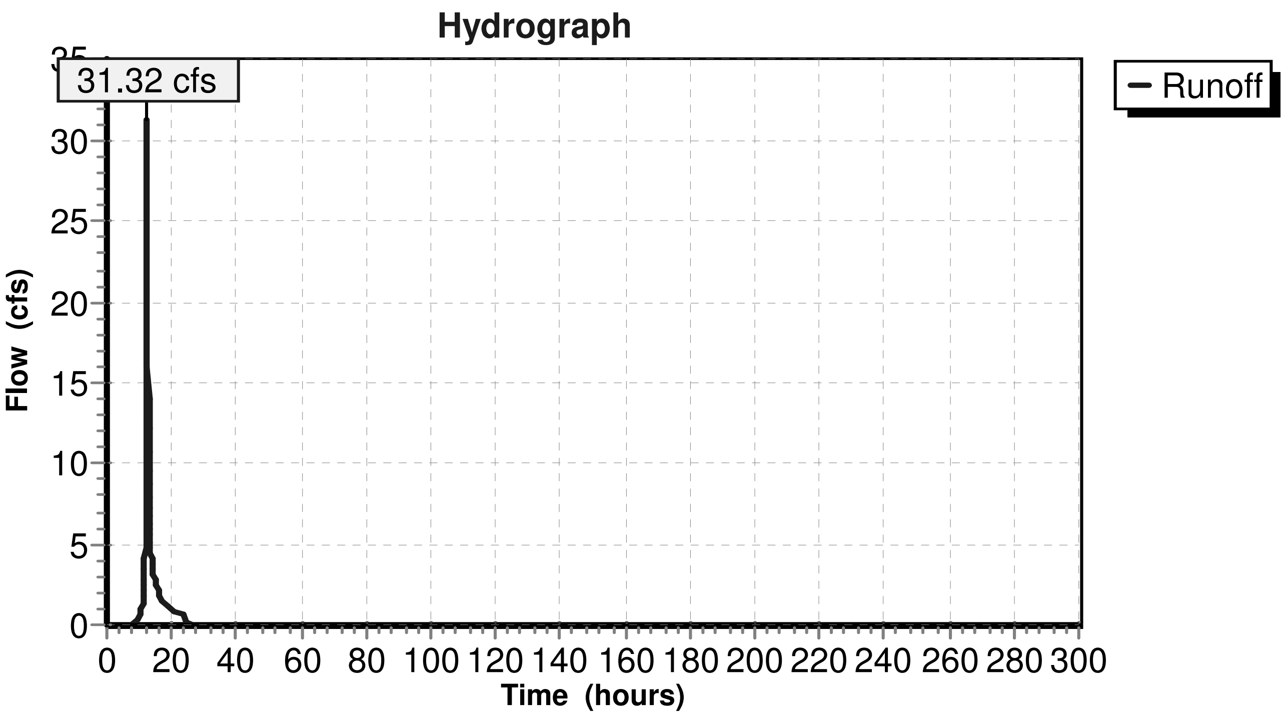
Runoff = 31.32 cfs @ 12.33 hrs, Volume= 3.567 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
10.600	70	Woods, Good, HSG C
10.600		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0600	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
10.6	1,100	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.8	1,200	Total			

Subcatchment 2.0S:



Summary for Subcatchment 3.0S:

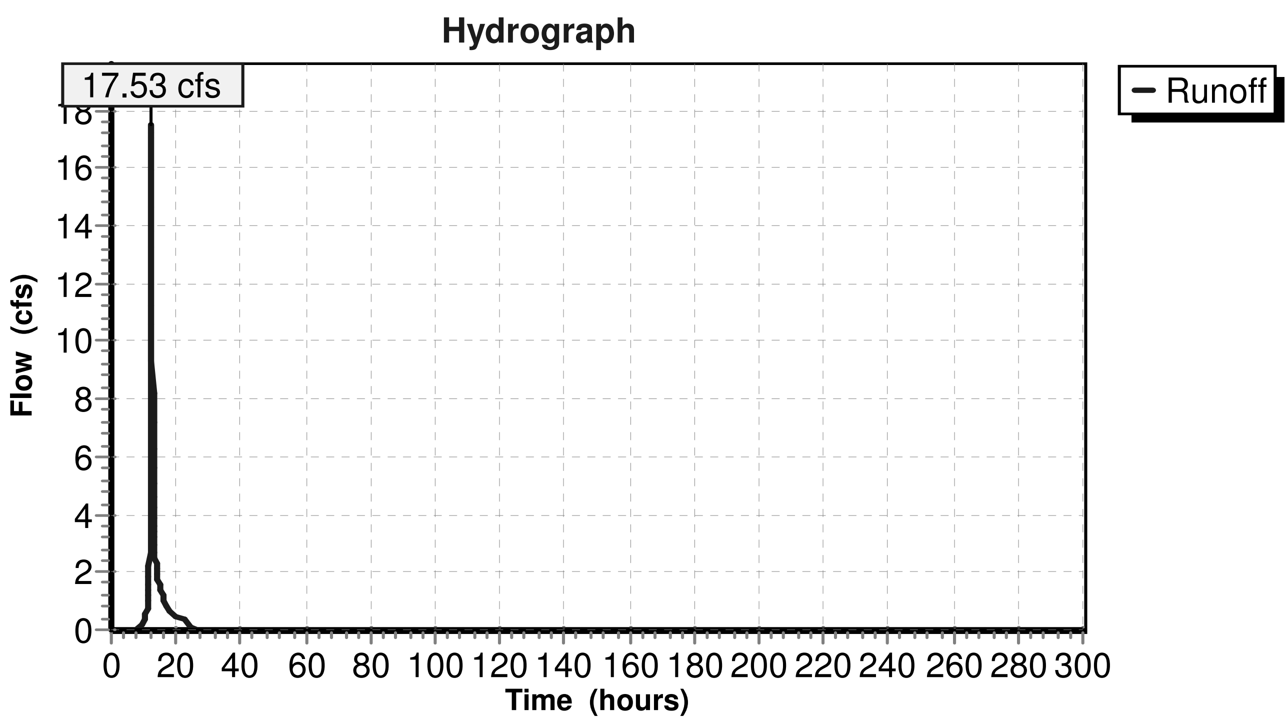
Runoff = 17.53 cfs @ 12.34 hrs, Volume= 2.019 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
6.000	70	Woods, Good, HSG C
6.000		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.0350	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
8.1	940	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
24.5	1,040	Total			

Subcatchment 3.0S:



Summary for Subcatchment 4.0S:

Runoff = 46.28 cfs @ 12.27 hrs, Volume= 4.845 af, Depth= 3.93"

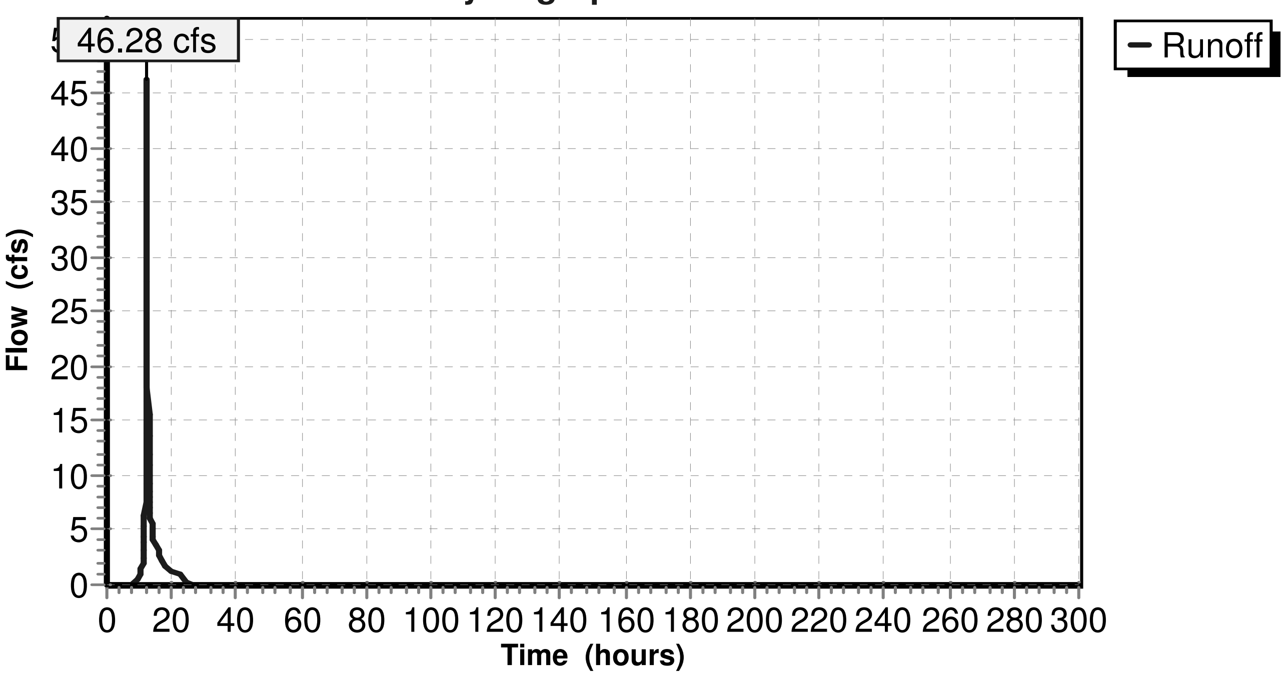
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
14.100	70	Woods, Good, HSG C
0.700	55	Woods, Good, HSG B
14.800	69	Weighted Average
14.800		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
8.2	980	0.1600	2.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.5	1,080	Total			

Subcatchment 4.0S:

Hydrograph



Summary for Subcatchment 5.0S:

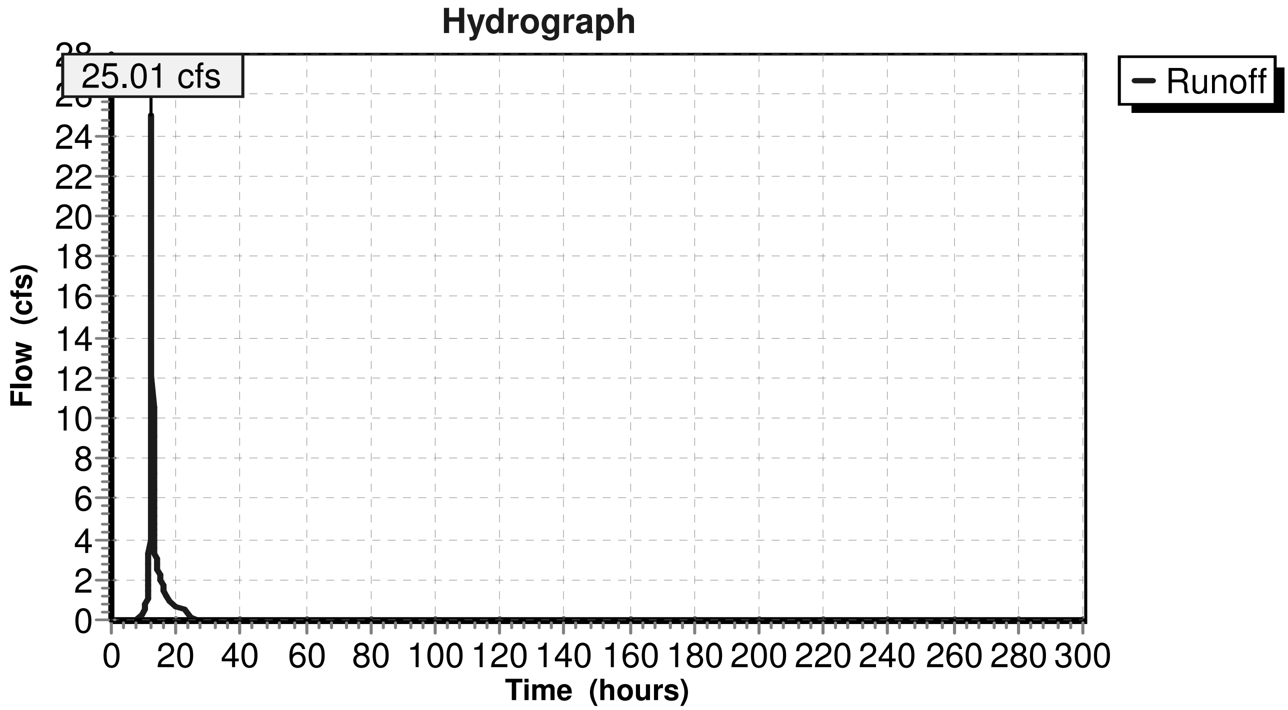
Runoff = 25.01 cfs @ 12.32 hrs, Volume= 2.793 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
8.300	70	Woods, Good, HSG C
8.300		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.3	140	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.8	240	Total			

Subcatchment 5.0S:

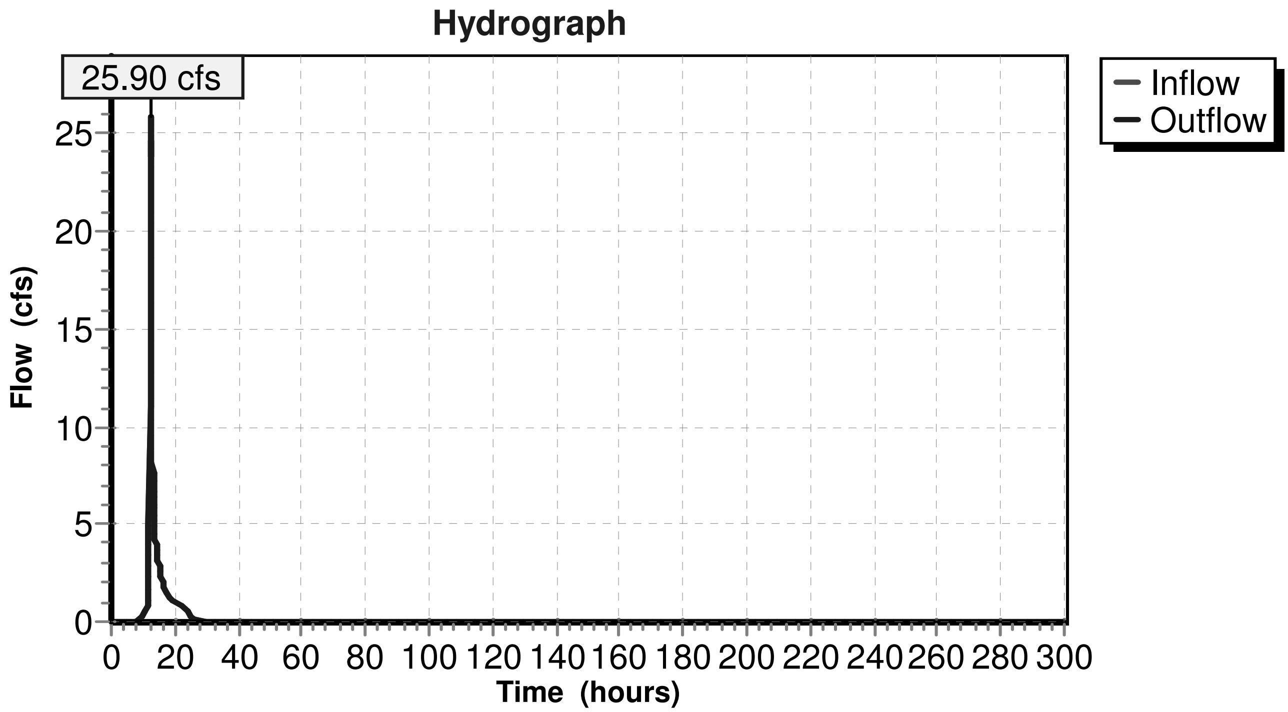


Summary for Reach DP 1:

Inflow Area = 10.040 ac, 40.94% Impervious, Inflow Depth = 4.54" for 100 year event
Inflow = 25.90 cfs @ 12.34 hrs, Volume= 3.798 af
Outflow = 25.90 cfs @ 12.34 hrs, Volume= 3.798 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

Reach DP 1:



Summary for Pond 1.1P:

Inflow Area = 2.600 ac, 57.69% Impervious, Inflow Depth = 5.96" for 100 year event
Inflow = 14.98 cfs @ 12.14 hrs, Volume= 1.292 af
Outflow = 12.19 cfs @ 12.22 hrs, Volume= 1.292 af, Atten= 19%, Lag= 4.9 min
Primary = 12.19 cfs @ 12.22 hrs, Volume= 1.292 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 403.00' Surf.Area= 2,630 sf Storage= 4,100 cf
Peak Elev= 405.89' @ 12.22 hrs Surf.Area= 7,986 sf Storage= 19,940 cf (15,840 cf above start)

Plug-Flow detention time= 547.3 min calculated for 1.198 af (93% of inflow)
Center-of-Mass det. time= 465.7 min (1,256.7 - 791.0)

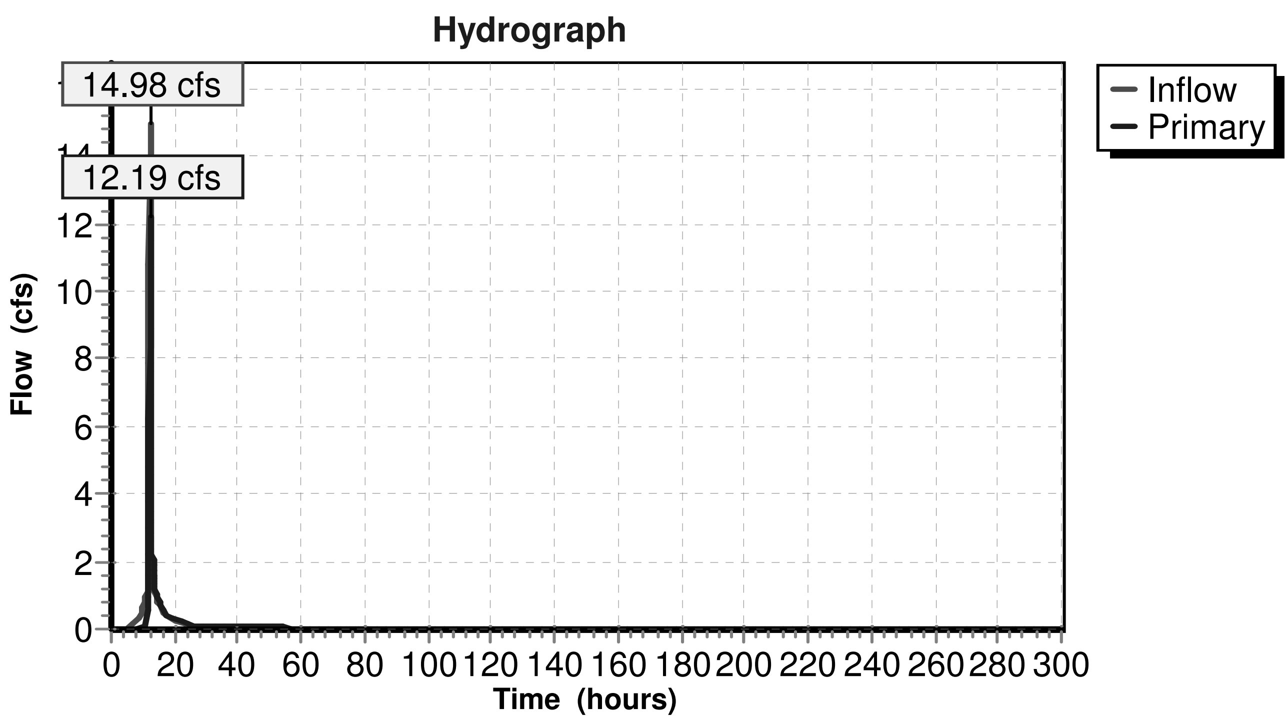
Volume	Invert	Avail.Storage	Storage Description
#1	399.00'	29,730 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
399.00	70	0	0
401.00	700	770	770
403.00	2,630	3,330	4,100
405.00	6,700	9,330	13,430
407.00	9,600	16,300	29,730

Device	Routing	Invert	Outlet Devices
#1	Device 3	403.00'	**1.2" Vert. Orifice/Grate** C= 0.600
#2	Device 3	405.00'	**5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Primary	399.00'	**15.0" x 60.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 388.00' S= 0.1833 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=12.01 cfs @ 12.22 hrs HW=405.88' (Free Discharge)
└─**3=Culvert** (Passes 12.01 cfs of 14.78 cfs potential flow)
  ├─**1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 8.10 fps)
  └─**2=Broad-Crested Rectangular Weir** (Weir Controls 11.95 cfs @ 2.72 fps)

Pond 1.1P:


Hydrograph
14.98 cfs
12.19 cfs
Inflow
Primary
Flow (cfs)
0
2
4
6
8
10
12
14
Time (hours)
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

Summary for Pond 1.2P:

Inflow Area = 3.600 ac, 41.67% Impervious, Inflow Depth = 5.49" for 100 year event
Inflow = 15.85 cfs @ 12.20 hrs, Volume= 1.647 af
Outflow = 10.11 cfs @ 12.44 hrs, Volume= 1.647 af, Atten= 36%, Lag= 14.1 min
Primary = 10.11 cfs @ 12.44 hrs, Volume= 1.647 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 369.90' @ 12.44 hrs Surf.Area= 6,545 sf Storage= 20,001 cf

Plug-Flow detention time= 1,142.5 min calculated for 1.647 af (100% of inflow)
Center-of-Mass det. time= 1,142.6 min (2,306.8 - 1,164.1)

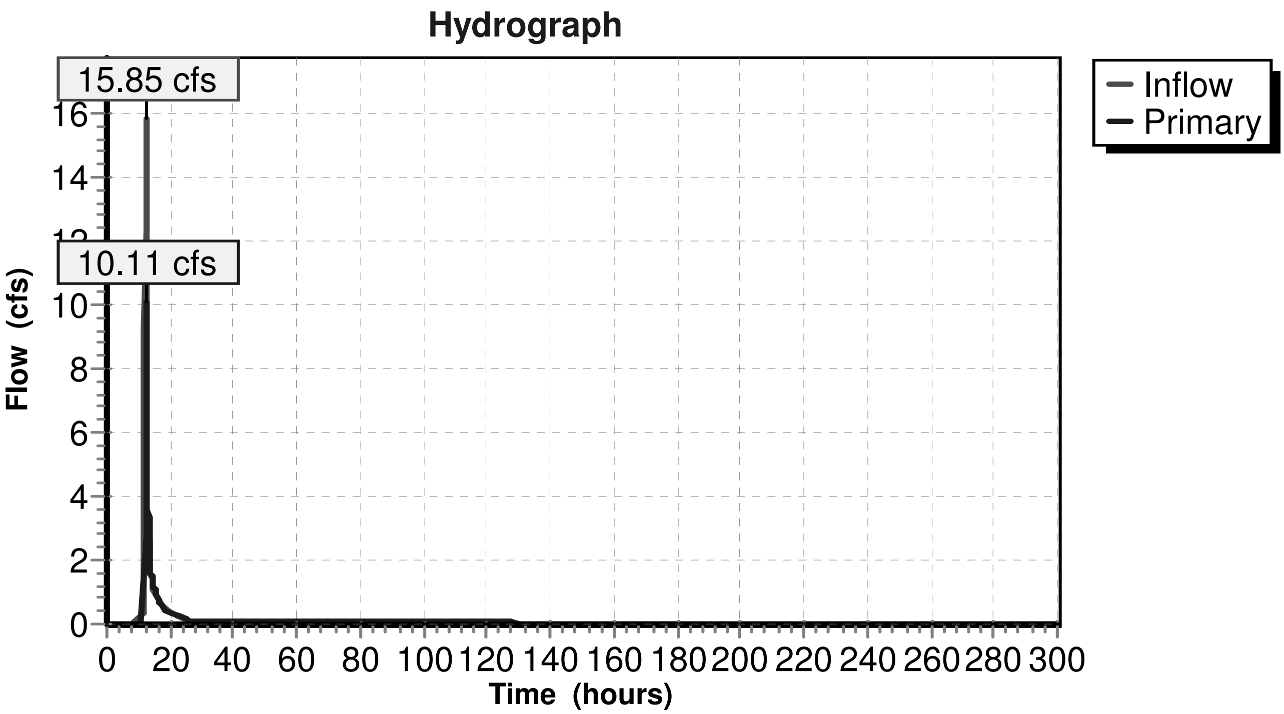
Volume	Invert	Avail.Storage	Storage Description
#1	365.00'	27,830 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
365.00	1,800	0	0
367.00	3,590	5,390	5,390
369.00	5,550	9,140	14,530
371.00	7,750	13,300	27,830

Device	Routing	Invert	Outlet Devices
#1	Device 3	364.00'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Device 3	369.00'	**4.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Primary	363.00'	**15.0" x 90.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 360.00' S= 0.0333 '/' Cc= 0.900 n= 0.010 PVC, smooth interior

Primary OutFlow Max=10.05 cfs @ 12.44 hrs HW=369.90' (Free Discharge)
└─**3=Culvert** (Passes 10.05 cfs of 14.80 cfs potential flow)
  ├─**1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 11.66 fps)
  └─**2=Broad-Crested Rectangular Weir** (Weir Controls 9.99 cfs @ 2.77 fps)

Pond 1.2P:


Hydrograph
15.85 cfs
10.11 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
2
4
6
8
10
14
16
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300

Summary for Pond 1.3P:

Inflow Area = 3.640 ac, 71.70% Impervious, Inflow Depth = 6.43" for 100 year event
Inflow = 27.83 cfs @ 12.04 hrs, Volume= 1.951 af
Outflow = 14.02 cfs @ 12.16 hrs, Volume= 1.157 af, Atten= 50%, Lag= 7.3 min
Primary = 14.02 cfs @ 12.16 hrs, Volume= 1.157 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 387.06' @ 12.16 hrs Surf.Area= 10,492 sf Storage= 41,146 cf

Plug-Flow detention time= 211.5 min calculated for 1.157 af (59% of inflow)
Center-of-Mass det. time= 106.6 min (877.5 - 770.9)

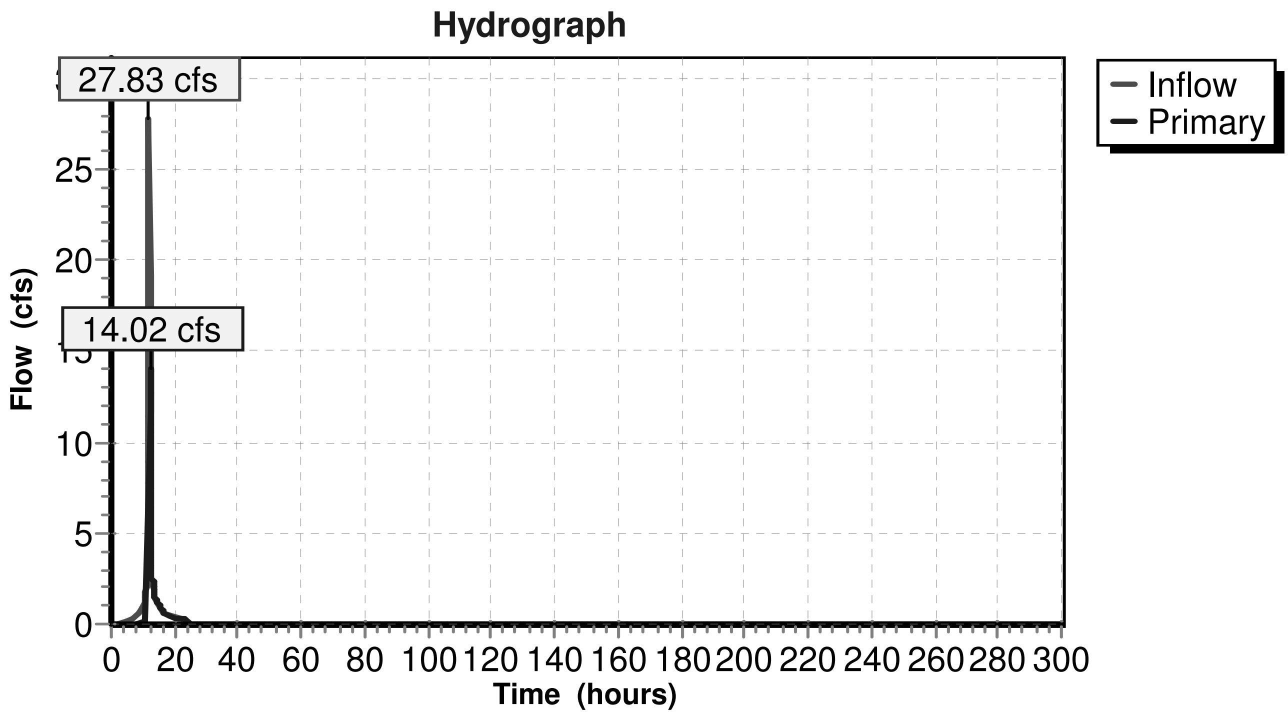
Volume	Invert	Avail.Storage	Storage Description
#1	378.00'	51,706 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
378.00	190	0	0
380.00	1,384	1,574	1,574
382.00	3,580	4,964	6,538
384.20	6,224	10,784	17,322
386.00	8,864	13,579	30,902
388.00	11,940	20,804	51,706

Device	Routing	Invert	Outlet Devices
#1	Primary	386.40'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	387.00'	**10.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

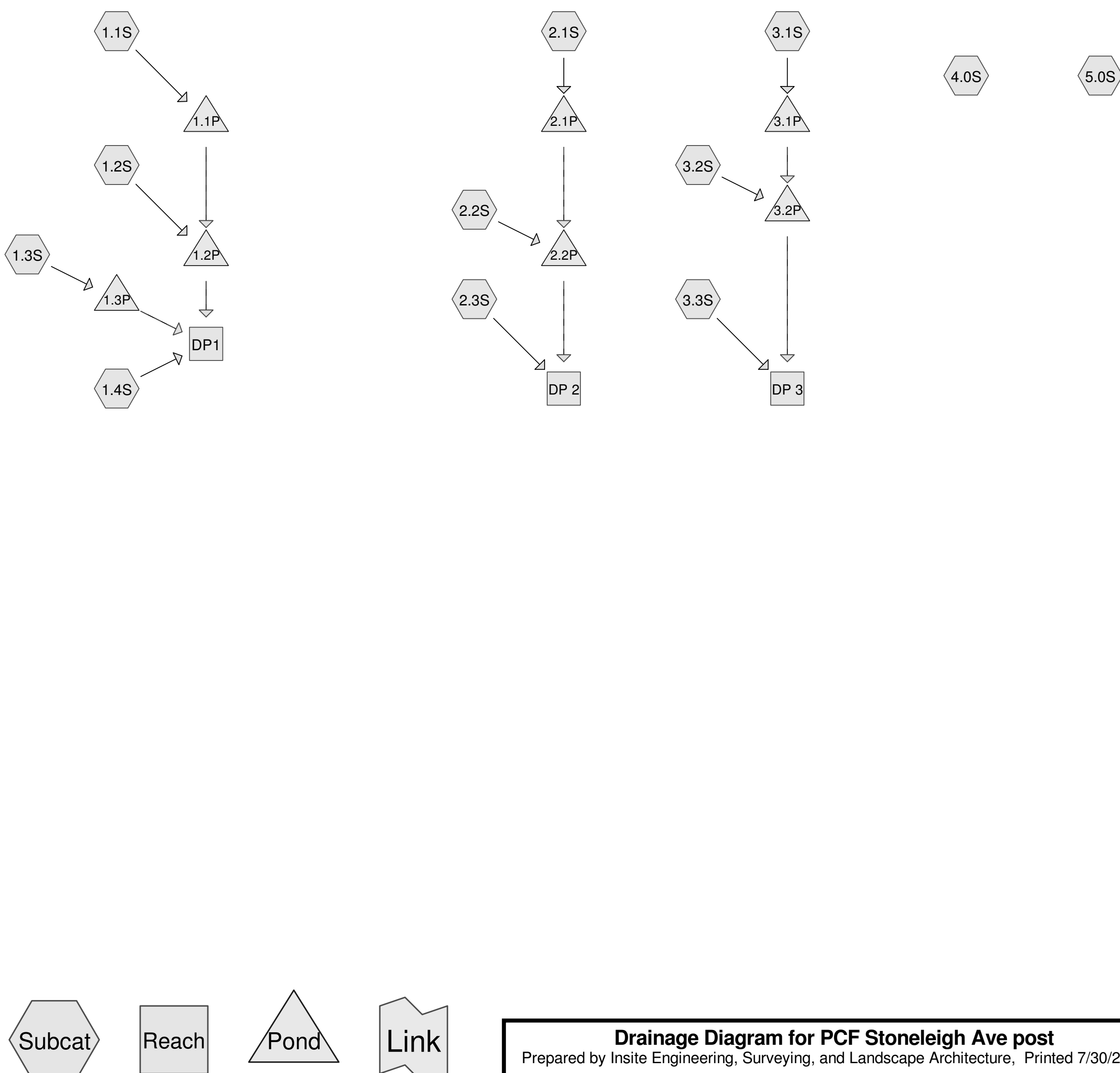
Primary OutFlow Max=13.59 cfs @ 12.16 hrs HW=387.05' (Free Discharge)
├─**1=Broad-Crested Rectangular Weir** (Weir Controls 13.25 cfs @ 2.54 fps)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.34 cfs @ 0.65 fps)

Pond 1.3P:


Hydrograph
27.83 cfs
14.02 cfs
Inflow
Primary
Flow (cfs)
0
5
10
15
20
25
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Time (hours)

APPENDIX B

Post-Development Computer Data



Drainage Diagram for PCF Stoneleigh Ave post
Prepared by Insite Engineering, Surveying, and Landscape Architecture, Printed 7/30/2008

Summary for Subcatchment 1.1S:

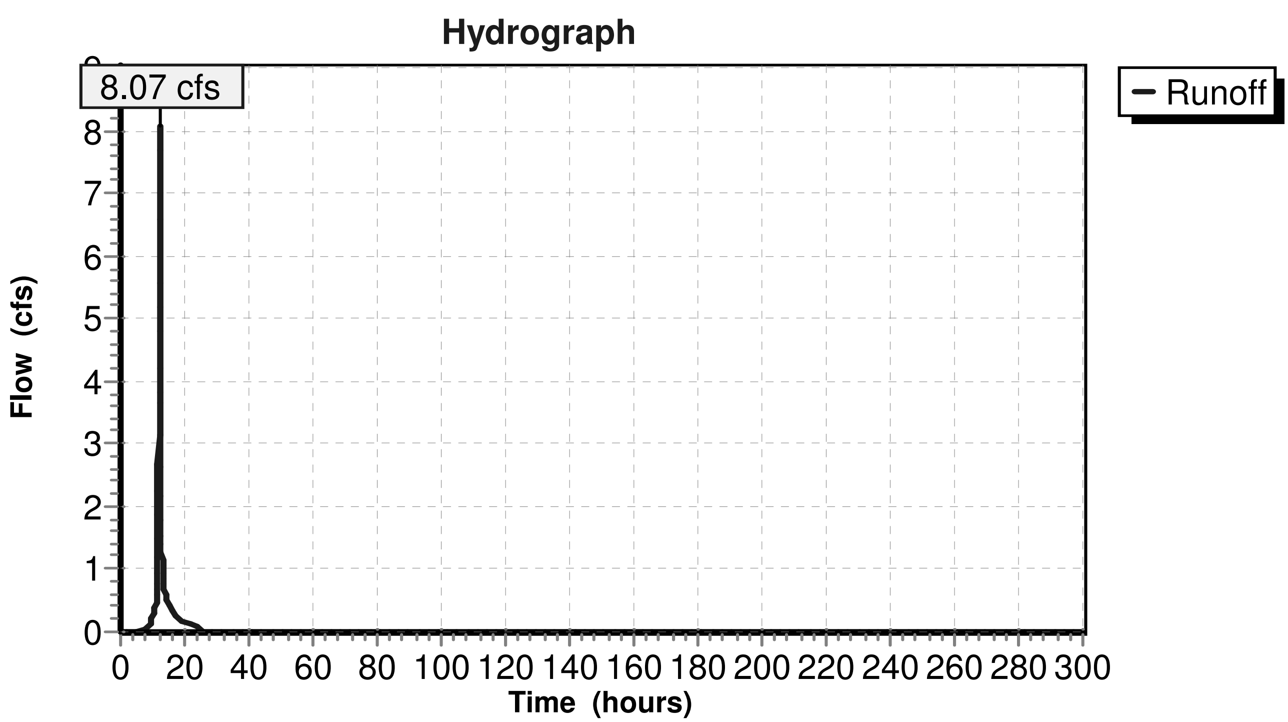
Runoff = 8.07 cfs @ 12.16 hrs, Volume= 0.699 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.70"

Area (ac)	CN	Description
3.200	98	Paved parking & roofs
1.700	74	>75% Grass cover, Good, HSG C
4.900	90	Weighted Average
1.700		Pervious Area
3.200		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	80	0.0875	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.9	390	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.3	310	0.1200	19.75	24.24	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
11.7	780	Total			

Subcatchment 1.1S:



Summary for Subcatchment 1.2S:

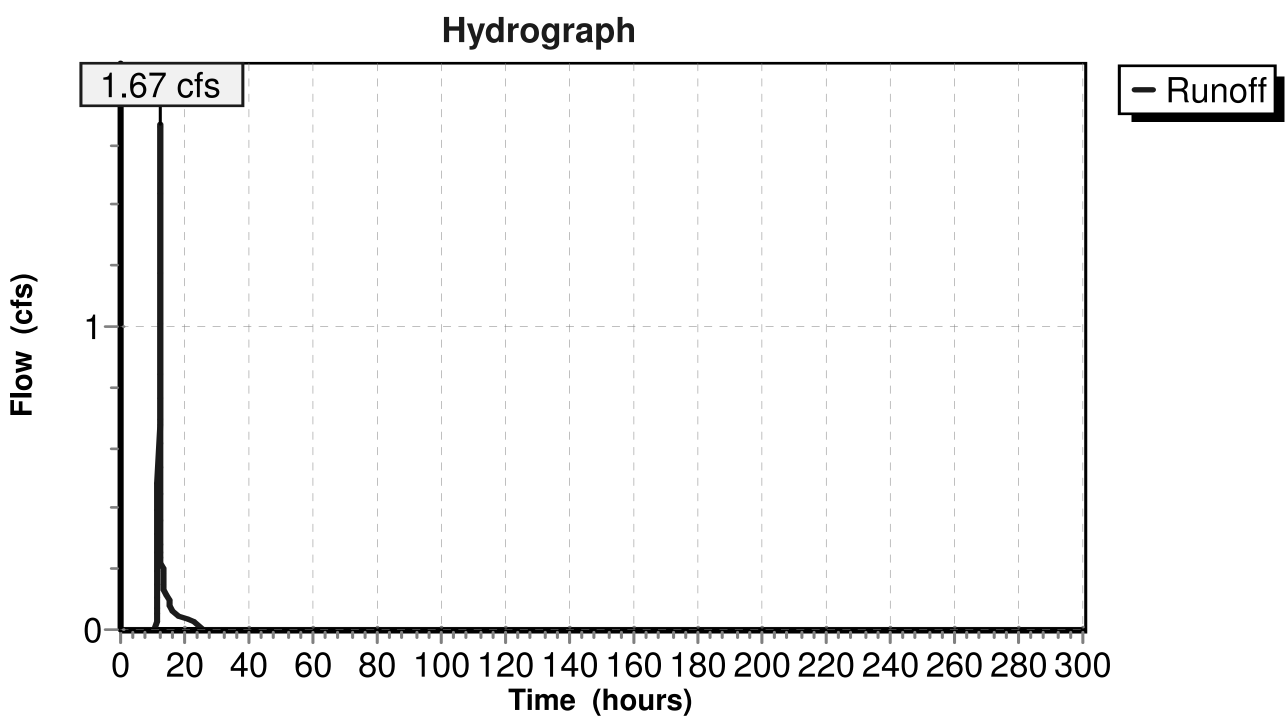
Runoff = 1.67 cfs @ 12.06 hrs, Volume= 0.115 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.70"

Area (ac)	CN	Description
0.250	98	Paved parking & roofs
1.250	74	>75% Grass cover, Good, HSG C
1.500	78	Weighted Average
1.250		Pervious Area
0.250		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	80	0.4300	0.40		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 1.2S:



Summary for Subcatchment 1.3S:

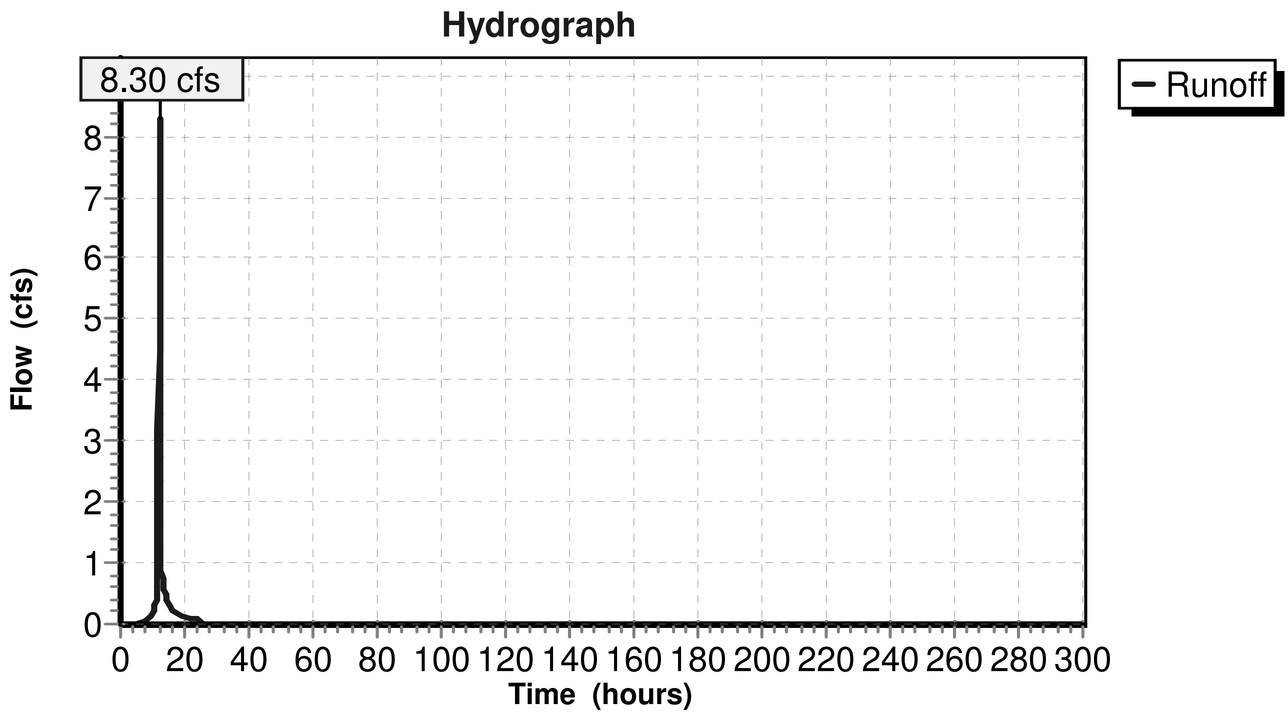
Runoff = 8.30 cfs @ 12.04 hrs, Volume= 0.544 af, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.70"

Area (ac)	CN	Description
0.660	79	50-75% Grass cover, Fair, HSG C
0.370	65	Brush, Good, HSG C
2.610	98	Paved parking & roofs
3.640	91	Weighted Average
1.030		Pervious Area
2.610		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.50"
0.2	60	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	305	0.0370	10.97	13.46	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	130	0.0920	17.30	21.23	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	60	0.0650	14.54	17.84	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
2.2	655	Total			

Subcatchment 1.3S:



Summary for Subcatchment 1.4S:

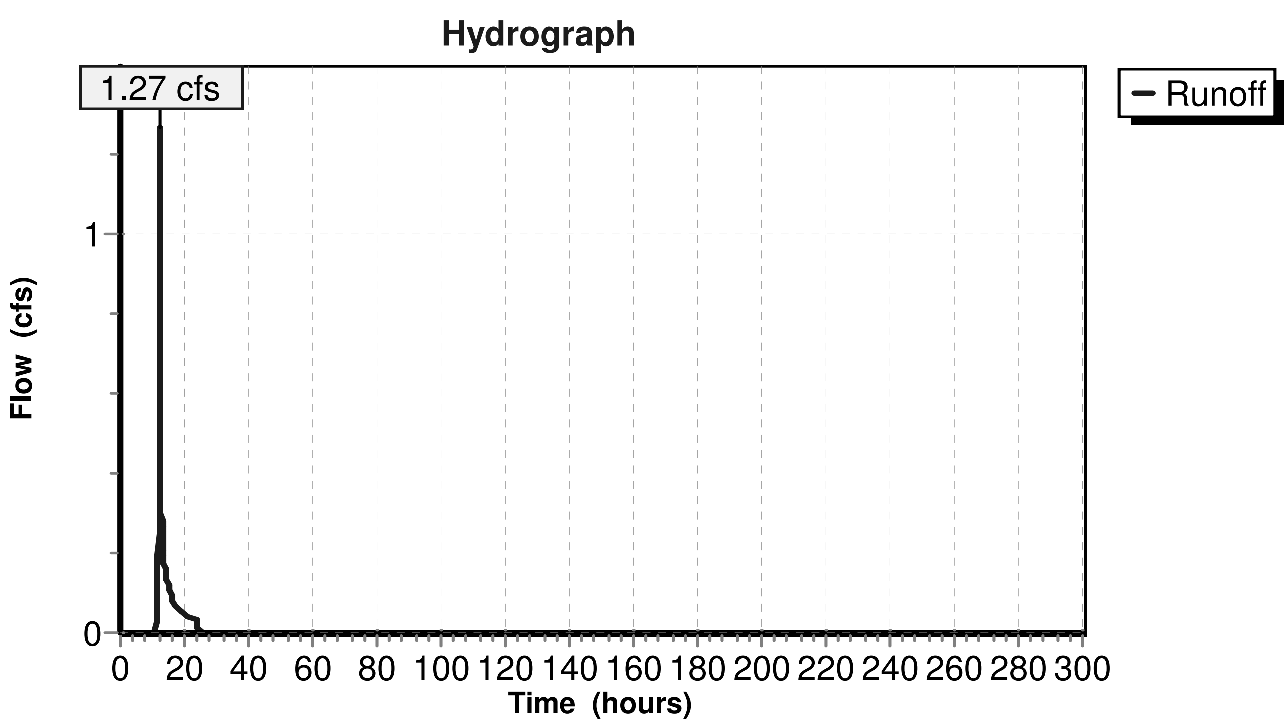
Runoff = 1.27 cfs @ 12.21 hrs, Volume= 0.130 af, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.70"

Area (ac)	CN	Description
1.200	70	Woods, Good, HSG C
0.950	74	>75% Grass cover, Good, HSG C
0.150	98	Paved parking & roofs
2.300	73	Weighted Average
2.150		Pervious Area
0.150		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.5	250	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	350	Total			

Subcatchment 1.4S:



Summary for Subcatchment 2.1S:

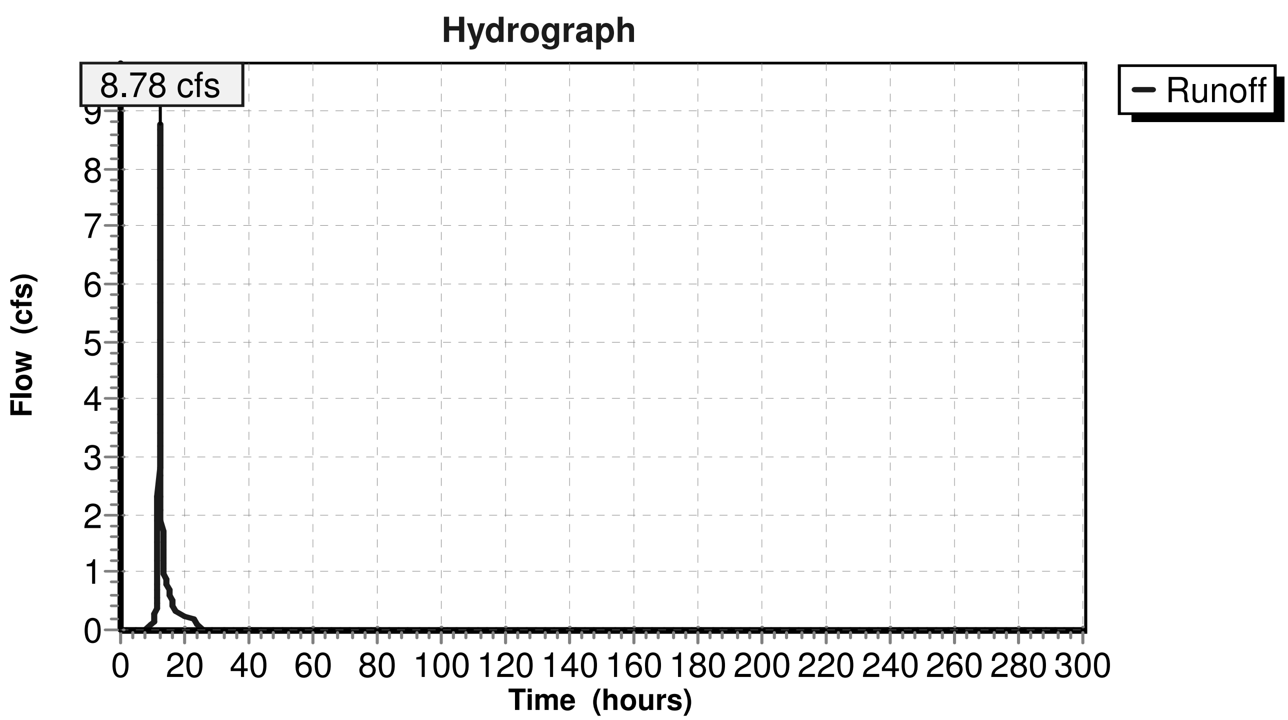
Runoff = 8.78 cfs @ 12.23 hrs, Volume= 0.860 af, Depth= 1.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.70"

Area (ac)	CN	Description
5.200	90	1/8 acre lots, 65% imp, HSG C
2.500	74	>75% Grass cover, Good, HSG C
7.700	85	Weighted Average
4.320		Pervious Area
3.380		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
2.0	120	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	740	0.0500	20.93	65.76	**Circular Channel (pipe),** Diam= 24.0" Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.010 PVC, smooth interior
16.2	960	Total			

Subcatchment 2.1S:



Summary for Subcatchment 2.2S:

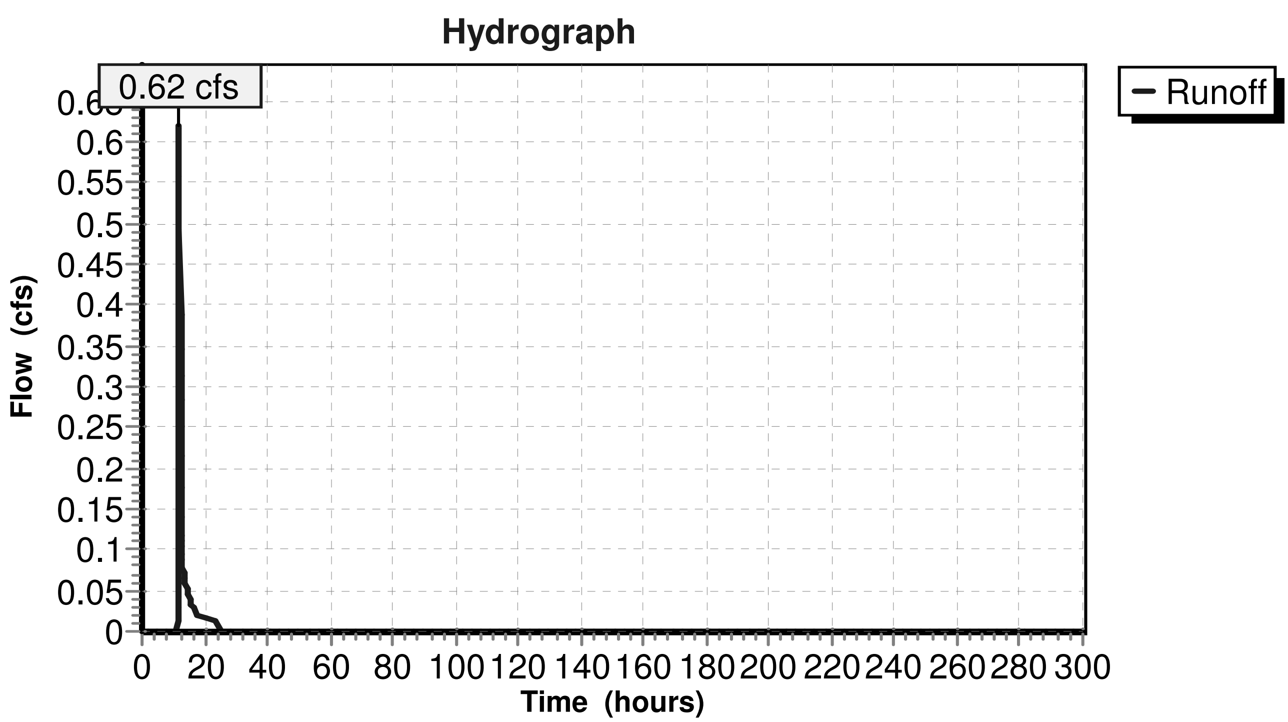
Runoff = 0.62 cfs @ 12.09 hrs, Volume= 0.048 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.70"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
0.800		Pervious Area

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

Subcatchment 2.2S:



Summary for Subcatchment 2.3S:

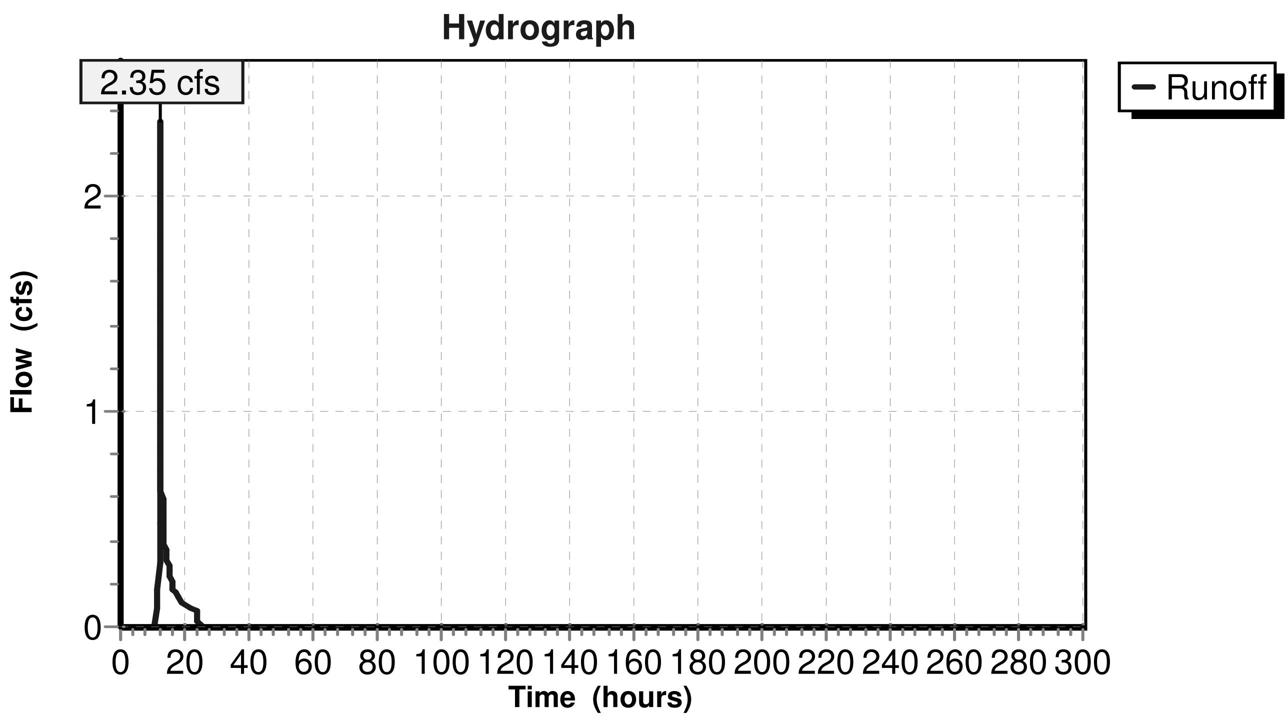
Runoff = 2.35 cfs @ 12.22 hrs, Volume= 0.263 af, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.70"

Area (ac)	CN	Description
5.700	70	Woods, Good, HSG C
5.700		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	8	0.5000	0.27		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
8.2	92	0.1700	0.19		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
4.8	580	0.1600	2.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	680	Total			

Subcatchment 2.3S:



Summary for Subcatchment 3.1S:

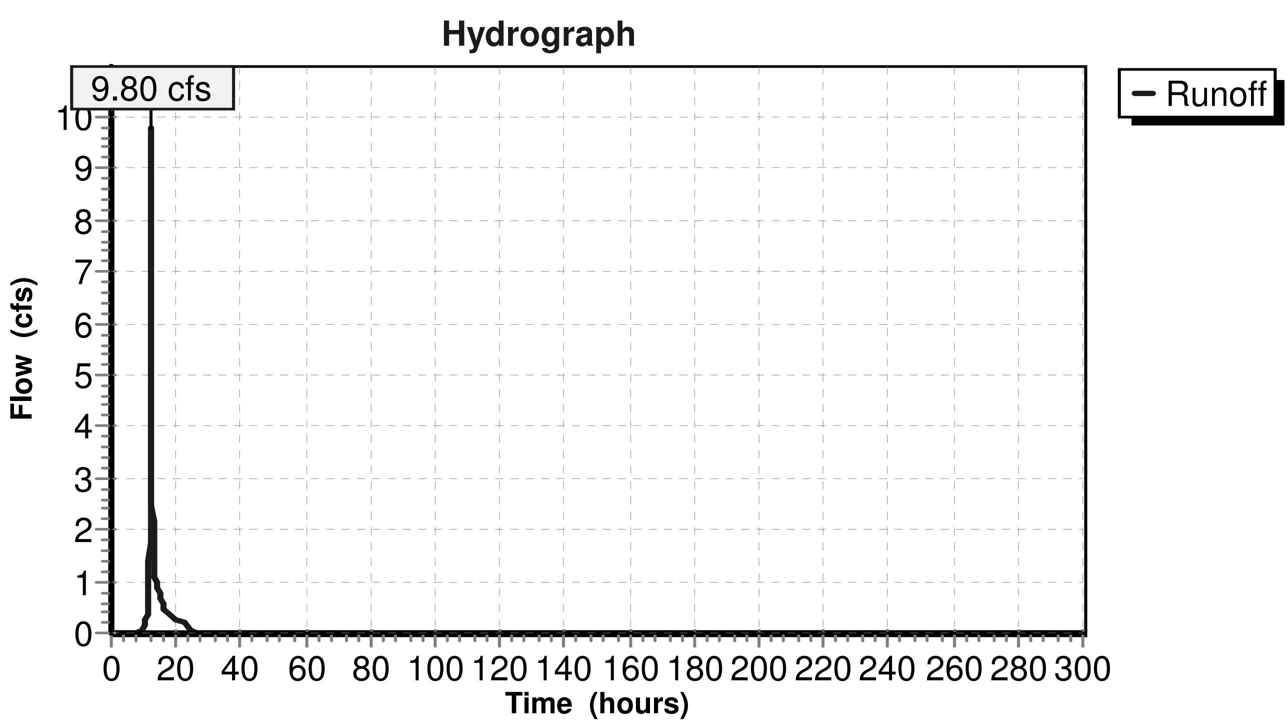
Runoff = 9.80 cfs @ 12.20 hrs, Volume= 0.902 af, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.70"

Area (ac)	CN	Description
1.500	98	Paved parking & roofs
2.900	90	1/8 acre lots, 65% imp, HSG C
4.100	74	>75% Grass cover, Good, HSG C
8.500	84	Weighted Average
5.115		Pervious Area
3.385		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.4	260	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.7	360	Total			

Subcatchment 3.1S:



Summary for Subcatchment 3.2S:

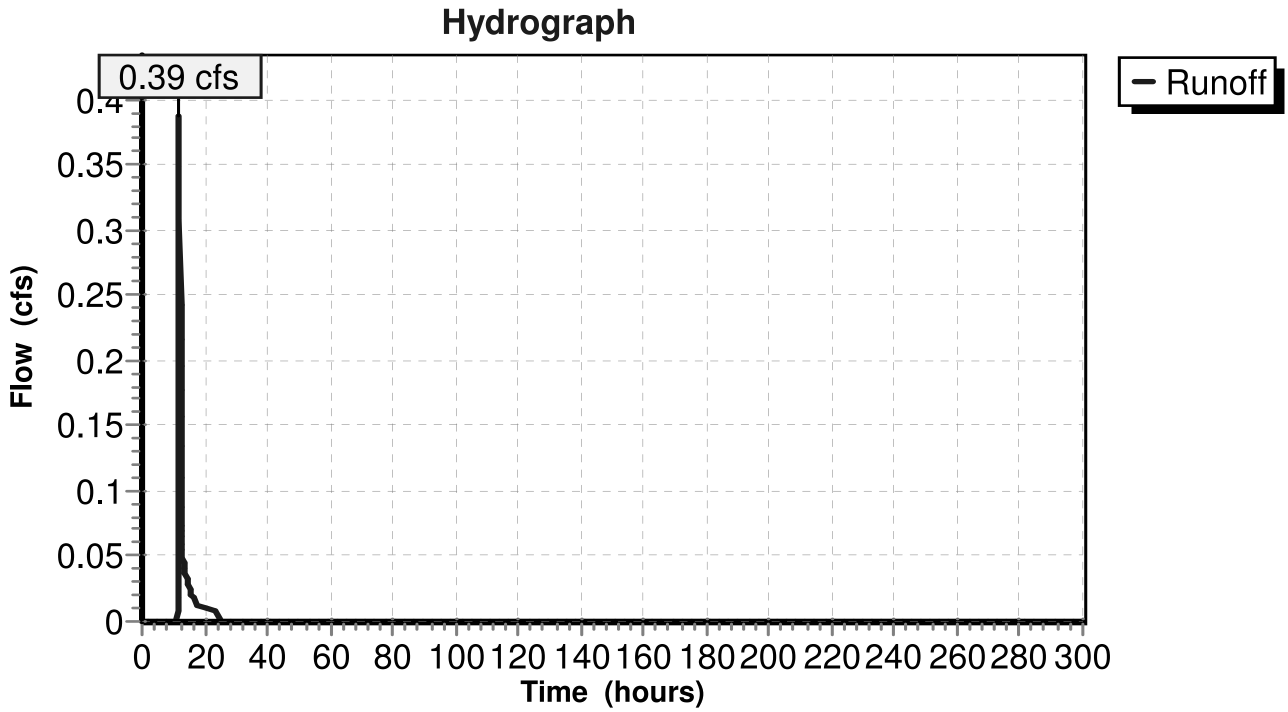
Runoff = 0.39 cfs @ 12.09 hrs, Volume= 0.030 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.70"

Area (ac)	CN	Description
0.500	74	>75% Grass cover, Good, HSG C
0.500		Pervious Area

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

Subcatchment 3.2S:



Summary for Subcatchment 3.3S:

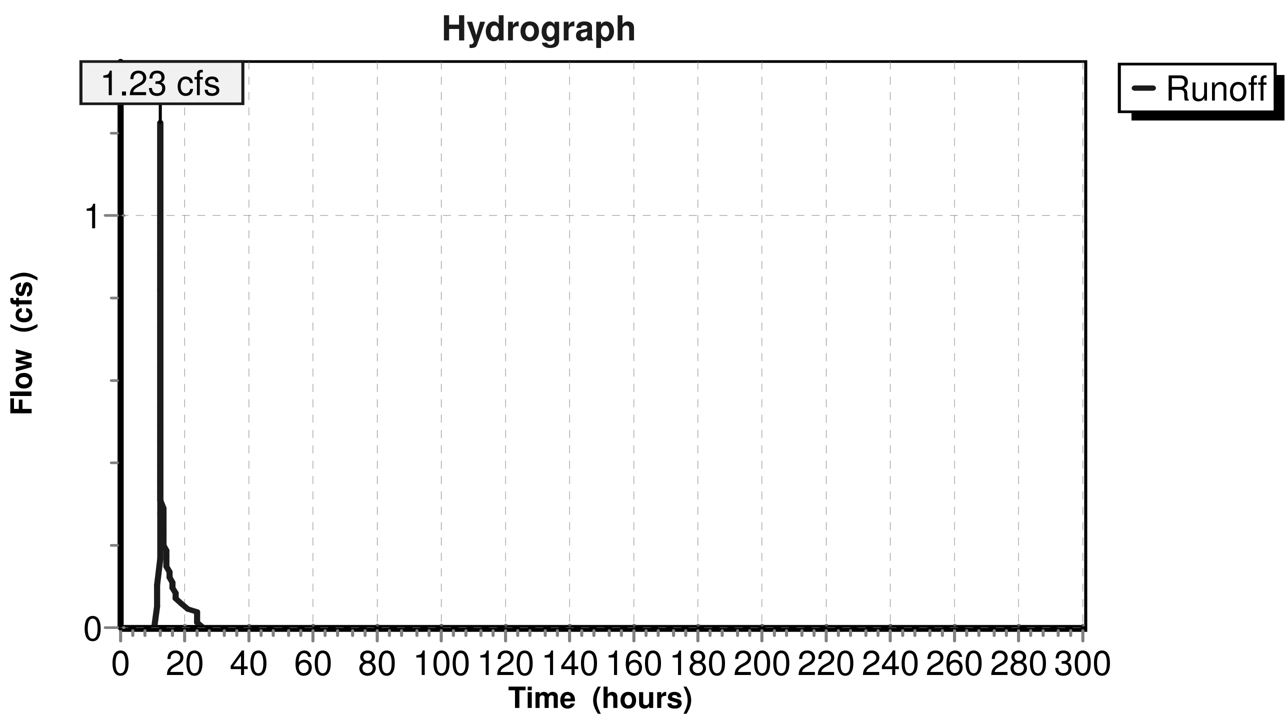
Runoff = 1.23 cfs @ 12.21 hrs, Volume= 0.134 af, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.70"

Area (ac)	CN	Description
2.700	70	Woods, Good, HSG C
0.200	74	>75% Grass cover, Good, HSG C
2.900	70	Weighted Average
2.900		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	26	0.4200	0.32		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
7.6	74	0.1300	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
3.1	388	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	207	0.0480	13.23	128.96	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.50' Z= 4.0 & 2.0 '/' Top.W=11.00' n= 0.022 Earth, clean & straight
12.4	695	Total			

Subcatchment 3.3S:



Summary for Subcatchment 4.0S:

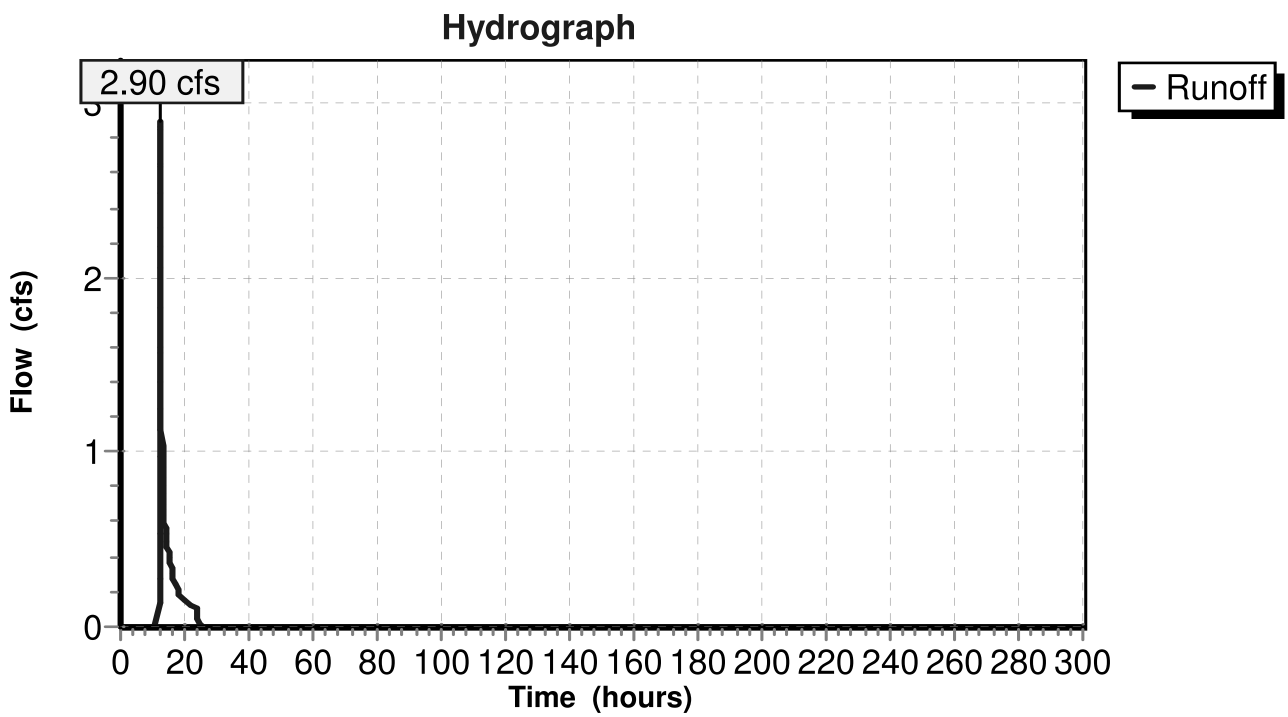
Runoff = 2.90 cfs @ 12.34 hrs, Volume= 0.387 af, Depth= 0.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.70"

Area (ac)	CN	Description
8.300	70	Woods, Good, HSG C
0.700	55	Woods, Good, HSG B
9.000	69	Weighted Average
9.000		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
8.2	980	0.1600	2.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.5	1,080	Total			

Subcatchment 4.0S:



Summary for Subcatchment 5.0S:

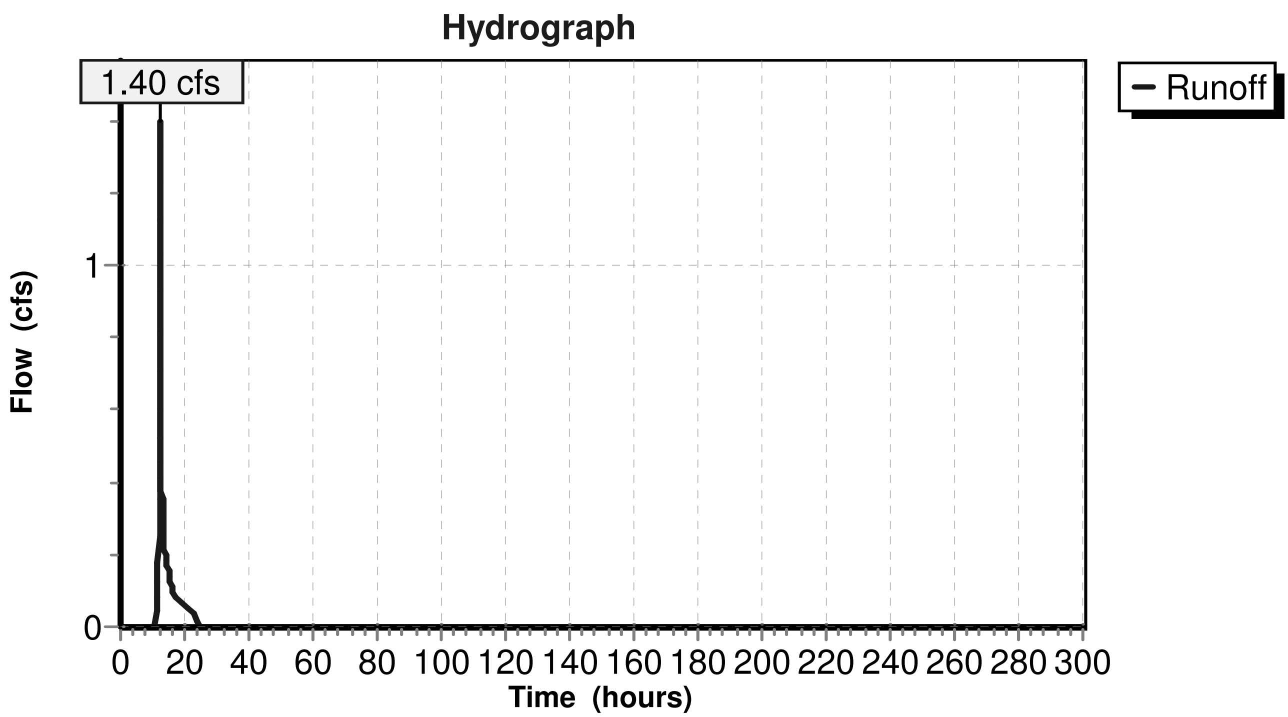
Runoff = 1.40 cfs @ 12.25 hrs, Volume= 0.153 af, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.70"

Area (ac)	CN	Description
1.700	74	>75% Grass cover, Good, HSG C
1.000	70	Woods, Good, HSG C
2.700	73	Weighted Average
2.700		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0500	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.4	120	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.6	220	Total			

Subcatchment 5.0S:

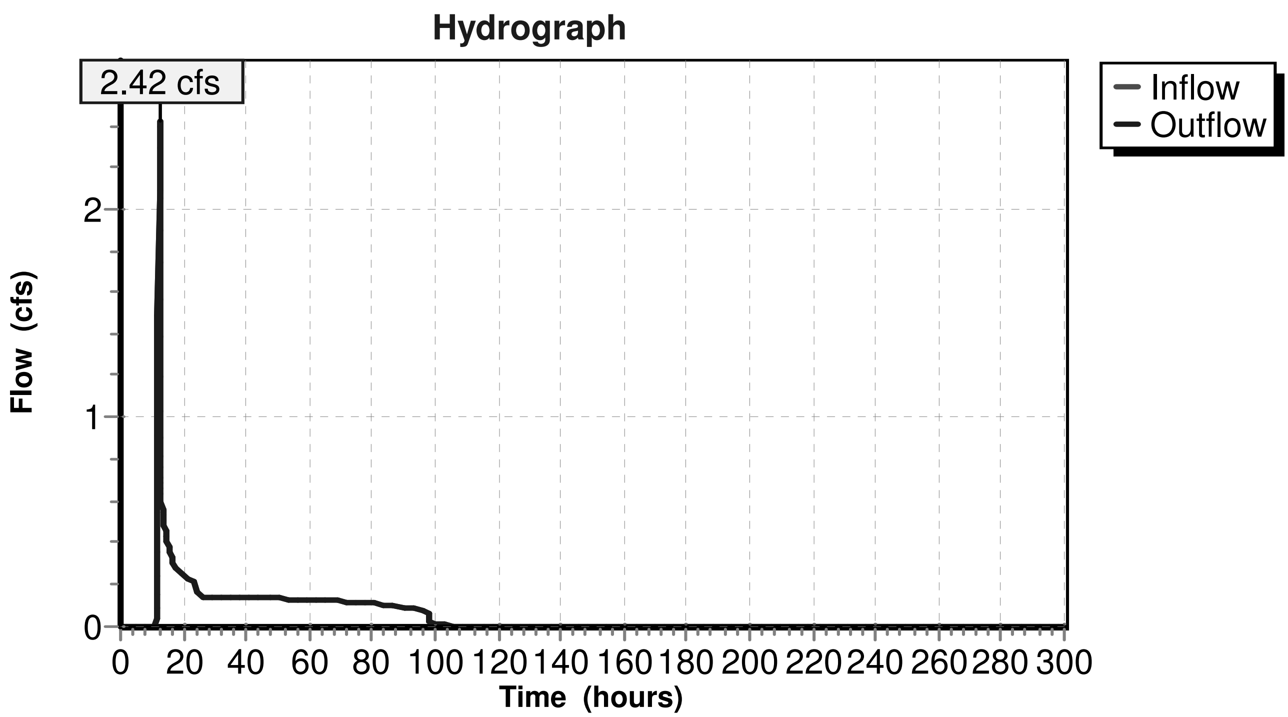


Summary for Reach DP 2:

Inflow Area = 14.200 ac, 23.80% Impervious, Inflow Depth = 0.99" for 1 year event
Inflow = 2.42 cfs @ 12.22 hrs, Volume= 1.168 af
Outflow = 2.42 cfs @ 12.22 hrs, Volume= 1.168 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

Reach DP 2:

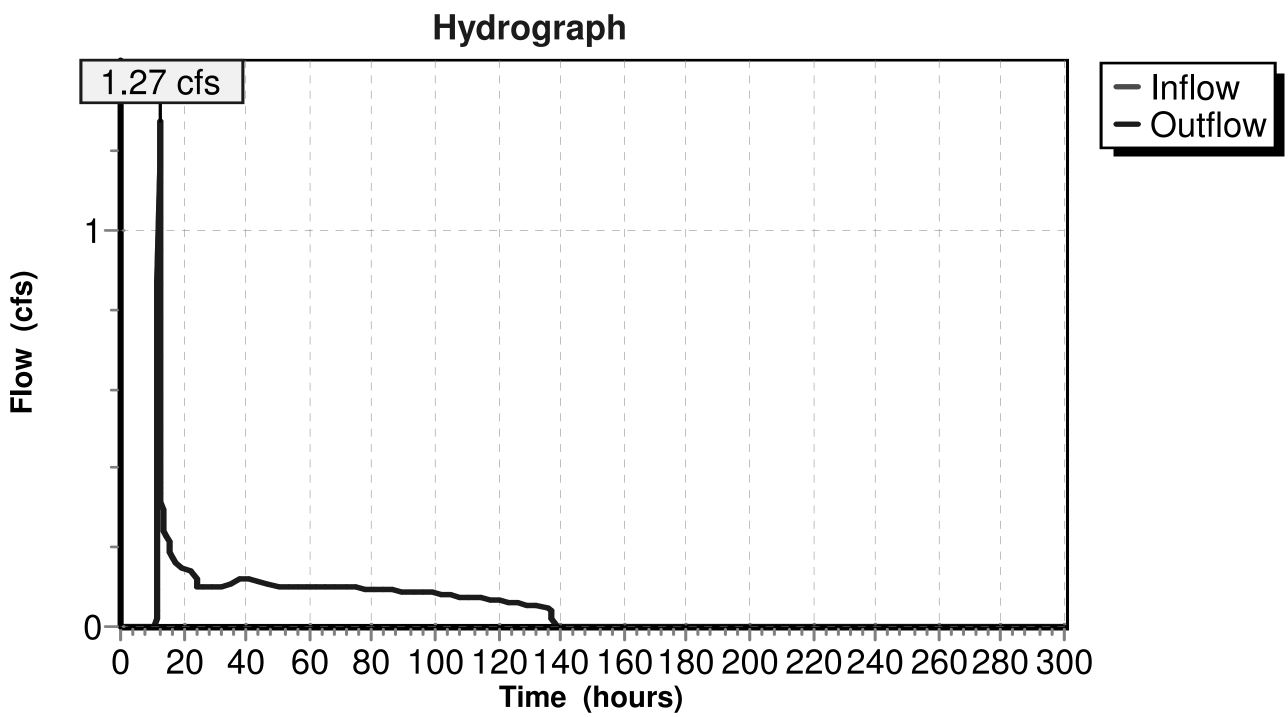


Summary for Reach DP 3:

Inflow Area = 11.900 ac, 28.45% Impervious, Inflow Depth > 1.07" for 1 year event
Inflow = 1.27 cfs @ 12.21 hrs, Volume= 1.063 af
Outflow = 1.27 cfs @ 12.21 hrs, Volume= 1.063 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

Reach DP 3:

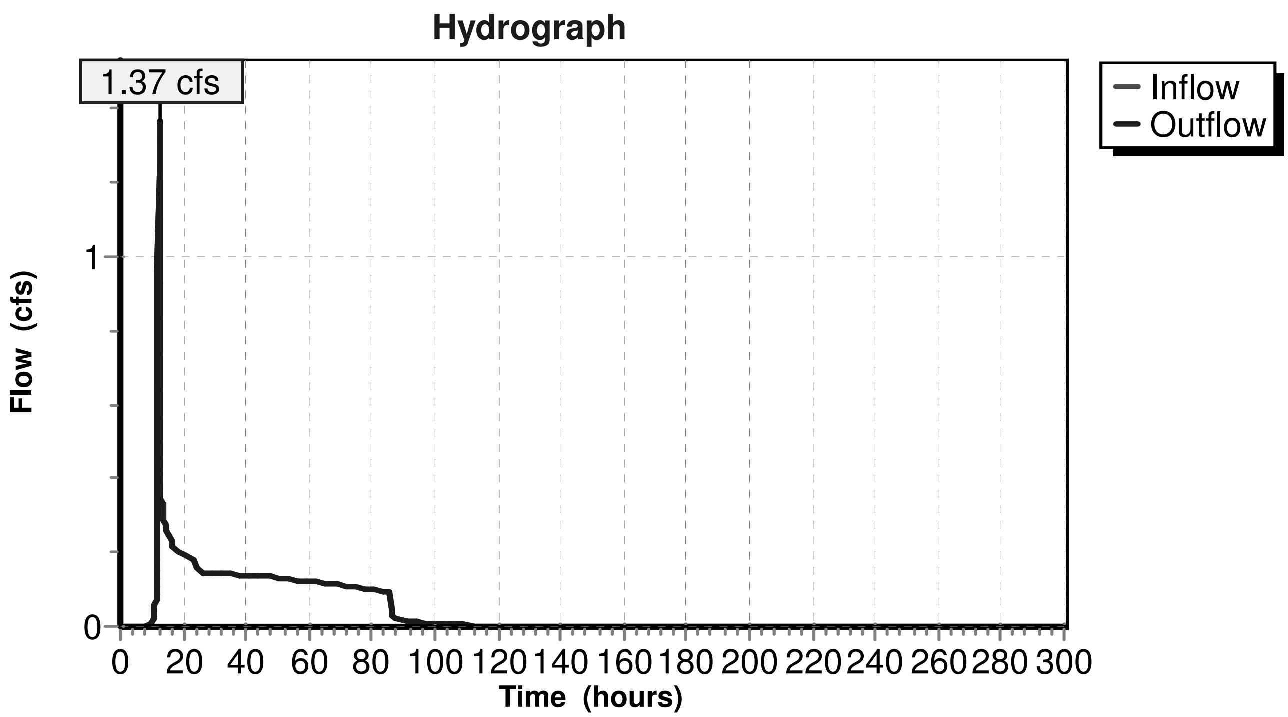


Summary for Reach DP1:

Inflow Area = 12.340 ac, 50.32% Impervious, Inflow Depth = 0.92" for 1 year event
Inflow = 1.37 cfs @ 12.21 hrs, Volume= 0.943 af
Outflow = 1.37 cfs @ 12.21 hrs, Volume= 0.943 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

Reach DP1:



Summary for Pond 1.1P:

Inflow Area = 4.900 ac, 65.31% Impervious, Inflow Depth = 1.71" for 1 year event
Inflow = 8.07 cfs @ 12.16 hrs, Volume= 0.699 af
Outflow = 0.86 cfs @ 13.18 hrs, Volume= 0.697 af, Atten= 89%, Lag= 60.9 min
Primary = 0.86 cfs @ 13.18 hrs, Volume= 0.697 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 403.20' Surf.Area= 8,340 sf Storage= 15,484 cf
Peak Elev= 404.87' @ 13.18 hrs Surf.Area= 12,821 sf Storage= 33,279 cf (17,795 cf above start)

Plug-Flow detention time= 2,629.4 min calculated for 0.342 af (49% of inflow)
Center-of-Mass det. time= 1,329.2 min (2,148.1 - 818.9)

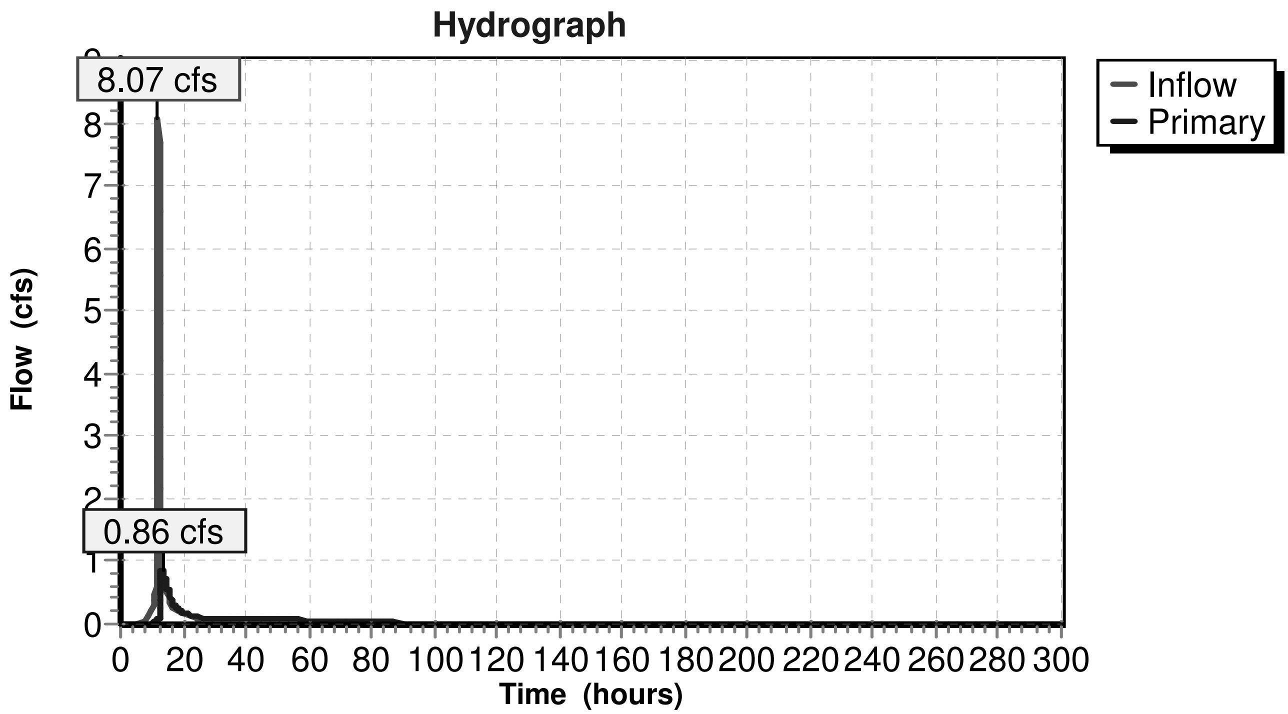
Volume	Invert	Avail.Storage	Storage Description
#1	399.00'	66,400 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
399.00	800	0	0
400.00	1,600	1,200	1,200
402.00	4,800	6,400	7,600
404.00	10,700	15,500	23,100
406.00	15,600	26,300	49,400
407.00	18,400	17,000	66,400

Device	Routing	Invert	Outlet Devices
#1	Primary	399.00'	**18.0" x 155.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 390.00' S= 0.0581 '/' Cc= 0.900 n= 0.012
#2	Device 1	403.20'	**1.8" Vert. Orifice/Grate** C= 0.600
#3	Device 1	404.70'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.86 cfs @ 13.18 hrs HW=404.87' TW=366.48' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.86 cfs of 19.24 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.11 cfs @ 6.07 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 0.75 cfs @ 1.14 fps)

Pond 1.1P:


Hydrograph
8.07 cfs
0.86 cfs
Inflow
Primary
Flow (cfs)
0
1
2
3
4
5
6
7
8
9
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Time (hours)

Summary for Pond 1.2P:

Inflow Area = 6.400 ac, 53.91% Impervious, Inflow Depth = 1.52" for 1 year event
Inflow = 1.74 cfs @ 12.06 hrs, Volume= 0.812 af
Outflow = 0.15 cfs @ 23.98 hrs, Volume= 0.812 af, Atten= 92%, Lag= 715.1 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.15 cfs @ 23.98 hrs, Volume= 0.812 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 367.50' @ 23.98 hrs Surf.Area= 9,794 sf Storage= 13,141 cf

Plug-Flow detention time= 948.7 min calculated for 0.812 af (100% of inflow)
Center-of-Mass det. time= 948.5 min (2,913.7 - 1,965.2)

Volume	Invert	Avail.Storage	Storage Description
#1	365.00'	64,033 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

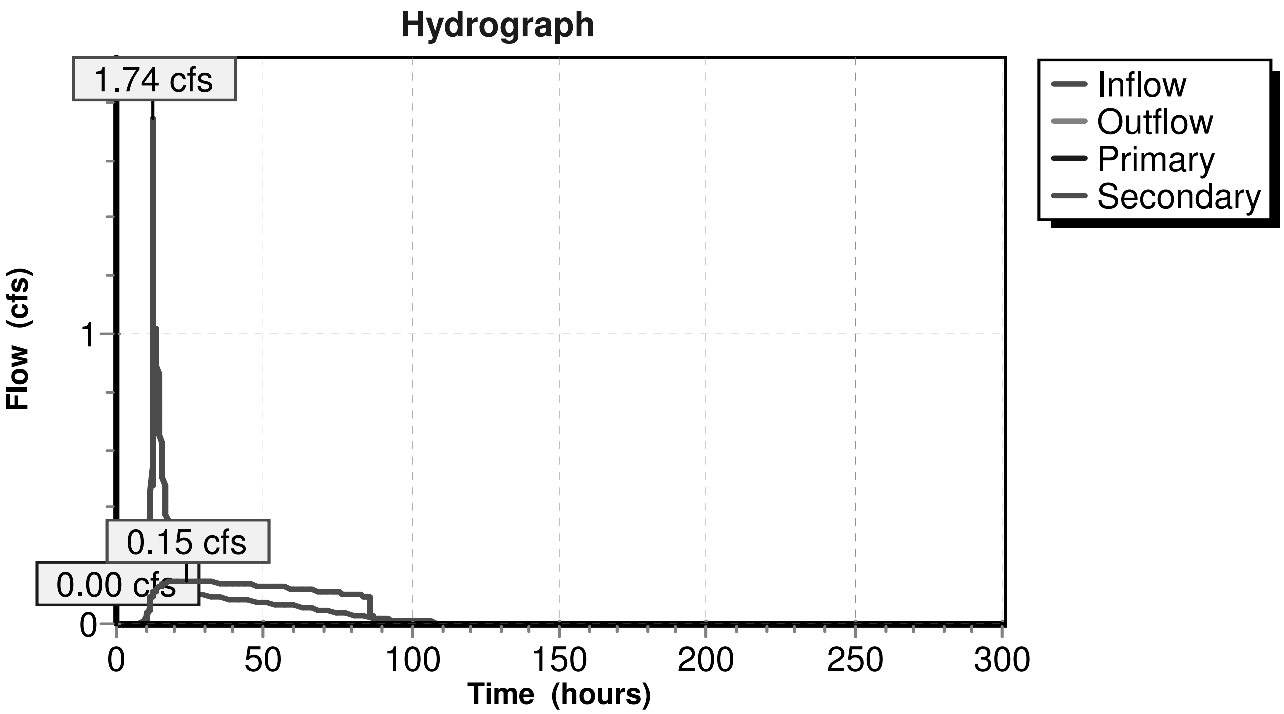
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
365.00	20	0	0
365.99	20	20	20
366.00	7,700	39	58
368.00	10,500	18,200	18,258
370.00	13,600	24,100	42,358
371.50	15,300	21,675	64,033

Device	Routing	Invert	Outlet Devices
#1	Secondary	365.00'	**1.9" Vert. Orifice/Grate** C= 0.600
#2	Primary	364.00'	**15.0" x 90.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 361.00' S= 0.0333 '/' Cc= 0.900 n= 0.012
#3	Device 2	369.40'	**3.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=365.00' TW=0.00' (Dynamic Tailwater)
2=Culvert (Passes 0.00 cfs of 3.58 cfs potential flow)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Secondary OutFlow Max=0.15 cfs @ 23.98 hrs HW=367.50' TW=0.00' (Dynamic Tailwater)
1=Orifice/Grate (Orifice Controls 0.15 cfs @ 7.48 fps)

Pond 1.2P:


Hydrograph
1.74 cfs
0.15 cfs
0.00 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
1
0
0
50
100
150
200
250
300
Time (hours)

Summary for Pond 1.3P:

Inflow Area = 3.640 ac, 71.70% Impervious, Inflow Depth = 1.79" for 1 year event
Inflow = 8.30 cfs @ 12.04 hrs, Volume= 0.544 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 397.51' @ 24.20 hrs Surf.Area= 9,616 sf Storage= 23,696 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	392.00'	54,900 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

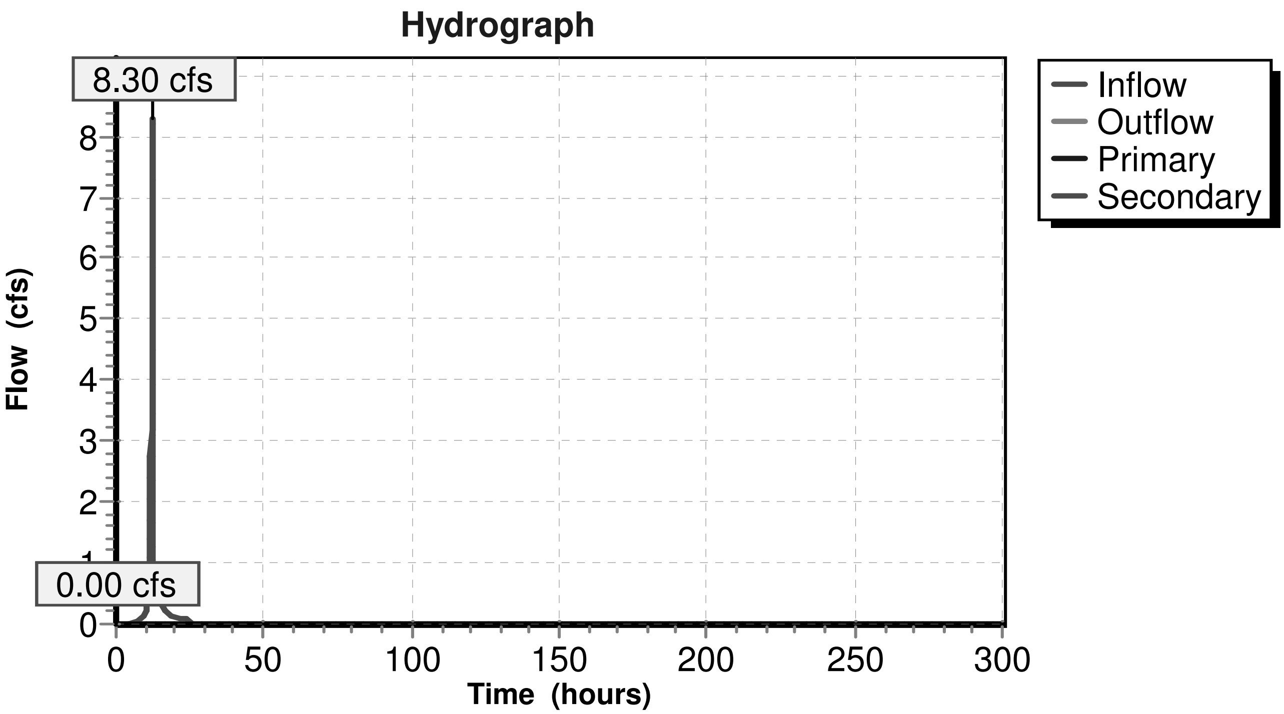
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
392.00	400	0	0
394.00	2,500	2,900	2,900
396.00	6,300	8,800	11,700
398.00	10,700	17,000	28,700
400.00	15,500	26,200	54,900

Device	Routing	Invert	Outlet Devices
#1	Primary	391.00'	**18.0" x 40.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 380.00' S= 0.2750 '/' Cc= 0.900 n= 0.012
#2	Device 1	398.40'	**10.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	399.00'	**10.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=392.00' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.00 cfs of 4.26 cfs potential flow)
  └─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=392.00' TW=0.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1.3P:


Hydrograph
8.30 cfs
0.00 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
50
100
150
200
250
300

Summary for Pond 2.1P:

Inflow Area = 7.700 ac, 43.90% Impervious, Inflow Depth = 1.34" for 1 year event
Inflow = 8.78 cfs @ 12.23 hrs, Volume= 0.860 af
Outflow = 1.49 cfs @ 13.02 hrs, Volume= 0.857 af, Atten= 83%, Lag= 47.3 min
Primary = 1.49 cfs @ 13.02 hrs, Volume= 0.857 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 440.00' Surf.Area= 13,300 sf Storage= 26,000 cf
Peak Elev= 441.25' @ 13.02 hrs Surf.Area= 17,409 sf Storage= 45,117 cf (19,117 cf above start)

Plug-Flow detention time= 3,124.4 min calculated for 0.260 af (30% of inflow)
Center-of-Mass det. time= 1,083.9 min (1,927.2 - 843.4)

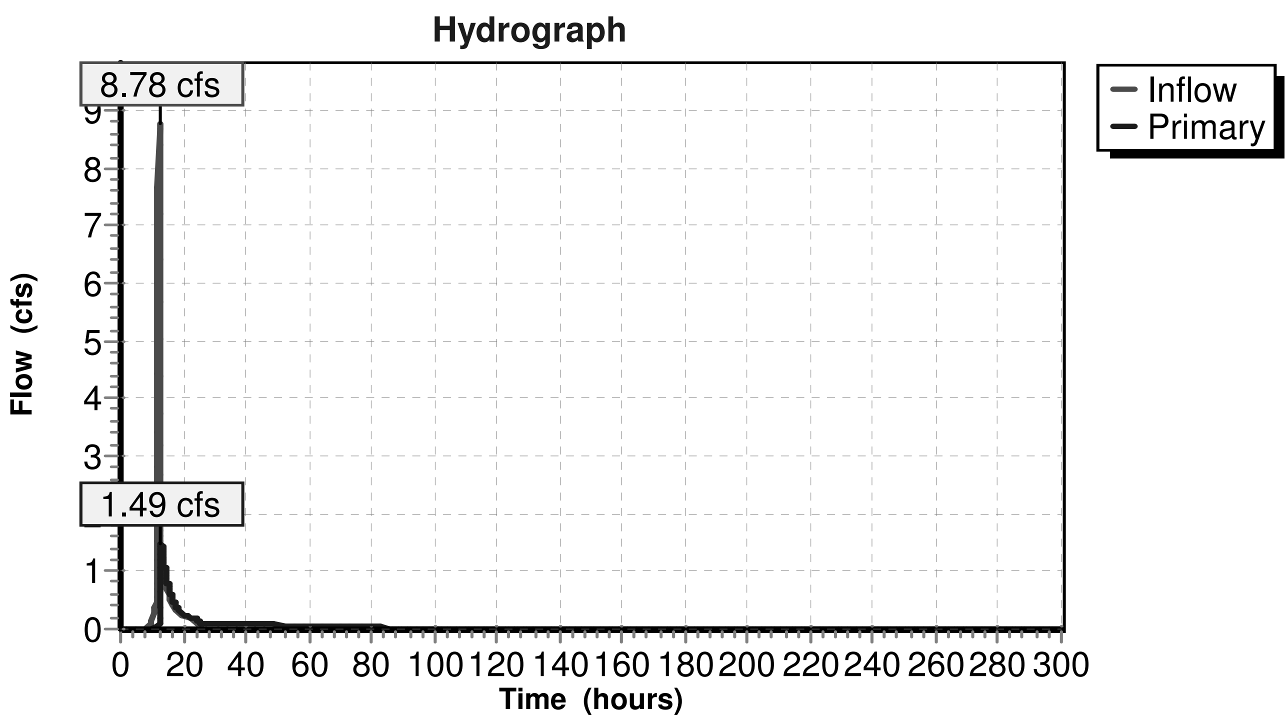
Volume	Invert	Avail.Storage	Storage Description
#1	436.00'	106,100 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
436.00	1,500	0	0
438.00	5,600	7,100	7,100
440.00	13,300	18,900	26,000
442.00	19,900	33,200	59,200
444.00	27,000	46,900	106,100

Device	Routing	Invert	Outlet Devices
#1	Primary	436.00'	**24.0" x 90.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 422.00' S= 0.1556 '/' Cc= 0.900 n= 0.012
#2	Device 1	440.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	441.00'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.48 cfs @ 13.02 hrs HW=441.24' TW=421.27' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.48 cfs of 31.17 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.19 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 1.37 cfs @ 1.40 fps)

Pond 2.1P:


Hydrograph
8.78 cfs
1.49 cfs
Inflow
Primary
Flow (cfs)
0
1
3
4
5
6
7
8
9
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Time (hours)

Summary for Pond 2.2P:

Inflow Area = 8.500 ac, 39.76% Impervious, Inflow Depth = 1.28" for 1 year event
Inflow = 1.57 cfs @ 12.99 hrs, Volume= 0.905 af
Outflow = 0.15 cfs @ 24.51 hrs, Volume= 0.905 af, Atten= 91%, Lag= 691.2 min
Primary = 0.15 cfs @ 24.51 hrs, Volume= 0.905 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 423.75' @ 24.51 hrs Surf.Area= 8,503 sf Storage= 18,062 cf

Plug-Flow detention time= 1,351.0 min calculated for 0.905 af (100% of inflow)
Center-of-Mass det. time= 1,350.6 min (3,221.7 - 1,871.0)

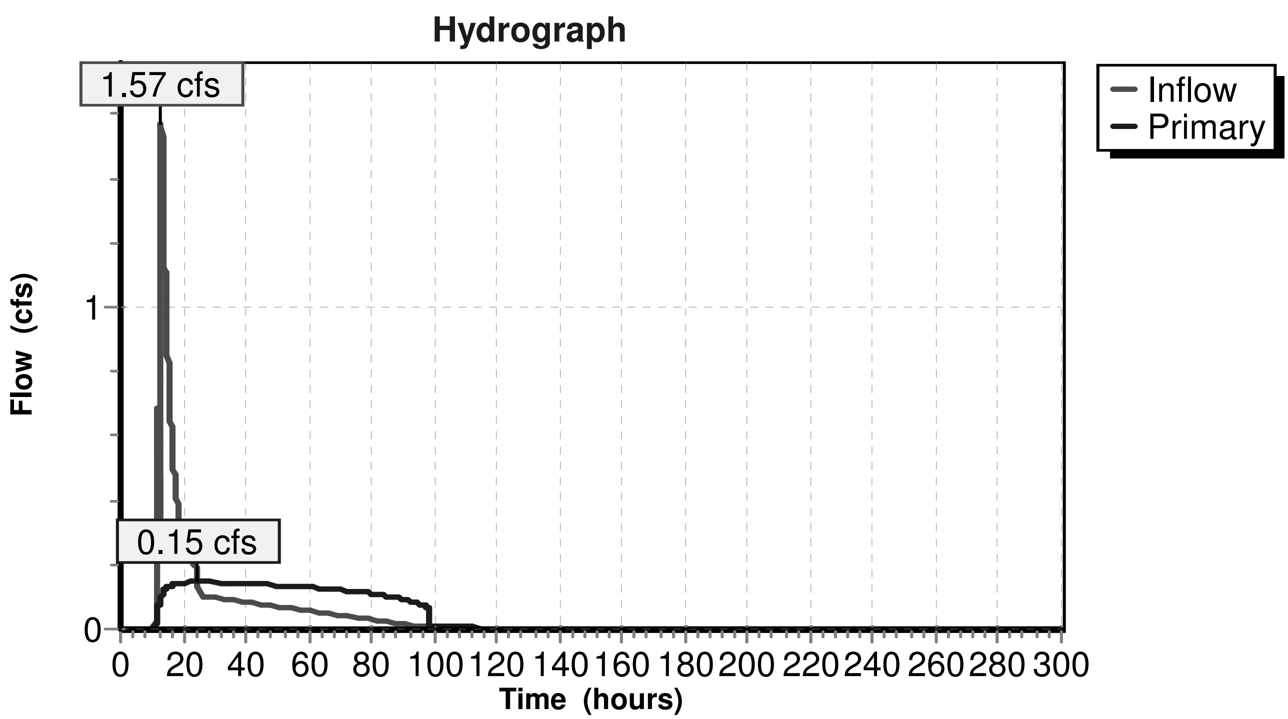
Volume	Invert	Avail.Storage	Storage Description
#1	419.00'	72,236 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
419.00	30	0	0
419.99	30	30	30
420.00	1,200	6	36
422.00	5,000	6,200	6,236
424.00	9,000	14,000	20,236
426.00	13,000	22,000	42,236
428.00	17,000	30,000	72,236

Device	Routing	Invert	Outlet Devices
#1	Primary	419.00'	**24.0" x 74.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 410.00' S= 0.1216 '/' Cc= 0.900 n= 0.012
#2	Device 1	419.00'	**1.6" Vert. Orifice/Grate** C= 0.600
#3	Device 1	424.50'	**3.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.15 cfs @ 24.51 hrs HW=423.75' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.15 cfs of 29.30 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 10.42 fps)
  └─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2.2P:


Hydrograph
1.57 cfs
0.15 cfs
Inflow
Primary
Flow (cfs)
1
0
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Time (hours)

Summary for Pond 3.1P:

Inflow Area = 8.500 ac, 39.82% Impervious, Inflow Depth = 1.27" for 1 year event
Inflow = 9.80 cfs @ 12.20 hrs, Volume= 0.902 af
Outflow = 0.86 cfs @ 14.16 hrs, Volume= 0.899 af, Atten= 91%, Lag= 118.1 min
Primary = 0.86 cfs @ 14.16 hrs, Volume= 0.899 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 446.00' Surf.Area= 15,300 sf Storage= 26,700 cf
Peak Elev= 447.24' @ 14.16 hrs Surf.Area= 21,210 sf Storage= 49,415 cf (22,715 cf above start)

Plug-Flow detention time= 2,785.2 min calculated for 0.286 af (32% of inflow)
Center-of-Mass det. time= 1,079.2 min (1,923.9 - 844.8)

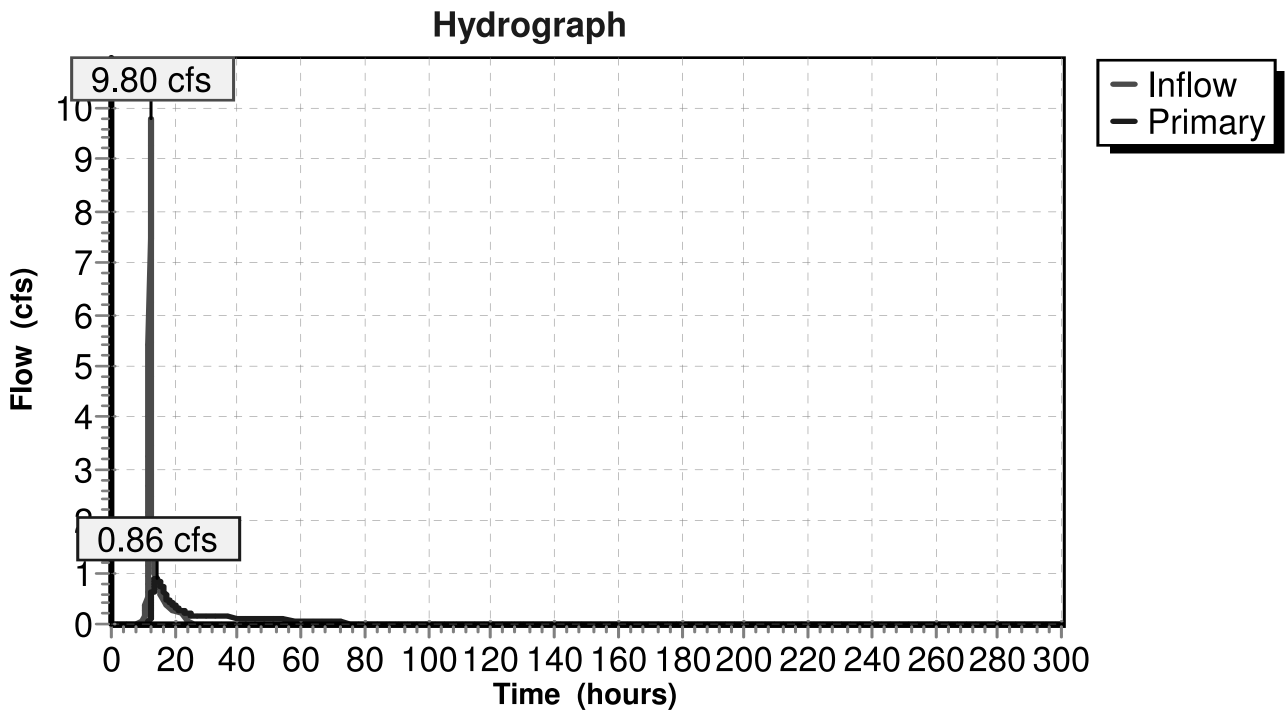
Volume	Invert	Avail.Storage	Storage Description
#1	442.00'	124,600 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
442.00	1,200	0	0
444.00	5,100	6,300	6,300
446.00	15,300	20,400	26,700
448.00	24,800	40,100	66,800
450.00	33,000	57,800	124,600

Device	Routing	Invert	Outlet Devices
#1	Primary	442.00'	**24.0" x 116.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 440.00' S= 0.0172 '/' Cc= 0.900 n= 0.012
#2	Device 1	446.00'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	447.00'	**2.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.86 cfs @ 14.16 hrs HW=447.24' TW=423.62' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.86 cfs of 31.16 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.18 cfs @ 5.14 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 0.68 cfs @ 1.40 fps)

Pond 3.1P:


Hydrograph
9.80 cfs
0.86 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300

Summary for Pond 3.2P:

Inflow Area = 9.000 ac, 37.61% Impervious, Inflow Depth > 1.24" for 1 year event
Inflow = 0.89 cfs @ 14.14 hrs, Volume= 0.929 af
Outflow = 0.12 cfs @ 38.74 hrs, Volume= 0.929 af, Atten= 86%, Lag= 1,476.0 min
Primary = 0.12 cfs @ 38.74 hrs, Volume= 0.929 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 426.53' @ 38.74 hrs Surf.Area= 7,085 sf Storage= 19,993 cf

Plug-Flow detention time= 2,291.3 min calculated for 0.929 af (100% of inflow)
Center-of-Mass det. time= 2,291.2 min (4,181.0 - 1,889.8)

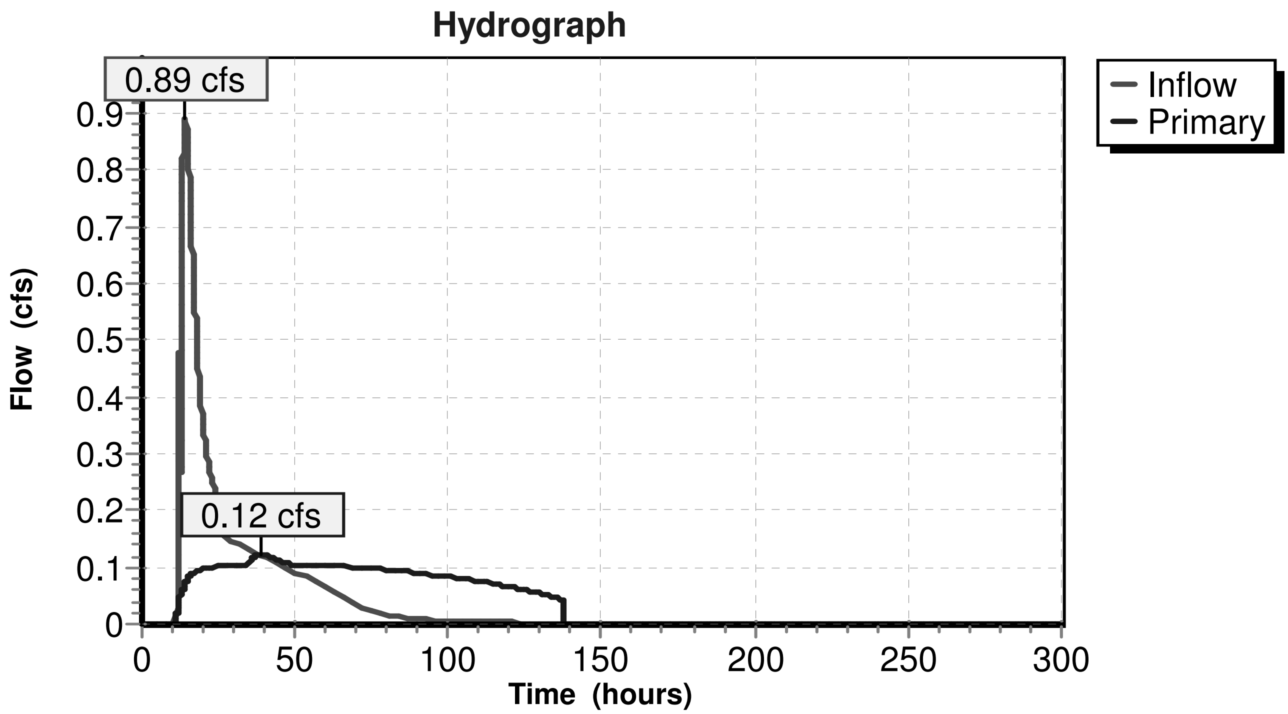
Volume	Invert	Avail.Storage	Storage Description
#1	421.00'	52,840 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
421.00	30	0	0
421.99	30	30	30
422.00	2,000	10	40
424.00	4,000	6,000	6,040
426.00	6,400	10,400	16,440
428.00	9,000	15,400	31,840
430.00	12,000	21,000	52,840

Device	Routing	Invert	Outlet Devices
#1	Primary	421.00'	**24.0" x 80.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 416.00' S= 0.0625 '/' Cc= 0.900 n= 0.012
#2	Device 1	421.00'	**1.3" Vert. Orifice/Grate** C= 0.600
#3	Device 1	426.50'	**1.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.12 cfs @ 38.74 hrs HW=426.53' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.12 cfs of 32.18 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.10 cfs @ 11.26 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 0.02 cfs @ 0.46 fps)

Pond 3.2P:


Hydrograph
0.89 cfs
0.12 cfs
Inflow
Primary
Flow (cfs)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
0
50
100
150
200
250
300
Time (hours)

Summary for Subcatchment 1.1S:

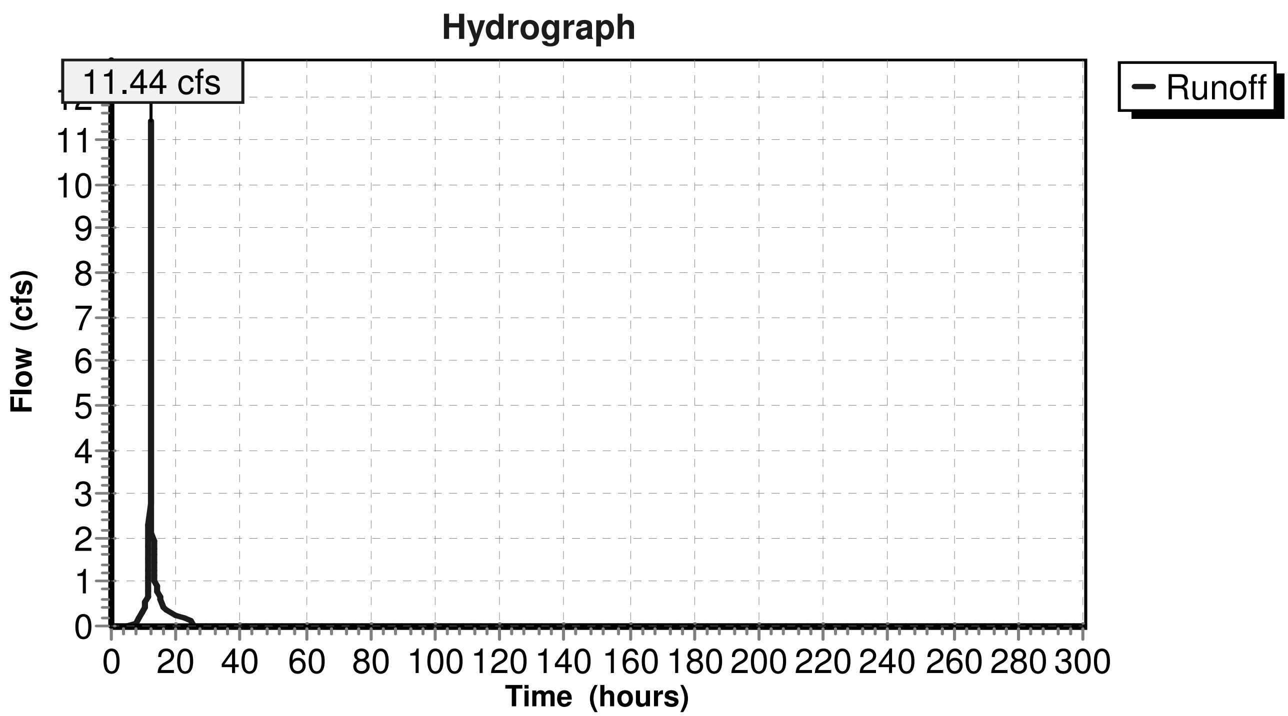
Runoff = 11.44 cfs @ 12.16 hrs, Volume= 1.000 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
3.200	98	Paved parking & roofs
1.700	74	>75% Grass cover, Good, HSG C
4.900	90	Weighted Average
1.700		Pervious Area
3.200		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	80	0.0875	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.9	390	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.3	310	0.1200	19.75	24.24	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
11.7	780	Total			

Subcatchment 1.1S:



Summary for Subcatchment 1.2S:

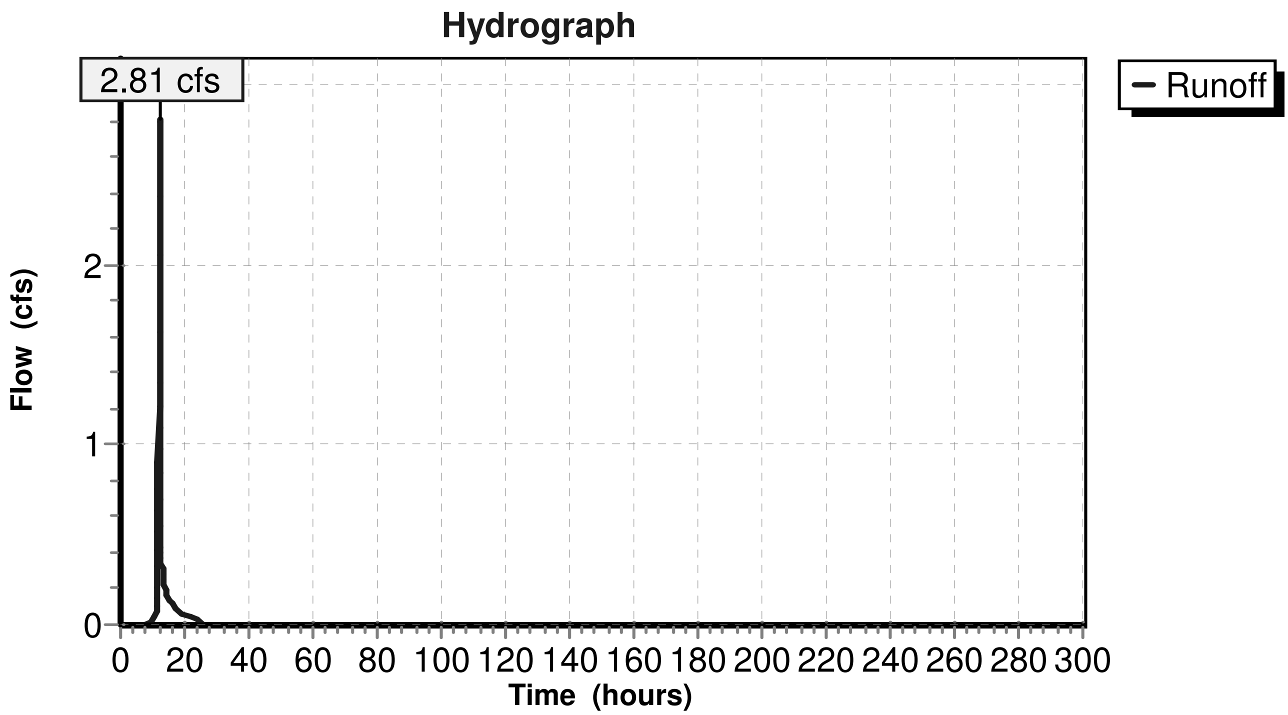
Runoff = 2.81 cfs @ 12.06 hrs, Volume= 0.187 af, Depth= 1.50"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
0.250	98	Paved parking & roofs
1.250	74	>75% Grass cover, Good, HSG C
1.500	78	Weighted Average
1.250		Pervious Area
0.250		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	80	0.4300	0.40		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 1.2S:



Summary for Subcatchment 1.3S:

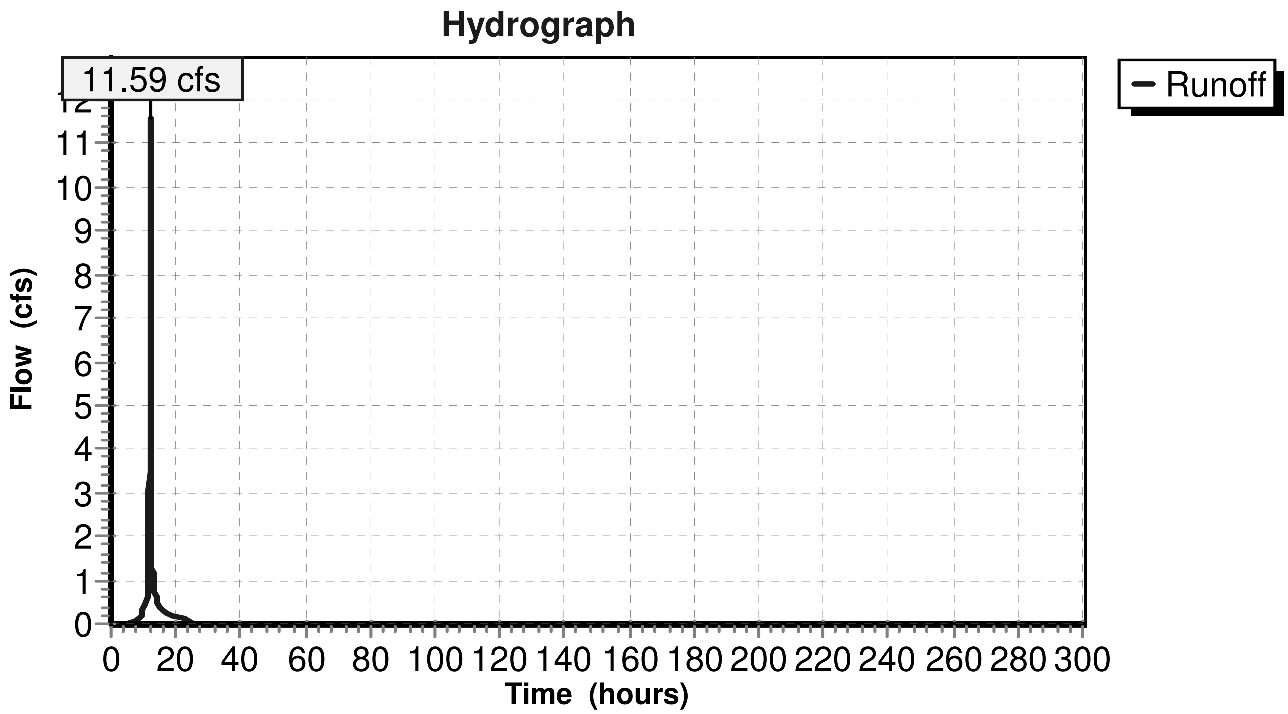
Runoff = 11.59 cfs @ 12.04 hrs, Volume= 0.771 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
0.660	79	50-75% Grass cover, Fair, HSG C
0.370	65	Brush, Good, HSG C
2.610	98	Paved parking & roofs
3.640	91	Weighted Average
1.030		Pervious Area
2.610		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.50"
0.2	60	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	305	0.0370	10.97	13.46	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	130	0.0920	17.30	21.23	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	60	0.0650	14.54	17.84	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
2.2	655	Total			

Subcatchment 1.3S:



Summary for Subcatchment 1.4S:

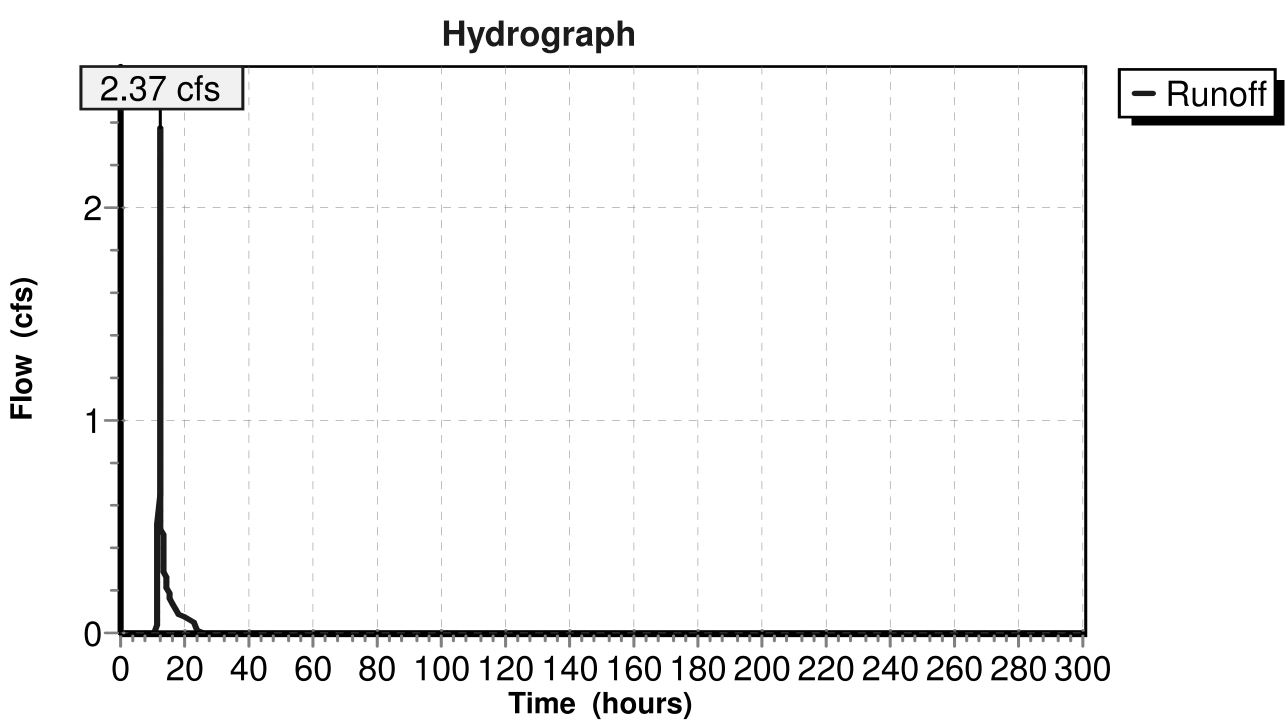
Runoff = 2.37 cfs @ 12.20 hrs, Volume= 0.226 af, Depth= 1.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
1.200	70	Woods, Good, HSG C
0.950	74	>75% Grass cover, Good, HSG C
0.150	98	Paved parking & roofs
2.300	73	Weighted Average
2.150		Pervious Area
0.150		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.5	250	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	350	Total			

Subcatchment 1.4S:



Summary for Subcatchment 2.1S:

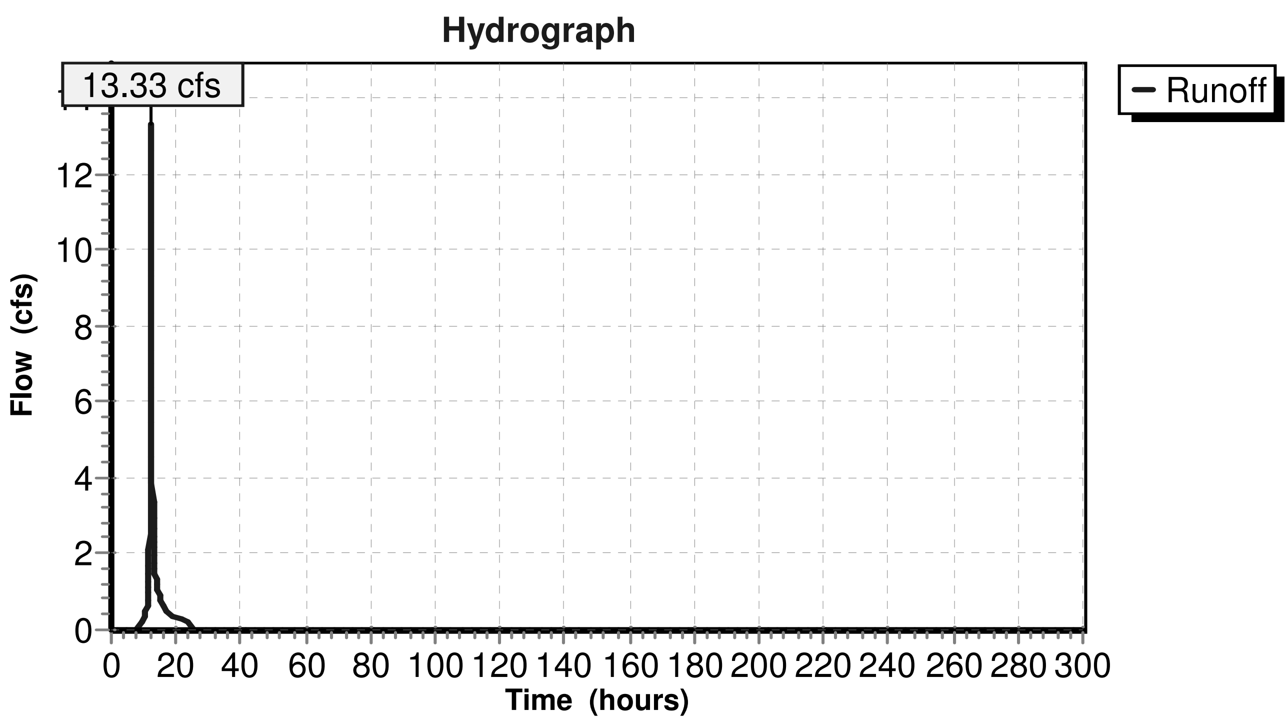
Runoff = 13.33 cfs @ 12.22 hrs, Volume= 1.294 af, Depth= 2.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
5.200	90	1/8 acre lots, 65% imp, HSG C
2.500	74	>75% Grass cover, Good, HSG C
7.700	85	Weighted Average
4.320		Pervious Area
3.380		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
2.0	120	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	740	0.0500	20.93	65.76	**Circular Channel (pipe),** Diam= 24.0" Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.010 PVC, smooth interior
16.2	960	Total			

Subcatchment 2.1S:



Summary for Subcatchment 2.2S:

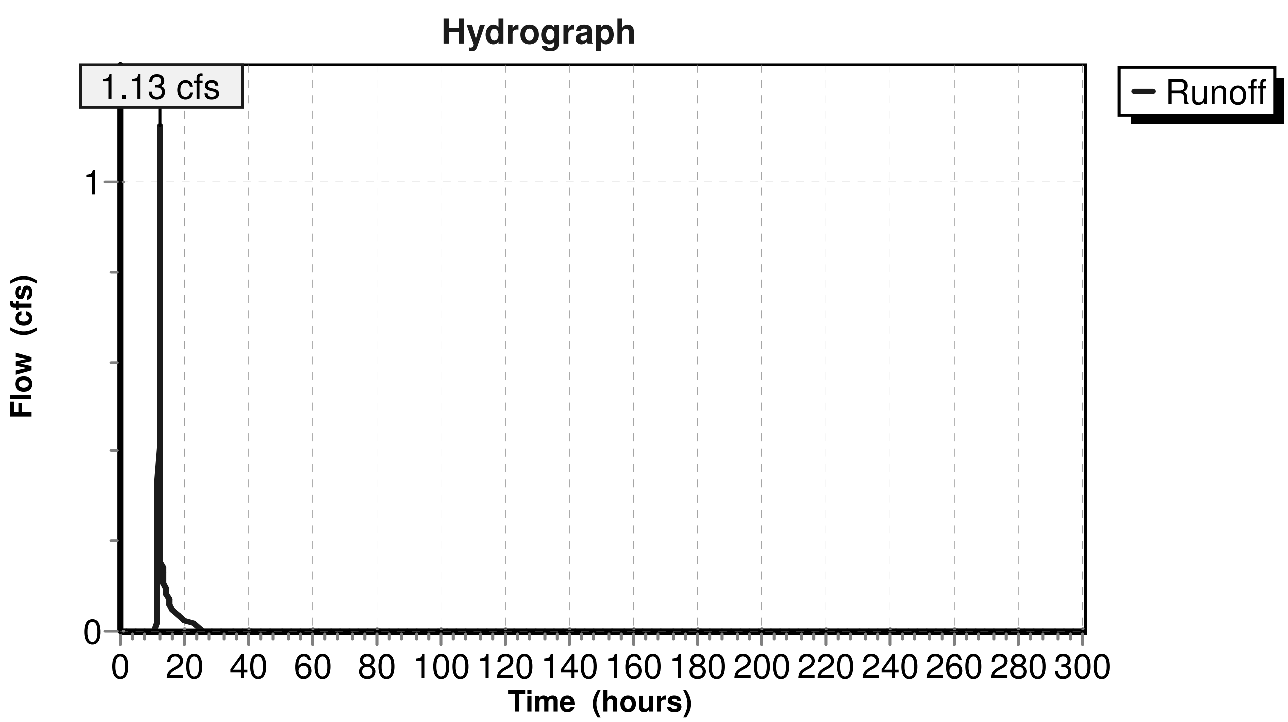
Runoff = 1.13 cfs @ 12.09 hrs, Volume= 0.083 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
0.800		Pervious Area

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

Subcatchment 2.2S:



Summary for Subcatchment 2.3S:

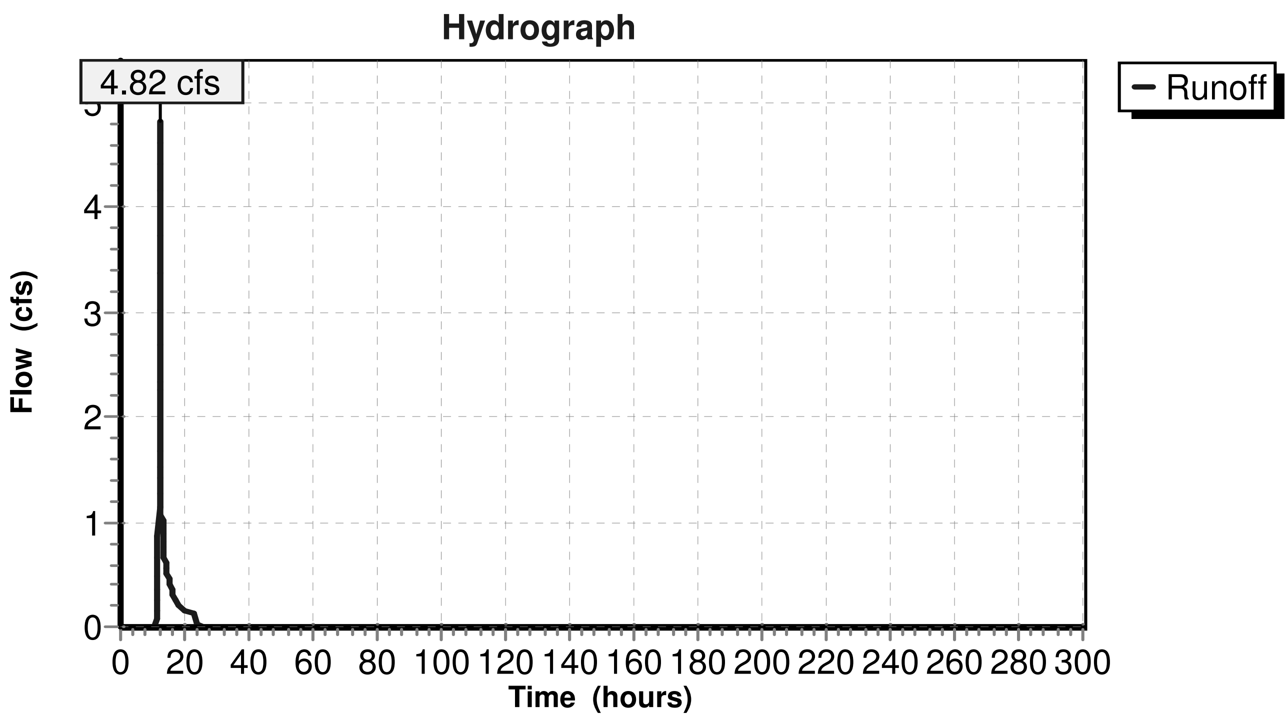
Runoff = 4.82 cfs @ 12.21 hrs, Volume= 0.479 af, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
5.700	70	Woods, Good, HSG C
5.700		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	8	0.5000	0.27		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
8.2	92	0.1700	0.19		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
4.8	580	0.1600	2.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	680	Total			

Subcatchment 2.3S:



Summary for Subcatchment 3.1S:

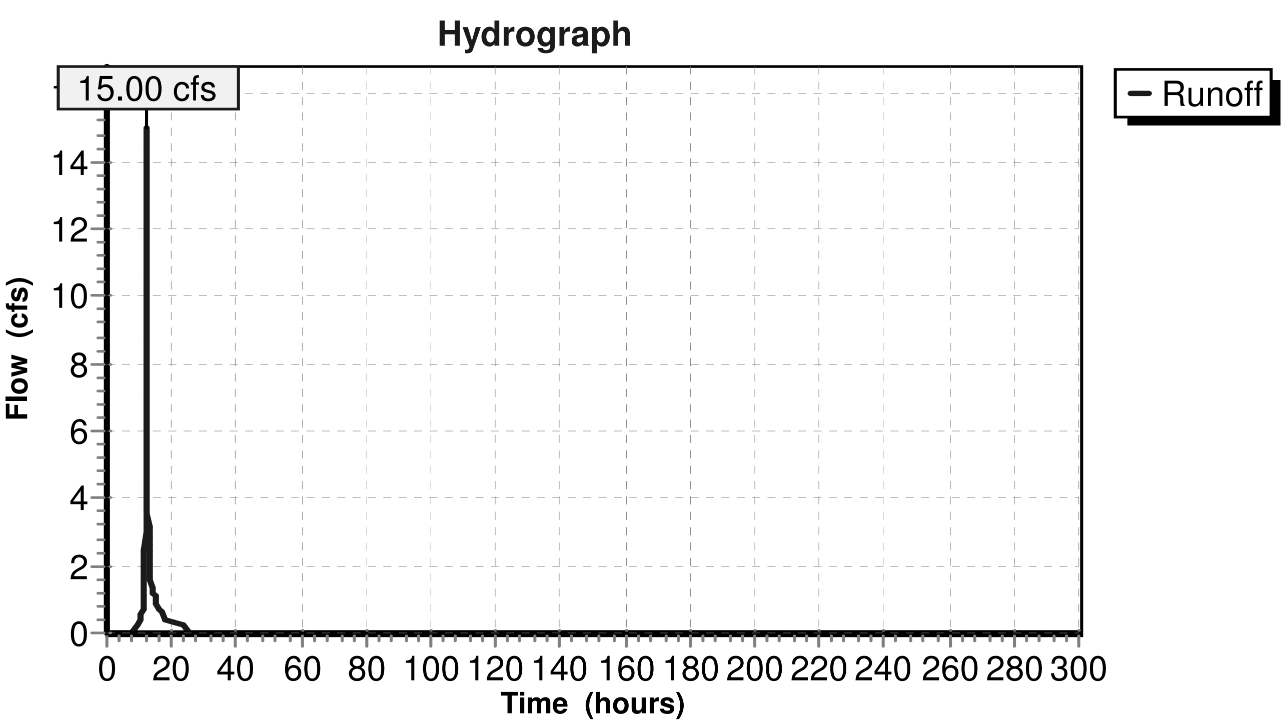
Runoff = 15.00 cfs @ 12.19 hrs, Volume= 1.372 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
1.500	98	Paved parking & roofs
2.900	90	1/8 acre lots, 65% imp, HSG C
4.100	74	>75% Grass cover, Good, HSG C
8.500	84	Weighted Average
5.115		Pervious Area
3.385		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.4	260	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.7	360	Total			

Subcatchment 3.1S:



Summary for Subcatchment 3.2S:

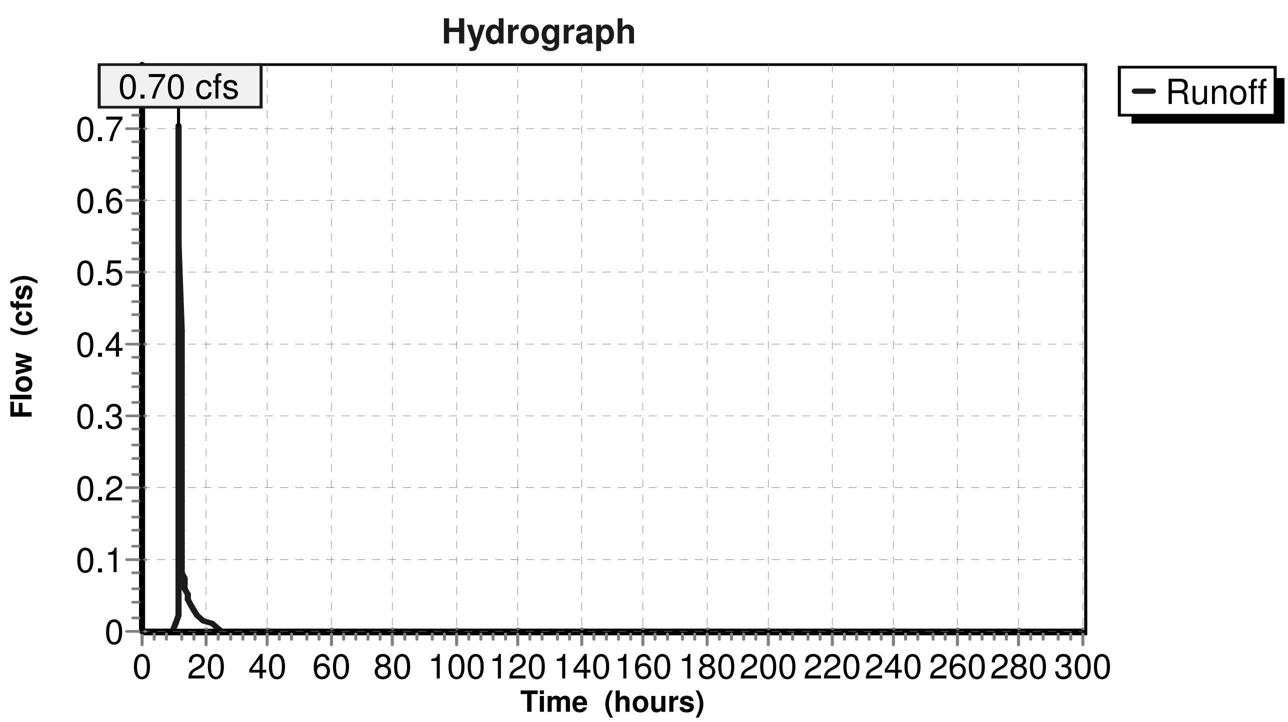
Runoff = 0.70 cfs @ 12.09 hrs, Volume= 0.052 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
0.500	74	>75% Grass cover, Good, HSG C
0.500		Pervious Area

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

Subcatchment 3.2S:



Summary for Subcatchment 3.3S:

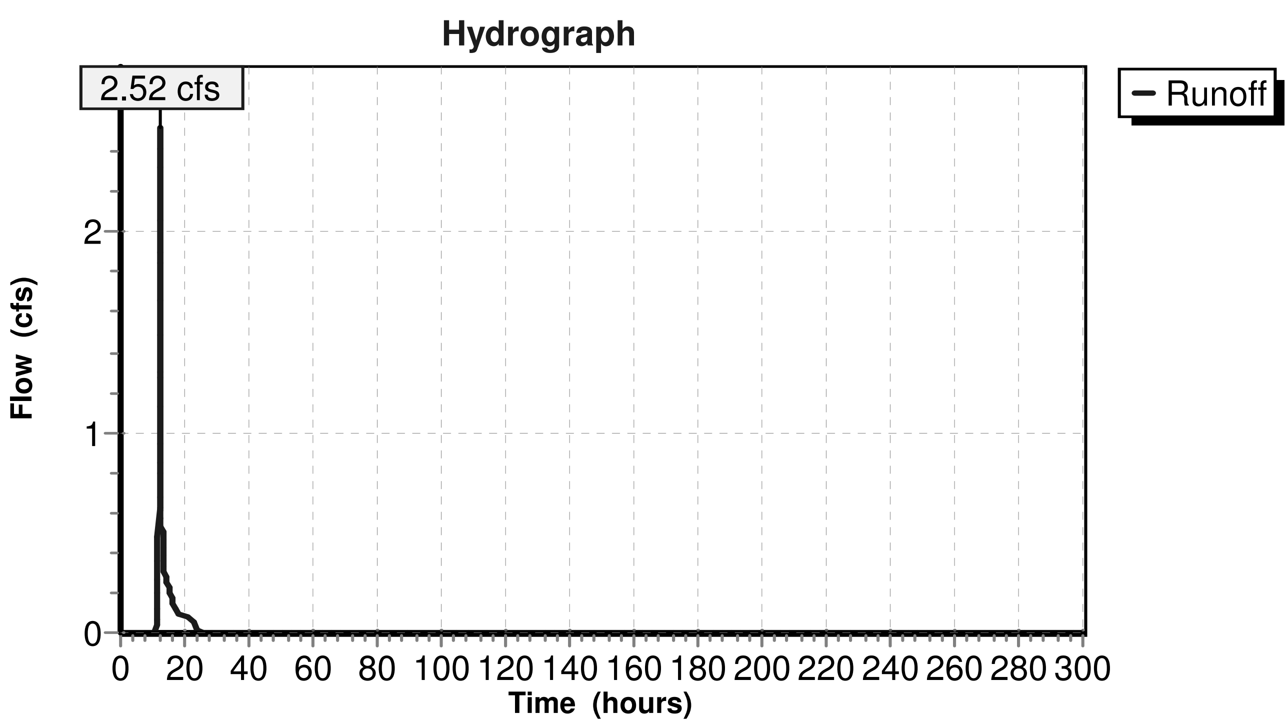
Runoff = 2.52 cfs @ 12.19 hrs, Volume= 0.244 af, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
2.700	70	Woods, Good, HSG C
0.200	74	>75% Grass cover, Good, HSG C
2.900	70	Weighted Average
2.900		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	26	0.4200	0.32		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
7.6	74	0.1300	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
3.1	388	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	207	0.0480	13.23	128.96	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.50' Z= 4.0 & 2.0 '/' Top.W=11.00' n= 0.022 Earth, clean & straight
12.4	695	Total			

Subcatchment 3.3S:



Summary for Subcatchment 4.0S:

Runoff = 6.16 cfs @ 12.30 hrs, Volume= 0.715 af, Depth= 0.95"

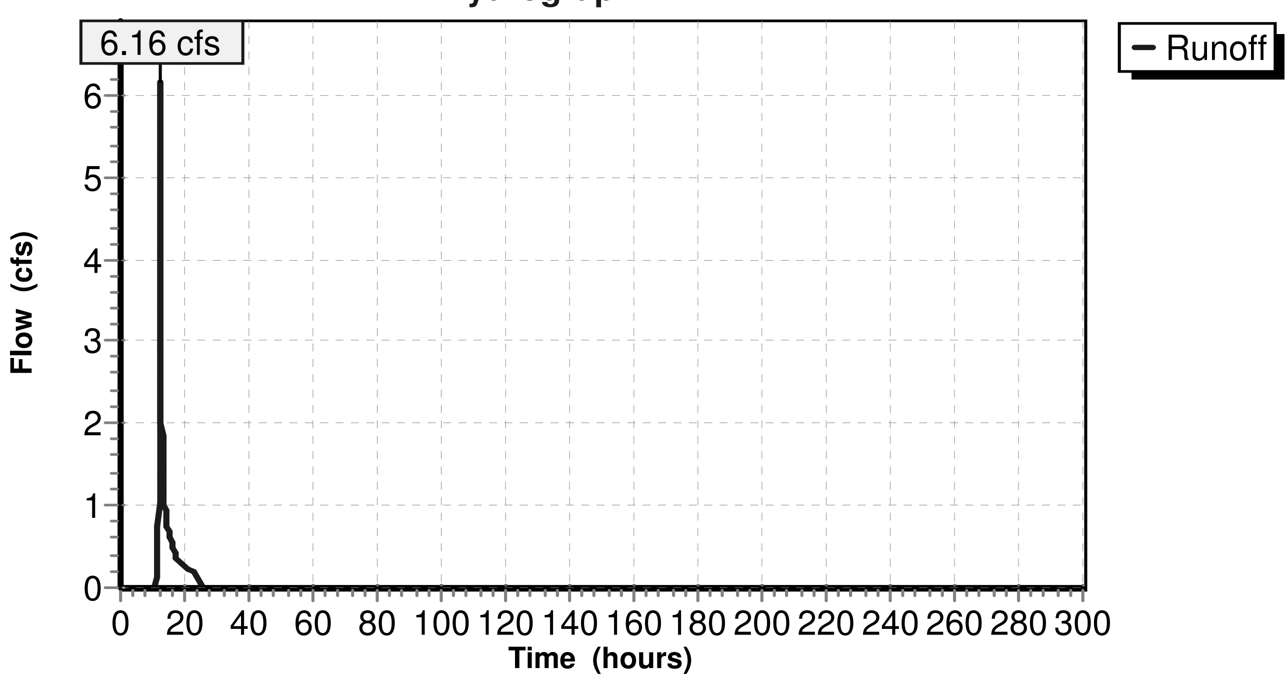
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
8.300	70	Woods, Good, HSG C
0.700	55	Woods, Good, HSG B
9.000	69	Weighted Average
9.000		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
8.2	980	0.1600	2.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.5	1,080	Total			

Subcatchment 4.0S:

Hydrograph



Summary for Subcatchment 5.0S:

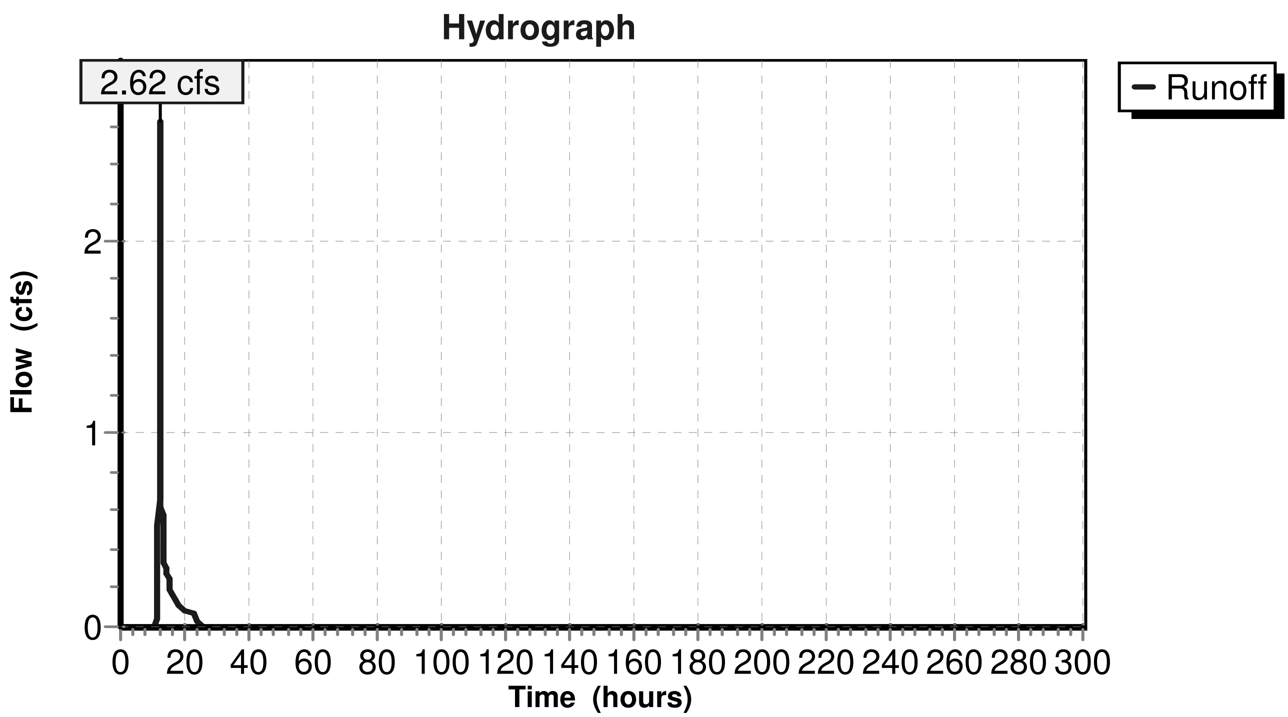
Runoff = 2.62 cfs @ 12.23 hrs, Volume= 0.265 af, Depth= 1.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.50"

Area (ac)	CN	Description
1.700	74	>75% Grass cover, Good, HSG C
1.000	70	Woods, Good, HSG C
2.700	73	Weighted Average
2.700		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0500	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.4	120	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.6	220	Total			

Subcatchment 5.0S:

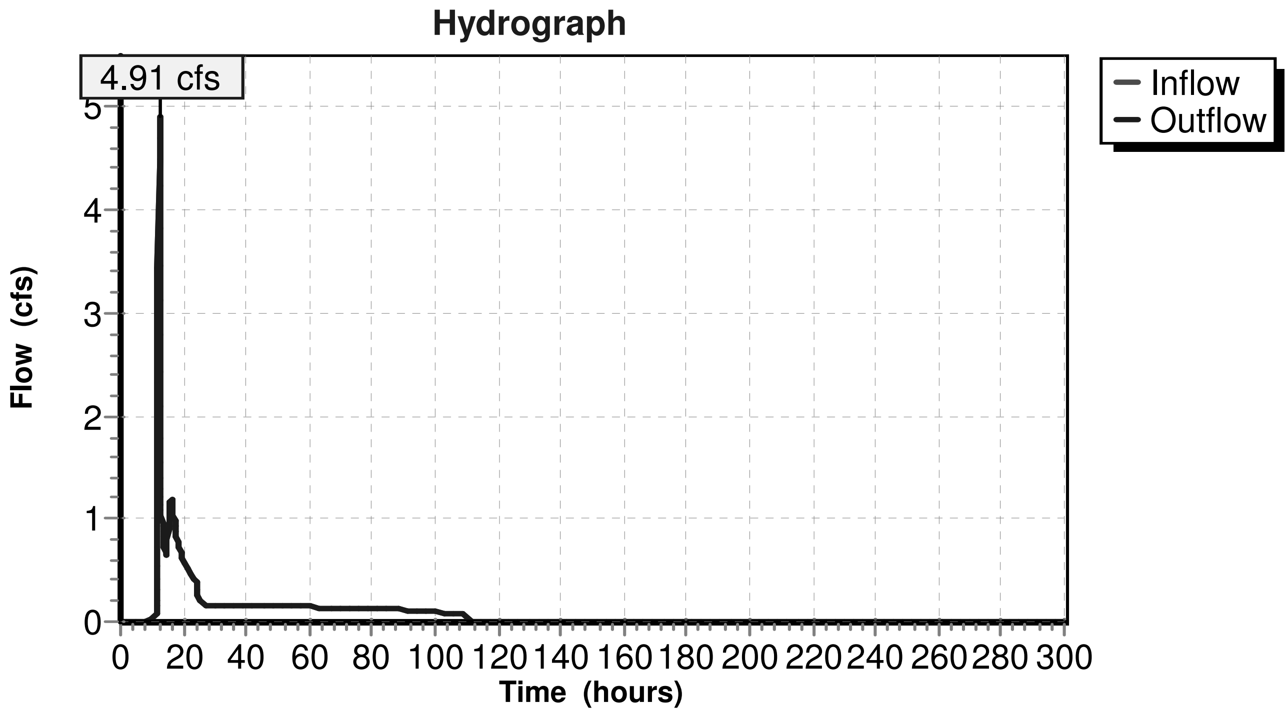


Summary for Reach DP 2:

Inflow Area = 14.200 ac, 23.80% Impervious, Inflow Depth = 1.57" for 2 year event
Inflow = 4.91 cfs @ 12.21 hrs, Volume= 1.853 af
Outflow = 4.91 cfs @ 12.21 hrs, Volume= 1.853 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

Reach DP 2:

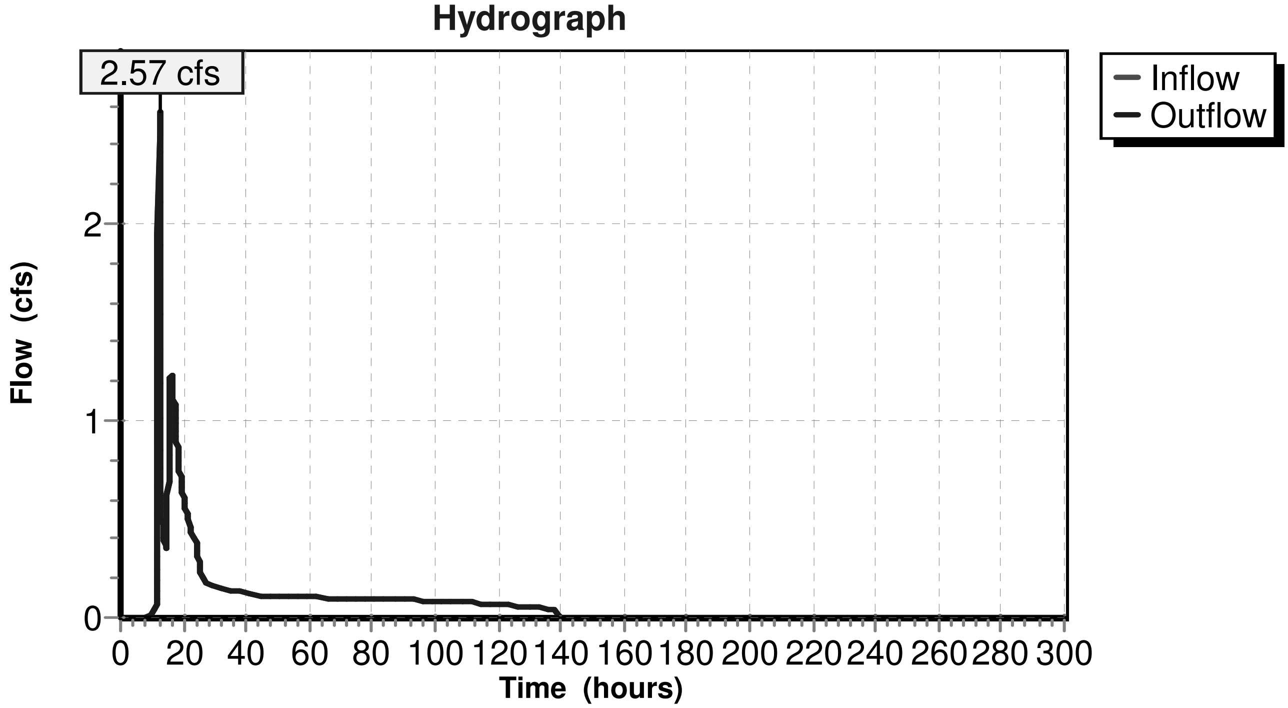


Summary for Reach DP 3:

Inflow Area = 11.900 ac, 28.45% Impervious, Inflow Depth = 1.68" for 2 year event
Inflow = 2.57 cfs @ 12.19 hrs, Volume= 1.664 af
Outflow = 2.57 cfs @ 12.19 hrs, Volume= 1.664 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

Reach DP 3:

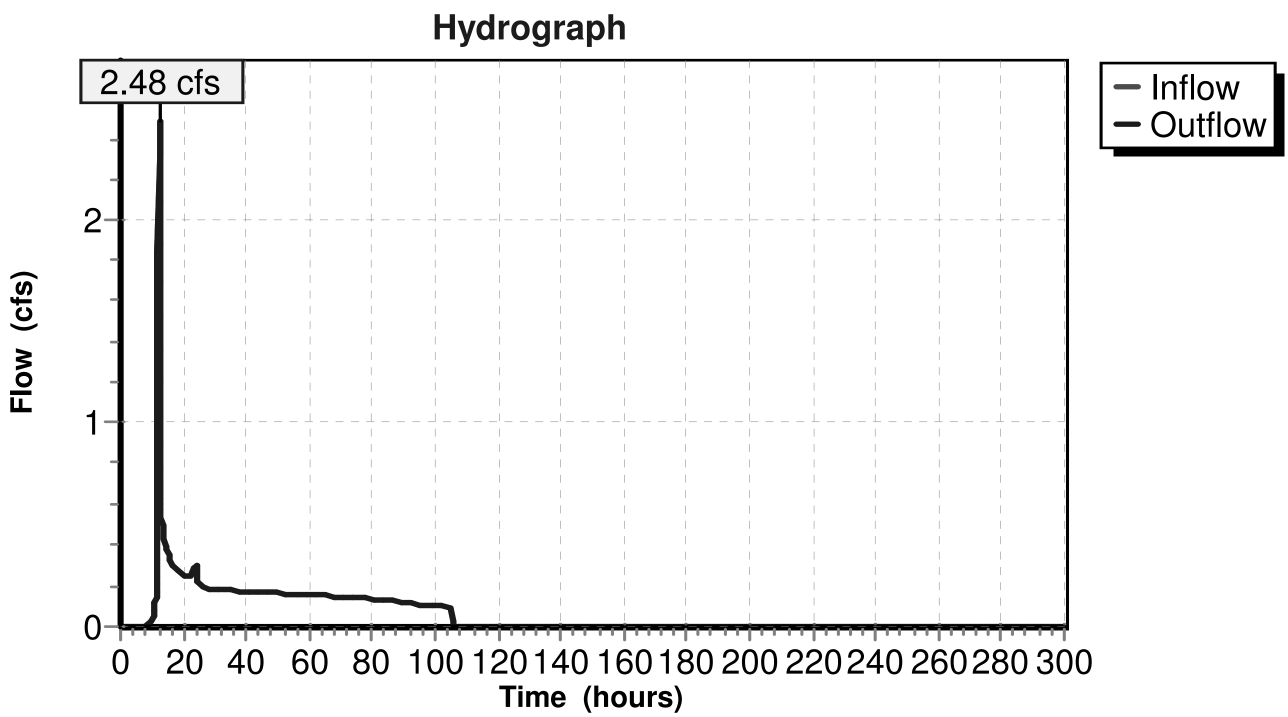


Summary for Reach DP1:

Inflow Area = 12.340 ac, 50.32% Impervious, Inflow Depth = 1.38" for 2 year event
Inflow = 2.48 cfs @ 12.20 hrs, Volume= 1.421 af
Outflow = 2.48 cfs @ 12.20 hrs, Volume= 1.421 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

Reach DP1:



Summary for Pond 1.1P:

Inflow Area = 4.900 ac, 65.31% Impervious, Inflow Depth = 2.45" for 2 year event
Inflow = 11.44 cfs @ 12.16 hrs, Volume= 1.000 af
Outflow = 3.62 cfs @ 12.55 hrs, Volume= 0.998 af, Atten= 68%, Lag= 23.5 min
Primary = 3.62 cfs @ 12.55 hrs, Volume= 0.998 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 403.20' Surf.Area= 8,340 sf Storage= 15,484 cf
Peak Elev= 405.14' @ 12.55 hrs Surf.Area= 13,504 sf Storage= 36,952 cf (21,468 cf above start)

Plug-Flow detention time= 1,597.9 min calculated for 0.643 af (64% of inflow)
Center-of-Mass det. time= 954.6 min (1,763.4 - 808.8)

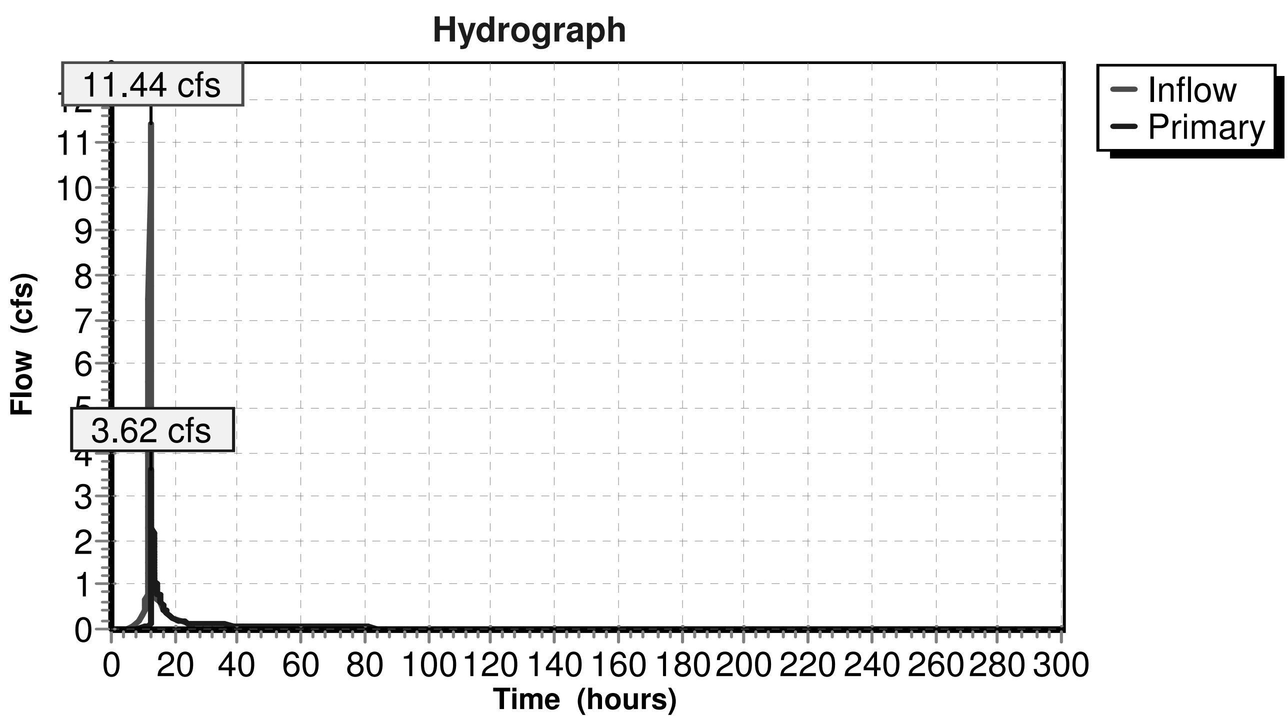
Volume	Invert	Avail.Storage	Storage Description
#1	399.00'	66,400 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
399.00	800	0	0
400.00	1,600	1,200	1,200
402.00	4,800	6,400	7,600
404.00	10,700	15,500	23,100
406.00	15,600	26,300	49,400
407.00	18,400	17,000	66,400

Device	Routing	Invert	Outlet Devices
#1	Primary	399.00'	**18.0" x 155.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 390.00' S= 0.0581 '/' Cc= 0.900 n= 0.012
#2	Device 1	403.20'	**1.8" Vert. Orifice/Grate** C= 0.600
#3	Device 1	404.70'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=3.62 cfs @ 12.55 hrs HW=405.14' TW=366.82' (Dynamic Tailwater)
└─**1=Culvert** (Passes 3.62 cfs of 19.76 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.12 cfs @ 6.58 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 3.50 cfs @ 1.97 fps)

Pond 1.1P:


Hydrograph
11.44 cfs
3.62 cfs
Inflow
Primary
Flow (cfs)
0
1
2
3
4
5
6
7
8
9
10
11
12
Time (hours)
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300

Summary for Pond 1.2P:

Inflow Area = 6.400 ac, 53.91% Impervious, Inflow Depth = 2.22" for 2 year event
Inflow = 4.11 cfs @ 12.50 hrs, Volume= 1.186 af
Outflow = 0.18 cfs @ 24.03 hrs, Volume= 1.186 af, Atten= 96%, Lag= 691.7 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.18 cfs @ 24.03 hrs, Volume= 1.186 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 368.82' @ 24.03 hrs Surf.Area= 11,772 sf Storage= 27,398 cf

Plug-Flow detention time= 1,656.6 min calculated for 1.186 af (100% of inflow)
Center-of-Mass det. time= 1,656.6 min (3,274.5 - 1,617.9)

Volume	Invert	Avail.Storage	Storage Description
#1	365.00'	64,033 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

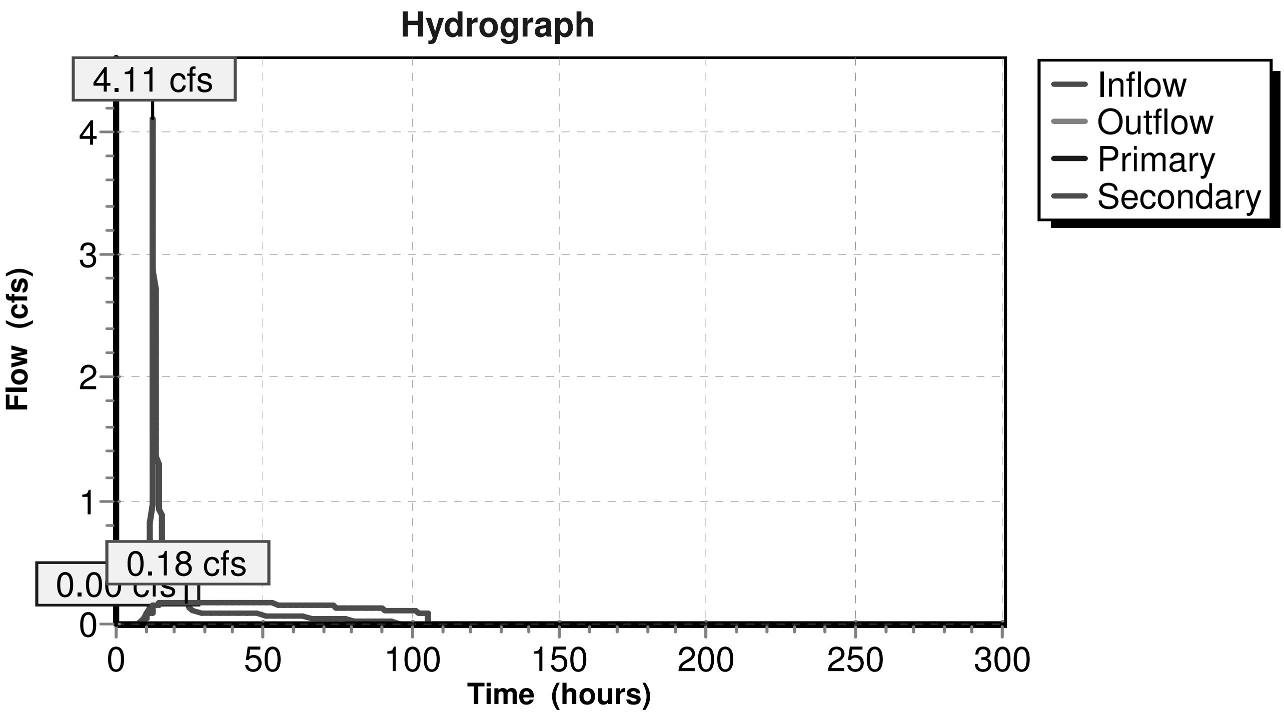
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
365.00	20	0	0
365.99	20	20	20
366.00	7,700	39	58
368.00	10,500	18,200	18,258
370.00	13,600	24,100	42,358
371.50	15,300	21,675	64,033

Device	Routing	Invert	Outlet Devices
#1	Secondary	365.00'	**1.9" Vert. Orifice/Grate** C= 0.600
#2	Primary	364.00'	**15.0" x 90.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 361.00' S= 0.0333 '/' Cc= 0.900 n= 0.012
#3	Device 2	369.40'	**3.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=365.00' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.00 cfs of 3.58 cfs potential flow)
  └─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.18 cfs @ 24.03 hrs HW=368.82' TW=0.00' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Orifice Controls 0.18 cfs @ 9.31 fps)

Pond 1.2P:


Hydrograph
4.11 cfs
0.18 cfs
0.00 cfs
Flow (cfs)
Time (hours)
0
1
2
3
4
0
50
100
150
200
250
300
Inflow
Outflow
Primary
Secondary

Summary for Pond 1.3P:

Inflow Area = 3.640 ac, 71.70% Impervious, Inflow Depth = 2.54" for 2 year event
Inflow = 11.59 cfs @ 12.04 hrs, Volume= 0.771 af
Outflow = 0.08 cfs @ 24.00 hrs, Volume= 0.009 af, Atten= 99%, Lag= 717.8 min
Primary = 0.08 cfs @ 24.00 hrs, Volume= 0.009 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 398.42' @ 24.00 hrs Surf.Area= 11,709 sf Storage= 33,409 cf

Plug-Flow detention time= 1,063.4 min calculated for 0.009 af (1% of inflow)
Center-of-Mass det. time= 691.3 min (1,487.0 - 795.6)

Volume	Invert	Avail.Storage	Storage Description
#1	392.00'	54,900 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

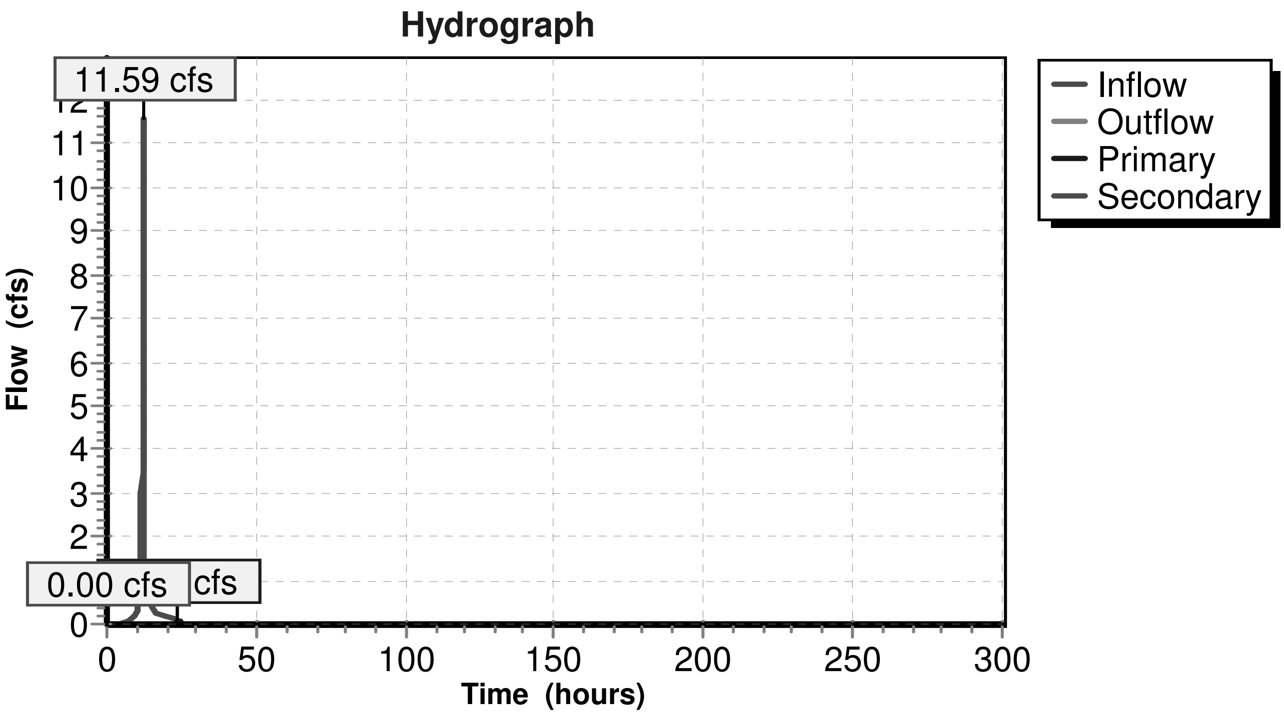
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
392.00	400	0	0
394.00	2,500	2,900	2,900
396.00	6,300	8,800	11,700
398.00	10,700	17,000	28,700
400.00	15,500	26,200	54,900

Device	Routing	Invert	Outlet Devices
#1	Primary	391.00'	**18.0" x 40.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 380.00' S= 0.2750 '/' Cc= 0.900 n= 0.012
#2	Device 1	398.40'	**10.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	399.00'	**10.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.08 cfs @ 24.00 hrs HW=398.42' TW=0.00' (Dynamic Tailwater)
↑ **1=Culvert** (Passes 0.08 cfs of 21.98 cfs potential flow)
↑ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.08 cfs @ 0.40 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=392.00' TW=0.00' (Dynamic Tailwater)
↑ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1.3P:


Hydrograph
11.59 cfs
0.00 cfs
cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
0
50
100
150
200
250
300

Summary for Pond 2.1P:

Inflow Area = 7.700 ac, 43.90% Impervious, Inflow Depth = 2.02" for 2 year event
Inflow = 13.33 cfs @ 12.22 hrs, Volume= 1.294 af
Outflow = 5.06 cfs @ 12.62 hrs, Volume= 1.291 af, Atten= 62%, Lag= 24.0 min
Primary = 5.06 cfs @ 12.62 hrs, Volume= 1.291 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 440.00' Surf.Area= 13,300 sf Storage= 26,000 cf
Peak Elev= 441.55' @ 12.62 hrs Surf.Area= 18,408 sf Storage= 50,540 cf (24,540 cf above start)

Plug-Flow detention time= 1,520.4 min calculated for 0.694 af (54% of inflow)
Center-of-Mass det. time= 743.9 min (1,575.6 - 831.6)

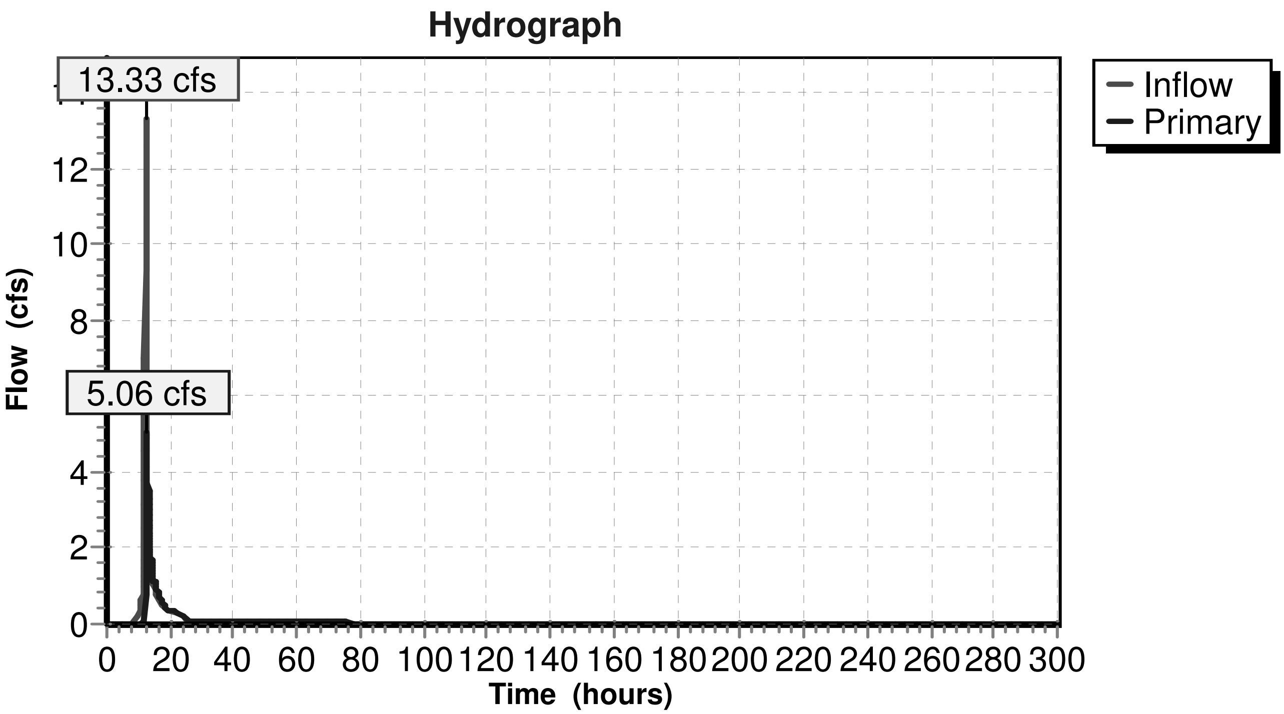
Volume	Invert	Avail.Storage	Storage Description
#1	436.00'	106,100 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
436.00	1,500	0	0
438.00	5,600	7,100	7,100
440.00	13,300	18,900	26,000
442.00	19,900	33,200	59,200
444.00	27,000	46,900	106,100

Device	Routing	Invert	Outlet Devices
#1	Primary	436.00'	**24.0" x 90.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 422.00' S= 0.1556 '/' Cc= 0.900 n= 0.012
#2	Device 1	440.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	441.00'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.04 cfs @ 12.62 hrs HW=441.55' TW=422.04' (Dynamic Tailwater)
└─**1=Culvert** (Passes 5.04 cfs of 32.25 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.13 cfs @ 5.82 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 4.91 cfs @ 2.25 fps)

Pond 2.1P:


Hydrograph
13.33 cfs
5.06 cfs
Inflow
Primary
Flow (cfs)
0
2
4
8
10
12
Time (hours)
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

Summary for Pond 2.2P:

Inflow Area = 8.500 ac, 39.76% Impervious, Inflow Depth = 1.94" for 2 year event
Inflow = 5.24 cfs @ 12.62 hrs, Volume= 1.374 af
Outflow = 0.88 cfs @ 16.06 hrs, Volume= 1.374 af, Atten= 83%, Lag= 206.4 min
Primary = 0.88 cfs @ 16.06 hrs, Volume= 1.374 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 424.69' @ 16.06 hrs Surf.Area= 10,388 sf Storage= 26,964 cf

Plug-Flow detention time= 1,448.6 min calculated for 1.374 af (100% of inflow)
Center-of-Mass det. time= 1,448.6 min (2,980.8 - 1,532.2)

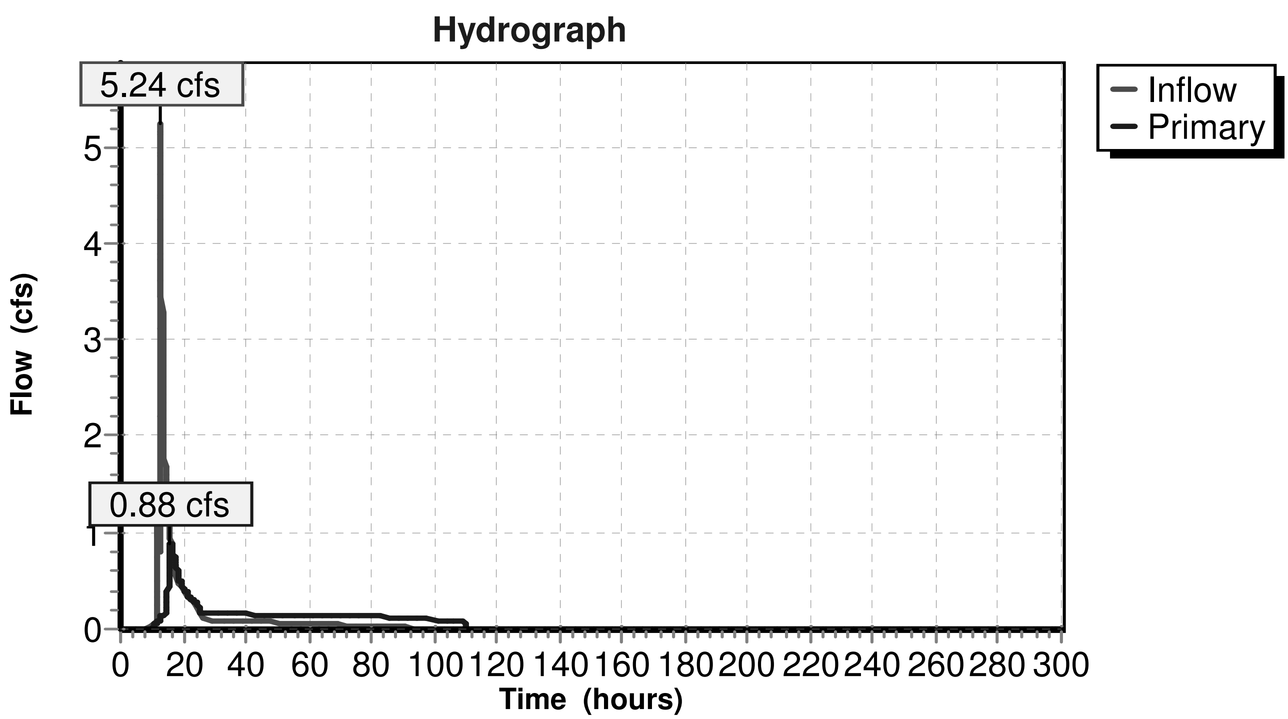
Volume	Invert	Avail.Storage	Storage Description
#1	419.00'	72,236 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
419.00	30	0	0
419.99	30	30	30
420.00	1,200	6	36
422.00	5,000	6,200	6,236
424.00	9,000	14,000	20,236
426.00	13,000	22,000	42,236
428.00	17,000	30,000	72,236

Device	Routing	Invert	Outlet Devices
#1	Primary	419.00'	**24.0" x 74.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 410.00' S= 0.1216 '/' Cc= 0.900 n= 0.012
#2	Device 1	419.00'	**1.6" Vert. Orifice/Grate** C= 0.600
#3	Device 1	424.50'	**3.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.88 cfs @ 16.06 hrs HW=424.69' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.88 cfs of 32.77 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.16 cfs @ 11.42 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 0.72 cfs @ 1.23 fps)

Pond 2.2P:


Hydrograph
5.24 cfs
0.88 cfs
Inflow
Primary
Flow (cfs)
0
1
2
3
4
5
Time (hours)
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

Summary for Pond 3.1P:

Inflow Area = 8.500 ac, 39.82% Impervious, Inflow Depth = 1.94" for 2 year event
Inflow = 15.00 cfs @ 12.19 hrs, Volume= 1.372 af
Outflow = 2.78 cfs @ 12.82 hrs, Volume= 1.369 af, Atten= 81%, Lag= 37.4 min
Primary = 2.78 cfs @ 12.82 hrs, Volume= 1.369 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 446.00' Surf.Area= 15,300 sf Storage= 26,700 cf
Peak Elev= 447.56' @ 12.82 hrs Surf.Area= 22,729 sf Storage= 56,439 cf (29,739 cf above start)

Plug-Flow detention time= 1,473.2 min calculated for 0.756 af (55% of inflow)
Center-of-Mass det. time= 754.2 min (1,586.8 - 832.6)

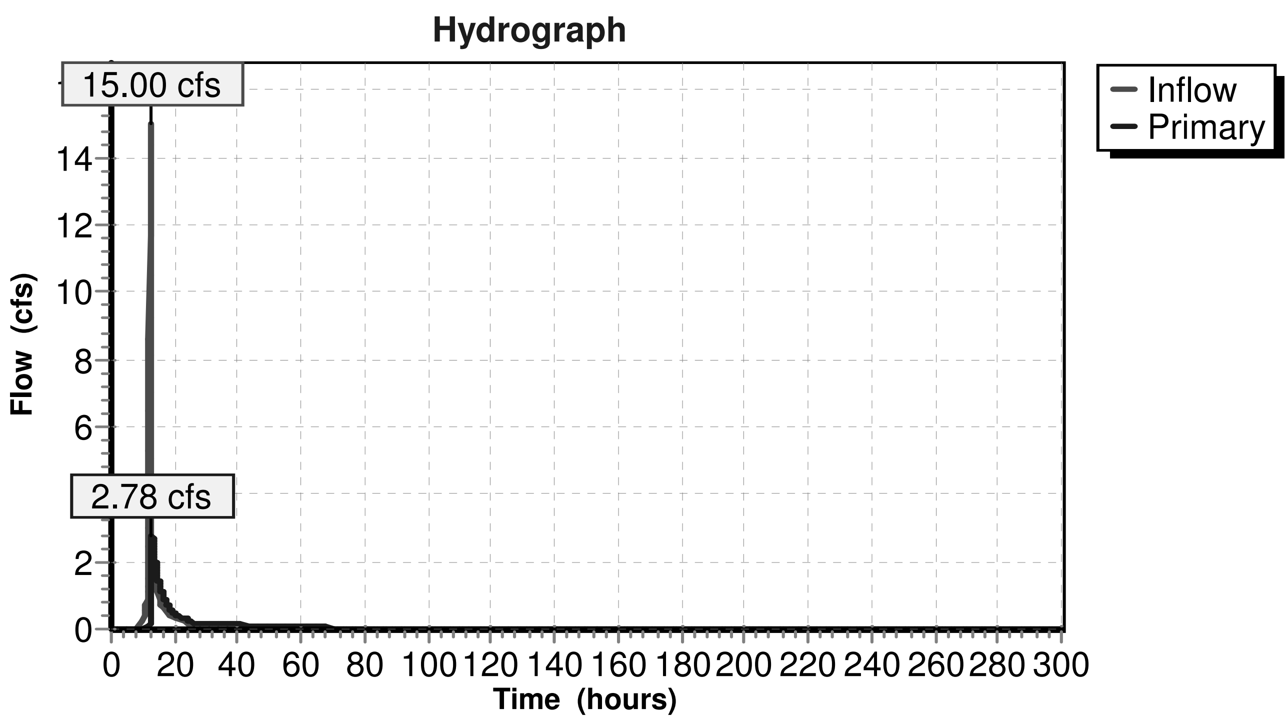
Volume	Invert	Avail.Storage	Storage Description
#1	442.00'	124,600 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
442.00	1,200	0	0
444.00	5,100	6,300	6,300
446.00	15,300	20,400	26,700
448.00	24,800	40,100	66,800
450.00	33,000	57,800	124,600

Device	Routing	Invert	Outlet Devices
#1	Primary	442.00'	**24.0" x 116.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 440.00' S= 0.0172 '/' Cc= 0.900 n= 0.012
#2	Device 1	446.00'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	447.00'	**2.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=2.78 cfs @ 12.82 hrs HW=447.56' TW=423.81' (Dynamic Tailwater)
└—**1=Culvert** (Passes 2.78 cfs of 32.32 cfs potential flow)
  ├—**2=Orifice/Grate** (Orifice Controls 0.20 cfs @ 5.82 fps)
  └—**3=Broad-Crested Rectangular Weir** (Weir Controls 2.58 cfs @ 2.29 fps)

Pond 3.1P:


Hydrograph
15.00 cfs
2.78 cfs
Inflow
Primary
Flow (cfs)
0
2
6
8
10
12
14
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Time (hours)

Summary for Pond 3.2P:

Inflow Area = 9.000 ac, 37.61% Impervious, Inflow Depth = 1.89" for 2 year event
Inflow = 2.88 cfs @ 12.80 hrs, Volume= 1.420 af
Outflow = 1.09 cfs @ 16.07 hrs, Volume= 1.420 af, Atten= 62%, Lag= 195.8 min
Primary = 1.09 cfs @ 16.07 hrs, Volume= 1.420 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 426.87' @ 16.07 hrs Surf.Area= 7,531 sf Storage= 22,499 cf

Plug-Flow detention time= 1,613.5 min calculated for 1.420 af (100% of inflow)
Center-of-Mass det. time= 1,613.4 min (3,173.7 - 1,560.2)

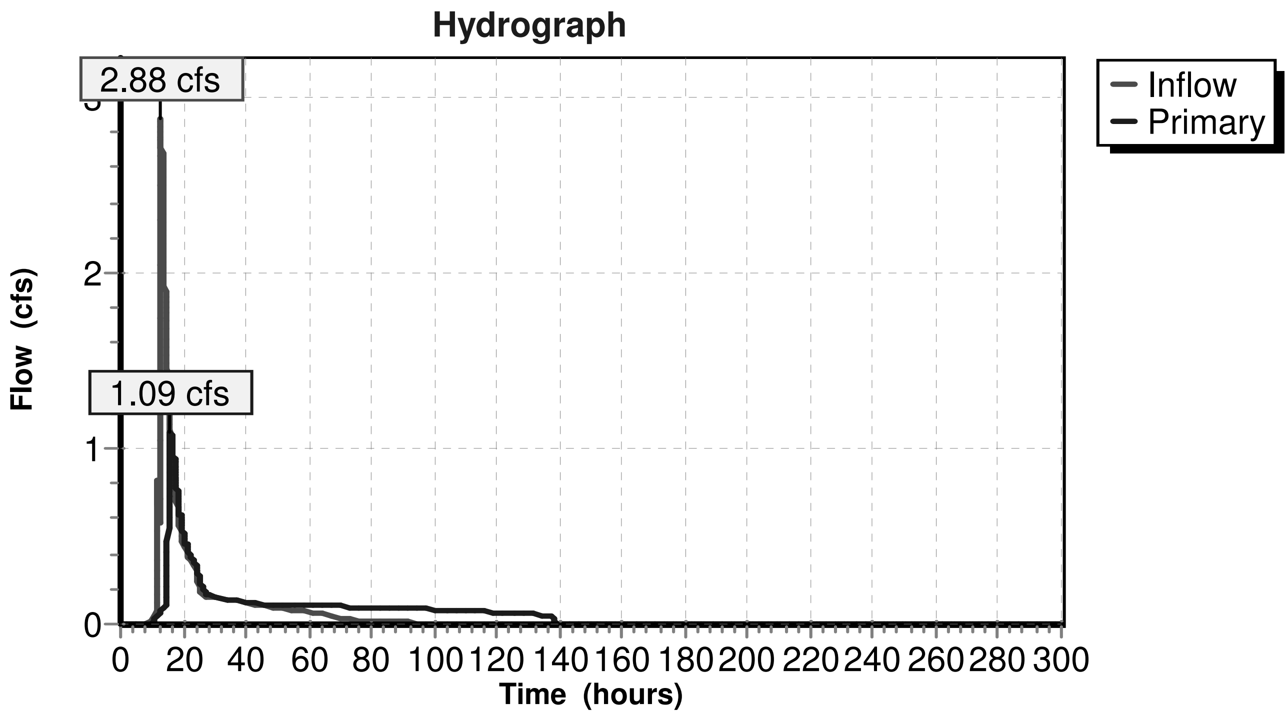
Volume	Invert	Avail.Storage	Storage Description
#1	421.00'	52,840 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
421.00	30	0	0
421.99	30	30	30
422.00	2,000	10	40
424.00	4,000	6,000	6,040
426.00	6,400	10,400	16,440
428.00	9,000	15,400	31,840
430.00	12,000	21,000	52,840

Device	Routing	Invert	Outlet Devices
#1	Primary	421.00'	**24.0" x 80.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 416.00' S= 0.0625 '/' Cc= 0.900 n= 0.012
#2	Device 1	421.00'	**1.3" Vert. Orifice/Grate** C= 0.600
#3	Device 1	426.50'	**1.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.09 cfs @ 16.07 hrs HW=426.87' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.09 cfs of 33.38 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.11 cfs @ 11.61 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 0.98 cfs @ 1.76 fps)

Pond 3.2P:


Hydrograph
2.88 cfs
1.09 cfs
Inflow
Primary
Flow (cfs)
0
1
2
3
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Time (hours)

Summary for Subcatchment 1.1S:

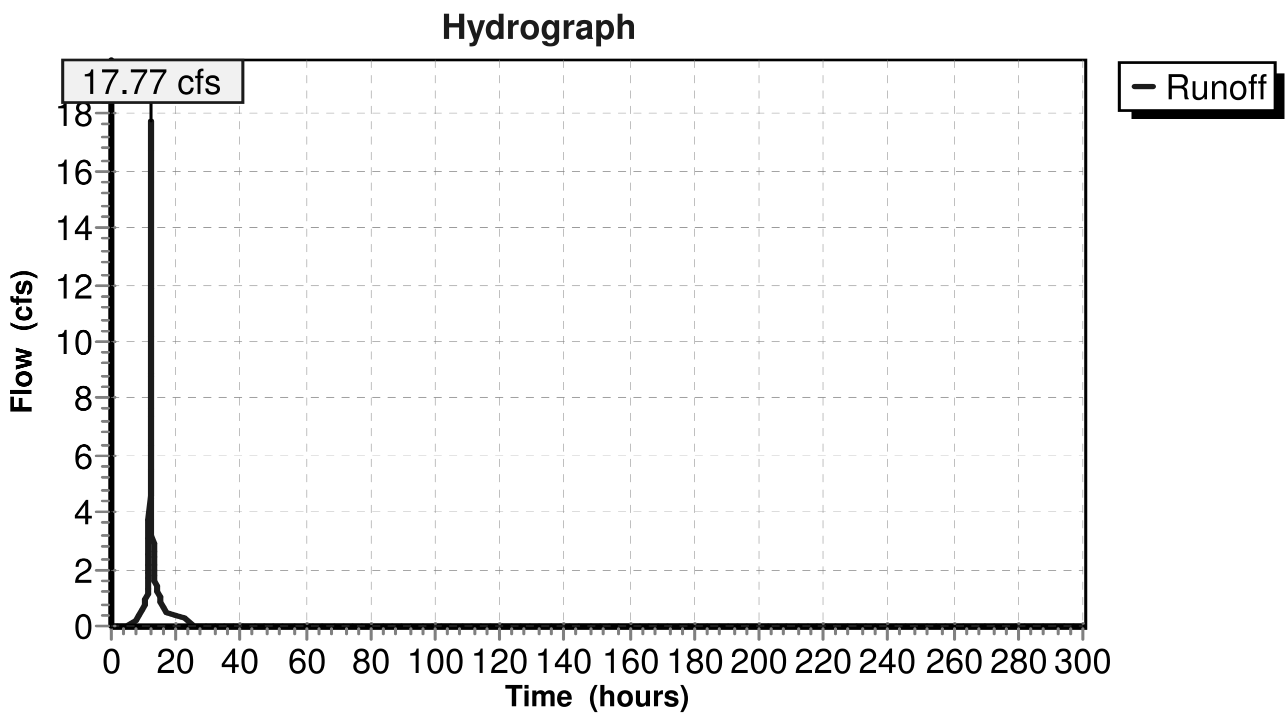
Runoff = 17.77 cfs @ 12.16 hrs, Volume= 1.583 af, Depth= 3.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
3.200	98	Paved parking & roofs
1.700	74	>75% Grass cover, Good, HSG C
4.900	90	Weighted Average
1.700		Pervious Area
3.200		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	80	0.0875	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.9	390	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.3	310	0.1200	19.75	24.24	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
11.7	780	Total			

Subcatchment 1.1S:



Summary for Subcatchment 1.2S:

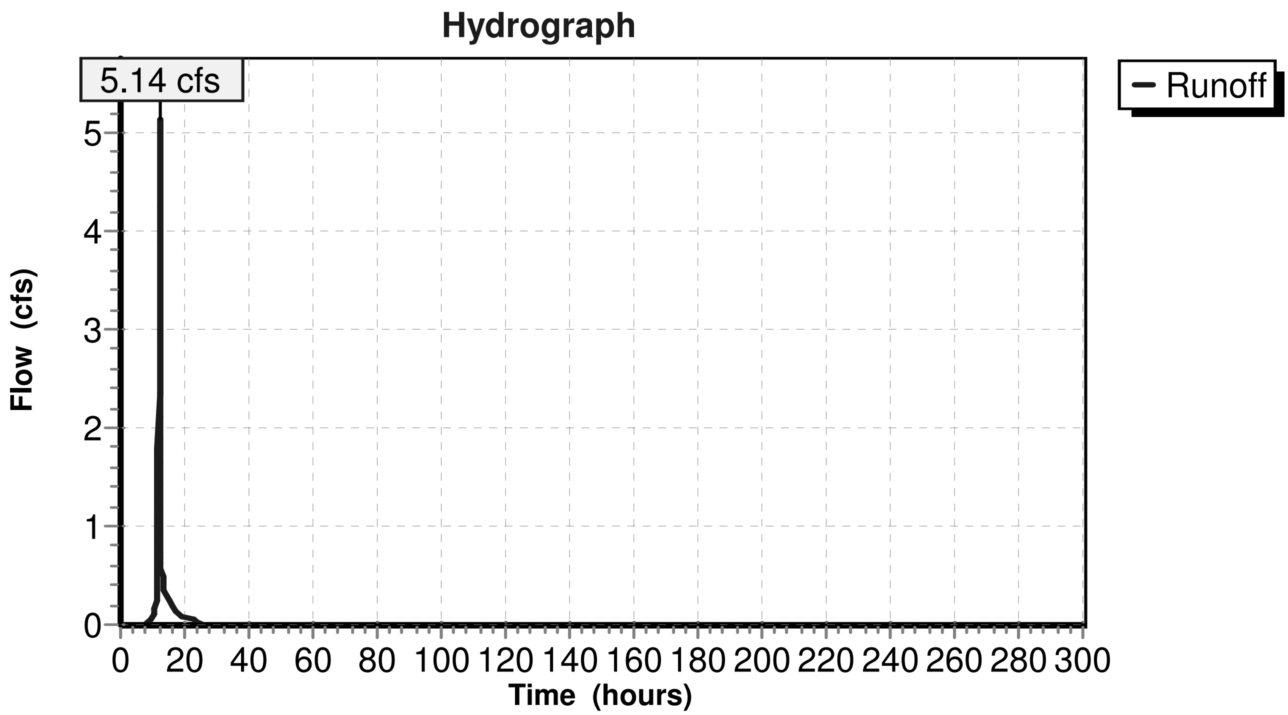
Runoff = 5.14 cfs @ 12.05 hrs, Volume= 0.339 af, Depth= 2.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
0.250	98	Paved parking & roofs
1.250	74	>75% Grass cover, Good, HSG C
1.500	78	Weighted Average
1.250		Pervious Area
0.250		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	80	0.4300	0.40		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 1.2S:



Summary for Subcatchment 1.3S:

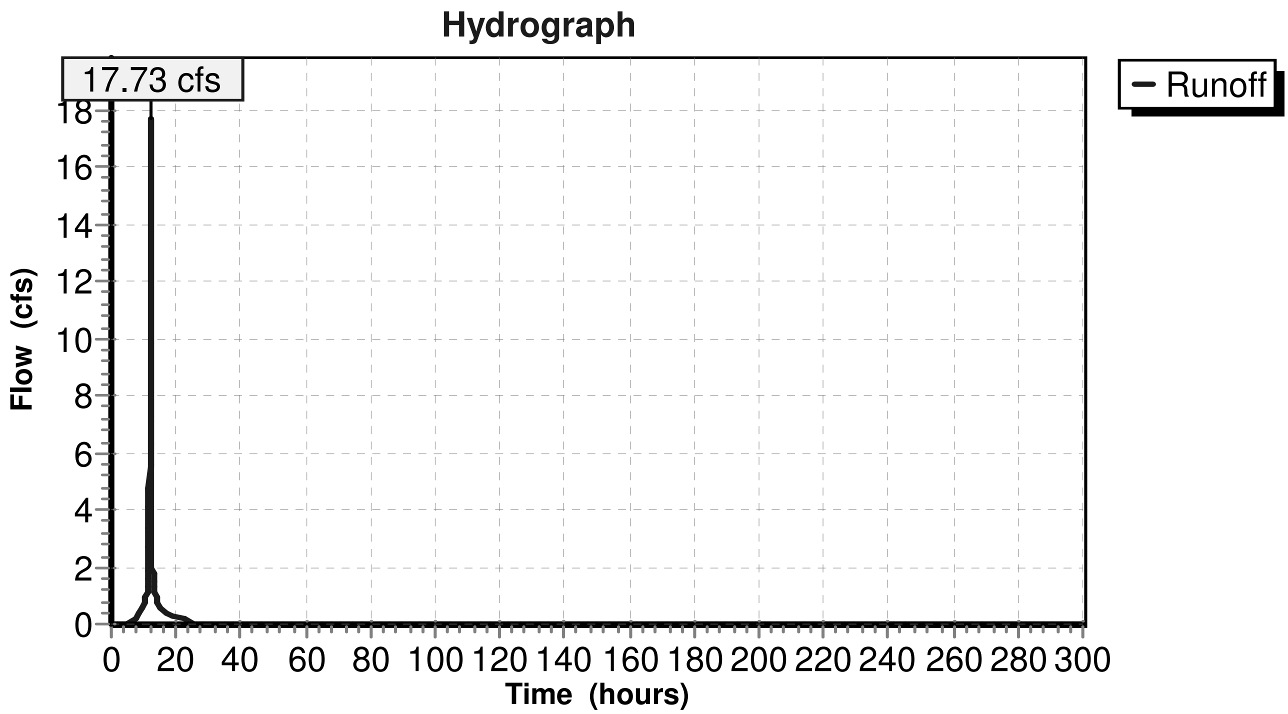
Runoff = 17.73 cfs @ 12.04 hrs, Volume= 1.208 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
0.660	79	50-75% Grass cover, Fair, HSG C
0.370	65	Brush, Good, HSG C
2.610	98	Paved parking & roofs
3.640	91	Weighted Average
1.030		Pervious Area
2.610		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.50"
0.2	60	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	305	0.0370	10.97	13.46	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	130	0.0920	17.30	21.23	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	60	0.0650	14.54	17.84	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
2.2	655	Total			

Subcatchment 1.3S:



Summary for Subcatchment 1.4S:

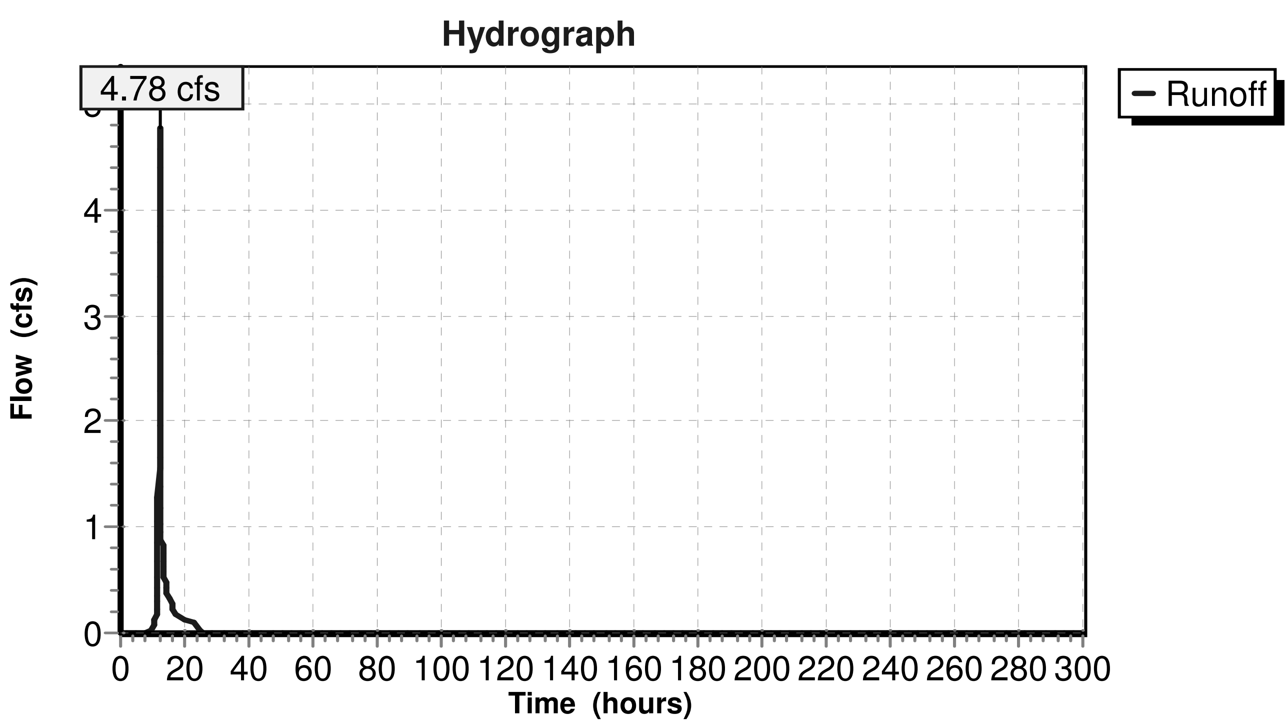
Runoff = 4.78 cfs @ 12.19 hrs, Volume= 0.437 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
1.200	70	Woods, Good, HSG C
0.950	74	>75% Grass cover, Good, HSG C
0.150	98	Paved parking & roofs
2.300	73	Weighted Average
2.150		Pervious Area
0.150		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.5	250	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	350	Total			

Subcatchment 1.4S:



Summary for Subcatchment 2.1S:

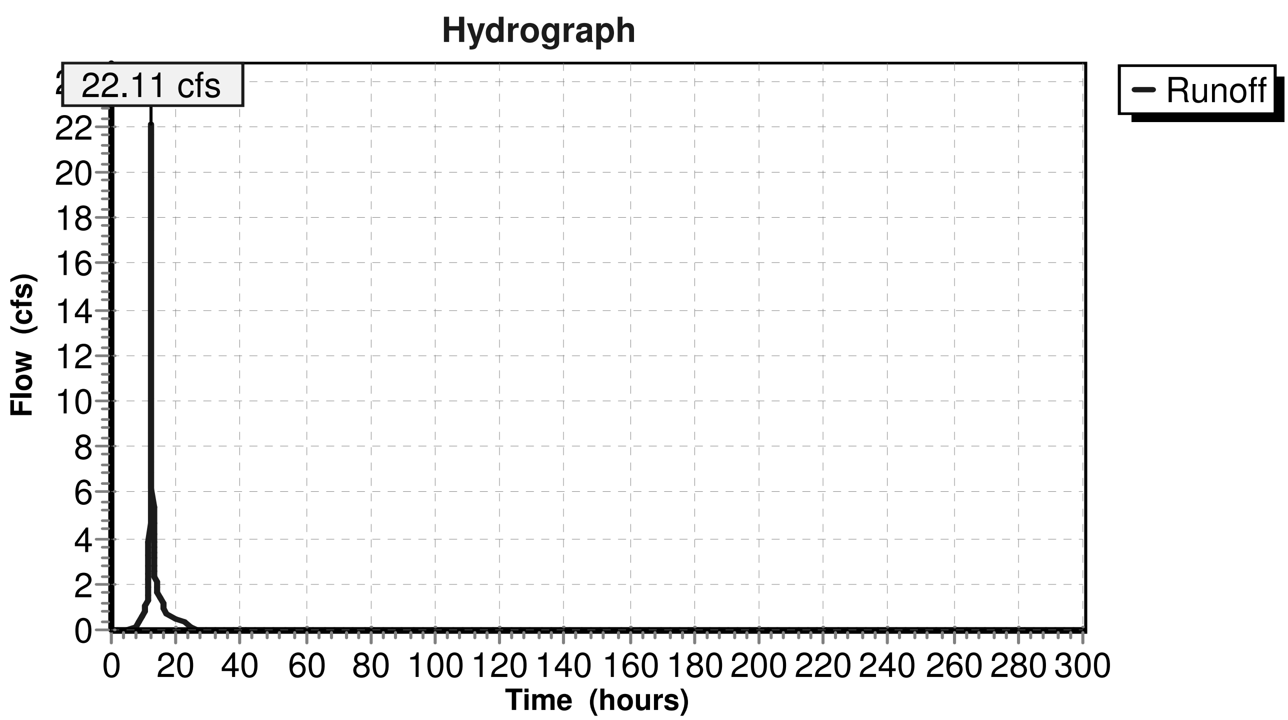
Runoff = 22.11 cfs @ 12.22 hrs, Volume= 2.161 af, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
5.200	90	1/8 acre lots, 65% imp, HSG C
2.500	74	>75% Grass cover, Good, HSG C
7.700	85	Weighted Average
4.320		Pervious Area
3.380		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
2.0	120	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	740	0.0500	20.93	65.76	**Circular Channel (pipe),** Diam= 24.0" Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.010 PVC, smooth interior
16.2	960	Total			

Subcatchment 2.1S:



Summary for Subcatchment 2.2S:

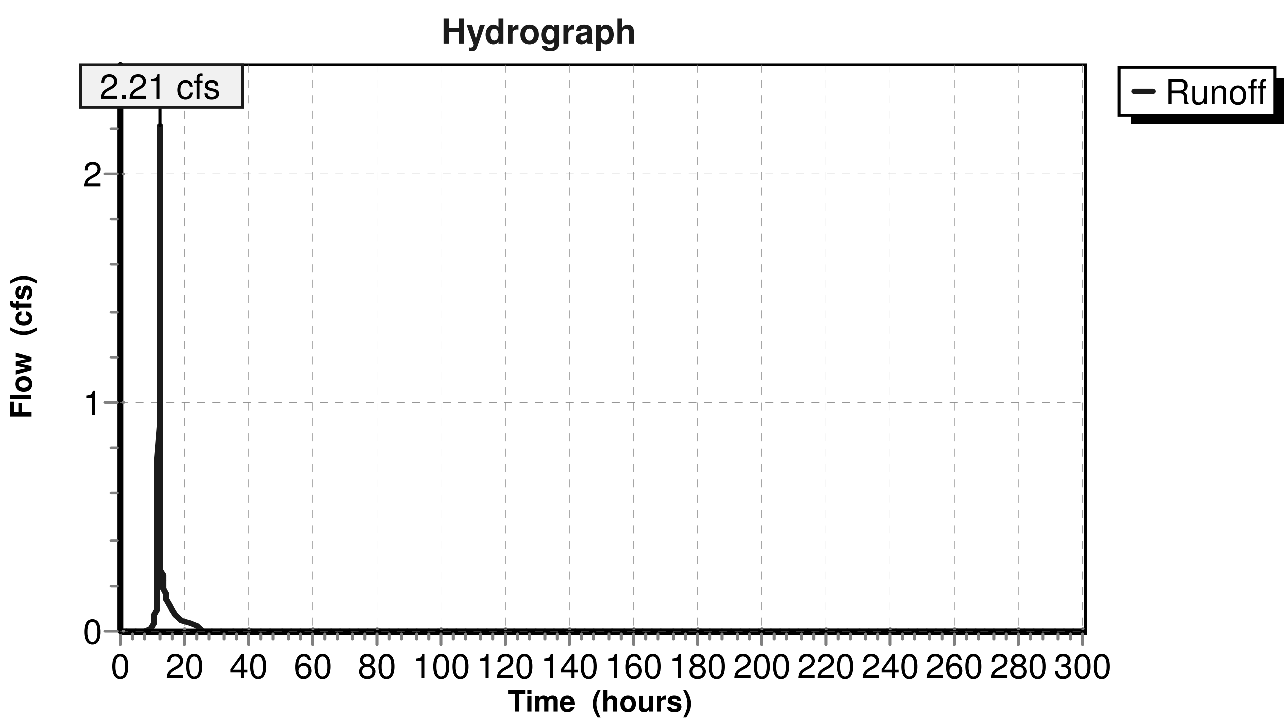
Runoff = 2.21 cfs @ 12.08 hrs, Volume= 0.158 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
0.800		Pervious Area

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

Subcatchment 2.2S:



Summary for Subcatchment 2.3S:

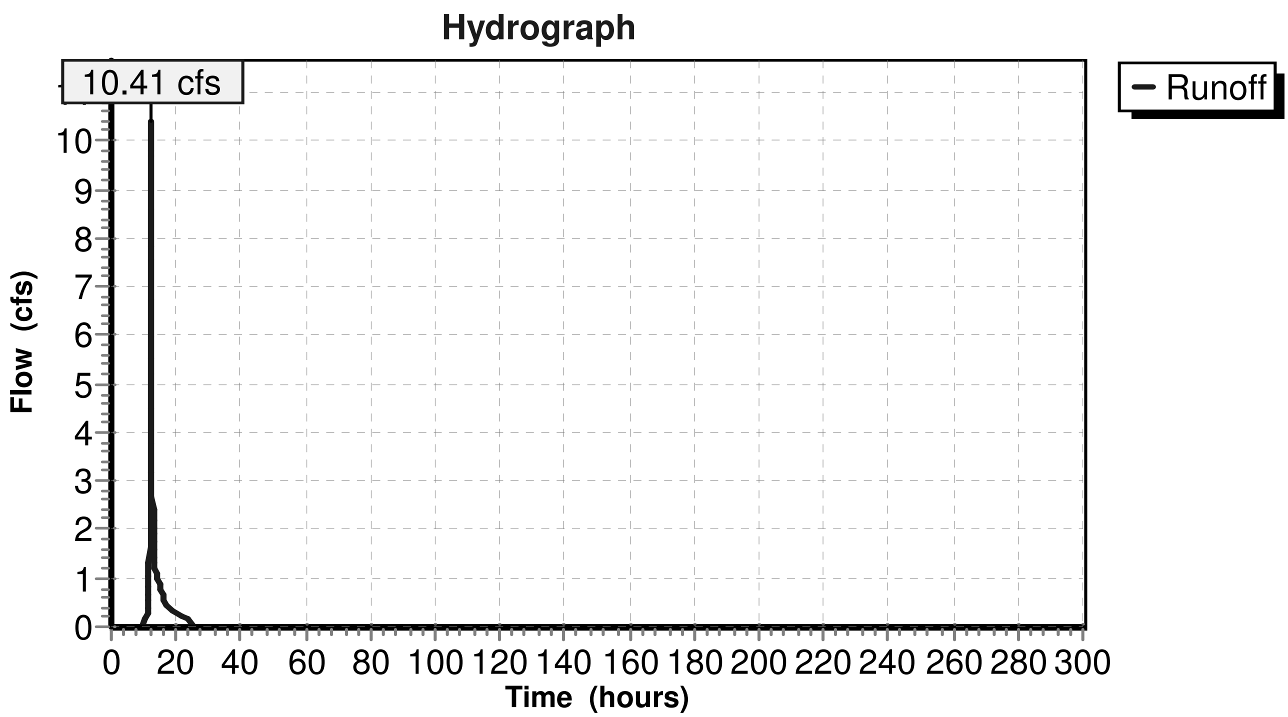
Runoff = 10.41 cfs @ 12.20 hrs, Volume= 0.967 af, Depth= 2.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
5.700	70	Woods, Good, HSG C
5.700		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	8	0.5000	0.27		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
8.2	92	0.1700	0.19		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
4.8	580	0.1600	2.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	680	Total			

Subcatchment 2.3S:



Summary for Subcatchment 3.1S:

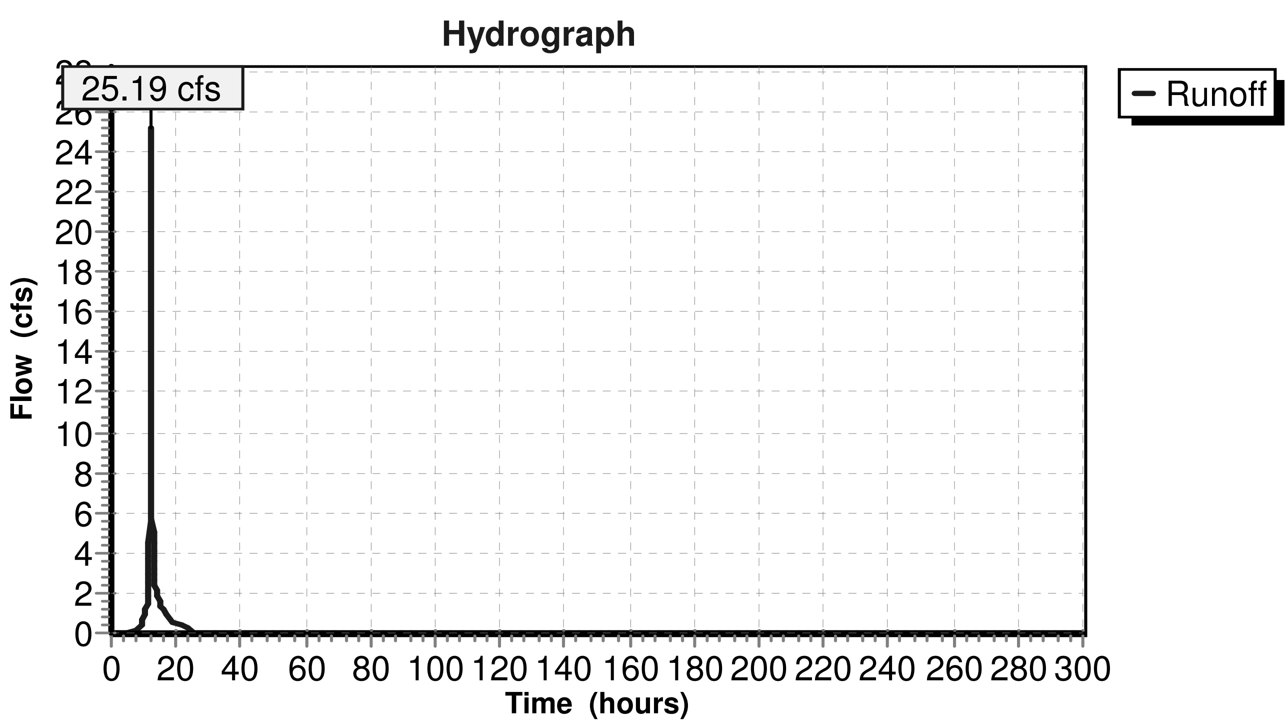
Runoff = 25.19 cfs @ 12.19 hrs, Volume= 2.317 af, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
1.500	98	Paved parking & roofs
2.900	90	1/8 acre lots, 65% imp, HSG C
4.100	74	>75% Grass cover, Good, HSG C
8.500	84	Weighted Average
5.115		Pervious Area
3.385		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.4	260	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.7	360	Total			

Subcatchment 3.1S:



Summary for Subcatchment 3.2S:

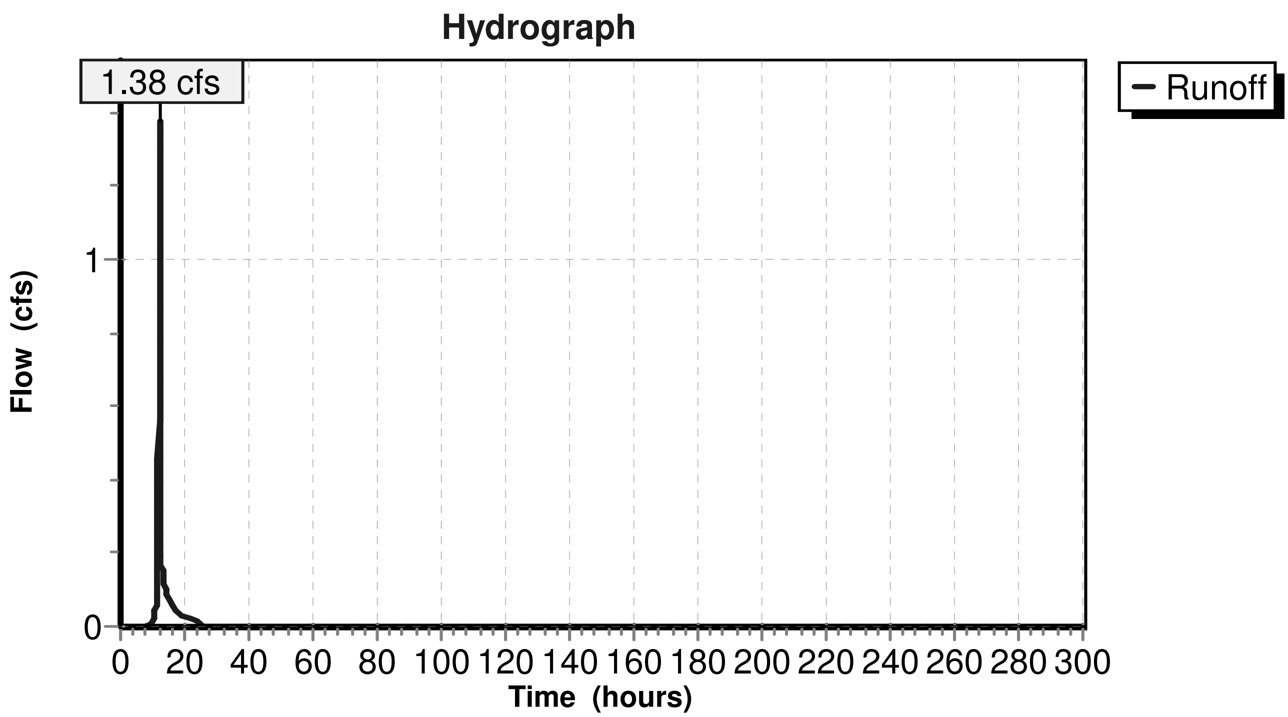
Runoff = 1.38 cfs @ 12.08 hrs, Volume= 0.099 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
0.500	74	>75% Grass cover, Good, HSG C
0.500		Pervious Area

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

Subcatchment 3.2S:



Summary for Subcatchment 3.3S:

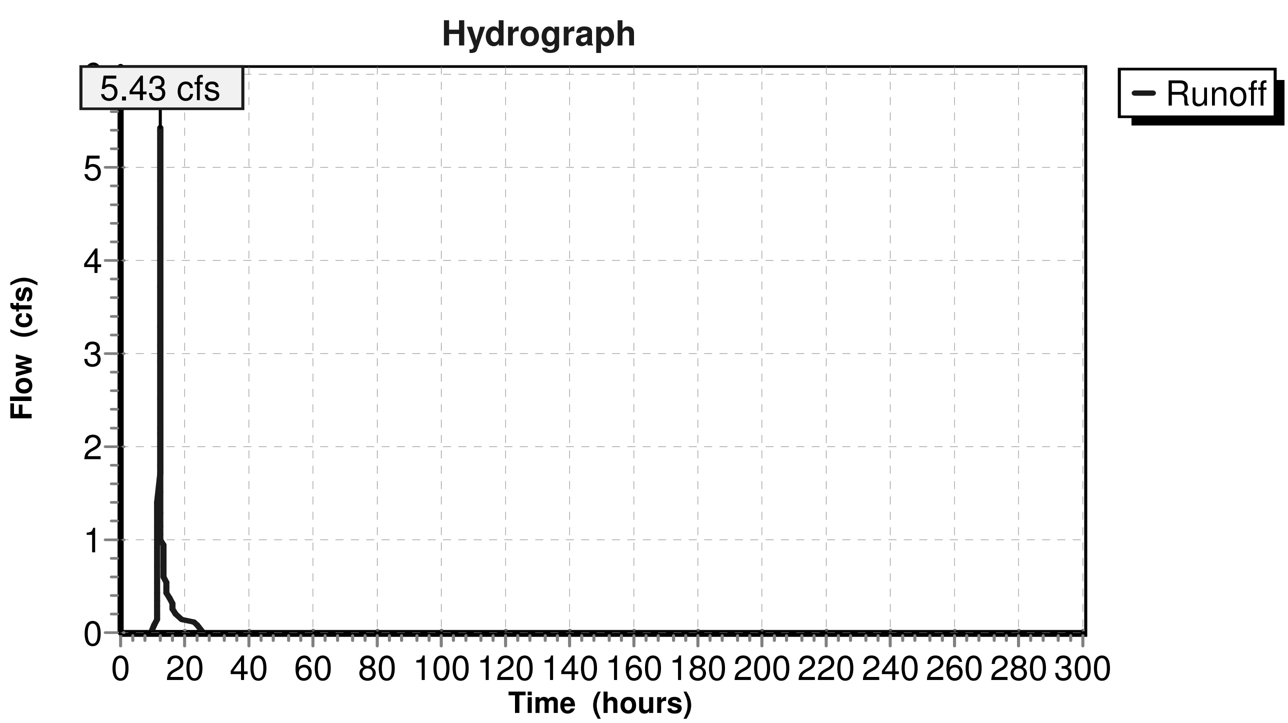
Runoff = 5.43 cfs @ 12.18 hrs, Volume= 0.492 af, Depth= 2.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
2.700	70	Woods, Good, HSG C
0.200	74	>75% Grass cover, Good, HSG C
2.900	70	Weighted Average
2.900		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	26	0.4200	0.32		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
7.6	74	0.1300	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
3.1	388	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	207	0.0480	13.23	128.96	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.50' Z= 4.0 & 2.0 '/' Top.W=11.00' n= 0.022 Earth, clean & straight
12.4	695	Total			

Subcatchment 3.3S:



Summary for Subcatchment 4.0S:

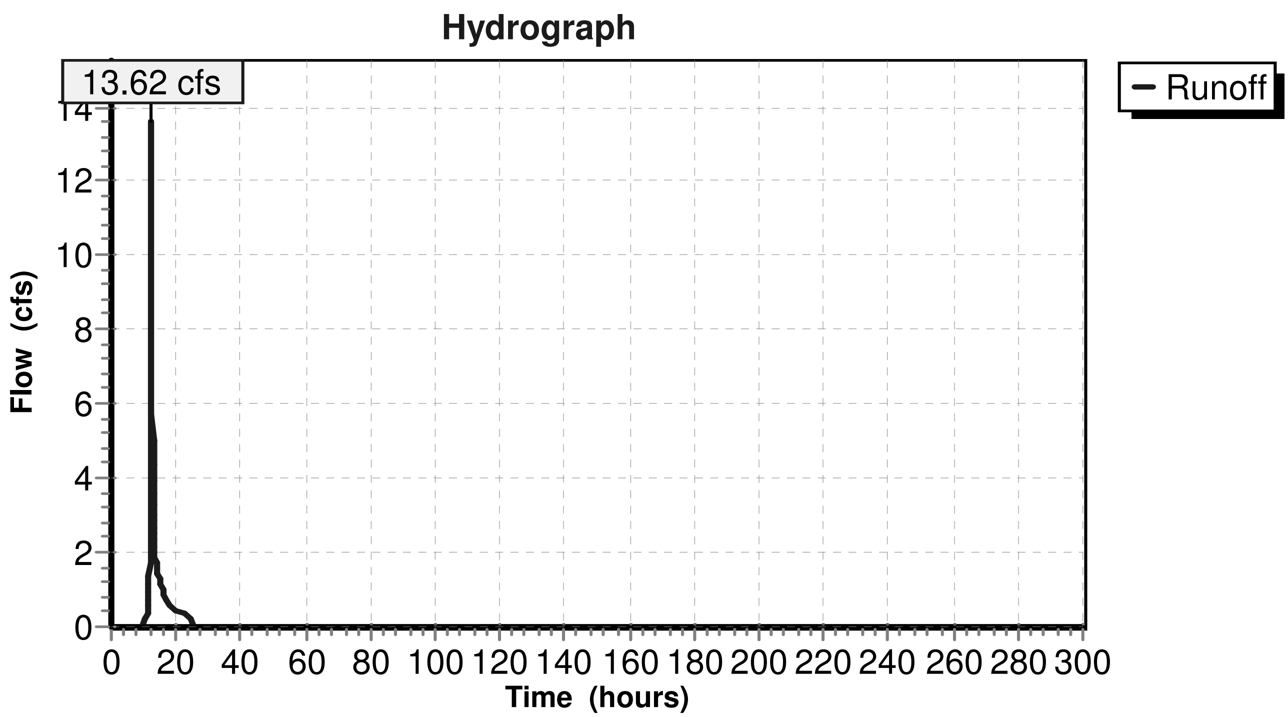
Runoff = 13.62 cfs @ 12.28 hrs, Volume= 1.468 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
8.300	70	Woods, Good, HSG C
0.700	55	Woods, Good, HSG B
9.000	69	Weighted Average
9.000		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
8.2	980	0.1600	2.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.5	1,080	Total			

Subcatchment 4.0S:



Summary for Subcatchment 5.0S:

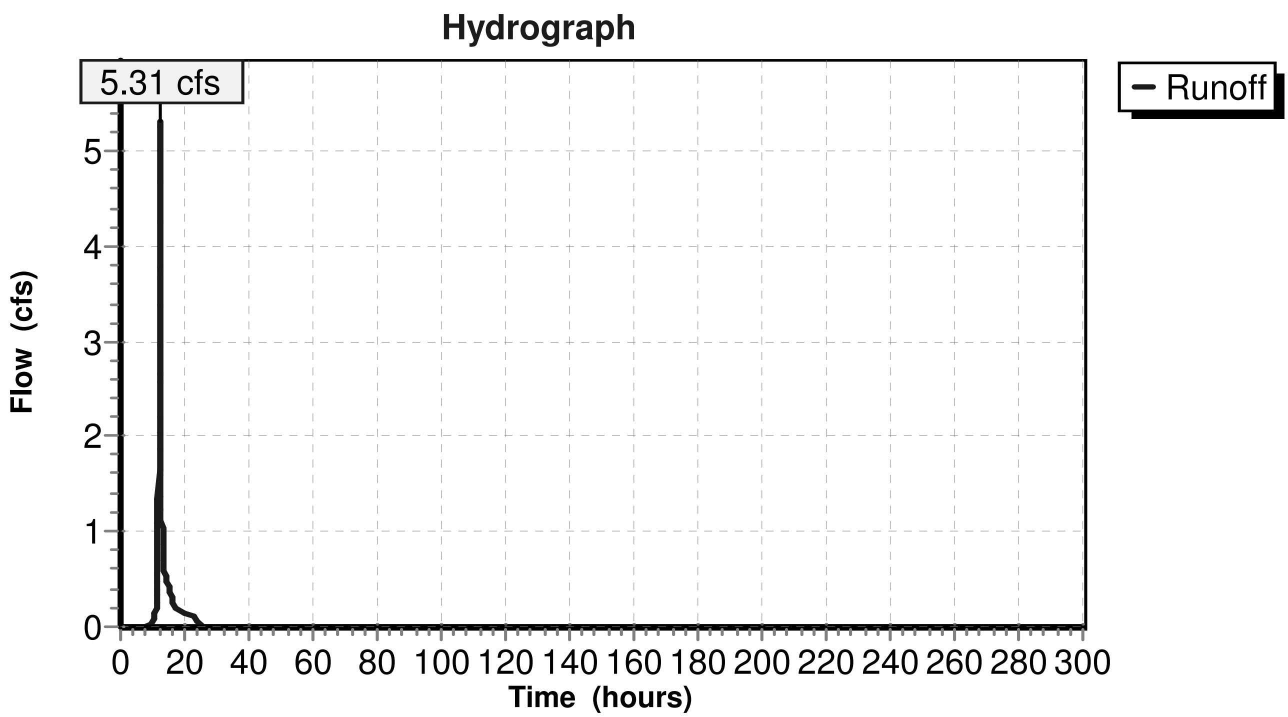
Runoff = 5.31 cfs @ 12.22 hrs, Volume= 0.513 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.00"

Area (ac)	CN	Description
1.700	74	>75% Grass cover, Good, HSG C
1.000	70	Woods, Good, HSG C
2.700	73	Weighted Average
2.700		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0500	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.4	120	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.6	220	Total			

Subcatchment 5.0S:

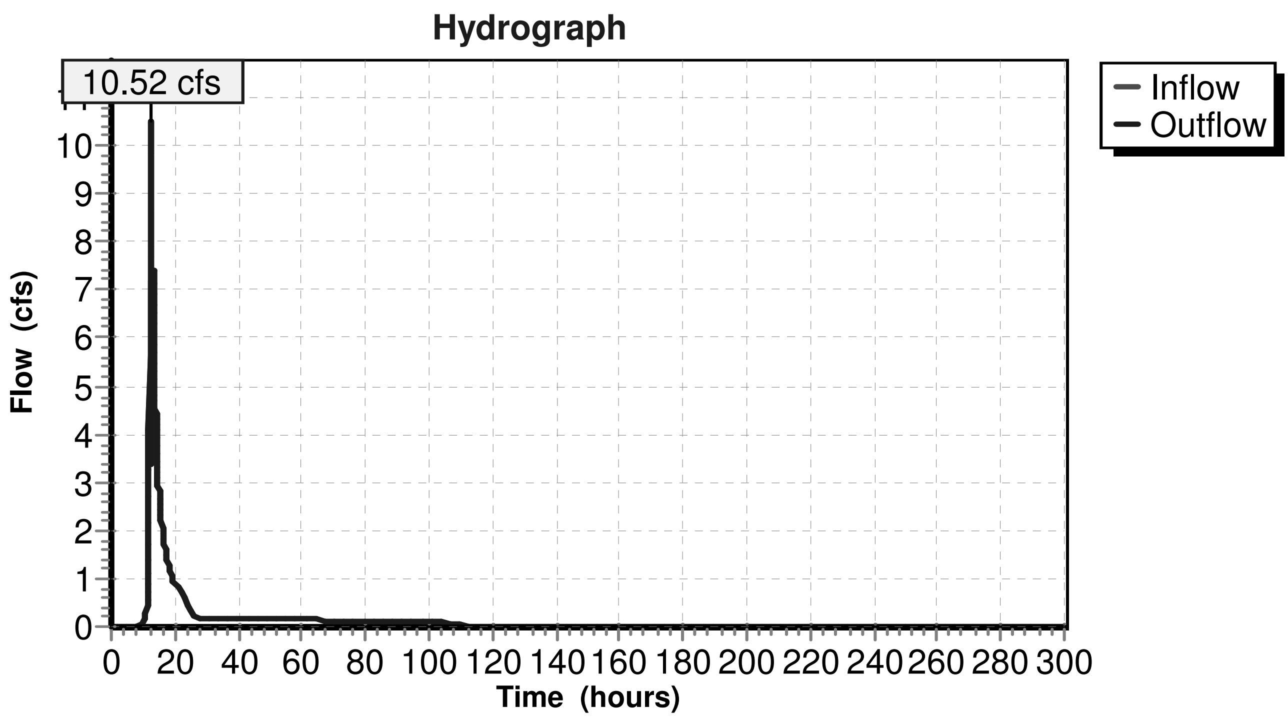


Summary for Reach DP 2:

Inflow Area = 14.200 ac, 23.80% Impervious, Inflow Depth = 2.77" for 10 year event
Inflow = 10.52 cfs @ 12.20 hrs, Volume= 3.283 af
Outflow = 10.52 cfs @ 12.20 hrs, Volume= 3.283 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

Reach DP 2:

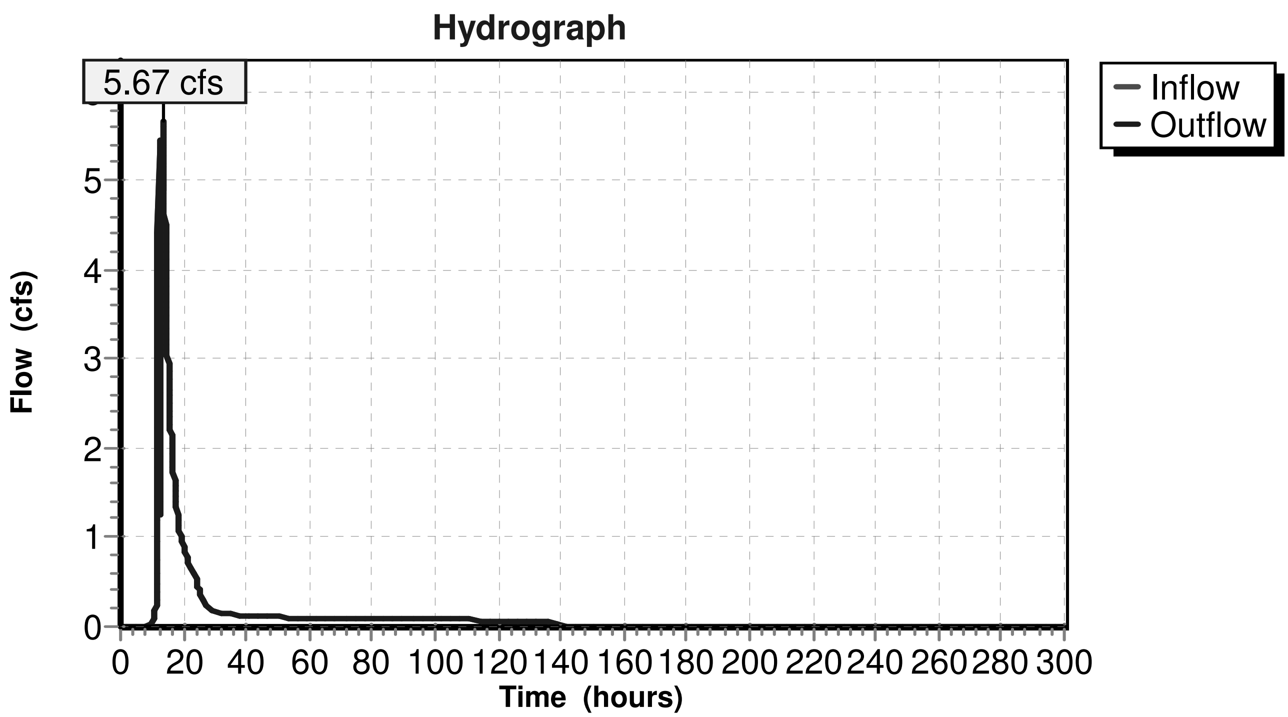


Summary for Reach DP 3:

Inflow Area =	11.900 ac, 28.45% Impervious,	Inflow Depth = 2.93"	for 10 year event	
Inflow =	5.67 cfs @ 13.45 hrs,	Volume=	2.904 af	
Outflow =	5.67 cfs @ 13.45 hrs,	Volume=	2.904 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

Reach DP 3:

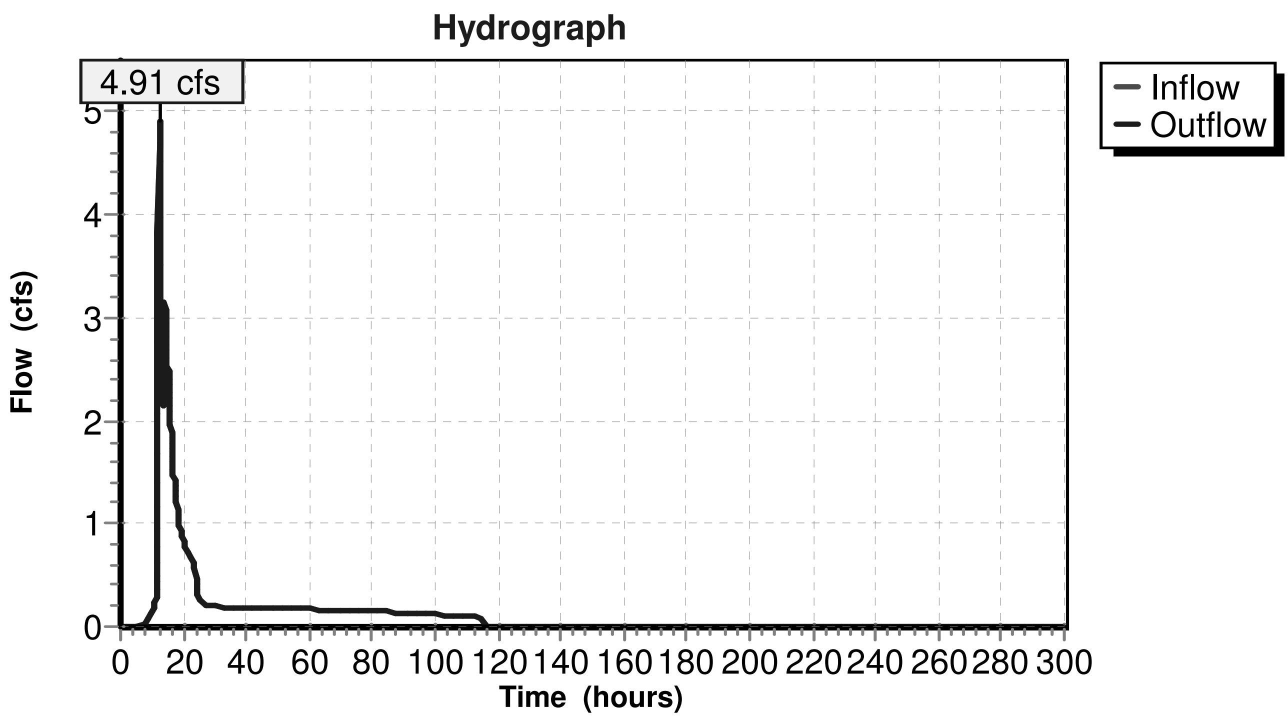


Summary for Reach DP1:

Inflow Area =	12.340 ac,	50.32% Impervious,	Inflow Depth = 2.73"	for 10 year event
Inflow =	4.91 cfs @	12.19 hrs, Volume=	2.804 af	
Outflow =	4.91 cfs @	12.19 hrs, Volume=	2.804 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

Reach DP1:



Summary for Pond 1.1P:

Inflow Area = 4.900 ac, 65.31% Impervious, Inflow Depth = 3.88" for 10 year event
Inflow = 17.77 cfs @ 12.16 hrs, Volume= 1.583 af
Outflow = 10.45 cfs @ 12.35 hrs, Volume= 1.582 af, Atten= 41%, Lag= 11.3 min
Primary = 10.45 cfs @ 12.35 hrs, Volume= 1.582 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 403.20' Surf.Area= 8,340 sf Storage= 15,484 cf
Peak Elev= 405.55' @ 12.35 hrs Surf.Area= 14,493 sf Storage= 42,600 cf (27,116 cf above start)

Plug-Flow detention time= 905.8 min calculated for 1.226 af (77% of inflow)
Center-of-Mass det. time= 627.5 min (1,423.5 - 796.0)

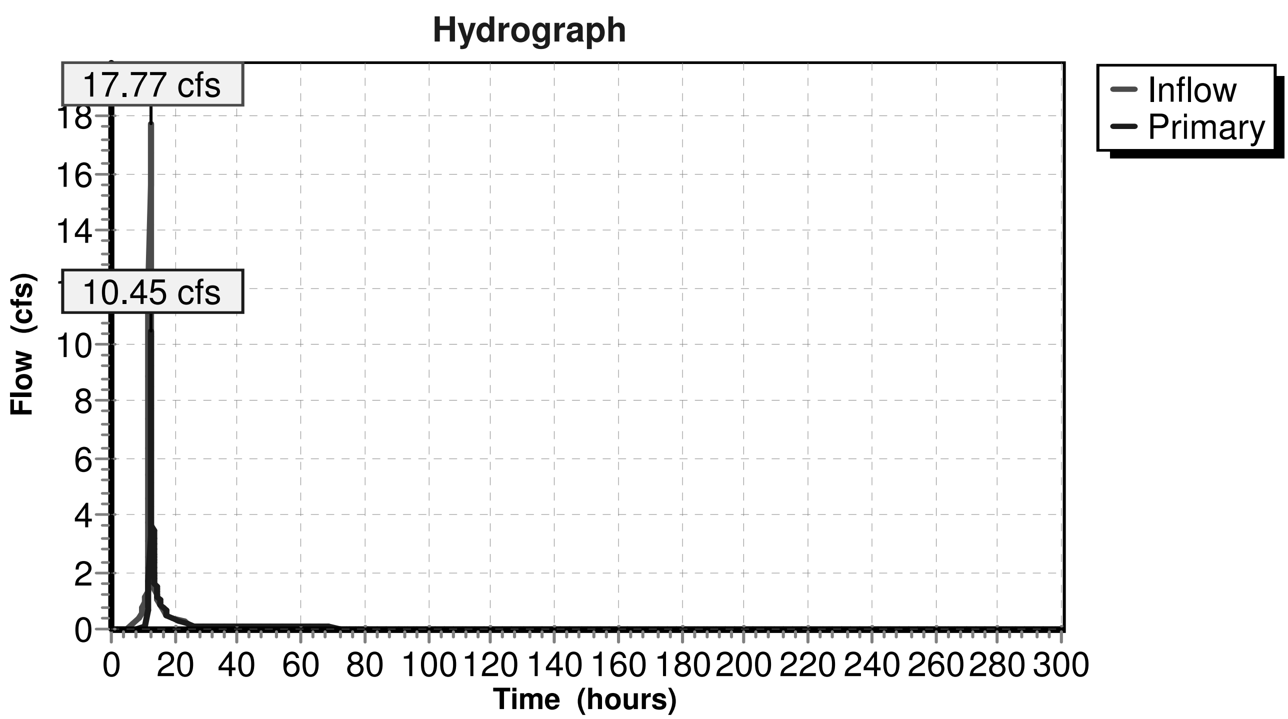
Volume	Invert	Avail.Storage	Storage Description
#1	399.00'	66,400 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
399.00	800	0	0
400.00	1,600	1,200	1,200
402.00	4,800	6,400	7,600
404.00	10,700	15,500	23,100
406.00	15,600	26,300	49,400
407.00	18,400	17,000	66,400

Device	Routing	Invert	Outlet Devices
#1	Primary	399.00'	**18.0" x 155.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 390.00' S= 0.0581 '/' Cc= 0.900 n= 0.012
#2	Device 1	403.20'	**1.8" Vert. Orifice/Grate** C= 0.600
#3	Device 1	404.70'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=10.44 cfs @ 12.35 hrs HW=405.55' TW=367.65' (Dynamic Tailwater)
└─**1=Culvert** (Passes 10.44 cfs of 20.49 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.13 cfs @ 7.26 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 10.31 cfs @ 3.04 fps)

Pond 1.1P:


Hydrograph
17.77 cfs
10.45 cfs
Inflow
Primary
Flow (cfs)
0
2
4
6
8
10
14
16
18
Time (hours)
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

Summary for Pond 1.2P:

Inflow Area = 6.400 ac, 53.91% Impervious, Inflow Depth = 3.60" for 10 year event
Inflow = 12.22 cfs @ 12.32 hrs, Volume= 1.921 af
Outflow = 1.77 cfs @ 14.12 hrs, Volume= 1.921 af, Atten= 86%, Lag= 108.3 min
Primary = 1.56 cfs @ 14.12 hrs, Volume= 0.521 af
Secondary = 0.20 cfs @ 14.12 hrs, Volume= 1.399 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 369.69' @ 14.12 hrs Surf.Area= 13,120 sf Storage= 38,224 cf

Plug-Flow detention time= 1,458.4 min calculated for 1.920 af (100% of inflow)
Center-of-Mass det. time= 1,458.1 min (2,775.9 - 1,317.8)

Volume	Invert	Avail.Storage	Storage Description
#1	365.00'	64,033 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

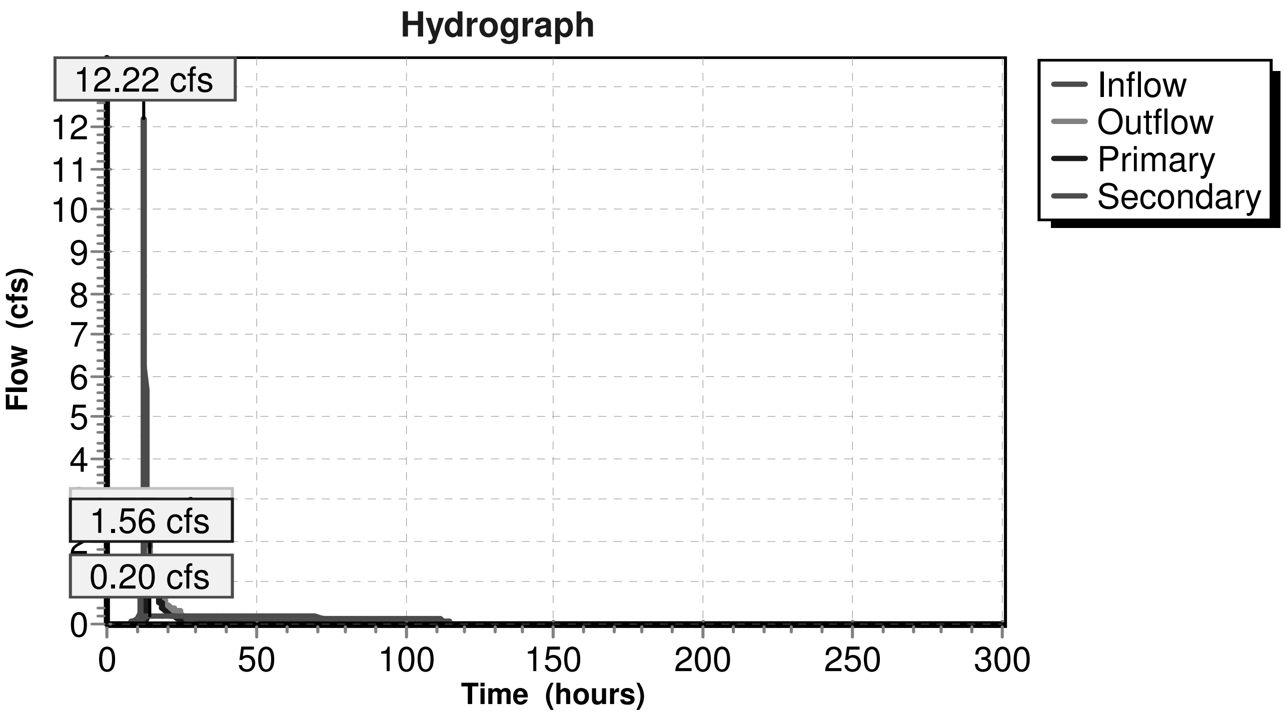
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
365.00	20	0	0
365.99	20	20	20
366.00	7,700	39	58
368.00	10,500	18,200	18,258
370.00	13,600	24,100	42,358
371.50	15,300	21,675	64,033

Device	Routing	Invert	Outlet Devices
#1	Secondary	365.00'	**1.9" Vert. Orifice/Grate** C= 0.600
#2	Primary	364.00'	**15.0" x 90.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 361.00' S= 0.0333 '/' Cc= 0.900 n= 0.012
#3	Device 2	369.40'	**3.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.56 cfs @ 14.12 hrs HW=369.69' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.56 cfs of 13.30 cfs potential flow)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 1.56 cfs @ 1.54 fps)

Secondary OutFlow Max=0.20 cfs @ 14.12 hrs HW=369.69' TW=0.00' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Orifice Controls 0.20 cfs @ 10.34 fps)

Pond 1.2P:


Hydrograph
12.22 cfs
1.56 cfs
0.20 cfs
Flow (cfs)
0
1
2
3
4
5
6
7
8
9
10
11
12
Time (hours)
0
50
100
150
200
250
300
Inflow
Outflow
Primary
Secondary

Summary for Pond 1.3P:

Inflow Area = 3.640 ac, 71.70% Impervious, Inflow Depth = 3.98" for 10 year event
Inflow = 17.73 cfs @ 12.04 hrs, Volume= 1.208 af
Outflow = 1.39 cfs @ 12.97 hrs, Volume= 0.446 af, Atten= 92%, Lag= 55.8 min
Primary = 1.39 cfs @ 12.97 hrs, Volume= 0.446 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 398.53' @ 12.97 hrs Surf.Area= 11,984 sf Storage= 34,766 cf

Plug-Flow detention time= 330.7 min calculated for 0.446 af (37% of inflow)
Center-of-Mass det. time= 197.8 min (981.1 - 783.3)

Volume	Invert	Avail.Storage	Storage Description
#1	392.00'	54,900 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

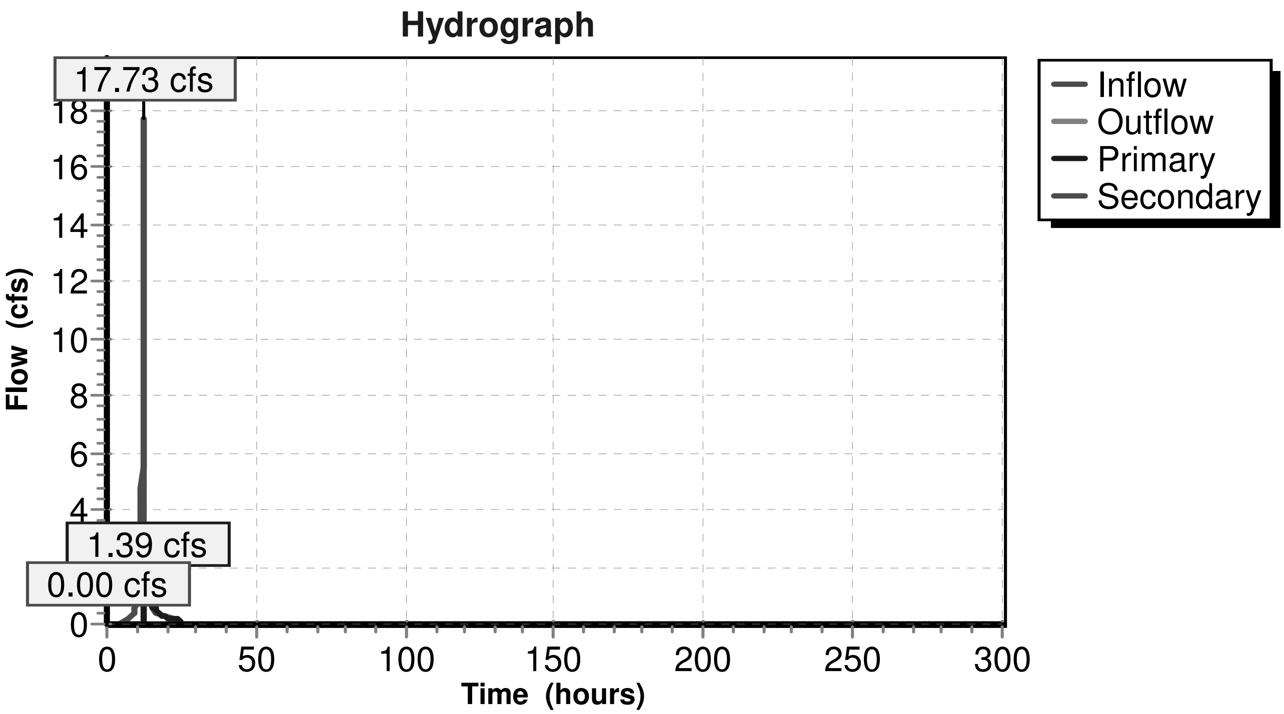
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
392.00	400	0	0
394.00	2,500	2,900	2,900
396.00	6,300	8,800	11,700
398.00	10,700	17,000	28,700
400.00	15,500	26,200	54,900

Device	Routing	Invert	Outlet Devices
#1	Primary	391.00'	**18.0" x 40.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 380.00' S= 0.2750 '/' Cc= 0.900 n= 0.012
#2	Device 1	398.40'	**10.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	399.00'	**10.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.38 cfs @ 12.97 hrs HW=398.53' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.38 cfs of 22.16 cfs potential flow)
  └─**2=Broad-Crested Rectangular Weir** (Weir Controls 1.38 cfs @ 1.03 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=392.00' TW=0.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1.3P:


Hydrograph
17.73 cfs
1.39 cfs
0.00 cfs
Flow (cfs)
0
4
6
8
10
12
14
16
18
Time (hours)
0
50
100
150
200
250
300
Inflow
Outflow
Primary
Secondary

Summary for Pond 2.1P:

Inflow Area = 7.700 ac, 43.90% Impervious, Inflow Depth = 3.37" for 10 year event
Inflow = 22.11 cfs @ 12.22 hrs, Volume= 2.161 af
Outflow = 13.34 cfs @ 12.46 hrs, Volume= 2.158 af, Atten= 40%, Lag= 14.2 min
Primary = 13.34 cfs @ 12.46 hrs, Volume= 2.158 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 440.00' Surf.Area= 13,300 sf Storage= 26,000 cf
Peak Elev= 442.00' @ 12.46 hrs Surf.Area= 19,887 sf Storage= 59,119 cf (33,119 cf above start)

Plug-Flow detention time= 762.8 min calculated for 1.561 af (72% of inflow)
Center-of-Mass det. time= 468.2 min (1,285.2 - 817.0)

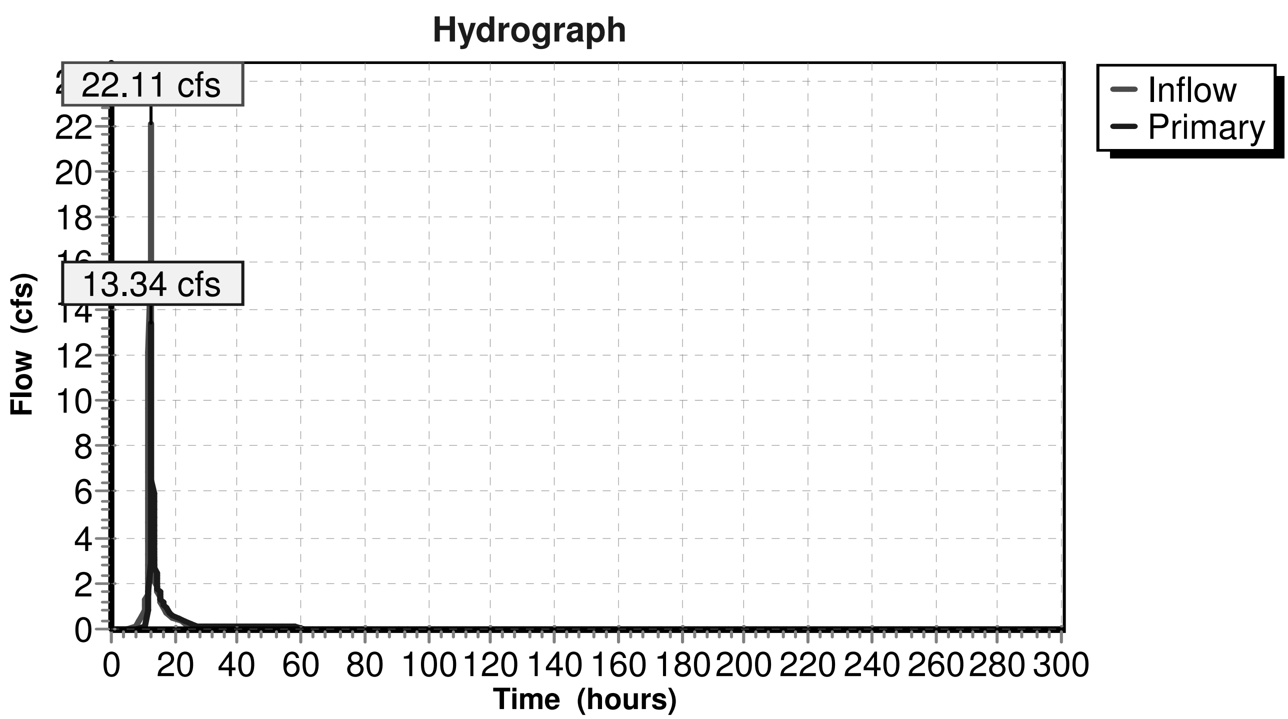
Volume	Invert	Avail.Storage	Storage Description
#1	436.00'	106,100 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
436.00	1,500	0	0
438.00	5,600	7,100	7,100
440.00	13,300	18,900	26,000
442.00	19,900	33,200	59,200
444.00	27,000	46,900	106,100

Device	Routing	Invert	Outlet Devices
#1	Primary	436.00'	**24.0" x 90.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 422.00' S= 0.1556 '/' Cc= 0.900 n= 0.012
#2	Device 1	440.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	441.00'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=13.32 cfs @ 12.46 hrs HW=442.00' TW=423.52' (Dynamic Tailwater)
1=Culvert (Passes 13.32 cfs of 33.81 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.15 cfs @ 6.66 fps)
3=Broad-Crested Rectangular Weir (Weir Controls 13.18 cfs @ 3.31 fps)

Pond 2.1P:


Hydrograph
22.11 cfs
13.34 cfs
Inflow
Primary
Flow (cfs)
0
2
4
6
8
10
12
14
18
20
22
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Time (hours)

Summary for Pond 2.2P:

Inflow Area = 8.500 ac, 39.76% Impervious, Inflow Depth = 3.27" for 10 year event
Inflow = 13.98 cfs @ 12.44 hrs, Volume= 2.316 af
Outflow = 5.88 cfs @ 13.09 hrs, Volume= 2.316 af, Atten= 58%, Lag= 39.1 min
Primary = 5.88 cfs @ 13.09 hrs, Volume= 2.316 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 425.21' @ 13.09 hrs Surf.Area= 11,416 sf Storage= 32,566 cf

Plug-Flow detention time= 890.6 min calculated for 2.316 af (100% of inflow)
Center-of-Mass det. time= 890.5 min (2,145.1 - 1,254.6)

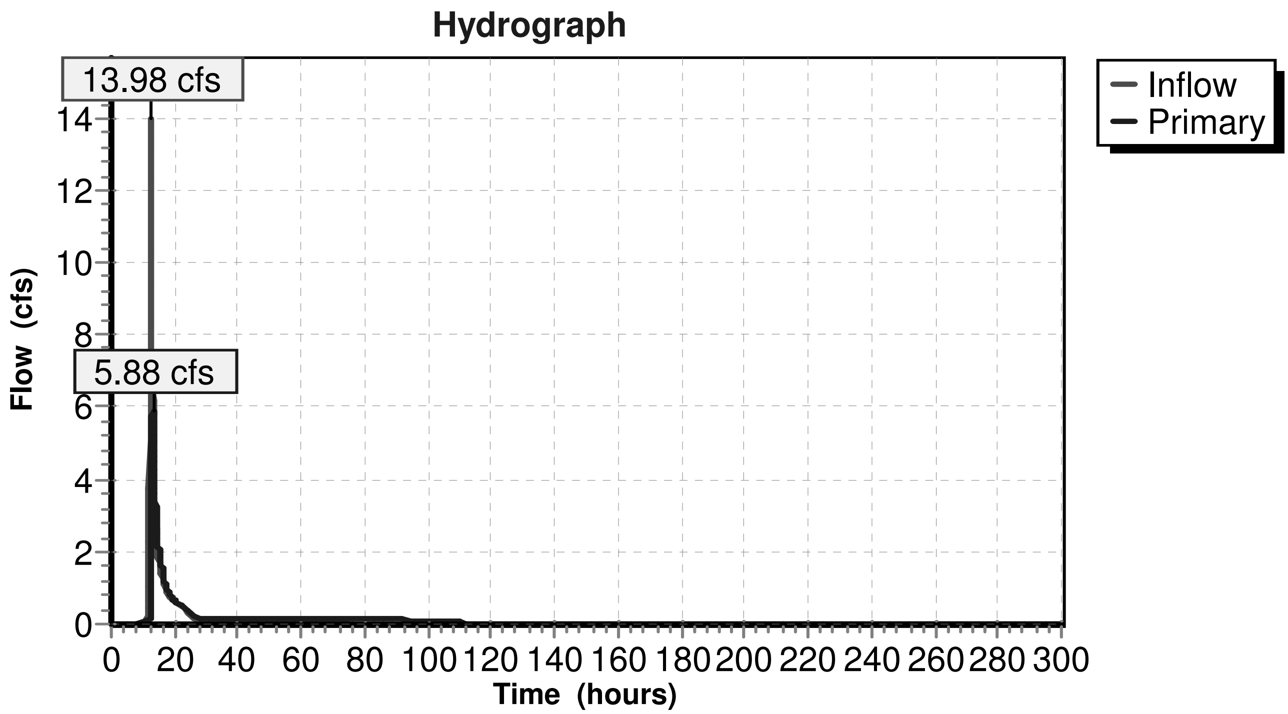
Volume	Invert	Avail.Storage	Storage Description
#1	419.00'	72,236 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
419.00	30	0	0
419.99	30	30	30
420.00	1,200	6	36
422.00	5,000	6,200	6,236
424.00	9,000	14,000	20,236
426.00	13,000	22,000	42,236
428.00	17,000	30,000	72,236

Device	Routing	Invert	Outlet Devices
#1	Primary	419.00'	**24.0" x 74.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 410.00' S= 0.1216 '/' Cc= 0.900 n= 0.012
#2	Device 1	419.00'	**1.6" Vert. Orifice/Grate** C= 0.600
#3	Device 1	424.50'	**3.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.88 cfs @ 13.09 hrs HW=425.21' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 5.88 cfs of 34.52 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.17 cfs @ 11.93 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 5.71 cfs @ 2.69 fps)

Pond 2.2P:


Hydrograph
13.98 cfs
5.88 cfs
Inflow
Primary
Flow (cfs)
0
2
4
6
8
10
12
14
Time (hours)
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

Summary for Pond 3.1P:

Inflow Area = 8.500 ac, 39.82% Impervious, Inflow Depth = 3.27" for 10 year event
Inflow = 25.19 cfs @ 12.19 hrs, Volume= 2.317 af
Outflow = 8.69 cfs @ 12.58 hrs, Volume= 2.313 af, Atten= 65%, Lag= 23.6 min
Primary = 8.69 cfs @ 12.58 hrs, Volume= 2.313 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 446.00' Surf.Area= 15,300 sf Storage= 26,700 cf
Peak Elev= 448.18' @ 12.58 hrs Surf.Area= 25,518 sf Storage= 71,206 cf (44,506 cf above start)

Plug-Flow detention time= 768.7 min calculated for 1.700 af (73% of inflow)
Center-of-Mass det. time= 485.1 min (1,302.7 - 817.7)

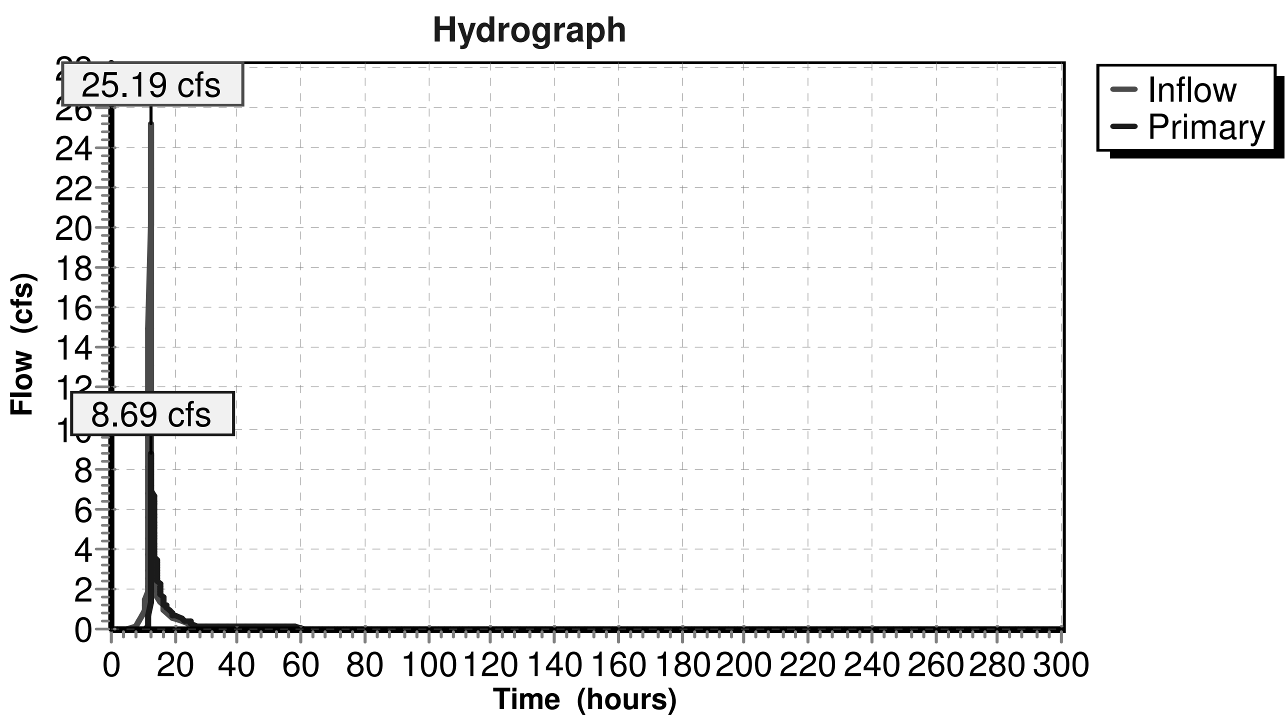
Volume	Invert	Avail.Storage	Storage Description
#1	442.00'	124,600 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
442.00	1,200	0	0
444.00	5,100	6,300	6,300
446.00	15,300	20,400	26,700
448.00	24,800	40,100	66,800
450.00	33,000	57,800	124,600

Device	Routing	Invert	Outlet Devices
#1	Primary	442.00'	**24.0" x 116.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 440.00' S= 0.0172 '/' Cc= 0.900 n= 0.012
#2	Device 1	446.00'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	447.00'	**2.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=8.68 cfs @ 12.58 hrs HW=448.17' TW=425.52' (Dynamic Tailwater)
1=Culvert (Passes 8.68 cfs of 34.41 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.24 cfs @ 6.93 fps)
3=Broad-Crested Rectangular Weir (Weir Controls 8.45 cfs @ 3.60 fps)

Pond 3.1P:


Hydrograph
25.19 cfs
8.69 cfs
Inflow
Primary
Flow (cfs)
0
2
4
6
8
14
16
18
20
22
24
26
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Time (hours)

Summary for Pond 3.2P:

Inflow Area = 9.000 ac, 37.61% Impervious, Inflow Depth = 3.22" for 10 year event
Inflow = 8.93 cfs @ 12.56 hrs, Volume= 2.412 af
Outflow = 5.03 cfs @ 13.47 hrs, Volume= 2.412 af, Atten= 44%, Lag= 54.3 min
Primary = 5.03 cfs @ 13.47 hrs, Volume= 2.412 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 427.49' @ 13.47 hrs Surf.Area= 8,339 sf Storage= 27,434 cf

Plug-Flow detention time= 981.7 min calculated for 2.412 af (100% of inflow)
Center-of-Mass det. time= 981.5 min (2,265.2 - 1,283.7)

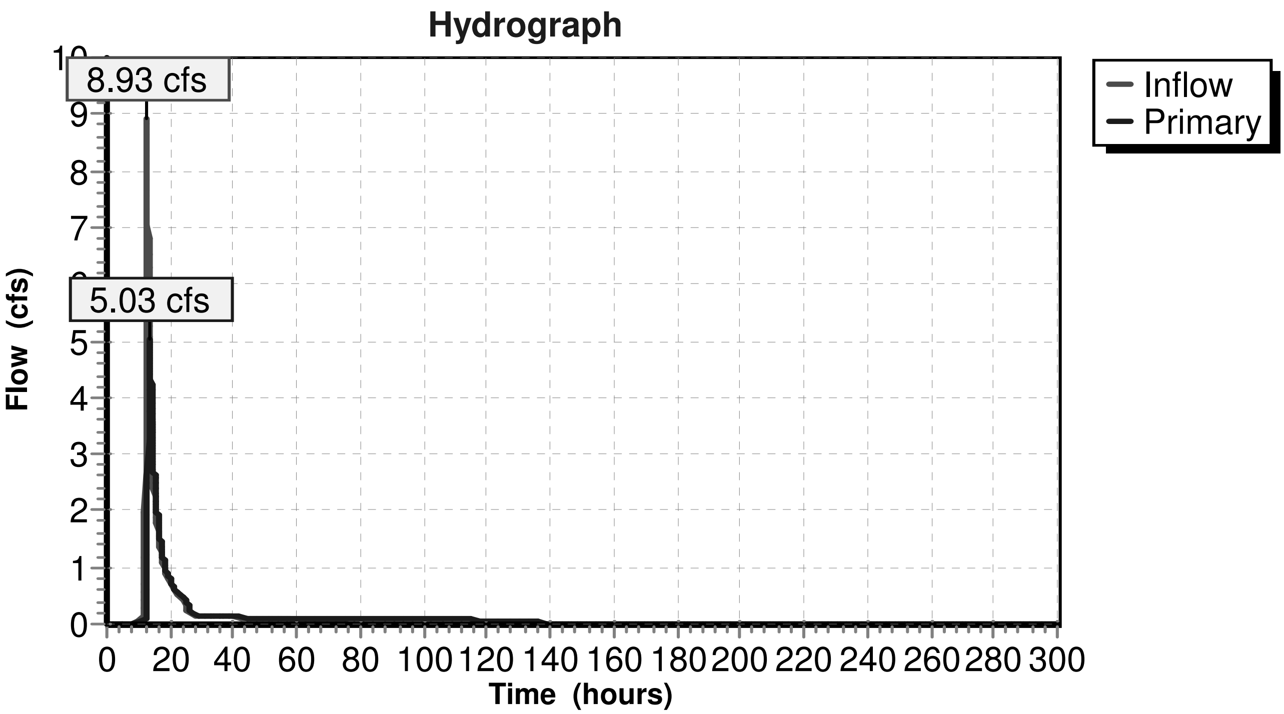
Volume	Invert	Avail.Storage	Storage Description
#1	421.00'	52,840 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
421.00	30	0	0
421.99	30	30	30
422.00	2,000	10	40
424.00	4,000	6,000	6,040
426.00	6,400	10,400	16,440
428.00	9,000	15,400	31,840
430.00	12,000	21,000	52,840

Device	Routing	Invert	Outlet Devices
#1	Primary	421.00'	**24.0" x 80.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 416.00' S= 0.0625 '/' Cc= 0.900 n= 0.012
#2	Device 1	421.00'	**1.3" Vert. Orifice/Grate** C= 0.600
#3	Device 1	426.50'	**1.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.03 cfs @ 13.47 hrs HW=427.49' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 5.03 cfs of 35.45 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.11 cfs @ 12.22 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 4.91 cfs @ 3.30 fps)

Pond 3.2P:


Hydrograph
8.93 cfs
5.03 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
7
8
9
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

Summary for Subcatchment 1.1S:

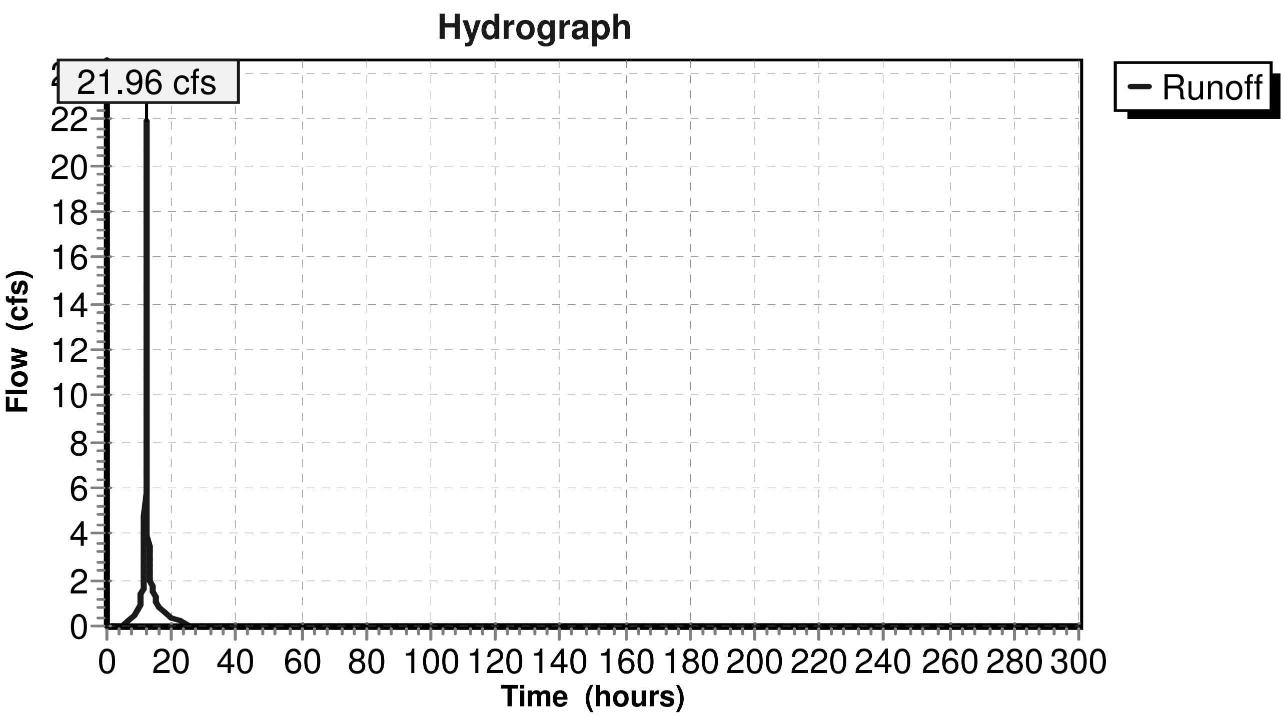
Runoff = 21.96 cfs @ 12.16 hrs, Volume= 1.979 af, Depth= 4.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
3.200	98	Paved parking & roofs
1.700	74	>75% Grass cover, Good, HSG C
4.900	90	Weighted Average
1.700		Pervious Area
3.200		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	80	0.0875	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.9	390	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.3	310	0.1200	19.75	24.24	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
11.7	780	Total			

Subcatchment 1.1S:



Summary for Subcatchment 1.2S:

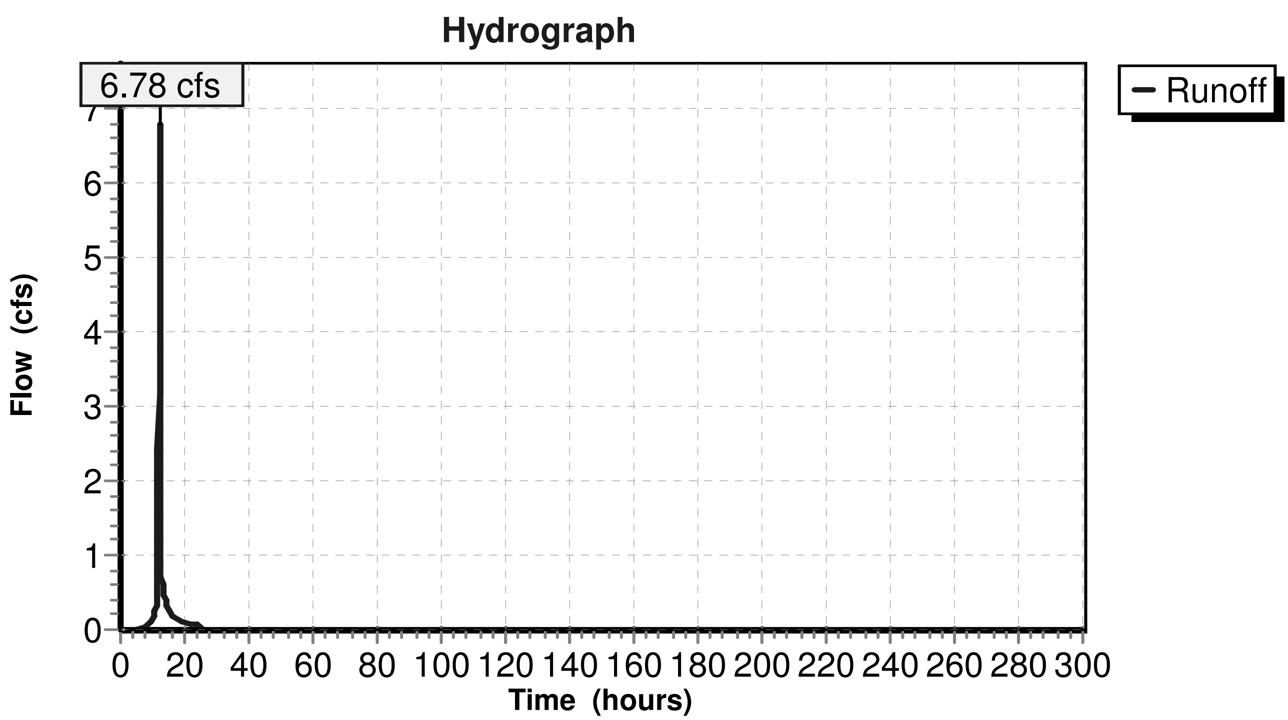
Runoff = 6.78 cfs @ 12.05 hrs, Volume= 0.447 af, Depth= 3.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
0.250	98	Paved parking & roofs
1.250	74	>75% Grass cover, Good, HSG C
1.500	78	Weighted Average
1.250		Pervious Area
0.250		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	80	0.4300	0.40		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 1.2S:



Summary for Subcatchment 1.3S:

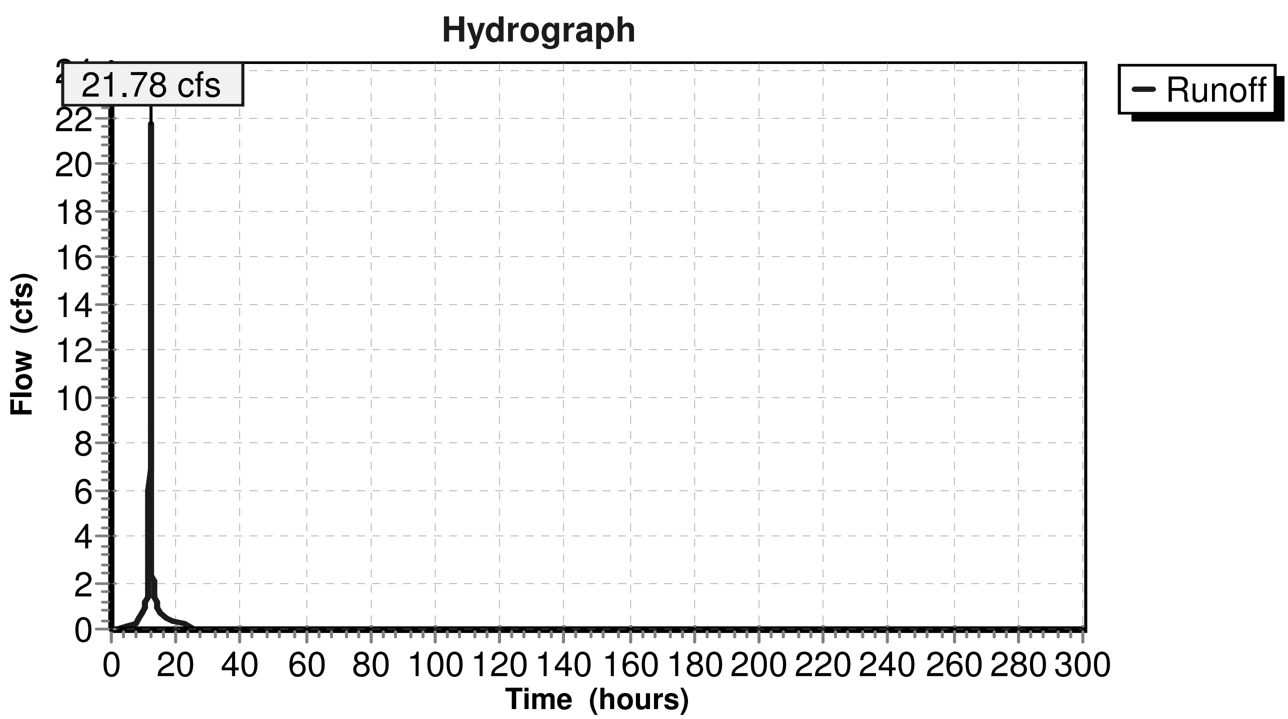
Runoff = 21.78 cfs @ 12.04 hrs, Volume= 1.504 af, Depth= 4.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
0.660	79	50-75% Grass cover, Fair, HSG C
0.370	65	Brush, Good, HSG C
2.610	98	Paved parking & roofs
3.640	91	Weighted Average
1.030		Pervious Area
2.610		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.50"
0.2	60	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	305	0.0370	10.97	13.46	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	130	0.0920	17.30	21.23	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	60	0.0650	14.54	17.84	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
2.2	655	Total			

Subcatchment 1.3S:



Summary for Subcatchment 1.4S:

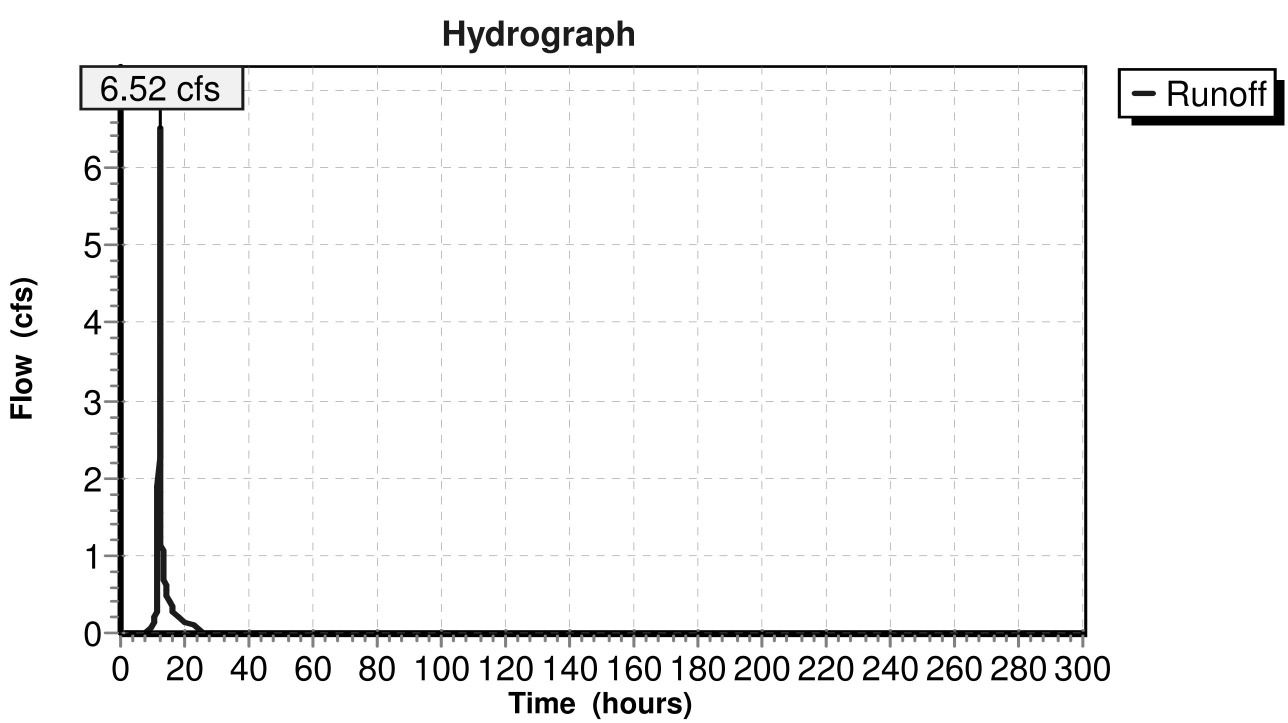
Runoff = 6.52 cfs @ 12.19 hrs, Volume= 0.592 af, Depth= 3.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
1.200	70	Woods, Good, HSG C
0.950	74	>75% Grass cover, Good, HSG C
0.150	98	Paved parking & roofs
2.300	73	Weighted Average
2.150		Pervious Area
0.150		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.5	250	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	350	Total			

Subcatchment 1.4S:



Summary for Subcatchment 2.1S:

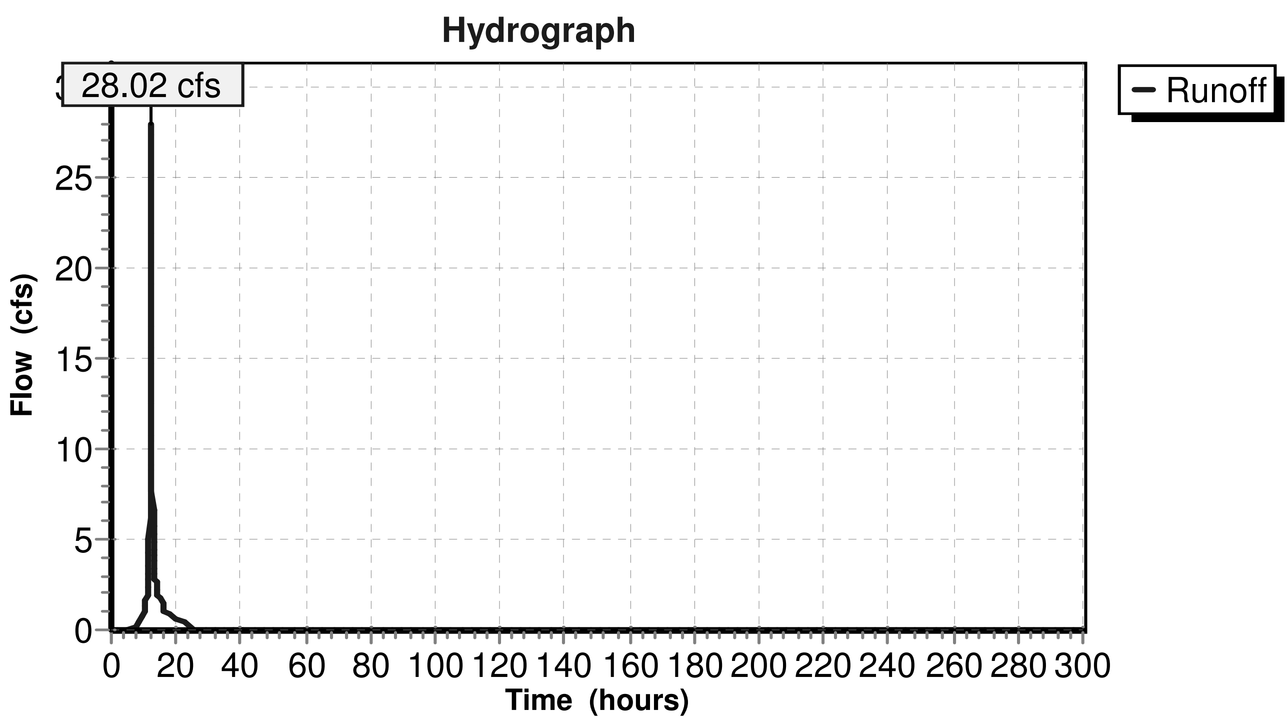
Runoff = 28.02 cfs @ 12.22 hrs, Volume= 2.761 af, Depth= 4.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
5.200	90	1/8 acre lots, 65% imp, HSG C
2.500	74	>75% Grass cover, Good, HSG C
7.700	85	Weighted Average
4.320		Pervious Area
3.380		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
2.0	120	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	740	0.0500	20.93	65.76	**Circular Channel (pipe),** Diam= 24.0" Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.010 PVC, smooth interior
16.2	960	Total			

Subcatchment 2.1S:



Summary for Subcatchment 2.2S:

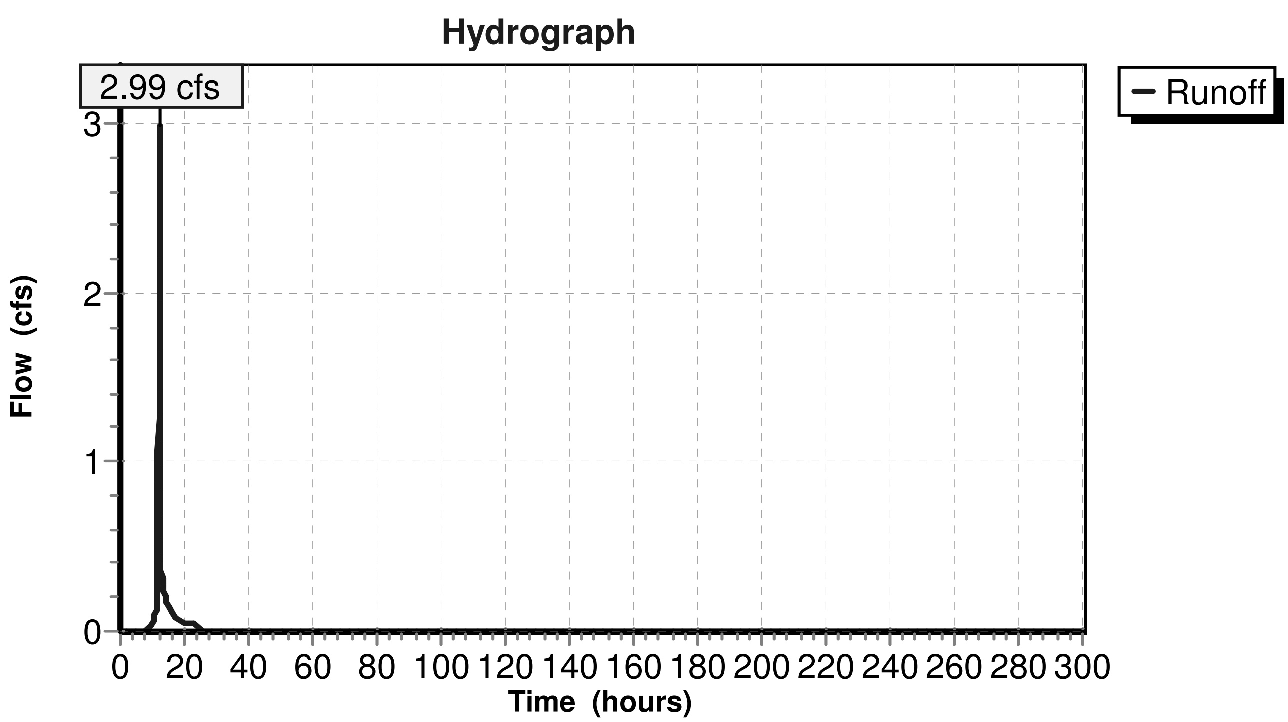
Runoff = 2.99 cfs @ 12.08 hrs, Volume= 0.212 af, Depth= 3.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
0.800		Pervious Area

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

Subcatchment 2.2S:



Summary for Subcatchment 2.3S:

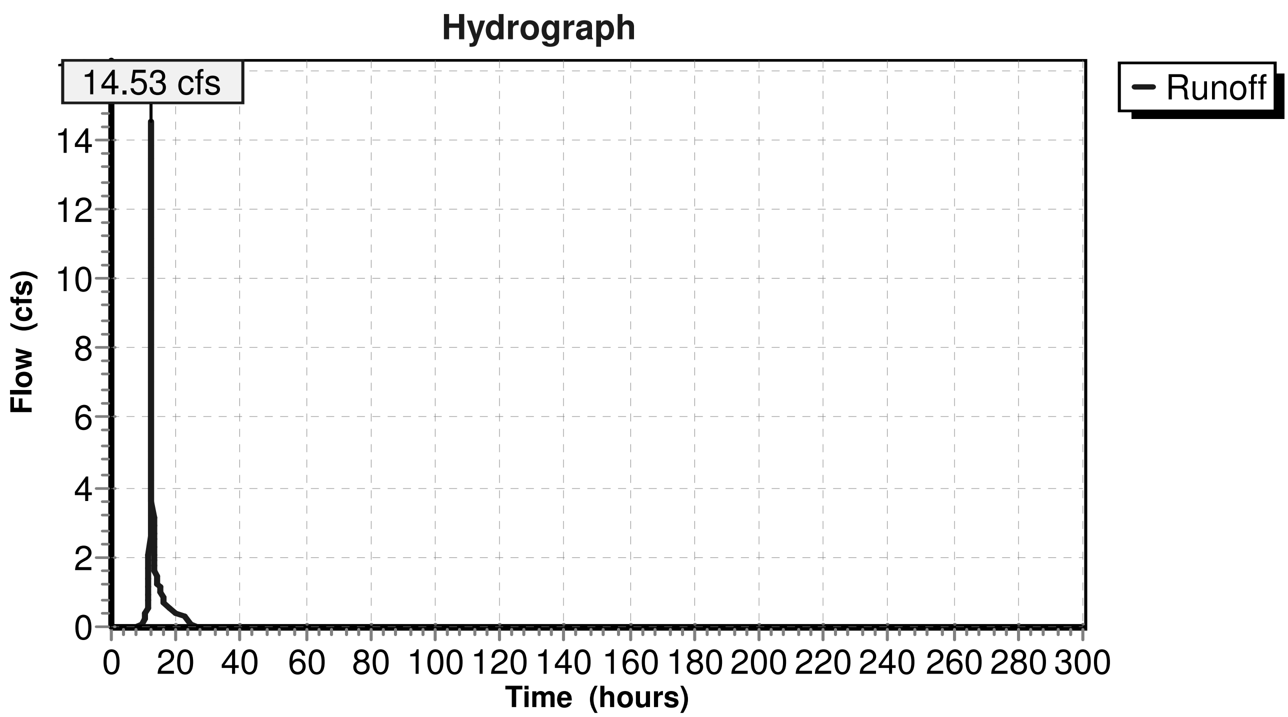
Runoff = 14.53 cfs @ 12.19 hrs, Volume= 1.332 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
5.700	70	Woods, Good, HSG C
5.700		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	8	0.5000	0.27		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
8.2	92	0.1700	0.19		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
4.8	580	0.1600	2.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	680	Total			

Subcatchment 2.3S:



Summary for Subcatchment 3.1S:

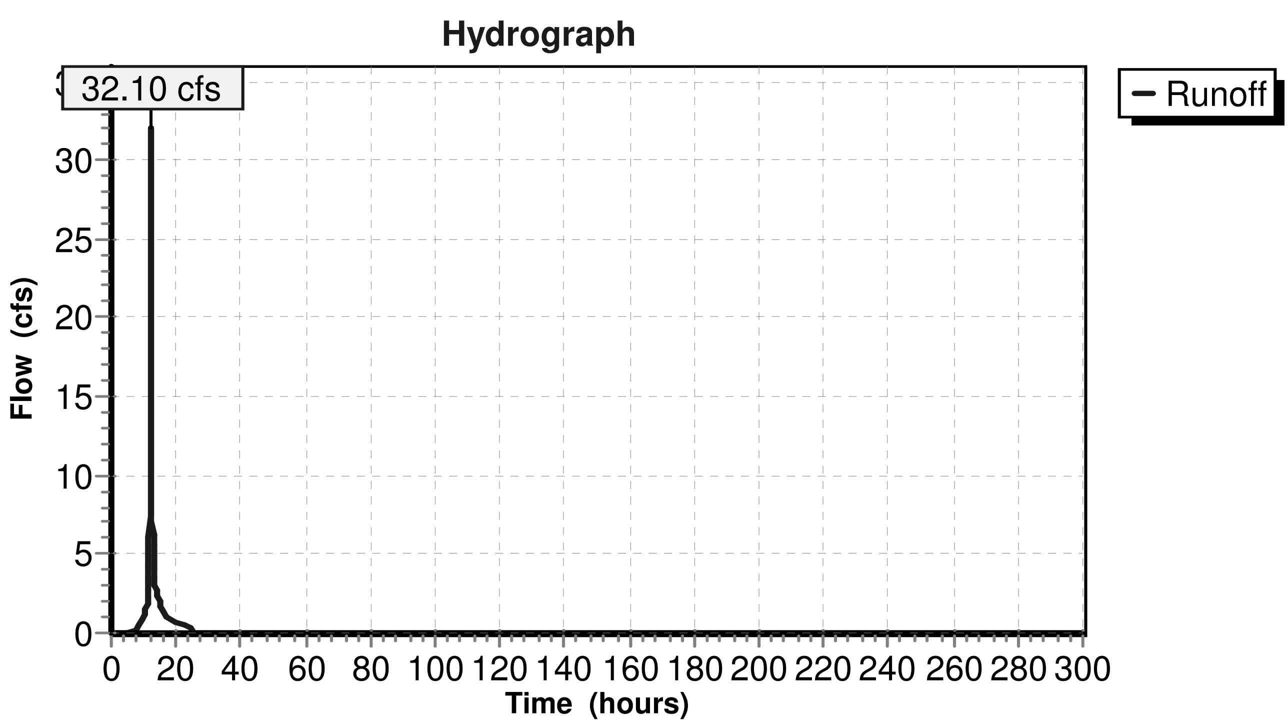
Runoff = 32.10 cfs @ 12.19 hrs, Volume= 2.973 af, Depth= 4.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
1.500	98	Paved parking & roofs
2.900	90	1/8 acre lots, 65% imp, HSG C
4.100	74	>75% Grass cover, Good, HSG C
8.500	84	Weighted Average
5.115		Pervious Area
3.385		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.4	260	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.7	360	Total			

Subcatchment 3.1S:



Summary for Subcatchment 3.2S:

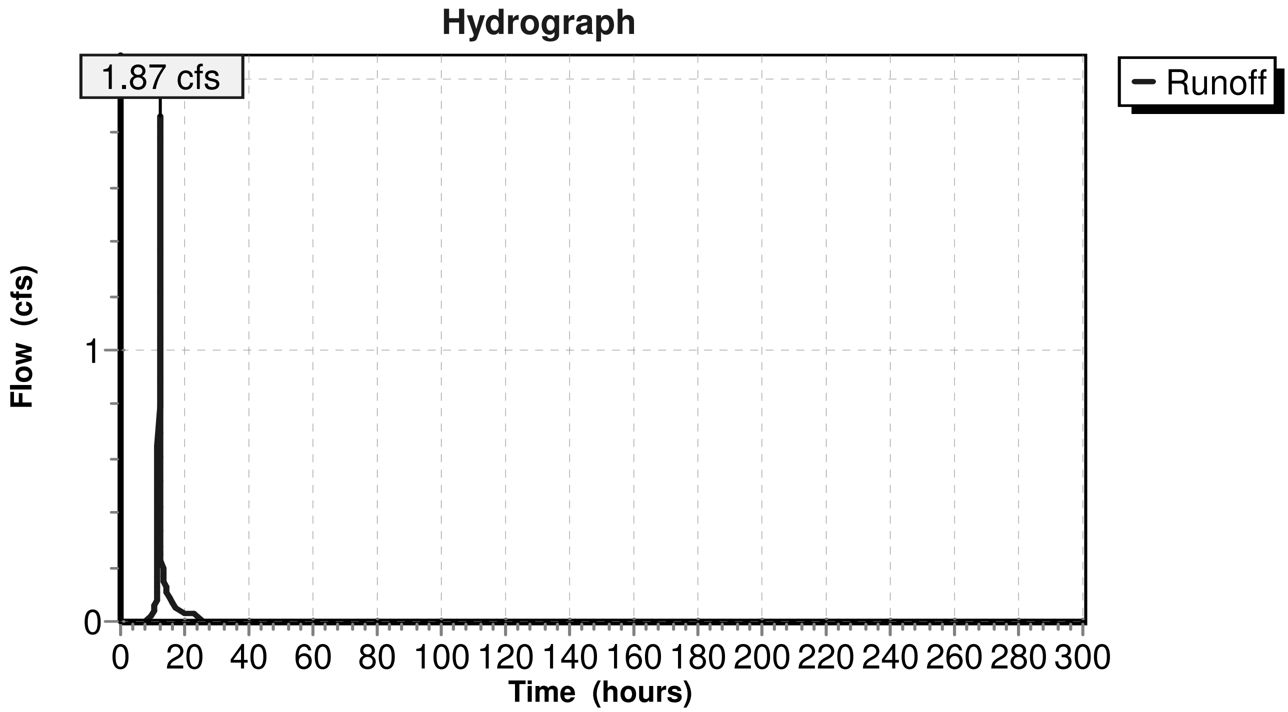
Runoff = 1.87 cfs @ 12.08 hrs, Volume= 0.133 af, Depth= 3.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
0.500	74	>75% Grass cover, Good, HSG C
0.500		Pervious Area

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

Subcatchment 3.2S:



Summary for Subcatchment 3.3S:

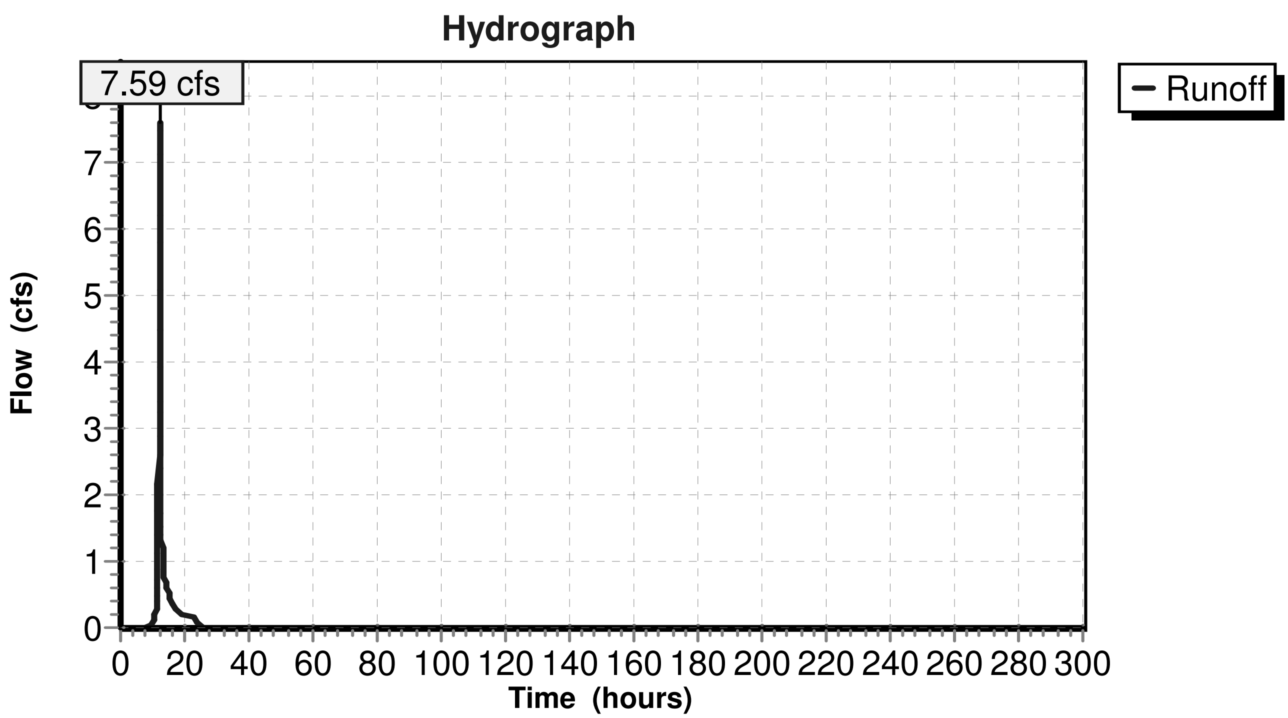
Runoff = 7.59 cfs @ 12.18 hrs, Volume= 0.678 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
2.700	70	Woods, Good, HSG C
0.200	74	>75% Grass cover, Good, HSG C
2.900	70	Weighted Average
2.900		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	26	0.4200	0.32		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
7.6	74	0.1300	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
3.1	388	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	207	0.0480	13.23	128.96	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.50' Z= 4.0 & 2.0 '/' Top.W=11.00' n= 0.022 Earth, clean & straight
12.4	695	Total			

Subcatchment 3.3S:



Summary for Subcatchment 4.0S:

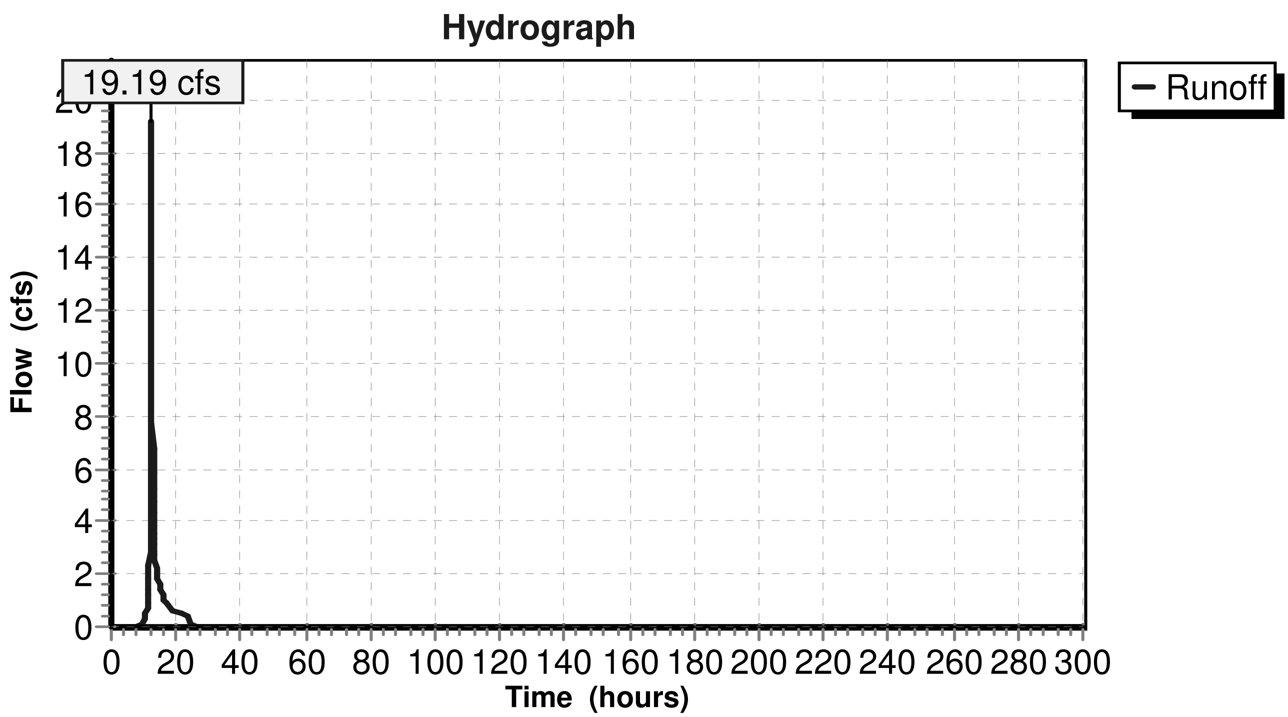
Runoff = 19.19 cfs @ 12.28 hrs, Volume= 2.034 af, Depth= 2.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
8.300	70	Woods, Good, HSG C
0.700	55	Woods, Good, HSG B
9.000	69	Weighted Average
9.000		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
8.2	980	0.1600	2.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.5	1,080	Total			

Subcatchment 4.0S:



Summary for Subcatchment 5.0S:

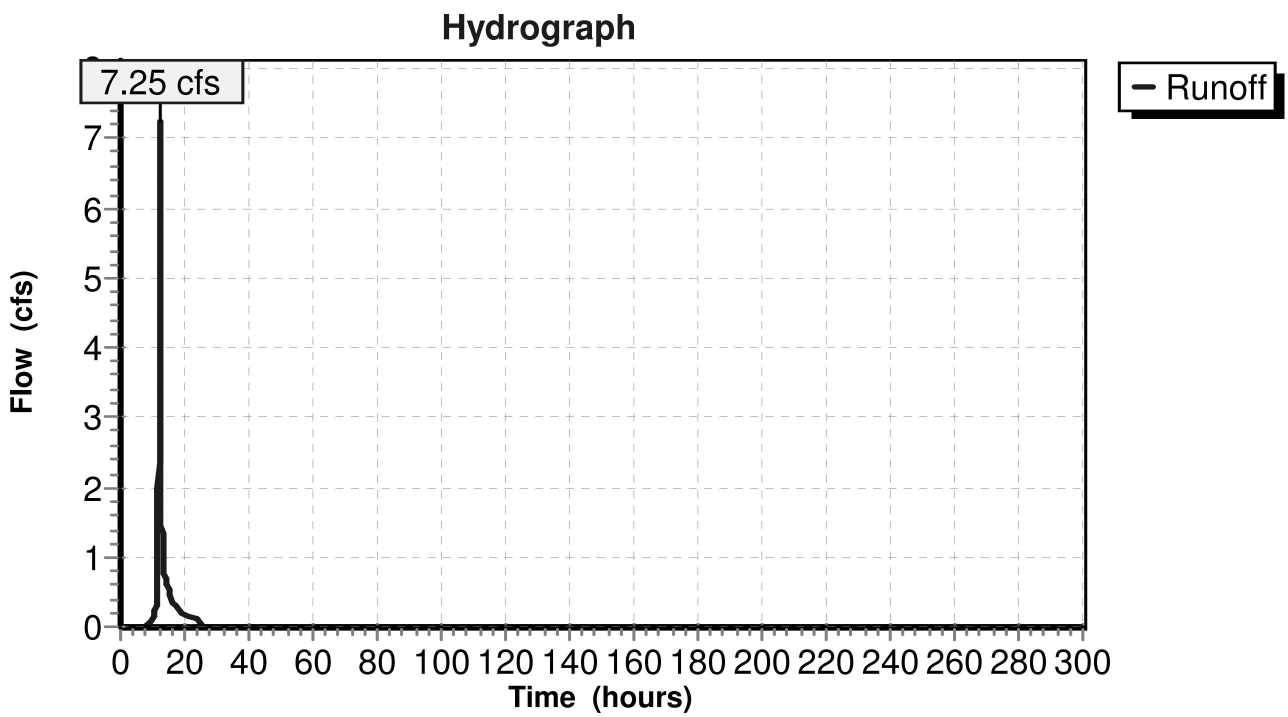
Runoff = 7.25 cfs @ 12.22 hrs, Volume= 0.695 af, Depth= 3.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.00"

Area (ac)	CN	Description
1.700	74	>75% Grass cover, Good, HSG C
1.000	70	Woods, Good, HSG C
2.700	73	Weighted Average
2.700		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0500	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.4	120	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.6	220	Total			

Subcatchment 5.0S:

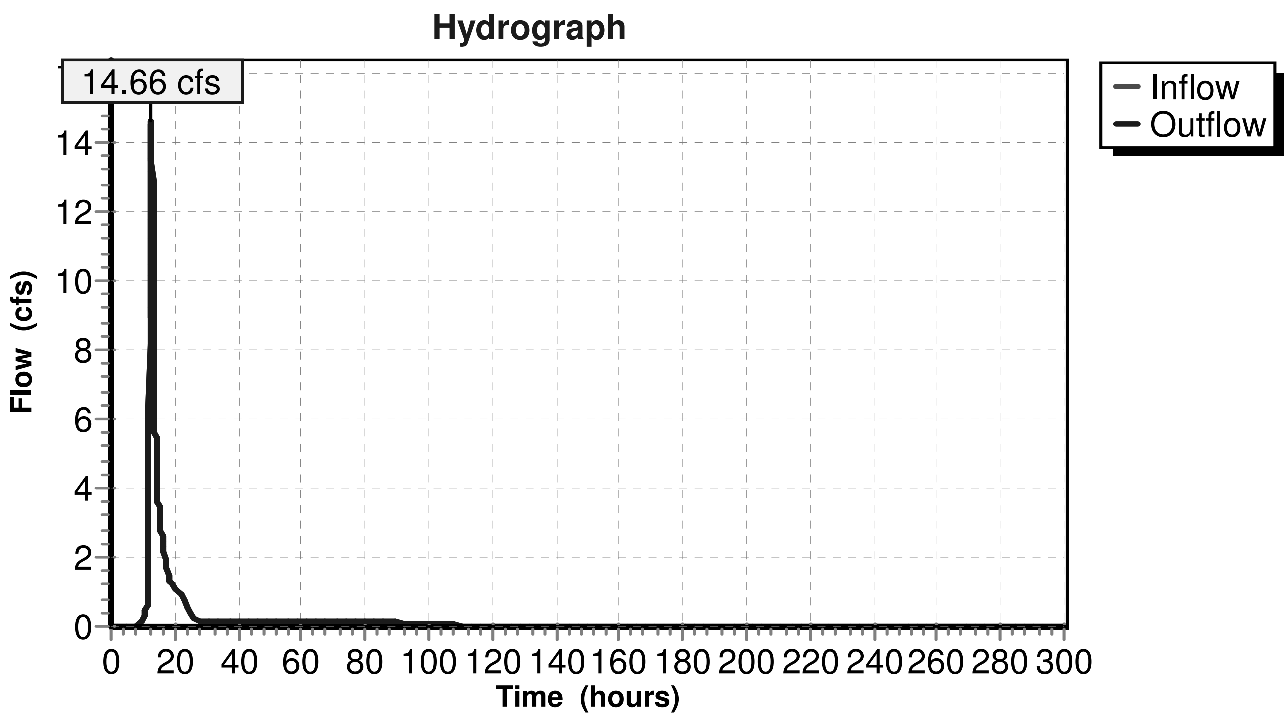


Summary for Reach DP 2:

Inflow Area = 14.200 ac, 23.80% Impervious, Inflow Depth = 3.64" for 25 year event
Inflow = 14.66 cfs @ 12.19 hrs, Volume= 4.303 af
Outflow = 14.66 cfs @ 12.19 hrs, Volume= 4.303 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

Reach DP 2:

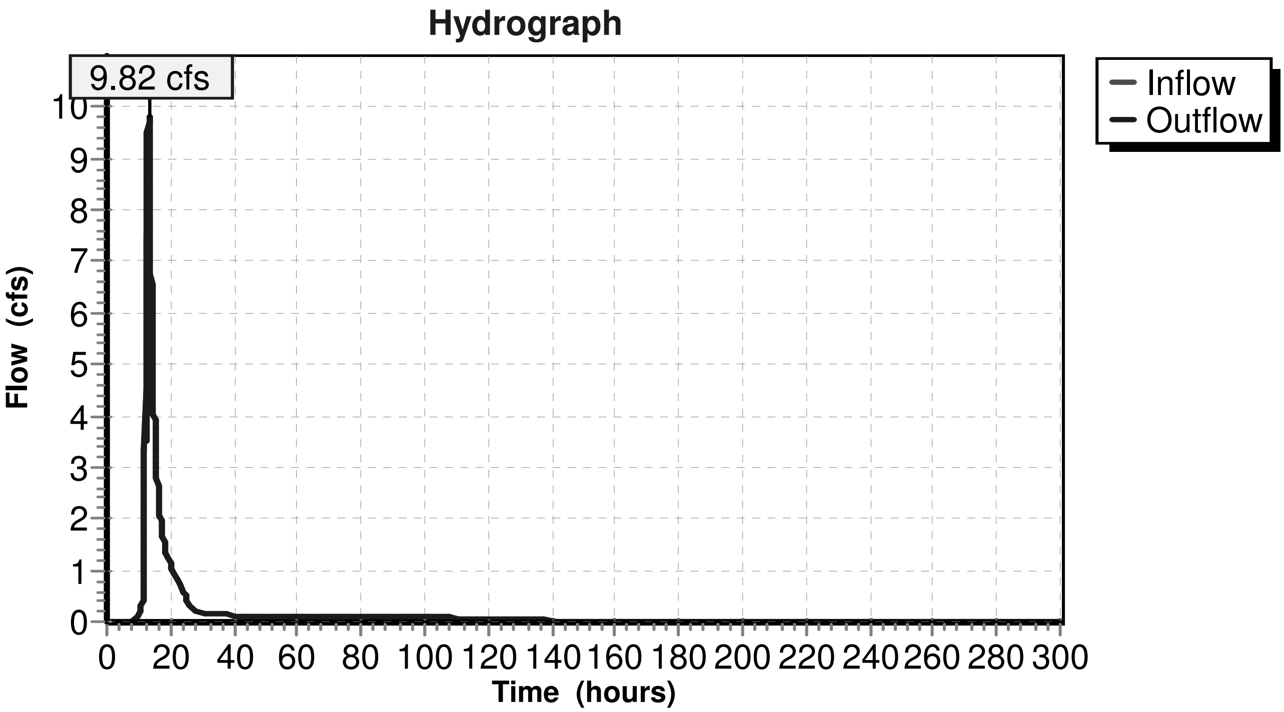


Summary for Reach DP 3:

Inflow Area =	11.900 ac, 28.45% Impervious, Inflow Depth = 3.81" for 25 year event			
Inflow =	9.82 cfs @	13.08 hrs, Volume=	3.780 af	
Outflow =	9.82 cfs @	13.08 hrs, Volume=	3.780 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

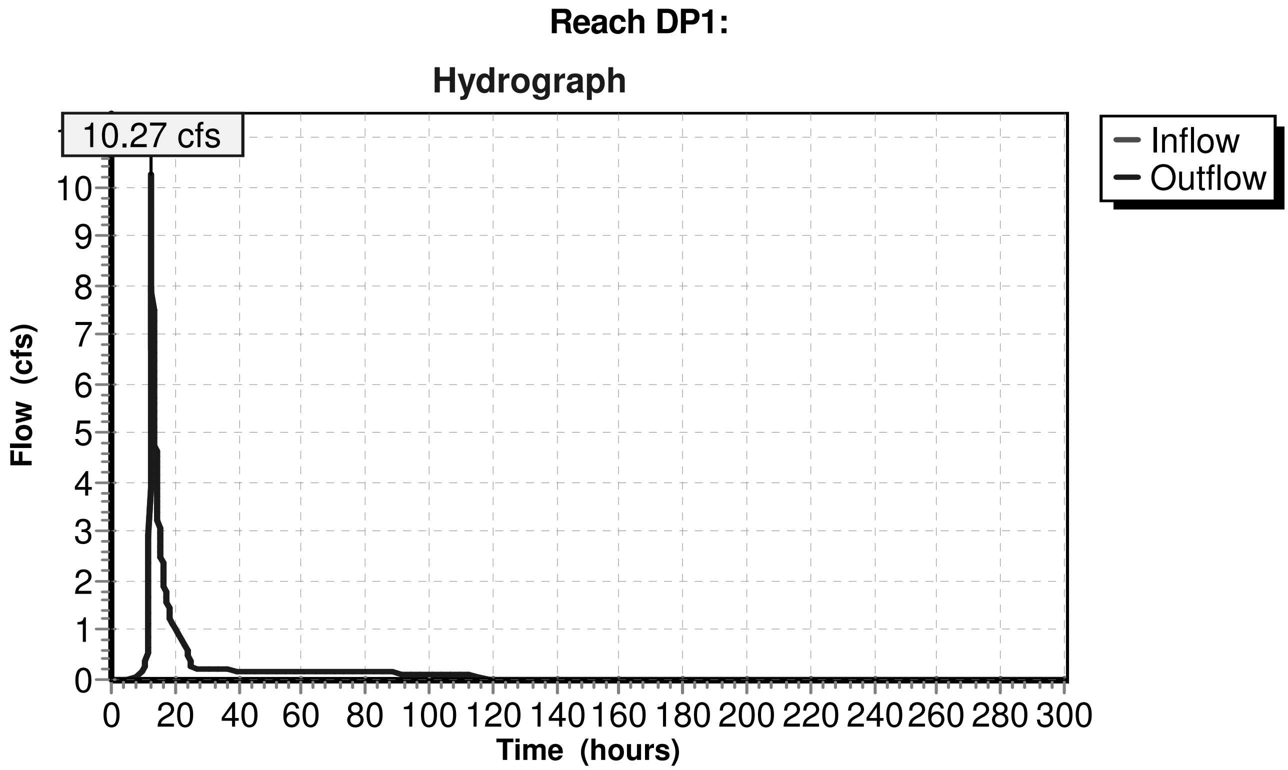
Reach DP 3:



Summary for Reach DP1:

Inflow Area = 12.340 ac, 50.32% Impervious, Inflow Depth = 3.66" for 25 year event
Inflow = 10.27 cfs @ 12.30 hrs, Volume= 3.759 af
Outflow = 10.27 cfs @ 12.30 hrs, Volume= 3.759 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs



Summary for Pond 1.1P:

Inflow Area = 4.900 ac, 65.31% Impervious, Inflow Depth = 4.85" for 25 year event
Inflow = 21.96 cfs @ 12.16 hrs, Volume= 1.979 af
Outflow = 14.60 cfs @ 12.31 hrs, Volume= 1.978 af, Atten= 34%, Lag= 9.0 min
Primary = 14.60 cfs @ 12.31 hrs, Volume= 1.978 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 403.20' Surf.Area= 8,340 sf Storage= 15,484 cf
Peak Elev= 405.76' @ 12.31 hrs Surf.Area= 15,008 sf Storage= 45,704 cf (30,220 cf above start)

Plug-Flow detention time= 713.1 min calculated for 1.622 af (82% of inflow)
Center-of-Mass det. time= 514.2 min (1,304.2 - 790.0)

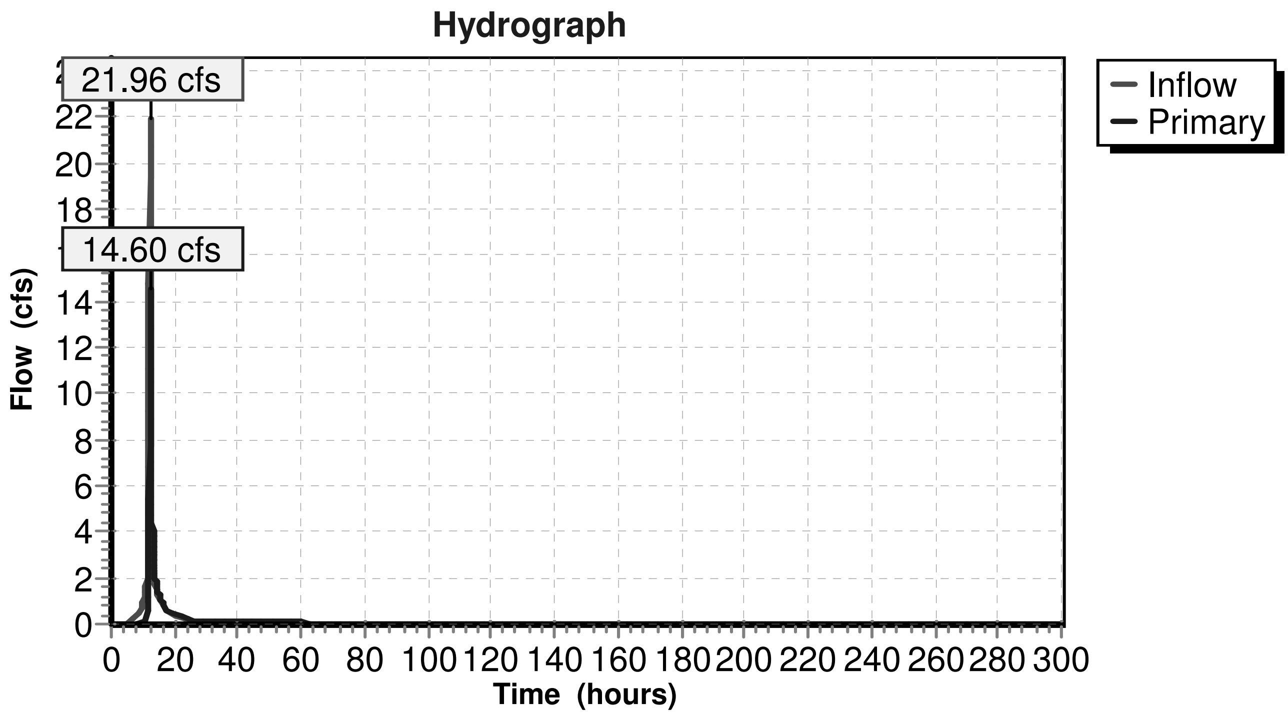
Volume	Invert	Avail.Storage	Storage Description
#1	399.00'	66,400 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
399.00	800	0	0
400.00	1,600	1,200	1,200
402.00	4,800	6,400	7,600
404.00	10,700	15,500	23,100
406.00	15,600	26,300	49,400
407.00	18,400	17,000	66,400

Device	Routing	Invert	Outlet Devices
#1	Primary	399.00'	**18.0" x 155.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 390.00' S= 0.0581 '/' Cc= 0.900 n= 0.012
#2	Device 1	403.20'	**1.8" Vert. Orifice/Grate** C= 0.600
#3	Device 1	404.70'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=14.55 cfs @ 12.31 hrs HW=405.76' TW=368.33' (Dynamic Tailwater)
└─**1=Culvert** (Passes 14.55 cfs of 20.85 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.13 cfs @ 7.58 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 14.42 cfs @ 3.41 fps)

Pond 1.1P:


Hydrograph
21.96 cfs
14.60 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
2
4
6
8
10
12
14
18
20
22
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300

Summary for Pond 1.2P:

Inflow Area = 6.400 ac, 53.91% Impervious, Inflow Depth = 4.55" for 25 year event
Inflow = 17.05 cfs @ 12.28 hrs, Volume= 2.425 af
Outflow = 4.87 cfs @ 13.02 hrs, Volume= 2.425 af, Atten= 71%, Lag= 43.9 min
Primary = 4.66 cfs @ 13.02 hrs, Volume= 1.013 af
Secondary = 0.21 cfs @ 13.02 hrs, Volume= 1.412 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 369.97' @ 13.02 hrs Surf.Area= 13,560 sf Storage= 42,006 cf

Plug-Flow detention time= 1,170.8 min calculated for 2.425 af (100% of inflow)
Center-of-Mass det. time= 1,170.8 min (2,385.0 - 1,214.2)

Volume	Invert	Avail.Storage	Storage Description
#1	365.00'	64,033 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

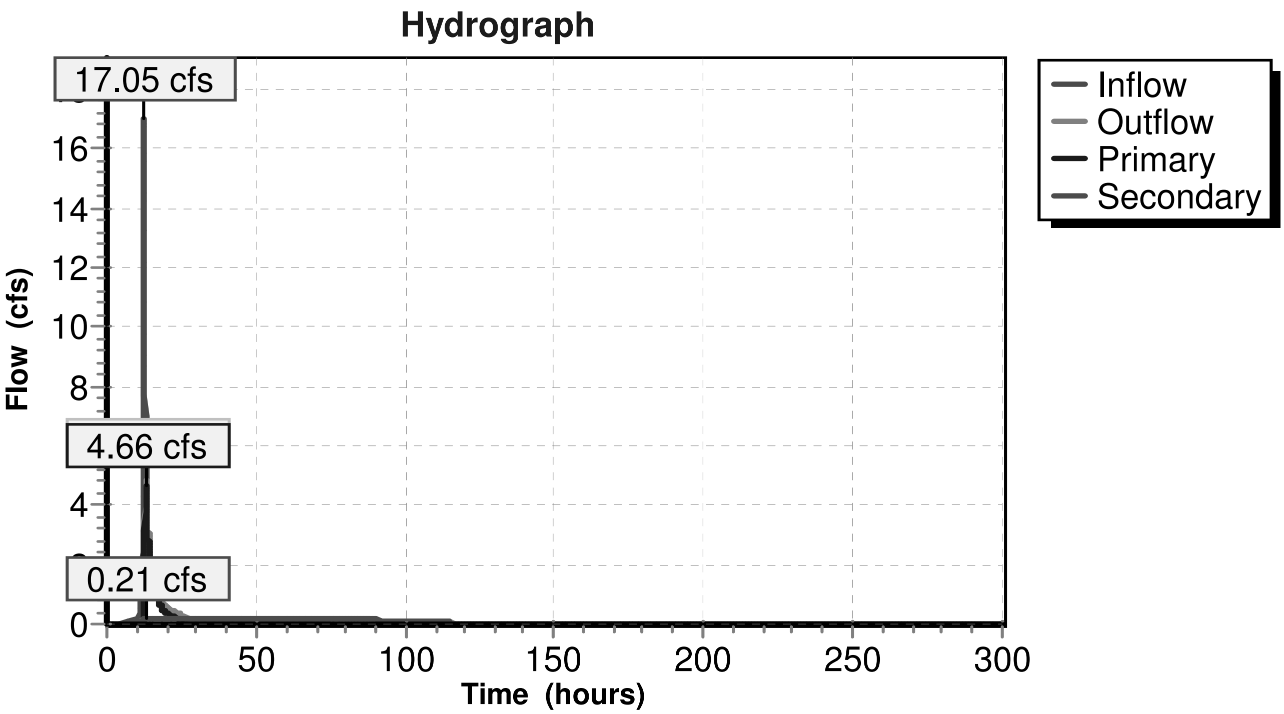
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
365.00	20	0	0
365.99	20	20	20
366.00	7,700	39	58
368.00	10,500	18,200	18,258
370.00	13,600	24,100	42,358
371.50	15,300	21,675	64,033

Device	Routing	Invert	Outlet Devices
#1	Secondary	365.00'	**1.9" Vert. Orifice/Grate** C= 0.600
#2	Primary	364.00'	**15.0" x 90.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 361.00' S= 0.0333 '/' Cc= 0.900 n= 0.012
#3	Device 2	369.40'	**3.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=4.65 cfs @ 13.02 hrs HW=369.97' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 4.65 cfs of 13.67 cfs potential flow)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 4.65 cfs @ 2.32 fps)

Secondary OutFlow Max=0.21 cfs @ 13.02 hrs HW=369.97' TW=0.00' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Orifice Controls 0.21 cfs @ 10.65 fps)

Pond 1.2P:


Hydrograph
17.05 cfs
4.66 cfs
0.21 cfs
Flow (cfs)
0
4
8
10
12
14
16
0
50
100
150
200
250
300
Time (hours)
Inflow
Outflow
Primary
Secondary

Summary for Pond 1.3P:

Inflow Area = 3.640 ac, 71.70% Impervious, Inflow Depth = 4.96" for 25 year event
Inflow = 21.78 cfs @ 12.04 hrs, Volume= 1.504 af
Outflow = 5.43 cfs @ 12.38 hrs, Volume= 0.742 af, Atten= 75%, Lag= 20.5 min
Primary = 5.43 cfs @ 12.38 hrs, Volume= 0.742 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 398.73' @ 12.38 hrs Surf.Area= 12,450 sf Storage= 37,139 cf

Plug-Flow detention time= 256.6 min calculated for 0.742 af (49% of inflow)
Center-of-Mass det. time= 139.3 min (916.8 - 777.5)

Volume	Invert	Avail.Storage	Storage Description
#1	392.00'	54,900 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

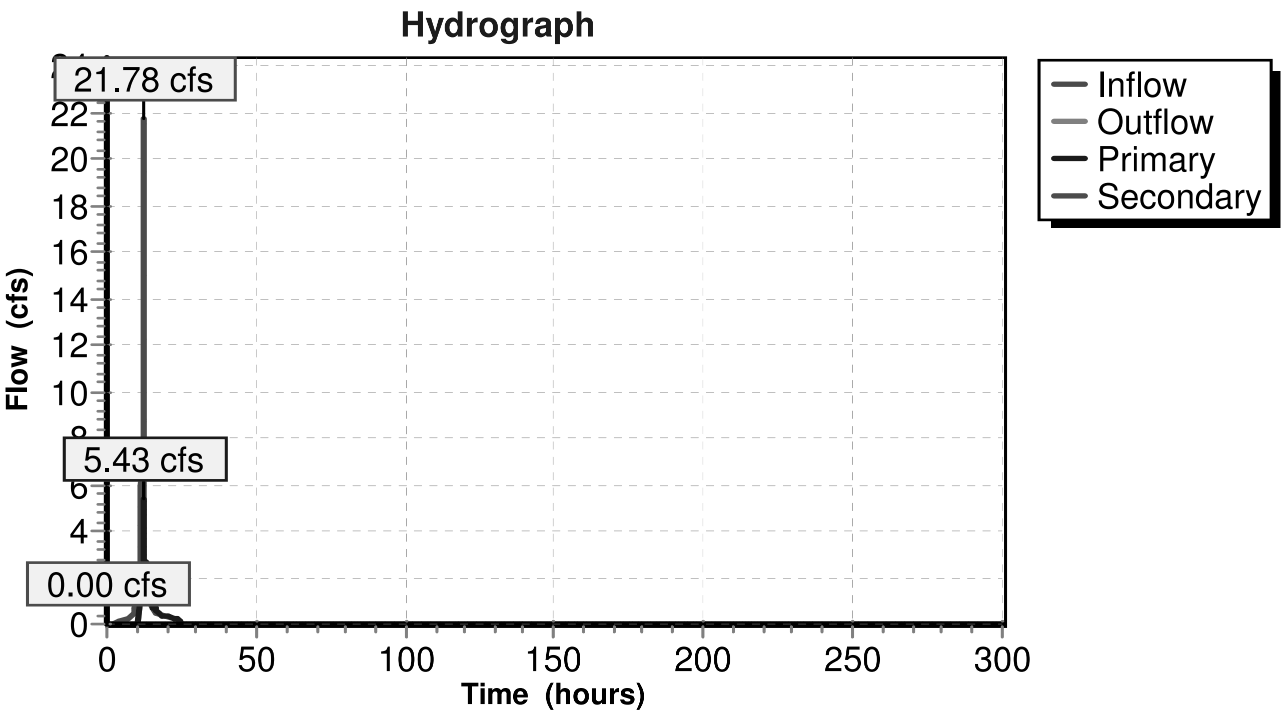
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
392.00	400	0	0
394.00	2,500	2,900	2,900
396.00	6,300	8,800	11,700
398.00	10,700	17,000	28,700
400.00	15,500	26,200	54,900

Device	Routing	Invert	Outlet Devices
#1	Primary	391.00'	**18.0" x 40.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 380.00' S= 0.2750 '/' Cc= 0.900 n= 0.012
#2	Device 1	398.40'	**10.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	399.00'	**10.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.40 cfs @ 12.38 hrs HW=398.73' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 5.40 cfs of 22.48 cfs potential flow)
  └─**2=Broad-Crested Rectangular Weir** (Weir Controls 5.40 cfs @ 1.65 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=392.00' TW=0.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1.3P:


Hydrograph
21.78 cfs
5.43 cfs
0.00 cfs
Flow (cfs)
Time (hours)
0
2
4
6
10
12
14
16
18
20
22
0
50
100
150
200
250
300
Inflow
Outflow
Primary
Secondary

Summary for Pond 2.1P:

Inflow Area = 7.700 ac, 43.90% Impervious, Inflow Depth = 4.30" for 25 year event
Inflow = 28.02 cfs @ 12.22 hrs, Volume= 2.761 af
Outflow = 18.51 cfs @ 12.42 hrs, Volume= 2.758 af, Atten= 34%, Lag= 11.9 min
Primary = 18.51 cfs @ 12.42 hrs, Volume= 2.758 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 440.00' Surf.Area= 13,300 sf Storage= 26,000 cf
Peak Elev= 442.24' @ 12.42 hrs Surf.Area= 20,755 sf Storage= 64,095 cf (38,095 cf above start)

Plug-Flow detention time= 583.0 min calculated for 2.161 af (78% of inflow)
Center-of-Mass det. time= 377.8 min (1,187.9 - 810.1)

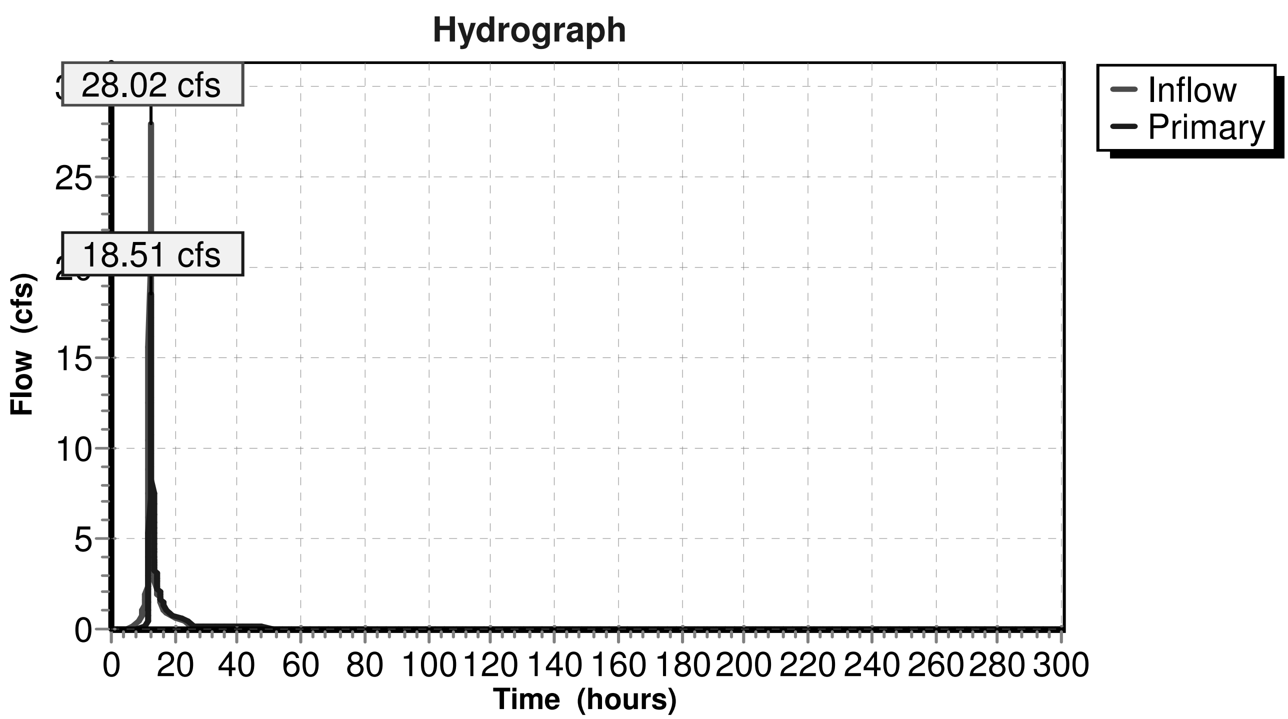
Volume	Invert	Avail.Storage	Storage Description
#1	436.00'	106,100 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
436.00	1,500	0	0
438.00	5,600	7,100	7,100
440.00	13,300	18,900	26,000
442.00	19,900	33,200	59,200
444.00	27,000	46,900	106,100

Device	Routing	Invert	Outlet Devices
#1	Primary	436.00'	**24.0" x 90.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 422.00' S= 0.1556 '/' Cc= 0.900 n= 0.012
#2	Device 1	440.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	441.00'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=18.45 cfs @ 12.42 hrs HW=442.24' TW=424.47' (Dynamic Tailwater)
└─**1=Culvert** (Passes 18.45 cfs of 34.62 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 7.07 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 18.30 cfs @ 3.69 fps)

Pond 2.1P:


Hydrograph
28.02 cfs
18.51 cfs
Inflow
Primary
Flow (cfs)
0
5
10
15
25
Time (hours)
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300

Summary for Pond 2.2P:

Inflow Area = 8.500 ac, 39.76% Impervious, Inflow Depth = 4.19" for 25 year event
Inflow = 19.46 cfs @ 12.40 hrs, Volume= 2.970 af
Outflow = 11.70 cfs @ 12.82 hrs, Volume= 2.970 af, Atten= 40%, Lag= 25.2 min
Primary = 11.70 cfs @ 12.82 hrs, Volume= 2.970 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 425.60' @ 12.82 hrs Surf.Area= 12,205 sf Storage= 37,226 cf

Plug-Flow detention time= 703.2 min calculated for 2.970 af (100% of inflow)
Center-of-Mass det. time= 703.2 min (1,865.3 - 1,162.2)

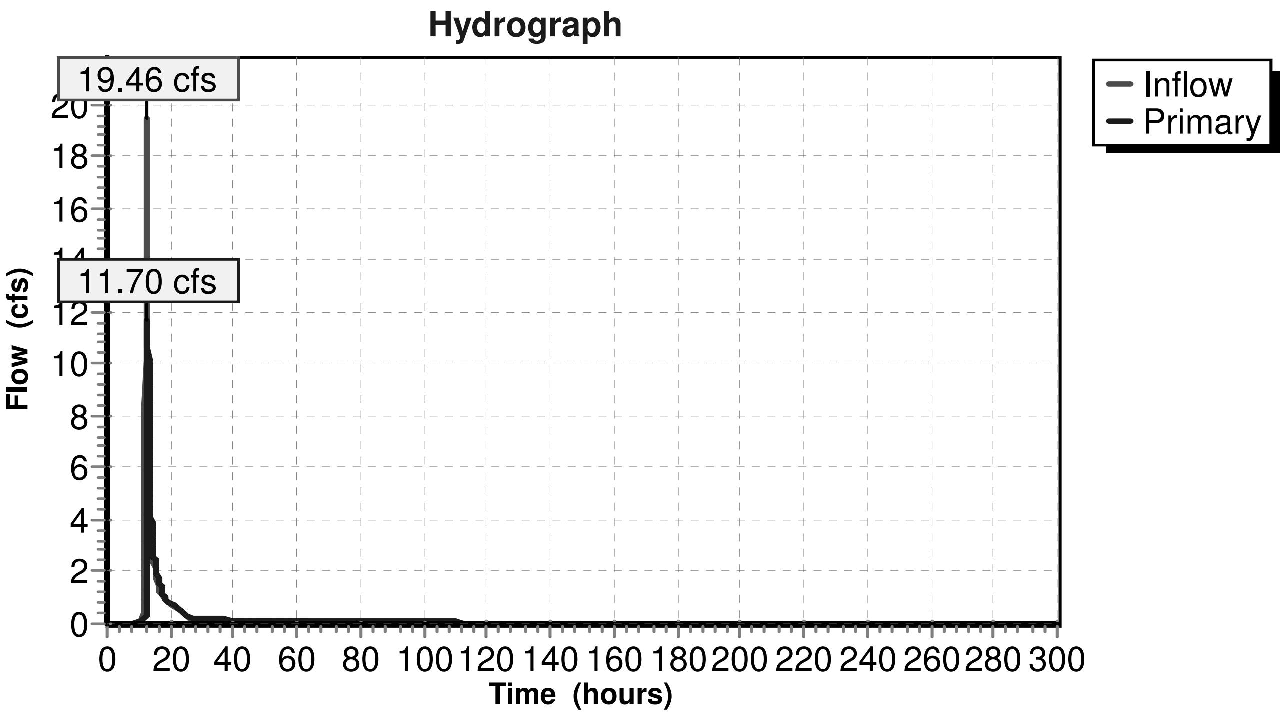
Volume	Invert	Avail.Storage	Storage Description
#1	419.00'	72,236 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
419.00	30	0	0
419.99	30	30	30
420.00	1,200	6	36
422.00	5,000	6,200	6,236
424.00	9,000	14,000	20,236
426.00	13,000	22,000	42,236
428.00	17,000	30,000	72,236

Device	Routing	Invert	Outlet Devices
#1	Primary	419.00'	**24.0" x 74.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 410.00' S= 0.1216 '/' Cc= 0.900 n= 0.012
#2	Device 1	419.00'	**1.6" Vert. Orifice/Grate** C= 0.600
#3	Device 1	424.50'	**3.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=11.67 cfs @ 12.82 hrs HW=425.60' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 11.67 cfs of 35.80 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.17 cfs @ 12.31 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 11.50 cfs @ 3.48 fps)

Pond 2.2P:


Hydrograph
19.46 cfs
11.70 cfs
Inflow
Primary
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
20
Time (hours)
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

Summary for Pond 3.1P:

Inflow Area = 8.500 ac, 39.82% Impervious, Inflow Depth = 4.20" for 25 year event
Inflow = 32.10 cfs @ 12.19 hrs, Volume= 2.973 af
Outflow = 12.90 cfs @ 12.53 hrs, Volume= 2.969 af, Atten= 60%, Lag= 20.7 min
Primary = 12.90 cfs @ 12.53 hrs, Volume= 2.969 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 446.00' Surf.Area= 15,300 sf Storage= 26,700 cf
Peak Elev= 448.54' @ 12.53 hrs Surf.Area= 27,000 sf Storage= 80,695 cf (53,995 cf above start)

Plug-Flow detention time= 592.6 min calculated for 2.356 af (79% of inflow)
Center-of-Mass det. time= 396.4 min (1,207.0 - 810.6)

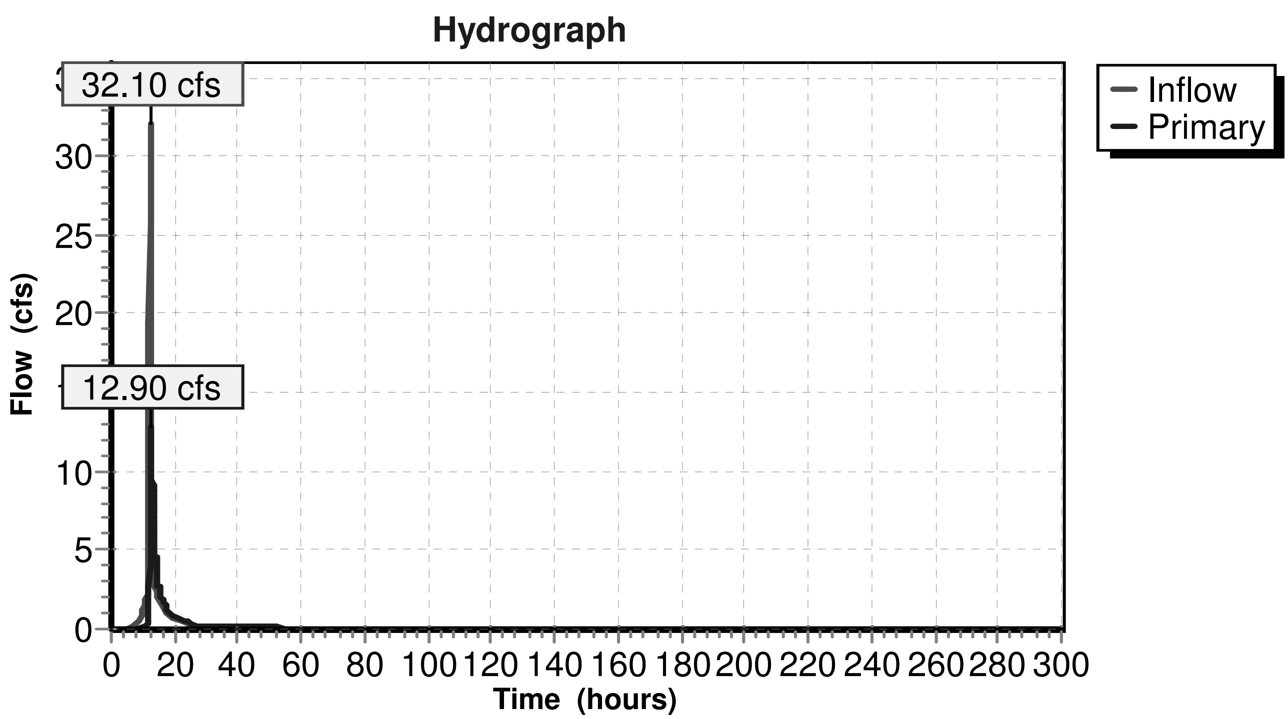
Volume	Invert	Avail.Storage	Storage Description
#1	442.00'	124,600 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
442.00	1,200	0	0
444.00	5,100	6,300	6,300
446.00	15,300	20,400	26,700
448.00	24,800	40,100	66,800
450.00	33,000	57,800	124,600

Device	Routing	Invert	Outlet Devices
#1	Primary	442.00'	**24.0" x 116.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 440.00' S= 0.0172 '/' Cc= 0.900 n= 0.012
#2	Device 1	446.00'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	447.00'	**2.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=12.88 cfs @ 12.53 hrs HW=448.53' TW=426.61' (Dynamic Tailwater)
└─**1=Culvert** (Passes 12.88 cfs of 35.59 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.26 cfs @ 7.51 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 12.63 cfs @ 4.11 fps)

Pond 3.1P:


Hydrograph
32.10 cfs
12.90 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
5
10
20
25
30
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300

Summary for Pond 3.2P:

Inflow Area = 9.000 ac, 37.61% Impervious, Inflow Depth = 4.14" for 25 year event
Inflow = 13.29 cfs @ 12.51 hrs, Volume= 3.102 af
Outflow = 8.81 cfs @ 13.11 hrs, Volume= 3.102 af, Atten= 34%, Lag= 36.4 min
Primary = 8.81 cfs @ 13.11 hrs, Volume= 3.102 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 427.95' @ 13.11 hrs Surf.Area= 8,934 sf Storage= 31,386 cf

Plug-Flow detention time= 772.9 min calculated for 3.102 af (100% of inflow)
Center-of-Mass det. time= 772.9 min (1,963.7 - 1,190.8)

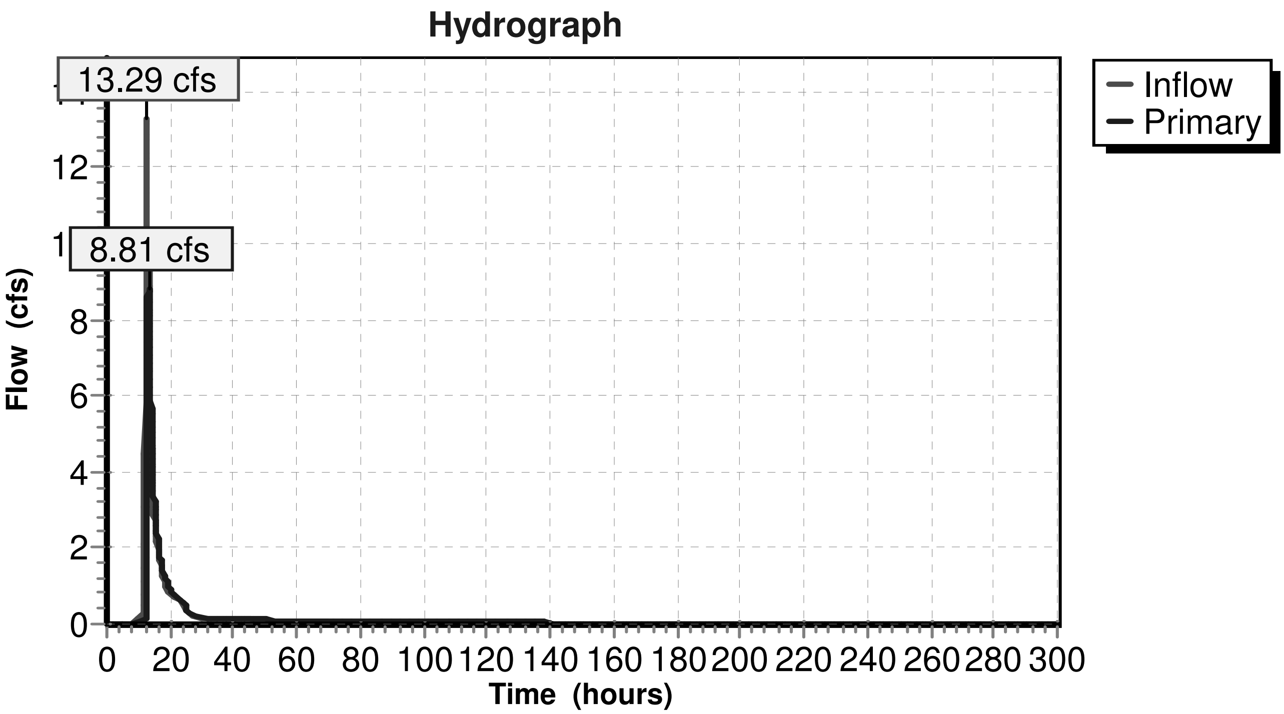
Volume	Invert	Avail.Storage	Storage Description
#1	421.00'	52,840 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
421.00	30	0	0
421.99	30	30	30
422.00	2,000	10	40
424.00	4,000	6,000	6,040
426.00	6,400	10,400	16,440
428.00	9,000	15,400	31,840
430.00	12,000	21,000	52,840

Device	Routing	Invert	Outlet Devices
#1	Primary	421.00'	**24.0" x 80.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 416.00' S= 0.0625 '/' Cc= 0.900 n= 0.012
#2	Device 1	421.00'	**1.3" Vert. Orifice/Grate** C= 0.600
#3	Device 1	426.50'	**1.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=8.80 cfs @ 13.11 hrs HW=427.95' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 8.80 cfs of 36.89 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.12 cfs @ 12.64 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 8.68 cfs @ 4.00 fps)

Pond 3.2P:


Hydrograph
13.29 cfs
8.81 cfs
Inflow
Primary
Flow (cfs)
0
2
4
6
8
12
Time (hours)
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

Summary for Subcatchment 1.1S:

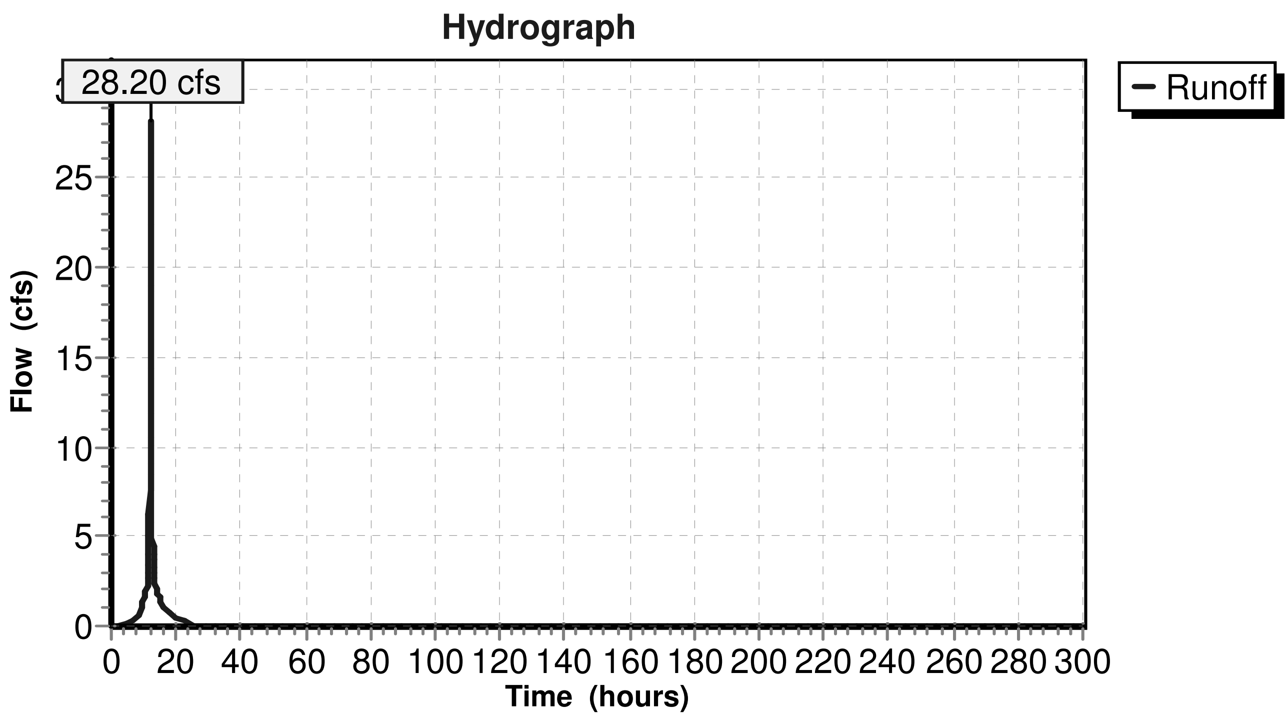
Runoff = 28.20 cfs @ 12.16 hrs, Volume= 2.578 af, Depth= 6.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
3.200	98	Paved parking & roofs
1.700	74	>75% Grass cover, Good, HSG C
4.900	90	Weighted Average
1.700		Pervious Area
3.200		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	80	0.0875	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.9	390	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.3	310	0.1200	19.75	24.24	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
11.7	780	Total			

Subcatchment 1.1S:



Summary for Subcatchment 1.2S:

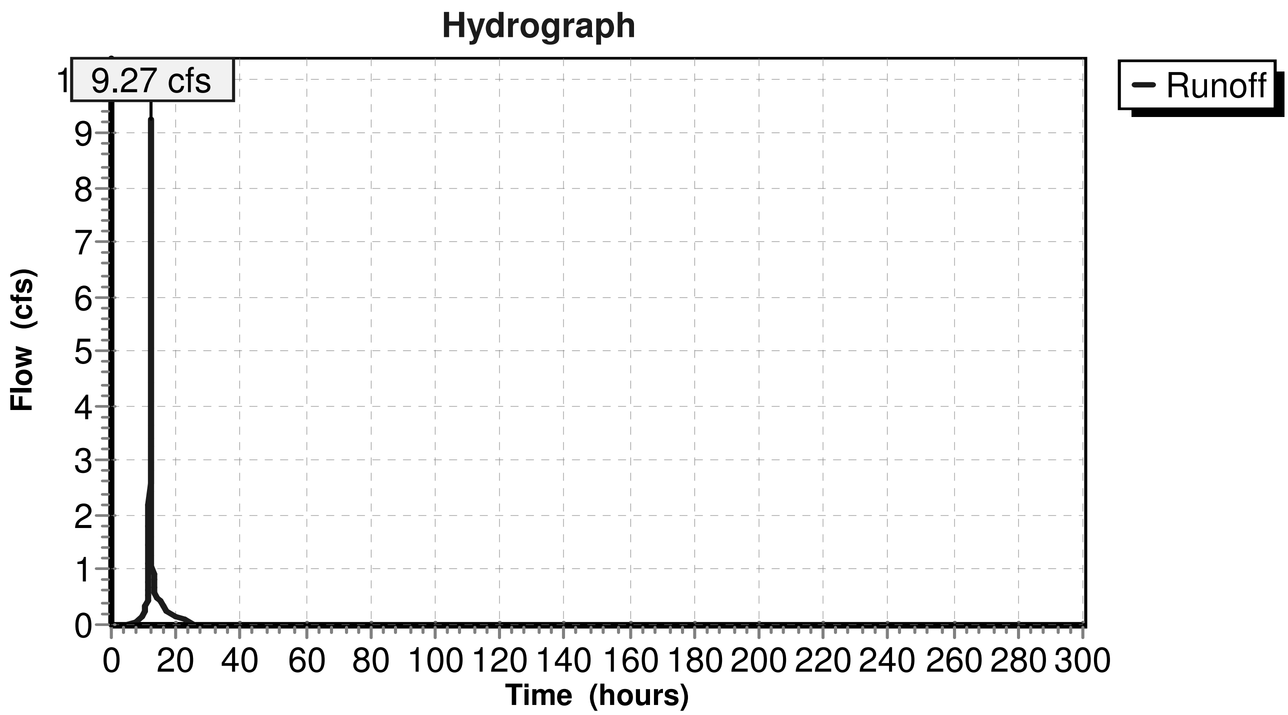
Runoff = 9.27 cfs @ 12.05 hrs, Volume= 0.616 af, Depth= 4.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
0.250	98	Paved parking & roofs
1.250	74	>75% Grass cover, Good, HSG C
1.500	78	Weighted Average
1.250		Pervious Area
0.250		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	80	0.4300	0.40		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 1.2S:



Summary for Subcatchment 1.3S:

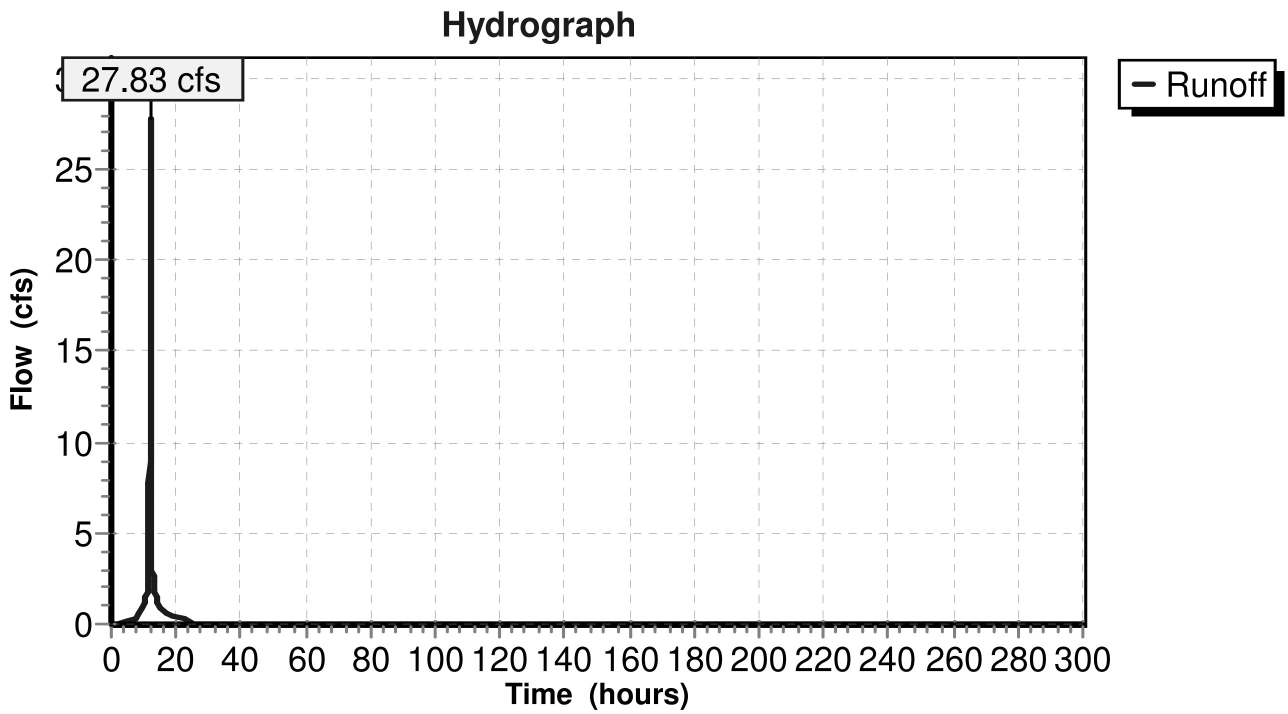
Runoff = 27.83 cfs @ 12.04 hrs, Volume= 1.951 af, Depth= 6.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
0.660	79	50-75% Grass cover, Fair, HSG C
0.370	65	Brush, Good, HSG C
2.610	98	Paved parking & roofs
3.640	91	Weighted Average
1.030		Pervious Area
2.610		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.50"
0.2	60	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	305	0.0370	10.97	13.46	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	130	0.0920	17.30	21.23	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	60	0.0650	14.54	17.84	**Circular Channel (pipe),** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
2.2	655	Total			

Subcatchment 1.3S:



Summary for Subcatchment 1.4S:

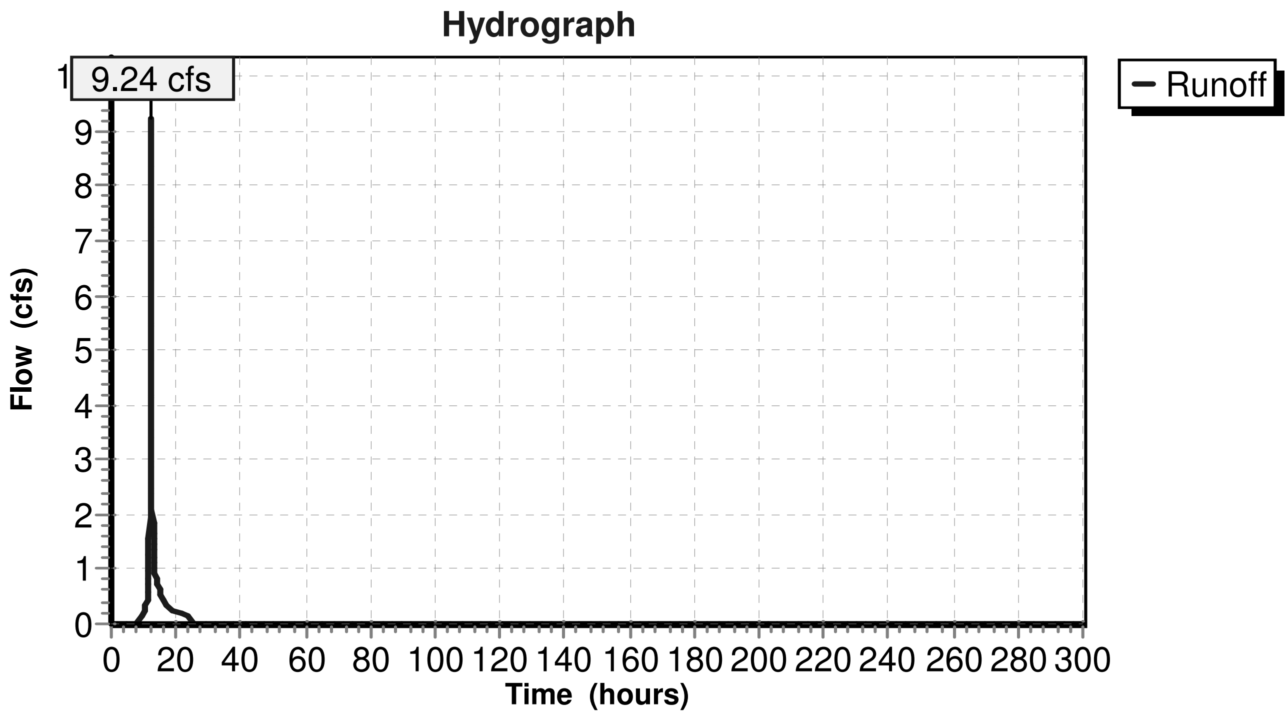
Runoff = 9.24 cfs @ 12.19 hrs, Volume= 0.838 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
1.200	70	Woods, Good, HSG C
0.950	74	>75% Grass cover, Good, HSG C
0.150	98	Paved parking & roofs
2.300	73	Weighted Average
2.150		Pervious Area
0.150		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.5	250	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	350	Total			

Subcatchment 1.4S:



Summary for Subcatchment 2.1S:

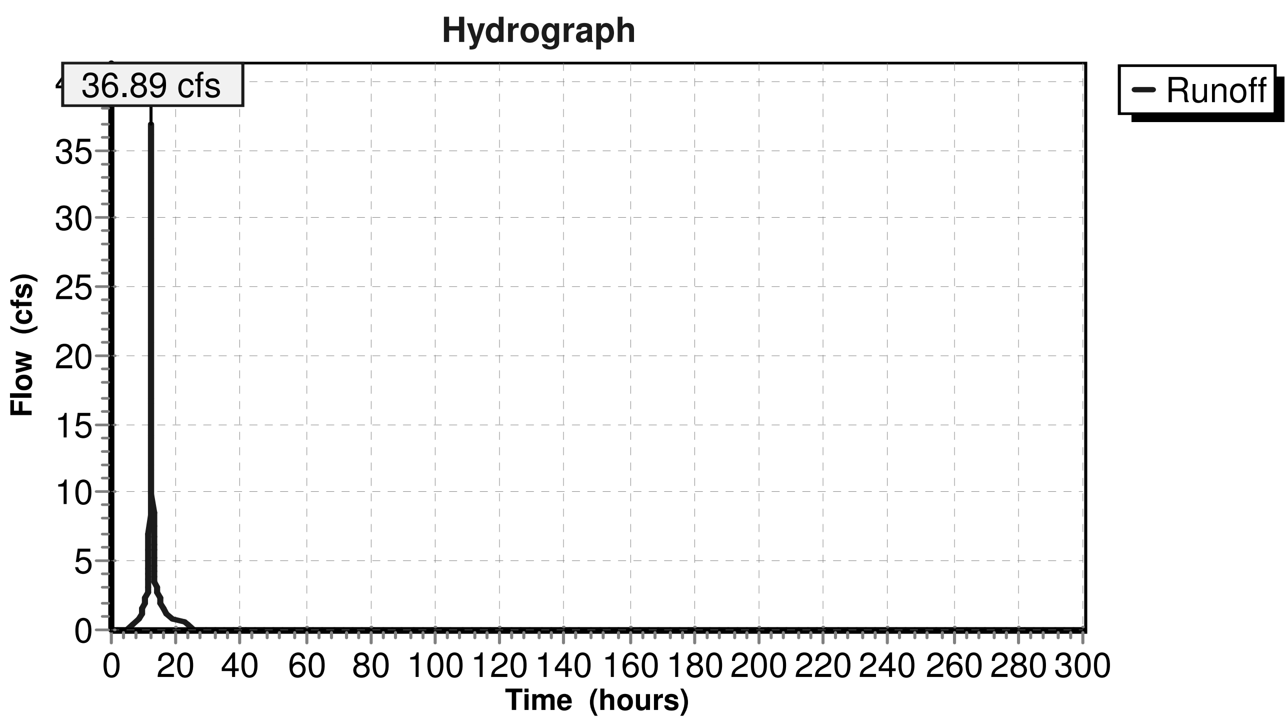
Runoff = 36.89 cfs @ 12.22 hrs, Volume= 3.678 af, Depth= 5.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
5.200	90	1/8 acre lots, 65% imp, HSG C
2.500	74	>75% Grass cover, Good, HSG C
7.700	85	Weighted Average
4.320		Pervious Area
3.380		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
2.0	120	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	740	0.0500	20.93	65.76	**Circular Channel (pipe),** Diam= 24.0" Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.010 PVC, smooth interior
16.2	960	Total			

Subcatchment 2.1S:



Summary for Subcatchment 2.2S:

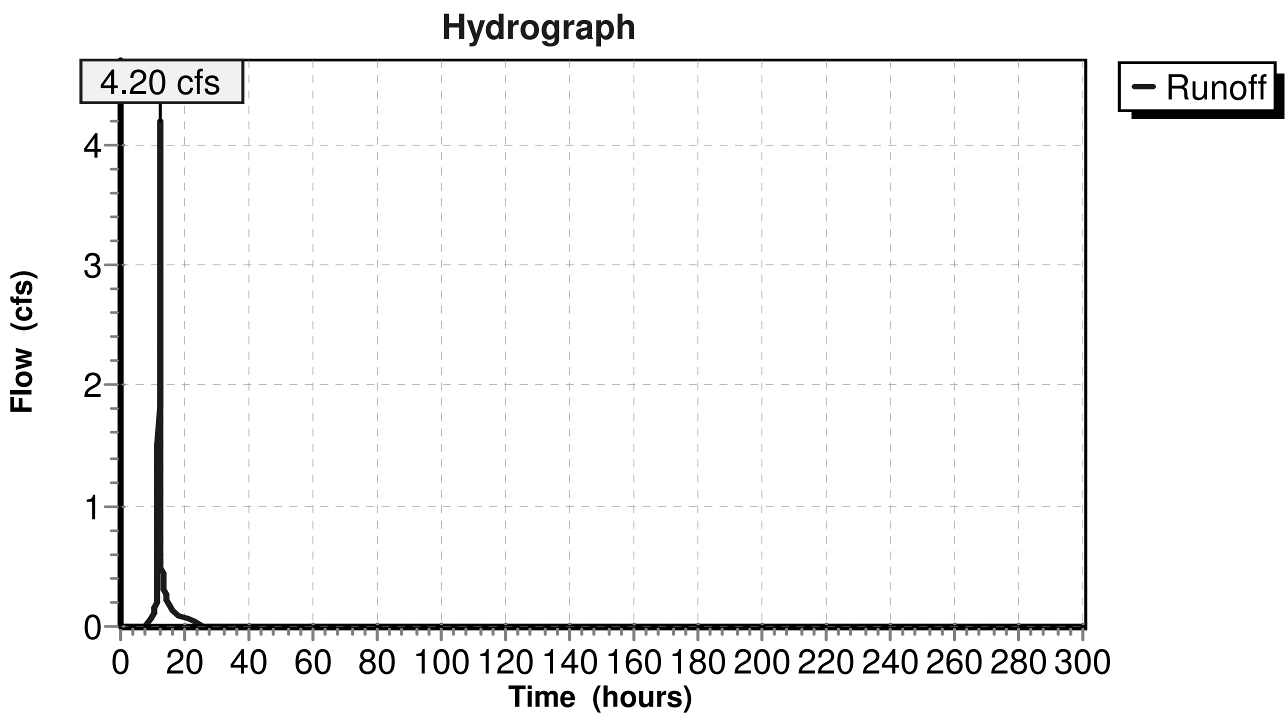
Runoff = 4.20 cfs @ 12.08 hrs, Volume= 0.299 af, Depth= 4.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
0.800		Pervious Area

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

Subcatchment 2.2S:



Summary for Subcatchment 2.3S:

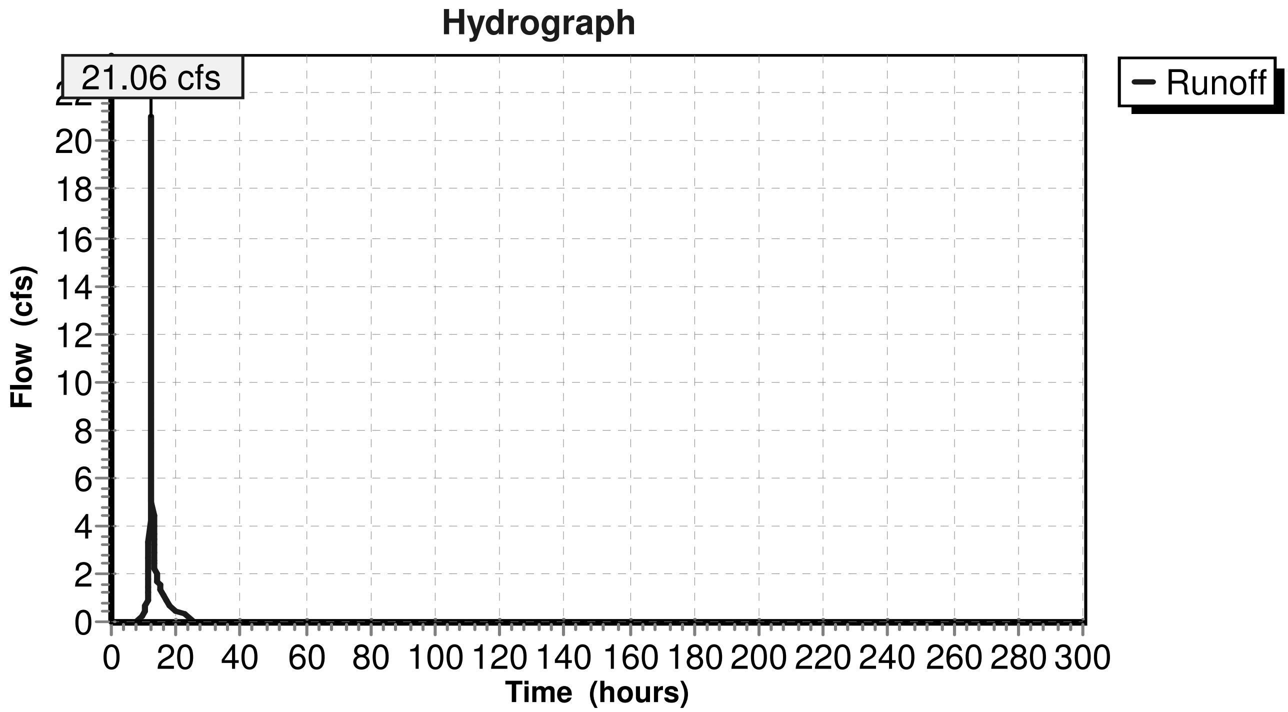
Runoff = 21.06 cfs @ 12.19 hrs, Volume= 1.918 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
5.700	70	Woods, Good, HSG C
5.700		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	8	0.5000	0.27		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
8.2	92	0.1700	0.19		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
4.8	580	0.1600	2.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	680	Total			

Subcatchment 2.3S:



Summary for Subcatchment 3.1S:

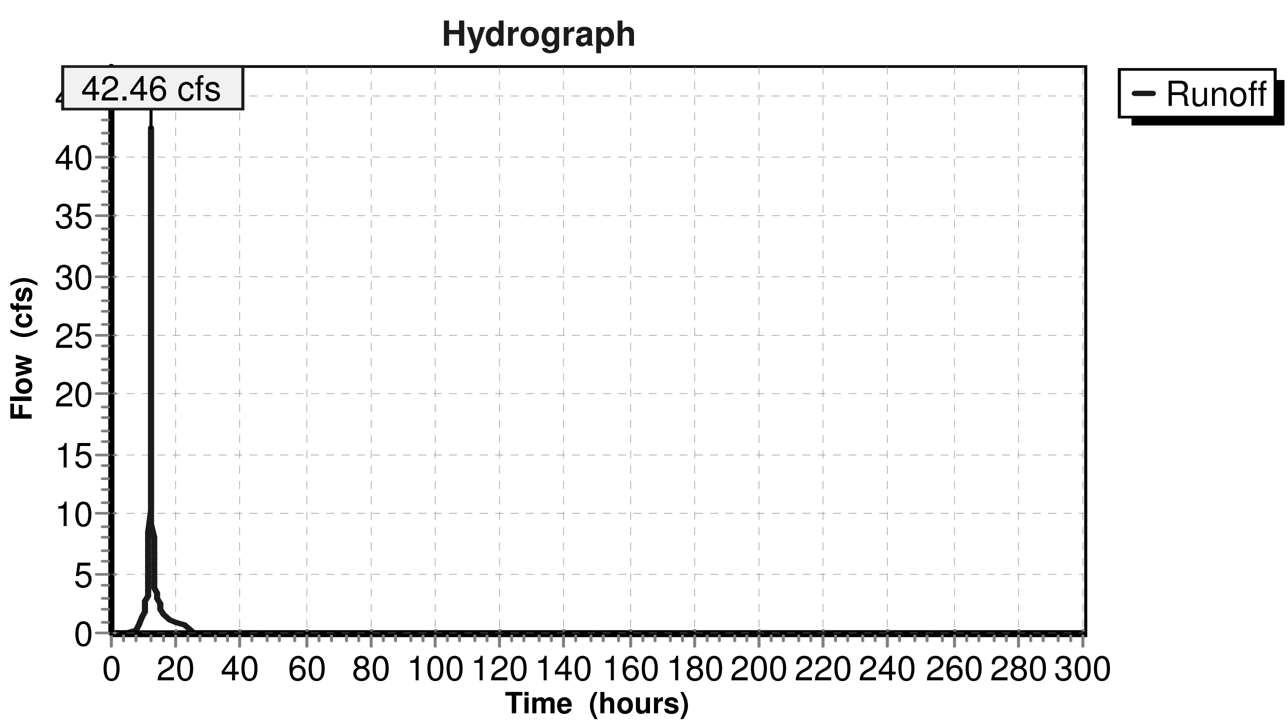
Runoff = 42.46 cfs @ 12.19 hrs, Volume= 3.978 af, Depth= 5.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
1.500	98	Paved parking & roofs
2.900	90	1/8 acre lots, 65% imp, HSG C
4.100	74	>75% Grass cover, Good, HSG C
8.500	84	Weighted Average
5.115		Pervious Area
3.385		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.4	260	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.7	360	Total			

Subcatchment 3.1S:



Summary for Subcatchment 3.2S:

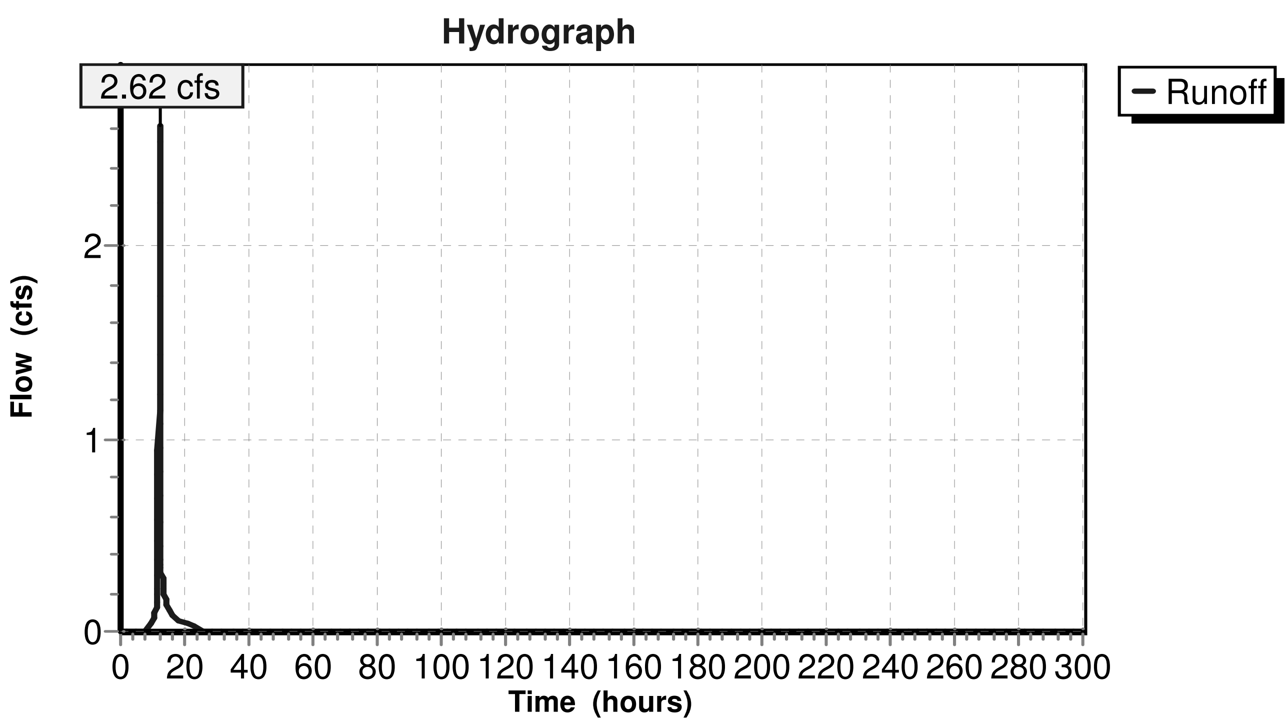
Runoff = 2.62 cfs @ 12.08 hrs, Volume= 0.187 af, Depth= 4.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
0.500	74	>75% Grass cover, Good, HSG C
0.500		Pervious Area

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

Subcatchment 3.2S:



Summary for Subcatchment 3.3S:

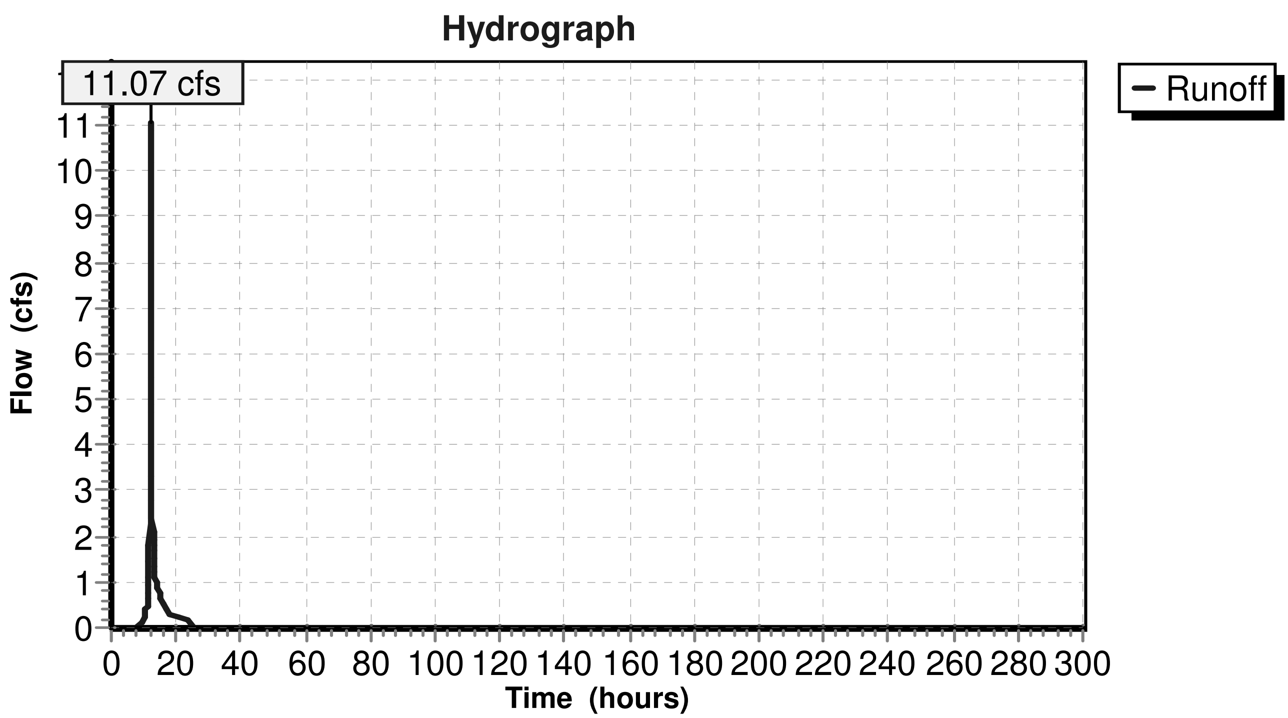
Runoff = 11.07 cfs @ 12.17 hrs, Volume= 0.976 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
2.700	70	Woods, Good, HSG C
0.200	74	>75% Grass cover, Good, HSG C
2.900	70	Weighted Average
2.900		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	26	0.4200	0.32		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
7.6	74	0.1300	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
3.1	388	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	207	0.0480	13.23	128.96	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.50' Z= 4.0 & 2.0 '/' Top.W=11.00' n= 0.022 Earth, clean & straight
12.4	695	Total			

Subcatchment 3.3S:



Summary for Subcatchment 4.0S:

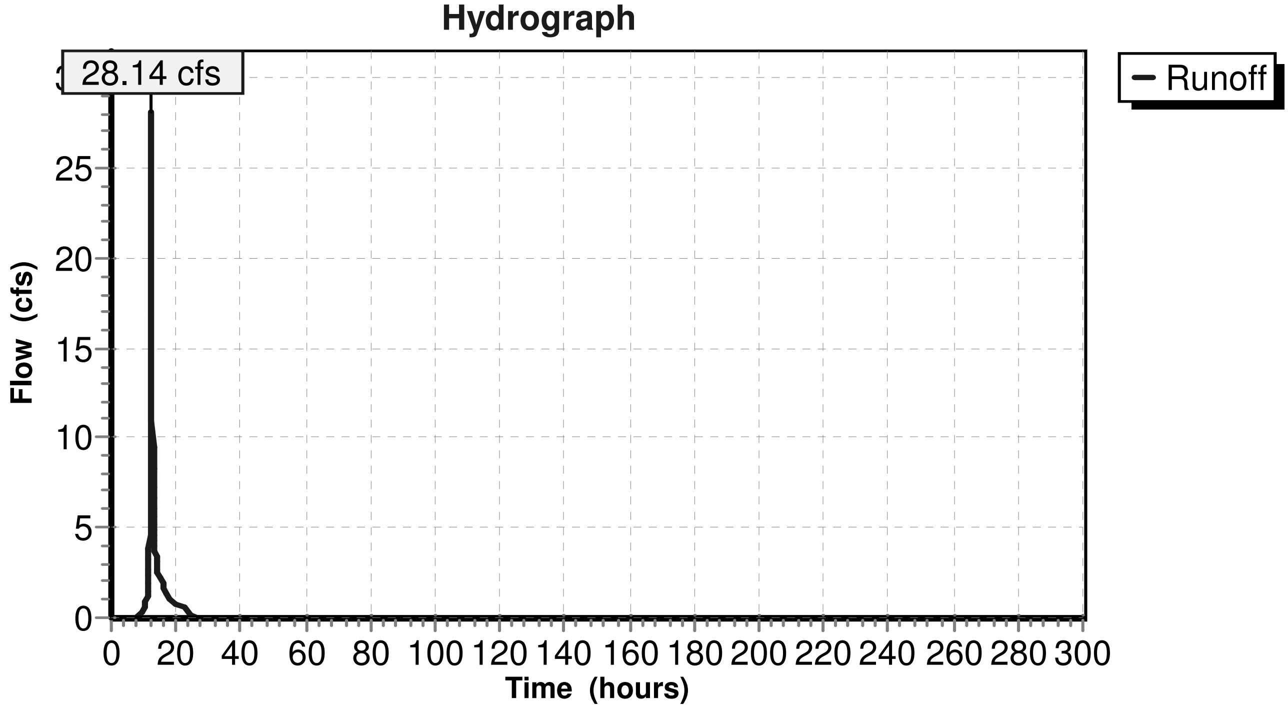
Runoff = 28.14 cfs @ 12.27 hrs, Volume= 2.946 af, Depth= 3.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
8.300	70	Woods, Good, HSG C
0.700	55	Woods, Good, HSG B
9.000	69	Weighted Average
9.000		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
8.2	980	0.1600	2.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.5	1,080	Total			

Subcatchment 4.0S:



Summary for Subcatchment 5.0S:

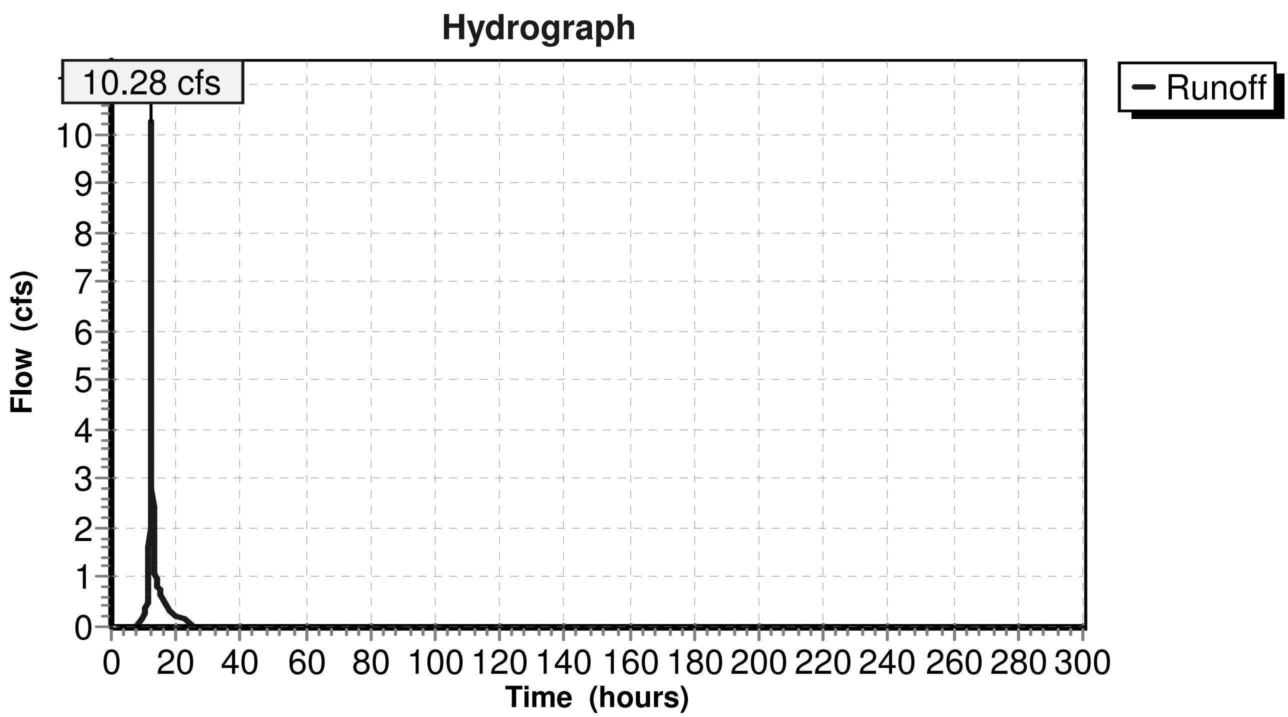
Runoff = 10.28 cfs @ 12.22 hrs, Volume= 0.983 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=7.50"

Area (ac)	CN	Description
1.700	74	>75% Grass cover, Good, HSG C
1.000	70	Woods, Good, HSG C
2.700	73	Weighted Average
2.700		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0500	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.4	120	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.6	220	Total			

Subcatchment 5.0S:

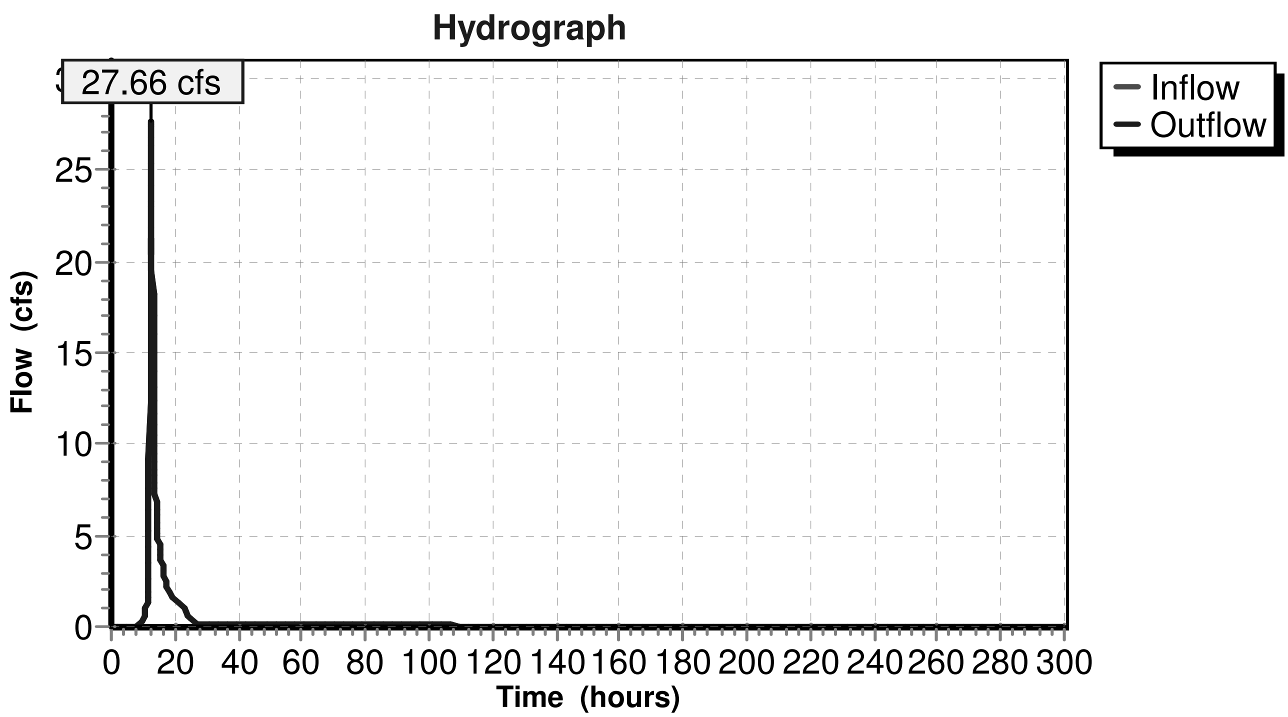


Summary for Reach DP 2:

Inflow Area = 14.200 ac, 23.80% Impervious, Inflow Depth = 4.98" for 100 year event
Inflow = 27.66 cfs @ 12.53 hrs, Volume= 5.892 af
Outflow = 27.66 cfs @ 12.53 hrs, Volume= 5.892 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

Reach DP 2:

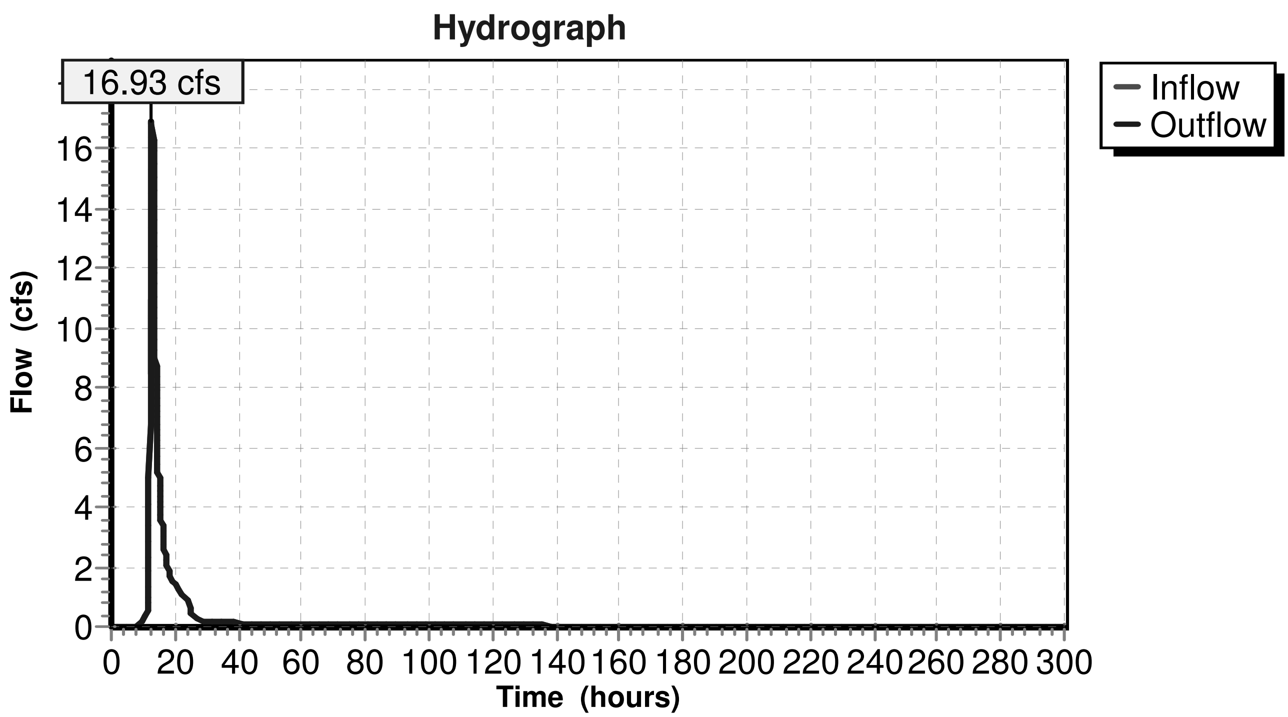


Summary for Reach DP 3:

Inflow Area =	11.900 ac, 28.45% Impervious, Inflow Depth = 5.18" for 100 year event			
Inflow =	16.93 cfs @	12.84 hrs, Volume=	5.138 af	
Outflow =	16.93 cfs @	12.84 hrs, Volume=	5.138 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

Reach DP 3:

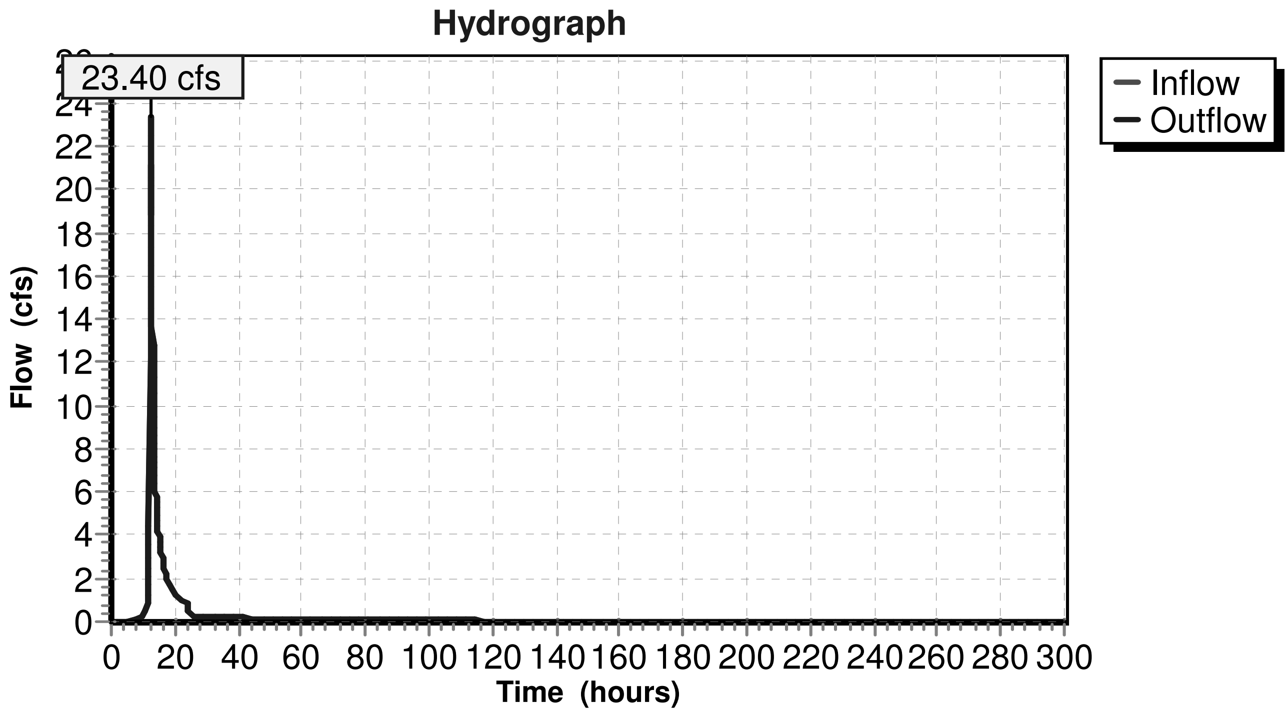


Summary for Reach DP1:

Inflow Area = 12.340 ac, 50.32% Impervious, Inflow Depth = 5.08" for 100 year event
Inflow = 23.40 cfs @ 12.17 hrs, Volume= 5.220 af
Outflow = 23.40 cfs @ 12.17 hrs, Volume= 5.220 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs

Reach DP1:



Summary for Pond 1.1P:

Inflow Area = 4.900 ac, 65.31% Impervious, Inflow Depth = 6.31" for 100 year event
Inflow = 28.20 cfs @ 12.16 hrs, Volume= 2.578 af
Outflow = 19.80 cfs @ 12.29 hrs, Volume= 2.577 af, Atten= 30%, Lag= 7.9 min
Primary = 19.80 cfs @ 12.29 hrs, Volume= 2.577 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 403.20' Surf.Area= 8,340 sf Storage= 15,484 cf
Peak Elev= 406.00' @ 12.29 hrs Surf.Area= 15,597 sf Storage= 49,384 cf (33,900 cf above start)

Plug-Flow detention time= 544.1 min calculated for 2.221 af (86% of inflow)
Center-of-Mass det. time= 407.8 min (1,190.9 - 783.1)

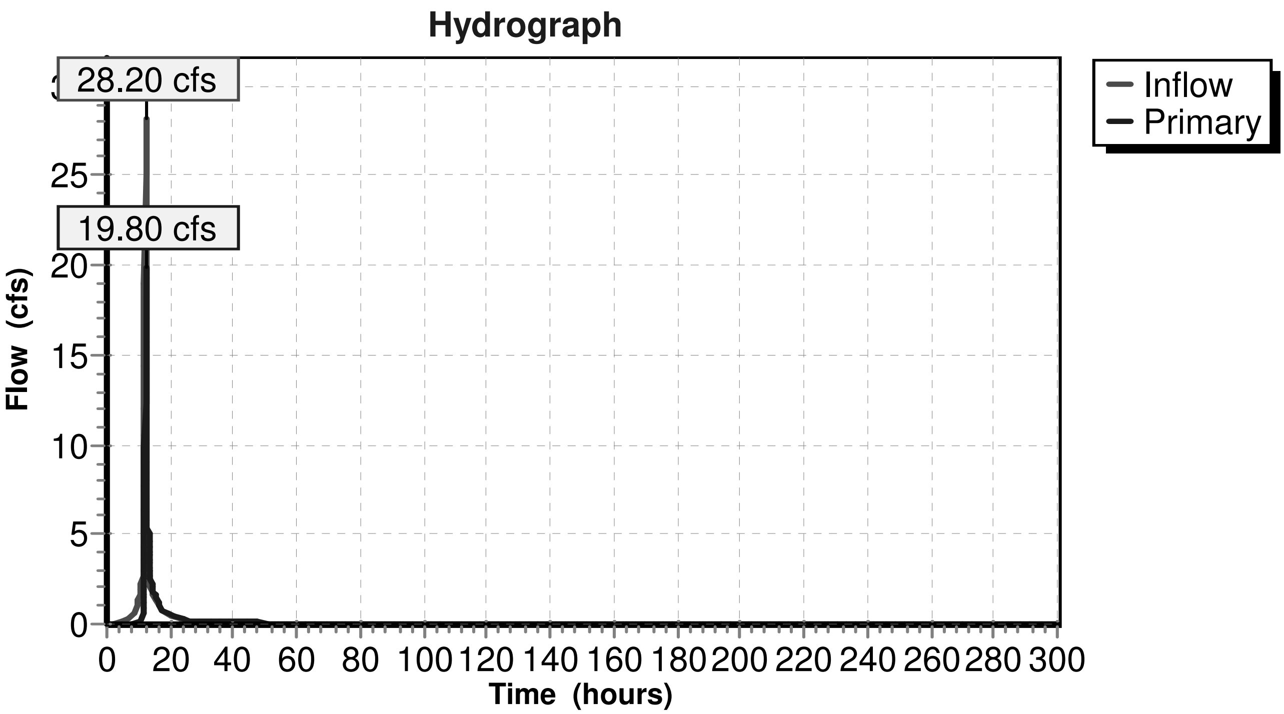
Volume	Invert	Avail.Storage	Storage Description
#1	399.00'	66,400 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
399.00	800	0	0
400.00	1,600	1,200	1,200
402.00	4,800	6,400	7,600
404.00	10,700	15,500	23,100
406.00	15,600	26,300	49,400
407.00	18,400	17,000	66,400

Device	Routing	Invert	Outlet Devices
#1	Primary	399.00'	**18.0" x 155.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 390.00' S= 0.0581 '/' Cc= 0.900 n= 0.012
#2	Device 1	403.20'	**1.8" Vert. Orifice/Grate** C= 0.600
#3	Device 1	404.70'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=19.73 cfs @ 12.29 hrs HW=406.00' TW=369.47' (Dynamic Tailwater)
└─**1=Culvert** (Passes 19.73 cfs of 21.27 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 7.94 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 19.59 cfs @ 3.78 fps)

Pond 1.1P:


Hydrograph
28.20 cfs
19.80 cfs
Inflow
Primary
Flow (cfs)
0
5
10
15
20
25
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Time (hours)

Summary for Pond 1.2P:

Inflow Area = 6.400 ac, 53.91% Impervious, Inflow Depth = 5.99" for 100 year event
Inflow = 23.27 cfs @ 12.27 hrs, Volume= 3.193 af
Outflow = 12.50 cfs @ 12.66 hrs, Volume= 3.193 af, Atten= 46%, Lag= 23.2 min
Primary = 12.28 cfs @ 12.66 hrs, Volume= 1.766 af
Secondary = 0.22 cfs @ 12.66 hrs, Volume= 1.427 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 370.44' @ 12.66 hrs Surf.Area= 14,096 sf Storage= 48,421 cf

Plug-Flow detention time= 902.0 min calculated for 3.193 af (100% of inflow)
Center-of-Mass det. time= 901.8 min (2,018.7 - 1,116.9)

Volume	Invert	Avail.Storage	Storage Description
#1	365.00'	64,033 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

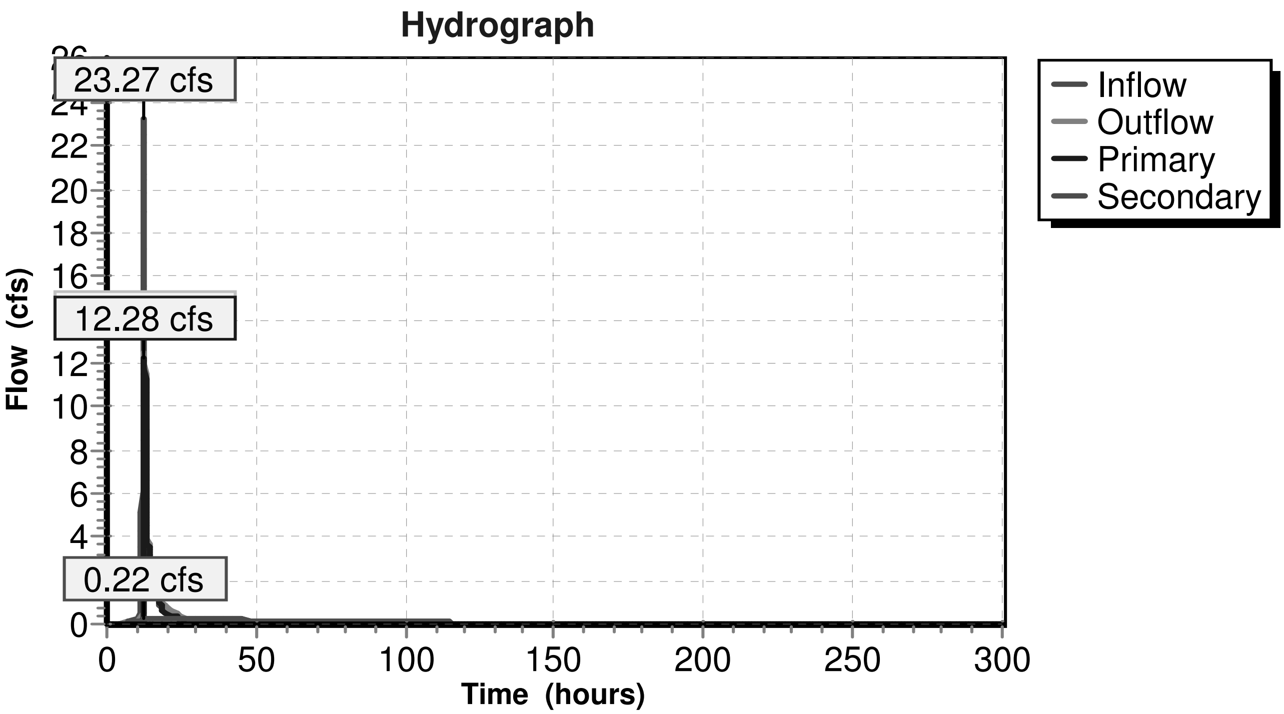
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
365.00	20	0	0
365.99	20	20	20
366.00	7,700	39	58
368.00	10,500	18,200	18,258
370.00	13,600	24,100	42,358
371.50	15,300	21,675	64,033

Device	Routing	Invert	Outlet Devices
#1	Secondary	365.00'	**1.9" Vert. Orifice/Grate** C= 0.600
#2	Primary	364.00'	**15.0" x 90.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 361.00' S= 0.0333 '/' Cc= 0.900 n= 0.012
#3	Device 2	369.40'	**3.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=12.27 cfs @ 12.66 hrs HW=370.44' TW=0.00' (Dynamic Tailwater)
└—**2=Culvert** (Passes 12.27 cfs of 14.25 cfs potential flow)
  └—**3=Broad-Crested Rectangular Weir** (Weir Controls 12.27 cfs @ 3.38 fps)

Secondary OutFlow Max=0.22 cfs @ 12.66 hrs HW=370.44' TW=0.00' (Dynamic Tailwater)
└—**1=Orifice/Grate** (Orifice Controls 0.22 cfs @ 11.15 fps)

Pond 1.2P:


Hydrograph
23.27 cfs
12.28 cfs
0.22 cfs
Flow (cfs)
Time (hours)
Inflow
Outflow
Primary
Secondary
0
2
4
6
8
10
12
16
18
20
22
24
26
0
50
100
150
200
250
300

Summary for Pond 1.3P:

Inflow Area = 3.640 ac, 71.70% Impervious, Inflow Depth = 6.43" for 100 year event
Inflow = 27.83 cfs @ 12.04 hrs, Volume= 1.951 af
Outflow = 14.11 cfs @ 12.15 hrs, Volume= 1.189 af, Atten= 49%, Lag= 7.0 min
Primary = 14.11 cfs @ 12.15 hrs, Volume= 1.189 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 398.99' @ 12.15 hrs Surf.Area= 13,088 sf Storage= 40,533 cf

Plug-Flow detention time= 208.0 min calculated for 1.189 af (61% of inflow)
Center-of-Mass det. time= 105.1 min (876.0 - 770.9)

Volume	Invert	Avail.Storage	Storage Description
#1	392.00'	54,900 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

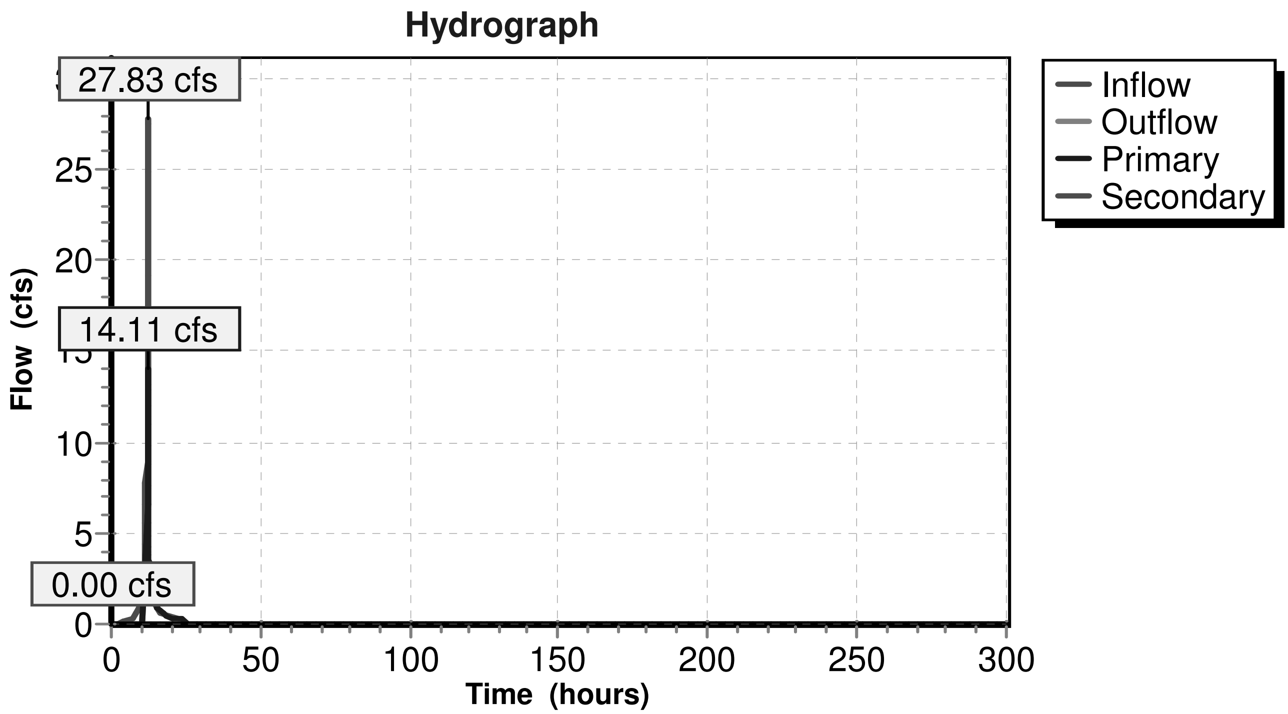
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
392.00	400	0	0
394.00	2,500	2,900	2,900
396.00	6,300	8,800	11,700
398.00	10,700	17,000	28,700
400.00	15,500	26,200	54,900

Device	Routing	Invert	Outlet Devices
#1	Primary	391.00'	**18.0" x 40.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 380.00' S= 0.2750 '/' Cc= 0.900 n= 0.012
#2	Device 1	398.40'	**10.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	399.00'	**10.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=14.04 cfs @ 12.15 hrs HW=398.99' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 14.04 cfs of 22.90 cfs potential flow)
　└─**2=Broad-Crested Rectangular Weir** (Weir Controls 14.04 cfs @ 2.37 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=392.00' TW=0.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1.3P:


Hydrograph
27.83 cfs
14.11 cfs
0.00 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0
5
10
20
25
0
50
100
150
200
250
300

Summary for Pond 2.1P:

Inflow Area = 7.700 ac, 43.90% Impervious, Inflow Depth = 5.73" for 100 year event
Inflow = 36.89 cfs @ 12.22 hrs, Volume= 3.678 af
Outflow = 25.54 cfs @ 12.40 hrs, Volume= 3.675 af, Atten= 31%, Lag= 10.8 min
Primary = 25.54 cfs @ 12.40 hrs, Volume= 3.675 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 440.00' Surf.Area= 13,300 sf Storage= 26,000 cf
Peak Elev= 442.54' @ 12.40 hrs Surf.Area= 21,817 sf Storage= 70,461 cf (44,461 cf above start)

Plug-Flow detention time= 437.0 min calculated for 3.078 af (84% of inflow)
Center-of-Mass det. time= 295.6 min (1,097.7 - 802.1)

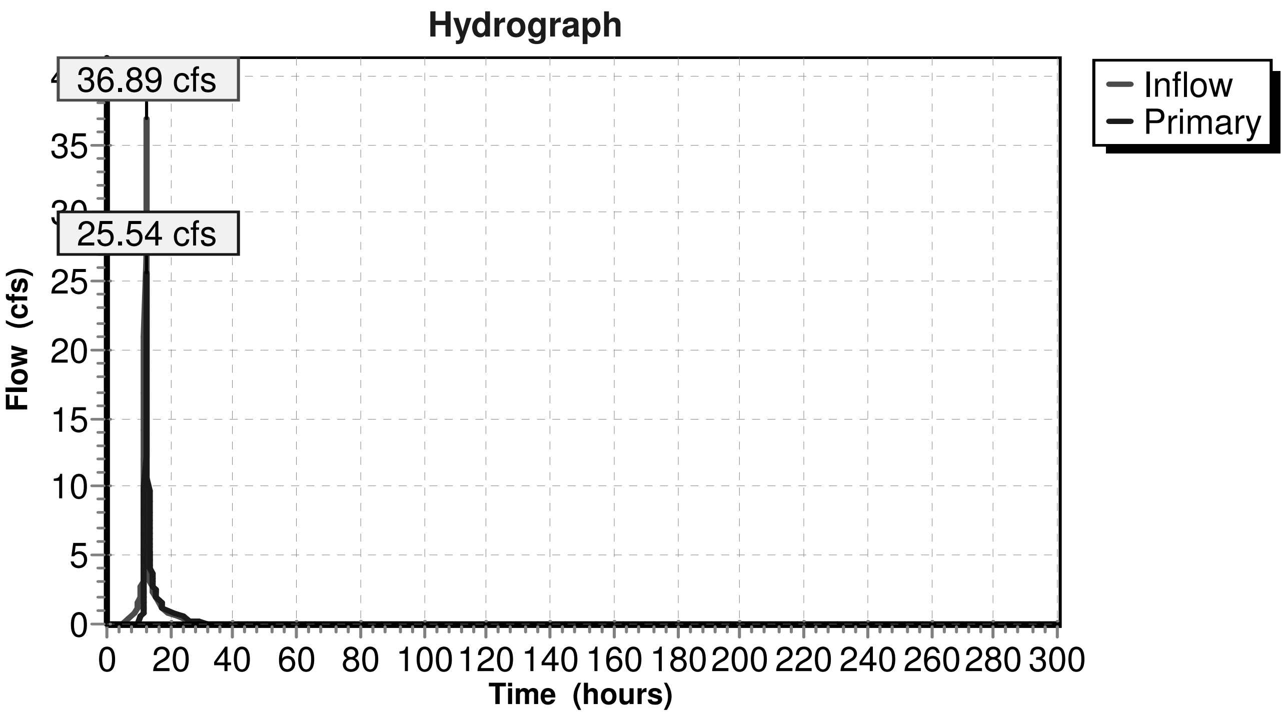
Volume	Invert	Avail.Storage	Storage Description
#1	436.00'	106,100 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
436.00	1,500	0	0
438.00	5,600	7,100	7,100
440.00	13,300	18,900	26,000
442.00	19,900	33,200	59,200
444.00	27,000	46,900	106,100

Device	Routing	Invert	Outlet Devices
#1	Primary	436.00'	**24.0" x 90.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 422.00' S= 0.1556 '/' Cc= 0.900 n= 0.012
#2	Device 1	440.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	441.00'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=25.52 cfs @ 12.40 hrs HW=442.54' TW=425.63' (Dynamic Tailwater)
└─**1=Culvert** (Passes 25.52 cfs of 35.60 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.55 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 25.35 cfs @ 4.12 fps)

Pond 2.1P:


Hydrograph
36.89 cfs
25.54 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
5
10
15
20
25
35
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300

Summary for Pond 2.2P:

Inflow Area = 8.500 ac, 39.76% Impervious, Inflow Depth = 5.61" for 100 year event
Inflow = 26.91 cfs @ 12.38 hrs, Volume= 3.974 af
Outflow = 20.42 cfs @ 12.66 hrs, Volume= 3.974 af, Atten= 24%, Lag= 16.7 min
Primary = 20.42 cfs @ 12.66 hrs, Volume= 3.974 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 426.10' @ 12.66 hrs Surf.Area= 13,209 sf Storage= 43,605 cf

Plug-Flow detention time= 534.5 min calculated for 3.973 af (100% of inflow)
Center-of-Mass det. time= 534.4 min (1,611.1 - 1,076.7)

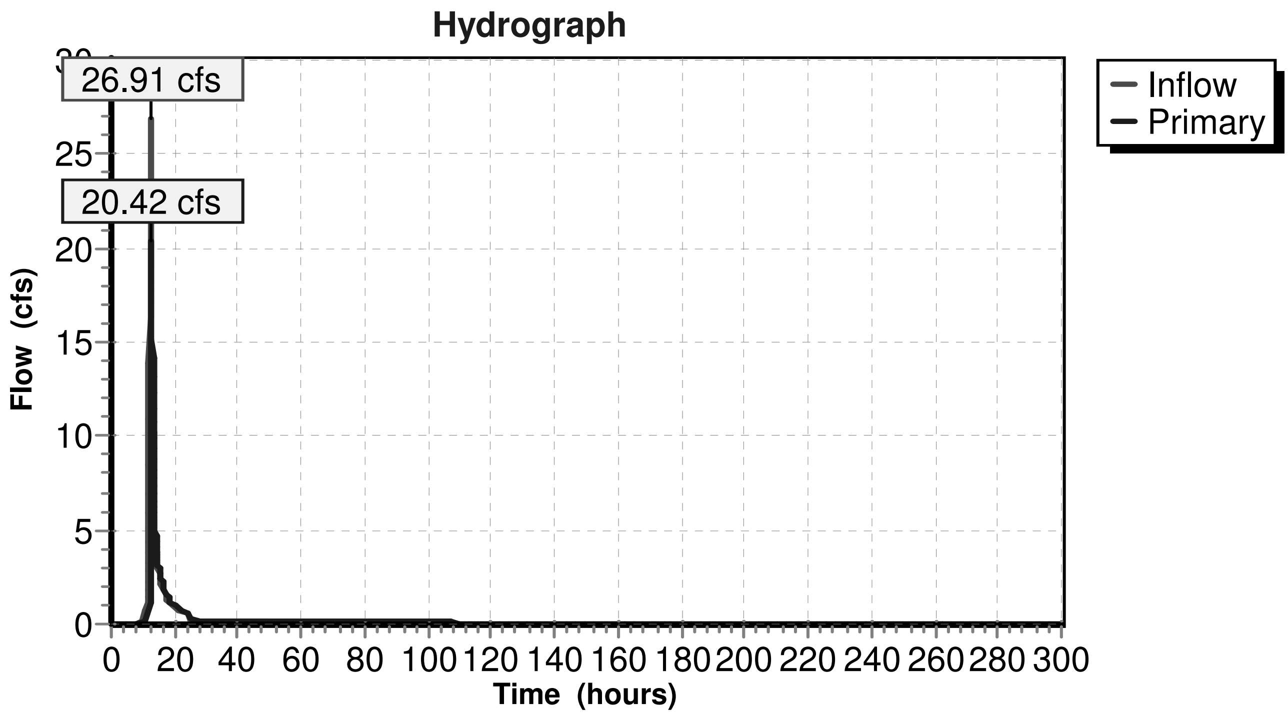
Volume	Invert	Avail.Storage	Storage Description
#1	419.00'	72,236 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
419.00	30	0	0
419.99	30	30	30
420.00	1,200	6	36
422.00	5,000	6,200	6,236
424.00	9,000	14,000	20,236
426.00	13,000	22,000	42,236
428.00	17,000	30,000	72,236

Device	Routing	Invert	Outlet Devices
#1	Primary	419.00'	**24.0" x 74.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 410.00' S= 0.1216 '/' Cc= 0.900 n= 0.012
#2	Device 1	419.00'	**1.6" Vert. Orifice/Grate** C= 0.600
#3	Device 1	424.50'	**3.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=20.39 cfs @ 12.66 hrs HW=426.10' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 20.39 cfs of 37.37 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.18 cfs @ 12.77 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 20.21 cfs @ 4.20 fps)

Pond 2.2P:


Hydrograph
26.91 cfs
20.42 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
5
10
15
20
25
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300

Summary for Pond 3.1P:

Inflow Area = 8.500 ac, 39.82% Impervious, Inflow Depth = 5.62" for 100 year event
Inflow = 42.46 cfs @ 12.19 hrs, Volume= 3.978 af
Outflow = 19.11 cfs @ 12.49 hrs, Volume= 3.975 af, Atten= 55%, Lag= 18.3 min
Primary = 19.11 cfs @ 12.49 hrs, Volume= 3.975 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Starting Elev= 446.00' Surf.Area= 15,300 sf Storage= 26,700 cf
Peak Elev= 449.00' @ 12.49 hrs Surf.Area= 28,915 sf Storage= 93,758 cf (67,058 cf above start)

Plug-Flow detention time= 449.9 min calculated for 3.362 af (84% of inflow)
Center-of-Mass det. time= 315.5 min (1,118.0 - 802.5)

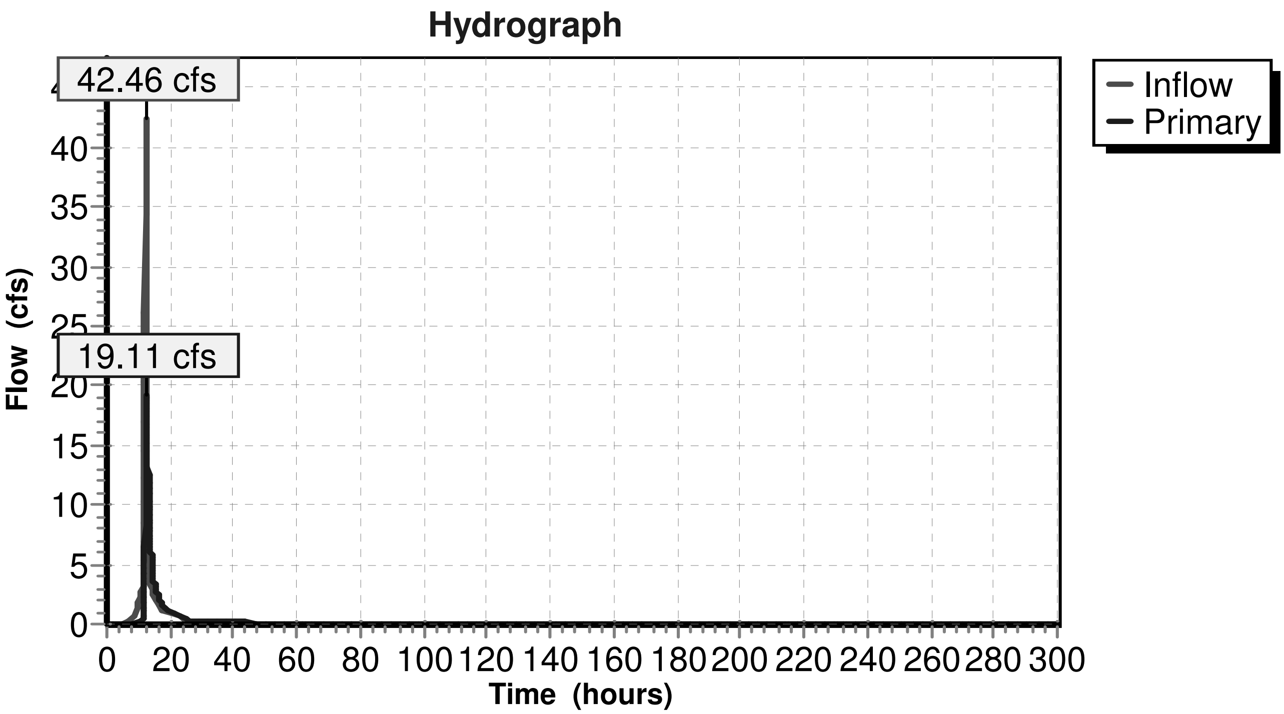
Volume	Invert	Avail.Storage	Storage Description
#1	442.00'	124,600 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
442.00	1,200	0	0
444.00	5,100	6,300	6,300
446.00	15,300	20,400	26,700
448.00	24,800	40,100	66,800
450.00	33,000	57,800	124,600

Device	Routing	Invert	Outlet Devices
#1	Primary	442.00'	**24.0" x 116.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 440.00' S= 0.0172 '/' Cc= 0.900 n= 0.012
#2	Device 1	446.00'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	447.00'	**2.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=19.09 cfs @ 12.49 hrs HW=449.00' TW=427.89' (Dynamic Tailwater)
└─**1=Culvert** (Passes 19.09 cfs of 37.06 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.28 cfs @ 8.20 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 18.82 cfs @ 4.70 fps)

Pond 3.1P:


Hydrograph
42.46 cfs
19.11 cfs
Inflow
Primary
Flow (cfs)
0
5
10
15
20
25
30
35
40
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Time (hours)

Summary for Pond 3.2P:

Inflow Area = 9.000 ac, 37.61% Impervious, Inflow Depth = 5.55" for 100 year event
Inflow = 19.74 cfs @ 12.47 hrs, Volume= 4.162 af
Outflow = 15.13 cfs @ 12.87 hrs, Volume= 4.162 af, Atten= 23%, Lag= 24.5 min
Primary = 15.13 cfs @ 12.87 hrs, Volume= 4.162 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Peak Elev= 428.59' @ 12.87 hrs Surf.Area= 9,879 sf Storage= 37,372 cf

Plug-Flow detention time= 585.4 min calculated for 4.162 af (100% of inflow)
Center-of-Mass det. time= 585.4 min (1,690.0 - 1,104.6)

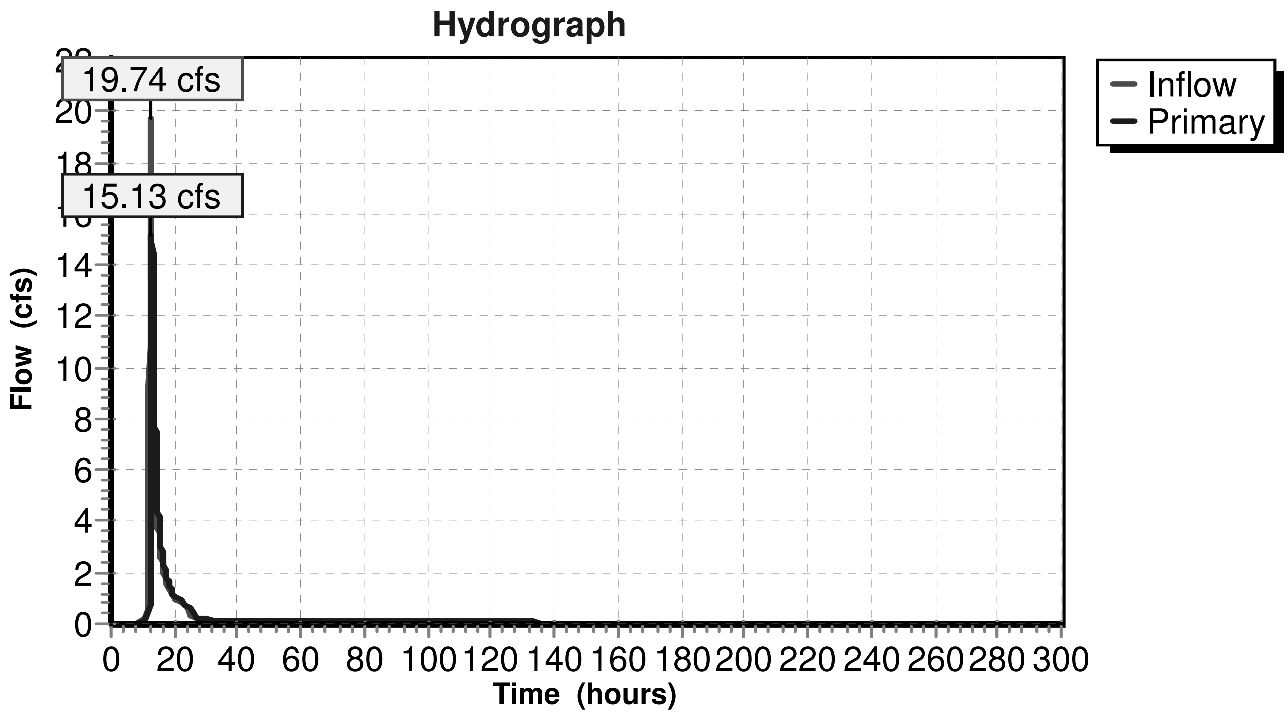
Volume	Invert	Avail.Storage	Storage Description
#1	421.00'	52,840 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
421.00	30	0	0
421.99	30	30	30
422.00	2,000	10	40
424.00	4,000	6,000	6,040
426.00	6,400	10,400	16,440
428.00	9,000	15,400	31,840
430.00	12,000	21,000	52,840

Device	Routing	Invert	Outlet Devices
#1	Primary	421.00'	**24.0" x 80.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 416.00' S= 0.0625 '/' Cc= 0.900 n= 0.012
#2	Device 1	421.00'	**1.3" Vert. Orifice/Grate** C= 0.600
#3	Device 1	426.50'	**1.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=15.11 cfs @ 12.87 hrs HW=428.58' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 15.11 cfs of 38.81 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.12 cfs @ 13.21 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 14.98 cfs @ 4.79 fps)

Pond 3.2P:


Hydrograph
19.74 cfs
15.13 cfs
Inflow
Primary
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
20
22
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Time (hours)

APPENDIX C

Annual Pollutant Loading Rate Calculation

THE PUTNAM COMMUNITY FOUNDATION, STONELEIGH AVENUE									
PRE-DEVELOPMENT ANNUAL POLLUTANT LOADS									
SUBCATCHMENT 1.1S									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods	0.70	6.0	0.10	1.8	77	4.2	0.07	1.3	54
Grass	0.40	6.0	0.12	3.7	308	2.4	0.05	1.5	123
Pavement	1.50	111.0	0.98	2.1	446	166.5	1.47	3.2	669
						173.1	1.59	5.9	846
DEP DESIGN 2 DETENTION POND REMOVAL EFFICIENCIES						40% to 60%	40% to 60%	20% to 40%	80% to 100%
SUBTOTAL						103.9 to 69.2	0.95 to 0.63	4.7 to 3.5	169 to 0
DEP DESIGN 14 GRASS SWALE						20% to 40%	20% to 40%	20% to 40%	20% to 40%
SUBTOTAL						83.1 to 41.5	0.76 to 0.38	3.8 to 2.1	135 to 0
DEP DESIGN 2 DETENTION POND REMOVAL EFFICIENCIES						40% to 60%	40% to 60%	20% to 40%	80% to 100%
SUBCATCHMENT 1.1S SUBTOTAL						**49.9 to 16.6**	**0.46 to 0.15**	**3.0 to 1.3**	**27 to 0**
SUBCATCHMENT 1.2S									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods	0.50	6.0	0.10	1.8	77	3.0	0.05	0.9	39
Grass	0.50	6.0	0.12	3.7	308	3.0	0.06	1.9	154
Pavement	0.00	111.0	0.98	2.1	446	0.0	0.00	0.0	0
						6.0	0.11	2.8	193
DEP DESIGN 2 DETENTION POND REMOVAL EFFICIENCIES						40% to 60%	40% to 60%	20% to 40%	80% to 100%
SUBCATCHMENT 1.2S SUBTOTAL						**3.6** to **2.4**	**0.07** to **0.04**	**2.2** to **1.7**	**39** to **0**
SUBCATCHMENT 1.3S									
						Total (lb/yr)			
						BOD	TP	TN	TSS
SUBCATCHMENT 1.3S SUBTOTAL						**194.5**	**1.23**	**17.4**	**139**
*LOADINGS TAKEN FROM ORIGINAL DESIGN REPORT FOR EXISTING SUBCATCHMENT AND STORMWATER BASIN									
SUBCATCHMENT 1.4S									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods	1.50	6.0	0.10	1.8	77	9.0	0.15	2.7	116
Grass	1.30	6.0	0.12	3.7	308	7.8	0.16	4.8	400
Pavement	0.00	111.0	0.98	2.1	446	0.0	0.00	0.0	0
SUBCATCHMENT 2.0S SUBTOTAL						**16.8**	**0.31**	**7.5**	**516**

SUBCATCHMENT 2.0S									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods	10.60	6.0	0.10	1.8	77	63.6	1.06	19.1	816
SUBCATCHMENT 2.0S SUBTOTAL						**63.6**	**1.06**	**19.1**	**816**

SUBCATCHMENT 3.0S									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods	6.00	6.0	0.10	1.8	77	36.0	0.60	10.8	462
SUBCATCHMENT 3.0S SUBTOTAL						**36.0**	**0.60**	**10.8**	**462**

SUBCATCHMENT 4.0S									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods	14.80	6.0	0.10	1.8	77	88.8	1.48	26.6	1140
SUBCATCHMENT 4.0S SUBTOTAL						**88.8**	**1.48**	**26.6**	**1140**

SUBCATCHMENT 5.0S									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods	8.30	6.0	0.10	1.8	77	49.8	0.83	14.9	639
SUBCATCHMENT 5.0S SUBTOTAL						**49.8**	**0.83**	**14.9**	**639**

	BOD	TP	TN	TSS
	503.0	**6.03**	**101.6**	**3778**
	to	to	to	to
PRE-DEVELOPMENT TOTALS	**468.5**	**5.70**	**99.3**	**3712**

THE PUTNAM COMMUNITY FOUNDATION, STONELEIGH AVENUE									
POST-DEVELOPMENT ANNUAL POLLUTANT LOADS									
SUBCATCHMENT 1.1S									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods	0.00	6.0	0.10	1.8	77	0.0	0.00	0.0	0
Grass	1.70	6.0	0.12	3.7	308	10.2	0.20	6.3	524
Pavement	3.20	111.0	0.98	2.1	446	355.2	3.13	6.7	1427
						365.4	3.34	13.0	1951
DEP DESIGN 2 DETENTION POND REMOVAL EFFICIENCIES						40% to 60%	40% to 60%	20% to 40%	80% to 100%
SUBTOTAL						219.2 to 146.2	2.00 to 1.33	10.4 to 7.8	390 to 0
DEP DESIGN 14 GRASS SWALE						20% to 40%	20% to 40%	20% to 40%	20% to 40%
SUBTOTAL						175.4 to 87.7	1.60 to 0.80	8.3 to 4.7	312 to 0
DEP DESIGN 2 DETENTION POND REMOVAL EFFICIENCIES						40% to 60%	40% to 60%	20% to 40%	80% to 100%
SUBCATCHMENT 1.1S SUBTOTAL						**105.2 to 35.1**	**0.96 to 0.32**	**6.7 to 2.8**	**62 to 0**
SUBCATCHMENT 1.2S									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods	0.00	6.0	0.10	1.8	77	0.0	0.00	0.0	0
Grass	0.90	6.0	0.12	3.7	308	5.4	0.11	3.3	277
Pavement	0.10	111.0	0.98	2.1	446	11.1	0.10	0.2	45
						16.5	0.21	3.5	322
DEP DESIGN 2 DETENTION POND REMOVAL EFFICIENCIES						40% to 60%	40% to 60%	20% to 40%	80% to 100%
SUBCATCHMENT 1.2S SUBTOTAL						**9.9 to 6.6**	**0.12 to 0.08**	**2.8 to 2.1**	**64 to 0**
SUBCATCHMENT 1.3S									
						Annual Loads (lb/yr)			
						BOD	**TP**	**TN**	**TSS**
SUBCATCHMENT 1.3S SUBTOTAL						**194.5**	**1.23**	**17.4**	**139**
*LOADINGS TAKEN FROM ORIGINAL DESIGN REPORT FOR EXISTING SUBCATCHMENT AND STORMWATER BASIN									
SUBCATCHMENT 1.4S A									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Grass	0.05	6.0	0.12	3.7	308	0.3	0.01	0.2	15
Pavement	0.20	111.0	0.98	2.1	446	22.2	0.20	0.4	89
TOTAL						22.5	0.20	0.6	105
STORMFILTER REMOVAL EFFICIENCIES						40%	40%	40%	80%
SUBCATCHMENT 3.2S SUBTOTAL						**13.5**	**0.12**	**0.4**	**21**

SUBCATCHMENT 1.4S									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods	1.20	6.0	0.10	1.8	77	7.2	0.12	2.2	92
Grass	0.95	6.0	0.12	3.7	308	5.7	0.11	3.5	293
Pavement	0.05	111.0	0.98	2.1	446	5.6	0.05	0.1	22
SUBCATCHMENT 1.4S SUBTOTAL						**18.5**	**0.28**	**5.8**	**407**

SUBCATCHMENT 2.1S A									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods	0.00	6.0	0.10	1.8	77	0.0	0.00	0.0	0
Grass	0.50	6.0	0.12	3.7	308	3.0	0.06	1.9	154
Multifamily Residential	2.00	50.0	0.63	5.0	395.0	100.0	1.26	10.0	790
TOTAL						103.0	1.32	11.9	944
DEP DESIGN 14 GRASS SWALE						20% to 40%	20% to 40%	20% to 40%	20% to 40%
SUBTOTAL						82.4 to 61.8	1.06 to 0.79	9.5 to 7.1	755 to 566
DEP DESIGN 2 DETENTION POND REMOVAL EFFICIENCIES						40% to 60%	40% to 60%	20% to 40%	80% to 100%
SUBTOTAL						49.4 to 24.7	0.63 to 0.32	7.6 to 4.3	151 to 0
DEP DESIGN 2 DETENTION POND REMOVAL EFFICIENCIES						40% to 60%	40% to 60%	20% to 40%	80% to 100%
SUBTOTAL						29.7 to 9.9	0.38 to 0.13	6.1 to 2.6	30 to 0
DEP DESIGN 14 GRASS SWALE						20% to 40%	20% to 40%	20% to 40%	20% to 40%
SUBCATCHMENT 2.1S A SUBTOTAL						**23.7** to **5.9**	**0.30** to **0.08**	**4.9** to **1.5**	**24** to **0**

SUBCATCHMENT 2.1S B									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Multifamily Residential	3.20	50.0	0.63	5.0	395.0	160.0	2.02	16.0	1264
Grass	2.00	6.0	0.12	3.7	308	12.0	0.24	7.4	616
Woods	0.00	6.0	0.10	1.8	77	0.0	0.00	0.0	0
TOTAL						172.0	2.26	23.4	1880
DEP DESIGN 2 DETENTION POND REMOVAL EFFICIENCIES						40% to 60%	40% to 60%	20% to 40%	80% to 100%
SUBTOTAL						103.2 to 68.8	1.35 to 0.90	18.7 to 14.0	376 to 0
DEP DESIGN 2 DETENTION POND REMOVAL EFFICIENCIES						40% to 60%	40% to 60%	20% to 40%	80% to 100%
SUBTOTAL						61.9 to 27.5	0.81 to 0.36	15.0 to 8.4	75 to 0
DEP DESIGN 14 GRASS SWALE						20% to 40%	20% to 40%	20% to 40%	20% to 40%
SUBCATCHMENT 2.1S B SUBTOTAL						**49.5** to **16.5**	**0.65** to **0.22**	**12.0** to **5.1**	**60** to **0**

SUBCATCHMENT 2.2S									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Grass	0.80	6.0	0.12	3.7	308	4.8	0.10	3.0	246
					TOTAL	4.8	0.10	3.0	246
						40%	40%	20%	80%
DEP DESIGN 2 DETENTION POND REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						2.9	0.06	2.4	49
					SUBTOTAL	to	to	to	to
						1.9	0.04	1.8	0
						20%	20%	20%	20%
DEP DESIGN 14 GRASS SWALE						to	to	to	to
						40%	40%	40%	40%
						2.3	**0.05**	**1.9**	**39**
SUBCATCHMENT 2.2S SUBTOTAL						to	to	to	to
						1.2	**0.02**	**1.1**	**0**

SUBCATCHMENT 2.3S									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods	5.70	6.0	0.10	1.8	77	34.2	0.57	10.3	439
Pavement	0.00	111.0	0.98	2.1	446	0.0	0.00	0.0	0
SUBCATCHMENT 2.3 S SUBTOTAL						**34.2**	**0.57**	**10.3**	**439**

SUBCATCHMENT 3.1S A									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Grass	1.00	6.0	0.12	3.7	308	6.0	0.12	3.7	308
Multifamily Residential	1.00	50.0	0.63	5.0	395.0	50.0	0.63	5.0	395
					TOTAL	56.0	0.8	8.7	703
						20%	20%	20%	20%
DEP DESIGN 14 GRASS SWALE						to	to	to	to
						40%	40%	40%	40%
						44.8	0.60	7.0	562
					SUBTOTAL	to	to	to	to
						33.6	0.45	5.2	422
						40%	40%	20%	80%
DEP DESIGN 2 DETENTION POND REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						26.9	0.36	5.6	112
					SUBTOTAL	to	to	to	to
						13.4	0.18	3.1	0
						40%	40%	20%	80%
DEP DESIGN 2 DETENTION POND REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						16.1	0.22	4.5	22
					SUBTOTAL	to	to	to	to
						5.4	0.07	1.9	0
						20%	20%	20%	20%
DEP DESIGN 14 GRASS SWALE						to	to	to	to
						40%	40%	40%	40%
						12.9	**0.17**	**3.6**	**18**
SUBCATCHMENT 3.1S A SUBTOTAL						to	to	to	to
						3.2	**0.04**	**1.1**	**0**

SUBCATCHMENT 3.1S B									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Pavement	1.5	111.0	0.98	2.1	446	166.5	1.4685	3.15	669
Multifamily Residential	1.90	50.0	0.63	5.0	395.0	95.0	1.20	9.5	751
Grass	3.10	6.0	0.12	3.7	308	18.6	0.37	11.5	955
Woods	0.00	6.0	0.10	1.8	77	0.0	0.00	0.0	0
					TOTAL	280.1	3.04	24.1	2374
						40%	40%	20%	80%
DEP DESIGN 2 DETENTION POND REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						168.1	1.8	19.3	475
					SUBTOTAL	to	to	to	to
						112.0	1.2	14.5	0
						40%	40%	20%	80%
DEP DESIGN 2 DETENTION POND REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						100.8	1.09	15.4	95
					SUBTOTAL	to	to	to	to
						44.8	0.49	8.7	0
						20%	20%	20%	20%
DEP DESIGN 14 GRASS SWALE						to	to	to	to
						40%	40%	40%	40%
						80.7	**0.87**	**12.3**	**76**
SUBCATCHMENT 3.1S B SUBTOTAL						to	to	to	to
						26.9	**0.29**	**5.2**	**0**
SUBCATCHMENT 3.2S									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Grass	0.50	6.0	0.12	3.7	308	3.0	0.06	1.9	154
					TOTAL	3.0	0.06	1.9	154
						40%	40%	20%	80%
DEP DESIGN 2 DETENTION POND REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						1.8	**0.04**	**1.5**	**31**
SUBCATCHMENT 3.2S SUBTOTAL						to	to	to	to
						1.2	**0.02**	**1.1**	**0**
SUBCATCHMENT 3.3S									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods	2.70	6.0	0.10	1.8	77	16.2	0.27	4.9	208
Grass	0.20	6.0	0.12	3.7	308	1.2	0.02	0.7	62
SUBCATCHMENT 3.3S SUBTOTAL						**17.4**	**0.29**	**5.6**	**270**
SUBCATCHMENT 4.1S									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods	9.00	6.0	0.10	1.8	77	54.0	0.90	16.2	693
SUBCATCHMENT 4.1S SUBTOTAL						**54.0**	**0.90**	**16.2**	**693**
SUBCATCHMENT 5.1S									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Grass	1.70	6.0	0.12	3.7	308	10.2	0.20	6.3	524
Woods	1.00	6.0	0.10	1.8	77	6.0	0.10	1.8	77
SUBCATCHMENT 5.1S SUBTOTAL						**16.2**	**0.30**	**8.1**	**601**
						634.3	**6.87**	**109.3**	**2945**
						to	to	to	to
POST-DEVELOPMENT TOTALS						**444.8**	**4.78**	**83.7**	**2570**

APPENDIX D

Project and Owner Information

<u>Site Data:</u>

The Putnam Community Foundation

Stoneleigh Avenue
Town of Carmel
New York

Tax Map Numbers: 66-2-58
Area: 35.23 acres

<u>Owner Information:</u>

The Putnam Community Foundation
P.O. Box 573
2 Route 164
Patterson, NY 12563

<u>Party Responsible for Implementation of the Stormwater Pollution Prevention Plan:</u>

The Putnam Community Foundation

<u>Qualified Professional Responsible for Inspection of the Stormwater Pollution Prevention Plan:</u>

Inspector to be determined at time of construction

APPENDIX E

NYSDEC SPDES for Construction Activities Construction Site Log Book

**STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM
FOR CONSTRUCTION ACTIVITIES**

CONSTRUCTION SITE LOG BOOK

Table of Contents

a

Properly completing forms such as those contained in this document meet the inspection requirement of NYSDEC SPDES GP for Construction Activities. Completed forms shall be kept on site at all times and made available to authorities upon request.

I. PRE-CONSTRUCTION MEETING DOCUMENTS

Project Name ____

Permit No. ______________________________ **Date of Authorization** ______________

Name of Operator ____

Prime Contractor ____

a. Preamble to Site Assessment and Inspections -The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified professional[1] conduct an assessment of the site prior to the commencement of construction[2] and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements.

When construction starts, site inspections shall be conducted by the qualified professional at least every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater (Construction Duration Inspections). The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request. The Operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis (Monthly Summary Report).

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization[3] using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 "Qualified Professional means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a Certified Professional in Erosion and Sediment Control (CPESC), soil scientist, licensed engineer or someone working under the direction and supervision of a licensed engineer (person must have experience in the principles and practices of erosion and sediment control).

2 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.

3 "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

b. Operators Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Further, I hereby certify that the SWPPP meets all Federal, State, and local erosion and sediment control requirements. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law. "

Name (please print):____

Title ______________________________**Date:**____________

Address: ____

Phone: __________ **Email:**______________________________

Signature:____

c. Qualified Professional's Credentials & Certification

" I hereby certify that I meet the criteria set forth in the General Permit to conduct site inspections for this project and that the appropriate erosion and sediment controls described in the SWPPP and as described in the following Pre-construction Site Assessment Checklist have been adequately installed or implemented, ensuring the overall preparedness of this site for the commencement of construction."

Name (please print):____

Title ____**Date:**______________

Address: ____

Phone: ____________ **Email:**__________________________________

Signature:____

d. Contractors Certification Statement

"I certify under penalty of law that I understand and agree to comply with the terms and conditions of the Stormwater Pollution Prevention Plan for the construction site identified in such plans as a condition of authorization to discharge storm water. I also understand that the operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") General Permit for Storm Water Discharges from Construction Activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards.

____

Signature of Contractor   Date

Name of Contractor ____________________________

Street Address ____________________________

City, State, Zip ____________________________

Telephone No. ____________________________

A copy of this statement shall be retained as part of the Stormwater Pollution Prevention Plan (SPPP) for a period off at least three (3) years after the subject property is stabilized.

e. Pre-construction Site Assessment Checklist (NOTE: Provide comments below as necessary)

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes No NA

[ ] [ ] [ ] Has a Notice of Intent been filed with the NYS Department of Conservation?
[ ] [ ] [ ] Is the SWPPP on-site? Where?________________________________
[ ] [ ] [ ] Is the Plan current? What is the latest revision date?_____________
[ ] [ ] [ ] Is a copy of the NOI (with brief description) onsite? Where?_____________
[ ] [ ] [ ] Have all contractors involved with stormwater related activities signed a contractor's certification?

2. Resource Protection

Yes No NA

[ ] [ ] [ ] Are construction limits clearly flagged or fenced?
[ ] [ ] [ ] Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
[ ] [ ] [ ] Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

Yes No NA

[ ] [ ] [ ] Clean stormwater runoff has been diverted from areas to be disturbed.
[ ] [ ] [ ] Bodies of water located either on site or in the vicinity of the site have been identified and protected.
[ ] [ ] [ ] Appropriate practices to protect on-site or downstream surface water are installed.
[ ] [ ] [ ] Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Entrance

Yes No NA

[ ] [ ] [ ] A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
[ ] [ ] [ ] Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
[ ] [ ] [ ] Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Perimeter Sediment Controls

Yes No NA

[ ] [ ] [ ] Silt fence material and installation comply with the standard drawing and specifications.
[ ] [ ] [ ] Silt fences are installed at appropriate spacing intervals
[ ] [ ] [ ] Sediment/detention basin was installed as first land disturbing activity.
[ ] [ ] [ ] Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

Yes No NA

[ ] [ ] [ ] The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
[ ] [ ] [ ] The plan is contained in the SWPPP on page ______
[ ] [ ] [ ] Appropriate materials to control spills are onsite. Where? __________________

II. CONSTRUCTION DURATION INSPECTIONS

a. Directions:
Inspection Forms will be filled out during the entire construction phase of the project.
Required Elements:

(1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

(2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;

(3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);

(5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and

(6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

SITE PLAN/SKETCH

Inspector (print name)	**Date of Inspection**
Qualified Professional (print name)	**Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Maintaining Water Quality

Yes No NA

[ ] [ ] [ ] Is there an increase in turbidity causing a substantial visible contrast to natural conditions?

[ ] [ ] [ ] Is there residue from oil and floating substances, visible oil film, or globules or grease?

[ ] [ ] [ ] All disturbance is within the limits of the approved plans.

[ ] [ ] [ ] Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions

Yes No NA

[ ] [ ] [ ] Is construction site litter and debris appropriately managed?

[ ] [ ] [ ] Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?

[ ] [ ] [ ] Is construction impacting the adjacent property?

[ ] [ ] [ ] Is dust adequately controlled?

2. Temporary Stream Crossing

Yes No NA

[ ] [ ] [ ] Maximum diameter pipes necessary to span creek without dredging are installed.

[ ] [ ] [ ] Installed non-woven geotextile fabric beneath approaches.

[ ] [ ] [ ] Is fill composed of aggregate (no earth or soil)?

[ ] [ ] [ ] Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

Runoff Control Practices

1. Excavation Dewatering

Yes No NA

[ ] [ ] [ ] Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.

[ ] [ ] [ ] Clean water from upstream pool is being pumped to the downstream pool.

[ ] [ ] [ ] Sediment laden water from work area is being discharged to a silt-trapping device.

[ ] [ ] [ ] Constructed upstream berm with one-foot minimum freeboard.

2. Level Spreader

Yes No NA

[ ] [ ] [ ] Installed per plan.

[ ] [ ] [ ] Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.

[ ] [ ] [ ] Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales

Yes No NA

[ ] [ ] [ ] Installed per plan with minimum side slopes 2H:1V or flatter.

[ ] [ ] [ ] Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.

[ ] [ ] [ ] Sediment-laden runoff directed to sediment trapping structure

Runoff Control Practices (continued)

4. Stone Check Dam

Yes No NA

[ ] [ ] [ ] Is channel stable? (flow is not eroding soil underneath or around the structure).
[ ] [ ] [ ] Check is in good condition (rocks in place and no permanent pools behind the structure).
[ ] [ ] [ ] Has accumulated sediment been removed?.

5. Rock Outlet Protection

Yes No NA

[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes No NA

[ ] [ ] [ ] Stockpiles are stabilized with vegetation and/or mulch.
[ ] [ ] [ ] Sediment control is installed at the toe of the slope.

2. Revegetation

Yes No NA

[ ] [ ] [ ] Temporary seedings and mulch have been applied to idle areas.
[ ] [ ] [ ] 4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control

1. Stabilized Construction Entrance

Yes No NA

[ ] [ ] [ ] Stone is clean enough to effectively remove mud from vehicles.
[ ] [ ] [ ] Installed per standards and specifications?
[ ] [ ] [ ] Does all traffic use the stabilized entrance to enter and leave site?
[ ] [ ] [ ] Is adequate drainage provided to prevent ponding at entrance?

2. Silt Fence

Yes No NA

[ ] [ ] [ ] Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
[ ] [ ] [ ] Joints constructed by wrapping the two ends together for continuous support.
[ ] [ ] [ ] Fabric buried 6 inches minimum.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation is ___% of design capacity.

Sediment Control (continued)

3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices)

Yes No NA

[ ] [ ] [ ] Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ] [ ] [ ] Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ] [ ] [ ] Drainage area is 1acre or less.
[ ] [ ] [ ] Excavated area is 900 cubic feet.
[ ] [ ] [ ] Excavated side slopes should be 2:1.
[ ] [ ] [ ] 2" x 4" frame is constructed and structurally sound.
[ ] [ ] [ ] Posts 3-foot maximum spacing between posts.
[ ] [ ] [ ] Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.

Sediment accumulation ___% of design capacity.

4. Temporary Sediment Trap

Yes No NA

[ ] [ ] [ ] Outlet structure is constructed per the approved plan or drawing.
[ ] [ ] [ ] Geotextile fabric has been placed beneath rock fill.

Sediment accumulation is ___% of design capacity.

5. Temporary Sediment Basin

Yes No NA

[ ] [ ] [ ] Basin and outlet structure constructed per the approved plan.
[ ] [ ] [ ] Basin side slopes are stabilized with seed/mulch.
[ ] [ ] [ ] Drainage structure flushed and basin surface restored upon removal of sediment basin facility.

Sediment accumulation is ___% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design.
Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

CONSTRUCTION DURATION INSPECTIONS
b. Modifications to the SWPPP (To be completed as described below)

The Operator shall amend the SWPPP whenever:
1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in:
a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason:

III. Monthly Summary of Site Inspection Activities

Name of Permitted Facility:	Today's Date:	Reporting Month:
Location:	Permit Identification #:	
Name and Telephone Number of Site Inspector:		

Date of Inspection	Regular / Rainfall based Inspection	Name of Inspector	Items of Concern

Owner/Operator Certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

Signature of Permittee or Duly Authorized Representative

Name of Permittee or Duly Authorized Representative date

Duly authorized representatives must have written authorization, submitted to DEC, to sign any permit documents.

APPENDIX F

Sediment Trap Calculations

3600 CF minimum of storage required for each acre of contributing area

Sediment Trap #	Contributing Area	Minimum Volume Required	Volume Provided
1.1P	4.9 AC	17,640 CF	19,500 CF
1.2P	6.1 AC	21,960 CF	34,400 CF
2.1P	7.7 AC	27,720 CF	33,200 CF
3.1P	8.5 AC	30,600 CF	40,100 CF

APPENDIX G

STORMFILTER SIZING CALCULATIONS

Compute Number of StormFilter (ZPG media) cartridges by Contech required:

Per the New York State Verified Proprietary Stormwater Management Practices released May 2007, found at **http://www.dec.ny.gov/chemical/29089.html**, the Stormfilter with ZPG media is verified to filter at 7.5 gpm/cartridge.

Per Chapter 10 of the NYSDEC Stormwater Design Manuel the WQ_v shall be the estimated runoff from the 1-year, 24-hour design storm. See following page for detailed information for subcatchment contributing to Stormfilter and design flow rate.

For a flow rate of 0.61 cfs (274 gpm)

274 gpm / 7.5 gpm/cartridge = 36.5 cartridges

Use 37 cartridges

Summary for Subcatchment 1.4S A: stormfilter

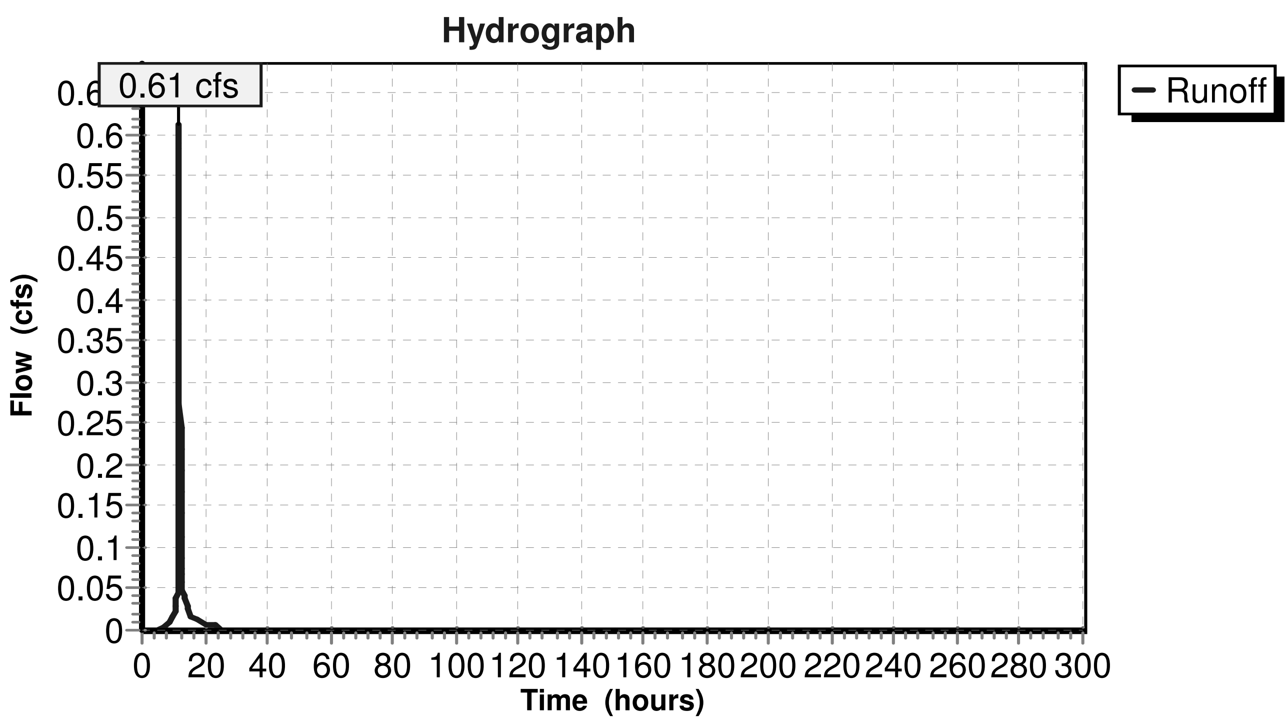
Runoff = 0.61 cfs @ 12.03 hrs, Volume= 0.041 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-300.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.70"

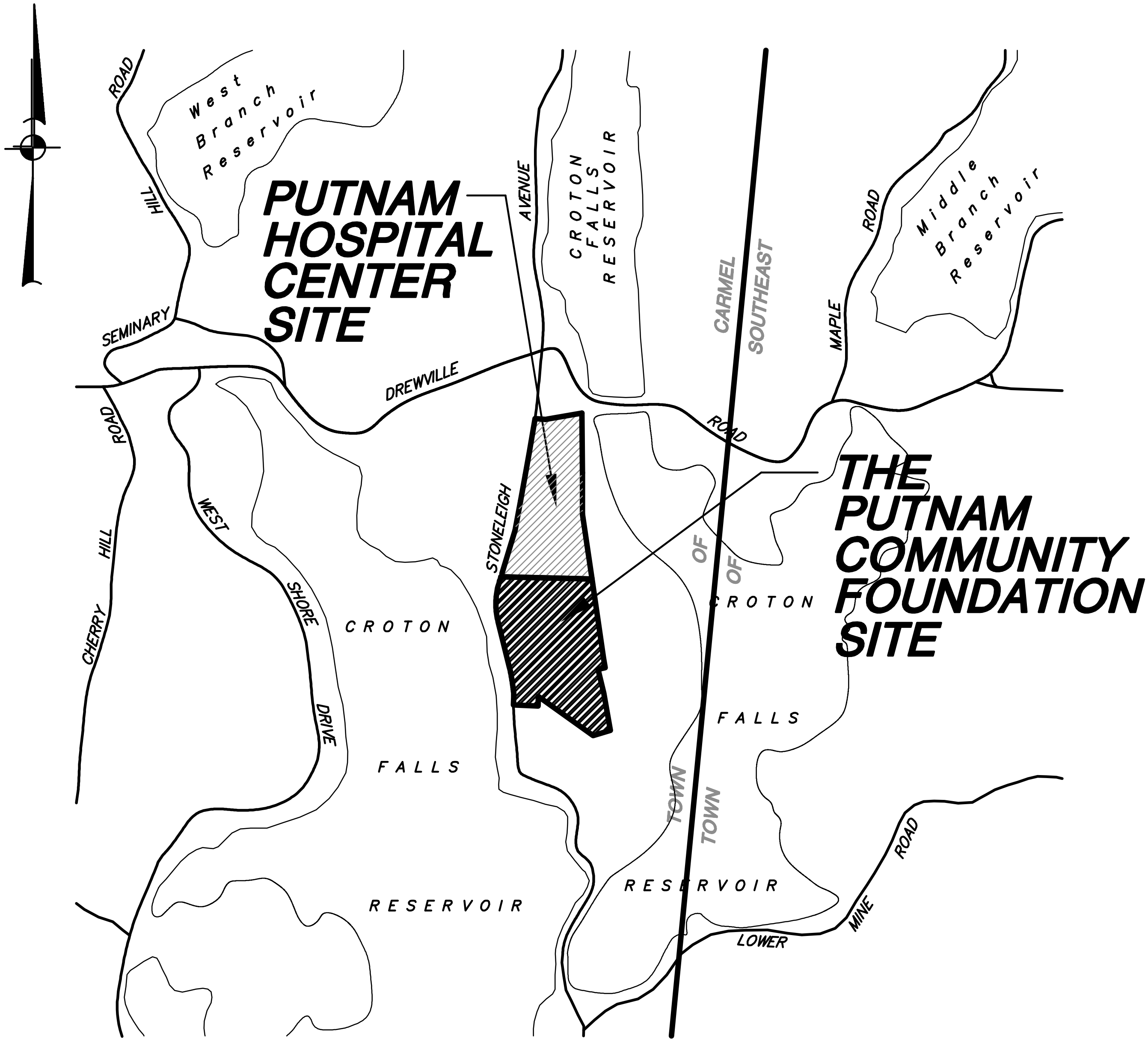
Area (ac)	CN	Description
0.050	74	>75% Grass cover, Good, HSG C
0.200	98	Paved parking & roofs
0.250	93	Weighted Average
0.050		Pervious Area
0.200		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	25	0.3200	0.28		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
0.1	40	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	65	Total			

Subcatchment 1.4S A: stormfilter

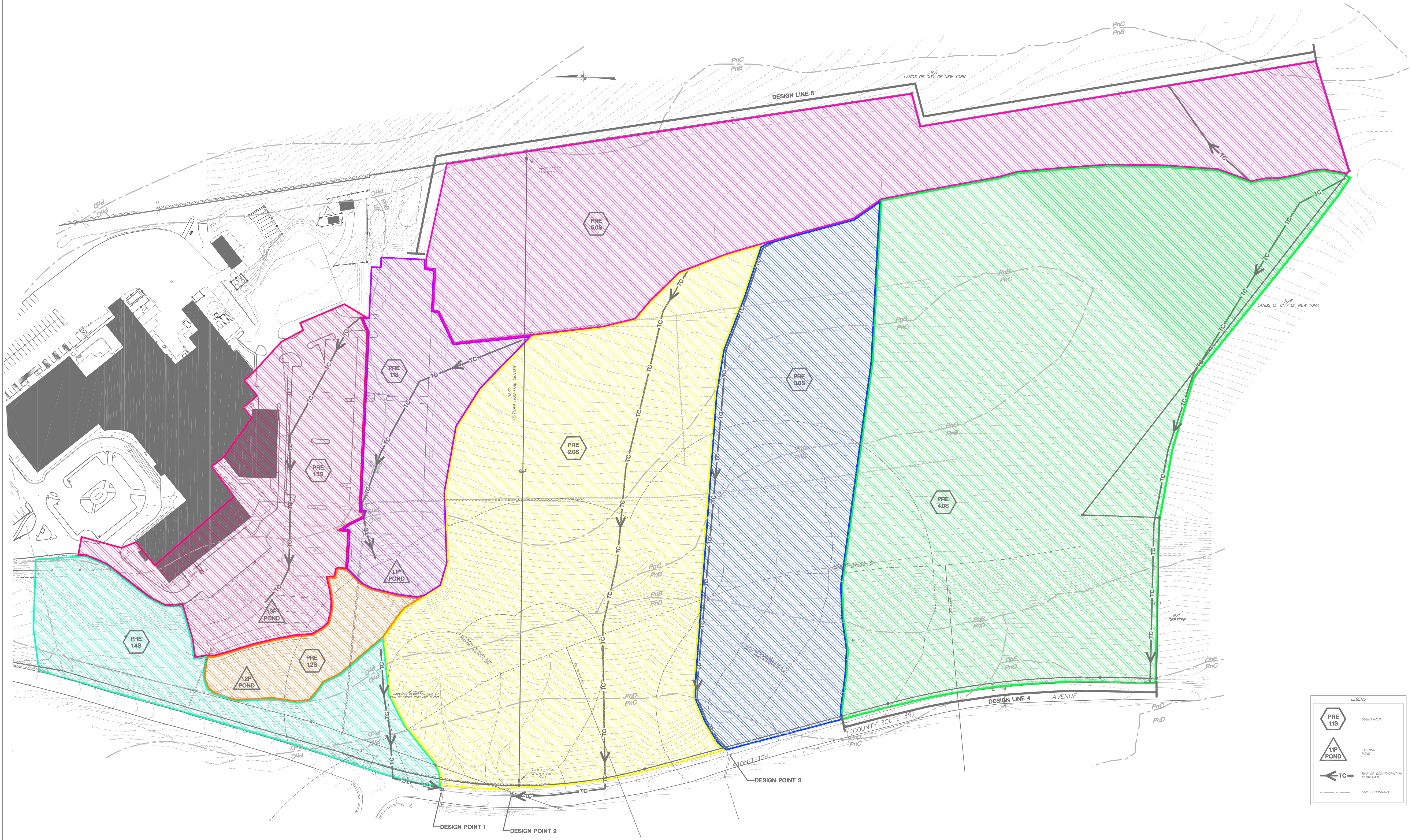


FIGURES



PROJECT: THE PUTNAM COMMUNITY FOUNDATION STONELEIGH AVENUE, TOWN OF CARMEL, PUTNAM COUNTY, NEW YORK	INSITE ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.	DATE:	5-23-08
		SCALE:	1" = 2000'
DRAWING: LOCATION MAP	3 Garrett Place • Carmel, New York 10512 Phone (845) 225-9690 • Fax (845) 225-9717 www.insite-eng.com	PROJECT NO.:	03198.100
		FIGURE:	1

Z:\E\03198100\Stormwater\FIGURES\FIGURE1.dwg, 7/30/2008 12:38:44 PM, eric, 1:1



LEGEND

PRE 1.1S	SUBCATMENT
1.1P POND	EXISTING POND
TC	TIME OF CONCENTRATION FLOW PATH
	SOILS BOUNDARY

SOILS LEGEND

SOILS	DESCRIPTION	HYDROLOGICAL GROUP
ChE	Charlton loam, 25% to 35% slopes	B
PnB	Paxton fine sandy loam, 2% to 8% slopes	C
PnC	Paxton fine sandy loam, 8% to 15% slopes	C
PnD	Paxton fine sandy loam, 15% to 25% slopes	C

NO.	DATE	REVISION	BY
1	8-8-08	REVISION FOR FEIS	EMS

INSITE
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LANDSCAPE ARCHITECTURE, P.C.
3 Garrett Place
Carmel, NY 10512
(845) 225-9690
(845) 225-9717 fax
www.insite-eng.com

PROJECT:

THE PUTNAM COMMUNITY FOUNDATION

STONELEIGH AVENUE, TOWN OF CARMEL, PUTNAM COUNTY, NEW YORK

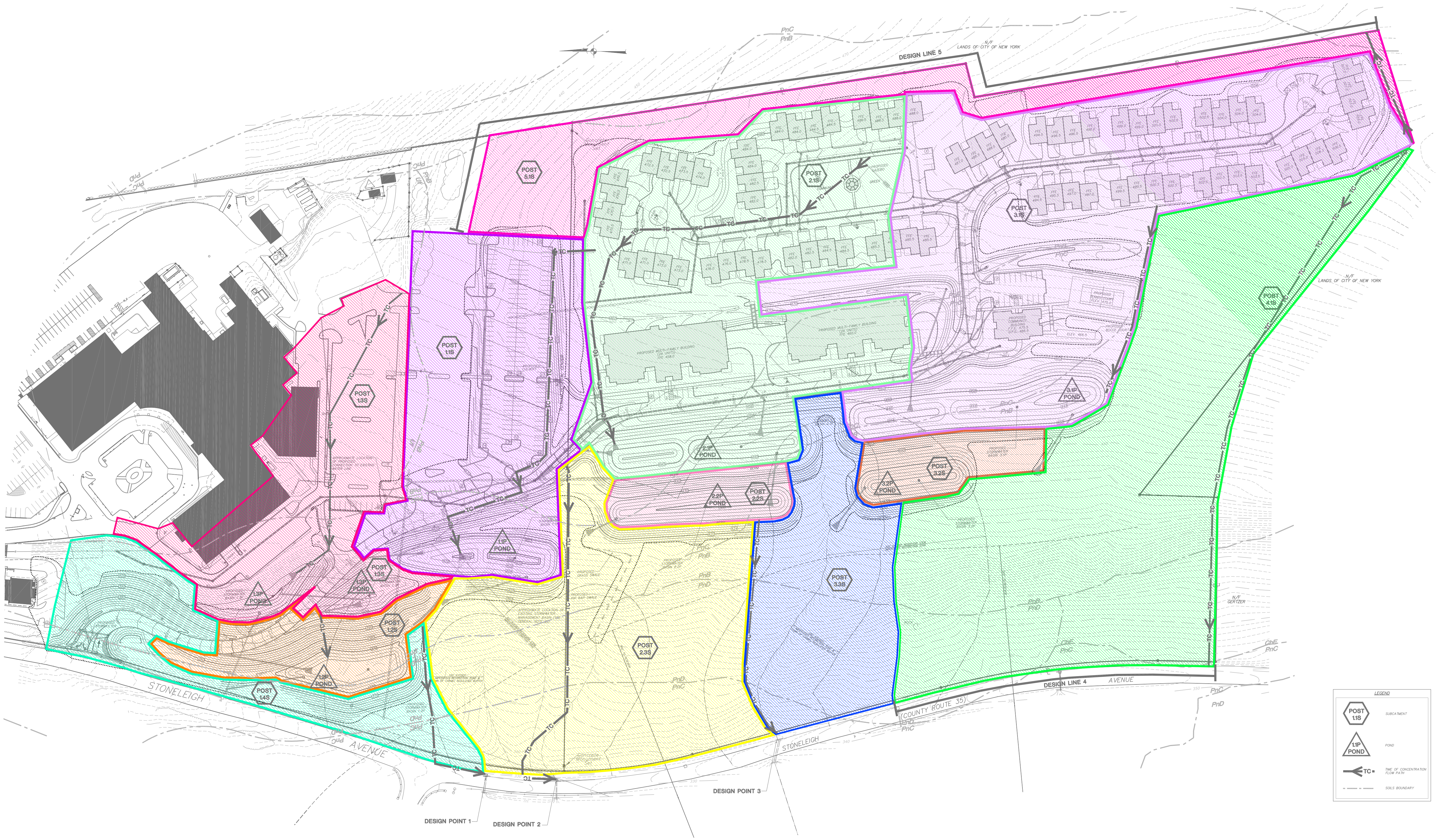
DRAWING:

PRE DEVELOPMENT DRAINAGE MAP

PROJECT NO.	03198.100	PROJECT MANAGER	J.J.C.
DATE	5-7-07	DRAWN BY	E.M.S.
SCALE	1"=60'	CHECKED BY	

DRAWING NO. Fig. 2

Z:\E\03198100\Stormwater\FIGURES\FIGURE2.dwg, 8/6/2008 1:26:00 PM, er



SOILS LEGEND

SOILS	DESCRIPTION	HYDROLOGICAL GROUP
ChE	Charlton loam, 25% to 35% slopes	B
PnB	Paxton fine sandy loam, 2% to 8% slopes	C
PnC	Paxton fine sandy loam, 8% to 15% slopes	C
PnD	Paxton fine sandy loam, 15% to 25% slopes	C

NO.	DATE	REVISION	BY
1	8-8-08	REVISION FOR FEIS	EMS

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ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.
3 Garrett Place
Carmel, NY 10512
(845) 225-9690
(845) 225-9717 fax
www.insite-eng.com

PROJECT:
THE PUTNAM COMMUNITY FOUNDATION
STONELEIGH AVENUE, TOWN OF CARMEL, PUTNAM COUNTY, NEW YORK

DRAWING:
POST DEVELOPMENT DRAINAGE MAP

PROJECT NO.	03198.100	PROJECT MANAGER	J.J.C.	DRAWING NO.
DATE	5-7-07	DRAWN BY	E.M.S.	FIG. 3
SCALE	1"=60'	CHECKED BY		

Z:\E\03198100\Stormwater\FIGURES\FIGURE3.dwg, 8/6/2008 1:30:52 PM, e

Appendix E

TRAFFIC CAPACITY ANALYSIS

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*JAG*
Agency/Co.	*TMA*
Date Performed	*6/19/2008*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Stoneleigh Ave and Hospital*
Jurisdiction	*Town of Carmel*
Analysis Year	*Build Condition*

Project Description The Putnam Community foundation Senior Housing Development

East/West Street: *Hospital (North) access* — North/South Street: *Stoneleigh Ave (CR 35)*

Intersection Orientation: *North-South* — Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	3	130	16	155	499	1
Peak-Hour Factor, PHF	0.81	0.81	0.81	0.94	0.94	0.94
Hourly Flow Rate, HFR (veh/h)	3	160	19	164	530	1
Percent Heavy Vehicles	1	--	--	1	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	3	3	5	6	1	37
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.65	0.65	0.65
Hourly Flow Rate, HFR (veh/h)	3	3	5	9	1	56
Percent Heavy Vehicles	1	0	0	1	0	2
Percent Grade (%)	8			-5		
Flared Approach		N			Y	
Storage		0			1	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	3	164		66			11	
C (m) (veh/h)	1042	1403		1030			254	
v/c	0.00	0.12		0.06			0.04	
95% queue length	0.01	0.40		0.21			0.14	
Control Delay (s/veh)	8.5	7.9		11.9			19.8	
LOS	A	A		B			C	
Approach Delay (s/veh)	--	--	11.9			19.8		
Approach LOS	--	--	B			C		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JAG*	Intersection	*Site Access and Stoneleigh*
Agency/Co.	*TMA*	Jurisdiction	*Town of Carmel*
Date Performed	*6/19/2008*	Analysis Year	*Build Condition*
Analysis Time Period	*AM Peak Hour*		

Project Description *The Putnam Community foundation Senior Housing Development*

East/West Street: *Site-Hospital south Access*	North/South Street: *Stoneleigh Avenue (CR35)*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*123*	*27*	*113*	*404*	
Peak-Hour Factor, PHF	*1.00*	*0.81*	*0.81*	*0.94*	*0.94*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*151*	*33*	*120*	*429*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*19*		*30*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.65*	*1.00*	*0.65*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*29*	*0*	*46*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*-4*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*120*		*75*				
C (m) (veh/h)		*1403*		*516*				
v/c		*0.09*		*0.15*				
95% queue length		*0.28*		*0.51*				
Control Delay (s/veh)		*7.8*		*13.2*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*13.2*					
Approach LOS	--	--	*B*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JAG*	Intersection	*Stoneleigh Ave and Hospital*
Agency/Co.	*TMA*	Jurisdiction	*Town of Carmel*
Date Performed	*6/19/2008*	Analysis Year	*Build Condition*
Analysis Time Period	*PM Peak Hour*		

Project Description *The Putnam Community foundation Senior Housing Development*

East/West Street: *Hospital Entrance (north)*	North/South Street: *Stoneleigh Ave (CR 35)*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*5*	*347*	*12*	*105*	*190*	*1*
Peak-Hour Factor, PHF	*0.98*	*0.98*	*0.98*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*5*	*354*	*12*	*114*	*206*	*1*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*4*	*0*	*1*	*9*	*1*	*205*
Peak-Hour Factor, PHF	*0.42*	*0.42*	*0.42*	*0.79*	*0.79*	*0.79*
Hourly Flow Rate, HFR (veh/h)	*9*	*0*	*2*	*11*	*1*	*259*
Percent Heavy Vehicles	*1*	*0*	*2*	*1*	*0*	*0*
Percent Grade (%)		*8*			*-5*	
Flared Approach		*N*			*Y*	
Storage		*0*			*1*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*5*	*114*		*271*			*11*	
C (m) (veh/h)	*1370*	*1198*		*684*			*165*	
v/c	*0.00*	*0.10*		*0.40*			*0.07*	
95% queue length	*0.01*	*0.31*		*1.90*			*0.21*	
Control Delay (s/veh)	*7.6*	*8.3*		*13.7*			*28.4*	
LOS	*A*	*A*		*B*			*D*	
Approach Delay (s/veh)	--	--		*13.7*			*28.4*	
Approach LOS	--	--		*B*			*D*	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JAG*	Intersection	*Site Access and Stoneleigh*
Agency/Co.	*TMA*	Jurisdiction	*Town of Carmel*
Date Performed	*6/19/2008*	Analysis Year	*Build Condition*
Analysis Time Period	*PM Peak Hour*		

Project Description *The Putnam Community foundation Senior Housing Development*	
East/West Street: *Site-Hospital (south) Access*	North/South Street: *Stoneleigh Avenue (CR35)*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*227*	*31*	*78*	*123*	
Peak-Hour Factor, PHF	*1.00*	*0.98*	*0.98*	*0.92*	*0.92*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*231*	*31*	*84*	*133*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*17*		*147*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.79*	*1.00*	*0.79*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*21*	*0*	*186*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*-4*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*84*		*207*				
C (m) (veh/h)		*1314*		*745*				
v/c		*0.06*		*0.28*				
95% queue length		*0.20*		*1.14*				
Control Delay (s/veh)		*7.9*		*11.7*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*11.7*					
Approach LOS	--	--	*B*					

Appendix F

WASTEWATER ENGINEERING
REPORT

INSITE
ENGINEERING, SURVEYING &
LANDSCAPE ARCHITECTURE, P.C.

WASTEWATER ENGINEERING REPORT

For

The Putnam Community Foundation
Stoneleigh Avenue Senior Housing
Town of Carmel, New York

August 8, 2008

Prepared By

Insite Engineering, Surveying & Landscape Architecture, P.C.
3 Garrett Place
Carmel, New York 10512

1.0 INTRODUCTION

The project is proposed on two parcels of land located along Stoneleigh Avenue in the Town of Carmel, New York. The first parcel is the Putnam Community Foundations (PCF) 35.2 ± acre parcel of vacant land designated as Town of Carmel Tax Map Parcel #66.-2-58. The second parcel is a 43.2 ± acre parcel of land containing the existing Putnam Hospital Center (PHC). The hospital parcel is designated as Town of Carmel Tax Map Parcel #66.-2-57. The subject parcels are located in the R (residential) zoning district. The parcels and their surroundings are delineated on Figure 1. It is proposed to create 120 single bedroom senior housing units on the PCF parcel. It is proposed to create an access driveway on the hospital lot to provide access to both the hospital and the proposed senior housing development.

Domestic water service for the project is to be provided by Carmel Water District #2 (CWD #2) per the Out of District Water Service Agreement found in Liber 1598 Pg 413 signed on 7/9/02. The wastewater from the site is to be received by Carmel Sewer District #8 (CSD #8) per the Out of District Sewer Service Agreement found in Liber 1598 Pg 417 and signed on 7/9/02. Per the agreement CSD #8 agrees to receive 72,000 gallons of sewerage per day and PCF agrees to pay over $200,000 in past capital charges.

2.0 PROJECT DESIGN FLOWS

The average daily design flow for the project is based on the hydraulic loading rates listed in the Putnam County Department of Health Bulletin CS-31. For residential wastewater uses, Bulletin CS-31 references the loading rates given in the New York State Department of Environmental Conservation's (NYSDEC) publication *Design Standards for Wastewater Treatment Works – 1988* (DSWTF). The following table lists the proposed use, associated hydraulic loading rate, and the design flow rate (gallons per day or gpd) for the project. The NYSDEC publication allows for a 20% decrease in hydraulic loading rates for premises equipped with water saving plumbing fixtures. Since current standards dictate that water saving devices be used in all new construction, this 20% reduction is reflected in the table below.

Proposed Use	Hydraulic Loading Rate	Average Daily Design Flow (gpd)
120 1-BR Senior Housing Units	120 gpd/unit	14,400

3.0 PROPOSED CONNECTION TO CARMEL SEWER DISTRICT #8

Wastewater from the project will be collected and conveyed to the existing 8" gravity sewer on the lands of The Putnam Hospital Center (PHC) that currently connects to CSD #8 in Stoneleigh Avenue. The connection to the PHC main will be through an existing easement between the PHC and The Putnam Community Foundation in favor of The Putnam Community Foundation.

4.0 PROPOSED SYSTEM COMPONENTS

The proposed sewer for the project will be composed on approximately 4,100 linear feet of 8" PVC SDR 35 sewer pipe and 24 pre-cast concrete manholes.

Appendix G

WATER ENGINEERING REPORT

INSITE
ENGINEERING, SURVEYING &
LANDSCAPE ARCHITECTURE, P.C.

WATER ENGINEERING REPORT

For

The Putnam Community Foundation
Stoneleigh Avenue Senior Housing
Town of Carmel, New York

August 8, 2008

Prepared By

Insite Engineering, Surveying & Landscape Architecture, P.C.
3 Garrett Place
Carmel, New York 10512

1.0 INTRODUCTION

The project is proposed on two parcels of land located along Stoneleigh Avenue in the Town of Carmel, New York. The first parcel is the Putnam Community Foundations (PCF) 35.2 ± acre parcel of vacant land designated as Town of Carmel Tax Map Parcel #66.-2-58. The second parcel is a 43.2 ± acre parcel of land containing the existing Putnam Hospital Center (PHC). The hospital parcel is designated as Town of Carmel Tax Map Parcel #66.-2-57. The subject parcels are located in the R (residential) zoning district. The parcels and their surroundings are delineated on Figure 1. It is proposed to create 120 single bedroom senior housing units on the PCF parcel. It is proposed to create an access driveway on the hospital lot to provide access to both the hospital and the proposed senior housing development.

Domestic water service for the project is to be provided by Carmel Water District #2 (CWD #2) per the Out of District Water Service Agreement found in Liber 1598 Pg 413 signed on 7/9/02. Per the agreement CWD #2 agrees to supply 72,000 gallons of water per day to the property and PCF agrees to pay over $75,000 in capital charges and capital contributions. The wastewater from the site is to be received by Carmel Sewer District #8 (CSD #8) per the Out of District Sewer Service Agreement found in Liber 1598 Pg 417 and signed on 7/9/02.

2.0 PROJECT DESIGN FLOWS

The average daily domestic water design flow for the project is based on the hydraulic loading rates listed in the Putnam County Department of Health Bulletin CS-31. The following table lists the proposed use, associated hydraulic loading rate, and the design flow rate (gallons per day or gpd) for the project.

Proposed Use	Hydraulic Loading Rate	Average Daily Design Flow (gpd)
120 1-BR Senior Housing Units	150 gpd/unit	18,000

The average daily wastewater flow is calculated in the *Wastewater Engineering Report for the project* as 14,400 gpd, or 3,600 gpd less than the average daily water demand. For wastewater flows, bulletin CS-31 references the loading rates given in the New York State Department of Environmental Conservation (NYSDEC) publication *Design Standards for Wastewater Treatment Works – 1988.* This publication allows a 20% reduction in the loading rate to account for water saving fixtures. For residential water demand, bulletin CS-31 does not allow this reduction.

The peak hourly flow for domestic water is calculated using a peaking factor that is based on the population of the subject project. *Recommended Standards for Wastewater Facilities - 2004*[1] was used to determine a peaking factor of four.

<u>Peak Hourly Flow</u>

18,000 gpd ÷ (24 hr/day) ÷ (60 min/hr) = 12.5 gallons per minute (gpm)

Peak Hourly Flow = 12.5 gpm x 4 **≈ 50.0 gpm**

In accordance with the Town of Carmel zoning law, (Section 63-10Y.Note 25.II.j.), all 120 of the senior housing units will be equipped with automatic sprinkler systems for fire protection. The final required flow and pressure for these systems will be determined as their designs are finalized.

[1] Published by the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers

3.0 PROPOSED CONNECTION TO CARMEL WATER DISTRICT #2

The project will connect to CWD #2 by a connection to the existing 8" water line, which provides service to the Putnam Hospital Center (PHC). This existing water line connects to CWD #2 water main along Stoneleigh Avenue. The connection to PHC water line will be made through an existing easement between the PHC and The Putnam Community Foundation in favor of The Putnam Community Foundation.

A system evaluation performed by J. Robert Folchetti and Associates, LLC in 1999 assessed pressures at various points in CWD#2. According to the evaluation, the static pressure in the water main at the PHC connection is 173 psi. The static pressure expected in the water service connection at the unit with the highest finished floor elevation is calculated as follows:

- Approximate elevation of water main in Stoneleigh Avenue: 340 ft
- Highest first floor elevation of proposed units: 507.5 ft
- Static pressure in water main in Stoneleigh Ave: 173 psi

Static pressure at proposed connection = 173 psi - (507.5ft - 340ft)/ 2.31ft/psi = <u>100psi</u>

Based on the previous calculation there is adequate pressure to service the proposed project. A preliminary fire flow of 500 gpm has been established to evaluate the proposed connection under fire flow conditions.

- Head loss at 550 gpm for 8" DR14 PVC: 2.171 ft/100ft of pipe
- Length of pipe to furthest unit from Stoneleigh Avenue: 2800 ft

Pressure at highest unit = 173psi – (507.5ft+ 2800ft/100ft* 2.171ft– 340ft)/2.31ft/psi = <u>74psi</u>

Based on the previous calculation there is adequate pressure to provide fire flow for the proposed project.

4.0 PROPOSED SYSTEM COMPONENTS

The proposed system and improvements will consist of approximately 3,400± feet of 8" DR14 Class 200 PVC water pipe and associated isolation valves and fire hydrants.