

Appendix G

Preliminary Stormwater Pollution Prevention Plan

EPT Concord Resort

Phase 1 – Development Area

SULLIVAN COUNTY, NEW YORK

Preliminary Stormwater Pollution Prevention Plan

AKRF Project Number: 80286

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1.0 OBJECTIVE

AKRF Engineering, P.C. (AKRF) prepared this Stormwater Pollution Prevention Plan (SWPPP) in accordance with the following applicable rules, regulations and guidance documents:

- New York State Department of Environmental Conservation (NYSDEC) Stormwater Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activities Permit No. GP-0-10-001 (SPDES GP-0-10-001);
- New York State Stormwater Management Design Manual, dated August 2010 produced by the NYSDEC;
- New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005 produced by NYSDEC;
- Delaware River Basin Commission (DRBC) Special Protection Water (SPW) regulations.

The objectives of this SWPPP are to:

1. Outline Owner and Contractor responsibilities to maintain compliance with SPDES GP-0-10-001, including required inspections, maintenance, forms, and certifications.
2. Outline measures to install, inspect, and maintain erosion and sediment control measures for the proposed project. The objective of these measures is to eliminate or significantly minimize pollutant discharges to the adjacent surface water bodies during construction activities.
3. Demonstrate that the post-construction water quality treatment practices as proposed are designed to capture and treat the stormwater runoff from the proposed project.
4. Specify post-construction stormwater management structures on-site such that the proposed peak flows do not exceed the pre-development peak flows, thus providing channel protection, overbank flood control, and control of the peak discharge control from the extreme storm event.
5. Incorporate green infrastructure techniques in order to replicate pre-development hydrology by maintaining pre-construction infiltration, peak runoff flow and discharge volume.
6. Provide a long term inspection and maintenance plan that would ensure the long term operation of the proposed practices.
7. Describe the measures that will be taken to comply with the requirements of the DRBC to maintain the high water quality of the Special Protection Waters of the Delaware River Basin.

2.0 OWNER/APPLICANT'S RESPONSIBILITIES

EPT Concord II, LLC, the "Owner/Applicant", is responsible to ensure that the Contractor installs and maintains the erosion and sediment control measures in accordance with this SWPPP. The Owner/Applicant is also responsible to ensure that the appropriate forms and certifications contained herein are completed prior to and throughout the duration of demolition and construction activities. The Owner/Applicant shall keep a copy of this document, associated attachments, and any inspection reports generated on-site for the duration of the project and for a minimum of 5 years from the date that the site achieves final stabilization. During this time period it is the Owner/Applicant's responsibility to conform to any changes or updates to the current regulations as they apply to the project.

The Owner/Applicant should ensure that the provisions of the SWPPP are implemented from the commencement of construction activity until all areas of disturbance have achieved final stabilization and the Notice of Termination (NOT) has been submitted to the appropriate NYSDEC office.

The Owner/Applicant should maintain a copy of the General Permit (SPDES GP-0-10-001), or latest version, Notice of Intent (NOI), NOI acknowledgement letter, SWPPP and SWPPP Acceptance Form and Inspection Reports at the construction site until all disturbed areas have achieved final stabilization and the Notice of Termination has been submitted to the NYSDEC. The documents must be maintained in a secure location, such as a project trailer, on-site construction office, or mailbox with lock; that is accessible during normal working hours to an individual performing a compliance inspection.

3.0 CONTRACTOR'S RESPONSIBILITIES

The Contractor is responsible for implementing this SWPPP and related project specifications and reviewing all forms, certifications, and contract drawings to become familiar with all aspects related to the SPDES GP-0-10-001. The Contractor shall retain a signed copy of this SWPPP and all associated attachments on-site from the initiation of demolition and proposed construction activities to the date of final stabilization. The Contractor is responsible for completing the certification contained herein Appendix A, prior to the commencement of demolition and proposed construction activities. Each of the Subcontractors involved in the implementation of erosion and sediment control measures must also complete a certification. The Contractor is responsible for each of the Subcontractors employed by the Contractor that are involved in the implementation of erosion and sediment controls or earthwork.

It is the duty of the Contractor to properly install and maintain all erosion and sediment control measures on the site as per this SWPPP. The Contractor shall also be responsible for the inspection of all erosion and sediment control measures for the proposed project by a "Trained Contractor" as per this SWPPP. Should the Owner, an owner's representative, or any local authority having jurisdiction deem that the SWPPP or the Contractor's implementation of the SWPPP proves to be ineffective in eliminating or significantly minimizing the pollutants or achieving the goals of the SPDES GP-0-10-001, the Contractor shall take any necessary action to conform to the objectives of the permit at no additional cost to the Owner.

It is the duty of the Contractor to properly inspect and maintain all erosion and sediment control measures installed on the site as per this SWPPP. Any revision to the SWPPP in design, demolition and construction activities, inspection, or maintenance shall be reflected by the Contractor in the on-site copy of the SWPPP in a timely manner. At the beginning of this work, the Contractor must designate a qualified inspector. The Contractor shall coordinate with the Resident Engineer to ensure that all of the inspection requirements are in conformance with this SWPPP and the requirements of the SPDES GP-0-10-001. On a monthly basis, copies of all inspection forms and maintenance records shall be organized and filed accordingly by the Contractor.

4.0 PRE-DEVELOPMENT CONDITIONS

EPT Concord II, LLC (referred to as "EPT" or the "Applicant") proposes to develop a master planned destination resort community (referred to as "EPT Concord Resort") on approximately 1,538 acres of land located in the Town of Thompson (the "Project Site"), Sullivan County, New York (see Figure 1). When complete, the EPT Concord Resort will include an 18-hole golf course, casino, harness horse racetrack, hotels, RV parks, and an entertainment district with cinemas and supporting retail. In addition, there will be a residential village with a mix of unit types including condos, apartments, townhouses and detached

single family homes, a civic center, a medical home, and an active adult residential community. This mix of uses will be connected via a multi-use trail system with abundant open space.

The Project Site is located in central Sullivan County, New York within the Town of Thompson. Towns and Villages surrounding Thompson include: Liberty, Fallsburg, Mamakating, Forestburgh, Lumberland and Bethel. The Project Site lies to the south and east of Kiamesha Lake in the northeast portion of the Town of Thompson. The Site is generally bordered on the south by New York State Route 17 (NY Route 17), on the west by New York State Route 42 (NY Route 42), on the north by County Route 109 (CR 109 - Kiamesha Lake Road), and on the east by County Route 161 (CR-161 Heiden Road). Figure 1 presents the Proposed Project Location.

4.1 Project Description

PHASE 1 DEVELOPMENT AREA

This SWPPP addresses the development of the Phase 1 Development Area (“Phase 1 Site”). Phase 1 Site is approximately 125 acres and is located in the southern portion of the Project Site. It is bordered by Thompsonville Road on the north and Joyland Road on the east. Monticello Raceway Management, Inc. (MRMI) will lease the property from the Applicant. Thus, MRMI will be the developer of the Casino Resort at the Resort Core with a Casino Hotel, and harness horse racetrack. At present there are no structures or built features on the proposed Phase 1 Site. The parcels are generally characterized as manicured lawns from the Monster Golf Course, with shade trees and wooded borders. A water trap from the golf course use is located on the western portion of Phase 1. Figure 2 presents the Phase 1 Development Area.

The Phase 1 development program will require infrastructure improvements to water supply, stormwater, sanitary services, and site access. Although these improvements will specifically support the Phase 1 development program, they will also be designed to support future development phases of the Proposed Project.

The majority of the proposed site for Phase 1 of the Concord Resort Project is undeveloped land consisting primarily of wooded area and vegetated cover. There is a minimal amount of impervious cover within the Phase 1 Site including the existing roadways flanking the site to the north and east, Thompsonville Road and Joyland Road, respectively. These roadways have an existing pavement width of 24 feet. The only other items contributing to the impervious coverage of the Phase 1 site are the existing single family homes and Breezy Corners Bungalow Colony. There are wetlands and water bodies located on the Phase 1 Site.

4.2 Existing Geology & Soil Conditions

Geologic maps indicate that Phase 1 Site is underlain by bedrock of the Upper and Lower Walton formations of the West Fall Group. This group characterizes the geology of the entire Neversink watershed, and largely consists of sedimentary rocks, including shale, sandstones, and conglomerate covered by glacial till.

The majority of surface material covering bedrock in the Catskills is soil and glacial deposits. Glacial advancement during the Pleistocene Epoch eroded and reduced rock to various forms and sizes, subsequently depositing glacial till as the ice sheets melted and retreated. Maps of unconsolidated deposits show that surficial geology within the Phase 1 Site consists of till and kame. The kame occurs in a narrow north-south band that underlies the Kiamesha Creek valley east of Kiamesha Creek, and the till underlies the site’s higher elevation areas to the west. Characteristics of till include varying texture of clay, silt-clay, or boulder-clay, high impermeability, tendency to be sandy in areas underlain by gneiss or sandstone, varying depths, and potential instability on steep slopes. Kame deposits are formed by glacial meltwater flowing

between a glacier and adjacent valley. Kame is usually found along opposite sides of a glacial valley, as illustrated within the Phase 1 Site where kame deposits border the eastern portion of the site, east of Kiamesha Creek. Kame is a coarse to fine gravel or sand that occurs in thicknesses of 10 to 30 meters.

The following soils are found on the Phase 1 site based on the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Soil Survey of Sullivan County, New York and the geotechnical investigation completed by Melick-Tully and Associates, P.C. (MTA).

4.2.1 USDA Soil Description

The NRCS identifies major classifications of soils that have similar characteristics (such as texture and drainage) into a series. Within each series, soils differ in slope and other characteristics that affect their use. On the basis of these differences, soil series are further divided into phases (soil map units). Different soil phases exhibit variable water storage, erosion potential, and other characteristics that are important from a development perspective.

The upper part of the Phase 1 site consists mainly of Wellsboro and Wurtsboro Series soils which are gravelly loams with a perched water table of approximately 1.5 to 3 feet below the surface. The lower portion of the site consists of Scriba loams, Neversink and Alden soils, Wayland silt loam and Wurtsboro loam. These soils generally have a perched water table of approximately 0.5 to 6 feet.

Table 4-1 contains a complete list of the soil mapping units located within the study area and lists their primary characteristics. The spatial arrangement of these soil types, as mapped by the NRCS Soils Survey of Sullivan County, is shown in Figure D-1. The majority of the soils are categorized as Hydrologic Group C or D soils which are typically indicative of comparatively slower soil permeability as compared to Hydrologic Group A or B soils. The HSG for each soil type found within the pre- or post-development drainage areas is listed on Table 4-2.

**Table 4-1
NRCS Soil Classification**

Symbol	Soil Series Name	Depth to Bedrock	Drainage Characteristics
AoC	Arnot-Oquage complex, 0-15% slopes, very rocky	10-20 inches	Drainage class: shallow and somewhat excessively drained to moderately well drained. Depth to water table: greater than 6 feet. Soil erodibility "K" factor: 0.17-0.24 Permeability: 0.6-2.0 in/hr Hydrologic group: C/D
AoE	Arnot-Oquage complex, 15-35% slopes, very rocky	10-20 inches	Drainage class: shallow and somewhat excessively drained to moderately well drained. Depth to water table: greater than 6 feet. Soil erodibility "K" factor: 0.17-0.24 Permeability: 0.6-2.0 in/hr Hydrologic group: C/D
Fu	Fluvaquents-Udifluvents complex, frequently flooded	Not listed	Drainage class: excessively drained to very poorly drained. Depth to water table: Not listed. Soil erodibility "K" factor: not listed. Permeability not listed. Subject to frequent flooding and stream scour, streambank erosion, and shifting of soil deposits. Hydrologic group not listed; capability subclass Vw.
MrA	Morris loam, 0-3% slopes	More than 60 inches	Drainage class: Somewhat poorly drained soil on till plains or broad, flat hilltop on uplands. Depth to water table: 0.5-1.5 feet Soil erodibility "K" factor: 0.24-0.32 Permeability: <0.2-2.0 in/hr Hydrologic group: C
MrB	Morris loam, 3-8% slopes	More than 60 inches	Drainage class: Somewhat poorly drained soil on the lower parts of concave hillsides on uplands. Depth to water table: 0.5-1.5 feet Soil erodibility "K" factor: 0.24-0.32 Permeability: <0.2-2.0 in/hr Hydrologic group: C
MrC	Morris loam, 8-15% slopes	More than 60 inches	Drainage class: Somewhat poorly drained soil on the lower parts of hillsides on uplands. Depth to water table: 0.5-1.5 feet Soil erodibility "K" factor: 0.24-0.32 Permeability: <0.2-2.0 in/hr Hydrologic group: C
Ne	Neversink loam	More than 60 inches	Drainage class: poorly drained to very poorly drained. Depth to water table: 0 to 6 inches, Dec-Apr. Permeability is moderate in surface and subsurface layers and slow in subsoil and substratum. Surface runoff is slow or very slow. Erosion is a slight hazard. Soil erodibility "K" factor: 0.20-0.28. Hydrologic group D and capability subclass IVw.
Nf	Neversink and Alden soils, very stony	More than 60 inches	Drainage class: poorly drained to very poorly drained. Depth to water table: 0 to 6 inches, Dec-Apr. Permeability not listed. Surface runoff is very slow or intermittently ponded. Erosion hazard not listed. Soil erodibility "K" factor: 0.20-0.24. Hydrologic group D and capability subclass VII.
OeB	Oquaga very silty loam, 3-8% slopes	20-40 inches	Drainage class: Well drained to excessively well drained soil on hilltops on bedrock-controlled uplands. Depth to water table: greater than 6 feet. Soil erodibility "K" factor: 0.20 Permeability: 0.6-2.0 in/hr Hydrologic group: C

**Table 4-1
NRCS Soil Classification**

Symbol	Soil Series Name	Depth to Bedrock	Drainage Characteristics
OgC	Oquaga Oquaga-Arnot complex, 8-15% slopes	20-40 inches	Drainage class: Moderately deep and well drained to excessively drained. Depth to water table: greater than 6 feet. Soil erodibility "K" factor: 0.20 Permeability: 0.6-2.0 in/hr Hydrologic group: C
Ra	Raynham silt loam	More than 60 inches	Drainage class: Somewhat poorly drained soil that formed in water-laid deposits of coarse silt and sands. Depth to water table: 0.5-1.5 feet Soil erodibility "K" factor: 0.49-0.64 Permeability: 0.06-2.0 in/hr Hydrologic group: C
ScB	Scriba loam, 3-8% slopes, stony	More than 60 inches	Drainage class: somewhat poorly drained. Depth to water table: 6 to 18 inches, Feb-Mar. Permeability is moderate or slow above the fragipan and slow in the fragipan. Surface runoff is slow. Erosion hazard is not listed. Soil erodibility "K" factor: 0.20-0.28. Hydrologic group C and capability subclass IIIw.
SrC	Raynham silt loam, 8-15% slopes, stony	More than 60 inches	Drainage class: Very deep, strongly sloping, well-drained soil on the sides and tops of hills. Depth to water table: 2.5-6.0 Soil erodibility "K" factor: 0.20 Permeability: 0.06-2.0 in/hr Hydrologic group: C
Wd	Wayland silt loam	More than 60 inches	Drainage class: poorly drained to very poorly drained. Depth to water table: 0 to 6 inches, Nov-Jun. Permeability is moderate in the surface layer and slow in the subsoil and substratum. Surface runoff is slow. Erosion hazard is not listed. Soil erodibility "K" factor: 0.43. Hydrologic group C/D and capability subclass Vw.
WeA	Wellsboro gravelly loam, 0-3% slopes	More than 60 inches	Drainage class: Very deep, nearly level, moderately well drained soil on till plains. Depth to water table: 1.5-3.0 feet Soil erodibility "K" factor: 0.28 Permeability: 0.06-2.0 in/hr Hydrologic group: C
WeB	Wellsboro gravelly loam, 3-8% slopes	More than 60 inches	Drainage class: moderately well-drained Depth to water table: 18 to 36 inches, Nov-Mar. Permeability is moderate above the fragipan and slow in the fragipan. Surface runoff is slow to rapid. Erosion is a hazard on long slopes. Soil erodibility "K" factor: 0.28. Hydrologic group C and capability subclasses IIw (0-3% and 3-8% slopes) and IIIe (8-15% slopes).
WeC	Wellsboro gravelly loam, 8-15% slopes	More than 60 inches	Drainage class: Very deep, sloping, moderately well drained soil on hillsides. Depth to water table: 1.5-3.0 feet Soil erodibility "K" factor: 0.28 Permeability: 0.06-2.0 in/hr Hydrologic group: C
WIC	Wellsboro and Wurtsboro soils, strongly sloping, extremely stony	More than 60 inches	Drainage class: moderately well-drained. Depth to water table: 18-36 inches, Nov-Mar. Permeability is moderate above the fragipan and slow in the fragipan. Surface runoff is medium or rapid. Erosion hazard is not listed. Soil erodibility "K" factor: 0.24-0.28. Hydrologic group C and capability subclass VIIs.

**Table 4-1
NRCS Soil Classification**

Symbol	Soil Series Name	Depth to Bedrock	Drainage Characteristics
WuA	Wurtsboro loam, 0-3% slopes, stony	More than 60 inches	Drainage class: Very deep, gently sloping, moderately well drained soil on hillsides and hilltops. Depth to water table: 1.0-3.0 feet Soil erodibility "K" factor: 0.28 Permeability: 0.06-2.0 in/hr Hydrologic group: C
WuB	Wurtsboro loam, 3-8% slopes	More than 60 inches	Drainage class: moderately well-drained. Depth to water table: 1 to 3 feet, Nov-Mar. Permeability is moderate to a depth of 26 inches and slow beyond. Surface runoff is medium (3-8% slopes). Erosion is a hazard at 3-8% slopes. Soil erodibility "K" factor: 0.28. Hydrologic group C and capability subclasses Ilw (3-5% slopes).

**Table 4-2
NRCS Soil Classification and Hydrologic Soil Group**

Symbol	Soil Series Name	Hydrologic Soil Group
AoC	Arnot-Oquage complex	C/D
AoE	Arnot-Oquage complex	C/D
MrA	Morris loam	C
MrB	Morris loam	C
MrC	Morris loam	C
Ne	Neversink loam	D
Nf	Neversink and Alden soils	D
OeB	Oquaga very channery silt loam	C
OgC	Oquaga Oquaga-Arnot complex	C
Ra	Raynham silt loam	C
ScB	Scriba Sciba loam	C
SrC	Swartswood gravelly loam	C
Wd	Wayland silt loam	C/D
WeA	Wellsboro gravelly loam	C
WeB	Wellsboro gravelly loam	C
WeC	Wellsboro gravelly loam	C
WIC	Wellsboro and Wurtsboro soils	C
WuA	Wurtsboro loam	C
WuB	Wurtsboro loam	C

4.2.2 Geotechnical Results

MTA’s subsurface investigation included 48 test borings and 41 test pit explorations at the site. Thirty-two (32) borings were completed in the hotel/casino area and 16 borings were completed along the proposed sanitary sewer route. Seven (7) test pits were completed in the area of the racetrack and paddock area and 25 test pits were completed in the casino parking areas. The remaining 9 test pits were completed in the future phase

entertainment village area. Tube permeameter tests were performed at 20 locations and the results are presented in Table 4-3. The laboratory results show that the permeability rate of the soils range from 0.02 inches/hour to 1.9 inches/hour. However, several of the locations demonstrated that with rates greater than 0.5 inches per hour certain green infrastructure practices may be feasible.

The general strata consisted of the following

- Topsoil – A layer of at least 4- to 12-inch thick topsoil was encountered in the majority of the test pits and borings.
- Pavement/Fill – up to 2 feet of fill may be encountered in previously disturbed areas, such as the abandoned camps. Existing pavement in Thompsonville Road are chip seal type construction.
- Silty Sand – Beneath topsoil and fill layers (where present), the natural soils consist of sands and silty sands containing gravel, cobbles and boulders. The top two feet of this sandy soil layer was observed to be loose, most likely due to freeze-thaw cycles. However the deeper sandy soils are very dense to the completion depths of most of the borings. Due to the high silt content and loose nature of the upper 2 feet of this layer as well as the presence of a perched water table, this soil will be highly susceptible to softening and disturbance once subjected to construction equipment traffic.
- Silty/Gravelly Strata – Based on the laboratory grain size testing, several of the soil samples can be classified as silt and/or gravel.
- Sandstone/Siltstone/Claystone Bedrock – relatively sound bedrock was encountered at 20 to 46 feet below grade in the vicinity of the proposed casino structure.

Based on MTA's Subsurface Investigation Report, the majority of soils within the Phase 1 Site are classified as suitable to supporting building foundations. The results of the geotechnical investigation indicate that the proposed buildings within the Phase 1 Site could be supported by conventional shallow foundations of a minimum of four feet below surface grade. Compacted fill may be required for greater bearing pressures in some areas, such as the below-grade parking area. On the basis of their moisture levels, the glacial soils on site could be used as controlled compacted fill, but their high silt content renders the soils susceptible to disturbance from slight changes in moisture. Over-excavation of foundations and a layer of fill materials such as crushed stone or gravel may be beneficial due to the high percentages of fines in the soils and the variation in groundwater levels throughout the site. Variable groundwater levels may necessitate control of groundwater through drains and diversion trenches, in addition to standard dewatering during and after construction. It is anticipated that below-grade walls for lower building levels would require a vertical drainage system to prevent buildup of hydrostatic pressure behind the walls. Bottom floor slabs would require a drainage system to remove water accumulated below.

Table 4-3
Summary of Tube Permeameter Results

Exploration No.	Approximate Surface Elevation (ft)	Approximate Test Depth (ft)	Approximate Permeability (in/hr)
TP-P-1	1,385	2.0	1.3
TP-P-1	1,385	6.0	0.7
TP-P-2	1,414	2.0	0.06
TP-P-3	1,442	2.0	0.6
TP-P-4	1,448	2.0	0.5
TP-P-4	1,448	6.0	0.7
TP-P-5	1,440	1.5	1.9
TP-P-6	1,448	1.5	0.2
TP-P-7	1,446	1.5	0.4
TP-P-8	1,450	1.5	0.4
TP-P-9	1,448	2.0	0.05
TP-P-11	1,368	2.5	0.02
TP-P-12	1,365	2.0	0.1
TP-P-13	1,375	3.5	0.04
TP-P-14	1,388	2.0	0.04
TP-P-15	1,380	2.0	0.06
TP-P-18	1,434	2.0	0.02
TP-P-20	1,454	2.0	0.09

A summary of the depth to season high groundwater, or mottling in the various test pit locations show that the water table varies throughout the site, varying from 0.5 feet below grade to greater than 7 feet. Rock or graded cobbles and boulders were found in several of the deep test pits, where rock refusal occurred as shallow as 4 feet in one or two areas. The confining layers in each test pit are summarized in Table 4-4 and locations can be found on Figure D-2 – Post-Development Stormwater Map.

Table 4-4
Summary of Soil Sample Results

Exploration No.	Depth to seasonal high groundwater table (FT)	Depth to rock (FT)	Total depth (FT)
T-1	3	9	11
T-2	-	7	7
T-3	-	4	4
T-4	-	8	8
T-5	3.5	7.5	7.5
T-6	1.5	7.5	7.5
T-7	-	8	8
P-1	-	7.5	7.5
P-2	-	10	10
P-3	-	-	12
P-4	4.5	11	11
P-5	-	-	12

Table 4-4
Summary of Soil Sample Results

Exploration No.	Depth to seasonal high groundwater table (FT)	Depth to rock (FT)	Total depth (FT)
P-6	-	-	12
P-7	2	5	5
P-8	4.5	-	12
P-9	2	13	13
P-10	7.5	9	9
P-11	-	6	8
P-12	3	6	7.5
P-13	-	8.5	8.5
P-14	-	10	10
P-15	-	-	8
P-16	1.5	-	12
P-17	0.5	-	11
P-18	-	10	10
P-19	1	-	12
P-20	1.5	-	13
P-21	3	-	10
P-22	4	-	12
P-23	1.5	-	11
P-24	1.5	-	11
P-25	2	-	12
R-1	2	-	10
R-2	-	10.5	10.5
R-3	-	11	11
R-4	2	-	12
R-5	1.5	-	12
R-6	4	-	12
R-7	-	-	10
R-8	-	10	10
R-9	6	9	9

4.3 Existing Natural Resources

Several vegetated wetlands and surface drainage channels that connect these wetlands to Kiamesha Creek can be found throughout the Phase 1 development area. However, there aren't any perennial streams or rivers within the project boundary. Kiamesha Creek is the closest perennial watercourse and is located immediately west of the Phase 1 development area.

4.3.1 Wetlands

There are approximately 12 wetlands located within the Phase 1 development area of the Concord Resort Project, see Figure 3. Ten of these wetlands, which range in size from 0.06 acres to 4.57 acres, fall under the jurisdiction of the US Army Corps of Engineers. Two of the larger wetlands (20.53 acres and 40.85 acres) are regulated by NYSDEC

which assigns a 100-foot buffer around its wetlands, see Figure 3. The wetlands located within the Phase 1 development area include several sloped forested red maple wetlands, a depressional forested hemlock wetland, a depressional forested red maple wetland, and several open water ponds/water features within the existing golf course. Figure 4 shows the proposed wetland disturbance.

Most of these wetland areas are patches of wetland habitat located in the flat lower elevations of the site adjacent to Kiamesha Creek. These wetland areas are surrounded by the existing golf course and consist of small forested areas that divide the fairways. The wetlands are interconnected by surface drainage features (ditches) and by culverts that drain the golf course and which eventually discharge downslope to the west towards Kiamesha Creek.

The majority of the Phase 1 development area is upland habitat, either Hemlock forest, Beech-maple forest, or Mowed lawn habitat in the existing golf course fairways.

4.4 Existing Utilities

The Phase 1 Site contains very little existing infrastructure. Water was provided to the few existing buildings on site by private wells. There are no existing public water service mains located within or adjacent to the site. Further, there are no active fire hydrants or storage facilities supporting fire protection for these facilities. Likewise, wastewater removal is handled by individual subsurface septic systems. There is no public sanitary sewer system located within the Phase 1 Site.

While there are no natural gas lines in the vicinity of the Phase 1 Site, New York State Electric and Gas Corporation (NYSEG) currently provides electric service to the Site via overhead wires and poles located along the public roads and within easements on the Site.

Telephone, high speed internet and cable television service is currently provided by Time Warner Cable (TWC) in the area of the Phase 1 Site via overhead wires in the public right-of-way along the major roadways. Verizon provides telephone and high-speed internet service in the area of the Phase 1 Site but does not provide cable television or FIOS services.

4.5 Existing Stormwater

Substantive stormwater infrastructure does not exist within the Phase 1 Site. The existing Phase 1 Site is predominantly undeveloped, consisting mainly of wooded and grassy vegetative cover. The Phase 1 Site presently contains minimal impervious cover from the existing roadways bordering the site and the various buildings and residences which remain on the site from previous uses. Drainage generally flows from the high area located along the western side of Joyland Road to the low lying wetlands and lakes. The elevations on the Phase 1 site range from a high of approximately 1,455 feet along the eastern property line to a low of approximately 1,342 feet in the southwestern corner of the site at the lake adjacent to Thompsonville Road.

Since there is minimal stormwater infrastructure located within the roadway network, the majority of the site runoff travels to the existing wetlands and water bodies via overland flow, natural channels, and through tributary streams and brooks. In some areas, such as along the southern side of Thompsonville Road, man-made swales parallel to the roadway collect and convey the stormwater through culvert crossings. These small (in the range of 8-inch to 24-inch) culverts channel stormwater flows under roadways and driveway crossings. They also serve, in some instances, to maintain the hydrologic connections between wetlands.

4.5.1 Design Points

The existing stormwater runoff corresponding to Phase 1 Site presently discharges to five design points. While some of these design points are pinpointed to a structural element such as a culvert, the majority of the points are defined as the locations at which overland flow enters a wetland or waterbody. See Figure D-1 for the design point location and contributing drainage areas.

A summary table of the areas used for the determination of the weighted curve numbers for both pre- and post-development drainage areas can be found in the HydroCAD analysis in Appendices D and F of this report. Figures D-1 and D-2 show the general impervious coverage and existing land use. Generally, stormwater flows via overland flow across the Phase 1 Site towards the Tannery Brook which ultimately discharges into Kiamesha Creek. Pre-development hydrologic calculations can be found in Appendix D of this report.

5.0 PROPOSED PROJECT DESCRIPTION

Phase 1 of the Concord Resort Project will consist of the construction of a new Casino Resort and 248-room Hotel with a harness race track and 53,409 sf grandstand near the intersection of Thompsonville and Joyland Roads. The proposed project will also include the construction of a 28,361 sf paddock and 16,264 sf maintenance building in support of the racing facilities. Utility infrastructure, stormwater management, lighting and landscaping will be designed and constructed as part of the project.

5.1 Anticipated Permits

The following is a list of anticipated permits for the construction activities associated with the proposed project.

5.1.1 New York State Department of Environmental Conservation

The Project work would disturb more than one (1) acre of land, and NYSDEC has determined that a SPDES permit is required for stormwater discharges based on the Project's potential for contribution to a violation of the water quality standards or for significant contribution of pollutants to surface waters of the state. This requires coverage under the SPDES General Permit for New Construction GP-0-10-001. This SWPPP is being prepared in compliance with the requirements of the New York State Stormwater Management Design Manual.

5.1.2 Town of Thompson

The Applicant must obtain Site Plan Approval from the Town of Thompson Planning Board for the first phase development of the Proposed Project ("Phase 1") that will include a casino, hotel, harness race track and related facilities.

5.1.3 Delaware River Basin Commission (DRBC)

The Delaware River Basin Commission (DRBC) requires applicants located in the drainage area of a Special Protection Water (SPW) to develop a site-specific Non-Point Source Pollution Control Plan (NPSPCP). The objective of the NPSPCP is to describe the Stormwater Management Practices (SMP's) that will be utilized at the Phase 1 Site to control any increase in non-point source pollutant loadings. A SWPPP prepared in

compliance with the NYSDEC SPDES General Permit 0-10-001 would serve as fulfillment of the DRBC NPSPCP requirement.

Table 5-1
Required Permits, Approvals and Involved Agencies

Approval/Permit/Review	Involved/Interested Agency
New York State Department of Environmental Conservation (NYSDEC)	
SPDES for Construction	NYSDEC
Public Water Supply	NYSDEC
Article 15 Protection of Waters	NYSDEC
Article 24 Freshwater Wetland	NYSDEC
Water Quality Certification (Section 401)	NYSDEC
Air Quality Permit	NYSDEC
Threatened and Endangered Species (TES)	NYSDEC
CAFOS	NYSDEC
SPDES Multi-Sector GP Industrial Activity	NYSDEC
Mining Permit Exemption	NYSDEC
Water Withdrawal Permit	NYSDEC
Sewer Extension Approval	NYSDEC
SPDEC General Permit (GP-0-10-001) - SWPPP	NYSDEC
Sullivan County Planning and Environmental Management (SCPEM)	
Project Review (GML 239)	SCPEM
Swimming Pool Approval	SCPEM
Backflow Prevention Application	SCPEM
Town of Thompson	
Approval of Planned Resort Development (PRD) and Comprehensive Development Plan (CDP)	Town Board
Site Plan Approval	Planning Board
Wetlands Permit?	Planning Board
Stripping of Land Approval	Planning Board
Subdivision Approval (as needed)	Planning Board
Water Service Connection?	Department of Public Works (DPW)
Backflow Prevention Application?	DPW
Overall Project Approval	Fire Department
Well Drilling Permit	Building Inspector

Table 5-1
Required Permits, Approvals and Involved Agencies

Delaware River Basin Commission (DRBC)	
Groundwater Withdrawal	DRBC
Discharge of Pollutants	DRBC
Total Dissolved Solids (TSS)	DRBC
New York State Department of Health (NYSDOH)	
Public Water Supply?	NYSDOH
Sewer System Extension?	NYSDOH
New York State Department of Transportation (NYSDOT)	
State Road Improvement	NYSDOT
Traffic Signal at Driveway Entrance	NYSDOT
United States Army Corps of Engineers (USACE)	
Wetlands Permit	United States Army Corps of Engineers (USACE)
New York State Historic Preservation Office (SHPO)	
Section 106 and Section 14.09 Cultural Resources Coordination	SHPO
Total Dissolved Solids (TSS)	DRBC
New York State Racing and Wagering Board	
Section 322 Approval	New York State Racing and Wagering Board
New York State Lottery	
Section 1617A Approval	New York State Lottery

6.0 POST-CONSTRUCTION STORMWATER PRACTICES

Post-construction stormwater practices that provide water quality and quantity control are required to meet pollutant removal goals, reduce runoff volume, reduce channel erosion, prevent overbank flooding, and control extreme floods. These controls help mitigate the effects of development by controlling suspended solids content and peak flows of runoff from developed sites. The NYSDEC has developed unified sizing criteria to size stormwater management measures. The requirement for treatment volume, also referred to as water quality volume (WQv), is to capture and treat the stormwater runoff generated from a 90% rainfall event. The NYSDEC requirements for channel protection volume, overbank flood and extreme storm, the 1, 10 and 100 year, 24-hour storm events.

6.1 Regulations

6.1.1 NYSDEC Sizing Criteria

The following table is representative of the storm design criteria required by the NYSDEC as outlined in the New York State Stormwater Management Design Manual (NYSSMDM).

**Table 6-1
NYSDEC Uniform Sizing Criteria**

Water Quality Volume (WQv)	WQv = Capture and treat runoff from the 90% Rainfall event
Runoff Reduction Volume (RRv)	RRv = Reduction of the total WQv by application of green infrastructure techniques and SMPs to replicate pre-development hydrology.
Channel Protection (Cpv)	Cpv = 24 hour extended detention of post-developed 1-year, 24-hour storm event.
Overbank Flood (Qp)	Control the peak discharge from the 10-year storm to 10-year predevelopment rates.
Extreme Storm (Qf)	Control the peak discharge from the 100-year storm to 100-year predevelopment rates. Safely pass the 100-year storm event.

6.2 Design Approach and Site Planning

Construction of Phase 1 of the Concord Resort Project will result in an increase in the total impervious coverage of the site as compared to the existing condition, and thereby produce greater stormwater volumes and introduce additional pollutants into the runoff. To mitigate the effects of the project, the stormwater management system has been designed in accordance with NYSDEC guidelines to comply with runoff reduction requirements, and provide minimum pollutant removal rates by using Stormwater Management Practices (SMP's) acceptable for water quality and runoff reduction. The development of the stormwater management system for the proposed Phase 1 Site involves the use of green infrastructure practices where feasible.

**Table 6-2
Green Infrastructure Planning General Categories and Specific Practices**

Group	Practice	Description
Preservation of Natural Resources	Preservation of Undisturbed Areas	Phase 1 Site was previously disturbed for substation and utility pole installation, therefore project expansion minimizes potential woodland disturbance.
	Preservation of Buffers	Where possible, the project has been designed to not impact steep slopes or wetland buffers.
	Reduction of Clearing and Grading	The building has been designed as a tiered structure which would work most efficiently with the existing site topography thus minimize areas of clearing and grading to the greatest extent possible.
	Locating Development in Less Sensitive Areas	The proposed resort and related amenities have been sited to avoid sensitive resource areas such as flood plains, wetlands and their buffers,
	Open Space Design	Not applicable to commercial development.

Table 6-2

Green Infrastructure Planning General Categories and Specific Practices

	Soil Restoration	Prior to final site stabilization the on-site soils would be modified or restored in order to reintroduce oxygen into compacted soils and improve the water storage within the soil which would subsequently help reduce runoff through infiltration and evapotranspiration.
Reduction of Impervious Cover	Roadway Reduction	The proposed roads will be constructed based on the required safe travel lane width of 12 feet.
	Sidewalk Reduction	N/A
	Driveway Reduction	This practice was not practical because proposed project is located on a commercial site.
	Cul-de-sac Reduction	At the main entrance drive a green landscaped area is proposed in the center of the turnaround, thereby reducing the total impervious surface coverage.
	Building Footprint Reduction	The proposed casino, hotel and garage have been designed to minimize the building footprint by designing multi-level parking garage and hotel.
	Parking Reduction	A multi-level parking garage is proposed within the main building structure, thereby reducing the surface area required for at-grade parking.

Table 6-3
Soil Restoration

Type of Soil Disturbance	Soil Restoration Requirement		Comments/Examples
No soil disturbance	Restoration not permitted		Preservation of Natural Features
Minimal soil disturbance	Restoration not permitted		Clearing and grubbing
Areas where topsoil is stripped only - no change in grade	HSG A & B	HSG C&D	Protect area from any ongoing construction activities.
	apply 6 inches of topsoil	Aerate* and apply 6 inches of topsoil	
Areas of cut or fill	HSG A & B	HSG C & D	
	Aerate and apply 6 inches of topsoil	Apply full Soil Restoration **	
Heavy traffic areas on site (especially in a zone 5-25 feet around buildings but not within a 5 foot perimeter around foundation walls)	Apply full Soil Restoration (de-compaction and compost enhancement)		
Areas where Runoff Reduction and/or Infiltration practices are applied	Restoration not required, but may be applied to enhance the reduction specified for appropriate practices.		Keep construction equipment from crossing these areas. To protect newly installed practice from any ongoing construction activities construct a single phase operation fence area

6.2.1 Water Quality Volume

The Water Quality Volume (WQv) was calculated for each proposed drainage area. The calculation is based on the 90% rainfall event. Back-up calculations can be found in Appendix E of this report.

Table 6-4
Water Quality Volume Summary Table

Drainage Area No.	Drainage Area	Percent Impervious Area	WQv (CF)
1A	29.16	49.55	63,001
2 & 3	10.80	57.27	26,605
6 & 1B	26.66	42.22	49,935
4A	8.01	54.58	18,879
5	6.32	28.84	8,524

6.2.2 Green Infrastructure Techniques and Standard SMPs with RRv Capacity

Along with treating the water quality and quantity for the major storm events on the proposed Phase 1 Site, the NYSSMDM requires the applicant to achieve a runoff reduction volume. This volume is achieved through infiltration, groundwater recharge, reuse, recycle, evaporation/evapotranspiration of 100 percent of the post-development water quality volumes to replicate pre-development hydrology by maintaining pre-construction infiltration, peak runoff flow, discharge volume, as well as minimizing concentrated flow. This requirement can be accomplished by application of on-site green infrastructure techniques, standard stormwater management practices with runoff reduction capacity, and good operation and maintenance. The following Green Infrastructure techniques are proposed for the project and their locations are shown on Figure 5.

Green Infrastructure Technique 7: Rain Gardens/Bioretenion Basins

Raingardens/bioretenion basins have been designated on the Phase 1 Site in areas downstream of paved parking areas, between driveways, and adjacent to buildings where there is sufficient space to provide the necessary treatment area.. Each area is designed to capture and treat this surface runoff before discharging into an adjacent proposed stormwater conveyance system. These areas are designed to achieve pollutant treatment, groundwater recharge, and micro-scale habitat.

Infrastructure Technique 11: Porous Pavement

Certain parking areas on the Phase 1 Site have been designed with porous pavement in order to decrease stormwater runoff and promote on-site infiltration. Porous asphalt pavement would be proposed in several of the parking surface as shown on Figure 5. These areas would help to reduce stormwater runoff and improve water quality and quantity downstream.

6.2.3 Runoff Reduction Volume Comparison

In order to achieve the requirements for the Runoff Reduction Volume (RRv), the proposed Phase 1 Site must use green infrastructure techniques and practices to meet the required water quality volume (WQv) as determined in the NYSSMDM. . However due to limiting site conditions the WQv could not be achieved using the green infrastructure practices. The major limiting conditions are the proposed slopes, building footprint, and poor infiltrative capacity of the soils.

In this case, the NYSSMDM states that if a project is not able to achieve runoff reduction to the pre-construction condition, it must at a minimum; reduce a percentage of the runoff from impervious areas to be constructed on-site. The percent reduction is based on the Hydrologic Soil Group(s) (HSG) of the site.

The Phase 1 Site is located in HSG C and D soils, and therefore the percent reduction factor is 0.30 and 0.20, respectively. The reduction factor for this site decreases the required RRv water quality volume for each drainage area.

By providing rain gardens/bioretenion basins and porous pavement, the project would likely meet the requirements of the RRv based on the Specific Reduction Factor as outlined in Section 4 of the NYSSMDM.

6.3 Design Analysis

In order to evaluate the pre- and post-development drainage conditions, five Design Points were chosen based on the pre-development hydrology; Design Point 1 through 5 were analyzed to evaluate the effects of the proposed development on stormwater runoff. The pre- and post-development contributing drainage areas, USDA soil boundaries, and Tc flow paths are shown on Pre- and Post-Development Stormwater Maps, Figure Nos. D-1 and D-2.

To analyze the peak flow in pre- and post-development conditions HydroCAD®, a computer aided design tool is used to evaluate and analyze the stormwater runoff from the site. The program also models the surface flow through the proposed stormwater practices determining the plug-flow and center-of-mass detention time within the ponds. A simultaneous routing process is used to evaluate the impacts associated with stormwater practices in series. The program is based on United State Department of Agriculture, Natural Resources Conservation Service (NRCS) Technical Releases TR20 and TR55. TR55 and TR20 are tools that were developed to calculate the volume and peak discharge rates of stormwater runoff generated in different rainfall events over a 24-hour period. Runoff volumes and rates are calculated by determining the curve numbers (CN) and calculating the time of concentration (Tc) for each subcatchment area depending on the given rainfall value. The CN values are based on the TR55 table and the hydrologic soil group, cover type, hydrologic condition and antecedent runoff condition. The Tc represents the time it takes for surface water to travel the hydraulically most distant point within the subcatchment area. The post-development hydrologic analysis can be found in Appendix F.

The following rainfall values for Sullivan County, shown in Table 6-6, were used in the analysis. For the purposes of the hydrologic analysis the runoff was based on Type III rainfall distribution for the northeast region. The following rainfall values are based on the 24-hour storm event. These values represent the rainfall distribution for various 24-hour storm frequencies.

**Table 6-5
Rainfall Values**

Rainfall Value (inches)	24-hour Storm Event (Year)
3.2	1
5.0	10
8.0	100
Source: Northeast Regional Climate Center	

Different types of ponds are proposed throughout the site to capture and treat the stormwater runoff. In addition to stormwater treatment the proposed ponds will also attenuate the larger storm events thereby reducing the total runoff flow to the predevelopment conditions. The common elements to each of the ponds are as follows:

- Outlet control structure – The pre-cast concrete structure is designed with a low flow orifice that would detain the 1-year, 24-hour storm event for a minimum of 24 hours, meeting the NYSDEC requirements. The larger storm events would also be conveyed through an opening at the top of the outlet control structure designed to attenuate the larger storm events. The outlet control structure is located within the pond embankment.

- Pond Drain – An adjustable gate valve located within the outlet control structure will allow for the owner/operator to drawdown the pond within 24 hours.
- Pond safety features are provided as the proposed side slopes are 5:1 (Horizontal: Vertical), greater than the required 3:1.
- Side slopes on Pond 1 are 5:1 (H:V), 20%.
- A forebay would be provided at each inlet point. This would provide primary settling for the larger particulates. The sediment forebay would be sized to contain 10% of the WQv. The depth of the forebay is four feet. The outfall from the inlet pipe would be stabilized with rip rap to minimize erosion of the ponds' sideslopes. A fixed depth marker would be installed to assist in the long term inspection and maintenance plan. This would help determine the depth of sediment accumulation and when maintenance is required.
- The pond buffer is greater than 25 feet.
- A maintenance access path will be provided.
- An emergency overflow spillway will be provided.
- Energy Dissipater - Rip-Rap will be used at the downstream end of the culvert leaving the outlet control structure to prevent erosion and scouring.
- Vegetation – Landscape plans would be designed in order to establish wetland plants within shallow areas of the permanent pool areas. The plan would incorporate various grass species for the sideslopes and emergent wetland species. The plant variety would provide treatment through nutrient uptake. Minimum elements of a plan include: delineation of pondscaping zones, selection of corresponding plant species, planting plan, sequence for preparing the wetland bed and sources of plant material.

6.3.1 Design Point 1

As a result of the proposed site development the proposed development area contributing to Design Point 1 is altered so that the contributing drainage area is now directed to Design Point 2. Therefore, there is a net decrease in flow to the design point.

6.3.2 Design Point 2

Design Point 2 is comprised of contributing Drainage Areas 1A, 8 and 9 as shown on Figure D-2 – Post-Development Stormwater Map. The stormwater from the proposed surfaces would be collected and conveyed through deep sump catch basins before being released into the proposed pond. This pond is designed to treat for water quality and quantity concerns before discharging stormwater to the adjacent wetland. The Extended Detention Shallow Wetland was selected for the proposed treatment and quantity control due to the depth to the seasonal water table and the 29-acre contributing drainage area.

The stormwater pond is designed to capture and treat the stormwater runoff from the 90% rainfall event in accordance with NYSDEC requirements for treatment of phosphorous pollutants. This stormwater pond also provides attenuation of peak flows

from the larger storm events. The pond is referred to as Pond 1 (1-P) in the HydroCAD® analysis and on the large scale drawings.

Pond 1 - Proposed Extended Detention Shallow Wetland (W-2 per the NYSSMDM)

- Contributing Drainage Area DA-1A to Pond 1 is approximately 1,270,318 SF (29.162 Acres).
- DA-1A consists of pavement and soils within HSG C and D. HSG C and D are silty loam soils therefore, a pond liner would not be necessary.
- The groundwater depth within DA-1A is located approximately 3’ below the existing grade.
- The permanent pool depth for pond 1 would be 2.5 FT, at elevation 1372.5 feet.
- The permanent pool volume for Pond 1 is approximately 150,226 CF.
- The water quality volume for Pond 1 is approximately 63,001 CF.
- The 100-year flood elevation for Pond 1 is approximately located at elevation 1,378.2, meeting the requirement of free board of 1 foot or more.
- A forebay volume of approximately 6,300 CF (10% of the WQv) would be provided.
- Length to width ratio is approximately 1:3. The design also meets the minimum surface area to drainage area ratio of 1:100.
- Micropool - A micropool would be provided at the outlet in order to protect the low flow pipe from clogging and prevent sediment resuspension. This area would range from four to six feet in depth.

The HydroCAD analysis was performed with the assumption of a permanent pool as the starting water surface elevation. Pursuant to the design requirements of the micropool extended detention pond a permanent pool is required and the overall function of the water quality treatment is improved when the water table is intercepted.

Table 6-6
Comparison of Pre- and Post-Development Conditions – Design Point 2

		Pre-Development DP-2	Post-Development DP-2
1 – Year Storm	Flow (cfs)	6.44	3.56
	Volume (CF)	61,725	158,297
10 – Year Storm	Flow (cfs)	38.39	28.73
	Volume (CF)	314,634	584,227
100 – Year Storm	Flow (cfs)	60.75	51.09
	Volume (CF)	493,056	859,265

6.3.3 Design Point 3

Design Point 3 is an existing 24 inch diameter pipe conveying flows northerly across Thompsonville Road ultimately connecting to Kiamesha Creek. Stormwater runoff from contributing Drainage Areas 1B and 6 are conveyed to Proposed Pond 6 ultimately

discharging to Design Point 3 via a culvert pipe that conveys flow under the proposed race track. Drainage Areas 2 and 3 are conveyed to proposed Pond 3, which also conveys flow to Design Point 3, see Figure D-2 – Post-Development Stormwater Map.

The stormwater pond is designed to capture and treat the stormwater runoff from the 90% rainfall event in accordance with NYSDEC requirements for treatment of phosphorous pollutants. This stormwater pond also provides attenuation of peak flows from the larger storm events. The pond is referred to as Pond 6 (6-P) in the HydroCAD® analysis and on the large scale drawings.

Table 6-7
Comparison of Pre- and Post-Development Conditions – Design Point 3

		Pre-Development DP-3	Post-Development DP-3
1 – Year Storm	Flow (cfs)	21.13	14.02
	Volume (CF)	153,810	358,586
10 – Year Storm	Flow (cfs)	113.57	68.96
	Volume (CF)	736,381	1,088,303
100 – Year Storm	Flow (cfs)	175.38	107.49
	Volume (CF)	1,138,876	1,560,581

Pond 6 - Proposed Pond/Wetland System (W-3 per the NYSSMDM)

- This pond is designed to treat for water quality and quantity concerns before discharging stormwater to the Design Point 3. The Pond/Wetland System (W-3) was selected for the proposed treatment and quantity control due to the depth to the seasonal water table and the 34+ acre contributing drainage area.
- Contributing Drainage area (DA-1B & DA-6) to Pond 6 is approximately 1,500,390 SF (34.444 Acres).
- DA-1B consist mostly of roof area and pavement and DA-6 consists mostly of soils within hydrologic group C and D. Hydrologic soil C and D are Silty Loam soils therefore, a pond liner would not be necessary.
- The groundwater depth within DA-6 is located approximately 1.5’ below the existing grade.
- The permanent pool depth for pond 6 is 3 FT, at elevation 1363.
- The permanent pool volume for pond 4 is approximately 303,797 CF.
- The water quality volume for pond 6 is approximately 49,935 CF.
- The 100 year flood elevation for pond 6 is approximately located at elevation 1,366.8, thus having a free board of approximately 1.2 feet.
- Length to width ratio of Pond 6 is approximately 1:4. The design also meets the minimum surface area to drainage area ratio of 1:100.

- Pond 6 forebay volume would be approximately 4,994 CF.

Pond 3 – Micro-pool Extended Detention Pond (P1)

- Drainage area contributing (DA-2 & DA-3) to pond 3 is approximately 694,928 SF (15.653 Acres).
- DA-2 consist mostly of pavement and roof and DA-3 consist mostly of soils within hydrologic group C and D. Hydrologic soil C and D are Silty Loam soils therefore, Pond liner would not be necessary.
- The groundwater depth within DA-3 is located approximately 3' below the existing grade.
- The permanent pool depth for Pond 3 is 2.5 FT, at elevation 1360.5.
- The permanent pool volume for Pond 3 is approximately 62,493 CF.
- The WQv for Pond 3 is approximately 49,935 CF, therefore more than 100% of the WQv would be captured within the permanent pool.
- The 100 year flood elevation for Pond 3 is approximately located at elevation 1,366.5, thus having a free board height of approximately 1.5 feet.
- Pond 3 forebay volume is approximately 4,994 CF.
- Rip-Rap will be used at the downstream end of the culvert leaving the outlet control structure to prevent erosion.
- Length to width ratio of pond 3 is approximately 2.5:1 meeting the requirements of 2:1.

6.3.4 **Design Point 4**

Design Point 4 is an existing man made pond located adjacent to Tannery Brook. Stormwater runoff from contributing Drainage Areas 4A and 4B is conveyed to Proposed Ponds 4A and 4B. Pond 4A is designed to treat the stormwater runoff from the WQv and Pond 4B would provide attenuation of the larger storm events, see Figure D-2.

Pond 4A – Pocket Pond (P5)

- Drainage area contributing (DA-4A) to pond 4A is approximately 348,816 SF (8.008 Acres).
- DA-4A consist of roof area and pavement and soils within hydrologic group C and D. Hydrologic soil C and D are Silty Loam soils therefore, Pond liner would not be necessary.
- The groundwater depth within DA-4A is located approximately 3.5' below the existing grade.
- The permanent pool depth for the pond is 3.2 FT, at elevation 1,345.2.
- The permanent pool volume for the pond is approximately 10,041 CF.
- The water quality volume for the pond is approximately 18,879 CF.
- The 100 year flood elevation for pond 4A is approximately located at elevation 1,346.4, thus having a free board of approximately 1.6 feet.

- Pond 4A forebay volume is approximately 1,888 CF.
- Length to width ratio of pond 4A is approximately 4.5:1.

Table 6-8
Comparison of Pre- and Post-Development Conditions – Design Point 4

		Pre-Development DP-4	Post-Development DP-4
1 – Year Storm	Flow (cfs)	10.46	9.41
	Volume (CF)	54,668	70,524
10 – Year Storm	Flow (cfs)	53.58	52.94
	Volume (CF)	252,866	268,112
100 – Year Storm	Flow (cfs)	82.18	75.29
	Volume (CF)	388,425	397,659

6.3.5 Design Point 5

Design Point 5 is an existing 12 inch diameter culver that conveys stormwater runoff northerly across Thompsonville Road ultimately discharging into Kiamesha Creek. Stormwater runoff from contributing Drainage Area 5 is conveyed to Proposed Pond 5.

Pond 5 – Pocket Pond (P5)

- Drainage area contributing (Drainage Area 5 – DA-5) to Pond 5 is approximately 275,346 SF (6.321 Acres).
- Soils within DA-5 consist mostly of soil within hydrologic group C and D. Hydrologic soil C and D are Silty Loam soils therefore, Pond liner would not be necessary.
- The groundwater depth within DA-5 is located approximately 3.5’ below the existing grade.
- The permanent pool depth for the pond is 2.5 FT, at elevation 1352.5.
- The permanent pool volume for the pond is approximately 9,056 CF.
- The water quality volume for the pond is approximately 8,524 CF.
- The 100 year flood elevation for the pond is approximately located at elevation 1,358.3, thus having a free board of approximately 1.7 feet.
- Pond 5 forebay volume is approximately 852 CF.
- Length to width ratio of the pond is approximately 1.5:1.

Table 6-9
Comparison of Pre- and Post-Development Conditions – Design Point 5

		Pre-Development DP-5	Post-Development DP-5
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1 – Year Storm	Flow (cfs)	4.08	0.16
	Volume (CF)	22,041	23,174
10 – Year Storm	Flow (cfs)	19.85	2.58
	Volume (CF)	98,489	88,950
100 – Year Storm	Flow (cfs)	30.16	3.72
	Volume (CF)	150,282	131,594

6.4 Summary

The peak flows have been reduced through the implementation of green infrastructure and a micropool extended detention pond. The post-development peak flows are less than the pre-development conditions. Therefore it has been demonstrated that the proposed stormwater management system mitigates the impacts associated with the proposed projects. By decreasing the peak flow to values less than predevelopment conditions, the potential impacts to the downstream wetland has been mitigated.

6.4.1 Non-structural Stormwater Best Management Practices

Below is a list of nonstructural stormwater management practices that would be implemented throughout the Phase 1 Site:

- Long term soil stabilization through landscaping and maintenance in the developed areas. Prevention of soil loss, through establishment of vegetation and a landscape plan that would increase the amount of tree canopy and healthy ground cover. The landscape plan would also maximize the travel time of stormwater runoff and minimize concentrated flows.
- The grounds maintenance program limits the potential for excessive nutrient loading, specifically controlling the application of phosphate-based fertilizers.
- A high level of maintenance and good housekeeping practices would be implemented for both the driving and parking surfaces located throughout the Phase 1 Site.
- Catch basins would contain deep sumps and a hood would be installed at the downstream end of all proposed catch basins. This would trap floatables and debris within the catch basin. The deep sumps would trap the petroleum and antifreeze attached to sediment particles. The accumulated material would be cleaned out of the catch basins in accordance with the long term inspection and maintenance plan.
- The area along the southwest property line would be designed to convey overland stormwater through a grassed swale before being collected into downstream yard drains. This would allow for sediment deposition and promote infiltration.

7.0 TEMPORARY EROSION AND SEDIMENT CONTROLS

The proposed project would require excavation of soil and the grading, which would result in the exposure of soil to natural forces. Several soil types located on the Phase 1 Site have moderate to severe erosion potential, including shallow depth to the seasonal groundwater table. If not properly managed, the temporary exposure of bare soil accelerates the potential for erosion. This acceleration in soil erosion could potentially lead to siltation of off-site wetlands, ponds, and off-site watercourses. This has the

potential to cause a reduction in surface water quality. Measures to avoid impacts from the proposed project are discussed below.

A 5-acre waiver request will be necessary for this project due to the proposed cut and fill balances and overall construction timeline.

As the design of the proposed project has progressed, the cut/fill calculations have determined that excess earth material to be excavated from the construction site would require deposition elsewhere off-site.

7.1 Erosion and Sediment Control Practices

The following are specific erosion control measures as identified in the large scale drawings prepared for this project. Please refer to the large scale Erosion and Sediment Control drawing in Appendix C.

7.1.1 Stabilized Construction Entrance / Exit (SCE)

The construction entrance/exit shall have a stabilized aggregate pad underlain with filter cloth to prevent construction vehicles from tracking sediment off-site. Stabilized construction entrances are located at specific transition areas between concrete/asphalt to exposed earth.

7.1.2 Silt Fence

Silt fence shall be installed on the down gradient edge of disturbed areas parallel to existing or proposed contours or along the property line as perimeter control. Silt fence are to be used where stakes can be properly driven into the ground as per the Silt Fence detail in the New York State Standards and Specifications for Erosion and Sediment Control and as shown on the drawings (See large scale drawings Appendix C).

Silt fence controls sediment runoff where the soil has been disturbed by slowing the flow of water and encouraging the deposition of sediment before the water passes through the silt fence. Built-up sediment shall be removed from silt fences when it has reached one-third the height of the fence and properly disposed.

7.1.3 Storm Drain Inlet Protection

Inlet protection shall be installed at all inlets where the surrounding area has been disturbed. The inlet protection shall be constructed in accordance with NYSDEC Standards and Specifications for Erosion and Sediment Control. Typically they should be constructed to pass stormwater through, but prevent silt and sediment from entering the drainage system.

7.1.4 Soil Stockpile Detail

Stockpiled soil is to be protected, stabilized, and sited in accordance with the Soil Stockpile Detail, as shown on the detail sheets. Soil stockpiles and exposed soil shall be stabilized by seed, mulch, or other appropriate measures, when activities temporarily cease during construction for 7 days or more in accordance with NYSDEC requirements.

7.1.5 Dust Control

During the demolition and construction process, debris and any disturbed earth shall be wet down with water, if necessary to control dust. After demolition and construction activities, all disturbed areas shall be covered and/or vegetated to provide for dust control on the site.

7.1.6 Temporary Seeding and Stabilization

In areas where demolition and construction activities, clearing, and grubbing have ceased, temporary seeding or permanent landscaping shall be performed to control sediment laden runoff and provide stabilization to control erosion during storm events. Other methods of soil stabilization methods besides temporary seeding include rolled erosion control product, hydro-seeding or hydro-mulching. This temporary seeding/stabilization or permanent landscaping shall be in place no later than 7 days after demolition and construction activity has ceased.

7.1.7 Sump Pit

A temporary pit is constructed to trap and filter water for pumping to a suitable discharge area. The purpose is to remove excessive water from excavations. Sump pits are constructed when water collects during the excavation phase of construction.

7.1.8 Dewatering

Due to the depth of excavation for the building foundation and proximity to on-site watercourses and wetland areas, there may be areas of construction where the groundwater table would be intercepted and dewatering activities would take place. Site-specific practices and appropriate filtering devices should be employed by the contractor so as to avoid discharging turbid water to the surface waters of the State of New York.

A portable sediment tank may be used in conjunction with other practices that would settle and filter the sediment from the stormwater runoff. The sediment tank is a compartmented tank container to which sediment laden water is pumped to trap and retain the sediment. The purpose of the tank is to trap and retain sediment prior to pumping the water to drainage ways, adjoining properties, and right-of-ways. In conjunction with the portable sediment tank, the mechanical filtering devices may be necessary to filter out the finer particulates. A permit may be required for such activities; therefore the contractor must coordinate with the resident engineer.

7.1.9 Perimeter Dike/Swale

The purpose of a perimeter dike/swale is to prevent off-site storm runoff from entering a disturbed area and to prevent sediment laden storm runoff from leaving the construction site or disturbed area. It can be used to convey stormwater runoff from the work area to a proposed sediment basin.

7.1.10 Stone Check Dam

The purpose of a check dam is to slow the rate of channelized flow in order to reduce erosion and allow for sediment deposition. A check dam is typically constructed out of stone and filter fabric and is positioned perpendicular to the flow of stormwater. This is typically a temporary measure before permanent stormwater controls are installed.

7.1.11 Temporary Sediment Basin

The purpose of a sediment basin is to intercept sediment-laden runoff and filter the sediment laden stormwater runoff leaving the disturbed area in order to protect drainage ways, properties, and rights-of-way below the sediment basin. The basin would be installed down gradient of construction operations which expose critical areas to soil erosion. A low flow dewatering device may be used to restrict the outflow rate from the

temporary sediment basin. The basin shall be maintained until the final stabilization is achieved.

7.1.12 Rip Rap Outlet Protection

Rip rap outlet protection would be installed at the outlet of all on-site stormwater piping. The purpose of the rip rap is to reduce flow rates, prevent scouring, and allow for sediment deposition. Outlet protection is important to the longevity of the development by helping to prevent future erosion and stabilize the discharge point.

7.1.13 Materials Handling

The Contractor must store construction and waste materials as far as practical from any environmentally sensitive areas. Where possible, materials shall be stored in a covered area to minimize any potential runoff. The Contractor shall incorporate storage practices to minimize exposure of the materials to stormwater, and spill prevention and response where practicable. Prior to commencing any construction activities the contractor shall obtain all necessary permits or verify that all permits have been obtained.

7.2 Sequence of Construction

The phasing of the project is important for the construction of the proposed development. The protection of the natural resources, specifically the watercourse and wetland areas, have also been carefully factored into the development of the sequence of construction.

A pre-construction meeting shall be held with representatives of the Town, the Resident Engineer, and the Contractor prior to any site disturbance. Any potential changes to the Erosion and Sediment Control Plan should be discussed at this time.

7.2.1 Sequence of Construction Activities

1. A pre-construction meeting shall be held with representatives of the town, certified professional trained contractor, the resident engineer, and the contractor prior to any site disturbance.
2. Prior to clearing and grubbing activities the contractor shall install stabilized construction entrance / exit as well as the construction laydown area as shown on the plan and in accordance with details.
3. Install silt fence as indicated on the erosion and sediment control plan.
4. Clear and grub area of proposed temporary sediment basins only. The contractor should take care to minimize clearing and grubbing activities throughout the site. Until the temporary sediment basin (TSB) is installed and appropriately stabilized. Topsoil shall be stockpiled on-site as shown on drawing. Soil stockpile should be located on grassy areas in accordance with detail.
5. Rough grade proposed temporary sediment basin and associated stormwater structures. Install 6" of topsoil, seed, and stabilize with rolled erosion control product (RECP). Install temporary outlet control structure.
6. Install perimeter dike/swale starting at the temporary sediment basins as shown on plan.
7. Install perimeter dike /swale in the area of the employee parking area to divert 'clean' runoff from undisturbed areas.

8. Begin clearing and grubbing in the area of the proposed building footprint. Stockpile fill material in designated area as shown on plan.
9. Begin construction of building and associated driveway and stormwater infrastructure.
10. Install inlet protection as shown in plans and in accordance with details.
11. Once building and paved surfaces are complete, complete final grading in adjacent areas. Stabilize with rolled erosion control product or proceed with landscape plan.
12. The Contractor shall amend the soils in conformance with the protocols outlined in the NYSDEC 'Deep Ripping and Decompaction' report dated April 2008.
13. Complete final grading in basin and install vegetation in accordance with landscape plan.
14. Once final grade is achieved in proposed landscaped areas temporary seeding and mulching shall be done immediately.

7.3 Inspections and Record Keeping During Construction

Once the contract has been let, the name, address, and phone number of responsible parties for maintenance would be provided to the NYSDEC. The following is a description of the maintenance and inspection practices that would be implemented as part of the project. Maintenance and inspection is important to ensure that the stabilization and structural practices that are part of the SWPPP continue to be effective in preventing sediment and other pollutants from entering the stormwater system. It is the responsibility of the owner or operator to ensure that inspections are completed in accordance with NYSDEC regulations.

7.3.1 Erosion and Sediment Control Inspection Report

Inspection and maintenance is important to ensure that the erosion and sediment control practices that are part of the SWPPP continue to be effective in preventing sediment and other pollutants from entering the stormwater system. It is the responsibility of the owner to ensure that inspections are completed in accordance with SPDES GP-0-10-001.

As a part of the SWPPP inspection and maintenance activities during construction, the Erosion and Sediment Control Inspection Report shall be updated and kept on-site. A sample Erosion and Sediment Control Inspection Report is provided in Appendix H of this report.

Inspections would be conducted by the qualified inspector periodically according to the schedule required by the SPDES GP 0-10-001. During each inspection, the qualified inspector would record the areas of disturbance, deficiencies in erosion and sediment control practices, required maintenance, and areas of temporary or permanent stabilization. The need for modifications to the Erosion and Sediment Control Plan would be identified and implemented immediately.

The Erosion and Sediment Control Inspection Report would be completed by a qualified inspector to fully document each inspection. A qualified inspector is a person knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), licensed Landscape Architect, or other NYSDEC endorsed individual(s). It also means someone working under the direct supervision of the licensed Professional Engineer or licensed Landscape Architect, provided the person has training in the

principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that an individual performing the site inspection has received four hours of training, which has been endorsed by the NYSDEC, from a Soil and Water Conservation District, CPESC, Inc., or other NYSDEC endorsed entity, in proper erosion and sediment control principles no later than two years from the date SPDES GP-0-10-001 is issued. After receiving the initial training, an individual working under the direct supervision of the licensed Professional Engineer or licensed Landscape Architect shall receive four hours of training every three years.

7.3.2 Inspections

Inspections shall be conducted by the qualified inspector periodically according to the following schedule:

1. When construction activities are ongoing, the qualified inspector shall conduct a site inspection at least once every seven (7) calendar days.
2. When construction activities are ongoing and the owner or operator has received authorization in accordance with Part II.C.3 of GP-0-10-001 to disturb greater than five acres of soil at any one time, the qualified inspector shall conduct at least two site inspections every seven calendar days. When performing two inspections every seven calendar days, the inspections shall be separated by a minimum of two full calendar days.
3. If soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the qualified inspector shall conduct a site inspection at least once every thirty (30) calendar days. The owner or operator shall notify the Regional Office stormwater contact person in writing prior to reducing the frequency of inspections.
4. If soil disturbance activities have been shut down with partial project completion, the qualified inspector can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved final stabilization and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The owner or operator shall notify the Regional Office stormwater contact person in writing prior to the shutdown. If soil disturbance activities have not resumed within 2 years from the date of shutdown, the owner or operator shall have the qualified inspector(s) perform a final inspection and certify that all disturbed areas have achieved final stabilization, and all temporary, structural erosion and sediment control measures have been removed, and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the “Final Stabilization” and “Post-Construction Stormwater Management Practice” certification statements on the Notice of Termination (NOT). The owner or operator shall then submit the completed NOT form in accordance with NYSDEC regulations.

During each inspection, the qualified inspector should fill out the Erosion and Sediment Control Inspection Report as directed below:

On the Erosion and Sediment Control Inspection Report site map show the following:

- Disturbed site areas and drainage pathways.

- Site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period.
- Site areas that have undergone temporary or permanent stabilization.
- In areas where soil disturbance activity has been temporarily or permanently ceased, temporary and/or permanent soil stabilization measures shall be installed and/or implemented within seven (7) days from the date the soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control.
- Photographs, including date stamp, of any deficiencies and recommendations.
- As deficiencies are fixed by the contractor, a photograph, include date stamp, should be included in the report.
- Photograph of each outfall during a rain event.

Record the following information on the Erosion and Sediment Control Inspection Report:

- For each structural measure, circle YES, NO, or N/A (not applicable) to indicate if the pollutant control measure is in conformance with specifications.
- For each structural measure, circle YES, NO, or N/A to indicate whether the structural measure is performing effectively in minimizing stormwater pollution.
- Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of the sediment storage volume in the allocated location on the Inspection Form Chart (i.e., 10 percent, 20 percent, and 50 percent).
- A description of the condition of the runoff at all points of discharge from the construction site. This shall include identification of any discharges of sediment from the construction site. Include discharges from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;
- A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any discharges of sediment to the surface waterbody;

The qualified inspector would give a brief explanation for all locations where he/she has noted that the structural practice was either not in conformance with specifications or in need of repair. This should be noted in the Erosion and Sediment Control Inspection Report. The qualified inspector would then give a brief recommendation for soil erosion and sediment control practices that were not installed properly or are not functioning as designed and need to be reinstalled or replaced.

7.3.3 Erosion and Sediment Control Maintenance Measures

All maintenance described below shall be completed in accordance with the New York State Standards and Specifications for Erosion and Sediment Control. Any material removed from erosion and sediment control measure shall be properly disposed.

All measures would be maintained in good working order; if repairs are found to be necessary, the qualified inspector shall notify the owner or operator and appropriate

contractor (and subcontractor) of any corrective actions needed within one business day. The contractor (or subcontractor) shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

A maintenance inspection report, titled “Erosion and Sediment Control Inspection Report,” would be made after each inspection conducted by a qualified inspector.

Disturbed areas and materials storage areas would be inspected for evidence of potential pollutants entering stormwater systems. Within one business day of the completion of the inspection, the qualified inspector shall notify the owner or operator and the appropriate contractor (or subcontractor) of any corrective actions that need to be taken. The contractor (or subcontractor) shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

A Monthly Summary of Site Inspection Activities would be prepared and kept on file with completed Erosion and Sediment Control Inspection Report. A Record of Stabilization and Construction Activities would be prepared and kept on file with the completed Construction Duration Inspection Forms.

The following are the maintenance requirements for each practice that would be implemented at the site.

7.3.4 Stabilized Construction Entrance/Exit

The stabilized construction entrance/exit shall be maintained in a condition that would prevent the tracking or flow of sediment onto public rights-of-way. All sediment spilled, dropped, washed or tracked onto public rights-of-way must be removed immediately; streets shall be swept as needed. The gravel pad shall be replaced as necessary. Sediment tracked onto public streets should be removed or cleaned on a daily basis.

7.3.5 Silt Fence

Maintenance of all silt fence shall be performed as needed. If a silt fence is knocked down, it shall be replaced immediately. When a silt fence appears deteriorated or ineffective and/or built up sediment reaches one-third the height of the bale or fence, the silt fence shall be replaced and/or cleaned accordingly. When “bulges” of material develop on the fence, they shall be removed.

Silt fence controls sediment runoff where the soil has been disturbed by slowing the flow of water and encouraging the deposition of sediment before the water passes through the silt fence. Built-up sediment shall be removed from silt fences when it has reached one-third the height of the fence and properly disposed.

7.3.6 Sump Pit

The sump pit would be inspected for proper control of runoff and sediment materials. Clean water should be pumped to a grassy area. If the contractor notices any visible contrast in the water, proper filtration shall be provided to release off site.

7.3.7 Soil Stockpile Detail

The silt fencing should be inspected for bulges and proper installation. The soil stockpile should be stabilized with grass or rolled erosion control blanket.

7.3.8 Storm Drain Inlet Protection

Maintenance and inspection of the filter fabric cloth beneath inlet grates in paved areas or the filter fabric drop inlet protection around the drop inlet shall be conducted. The filter fabric cloth shall be cleaned to allow water to pass and prevent clogging the drainage structure. The drainage inlet protection should be inspected for integrity and visible sediment buildup. Collected sediment should be removed from the drainage inlet protection and shall be disposed of properly in accordance with all applicable local, state, and federal requirements.

7.3.9 Dust Control

Maintain all dust control measures through dry weather periods until all disturbed areas are stabilized.

7.3.10 Soil Stabilization

To ensure that the site is properly seeded and stabilized, the Contractor must initiate stabilization measures as soon as practicable in areas of the site where construction activities have permanently ceased and in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. The Contractor would be responsible for the maintenance of the vegetated cover for the duration of construction activities. The areas shall be monitored to ensure that vegetation achieves good coverage over the entire disturbed section. Additional seeding shall be completed as needed. Watering shall be provided as needed.

In areas where soil disturbance activity has been temporarily or permanently ceased, temporary and/or permanent soil stabilization measures shall be installed and/or implemented within seven days from the date the soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control.

7.3.11 Perimeter Dike/Swale

The dike/swale should be properly stabilized with rolled erosion control blanket or other stabilization measures. Any rilling or areas of cutting should be immediately stabilized. Further investigation as to the cause should also be performed to determine if other upstream erosion and sediment control measures are needed. When accumulated sediment reached a depth of 1/3 of the total depth of the swale, this material shall be removed and properly disposed.

7.3.12 Check Dam

Check dams should be field verified on a regular basis to ensure their functionality. It is important to remove excessive sediment and debris from the stone as well as inspect the edges of the dam where erosion is possible during large storm events. Stone or rock should be installed where necessary in order to maintain height, drainage width, and flow through operation.

7.3.13 Temporary Sediment Basin

Any rilling and erosion of the basin sideslopes should be evaluated and adequate stabilization should be provided. Rolled erosion control blankets or other stabilization practices should be installed on the sideslopes. The outlet structure should be inspected

for damages, accumulation of sediment, trash and debris, and overall performance. If sediment-laden stormwater is leaving the basin then additional erosion and sediment control practices may be required.

7.4 Post-Construction Operation and Maintenance

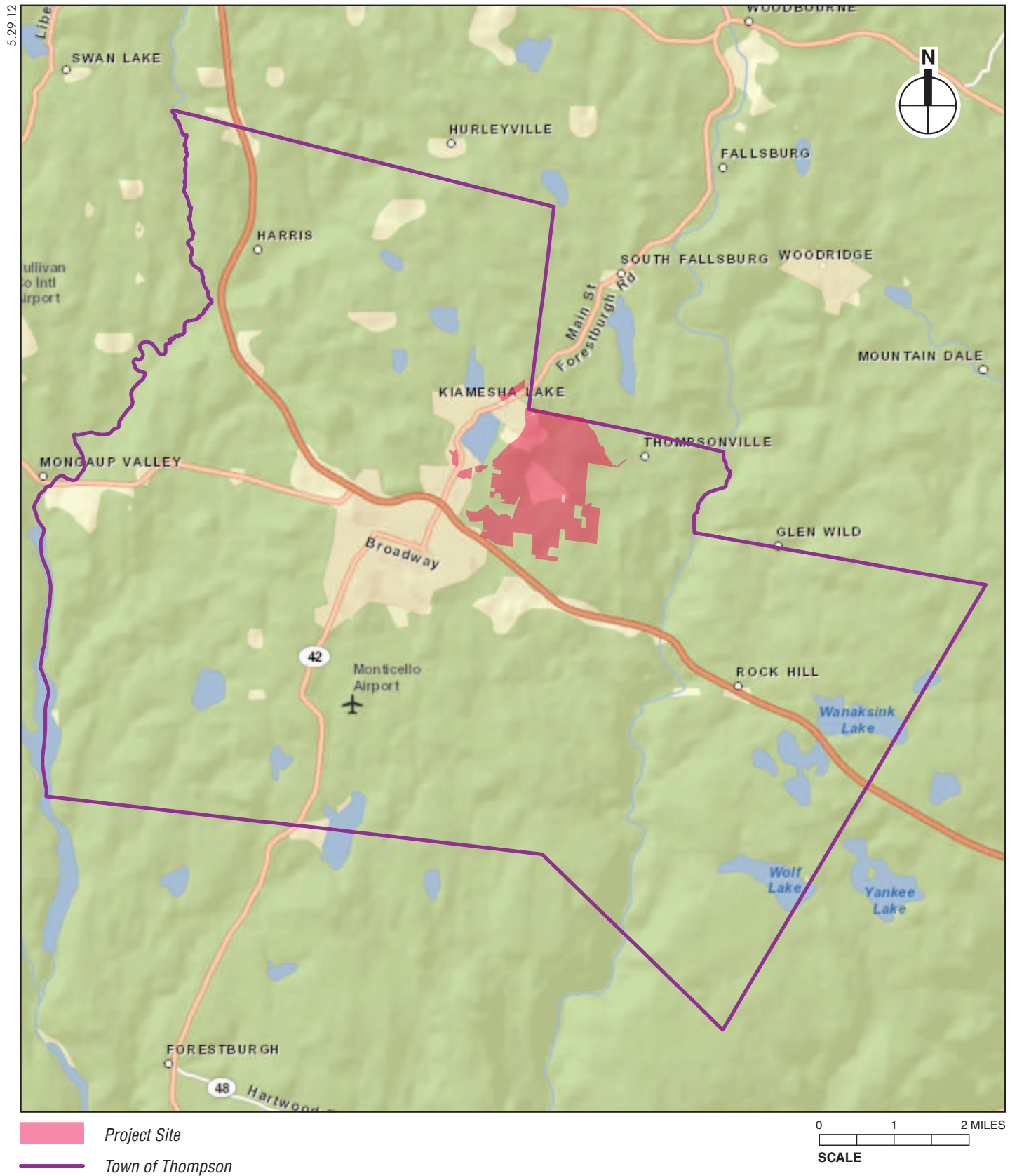
Following completion of construction, a long term inspection and maintenance program would be implemented to ensure the proper function of the stormwater management system. The program would be carried out by the facilities manager. A detailed checklist of pond inspection and maintenance is included in the Appendix I. The maintenance program would include the following:

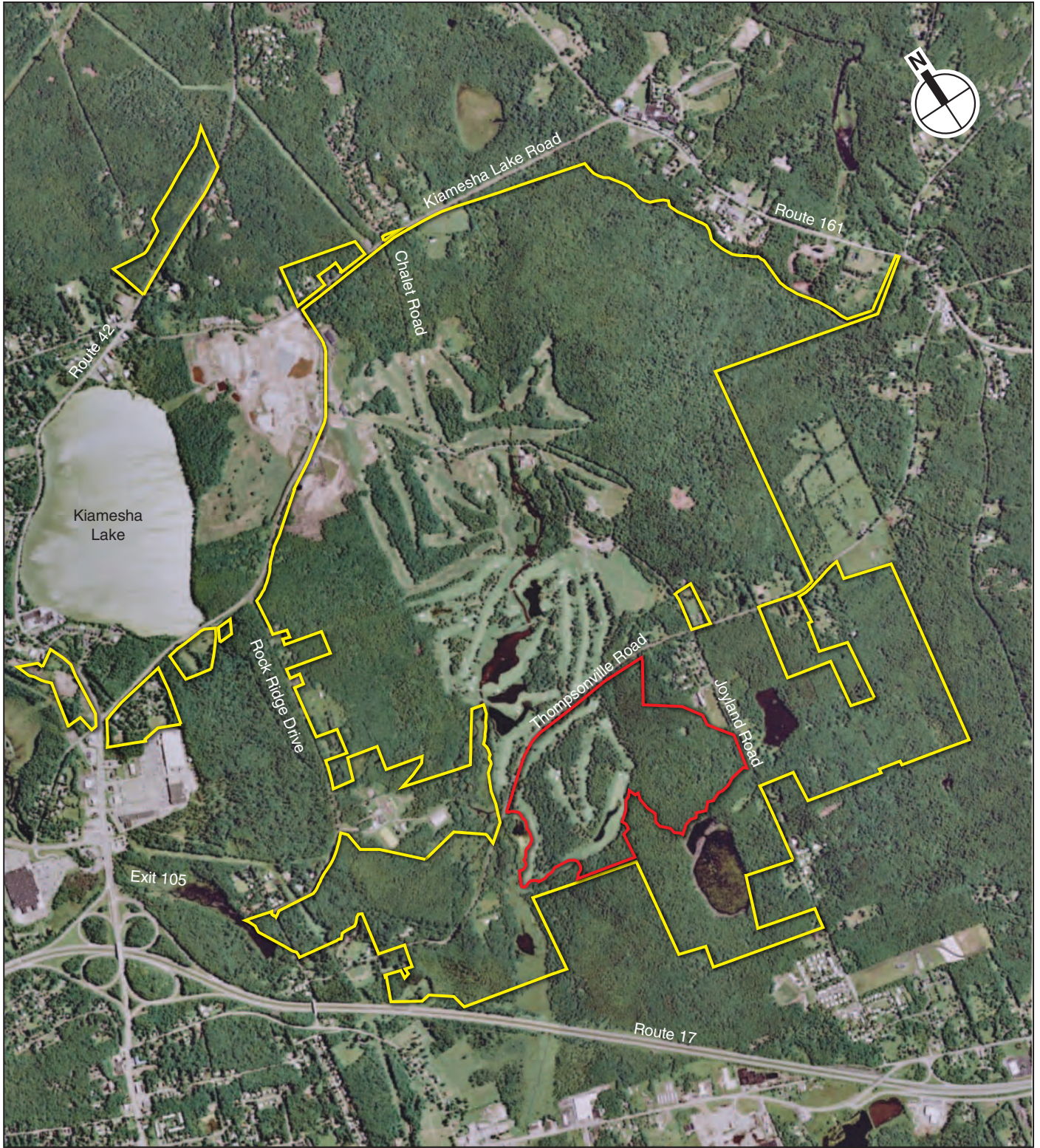
1. The side slopes of the pond would be mowed at a minimum twice a year. If necessary, invasive woody vegetation around and in the pond would be removed to prevent it from becoming established within the pond.
2. Litter and debris would be removed from catch basins, vegetated swales, ponds, and the outlet control structures.
3. The stormwater management system should be inspected after each major storm event (greater than 2-year, 24-hour storm) to ensure the small orifices and inlets remain open.
4. Silt would be cleaned from catch basins and other drainage structures when the depth exceeds half of the depth of the sump.
5. Sediment would be removed from stormwater ponds as needed, but at a minimum of every five years. A backhoe or excavator would be used to remove sediment accumulation from the bottom of the detention pond. However, vehicles shall be prevented from traversing the sideslopes to the extent possible to avoid damaging established vegetation. Repairs to the embankment should be done with hand tools to the extent practical.
6. Use of road salt for maintenance of driveway areas would be minimized.
7. Eroded areas and gullies would be restored and re-seeded as soon as possible.

In addition to inspection and maintenance of the stormwater management system, inspection of the overall site for areas of potential contamination would also be noted. Maintenance of existing landscaped areas is performed consistently throughout the year. Pest control would follow an Integrated Pest Management program in conjunction with guidance from the Cornell Cooperative Extension Agency, applicable regulations, and best practices. All potential pollutants, such as petroleum products, chemicals, etc, would be properly stored in designated areas that would minimize contact with precipitation.

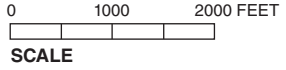
7.4.1 WEST NILE VIRUS

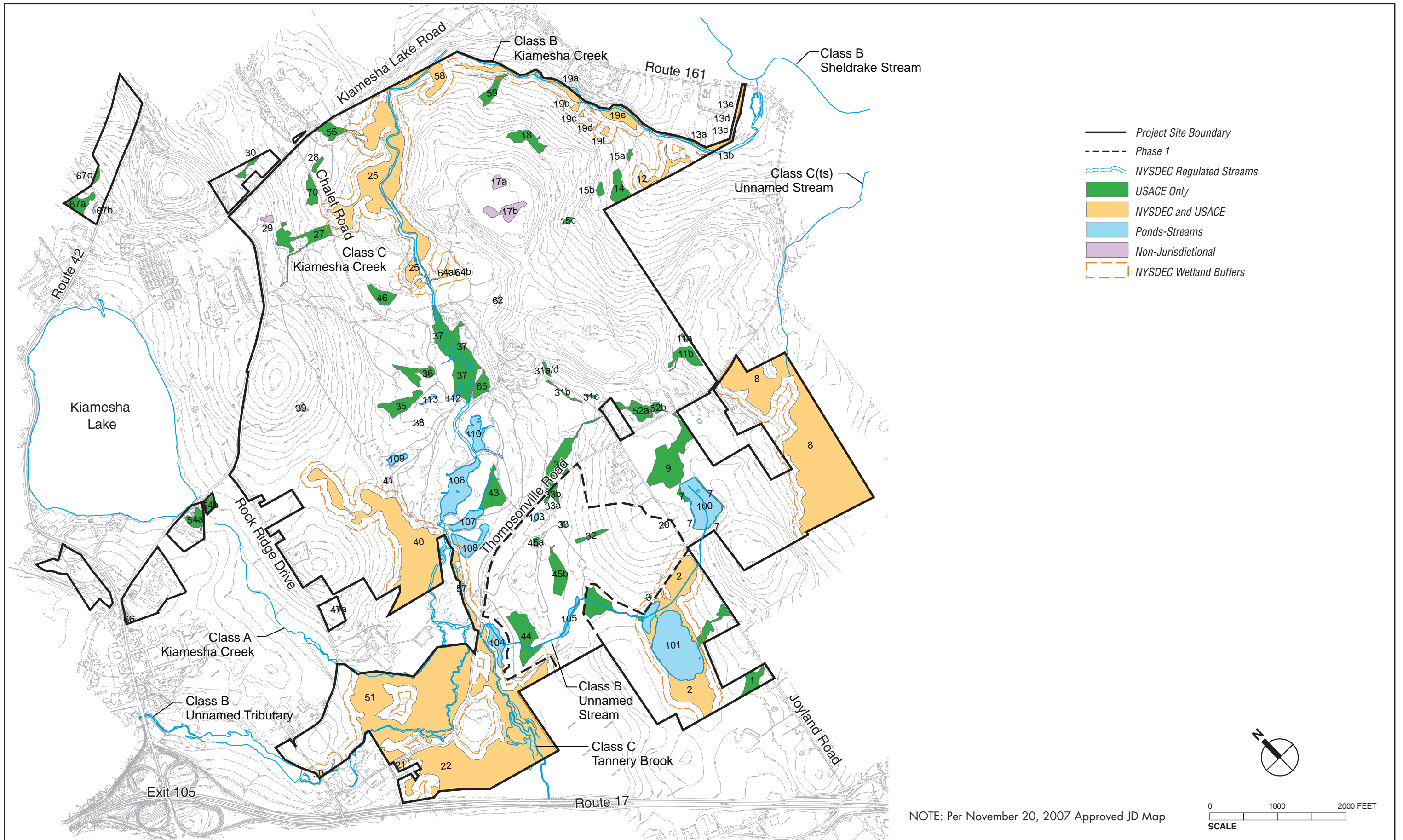
Recent field observations conclude that constructed wetlands and stormwater management ponds actually pose a low risk in spreading the West Nile Virus since the mosquito species that are found in wetlands and stormwater management ponds tend not to be the variety that are known to carry the West Nile Virus. Within a healthy aquatic ecosystem, other aquatic invertebrates (dragonfly larvae and other species) prey on mosquito larvae thereby reducing mosquito populations. The SWPPP submitted to the NYSDEC would include a regular maintenance schedule to be implemented at the completion of construction. This may include the stocking of the ponds with species to feed on potential mosquito larvae, and possible aeration systems to be exercised during periods of minimal flow through the ponds.

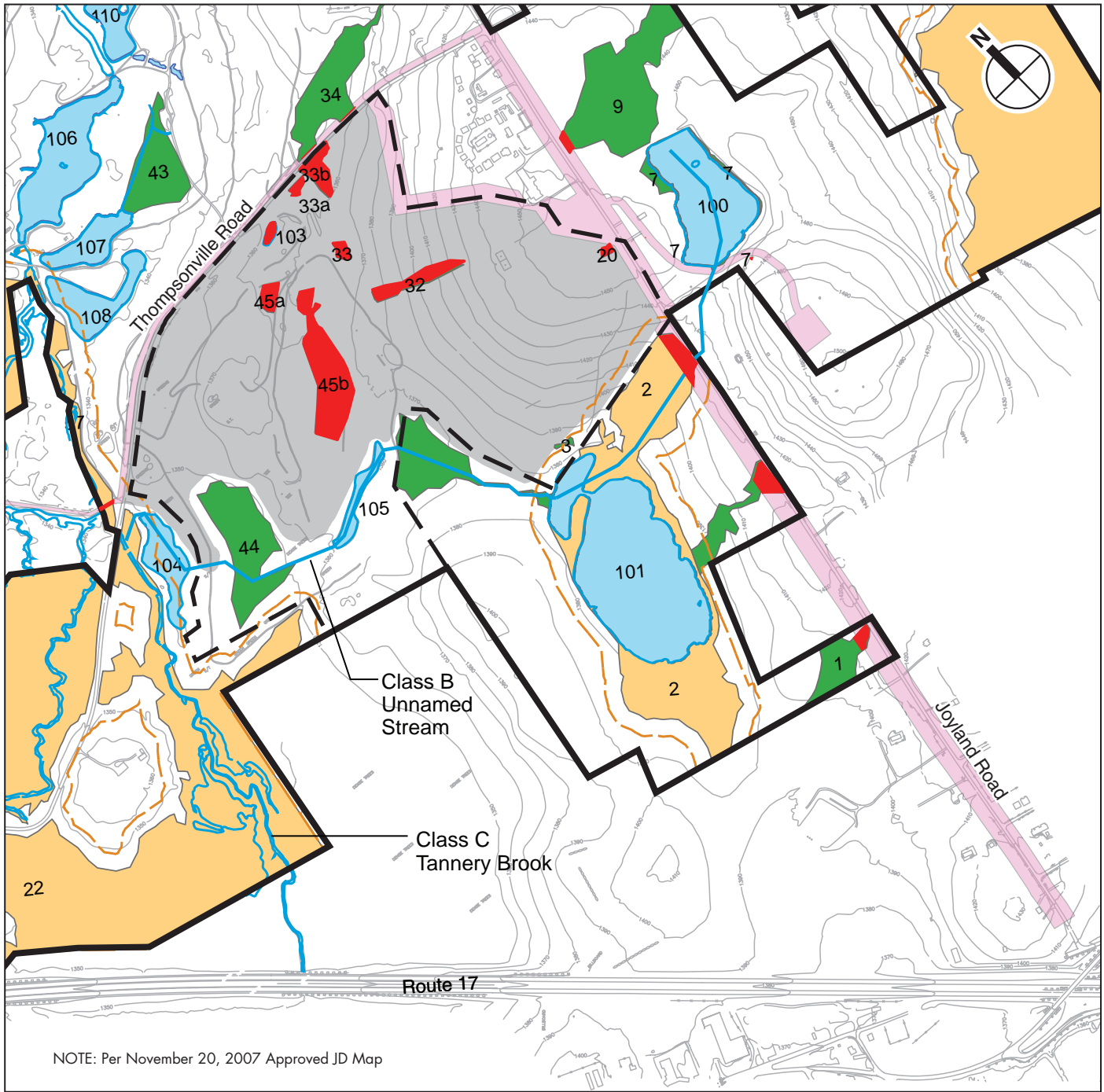




— Project Site Boundary
— Phase I Area Boundary





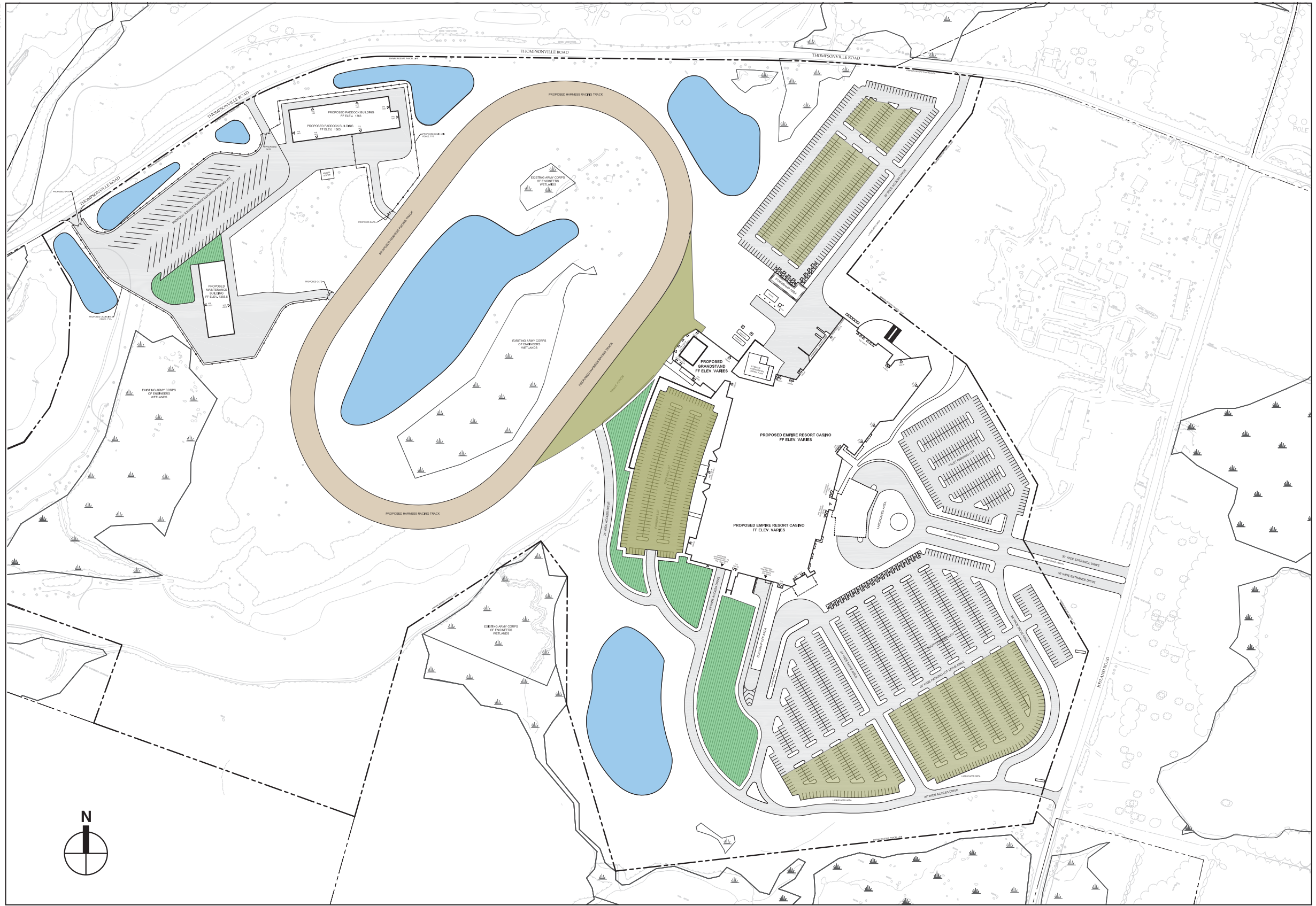


NOTE: Per November 20, 2007 Approved JD Map

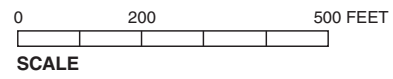
- Project Site Boundary
- Phase 1
- NYSDEC Regulated Streams
- USACE Only
- NYSDEC and USACE
- Ponds-Streams
- Non-Jurisdictional
- NYSDEC Wetland Buffers
- Wetland Disturbance
- Phase 1 Disturbance
- Phase 1 Infrastructure Disturbance

0 500 1000 FEET
SCALE

Impacts to Phase 1 Wetlands and Waterbodies by Jurisdiction
Figure 4



- Project Site Boundary
- Raingarden/Bioretention Basin
- Porous Pavement
- Proposed Stormwater Pond



Phase 1 Green Infrastructure
Figure 5

PRELIMINARY SWPPP
APPENDIX A
CONTRACTOR'S CERTIFICATION
OWNER'S CERTIFICATION

CONTRACTOR'S CERTIFICATION

"I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the Qualified Inspector during a site inspection. I also understand that the Owner or Operator/Applicant must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings. "

SIGNED: _____ DATE: _____

NAME: _____

FIRM: _____

ADDRESS: _____

PHONE: _____

SITE: _____

SWPPP
IMPLEMENTER'S NAME: _____

SWPPP
IMPLEMENTER'S TITLE: _____

CONTRACTOR'S SCOPE: _____

TRAINED
CONTRACTOR'S NAME: _____

TRAINED
CONTRACTOR'S TITLE: _____

*The SWPPP Implementer must be a trained Contractor responsible for SWPPP implementation, an employee of the firm who has received training in accordance with SPEDES GP-0-10-001.

OWNER'S CERTIFICATION

“I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the Qualified Inspector during a site inspection. I also understand that the Owner or Operator/Applicant must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System (“SPDES”) general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.”

NAME: _____

FIRM: _____

ADDRESS: _____

PHONE: _____

SITE: _____

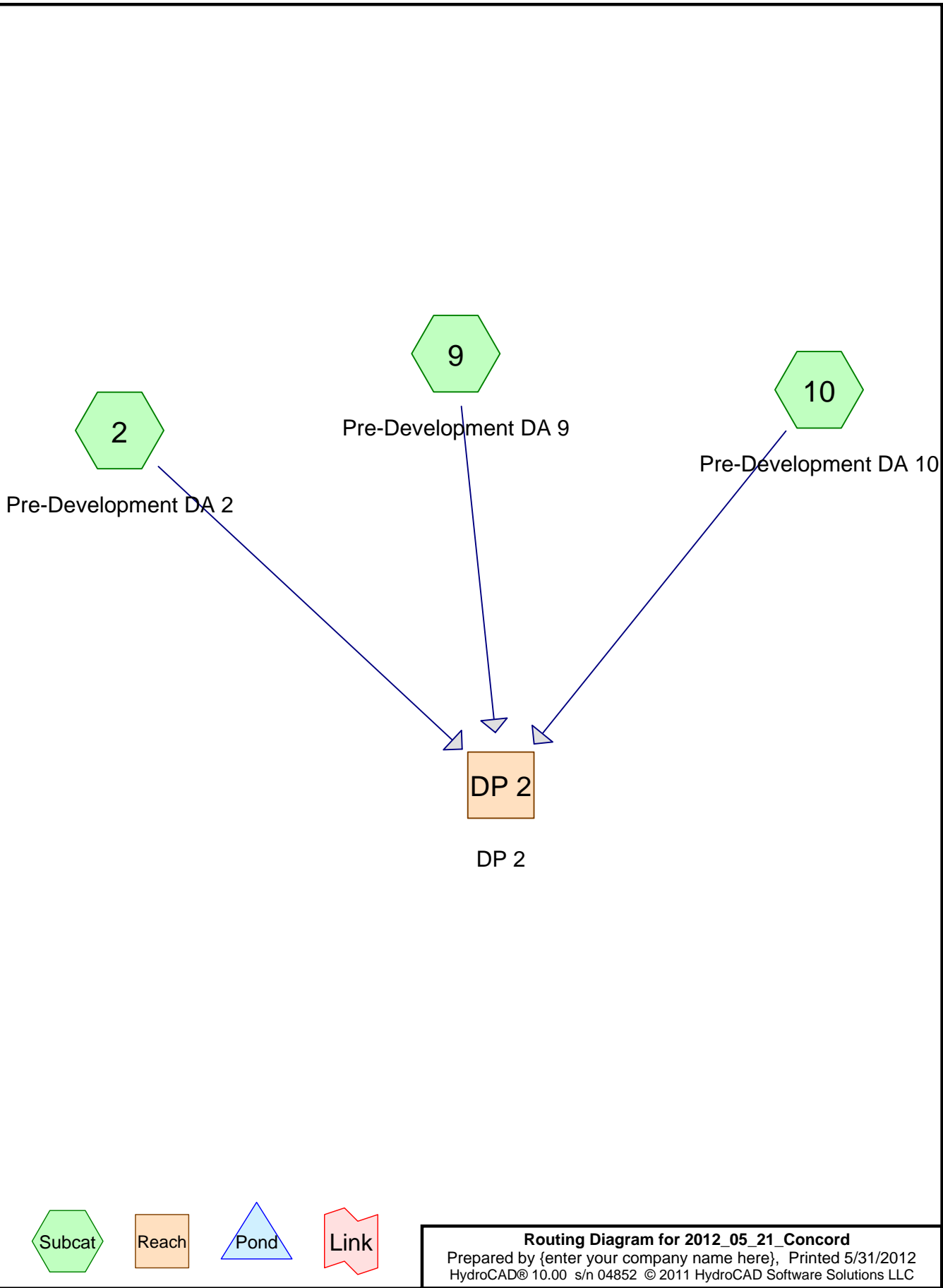
**PRELIMINARY SWPPP
APPENDIX B
GEOTECHNICAL REPORT**

[See Appendix D of this DGEIS/DEIS]

**PRELIMINARY SWPPP
APPENDIX C
DRAWINGS
(SEE FULL SIZE DRAWING SET)**

[See Appendix M of this DGEIS/DEIS]

PRELIMINARY SWPPP
APPENDIX D
PRE-DEVELOPMENT HYDROLOGIC ROUTING CALCULATIONS



Summary for Subcatchment 2: Pre-Development DA 2

Runoff = 4.33 cfs @ 12.77 hrs, Volume= 0.851 af, Depth= 0.50"

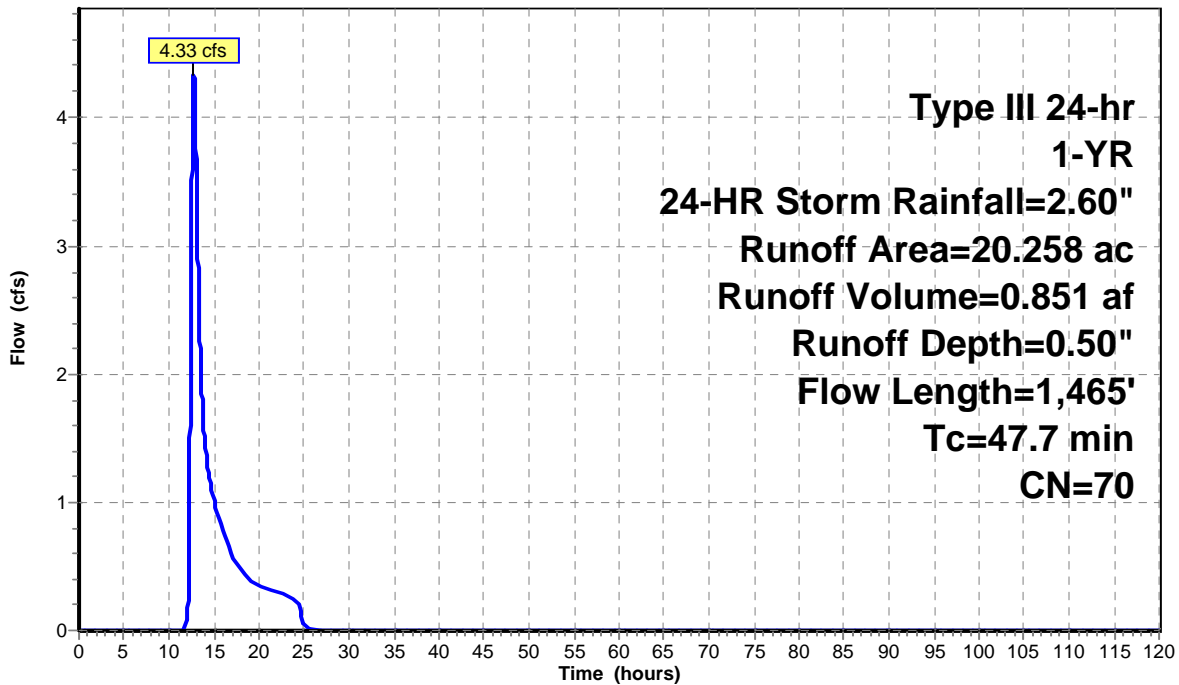
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

Area (ac)	CN	Description
0.057	77	Woods, Good, HSG D
19.831	70	Woods, Good, HSG C
0.370	74	>75% Grass cover, Good, HSG C
20.258	70	Weighted Average
20.258		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.4	100	0.0300	0.06		Sheet Flow, SHEET FLOW Woods: Dense underbrush n= 0.800 P2= 3.75"
18.3	1,365	0.0620	1.24		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
47.7	1,465	Total			

Subcatchment 2: Pre-Development DA 2

Hydrograph



2012_05_21_Concord

Prepared by {enter your company name here}

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Pre-Development Analysis (Concord - Phase I)
Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

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Hydrograph for Subcatchment 2: Pre-Development DA 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	2.60	0.50	0.00
2.00	0.05	0.00	0.00	106.00	2.60	0.50	0.00
4.00	0.11	0.00	0.00	108.00	2.60	0.50	0.00
6.00	0.19	0.00	0.00	110.00	2.60	0.50	0.00
8.00	0.30	0.00	0.00	112.00	2.60	0.50	0.00
10.00	0.49	0.00	0.00	114.00	2.60	0.50	0.00
12.00	1.30	0.04	0.05	116.00	2.60	0.50	0.00
14.00	2.11	0.28	1.46	118.00	2.60	0.50	0.00
16.00	2.30	0.36	0.78	120.00	2.60	0.50	0.00
18.00	2.41	0.41	0.48				
20.00	2.49	0.45	0.35				
22.00	2.55	0.48	0.30				
24.00	2.60	0.50	0.24				
26.00	2.60	0.50	0.00				
28.00	2.60	0.50	0.00				
30.00	2.60	0.50	0.00				
32.00	2.60	0.50	0.00				
34.00	2.60	0.50	0.00				
36.00	2.60	0.50	0.00				
38.00	2.60	0.50	0.00				
40.00	2.60	0.50	0.00				
42.00	2.60	0.50	0.00				
44.00	2.60	0.50	0.00				
46.00	2.60	0.50	0.00				
48.00	2.60	0.50	0.00				
50.00	2.60	0.50	0.00				
52.00	2.60	0.50	0.00				
54.00	2.60	0.50	0.00				
56.00	2.60	0.50	0.00				
58.00	2.60	0.50	0.00				
60.00	2.60	0.50	0.00				
62.00	2.60	0.50	0.00				
64.00	2.60	0.50	0.00				
66.00	2.60	0.50	0.00				
68.00	2.60	0.50	0.00				
70.00	2.60	0.50	0.00				
72.00	2.60	0.50	0.00				
74.00	2.60	0.50	0.00				
76.00	2.60	0.50	0.00				
78.00	2.60	0.50	0.00				
80.00	2.60	0.50	0.00				
82.00	2.60	0.50	0.00				
84.00	2.60	0.50	0.00				
86.00	2.60	0.50	0.00				
88.00	2.60	0.50	0.00				
90.00	2.60	0.50	0.00				
92.00	2.60	0.50	0.00				
94.00	2.60	0.50	0.00				
96.00	2.60	0.50	0.00				
98.00	2.60	0.50	0.00				
100.00	2.60	0.50	0.00				
102.00	2.60	0.50	0.00				

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Pre-Development Analysis (Concord - Phase I)
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"
 Printed 5/31/2012
 Page 4

Summary for Subcatchment 9: Pre-Development DA 9

Runoff = 3.34 cfs @ 12.17 hrs, Volume= 0.303 af, Depth= 0.80"

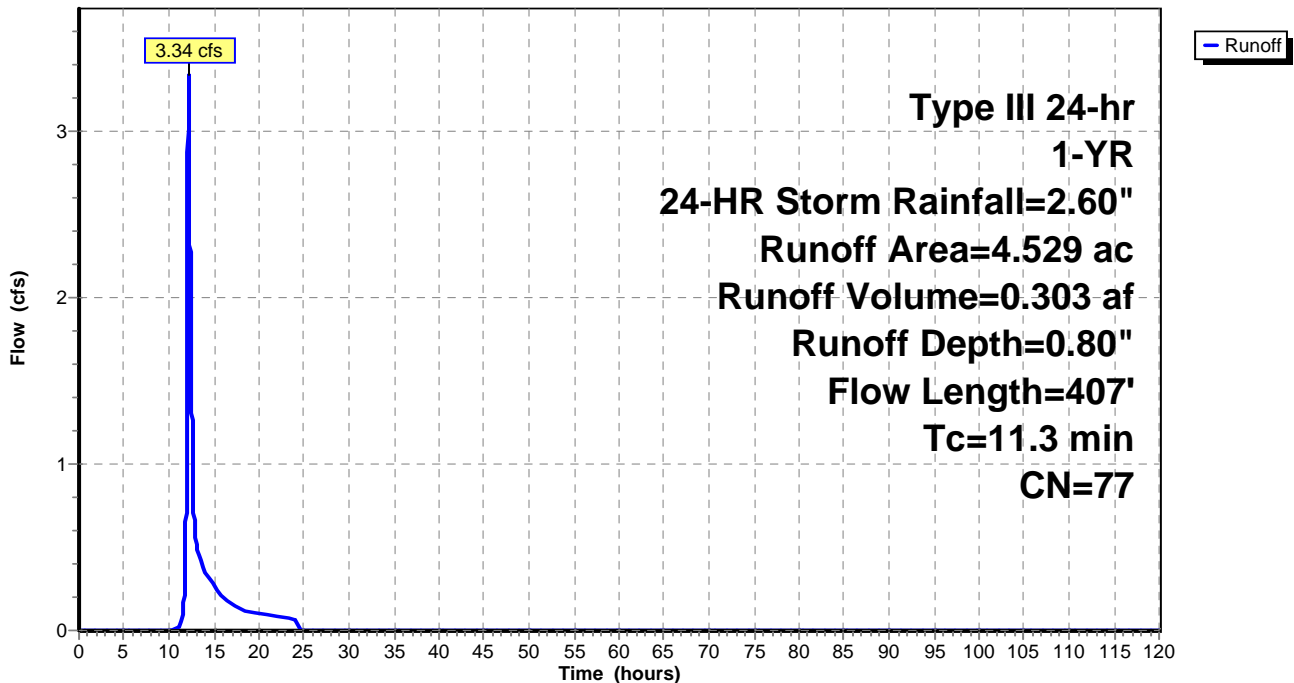
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

Area (ac)	CN	Description
2.374	74	>75% Grass cover, Good, HSG C
0.966	80	>75% Grass cover, Good, HSG D
1.189	79	Woods/grass comb., Good, HSG D
4.529	77	Weighted Average
4.529		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	100	0.0540	0.27		Sheet Flow, SHEET FLOW Grass: Short n= 0.150 P2= 3.75"
5.2	307	0.0200	0.99		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Short Grass Pasture Kv= 7.0 fps
11.3	407	Total			

Subcatchment 9: Pre-Development DA 9

Hydrograph



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Pre-Development Analysis (Concord - Phase I)
Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

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Hydrograph for Subcatchment 9: Pre-Development DA 9

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	2.60	0.80	0.00
2.00	0.05	0.00	0.00	106.00	2.60	0.80	0.00
4.00	0.11	0.00	0.00	108.00	2.60	0.80	0.00
6.00	0.19	0.00	0.00	110.00	2.60	0.80	0.00
8.00	0.30	0.00	0.00	112.00	2.60	0.80	0.00
10.00	0.49	0.00	0.00	114.00	2.60	0.80	0.00
12.00	1.30	0.13	1.20	116.00	2.60	0.80	0.00
14.00	2.11	0.51	0.35	118.00	2.60	0.80	0.00
16.00	2.30	0.62	0.20	120.00	2.60	0.80	0.00
18.00	2.41	0.69	0.12				
20.00	2.49	0.73	0.10				
22.00	2.55	0.77	0.08				
24.00	2.60	0.80	0.07				
26.00	2.60	0.80	0.00				
28.00	2.60	0.80	0.00				
30.00	2.60	0.80	0.00				
32.00	2.60	0.80	0.00				
34.00	2.60	0.80	0.00				
36.00	2.60	0.80	0.00				
38.00	2.60	0.80	0.00				
40.00	2.60	0.80	0.00				
42.00	2.60	0.80	0.00				
44.00	2.60	0.80	0.00				
46.00	2.60	0.80	0.00				
48.00	2.60	0.80	0.00				
50.00	2.60	0.80	0.00				
52.00	2.60	0.80	0.00				
54.00	2.60	0.80	0.00				
56.00	2.60	0.80	0.00				
58.00	2.60	0.80	0.00				
60.00	2.60	0.80	0.00				
62.00	2.60	0.80	0.00				
64.00	2.60	0.80	0.00				
66.00	2.60	0.80	0.00				
68.00	2.60	0.80	0.00				
70.00	2.60	0.80	0.00				
72.00	2.60	0.80	0.00				
74.00	2.60	0.80	0.00				
76.00	2.60	0.80	0.00				
78.00	2.60	0.80	0.00				
80.00	2.60	0.80	0.00				
82.00	2.60	0.80	0.00				
84.00	2.60	0.80	0.00				
86.00	2.60	0.80	0.00				
88.00	2.60	0.80	0.00				
90.00	2.60	0.80	0.00				
92.00	2.60	0.80	0.00				
94.00	2.60	0.80	0.00				
96.00	2.60	0.80	0.00				
98.00	2.60	0.80	0.00				
100.00	2.60	0.80	0.00				
102.00	2.60	0.80	0.00				

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Pre-Development Analysis (Concord - Phase I)
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"
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 Page 6

Summary for Subcatchment 10: Pre-Development DA 10

Runoff = 2.64 cfs @ 12.21 hrs, Volume= 0.263 af, Depth= 0.76"

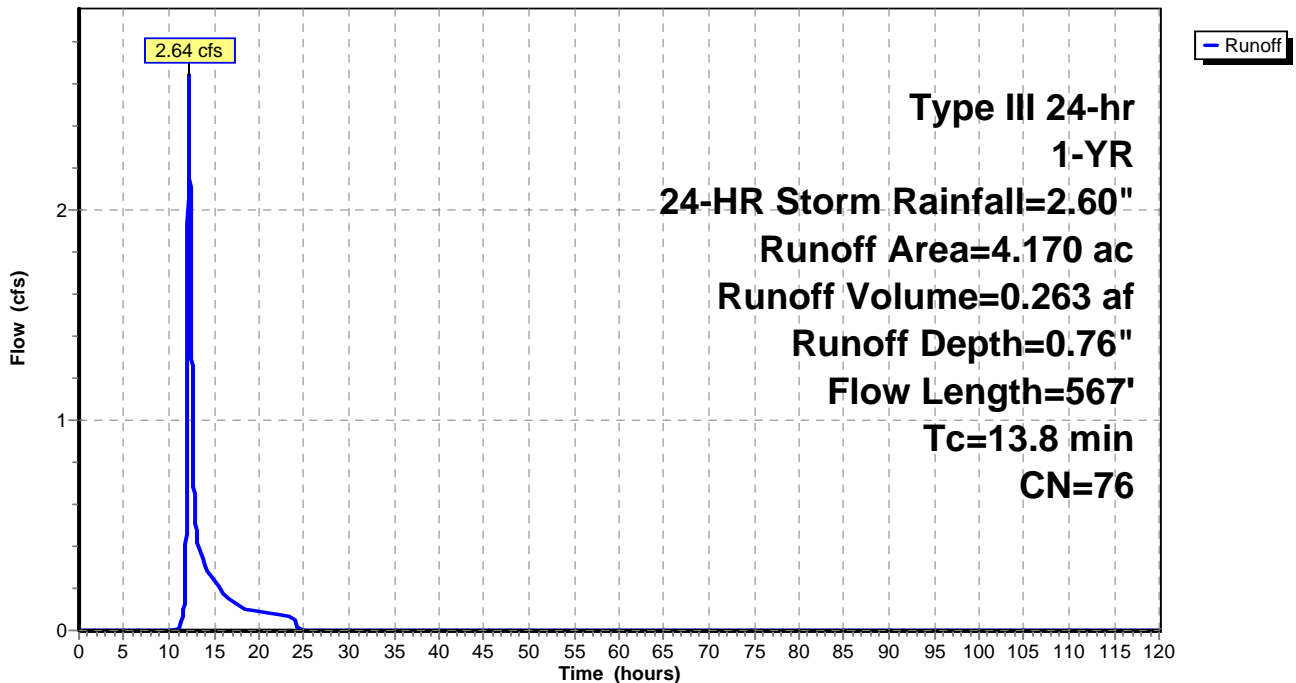
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

Area (ac)	CN	Description
0.774	70	Woods, Good, HSG C
2.388	77	Woods, Good, HSG D
1.008	80	>75% Grass cover, Good, HSG D
4.170	76	Weighted Average
4.170		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0200	1.49		Sheet Flow, SHEET FLOW Smooth surfaces n= 0.011 P2= 3.75"
12.7	467	0.0150	0.61		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
13.8	567	Total			

Subcatchment 10: Pre-Development DA 10

Hydrograph



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Pre-Development Analysis (Concord - Phase I)
Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

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Hydrograph for Subcatchment 10: Pre-Development DA 10

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	2.60	0.76	0.00
2.00	0.05	0.00	0.00	106.00	2.60	0.76	0.00
4.00	0.11	0.00	0.00	108.00	2.60	0.76	0.00
6.00	0.19	0.00	0.00	110.00	2.60	0.76	0.00
8.00	0.30	0.00	0.00	112.00	2.60	0.76	0.00
10.00	0.49	0.00	0.00	114.00	2.60	0.76	0.00
12.00	1.30	0.12	0.82	116.00	2.60	0.76	0.00
14.00	2.11	0.47	0.31	118.00	2.60	0.76	0.00
16.00	2.30	0.58	0.18	120.00	2.60	0.76	0.00
18.00	2.41	0.64	0.11				
20.00	2.49	0.69	0.09				
22.00	2.55	0.72	0.07				
24.00	2.60	0.76	0.06				
26.00	2.60	0.76	0.00				
28.00	2.60	0.76	0.00				
30.00	2.60	0.76	0.00				
32.00	2.60	0.76	0.00				
34.00	2.60	0.76	0.00				
36.00	2.60	0.76	0.00				
38.00	2.60	0.76	0.00				
40.00	2.60	0.76	0.00				
42.00	2.60	0.76	0.00				
44.00	2.60	0.76	0.00				
46.00	2.60	0.76	0.00				
48.00	2.60	0.76	0.00				
50.00	2.60	0.76	0.00				
52.00	2.60	0.76	0.00				
54.00	2.60	0.76	0.00				
56.00	2.60	0.76	0.00				
58.00	2.60	0.76	0.00				
60.00	2.60	0.76	0.00				
62.00	2.60	0.76	0.00				
64.00	2.60	0.76	0.00				
66.00	2.60	0.76	0.00				
68.00	2.60	0.76	0.00				
70.00	2.60	0.76	0.00				
72.00	2.60	0.76	0.00				
74.00	2.60	0.76	0.00				
76.00	2.60	0.76	0.00				
78.00	2.60	0.76	0.00				
80.00	2.60	0.76	0.00				
82.00	2.60	0.76	0.00				
84.00	2.60	0.76	0.00				
86.00	2.60	0.76	0.00				
88.00	2.60	0.76	0.00				
90.00	2.60	0.76	0.00				
92.00	2.60	0.76	0.00				
94.00	2.60	0.76	0.00				
96.00	2.60	0.76	0.00				
98.00	2.60	0.76	0.00				
100.00	2.60	0.76	0.00				
102.00	2.60	0.76	0.00				

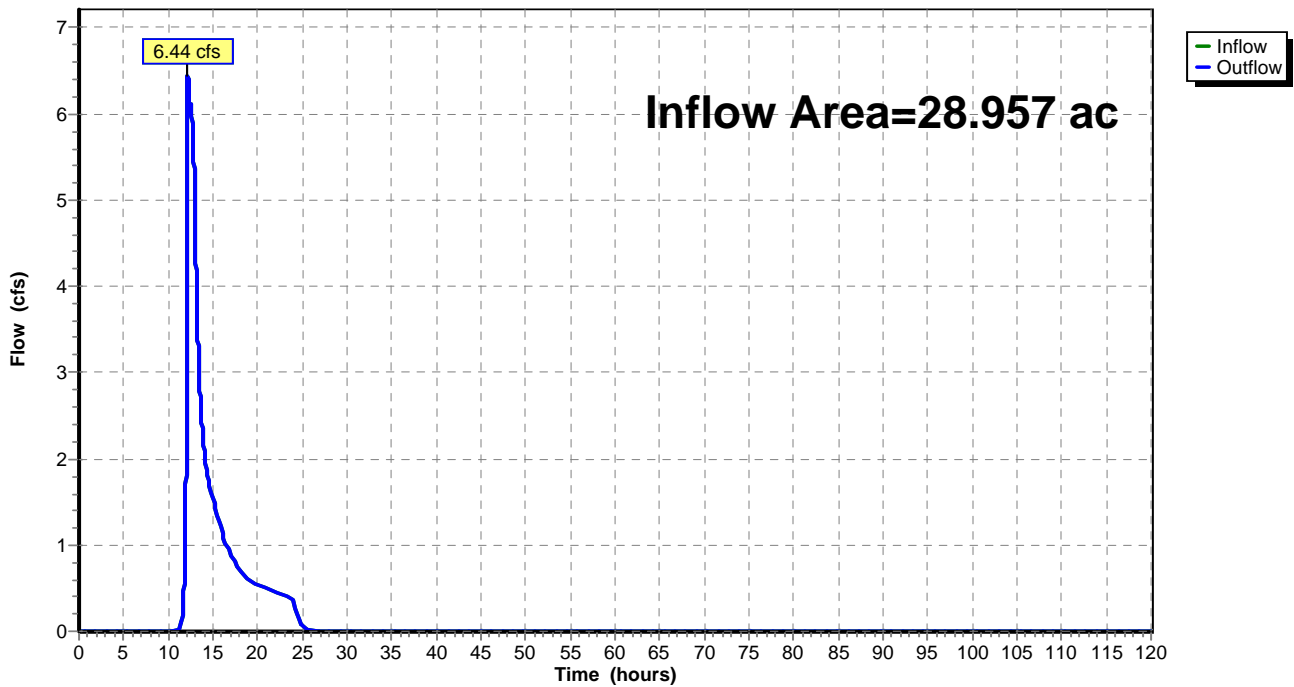
Summary for Reach DP 2: DP 2

Inflow Area = 28.957 ac, 0.00% Impervious, Inflow Depth = 0.59" for 1-YR, 24-HR Storm event
Inflow = 6.44 cfs @ 12.20 hrs, Volume= 1.417 af
Outflow = 6.44 cfs @ 12.20 hrs, Volume= 1.417 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach DP 2: DP 2

Hydrograph



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Pre-Development Analysis (Concord - Phase I)
Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

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Hydrograph for Reach DP 2: DP 2

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.00		0.00
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.00		0.00	110.00	0.00		0.00
8.00	0.00		0.00	112.00	0.00		0.00
10.00	0.00		0.00	114.00	0.00		0.00
12.00	2.07		2.07	116.00	0.00		0.00
14.00	2.12		2.12	118.00	0.00		0.00
16.00	1.16		1.16	120.00	0.00		0.00
18.00	0.71		0.71				
20.00	0.54		0.54				
22.00	0.45		0.45				
24.00	0.37		0.37				
26.00	0.00		0.00				
28.00	0.00		0.00				
30.00	0.00		0.00				
32.00	0.00		0.00				
34.00	0.00		0.00				
36.00	0.00		0.00				
38.00	0.00		0.00				
40.00	0.00		0.00				
42.00	0.00		0.00				
44.00	0.00		0.00				
46.00	0.00		0.00				
48.00	0.00		0.00				
50.00	0.00		0.00				
52.00	0.00		0.00				
54.00	0.00		0.00				
56.00	0.00		0.00				
58.00	0.00		0.00				
60.00	0.00		0.00				
62.00	0.00		0.00				
64.00	0.00		0.00				
66.00	0.00		0.00				
68.00	0.00		0.00				
70.00	0.00		0.00				
72.00	0.00		0.00				
74.00	0.00		0.00				
76.00	0.00		0.00				
78.00	0.00		0.00				
80.00	0.00		0.00				
82.00	0.00		0.00				
84.00	0.00		0.00				
86.00	0.00		0.00				
88.00	0.00		0.00				
90.00	0.00		0.00				
92.00	0.00		0.00				
94.00	0.00		0.00				
96.00	0.00		0.00				
98.00	0.00		0.00				
100.00	0.00		0.00				
102.00	0.00		0.00				

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Pre-Development Analysis (Concord - Phase I)
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Summary for Subcatchment 2: Pre-Development DA 2

Runoff = 29.73 cfs @ 12.67 hrs, Volume= 4.736 af, Depth= 2.81"

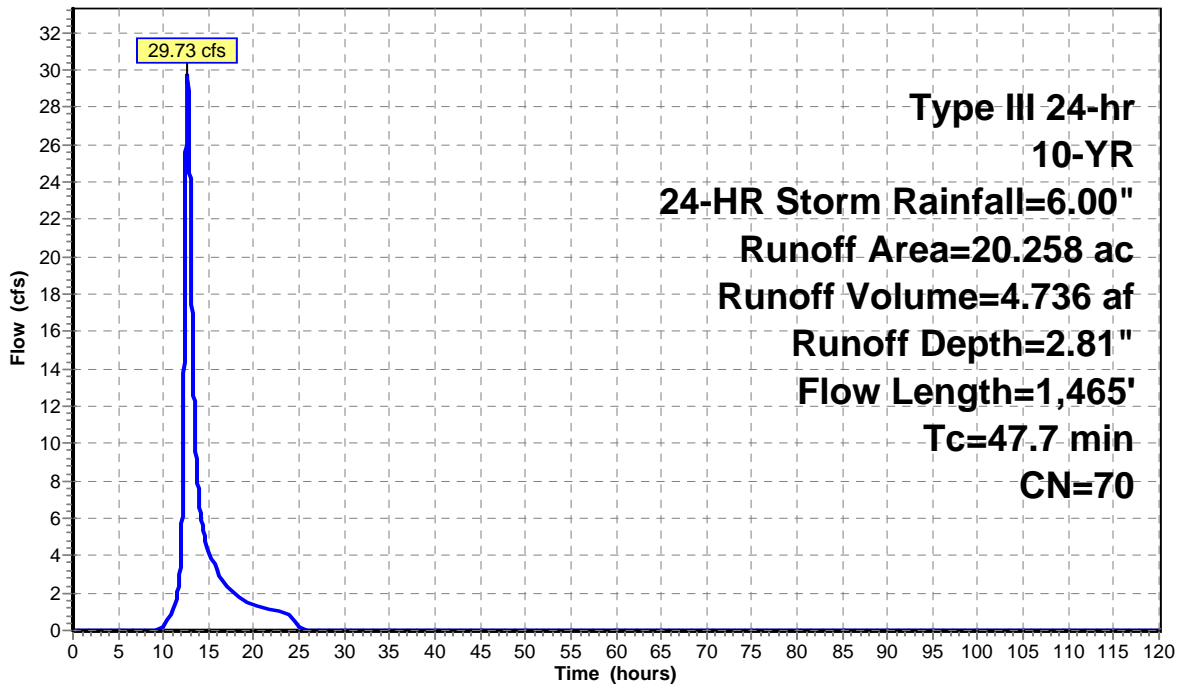
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

Area (ac)	CN	Description
0.057	77	Woods, Good, HSG D
19.831	70	Woods, Good, HSG C
0.370	74	>75% Grass cover, Good, HSG C
20.258	70	Weighted Average
20.258		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.4	100	0.0300	0.06		Sheet Flow, SHEET FLOW Woods: Dense underbrush n= 0.800 P2= 3.75"
18.3	1,365	0.0620	1.24		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
47.7	1,465	Total			

Subcatchment 2: Pre-Development DA 2

Hydrograph



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Pre-Development Analysis (Concord - Phase I)

Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Subcatchment 2: Pre-Development DA 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	6.00	2.81	0.00
2.00	0.12	0.00	0.00	106.00	6.00	2.81	0.00
4.00	0.26	0.00	0.00	108.00	6.00	2.81	0.00
6.00	0.43	0.00	0.00	110.00	6.00	2.81	0.00
8.00	0.68	0.00	0.00	112.00	6.00	2.81	0.00
10.00	1.13	0.02	0.22	114.00	6.00	2.81	0.00
12.00	3.00	0.71	5.04	116.00	6.00	2.81	0.00
14.00	4.87	1.94	6.67	118.00	6.00	2.81	0.00
16.00	5.32	2.27	3.17	120.00	6.00	2.81	0.00
18.00	5.57	2.47	1.86				
20.00	5.74	2.60	1.35				
22.00	5.88	2.71	1.12				
24.00	6.00	2.81	0.91				
26.00	6.00	2.81	0.01				
28.00	6.00	2.81	0.00				
30.00	6.00	2.81	0.00				
32.00	6.00	2.81	0.00				
34.00	6.00	2.81	0.00				
36.00	6.00	2.81	0.00				
38.00	6.00	2.81	0.00				
40.00	6.00	2.81	0.00				
42.00	6.00	2.81	0.00				
44.00	6.00	2.81	0.00				
46.00	6.00	2.81	0.00				
48.00	6.00	2.81	0.00				
50.00	6.00	2.81	0.00				
52.00	6.00	2.81	0.00				
54.00	6.00	2.81	0.00				
56.00	6.00	2.81	0.00				
58.00	6.00	2.81	0.00				
60.00	6.00	2.81	0.00				
62.00	6.00	2.81	0.00				
64.00	6.00	2.81	0.00				
66.00	6.00	2.81	0.00				
68.00	6.00	2.81	0.00				
70.00	6.00	2.81	0.00				
72.00	6.00	2.81	0.00				
74.00	6.00	2.81	0.00				
76.00	6.00	2.81	0.00				
78.00	6.00	2.81	0.00				
80.00	6.00	2.81	0.00				
82.00	6.00	2.81	0.00				
84.00	6.00	2.81	0.00				
86.00	6.00	2.81	0.00				
88.00	6.00	2.81	0.00				
90.00	6.00	2.81	0.00				
92.00	6.00	2.81	0.00				
94.00	6.00	2.81	0.00				
96.00	6.00	2.81	0.00				
98.00	6.00	2.81	0.00				
100.00	6.00	2.81	0.00				
102.00	6.00	2.81	0.00				

Summary for Subcatchment 9: Pre-Development DA 9

Runoff = 15.49 cfs @ 12.16 hrs, Volume= 1.313 af, Depth= 3.48"

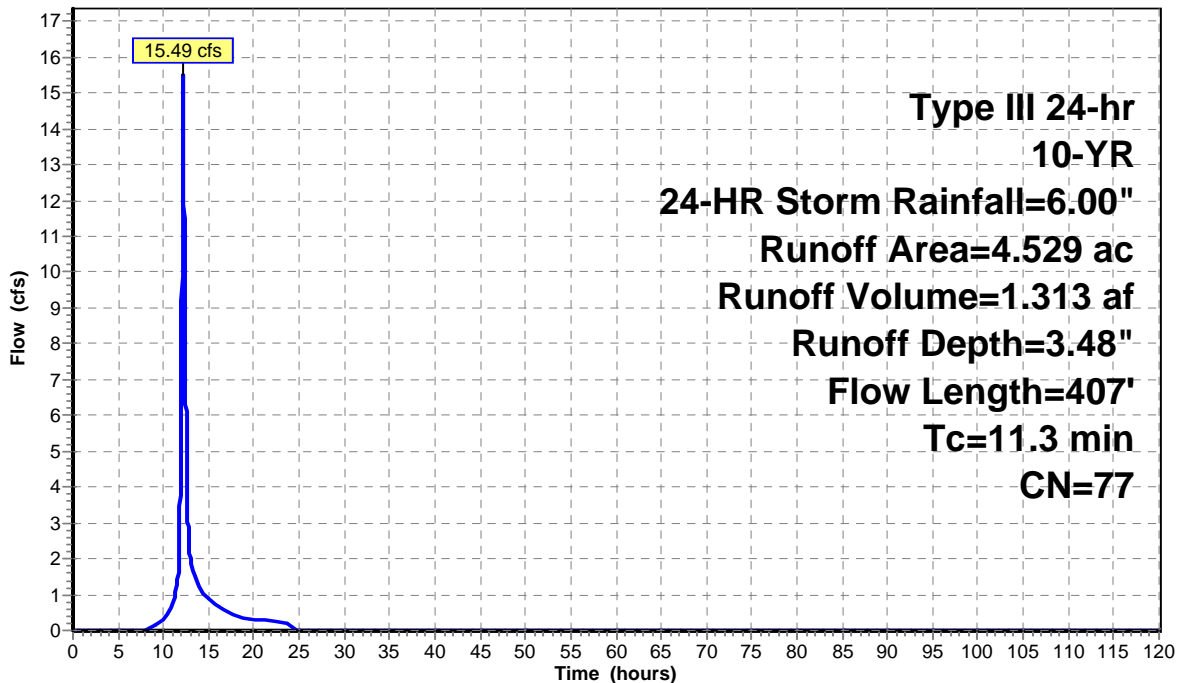
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

Area (ac)	CN	Description
2.374	74	>75% Grass cover, Good, HSG C
0.966	80	>75% Grass cover, Good, HSG D
1.189	79	Woods/grass comb., Good, HSG D
4.529	77	Weighted Average
4.529		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	100	0.0540	0.27		Sheet Flow, SHEET FLOW Grass: Short n= 0.150 P2= 3.75"
5.2	307	0.0200	0.99		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Short Grass Pasture Kv= 7.0 fps
11.3	407	Total			

Subcatchment 9: Pre-Development DA 9

Hydrograph



2012_05_21_Concord

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Pre-Development Analysis (Concord - Phase I)

Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Subcatchment 9: Pre-Development DA 9

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	6.00	3.48	0.00
2.00	0.12	0.00	0.00	106.00	6.00	3.48	0.00
4.00	0.26	0.00	0.00	108.00	6.00	3.48	0.00
6.00	0.43	0.00	0.00	110.00	6.00	3.48	0.00
8.00	0.68	0.00	0.03	112.00	6.00	3.48	0.00
10.00	1.13	0.08	0.34	114.00	6.00	3.48	0.00
12.00	3.00	1.07	7.14	116.00	6.00	3.48	0.00
14.00	4.87	2.51	1.21	118.00	6.00	3.48	0.00
16.00	5.32	2.89	0.65	120.00	6.00	3.48	0.00
18.00	5.57	3.10	0.40				
20.00	5.74	3.25	0.31				
22.00	5.88	3.38	0.26				
24.00	6.00	3.48	0.21				
26.00	6.00	3.48	0.00				
28.00	6.00	3.48	0.00				
30.00	6.00	3.48	0.00				
32.00	6.00	3.48	0.00				
34.00	6.00	3.48	0.00				
36.00	6.00	3.48	0.00				
38.00	6.00	3.48	0.00				
40.00	6.00	3.48	0.00				
42.00	6.00	3.48	0.00				
44.00	6.00	3.48	0.00				
46.00	6.00	3.48	0.00				
48.00	6.00	3.48	0.00				
50.00	6.00	3.48	0.00				
52.00	6.00	3.48	0.00				
54.00	6.00	3.48	0.00				
56.00	6.00	3.48	0.00				
58.00	6.00	3.48	0.00				
60.00	6.00	3.48	0.00				
62.00	6.00	3.48	0.00				
64.00	6.00	3.48	0.00				
66.00	6.00	3.48	0.00				
68.00	6.00	3.48	0.00				
70.00	6.00	3.48	0.00				
72.00	6.00	3.48	0.00				
74.00	6.00	3.48	0.00				
76.00	6.00	3.48	0.00				
78.00	6.00	3.48	0.00				
80.00	6.00	3.48	0.00				
82.00	6.00	3.48	0.00				
84.00	6.00	3.48	0.00				
86.00	6.00	3.48	0.00				
88.00	6.00	3.48	0.00				
90.00	6.00	3.48	0.00				
92.00	6.00	3.48	0.00				
94.00	6.00	3.48	0.00				
96.00	6.00	3.48	0.00				
98.00	6.00	3.48	0.00				
100.00	6.00	3.48	0.00				
102.00	6.00	3.48	0.00				

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Pre-Development Analysis (Concord - Phase I)
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Summary for Subcatchment 10: Pre-Development DA 10

Runoff = 12.93 cfs @ 12.19 hrs, Volume= 1.175 af, Depth= 3.38"

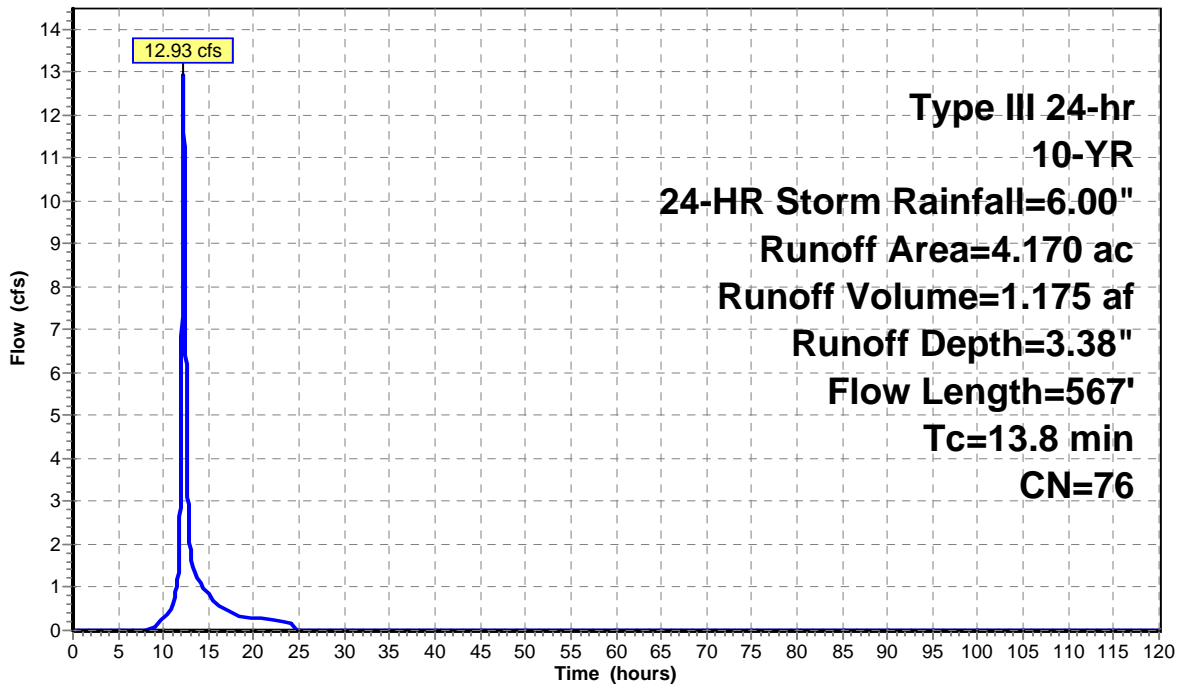
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

Area (ac)	CN	Description
0.774	70	Woods, Good, HSG C
2.388	77	Woods, Good, HSG D
1.008	80	>75% Grass cover, Good, HSG D
4.170	76	Weighted Average
4.170		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0200	1.49		Sheet Flow, SHEET FLOW Smooth surfaces n= 0.011 P2= 3.75"
12.7	467	0.0150	0.61		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
13.8	567	Total			

Subcatchment 10: Pre-Development DA 10

Hydrograph



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Pre-Development Analysis (Concord - Phase I)
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Subcatchment 10: Pre-Development DA 10

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	6.00	3.38	0.00
2.00	0.12	0.00	0.00	106.00	6.00	3.38	0.00
4.00	0.26	0.00	0.00	108.00	6.00	3.38	0.00
6.00	0.43	0.00	0.00	110.00	6.00	3.38	0.00
8.00	0.68	0.00	0.01	112.00	6.00	3.38	0.00
10.00	1.13	0.07	0.27	114.00	6.00	3.38	0.00
12.00	3.00	1.02	5.55	116.00	6.00	3.38	0.00
14.00	4.87	2.43	1.11	118.00	6.00	3.38	0.00
16.00	5.32	2.80	0.60	120.00	6.00	3.38	0.00
18.00	5.57	3.01	0.36				
20.00	5.74	3.16	0.29				
22.00	5.88	3.28	0.24				
24.00	6.00	3.38	0.19				
26.00	6.00	3.38	0.00				
28.00	6.00	3.38	0.00				
30.00	6.00	3.38	0.00				
32.00	6.00	3.38	0.00				
34.00	6.00	3.38	0.00				
36.00	6.00	3.38	0.00				
38.00	6.00	3.38	0.00				
40.00	6.00	3.38	0.00				
42.00	6.00	3.38	0.00				
44.00	6.00	3.38	0.00				
46.00	6.00	3.38	0.00				
48.00	6.00	3.38	0.00				
50.00	6.00	3.38	0.00				
52.00	6.00	3.38	0.00				
54.00	6.00	3.38	0.00				
56.00	6.00	3.38	0.00				
58.00	6.00	3.38	0.00				
60.00	6.00	3.38	0.00				
62.00	6.00	3.38	0.00				
64.00	6.00	3.38	0.00				
66.00	6.00	3.38	0.00				
68.00	6.00	3.38	0.00				
70.00	6.00	3.38	0.00				
72.00	6.00	3.38	0.00				
74.00	6.00	3.38	0.00				
76.00	6.00	3.38	0.00				
78.00	6.00	3.38	0.00				
80.00	6.00	3.38	0.00				
82.00	6.00	3.38	0.00				
84.00	6.00	3.38	0.00				
86.00	6.00	3.38	0.00				
88.00	6.00	3.38	0.00				
90.00	6.00	3.38	0.00				
92.00	6.00	3.38	0.00				
94.00	6.00	3.38	0.00				
96.00	6.00	3.38	0.00				
98.00	6.00	3.38	0.00				
100.00	6.00	3.38	0.00				
102.00	6.00	3.38	0.00				

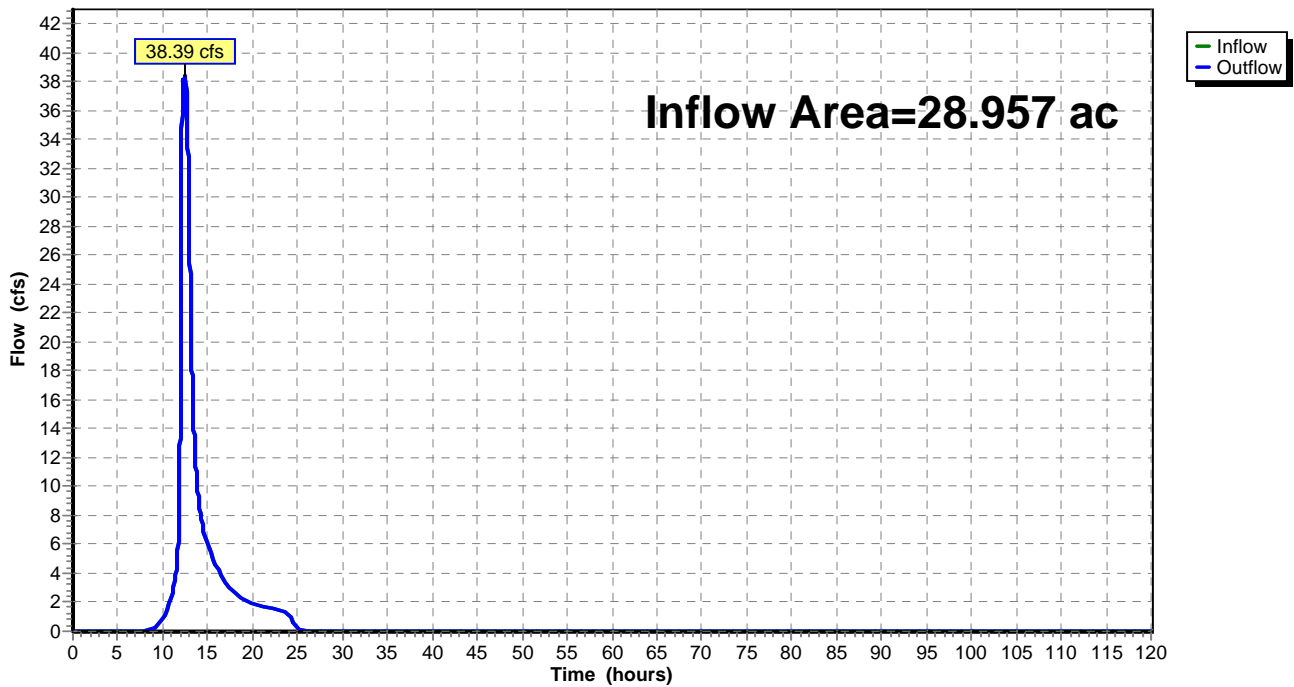
Summary for Reach DP 2: DP 2

Inflow Area = 28.957 ac, 0.00% Impervious, Inflow Depth = 2.99" for 10-YR, 24-HR Storm event
Inflow = 38.39 cfs @ 12.51 hrs, Volume= 7.223 af
Outflow = 38.39 cfs @ 12.51 hrs, Volume= 7.223 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach DP 2: DP 2

Hydrograph



Hydrograph for Reach DP 2: DP 2

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.00		0.00
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.00		0.00	110.00	0.00		0.00
8.00	0.04		0.04	112.00	0.00		0.00
10.00	0.82		0.82	114.00	0.00		0.00
12.00	17.73		17.73	116.00	0.00		0.00
14.00	8.99		8.99	118.00	0.00		0.00
16.00	4.43		4.43	120.00	0.00		0.00
18.00	2.62		2.62				
20.00	1.95		1.95				
22.00	1.61		1.61				
24.00	1.30		1.30				
26.00	0.01		0.01				
28.00	0.00		0.00				
30.00	0.00		0.00				
32.00	0.00		0.00				
34.00	0.00		0.00				
36.00	0.00		0.00				
38.00	0.00		0.00				
40.00	0.00		0.00				
42.00	0.00		0.00				
44.00	0.00		0.00				
46.00	0.00		0.00				
48.00	0.00		0.00				
50.00	0.00		0.00				
52.00	0.00		0.00				
54.00	0.00		0.00				
56.00	0.00		0.00				
58.00	0.00		0.00				
60.00	0.00		0.00				
62.00	0.00		0.00				
64.00	0.00		0.00				
66.00	0.00		0.00				
68.00	0.00		0.00				
70.00	0.00		0.00				
72.00	0.00		0.00				
74.00	0.00		0.00				
76.00	0.00		0.00				
78.00	0.00		0.00				
80.00	0.00		0.00				
82.00	0.00		0.00				
84.00	0.00		0.00				
86.00	0.00		0.00				
88.00	0.00		0.00				
90.00	0.00		0.00				
92.00	0.00		0.00				
94.00	0.00		0.00				
96.00	0.00		0.00				
98.00	0.00		0.00				
100.00	0.00		0.00				
102.00	0.00		0.00				

Summary for Subcatchment 2: Pre-Development DA 2

Runoff = 47.69 cfs @ 12.67 hrs, Volume= 7.536 af, Depth= 4.46"

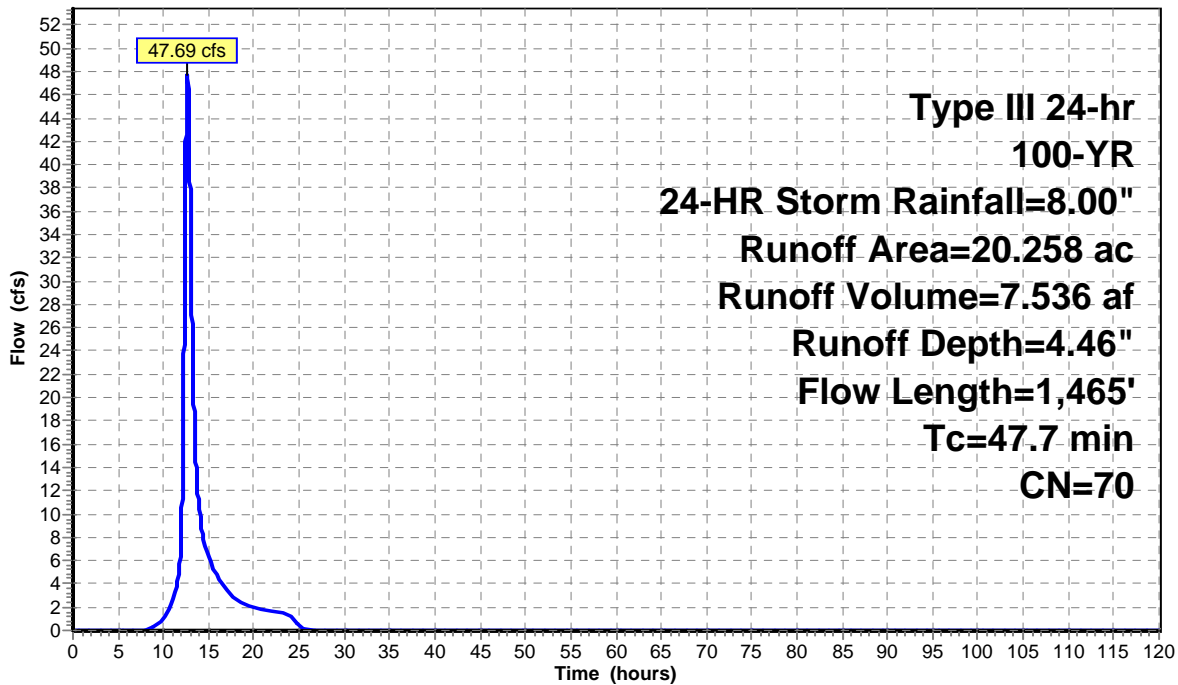
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Area (ac)	CN	Description
0.057	77	Woods, Good, HSG D
19.831	70	Woods, Good, HSG C
0.370	74	>75% Grass cover, Good, HSG C
20.258	70	Weighted Average
20.258		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.4	100	0.0300	0.06		Sheet Flow, SHEET FLOW Woods: Dense underbrush n= 0.800 P2= 3.75"
18.3	1,365	0.0620	1.24		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
47.7	1,465	Total			

Subcatchment 2: Pre-Development DA 2

Hydrograph



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Pre-Development Analysis (Concord - Phase I)

Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

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Hydrograph for Subcatchment 2: Pre-Development DA 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	8.00	4.46	0.00
2.00	0.16	0.00	0.00	106.00	8.00	4.46	0.00
4.00	0.34	0.00	0.00	108.00	8.00	4.46	0.00
6.00	0.58	0.00	0.00	110.00	8.00	4.46	0.00
8.00	0.91	0.00	0.00	112.00	8.00	4.46	0.00
10.00	1.51	0.09	1.09	114.00	8.00	4.46	0.00
12.00	4.00	1.33	9.44	116.00	8.00	4.46	0.00
14.00	6.49	3.20	10.01	118.00	8.00	4.46	0.00
16.00	7.09	3.69	4.66	120.00	8.00	4.46	0.00
18.00	7.42	3.97	2.71				
20.00	7.66	4.17	1.96				
22.00	7.85	4.33	1.62				
24.00	8.00	4.46	1.31				
26.00	8.00	4.46	0.01				
28.00	8.00	4.46	0.00				
30.00	8.00	4.46	0.00				
32.00	8.00	4.46	0.00				
34.00	8.00	4.46	0.00				
36.00	8.00	4.46	0.00				
38.00	8.00	4.46	0.00				
40.00	8.00	4.46	0.00				
42.00	8.00	4.46	0.00				
44.00	8.00	4.46	0.00				
46.00	8.00	4.46	0.00				
48.00	8.00	4.46	0.00				
50.00	8.00	4.46	0.00				
52.00	8.00	4.46	0.00				
54.00	8.00	4.46	0.00				
56.00	8.00	4.46	0.00				
58.00	8.00	4.46	0.00				
60.00	8.00	4.46	0.00				
62.00	8.00	4.46	0.00				
64.00	8.00	4.46	0.00				
66.00	8.00	4.46	0.00				
68.00	8.00	4.46	0.00				
70.00	8.00	4.46	0.00				
72.00	8.00	4.46	0.00				
74.00	8.00	4.46	0.00				
76.00	8.00	4.46	0.00				
78.00	8.00	4.46	0.00				
80.00	8.00	4.46	0.00				
82.00	8.00	4.46	0.00				
84.00	8.00	4.46	0.00				
86.00	8.00	4.46	0.00				
88.00	8.00	4.46	0.00				
90.00	8.00	4.46	0.00				
92.00	8.00	4.46	0.00				
94.00	8.00	4.46	0.00				
96.00	8.00	4.46	0.00				
98.00	8.00	4.46	0.00				
100.00	8.00	4.46	0.00				
102.00	8.00	4.46	0.00				

Summary for Subcatchment 9: Pre-Development DA 9

Runoff = 23.34 cfs @ 12.15 hrs, Volume= 1.991 af, Depth= 5.27"

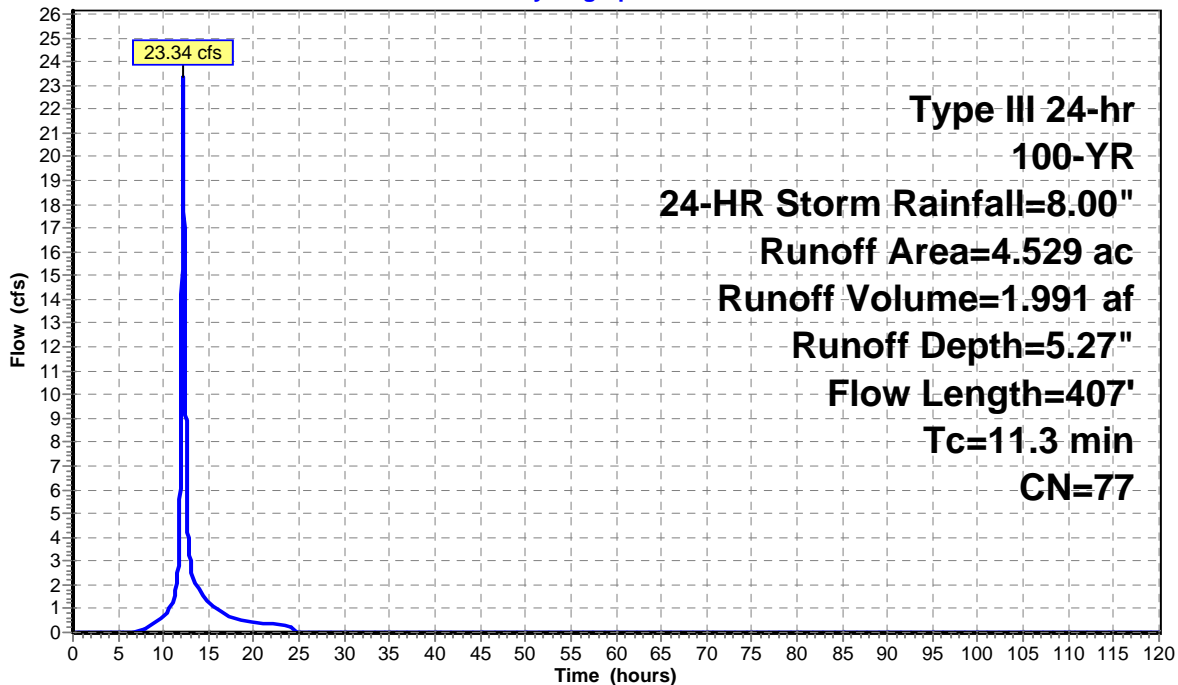
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Area (ac)	CN	Description
2.374	74	>75% Grass cover, Good, HSG C
0.966	80	>75% Grass cover, Good, HSG D
1.189	79	Woods/grass comb., Good, HSG D
4.529	77	Weighted Average
4.529		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	100	0.0540	0.27		Sheet Flow, SHEET FLOW Grass: Short n= 0.150 P2= 3.75"
5.2	307	0.0200	0.99		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Short Grass Pasture Kv= 7.0 fps
11.3	407	Total			

Subcatchment 9: Pre-Development DA 9

Hydrograph



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Pre-Development Analysis (Concord - Phase I)

Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

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Hydrograph for Subcatchment 9: Pre-Development DA 9

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	8.00	5.27	0.00
2.00	0.16	0.00	0.00	106.00	8.00	5.27	0.00
4.00	0.34	0.00	0.00	108.00	8.00	5.27	0.00
6.00	0.58	0.00	0.00	110.00	8.00	5.27	0.00
8.00	0.91	0.03	0.15	112.00	8.00	5.27	0.00
10.00	1.51	0.21	0.68	114.00	8.00	5.27	0.00
12.00	4.00	1.81	11.16	116.00	8.00	5.27	0.00
14.00	6.49	3.91	1.72	118.00	8.00	5.27	0.00
16.00	7.09	4.44	0.92	120.00	8.00	5.27	0.00
18.00	7.42	4.75	0.56				
20.00	7.66	4.96	0.44				
22.00	7.85	5.13	0.37				
24.00	8.00	5.27	0.29				
26.00	8.00	5.27	0.00				
28.00	8.00	5.27	0.00				
30.00	8.00	5.27	0.00				
32.00	8.00	5.27	0.00				
34.00	8.00	5.27	0.00				
36.00	8.00	5.27	0.00				
38.00	8.00	5.27	0.00				
40.00	8.00	5.27	0.00				
42.00	8.00	5.27	0.00				
44.00	8.00	5.27	0.00				
46.00	8.00	5.27	0.00				
48.00	8.00	5.27	0.00				
50.00	8.00	5.27	0.00				
52.00	8.00	5.27	0.00				
54.00	8.00	5.27	0.00				
56.00	8.00	5.27	0.00				
58.00	8.00	5.27	0.00				
60.00	8.00	5.27	0.00				
62.00	8.00	5.27	0.00				
64.00	8.00	5.27	0.00				
66.00	8.00	5.27	0.00				
68.00	8.00	5.27	0.00				
70.00	8.00	5.27	0.00				
72.00	8.00	5.27	0.00				
74.00	8.00	5.27	0.00				
76.00	8.00	5.27	0.00				
78.00	8.00	5.27	0.00				
80.00	8.00	5.27	0.00				
82.00	8.00	5.27	0.00				
84.00	8.00	5.27	0.00				
86.00	8.00	5.27	0.00				
88.00	8.00	5.27	0.00				
90.00	8.00	5.27	0.00				
92.00	8.00	5.27	0.00				
94.00	8.00	5.27	0.00				
96.00	8.00	5.27	0.00				
98.00	8.00	5.27	0.00				
100.00	8.00	5.27	0.00				
102.00	8.00	5.27	0.00				

Summary for Subcatchment 10: Pre-Development DA 10

Runoff = 19.64 cfs @ 12.19 hrs, Volume= 1.792 af, Depth= 5.16"

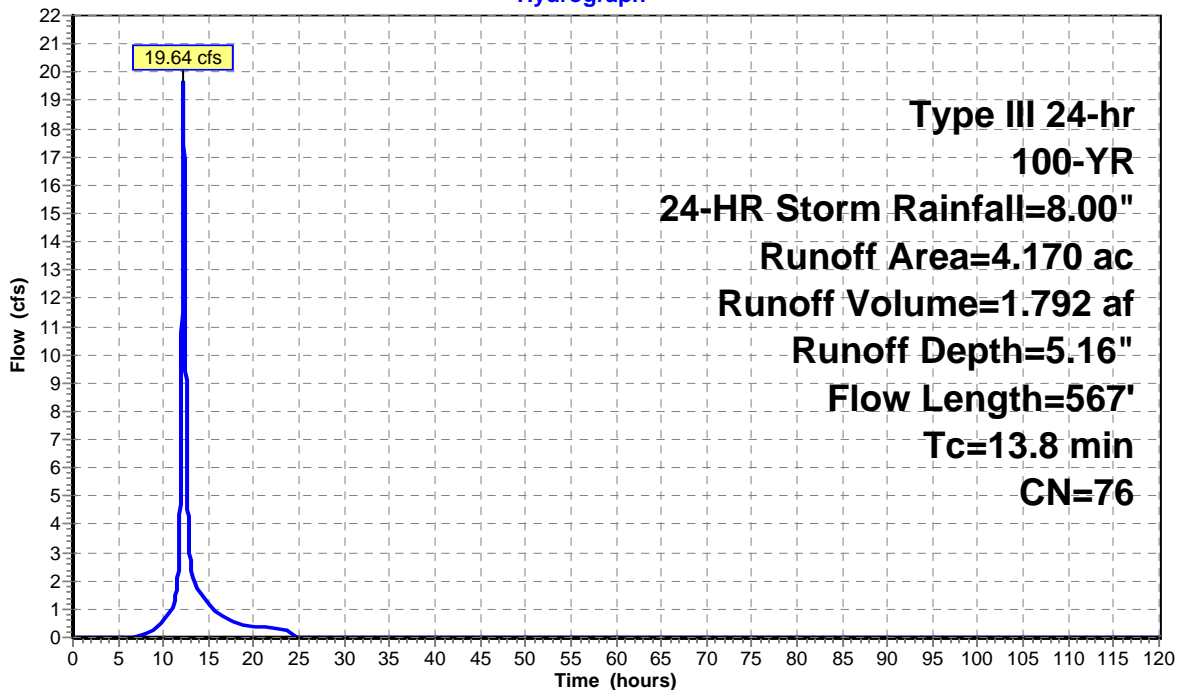
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Area (ac)	CN	Description
0.774	70	Woods, Good, HSG C
2.388	77	Woods, Good, HSG D
1.008	80	>75% Grass cover, Good, HSG D
4.170	76	Weighted Average
4.170		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0200	1.49		Sheet Flow, SHEET FLOW Smooth surfaces n= 0.011 P2= 3.75"
12.7	467	0.0150	0.61		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
13.8	567	Total			

Subcatchment 10: Pre-Development DA 10

Hydrograph



2012_05_21_Concord

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Pre-Development Analysis (Concord - Phase I)

Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

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Hydrograph for Subcatchment 10: Pre-Development DA 10

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	8.00	5.16	0.00
2.00	0.16	0.00	0.00	106.00	8.00	5.16	0.00
4.00	0.34	0.00	0.00	108.00	8.00	5.16	0.00
6.00	0.58	0.00	0.00	110.00	8.00	5.16	0.00
8.00	0.91	0.02	0.11	112.00	8.00	5.16	0.00
10.00	1.51	0.19	0.57	114.00	8.00	5.16	0.00
12.00	4.00	1.74	8.82	116.00	8.00	5.16	0.00
14.00	6.49	3.80	1.59	118.00	8.00	5.16	0.00
16.00	7.09	4.34	0.85	120.00	8.00	5.16	0.00
18.00	7.42	4.64	0.52				
20.00	7.66	4.85	0.40				
22.00	7.85	5.02	0.34				
24.00	8.00	5.16	0.27				
26.00	8.00	5.16	0.00				
28.00	8.00	5.16	0.00				
30.00	8.00	5.16	0.00				
32.00	8.00	5.16	0.00				
34.00	8.00	5.16	0.00				
36.00	8.00	5.16	0.00				
38.00	8.00	5.16	0.00				
40.00	8.00	5.16	0.00				
42.00	8.00	5.16	0.00				
44.00	8.00	5.16	0.00				
46.00	8.00	5.16	0.00				
48.00	8.00	5.16	0.00				
50.00	8.00	5.16	0.00				
52.00	8.00	5.16	0.00				
54.00	8.00	5.16	0.00				
56.00	8.00	5.16	0.00				
58.00	8.00	5.16	0.00				
60.00	8.00	5.16	0.00				
62.00	8.00	5.16	0.00				
64.00	8.00	5.16	0.00				
66.00	8.00	5.16	0.00				
68.00	8.00	5.16	0.00				
70.00	8.00	5.16	0.00				
72.00	8.00	5.16	0.00				
74.00	8.00	5.16	0.00				
76.00	8.00	5.16	0.00				
78.00	8.00	5.16	0.00				
80.00	8.00	5.16	0.00				
82.00	8.00	5.16	0.00				
84.00	8.00	5.16	0.00				
86.00	8.00	5.16	0.00				
88.00	8.00	5.16	0.00				
90.00	8.00	5.16	0.00				
92.00	8.00	5.16	0.00				
94.00	8.00	5.16	0.00				
96.00	8.00	5.16	0.00				
98.00	8.00	5.16	0.00				
100.00	8.00	5.16	0.00				
102.00	8.00	5.16	0.00				

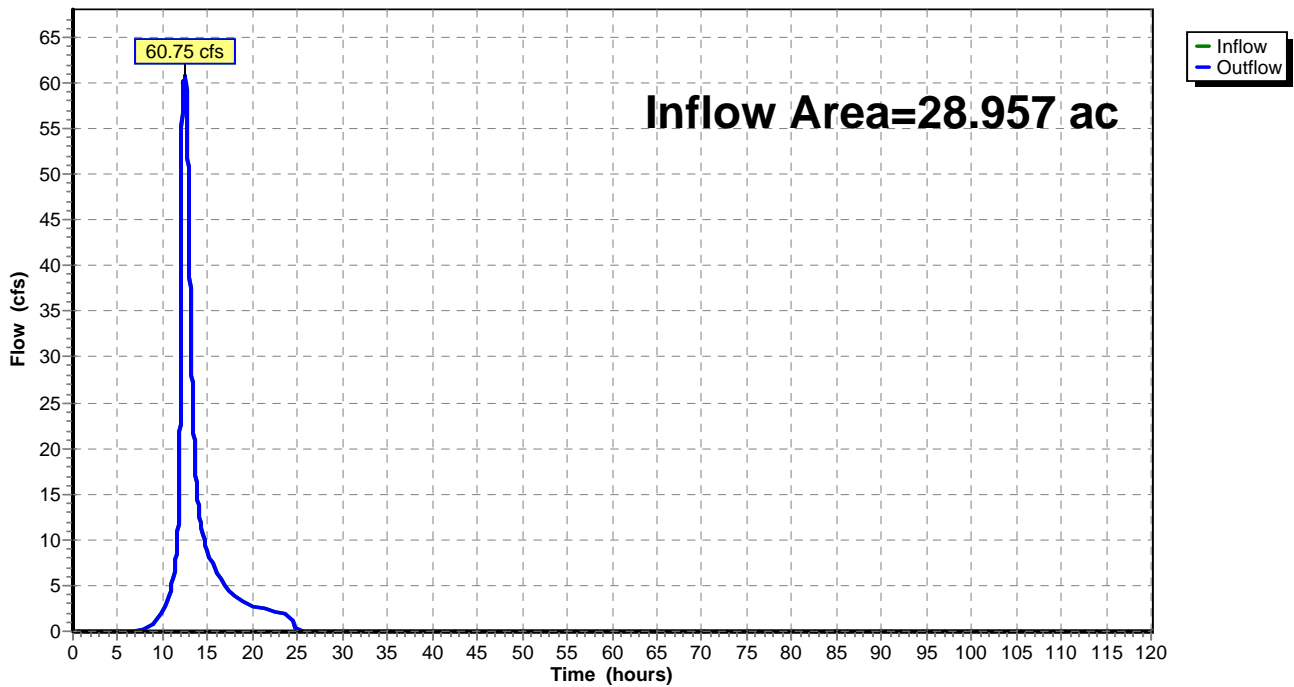
Summary for Reach DP 2: DP 2

Inflow Area = 28.957 ac, 0.00% Impervious, Inflow Depth = 4.69" for 100-YR, 24-HR Storm event
Inflow = 60.75 cfs @ 12.51 hrs, Volume= 11.319 af
Outflow = 60.75 cfs @ 12.51 hrs, Volume= 11.319 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

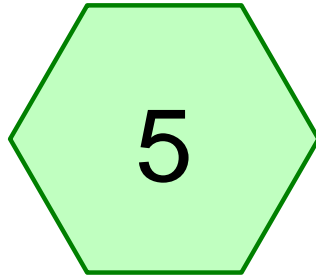
Reach DP 2: DP 2

Hydrograph



Hydrograph for Reach DP 2: DP 2

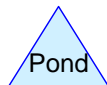
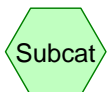
Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.00		0.00
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.00		0.00	110.00	0.00		0.00
8.00	0.26		0.26	112.00	0.00		0.00
10.00	2.34		2.34	114.00	0.00		0.00
12.00	29.42		29.42	116.00	0.00		0.00
14.00	13.33		13.33	118.00	0.00		0.00
16.00	6.44		6.44	120.00	0.00		0.00
18.00	3.78		3.78				
20.00	2.80		2.80				
22.00	2.32		2.32				
24.00	1.87		1.87				
26.00	0.01		0.01				
28.00	0.00		0.00				
30.00	0.00		0.00				
32.00	0.00		0.00				
34.00	0.00		0.00				
36.00	0.00		0.00				
38.00	0.00		0.00				
40.00	0.00		0.00				
42.00	0.00		0.00				
44.00	0.00		0.00				
46.00	0.00		0.00				
48.00	0.00		0.00				
50.00	0.00		0.00				
52.00	0.00		0.00				
54.00	0.00		0.00				
56.00	0.00		0.00				
58.00	0.00		0.00				
60.00	0.00		0.00				
62.00	0.00		0.00				
64.00	0.00		0.00				
66.00	0.00		0.00				
68.00	0.00		0.00				
70.00	0.00		0.00				
72.00	0.00		0.00				
74.00	0.00		0.00				
76.00	0.00		0.00				
78.00	0.00		0.00				
80.00	0.00		0.00				
82.00	0.00		0.00				
84.00	0.00		0.00				
86.00	0.00		0.00				
88.00	0.00		0.00				
90.00	0.00		0.00				
92.00	0.00		0.00				
94.00	0.00		0.00				
96.00	0.00		0.00				
98.00	0.00		0.00				
100.00	0.00		0.00				
102.00	0.00		0.00				



Pre-Development DA 5



DP 3



Summary for Subcatchment 5: Pre-Development DA 5

Runoff = 21.13 cfs @ 12.66 hrs, Volume= 3.531 af, Depth= 0.67"

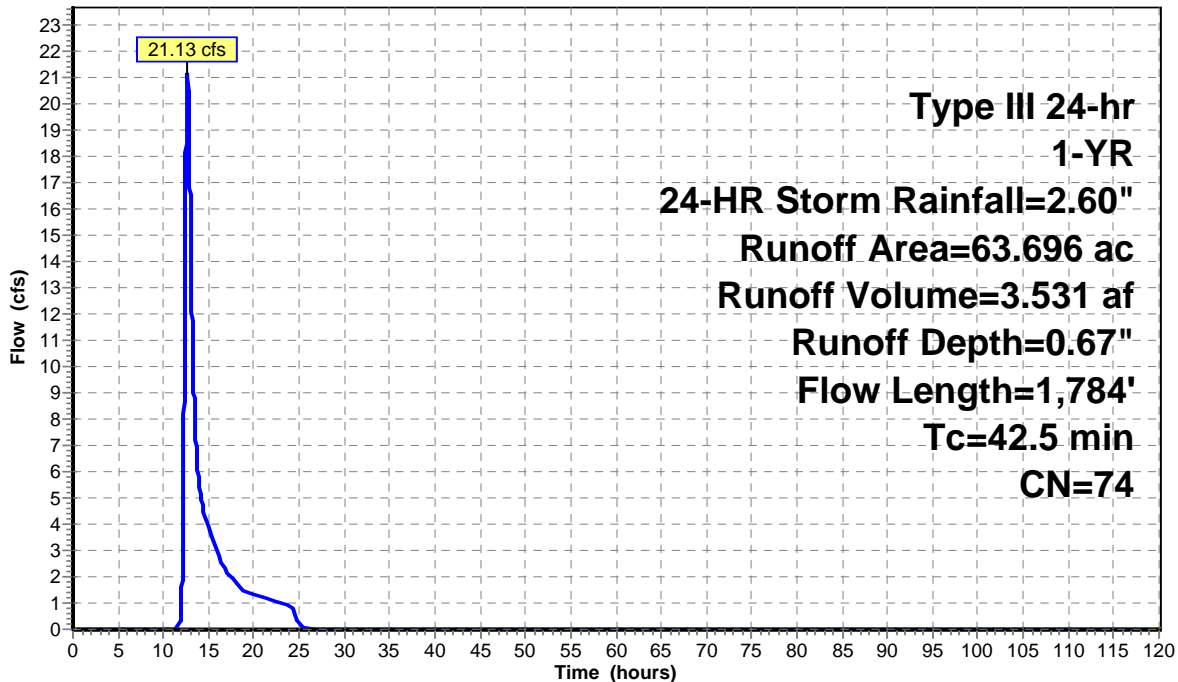
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

Area (ac)	CN	Description
35.460	70	Woods, Good, HSG C
6.964	77	Woods, Good, HSG D
12.164	74	>75% Grass cover, Good, HSG C
7.641	86	<50% Grass cover, Poor, HSG C
1.467	98	Unconnected roofs, HSG C
63.696	74	Weighted Average
62.229		97.70% Pervious Area
1.467		2.30% Impervious Area
1.467		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	100	0.0210	0.09		Sheet Flow, SHEET FLOW Woods: Light underbrush n= 0.400 P2= 3.75"
23.0	1,684	0.0594	1.22		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
42.5	1,784	Total			

Subcatchment 5: Pre-Development DA 5

Hydrograph



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Pre-Development Analysis (Concord - Phase I)
Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

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Hydrograph for Subcatchment 5: Pre-Development DA 5

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	2.60	0.67	0.00
2.00	0.05	0.00	0.00	106.00	2.60	0.67	0.00
4.00	0.11	0.00	0.00	108.00	2.60	0.67	0.00
6.00	0.19	0.00	0.00	110.00	2.60	0.67	0.00
8.00	0.30	0.00	0.00	112.00	2.60	0.67	0.00
10.00	0.49	0.00	0.00	114.00	2.60	0.67	0.00
12.00	1.30	0.09	1.33	116.00	2.60	0.67	0.00
14.00	2.11	0.40	5.42	118.00	2.60	0.67	0.00
16.00	2.30	0.50	2.90	120.00	2.60	0.67	0.00
18.00	2.41	0.56	1.75				
20.00	2.49	0.60	1.30				
22.00	2.55	0.64	1.09				
24.00	2.60	0.67	0.89				
26.00	2.60	0.67	0.00				
28.00	2.60	0.67	0.00				
30.00	2.60	0.67	0.00				
32.00	2.60	0.67	0.00				
34.00	2.60	0.67	0.00				
36.00	2.60	0.67	0.00				
38.00	2.60	0.67	0.00				
40.00	2.60	0.67	0.00				
42.00	2.60	0.67	0.00				
44.00	2.60	0.67	0.00				
46.00	2.60	0.67	0.00				
48.00	2.60	0.67	0.00				
50.00	2.60	0.67	0.00				
52.00	2.60	0.67	0.00				
54.00	2.60	0.67	0.00				
56.00	2.60	0.67	0.00				
58.00	2.60	0.67	0.00				
60.00	2.60	0.67	0.00				
62.00	2.60	0.67	0.00				
64.00	2.60	0.67	0.00				
66.00	2.60	0.67	0.00				
68.00	2.60	0.67	0.00				
70.00	2.60	0.67	0.00				
72.00	2.60	0.67	0.00				
74.00	2.60	0.67	0.00				
76.00	2.60	0.67	0.00				
78.00	2.60	0.67	0.00				
80.00	2.60	0.67	0.00				
82.00	2.60	0.67	0.00				
84.00	2.60	0.67	0.00				
86.00	2.60	0.67	0.00				
88.00	2.60	0.67	0.00				
90.00	2.60	0.67	0.00				
92.00	2.60	0.67	0.00				
94.00	2.60	0.67	0.00				
96.00	2.60	0.67	0.00				
98.00	2.60	0.67	0.00				
100.00	2.60	0.67	0.00				
102.00	2.60	0.67	0.00				

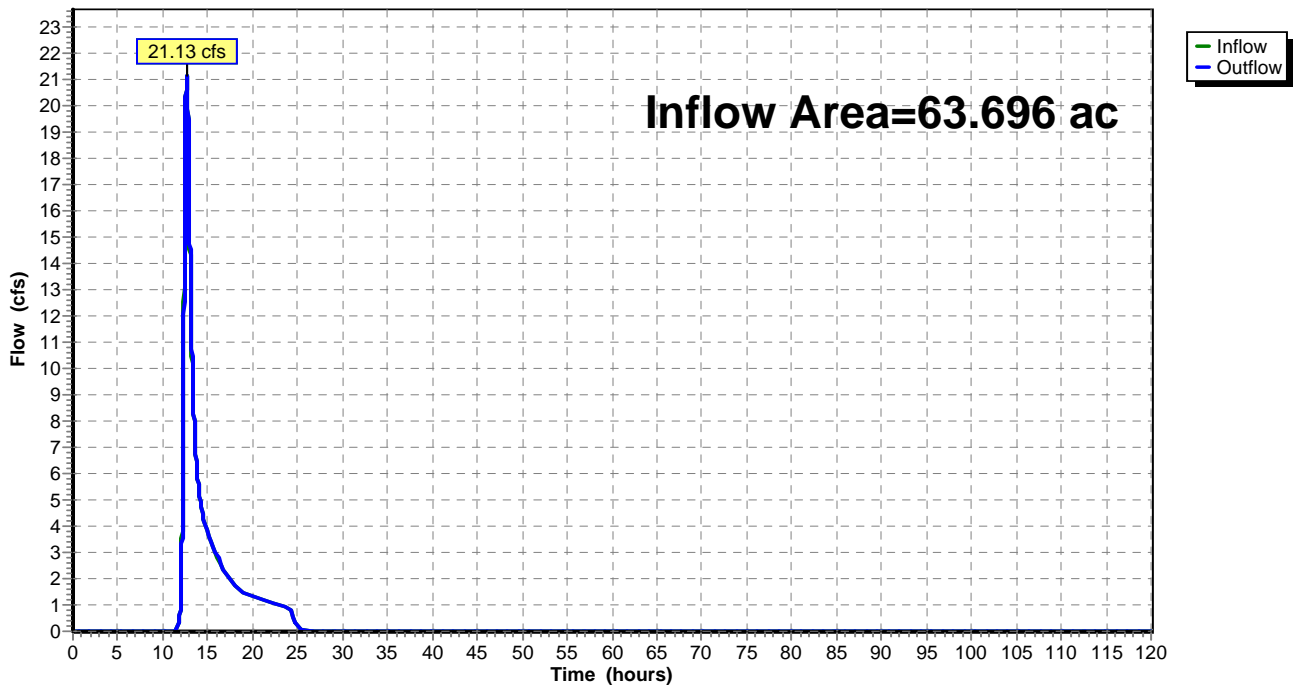
Summary for Reach DP 3: DP 3

Inflow Area = 63.696 ac, 2.30% Impervious, Inflow Depth = 0.67" for 1-YR, 24-HR Storm event
Inflow = 21.13 cfs @ 12.66 hrs, Volume= 3.531 af
Outflow = 21.13 cfs @ 12.67 hrs, Volume= 3.531 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach DP 3: DP 3

Hydrograph



Hydrograph for Reach DP 3: DP 3

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.00		0.00
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.00		0.00	110.00	0.00		0.00
8.00	0.00		0.00	112.00	0.00		0.00
10.00	0.00		0.00	114.00	0.00		0.00
12.00	1.33		1.23	116.00	0.00		0.00
14.00	5.42		5.44	118.00	0.00		0.00
16.00	2.90		2.91	120.00	0.00		0.00
18.00	1.75		1.75				
20.00	1.30		1.30				
22.00	1.09		1.09				
24.00	0.89		0.89				
26.00	0.00		0.00				
28.00	0.00		0.00				
30.00	0.00		0.00				
32.00	0.00		0.00				
34.00	0.00		0.00				
36.00	0.00		0.00				
38.00	0.00		0.00				
40.00	0.00		0.00				
42.00	0.00		0.00				
44.00	0.00		0.00				
46.00	0.00		0.00				
48.00	0.00		0.00				
50.00	0.00		0.00				
52.00	0.00		0.00				
54.00	0.00		0.00				
56.00	0.00		0.00				
58.00	0.00		0.00				
60.00	0.00		0.00				
62.00	0.00		0.00				
64.00	0.00		0.00				
66.00	0.00		0.00				
68.00	0.00		0.00				
70.00	0.00		0.00				
72.00	0.00		0.00				
74.00	0.00		0.00				
76.00	0.00		0.00				
78.00	0.00		0.00				
80.00	0.00		0.00				
82.00	0.00		0.00				
84.00	0.00		0.00				
86.00	0.00		0.00				
88.00	0.00		0.00				
90.00	0.00		0.00				
92.00	0.00		0.00				
94.00	0.00		0.00				
96.00	0.00		0.00				
98.00	0.00		0.00				
100.00	0.00		0.00				
102.00	0.00		0.00				

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Pre-Development Analysis (Concord - Phase I)
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Summary for Subcatchment 5: Pre-Development DA 5

Runoff = 113.57 cfs @ 12.61 hrs, Volume= 16.905 af, Depth= 3.18"

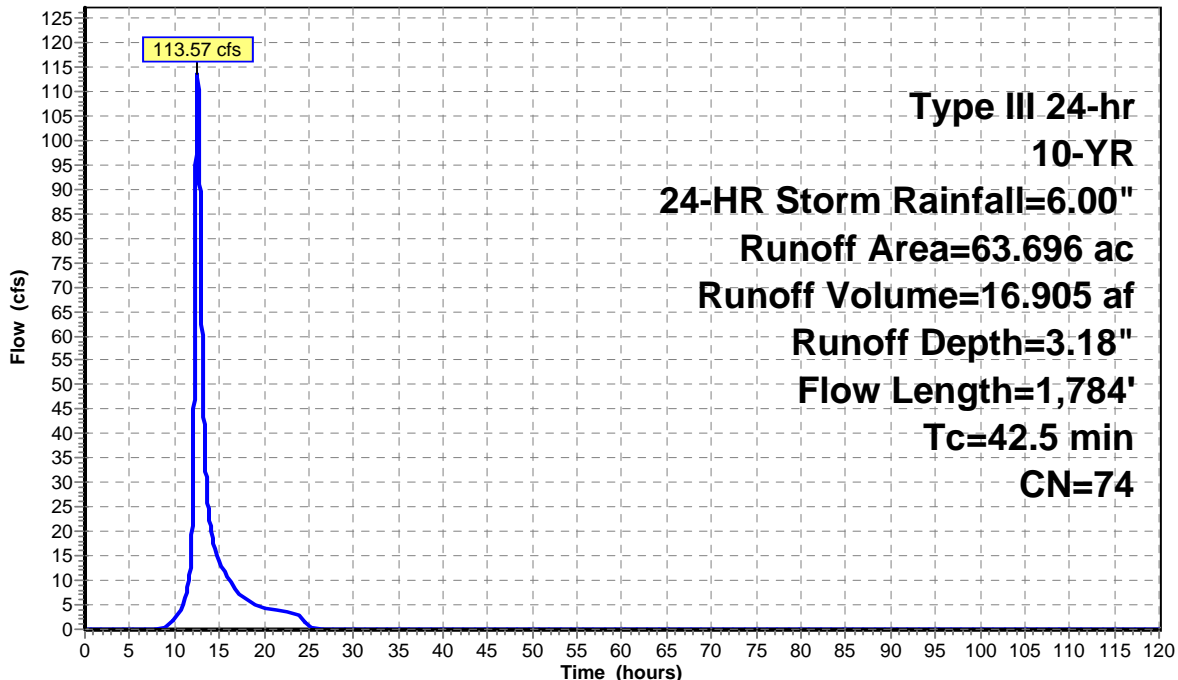
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

Area (ac)	CN	Description
35.460	70	Woods, Good, HSG C
6.964	77	Woods, Good, HSG D
12.164	74	>75% Grass cover, Good, HSG C
7.641	86	<50% Grass cover, Poor, HSG C
1.467	98	Unconnected roofs, HSG C
63.696	74	Weighted Average
62.229		97.70% Pervious Area
1.467		2.30% Impervious Area
1.467		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	100	0.0210	0.09		Sheet Flow, SHEET FLOW Woods: Light underbrush n= 0.400 P2= 3.75"
23.0	1,684	0.0594	1.22		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
42.5	1,784	Total			

Subcatchment 5: Pre-Development DA 5

Hydrograph



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Pre-Development Analysis (Concord - Phase I)

Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Subcatchment 5: Pre-Development DA 5

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	6.00	3.18	0.00
2.00	0.12	0.00	0.00	106.00	6.00	3.18	0.00
4.00	0.26	0.00	0.00	108.00	6.00	3.18	0.00
6.00	0.43	0.00	0.00	110.00	6.00	3.18	0.00
8.00	0.68	0.00	0.00	112.00	6.00	3.18	0.00
10.00	1.13	0.05	2.13	114.00	6.00	3.18	0.00
12.00	3.00	0.91	23.49	116.00	6.00	3.18	0.00
14.00	4.87	2.26	21.12	118.00	6.00	3.18	0.00
16.00	5.32	2.62	10.44	120.00	6.00	3.18	0.00
18.00	5.57	2.83	6.11				
20.00	5.74	2.97	4.47				
22.00	5.88	3.09	3.69				
24.00	6.00	3.18	2.99				
26.00	6.00	3.18	0.01				
28.00	6.00	3.18	0.00				
30.00	6.00	3.18	0.00				
32.00	6.00	3.18	0.00				
34.00	6.00	3.18	0.00				
36.00	6.00	3.18	0.00				
38.00	6.00	3.18	0.00				
40.00	6.00	3.18	0.00				
42.00	6.00	3.18	0.00				
44.00	6.00	3.18	0.00				
46.00	6.00	3.18	0.00				
48.00	6.00	3.18	0.00				
50.00	6.00	3.18	0.00				
52.00	6.00	3.18	0.00				
54.00	6.00	3.18	0.00				
56.00	6.00	3.18	0.00				
58.00	6.00	3.18	0.00				
60.00	6.00	3.18	0.00				
62.00	6.00	3.18	0.00				
64.00	6.00	3.18	0.00				
66.00	6.00	3.18	0.00				
68.00	6.00	3.18	0.00				
70.00	6.00	3.18	0.00				
72.00	6.00	3.18	0.00				
74.00	6.00	3.18	0.00				
76.00	6.00	3.18	0.00				
78.00	6.00	3.18	0.00				
80.00	6.00	3.18	0.00				
82.00	6.00	3.18	0.00				
84.00	6.00	3.18	0.00				
86.00	6.00	3.18	0.00				
88.00	6.00	3.18	0.00				
90.00	6.00	3.18	0.00				
92.00	6.00	3.18	0.00				
94.00	6.00	3.18	0.00				
96.00	6.00	3.18	0.00				
98.00	6.00	3.18	0.00				
100.00	6.00	3.18	0.00				
102.00	6.00	3.18	0.00				

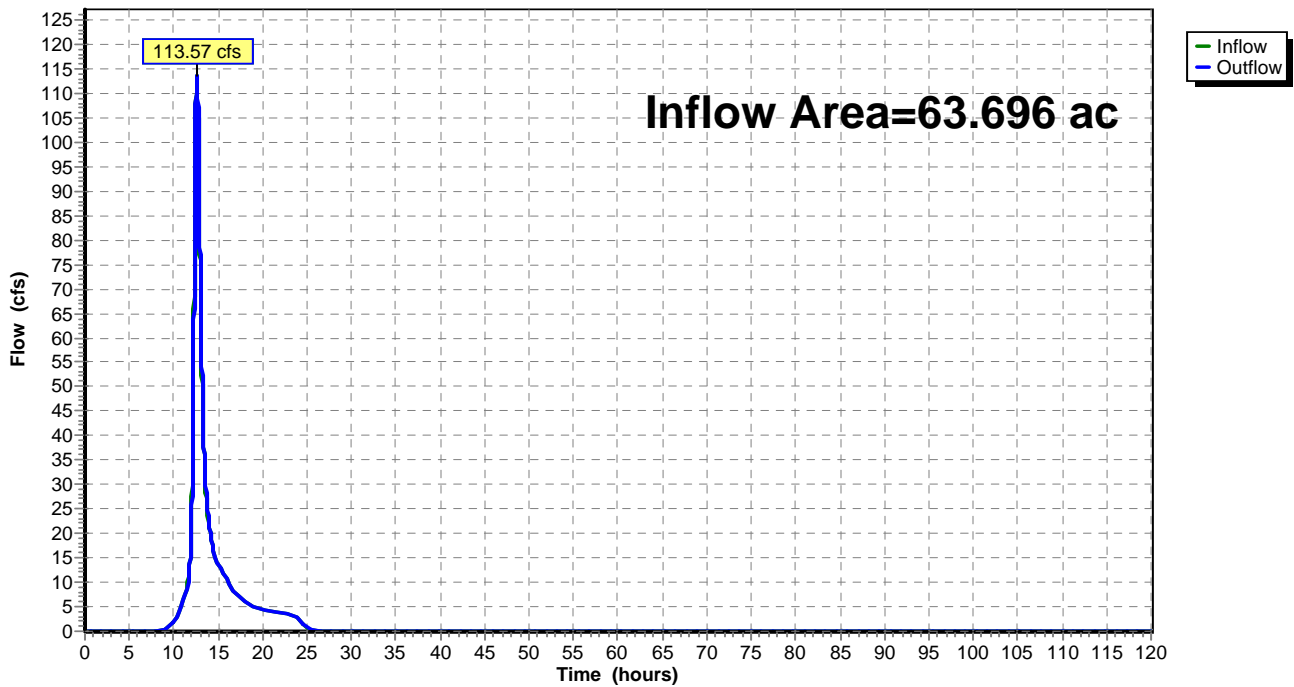
Summary for Reach DP 3: DP 3

Inflow Area = 63.696 ac, 2.30% Impervious, Inflow Depth = 3.18" for 10-YR, 24-HR Storm event
Inflow = 113.57 cfs @ 12.61 hrs, Volume= 16.905 af
Outflow = 113.57 cfs @ 12.62 hrs, Volume= 16.905 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach DP 3: DP 3

Hydrograph



Hydrograph for Reach DP 3: DP 3

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.00		0.00
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.00		0.00	110.00	0.00		0.00
8.00	0.00		0.00	112.00	0.00		0.00
10.00	2.13		2.11	114.00	0.00		0.00
12.00	23.49		22.71	116.00	0.00		0.00
14.00	21.12		21.24	118.00	0.00		0.00
16.00	10.44		10.47	120.00	0.00		0.00
18.00	6.11		6.12				
20.00	4.47		4.47				
22.00	3.69		3.70				
24.00	2.99		2.99				
26.00	0.01		0.01				
28.00	0.00		0.00				
30.00	0.00		0.00				
32.00	0.00		0.00				
34.00	0.00		0.00				
36.00	0.00		0.00				
38.00	0.00		0.00				
40.00	0.00		0.00				
42.00	0.00		0.00				
44.00	0.00		0.00				
46.00	0.00		0.00				
48.00	0.00		0.00				
50.00	0.00		0.00				
52.00	0.00		0.00				
54.00	0.00		0.00				
56.00	0.00		0.00				
58.00	0.00		0.00				
60.00	0.00		0.00				
62.00	0.00		0.00				
64.00	0.00		0.00				
66.00	0.00		0.00				
68.00	0.00		0.00				
70.00	0.00		0.00				
72.00	0.00		0.00				
74.00	0.00		0.00				
76.00	0.00		0.00				
78.00	0.00		0.00				
80.00	0.00		0.00				
82.00	0.00		0.00				
84.00	0.00		0.00				
86.00	0.00		0.00				
88.00	0.00		0.00				
90.00	0.00		0.00				
92.00	0.00		0.00				
94.00	0.00		0.00				
96.00	0.00		0.00				
98.00	0.00		0.00				
100.00	0.00		0.00				
102.00	0.00		0.00				

Summary for Subcatchment 5: Pre-Development DA 5

Runoff = 175.38 cfs @ 12.60 hrs, Volume= 26.145 af, Depth= 4.93"

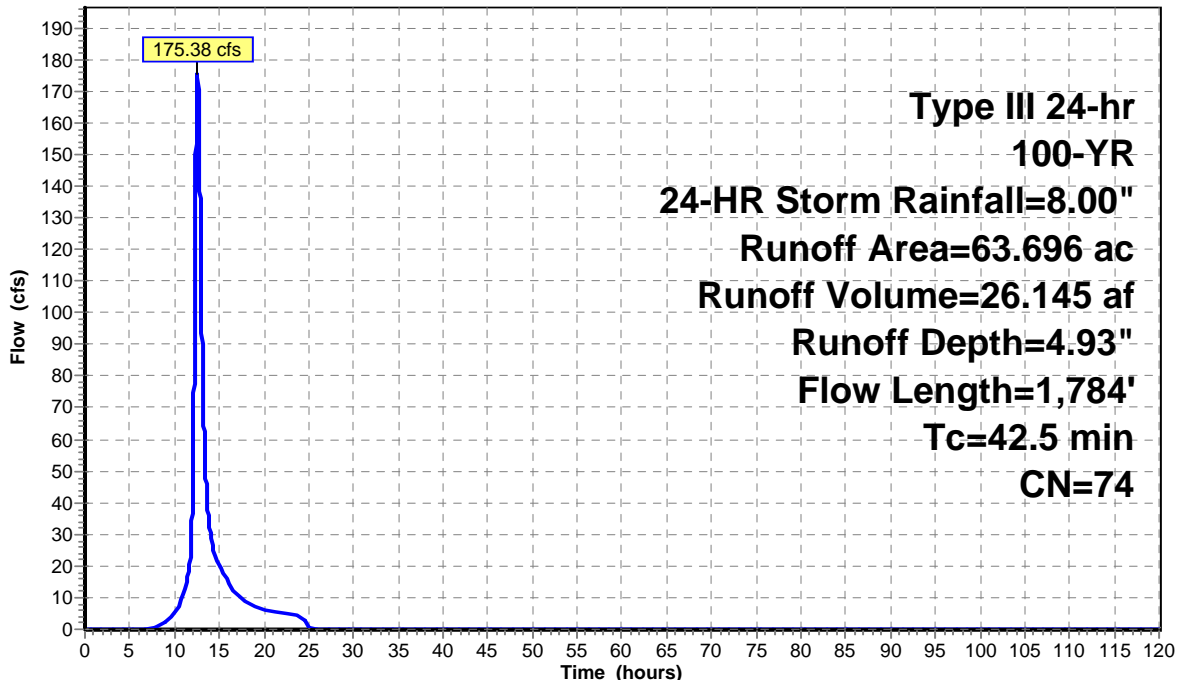
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Area (ac)	CN	Description
35.460	70	Woods, Good, HSG C
6.964	77	Woods, Good, HSG D
12.164	74	>75% Grass cover, Good, HSG C
7.641	86	<50% Grass cover, Poor, HSG C
1.467	98	Unconnected roofs, HSG C
63.696	74	Weighted Average
62.229		97.70% Pervious Area
1.467		2.30% Impervious Area
1.467		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	100	0.0210	0.09		Sheet Flow, SHEET FLOW Woods: Light underbrush n= 0.400 P2= 3.75"
23.0	1,684	0.0594	1.22		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
42.5	1,784	Total			

Subcatchment 5: Pre-Development DA 5

Hydrograph



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Pre-Development Analysis (Concord - Phase I)

Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

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Hydrograph for Subcatchment 5: Pre-Development DA 5

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	8.00	4.93	0.00
2.00	0.16	0.00	0.00	106.00	8.00	4.93	0.00
4.00	0.34	0.00	0.00	108.00	8.00	4.93	0.00
6.00	0.58	0.00	0.00	110.00	8.00	4.93	0.00
8.00	0.91	0.01	0.57	112.00	8.00	4.93	0.00
10.00	1.51	0.15	5.62	114.00	8.00	4.93	0.00
12.00	4.00	1.60	40.49	116.00	8.00	4.93	0.00
14.00	6.49	3.60	30.81	118.00	8.00	4.93	0.00
16.00	7.09	4.12	15.00	120.00	8.00	4.93	0.00
18.00	7.42	4.41	8.72				
20.00	7.66	4.62	6.37				
22.00	7.85	4.79	5.25				
24.00	8.00	4.93	4.24				
26.00	8.00	4.93	0.01				
28.00	8.00	4.93	0.00				
30.00	8.00	4.93	0.00				
32.00	8.00	4.93	0.00				
34.00	8.00	4.93	0.00				
36.00	8.00	4.93	0.00				
38.00	8.00	4.93	0.00				
40.00	8.00	4.93	0.00				
42.00	8.00	4.93	0.00				
44.00	8.00	4.93	0.00				
46.00	8.00	4.93	0.00				
48.00	8.00	4.93	0.00				
50.00	8.00	4.93	0.00				
52.00	8.00	4.93	0.00				
54.00	8.00	4.93	0.00				
56.00	8.00	4.93	0.00				
58.00	8.00	4.93	0.00				
60.00	8.00	4.93	0.00				
62.00	8.00	4.93	0.00				
64.00	8.00	4.93	0.00				
66.00	8.00	4.93	0.00				
68.00	8.00	4.93	0.00				
70.00	8.00	4.93	0.00				
72.00	8.00	4.93	0.00				
74.00	8.00	4.93	0.00				
76.00	8.00	4.93	0.00				
78.00	8.00	4.93	0.00				
80.00	8.00	4.93	0.00				
82.00	8.00	4.93	0.00				
84.00	8.00	4.93	0.00				
86.00	8.00	4.93	0.00				
88.00	8.00	4.93	0.00				
90.00	8.00	4.93	0.00				
92.00	8.00	4.93	0.00				
94.00	8.00	4.93	0.00				
96.00	8.00	4.93	0.00				
98.00	8.00	4.93	0.00				
100.00	8.00	4.93	0.00				
102.00	8.00	4.93	0.00				

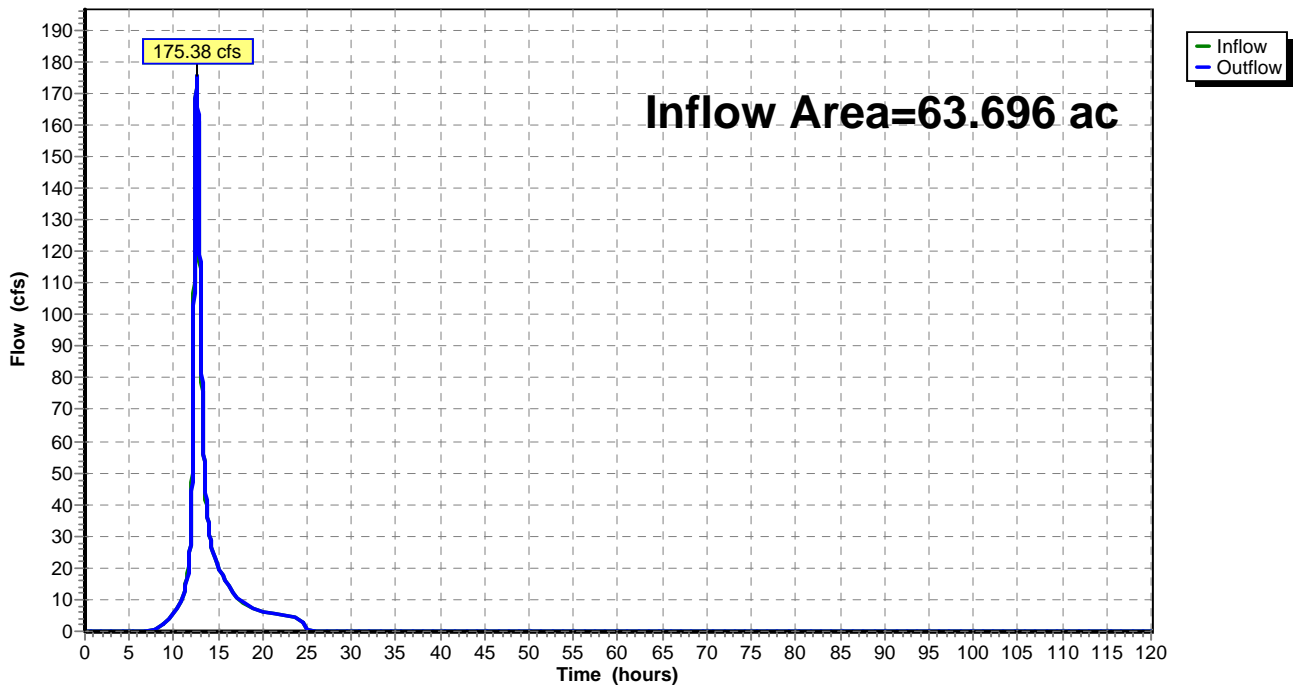
Summary for Reach DP 3: DP 3

Inflow Area = 63.696 ac, 2.30% Impervious, Inflow Depth = 4.93" for 100-YR, 24-HR Storm event
Inflow = 175.38 cfs @ 12.60 hrs, Volume= 26.145 af
Outflow = 175.38 cfs @ 12.61 hrs, Volume= 26.145 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

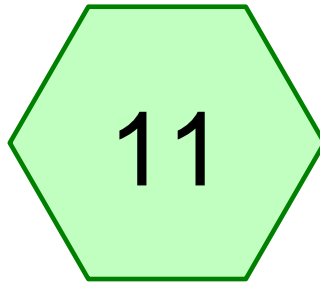
Reach DP 3: DP 3

Hydrograph

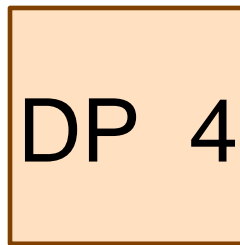
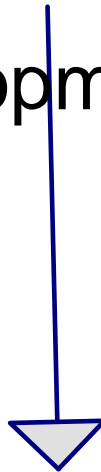


Hydrograph for Reach DP 3: DP 3

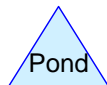
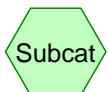
Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.00		0.00
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.00		0.00	110.00	0.00		0.00
8.00	0.57		0.56	112.00	0.00		0.00
10.00	5.62		5.58	114.00	0.00		0.00
12.00	40.49		39.23	116.00	0.00		0.00
14.00	30.81		30.99	118.00	0.00		0.00
16.00	15.00		15.05	120.00	0.00		0.00
18.00	8.72		8.75				
20.00	6.37		6.37				
22.00	5.25		5.26				
24.00	4.24		4.24				
26.00	0.01		0.01				
28.00	0.00		0.00				
30.00	0.00		0.00				
32.00	0.00		0.00				
34.00	0.00		0.00				
36.00	0.00		0.00				
38.00	0.00		0.00				
40.00	0.00		0.00				
42.00	0.00		0.00				
44.00	0.00		0.00				
46.00	0.00		0.00				
48.00	0.00		0.00				
50.00	0.00		0.00				
52.00	0.00		0.00				
54.00	0.00		0.00				
56.00	0.00		0.00				
58.00	0.00		0.00				
60.00	0.00		0.00				
62.00	0.00		0.00				
64.00	0.00		0.00				
66.00	0.00		0.00				
68.00	0.00		0.00				
70.00	0.00		0.00				
72.00	0.00		0.00				
74.00	0.00		0.00				
76.00	0.00		0.00				
78.00	0.00		0.00				
80.00	0.00		0.00				
82.00	0.00		0.00				
84.00	0.00		0.00				
86.00	0.00		0.00				
88.00	0.00		0.00				
90.00	0.00		0.00				
92.00	0.00		0.00				
94.00	0.00		0.00				
96.00	0.00		0.00				
98.00	0.00		0.00				
100.00	0.00		0.00				
102.00	0.00		0.00				



Pre-Development DA 11



DP 4



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Pre-Development Design Point 4 (Concord Phase 1)
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"
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Summary for Subcatchment 11: Pre-Development DA 11

Runoff = 10.46 cfs @ 12.34 hrs, Volume= 1.255 af, Depth= 0.71"

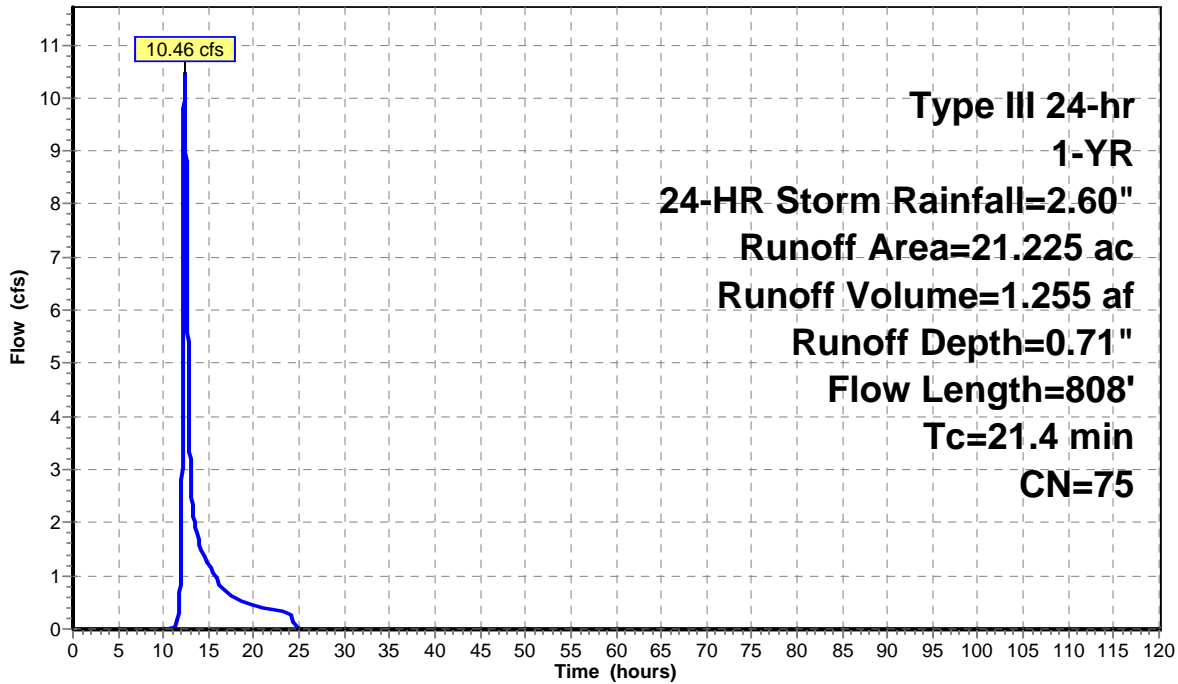
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

Area (ac)	CN	Description
7.693	72	Woods/grass comb., Good, HSG C
1.535	79	Woods/grass comb., Good, HSG D
8.106	74	>75% Grass cover, Good, HSG C
3.891	80	>75% Grass cover, Good, HSG D
21.225	75	Weighted Average
21.225		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.1040	0.16		Sheet Flow, SHEET FLOW Woods: Light underbrush n= 0.400 P2= 3.75"
11.1	708	0.0450	1.06		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
21.4	808	Total			

Subcatchment 11: Pre-Development DA 11

Hydrograph



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Pre-Development Design Point 4 (Concord Phase 1)

Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

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Hydrograph for Subcatchment 11: Pre-Development DA 11

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	2.60	0.71	0.00
2.00	0.05	0.00	0.00	106.00	2.60	0.71	0.00
4.00	0.11	0.00	0.00	108.00	2.60	0.71	0.00
6.00	0.19	0.00	0.00	110.00	2.60	0.71	0.00
8.00	0.30	0.00	0.00	112.00	2.60	0.71	0.00
10.00	0.49	0.00	0.00	114.00	2.60	0.71	0.00
12.00	1.30	0.10	2.16	116.00	2.60	0.71	0.00
14.00	2.11	0.44	1.59	118.00	2.60	0.71	0.00
16.00	2.30	0.54	0.91	120.00	2.60	0.71	0.00
18.00	2.41	0.60	0.56				
20.00	2.49	0.64	0.44				
22.00	2.55	0.68	0.37				
24.00	2.60	0.71	0.30				
26.00	2.60	0.71	0.00				
28.00	2.60	0.71	0.00				
30.00	2.60	0.71	0.00				
32.00	2.60	0.71	0.00				
34.00	2.60	0.71	0.00				
36.00	2.60	0.71	0.00				
38.00	2.60	0.71	0.00				
40.00	2.60	0.71	0.00				
42.00	2.60	0.71	0.00				
44.00	2.60	0.71	0.00				
46.00	2.60	0.71	0.00				
48.00	2.60	0.71	0.00				
50.00	2.60	0.71	0.00				
52.00	2.60	0.71	0.00				
54.00	2.60	0.71	0.00				
56.00	2.60	0.71	0.00				
58.00	2.60	0.71	0.00				
60.00	2.60	0.71	0.00				
62.00	2.60	0.71	0.00				
64.00	2.60	0.71	0.00				
66.00	2.60	0.71	0.00				
68.00	2.60	0.71	0.00				
70.00	2.60	0.71	0.00				
72.00	2.60	0.71	0.00				
74.00	2.60	0.71	0.00				
76.00	2.60	0.71	0.00				
78.00	2.60	0.71	0.00				
80.00	2.60	0.71	0.00				
82.00	2.60	0.71	0.00				
84.00	2.60	0.71	0.00				
86.00	2.60	0.71	0.00				
88.00	2.60	0.71	0.00				
90.00	2.60	0.71	0.00				
92.00	2.60	0.71	0.00				
94.00	2.60	0.71	0.00				
96.00	2.60	0.71	0.00				
98.00	2.60	0.71	0.00				
100.00	2.60	0.71	0.00				
102.00	2.60	0.71	0.00				

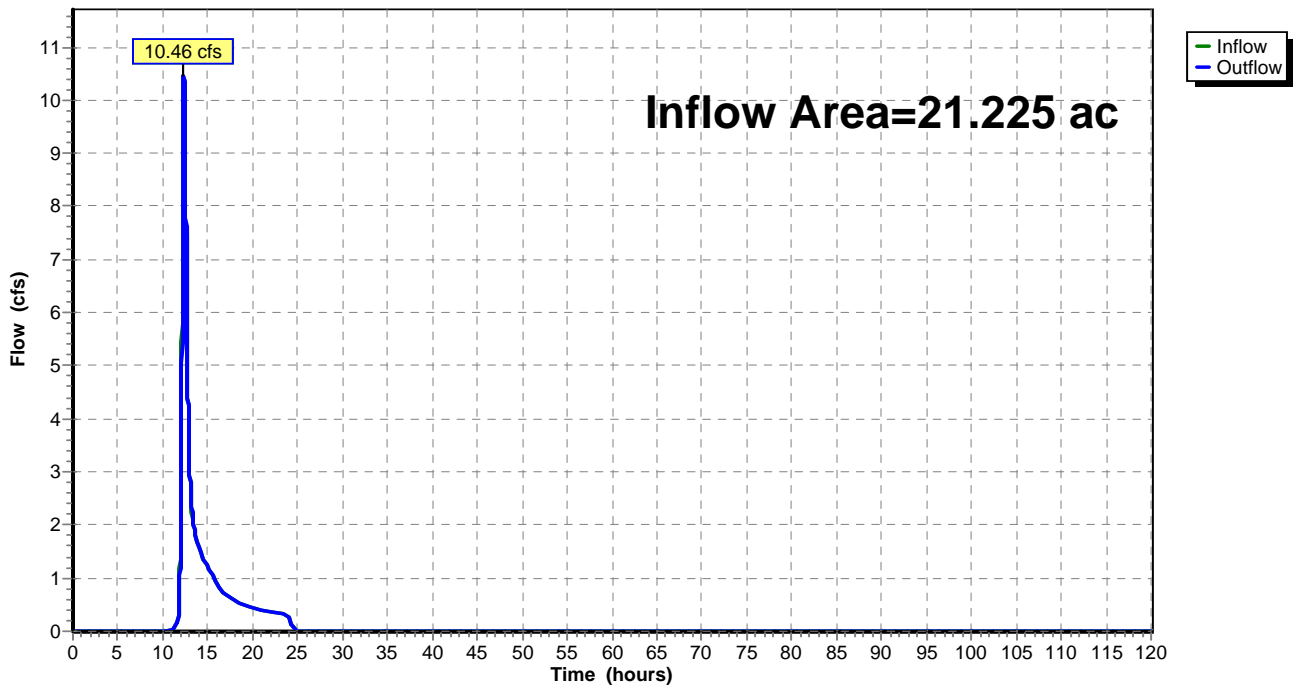
Summary for Reach DP 4: DP 4

Inflow Area = 21.225 ac, 0.00% Impervious, Inflow Depth = 0.71" for 1-YR, 24-HR Storm event
Inflow = 10.46 cfs @ 12.34 hrs, Volume= 1.255 af
Outflow = 10.46 cfs @ 12.35 hrs, Volume= 1.255 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach DP 4: DP 4

Hydrograph



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Pre-Development Design Point 4 (Concord Phase 1)

Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

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Hydrograph for Reach DP 4: DP 4

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.00		0.00
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.00		0.00	110.00	0.00		0.00
8.00	0.00		0.00	112.00	0.00		0.00
10.00	0.00		0.00	114.00	0.00		0.00
12.00	2.16		2.02	116.00	0.00		0.00
14.00	1.59		1.60	118.00	0.00		0.00
16.00	0.91		0.91	120.00	0.00		0.00
18.00	0.56		0.56				
20.00	0.44		0.44				
22.00	0.37		0.37				
24.00	0.30		0.30				
26.00	0.00		0.00				
28.00	0.00		0.00				
30.00	0.00		0.00				
32.00	0.00		0.00				
34.00	0.00		0.00				
36.00	0.00		0.00				
38.00	0.00		0.00				
40.00	0.00		0.00				
42.00	0.00		0.00				
44.00	0.00		0.00				
46.00	0.00		0.00				
48.00	0.00		0.00				
50.00	0.00		0.00				
52.00	0.00		0.00				
54.00	0.00		0.00				
56.00	0.00		0.00				
58.00	0.00		0.00				
60.00	0.00		0.00				
62.00	0.00		0.00				
64.00	0.00		0.00				
66.00	0.00		0.00				
68.00	0.00		0.00				
70.00	0.00		0.00				
72.00	0.00		0.00				
74.00	0.00		0.00				
76.00	0.00		0.00				
78.00	0.00		0.00				
80.00	0.00		0.00				
82.00	0.00		0.00				
84.00	0.00		0.00				
86.00	0.00		0.00				
88.00	0.00		0.00				
90.00	0.00		0.00				
92.00	0.00		0.00				
94.00	0.00		0.00				
96.00	0.00		0.00				
98.00	0.00		0.00				
100.00	0.00		0.00				
102.00	0.00		0.00				

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Pre-Development Design Point 4 (Concord Phase 1)
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Summary for Subcatchment 11: Pre-Development DA 11

Runoff = 53.58 cfs @ 12.29 hrs, Volume= 5.805 af, Depth= 3.28"

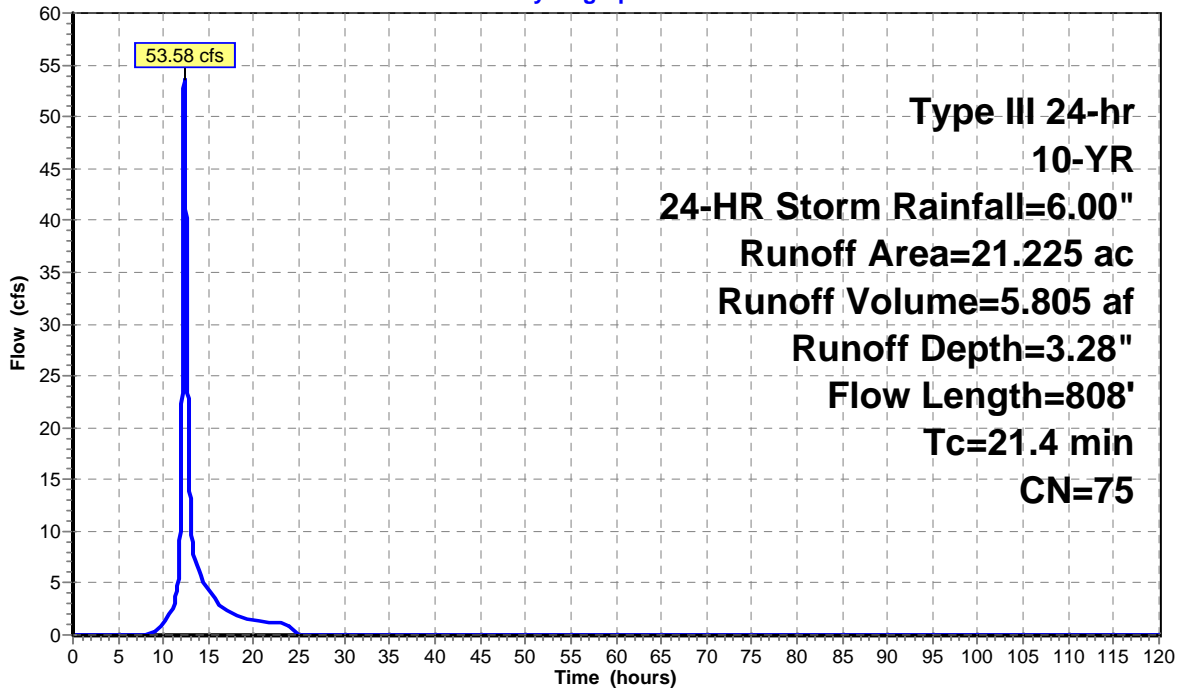
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

Area (ac)	CN	Description
7.693	72	Woods/grass comb., Good, HSG C
1.535	79	Woods/grass comb., Good, HSG D
8.106	74	>75% Grass cover, Good, HSG C
3.891	80	>75% Grass cover, Good, HSG D
21.225	75	Weighted Average
21.225		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.1040	0.16		Sheet Flow, SHEET FLOW Woods: Light underbrush n= 0.400 P2= 3.75"
11.1	708	0.0450	1.06		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
21.4	808	Total			

Subcatchment 11: Pre-Development DA 11

Hydrograph



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Pre-Development Design Point 4 (Concord Phase 1)
Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Subcatchment 11: Pre-Development DA 11

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	6.00	3.28	0.00
2.00	0.12	0.00	0.00	106.00	6.00	3.28	0.00
4.00	0.26	0.00	0.00	108.00	6.00	3.28	0.00
6.00	0.43	0.00	0.00	110.00	6.00	3.28	0.00
8.00	0.68	0.00	0.00	112.00	6.00	3.28	0.00
10.00	1.13	0.06	1.12	114.00	6.00	3.28	0.00
12.00	3.00	0.96	18.85	116.00	6.00	3.28	0.00
14.00	4.87	2.34	5.84	118.00	6.00	3.28	0.00
16.00	5.32	2.71	3.15	120.00	6.00	3.28	0.00
18.00	5.57	2.92	1.89				
20.00	5.74	3.06	1.46				
22.00	5.88	3.18	1.21				
24.00	6.00	3.28	0.97				
26.00	6.00	3.28	0.00				
28.00	6.00	3.28	0.00				
30.00	6.00	3.28	0.00				
32.00	6.00	3.28	0.00				
34.00	6.00	3.28	0.00				
36.00	6.00	3.28	0.00				
38.00	6.00	3.28	0.00				
40.00	6.00	3.28	0.00				
42.00	6.00	3.28	0.00				
44.00	6.00	3.28	0.00				
46.00	6.00	3.28	0.00				
48.00	6.00	3.28	0.00				
50.00	6.00	3.28	0.00				
52.00	6.00	3.28	0.00				
54.00	6.00	3.28	0.00				
56.00	6.00	3.28	0.00				
58.00	6.00	3.28	0.00				
60.00	6.00	3.28	0.00				
62.00	6.00	3.28	0.00				
64.00	6.00	3.28	0.00				
66.00	6.00	3.28	0.00				
68.00	6.00	3.28	0.00				
70.00	6.00	3.28	0.00				
72.00	6.00	3.28	0.00				
74.00	6.00	3.28	0.00				
76.00	6.00	3.28	0.00				
78.00	6.00	3.28	0.00				
80.00	6.00	3.28	0.00				
82.00	6.00	3.28	0.00				
84.00	6.00	3.28	0.00				
86.00	6.00	3.28	0.00				
88.00	6.00	3.28	0.00				
90.00	6.00	3.28	0.00				
92.00	6.00	3.28	0.00				
94.00	6.00	3.28	0.00				
96.00	6.00	3.28	0.00				
98.00	6.00	3.28	0.00				
100.00	6.00	3.28	0.00				
102.00	6.00	3.28	0.00				

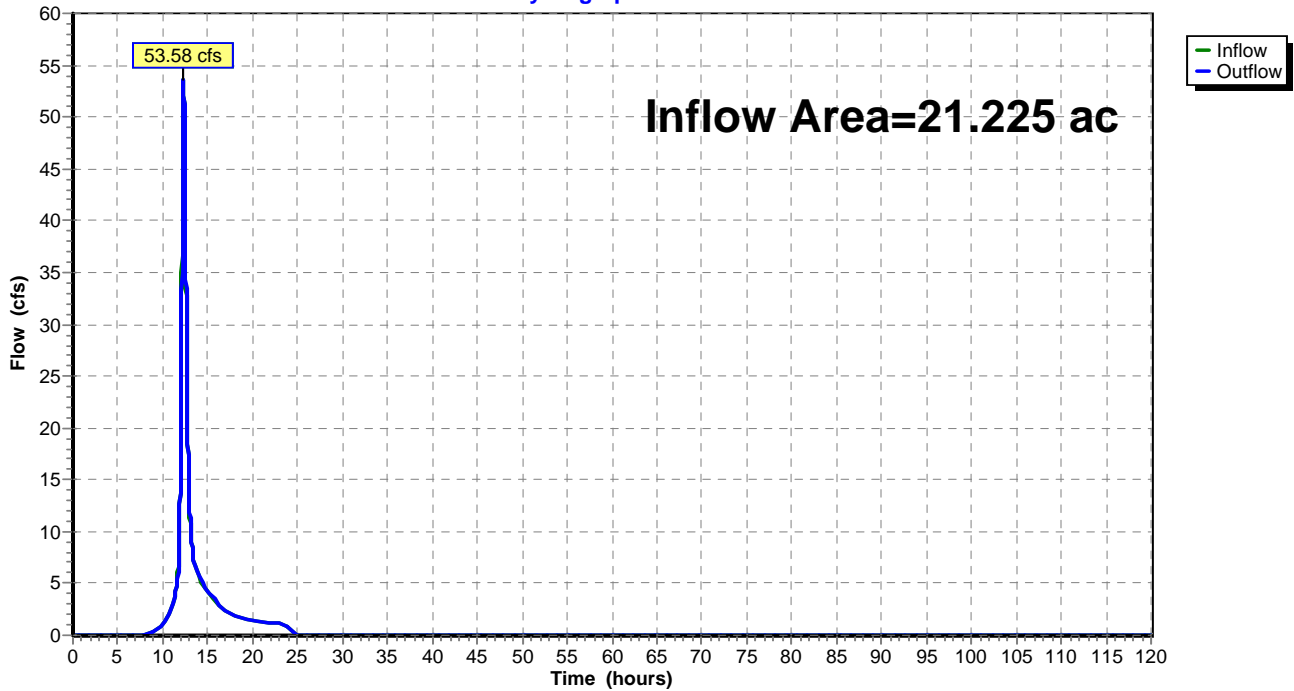
Summary for Reach DP 4: DP 4

Inflow Area = 21.225 ac, 0.00% Impervious, Inflow Depth = 3.28" for 10-YR, 24-HR Storm event
Inflow = 53.58 cfs @ 12.29 hrs, Volume= 5.805 af
Outflow = 53.58 cfs @ 12.30 hrs, Volume= 5.805 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach DP 4: DP 4

Hydrograph



Hydrograph for Reach DP 4: DP 4

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.00		0.00
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.00		0.00	110.00	0.00		0.00
8.00	0.00		0.00	112.00	0.00		0.00
10.00	1.12		1.11	114.00	0.00		0.00
12.00	18.85		18.10	116.00	0.00		0.00
14.00	5.84		5.86	118.00	0.00		0.00
16.00	3.15		3.16	120.00	0.00		0.00
18.00	1.89		1.90				
20.00	1.46		1.46				
22.00	1.21		1.21				
24.00	0.97		0.97				
26.00	0.00		0.00				
28.00	0.00		0.00				
30.00	0.00		0.00				
32.00	0.00		0.00				
34.00	0.00		0.00				
36.00	0.00		0.00				
38.00	0.00		0.00				
40.00	0.00		0.00				
42.00	0.00		0.00				
44.00	0.00		0.00				
46.00	0.00		0.00				
48.00	0.00		0.00				
50.00	0.00		0.00				
52.00	0.00		0.00				
54.00	0.00		0.00				
56.00	0.00		0.00				
58.00	0.00		0.00				
60.00	0.00		0.00				
62.00	0.00		0.00				
64.00	0.00		0.00				
66.00	0.00		0.00				
68.00	0.00		0.00				
70.00	0.00		0.00				
72.00	0.00		0.00				
74.00	0.00		0.00				
76.00	0.00		0.00				
78.00	0.00		0.00				
80.00	0.00		0.00				
82.00	0.00		0.00				
84.00	0.00		0.00				
86.00	0.00		0.00				
88.00	0.00		0.00				
90.00	0.00		0.00				
92.00	0.00		0.00				
94.00	0.00		0.00				
96.00	0.00		0.00				
98.00	0.00		0.00				
100.00	0.00		0.00				
102.00	0.00		0.00				

Summary for Subcatchment 11: Pre-Development DA 11

Runoff = 82.18 cfs @ 12.29 hrs, Volume= 8.917 af, Depth= 5.04"

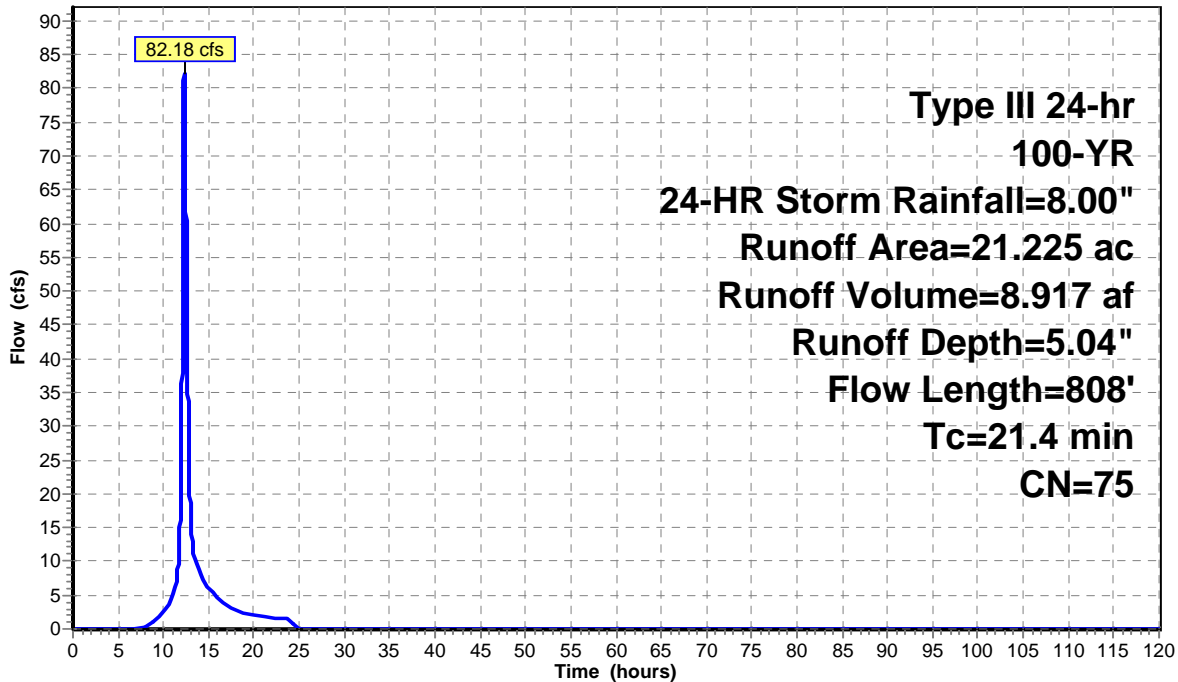
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Area (ac)	CN	Description
7.693	72	Woods/grass comb., Good, HSG C
1.535	79	Woods/grass comb., Good, HSG D
8.106	74	>75% Grass cover, Good, HSG C
3.891	80	>75% Grass cover, Good, HSG D
21.225	75	Weighted Average
21.225		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.1040	0.16		Sheet Flow, SHEET FLOW Woods: Light underbrush n= 0.400 P2= 3.75"
11.1	708	0.0450	1.06		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
21.4	808	Total			

Subcatchment 11: Pre-Development DA 11

Hydrograph



Hydrograph for Subcatchment 11: Pre-Development DA 11

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	8.00	5.04	0.00
2.00	0.16	0.00	0.00	106.00	8.00	5.04	0.00
4.00	0.34	0.00	0.00	108.00	8.00	5.04	0.00
6.00	0.58	0.00	0.00	110.00	8.00	5.04	0.00
8.00	0.91	0.02	0.42	112.00	8.00	5.04	0.00
10.00	1.51	0.17	2.51	114.00	8.00	5.04	0.00
12.00	4.00	1.67	30.83	116.00	8.00	5.04	0.00
14.00	6.49	3.70	8.42	118.00	8.00	5.04	0.00
16.00	7.09	4.23	4.50	120.00	8.00	5.04	0.00
18.00	7.42	4.53	2.69				
20.00	7.66	4.73	2.07				
22.00	7.85	4.90	1.71				
24.00	8.00	5.04	1.37				
26.00	8.00	5.04	0.00				
28.00	8.00	5.04	0.00				
30.00	8.00	5.04	0.00				
32.00	8.00	5.04	0.00				
34.00	8.00	5.04	0.00				
36.00	8.00	5.04	0.00				
38.00	8.00	5.04	0.00				
40.00	8.00	5.04	0.00				
42.00	8.00	5.04	0.00				
44.00	8.00	5.04	0.00				
46.00	8.00	5.04	0.00				
48.00	8.00	5.04	0.00				
50.00	8.00	5.04	0.00				
52.00	8.00	5.04	0.00				
54.00	8.00	5.04	0.00				
56.00	8.00	5.04	0.00				
58.00	8.00	5.04	0.00				
60.00	8.00	5.04	0.00				
62.00	8.00	5.04	0.00				
64.00	8.00	5.04	0.00				
66.00	8.00	5.04	0.00				
68.00	8.00	5.04	0.00				
70.00	8.00	5.04	0.00				
72.00	8.00	5.04	0.00				
74.00	8.00	5.04	0.00				
76.00	8.00	5.04	0.00				
78.00	8.00	5.04	0.00				
80.00	8.00	5.04	0.00				
82.00	8.00	5.04	0.00				
84.00	8.00	5.04	0.00				
86.00	8.00	5.04	0.00				
88.00	8.00	5.04	0.00				
90.00	8.00	5.04	0.00				
92.00	8.00	5.04	0.00				
94.00	8.00	5.04	0.00				
96.00	8.00	5.04	0.00				
98.00	8.00	5.04	0.00				
100.00	8.00	5.04	0.00				
102.00	8.00	5.04	0.00				

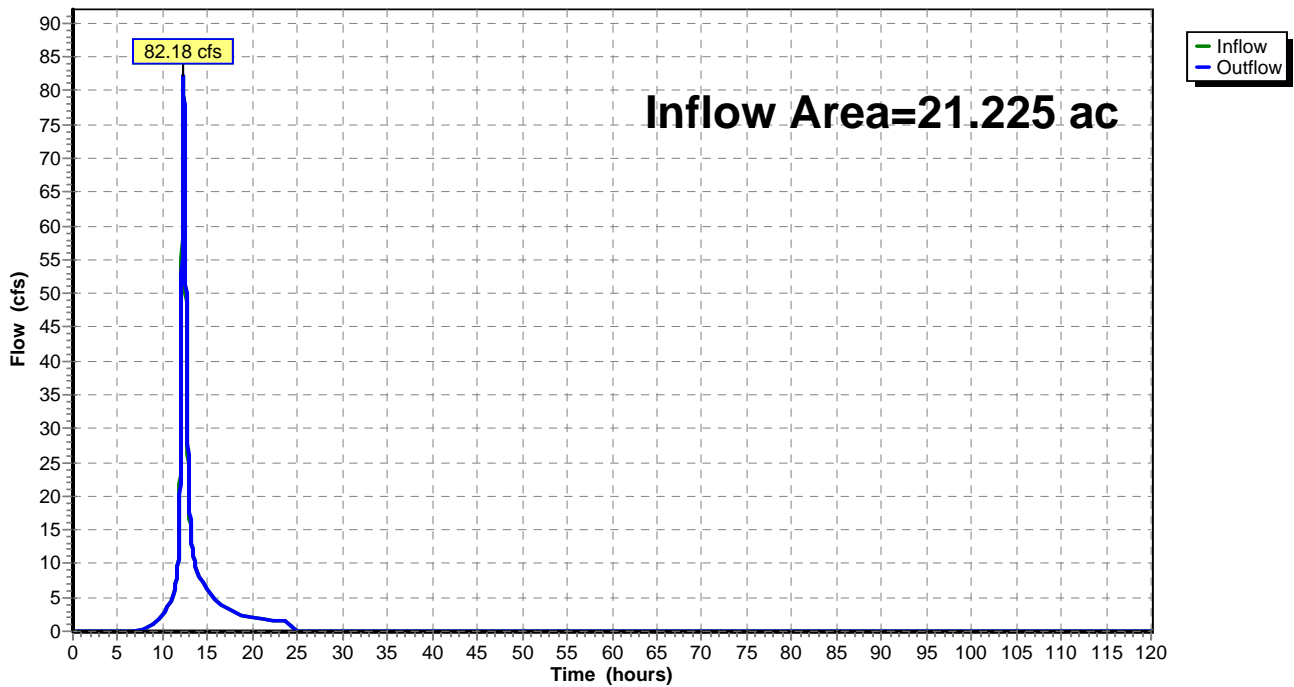
Summary for Reach DP 4: DP 4

Inflow Area = 21.225 ac, 0.00% Impervious, Inflow Depth = 5.04" for 100-YR, 24-HR Storm event
Inflow = 82.18 cfs @ 12.29 hrs, Volume= 8.917 af
Outflow = 82.18 cfs @ 12.30 hrs, Volume= 8.917 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

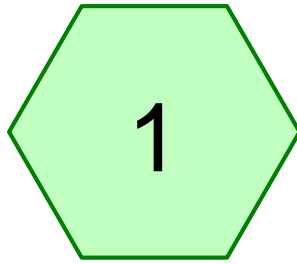
Reach DP 4: DP 4

Hydrograph



Hydrograph for Reach DP 4: DP 4

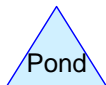
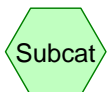
Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.00		0.00
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.00		0.00	110.00	0.00		0.00
8.00	0.42		0.41	112.00	0.00		0.00
10.00	2.51		2.50	114.00	0.00		0.00
12.00	30.83		29.67	116.00	0.00		0.00
14.00	8.42		8.45	118.00	0.00		0.00
16.00	4.50		4.51	120.00	0.00		0.00
18.00	2.69		2.70				
20.00	2.07		2.07				
22.00	1.71		1.71				
24.00	1.37		1.37				
26.00	0.00		0.00				
28.00	0.00		0.00				
30.00	0.00		0.00				
32.00	0.00		0.00				
34.00	0.00		0.00				
36.00	0.00		0.00				
38.00	0.00		0.00				
40.00	0.00		0.00				
42.00	0.00		0.00				
44.00	0.00		0.00				
46.00	0.00		0.00				
48.00	0.00		0.00				
50.00	0.00		0.00				
52.00	0.00		0.00				
54.00	0.00		0.00				
56.00	0.00		0.00				
58.00	0.00		0.00				
60.00	0.00		0.00				
62.00	0.00		0.00				
64.00	0.00		0.00				
66.00	0.00		0.00				
68.00	0.00		0.00				
70.00	0.00		0.00				
72.00	0.00		0.00				
74.00	0.00		0.00				
76.00	0.00		0.00				
78.00	0.00		0.00				
80.00	0.00		0.00				
82.00	0.00		0.00				
84.00	0.00		0.00				
86.00	0.00		0.00				
88.00	0.00		0.00				
90.00	0.00		0.00				
92.00	0.00		0.00				
94.00	0.00		0.00				
96.00	0.00		0.00				
98.00	0.00		0.00				
100.00	0.00		0.00				
102.00	0.00		0.00				



Pre-Development DA 1



DP 5



2012_05_21_Concord

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Pre-Development Design Point 5 (Concord Phase 1)
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"
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 Page 2

Summary for Subcatchment 1: Pre-Development DA 1

Runoff = 4.08 cfs @ 12.37 hrs, Volume= 0.506 af, Depth= 0.76"

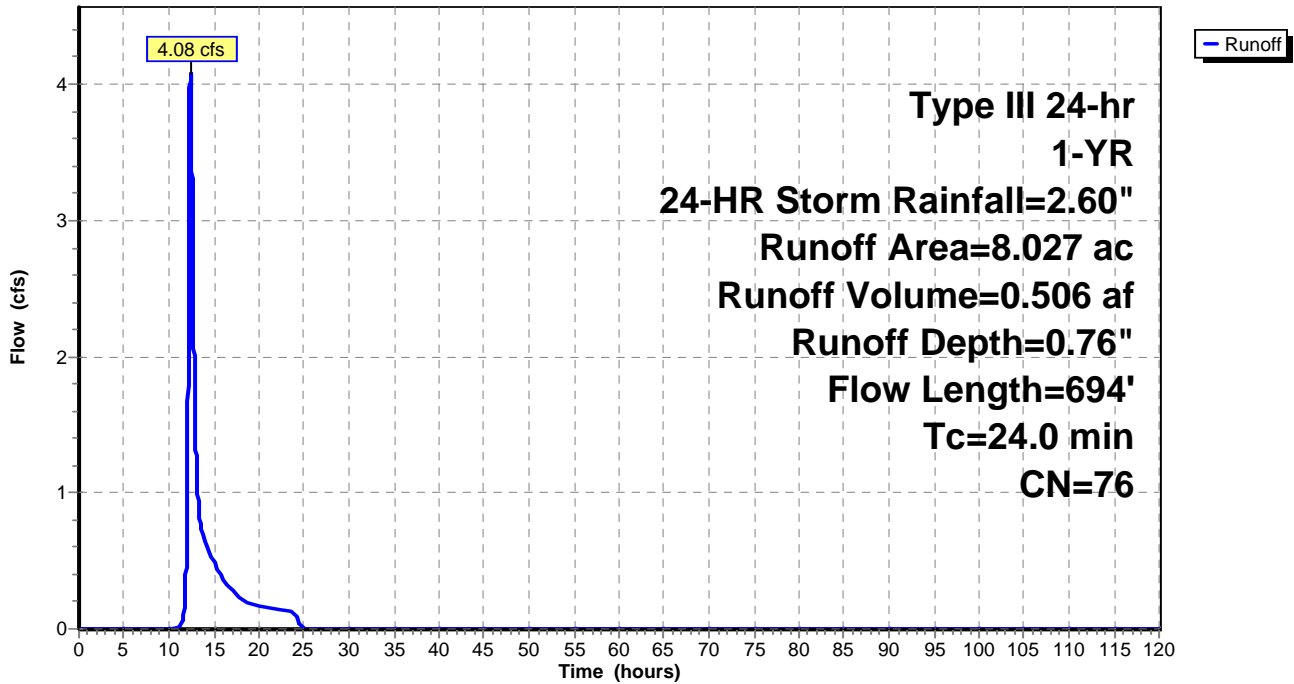
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

Area (ac)	CN	Description
4.714	74	>75% Grass cover, Good, HSG C
3.313	79	Woods/grass comb., Good, HSG D
8.027	76	Weighted Average
8.027		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	100	0.0500	0.12		Sheet Flow, SHEET FLOW Woods: Light underbrush n= 0.400 P2= 3.75"
10.3	594	0.0370	0.96		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
24.0	694	Total			

Subcatchment 1: Pre-Development DA 1

Hydrograph



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Pre-Development Design Point 5 (Concord Phase 1)

Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

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Hydrograph for Subcatchment 1: Pre-Development DA 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	2.60	0.76	0.00
2.00	0.05	0.00	0.00	106.00	2.60	0.76	0.00
4.00	0.11	0.00	0.00	108.00	2.60	0.76	0.00
6.00	0.19	0.00	0.00	110.00	2.60	0.76	0.00
8.00	0.30	0.00	0.00	112.00	2.60	0.76	0.00
10.00	0.49	0.00	0.00	114.00	2.60	0.76	0.00
12.00	1.30	0.12	0.81	116.00	2.60	0.76	0.00
14.00	2.11	0.47	0.64	118.00	2.60	0.76	0.00
16.00	2.30	0.58	0.36	120.00	2.60	0.76	0.00
18.00	2.41	0.64	0.22				
20.00	2.49	0.69	0.17				
22.00	2.55	0.72	0.14				
24.00	2.60	0.76	0.12				
26.00	2.60	0.76	0.00				
28.00	2.60	0.76	0.00				
30.00	2.60	0.76	0.00				
32.00	2.60	0.76	0.00				
34.00	2.60	0.76	0.00				
36.00	2.60	0.76	0.00				
38.00	2.60	0.76	0.00				
40.00	2.60	0.76	0.00				
42.00	2.60	0.76	0.00				
44.00	2.60	0.76	0.00				
46.00	2.60	0.76	0.00				
48.00	2.60	0.76	0.00				
50.00	2.60	0.76	0.00				
52.00	2.60	0.76	0.00				
54.00	2.60	0.76	0.00				
56.00	2.60	0.76	0.00				
58.00	2.60	0.76	0.00				
60.00	2.60	0.76	0.00				
62.00	2.60	0.76	0.00				
64.00	2.60	0.76	0.00				
66.00	2.60	0.76	0.00				
68.00	2.60	0.76	0.00				
70.00	2.60	0.76	0.00				
72.00	2.60	0.76	0.00				
74.00	2.60	0.76	0.00				
76.00	2.60	0.76	0.00				
78.00	2.60	0.76	0.00				
80.00	2.60	0.76	0.00				
82.00	2.60	0.76	0.00				
84.00	2.60	0.76	0.00				
86.00	2.60	0.76	0.00				
88.00	2.60	0.76	0.00				
90.00	2.60	0.76	0.00				
92.00	2.60	0.76	0.00				
94.00	2.60	0.76	0.00				
96.00	2.60	0.76	0.00				
98.00	2.60	0.76	0.00				
100.00	2.60	0.76	0.00				
102.00	2.60	0.76	0.00				

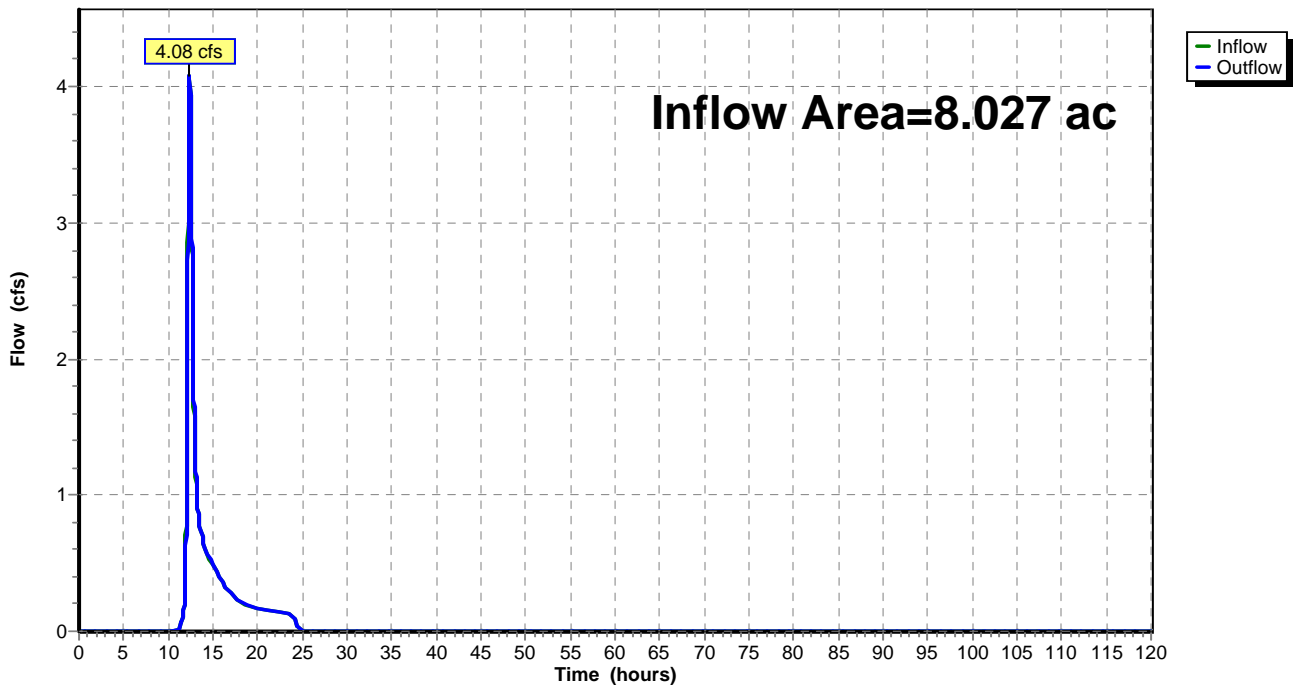
Summary for Reach DP 5: DP 5

Inflow Area = 8.027 ac, 0.00% Impervious, Inflow Depth = 0.76" for 1-YR, 24-HR Storm event
Inflow = 4.08 cfs @ 12.37 hrs, Volume= 0.506 af
Outflow = 4.08 cfs @ 12.38 hrs, Volume= 0.506 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach DP 5: DP 5

Hydrograph



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Pre-Development Design Point 5 (Concord Phase 1)

Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

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Hydrograph for Reach DP 5: DP 5

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.00		0.00
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.00		0.00	110.00	0.00		0.00
8.00	0.00		0.00	112.00	0.00		0.00
10.00	0.00		0.00	114.00	0.00		0.00
12.00	0.81		0.77	116.00	0.00		0.00
14.00	0.64		0.64	118.00	0.00		0.00
16.00	0.36		0.36	120.00	0.00		0.00
18.00	0.22		0.22				
20.00	0.17		0.17				
22.00	0.14		0.14				
24.00	0.12		0.12				
26.00	0.00		0.00				
28.00	0.00		0.00				
30.00	0.00		0.00				
32.00	0.00		0.00				
34.00	0.00		0.00				
36.00	0.00		0.00				
38.00	0.00		0.00				
40.00	0.00		0.00				
42.00	0.00		0.00				
44.00	0.00		0.00				
46.00	0.00		0.00				
48.00	0.00		0.00				
50.00	0.00		0.00				
52.00	0.00		0.00				
54.00	0.00		0.00				
56.00	0.00		0.00				
58.00	0.00		0.00				
60.00	0.00		0.00				
62.00	0.00		0.00				
64.00	0.00		0.00				
66.00	0.00		0.00				
68.00	0.00		0.00				
70.00	0.00		0.00				
72.00	0.00		0.00				
74.00	0.00		0.00				
76.00	0.00		0.00				
78.00	0.00		0.00				
80.00	0.00		0.00				
82.00	0.00		0.00				
84.00	0.00		0.00				
86.00	0.00		0.00				
88.00	0.00		0.00				
90.00	0.00		0.00				
92.00	0.00		0.00				
94.00	0.00		0.00				
96.00	0.00		0.00				
98.00	0.00		0.00				
100.00	0.00		0.00				
102.00	0.00		0.00				

2012_05_21_Concord

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Pre-Development Design Point 5 (Concord Phase 1)
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Summary for Subcatchment 1: Pre-Development DA 1

Runoff = 19.85 cfs @ 12.34 hrs, Volume= 2.261 af, Depth= 3.38"

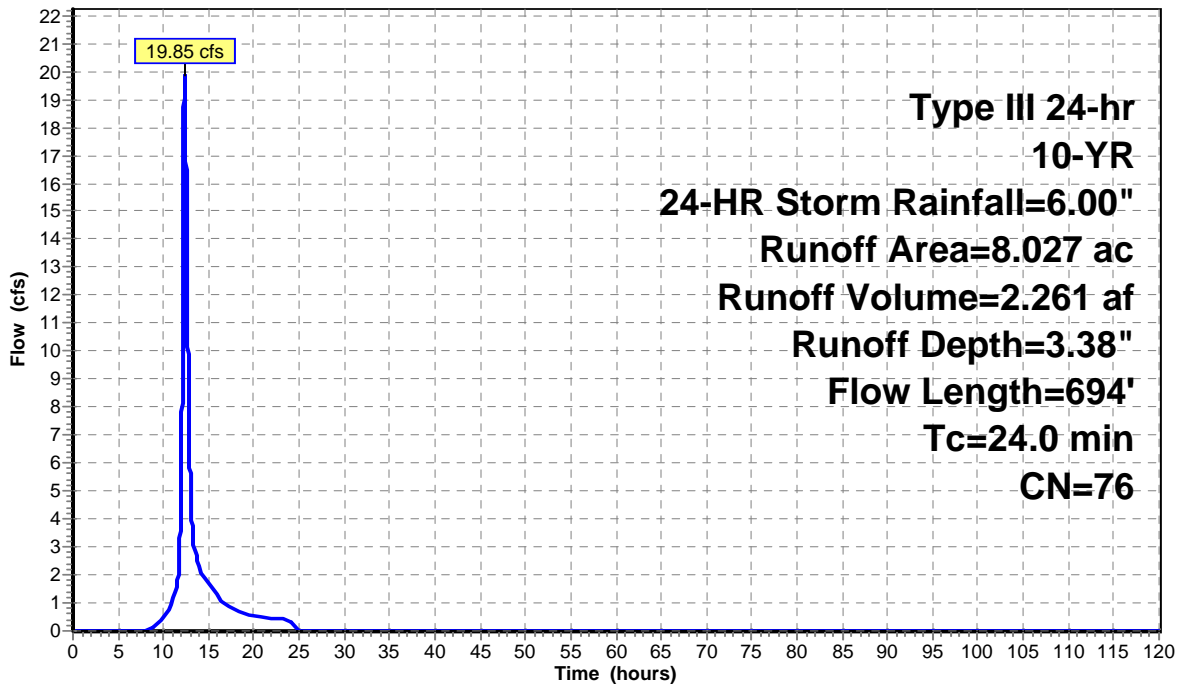
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

Area (ac)	CN	Description
4.714	74	>75% Grass cover, Good, HSG C
3.313	79	Woods/grass comb., Good, HSG D
8.027	76	Weighted Average
8.027		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	100	0.0500	0.12		Sheet Flow, SHEET FLOW Woods: Light underbrush n= 0.400 P2= 3.75"
10.3	594	0.0370	0.96		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
24.0	694	Total			

Subcatchment 1: Pre-Development DA 1

Hydrograph



2012_05_21_Concord

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Pre-Development Design Point 5 (Concord Phase 1)
Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Subcatchment 1: Pre-Development DA 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	6.00	3.38	0.00
2.00	0.12	0.00	0.00	106.00	6.00	3.38	0.00
4.00	0.26	0.00	0.00	108.00	6.00	3.38	0.00
6.00	0.43	0.00	0.00	110.00	6.00	3.38	0.00
8.00	0.68	0.00	0.01	112.00	6.00	3.38	0.00
10.00	1.13	0.07	0.46	114.00	6.00	3.38	0.00
12.00	3.00	1.02	6.61	116.00	6.00	3.38	0.00
14.00	4.87	2.43	2.28	118.00	6.00	3.38	0.00
16.00	5.32	2.80	1.23	120.00	6.00	3.38	0.00
18.00	5.57	3.01	0.73				
20.00	5.74	3.16	0.56				
22.00	5.88	3.28	0.47				
24.00	6.00	3.38	0.37				
26.00	6.00	3.38	0.00				
28.00	6.00	3.38	0.00				
30.00	6.00	3.38	0.00				
32.00	6.00	3.38	0.00				
34.00	6.00	3.38	0.00				
36.00	6.00	3.38	0.00				
38.00	6.00	3.38	0.00				
40.00	6.00	3.38	0.00				
42.00	6.00	3.38	0.00				
44.00	6.00	3.38	0.00				
46.00	6.00	3.38	0.00				
48.00	6.00	3.38	0.00				
50.00	6.00	3.38	0.00				
52.00	6.00	3.38	0.00				
54.00	6.00	3.38	0.00				
56.00	6.00	3.38	0.00				
58.00	6.00	3.38	0.00				
60.00	6.00	3.38	0.00				
62.00	6.00	3.38	0.00				
64.00	6.00	3.38	0.00				
66.00	6.00	3.38	0.00				
68.00	6.00	3.38	0.00				
70.00	6.00	3.38	0.00				
72.00	6.00	3.38	0.00				
74.00	6.00	3.38	0.00				
76.00	6.00	3.38	0.00				
78.00	6.00	3.38	0.00				
80.00	6.00	3.38	0.00				
82.00	6.00	3.38	0.00				
84.00	6.00	3.38	0.00				
86.00	6.00	3.38	0.00				
88.00	6.00	3.38	0.00				
90.00	6.00	3.38	0.00				
92.00	6.00	3.38	0.00				
94.00	6.00	3.38	0.00				
96.00	6.00	3.38	0.00				
98.00	6.00	3.38	0.00				
100.00	6.00	3.38	0.00				
102.00	6.00	3.38	0.00				

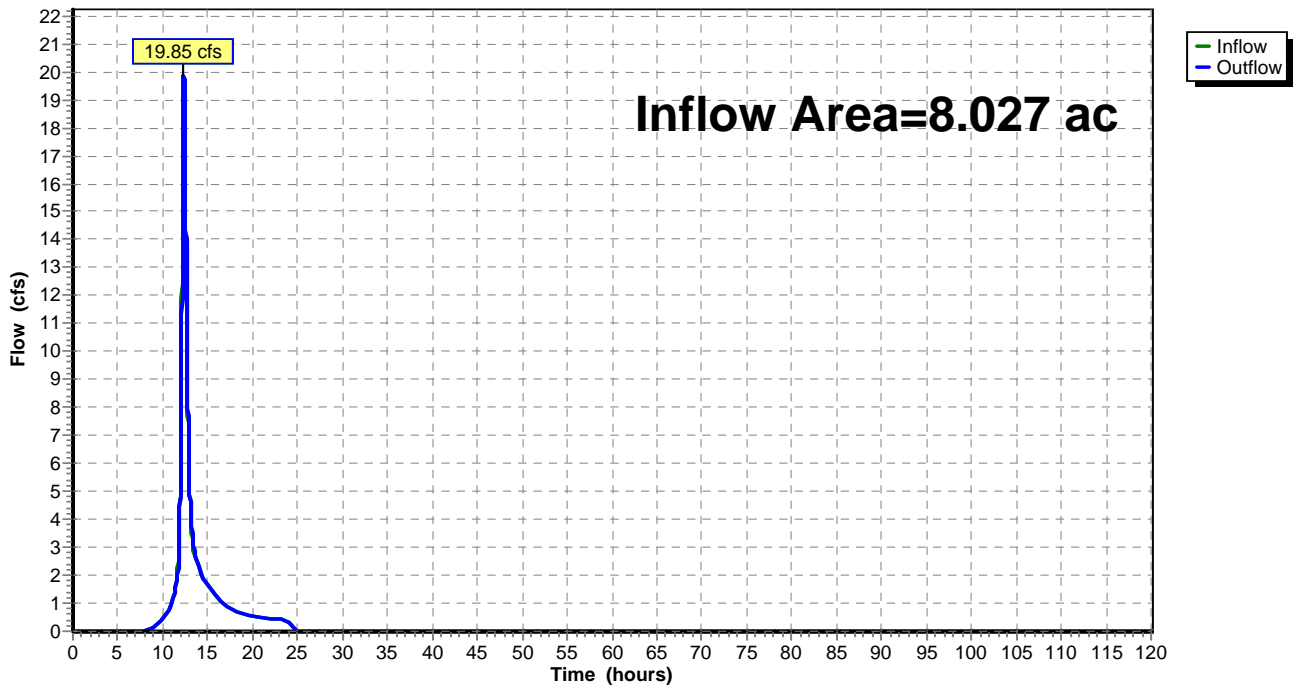
Summary for Reach DP 5: DP 5

Inflow Area = 8.027 ac, 0.00% Impervious, Inflow Depth = 3.38" for 10-YR, 24-HR Storm event
Inflow = 19.85 cfs @ 12.34 hrs, Volume= 2.261 af
Outflow = 19.85 cfs @ 12.35 hrs, Volume= 2.261 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach DP 5: DP 5

Hydrograph



Hydrograph for Reach DP 5: DP 5

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.00		0.00
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.00		0.00	110.00	0.00		0.00
8.00	0.01		0.01	112.00	0.00		0.00
10.00	0.46		0.46	114.00	0.00		0.00
12.00	6.61		6.37	116.00	0.00		0.00
14.00	2.28		2.29	118.00	0.00		0.00
16.00	1.23		1.23	120.00	0.00		0.00
18.00	0.73		0.74				
20.00	0.56		0.56				
22.00	0.47		0.47				
24.00	0.37		0.37				
26.00	0.00		0.00				
28.00	0.00		0.00				
30.00	0.00		0.00				
32.00	0.00		0.00				
34.00	0.00		0.00				
36.00	0.00		0.00				
38.00	0.00		0.00				
40.00	0.00		0.00				
42.00	0.00		0.00				
44.00	0.00		0.00				
46.00	0.00		0.00				
48.00	0.00		0.00				
50.00	0.00		0.00				
52.00	0.00		0.00				
54.00	0.00		0.00				
56.00	0.00		0.00				
58.00	0.00		0.00				
60.00	0.00		0.00				
62.00	0.00		0.00				
64.00	0.00		0.00				
66.00	0.00		0.00				
68.00	0.00		0.00				
70.00	0.00		0.00				
72.00	0.00		0.00				
74.00	0.00		0.00				
76.00	0.00		0.00				
78.00	0.00		0.00				
80.00	0.00		0.00				
82.00	0.00		0.00				
84.00	0.00		0.00				
86.00	0.00		0.00				
88.00	0.00		0.00				
90.00	0.00		0.00				
92.00	0.00		0.00				
94.00	0.00		0.00				
96.00	0.00		0.00				
98.00	0.00		0.00				
100.00	0.00		0.00				
102.00	0.00		0.00				

Summary for Subcatchment 1: Pre-Development DA 1

Runoff = 30.16 cfs @ 12.33 hrs, Volume= 3.450 af, Depth= 5.16"

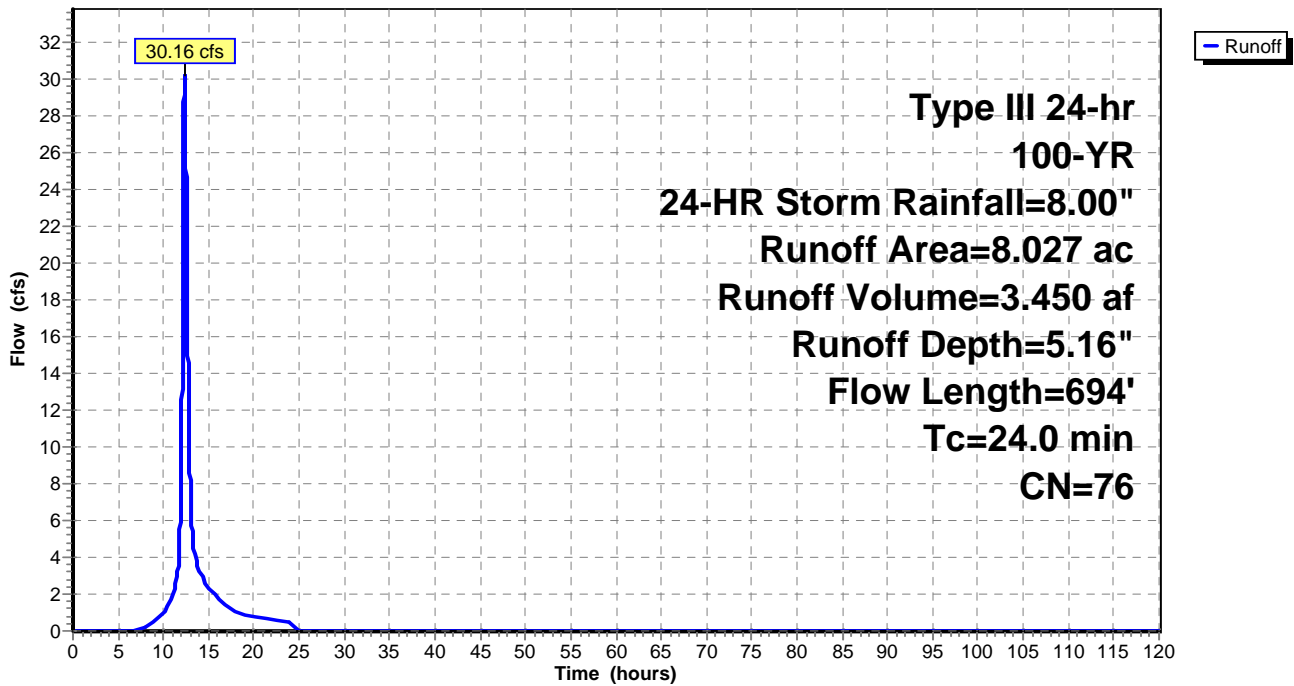
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Area (ac)	CN	Description
4.714	74	>75% Grass cover, Good, HSG C
3.313	79	Woods/grass comb., Good, HSG D
8.027	76	Weighted Average
8.027		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	100	0.0500	0.12		Sheet Flow, SHEET FLOW Woods: Light underbrush n= 0.400 P2= 3.75"
10.3	594	0.0370	0.96		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
24.0	694	Total			

Subcatchment 1: Pre-Development DA 1

Hydrograph



Hydrograph for Subcatchment 1: Pre-Development DA 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	8.00	5.16	0.00
2.00	0.16	0.00	0.00	106.00	8.00	5.16	0.00
4.00	0.34	0.00	0.00	108.00	8.00	5.16	0.00
6.00	0.58	0.00	0.00	110.00	8.00	5.16	0.00
8.00	0.91	0.02	0.19	112.00	8.00	5.16	0.00
10.00	1.51	0.19	1.00	114.00	8.00	5.16	0.00
12.00	4.00	1.74	10.73	116.00	8.00	5.16	0.00
14.00	6.49	3.80	3.28	118.00	8.00	5.16	0.00
16.00	7.09	4.34	1.74	120.00	8.00	5.16	0.00
18.00	7.42	4.64	1.04				
20.00	7.66	4.85	0.79				
22.00	7.85	5.02	0.66				
24.00	8.00	5.16	0.52				
26.00	8.00	5.16	0.00				
28.00	8.00	5.16	0.00				
30.00	8.00	5.16	0.00				
32.00	8.00	5.16	0.00				
34.00	8.00	5.16	0.00				
36.00	8.00	5.16	0.00				
38.00	8.00	5.16	0.00				
40.00	8.00	5.16	0.00				
42.00	8.00	5.16	0.00				
44.00	8.00	5.16	0.00				
46.00	8.00	5.16	0.00				
48.00	8.00	5.16	0.00				
50.00	8.00	5.16	0.00				
52.00	8.00	5.16	0.00				
54.00	8.00	5.16	0.00				
56.00	8.00	5.16	0.00				
58.00	8.00	5.16	0.00				
60.00	8.00	5.16	0.00				
62.00	8.00	5.16	0.00				
64.00	8.00	5.16	0.00				
66.00	8.00	5.16	0.00				
68.00	8.00	5.16	0.00				
70.00	8.00	5.16	0.00				
72.00	8.00	5.16	0.00				
74.00	8.00	5.16	0.00				
76.00	8.00	5.16	0.00				
78.00	8.00	5.16	0.00				
80.00	8.00	5.16	0.00				
82.00	8.00	5.16	0.00				
84.00	8.00	5.16	0.00				
86.00	8.00	5.16	0.00				
88.00	8.00	5.16	0.00				
90.00	8.00	5.16	0.00				
92.00	8.00	5.16	0.00				
94.00	8.00	5.16	0.00				
96.00	8.00	5.16	0.00				
98.00	8.00	5.16	0.00				
100.00	8.00	5.16	0.00				
102.00	8.00	5.16	0.00				

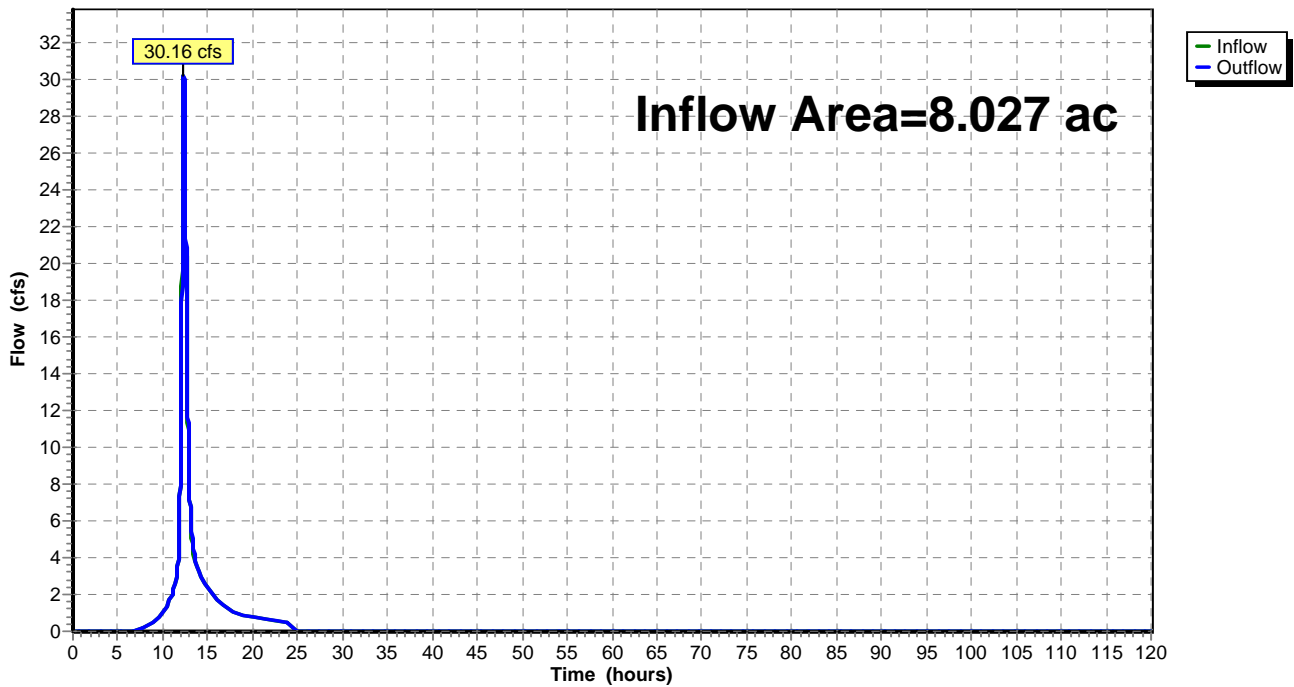
Summary for Reach DP 5: DP 5

Inflow Area = 8.027 ac, 0.00% Impervious, Inflow Depth = 5.16" for 100-YR, 24-HR Storm event
Inflow = 30.16 cfs @ 12.33 hrs, Volume= 3.450 af
Outflow = 30.16 cfs @ 12.34 hrs, Volume= 3.450 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

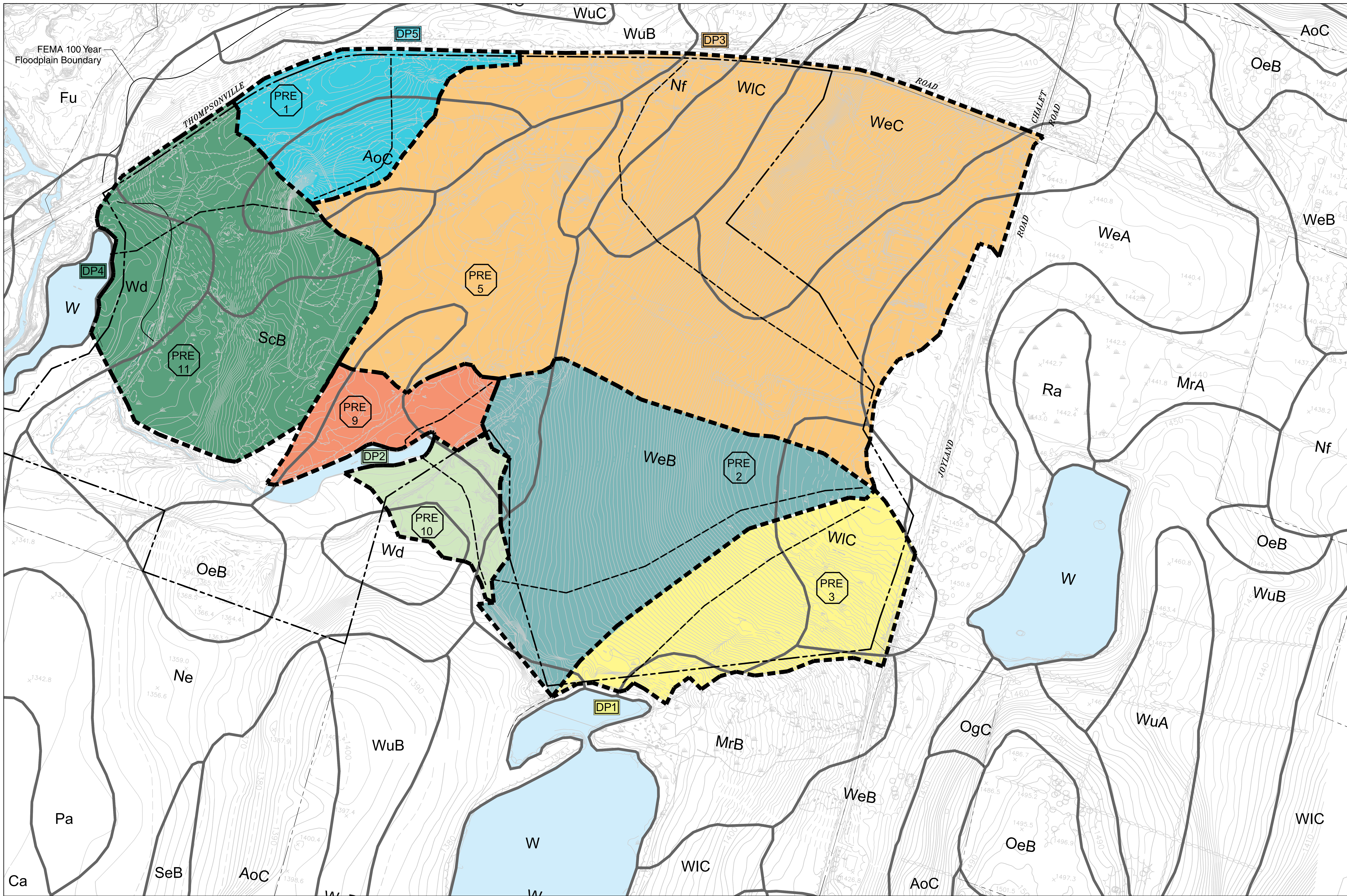
Reach DP 5: DP 5

Hydrograph



Hydrograph for Reach DP 5: DP 5

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.00		0.00
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.00		0.00	110.00	0.00		0.00
8.00	0.19		0.18	112.00	0.00		0.00
10.00	1.00		0.99	114.00	0.00		0.00
12.00	10.73		10.36	116.00	0.00		0.00
14.00	3.28		3.29	118.00	0.00		0.00
16.00	1.74		1.75	120.00	0.00		0.00
18.00	1.04		1.04				
20.00	0.79		0.79				
22.00	0.66		0.66				
24.00	0.52		0.53				
26.00	0.00		0.00				
28.00	0.00		0.00				
30.00	0.00		0.00				
32.00	0.00		0.00				
34.00	0.00		0.00				
36.00	0.00		0.00				
38.00	0.00		0.00				
40.00	0.00		0.00				
42.00	0.00		0.00				
44.00	0.00		0.00				
46.00	0.00		0.00				
48.00	0.00		0.00				
50.00	0.00		0.00				
52.00	0.00		0.00				
54.00	0.00		0.00				
56.00	0.00		0.00				
58.00	0.00		0.00				
60.00	0.00		0.00				
62.00	0.00		0.00				
64.00	0.00		0.00				
66.00	0.00		0.00				
68.00	0.00		0.00				
70.00	0.00		0.00				
72.00	0.00		0.00				
74.00	0.00		0.00				
76.00	0.00		0.00				
78.00	0.00		0.00				
80.00	0.00		0.00				
82.00	0.00		0.00				
84.00	0.00		0.00				
86.00	0.00		0.00				
88.00	0.00		0.00				
90.00	0.00		0.00				
92.00	0.00		0.00				
94.00	0.00		0.00				
96.00	0.00		0.00				
98.00	0.00		0.00				
100.00	0.00		0.00				
102.00	0.00		0.00				



Map Symbol	Soil Name	Hydro-Logic Group
AoC	Arnot-Oquaga complex	C/D
AoE	Arnot-Oquaga complex	C/D
MrA	Morris loam	C
MrB	Morris loam	C
MrC	Morris loam	C
Ne	Neversink loam	D
Nf	Neversink and Alden soils	D
OeB	Oquaga very channery silt loam	C
OgC	Oquaga Oquaga-Arnot complex	C
Ra	Rayham silt loam	C
ScB	Scriba Sciba loam	C
ScC	Swartswood gravelly loam	C
Wd	Wayland silt loam	C/D
WeA	Wellsboro gravelly loam	C
WeB	Wellsboro gravelly loam	C
WeC	Wellsboro gravelly loam	C
WIC	Wellsboro and Wurtsboro soils	C
WuA	Wurtsboro loam	C
WuB	Wurtsboro loam	C

- PONDS AND STREAMS
- PRE-DEVELOPMENT SUB-CATCHMENT AREA 1
- PRE-DEVELOPMENT SUB-CATCHMENT AREA 2
- PRE-DEVELOPMENT SUB-CATCHMENT AREA 3
- PRE-DEVELOPMENT SUB-CATCHMENT AREA 5
- PRE-DEVELOPMENT SUB-CATCHMENT AREA 9
- PRE-DEVELOPMENT SUB-CATCHMENT AREA 10
- PRE-DEVELOPMENT SUB-CATCHMENT AREA 11

LEGEND

- EXISTING CONTOUR
- EXISTING TREE LINE
- EXISTING WETLANDS
- USDA SOIL BOUNDARY
- FEMA 100 YEAR FLOOD PLAIN
- DESIGN POINT
- PRE DEVELOPMENT SUB-CATCHMENT AREA
- DRAINAGE BOUNDARY
- Tc FLOW PATH
- PROPERTY LINE

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REVISIONS		
No.	DATE	DESCRIPTION

PROJECT
EPT CONCORD RESORT
TOWN OF THOMPSON
NEW YORK

DRAWN BY TJT **CHECKED BY** AM

SCALE 1" = 120' **DATE** 05/23/12

SHEET TITLE

PRE-DEVELOPMENT STORMWATER MAP

SHEET NO.

FIGURE D-1



Map Symbol	Soil Name	Hydro-Logic Group
AoC	Arnot-Oquaga complex	C/D
AoE	Arnot-Oquaga complex	C/D
MrA	Morris loam	C
MrB	Morris loam	C
MrC	Morris loam	C
Ne	Neversink loam	D
Nf	Neversink and Alden soils	D
OeB	Oquaga very channery silt loam	C
OgC	Oquaga-Oquaga-Arnot complex	C
Ra	Raynham silt loam	C
ScB	Scriba Sciba loam	C
SrC	Swartswood gravelly loam	C
Wd	Wayland silt loam	C/D
WeA	Wellsboro gravelly loam	C
WeB	Wellsboro gravelly loam	C
WeC	Wellsboro gravelly loam	C
WIC	Wellsboro and Wurtsboro soils	C
WuA	Wurtsboro loam	C
WuB	Wurtsboro loam	C

- PONDS AND STREAMS
- POST-DEVELOPMENT SUB-CATCHMENT AREA 1B
- POST-DEVELOPMENT SUB-CATCHMENT AREA 2
- POST-DEVELOPMENT SUB-CATCHMENT AREA 3
- POST-DEVELOPMENT SUB-CATCHMENT AREA 6
- POST-DEVELOPMENT SUB-CATCHMENT AREA 7
- POST-DEVELOPMENT SUB-CATCHMENT AREA 1A
- POST-DEVELOPMENT SUB-CATCHMENT AREA 8
- POST-DEVELOPMENT SUB-CATCHMENT AREA 9
- POST-DEVELOPMENT SUB-CATCHMENT AREA 4A
- POST-DEVELOPMENT SUB-CATCHMENT AREA 4B
- POST-DEVELOPMENT SUB-CATCHMENT AREA 5

- EXISTING CONTOUR
- EXISTING TREE LINE
- EXISTING WETLANDS
- USDA SOIL BOUNDARY
- FEMA 100 YEAR FLOOD PLAIN

- DESIGN POINT
- POST DEVELOPMENT SUB-CATCHMENT AREA
- DRAINAGE BOUNDARY
- Tc FLOW PATH
- PROPERTY LINE

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REVISIONS		
No.	DATE	DESCRIPTION

PROJECT
EPT CONCORD RESORT
 TOWN OF THOMPSON
 NEW YORK

DRAWN BY TJT	CHECKED BY AM
SCALE 1" = 120'	DATE 05/23/12

SHEET TITLE
 POST-DEVELOPMENT
 STORMWATER MAP

SHEET NO.
 FIGURE D-2

PRELIMINARY SWPPP
APPENDIX E
STORMWATER CALCULATIONS

Concord - Phase 1
Preliminary Stormwater Pollution Prevention Plan

Water Quality Volume Calculation:

DA-1		
P =	1.2 in	WQv Rainfall Event
I =	49.55 %	Impervious Cover
Rv =	0.49595	
A =	1,270,318 SF	Drainage Area
	29.16 AC	
WQv₁ =		
	1.45 AC-FT	
	63,001 CF	

Water Quality Volume Calculation:

DA-4A		
P =	1.2 in	WQv Rainfall Event
I =	54.58 %	Impervious Cover
Rv =	0.54122	
A =	348,816 SF	Drainage Area
	8.01 AC	
WQv₁ =		
	0.43 AC-FT	
	18,879 CF	

Water Quality Volume Calculation:

DA-2 & 3		
P =	1.2 in	WQv Rainfall Event
I =	57.27 %	Impervious Cover
Rv =	0.56543	
A =	470,530 SF	Drainage Area
	10.80 AC	
WQv₁ =		
	0.61 AC-FT	
	26,605 CF	

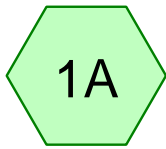
Water Quality Volume Calculation:

DA-5		
P =	1.2 in	WQv Rainfall Event
I =	28.84 %	Impervious Cover
Rv =	0.30956	
A =	275,346 SF	Drainage Area
	6.32 AC	
WQv₁ =		
	0.20 AC-FT	
	8,524 CF	

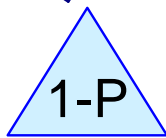
Water Quality Volume Calculation:

DA-6 & 1B		
P =	1.2 in	WQv Rainfall Event
I =	42.22 %	Impervious Cover
Rv =	0.42998	
A =	1,161,331 SF	Drainage Area
	26.66 AC	
WQv₁ =		
	1.15 AC-FT	
	49,935 CF	

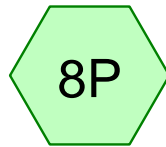
PRELIMINARY SWPPP
APPENDIX F
POST-DEVELOPMENT HYDROLOGIC ROUTING CALCULATIONS



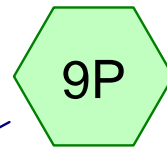
PROPOSED SUBCAT
AREA 1A



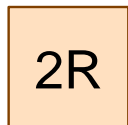
Pond 1



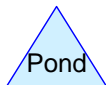
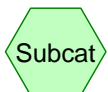
PROPOSED SUBCAT
AREA 8



PROPOSED SUBCAT
AREA 9



DP 2



Routing Diagram for 2012_05_21_Concord
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Summary for Pond 1-P: Pond 1

Inflow Area = 29.162 ac, 49.55% Impervious, Inflow Depth = 1.26" for 1-YR, 24-HR Storm event
 Inflow = 47.83 cfs @ 12.05 hrs, Volume= 3.059 af
 Outflow = 0.85 cfs @ 19.41 hrs, Volume= 2.973 af, Atten= 98%, Lag= 441.5 min
 Primary = 0.85 cfs @ 19.41 hrs, Volume= 2.973 af

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,372.50' Surf.Area= 48,970 sf Storage= 107,718 cf
 Peak Elev= 1,374.37' @ 19.41 hrs Surf.Area= 58,171 sf Storage= 207,895 cf (100,178 cf above start)

Plug-Flow detention time= 3,695.5 min calculated for 0.500 af (16% of inflow)
 Center-of-Mass det. time= 1,486.3 min (2,319.2 - 833.0)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,370.00'	620,462 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,370.00	37,418	873.0	0	0	37,418
1,371.00	41,850	904.0	39,613	39,613	41,891
1,372.00	46,614	943.0	44,211	83,824	47,697
1,373.00	51,384	974.0	48,980	132,804	52,522
1,374.00	56,309	1,005.0	53,828	186,631	57,503
1,375.00	61,390	1,037.0	58,831	245,463	62,803
1,376.00	66,627	1,068.0	63,991	309,453	68,101
1,377.00	72,019	1,099.0	69,306	378,759	73,556
1,378.00	77,699	1,132.0	74,841	453,600	79,519
1,379.00	83,409	1,164.0	80,537	534,137	85,478
1,380.00	89,275	1,195.0	86,325	620,462	91,416

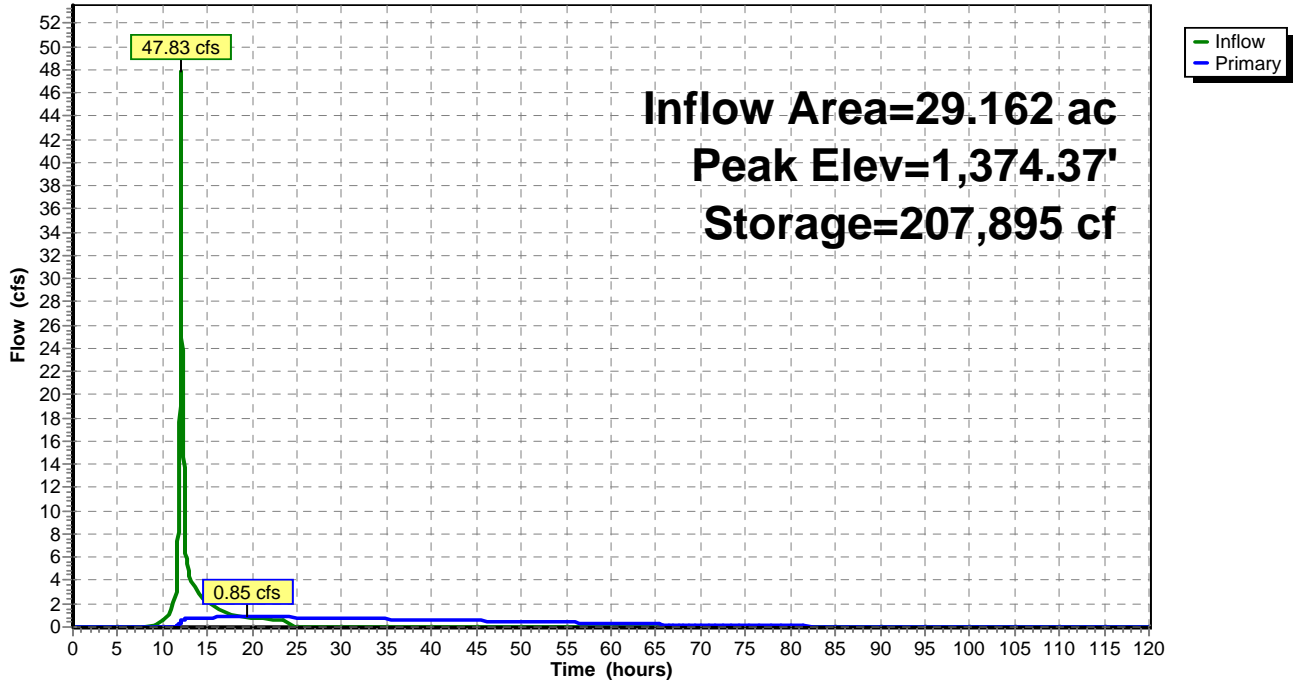
Device	Routing	Invert	Outlet Devices
#1	Primary	1,368.00'	48.0" Round Culvert L= 200.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,368.00' / 1,365.00' S= 0.0150 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf
#2	Device 1	1,372.50'	5.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,375.70'	36.0" W x 16.0" H Vert. Orifice/Grate C= 0.600
#4	Device 1	1,378.50'	16.0' 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=0.85 cfs @ 19.41 hrs HW=1,374.37' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.85 cfs of 126.51 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.85 cfs @ 6.21 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)
- 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1-P: Pond 1

Hydrograph



2012_05_21_Concord

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Hydrograph for Pond 1-P: Pond 1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	107,718	1,372.50	0.00
5.00	0.00	107,718	1,372.50	0.00
10.00	0.50	108,689	1,372.52	0.00
15.00	2.22	200,627	1,374.25	0.81
20.00	0.79	207,845	1,374.37	0.85
25.00	0.00	202,361	1,374.28	0.82
30.00	0.00	188,174	1,374.03	0.75
35.00	0.00	175,223	1,373.80	0.68
40.00	0.00	163,536	1,373.58	0.61
45.00	0.00	153,137	1,373.39	0.54
50.00	0.00	144,048	1,373.22	0.47
55.00	0.00	136,291	1,373.07	0.39
60.00	0.00	129,885	1,372.94	0.32
65.00	0.00	124,833	1,372.84	0.24
70.00	0.00	121,203	1,372.77	0.17
75.00	0.00	118,670	1,372.72	0.12
80.00	0.00	116,860	1,372.68	0.09
85.00	0.00	115,524	1,372.66	0.06
90.00	0.00	114,507	1,372.64	0.05
95.00	0.00	113,712	1,372.62	0.04
100.00	0.00	113,075	1,372.61	0.03
105.00	0.00	112,555	1,372.60	0.03
110.00	0.00	112,123	1,372.59	0.02
115.00	0.00	111,760	1,372.58	0.02
120.00	0.00	111,451	1,372.58	0.02

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Post-Development Design Point 2 (Concord Phase 1)
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"
 Printed 5/31/2012
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Summary for Subcatchment 1A: PROPOSED SUBCAT AREA 1A

Runoff = 47.83 cfs @ 12.05 hrs, Volume= 3.059 af, Depth= 1.26"

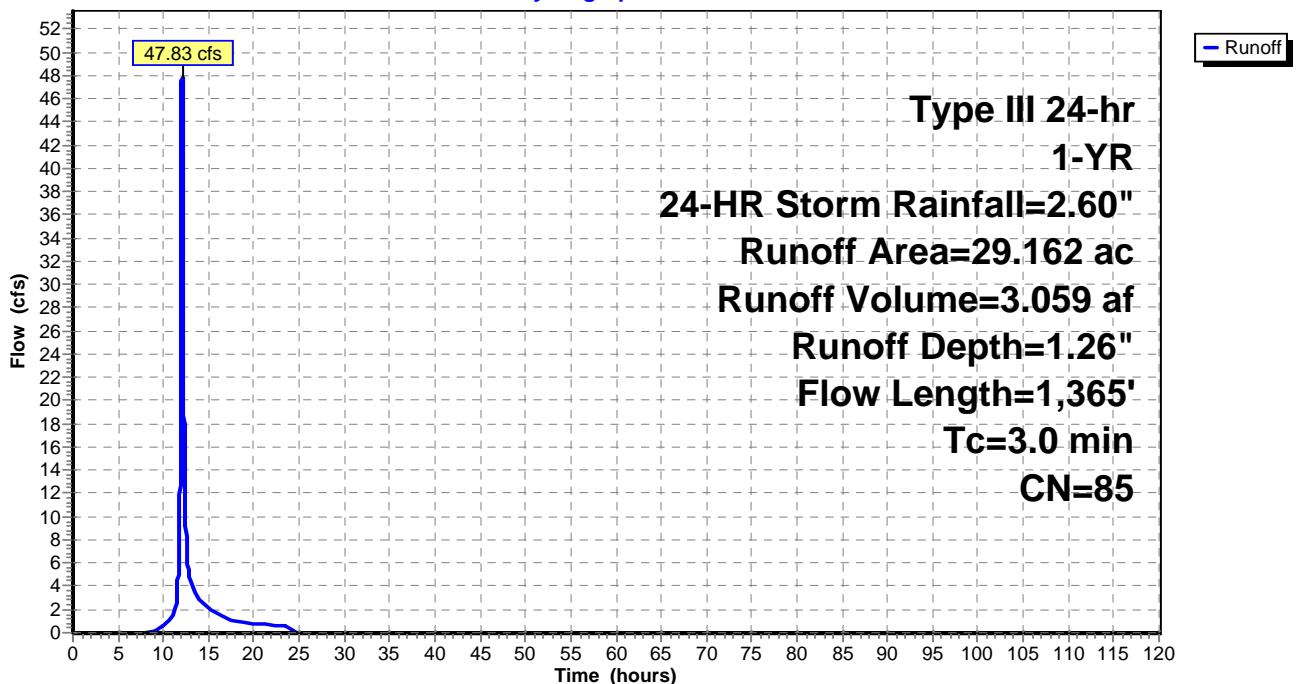
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

Area (ac)	CN	Description
10.978	74	>75% Grass cover, Good, HSG C
3.681	70	Woods, Good, HSG C
0.054	80	>75% Grass cover, Good, HSG D
14.449	98	Paved parking, HSG D
29.162	85	Weighted Average
14.713		50.45% Pervious Area
14.449		49.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0195	1.47		Sheet Flow, PARKING LOT - SHEET FLOW Smooth surfaces n= 0.011 P2= 3.75"
1.9	1,265	0.0600	11.11	8.73	Pipe Channel, CMP_Round 12" 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
3.0	1,365	Total			

Subcatchment 1A: PROPOSED SUBCAT AREA 1A

Hydrograph



Hydrograph for Subcatchment 1A: PROPOSED SUBCAT AREA 1A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	2.60	1.26	0.00
2.00	0.05	0.00	0.00	106.00	2.60	1.26	0.00
4.00	0.11	0.00	0.00	108.00	2.60	1.26	0.00
6.00	0.19	0.00	0.00	110.00	2.60	1.26	0.00
8.00	0.30	0.00	0.00	112.00	2.60	1.26	0.00
10.00	0.49	0.01	0.50	114.00	2.60	1.26	0.00
12.00	1.30	0.33	35.85	116.00	2.60	1.26	0.00
14.00	2.11	0.88	2.87	118.00	2.60	1.26	0.00
16.00	2.30	1.02	1.57	120.00	2.60	1.26	0.00
18.00	2.41	1.11	0.98				
20.00	2.49	1.17	0.79				
22.00	2.55	1.22	0.66				
24.00	2.60	1.26	0.53				
26.00	2.60	1.26	0.00				
28.00	2.60	1.26	0.00				
30.00	2.60	1.26	0.00				
32.00	2.60	1.26	0.00				
34.00	2.60	1.26	0.00				
36.00	2.60	1.26	0.00				
38.00	2.60	1.26	0.00				
40.00	2.60	1.26	0.00				
42.00	2.60	1.26	0.00				
44.00	2.60	1.26	0.00				
46.00	2.60	1.26	0.00				
48.00	2.60	1.26	0.00				
50.00	2.60	1.26	0.00				
52.00	2.60	1.26	0.00				
54.00	2.60	1.26	0.00				
56.00	2.60	1.26	0.00				
58.00	2.60	1.26	0.00				
60.00	2.60	1.26	0.00				
62.00	2.60	1.26	0.00				
64.00	2.60	1.26	0.00				
66.00	2.60	1.26	0.00				
68.00	2.60	1.26	0.00				
70.00	2.60	1.26	0.00				
72.00	2.60	1.26	0.00				
74.00	2.60	1.26	0.00				
76.00	2.60	1.26	0.00				
78.00	2.60	1.26	0.00				
80.00	2.60	1.26	0.00				
82.00	2.60	1.26	0.00				
84.00	2.60	1.26	0.00				
86.00	2.60	1.26	0.00				
88.00	2.60	1.26	0.00				
90.00	2.60	1.26	0.00				
92.00	2.60	1.26	0.00				
94.00	2.60	1.26	0.00				
96.00	2.60	1.26	0.00				
98.00	2.60	1.26	0.00				
100.00	2.60	1.26	0.00				
102.00	2.60	1.26	0.00				

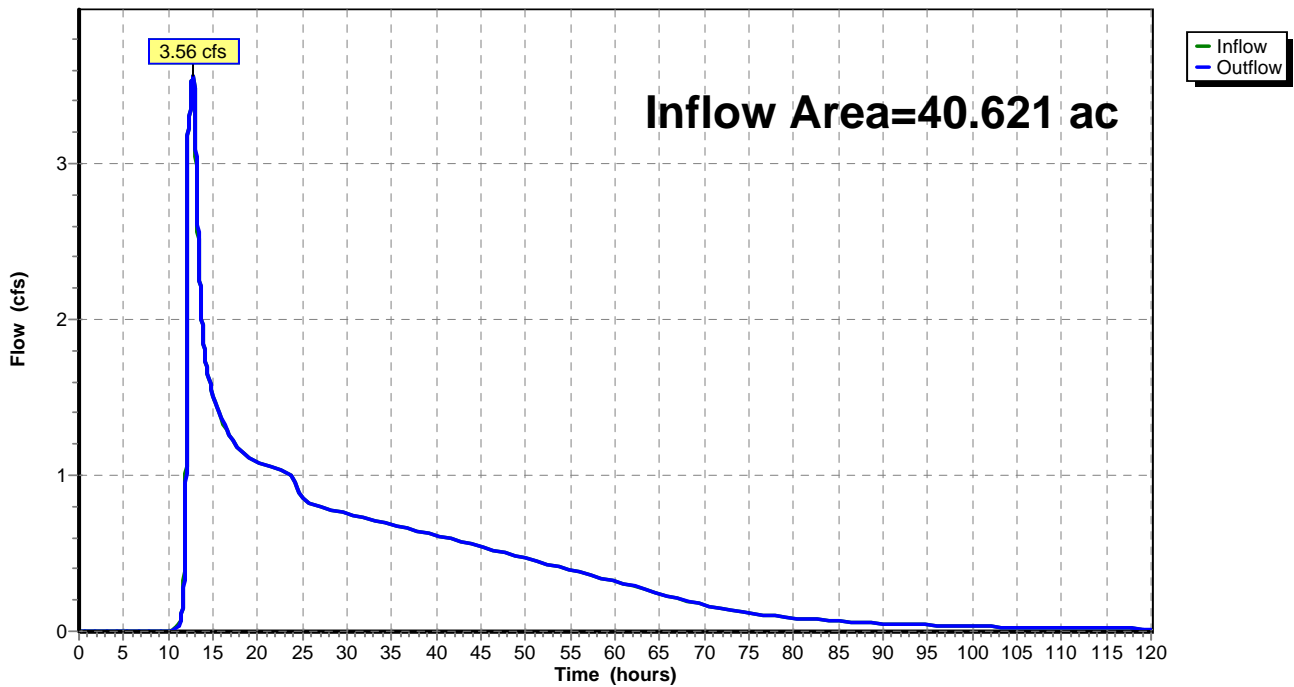
Summary for Reach 2R: DP 2

Inflow Area = 40.621 ac, 35.57% Impervious, Inflow Depth > 1.07" for 1-YR, 24-HR Storm event
Inflow = 3.56 cfs @ 12.78 hrs, Volume= 3.634 af
Outflow = 3.56 cfs @ 12.79 hrs, Volume= 3.634 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach 2R: DP 2

Hydrograph



Hydrograph for Reach 2R: DP 2

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.03		0.03
2.00	0.00		0.00	106.00	0.03		0.03
4.00	0.00		0.00	108.00	0.02		0.02
6.00	0.00		0.00	110.00	0.02		0.02
8.00	0.00		0.00	112.00	0.02		0.02
10.00	0.00		0.00	114.00	0.02		0.02
12.00	1.18		1.12	116.00	0.02		0.02
14.00	1.83		1.84	118.00	0.02		0.02
16.00	1.36		1.36	120.00	0.00		0.02
18.00	1.16		1.17				
20.00	1.09		1.09				
22.00	1.04		1.04				
24.00	1.00		1.00				
26.00	0.81		0.81				
28.00	0.78		0.78				
30.00	0.75		0.75				
32.00	0.73		0.73				
34.00	0.70		0.70				
36.00	0.67		0.67				
38.00	0.64		0.64				
40.00	0.61		0.61				
42.00	0.58		0.59				
44.00	0.56		0.56				
46.00	0.53		0.53				
48.00	0.50		0.50				
50.00	0.47		0.47				
52.00	0.44		0.44				
54.00	0.41		0.41				
56.00	0.38		0.38				
58.00	0.35		0.35				
60.00	0.32		0.32				
62.00	0.29		0.29				
64.00	0.26		0.26				
66.00	0.22		0.22				
68.00	0.19		0.19				
70.00	0.17		0.17				
72.00	0.14		0.14				
74.00	0.13		0.13				
76.00	0.11		0.11				
78.00	0.10		0.10				
80.00	0.09		0.09				
82.00	0.08		0.08				
84.00	0.07		0.07				
86.00	0.06		0.06				
88.00	0.05		0.05				
90.00	0.05		0.05				
92.00	0.05		0.05				
94.00	0.04		0.04				
96.00	0.04		0.04				
98.00	0.03		0.03				
100.00	0.03		0.03				
102.00	0.03		0.03				

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 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"
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Summary for Subcatchment 8P: PROPOSED SUBCAT AREA 8

Runoff = 2.32 cfs @ 12.83 hrs, Volume= 0.444 af, Depth= 0.67"

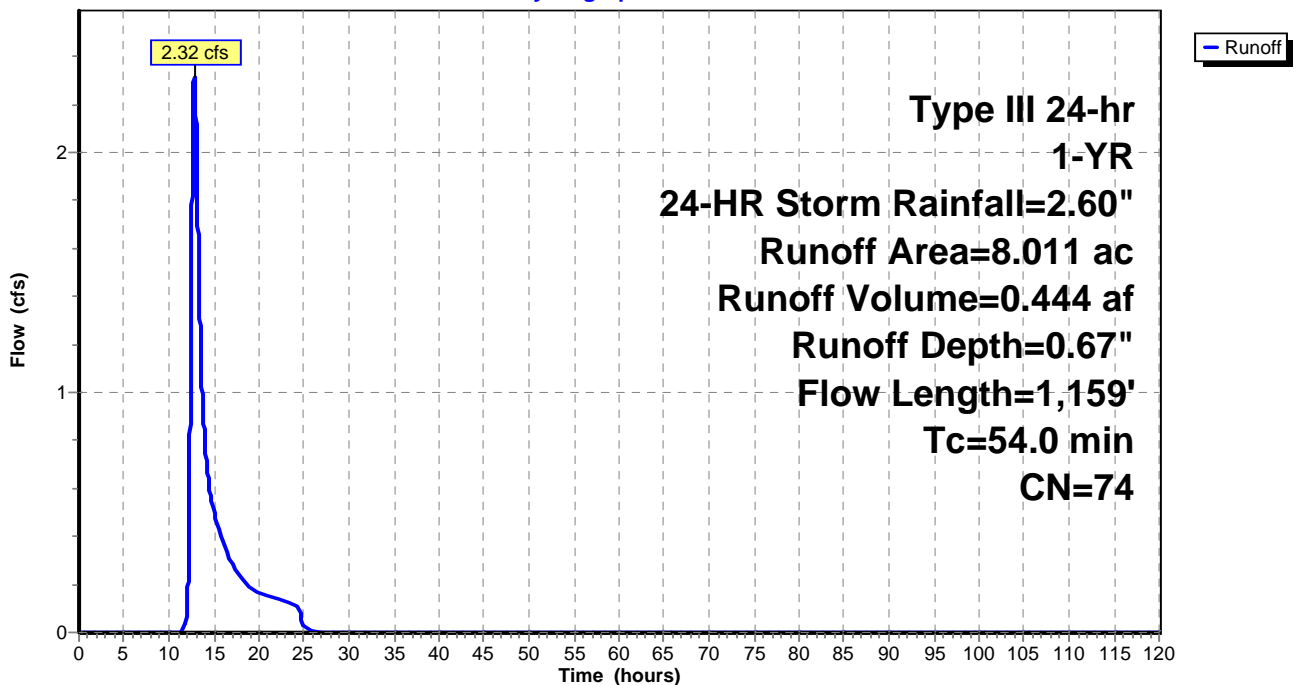
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

Area (ac)	CN	Description
3.391	77	Woods, Good, HSG D
2.112	70	Woods, Good, HSG C
2.508	74	>75% Grass cover, Good, HSG C
8.011	74	Weighted Average
8.011		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0	100	0.0450	0.07		Sheet Flow, SHEET FLOW Woods: Dense underbrush n= 0.800 P2= 3.75"
29.0	1,059	0.0148	0.61		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
54.0	1,159	Total			

Subcatchment 8P: PROPOSED SUBCAT AREA 8

Hydrograph



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Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

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Hydrograph for Subcatchment 8P: PROPOSED SUBCAT AREA 8

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	2.60	0.67	0.00
2.00	0.05	0.00	0.00	106.00	2.60	0.67	0.00
4.00	0.11	0.00	0.00	108.00	2.60	0.67	0.00
6.00	0.19	0.00	0.00	110.00	2.60	0.67	0.00
8.00	0.30	0.00	0.00	112.00	2.60	0.67	0.00
10.00	0.49	0.00	0.00	114.00	2.60	0.67	0.00
12.00	1.30	0.09	0.09	116.00	2.60	0.67	0.00
14.00	2.11	0.40	0.79	118.00	2.60	0.67	0.00
16.00	2.30	0.50	0.38	120.00	2.60	0.67	0.00
18.00	2.41	0.56	0.23				
20.00	2.49	0.60	0.17				
22.00	2.55	0.64	0.14				
24.00	2.60	0.67	0.11				
26.00	2.60	0.67	0.00				
28.00	2.60	0.67	0.00				
30.00	2.60	0.67	0.00				
32.00	2.60	0.67	0.00				
34.00	2.60	0.67	0.00				
36.00	2.60	0.67	0.00				
38.00	2.60	0.67	0.00				
40.00	2.60	0.67	0.00				
42.00	2.60	0.67	0.00				
44.00	2.60	0.67	0.00				
46.00	2.60	0.67	0.00				
48.00	2.60	0.67	0.00				
50.00	2.60	0.67	0.00				
52.00	2.60	0.67	0.00				
54.00	2.60	0.67	0.00				
56.00	2.60	0.67	0.00				
58.00	2.60	0.67	0.00				
60.00	2.60	0.67	0.00				
62.00	2.60	0.67	0.00				
64.00	2.60	0.67	0.00				
66.00	2.60	0.67	0.00				
68.00	2.60	0.67	0.00				
70.00	2.60	0.67	0.00				
72.00	2.60	0.67	0.00				
74.00	2.60	0.67	0.00				
76.00	2.60	0.67	0.00				
78.00	2.60	0.67	0.00				
80.00	2.60	0.67	0.00				
82.00	2.60	0.67	0.00				
84.00	2.60	0.67	0.00				
86.00	2.60	0.67	0.00				
88.00	2.60	0.67	0.00				
90.00	2.60	0.67	0.00				
92.00	2.60	0.67	0.00				
94.00	2.60	0.67	0.00				
96.00	2.60	0.67	0.00				
98.00	2.60	0.67	0.00				
100.00	2.60	0.67	0.00				
102.00	2.60	0.67	0.00				

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Post-Development Design Point 2 (Concord Phase 1)
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"
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Summary for Subcatchment 9P: PROPOSED SUBCAT AREA 9

Runoff = 2.23 cfs @ 12.20 hrs, Volume= 0.217 af, Depth= 0.76"

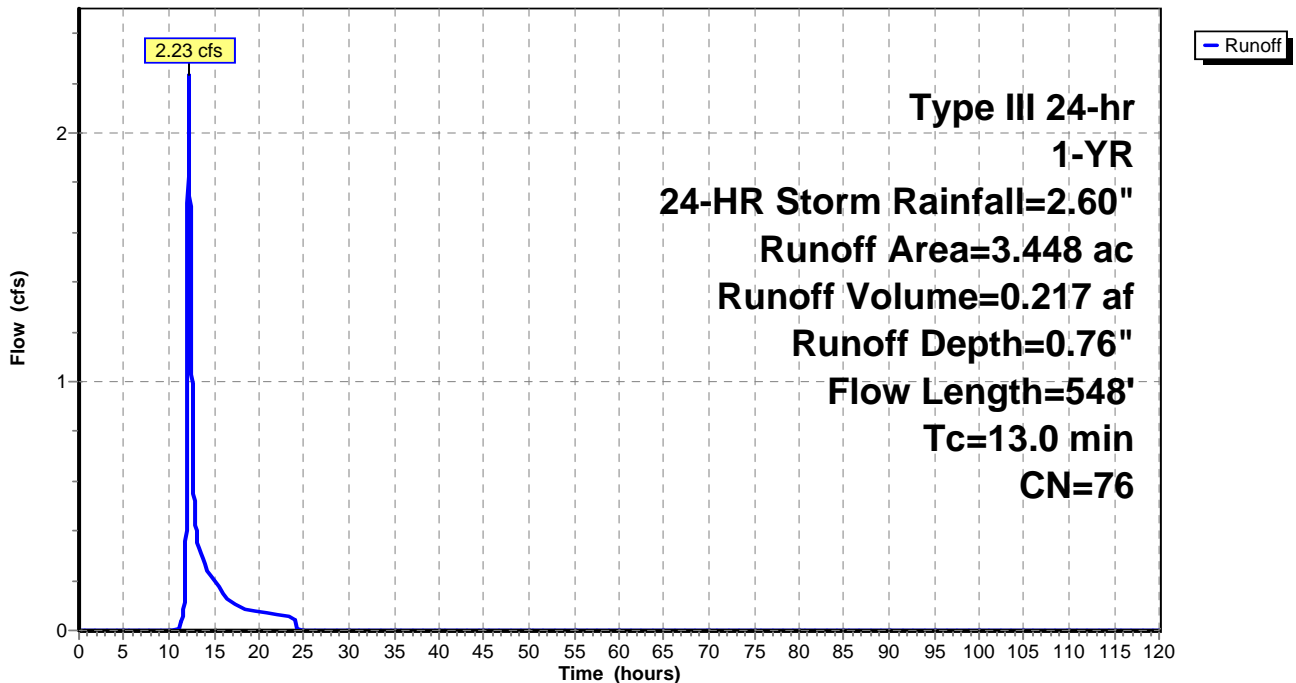
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

Area (ac)	CN	Description
2.111	74	>75% Grass cover, Good, HSG C
0.841	80	>75% Grass cover, Good, HSG D
0.496	79	Woods/grass comb., Good, HSG D
3.448	76	Weighted Average
3.448		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0450	0.25		Sheet Flow, SHEET FLOW Grass: Short n= 0.150 P2= 3.75"
6.5	448	0.0272	1.15		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Short Grass Pasture Kv= 7.0 fps
13.0	548	Total			

Subcatchment 9P: PROPOSED SUBCAT AREA 9

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Hydrograph for Subcatchment 9P: PROPOSED SUBCAT AREA 9

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	2.60	0.76	0.00
2.00	0.05	0.00	0.00	106.00	2.60	0.76	0.00
4.00	0.11	0.00	0.00	108.00	2.60	0.76	0.00
6.00	0.19	0.00	0.00	110.00	2.60	0.76	0.00
8.00	0.30	0.00	0.00	112.00	2.60	0.76	0.00
10.00	0.49	0.00	0.00	114.00	2.60	0.76	0.00
12.00	1.30	0.12	0.72	116.00	2.60	0.76	0.00
14.00	2.11	0.47	0.26	118.00	2.60	0.76	0.00
16.00	2.30	0.58	0.15	120.00	2.60	0.76	0.00
18.00	2.41	0.64	0.09				
20.00	2.49	0.69	0.07				
22.00	2.55	0.72	0.06				
24.00	2.60	0.76	0.05				
26.00	2.60	0.76	0.00				
28.00	2.60	0.76	0.00				
30.00	2.60	0.76	0.00				
32.00	2.60	0.76	0.00				
34.00	2.60	0.76	0.00				
36.00	2.60	0.76	0.00				
38.00	2.60	0.76	0.00				
40.00	2.60	0.76	0.00				
42.00	2.60	0.76	0.00				
44.00	2.60	0.76	0.00				
46.00	2.60	0.76	0.00				
48.00	2.60	0.76	0.00				
50.00	2.60	0.76	0.00				
52.00	2.60	0.76	0.00				
54.00	2.60	0.76	0.00				
56.00	2.60	0.76	0.00				
58.00	2.60	0.76	0.00				
60.00	2.60	0.76	0.00				
62.00	2.60	0.76	0.00				
64.00	2.60	0.76	0.00				
66.00	2.60	0.76	0.00				
68.00	2.60	0.76	0.00				
70.00	2.60	0.76	0.00				
72.00	2.60	0.76	0.00				
74.00	2.60	0.76	0.00				
76.00	2.60	0.76	0.00				
78.00	2.60	0.76	0.00				
80.00	2.60	0.76	0.00				
82.00	2.60	0.76	0.00				
84.00	2.60	0.76	0.00				
86.00	2.60	0.76	0.00				
88.00	2.60	0.76	0.00				
90.00	2.60	0.76	0.00				
92.00	2.60	0.76	0.00				
94.00	2.60	0.76	0.00				
96.00	2.60	0.76	0.00				
98.00	2.60	0.76	0.00				
100.00	2.60	0.76	0.00				
102.00	2.60	0.76	0.00				

Summary for Pond 1-P: Pond 1

Inflow Area = 29.162 ac, 49.55% Impervious, Inflow Depth = 4.30" for 10-YR, 24-HR Storm event
 Inflow = 160.88 cfs @ 12.04 hrs, Volume= 10.456 af
 Outflow = 14.06 cfs @ 12.89 hrs, Volume= 10.314 af, Atten= 91%, Lag= 50.8 min
 Primary = 14.06 cfs @ 12.89 hrs, Volume= 10.314 af

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,372.50' Surf.Area= 48,970 sf Storage= 107,718 cf
 Peak Elev= 1,376.90' @ 12.89 hrs Surf.Area= 71,489 sf Storage= 371,829 cf (264,112 cf above start)

Plug-Flow detention time= 1,526.1 min calculated for 7.841 af (75% of inflow)
 Center-of-Mass det. time= 1,093.8 min (1,891.6 - 797.9)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,370.00'	620,462 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,370.00	37,418	873.0	0	0	37,418
1,371.00	41,850	904.0	39,613	39,613	41,891
1,372.00	46,614	943.0	44,211	83,824	47,697
1,373.00	51,384	974.0	48,980	132,804	52,522
1,374.00	56,309	1,005.0	53,828	186,631	57,503
1,375.00	61,390	1,037.0	58,831	245,463	62,803
1,376.00	66,627	1,068.0	63,991	309,453	68,101
1,377.00	72,019	1,099.0	69,306	378,759	73,556
1,378.00	77,699	1,132.0	74,841	453,600	79,519
1,379.00	83,409	1,164.0	80,537	534,137	85,478
1,380.00	89,275	1,195.0	86,325	620,462	91,416

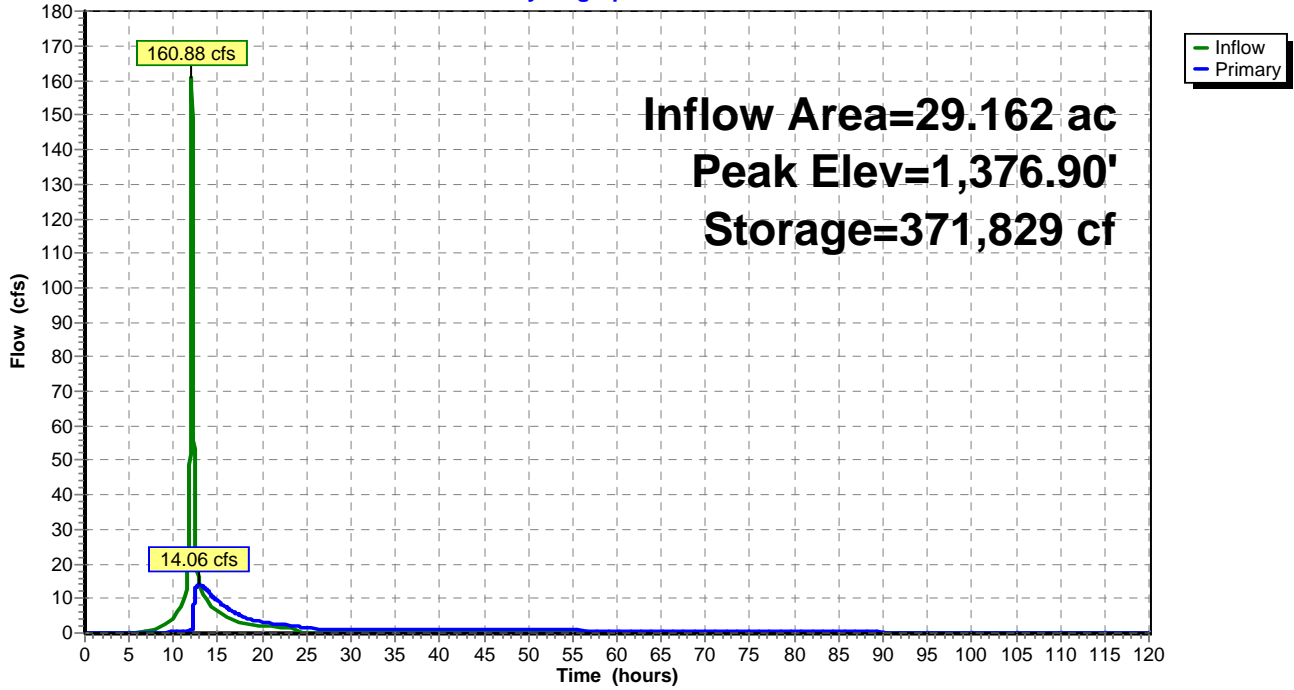
Device	Routing	Invert	Outlet Devices
#1	Primary	1,368.00'	48.0" Round Culvert L= 200.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,368.00' / 1,365.00' S= 0.0150 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf
#2	Device 1	1,372.50'	5.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,375.70'	36.0" W x 16.0" H Vert. Orifice/Grate C= 0.600
#4	Device 1	1,378.50'	16.0' 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=14.06 cfs @ 12.89 hrs HW=1,376.90' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 14.06 cfs of 158.98 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 1.34 cfs @ 9.86 fps)
- 3=Orifice/Grate (Orifice Controls 12.71 cfs @ 3.52 fps)
- 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1-P: Pond 1

Hydrograph



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Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Pond 1-P: Pond 1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	107,718	1,372.50	0.00
5.00	0.00	107,718	1,372.50	0.00
10.00	4.40	131,113	1,372.97	0.33
15.00	6.22	349,195	1,376.58	9.28
20.00	2.17	312,551	1,376.05	3.16
25.00	0.00	296,478	1,375.80	1.48
30.00	0.00	275,601	1,375.48	1.09
35.00	0.00	256,472	1,375.18	1.03
40.00	0.00	238,465	1,374.89	0.97
45.00	0.00	221,606	1,374.60	0.90
50.00	0.00	205,923	1,374.34	0.84
55.00	0.00	191,444	1,374.09	0.77
60.00	0.00	178,197	1,373.85	0.70
65.00	0.00	166,206	1,373.63	0.63
70.00	0.00	155,497	1,373.43	0.56
75.00	0.00	146,094	1,373.26	0.49
80.00	0.00	138,018	1,373.10	0.41
85.00	0.00	131,288	1,372.97	0.34
90.00	0.00	125,907	1,372.86	0.26
95.00	0.00	121,952	1,372.79	0.18
100.00	0.00	119,197	1,372.73	0.13
105.00	0.00	117,241	1,372.69	0.09
110.00	0.00	115,808	1,372.66	0.07
115.00	0.00	114,726	1,372.64	0.05
120.00	0.00	113,885	1,372.63	0.04

Summary for Subcatchment 1A: PROPOSED SUBCAT AREA 1A

Runoff = 160.88 cfs @ 12.04 hrs, Volume= 10.456 af, Depth= 4.30"

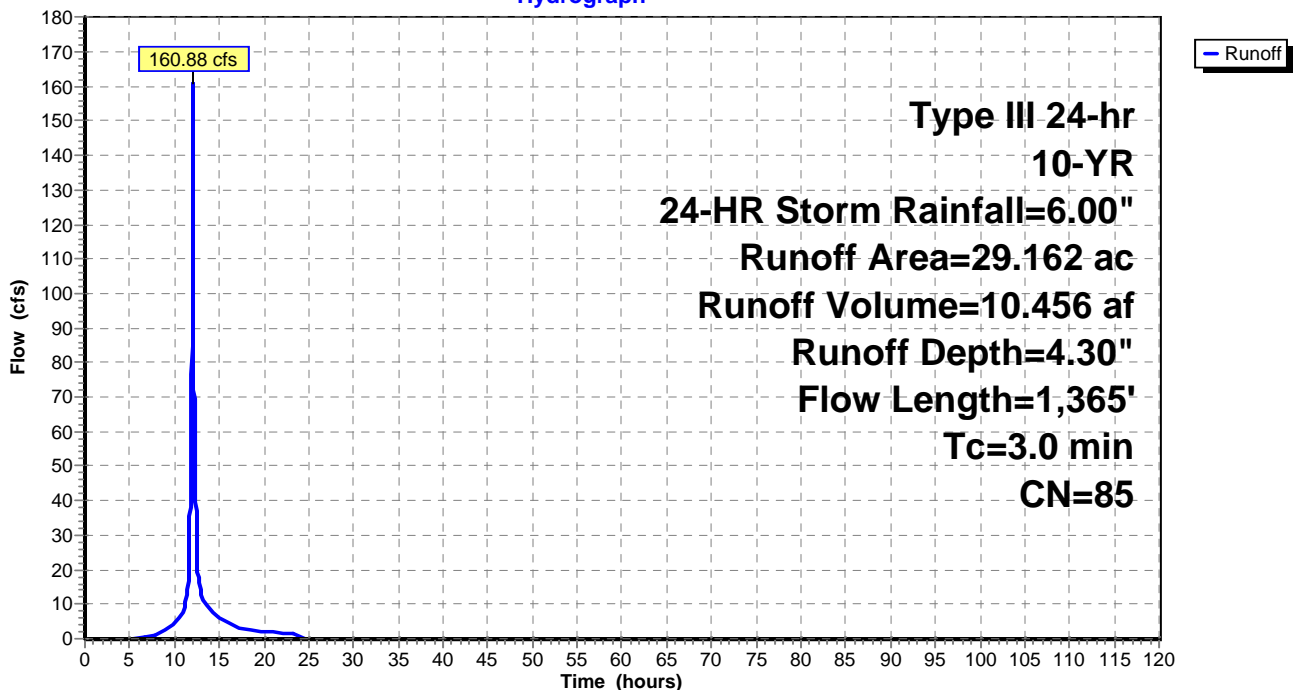
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

Area (ac)	CN	Description
10.978	74	>75% Grass cover, Good, HSG C
3.681	70	Woods, Good, HSG C
0.054	80	>75% Grass cover, Good, HSG D
14.449	98	Paved parking, HSG D
29.162	85	Weighted Average
14.713		50.45% Pervious Area
14.449		49.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0195	1.47		Sheet Flow, PARKING LOT - SHEET FLOW Smooth surfaces n= 0.011 P2= 3.75"
1.9	1,265	0.0600	11.11	8.73	Pipe Channel, CMP_Round 12" 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
3.0	1,365	Total			

Subcatchment 1A: PROPOSED SUBCAT AREA 1A

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Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Subcatchment 1A: PROPOSED SUBCAT AREA 1A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	6.00	4.30	0.00
2.00	0.12	0.00	0.00	106.00	6.00	4.30	0.00
4.00	0.26	0.00	0.00	108.00	6.00	4.30	0.00
6.00	0.43	0.00	0.22	110.00	6.00	4.30	0.00
8.00	0.68	0.05	1.30	112.00	6.00	4.30	0.00
10.00	1.13	0.24	4.40	114.00	6.00	4.30	0.00
12.00	3.00	1.59	125.77	116.00	6.00	4.30	0.00
14.00	4.87	3.24	8.14	118.00	6.00	4.30	0.00
16.00	5.32	3.66	4.36	120.00	6.00	4.30	0.00
18.00	5.57	3.90	2.68				
20.00	5.74	4.06	2.17				
22.00	5.88	4.19	1.79				
24.00	6.00	4.30	1.42				
26.00	6.00	4.30	0.00				
28.00	6.00	4.30	0.00				
30.00	6.00	4.30	0.00				
32.00	6.00	4.30	0.00				
34.00	6.00	4.30	0.00				
36.00	6.00	4.30	0.00				
38.00	6.00	4.30	0.00				
40.00	6.00	4.30	0.00				
42.00	6.00	4.30	0.00				
44.00	6.00	4.30	0.00				
46.00	6.00	4.30	0.00				
48.00	6.00	4.30	0.00				
50.00	6.00	4.30	0.00				
52.00	6.00	4.30	0.00				
54.00	6.00	4.30	0.00				
56.00	6.00	4.30	0.00				
58.00	6.00	4.30	0.00				
60.00	6.00	4.30	0.00				
62.00	6.00	4.30	0.00				
64.00	6.00	4.30	0.00				
66.00	6.00	4.30	0.00				
68.00	6.00	4.30	0.00				
70.00	6.00	4.30	0.00				
72.00	6.00	4.30	0.00				
74.00	6.00	4.30	0.00				
76.00	6.00	4.30	0.00				
78.00	6.00	4.30	0.00				
80.00	6.00	4.30	0.00				
82.00	6.00	4.30	0.00				
84.00	6.00	4.30	0.00				
86.00	6.00	4.30	0.00				
88.00	6.00	4.30	0.00				
90.00	6.00	4.30	0.00				
92.00	6.00	4.30	0.00				
94.00	6.00	4.30	0.00				
96.00	6.00	4.30	0.00				
98.00	6.00	4.30	0.00				
100.00	6.00	4.30	0.00				
102.00	6.00	4.30	0.00				

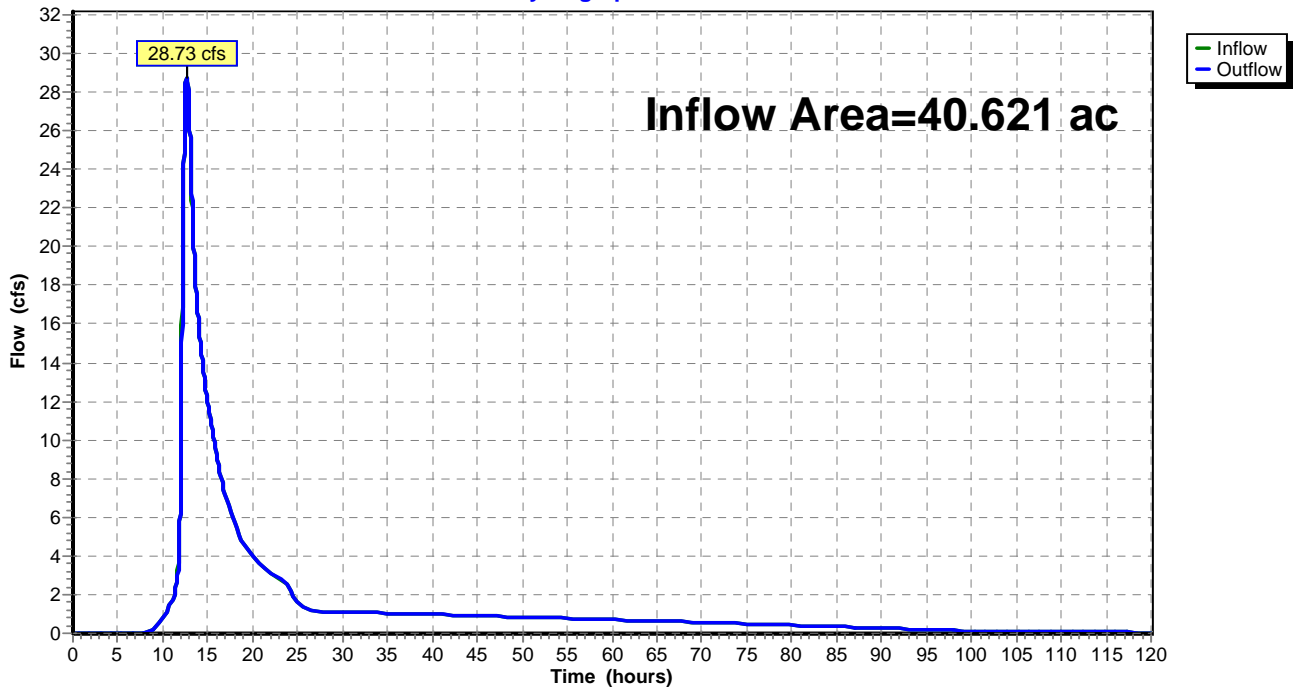
Summary for Reach 2R: DP 2

Inflow Area = 40.621 ac, 35.57% Impervious, Inflow Depth > 3.96" for 10-YR, 24-HR Storm event
Inflow = 28.73 cfs @ 12.66 hrs, Volume= 13.412 af
Outflow = 28.73 cfs @ 12.67 hrs, Volume= 13.412 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach 2R: DP 2

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Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Reach 2R: DP 2

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.10		0.10
2.00	0.00		0.00	106.00	0.09		0.09
4.00	0.00		0.00	108.00	0.08		0.08
6.00	0.00		0.00	110.00	0.07		0.07
8.00	0.04		0.04	112.00	0.06		0.06
10.00	0.78		0.78	114.00	0.06		0.06
12.00	7.92		7.64	116.00	0.05		0.05
14.00	15.84		15.89	118.00	0.05		0.05
16.00	9.15		9.17	120.00	0.00		0.04
18.00	5.64		5.65				
20.00	3.97		3.98				
22.00	3.13		3.13				
24.00	2.53		2.54				
26.00	1.20		1.20				
28.00	1.12		1.12				
30.00	1.09		1.09				
32.00	1.07		1.07				
34.00	1.04		1.04				
36.00	1.02		1.02				
38.00	0.99		0.99				
40.00	0.97		0.97				
42.00	0.94		0.94				
44.00	0.92		0.92				
46.00	0.89		0.89				
48.00	0.86		0.86				
50.00	0.84		0.84				
52.00	0.81		0.81				
54.00	0.78		0.78				
56.00	0.76		0.76				
58.00	0.73		0.73				
60.00	0.70		0.70				
62.00	0.67		0.67				
64.00	0.64		0.65				
66.00	0.62		0.62				
68.00	0.59		0.59				
70.00	0.56		0.56				
72.00	0.53		0.53				
74.00	0.50		0.50				
76.00	0.47		0.47				
78.00	0.44		0.44				
80.00	0.41		0.41				
82.00	0.38		0.38				
84.00	0.35		0.35				
86.00	0.32		0.32				
88.00	0.29		0.29				
90.00	0.26		0.26				
92.00	0.23		0.23				
94.00	0.20		0.20				
96.00	0.17		0.17				
98.00	0.15		0.15				
100.00	0.13		0.13				
102.00	0.11		0.11				

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 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Summary for Subcatchment 8P: PROPOSED SUBCAT AREA 8

Runoff = 12.48 cfs @ 12.77 hrs, Volume= 2.126 af, Depth= 3.18"

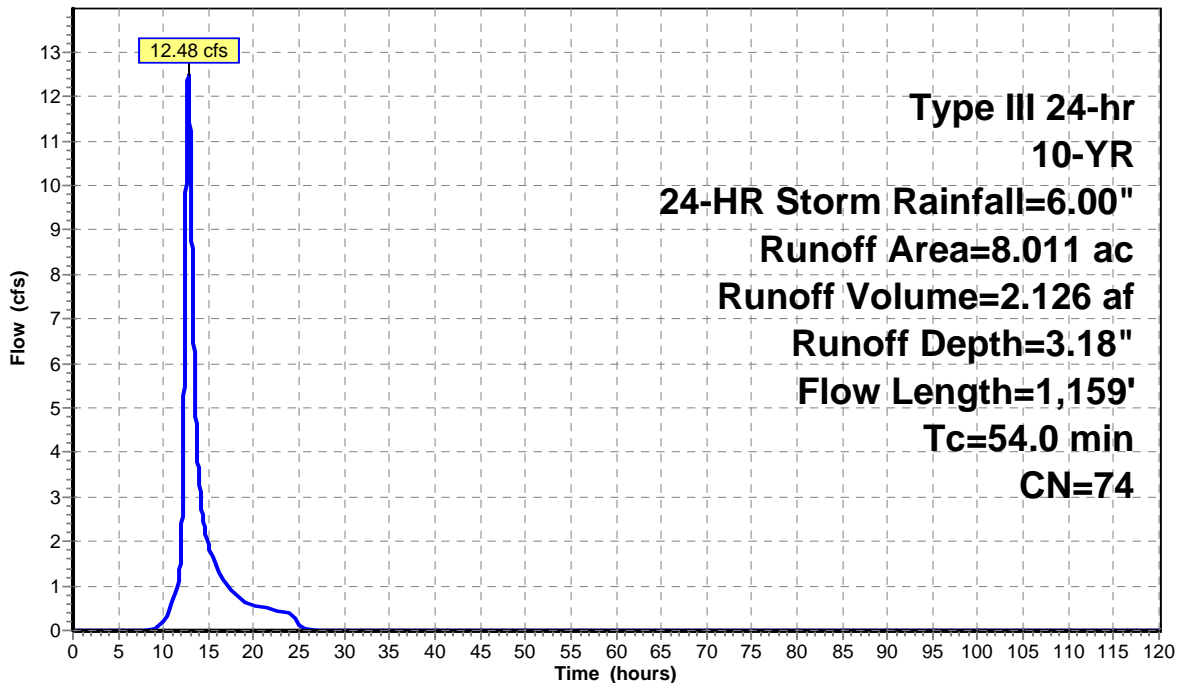
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

Area (ac)	CN	Description
3.391	77	Woods, Good, HSG D
2.112	70	Woods, Good, HSG C
2.508	74	>75% Grass cover, Good, HSG C
8.011	74	Weighted Average
8.011		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0	100	0.0450	0.07		Sheet Flow, SHEET FLOW Woods: Dense underbrush n= 0.800 P2= 3.75"
29.0	1,059	0.0148	0.61		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
54.0	1,159	Total			

Subcatchment 8P: PROPOSED SUBCAT AREA 8

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Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Subcatchment 8P: PROPOSED SUBCAT AREA 8

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	6.00	3.18	0.00
2.00	0.12	0.00	0.00	106.00	6.00	3.18	0.00
4.00	0.26	0.00	0.00	108.00	6.00	3.18	0.00
6.00	0.43	0.00	0.00	110.00	6.00	3.18	0.00
8.00	0.68	0.00	0.00	112.00	6.00	3.18	0.00
10.00	1.13	0.05	0.22	114.00	6.00	3.18	0.00
12.00	3.00	0.91	2.16	116.00	6.00	3.18	0.00
14.00	4.87	2.26	3.20	118.00	6.00	3.18	0.00
16.00	5.32	2.62	1.39	120.00	6.00	3.18	0.00
18.00	5.57	2.83	0.80				
20.00	5.74	2.97	0.57				
22.00	5.88	3.09	0.47				
24.00	6.00	3.18	0.38				
26.00	6.00	3.18	0.01				
28.00	6.00	3.18	0.00				
30.00	6.00	3.18	0.00				
32.00	6.00	3.18	0.00				
34.00	6.00	3.18	0.00				
36.00	6.00	3.18	0.00				
38.00	6.00	3.18	0.00				
40.00	6.00	3.18	0.00				
42.00	6.00	3.18	0.00				
44.00	6.00	3.18	0.00				
46.00	6.00	3.18	0.00				
48.00	6.00	3.18	0.00				
50.00	6.00	3.18	0.00				
52.00	6.00	3.18	0.00				
54.00	6.00	3.18	0.00				
56.00	6.00	3.18	0.00				
58.00	6.00	3.18	0.00				
60.00	6.00	3.18	0.00				
62.00	6.00	3.18	0.00				
64.00	6.00	3.18	0.00				
66.00	6.00	3.18	0.00				
68.00	6.00	3.18	0.00				
70.00	6.00	3.18	0.00				
72.00	6.00	3.18	0.00				
74.00	6.00	3.18	0.00				
76.00	6.00	3.18	0.00				
78.00	6.00	3.18	0.00				
80.00	6.00	3.18	0.00				
82.00	6.00	3.18	0.00				
84.00	6.00	3.18	0.00				
86.00	6.00	3.18	0.00				
88.00	6.00	3.18	0.00				
90.00	6.00	3.18	0.00				
92.00	6.00	3.18	0.00				
94.00	6.00	3.18	0.00				
96.00	6.00	3.18	0.00				
98.00	6.00	3.18	0.00				
100.00	6.00	3.18	0.00				
102.00	6.00	3.18	0.00				

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 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"
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Summary for Subcatchment 9P: PROPOSED SUBCAT AREA 9

Runoff = 10.92 cfs @ 12.18 hrs, Volume= 0.971 af, Depth= 3.38"

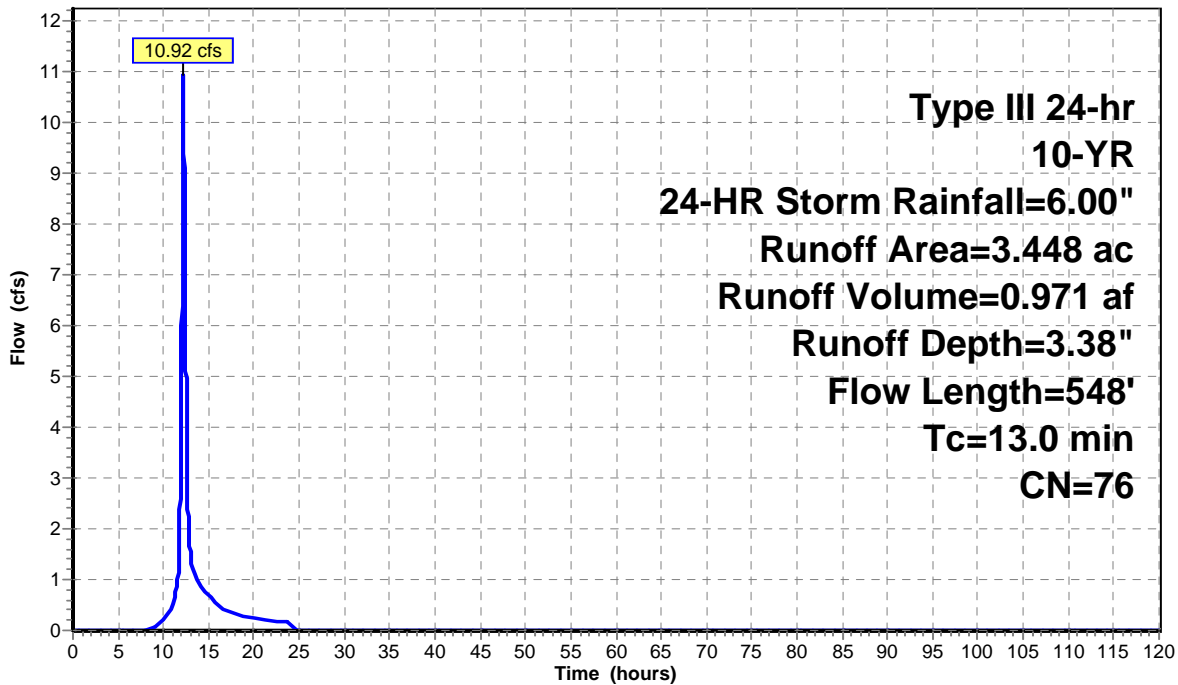
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

Area (ac)	CN	Description
2.111	74	>75% Grass cover, Good, HSG C
0.841	80	>75% Grass cover, Good, HSG D
0.496	79	Woods/grass comb., Good, HSG D
3.448	76	Weighted Average
3.448		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0450	0.25		Sheet Flow, SHEET FLOW Grass: Short n= 0.150 P2= 3.75"
6.5	448	0.0272	1.15		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Short Grass Pasture Kv= 7.0 fps
13.0	548	Total			

Subcatchment 9P: PROPOSED SUBCAT AREA 9

Hydrograph



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Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Subcatchment 9P: PROPOSED SUBCAT AREA 9

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	6.00	3.38	0.00
2.00	0.12	0.00	0.00	106.00	6.00	3.38	0.00
4.00	0.26	0.00	0.00	108.00	6.00	3.38	0.00
6.00	0.43	0.00	0.00	110.00	6.00	3.38	0.00
8.00	0.68	0.00	0.01	112.00	6.00	3.38	0.00
10.00	1.13	0.07	0.23	114.00	6.00	3.38	0.00
12.00	3.00	1.02	4.78	116.00	6.00	3.38	0.00
14.00	4.87	2.43	0.91	118.00	6.00	3.38	0.00
16.00	5.32	2.80	0.49	120.00	6.00	3.38	0.00
18.00	5.57	3.01	0.30				
20.00	5.74	3.16	0.24				
22.00	5.88	3.28	0.20				
24.00	6.00	3.38	0.16				
26.00	6.00	3.38	0.00				
28.00	6.00	3.38	0.00				
30.00	6.00	3.38	0.00				
32.00	6.00	3.38	0.00				
34.00	6.00	3.38	0.00				
36.00	6.00	3.38	0.00				
38.00	6.00	3.38	0.00				
40.00	6.00	3.38	0.00				
42.00	6.00	3.38	0.00				
44.00	6.00	3.38	0.00				
46.00	6.00	3.38	0.00				
48.00	6.00	3.38	0.00				
50.00	6.00	3.38	0.00				
52.00	6.00	3.38	0.00				
54.00	6.00	3.38	0.00				
56.00	6.00	3.38	0.00				
58.00	6.00	3.38	0.00				
60.00	6.00	3.38	0.00				
62.00	6.00	3.38	0.00				
64.00	6.00	3.38	0.00				
66.00	6.00	3.38	0.00				
68.00	6.00	3.38	0.00				
70.00	6.00	3.38	0.00				
72.00	6.00	3.38	0.00				
74.00	6.00	3.38	0.00				
76.00	6.00	3.38	0.00				
78.00	6.00	3.38	0.00				
80.00	6.00	3.38	0.00				
82.00	6.00	3.38	0.00				
84.00	6.00	3.38	0.00				
86.00	6.00	3.38	0.00				
88.00	6.00	3.38	0.00				
90.00	6.00	3.38	0.00				
92.00	6.00	3.38	0.00				
94.00	6.00	3.38	0.00				
96.00	6.00	3.38	0.00				
98.00	6.00	3.38	0.00				
100.00	6.00	3.38	0.00				
102.00	6.00	3.38	0.00				

Summary for Pond 1-P: Pond 1

Inflow Area = 29.162 ac, 49.55% Impervious, Inflow Depth = 6.21" for 100-YR, 24-HR Storm event
 Inflow = 228.27 cfs @ 12.04 hrs, Volume= 15.099 af
 Outflow = 27.69 cfs @ 12.55 hrs, Volume= 14.955 af, Atten= 88%, Lag= 30.5 min
 Primary = 27.69 cfs @ 12.55 hrs, Volume= 14.955 af

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,372.50' Surf.Area= 48,970 sf Storage= 107,718 cf
 Peak Elev= 1,378.23' @ 12.55 hrs Surf.Area= 78,993 sf Storage= 471,594 cf (363,877 cf above start)

Plug-Flow detention time= 1,043.1 min calculated for 12.481 af (83% of inflow)
 Center-of-Mass det. time= 805.8 min (1,593.5 - 787.7)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,370.00'	620,462 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,370.00	37,418	873.0	0	0	37,418
1,371.00	41,850	904.0	39,613	39,613	41,891
1,372.00	46,614	943.0	44,211	83,824	47,697
1,373.00	51,384	974.0	48,980	132,804	52,522
1,374.00	56,309	1,005.0	53,828	186,631	57,503
1,375.00	61,390	1,037.0	58,831	245,463	62,803
1,376.00	66,627	1,068.0	63,991	309,453	68,101
1,377.00	72,019	1,099.0	69,306	378,759	73,556
1,378.00	77,699	1,132.0	74,841	453,600	79,519
1,379.00	83,409	1,164.0	80,537	534,137	85,478
1,380.00	89,275	1,195.0	86,325	620,462	91,416

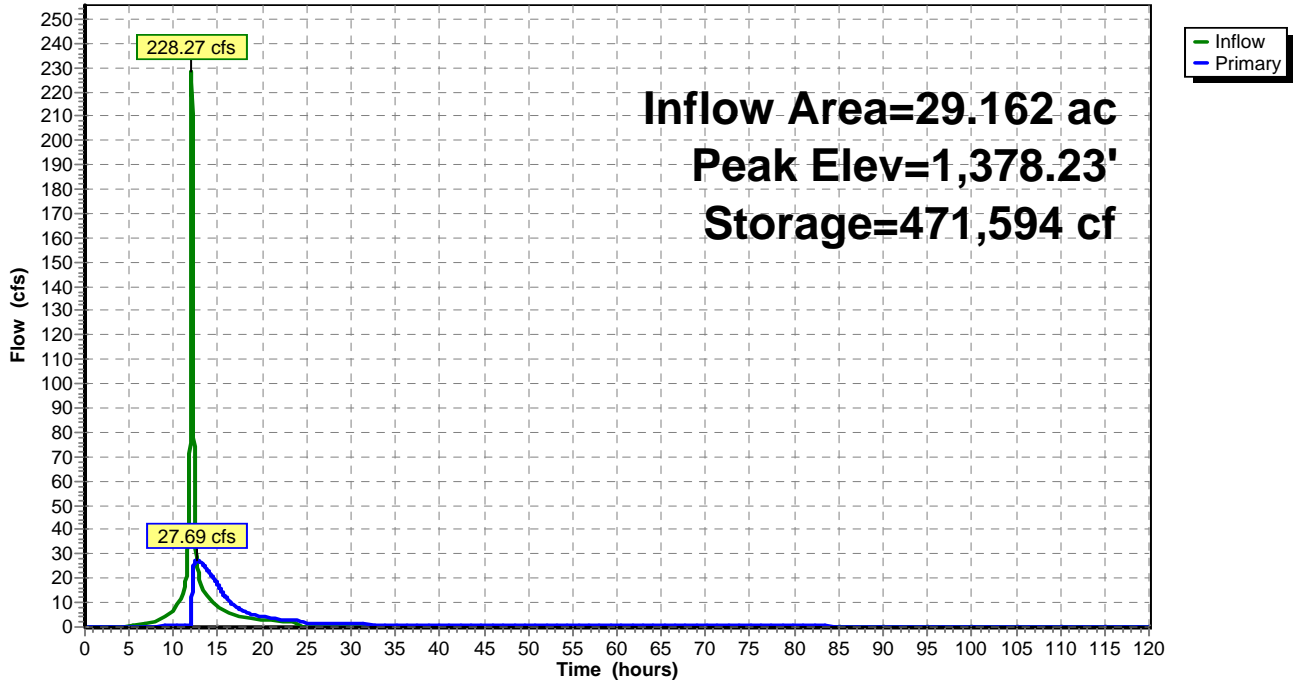
Device	Routing	Invert	Outlet Devices
#1	Primary	1,368.00'	48.0" Round Culvert L= 200.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,368.00' / 1,365.00' S= 0.0150 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf
#2	Device 1	1,372.50'	5.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,375.70'	36.0" W x 16.0" H Vert. Orifice/Grate C= 0.600
#4	Device 1	1,378.50'	16.0' 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=27.69 cfs @ 12.55 hrs HW=1,378.23' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 27.69 cfs of 173.58 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 1.54 cfs @ 11.31 fps)
- 3=Orifice/Grate (Orifice Controls 26.14 cfs @ 6.54 fps)
- 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1-P: Pond 1

Hydrograph



Hydrograph for Pond 1-P: Pond 1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	107,718	1,372.50	0.00
5.00	0.34	108,233	1,372.51	0.00
10.00	7.20	152,065	1,373.37	0.53
15.00	8.54	386,477	1,377.11	17.25
20.00	2.96	320,230	1,376.16	4.23
25.00	0.00	300,507	1,375.86	1.81
30.00	0.00	278,305	1,375.52	1.10
35.00	0.00	259,026	1,375.22	1.04
40.00	0.00	240,863	1,374.92	0.98
45.00	0.00	223,845	1,374.64	0.91
50.00	0.00	208,000	1,374.37	0.85
55.00	0.00	193,355	1,374.12	0.78
60.00	0.00	179,937	1,373.88	0.71
65.00	0.00	167,773	1,373.66	0.64
70.00	0.00	156,887	1,373.46	0.57
75.00	0.00	147,304	1,373.28	0.50
80.00	0.00	139,045	1,373.12	0.42
85.00	0.00	132,129	1,372.99	0.35
90.00	0.00	126,563	1,372.88	0.27
95.00	0.00	122,413	1,372.80	0.19
100.00	0.00	119,519	1,372.74	0.13
105.00	0.00	117,473	1,372.70	0.10
110.00	0.00	115,981	1,372.67	0.07
115.00	0.00	114,858	1,372.64	0.05
120.00	0.00	113,989	1,372.63	0.04

Summary for Subcatchment 1A: PROPOSED SUBCAT AREA 1A

Runoff = 228.27 cfs @ 12.04 hrs, Volume= 15.099 af, Depth= 6.21"

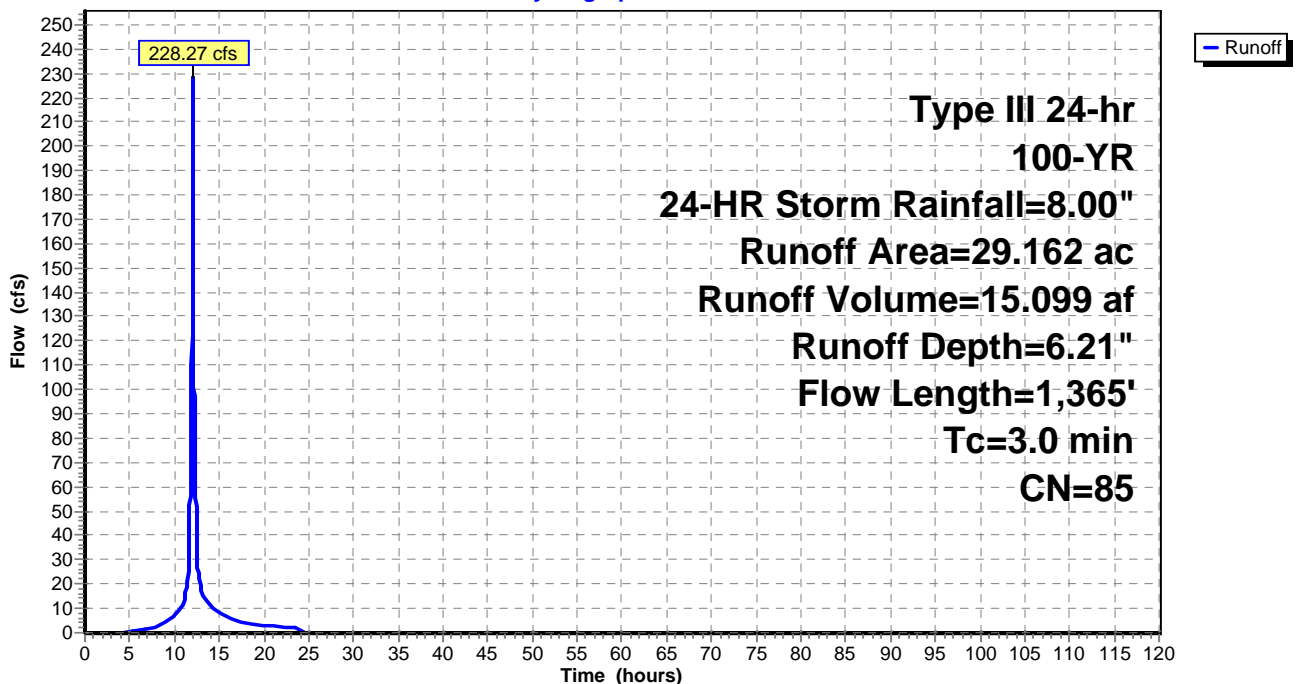
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Area (ac)	CN	Description
10.978	74	>75% Grass cover, Good, HSG C
3.681	70	Woods, Good, HSG C
0.054	80	>75% Grass cover, Good, HSG D
14.449	98	Paved parking, HSG D
29.162	85	Weighted Average
14.713		50.45% Pervious Area
14.449		49.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0195	1.47		Sheet Flow, PARKING LOT - SHEET FLOW Smooth surfaces n= 0.011 P2= 3.75"
1.9	1,265	0.0600	11.11	8.73	Pipe Channel, CMP_Round 12" 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
3.0	1,365	Total			

Subcatchment 1A: PROPOSED SUBCAT AREA 1A

Hydrograph



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Post-Development Design Point 2 (Concord Phase 1)
Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

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Hydrograph for Subcatchment 1A: PROPOSED SUBCAT AREA 1A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	8.00	6.21	0.00
2.00	0.16	0.00	0.00	106.00	8.00	6.21	0.00
4.00	0.34	0.00	0.00	108.00	8.00	6.21	0.00
6.00	0.58	0.03	0.78	110.00	8.00	6.21	0.00
8.00	0.91	0.13	2.54	112.00	8.00	6.21	0.00
10.00	1.51	0.46	7.20	114.00	8.00	6.21	0.00
12.00	4.00	2.46	179.84	116.00	8.00	6.21	0.00
14.00	6.49	4.76	11.20	118.00	8.00	6.21	0.00
16.00	7.09	5.34	5.97	120.00	8.00	6.21	0.00
18.00	7.42	5.66	3.67				
20.00	7.66	5.88	2.96				
22.00	7.85	6.06	2.45				
24.00	8.00	6.21	1.94				
26.00	8.00	6.21	0.00				
28.00	8.00	6.21	0.00				
30.00	8.00	6.21	0.00				
32.00	8.00	6.21	0.00				
34.00	8.00	6.21	0.00				
36.00	8.00	6.21	0.00				
38.00	8.00	6.21	0.00				
40.00	8.00	6.21	0.00				
42.00	8.00	6.21	0.00				
44.00	8.00	6.21	0.00				
46.00	8.00	6.21	0.00				
48.00	8.00	6.21	0.00				
50.00	8.00	6.21	0.00				
52.00	8.00	6.21	0.00				
54.00	8.00	6.21	0.00				
56.00	8.00	6.21	0.00				
58.00	8.00	6.21	0.00				
60.00	8.00	6.21	0.00				
62.00	8.00	6.21	0.00				
64.00	8.00	6.21	0.00				
66.00	8.00	6.21	0.00				
68.00	8.00	6.21	0.00				
70.00	8.00	6.21	0.00				
72.00	8.00	6.21	0.00				
74.00	8.00	6.21	0.00				
76.00	8.00	6.21	0.00				
78.00	8.00	6.21	0.00				
80.00	8.00	6.21	0.00				
82.00	8.00	6.21	0.00				
84.00	8.00	6.21	0.00				
86.00	8.00	6.21	0.00				
88.00	8.00	6.21	0.00				
90.00	8.00	6.21	0.00				
92.00	8.00	6.21	0.00				
94.00	8.00	6.21	0.00				
96.00	8.00	6.21	0.00				
98.00	8.00	6.21	0.00				
100.00	8.00	6.21	0.00				
102.00	8.00	6.21	0.00				

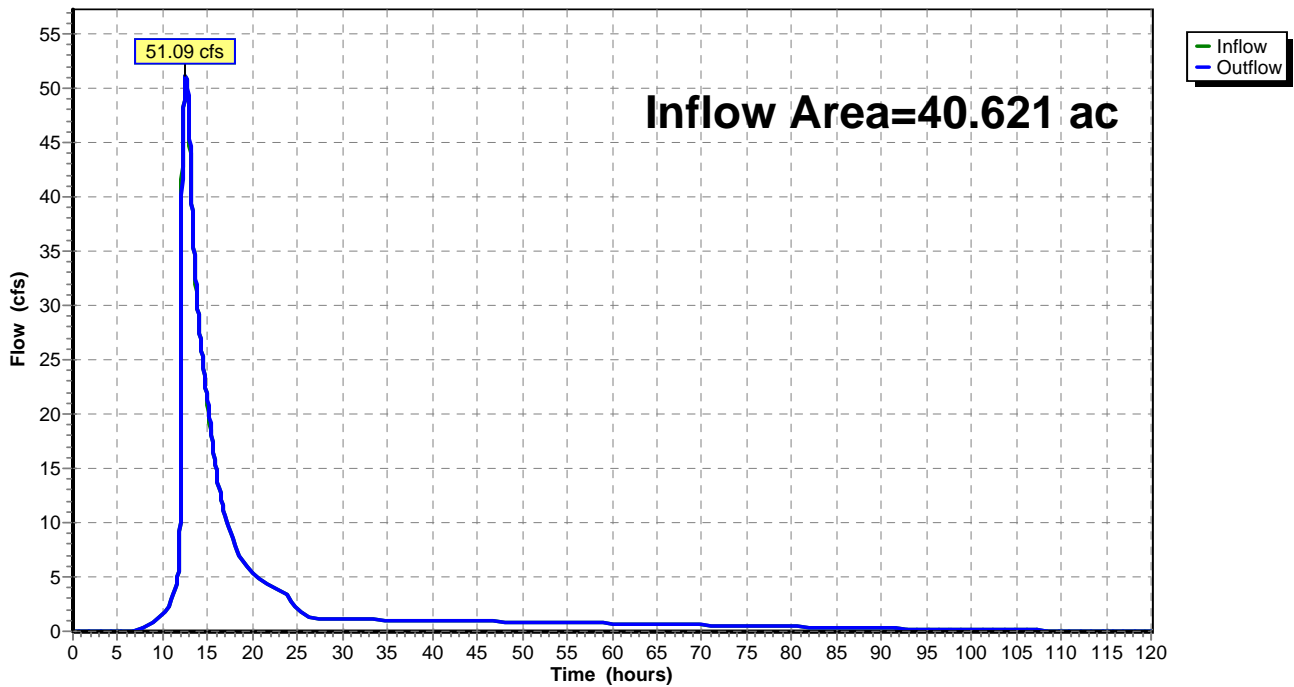
Summary for Reach 2R: DP 2

Inflow Area = 40.621 ac, 35.57% Impervious, Inflow Depth > 5.83" for 100-YR, 24-HR Storm event
Inflow = 51.09 cfs @ 12.54 hrs, Volume= 19.726 af
Outflow = 51.09 cfs @ 12.55 hrs, Volume= 19.726 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach 2R: DP 2

Hydrograph



Hydrograph for Reach 2R: DP 2

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.10		0.10
2.00	0.00		0.00	106.00	0.09		0.09
4.00	0.00		0.00	108.00	0.08		0.08
6.00	0.01		0.01	110.00	0.07		0.07
8.00	0.31		0.31	112.00	0.06		0.06
10.00	1.63		1.62	114.00	0.06		0.06
12.00	15.77		14.52	116.00	0.05		0.05
14.00	28.60		28.69	118.00	0.05		0.05
16.00	14.41		14.46	120.00	0.00		0.04
18.00	7.94		7.96				
20.00	5.38		5.39				
22.00	4.19		4.19				
24.00	3.37		3.37				
26.00	1.37		1.38				
28.00	1.13		1.13				
30.00	1.10		1.10				
32.00	1.08		1.08				
34.00	1.05		1.05				
36.00	1.03		1.03				
38.00	1.00		1.00				
40.00	0.98		0.98				
42.00	0.95		0.95				
44.00	0.93		0.93				
46.00	0.90		0.90				
48.00	0.87		0.87				
50.00	0.85		0.85				
52.00	0.82		0.82				
54.00	0.79		0.79				
56.00	0.77		0.77				
58.00	0.74		0.74				
60.00	0.71		0.71				
62.00	0.68		0.68				
64.00	0.65		0.65				
66.00	0.63		0.63				
68.00	0.60		0.60				
70.00	0.57		0.57				
72.00	0.54		0.54				
74.00	0.51		0.51				
76.00	0.48		0.48				
78.00	0.45		0.45				
80.00	0.42		0.42				
82.00	0.39		0.39				
84.00	0.36		0.36				
86.00	0.33		0.33				
88.00	0.30		0.30				
90.00	0.27		0.27				
92.00	0.24		0.24				
94.00	0.21		0.21				
96.00	0.18		0.18				
98.00	0.15		0.15				
100.00	0.13		0.13				
102.00	0.12		0.12				

Summary for Subcatchment 8P: PROPOSED SUBCAT AREA 8

Runoff = 19.33 cfs @ 12.72 hrs, Volume= 3.288 af, Depth= 4.93"

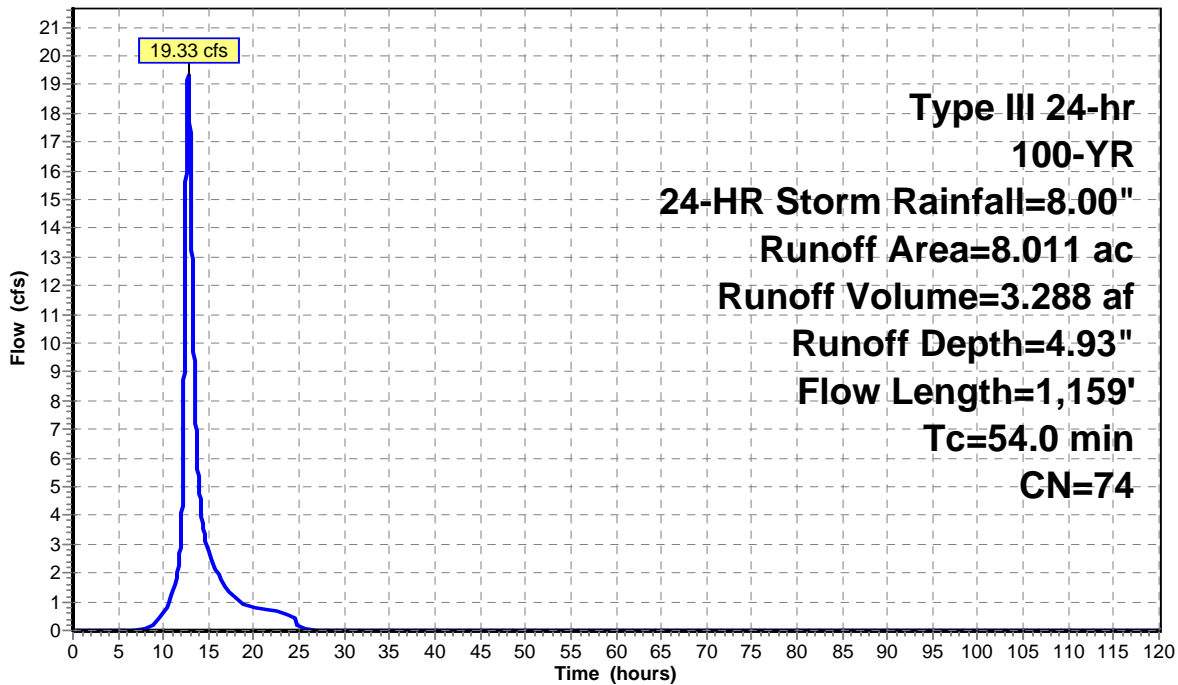
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Area (ac)	CN	Description
3.391	77	Woods, Good, HSG D
2.112	70	Woods, Good, HSG C
2.508	74	>75% Grass cover, Good, HSG C
8.011	74	Weighted Average
8.011		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0	100	0.0450	0.07		Sheet Flow, SHEET FLOW Woods: Dense underbrush n= 0.800 P2= 3.75"
29.0	1,059	0.0148	0.61		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
54.0	1,159	Total			

Subcatchment 8P: PROPOSED SUBCAT AREA 8

Hydrograph



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Post-Development Design Point 2 (Concord Phase 1)
Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

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Hydrograph for Subcatchment 8P: PROPOSED SUBCAT AREA 8

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	8.00	4.93	0.00
2.00	0.16	0.00	0.00	106.00	8.00	4.93	0.00
4.00	0.34	0.00	0.00	108.00	8.00	4.93	0.00
6.00	0.58	0.00	0.00	110.00	8.00	4.93	0.00
8.00	0.91	0.01	0.05	112.00	8.00	4.93	0.00
10.00	1.51	0.15	0.62	114.00	8.00	4.93	0.00
12.00	4.00	1.60	3.80	116.00	8.00	4.93	0.00
14.00	6.49	3.60	4.71	118.00	8.00	4.93	0.00
16.00	7.09	4.12	2.00	120.00	8.00	4.93	0.00
18.00	7.42	4.41	1.15				
20.00	7.66	4.62	0.82				
22.00	7.85	4.79	0.67				
24.00	8.00	4.93	0.54				
26.00	8.00	4.93	0.01				
28.00	8.00	4.93	0.00				
30.00	8.00	4.93	0.00				
32.00	8.00	4.93	0.00				
34.00	8.00	4.93	0.00				
36.00	8.00	4.93	0.00				
38.00	8.00	4.93	0.00				
40.00	8.00	4.93	0.00				
42.00	8.00	4.93	0.00				
44.00	8.00	4.93	0.00				
46.00	8.00	4.93	0.00				
48.00	8.00	4.93	0.00				
50.00	8.00	4.93	0.00				
52.00	8.00	4.93	0.00				
54.00	8.00	4.93	0.00				
56.00	8.00	4.93	0.00				
58.00	8.00	4.93	0.00				
60.00	8.00	4.93	0.00				
62.00	8.00	4.93	0.00				
64.00	8.00	4.93	0.00				
66.00	8.00	4.93	0.00				
68.00	8.00	4.93	0.00				
70.00	8.00	4.93	0.00				
72.00	8.00	4.93	0.00				
74.00	8.00	4.93	0.00				
76.00	8.00	4.93	0.00				
78.00	8.00	4.93	0.00				
80.00	8.00	4.93	0.00				
82.00	8.00	4.93	0.00				
84.00	8.00	4.93	0.00				
86.00	8.00	4.93	0.00				
88.00	8.00	4.93	0.00				
90.00	8.00	4.93	0.00				
92.00	8.00	4.93	0.00				
94.00	8.00	4.93	0.00				
96.00	8.00	4.93	0.00				
98.00	8.00	4.93	0.00				
100.00	8.00	4.93	0.00				
102.00	8.00	4.93	0.00				

Summary for Subcatchment 9P: PROPOSED SUBCAT AREA 9

Runoff = 16.60 cfs @ 12.18 hrs, Volume= 1.482 af, Depth= 5.16"

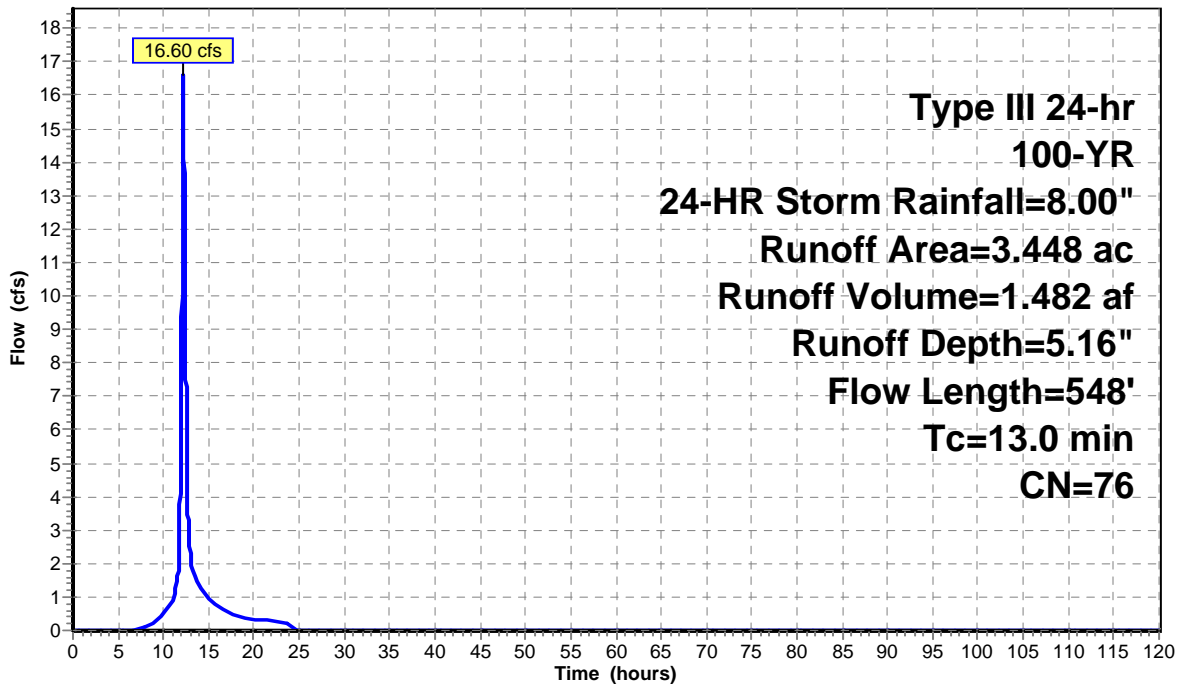
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Area (ac)	CN	Description
2.111	74	>75% Grass cover, Good, HSG C
0.841	80	>75% Grass cover, Good, HSG D
0.496	79	Woods/grass comb., Good, HSG D
3.448	76	Weighted Average
3.448		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0450	0.25		Sheet Flow, SHEET FLOW Grass: Short n= 0.150 P2= 3.75"
6.5	448	0.0272	1.15		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Short Grass Pasture Kv= 7.0 fps
13.0	548	Total			

Subcatchment 9P: PROPOSED SUBCAT AREA 9

Hydrograph



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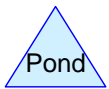
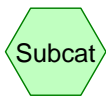
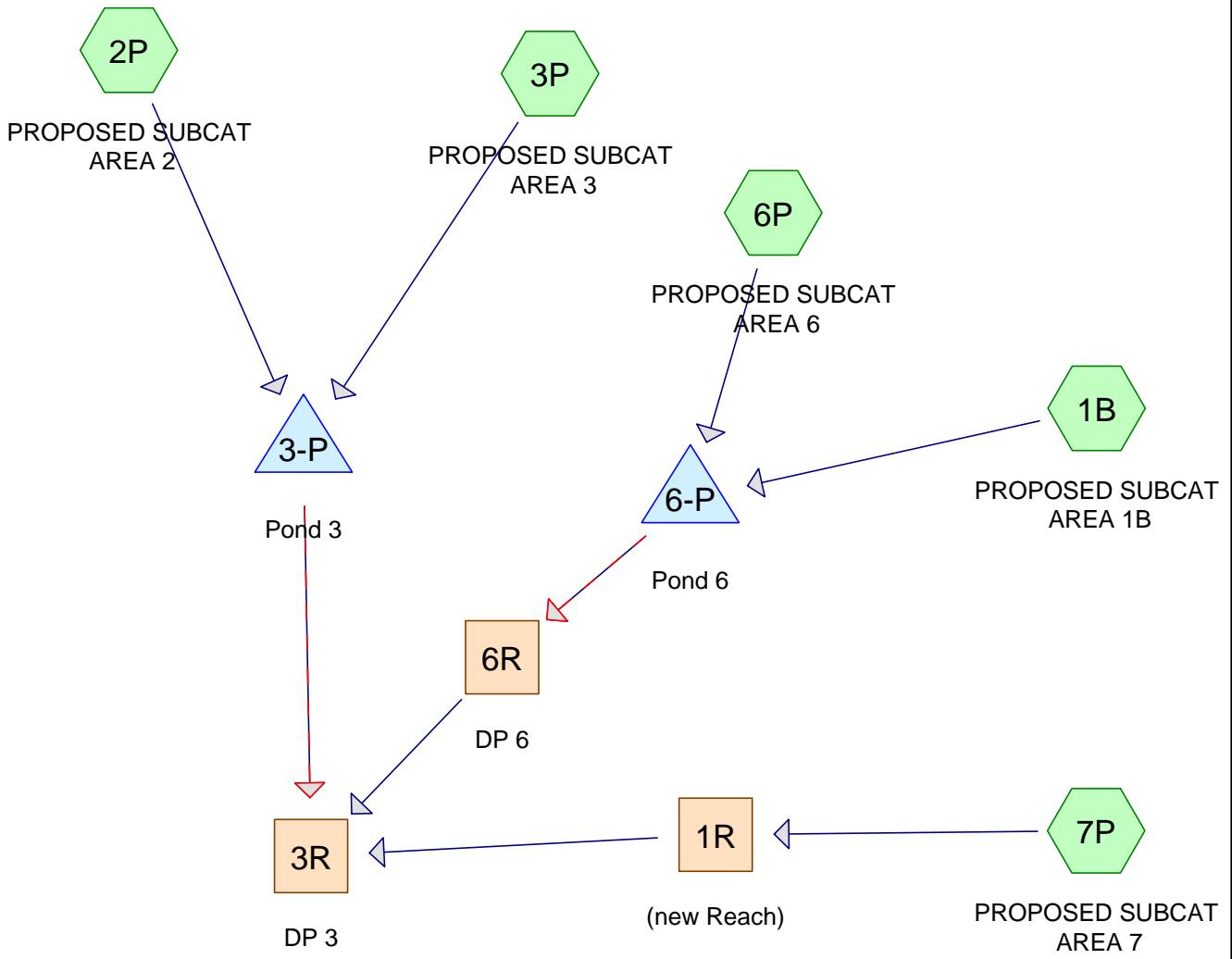
Post-Development Design Point 2 (Concord Phase 1)
Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

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Hydrograph for Subcatchment 9P: PROPOSED SUBCAT AREA 9

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	8.00	5.16	0.00
2.00	0.16	0.00	0.00	106.00	8.00	5.16	0.00
4.00	0.34	0.00	0.00	108.00	8.00	5.16	0.00
6.00	0.58	0.00	0.00	110.00	8.00	5.16	0.00
8.00	0.91	0.02	0.09	112.00	8.00	5.16	0.00
10.00	1.51	0.19	0.47	114.00	8.00	5.16	0.00
12.00	4.00	1.74	7.58	116.00	8.00	5.16	0.00
14.00	6.49	3.80	1.31	118.00	8.00	5.16	0.00
16.00	7.09	4.34	0.70	120.00	8.00	5.16	0.00
18.00	7.42	4.64	0.42				
20.00	7.66	4.85	0.33				
22.00	7.85	5.02	0.28				
24.00	8.00	5.16	0.22				
26.00	8.00	5.16	0.00				
28.00	8.00	5.16	0.00				
30.00	8.00	5.16	0.00				
32.00	8.00	5.16	0.00				
34.00	8.00	5.16	0.00				
36.00	8.00	5.16	0.00				
38.00	8.00	5.16	0.00				
40.00	8.00	5.16	0.00				
42.00	8.00	5.16	0.00				
44.00	8.00	5.16	0.00				
46.00	8.00	5.16	0.00				
48.00	8.00	5.16	0.00				
50.00	8.00	5.16	0.00				
52.00	8.00	5.16	0.00				
54.00	8.00	5.16	0.00				
56.00	8.00	5.16	0.00				
58.00	8.00	5.16	0.00				
60.00	8.00	5.16	0.00				
62.00	8.00	5.16	0.00				
64.00	8.00	5.16	0.00				
66.00	8.00	5.16	0.00				
68.00	8.00	5.16	0.00				
70.00	8.00	5.16	0.00				
72.00	8.00	5.16	0.00				
74.00	8.00	5.16	0.00				
76.00	8.00	5.16	0.00				
78.00	8.00	5.16	0.00				
80.00	8.00	5.16	0.00				
82.00	8.00	5.16	0.00				
84.00	8.00	5.16	0.00				
86.00	8.00	5.16	0.00				
88.00	8.00	5.16	0.00				
90.00	8.00	5.16	0.00				
92.00	8.00	5.16	0.00				
94.00	8.00	5.16	0.00				
96.00	8.00	5.16	0.00				
98.00	8.00	5.16	0.00				
100.00	8.00	5.16	0.00				
102.00	8.00	5.16	0.00				



Routing Diagram for 2012_05_21_Concord
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Post-Development Design Point 3 (Concord Phase 1)
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"
 Printed 5/31/2012
 Page 2

Summary for Subcatchment 1B: PROPOSED SUBCAT AREA 1B

Runoff = 19.57 cfs @ 12.05 hrs, Volume= 1.336 af, Depth= 2.06"

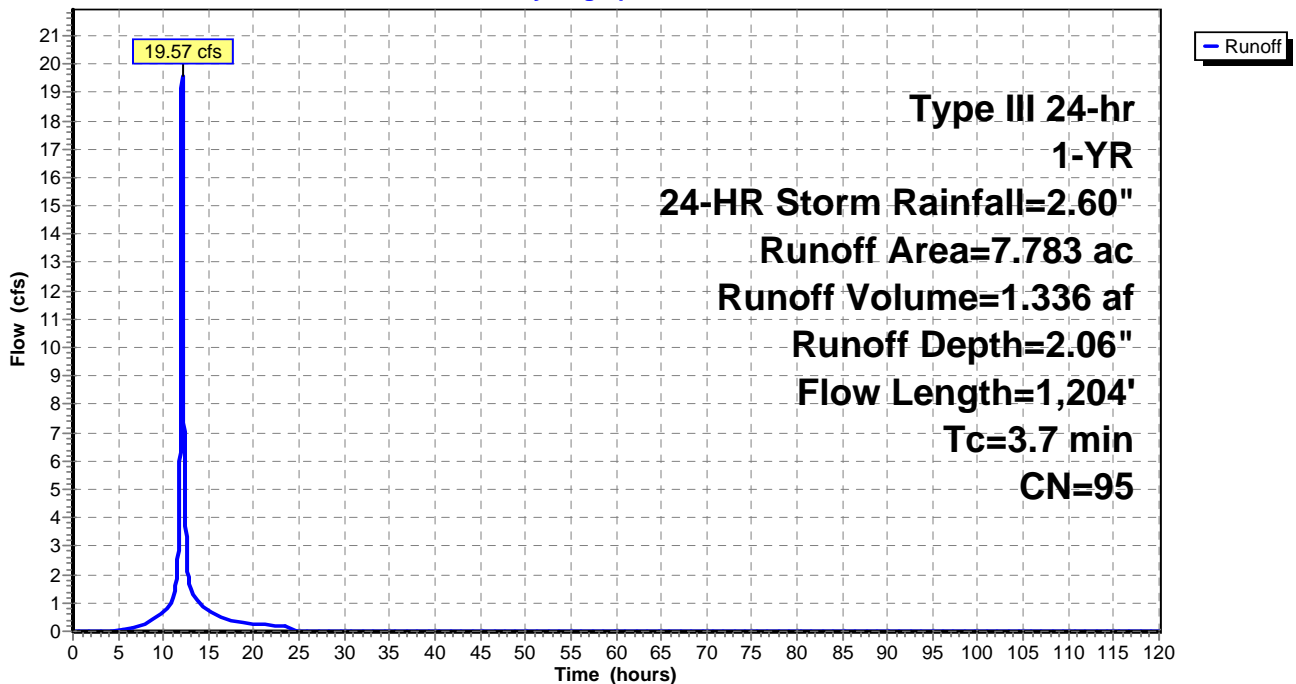
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

Area (ac)	CN	Description
0.927	74	>75% Grass cover, Good, HSG C
4.559	98	Roofs, HSG D
2.297	98	Paved parking, HSG D
7.783	95	Weighted Average
0.927		11.91% Pervious Area
6.856		88.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0200	1.49		Sheet Flow, PARKING LOT - SHEET FLOW Smooth surfaces n= 0.011 P2= 3.75"
1.6	278	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.0	826	0.0850	13.23	10.39	Pipe Channel, CMP_Round 12" 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
3.7	1,204	Total			

Subcatchment 1B: PROPOSED SUBCAT AREA 1B

Hydrograph



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Hydrograph for Subcatchment 1B: PROPOSED SUBCAT AREA 1B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	2.60	2.06	0.00
2.00	0.05	0.00	0.00	106.00	2.60	2.06	0.00
4.00	0.11	0.00	0.00	108.00	2.60	2.06	0.00
6.00	0.19	0.01	0.08	110.00	2.60	2.06	0.00
8.00	0.30	0.05	0.24	112.00	2.60	2.06	0.00
10.00	0.49	0.16	0.65	114.00	2.60	2.06	0.00
12.00	1.30	0.83	14.50	116.00	2.60	2.06	0.00
14.00	2.11	1.59	0.98	118.00	2.60	2.06	0.00
16.00	2.30	1.77	0.52	120.00	2.60	2.06	0.00
18.00	2.41	1.88	0.32				
20.00	2.49	1.95	0.26				
22.00	2.55	2.01	0.21				
24.00	2.60	2.06	0.17				
26.00	2.60	2.06	0.00				
28.00	2.60	2.06	0.00				
30.00	2.60	2.06	0.00				
32.00	2.60	2.06	0.00				
34.00	2.60	2.06	0.00				
36.00	2.60	2.06	0.00				
38.00	2.60	2.06	0.00				
40.00	2.60	2.06	0.00				
42.00	2.60	2.06	0.00				
44.00	2.60	2.06	0.00				
46.00	2.60	2.06	0.00				
48.00	2.60	2.06	0.00				
50.00	2.60	2.06	0.00				
52.00	2.60	2.06	0.00				
54.00	2.60	2.06	0.00				
56.00	2.60	2.06	0.00				
58.00	2.60	2.06	0.00				
60.00	2.60	2.06	0.00				
62.00	2.60	2.06	0.00				
64.00	2.60	2.06	0.00				
66.00	2.60	2.06	0.00				
68.00	2.60	2.06	0.00				
70.00	2.60	2.06	0.00				
72.00	2.60	2.06	0.00				
74.00	2.60	2.06	0.00				
76.00	2.60	2.06	0.00				
78.00	2.60	2.06	0.00				
80.00	2.60	2.06	0.00				
82.00	2.60	2.06	0.00				
84.00	2.60	2.06	0.00				
86.00	2.60	2.06	0.00				
88.00	2.60	2.06	0.00				
90.00	2.60	2.06	0.00				
92.00	2.60	2.06	0.00				
94.00	2.60	2.06	0.00				
96.00	2.60	2.06	0.00				
98.00	2.60	2.06	0.00				
100.00	2.60	2.06	0.00				
102.00	2.60	2.06	0.00				

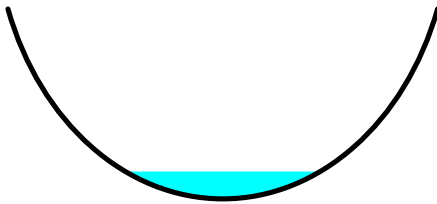
Summary for Reach 1R: (new Reach)

Inflow Area = 18.988 ac, 7.88% Impervious, Inflow Depth = 1.07" for 1-YR, 24-HR Storm event
 Inflow = 13.00 cfs @ 12.47 hrs, Volume= 1.696 af
 Outflow = 13.00 cfs @ 12.47 hrs, Volume= 1.696 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Max. Velocity= 6.03 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 2.55 fps, Avg. Travel Time= 2.0 min

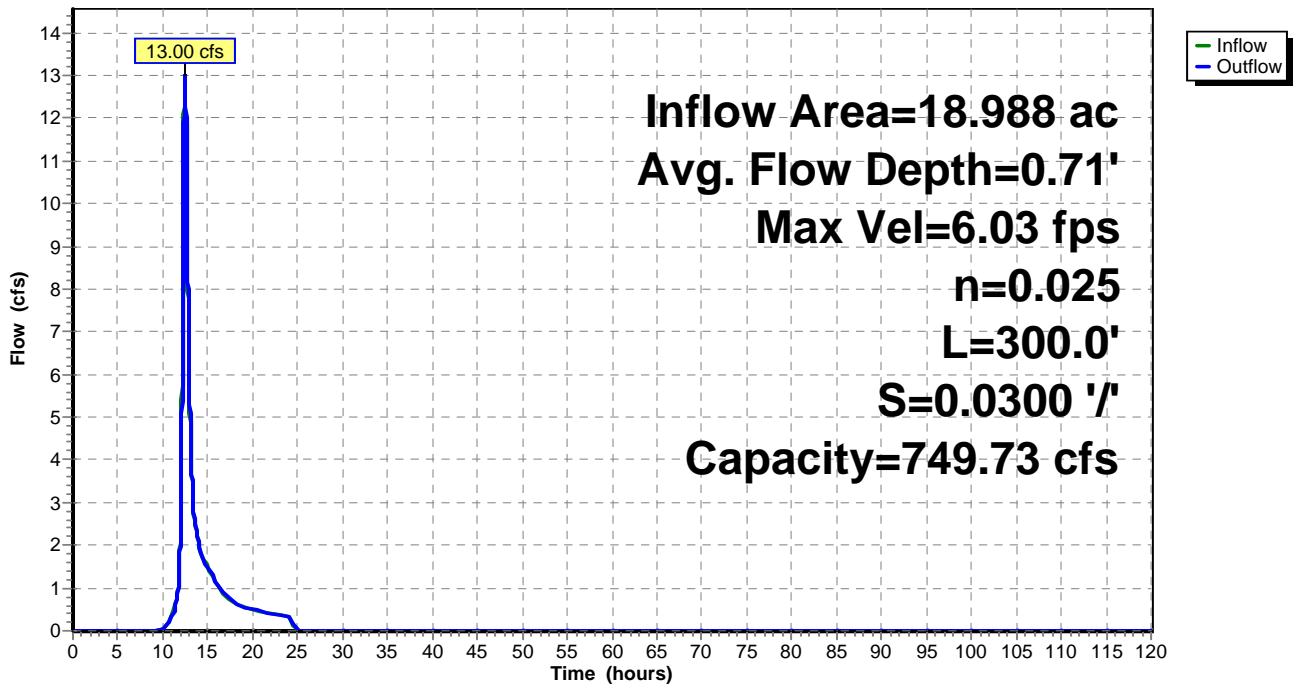
Peak Storage= 647 cf @ 12.47 hrs
 Average Depth at Peak Storage= 0.71'
 Bank-Full Depth= 5.00' Flow Area= 40.0 sf, Capacity= 749.73 cfs

12.00' x 5.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
 Length= 300.0' Slope= 0.0300 1/100
 Inlet Invert= 1,361.00', Outlet Invert= 1,352.00'



Reach 1R: (new Reach)

Hydrograph



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Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

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Hydrograph for Reach 1R: (new Reach)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	1,361.00	0.00
5.00	0.00	0	1,361.00	0.00
10.00	0.01	2	1,361.01	0.01
15.00	1.47	141	1,361.26	1.48
20.00	0.50	66	1,361.16	0.50
25.00	0.01	5	1,361.02	0.02
30.00	0.00	0	1,361.00	0.00
35.00	0.00	0	1,361.00	0.00
40.00	0.00	0	1,361.00	0.00
45.00	0.00	0	1,361.00	0.00
50.00	0.00	0	1,361.00	0.00
55.00	0.00	0	1,361.00	0.00
60.00	0.00	0	1,361.00	0.00
65.00	0.00	0	1,361.00	0.00
70.00	0.00	0	1,361.00	0.00
75.00	0.00	0	1,361.00	0.00
80.00	0.00	0	1,361.00	0.00
85.00	0.00	0	1,361.00	0.00
90.00	0.00	0	1,361.00	0.00
95.00	0.00	0	1,361.00	0.00
100.00	0.00	0	1,361.00	0.00
105.00	0.00	0	1,361.00	0.00
110.00	0.00	0	1,361.00	0.00
115.00	0.00	0	1,361.00	0.00
120.00	0.00	0	1,361.00	0.00

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Post-Development Design Point 3 (Concord Phase 1)
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"
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Summary for Subcatchment 2P: PROPOSED SUBCAT AREA 2

Runoff = 26.81 cfs @ 12.05 hrs, Volume= 1.769 af, Depth= 1.97"

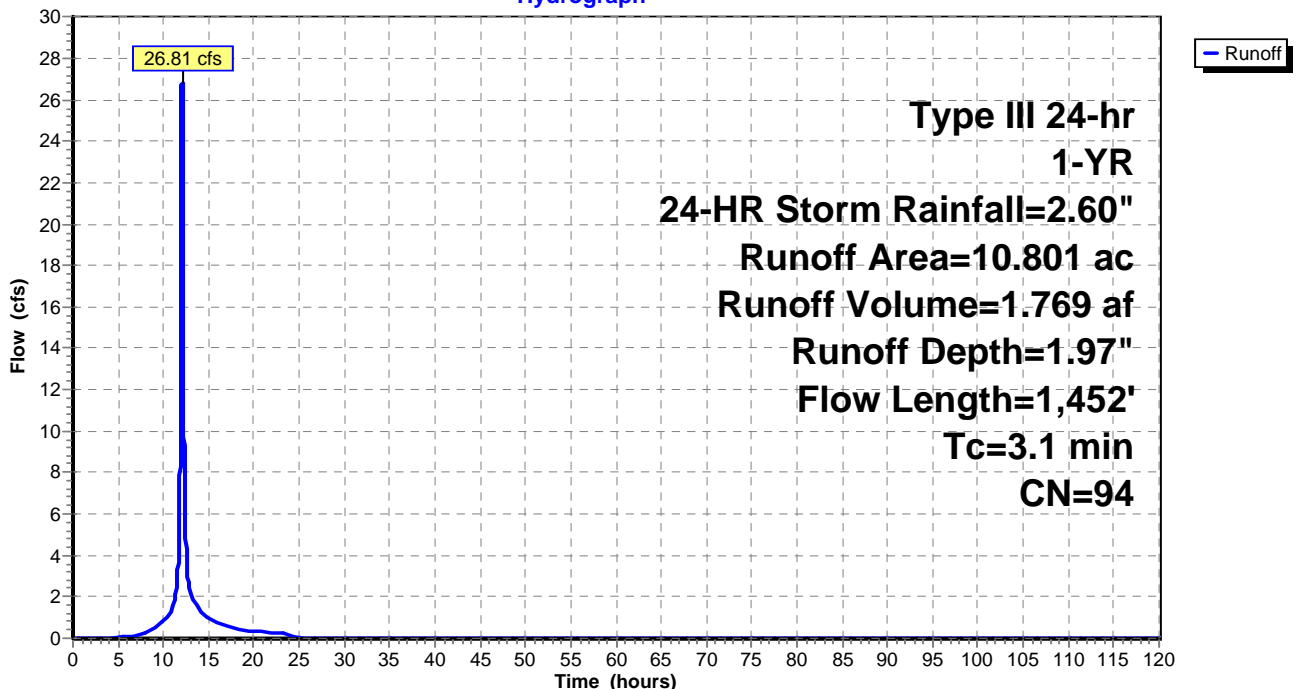
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

Area (ac)	CN	Description
7.575	98	Paved parking, HSG D
1.561	98	Roofs, HSG D
1.665	74	>75% Grass cover, Good, HSG C
10.801	94	Weighted Average
1.665		15.42% Pervious Area
9.136		84.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	100	0.0591	2.30		Sheet Flow, PARKING LOT - SHEET FLOW Smooth surfaces n= 0.011 P2= 3.75"
0.7	200	0.0591	4.94		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.7	1,152	0.0595	11.07	8.69	Pipe Channel, CMP_Round 12" 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
3.1	1,452	Total			

Subcatchment 2P: PROPOSED SUBCAT AREA 2

Hydrograph



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Hydrograph for Subcatchment 2P: PROPOSED SUBCAT AREA 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	2.60	1.97	0.00
2.00	0.05	0.00	0.00	106.00	2.60	1.97	0.00
4.00	0.11	0.00	0.00	108.00	2.60	1.97	0.00
6.00	0.19	0.01	0.07	110.00	2.60	1.97	0.00
8.00	0.30	0.04	0.27	112.00	2.60	1.97	0.00
10.00	0.49	0.13	0.81	114.00	2.60	1.97	0.00
12.00	1.30	0.76	20.89	116.00	2.60	1.97	0.00
14.00	2.11	1.50	1.34	118.00	2.60	1.97	0.00
16.00	2.30	1.68	0.71	120.00	2.60	1.97	0.00
18.00	2.41	1.79	0.44				
20.00	2.49	1.86	0.35				
22.00	2.55	1.92	0.29				
24.00	2.60	1.97	0.23				
26.00	2.60	1.97	0.00				
28.00	2.60	1.97	0.00				
30.00	2.60	1.97	0.00				
32.00	2.60	1.97	0.00				
34.00	2.60	1.97	0.00				
36.00	2.60	1.97	0.00				
38.00	2.60	1.97	0.00				
40.00	2.60	1.97	0.00				
42.00	2.60	1.97	0.00				
44.00	2.60	1.97	0.00				
46.00	2.60	1.97	0.00				
48.00	2.60	1.97	0.00				
50.00	2.60	1.97	0.00				
52.00	2.60	1.97	0.00				
54.00	2.60	1.97	0.00				
56.00	2.60	1.97	0.00				
58.00	2.60	1.97	0.00				
60.00	2.60	1.97	0.00				
62.00	2.60	1.97	0.00				
64.00	2.60	1.97	0.00				
66.00	2.60	1.97	0.00				
68.00	2.60	1.97	0.00				
70.00	2.60	1.97	0.00				
72.00	2.60	1.97	0.00				
74.00	2.60	1.97	0.00				
76.00	2.60	1.97	0.00				
78.00	2.60	1.97	0.00				
80.00	2.60	1.97	0.00				
82.00	2.60	1.97	0.00				
84.00	2.60	1.97	0.00				
86.00	2.60	1.97	0.00				
88.00	2.60	1.97	0.00				
90.00	2.60	1.97	0.00				
92.00	2.60	1.97	0.00				
94.00	2.60	1.97	0.00				
96.00	2.60	1.97	0.00				
98.00	2.60	1.97	0.00				
100.00	2.60	1.97	0.00				
102.00	2.60	1.97	0.00				

Summary for Pond 3-P: Pond 3

Inflow Area = 15.953 ac, 57.27% Impervious, Inflow Depth = 1.57" for 1-YR, 24-HR Storm event
 Inflow = 29.27 cfs @ 12.05 hrs, Volume= 2.093 af
 Outflow = 0.36 cfs @ 22.62 hrs, Volume= 2.000 af, Atten= 99%, Lag= 634.0 min
 Primary = 0.36 cfs @ 22.62 hrs, Volume= 2.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,360.50' Surf.Area= 26,575 sf Storage= 55,843 cf
 Peak Elev= 1,362.93' @ 22.62 hrs Surf.Area= 35,604 sf Storage= 131,178 cf (75,335 cf above start)

Plug-Flow detention time= 4,316.2 min calculated for 0.718 af (34% of inflow)
 Center-of-Mass det. time= 2,309.8 min (3,113.6 - 803.8)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,358.00'	365,330 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,358.00	18,268	626.0	0	0	18,268
1,359.00	21,477	657.0	19,851	19,851	21,497
1,360.00	24,843	688.0	23,140	42,990	24,883
1,361.00	28,366	720.0	26,585	69,576	28,537
1,362.00	32,046	752.0	30,187	99,763	32,357
1,363.00	35,883	783.0	33,946	133,709	36,220
1,364.00	39,878	815.0	37,863	171,572	40,367
1,365.00	44,030	846.0	41,937	213,509	44,548
1,366.00	48,338	877.0	46,167	259,676	48,885
1,367.00	52,804	909.0	50,555	310,231	53,520
1,368.00	57,427	940.0	55,099	365,330	58,174

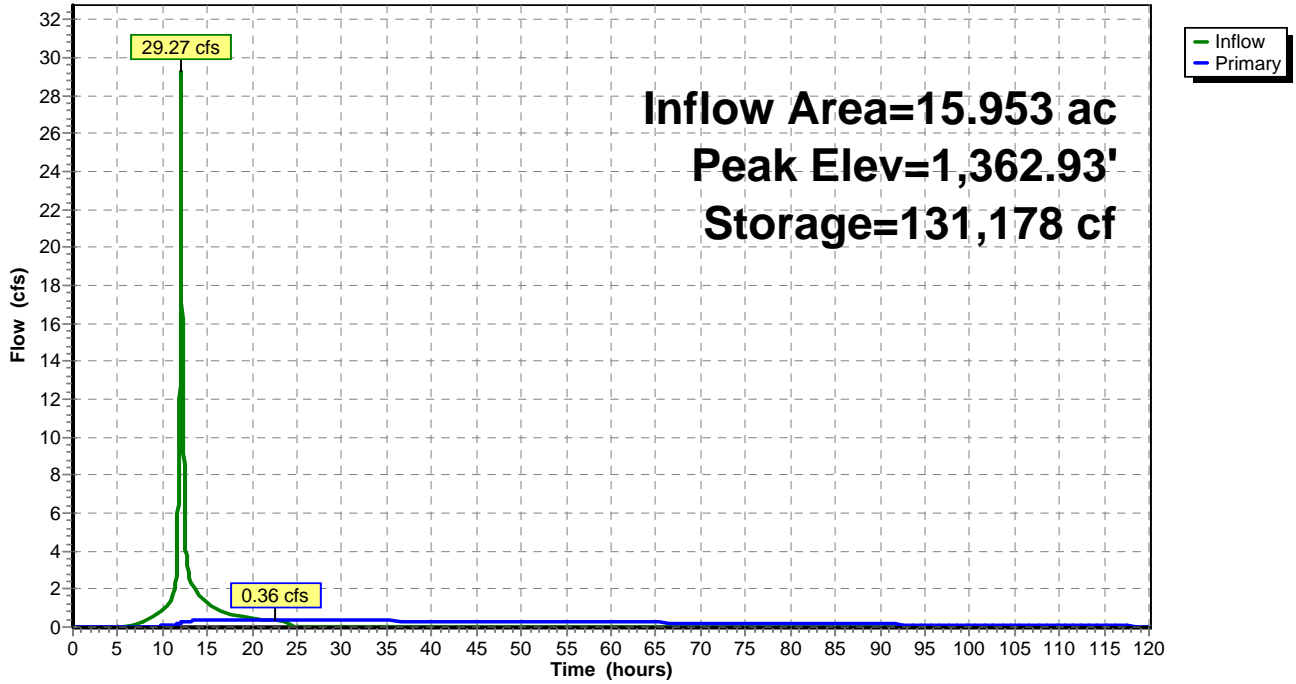
Device	Routing	Invert	Outlet Devices
#1	Primary	1,356.00'	24.0" Round Culvert L= 230.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,356.00' / 1,353.00' S= 0.0130 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	1,360.50'	3.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,363.00'	6.0" W x 3.0" H Vert. Orifice/Grate C= 0.600
#4	Device 1	1,366.00'	16.0' 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=0.36 cfs @ 22.62 hrs HW=1,362.93' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.36 cfs of 33.97 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.36 cfs @ 7.31 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)
- 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 3-P: Pond 3

Hydrograph



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Hydrograph for Pond 3-P: Pond 3

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	55,843	1,360.50	0.00
5.00	0.02	55,862	1,360.50	0.00
10.00	0.81	60,702	1,360.68	0.05
15.00	1.31	123,991	1,362.73	0.34
20.00	0.46	130,696	1,362.92	0.36
25.00	0.00	129,831	1,362.89	0.36
30.00	0.00	123,555	1,362.71	0.34
35.00	0.00	117,539	1,362.54	0.33
40.00	0.00	111,789	1,362.37	0.31
45.00	0.00	106,310	1,362.20	0.30
50.00	0.00	101,106	1,362.04	0.28
55.00	0.00	96,183	1,361.89	0.27
60.00	0.00	91,547	1,361.74	0.25
65.00	0.00	87,202	1,361.60	0.23
70.00	0.00	83,153	1,361.46	0.22
75.00	0.00	79,405	1,361.34	0.20
80.00	0.00	75,964	1,361.22	0.18
85.00	0.00	72,832	1,361.11	0.17
90.00	0.00	70,015	1,361.02	0.15
95.00	0.00	67,516	1,360.93	0.13
100.00	0.00	65,340	1,360.85	0.11
105.00	0.00	63,488	1,360.78	0.09
110.00	0.00	61,961	1,360.73	0.08
115.00	0.00	60,776	1,360.68	0.06
120.00	0.00	59,906	1,360.65	0.04

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Post-Development Design Point 3 (Concord Phase 1)
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"
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Summary for Subcatchment 3P: PROPOSED SUBCAT AREA 3

Runoff = 3.84 cfs @ 12.13 hrs, Volume= 0.325 af, Depth= 0.76"

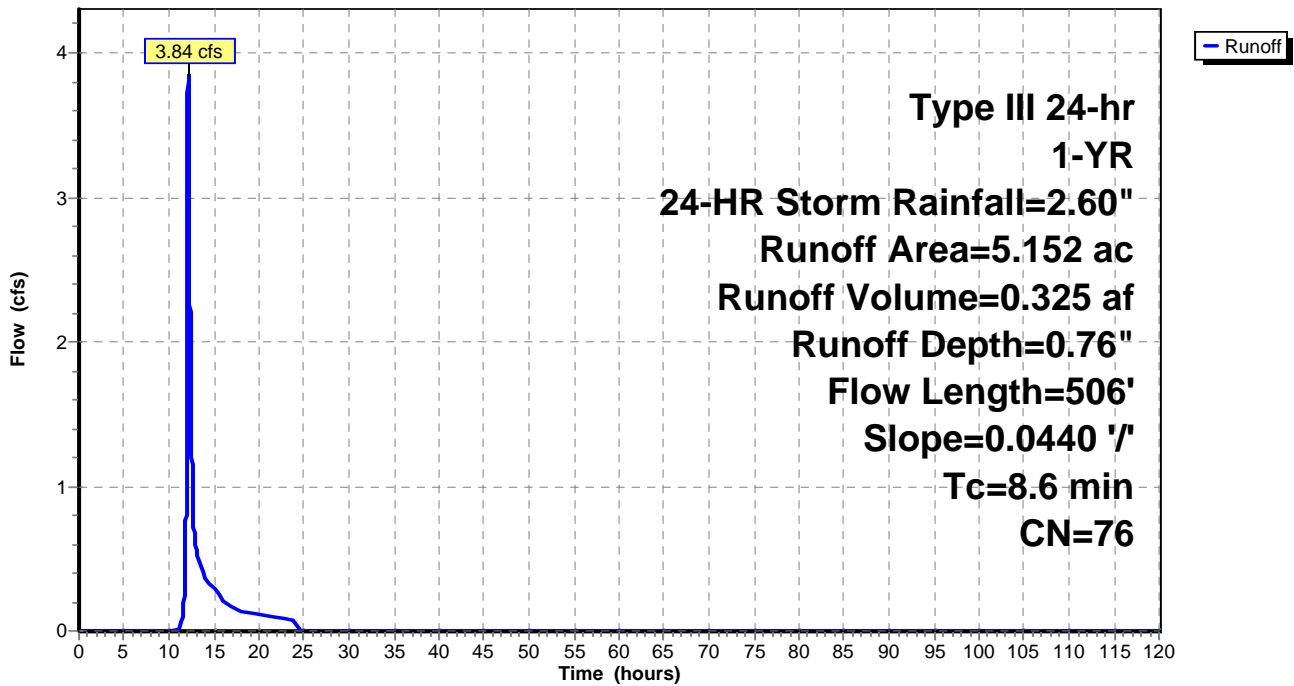
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

Area (ac)	CN	Description
3.080	74	>75% Grass cover, Good, HSG C
2.072	80	>75% Grass cover, Good, HSG D
5.152	76	Weighted Average
5.152		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	100	0.0440	0.25		Sheet Flow, SHEET FLOW Grass: Short n= 0.150 P2= 3.75"
2.0	406	0.0440	3.38		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Unpaved Kv= 16.1 fps
8.6	506	Total			

Subcatchment 3P: PROPOSED SUBCAT AREA 3

Hydrograph



Hydrograph for Subcatchment 3P: PROPOSED SUBCAT AREA 3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	2.60	0.76	0.00
2.00	0.05	0.00	0.00	106.00	2.60	0.76	0.00
4.00	0.11	0.00	0.00	108.00	2.60	0.76	0.00
6.00	0.19	0.00	0.00	110.00	2.60	0.76	0.00
8.00	0.30	0.00	0.00	112.00	2.60	0.76	0.00
10.00	0.49	0.00	0.00	114.00	2.60	0.76	0.00
12.00	1.30	0.12	1.54	116.00	2.60	0.76	0.00
14.00	2.11	0.47	0.38	118.00	2.60	0.76	0.00
16.00	2.30	0.58	0.21	120.00	2.60	0.76	0.00
18.00	2.41	0.64	0.13				
20.00	2.49	0.69	0.11				
22.00	2.55	0.72	0.09				
24.00	2.60	0.76	0.07				
26.00	2.60	0.76	0.00				
28.00	2.60	0.76	0.00				
30.00	2.60	0.76	0.00				
32.00	2.60	0.76	0.00				
34.00	2.60	0.76	0.00				
36.00	2.60	0.76	0.00				
38.00	2.60	0.76	0.00				
40.00	2.60	0.76	0.00				
42.00	2.60	0.76	0.00				
44.00	2.60	0.76	0.00				
46.00	2.60	0.76	0.00				
48.00	2.60	0.76	0.00				
50.00	2.60	0.76	0.00				
52.00	2.60	0.76	0.00				
54.00	2.60	0.76	0.00				
56.00	2.60	0.76	0.00				
58.00	2.60	0.76	0.00				
60.00	2.60	0.76	0.00				
62.00	2.60	0.76	0.00				
64.00	2.60	0.76	0.00				
66.00	2.60	0.76	0.00				
68.00	2.60	0.76	0.00				
70.00	2.60	0.76	0.00				
72.00	2.60	0.76	0.00				
74.00	2.60	0.76	0.00				
76.00	2.60	0.76	0.00				
78.00	2.60	0.76	0.00				
80.00	2.60	0.76	0.00				
82.00	2.60	0.76	0.00				
84.00	2.60	0.76	0.00				
86.00	2.60	0.76	0.00				
88.00	2.60	0.76	0.00				
90.00	2.60	0.76	0.00				
92.00	2.60	0.76	0.00				
94.00	2.60	0.76	0.00				
96.00	2.60	0.76	0.00				
98.00	2.60	0.76	0.00				
100.00	2.60	0.76	0.00				
102.00	2.60	0.76	0.00				

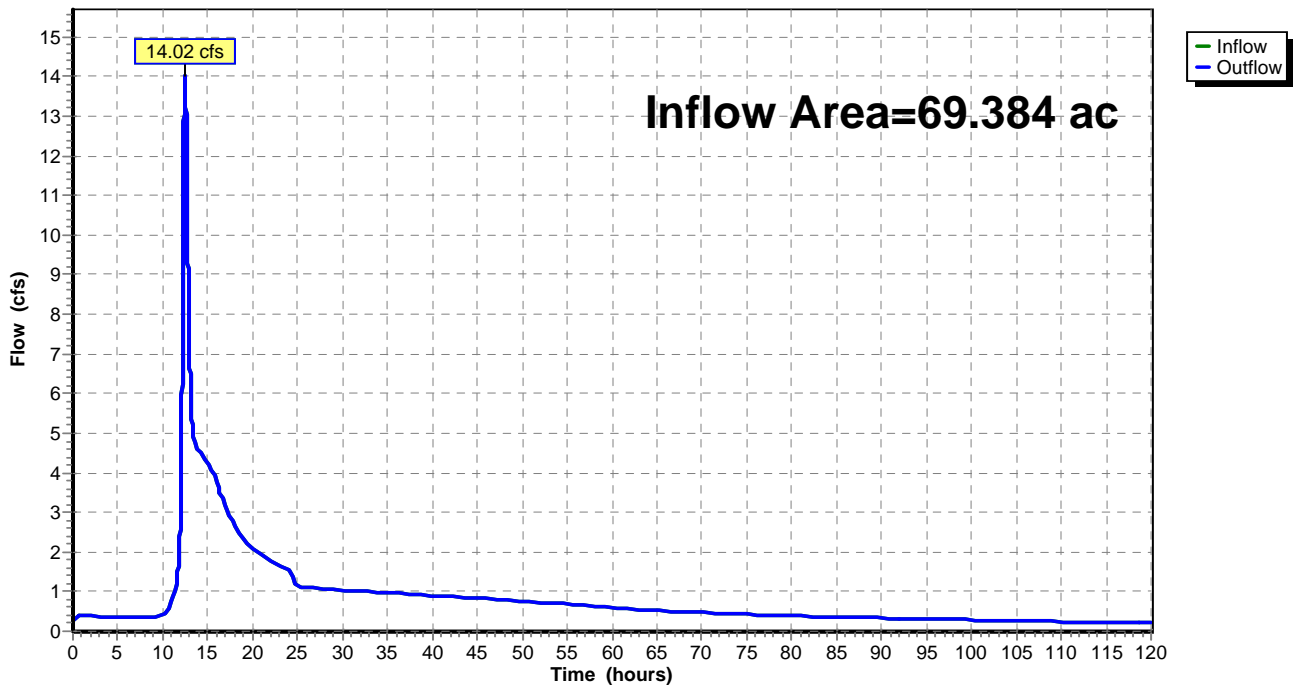
Summary for Reach 3R: DP 3

Inflow Area = 69.384 ac, 36.29% Impervious, Inflow Depth > 1.42" for 1-YR, 24-HR Storm event
Inflow = 14.02 cfs @ 12.47 hrs, Volume= 8.232 af
Outflow = 14.02 cfs @ 12.47 hrs, Volume= 8.232 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach 3R: DP 3

Hydrograph



Hydrograph for Reach 3R: DP 3

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.01		0.01	104.00	0.27		0.27
2.00	0.39		0.39	106.00	0.26		0.26
4.00	0.36		0.36	108.00	0.25		0.25
6.00	0.34		0.34	110.00	0.24		0.24
8.00	0.34		0.34	112.00	0.23		0.23
10.00	0.40		0.40	114.00	0.22		0.22
12.00	3.43		3.43	116.00	0.21		0.21
14.00	4.56		4.56	118.00	0.21		0.21
16.00	3.73		3.73	120.00	0.20		0.20
18.00	2.67		2.67				
20.00	2.09		2.09				
22.00	1.77		1.77				
24.00	1.54		1.54				
26.00	1.09		1.09				
28.00	1.07		1.07				
30.00	1.04		1.04				
32.00	1.01		1.01				
34.00	0.99		0.99				
36.00	0.96		0.96				
38.00	0.93		0.93				
40.00	0.90		0.90				
42.00	0.88		0.88				
44.00	0.85		0.85				
46.00	0.82		0.82				
48.00	0.79		0.79				
50.00	0.76		0.76				
52.00	0.73		0.73				
54.00	0.69		0.69				
56.00	0.66		0.66				
58.00	0.62		0.62				
60.00	0.59		0.59				
62.00	0.56		0.56				
64.00	0.54		0.54				
66.00	0.51		0.51				
68.00	0.49		0.49				
70.00	0.47		0.47				
72.00	0.45		0.45				
74.00	0.43		0.43				
76.00	0.42		0.42				
78.00	0.40		0.40				
80.00	0.39		0.39				
82.00	0.37		0.37				
84.00	0.36		0.36				
86.00	0.35		0.35				
88.00	0.34		0.34				
90.00	0.33		0.33				
92.00	0.32		0.32				
94.00	0.31		0.31				
96.00	0.30		0.30				
98.00	0.30		0.30				
100.00	0.29		0.29				
102.00	0.28		0.28				

Summary for Pond 6-P: Pond 6

Inflow Area = 34.443 ac, 42.22% Impervious, Inflow Depth = 1.17" for 1-YR, 24-HR Storm event
 Inflow = 47.97 cfs @ 12.06 hrs, Volume= 3.347 af
 Outflow = 2.45 cfs @ 14.95 hrs, Volume= 4.537 af, Atten= 95%, Lag= 173.4 min
 Primary = 2.45 cfs @ 14.95 hrs, Volume= 4.537 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,364.00' Surf.Area= 123,982 sf Storage= 423,130 cf
 Peak Elev= 1,364.61' @ 14.95 hrs Surf.Area= 129,678 sf Storage= 500,560 cf (77,430 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= 1,578.5 min (2,406.4 - 828.0)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,360.00'	995,221 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,360.00	88,152	1,690.0	0	0	88,152
1,361.00	96,779	1,756.0	92,432	92,432	106,333
1,362.00	105,668	1,798.0	101,191	193,623	118,343
1,363.00	114,743	1,832.0	110,174	303,797	128,331
1,364.00	123,982	1,864.0	119,333	423,130	137,922
1,365.00	133,378	1,895.0	128,651	551,781	147,384
1,366.00	142,932	1,926.0	138,127	689,909	157,002
1,367.00	152,643	1,958.0	147,761	837,670	167,081
1,368.00	162,512	1,989.0	157,552	995,221	177,016

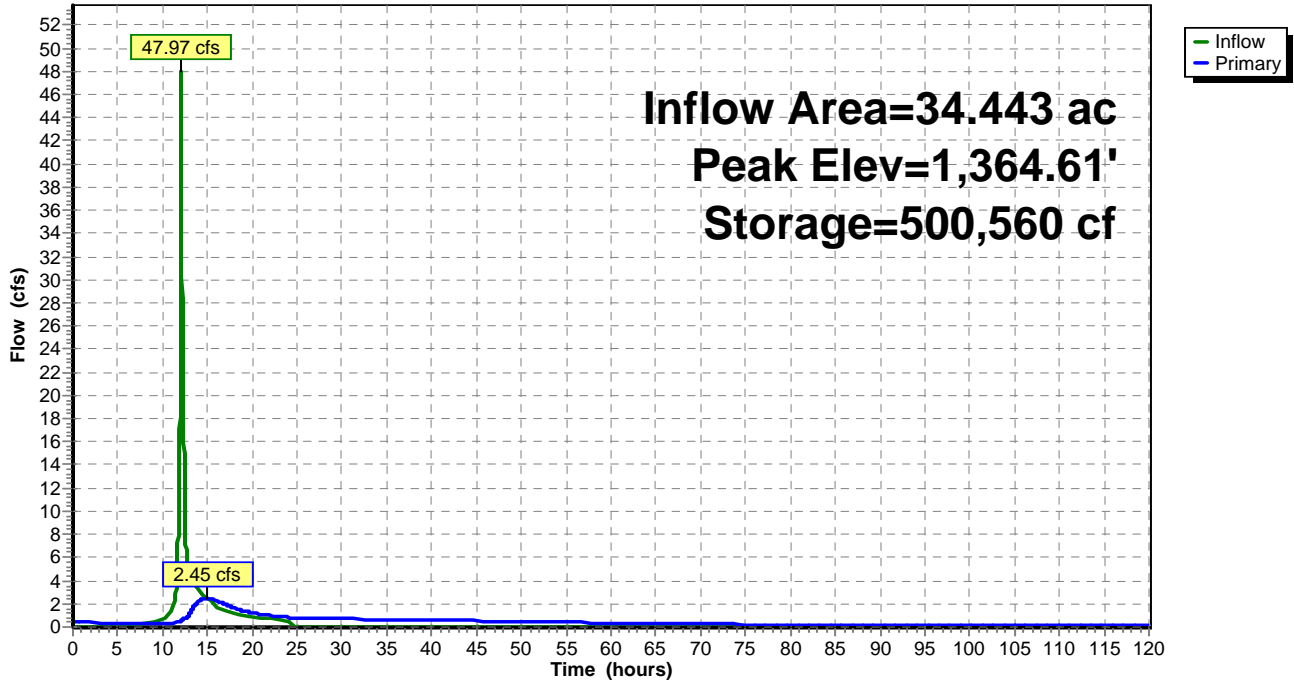
Device	Routing	Invert	Outlet Devices
#1	Primary	1,360.00'	24.0" Round Culvert L= 510.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,360.00' / 1,358.00' S= 0.0039 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	1,363.00'	3.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,363.75'	6.0" W x 3.0" H Vert. Orifice/Grate C= 0.600
#4	Device 1	1,364.50'	16.0' 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=2.45 cfs @ 14.95 hrs HW=1,364.61' TW=1,360.48' (Dynamic Tailwater)

- 1=Culvert (Passes 2.45 cfs of 18.29 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.29 cfs @ 5.87 fps)
- 3=Orifice/Grate (Orifice Controls 0.52 cfs @ 4.12 fps)
- 4=Broad-Crested Rectangular Weir (Weir Controls 1.65 cfs @ 0.93 fps)

Pond 6-P: Pond 6

Hydrograph



Hydrograph for Pond 6-P: Pond 6

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	423,130	1,364.00	0.42
5.00	0.04	416,285	1,363.94	0.35
10.00	0.65	414,646	1,363.93	0.34
15.00	2.42	500,558	1,364.61	2.45
20.00	0.87	492,277	1,364.55	1.22
25.00	0.00	485,541	1,364.49	0.75
30.00	0.00	472,513	1,364.39	0.70
35.00	0.00	460,418	1,364.30	0.65
40.00	0.00	449,277	1,364.21	0.59
45.00	0.00	439,117	1,364.13	0.54
50.00	0.00	429,983	1,364.06	0.48
55.00	0.00	421,969	1,363.99	0.41
60.00	0.00	415,238	1,363.94	0.34
65.00	0.00	409,564	1,363.89	0.29
70.00	0.00	404,690	1,363.85	0.25
75.00	0.00	400,421	1,363.82	0.22
80.00	0.00	396,603	1,363.78	0.20
85.00	0.00	393,101	1,363.76	0.19
90.00	0.00	389,759	1,363.73	0.18
95.00	0.00	386,493	1,363.70	0.18
100.00	0.00	383,301	1,363.67	0.18
105.00	0.00	380,184	1,363.65	0.17
110.00	0.00	377,142	1,363.62	0.17
115.00	0.00	374,175	1,363.60	0.16
120.00	0.00	371,284	1,363.58	0.16

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Post-Development Design Point 3 (Concord Phase 1)
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"
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Summary for Subcatchment 6P: PROPOSED SUBCAT AREA 6

Runoff = 28.81 cfs @ 12.07 hrs, Volume= 2.011 af, Depth= 0.91"

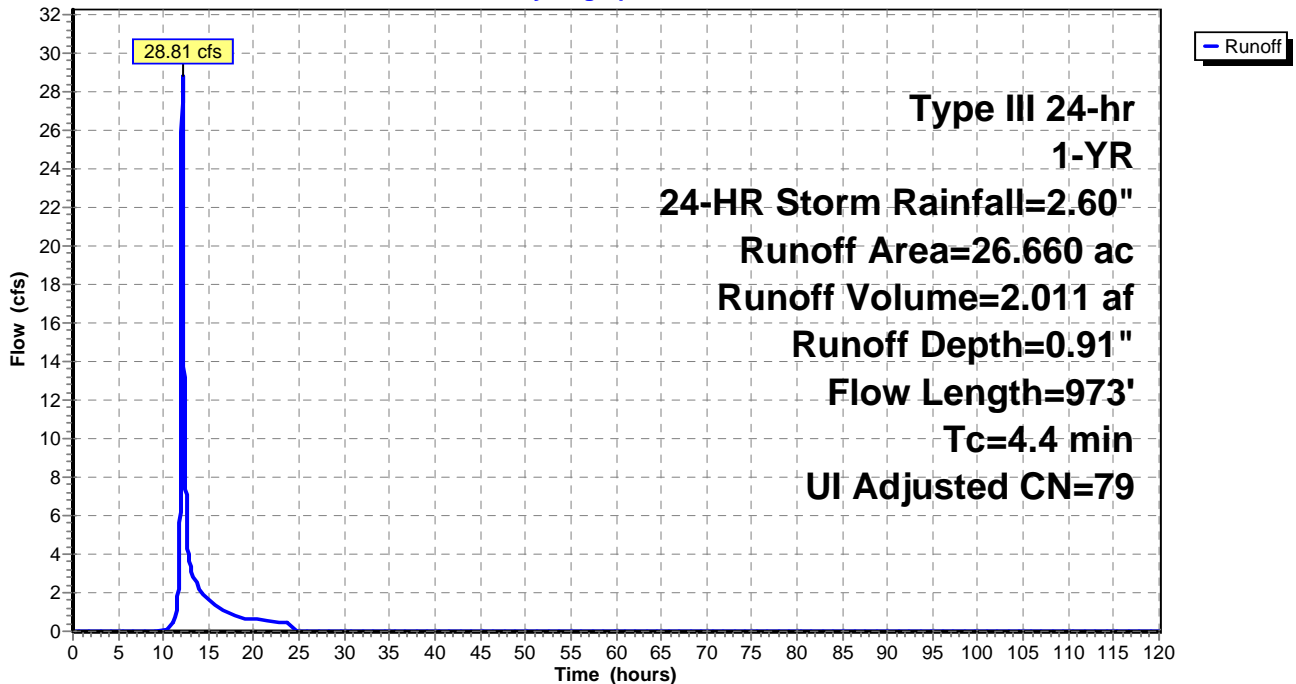
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

Area (ac)	CN	Description
14.822	74	>75% Grass cover, Good, HSG C
7.241	98	Unconnected pavement, HSG D
0.446	98	Roofs, HSG D
4.151	80	>75% Grass cover, Good, HSG D
26.660	82	Weighted Average, UI Adjusted CN = 79
18.973		71.17% Pervious Area
7.687		28.83% Impervious Area
7.241		94.20% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0200	1.49		Sheet Flow, SHEET FLOW Smooth surfaces n= 0.011 P2= 3.75"
3.3	873	0.0092	4.35	3.42	Pipe Channel, pipe 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
4.4	973	Total			

Subcatchment 6P: PROPOSED SUBCAT AREA 6

Hydrograph



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Hydrograph for Subcatchment 6P: PROPOSED SUBCAT AREA 6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	2.60	0.91	0.00
2.00	0.05	0.00	0.00	106.00	2.60	0.91	0.00
4.00	0.11	0.00	0.00	108.00	2.60	0.91	0.00
6.00	0.19	0.00	0.00	110.00	2.60	0.91	0.00
8.00	0.30	0.00	0.00	112.00	2.60	0.91	0.00
10.00	0.49	0.00	0.00	114.00	2.60	0.91	0.00
12.00	1.30	0.17	17.55	116.00	2.60	0.91	0.00
14.00	2.11	0.59	2.14	118.00	2.60	0.91	0.00
16.00	2.30	0.71	1.20	120.00	2.60	0.91	0.00
18.00	2.41	0.78	0.75				
20.00	2.49	0.83	0.61				
22.00	2.55	0.87	0.51				
24.00	2.60	0.91	0.41				
26.00	2.60	0.91	0.00				
28.00	2.60	0.91	0.00				
30.00	2.60	0.91	0.00				
32.00	2.60	0.91	0.00				
34.00	2.60	0.91	0.00				
36.00	2.60	0.91	0.00				
38.00	2.60	0.91	0.00				
40.00	2.60	0.91	0.00				
42.00	2.60	0.91	0.00				
44.00	2.60	0.91	0.00				
46.00	2.60	0.91	0.00				
48.00	2.60	0.91	0.00				
50.00	2.60	0.91	0.00				
52.00	2.60	0.91	0.00				
54.00	2.60	0.91	0.00				
56.00	2.60	0.91	0.00				
58.00	2.60	0.91	0.00				
60.00	2.60	0.91	0.00				
62.00	2.60	0.91	0.00				
64.00	2.60	0.91	0.00				
66.00	2.60	0.91	0.00				
68.00	2.60	0.91	0.00				
70.00	2.60	0.91	0.00				
72.00	2.60	0.91	0.00				
74.00	2.60	0.91	0.00				
76.00	2.60	0.91	0.00				
78.00	2.60	0.91	0.00				
80.00	2.60	0.91	0.00				
82.00	2.60	0.91	0.00				
84.00	2.60	0.91	0.00				
86.00	2.60	0.91	0.00				
88.00	2.60	0.91	0.00				
90.00	2.60	0.91	0.00				
92.00	2.60	0.91	0.00				
94.00	2.60	0.91	0.00				
96.00	2.60	0.91	0.00				
98.00	2.60	0.91	0.00				
100.00	2.60	0.91	0.00				
102.00	2.60	0.91	0.00				

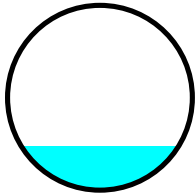
Summary for Reach 6R: DP 6

Inflow Area = 34.443 ac, 42.22% Impervious, Inflow Depth > 1.58" for 1-YR, 24-HR Storm event
 Inflow = 2.45 cfs @ 14.95 hrs, Volume= 4.537 af
 Outflow = 2.45 cfs @ 15.00 hrs, Volume= 4.536 af, Atten= 0%, Lag= 2.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Max. Velocity= 4.28 fps, Min. Travel Time= 3.6 min
 Avg. Velocity = 2.45 fps, Avg. Travel Time= 6.3 min

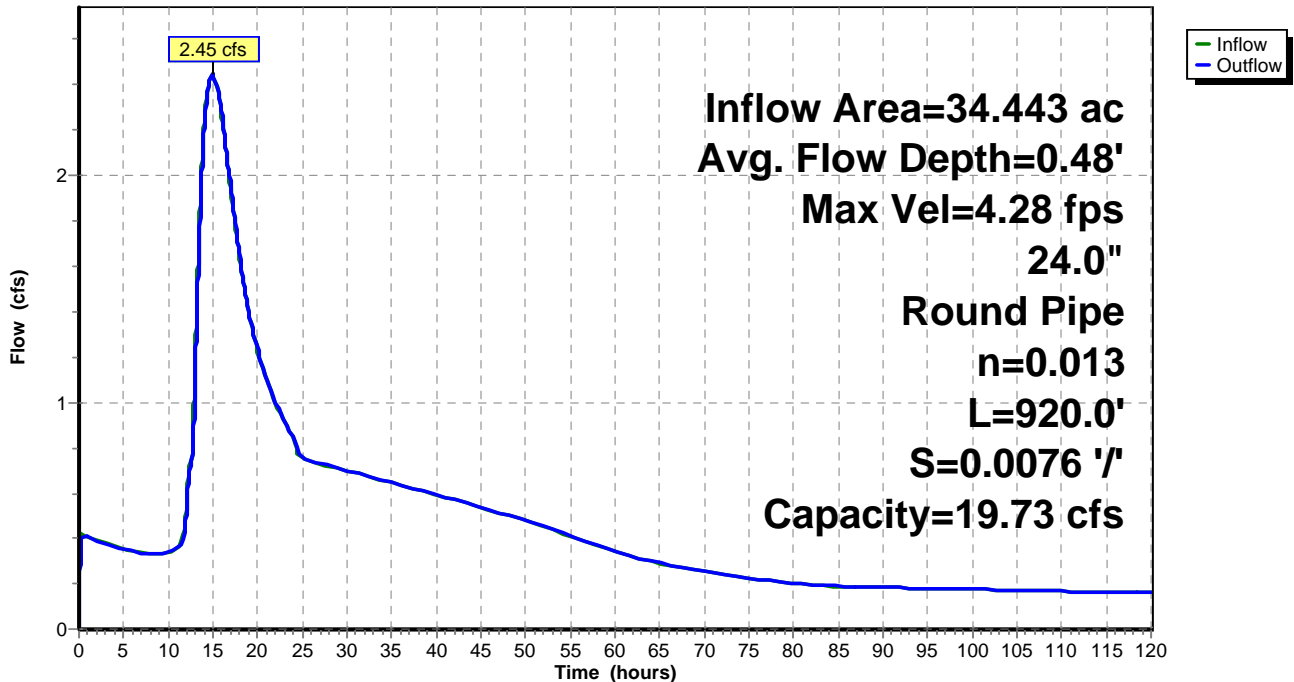
Peak Storage= 527 cf @ 15.00 hrs
 Average Depth at Peak Storage= 0.48'
 Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 19.73 cfs

24.0" Round Pipe
 n= 0.013 Corrugated PE, smooth interior
 Length= 920.0' Slope= 0.0076 '/
 Inlet Invert= 1,360.00', Outlet Invert= 1,353.00'



Reach 6R: DP 6

Hydrograph



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Post-Development Design Point 3 (Concord Phase 1)

Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

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Hydrograph for Reach 6R: DP 6

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.42	7	1,360.03	0.01
5.00	0.35	135	1,360.19	0.35
10.00	0.34	130	1,360.18	0.34
15.00	2.45	527	1,360.48	2.45
20.00	1.22	324	1,360.34	1.23
25.00	0.75	229	1,360.27	0.75
30.00	0.70	218	1,360.26	0.70
35.00	0.65	206	1,360.25	0.65
40.00	0.59	194	1,360.24	0.59
45.00	0.54	181	1,360.23	0.54
50.00	0.48	167	1,360.21	0.48
55.00	0.41	150	1,360.20	0.41
60.00	0.34	132	1,360.18	0.34
65.00	0.29	118	1,360.17	0.29
70.00	0.25	107	1,360.16	0.25
75.00	0.22	98	1,360.15	0.22
80.00	0.20	92	1,360.14	0.20
85.00	0.19	87	1,360.14	0.19
90.00	0.18	85	1,360.14	0.18
95.00	0.18	84	1,360.13	0.18
100.00	0.18	83	1,360.13	0.18
105.00	0.17	81	1,360.13	0.17
110.00	0.17	80	1,360.13	0.17
115.00	0.16	79	1,360.13	0.16
120.00	0.16	77	1,360.13	0.16

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Post-Development Design Point 3 (Concord Phase 1)
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"
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Summary for Subcatchment 7P: PROPOSED SUBCAT AREA 7

Runoff = 13.00 cfs @ 12.47 hrs, Volume= 1.696 af, Depth= 1.07"

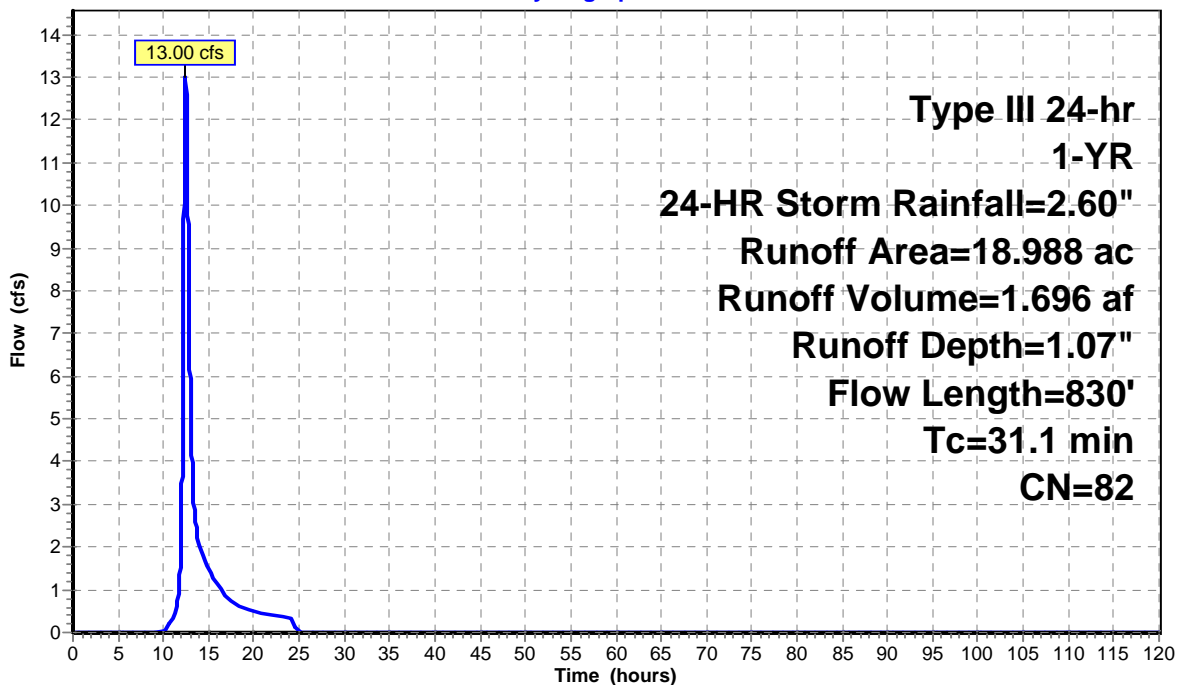
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

Area (ac)	CN	Description
7.674	86	<50% Grass cover, Poor, HSG C
9.817	77	Woods, Good, HSG D
1.497	98	Unconnected roofs, HSG C
18.988	82	Weighted Average
17.491		92.12% Pervious Area
1.497		7.88% Impervious Area
1.497		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.9	100	0.0500	0.07		Sheet Flow, SHEET FLOW Woods: Dense underbrush n= 0.800 P2= 3.75"
7.2	730	0.1151	1.70		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
31.1	830	Total			

Subcatchment 7P: PROPOSED SUBCAT AREA 7

Hydrograph



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Hydrograph for Subcatchment 7P: PROPOSED SUBCAT AREA 7

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	2.60	1.07	0.00
2.00	0.05	0.00	0.00	106.00	2.60	1.07	0.00
4.00	0.11	0.00	0.00	108.00	2.60	1.07	0.00
6.00	0.19	0.00	0.00	110.00	2.60	1.07	0.00
8.00	0.30	0.00	0.00	112.00	2.60	1.07	0.00
10.00	0.49	0.00	0.01	114.00	2.60	1.07	0.00
12.00	1.30	0.24	2.91	116.00	2.60	1.07	0.00
14.00	2.11	0.72	2.02	118.00	2.60	1.07	0.00
16.00	2.30	0.86	1.10	120.00	2.60	1.07	0.00
18.00	2.41	0.93	0.66				
20.00	2.49	0.99	0.50				
22.00	2.55	1.03	0.42				
24.00	2.60	1.07	0.34				
26.00	2.60	1.07	0.00				
28.00	2.60	1.07	0.00				
30.00	2.60	1.07	0.00				
32.00	2.60	1.07	0.00				
34.00	2.60	1.07	0.00				
36.00	2.60	1.07	0.00				
38.00	2.60	1.07	0.00				
40.00	2.60	1.07	0.00				
42.00	2.60	1.07	0.00				
44.00	2.60	1.07	0.00				
46.00	2.60	1.07	0.00				
48.00	2.60	1.07	0.00				
50.00	2.60	1.07	0.00				
52.00	2.60	1.07	0.00				
54.00	2.60	1.07	0.00				
56.00	2.60	1.07	0.00				
58.00	2.60	1.07	0.00				
60.00	2.60	1.07	0.00				
62.00	2.60	1.07	0.00				
64.00	2.60	1.07	0.00				
66.00	2.60	1.07	0.00				
68.00	2.60	1.07	0.00				
70.00	2.60	1.07	0.00				
72.00	2.60	1.07	0.00				
74.00	2.60	1.07	0.00				
76.00	2.60	1.07	0.00				
78.00	2.60	1.07	0.00				
80.00	2.60	1.07	0.00				
82.00	2.60	1.07	0.00				
84.00	2.60	1.07	0.00				
86.00	2.60	1.07	0.00				
88.00	2.60	1.07	0.00				
90.00	2.60	1.07	0.00				
92.00	2.60	1.07	0.00				
94.00	2.60	1.07	0.00				
96.00	2.60	1.07	0.00				
98.00	2.60	1.07	0.00				
100.00	2.60	1.07	0.00				
102.00	2.60	1.07	0.00				

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Post-Development Design Point 3 (Concord Phase 1)
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"
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Summary for Subcatchment 1B: PROPOSED SUBCAT AREA 1B

Runoff = 48.69 cfs @ 12.05 hrs, Volume= 3.510 af, Depth= 5.41"

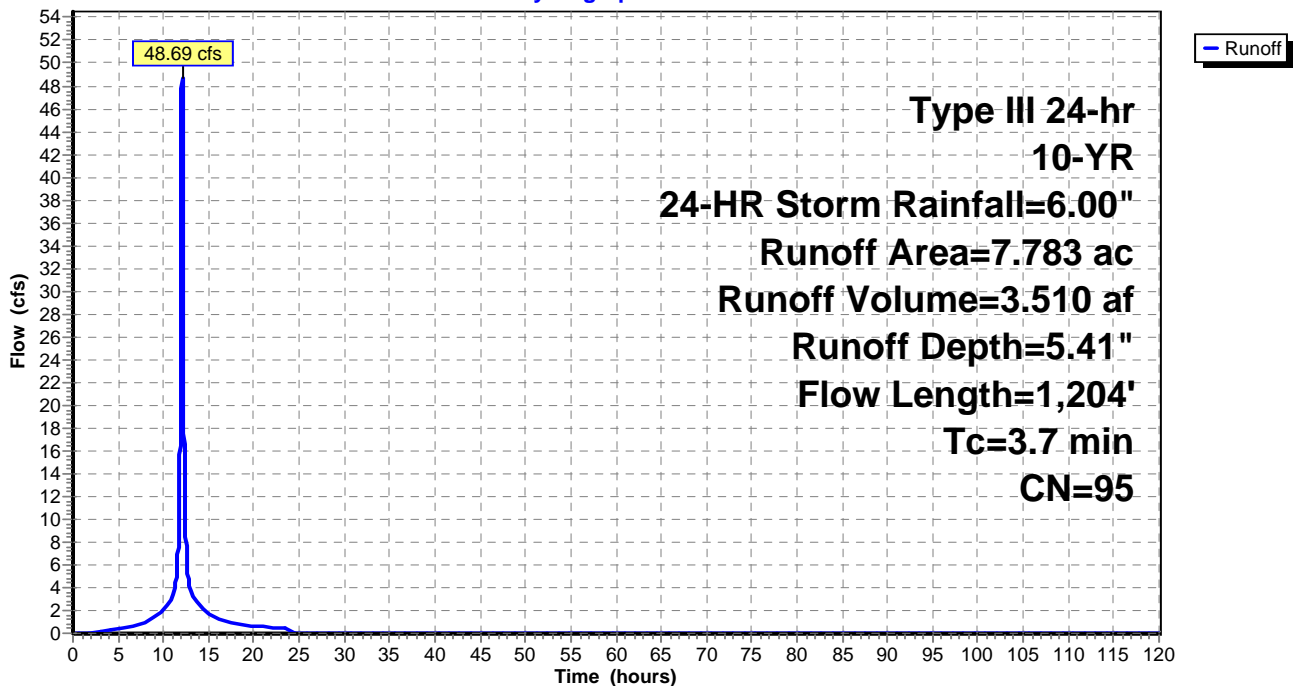
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

Area (ac)	CN	Description
0.927	74	>75% Grass cover, Good, HSG C
4.559	98	Roofs, HSG D
2.297	98	Paved parking, HSG D
7.783	95	Weighted Average
0.927		11.91% Pervious Area
6.856		88.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0200	1.49		Sheet Flow, PARKING LOT - SHEET FLOW Smooth surfaces n= 0.011 P2= 3.75"
1.6	278	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.0	826	0.0850	13.23	10.39	Pipe Channel, CMP_Round 12" 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
3.7	1,204	Total			

Subcatchment 1B: PROPOSED SUBCAT AREA 1B

Hydrograph



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Post-Development Design Point 3 (Concord Phase 1)

Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Subcatchment 1B: PROPOSED SUBCAT AREA 1B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	6.00	5.41	0.00
2.00	0.12	0.00	0.02	106.00	6.00	5.41	0.00
4.00	0.26	0.03	0.24	108.00	6.00	5.41	0.00
6.00	0.43	0.13	0.46	110.00	6.00	5.41	0.00
8.00	0.68	0.30	0.93	112.00	6.00	5.41	0.00
10.00	1.13	0.68	2.01	114.00	6.00	5.41	0.00
12.00	3.00	2.45	36.52	116.00	6.00	5.41	0.00
14.00	4.87	4.29	2.35	118.00	6.00	5.41	0.00
16.00	5.32	4.73	1.24	120.00	6.00	5.41	0.00
18.00	5.57	4.98	0.76				
20.00	5.74	5.16	0.61				
22.00	5.88	5.30	0.51				
24.00	6.00	5.41	0.40				
26.00	6.00	5.41	0.00				
28.00	6.00	5.41	0.00				
30.00	6.00	5.41	0.00				
32.00	6.00	5.41	0.00				
34.00	6.00	5.41	0.00				
36.00	6.00	5.41	0.00				
38.00	6.00	5.41	0.00				
40.00	6.00	5.41	0.00				
42.00	6.00	5.41	0.00				
44.00	6.00	5.41	0.00				
46.00	6.00	5.41	0.00				
48.00	6.00	5.41	0.00				
50.00	6.00	5.41	0.00				
52.00	6.00	5.41	0.00				
54.00	6.00	5.41	0.00				
56.00	6.00	5.41	0.00				
58.00	6.00	5.41	0.00				
60.00	6.00	5.41	0.00				
62.00	6.00	5.41	0.00				
64.00	6.00	5.41	0.00				
66.00	6.00	5.41	0.00				
68.00	6.00	5.41	0.00				
70.00	6.00	5.41	0.00				
72.00	6.00	5.41	0.00				
74.00	6.00	5.41	0.00				
76.00	6.00	5.41	0.00				
78.00	6.00	5.41	0.00				
80.00	6.00	5.41	0.00				
82.00	6.00	5.41	0.00				
84.00	6.00	5.41	0.00				
86.00	6.00	5.41	0.00				
88.00	6.00	5.41	0.00				
90.00	6.00	5.41	0.00				
92.00	6.00	5.41	0.00				
94.00	6.00	5.41	0.00				
96.00	6.00	5.41	0.00				
98.00	6.00	5.41	0.00				
100.00	6.00	5.41	0.00				
102.00	6.00	5.41	0.00				

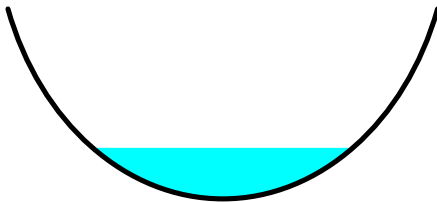
Summary for Reach 1R: (new Reach)

Inflow Area = 18.988 ac, 7.88% Impervious, Inflow Depth = 3.99" for 10-YR, 24-HR Storm event
 Inflow = 49.12 cfs @ 12.41 hrs, Volume= 6.309 af
 Outflow = 49.08 cfs @ 12.42 hrs, Volume= 6.309 af, Atten= 0%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Max. Velocity= 8.88 fps, Min. Travel Time= 0.6 min
 Avg. Velocity = 3.42 fps, Avg. Travel Time= 1.5 min

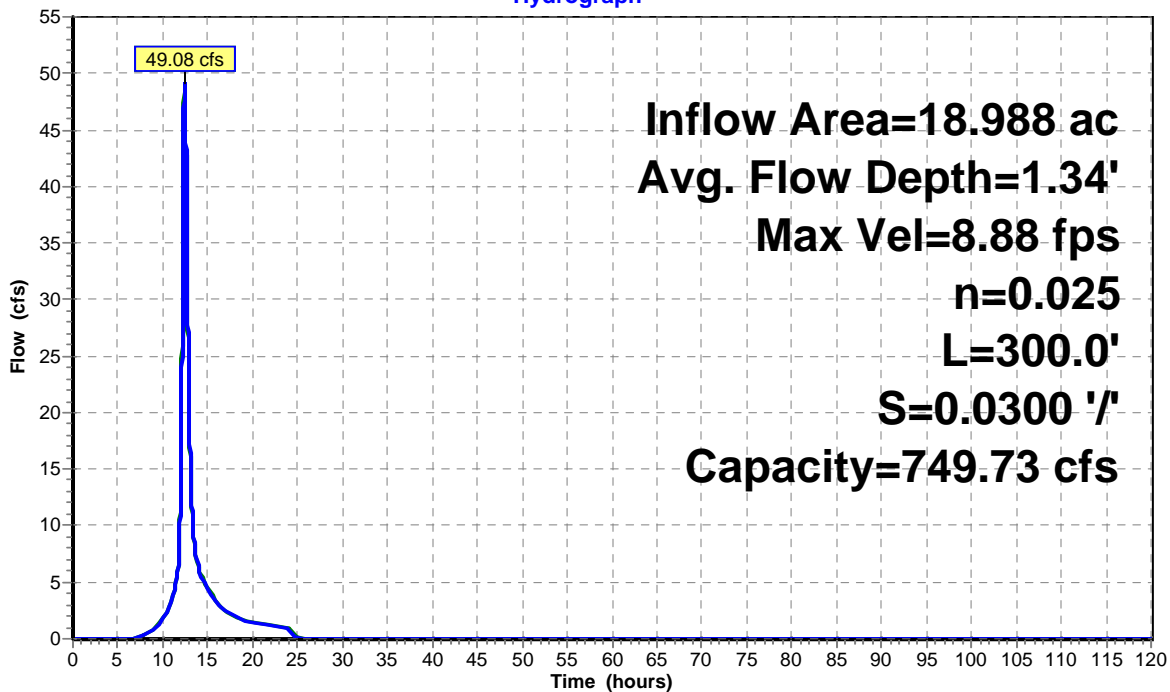
Peak Storage= 1,658 cf @ 12.42 hrs
 Average Depth at Peak Storage= 1.34'
 Bank-Full Depth= 5.00' Flow Area= 40.0 sf, Capacity= 749.73 cfs

12.00' x 5.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
 Length= 300.0' Slope= 0.0300 '/'
 Inlet Invert= 1,361.00', Outlet Invert= 1,352.00'



Reach 1R: (new Reach)

Hydrograph



Inflow
 Outflow

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Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Reach 1R: (new Reach)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	1,361.00	0.00
5.00	0.00	0	1,361.00	0.00
10.00	1.84	163	1,361.28	1.82
15.00	4.43	304	1,361.43	4.44
20.00	1.44	139	1,361.26	1.44
25.00	0.03	12	1,361.05	0.04
30.00	0.00	0	1,361.00	0.00
35.00	0.00	0	1,361.00	0.00
40.00	0.00	0	1,361.00	0.00
45.00	0.00	0	1,361.00	0.00
50.00	0.00	0	1,361.00	0.00
55.00	0.00	0	1,361.00	0.00
60.00	0.00	0	1,361.00	0.00
65.00	0.00	0	1,361.00	0.00
70.00	0.00	0	1,361.00	0.00
75.00	0.00	0	1,361.00	0.00
80.00	0.00	0	1,361.00	0.00
85.00	0.00	0	1,361.00	0.00
90.00	0.00	0	1,361.00	0.00
95.00	0.00	0	1,361.00	0.00
100.00	0.00	0	1,361.00	0.00
105.00	0.00	0	1,361.00	0.00
110.00	0.00	0	1,361.00	0.00
115.00	0.00	0	1,361.00	0.00
120.00	0.00	0	1,361.00	0.00

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Post-Development Design Point 3 (Concord Phase 1)
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"
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Summary for Subcatchment 2P: PROPOSED SUBCAT AREA 2

Runoff = 68.39 cfs @ 12.04 hrs, Volume= 4.767 af, Depth= 5.30"

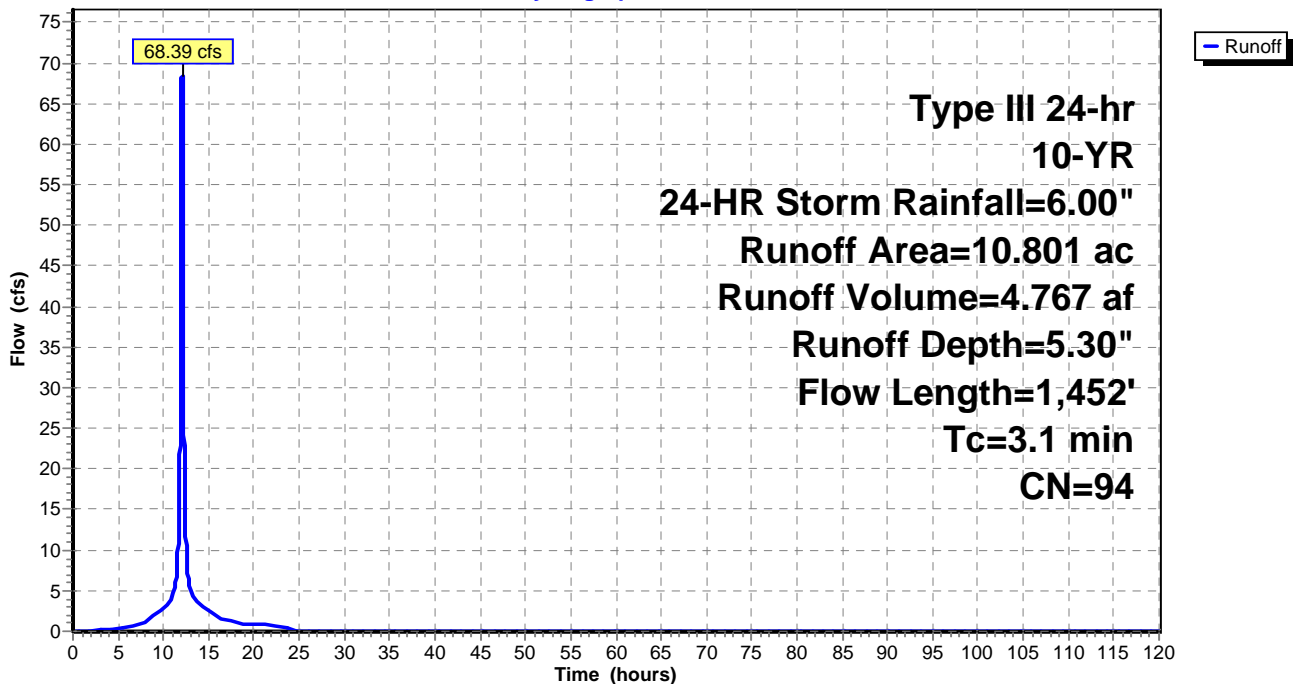
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

Area (ac)	CN	Description
7.575	98	Paved parking, HSG D
1.561	98	Roofs, HSG D
1.665	74	>75% Grass cover, Good, HSG C
10.801	94	Weighted Average
1.665		15.42% Pervious Area
9.136		84.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	100	0.0591	2.30		Sheet Flow, PARKING LOT - SHEET FLOW Smooth surfaces n= 0.011 P2= 3.75"
0.7	200	0.0591	4.94		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.7	1,152	0.0595	11.07	8.69	Pipe Channel, CMP_Round 12" 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
3.1	1,452	Total			

Subcatchment 2P: PROPOSED SUBCAT AREA 2

Hydrograph



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Post-Development Design Point 3 (Concord Phase 1)

Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Subcatchment 2P: PROPOSED SUBCAT AREA 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	6.00	5.30	0.00
2.00	0.12	0.00	0.00	106.00	6.00	5.30	0.00
4.00	0.26	0.02	0.26	108.00	6.00	5.30	0.00
6.00	0.43	0.10	0.56	110.00	6.00	5.30	0.00
8.00	0.68	0.26	1.20	112.00	6.00	5.30	0.00
10.00	1.13	0.62	2.68	114.00	6.00	5.30	0.00
12.00	3.00	2.35	54.00	116.00	6.00	5.30	0.00
14.00	4.87	4.18	3.23	118.00	6.00	5.30	0.00
16.00	5.32	4.62	1.71	120.00	6.00	5.30	0.00
18.00	5.57	4.87	1.05				
20.00	5.74	5.04	0.85				
22.00	5.88	5.18	0.70				
24.00	6.00	5.30	0.55				
26.00	6.00	5.30	0.00				
28.00	6.00	5.30	0.00				
30.00	6.00	5.30	0.00				
32.00	6.00	5.30	0.00				
34.00	6.00	5.30	0.00				
36.00	6.00	5.30	0.00				
38.00	6.00	5.30	0.00				
40.00	6.00	5.30	0.00				
42.00	6.00	5.30	0.00				
44.00	6.00	5.30	0.00				
46.00	6.00	5.30	0.00				
48.00	6.00	5.30	0.00				
50.00	6.00	5.30	0.00				
52.00	6.00	5.30	0.00				
54.00	6.00	5.30	0.00				
56.00	6.00	5.30	0.00				
58.00	6.00	5.30	0.00				
60.00	6.00	5.30	0.00				
62.00	6.00	5.30	0.00				
64.00	6.00	5.30	0.00				
66.00	6.00	5.30	0.00				
68.00	6.00	5.30	0.00				
70.00	6.00	5.30	0.00				
72.00	6.00	5.30	0.00				
74.00	6.00	5.30	0.00				
76.00	6.00	5.30	0.00				
78.00	6.00	5.30	0.00				
80.00	6.00	5.30	0.00				
82.00	6.00	5.30	0.00				
84.00	6.00	5.30	0.00				
86.00	6.00	5.30	0.00				
88.00	6.00	5.30	0.00				
90.00	6.00	5.30	0.00				
92.00	6.00	5.30	0.00				
94.00	6.00	5.30	0.00				
96.00	6.00	5.30	0.00				
98.00	6.00	5.30	0.00				
100.00	6.00	5.30	0.00				
102.00	6.00	5.30	0.00				

Summary for Pond 3-P: Pond 3

Inflow Area = 15.953 ac, 57.27% Impervious, Inflow Depth = 4.68" for 10-YR, 24-HR Storm event
 Inflow = 81.94 cfs @ 12.05 hrs, Volume= 6.219 af
 Outflow = 2.28 cfs @ 16.25 hrs, Volume= 5.829 af, Atten= 97%, Lag= 252.1 min
 Primary = 2.28 cfs @ 16.25 hrs, Volume= 5.829 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,360.50' Surf.Area= 26,575 sf Storage= 55,843 cf
 Peak Elev= 1,366.06' @ 16.25 hrs Surf.Area= 48,610 sf Storage= 262,690 cf (206,848 cf above start)

Plug-Flow detention time= 2,324.6 min calculated for 4.547 af (73% of inflow)
 Center-of-Mass det. time= 1,782.9 min (2,562.9 - 780.0)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,358.00'	365,330 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,358.00	18,268	626.0	0	0	18,268
1,359.00	21,477	657.0	19,851	19,851	21,497
1,360.00	24,843	688.0	23,140	42,990	24,883
1,361.00	28,366	720.0	26,585	69,576	28,537
1,362.00	32,046	752.0	30,187	99,763	32,357
1,363.00	35,883	783.0	33,946	133,709	36,220
1,364.00	39,878	815.0	37,863	171,572	40,367
1,365.00	44,030	846.0	41,937	213,509	44,548
1,366.00	48,338	877.0	46,167	259,676	48,885
1,367.00	52,804	909.0	50,555	310,231	53,520
1,368.00	57,427	940.0	55,099	365,330	58,174

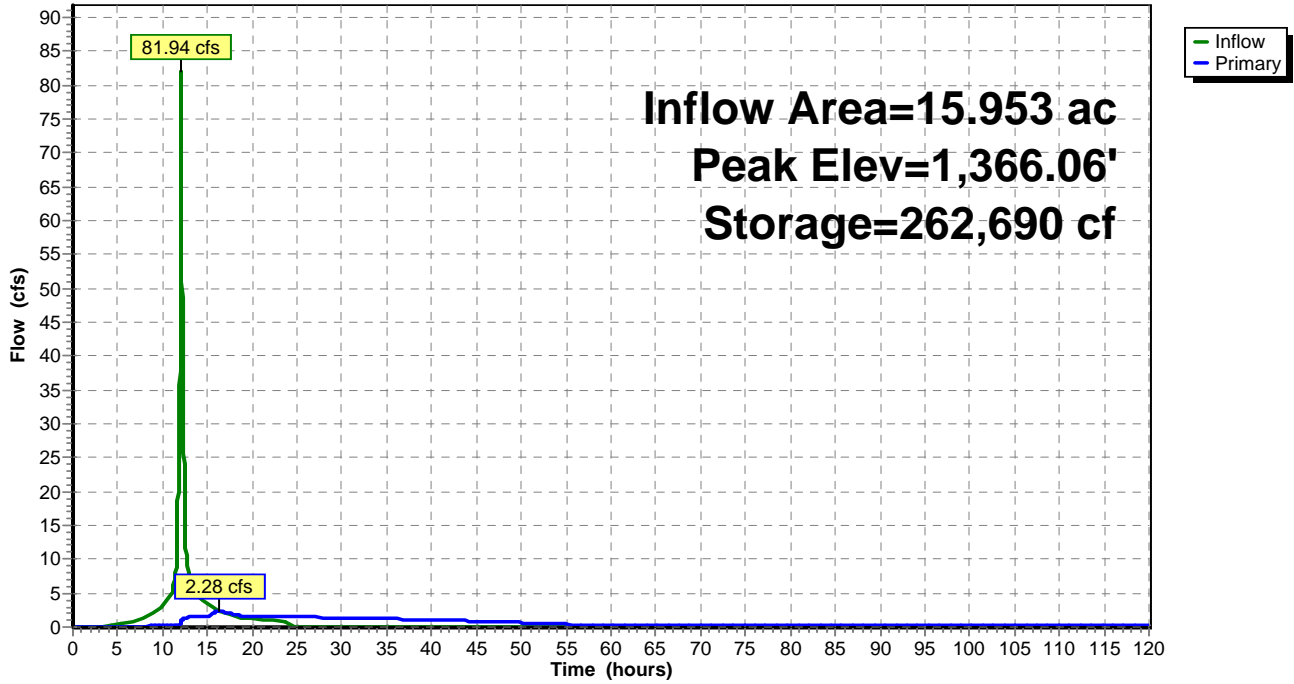
Device	Routing	Invert	Outlet Devices
#1	Primary	1,356.00'	24.0" Round Culvert L= 230.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,356.00' / 1,353.00' S= 0.0130 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	1,360.50'	3.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,363.00'	6.0" W x 3.0" H Vert. Orifice/Grate C= 0.600
#4	Device 1	1,366.00'	16.0' 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=2.28 cfs @ 16.25 hrs HW=1,366.06' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 2.28 cfs of 40.13 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.55 cfs @ 11.23 fps)
- 3=Orifice/Grate (Orifice Controls 1.03 cfs @ 8.25 fps)
- 4=Broad-Crested Rectangular Weir (Weir Controls 0.69 cfs @ 0.70 fps)

Pond 3-P: Pond 3

Hydrograph



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Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Pond 3-P: Pond 3

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	55,843	1,360.50	0.00
5.00	0.41	57,835	1,360.57	0.01
10.00	3.04	78,917	1,361.32	0.20
15.00	3.46	258,900	1,365.98	1.56
20.00	1.20	259,028	1,365.99	1.57
25.00	0.00	245,754	1,365.71	1.50
30.00	0.00	220,016	1,365.15	1.36
35.00	0.00	196,914	1,364.62	1.21
40.00	0.00	176,636	1,364.13	1.04
45.00	0.00	159,420	1,363.69	0.87
50.00	0.00	145,661	1,363.33	0.65
55.00	0.00	136,378	1,363.07	0.40
60.00	0.00	129,759	1,362.89	0.36
65.00	0.00	123,486	1,362.71	0.34
70.00	0.00	117,473	1,362.54	0.33
75.00	0.00	111,726	1,362.37	0.31
80.00	0.00	106,250	1,362.20	0.30
85.00	0.00	101,049	1,362.04	0.28
90.00	0.00	96,130	1,361.89	0.27
95.00	0.00	91,497	1,361.74	0.25
100.00	0.00	87,155	1,361.60	0.23
105.00	0.00	83,109	1,361.46	0.22
110.00	0.00	79,365	1,361.34	0.20
115.00	0.00	75,927	1,361.22	0.18
120.00	0.00	72,799	1,361.11	0.17

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Post-Development Design Point 3 (Concord Phase 1)
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Summary for Subcatchment 3P: PROPOSED SUBCAT AREA 3

Runoff = 18.67 cfs @ 12.12 hrs, Volume= 1.451 af, Depth= 3.38"

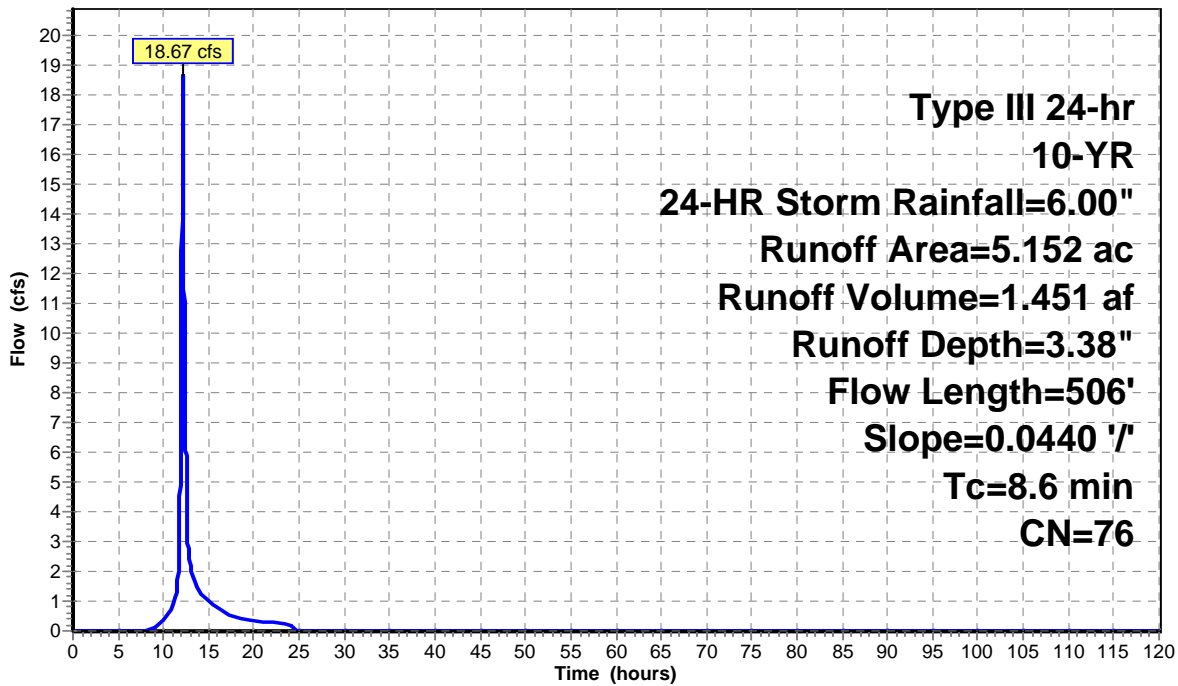
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

Area (ac)	CN	Description
3.080	74	>75% Grass cover, Good, HSG C
2.072	80	>75% Grass cover, Good, HSG D
5.152	76	Weighted Average
5.152		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	100	0.0440	0.25		Sheet Flow, SHEET FLOW Grass: Short n= 0.150 P2= 3.75"
2.0	406	0.0440	3.38		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Unpaved Kv= 16.1 fps
8.6	506	Total			

Subcatchment 3P: PROPOSED SUBCAT AREA 3

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Hydrograph for Subcatchment 3P: PROPOSED SUBCAT AREA 3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	6.00	3.38	0.00
2.00	0.12	0.00	0.00	106.00	6.00	3.38	0.00
4.00	0.26	0.00	0.00	108.00	6.00	3.38	0.00
6.00	0.43	0.00	0.00	110.00	6.00	3.38	0.00
8.00	0.68	0.00	0.02	112.00	6.00	3.38	0.00
10.00	1.13	0.07	0.35	114.00	6.00	3.38	0.00
12.00	3.00	1.02	9.33	116.00	6.00	3.38	0.00
14.00	4.87	2.43	1.33	118.00	6.00	3.38	0.00
16.00	5.32	2.80	0.72	120.00	6.00	3.38	0.00
18.00	5.57	3.01	0.44				
20.00	5.74	3.16	0.35				
22.00	5.88	3.28	0.29				
24.00	6.00	3.38	0.23				
26.00	6.00	3.38	0.00				
28.00	6.00	3.38	0.00				
30.00	6.00	3.38	0.00				
32.00	6.00	3.38	0.00				
34.00	6.00	3.38	0.00				
36.00	6.00	3.38	0.00				
38.00	6.00	3.38	0.00				
40.00	6.00	3.38	0.00				
42.00	6.00	3.38	0.00				
44.00	6.00	3.38	0.00				
46.00	6.00	3.38	0.00				
48.00	6.00	3.38	0.00				
50.00	6.00	3.38	0.00				
52.00	6.00	3.38	0.00				
54.00	6.00	3.38	0.00				
56.00	6.00	3.38	0.00				
58.00	6.00	3.38	0.00				
60.00	6.00	3.38	0.00				
62.00	6.00	3.38	0.00				
64.00	6.00	3.38	0.00				
66.00	6.00	3.38	0.00				
68.00	6.00	3.38	0.00				
70.00	6.00	3.38	0.00				
72.00	6.00	3.38	0.00				
74.00	6.00	3.38	0.00				
76.00	6.00	3.38	0.00				
78.00	6.00	3.38	0.00				
80.00	6.00	3.38	0.00				
82.00	6.00	3.38	0.00				
84.00	6.00	3.38	0.00				
86.00	6.00	3.38	0.00				
88.00	6.00	3.38	0.00				
90.00	6.00	3.38	0.00				
92.00	6.00	3.38	0.00				
94.00	6.00	3.38	0.00				
96.00	6.00	3.38	0.00				
98.00	6.00	3.38	0.00				
100.00	6.00	3.38	0.00				
102.00	6.00	3.38	0.00				

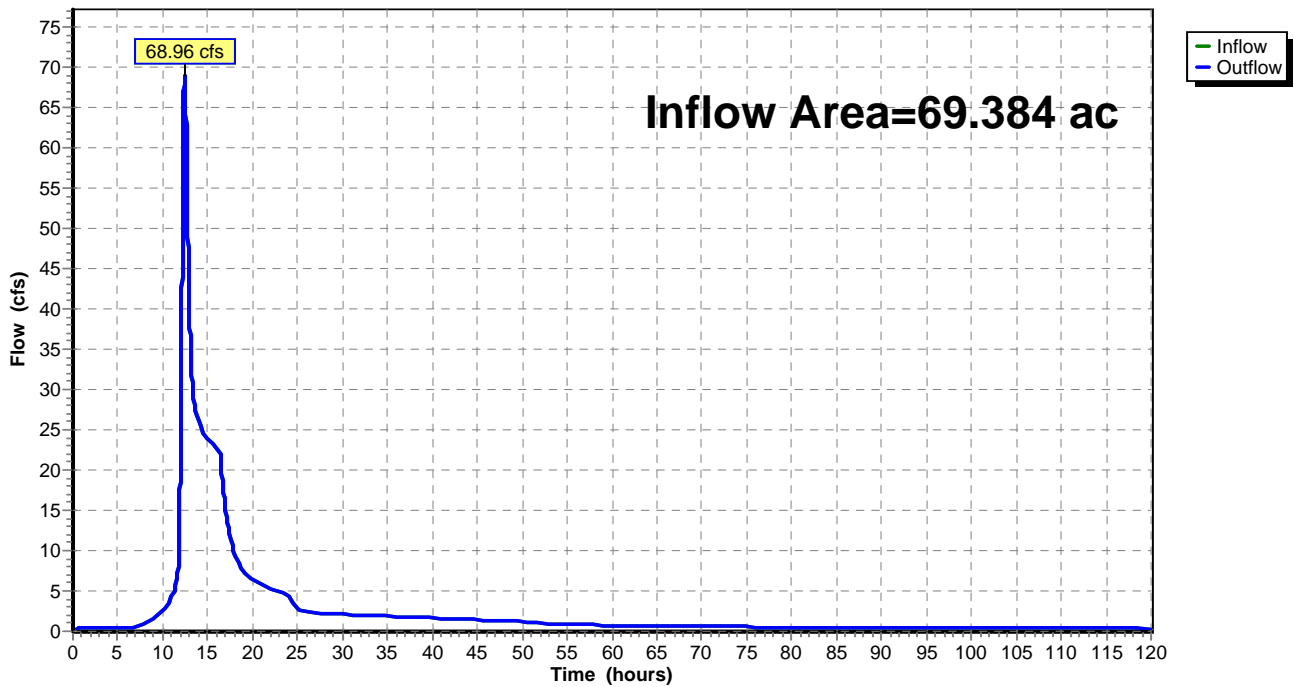
Summary for Reach 3R: DP 3

Inflow Area = 69.384 ac, 36.29% Impervious, Inflow Depth > 4.32" for 10-YR, 24-HR Storm event
Inflow = 68.96 cfs @ 12.42 hrs, Volume= 24.984 af
Outflow = 68.96 cfs @ 12.42 hrs, Volume= 24.984 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach 3R: DP 3

Hydrograph



Hydrograph for Reach 3R: DP 3

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.01		0.01	104.00	0.39		0.39
2.00	0.39		0.39	106.00	0.39		0.39
4.00	0.37		0.37	108.00	0.38		0.38
6.00	0.41		0.41	110.00	0.37		0.37
8.00	0.88		0.88	112.00	0.36		0.36
10.00	2.54		2.54	114.00	0.35		0.35
12.00	28.25		28.25	116.00	0.34		0.34
14.00	26.10		26.10	118.00	0.33		0.33
16.00	22.78		22.78	120.00	0.33		0.33
18.00	9.69		9.69				
20.00	6.36		6.36				
22.00	5.26		5.26				
24.00	4.51		4.51				
26.00	2.37		2.37				
28.00	2.16		2.16				
30.00	2.08		2.08				
32.00	2.00		2.00				
34.00	1.92		1.92				
36.00	1.83		1.83				
38.00	1.75		1.75				
40.00	1.66		1.66				
42.00	1.57		1.57				
44.00	1.48		1.48				
46.00	1.38		1.38				
48.00	1.27		1.27				
50.00	1.16		1.16				
52.00	1.02		1.02				
54.00	0.89		0.89				
56.00	0.81		0.81				
58.00	0.76		0.76				
60.00	0.73		0.73				
62.00	0.69		0.69				
64.00	0.67		0.67				
66.00	0.64		0.64				
68.00	0.62		0.62				
70.00	0.59		0.59				
72.00	0.57		0.57				
74.00	0.56		0.56				
76.00	0.54		0.54				
78.00	0.52		0.52				
80.00	0.51		0.51				
82.00	0.49		0.49				
84.00	0.48		0.48				
86.00	0.47		0.47				
88.00	0.46		0.46				
90.00	0.45		0.45				
92.00	0.44		0.44				
94.00	0.43		0.43				
96.00	0.43		0.43				
98.00	0.42		0.42				
100.00	0.41		0.41				
102.00	0.40		0.40				

Summary for Pond 6-P: Pond 6

Inflow Area = 34.443 ac, 42.22% Impervious, Inflow Depth = 4.07" for 10-YR, 24-HR Storm event
 Inflow = 169.62 cfs @ 12.06 hrs, Volume= 11.685 af
 Outflow = 18.69 cfs @ 12.73 hrs, Volume= 12.847 af, Atten= 89%, Lag= 39.8 min
 Primary = 18.69 cfs @ 12.73 hrs, Volume= 12.847 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,364.00' Surf.Area= 123,982 sf Storage= 423,130 cf
 Peak Elev= 1,365.87' @ 12.73 hrs Surf.Area= 141,676 sf Storage= 671,476 cf (248,346 cf above start)

Plug-Flow detention time= 2,568.0 min calculated for 3.133 af (27% of inflow)
 Center-of-Mass det. time= 663.3 min (1,462.3 - 799.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,360.00'	995,221 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,360.00	88,152	1,690.0	0	0	88,152
1,361.00	96,779	1,756.0	92,432	92,432	106,333
1,362.00	105,668	1,798.0	101,191	193,623	118,343
1,363.00	114,743	1,832.0	110,174	303,797	128,331
1,364.00	123,982	1,864.0	119,333	423,130	137,922
1,365.00	133,378	1,895.0	128,651	551,781	147,384
1,366.00	142,932	1,926.0	138,127	689,909	157,002
1,367.00	152,643	1,958.0	147,761	837,670	167,081
1,368.00	162,512	1,989.0	157,552	995,221	177,016

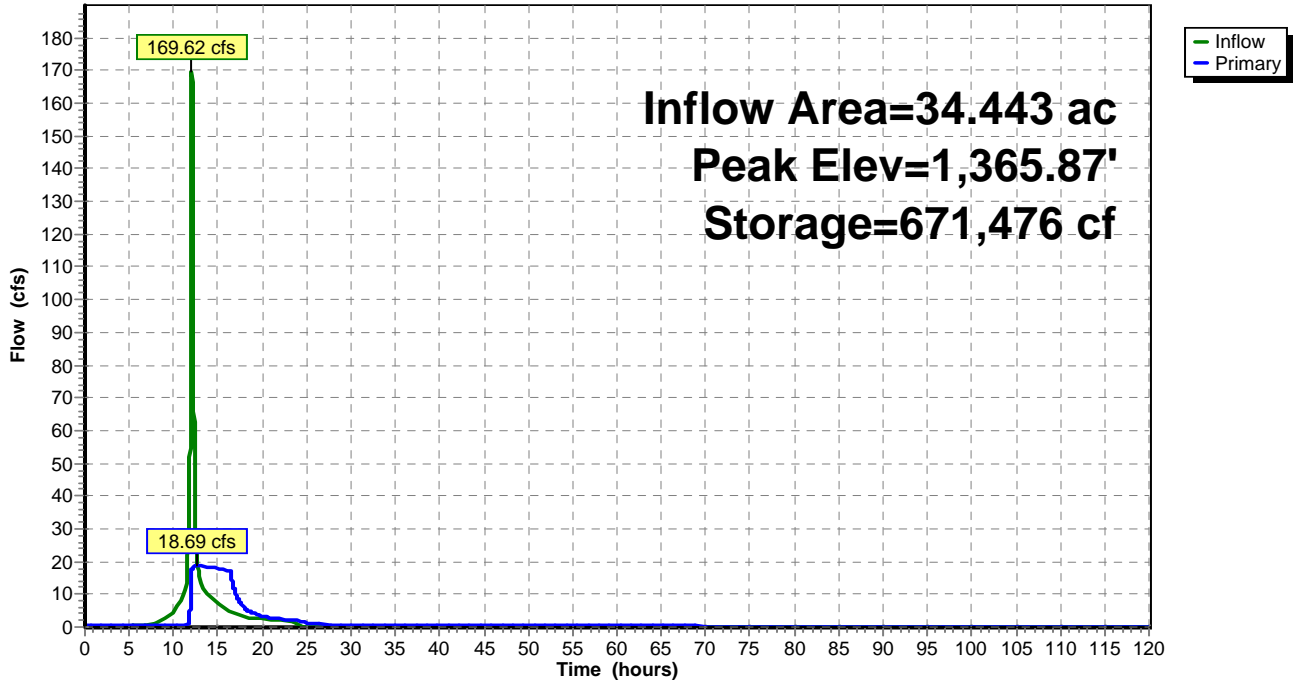
Device	Routing	Invert	Outlet Devices
#1	Primary	1,360.00'	24.0" Round Culvert L= 510.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,360.00' / 1,358.00' S= 0.0039 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	1,363.00'	3.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,363.75'	6.0" W x 3.0" H Vert. Orifice/Grate C= 0.600
#4	Device 1	1,364.50'	16.0' 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=18.69 cfs @ 12.73 hrs HW=1,365.87' TW=1,361.55' (Dynamic Tailwater)

- 1=Culvert (Outlet Controls 18.69 cfs @ 5.95 fps)
- 2=Orifice/Grate (Passes < 0.39 cfs potential flow)
- 3=Orifice/Grate (Passes < 0.85 cfs potential flow)
- 4=Broad-Crested Rectangular Weir (Passes < 85.22 cfs potential flow)

Pond 6-P: Pond 6

Hydrograph



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Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Pond 6-P: Pond 6

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	423,130	1,364.00	0.42
5.00	0.35	418,113	1,363.96	0.37
10.00	4.55	437,723	1,364.12	0.53
15.00	7.12	608,392	1,365.42	17.83
20.00	2.48	505,201	1,364.65	3.33
25.00	0.00	492,565	1,364.55	1.26
30.00	0.00	477,983	1,364.44	0.72
35.00	0.00	465,486	1,364.34	0.67
40.00	0.00	453,933	1,364.25	0.62
45.00	0.00	443,349	1,364.16	0.56
50.00	0.00	433,768	1,364.09	0.50
55.00	0.00	425,254	1,364.02	0.44
60.00	0.00	417,975	1,363.96	0.37
65.00	0.00	411,884	1,363.91	0.31
70.00	0.00	406,695	1,363.87	0.27
75.00	0.00	402,187	1,363.83	0.23
80.00	0.00	398,193	1,363.80	0.21
85.00	0.00	394,572	1,363.77	0.19
90.00	0.00	391,182	1,363.74	0.19
95.00	0.00	387,884	1,363.71	0.18
100.00	0.00	384,660	1,363.69	0.18
105.00	0.00	381,511	1,363.66	0.17
110.00	0.00	378,437	1,363.63	0.17
115.00	0.00	375,437	1,363.61	0.16
120.00	0.00	372,514	1,363.59	0.16

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Post-Development Design Point 3 (Concord Phase 1)
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"
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Summary for Subcatchment 6P: PROPOSED SUBCAT AREA 6

Runoff = 121.54 cfs @ 12.07 hrs, Volume= 8.175 af, Depth= 3.68"

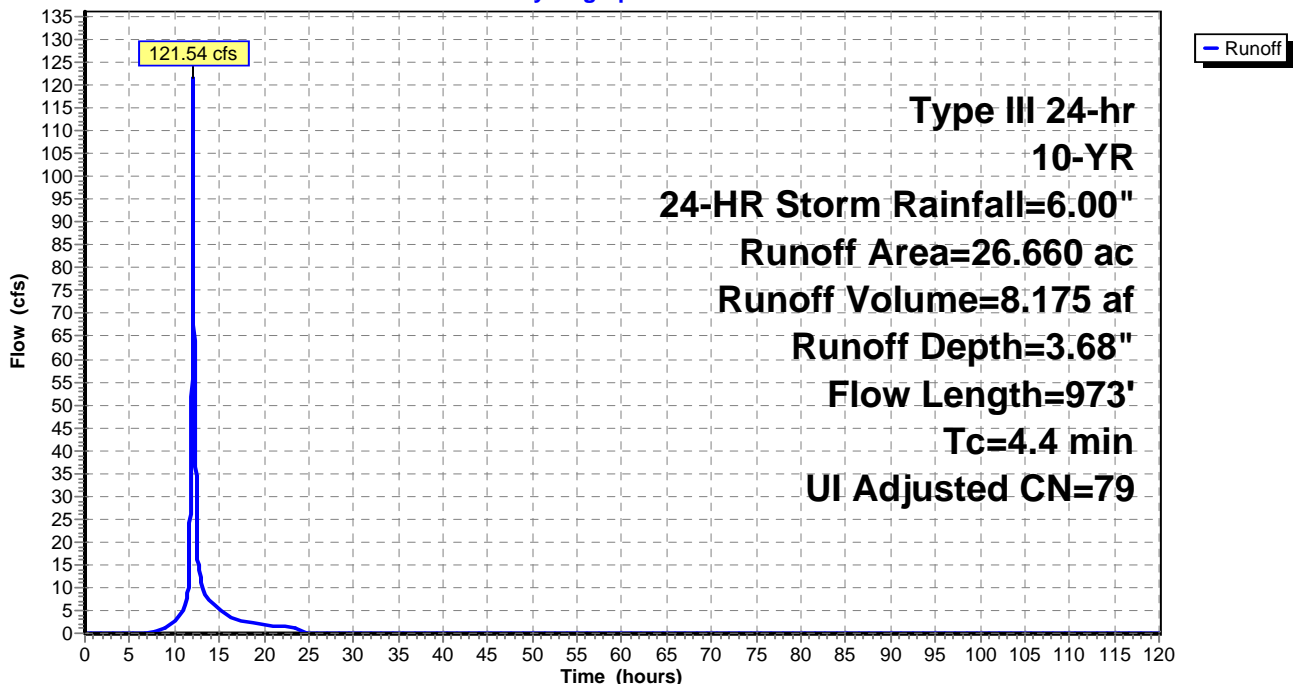
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

Area (ac)	CN	Description
14.822	74	>75% Grass cover, Good, HSG C
7.241	98	Unconnected pavement, HSG D
0.446	98	Roofs, HSG D
4.151	80	>75% Grass cover, Good, HSG D
26.660	82	Weighted Average, UI Adjusted CN = 79
18.973		71.17% Pervious Area
7.687		28.83% Impervious Area
7.241		94.20% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0200	1.49		Sheet Flow, SHEET FLOW Smooth surfaces n= 0.011 P2= 3.75"
3.3	873	0.0092	4.35	3.42	Pipe Channel, pipe 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
4.4	973	Total			

Subcatchment 6P: PROPOSED SUBCAT AREA 6

Hydrograph



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Post-Development Design Point 3 (Concord Phase 1)

Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Subcatchment 6P: PROPOSED SUBCAT AREA 6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	6.00	3.68	0.00
2.00	0.12	0.00	0.00	106.00	6.00	3.68	0.00
4.00	0.26	0.00	0.00	108.00	6.00	3.68	0.00
6.00	0.43	0.00	0.00	110.00	6.00	3.68	0.00
8.00	0.68	0.01	0.41	112.00	6.00	3.68	0.00
10.00	1.13	0.11	2.54	114.00	6.00	3.68	0.00
12.00	3.00	1.19	81.78	116.00	6.00	3.68	0.00
14.00	4.87	2.69	6.98	118.00	6.00	3.68	0.00
16.00	5.32	3.08	3.77	120.00	6.00	3.68	0.00
18.00	5.57	3.30	2.32				
20.00	5.74	3.45	1.87				
22.00	5.88	3.58	1.55				
24.00	6.00	3.68	1.24				
26.00	6.00	3.68	0.00				
28.00	6.00	3.68	0.00				
30.00	6.00	3.68	0.00				
32.00	6.00	3.68	0.00				
34.00	6.00	3.68	0.00				
36.00	6.00	3.68	0.00				
38.00	6.00	3.68	0.00				
40.00	6.00	3.68	0.00				
42.00	6.00	3.68	0.00				
44.00	6.00	3.68	0.00				
46.00	6.00	3.68	0.00				
48.00	6.00	3.68	0.00				
50.00	6.00	3.68	0.00				
52.00	6.00	3.68	0.00				
54.00	6.00	3.68	0.00				
56.00	6.00	3.68	0.00				
58.00	6.00	3.68	0.00				
60.00	6.00	3.68	0.00				
62.00	6.00	3.68	0.00				
64.00	6.00	3.68	0.00				
66.00	6.00	3.68	0.00				
68.00	6.00	3.68	0.00				
70.00	6.00	3.68	0.00				
72.00	6.00	3.68	0.00				
74.00	6.00	3.68	0.00				
76.00	6.00	3.68	0.00				
78.00	6.00	3.68	0.00				
80.00	6.00	3.68	0.00				
82.00	6.00	3.68	0.00				
84.00	6.00	3.68	0.00				
86.00	6.00	3.68	0.00				
88.00	6.00	3.68	0.00				
90.00	6.00	3.68	0.00				
92.00	6.00	3.68	0.00				
94.00	6.00	3.68	0.00				
96.00	6.00	3.68	0.00				
98.00	6.00	3.68	0.00				
100.00	6.00	3.68	0.00				
102.00	6.00	3.68	0.00				

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Post-Development Design Point 3 (Concord Phase 1)
Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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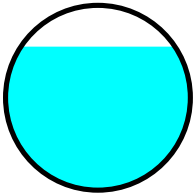
Summary for Reach 6R: DP 6

Inflow Area = 34.443 ac, 42.22% Impervious, Inflow Depth > 4.48" for 10-YR, 24-HR Storm event
Inflow = 18.69 cfs @ 12.73 hrs, Volume= 12.847 af
Outflow = 18.69 cfs @ 12.76 hrs, Volume= 12.845 af, Atten= 0%, Lag= 2.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.15 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 2.70 fps, Avg. Travel Time= 5.7 min

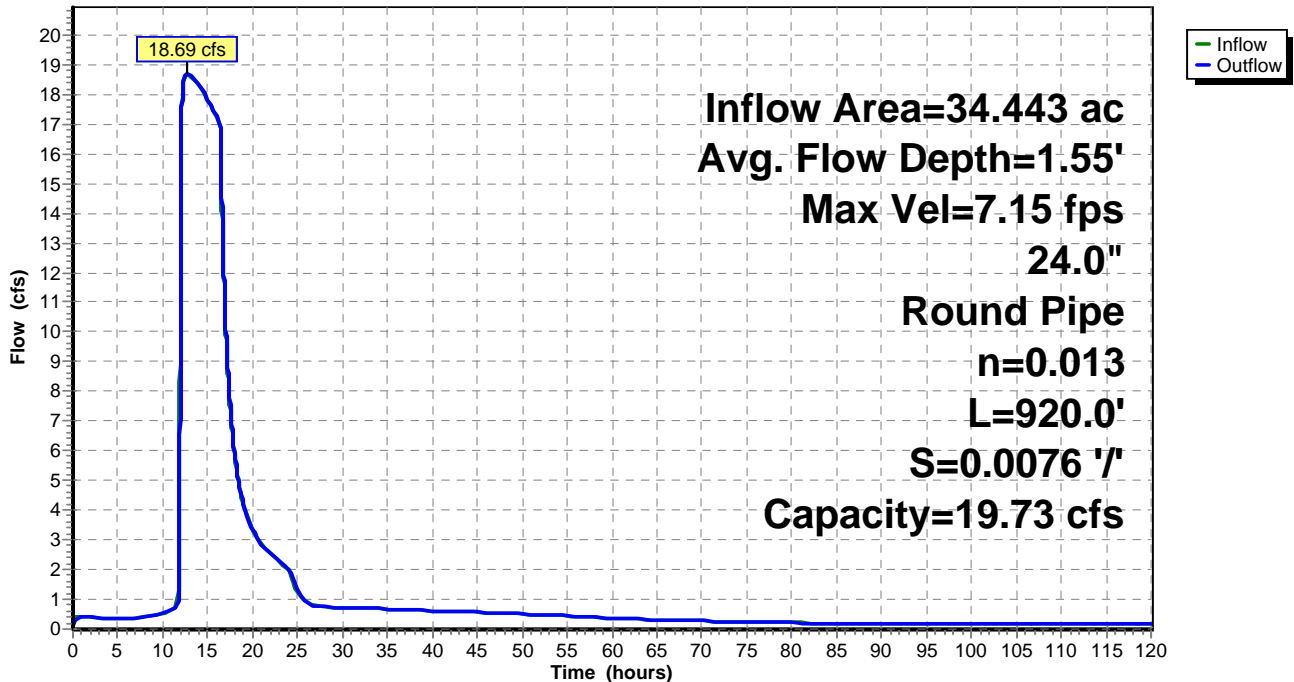
Peak Storage= 2,406 cf @ 12.76 hrs
Average Depth at Peak Storage= 1.55'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 19.73 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 920.0' Slope= 0.0076 '/'
Inlet Invert= 1,360.00', Outlet Invert= 1,353.00'



Reach 6R: DP 6

Hydrograph



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Post-Development Design Point 3 (Concord Phase 1)

Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Reach 6R: DP 6

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.42	7	1,360.03	0.01
5.00	0.37	139	1,360.19	0.37
10.00	0.53	178	1,360.22	0.52
15.00	17.83	2,308	1,361.49	17.85
20.00	3.33	658	1,360.56	3.35
25.00	1.26	334	1,360.35	1.29
30.00	0.72	222	1,360.26	0.72
35.00	0.67	211	1,360.25	0.67
40.00	0.62	199	1,360.24	0.62
45.00	0.56	187	1,360.23	0.56
50.00	0.50	173	1,360.22	0.50
55.00	0.44	158	1,360.21	0.44
60.00	0.37	139	1,360.19	0.37
65.00	0.31	124	1,360.17	0.31
70.00	0.27	111	1,360.16	0.27
75.00	0.23	102	1,360.15	0.24
80.00	0.21	94	1,360.15	0.21
85.00	0.19	89	1,360.14	0.19
90.00	0.19	86	1,360.14	0.19
95.00	0.18	85	1,360.14	0.18
100.00	0.18	83	1,360.13	0.18
105.00	0.17	82	1,360.13	0.17
110.00	0.17	81	1,360.13	0.17
115.00	0.16	79	1,360.13	0.16
120.00	0.16	78	1,360.13	0.16

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Post-Development Design Point 3 (Concord Phase 1)
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Summary for Subcatchment 7P: PROPOSED SUBCAT AREA 7

Runoff = 49.12 cfs @ 12.41 hrs, Volume= 6.309 af, Depth= 3.99"

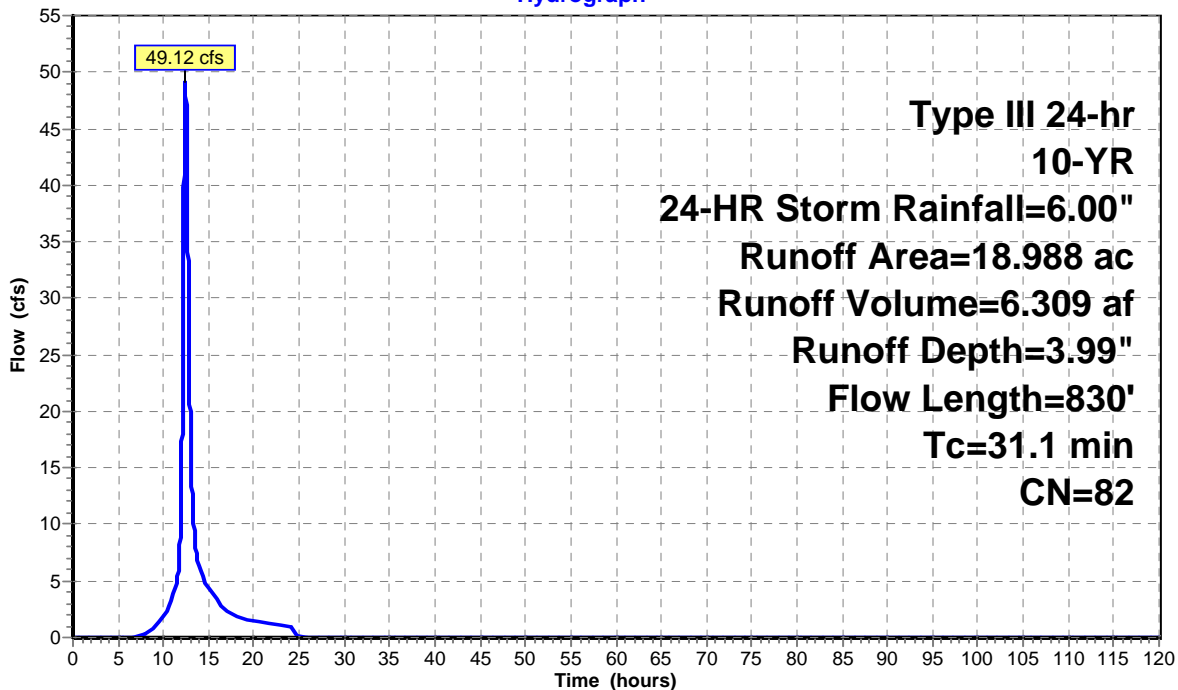
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

Area (ac)	CN	Description
7.674	86	<50% Grass cover, Poor, HSG C
9.817	77	Woods, Good, HSG D
1.497	98	Unconnected roofs, HSG C
18.988	82	Weighted Average
17.491		92.12% Pervious Area
1.497		7.88% Impervious Area
1.497		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.9	100	0.0500	0.07		Sheet Flow, SHEET FLOW Woods: Dense underbrush n= 0.800 P2= 3.75"
7.2	730	0.1151	1.70		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
31.1	830	Total			

Subcatchment 7P: PROPOSED SUBCAT AREA 7

Hydrograph



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Post-Development Design Point 3 (Concord Phase 1)

Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Subcatchment 7P: PROPOSED SUBCAT AREA 7

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	6.00	3.99	0.00
2.00	0.12	0.00	0.00	106.00	6.00	3.99	0.00
4.00	0.26	0.00	0.00	108.00	6.00	3.99	0.00
6.00	0.43	0.00	0.00	110.00	6.00	3.99	0.00
8.00	0.68	0.02	0.39	112.00	6.00	3.99	0.00
10.00	1.13	0.17	1.84	114.00	6.00	3.99	0.00
12.00	3.00	1.38	14.96	116.00	6.00	3.99	0.00
14.00	4.87	2.96	6.21	118.00	6.00	3.99	0.00
16.00	5.32	3.36	3.27	120.00	6.00	3.99	0.00
18.00	5.57	3.59	1.92				
20.00	5.74	3.75	1.44				
22.00	5.88	3.88	1.19				
24.00	6.00	3.99	0.95				
26.00	6.00	3.99	0.00				
28.00	6.00	3.99	0.00				
30.00	6.00	3.99	0.00				
32.00	6.00	3.99	0.00				
34.00	6.00	3.99	0.00				
36.00	6.00	3.99	0.00				
38.00	6.00	3.99	0.00				
40.00	6.00	3.99	0.00				
42.00	6.00	3.99	0.00				
44.00	6.00	3.99	0.00				
46.00	6.00	3.99	0.00				
48.00	6.00	3.99	0.00				
50.00	6.00	3.99	0.00				
52.00	6.00	3.99	0.00				
54.00	6.00	3.99	0.00				
56.00	6.00	3.99	0.00				
58.00	6.00	3.99	0.00				
60.00	6.00	3.99	0.00				
62.00	6.00	3.99	0.00				
64.00	6.00	3.99	0.00				
66.00	6.00	3.99	0.00				
68.00	6.00	3.99	0.00				
70.00	6.00	3.99	0.00				
72.00	6.00	3.99	0.00				
74.00	6.00	3.99	0.00				
76.00	6.00	3.99	0.00				
78.00	6.00	3.99	0.00				
80.00	6.00	3.99	0.00				
82.00	6.00	3.99	0.00				
84.00	6.00	3.99	0.00				
86.00	6.00	3.99	0.00				
88.00	6.00	3.99	0.00				
90.00	6.00	3.99	0.00				
92.00	6.00	3.99	0.00				
94.00	6.00	3.99	0.00				
96.00	6.00	3.99	0.00				
98.00	6.00	3.99	0.00				
100.00	6.00	3.99	0.00				
102.00	6.00	3.99	0.00				

Summary for Subcatchment 1B: PROPOSED SUBCAT AREA 1B

Runoff = 65.56 cfs @ 12.05 hrs, Volume= 4.800 af, Depth= 7.40"

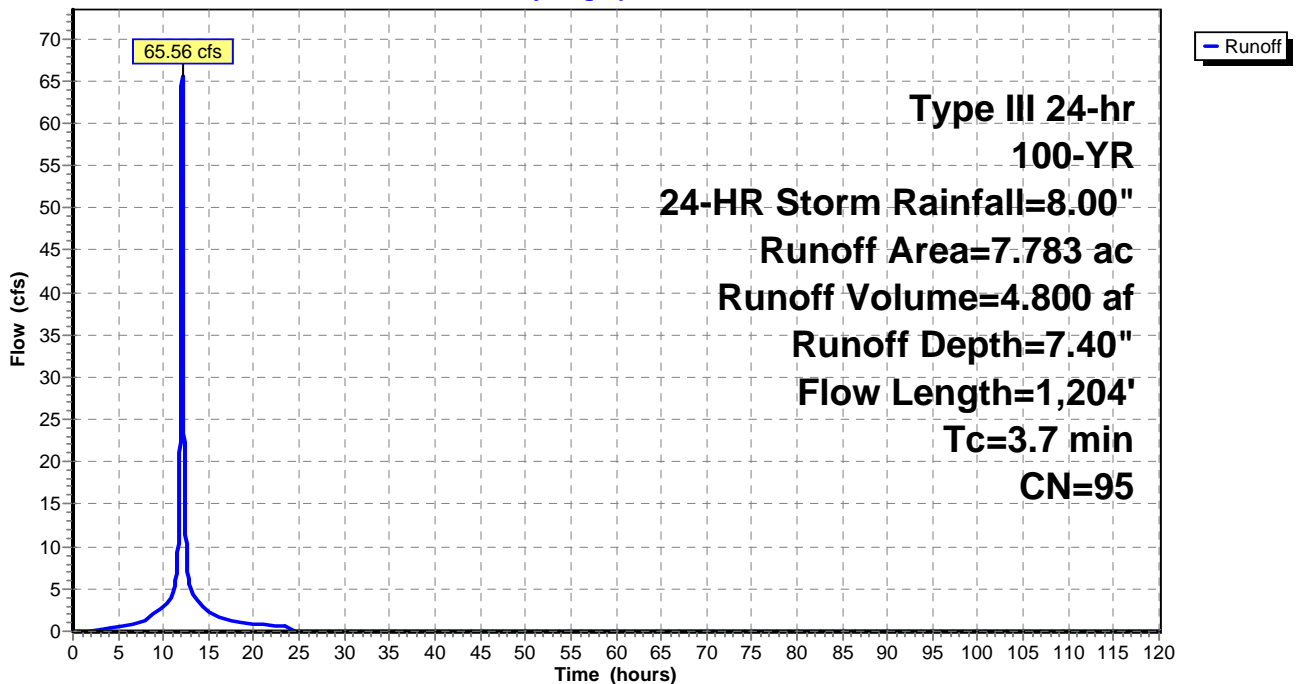
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Area (ac)	CN	Description
0.927	74	>75% Grass cover, Good, HSG C
4.559	98	Roofs, HSG D
2.297	98	Paved parking, HSG D
7.783	95	Weighted Average
0.927		11.91% Pervious Area
6.856		88.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0200	1.49		Sheet Flow, PARKING LOT - SHEET FLOW Smooth surfaces n= 0.011 P2= 3.75"
1.6	278	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.0	826	0.0850	13.23	10.39	Pipe Channel, CMP_Round 12" 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
3.7	1,204	Total			

Subcatchment 1B: PROPOSED SUBCAT AREA 1B

Hydrograph



Hydrograph for Subcatchment 1B: PROPOSED SUBCAT AREA 1B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	8.00	7.40	0.00
2.00	0.16	0.01	0.10	106.00	8.00	7.40	0.00
4.00	0.34	0.07	0.42	108.00	8.00	7.40	0.00
6.00	0.58	0.22	0.72	110.00	8.00	7.40	0.00
8.00	0.91	0.49	1.36	112.00	8.00	7.40	0.00
10.00	1.51	1.02	2.80	114.00	8.00	7.40	0.00
12.00	4.00	3.43	49.27	116.00	8.00	7.40	0.00
14.00	6.49	5.90	3.14	118.00	8.00	7.40	0.00
16.00	7.09	6.49	1.67	120.00	8.00	7.40	0.00
18.00	7.42	6.83	1.02				
20.00	7.66	7.06	0.82				
22.00	7.85	7.25	0.68				
24.00	8.00	7.40	0.54				
26.00	8.00	7.40	0.00				
28.00	8.00	7.40	0.00				
30.00	8.00	7.40	0.00				
32.00	8.00	7.40	0.00				
34.00	8.00	7.40	0.00				
36.00	8.00	7.40	0.00				
38.00	8.00	7.40	0.00				
40.00	8.00	7.40	0.00				
42.00	8.00	7.40	0.00				
44.00	8.00	7.40	0.00				
46.00	8.00	7.40	0.00				
48.00	8.00	7.40	0.00				
50.00	8.00	7.40	0.00				
52.00	8.00	7.40	0.00				
54.00	8.00	7.40	0.00				
56.00	8.00	7.40	0.00				
58.00	8.00	7.40	0.00				
60.00	8.00	7.40	0.00				
62.00	8.00	7.40	0.00				
64.00	8.00	7.40	0.00				
66.00	8.00	7.40	0.00				
68.00	8.00	7.40	0.00				
70.00	8.00	7.40	0.00				
72.00	8.00	7.40	0.00				
74.00	8.00	7.40	0.00				
76.00	8.00	7.40	0.00				
78.00	8.00	7.40	0.00				
80.00	8.00	7.40	0.00				
82.00	8.00	7.40	0.00				
84.00	8.00	7.40	0.00				
86.00	8.00	7.40	0.00				
88.00	8.00	7.40	0.00				
90.00	8.00	7.40	0.00				
92.00	8.00	7.40	0.00				
94.00	8.00	7.40	0.00				
96.00	8.00	7.40	0.00				
98.00	8.00	7.40	0.00				
100.00	8.00	7.40	0.00				
102.00	8.00	7.40	0.00				

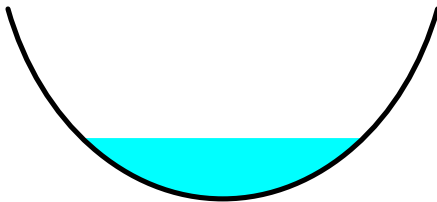
Summary for Reach 1R: (new Reach)

Inflow Area = 18.988 ac, 7.88% Impervious, Inflow Depth = 5.86" for 100-YR, 24-HR Storm event
 Inflow = 71.39 cfs @ 12.41 hrs, Volume= 9.272 af
 Outflow = 71.34 cfs @ 12.42 hrs, Volume= 9.272 af, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.88 fps, Min. Travel Time= 0.5 min
 Avg. Velocity = 3.74 fps, Avg. Travel Time= 1.3 min

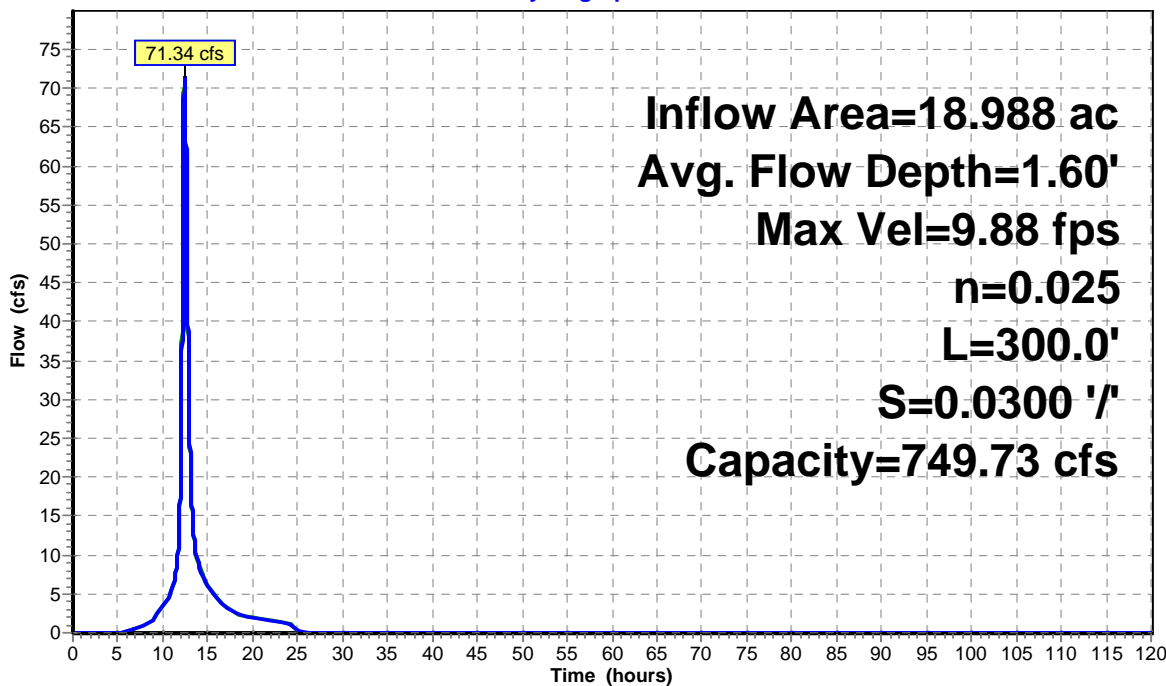
Peak Storage= 2,166 cf @ 12.42 hrs
 Average Depth at Peak Storage= 1.60'
 Bank-Full Depth= 5.00' Flow Area= 40.0 sf, Capacity= 749.73 cfs

12.00' x 5.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
 Length= 300.0' Slope= 0.0300 1/100
 Inlet Invert= 1,361.00', Outlet Invert= 1,352.00'



Reach 1R: (new Reach)

Hydrograph



— Inflow
 — Outflow

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Post-Development Design Point 3 (Concord Phase 1)
Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

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Hydrograph for Reach 1R: (new Reach)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	1,361.00	0.00
5.00	0.00	0	1,361.00	0.00
10.00	3.31	246	1,361.37	3.29
15.00	6.15	383	1,361.50	6.17
20.00	1.99	174	1,361.30	1.99
25.00	0.04	14	1,361.05	0.06
30.00	0.00	0	1,361.00	0.00
35.00	0.00	0	1,361.00	0.00
40.00	0.00	0	1,361.00	0.00
45.00	0.00	0	1,361.00	0.00
50.00	0.00	0	1,361.00	0.00
55.00	0.00	0	1,361.00	0.00
60.00	0.00	0	1,361.00	0.00
65.00	0.00	0	1,361.00	0.00
70.00	0.00	0	1,361.00	0.00
75.00	0.00	0	1,361.00	0.00
80.00	0.00	0	1,361.00	0.00
85.00	0.00	0	1,361.00	0.00
90.00	0.00	0	1,361.00	0.00
95.00	0.00	0	1,361.00	0.00
100.00	0.00	0	1,361.00	0.00
105.00	0.00	0	1,361.00	0.00
110.00	0.00	0	1,361.00	0.00
115.00	0.00	0	1,361.00	0.00
120.00	0.00	0	1,361.00	0.00

Summary for Subcatchment 2P: PROPOSED SUBCAT AREA 2

Runoff = 92.43 cfs @ 12.04 hrs, Volume= 6.554 af, Depth= 7.28"

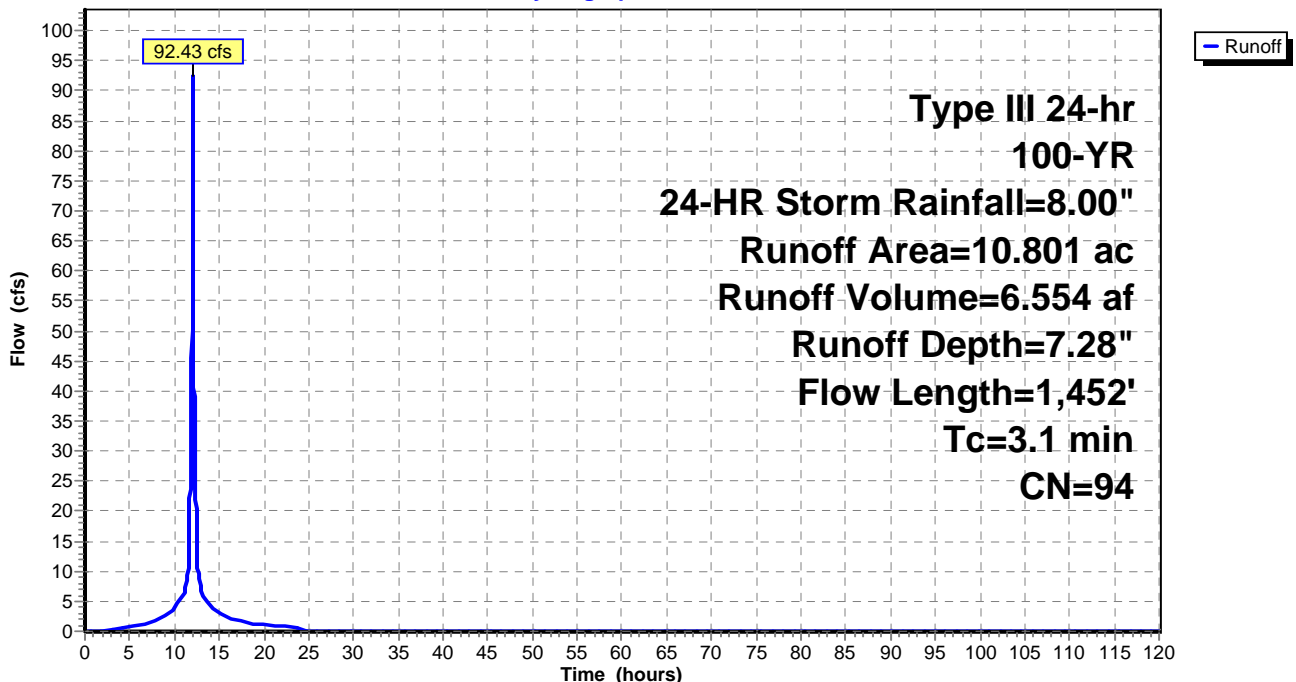
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Area (ac)	CN	Description
7.575	98	Paved parking, HSG D
1.561	98	Roofs, HSG D
1.665	74	>75% Grass cover, Good, HSG C
10.801	94	Weighted Average
1.665		15.42% Pervious Area
9.136		84.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	100	0.0591	2.30		Sheet Flow, PARKING LOT - SHEET FLOW Smooth surfaces n= 0.011 P2= 3.75"
0.7	200	0.0591	4.94		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.7	1,152	0.0595	11.07	8.69	Pipe Channel, CMP_Round 12" 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
3.1	1,452	Total			

Subcatchment 2P: PROPOSED SUBCAT AREA 2

Hydrograph



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Post-Development Design Point 3 (Concord Phase 1)
Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

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Hydrograph for Subcatchment 2P: PROPOSED SUBCAT AREA 2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	8.00	7.28	0.00
2.00	0.16	0.00	0.07	106.00	8.00	7.28	0.00
4.00	0.34	0.05	0.49	108.00	8.00	7.28	0.00
6.00	0.58	0.18	0.90	110.00	8.00	7.28	0.00
8.00	0.91	0.43	1.79	112.00	8.00	7.28	0.00
10.00	1.51	0.95	3.79	114.00	8.00	7.28	0.00
12.00	4.00	3.32	73.13	116.00	8.00	7.28	0.00
14.00	6.49	5.78	4.33	118.00	8.00	7.28	0.00
16.00	7.09	6.38	2.30	120.00	8.00	7.28	0.00
18.00	7.42	6.71	1.41				
20.00	7.66	6.94	1.13				
22.00	7.85	7.13	0.94				
24.00	8.00	7.28	0.74				
26.00	8.00	7.28	0.00				
28.00	8.00	7.28	0.00				
30.00	8.00	7.28	0.00				
32.00	8.00	7.28	0.00				
34.00	8.00	7.28	0.00				
36.00	8.00	7.28	0.00				
38.00	8.00	7.28	0.00				
40.00	8.00	7.28	0.00				
42.00	8.00	7.28	0.00				
44.00	8.00	7.28	0.00				
46.00	8.00	7.28	0.00				
48.00	8.00	7.28	0.00				
50.00	8.00	7.28	0.00				
52.00	8.00	7.28	0.00				
54.00	8.00	7.28	0.00				
56.00	8.00	7.28	0.00				
58.00	8.00	7.28	0.00				
60.00	8.00	7.28	0.00				
62.00	8.00	7.28	0.00				
64.00	8.00	7.28	0.00				
66.00	8.00	7.28	0.00				
68.00	8.00	7.28	0.00				
70.00	8.00	7.28	0.00				
72.00	8.00	7.28	0.00				
74.00	8.00	7.28	0.00				
76.00	8.00	7.28	0.00				
78.00	8.00	7.28	0.00				
80.00	8.00	7.28	0.00				
82.00	8.00	7.28	0.00				
84.00	8.00	7.28	0.00				
86.00	8.00	7.28	0.00				
88.00	8.00	7.28	0.00				
90.00	8.00	7.28	0.00				
92.00	8.00	7.28	0.00				
94.00	8.00	7.28	0.00				
96.00	8.00	7.28	0.00				
98.00	8.00	7.28	0.00				
100.00	8.00	7.28	0.00				
102.00	8.00	7.28	0.00				

Summary for Pond 3-P: Pond 3

Inflow Area = 15.953 ac, 57.27% Impervious, Inflow Depth = 6.60" for 100-YR, 24-HR Storm event
 Inflow = 113.41 cfs @ 12.05 hrs, Volume= 8.769 af
 Outflow = 18.11 cfs @ 12.54 hrs, Volume= 8.364 af, Atten= 84%, Lag= 29.5 min
 Primary = 18.11 cfs @ 12.54 hrs, Volume= 8.364 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,360.50' Surf.Area= 26,575 sf Storage= 55,843 cf
 Peak Elev= 1,366.49' @ 12.54 hrs Surf.Area= 50,503 sf Storage= 283,900 cf (228,057 cf above start)

Plug-Flow detention time= 1,613.9 min calculated for 7.081 af (81% of inflow)
 Center-of-Mass det. time= 1,299.3 min (2,072.0 - 772.7)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,358.00'	365,330 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,358.00	18,268	626.0	0	0	18,268
1,359.00	21,477	657.0	19,851	19,851	21,497
1,360.00	24,843	688.0	23,140	42,990	24,883
1,361.00	28,366	720.0	26,585	69,576	28,537
1,362.00	32,046	752.0	30,187	99,763	32,357
1,363.00	35,883	783.0	33,946	133,709	36,220
1,364.00	39,878	815.0	37,863	171,572	40,367
1,365.00	44,030	846.0	41,937	213,509	44,548
1,366.00	48,338	877.0	46,167	259,676	48,885
1,367.00	52,804	909.0	50,555	310,231	53,520
1,368.00	57,427	940.0	55,099	365,330	58,174

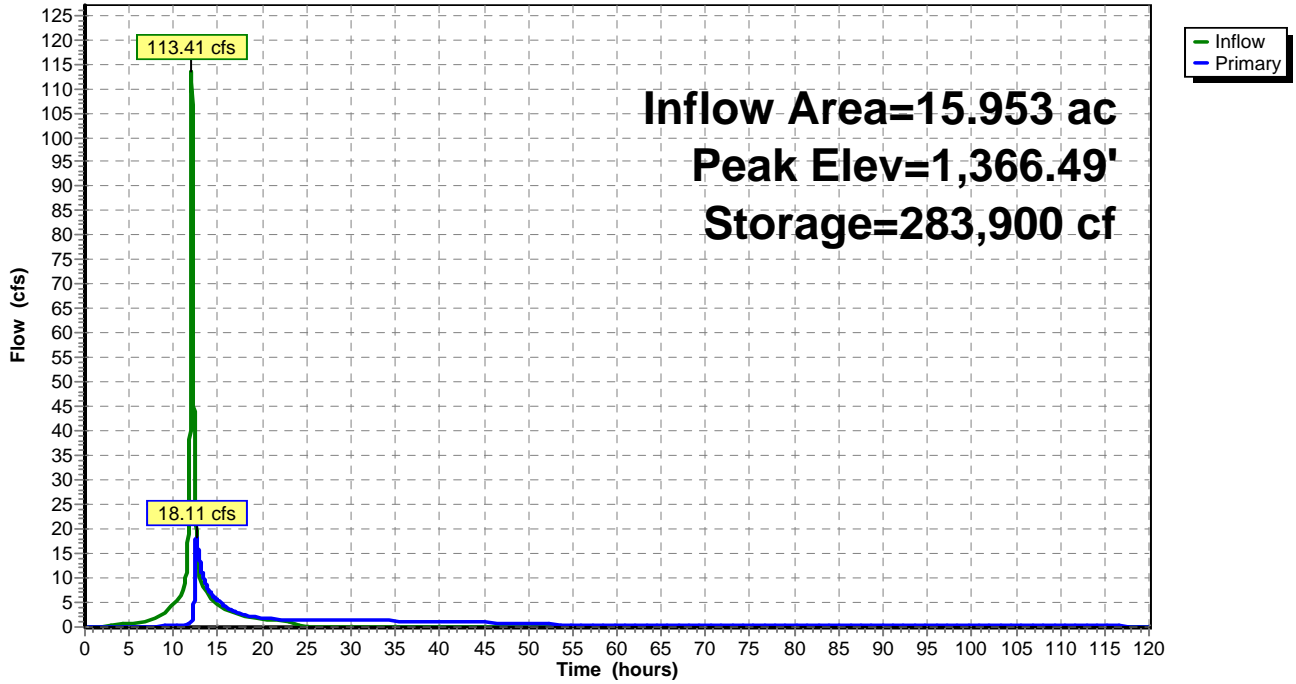
Device	Routing	Invert	Outlet Devices
#1	Primary	1,356.00'	24.0" Round Culvert L= 230.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,356.00' / 1,353.00' S= 0.0130 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	1,360.50'	3.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,363.00'	6.0" W x 3.0" H Vert. Orifice/Grate C= 0.600
#4	Device 1	1,366.00'	16.0' 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=18.10 cfs @ 12.54 hrs HW=1,366.49' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 18.10 cfs of 40.90 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.57 cfs @ 11.66 fps)
- 3=Orifice/Grate (Orifice Controls 1.10 cfs @ 8.83 fps)
- 4=Broad-Crested Rectangular Weir (Weir Controls 16.43 cfs @ 2.09 fps)

Pond 3-P: Pond 3

Hydrograph



Hydrograph for Pond 3-P: Pond 3

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	55,843	1,360.50	0.00
5.00	0.70	59,939	1,360.65	0.04
10.00	4.53	92,890	1,361.78	0.25
15.00	4.73	269,065	1,366.19	5.40
20.00	1.63	261,231	1,366.03	1.83
25.00	0.00	251,947	1,365.84	1.53
30.00	0.00	225,633	1,365.27	1.39
35.00	0.00	201,918	1,364.73	1.24
40.00	0.00	180,980	1,364.23	1.08
45.00	0.00	163,044	1,363.78	0.91
50.00	0.00	148,446	1,363.40	0.71
55.00	0.00	138,097	1,363.12	0.44
60.00	0.00	131,219	1,362.93	0.36
65.00	0.00	124,888	1,362.75	0.34
70.00	0.00	118,815	1,362.58	0.33
75.00	0.00	113,007	1,362.40	0.32
80.00	0.00	107,469	1,362.24	0.30
85.00	0.00	102,205	1,362.08	0.28
90.00	0.00	97,222	1,361.92	0.27
95.00	0.00	92,523	1,361.77	0.25
100.00	0.00	88,115	1,361.63	0.24
105.00	0.00	84,001	1,361.49	0.22
110.00	0.00	80,188	1,361.37	0.20
115.00	0.00	76,680	1,361.25	0.19
120.00	0.00	73,481	1,361.14	0.17

Summary for Subcatchment 3P: PROPOSED SUBCAT AREA 3

Runoff = 28.34 cfs @ 12.12 hrs, Volume= 2.214 af, Depth= 5.16"

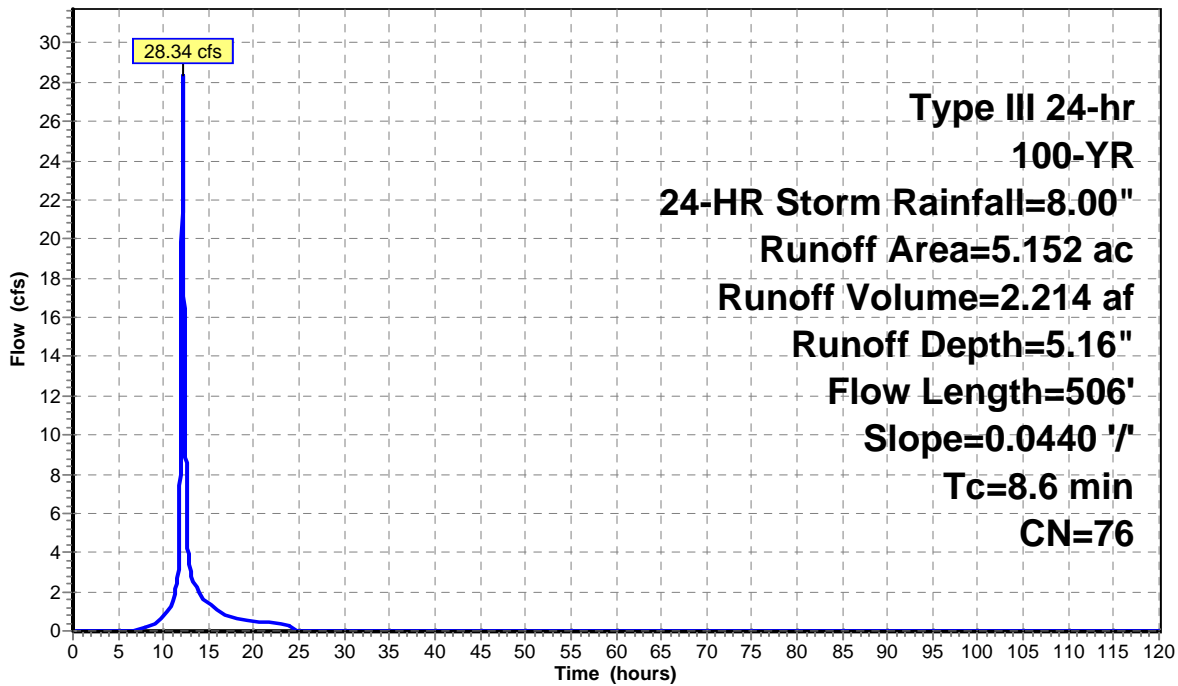
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Area (ac)	CN	Description
3.080	74	>75% Grass cover, Good, HSG C
2.072	80	>75% Grass cover, Good, HSG D
5.152	76	Weighted Average
5.152		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	100	0.0440	0.25		Sheet Flow, SHEET FLOW Grass: Short n= 0.150 P2= 3.75"
2.0	406	0.0440	3.38		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Unpaved Kv= 16.1 fps
8.6	506	Total			

Subcatchment 3P: PROPOSED SUBCAT AREA 3

Hydrograph



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Post-Development Design Point 3 (Concord Phase 1)
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

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Hydrograph for Subcatchment 3P: PROPOSED SUBCAT AREA 3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	8.00	5.16	0.00
2.00	0.16	0.00	0.00	106.00	8.00	5.16	0.00
4.00	0.34	0.00	0.00	108.00	8.00	5.16	0.00
6.00	0.58	0.00	0.00	110.00	8.00	5.16	0.00
8.00	0.91	0.02	0.15	112.00	8.00	5.16	0.00
10.00	1.51	0.19	0.74	114.00	8.00	5.16	0.00
12.00	4.00	1.74	14.62	116.00	8.00	5.16	0.00
14.00	6.49	3.80	1.90	118.00	8.00	5.16	0.00
16.00	7.09	4.34	1.02	120.00	8.00	5.16	0.00
18.00	7.42	4.64	0.62				
20.00	7.66	4.85	0.50				
22.00	7.85	5.02	0.41				
24.00	8.00	5.16	0.33				
26.00	8.00	5.16	0.00				
28.00	8.00	5.16	0.00				
30.00	8.00	5.16	0.00				
32.00	8.00	5.16	0.00				
34.00	8.00	5.16	0.00				
36.00	8.00	5.16	0.00				
38.00	8.00	5.16	0.00				
40.00	8.00	5.16	0.00				
42.00	8.00	5.16	0.00				
44.00	8.00	5.16	0.00				
46.00	8.00	5.16	0.00				
48.00	8.00	5.16	0.00				
50.00	8.00	5.16	0.00				
52.00	8.00	5.16	0.00				
54.00	8.00	5.16	0.00				
56.00	8.00	5.16	0.00				
58.00	8.00	5.16	0.00				
60.00	8.00	5.16	0.00				
62.00	8.00	5.16	0.00				
64.00	8.00	5.16	0.00				
66.00	8.00	5.16	0.00				
68.00	8.00	5.16	0.00				
70.00	8.00	5.16	0.00				
72.00	8.00	5.16	0.00				
74.00	8.00	5.16	0.00				
76.00	8.00	5.16	0.00				
78.00	8.00	5.16	0.00				
80.00	8.00	5.16	0.00				
82.00	8.00	5.16	0.00				
84.00	8.00	5.16	0.00				
86.00	8.00	5.16	0.00				
88.00	8.00	5.16	0.00				
90.00	8.00	5.16	0.00				
92.00	8.00	5.16	0.00				
94.00	8.00	5.16	0.00				
96.00	8.00	5.16	0.00				
98.00	8.00	5.16	0.00				
100.00	8.00	5.16	0.00				
102.00	8.00	5.16	0.00				

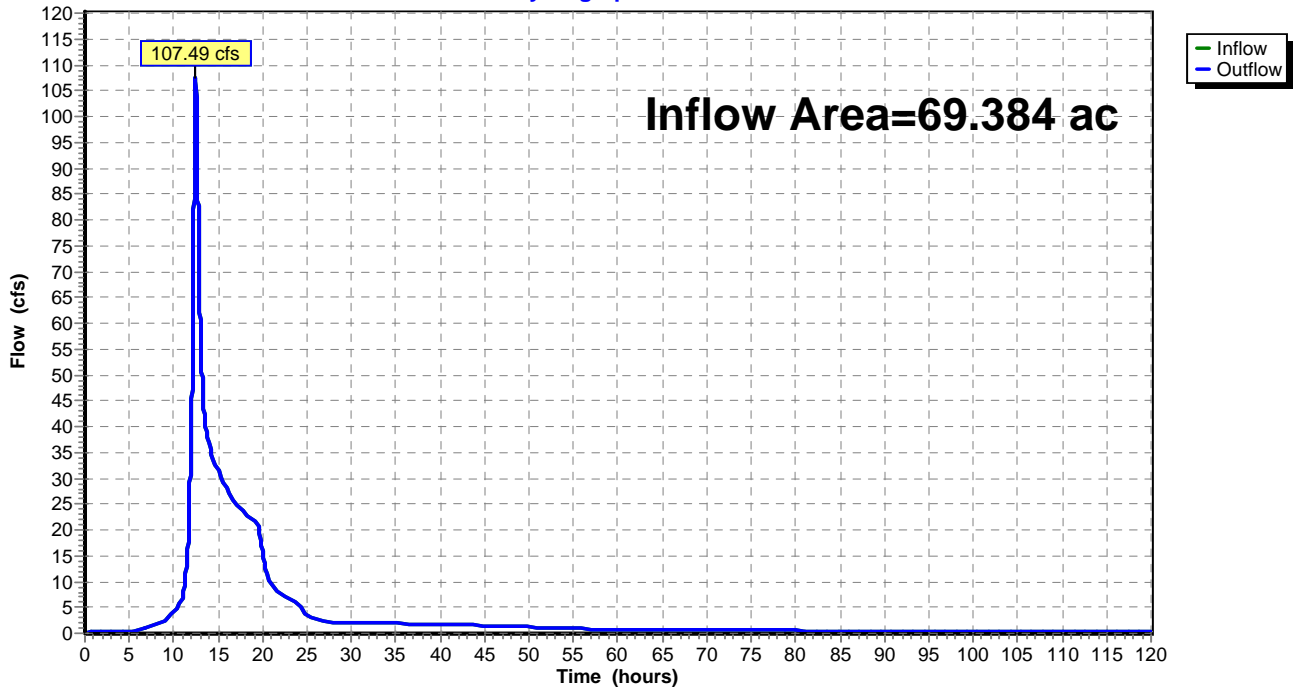
Summary for Reach 3R: DP 3

Inflow Area = 69.384 ac, 36.29% Impervious, Inflow Depth > 6.20" for 100-YR, 24-HR Storm event
Inflow = 107.49 cfs @ 12.47 hrs, Volume= 35.826 af
Outflow = 107.49 cfs @ 12.47 hrs, Volume= 35.826 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach 3R: DP 3

Hydrograph



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Post-Development Design Point 3 (Concord Phase 1)

Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

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Hydrograph for Reach 3R: DP 3

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.01		0.01	104.00	0.40		0.40
2.00	0.39		0.39	106.00	0.39		0.39
4.00	0.40		0.40	108.00	0.38		0.38
6.00	0.63		0.63	110.00	0.37		0.37
8.00	1.60		1.60	112.00	0.36		0.36
10.00	4.18		4.18	114.00	0.36		0.36
12.00	41.10		41.10	116.00	0.35		0.35
14.00	36.31		36.31	118.00	0.34		0.34
16.00	27.90		27.90	120.00	0.33		0.33
18.00	23.22		23.22				
20.00	15.12		15.12				
22.00	7.49		7.49				
24.00	5.78		5.78				
26.00	2.59		2.59				
28.00	2.20		2.20				
30.00	2.12		2.12				
32.00	2.04		2.04				
34.00	1.96		1.96				
36.00	1.88		1.88				
38.00	1.79		1.79				
40.00	1.70		1.70				
42.00	1.61		1.61				
44.00	1.52		1.52				
46.00	1.43		1.43				
48.00	1.33		1.33				
50.00	1.22		1.22				
52.00	1.10		1.10				
54.00	0.95		0.95				
56.00	0.84		0.84				
58.00	0.77		0.77				
60.00	0.74		0.74				
62.00	0.70		0.70				
64.00	0.68		0.68				
66.00	0.65		0.65				
68.00	0.63		0.63				
70.00	0.60		0.60				
72.00	0.58		0.58				
74.00	0.56		0.56				
76.00	0.55		0.55				
78.00	0.53		0.53				
80.00	0.51		0.51				
82.00	0.50		0.50				
84.00	0.49		0.49				
86.00	0.47		0.47				
88.00	0.46		0.46				
90.00	0.45		0.45				
92.00	0.45		0.45				
94.00	0.44		0.44				
96.00	0.43		0.43				
98.00	0.42		0.42				
100.00	0.41		0.41				
102.00	0.41		0.41				

Summary for Pond 6-P: Pond 6

Inflow Area = 34.443 ac, 42.22% Impervious, Inflow Depth = 5.94" for 100-YR, 24-HR Storm event
 Inflow = 244.80 cfs @ 12.06 hrs, Volume= 17.037 af
 Outflow = 20.31 cfs @ 12.98 hrs, Volume= 18.192 af, Atten= 92%, Lag= 55.2 min
 Primary = 20.31 cfs @ 12.98 hrs, Volume= 18.192 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,364.00' Surf.Area= 123,982 sf Storage= 423,130 cf
 Peak Elev= 1,366.80' @ 12.99 hrs Surf.Area= 150,660 sf Storage= 807,099 cf (383,969 cf above start)

Plug-Flow detention time= 1,254.0 min calculated for 8.477 af (50% of inflow)
 Center-of-Mass det. time= 558.1 min (1,348.0 - 790.0)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,360.00'	995,221 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,360.00	88,152	1,690.0	0	0	88,152
1,361.00	96,779	1,756.0	92,432	92,432	106,333
1,362.00	105,668	1,798.0	101,191	193,623	118,343
1,363.00	114,743	1,832.0	110,174	303,797	128,331
1,364.00	123,982	1,864.0	119,333	423,130	137,922
1,365.00	133,378	1,895.0	128,651	551,781	147,384
1,366.00	142,932	1,926.0	138,127	689,909	157,002
1,367.00	152,643	1,958.0	147,761	837,670	167,081
1,368.00	162,512	1,989.0	157,552	995,221	177,016

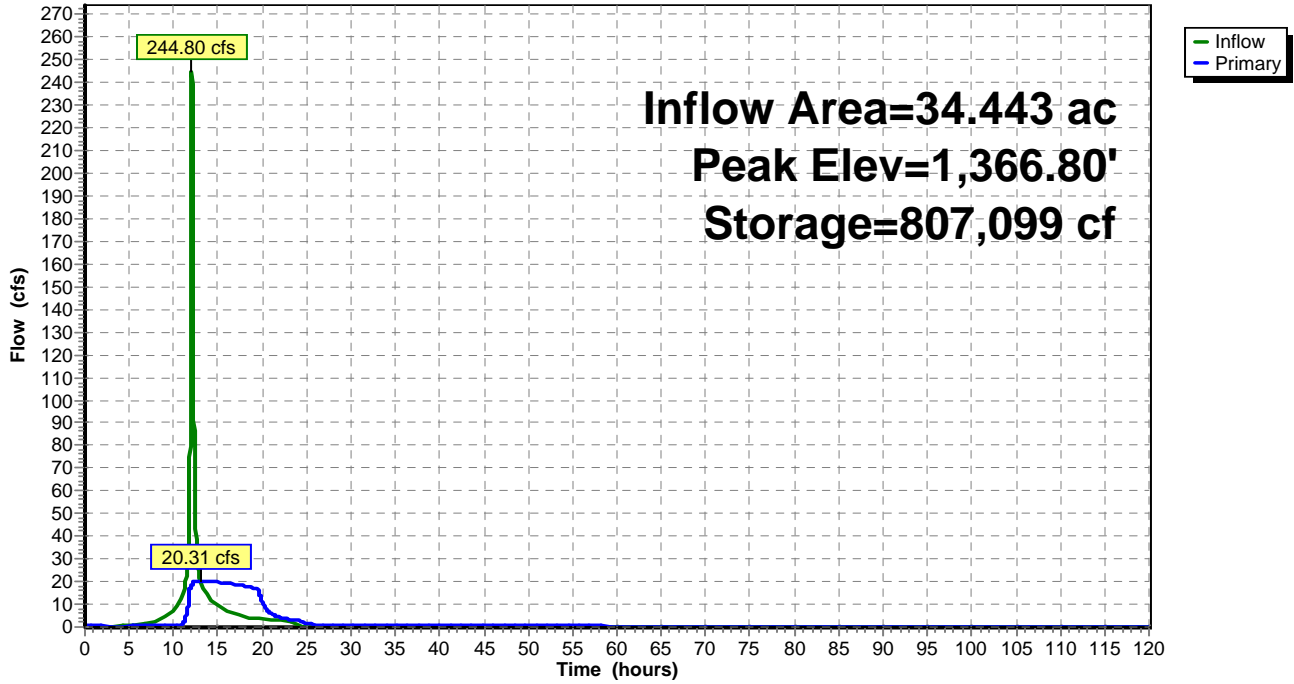
Device	Routing	Invert	Outlet Devices
#1	Primary	1,360.00'	24.0" Round Culvert L= 510.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,360.00' / 1,358.00' S= 0.0039 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	1,363.00'	3.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,363.75'	6.0" W x 3.0" H Vert. Orifice/Grate C= 0.600
#4	Device 1	1,364.50'	16.0' 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=20.31 cfs @ 12.98 hrs HW=1,366.80' TW=1,361.70' (Dynamic Tailwater)

- 1=Culvert (Outlet Controls 20.31 cfs @ 6.47 fps)
- 2=Orifice/Grate (Passes < 0.45 cfs potential flow)
- 3=Orifice/Grate (Passes < 1.03 cfs potential flow)
- 4=Broad-Crested Rectangular Weir (Passes < 185.09 cfs potential flow)

Pond 6-P: Pond 6

Hydrograph



Hydrograph for Pond 6-P: Pond 6

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	423,130	1,364.00	0.42
5.00	0.57	419,851	1,363.97	0.39
10.00	7.56	460,317	1,364.30	0.65
15.00	9.89	760,853	1,366.49	19.79
20.00	3.43	533,473	1,364.86	11.01
25.00	0.00	495,510	1,364.57	1.64
30.00	0.00	479,466	1,364.45	0.73
35.00	0.00	466,862	1,364.35	0.67
40.00	0.00	455,201	1,364.26	0.62
45.00	0.00	444,504	1,364.17	0.57
50.00	0.00	434,807	1,364.09	0.51
55.00	0.00	426,166	1,364.02	0.45
60.00	0.00	418,738	1,363.96	0.38
65.00	0.00	412,528	1,363.91	0.32
70.00	0.00	407,248	1,363.87	0.27
75.00	0.00	402,672	1,363.83	0.24
80.00	0.00	398,627	1,363.80	0.21
85.00	0.00	394,970	1,363.77	0.19
90.00	0.00	391,562	1,363.74	0.19
95.00	0.00	388,256	1,363.72	0.18
100.00	0.00	385,023	1,363.69	0.18
105.00	0.00	381,866	1,363.66	0.17
110.00	0.00	378,783	1,363.64	0.17
115.00	0.00	375,775	1,363.61	0.17
120.00	0.00	372,843	1,363.59	0.16

Summary for Subcatchment 6P: PROPOSED SUBCAT AREA 6

Runoff = 180.01 cfs @ 12.06 hrs, Volume= 12.237 af, Depth= 5.51"

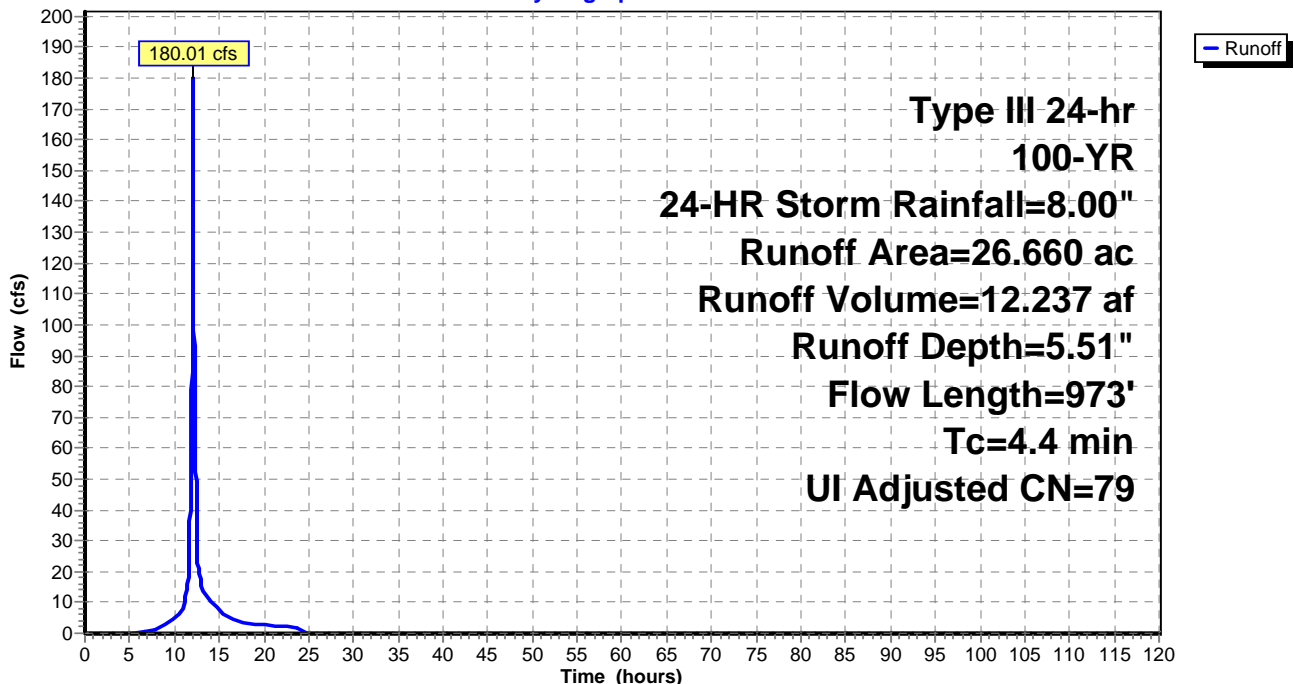
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Area (ac)	CN	Description
14.822	74	>75% Grass cover, Good, HSG C
7.241	98	Unconnected pavement, HSG D
0.446	98	Roofs, HSG D
4.151	80	>75% Grass cover, Good, HSG D
26.660	82	Weighted Average, UI Adjusted CN = 79
18.973		71.17% Pervious Area
7.687		28.83% Impervious Area
7.241		94.20% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0200	1.49		Sheet Flow, SHEET FLOW Smooth surfaces n= 0.011 P2= 3.75"
3.3	873	0.0092	4.35	3.42	Pipe Channel, pipe 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
4.4	973	Total			

Subcatchment 6P: PROPOSED SUBCAT AREA 6

Hydrograph



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Post-Development Design Point 3 (Concord Phase 1)
Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

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Hydrograph for Subcatchment 6P: PROPOSED SUBCAT AREA 6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	8.00	5.51	0.00
2.00	0.16	0.00	0.00	106.00	8.00	5.51	0.00
4.00	0.34	0.00	0.00	108.00	8.00	5.51	0.00
6.00	0.58	0.00	0.09	110.00	8.00	5.51	0.00
8.00	0.91	0.05	1.26	112.00	8.00	5.51	0.00
10.00	1.51	0.26	4.75	114.00	8.00	5.51	0.00
12.00	4.00	1.96	123.08	116.00	8.00	5.51	0.00
14.00	6.49	4.12	9.85	118.00	8.00	5.51	0.00
16.00	7.09	4.66	5.28	120.00	8.00	5.51	0.00
18.00	7.42	4.97	3.24				
20.00	7.66	5.19	2.61				
22.00	7.85	5.36	2.16				
24.00	8.00	5.51	1.72				
26.00	8.00	5.51	0.00				
28.00	8.00	5.51	0.00				
30.00	8.00	5.51	0.00				
32.00	8.00	5.51	0.00				
34.00	8.00	5.51	0.00				
36.00	8.00	5.51	0.00				
38.00	8.00	5.51	0.00				
40.00	8.00	5.51	0.00				
42.00	8.00	5.51	0.00				
44.00	8.00	5.51	0.00				
46.00	8.00	5.51	0.00				
48.00	8.00	5.51	0.00				
50.00	8.00	5.51	0.00				
52.00	8.00	5.51	0.00				
54.00	8.00	5.51	0.00				
56.00	8.00	5.51	0.00				
58.00	8.00	5.51	0.00				
60.00	8.00	5.51	0.00				
62.00	8.00	5.51	0.00				
64.00	8.00	5.51	0.00				
66.00	8.00	5.51	0.00				
68.00	8.00	5.51	0.00				
70.00	8.00	5.51	0.00				
72.00	8.00	5.51	0.00				
74.00	8.00	5.51	0.00				
76.00	8.00	5.51	0.00				
78.00	8.00	5.51	0.00				
80.00	8.00	5.51	0.00				
82.00	8.00	5.51	0.00				
84.00	8.00	5.51	0.00				
86.00	8.00	5.51	0.00				
88.00	8.00	5.51	0.00				
90.00	8.00	5.51	0.00				
92.00	8.00	5.51	0.00				
94.00	8.00	5.51	0.00				
96.00	8.00	5.51	0.00				
98.00	8.00	5.51	0.00				
100.00	8.00	5.51	0.00				
102.00	8.00	5.51	0.00				

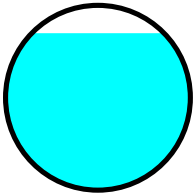
Summary for Reach 6R: DP 6

Inflow Area = 34.443 ac, 42.22% Impervious, Inflow Depth > 6.34" for 100-YR, 24-HR Storm event
 Inflow = 20.31 cfs @ 12.98 hrs, Volume= 18.192 af
 Outflow = 20.31 cfs @ 13.02 hrs, Volume= 18.190 af, Atten= 0%, Lag= 2.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Max. Velocity= 7.16 fps, Min. Travel Time= 2.1 min
 Avg. Velocity = 2.81 fps, Avg. Travel Time= 5.5 min

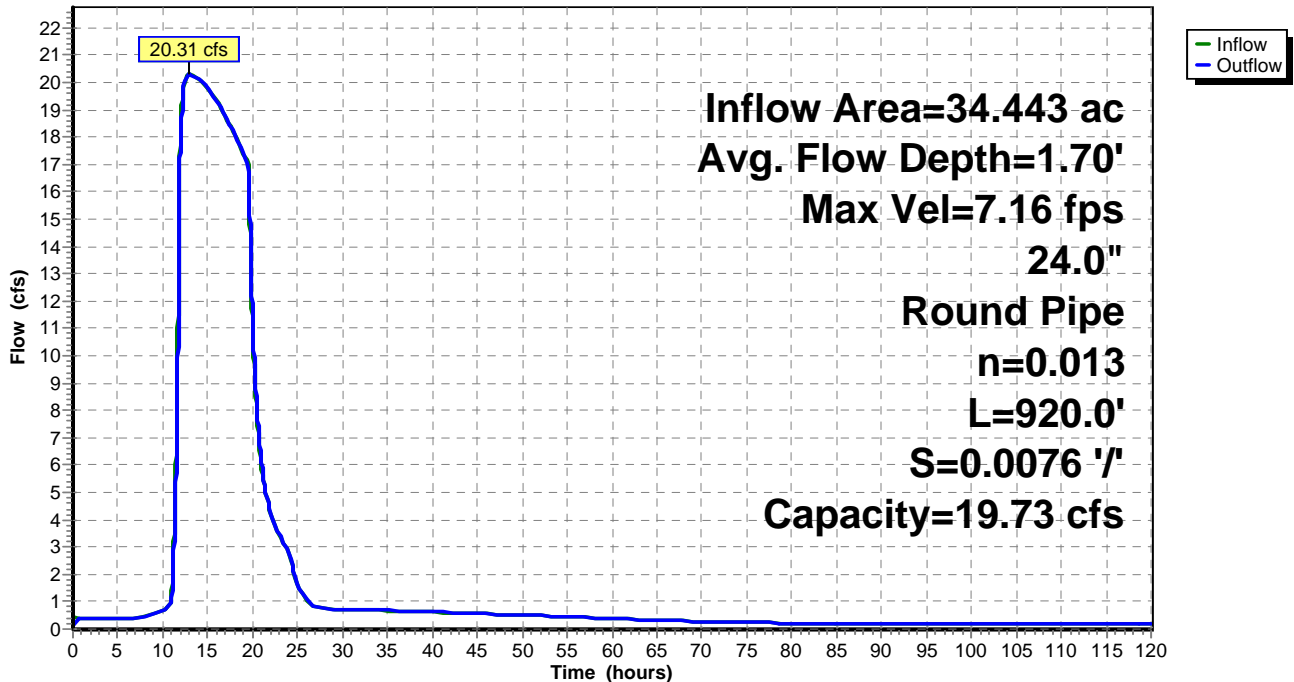
Peak Storage= 2,616 cf @ 13.02 hrs
 Average Depth at Peak Storage= 1.70'
 Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 19.73 cfs

24.0" Round Pipe
 n= 0.013 Corrugated PE, smooth interior
 Length= 920.0' Slope= 0.0076 '/'
 Inlet Invert= 1,360.00', Outlet Invert= 1,353.00'



Reach 6R: DP 6

Hydrograph



Hydrograph for Reach 6R: DP 6

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.42	7	1,360.03	0.01
5.00	0.39	144	1,360.19	0.39
10.00	0.65	204	1,360.25	0.64
15.00	19.79	2,545	1,361.65	19.81
20.00	11.01	1,600	1,361.08	11.29
25.00	1.64	404	1,360.39	1.68
30.00	0.73	224	1,360.26	0.73
35.00	0.67	212	1,360.25	0.67
40.00	0.62	201	1,360.24	0.62
45.00	0.57	188	1,360.23	0.57
50.00	0.51	175	1,360.22	0.51
55.00	0.45	160	1,360.21	0.45
60.00	0.38	141	1,360.19	0.38
65.00	0.32	125	1,360.18	0.32
70.00	0.27	113	1,360.16	0.27
75.00	0.24	103	1,360.15	0.24
80.00	0.21	95	1,360.15	0.21
85.00	0.19	89	1,360.14	0.20
90.00	0.19	86	1,360.14	0.19
95.00	0.18	85	1,360.14	0.18
100.00	0.18	83	1,360.13	0.18
105.00	0.17	82	1,360.13	0.17
110.00	0.17	81	1,360.13	0.17
115.00	0.17	79	1,360.13	0.17
120.00	0.16	78	1,360.13	0.16

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 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

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Summary for Subcatchment 7P: PROPOSED SUBCAT AREA 7

Runoff = 71.39 cfs @ 12.41 hrs, Volume= 9.272 af, Depth= 5.86"

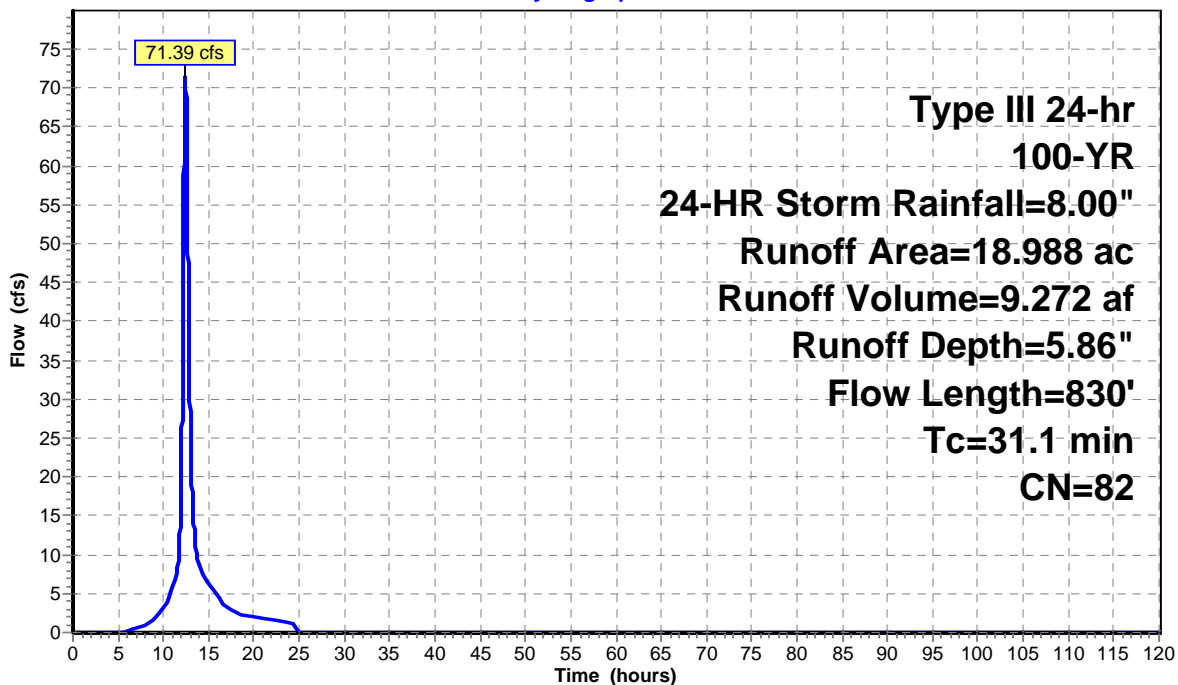
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Area (ac)	CN	Description
7.674	86	<50% Grass cover, Poor, HSG C
9.817	77	Woods, Good, HSG D
1.497	98	Unconnected roofs, HSG C
18.988	82	Weighted Average
17.491		92.12% Pervious Area
1.497		7.88% Impervious Area
1.497		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.9	100	0.0500	0.07		Sheet Flow, SHEET FLOW Woods: Dense underbrush n= 0.800 P2= 3.75"
7.2	730	0.1151	1.70		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Woodland Kv= 5.0 fps
31.1	830	Total			

Subcatchment 7P: PROPOSED SUBCAT AREA 7

Hydrograph



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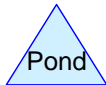
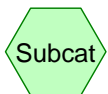
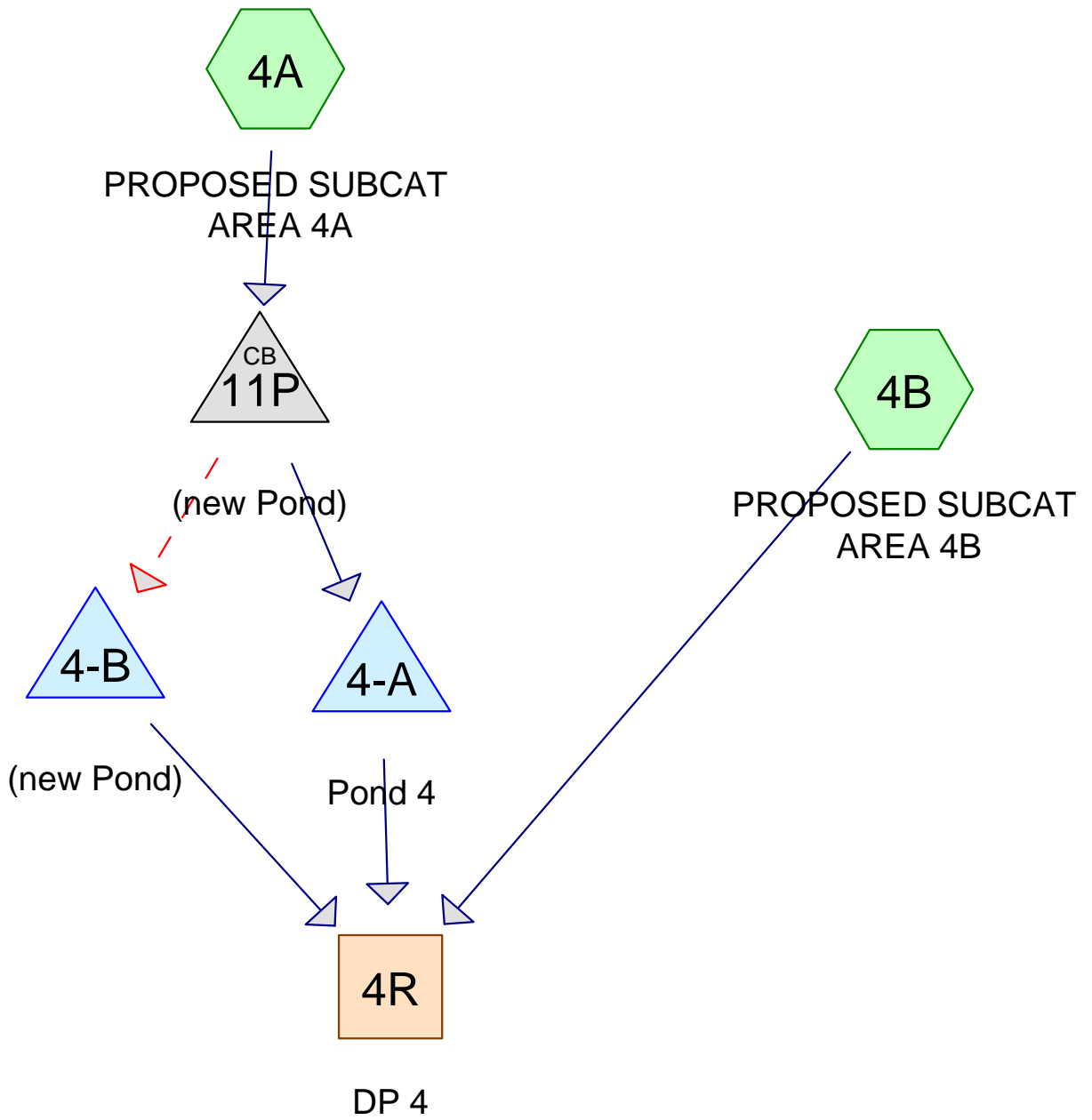
Post-Development Design Point 3 (Concord Phase 1)
Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

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Hydrograph for Subcatchment 7P: PROPOSED SUBCAT AREA 7

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	8.00	5.86	0.00
2.00	0.16	0.00	0.00	106.00	8.00	5.86	0.00
4.00	0.34	0.00	0.00	108.00	8.00	5.86	0.00
6.00	0.58	0.01	0.16	110.00	8.00	5.86	0.00
8.00	0.91	0.08	0.99	112.00	8.00	5.86	0.00
10.00	1.51	0.35	3.31	114.00	8.00	5.86	0.00
12.00	4.00	2.20	22.89	116.00	8.00	5.86	0.00
14.00	6.49	4.44	8.67	118.00	8.00	5.86	0.00
16.00	7.09	5.00	4.53	120.00	8.00	5.86	0.00
18.00	7.42	5.31	2.66				
20.00	7.66	5.53	1.99				
22.00	7.85	5.71	1.64				
24.00	8.00	5.86	1.31				
26.00	8.00	5.86	0.00				
28.00	8.00	5.86	0.00				
30.00	8.00	5.86	0.00				
32.00	8.00	5.86	0.00				
34.00	8.00	5.86	0.00				
36.00	8.00	5.86	0.00				
38.00	8.00	5.86	0.00				
40.00	8.00	5.86	0.00				
42.00	8.00	5.86	0.00				
44.00	8.00	5.86	0.00				
46.00	8.00	5.86	0.00				
48.00	8.00	5.86	0.00				
50.00	8.00	5.86	0.00				
52.00	8.00	5.86	0.00				
54.00	8.00	5.86	0.00				
56.00	8.00	5.86	0.00				
58.00	8.00	5.86	0.00				
60.00	8.00	5.86	0.00				
62.00	8.00	5.86	0.00				
64.00	8.00	5.86	0.00				
66.00	8.00	5.86	0.00				
68.00	8.00	5.86	0.00				
70.00	8.00	5.86	0.00				
72.00	8.00	5.86	0.00				
74.00	8.00	5.86	0.00				
76.00	8.00	5.86	0.00				
78.00	8.00	5.86	0.00				
80.00	8.00	5.86	0.00				
82.00	8.00	5.86	0.00				
84.00	8.00	5.86	0.00				
86.00	8.00	5.86	0.00				
88.00	8.00	5.86	0.00				
90.00	8.00	5.86	0.00				
92.00	8.00	5.86	0.00				
94.00	8.00	5.86	0.00				
96.00	8.00	5.86	0.00				
98.00	8.00	5.86	0.00				
100.00	8.00	5.86	0.00				
102.00	8.00	5.86	0.00				



Routing Diagram for 2012_05_21_Concord
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Summary for Pond 4-A: Pond 4

Inflow Area = 8.007 ac, 54.58% Impervious, Inflow Depth = 1.15" for 1-YR, 24-HR Storm event
 Inflow = 4.47 cfs @ 12.10 hrs, Volume= 0.769 af
 Outflow = 3.82 cfs @ 12.20 hrs, Volume= 0.767 af, Atten= 15%, Lag= 5.9 min
 Primary = 3.82 cfs @ 12.20 hrs, Volume= 0.767 af

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,345.20' Surf.Area= 6,148 sf Storage= 9,778 cf
 Peak Elev= 1,346.19' @ 12.20 hrs Surf.Area= 9,417 sf Storage= 17,468 cf (7,690 cf above start)

Plug-Flow detention time= 465.2 min calculated for 0.543 af (71% of inflow)
 Center-of-Mass det. time= 221.3 min (1,072.4 - 851.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,342.00'	39,487 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,342.00	813	174.0	0	0	813
1,343.00	1,815	213.0	1,281	1,281	2,030
1,344.00	3,738	345.0	2,719	4,000	7,898
1,345.00	5,540	376.0	4,610	8,610	9,712
1,346.00	8,899	576.0	7,153	15,763	24,871
1,347.00	11,855	607.0	10,342	26,105	27,849
1,348.00	14,969	639.0	13,382	39,487	31,083

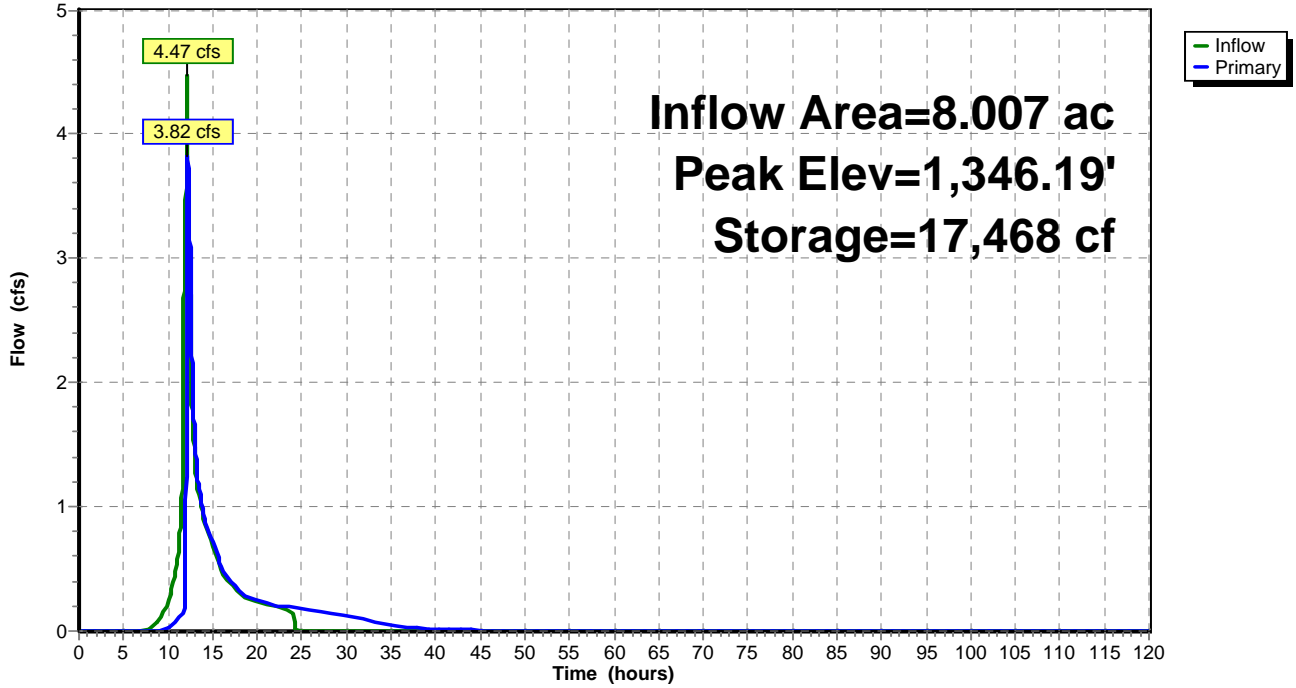
Device	Routing	Invert	Outlet Devices
#1	Primary	1,341.00'	36.0" Round Culvert L= 278.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,341.00' / 1,336.70' S= 0.0155 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	1,345.20'	3.0" Vert. Orifice/Grate C= 0.600
#3	Primary	1,346.00'	16.0' 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=3.82 cfs @ 12.20 hrs HW=1,346.19' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.22 cfs of 65.34 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.22 cfs @ 4.47 fps)
- 3=Broad-Crested Rectangular Weir (Weir Controls 3.60 cfs @ 1.21 fps)

Pond 4-A: Pond 4

Hydrograph



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Hydrograph for Pond 4-A: Pond 4

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	9,778	1,345.20	0.00
5.00	0.00	9,778	1,345.20	0.00
10.00	0.24	10,511	1,345.32	0.03
15.00	0.68	16,215	1,346.05	0.71
20.00	0.24	15,858	1,346.01	0.24
25.00	0.00	15,048	1,345.92	0.18
30.00	0.00	12,326	1,345.58	0.12
35.00	0.00	10,829	1,345.36	0.05
40.00	0.00	10,332	1,345.29	0.02
45.00	0.00	10,142	1,345.26	0.01
50.00	0.00	10,046	1,345.24	0.00
55.00	0.00	9,989	1,345.23	0.00
60.00	0.00	9,952	1,345.23	0.00
65.00	0.00	9,925	1,345.22	0.00
70.00	0.00	9,906	1,345.22	0.00
75.00	0.00	9,891	1,345.22	0.00
80.00	0.00	9,879	1,345.22	0.00
85.00	0.00	9,869	1,345.21	0.00
90.00	0.00	9,862	1,345.21	0.00
95.00	0.00	9,855	1,345.21	0.00
100.00	0.00	9,849	1,345.21	0.00
105.00	0.00	9,844	1,345.21	0.00
110.00	0.00	9,840	1,345.21	0.00
115.00	0.00	9,836	1,345.21	0.00
120.00	0.00	9,833	1,345.21	0.00

Summary for Pond 4-B: (new Pond)

Inflow = 8.98 cfs @ 12.11 hrs, Volume= 0.211 af
 Outflow = 1.50 cfs @ 12.45 hrs, Volume= 0.210 af, Atten= 83%, Lag= 20.6 min
 Primary = 1.50 cfs @ 12.45 hrs, Volume= 0.210 af

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,341.59' @ 12.45 hrs Surf.Area= 6,752 sf Storage= 7,845 cf

Plug-Flow detention time= 283.0 min calculated for 0.210 af (100% of inflow)
 Center-of-Mass det. time= 283.4 min (1,013.6 - 730.2)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,340.00'	19,821 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,340.00	3,213	421.0	0	0	3,213
1,341.00	5,408	456.0	4,263	4,263	5,695
1,342.00	7,772	489.0	6,554	10,818	8,221
1,343.00	10,293	520.0	9,003	19,821	10,761

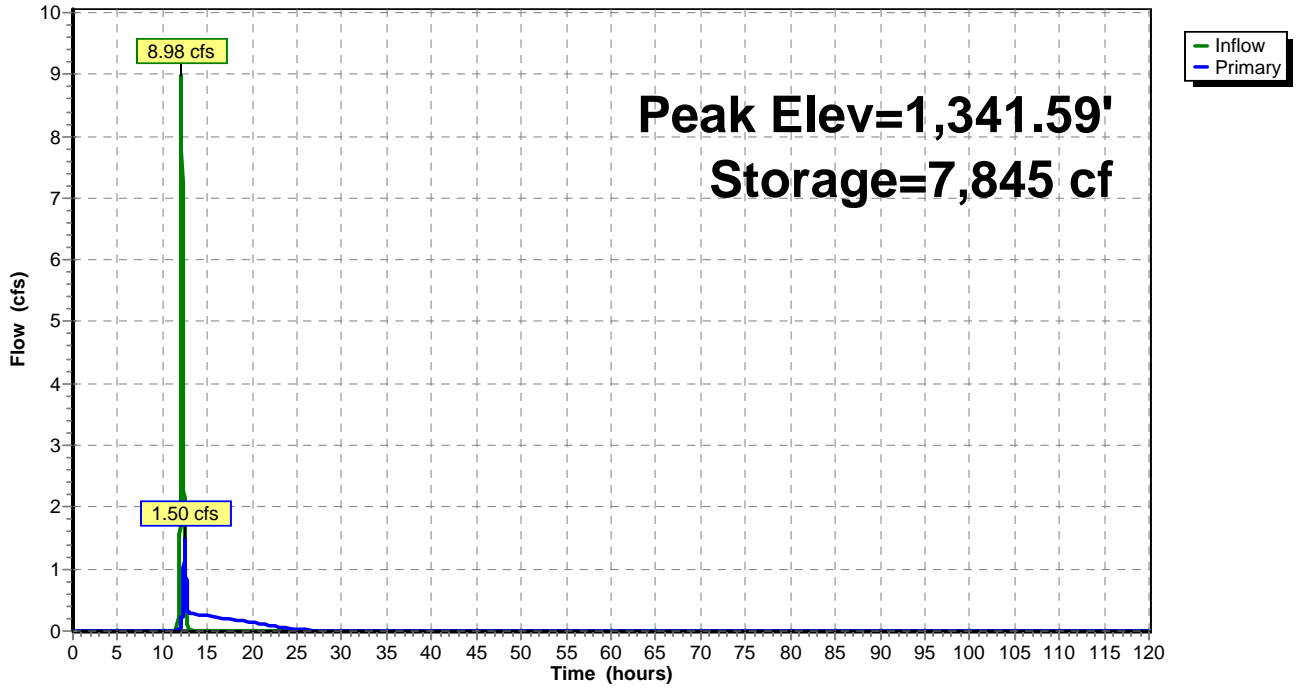
Device	Routing	Invert	Outlet Devices
#1	Primary	1,340.00'	36.0" Round Culvert L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,340.00' / 1,339.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	1,340.00'	3.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,341.50'	16.0' 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=1.50 cfs @ 12.45 hrs HW=1,341.59' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 1.50 cfs of 16.05 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.29 cfs @ 5.83 fps)
- 3=Broad-Crested Rectangular Weir (Weir Controls 1.21 cfs @ 0.84 fps)

Pond 4-B: (new Pond)

Hydrograph



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Post-Development Design Point 4 (Concord Phase 1)

Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

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Hydrograph for Pond 4-B: (new Pond)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	1,340.00	0.00
5.00	0.00	0	1,340.00	0.00
10.00	0.00	0	1,340.00	0.00
15.00	0.00	5,267	1,341.18	0.24
20.00	0.00	1,766	1,340.48	0.14
25.00	0.00	374	1,340.11	0.02
30.00	0.00	164	1,340.05	0.01
35.00	0.00	102	1,340.03	0.00
40.00	0.00	74	1,340.02	0.00
45.00	0.00	58	1,340.02	0.00
50.00	0.00	47	1,340.01	0.00
55.00	0.00	40	1,340.01	0.00
60.00	0.00	35	1,340.01	0.00
65.00	0.00	31	1,340.01	0.00
70.00	0.00	27	1,340.01	0.00
75.00	0.00	25	1,340.01	0.00
80.00	0.00	23	1,340.01	0.00
85.00	0.00	21	1,340.01	0.00
90.00	0.00	19	1,340.01	0.00
95.00	0.00	18	1,340.01	0.00
100.00	0.00	17	1,340.01	0.00
105.00	0.00	16	1,340.00	0.00
110.00	0.00	15	1,340.00	0.00
115.00	0.00	14	1,340.00	0.00
120.00	0.00	13	1,340.00	0.00

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Post-Development Design Point 4 (Concord Phase 1)
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"
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Summary for Subcatchment 4A: PROPOSED SUBCAT AREA 4A

Runoff = 13.45 cfs @ 12.10 hrs, Volume= 0.979 af, Depth= 1.47"

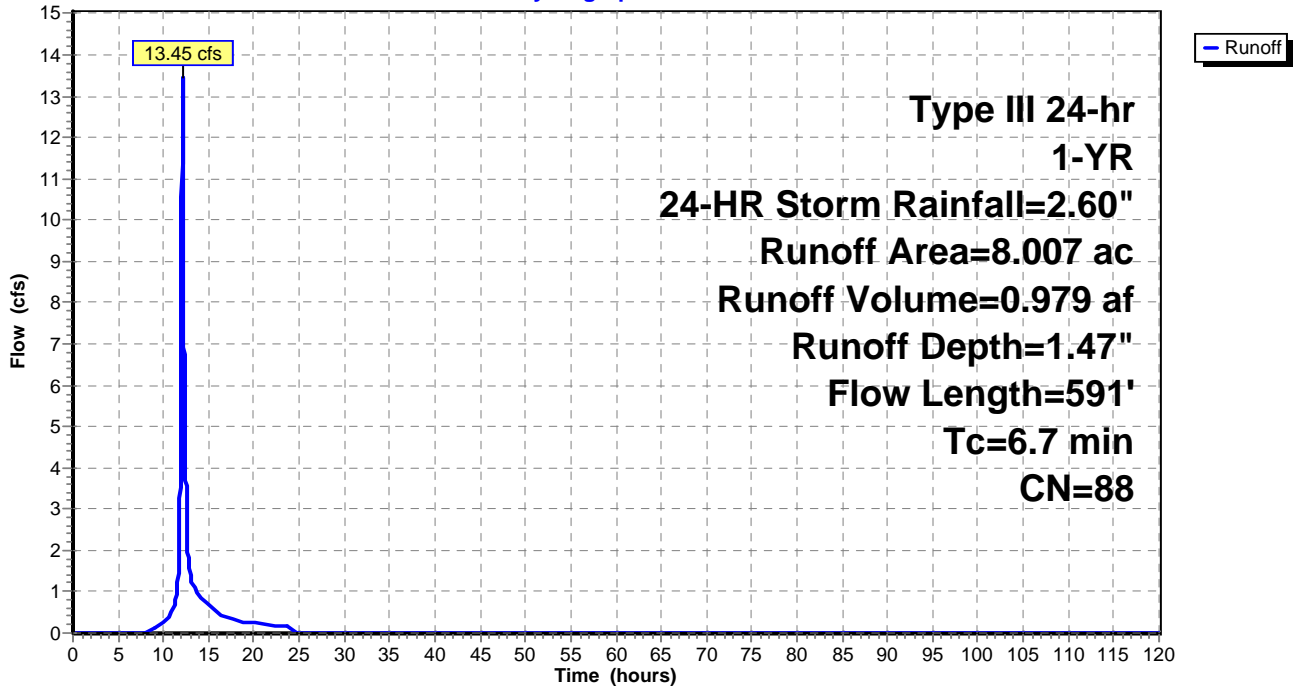
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

Area (ac)	CN	Description
1.805	74	>75% Grass cover, Good, HSG C
1.832	80	>75% Grass cover, Good, HSG D
0.373	98	Roofs, HSG D
3.997	98	Paved parking, HSG D
8.007	88	Weighted Average
3.637		45.42% Pervious Area
4.370		54.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	100	0.1040	0.36		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.75"
0.5	152	0.0890	4.80		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.1	152	0.0138	2.38		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Paved Kv= 20.3 fps
0.4	187	0.0320	8.11	6.37	Pipe Channel, CMP_Round 12" 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
6.7	591	Total			

Subcatchment 4A: PROPOSED SUBCAT AREA 4A

Hydrograph



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Hydrograph for Subcatchment 4A: PROPOSED SUBCAT AREA 4A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	2.60	1.47	0.00
2.00	0.05	0.00	0.00	106.00	2.60	1.47	0.00
4.00	0.11	0.00	0.00	108.00	2.60	1.47	0.00
6.00	0.19	0.00	0.00	110.00	2.60	1.47	0.00
8.00	0.30	0.00	0.01	112.00	2.60	1.47	0.00
10.00	0.49	0.03	0.25	114.00	2.60	1.47	0.00
12.00	1.30	0.44	7.42	116.00	2.60	1.47	0.00
14.00	2.11	1.05	0.88	118.00	2.60	1.47	0.00
16.00	2.30	1.22	0.48	120.00	2.60	1.47	0.00
18.00	2.41	1.31	0.29				
20.00	2.49	1.37	0.24				
22.00	2.55	1.42	0.20				
24.00	2.60	1.47	0.16				
26.00	2.60	1.47	0.00				
28.00	2.60	1.47	0.00				
30.00	2.60	1.47	0.00				
32.00	2.60	1.47	0.00				
34.00	2.60	1.47	0.00				
36.00	2.60	1.47	0.00				
38.00	2.60	1.47	0.00				
40.00	2.60	1.47	0.00				
42.00	2.60	1.47	0.00				
44.00	2.60	1.47	0.00				
46.00	2.60	1.47	0.00				
48.00	2.60	1.47	0.00				
50.00	2.60	1.47	0.00				
52.00	2.60	1.47	0.00				
54.00	2.60	1.47	0.00				
56.00	2.60	1.47	0.00				
58.00	2.60	1.47	0.00				
60.00	2.60	1.47	0.00				
62.00	2.60	1.47	0.00				
64.00	2.60	1.47	0.00				
66.00	2.60	1.47	0.00				
68.00	2.60	1.47	0.00				
70.00	2.60	1.47	0.00				
72.00	2.60	1.47	0.00				
74.00	2.60	1.47	0.00				
76.00	2.60	1.47	0.00				
78.00	2.60	1.47	0.00				
80.00	2.60	1.47	0.00				
82.00	2.60	1.47	0.00				
84.00	2.60	1.47	0.00				
86.00	2.60	1.47	0.00				
88.00	2.60	1.47	0.00				
90.00	2.60	1.47	0.00				
92.00	2.60	1.47	0.00				
94.00	2.60	1.47	0.00				
96.00	2.60	1.47	0.00				
98.00	2.60	1.47	0.00				
100.00	2.60	1.47	0.00				
102.00	2.60	1.47	0.00				

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Post-Development Design Point 4 (Concord Phase 1)
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"
 Printed 5/31/2012
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Summary for Subcatchment 4B: PROPOSED SUBCAT AREA 4B

Runoff = 4.77 cfs @ 12.43 hrs, Volume= 0.641 af, Depth= 0.67"

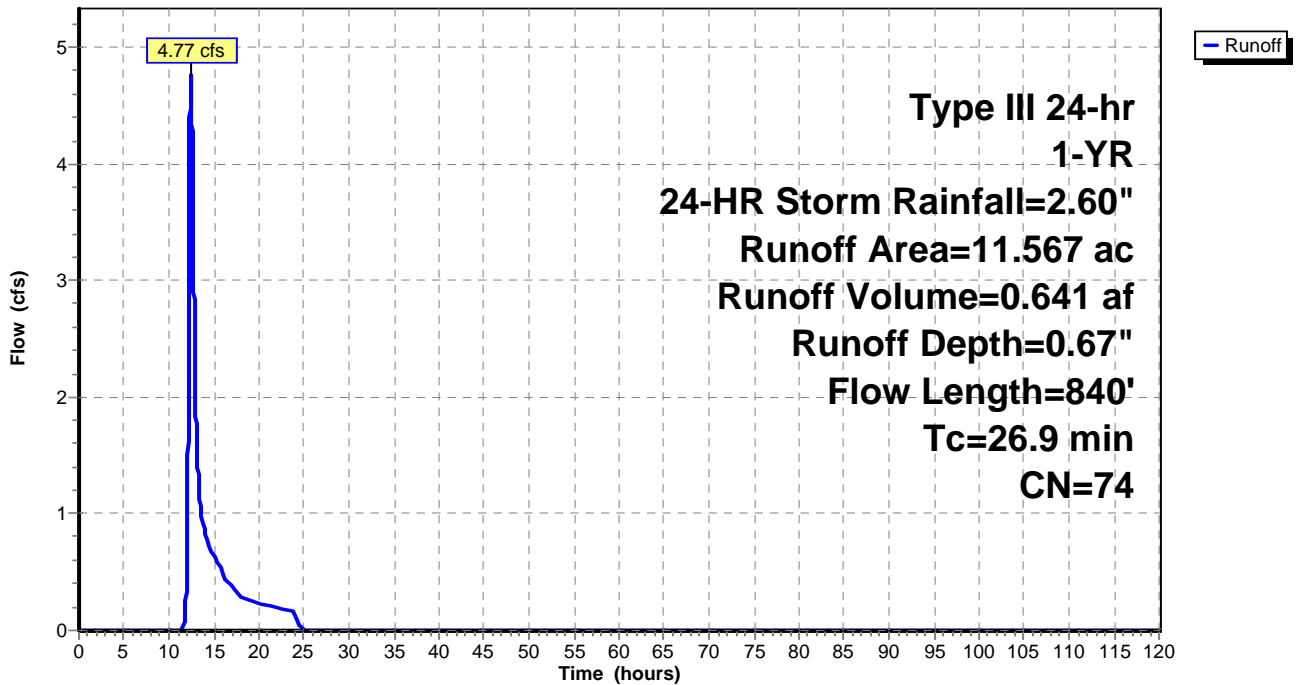
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

Area (ac)	CN	Description
2.916	74	>75% Grass cover, Good, HSG C
3.847	80	>75% Grass cover, Good, HSG D
4.804	70	Woods, Good, HSG C
11.567	74	Weighted Average
11.567		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0460	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.75"
12.7	740	0.0380	0.97		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
26.9	840	Total			

Subcatchment 4B: PROPOSED SUBCAT AREA 4B

Hydrograph



Hydrograph for Subcatchment 4B: PROPOSED SUBCAT AREA 4B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	2.60	0.67	0.00
2.00	0.05	0.00	0.00	106.00	2.60	0.67	0.00
4.00	0.11	0.00	0.00	108.00	2.60	0.67	0.00
6.00	0.19	0.00	0.00	110.00	2.60	0.67	0.00
8.00	0.30	0.00	0.00	112.00	2.60	0.67	0.00
10.00	0.49	0.00	0.00	114.00	2.60	0.67	0.00
12.00	1.30	0.09	0.66	116.00	2.60	0.67	0.00
14.00	2.11	0.40	0.85	118.00	2.60	0.67	0.00
16.00	2.30	0.50	0.49	120.00	2.60	0.67	0.00
18.00	2.41	0.56	0.30				
20.00	2.49	0.60	0.23				
22.00	2.55	0.64	0.19				
24.00	2.60	0.67	0.16				
26.00	2.60	0.67	0.00				
28.00	2.60	0.67	0.00				
30.00	2.60	0.67	0.00				
32.00	2.60	0.67	0.00				
34.00	2.60	0.67	0.00				
36.00	2.60	0.67	0.00				
38.00	2.60	0.67	0.00				
40.00	2.60	0.67	0.00				
42.00	2.60	0.67	0.00				
44.00	2.60	0.67	0.00				
46.00	2.60	0.67	0.00				
48.00	2.60	0.67	0.00				
50.00	2.60	0.67	0.00				
52.00	2.60	0.67	0.00				
54.00	2.60	0.67	0.00				
56.00	2.60	0.67	0.00				
58.00	2.60	0.67	0.00				
60.00	2.60	0.67	0.00				
62.00	2.60	0.67	0.00				
64.00	2.60	0.67	0.00				
66.00	2.60	0.67	0.00				
68.00	2.60	0.67	0.00				
70.00	2.60	0.67	0.00				
72.00	2.60	0.67	0.00				
74.00	2.60	0.67	0.00				
76.00	2.60	0.67	0.00				
78.00	2.60	0.67	0.00				
80.00	2.60	0.67	0.00				
82.00	2.60	0.67	0.00				
84.00	2.60	0.67	0.00				
86.00	2.60	0.67	0.00				
88.00	2.60	0.67	0.00				
90.00	2.60	0.67	0.00				
92.00	2.60	0.67	0.00				
94.00	2.60	0.67	0.00				
96.00	2.60	0.67	0.00				
98.00	2.60	0.67	0.00				
100.00	2.60	0.67	0.00				
102.00	2.60	0.67	0.00				

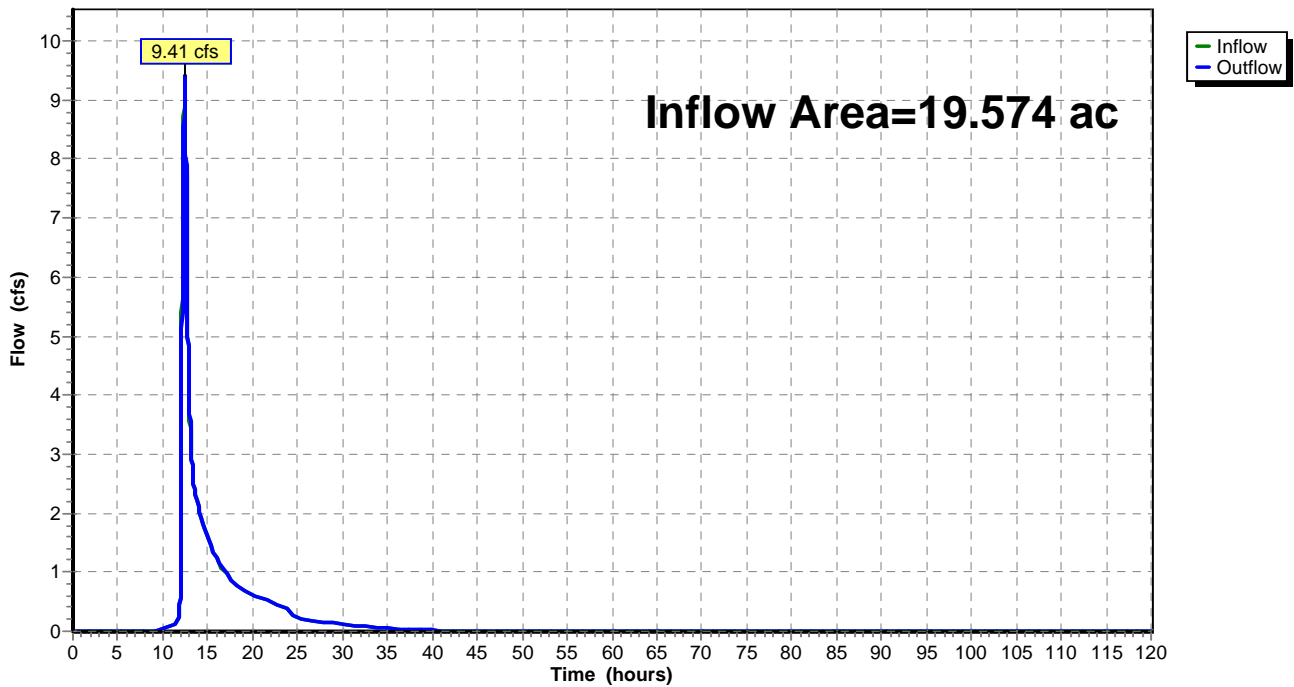
Summary for Reach 4R: DP 4

Inflow Area = 19.574 ac, 22.33% Impervious, Inflow Depth = 0.99" for 1-YR, 24-HR Storm event
Inflow = 9.41 cfs @ 12.43 hrs, Volume= 1.619 af
Outflow = 9.41 cfs @ 12.44 hrs, Volume= 1.619 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach 4R: DP 4

Hydrograph



Hydrograph for Reach 4R: DP 4

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.00		0.00
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.00		0.00	110.00	0.00		0.00
8.00	0.00		0.00	112.00	0.00		0.00
10.00	0.03		0.03	114.00	0.00		0.00
12.00	1.99		1.75	116.00	0.00		0.00
14.00	2.06		2.06	118.00	0.00		0.00
16.00	1.23		1.23	120.00	0.00		0.00
18.00	0.80		0.80				
20.00	0.62		0.62				
22.00	0.49		0.49				
24.00	0.39		0.39				
26.00	0.19		0.19				
28.00	0.15		0.15				
30.00	0.12		0.12				
32.00	0.09		0.09				
34.00	0.06		0.06				
36.00	0.04		0.04				
38.00	0.02		0.02				
40.00	0.02		0.02				
42.00	0.01		0.01				
44.00	0.01		0.01				
46.00	0.01		0.01				
48.00	0.01		0.01				
50.00	0.00		0.00				
52.00	0.00		0.00				
54.00	0.00		0.00				
56.00	0.00		0.00				
58.00	0.00		0.00				
60.00	0.00		0.00				
62.00	0.00		0.00				
64.00	0.00		0.00				
66.00	0.00		0.00				
68.00	0.00		0.00				
70.00	0.00		0.00				
72.00	0.00		0.00				
74.00	0.00		0.00				
76.00	0.00		0.00				
78.00	0.00		0.00				
80.00	0.00		0.00				
82.00	0.00		0.00				
84.00	0.00		0.00				
86.00	0.00		0.00				
88.00	0.00		0.00				
90.00	0.00		0.00				
92.00	0.00		0.00				
94.00	0.00		0.00				
96.00	0.00		0.00				
98.00	0.00		0.00				
100.00	0.00		0.00				
102.00	0.00		0.00				

Summary for Pond 11P: (new Pond)

Inflow Area = 8.007 ac, 54.58% Impervious, Inflow Depth = 1.47" for 1-YR, 24-HR Storm event
 Inflow = 13.45 cfs @ 12.10 hrs, Volume= 0.979 af
 Outflow = 13.45 cfs @ 12.11 hrs, Volume= 0.979 af, Atten= 0%, Lag= 0.6 min
 Primary = 4.47 cfs @ 12.10 hrs, Volume= 0.769 af
 Secondary = 8.98 cfs @ 12.11 hrs, Volume= 0.211 af

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Peak Elev= 1,347.55' @ 12.11 hrs

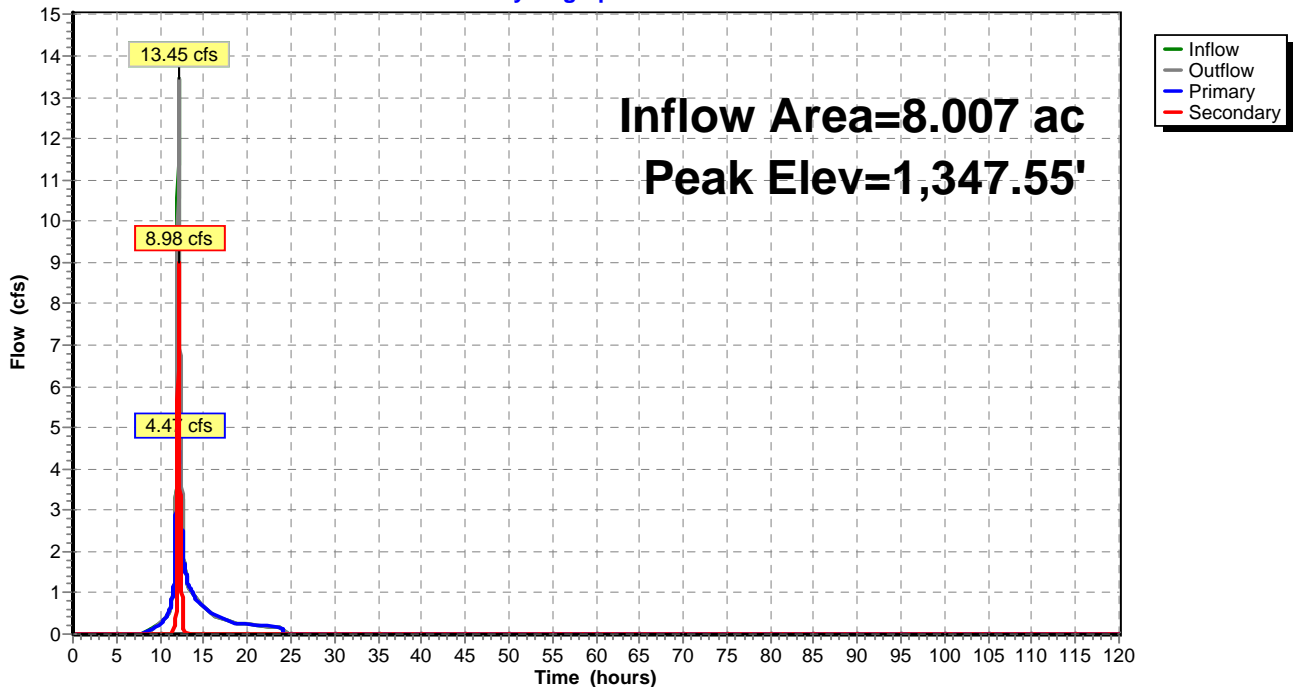
Device	Routing	Invert	Outlet Devices
#1	Primary	1,343.00'	12.0" Vert. Orifice/Grate C= 0.600
#2	Secondary	1,346.20'	24.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=4.46 cfs @ 12.10 hrs HW=1,347.55' TW=1,346.16' (Dynamic Tailwater)
 ↳ **1=Orifice/Grate** (Orifice Controls 4.46 cfs @ 5.68 fps)

Secondary OutFlow Max=8.97 cfs @ 12.11 hrs HW=1,347.55' TW=1,340.81' (Dynamic Tailwater)
 ↳ **2=Orifice/Grate** (Orifice Controls 8.97 cfs @ 3.96 fps)

Pond 11P: (new Pond)

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Hydrograph for Pond 11P: (new Pond)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	1,345.20	0.00	0.00	0.00
5.00	0.00	1,345.20	0.00	0.00	0.00
10.00	0.25	1,345.32	0.24	0.24	0.00
15.00	0.67	1,346.08	0.68	0.68	0.00
20.00	0.24	1,346.01	0.24	0.24	0.00
25.00	0.00	1,345.92	0.00	0.00	0.00
30.00	0.00	1,345.58	0.00	0.00	0.00
35.00	0.00	1,345.36	0.00	0.00	0.00
40.00	0.00	1,345.29	0.00	0.00	0.00
45.00	0.00	1,345.26	0.00	0.00	0.00
50.00	0.00	1,345.24	0.00	0.00	0.00
55.00	0.00	1,345.23	0.00	0.00	0.00
60.00	0.00	1,345.23	0.00	0.00	0.00
65.00	0.00	1,345.22	0.00	0.00	0.00
70.00	0.00	1,345.22	0.00	0.00	0.00
75.00	0.00	1,345.22	0.00	0.00	0.00
80.00	0.00	1,345.22	0.00	0.00	0.00
85.00	0.00	1,345.21	0.00	0.00	0.00
90.00	0.00	1,345.21	0.00	0.00	0.00
95.00	0.00	1,345.21	0.00	0.00	0.00
100.00	0.00	1,345.21	0.00	0.00	0.00
105.00	0.00	1,345.21	0.00	0.00	0.00
110.00	0.00	1,345.21	0.00	0.00	0.00
115.00	0.00	1,345.21	0.00	0.00	0.00
120.00	0.00	1,345.21	0.00	0.00	0.00

Summary for Pond 4-A: Pond 4

Inflow Area = 8.007 ac, 54.58% Impervious, Inflow Depth = 2.85" for 10-YR, 24-HR Storm event
 Inflow = 8.82 cfs @ 12.10 hrs, Volume= 1.902 af
 Outflow = 7.81 cfs @ 12.16 hrs, Volume= 1.901 af, Atten= 11%, Lag= 3.2 min
 Primary = 7.81 cfs @ 12.16 hrs, Volume= 1.901 af

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,345.20' Surf.Area= 6,148 sf Storage= 9,778 cf
 Peak Elev= 1,346.30' @ 12.16 hrs Surf.Area= 9,746 sf Storage= 18,573 cf (8,795 cf above start)

Plug-Flow detention time= 213.2 min calculated for 1.677 af (88% of inflow)
 Center-of-Mass det. time= 109.3 min (939.7 - 830.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,342.00'	39,487 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,342.00	813	174.0	0	0	813
1,343.00	1,815	213.0	1,281	1,281	2,030
1,344.00	3,738	345.0	2,719	4,000	7,898
1,345.00	5,540	376.0	4,610	8,610	9,712
1,346.00	8,899	576.0	7,153	15,763	24,871
1,347.00	11,855	607.0	10,342	26,105	27,849
1,348.00	14,969	639.0	13,382	39,487	31,083

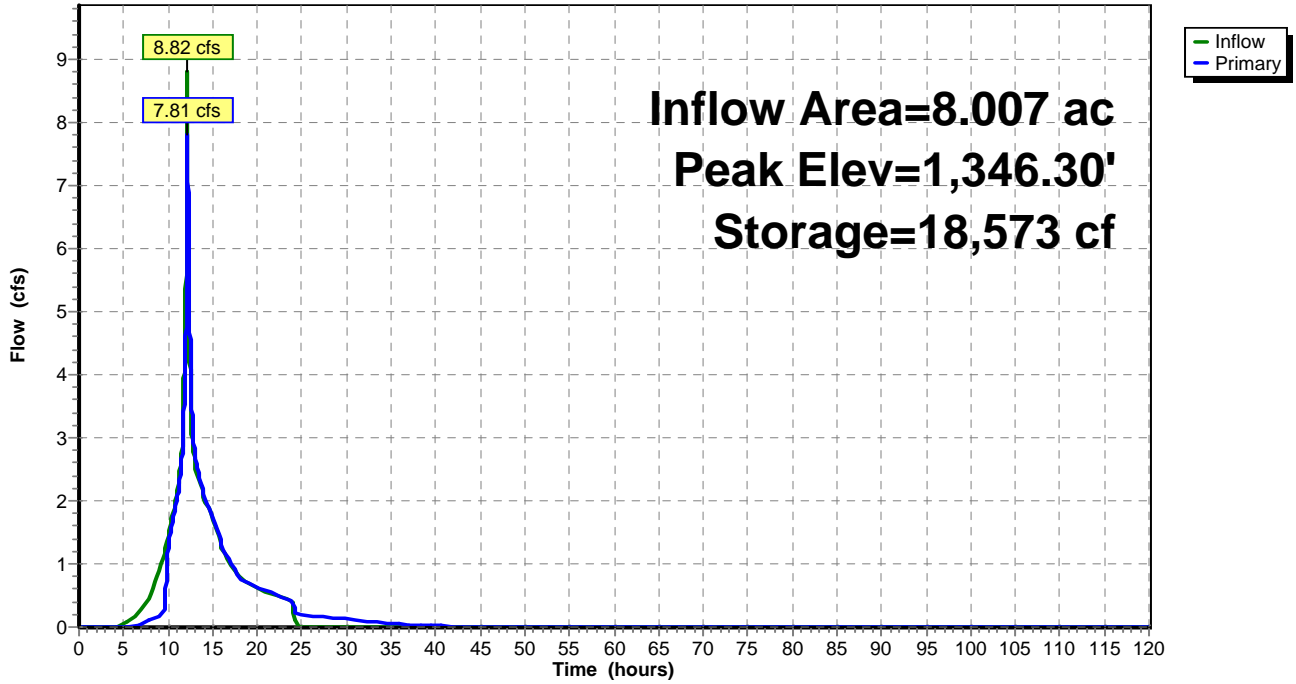
Device	Routing	Invert	Outlet Devices
#1	Primary	1,341.00'	36.0" Round Culvert L= 278.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,341.00' / 1,336.70' S= 0.0155 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	1,345.20'	3.0" Vert. Orifice/Gate C= 0.600
#3	Primary	1,346.00'	16.0' 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=7.81 cfs @ 12.16 hrs HW=1,346.30' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.23 cfs of 66.36 cfs potential flow)
- 2=Orifice/Gate (Orifice Controls 0.23 cfs @ 4.76 fps)
- 3=Broad-Crested Rectangular Weir (Weir Controls 7.57 cfs @ 1.57 fps)

Pond 4-A: Pond 4

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Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Pond 4-A: Pond 4

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	9,778	1,345.20	0.00
5.00	0.06	9,846	1,345.21	0.00
10.00	1.41	16,501	1,346.08	1.25
15.00	1.71	16,722	1,346.11	1.75
20.00	0.61	16,165	1,346.04	0.62
25.00	0.00	15,339	1,345.95	0.19
30.00	0.00	12,518	1,345.60	0.12
35.00	0.00	10,908	1,345.38	0.05
40.00	0.00	10,357	1,345.29	0.02
45.00	0.00	10,153	1,345.26	0.01
50.00	0.00	10,052	1,345.24	0.00
55.00	0.00	9,993	1,345.23	0.00
60.00	0.00	9,954	1,345.23	0.00
65.00	0.00	9,927	1,345.22	0.00
70.00	0.00	9,907	1,345.22	0.00
75.00	0.00	9,892	1,345.22	0.00
80.00	0.00	9,880	1,345.22	0.00
85.00	0.00	9,870	1,345.21	0.00
90.00	0.00	9,862	1,345.21	0.00
95.00	0.00	9,855	1,345.21	0.00
100.00	0.00	9,850	1,345.21	0.00
105.00	0.00	9,845	1,345.21	0.00
110.00	0.00	9,840	1,345.21	0.00
115.00	0.00	9,836	1,345.21	0.00
120.00	0.00	9,833	1,345.21	0.00

Summary for Pond 4-B: (new Pond)

Inflow = 32.13 cfs @ 12.10 hrs, Volume= 1.184 af
 Outflow = 28.09 cfs @ 12.15 hrs, Volume= 1.184 af, Atten= 13%, Lag= 3.0 min
 Primary = 28.09 cfs @ 12.15 hrs, Volume= 1.184 af

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,342.26' @ 12.15 hrs Surf.Area= 8,388 sf Storage= 12,899 cf

Plug-Flow detention time= 73.3 min calculated for 1.184 af (100% of inflow)
 Center-of-Mass det. time= 73.3 min (805.6 - 732.4)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,340.00'	19,821 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,340.00	3,213	421.0	0	0	3,213
1,341.00	5,408	456.0	4,263	4,263	5,695
1,342.00	7,772	489.0	6,554	10,818	8,221
1,343.00	10,293	520.0	9,003	19,821	10,761

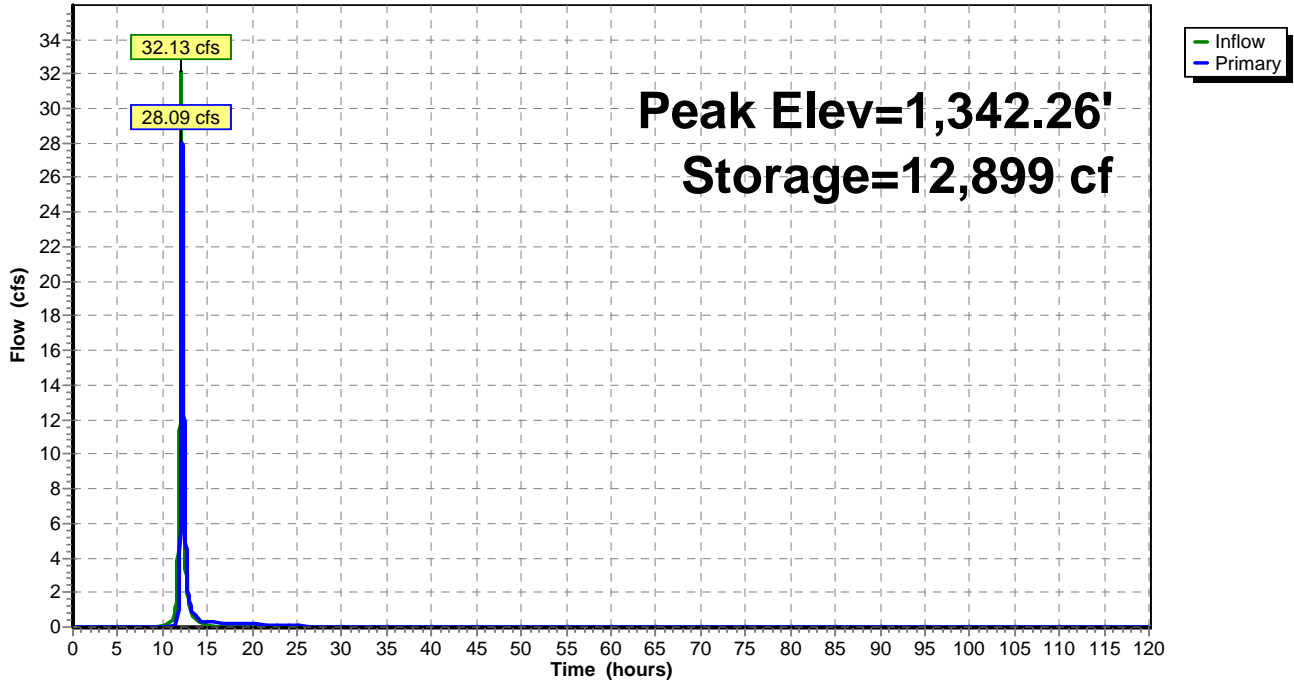
Device	Routing	Invert	Outlet Devices
#1	Primary	1,340.00'	36.0" Round Culvert L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,340.00' / 1,339.00' S= 0.0100 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	1,340.00'	3.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,341.50'	16.0' 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=28.08 cfs @ 12.15 hrs HW=1,342.26' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Barrel Controls 28.08 cfs @ 6.83 fps)
- 2=Orifice/Grate (Passes < 0.35 cfs potential flow)
- 3=Broad-Crested Rectangular Weir (Passes < 34.27 cfs potential flow)

Pond 4-B: (new Pond)

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Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Pond 4-B: (new Pond)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	1,340.00	0.00
5.00	0.00	0	1,340.00	0.00
10.00	0.00	0	1,340.00	0.00
15.00	0.08	6,926	1,341.45	0.27
20.00	0.00	2,869	1,340.73	0.18
25.00	0.00	635	1,340.19	0.06
30.00	0.00	210	1,340.06	0.01
35.00	0.00	119	1,340.04	0.00
40.00	0.00	83	1,340.03	0.00
45.00	0.00	63	1,340.02	0.00
50.00	0.00	51	1,340.02	0.00
55.00	0.00	42	1,340.01	0.00
60.00	0.00	37	1,340.01	0.00
65.00	0.00	32	1,340.01	0.00
70.00	0.00	29	1,340.01	0.00
75.00	0.00	26	1,340.01	0.00
80.00	0.00	23	1,340.01	0.00
85.00	0.00	21	1,340.01	0.00
90.00	0.00	20	1,340.01	0.00
95.00	0.00	18	1,340.01	0.00
100.00	0.00	17	1,340.01	0.00
105.00	0.00	16	1,340.00	0.00
110.00	0.00	15	1,340.00	0.00
115.00	0.00	14	1,340.00	0.00
120.00	0.00	14	1,340.00	0.00

Summary for Subcatchment 4A: PROPOSED SUBCAT AREA 4A

Runoff = 40.94 cfs @ 12.09 hrs, Volume= 3.087 af, Depth= 4.63"

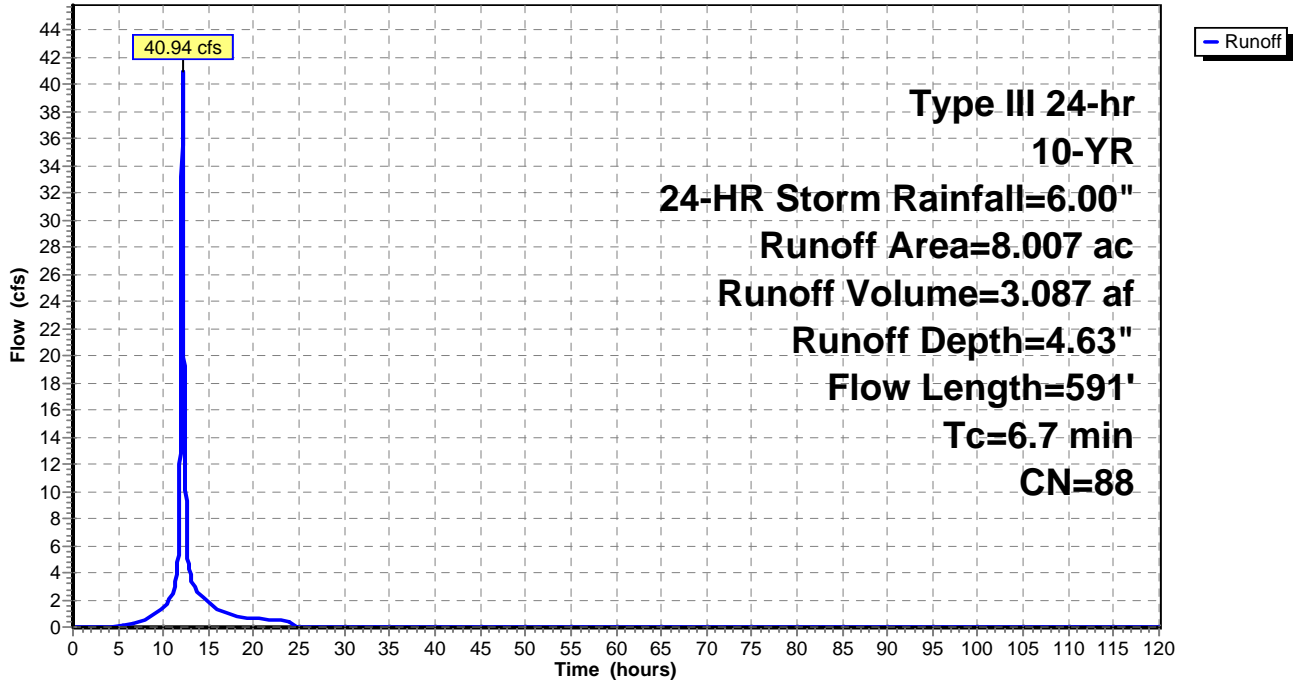
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

Area (ac)	CN	Description
1.805	74	>75% Grass cover, Good, HSG C
1.832	80	>75% Grass cover, Good, HSG D
0.373	98	Roofs, HSG D
3.997	98	Paved parking, HSG D
8.007	88	Weighted Average
3.637		45.42% Pervious Area
4.370		54.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	100	0.1040	0.36		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.75"
0.5	152	0.0890	4.80		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.1	152	0.0138	2.38		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Paved Kv= 20.3 fps
0.4	187	0.0320	8.11	6.37	Pipe Channel, CMP_Round 12" 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
6.7	591	Total			

Subcatchment 4A: PROPOSED SUBCAT AREA 4A

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Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Subcatchment 4A: PROPOSED SUBCAT AREA 4A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	6.00	4.63	0.00
2.00	0.12	0.00	0.00	106.00	6.00	4.63	0.00
4.00	0.26	0.00	0.00	108.00	6.00	4.63	0.00
6.00	0.43	0.02	0.14	110.00	6.00	4.63	0.00
8.00	0.68	0.10	0.49	112.00	6.00	4.63	0.00
10.00	1.13	0.33	1.42	114.00	6.00	4.63	0.00
12.00	3.00	1.82	23.99	116.00	6.00	4.63	0.00
14.00	4.87	3.54	2.36	118.00	6.00	4.63	0.00
16.00	5.32	3.97	1.26	120.00	6.00	4.63	0.00
18.00	5.57	4.21	0.77				
20.00	5.74	4.38	0.61				
22.00	5.88	4.51	0.51				
24.00	6.00	4.63	0.40				
26.00	6.00	4.63	0.00				
28.00	6.00	4.63	0.00				
30.00	6.00	4.63	0.00				
32.00	6.00	4.63	0.00				
34.00	6.00	4.63	0.00				
36.00	6.00	4.63	0.00				
38.00	6.00	4.63	0.00				
40.00	6.00	4.63	0.00				
42.00	6.00	4.63	0.00				
44.00	6.00	4.63	0.00				
46.00	6.00	4.63	0.00				
48.00	6.00	4.63	0.00				
50.00	6.00	4.63	0.00				
52.00	6.00	4.63	0.00				
54.00	6.00	4.63	0.00				
56.00	6.00	4.63	0.00				
58.00	6.00	4.63	0.00				
60.00	6.00	4.63	0.00				
62.00	6.00	4.63	0.00				
64.00	6.00	4.63	0.00				
66.00	6.00	4.63	0.00				
68.00	6.00	4.63	0.00				
70.00	6.00	4.63	0.00				
72.00	6.00	4.63	0.00				
74.00	6.00	4.63	0.00				
76.00	6.00	4.63	0.00				
78.00	6.00	4.63	0.00				
80.00	6.00	4.63	0.00				
82.00	6.00	4.63	0.00				
84.00	6.00	4.63	0.00				
86.00	6.00	4.63	0.00				
88.00	6.00	4.63	0.00				
90.00	6.00	4.63	0.00				
92.00	6.00	4.63	0.00				
94.00	6.00	4.63	0.00				
96.00	6.00	4.63	0.00				
98.00	6.00	4.63	0.00				
100.00	6.00	4.63	0.00				
102.00	6.00	4.63	0.00				

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Post-Development Design Point 4 (Concord Phase 1)
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Summary for Subcatchment 4B: PROPOSED SUBCAT AREA 4B

Runoff = 25.59 cfs @ 12.38 hrs, Volume= 3.070 af, Depth= 3.18"

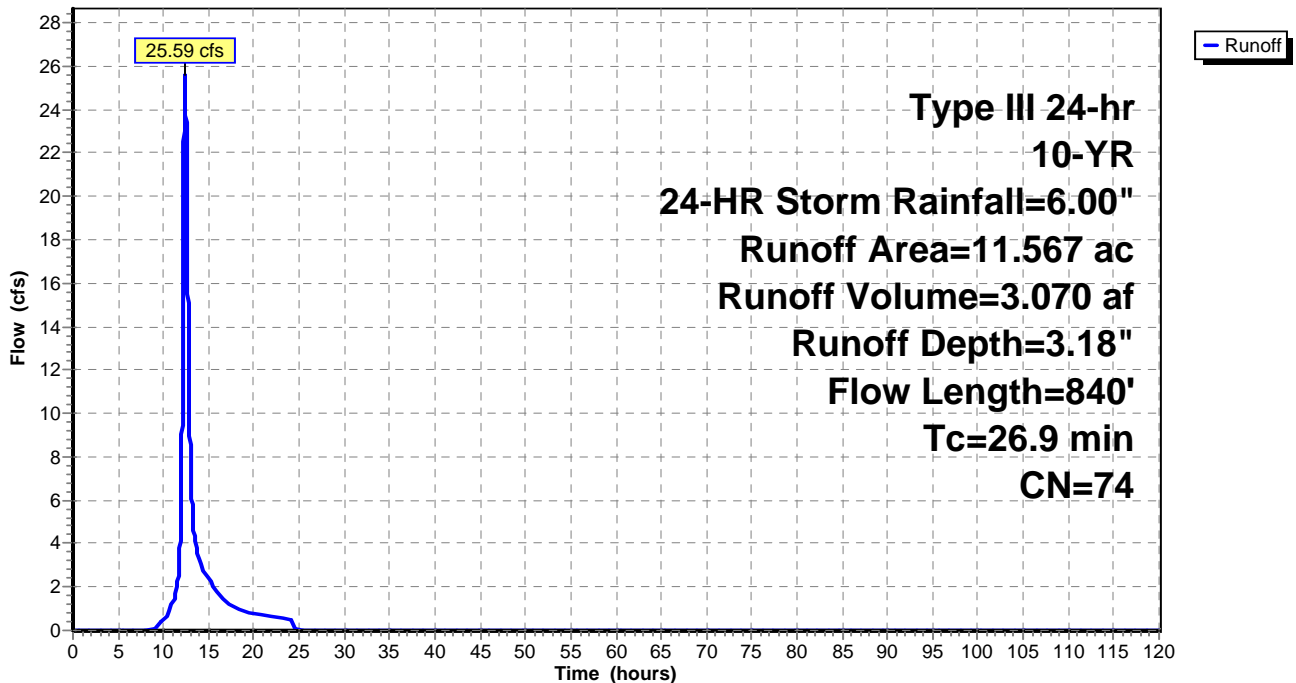
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

Area (ac)	CN	Description
2.916	74	>75% Grass cover, Good, HSG C
3.847	80	>75% Grass cover, Good, HSG D
4.804	70	Woods, Good, HSG C
11.567	74	Weighted Average
11.567		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0460	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.75"
12.7	740	0.0380	0.97		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
26.9	840	Total			

Subcatchment 4B: PROPOSED SUBCAT AREA 4B

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Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Subcatchment 4B: PROPOSED SUBCAT AREA 4B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	6.00	3.18	0.00
2.00	0.12	0.00	0.00	106.00	6.00	3.18	0.00
4.00	0.26	0.00	0.00	108.00	6.00	3.18	0.00
6.00	0.43	0.00	0.00	110.00	6.00	3.18	0.00
8.00	0.68	0.00	0.00	112.00	6.00	3.18	0.00
10.00	1.13	0.05	0.49	114.00	6.00	3.18	0.00
12.00	3.00	0.91	7.66	116.00	6.00	3.18	0.00
14.00	4.87	2.26	3.24	118.00	6.00	3.18	0.00
16.00	5.32	2.62	1.74	120.00	6.00	3.18	0.00
18.00	5.57	2.83	1.04				
20.00	5.74	2.97	0.79				
22.00	5.88	3.09	0.66				
24.00	6.00	3.18	0.53				
26.00	6.00	3.18	0.00				
28.00	6.00	3.18	0.00				
30.00	6.00	3.18	0.00				
32.00	6.00	3.18	0.00				
34.00	6.00	3.18	0.00				
36.00	6.00	3.18	0.00				
38.00	6.00	3.18	0.00				
40.00	6.00	3.18	0.00				
42.00	6.00	3.18	0.00				
44.00	6.00	3.18	0.00				
46.00	6.00	3.18	0.00				
48.00	6.00	3.18	0.00				
50.00	6.00	3.18	0.00				
52.00	6.00	3.18	0.00				
54.00	6.00	3.18	0.00				
56.00	6.00	3.18	0.00				
58.00	6.00	3.18	0.00				
60.00	6.00	3.18	0.00				
62.00	6.00	3.18	0.00				
64.00	6.00	3.18	0.00				
66.00	6.00	3.18	0.00				
68.00	6.00	3.18	0.00				
70.00	6.00	3.18	0.00				
72.00	6.00	3.18	0.00				
74.00	6.00	3.18	0.00				
76.00	6.00	3.18	0.00				
78.00	6.00	3.18	0.00				
80.00	6.00	3.18	0.00				
82.00	6.00	3.18	0.00				
84.00	6.00	3.18	0.00				
86.00	6.00	3.18	0.00				
88.00	6.00	3.18	0.00				
90.00	6.00	3.18	0.00				
92.00	6.00	3.18	0.00				
94.00	6.00	3.18	0.00				
96.00	6.00	3.18	0.00				
98.00	6.00	3.18	0.00				
100.00	6.00	3.18	0.00				
102.00	6.00	3.18	0.00				

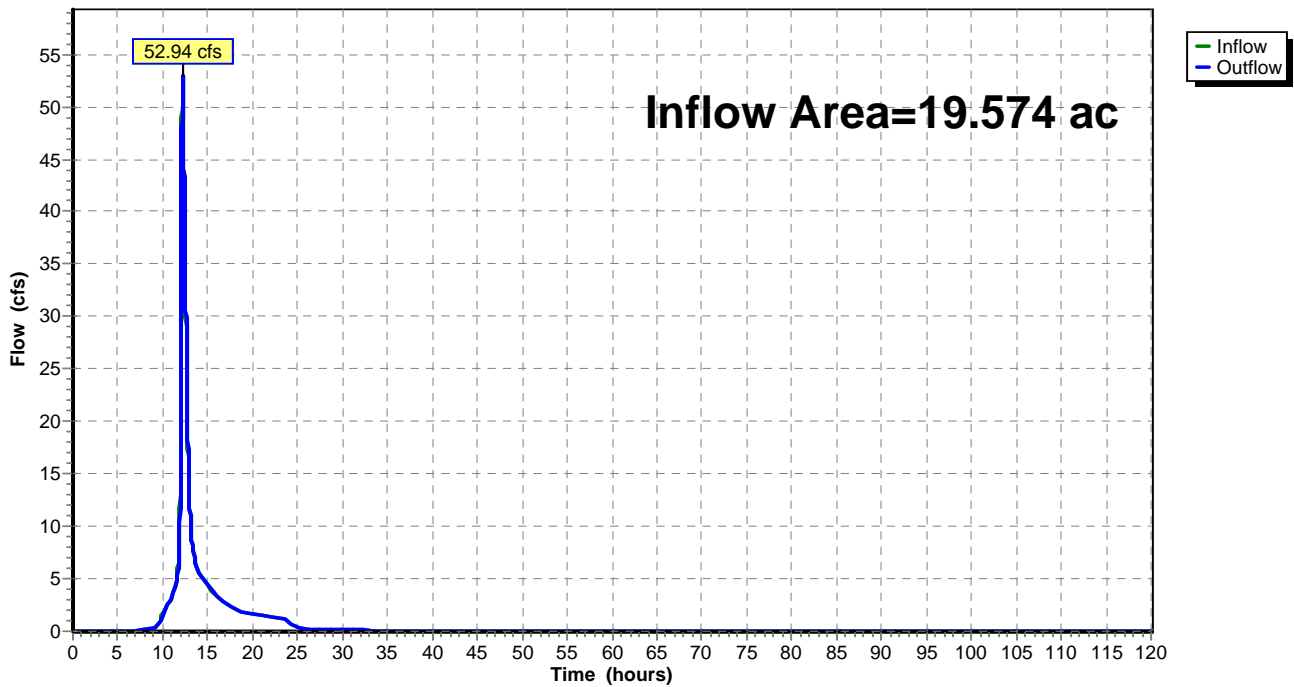
Summary for Reach 4R: DP 4

Inflow Area = 19.574 ac, 22.33% Impervious, Inflow Depth = 3.77" for 10-YR, 24-HR Storm event
Inflow = 52.94 cfs @ 12.21 hrs, Volume= 6.155 af
Outflow = 52.94 cfs @ 12.22 hrs, Volume= 6.155 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach 4R: DP 4

Hydrograph



Hydrograph for Reach 4R: DP 4

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.00		0.00
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.01		0.01	110.00	0.00		0.00
8.00	0.11		0.11	112.00	0.00		0.00
10.00	1.75		1.73	114.00	0.00		0.00
12.00	24.03		22.62	116.00	0.00		0.00
14.00	5.76		5.78	118.00	0.00		0.00
16.00	3.33		3.34	120.00	0.00		0.00
18.00	2.07		2.07				
20.00	1.60		1.60				
22.00	1.31		1.31				
24.00	1.03		1.03				
26.00	0.21		0.21				
28.00	0.17		0.17				
30.00	0.13		0.13				
32.00	0.10		0.10				
34.00	0.07		0.07				
36.00	0.04		0.04				
38.00	0.03		0.03				
40.00	0.02		0.02				
42.00	0.01		0.01				
44.00	0.01		0.01				
46.00	0.01		0.01				
48.00	0.01		0.01				
50.00	0.00		0.00				
52.00	0.00		0.00				
54.00	0.00		0.00				
56.00	0.00		0.00				
58.00	0.00		0.00				
60.00	0.00		0.00				
62.00	0.00		0.00				
64.00	0.00		0.00				
66.00	0.00		0.00				
68.00	0.00		0.00				
70.00	0.00		0.00				
72.00	0.00		0.00				
74.00	0.00		0.00				
76.00	0.00		0.00				
78.00	0.00		0.00				
80.00	0.00		0.00				
82.00	0.00		0.00				
84.00	0.00		0.00				
86.00	0.00		0.00				
88.00	0.00		0.00				
90.00	0.00		0.00				
92.00	0.00		0.00				
94.00	0.00		0.00				
96.00	0.00		0.00				
98.00	0.00		0.00				
100.00	0.00		0.00				
102.00	0.00		0.00				

Summary for Pond 11P: (new Pond)

Inflow Area = 8.007 ac, 54.58% Impervious, Inflow Depth = 4.63" for 10-YR, 24-HR Storm event
 Inflow = 40.94 cfs @ 12.09 hrs, Volume= 3.087 af
 Outflow = 40.94 cfs @ 12.10 hrs, Volume= 3.087 af, Atten= 0%, Lag= 0.6 min
 Primary = 8.82 cfs @ 12.10 hrs, Volume= 1.902 af
 Secondary = 32.13 cfs @ 12.10 hrs, Volume= 1.184 af

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,351.71' @ 12.10 hrs

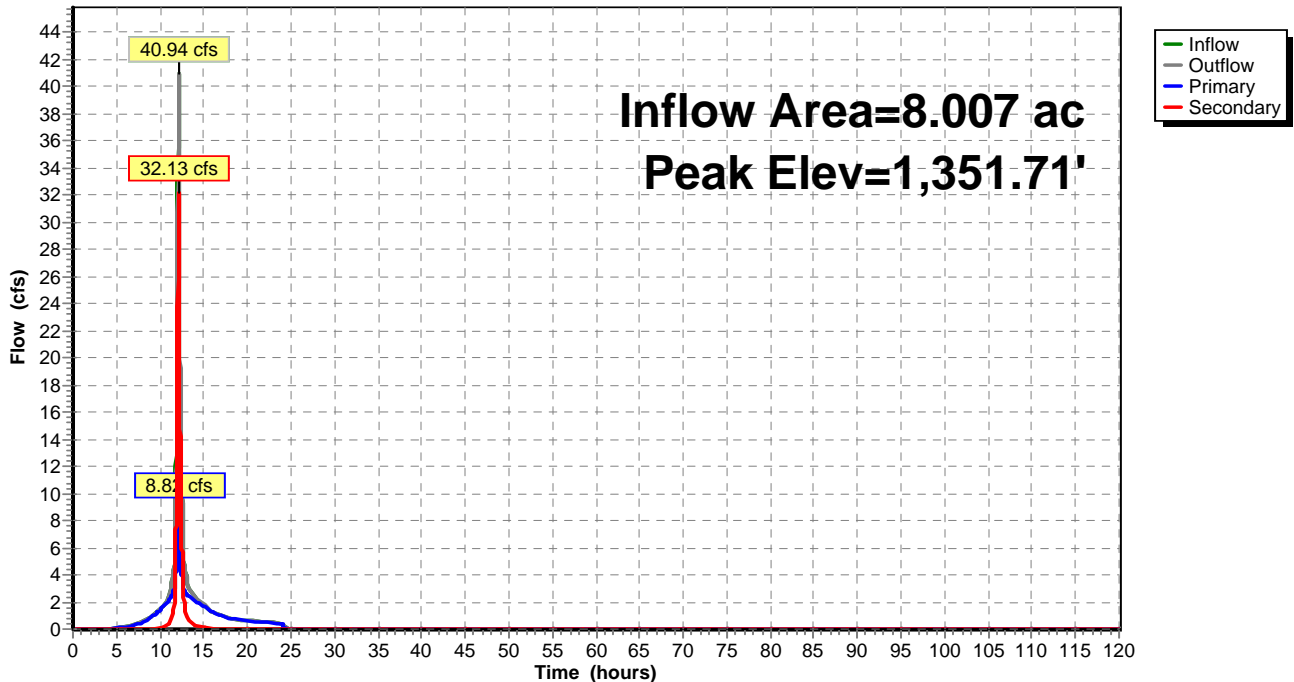
Device	Routing	Invert	Outlet Devices
#1	Primary	1,343.00'	12.0" Vert. Orifice/Grate C= 0.600
#2	Secondary	1,346.20'	24.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=8.80 cfs @ 12.10 hrs HW=1,351.70' TW=1,346.28' (Dynamic Tailwater)
 ↳1=Orifice/Grate (Orifice Controls 8.80 cfs @ 11.20 fps)

Secondary OutFlow Max=32.07 cfs @ 12.10 hrs HW=1,351.70' TW=1,342.18' (Dynamic Tailwater)
 ↳2=Orifice/Grate (Orifice Controls 32.07 cfs @ 10.21 fps)

Pond 11P: (new Pond)

Hydrograph



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Post-Development Design Point 4 (Concord Phase 1)

Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Pond 11P: (new Pond)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	1,345.20	0.00	0.00	0.00
5.00	0.06	1,345.21	0.06	0.06	0.00
10.00	1.42	1,346.22	1.42	1.41	0.00
15.00	1.78	1,346.31	1.79	1.71	0.08
20.00	0.61	1,346.07	0.61	0.61	0.00
25.00	0.00	1,345.95	0.00	0.00	0.00
30.00	0.00	1,345.60	0.00	0.00	0.00
35.00	0.00	1,345.38	0.00	0.00	0.00
40.00	0.00	1,345.29	0.00	0.00	0.00
45.00	0.00	1,345.26	0.00	0.00	0.00
50.00	0.00	1,345.24	0.00	0.00	0.00
55.00	0.00	1,345.23	0.00	0.00	0.00
60.00	0.00	1,345.23	0.00	0.00	0.00
65.00	0.00	1,345.22	0.00	0.00	0.00
70.00	0.00	1,345.22	0.00	0.00	0.00
75.00	0.00	1,345.22	0.00	0.00	0.00
80.00	0.00	1,345.22	0.00	0.00	0.00
85.00	0.00	1,345.21	0.00	0.00	0.00
90.00	0.00	1,345.21	0.00	0.00	0.00
95.00	0.00	1,345.21	0.00	0.00	0.00
100.00	0.00	1,345.21	0.00	0.00	0.00
105.00	0.00	1,345.21	0.00	0.00	0.00
110.00	0.00	1,345.21	0.00	0.00	0.00
115.00	0.00	1,345.21	0.00	0.00	0.00
120.00	0.00	1,345.21	0.00	0.00	0.00

Summary for Pond 4-A: Pond 4

Inflow Area = 8.007 ac, 54.58% Impervious, Inflow Depth = 3.72" for 100-YR, 24-HR Storm event
 Inflow = 11.84 cfs @ 12.10 hrs, Volume= 2.484 af
 Outflow = 10.51 cfs @ 12.15 hrs, Volume= 2.483 af, Atten= 11%, Lag= 3.0 min
 Primary = 10.51 cfs @ 12.15 hrs, Volume= 2.483 af

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,345.20' Surf.Area= 6,148 sf Storage= 9,778 cf
 Peak Elev= 1,346.37' @ 12.15 hrs Surf.Area= 9,932 sf Storage= 19,207 cf (9,429 cf above start)

Plug-Flow detention time= 174.9 min calculated for 2.258 af (91% of inflow)
 Center-of-Mass det. time= 89.7 min (911.1 - 821.4)

Volume	Invert	Avail.Storage	Storage Description			
#1	1,342.00'	39,487 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
1,342.00	813	174.0	0	0	813	
1,343.00	1,815	213.0	1,281	1,281	2,030	
1,344.00	3,738	345.0	2,719	4,000	7,898	
1,345.00	5,540	376.0	4,610	8,610	9,712	
1,346.00	8,899	576.0	7,153	15,763	24,871	
1,347.00	11,855	607.0	10,342	26,105	27,849	
1,348.00	14,969	639.0	13,382	39,487	31,083	

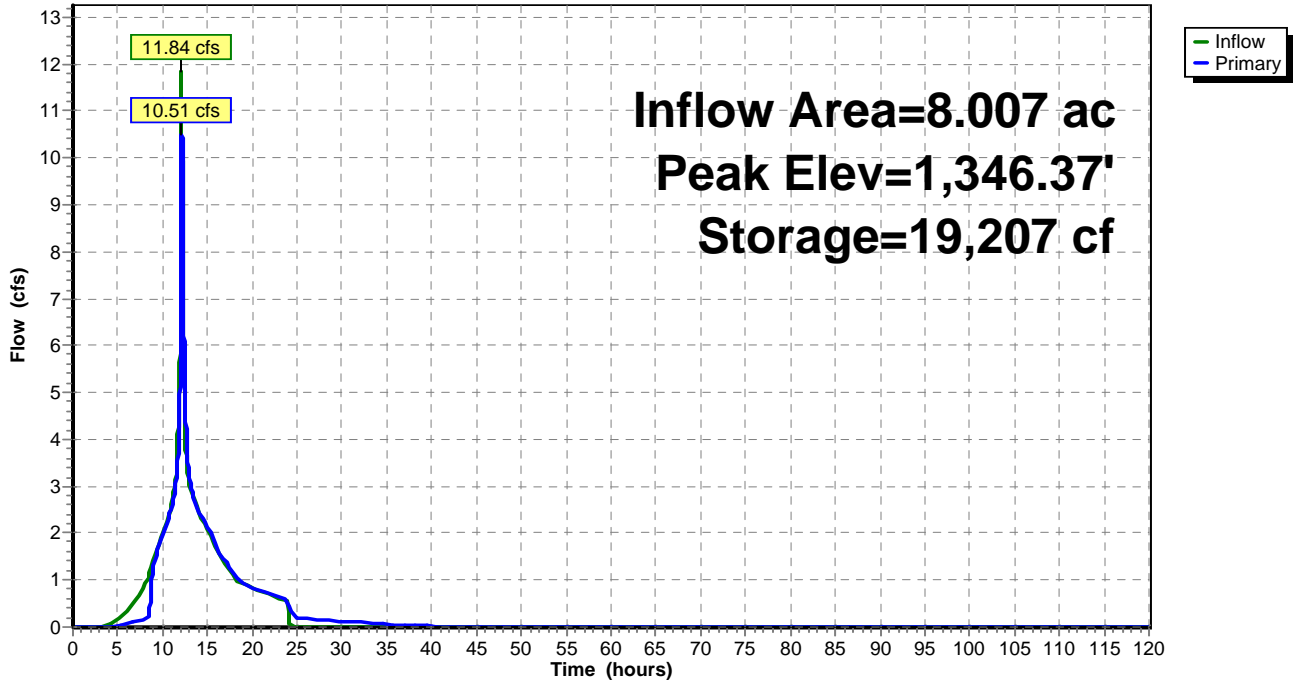
Device	Routing	Invert	Outlet Devices
#1	Primary	1,341.00'	36.0" Round Culvert L= 278.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,341.00' / 1,336.70' S= 0.0155 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	1,345.20'	3.0" Vert. Orifice/Gate C= 0.600
#3	Primary	1,346.00'	16.0' 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=10.50 cfs @ 12.15 hrs HW=1,346.37' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.24 cfs of 66.92 cfs potential flow)
- 2=Orifice/Gate (Orifice Controls 0.24 cfs @ 4.91 fps)
- 3=Broad-Crested Rectangular Weir (Weir Controls 10.26 cfs @ 1.75 fps)

Pond 4-A: Pond 4

Hydrograph



Hydrograph for Pond 4-A: Pond 4

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	9,778	1,345.20	0.00
5.00	0.19	10,295	1,345.28	0.01
10.00	1.98	16,795	1,346.11	1.93
15.00	2.10	16,878	1,346.12	2.14
20.00	0.83	16,294	1,346.06	0.84
25.00	0.00	15,379	1,345.96	0.19
30.00	0.00	12,545	1,345.61	0.13
35.00	0.00	10,919	1,345.38	0.05
40.00	0.00	10,361	1,345.29	0.02
45.00	0.00	10,155	1,345.26	0.01
50.00	0.00	10,053	1,345.24	0.00
55.00	0.00	9,993	1,345.23	0.00
60.00	0.00	9,955	1,345.23	0.00
65.00	0.00	9,928	1,345.22	0.00
70.00	0.00	9,908	1,345.22	0.00
75.00	0.00	9,892	1,345.22	0.00
80.00	0.00	9,880	1,345.22	0.00
85.00	0.00	9,870	1,345.21	0.00
90.00	0.00	9,862	1,345.21	0.00
95.00	0.00	9,855	1,345.21	0.00
100.00	0.00	9,850	1,345.21	0.00
105.00	0.00	9,845	1,345.21	0.00
110.00	0.00	9,840	1,345.21	0.00
115.00	0.00	9,837	1,345.21	0.00
120.00	0.00	9,833	1,345.21	0.00

Summary for Pond 4-B: (new Pond)

Inflow = 45.20 cfs @ 12.10 hrs, Volume= 1.899 af
 Outflow = 35.93 cfs @ 12.17 hrs, Volume= 1.898 af, Atten= 21%, Lag= 4.0 min
 Primary = 35.93 cfs @ 12.17 hrs, Volume= 1.898 af

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,342.67' @ 12.17 hrs Surf.Area= 9,424 sf Storage= 16,574 cf

Plug-Flow detention time= 55.1 min calculated for 1.898 af (100% of inflow)
 Center-of-Mass det. time= 55.0 min (788.6 - 733.5)

Volume	Invert	Avail.Storage	Storage Description			
#1	1,340.00'	19,821 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
1,340.00	3,213	421.0	0	0	3,213	
1,341.00	5,408	456.0	4,263	4,263	5,695	
1,342.00	7,772	489.0	6,554	10,818	8,221	
1,343.00	10,293	520.0	9,003	19,821	10,761	

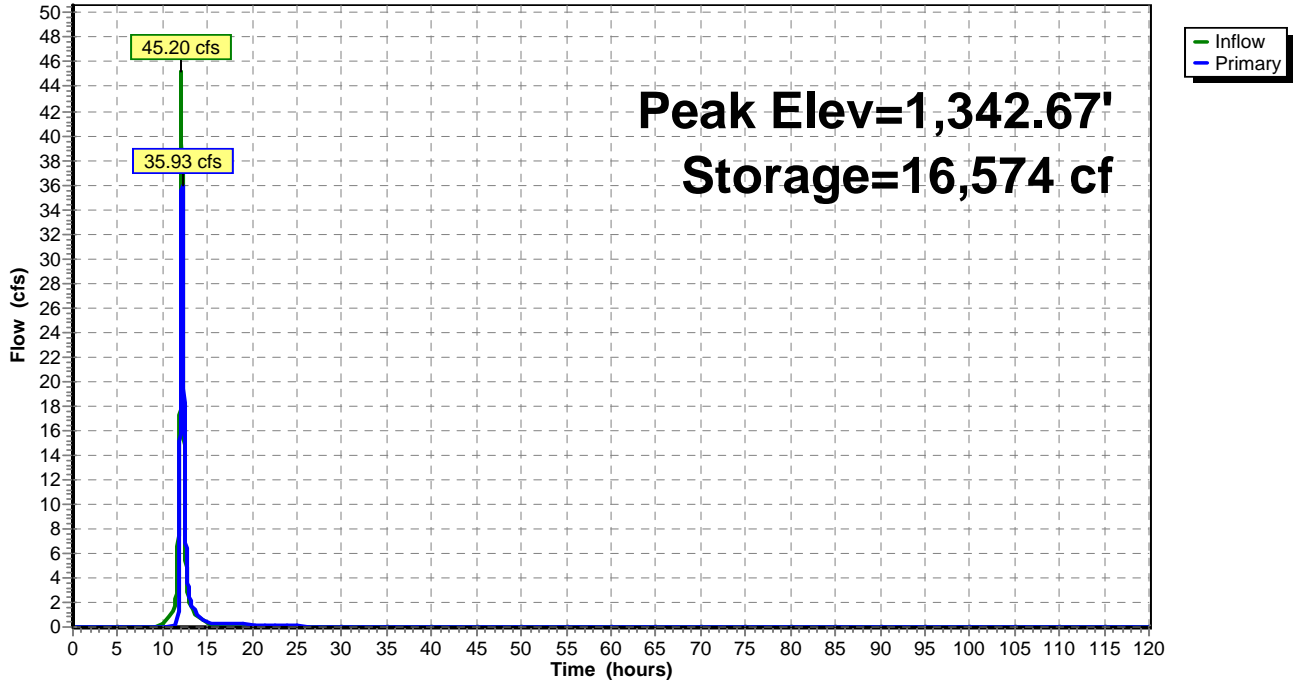
Device	Routing	Invert	Outlet Devices
#1	Primary	1,340.00'	36.0" Round Culvert L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,340.00' / 1,339.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	1,340.00'	3.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,341.50'	16.0' 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=35.92 cfs @ 12.17 hrs HW=1,342.67' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Barrel Controls 35.92 cfs @ 7.16 fps)
- 2=Orifice/Grate (Passes < 0.38 cfs potential flow)
- 3=Broad-Crested Rectangular Weir (Passes < 67.25 cfs potential flow)

Pond 4-B: (new Pond)

Hydrograph



2012_05_21_Concord

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Post-Development Design Point 4 (Concord Phase 1)
Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

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Hydrograph for Pond 4-B: (new Pond)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	1,340.00	0.00
5.00	0.00	0	1,340.00	0.00
10.00	0.22	317	1,340.10	0.02
15.00	0.33	7,369	1,341.52	0.39
20.00	0.00	3,563	1,340.87	0.20
25.00	0.00	897	1,340.26	0.09
30.00	0.00	245	1,340.07	0.01
35.00	0.00	131	1,340.04	0.00
40.00	0.00	88	1,340.03	0.00
45.00	0.00	66	1,340.02	0.00
50.00	0.00	53	1,340.02	0.00
55.00	0.00	44	1,340.01	0.00
60.00	0.00	38	1,340.01	0.00
65.00	0.00	33	1,340.01	0.00
70.00	0.00	29	1,340.01	0.00
75.00	0.00	26	1,340.01	0.00
80.00	0.00	24	1,340.01	0.00
85.00	0.00	22	1,340.01	0.00
90.00	0.00	20	1,340.01	0.00
95.00	0.00	19	1,340.01	0.00
100.00	0.00	17	1,340.01	0.00
105.00	0.00	16	1,340.01	0.00
110.00	0.00	15	1,340.00	0.00
115.00	0.00	14	1,340.00	0.00
120.00	0.00	14	1,340.00	0.00

Summary for Subcatchment 4A: PROPOSED SUBCAT AREA 4A

Runoff = 57.04 cfs @ 12.09 hrs, Volume= 4.383 af, Depth= 6.57"

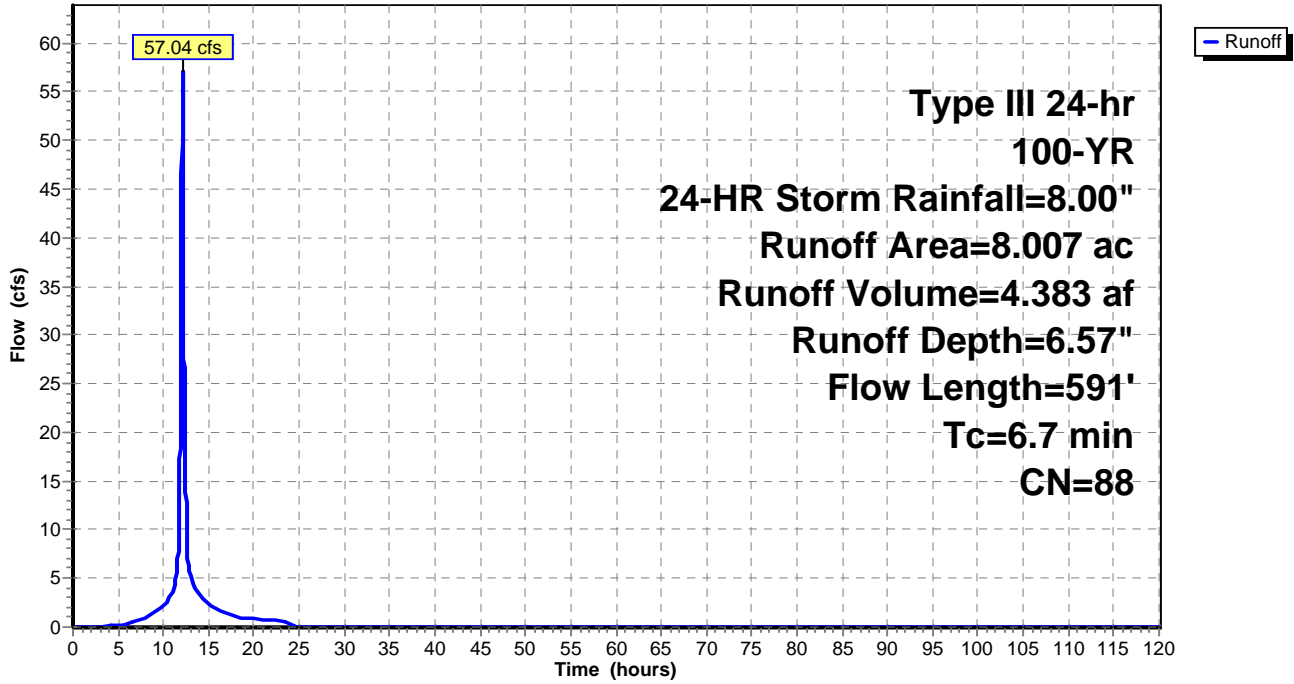
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Area (ac)	CN	Description
1.805	74	>75% Grass cover, Good, HSG C
1.832	80	>75% Grass cover, Good, HSG D
0.373	98	Roofs, HSG D
3.997	98	Paved parking, HSG D
8.007	88	Weighted Average
3.637		45.42% Pervious Area
4.370		54.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	100	0.1040	0.36		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.75"
0.5	152	0.0890	4.80		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.1	152	0.0138	2.38		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Paved Kv= 20.3 fps
0.4	187	0.0320	8.11	6.37	Pipe Channel, CMP_Round 12" 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
6.7	591	Total			

Subcatchment 4A: PROPOSED SUBCAT AREA 4A

Hydrograph



Hydrograph for Subcatchment 4A: PROPOSED SUBCAT AREA 4A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	8.00	6.57	0.00
2.00	0.16	0.00	0.00	106.00	8.00	6.57	0.00
4.00	0.34	0.00	0.07	108.00	8.00	6.57	0.00
6.00	0.58	0.06	0.33	110.00	8.00	6.57	0.00
8.00	0.91	0.20	0.87	112.00	8.00	6.57	0.00
10.00	1.51	0.59	2.21	114.00	8.00	6.57	0.00
12.00	4.00	2.73	33.78	116.00	8.00	6.57	0.00
14.00	6.49	5.10	3.22	118.00	8.00	6.57	0.00
16.00	7.09	5.68	1.71	120.00	8.00	6.57	0.00
18.00	7.42	6.01	1.04				
20.00	7.66	6.23	0.83				
22.00	7.85	6.42	0.69				
24.00	8.00	6.57	0.54				
26.00	8.00	6.57	0.00				
28.00	8.00	6.57	0.00				
30.00	8.00	6.57	0.00				
32.00	8.00	6.57	0.00				
34.00	8.00	6.57	0.00				
36.00	8.00	6.57	0.00				
38.00	8.00	6.57	0.00				
40.00	8.00	6.57	0.00				
42.00	8.00	6.57	0.00				
44.00	8.00	6.57	0.00				
46.00	8.00	6.57	0.00				
48.00	8.00	6.57	0.00				
50.00	8.00	6.57	0.00				
52.00	8.00	6.57	0.00				
54.00	8.00	6.57	0.00				
56.00	8.00	6.57	0.00				
58.00	8.00	6.57	0.00				
60.00	8.00	6.57	0.00				
62.00	8.00	6.57	0.00				
64.00	8.00	6.57	0.00				
66.00	8.00	6.57	0.00				
68.00	8.00	6.57	0.00				
70.00	8.00	6.57	0.00				
72.00	8.00	6.57	0.00				
74.00	8.00	6.57	0.00				
76.00	8.00	6.57	0.00				
78.00	8.00	6.57	0.00				
80.00	8.00	6.57	0.00				
82.00	8.00	6.57	0.00				
84.00	8.00	6.57	0.00				
86.00	8.00	6.57	0.00				
88.00	8.00	6.57	0.00				
90.00	8.00	6.57	0.00				
92.00	8.00	6.57	0.00				
94.00	8.00	6.57	0.00				
96.00	8.00	6.57	0.00				
98.00	8.00	6.57	0.00				
100.00	8.00	6.57	0.00				
102.00	8.00	6.57	0.00				

Summary for Subcatchment 4B: PROPOSED SUBCAT AREA 4B

Runoff = 39.58 cfs @ 12.37 hrs, Volume= 4.748 af, Depth= 4.93"

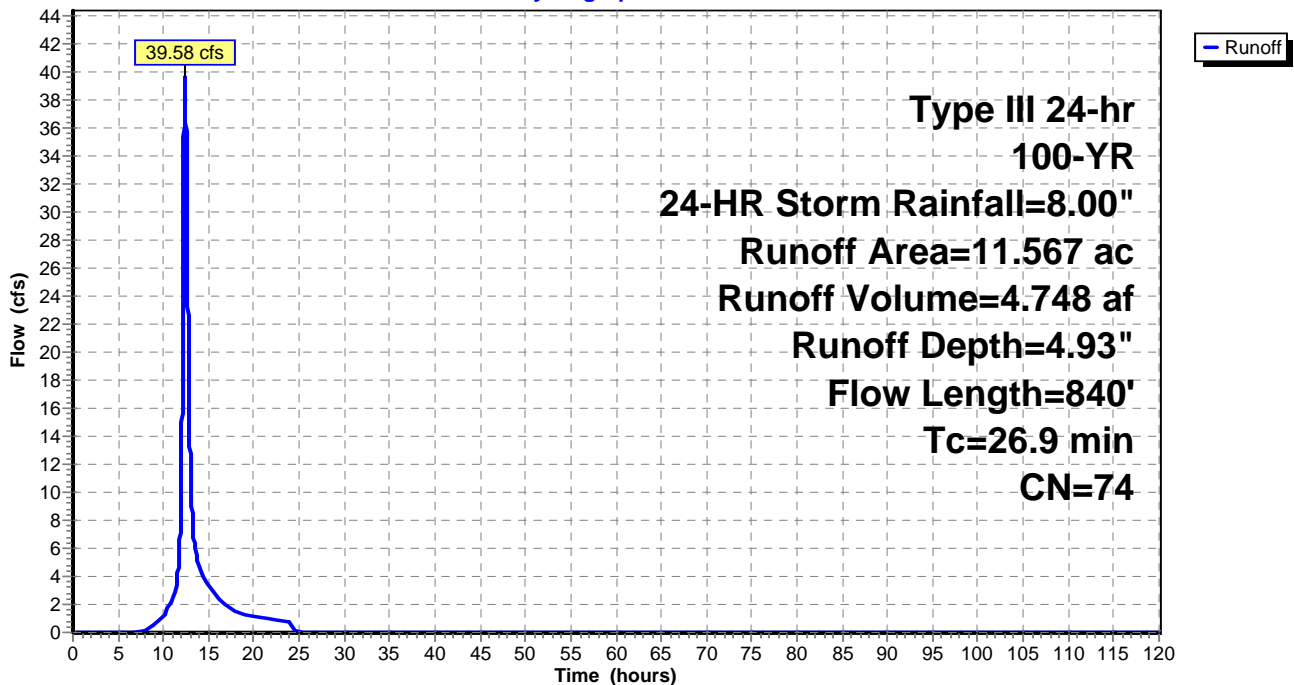
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Area (ac)	CN	Description
2.916	74	>75% Grass cover, Good, HSG C
3.847	80	>75% Grass cover, Good, HSG D
4.804	70	Woods, Good, HSG C
11.567	74	Weighted Average
11.567		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0460	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.75"
12.7	740	0.0380	0.97		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
26.9	840	Total			

Subcatchment 4B: PROPOSED SUBCAT AREA 4B

Hydrograph



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Post-Development Design Point 4 (Concord Phase 1)
Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

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Hydrograph for Subcatchment 4B: PROPOSED SUBCAT AREA 4B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	8.00	4.93	0.00
2.00	0.16	0.00	0.00	106.00	8.00	4.93	0.00
4.00	0.34	0.00	0.00	108.00	8.00	4.93	0.00
6.00	0.58	0.00	0.00	110.00	8.00	4.93	0.00
8.00	0.91	0.01	0.15	112.00	8.00	4.93	0.00
10.00	1.51	0.15	1.20	114.00	8.00	4.93	0.00
12.00	4.00	1.60	12.83	116.00	8.00	4.93	0.00
14.00	6.49	3.60	4.70	118.00	8.00	4.93	0.00
16.00	7.09	4.12	2.50	120.00	8.00	4.93	0.00
18.00	7.42	4.41	1.49				
20.00	7.66	4.62	1.13				
22.00	7.85	4.79	0.93				
24.00	8.00	4.93	0.75				
26.00	8.00	4.93	0.00				
28.00	8.00	4.93	0.00				
30.00	8.00	4.93	0.00				
32.00	8.00	4.93	0.00				
34.00	8.00	4.93	0.00				
36.00	8.00	4.93	0.00				
38.00	8.00	4.93	0.00				
40.00	8.00	4.93	0.00				
42.00	8.00	4.93	0.00				
44.00	8.00	4.93	0.00				
46.00	8.00	4.93	0.00				
48.00	8.00	4.93	0.00				
50.00	8.00	4.93	0.00				
52.00	8.00	4.93	0.00				
54.00	8.00	4.93	0.00				
56.00	8.00	4.93	0.00				
58.00	8.00	4.93	0.00				
60.00	8.00	4.93	0.00				
62.00	8.00	4.93	0.00				
64.00	8.00	4.93	0.00				
66.00	8.00	4.93	0.00				
68.00	8.00	4.93	0.00				
70.00	8.00	4.93	0.00				
72.00	8.00	4.93	0.00				
74.00	8.00	4.93	0.00				
76.00	8.00	4.93	0.00				
78.00	8.00	4.93	0.00				
80.00	8.00	4.93	0.00				
82.00	8.00	4.93	0.00				
84.00	8.00	4.93	0.00				
86.00	8.00	4.93	0.00				
88.00	8.00	4.93	0.00				
90.00	8.00	4.93	0.00				
92.00	8.00	4.93	0.00				
94.00	8.00	4.93	0.00				
96.00	8.00	4.93	0.00				
98.00	8.00	4.93	0.00				
100.00	8.00	4.93	0.00				
102.00	8.00	4.93	0.00				

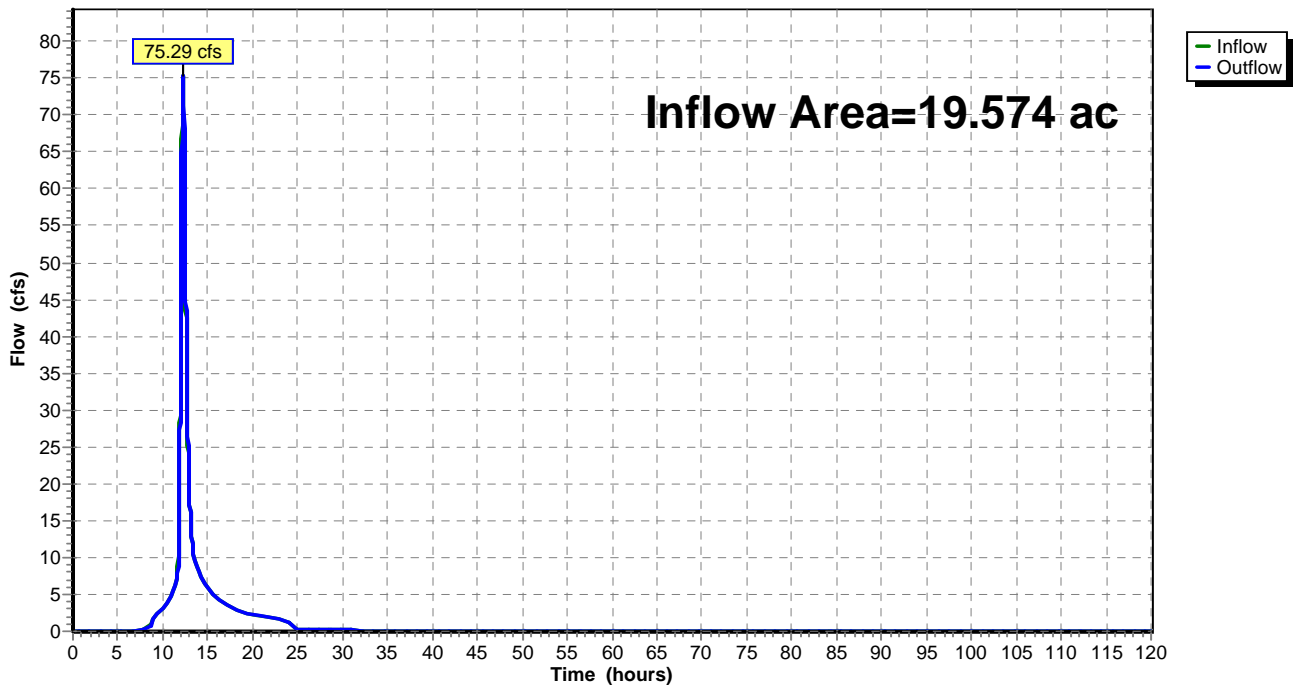
Summary for Reach 4R: DP 4

Inflow Area = 19.574 ac, 22.33% Impervious, Inflow Depth = 5.60" for 100-YR, 24-HR Storm event
Inflow = 75.29 cfs @ 12.23 hrs, Volume= 9.129 af
Outflow = 75.29 cfs @ 12.24 hrs, Volume= 9.129 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach 4R: DP 4

Hydrograph



Hydrograph for Reach 4R: DP 4

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.00		0.00
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.07		0.06	110.00	0.00		0.00
8.00	0.32		0.32	112.00	0.00		0.00
10.00	3.15		3.13	114.00	0.00		0.00
12.00	38.34		36.74	116.00	0.00		0.00
14.00	8.09		8.12	118.00	0.00		0.00
16.00	4.49		4.51	120.00	0.00		0.00
18.00	2.81		2.82				
20.00	2.18		2.18				
22.00	1.79		1.79				
24.00	1.42		1.42				
26.00	0.23		0.23				
28.00	0.17		0.18				
30.00	0.14		0.14				
32.00	0.10		0.10				
34.00	0.07		0.07				
36.00	0.04		0.04				
38.00	0.03		0.03				
40.00	0.02		0.02				
42.00	0.01		0.01				
44.00	0.01		0.01				
46.00	0.01		0.01				
48.00	0.01		0.01				
50.00	0.00		0.00				
52.00	0.00		0.00				
54.00	0.00		0.00				
56.00	0.00		0.00				
58.00	0.00		0.00				
60.00	0.00		0.00				
62.00	0.00		0.00				
64.00	0.00		0.00				
66.00	0.00		0.00				
68.00	0.00		0.00				
70.00	0.00		0.00				
72.00	0.00		0.00				
74.00	0.00		0.00				
76.00	0.00		0.00				
78.00	0.00		0.00				
80.00	0.00		0.00				
82.00	0.00		0.00				
84.00	0.00		0.00				
86.00	0.00		0.00				
88.00	0.00		0.00				
90.00	0.00		0.00				
92.00	0.00		0.00				
94.00	0.00		0.00				
96.00	0.00		0.00				
98.00	0.00		0.00				
100.00	0.00		0.00				
102.00	0.00		0.00				

Summary for Pond 11P: (new Pond)

Inflow Area = 8.007 ac, 54.58% Impervious, Inflow Depth = 6.57" for 100-YR, 24-HR Storm event
 Inflow = 57.04 cfs @ 12.09 hrs, Volume= 4.383 af
 Outflow = 57.04 cfs @ 12.10 hrs, Volume= 4.383 af, Atten= 0%, Lag= 0.6 min
 Primary = 11.84 cfs @ 12.10 hrs, Volume= 2.484 af
 Secondary = 45.20 cfs @ 12.10 hrs, Volume= 1.899 af

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,356.13' @ 12.10 hrs

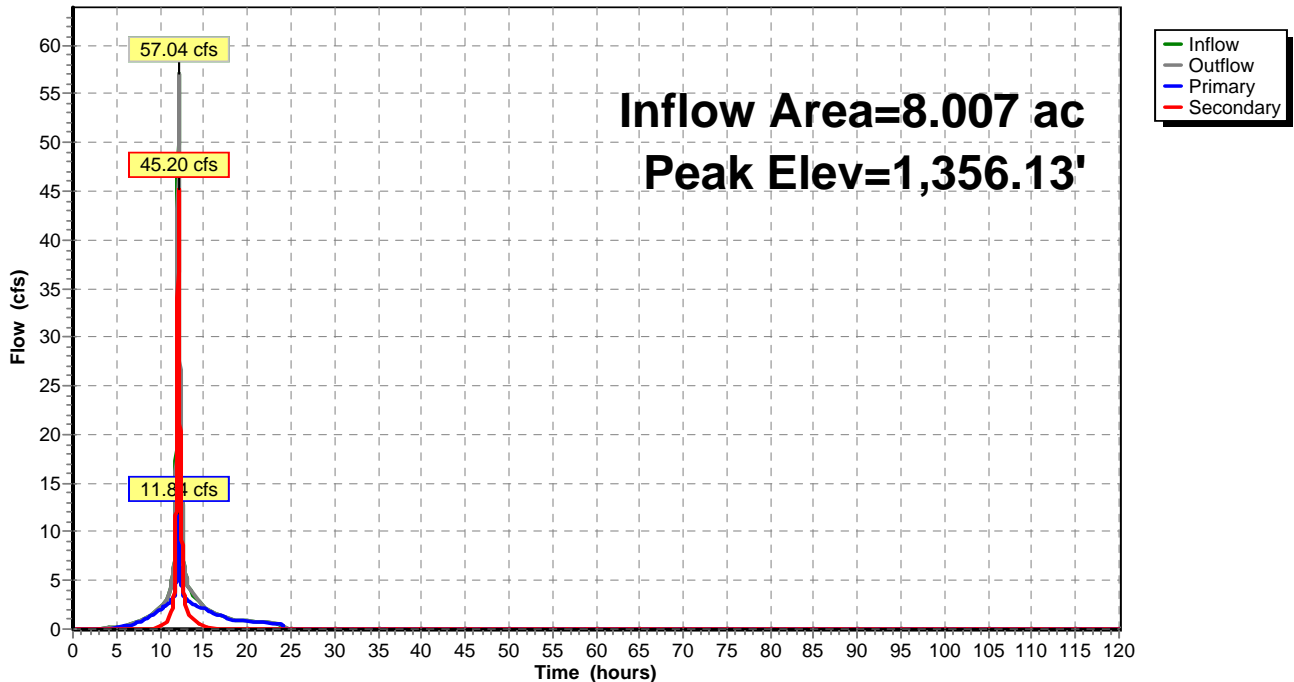
Device	Routing	Invert	Outlet Devices
#1	Primary	1,343.00'	12.0" Vert. Orifice/Grate C= 0.600
#2	Secondary	1,346.20'	24.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=11.82 cfs @ 12.10 hrs HW=1,356.10' TW=1,346.34' (Dynamic Tailwater)
 ↳1=Orifice/Grate (Orifice Controls 11.82 cfs @ 15.05 fps)

Secondary OutFlow Max=45.13 cfs @ 12.10 hrs HW=1,356.10' TW=1,342.47' (Dynamic Tailwater)
 ↳2=Orifice/Grate (Orifice Controls 45.13 cfs @ 14.37 fps)

Pond 11P: (new Pond)

Hydrograph



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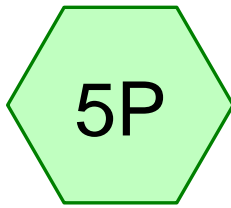
Post-Development Design Point 4 (Concord Phase 1)
Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

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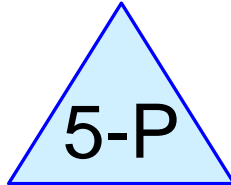
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Hydrograph for Pond 11P: (new Pond)

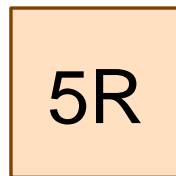
Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	1,345.20	0.00	0.00	0.00
5.00	0.19	1,345.28	0.19	0.19	0.00
10.00	2.21	1,346.39	2.21	1.98	0.22
15.00	2.43	1,346.43	2.43	2.10	0.33
20.00	0.83	1,346.11	0.83	0.83	0.00
25.00	0.00	1,345.96	0.00	0.00	0.00
30.00	0.00	1,345.61	0.00	0.00	0.00
35.00	0.00	1,345.38	0.00	0.00	0.00
40.00	0.00	1,345.29	0.00	0.00	0.00
45.00	0.00	1,345.26	0.00	0.00	0.00
50.00	0.00	1,345.24	0.00	0.00	0.00
55.00	0.00	1,345.23	0.00	0.00	0.00
60.00	0.00	1,345.23	0.00	0.00	0.00
65.00	0.00	1,345.22	0.00	0.00	0.00
70.00	0.00	1,345.22	0.00	0.00	0.00
75.00	0.00	1,345.22	0.00	0.00	0.00
80.00	0.00	1,345.22	0.00	0.00	0.00
85.00	0.00	1,345.21	0.00	0.00	0.00
90.00	0.00	1,345.21	0.00	0.00	0.00
95.00	0.00	1,345.21	0.00	0.00	0.00
100.00	0.00	1,345.21	0.00	0.00	0.00
105.00	0.00	1,345.21	0.00	0.00	0.00
110.00	0.00	1,345.21	0.00	0.00	0.00
115.00	0.00	1,345.21	0.00	0.00	0.00
120.00	0.00	1,345.21	0.00	0.00	0.00



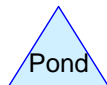
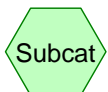
PROPOSED SUBCAT
AREA 5



Pond 5



DP 5



Summary for Pond 5-P: Pond 5

Inflow Area = 6.321 ac, 28.84% Impervious, Inflow Depth = 1.01" for 1-YR, 24-HR Storm event
 Inflow = 6.87 cfs @ 12.12 hrs, Volume= 0.534 af
 Outflow = 0.16 cfs @ 19.98 hrs, Volume= 0.532 af, Atten= 98%, Lag= 471.6 min
 Primary = 0.16 cfs @ 19.98 hrs, Volume= 0.532 af

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,352.50' Surf.Area= 5,386 sf Storage= 8,827 cf
 Peak Elev= 1,354.78' @ 19.98 hrs Surf.Area= 9,600 sf Storage= 25,869 cf (17,042 cf above start)

Plug-Flow detention time= 2,039.0 min calculated for 0.330 af (62% of inflow)
 Center-of-Mass det. time= 1,328.1 min (2,180.3 - 852.2)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,350.00'	131,015 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,350.00	1,823	163.0	0	0	1,823
1,351.00	3,242	238.0	2,499	2,499	4,225
1,352.00	4,509	269.0	3,858	6,357	5,501
1,353.00	6,341	339.0	5,399	11,756	8,901
1,354.00	8,112	370.0	7,208	18,964	10,686
1,355.00	10,041	401.0	9,059	28,024	12,627
1,356.00	12,126	433.0	11,067	39,091	14,791
1,357.00	18,484	918.0	15,194	54,284	66,937
1,358.00	23,151	949.0	20,774	75,058	71,637
1,359.00	27,975	981.0	25,525	100,583	76,645
1,360.00	32,957	1,012.0	30,432	131,015	81,662

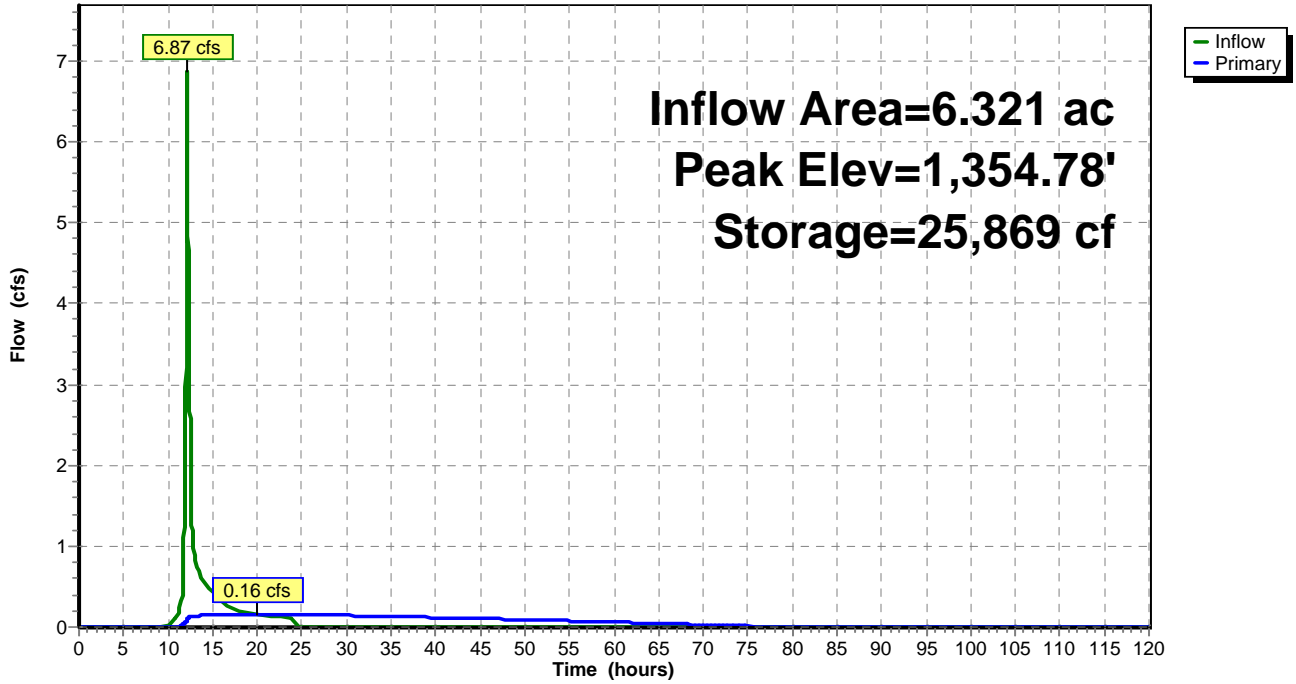
Device	Routing	Invert	Outlet Devices
#1	Primary	1,350.00'	12.0" Round Culvert L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,350.00' / 1,350.00' S= 0.0000 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	1,352.50'	2.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,356.00'	12.0" W x 6.0" H Vert. Orifice/Grate C= 0.600
#4	Device 1	1,359.00'	16.0' 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=0.16 cfs @ 19.98 hrs HW=1,354.78' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.16 cfs of 7.38 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.16 cfs @ 7.14 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)
- 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5-P: Pond 5

Hydrograph



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Hydrograph for Pond 5-P: Pond 5

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	8,827	1,352.50	0.00
5.00	0.00	8,827	1,352.50	0.00
10.00	0.01	8,828	1,352.50	0.00
15.00	0.43	24,277	1,354.61	0.15
20.00	0.16	25,870	1,354.78	0.16
25.00	0.00	24,996	1,354.69	0.15
30.00	0.00	22,349	1,354.40	0.14
35.00	0.00	19,904	1,354.11	0.13
40.00	0.00	17,674	1,353.84	0.12
45.00	0.00	15,673	1,353.57	0.10
50.00	0.00	13,916	1,353.33	0.09
55.00	0.00	12,418	1,353.10	0.08
60.00	0.00	11,195	1,352.91	0.06
65.00	0.00	10,261	1,352.75	0.04
70.00	0.00	9,632	1,352.65	0.03
75.00	0.00	9,308	1,352.59	0.01
80.00	0.00	9,157	1,352.56	0.01
85.00	0.00	9,075	1,352.55	0.00
90.00	0.00	9,025	1,352.54	0.00
95.00	0.00	8,991	1,352.53	0.00
100.00	0.00	8,967	1,352.53	0.00
105.00	0.00	8,949	1,352.52	0.00
110.00	0.00	8,935	1,352.52	0.00
115.00	0.00	8,924	1,352.52	0.00
120.00	0.00	8,915	1,352.52	0.00

Summary for Subcatchment 5P: PROPOSED SUBCAT AREA 5

Runoff = 6.87 cfs @ 12.12 hrs, Volume= 0.534 af, Depth= 1.01"

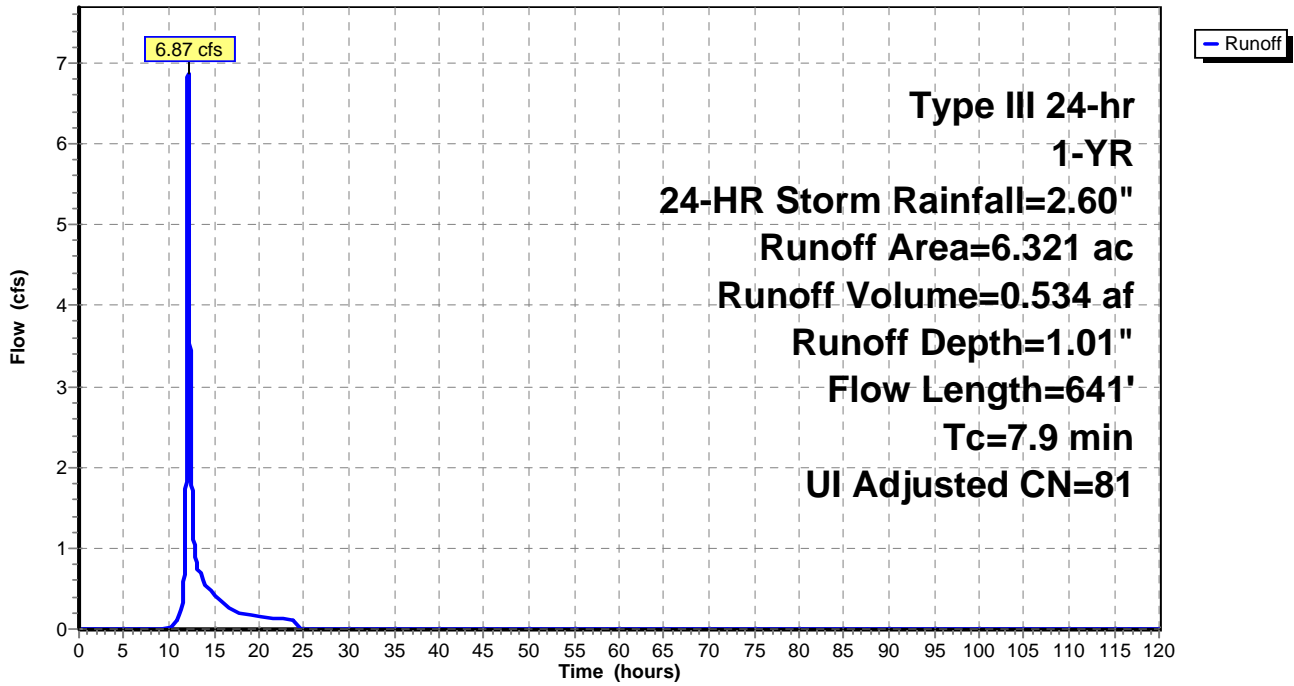
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

Area (ac)	CN	Description
2.754	74	>75% Grass cover, Good, HSG C
1.744	80	>75% Grass cover, Good, HSG D
0.651	98	Unconnected roofs, HSG D
1.172	98	Paved parking, HSG D
6.321	83	Weighted Average, UI Adjusted CN = 81
4.498		71.16% Pervious Area
1.823		28.84% Impervious Area
0.651		35.71% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.0500	0.27		Sheet Flow, SHEET FLOW Grass: Short n= 0.150 P2= 3.75"
0.7	119	0.0340	2.97		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Unpaved Kv= 16.1 fps
0.6	171	0.0600	4.97		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	251	0.0500	13.29	23.49	Pipe Channel, Pipe 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
7.9	641	Total			

Subcatchment 5P: PROPOSED SUBCAT AREA 5

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Hydrograph for Subcatchment 5P: PROPOSED SUBCAT AREA 5

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	2.60	1.01	0.00
2.00	0.05	0.00	0.00	106.00	2.60	1.01	0.00
4.00	0.11	0.00	0.00	108.00	2.60	1.01	0.00
6.00	0.19	0.00	0.00	110.00	2.60	1.01	0.00
8.00	0.30	0.00	0.00	112.00	2.60	1.01	0.00
10.00	0.49	0.00	0.01	114.00	2.60	1.01	0.00
12.00	1.30	0.22	3.22	116.00	2.60	1.01	0.00
14.00	2.11	0.67	0.56	118.00	2.60	1.01	0.00
16.00	2.30	0.81	0.31	120.00	2.60	1.01	0.00
18.00	2.41	0.88	0.19				
20.00	2.49	0.93	0.16				
22.00	2.55	0.98	0.13				
24.00	2.60	1.01	0.10				
26.00	2.60	1.01	0.00				
28.00	2.60	1.01	0.00				
30.00	2.60	1.01	0.00				
32.00	2.60	1.01	0.00				
34.00	2.60	1.01	0.00				
36.00	2.60	1.01	0.00				
38.00	2.60	1.01	0.00				
40.00	2.60	1.01	0.00				
42.00	2.60	1.01	0.00				
44.00	2.60	1.01	0.00				
46.00	2.60	1.01	0.00				
48.00	2.60	1.01	0.00				
50.00	2.60	1.01	0.00				
52.00	2.60	1.01	0.00				
54.00	2.60	1.01	0.00				
56.00	2.60	1.01	0.00				
58.00	2.60	1.01	0.00				
60.00	2.60	1.01	0.00				
62.00	2.60	1.01	0.00				
64.00	2.60	1.01	0.00				
66.00	2.60	1.01	0.00				
68.00	2.60	1.01	0.00				
70.00	2.60	1.01	0.00				
72.00	2.60	1.01	0.00				
74.00	2.60	1.01	0.00				
76.00	2.60	1.01	0.00				
78.00	2.60	1.01	0.00				
80.00	2.60	1.01	0.00				
82.00	2.60	1.01	0.00				
84.00	2.60	1.01	0.00				
86.00	2.60	1.01	0.00				
88.00	2.60	1.01	0.00				
90.00	2.60	1.01	0.00				
92.00	2.60	1.01	0.00				
94.00	2.60	1.01	0.00				
96.00	2.60	1.01	0.00				
98.00	2.60	1.01	0.00				
100.00	2.60	1.01	0.00				
102.00	2.60	1.01	0.00				

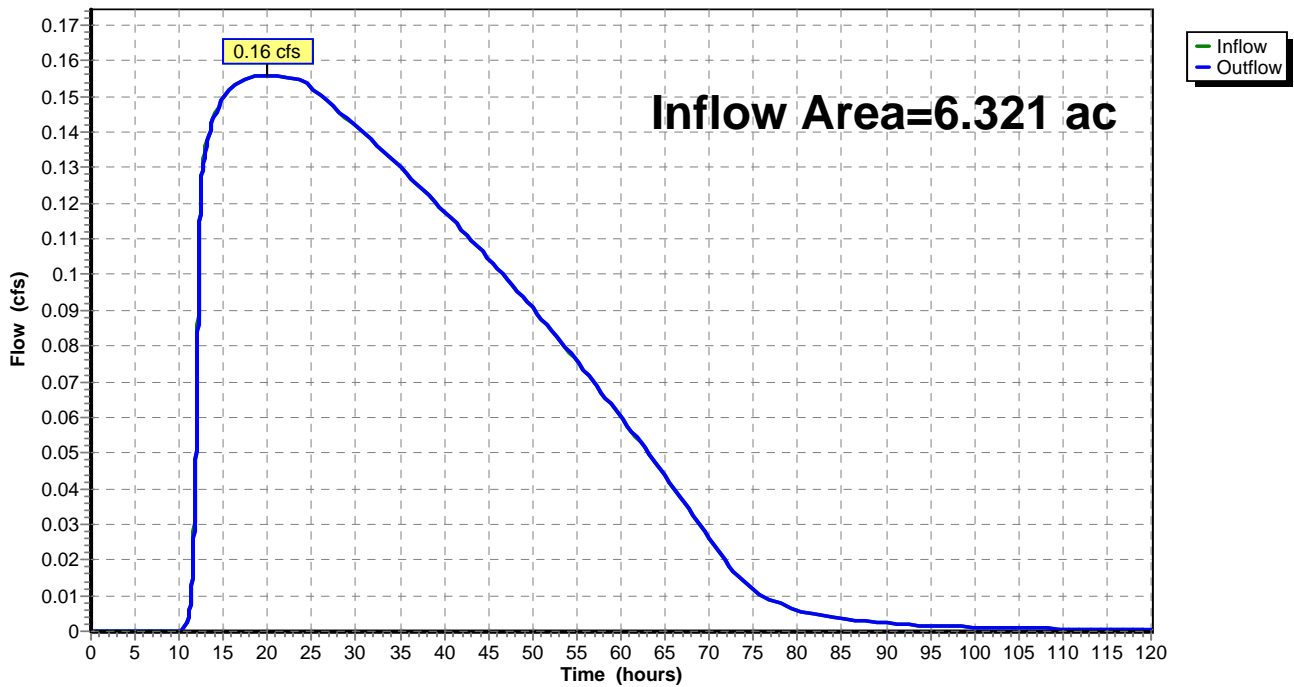
Summary for Reach 5R: DP 5

Inflow Area = 6.321 ac, 28.84% Impervious, Inflow Depth > 1.01" for 1-YR, 24-HR Storm event
Inflow = 0.16 cfs @ 19.98 hrs, Volume= 0.532 af
Outflow = 0.16 cfs @ 19.99 hrs, Volume= 0.532 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach 5R: DP 5

Hydrograph



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Post-Development Design Point 5 (Concord Phase 1)

Type III 24-hr 1-YR, 24-HR Storm Rainfall=2.60"

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Hydrograph for Reach 5R: DP 5

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.00		0.00
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.00		0.00	110.00	0.00		0.00
8.00	0.00		0.00	112.00	0.00		0.00
10.00	0.00		0.00	114.00	0.00		0.00
12.00	0.06		0.06	116.00	0.00		0.00
14.00	0.14		0.14	118.00	0.00		0.00
16.00	0.15		0.15	120.00	0.00		0.00
18.00	0.16		0.16				
20.00	0.16		0.16				
22.00	0.16		0.16				
24.00	0.15		0.15				
26.00	0.15		0.15				
28.00	0.15		0.15				
30.00	0.14		0.14				
32.00	0.14		0.14				
34.00	0.13		0.13				
36.00	0.13		0.13				
38.00	0.12		0.12				
40.00	0.12		0.12				
42.00	0.11		0.11				
44.00	0.11		0.11				
46.00	0.10		0.10				
48.00	0.10		0.10				
50.00	0.09		0.09				
52.00	0.08		0.08				
54.00	0.08		0.08				
56.00	0.07		0.07				
58.00	0.07		0.07				
60.00	0.06		0.06				
62.00	0.05		0.05				
64.00	0.05		0.05				
66.00	0.04		0.04				
68.00	0.03		0.03				
70.00	0.03		0.03				
72.00	0.02		0.02				
74.00	0.01		0.01				
76.00	0.01		0.01				
78.00	0.01		0.01				
80.00	0.01		0.01				
82.00	0.00		0.00				
84.00	0.00		0.00				
86.00	0.00		0.00				
88.00	0.00		0.00				
90.00	0.00		0.00				
92.00	0.00		0.00				
94.00	0.00		0.00				
96.00	0.00		0.00				
98.00	0.00		0.00				
100.00	0.00		0.00				
102.00	0.00		0.00				

Summary for Pond 5-P: Pond 5

Inflow Area = 6.321 ac, 28.84% Impervious, Inflow Depth = 3.88" for 10-YR, 24-HR Storm event
 Inflow = 26.79 cfs @ 12.11 hrs, Volume= 2.046 af
 Outflow = 2.58 cfs @ 13.07 hrs, Volume= 2.042 af, Atten= 90%, Lag= 57.7 min
 Primary = 2.58 cfs @ 13.07 hrs, Volume= 2.042 af

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,352.50' Surf.Area= 5,386 sf Storage= 8,827 cf
 Peak Elev= 1,357.21' @ 13.07 hrs Surf.Area= 19,422 sf Storage= 58,270 cf (49,443 cf above start)

Plug-Flow detention time= 1,069.4 min calculated for 1.840 af (90% of inflow)
 Center-of-Mass det. time= 912.6 min (1,725.9 - 813.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,350.00'	131,015 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,350.00	1,823	163.0	0	0	1,823
1,351.00	3,242	238.0	2,499	2,499	4,225
1,352.00	4,509	269.0	3,858	6,357	5,501
1,353.00	6,341	339.0	5,399	11,756	8,901
1,354.00	8,112	370.0	7,208	18,964	10,686
1,355.00	10,041	401.0	9,059	28,024	12,627
1,356.00	12,126	433.0	11,067	39,091	14,791
1,357.00	18,484	918.0	15,194	54,284	66,937
1,358.00	23,151	949.0	20,774	75,058	71,637
1,359.00	27,975	981.0	25,525	100,583	76,645
1,360.00	32,957	1,012.0	30,432	131,015	81,662

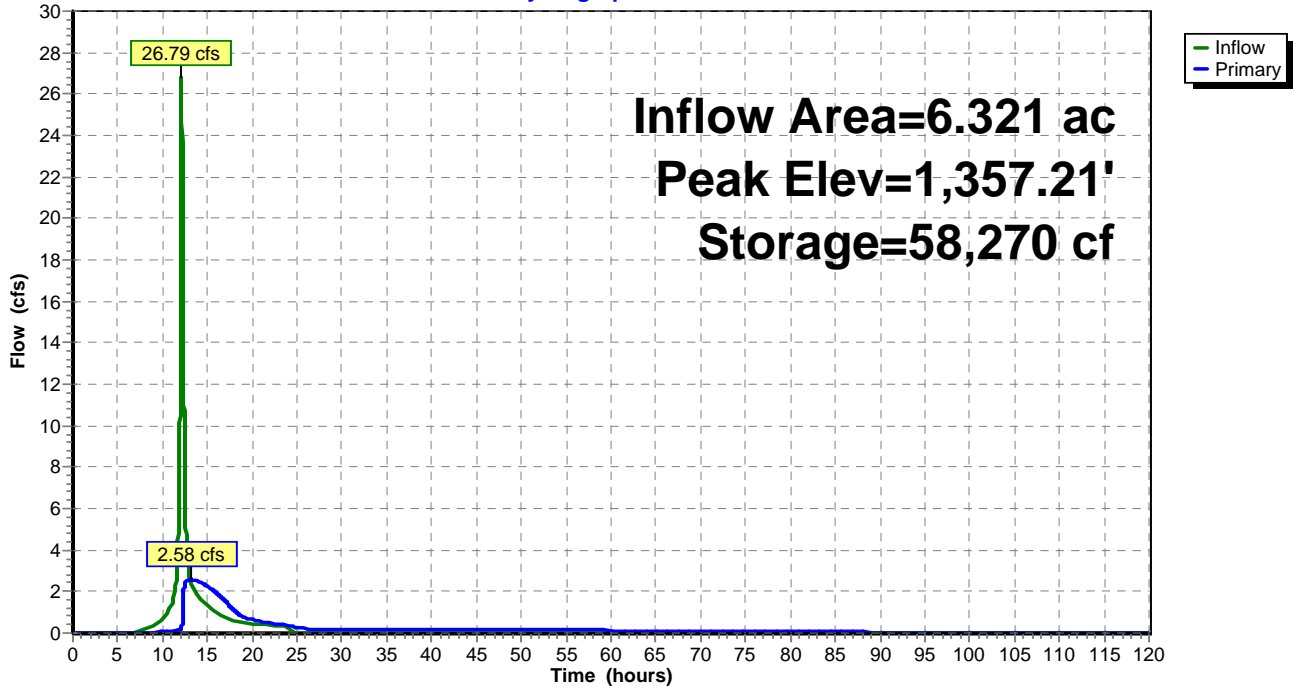
Device	Routing	Invert	Outlet Devices
#1	Primary	1,350.00'	12.0" Round Culvert L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,350.00' / 1,350.00' S= 0.0000 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	1,352.50'	2.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,356.00'	12.0" W x 6.0" H Vert. Orifice/Grate C= 0.600
#4	Device 1	1,359.00'	16.0' 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=2.58 cfs @ 13.07 hrs HW=1,357.21' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 2.58 cfs of 9.46 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.23 cfs @ 10.36 fps)
- 3=Orifice/Grate (Orifice Controls 2.35 cfs @ 4.70 fps)
- 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5-P: Pond 5

Hydrograph



2012_05_21_Concord

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Post-Development Design Point 5 (Concord Phase 1)

Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Pond 5-P: Pond 5

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	8,827	1,352.50	0.00
5.00	0.00	8,827	1,352.50	0.00
10.00	0.69	11,612	1,352.98	0.07
15.00	1.32	53,729	1,356.97	2.25
20.00	0.46	42,486	1,356.26	0.63
25.00	0.00	39,944	1,356.07	0.25
30.00	0.00	36,404	1,355.77	0.19
35.00	0.00	33,105	1,355.48	0.18
40.00	0.00	29,968	1,355.19	0.17
45.00	0.00	27,002	1,354.90	0.16
50.00	0.00	24,219	1,354.61	0.15
55.00	0.00	21,629	1,354.32	0.14
60.00	0.00	19,244	1,354.03	0.13
65.00	0.00	17,078	1,353.76	0.11
70.00	0.00	15,145	1,353.50	0.10
75.00	0.00	13,460	1,353.26	0.09
80.00	0.00	12,039	1,353.04	0.07
85.00	0.00	10,897	1,352.86	0.06
90.00	0.00	10,050	1,352.72	0.04
95.00	0.00	9,511	1,352.62	0.02
100.00	0.00	9,253	1,352.58	0.01
105.00	0.00	9,129	1,352.56	0.01
110.00	0.00	9,058	1,352.54	0.00
115.00	0.00	9,014	1,352.53	0.00
120.00	0.00	8,983	1,352.53	0.00

Summary for Subcatchment 5P: PROPOSED SUBCAT AREA 5

Runoff = 26.79 cfs @ 12.11 hrs, Volume= 2.046 af, Depth= 3.88"

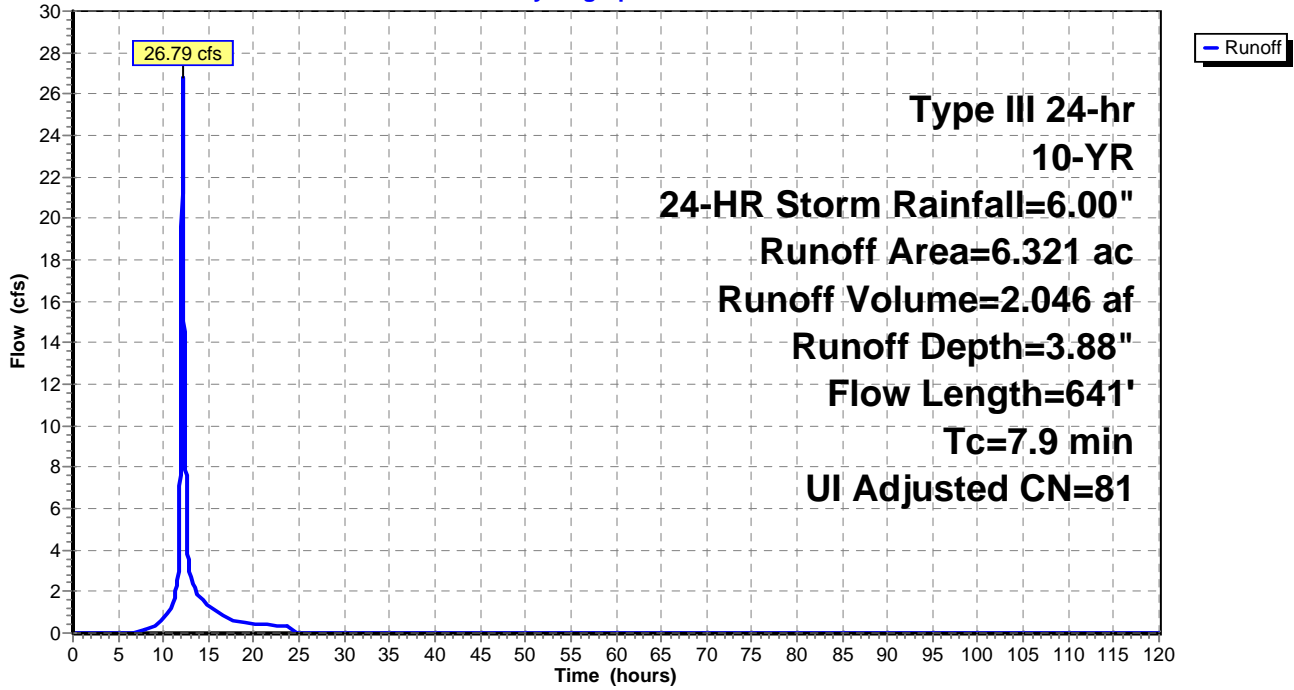
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

Area (ac)	CN	Description
2.754	74	>75% Grass cover, Good, HSG C
1.744	80	>75% Grass cover, Good, HSG D
0.651	98	Unconnected roofs, HSG D
1.172	98	Paved parking, HSG D
6.321	83	Weighted Average, UI Adjusted CN = 81
4.498		71.16% Pervious Area
1.823		28.84% Impervious Area
0.651		35.71% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.0500	0.27		Sheet Flow, SHEET FLOW Grass: Short n= 0.150 P2= 3.75"
0.7	119	0.0340	2.97		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Unpaved Kv= 16.1 fps
0.6	171	0.0600	4.97		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	251	0.0500	13.29	23.49	Pipe Channel, Pipe 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
7.9	641	Total			

Subcatchment 5P: PROPOSED SUBCAT AREA 5

Hydrograph



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Post-Development Design Point 5 (Concord Phase 1)

Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Subcatchment 5P: PROPOSED SUBCAT AREA 5

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	6.00	3.88	0.00
2.00	0.12	0.00	0.00	106.00	6.00	3.88	0.00
4.00	0.26	0.00	0.00	108.00	6.00	3.88	0.00
6.00	0.43	0.00	0.00	110.00	6.00	3.88	0.00
8.00	0.68	0.02	0.14	112.00	6.00	3.88	0.00
10.00	1.13	0.15	0.69	114.00	6.00	3.88	0.00
12.00	3.00	1.31	14.26	116.00	6.00	3.88	0.00
14.00	4.87	2.87	1.74	118.00	6.00	3.88	0.00
16.00	5.32	3.27	0.94	120.00	6.00	3.88	0.00
18.00	5.57	3.49	0.57				
20.00	5.74	3.65	0.46				
22.00	5.88	3.78	0.38				
24.00	6.00	3.88	0.30				
26.00	6.00	3.88	0.00				
28.00	6.00	3.88	0.00				
30.00	6.00	3.88	0.00				
32.00	6.00	3.88	0.00				
34.00	6.00	3.88	0.00				
36.00	6.00	3.88	0.00				
38.00	6.00	3.88	0.00				
40.00	6.00	3.88	0.00				
42.00	6.00	3.88	0.00				
44.00	6.00	3.88	0.00				
46.00	6.00	3.88	0.00				
48.00	6.00	3.88	0.00				
50.00	6.00	3.88	0.00				
52.00	6.00	3.88	0.00				
54.00	6.00	3.88	0.00				
56.00	6.00	3.88	0.00				
58.00	6.00	3.88	0.00				
60.00	6.00	3.88	0.00				
62.00	6.00	3.88	0.00				
64.00	6.00	3.88	0.00				
66.00	6.00	3.88	0.00				
68.00	6.00	3.88	0.00				
70.00	6.00	3.88	0.00				
72.00	6.00	3.88	0.00				
74.00	6.00	3.88	0.00				
76.00	6.00	3.88	0.00				
78.00	6.00	3.88	0.00				
80.00	6.00	3.88	0.00				
82.00	6.00	3.88	0.00				
84.00	6.00	3.88	0.00				
86.00	6.00	3.88	0.00				
88.00	6.00	3.88	0.00				
90.00	6.00	3.88	0.00				
92.00	6.00	3.88	0.00				
94.00	6.00	3.88	0.00				
96.00	6.00	3.88	0.00				
98.00	6.00	3.88	0.00				
100.00	6.00	3.88	0.00				
102.00	6.00	3.88	0.00				

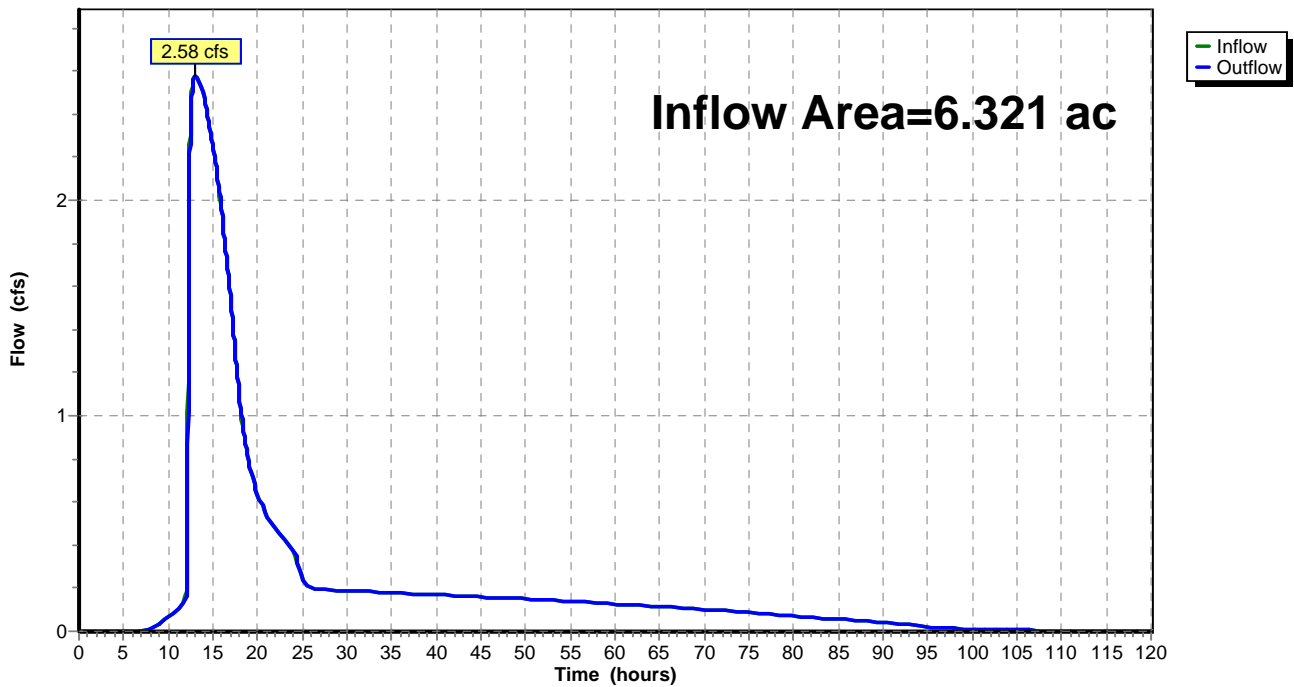
Summary for Reach 5R: DP 5

Inflow Area = 6.321 ac, 28.84% Impervious, Inflow Depth > 3.88" for 10-YR, 24-HR Storm event
Inflow = 2.58 cfs @ 13.07 hrs, Volume= 2.042 af
Outflow = 2.58 cfs @ 13.08 hrs, Volume= 2.042 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach 5R: DP 5

Hydrograph



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Post-Development Design Point 5 (Concord Phase 1)

Type III 24-hr 10-YR, 24-HR Storm Rainfall=6.00"

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Hydrograph for Reach 5R: DP 5

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.01		0.01
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.00		0.00	110.00	0.00		0.00
8.00	0.01		0.01	112.00	0.00		0.00
10.00	0.07		0.07	114.00	0.00		0.00
12.00	0.16		0.16	116.00	0.00		0.00
14.00	2.48		2.48	118.00	0.00		0.00
16.00	1.93		1.94	120.00	0.00		0.00
18.00	1.07		1.07				
20.00	0.63		0.64				
22.00	0.48		0.48				
24.00	0.38		0.38				
26.00	0.20		0.20				
28.00	0.19		0.19				
30.00	0.19		0.19				
32.00	0.18		0.18				
34.00	0.18		0.18				
36.00	0.18		0.18				
38.00	0.17		0.17				
40.00	0.17		0.17				
42.00	0.17		0.17				
44.00	0.16		0.16				
46.00	0.16		0.16				
48.00	0.15		0.15				
50.00	0.15		0.15				
52.00	0.15		0.15				
54.00	0.14		0.14				
56.00	0.14		0.14				
58.00	0.13		0.13				
60.00	0.13		0.13				
62.00	0.12		0.12				
64.00	0.12		0.12				
66.00	0.11		0.11				
68.00	0.11		0.11				
70.00	0.10		0.10				
72.00	0.10		0.10				
74.00	0.09		0.09				
76.00	0.08		0.08				
78.00	0.08		0.08				
80.00	0.07		0.07				
82.00	0.07		0.07				
84.00	0.06		0.06				
86.00	0.05		0.05				
88.00	0.05		0.05				
90.00	0.04		0.04				
92.00	0.03		0.03				
94.00	0.02		0.02				
96.00	0.02		0.02				
98.00	0.01		0.01				
100.00	0.01		0.01				
102.00	0.01		0.01				

Summary for Pond 5-P: Pond 5

Inflow Area = 6.321 ac, 28.84% Impervious, Inflow Depth = 5.74" for 100-YR, 24-HR Storm event
 Inflow = 39.11 cfs @ 12.11 hrs, Volume= 3.025 af
 Outflow = 3.72 cfs @ 13.05 hrs, Volume= 3.021 af, Atten= 90%, Lag= 56.3 min
 Primary = 3.72 cfs @ 13.05 hrs, Volume= 3.021 af

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,352.50' Surf.Area= 5,386 sf Storage= 8,827 cf
 Peak Elev= 1,358.33' @ 13.05 hrs Surf.Area= 24,708 sf Storage= 83,033 cf (74,206 cf above start)

Plug-Flow detention time= 791.8 min calculated for 2.818 af (93% of inflow)
 Center-of-Mass det. time= 699.8 min (1,502.1 - 802.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,350.00'	131,015 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,350.00	1,823	163.0	0	0	1,823
1,351.00	3,242	238.0	2,499	2,499	4,225
1,352.00	4,509	269.0	3,858	6,357	5,501
1,353.00	6,341	339.0	5,399	11,756	8,901
1,354.00	8,112	370.0	7,208	18,964	10,686
1,355.00	10,041	401.0	9,059	28,024	12,627
1,356.00	12,126	433.0	11,067	39,091	14,791
1,357.00	18,484	918.0	15,194	54,284	66,937
1,358.00	23,151	949.0	20,774	75,058	71,637
1,359.00	27,975	981.0	25,525	100,583	76,645
1,360.00	32,957	1,012.0	30,432	131,015	81,662

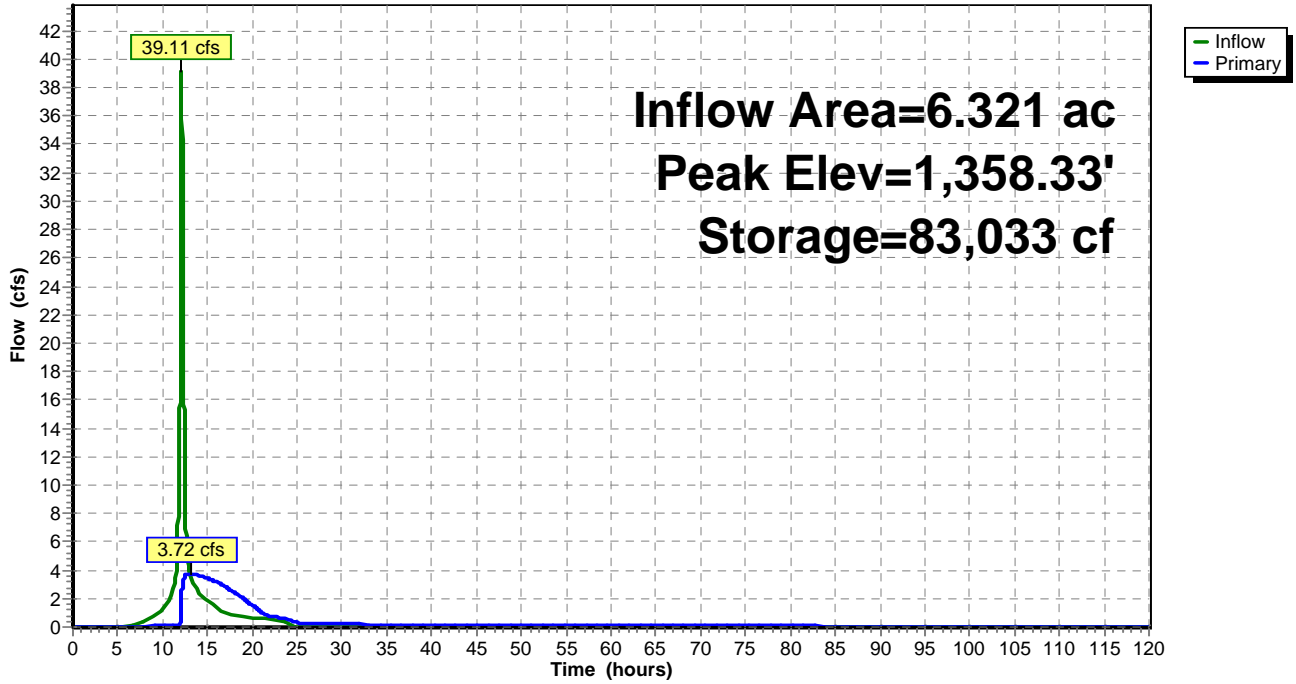
Device	Routing	Invert	Outlet Devices
#1	Primary	1,350.00'	12.0" Round Culvert L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,350.00' / 1,350.00' S= 0.0000 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	1,352.50'	2.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,356.00'	12.0" W x 6.0" H Vert. Orifice/Grate C= 0.600
#4	Device 1	1,359.00'	16.0' 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=3.72 cfs @ 13.05 hrs HW=1,358.33' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 3.72 cfs of 10.28 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.25 cfs @ 11.55 fps)
- 3=Orifice/Grate (Orifice Controls 3.47 cfs @ 6.95 fps)
- 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5-P: Pond 5

Hydrograph



Hydrograph for Pond 5-P: Pond 5

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	8,827	1,352.50	0.00
5.00	0.00	8,827	1,352.50	0.00
10.00	1.23	15,008	1,353.48	0.10
15.00	1.84	75,427	1,358.02	3.44
20.00	0.63	46,928	1,356.57	1.52
25.00	0.00	40,599	1,356.12	0.33
30.00	0.00	36,829	1,355.81	0.19
35.00	0.00	33,510	1,355.52	0.18
40.00	0.00	30,352	1,355.23	0.17
45.00	0.00	27,364	1,354.93	0.16
50.00	0.00	24,557	1,354.64	0.15
55.00	0.00	21,942	1,354.35	0.14
60.00	0.00	19,531	1,354.07	0.13
65.00	0.00	17,337	1,353.79	0.12
70.00	0.00	15,374	1,353.53	0.10
75.00	0.00	13,657	1,353.29	0.09
80.00	0.00	12,202	1,353.07	0.07
85.00	0.00	11,025	1,352.88	0.06
90.00	0.00	10,139	1,352.73	0.04
95.00	0.00	9,561	1,352.63	0.02
100.00	0.00	9,276	1,352.58	0.01
105.00	0.00	9,140	1,352.56	0.01
110.00	0.00	9,065	1,352.54	0.00
115.00	0.00	9,018	1,352.53	0.00
120.00	0.00	8,987	1,352.53	0.00

Summary for Subcatchment 5P: PROPOSED SUBCAT AREA 5

Runoff = 39.11 cfs @ 12.11 hrs, Volume= 3.025 af, Depth= 5.74"

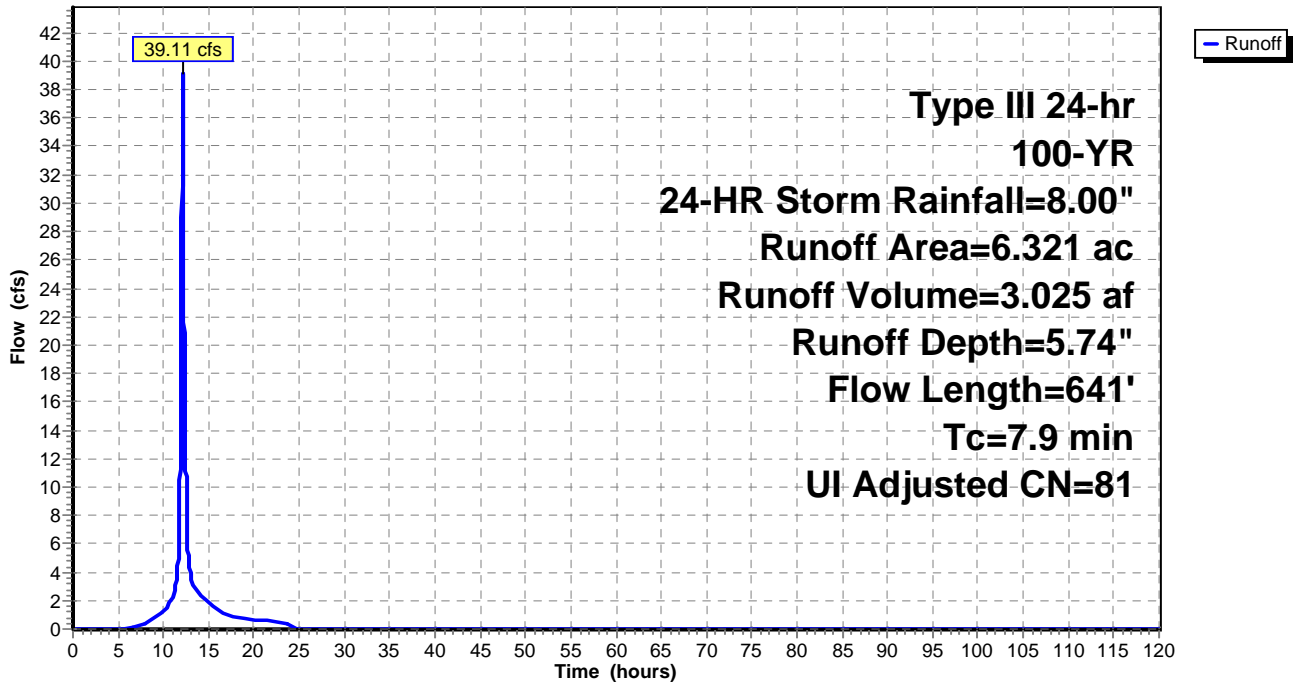
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Area (ac)	CN	Description
2.754	74	>75% Grass cover, Good, HSG C
1.744	80	>75% Grass cover, Good, HSG D
0.651	98	Unconnected roofs, HSG D
1.172	98	Paved parking, HSG D
6.321	83	Weighted Average, UI Adjusted CN = 81
4.498		71.16% Pervious Area
1.823		28.84% Impervious Area
0.651		35.71% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.0500	0.27		Sheet Flow, SHEET FLOW Grass: Short n= 0.150 P2= 3.75"
0.7	119	0.0340	2.97		Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW Unpaved Kv= 16.1 fps
0.6	171	0.0600	4.97		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	251	0.0500	13.29	23.49	Pipe Channel, Pipe 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
7.9	641	Total			

Subcatchment 5P: PROPOSED SUBCAT AREA 5

Hydrograph



2012_05_21_Concord

Prepared by {enter your company name here}

HydroCAD® 10.00 s/n 04852 © 2011 HydroCAD Software Solutions LLC

Post-Development Design Point 5 (Concord Phase 1)
 Type III 24-hr 100-YR, 24-HR Storm Rainfall=8.00"

Printed 5/31/2012

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Hydrograph for Subcatchment 5P: PROPOSED SUBCAT AREA 5

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	104.00	8.00	5.74	0.00
2.00	0.16	0.00	0.00	106.00	8.00	5.74	0.00
4.00	0.34	0.00	0.00	108.00	8.00	5.74	0.00
6.00	0.58	0.00	0.06	110.00	8.00	5.74	0.00
8.00	0.91	0.07	0.36	112.00	8.00	5.74	0.00
10.00	1.51	0.32	1.23	114.00	8.00	5.74	0.00
12.00	4.00	2.12	21.28	116.00	8.00	5.74	0.00
14.00	6.49	4.33	2.44	118.00	8.00	5.74	0.00
16.00	7.09	4.89	1.30	120.00	8.00	5.74	0.00
18.00	7.42	5.20	0.79				
20.00	7.66	5.42	0.63				
22.00	7.85	5.60	0.52				
24.00	8.00	5.74	0.42				
26.00	8.00	5.74	0.00				
28.00	8.00	5.74	0.00				
30.00	8.00	5.74	0.00				
32.00	8.00	5.74	0.00				
34.00	8.00	5.74	0.00				
36.00	8.00	5.74	0.00				
38.00	8.00	5.74	0.00				
40.00	8.00	5.74	0.00				
42.00	8.00	5.74	0.00				
44.00	8.00	5.74	0.00				
46.00	8.00	5.74	0.00				
48.00	8.00	5.74	0.00				
50.00	8.00	5.74	0.00				
52.00	8.00	5.74	0.00				
54.00	8.00	5.74	0.00				
56.00	8.00	5.74	0.00				
58.00	8.00	5.74	0.00				
60.00	8.00	5.74	0.00				
62.00	8.00	5.74	0.00				
64.00	8.00	5.74	0.00				
66.00	8.00	5.74	0.00				
68.00	8.00	5.74	0.00				
70.00	8.00	5.74	0.00				
72.00	8.00	5.74	0.00				
74.00	8.00	5.74	0.00				
76.00	8.00	5.74	0.00				
78.00	8.00	5.74	0.00				
80.00	8.00	5.74	0.00				
82.00	8.00	5.74	0.00				
84.00	8.00	5.74	0.00				
86.00	8.00	5.74	0.00				
88.00	8.00	5.74	0.00				
90.00	8.00	5.74	0.00				
92.00	8.00	5.74	0.00				
94.00	8.00	5.74	0.00				
96.00	8.00	5.74	0.00				
98.00	8.00	5.74	0.00				
100.00	8.00	5.74	0.00				
102.00	8.00	5.74	0.00				

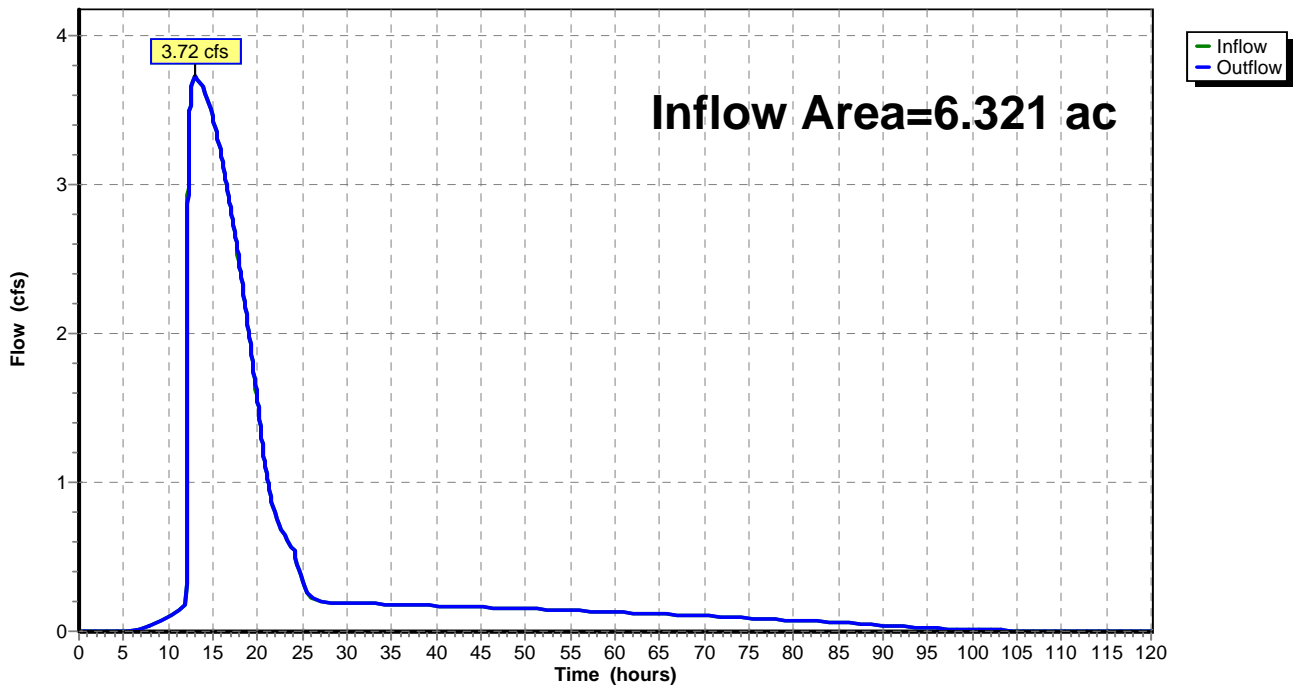
Summary for Reach 5R: DP 5

Inflow Area = 6.321 ac, 28.84% Impervious, Inflow Depth > 5.74" for 100-YR, 24-HR Storm event
Inflow = 3.72 cfs @ 13.05 hrs, Volume= 3.021 af
Outflow = 3.72 cfs @ 13.06 hrs, Volume= 3.021 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs

Reach 5R: DP 5

Hydrograph



Hydrograph for Reach 5R: DP 5

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	104.00	0.01		0.01
2.00	0.00		0.00	106.00	0.00		0.00
4.00	0.00		0.00	108.00	0.00		0.00
6.00	0.00		0.00	110.00	0.00		0.00
8.00	0.04		0.04	112.00	0.00		0.00
10.00	0.10		0.10	114.00	0.00		0.00
12.00	0.53		0.41	116.00	0.00		0.00
14.00	3.64		3.64	118.00	0.00		0.00
16.00	3.17		3.17	120.00	0.00		0.00
18.00	2.44		2.45				
20.00	1.52		1.53				
22.00	0.78		0.78				
24.00	0.55		0.55				
26.00	0.22		0.22				
28.00	0.19		0.19				
30.00	0.19		0.19				
32.00	0.19		0.19				
34.00	0.18		0.18				
36.00	0.18		0.18				
38.00	0.17		0.17				
40.00	0.17		0.17				
42.00	0.17		0.17				
44.00	0.16		0.16				
46.00	0.16		0.16				
48.00	0.15		0.15				
50.00	0.15		0.15				
52.00	0.15		0.15				
54.00	0.14		0.14				
56.00	0.14		0.14				
58.00	0.13		0.13				
60.00	0.13		0.13				
62.00	0.12		0.12				
64.00	0.12		0.12				
66.00	0.11		0.11				
68.00	0.11		0.11				
70.00	0.10		0.10				
72.00	0.10		0.10				
74.00	0.09		0.09				
76.00	0.09		0.09				
78.00	0.08		0.08				
80.00	0.07		0.07				
82.00	0.07		0.07				
84.00	0.06		0.06				
86.00	0.05		0.05				
88.00	0.05		0.05				
90.00	0.04		0.04				
92.00	0.03		0.03				
94.00	0.03		0.03				
96.00	0.02		0.02				
98.00	0.01		0.01				
100.00	0.01		0.01				
102.00	0.01		0.01				

PRELIMINARY SWPPP
APPENDIX G
EROSION AND SEDIMENT CONTROL INSPECTION REPORT

Project Name: _____ **Date:** _____
Project Number: _____ **Logged by:** _____
Weather: _____

SITE PLAN/SKETCH

Provide a concise sketch indicating construction activities, location and description of stormwater runoff from the site, stabilization activities, and soil erosion and sediment control BMPs. Indicate BMPs improperly installed or in need of repair. The inspector shall notify the contractor(s) and subcontractor(s) of necessary repairs of BMPs required within one business day of this inspection.

Maintain Water Quality

Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is there an increase in turbidity causing a substantial visible contrast to natural conditions?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is there residue from oil and floating substances, visible oil film, or globules or grease?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All disturbance is within the limits of the approved plans.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions

Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is construction site litter and debris appropriately managed?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is construction impacting the adjacent property?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is dust adequately controlled?

2. Temporary Stream Crossing

Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Maximum diameter pipes necessary to span creek without dredging are installed.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Installed non-woven geotextile fabric beneath approaches.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is fill composed of aggregate (no earth or soil)?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	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	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Clean water from upstream pool is being pumped to the downstream pool.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sediment laden water from work area is being discharged to a silt-trapping device.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Constructed upstream berm with one-foot minimum freeboard.

2. Level Spreader

Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Installed per plan.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales

Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Installed per plan with minimum side slopes 2H:1V or flatter.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sediment-laden runoff directed to sediment trapping structure.

4. Stone Check Dam

Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is channel stable (the flow is not eroding soil underneath or around the structure)?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Check is in good condition (rocks in place and no permanent pools behind structure).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Has accumulated sediment been removed?

5. Rock Outlet Protection

Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Installed per plan.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Stockpiles are stabilized with vegetation and/or mulch.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sediment control is installed at the toe of the slope.

2. Revegetation

Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temporary seeding and mulch have been applied to idle areas.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4 inches minimum of topsoil has been applied under permanent seeding.

Sediment Control

1. Stabilized Construction Entrance

Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Stone is clean enough to effectively remove mud from vehicles.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Installed per standards and specifications?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Does all traffic use the stabilized entrance to enter and leave site?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is adequate drainage provided to prevent ponding at entrance?

2. Silt Fence

Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Joints constructed by wrapping the two ends together for continuous support.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fabric buried 6 inches minimum.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Posts are stable, fabric is tight and without rips or frayed areas. Sediment accumulation is % of design capacity.

3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices)

Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Installed concrete blocks lengthwise so open ends face outward, not upward.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Placed wire screen between No. 3 crushed stone and concrete blocks.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Drainage area is 1 acre or less.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Excavated area is 900 cubic feet.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Excavated side slopes should be 2:1.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2" x 4" frame is constructed and structurally sound.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Posts 3-foot maximum spacing between posts.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Posts are stable, fabric is tight and without rips or frayed areas. Sediment accumulation % of design capacity.

4. Temporary Sediment Trap

Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outlet structure is constructed per the approved plan or drawing.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Geotextile fabric has been placed beneath rock fill. Sediment accumulation is % of design capacity.

5. Temporary Sediment Basin

Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Basin and outlet structure constructed per the approved plan.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Basin side slopes are stabilized with seed/mulch.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	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 the SWPPP.

MODIFICATION & REASON:

Qualified 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.

SWPPP APPENDIX H
CONSTRUCTION INSPECTION CHECKLIST
STORMWATER POND/CREATED WETLAND
BIORETENTION BASIN

**STORMWATER POND/ WETLAND
CONSTRUCTION INSPECTION CHECKLIST**

Project Name:			Location:		
Site Status:			Weather Condition:		
Inspector:		Date:		Time:	
Construction Sequence		Satisfactory/ Unsatisfactory		Comments	
Pre-Construction/Materials and Equipment					
Pre-construction meeting					
Pipe and appurtenances on-site prior to construction and dimensions checked					
1. Material (including protective coating, if specified)					
2. Diameter					
3. Dimensions of metal riser or pre-cast concrete outlet structure					
4. Required dimensions between water control structures (orifices, weirs, etc.) are in accordance with approved plans					
5. Barrel stub for prefabricated pipe structures at proper angle for design barrel slope					
6. Number and dimensions of prefabricated anti-seep collars					
7. Watertight connectors and gaskets					
8. Outlet drain valve					
Project benchmark near pond site					
Equipment for temporary de-watering					
2. Subgrade Preparation					

**STORMWATER POND/ WETLAND
CONSTRUCTION INSPECTION CHECKLIST**

Project Name:			Location:		
Site Status:			Weather Condition:		
Inspector:		Date:		Time:	
Construction Sequence		Satisfactory/ Unsatisfactory		Comments	
Area beneath embankment stripped of all vegetation, topsoil, and organic matter					
3. Pipe Spillway Installation					
Method of installation detailed on plans					
A. Bed preparation					
Installation trench excavated with specified side slopes					
Stable, uniform, dry subgrade of relatively impervious material (If subgrade is wet, contractor shall have defined steps before proceeding with installation)					
Invert at proper elevation and grade					
B. Pipe placement					
Metal / plastic pipe					
1. Watertight connectors and gaskets properly installed					
2. Anti-seep collars properly spaced and having watertight connections to pipe					
3. Backfill placed and tamped by hand under “haunches” of pipe					
4. Remaining backfill placed in max. 8 inch lifts using small power tamping equipment until 2 feet cover over pipe is reached					

**STORMWATER POND/ WETLAND
CONSTRUCTION INSPECTION CHECKLIST**

Project Name:		Location:
Site Status:		Weather Condition:
Inspector:	Date:	Time:
Construction Sequence	Satisfactory/ Unsatisfactory	Comments

3. Pipe Spillway Installation

Concrete pipe

1. Pipe set on blocks or concrete slab for pouring of low cradle		
2. Pipe installed with rubber gasket joints with no spalling in gasket interface area		
3. Excavation for lower half of anti-seep collar(s) with reinforcing steel set		
4. Entire area where anti-seep collar(s) will come in contact with pipe coated with mastic or other approved waterproof sealant		
5. Low cradle and bottom half of anti-seep collar installed as monolithic pour and of an approved mix		
6. Upper half of anti-seep collar(s) formed with reinforcing steel set		
7. Concrete for collar of an approved mix and vibrated into place (protected from freezing while curing, if necessary)		
8. Forms stripped and collar inspected for honeycomb prior to backfilling. Parge if necessary.		

C. Backfilling

**STORMWATER POND/ WETLAND
CONSTRUCTION INSPECTION CHECKLIST**

Project Name:			Location:		
Site Status:			Weather Condition:		
Inspector:		Date:		Time:	
Construction Sequence		Satisfactory/ Unsatisfactory		Comments	
Fill placed in maximum 8 inch lifts					
Backfill taken minimum 2 feet above top of anti- seep collar elevation before traversing with heavy equipment					
4. Riser / Outlet Structure Installation					
Riser located within embankment					
A. Metal riser					
Riser base excavated or formed on stable subgrade to design dimensions					
Set on blocks to design elevations and plumbed					
Reinforcing bars placed at right angles and projecting into sides of riser					
Concrete poured so as to fill inside of riser to invert of barrel					
B. Pre-cast concrete structure					
Dry and stable subgrade					
Riser base set to design elevation					
If more than one section, no spalling in gasket interface area; gasket or approved caulking material placed securely					
Watertight and structurally sound collar or gasket joint where structure connects to pipe spillway					
C. Poured concrete structure					
Footing excavated or formed on stable subgrade, to design dimensions with reinforcing steel set					

**STORMWATER POND/ WETLAND
CONSTRUCTION INSPECTION CHECKLIST**

Project Name:			Location:		
Site Status:			Weather Condition:		
Inspector:		Date:		Time:	
Construction Sequence	Satisfactory/ Unsatisfactory	Comments			
Structure formed to design dimensions, with reinforcing steel set as per plan					
Concrete of an approved mix and vibrated into place (protected from freezing while curing, if necessary)					
Forms stripped & inspected for “honeycomb” prior to backfilling; parge if necessary					
5. Embankment Construction					
Fill material					
Compaction					
Embankment					
1. Fill placed in specified lifts and compacted with appropriate equipment					
2. Constructed to design cross-section, side slopes and top width					
3. Constructed to design elevation plus allowance for settlement					
6. Impounded Area Construction					
Excavated / graded to design contours and side slopes					
Inlet pipes have adequate outfall protection					
Excavated / graded to design contours and side slopes					
Inlet pipes have adequate outfall protection					
Forebay(s)					
Pond benches					
7. Earth Emergency Spillway Construction					
Spillway located in cut or structurally stabilized with riprap, gabions, concrete,					

**STORMWATER POND/ WETLAND
CONSTRUCTION INSPECTION CHECKLIST**

Project Name:			Location:		
Site Status:			Weather Condition:		
Inspector:		Date:		Time:	
Construction Sequence		Satisfactory/ Unsatisfactory		Comments	
etc.					
Excavated to proper cross-section, side slopes and bottom width					
Entrance channel, crest, and exit channel constructed to design grades and elevations					
8. Outlet Protection					
A. End section					
Securely in place and properly backfilled					
B. Endwall					
Footing excavated or formed on stable subgrade, to design dimensions and reinforcing steel set, if specified					
Endwall formed to design dimensions with reinforcing steel set as per plan					
Concrete of an approved mix and vibrated into place (protected from freezing, if necessary)					
Forms stripped and structure inspected for "honeycomb" prior to backfilling; parge if necessary					
C. Riprap apron / channel					
Apron / channel excavated to design crosssection with proper transition to existing ground					
Filter fabric in place					
Stone sized as per plan and uniformly place at the thickness specified					
9. Vegetative Stabilization					
Approved seed mixture or sod					
Proper surface preparation and required soil amendments					

**STORMWATER POND/ WETLAND
CONSTRUCTION INSPECTION CHECKLIST**

Project Name:			Location:		
Site Status:			Weather Condition:		
Inspector:		Date:		Time:	
Construction Sequence		Satisfactory/ Unsatisfactory		Comments	
Excelsior mat or other stabilization, as per plan					
10. Miscellaneous					
Drain for ponds having a permanent pool					
Trash protection for low flow pipes, orifices, etc.					
Fencing (when required)					
Access road					
Set aside for clean-out maintenance					
11. Stormwater Wetlands					
Adequate water balance					
Variety of depth zones present					
Approved pondscaping plan in place Reinforcement budget for additional plantings					
Plants and materials ordered 6 months prior to construction					
Construction planned to allow for adequate planting and establishment of plant community (April-June planting window)					
Wetland buffer area preserved to maximum extent possible					

**STORMWATER POND/ WETLAND
CONSTRUCTION INSPECTION CHECKLIST**

Project Name:

Location:

Site Status:

**Weather
Condition:**

Inspector:

Date:

Time:

Construction Sequence	Satisfactory/ Unsatisfactory	Comments
-----------------------	---------------------------------	----------

Comments:

Actions to be Taken:

BIORETENTION CONSTRUCTION INSPECTION CHECKLIST		
Project Name:		Location:
Site Status:		Weather Condition:
Inspector:	Date:	Time:
Construction Sequence	Satisfactory/ Unsatisfactory	Comments
1. Pre-Construction		
Pre-construction meeting		
Runoff diverted		
Facility area cleared		
If designed as exfilter, soil testing for permeability		
Facility location staked out		
2. Excavation		
Size and location		
Lateral slopes completely level		
If designed as exfilter, ensure that excavation does not compact susoils.		
Longitudinal slopes within design range		
3. Structural Components		
Stone diaphragm installed correctly		
Outlets installed correctly		
Underdrain		
Pretreatment devices installed		
Soil bed composition and texture		
4. Vegetation		
Complies with planting specs		
Topsoil adequate in composition and placement		
Adequate erosion control measures in place		

BIORETENTION CONSTRUCTION INSPECTION CHECKLIST

Project Name:		Location:
Site Status:		Weather Condition:
Inspector:	Date:	Time:
Construction Sequence	Satisfactory/ Unsatisfactory	Comments
5. Final Inspection		
Dimensions		
Proper stone diaphragm		
Proper outlet		
Soil/ filter bed permeability testing		
Effective stand of vegetation and stabilization		
Construction generated sediments removed		
Contributing watershed stabilized before flow is diverted to the practice		

Comments:

Actions to be Taken:

SWPPP APPENDIX I
INSPECTION AND MAINTENANCE FORMS FOR POST-CONSTRUCTION PRACTICES
STORMWATER POND/CREATED WETLAND

STORMWATER POND/ WETLAND		
Project Name:		Location:
Site Status:		Weather Condition:
Inspector:	Date:	Time:
Maintenance Item	Satisfactory/ Unsatisfactory	Comments
Embankment and emergency spillway (Annual, After Major Storms)		
1. Vegetation and ground cover adequate		
2. Embankment erosion		
3. Animal burrows		
4. Unauthorized planting		
5. Cracking, bulging, or sliding of dam		
a. Upstream face		
b. Downstream face		
c. At or beyond toe downstream/downstream		
d. Emergency spillway		
6. Pond, toe & chimney drains clear and functioning		
7. Seeps/leaks on downstream face		
8. Slope protection or riprap failure		
9. Vertical/horizontal alignment of top of dam As-Built		
10. Emergency spillway clear of obstructions and debris		
Riser and principal spillway (Annual)		
Type: Reinforced concrete _____		
Corrugated pipe _____		
1. Low flow orifice obstructed		

STORMWATER POND/ WETLAND

Project Name:		Location:	
Site Status:		Weather Condition:	
Inspector:	Date:	Time:	
Maintenance Item	Satisfactory/ Unsatisfactory	Comments	
2. Low flow trash rack.			
a. Debris removal necessary			
b. Corrosion control			
3. Weir trash rack maintenance			
a. Debris removal necessary			
b. corrosion control			
4. Excessive sediment accumulation insider riser			
5. Concrete/masonry condition riser and barrels			
a. cracks or displacement			
b. Minor spalling (<1")			
c. Major spalling (exposed rebar)			
d. Joint failures			
e. Water tightness			
6. Metal pipe condition			
7. Control valve			
a. Operational/exercised			
b. Chained and locked			
8. Pond drain valve			
a. Operational/exercised			
b. Chained and locked			
9. Outfall channels functioning			

STORMWATER POND/WETLAND		
Project Name:		Location:
Site Status:		Weather Condition:
Inspector:	Date:	Time:
Maintenance Item	Satisfactory/ Unsatisfactory	Comments
Permanent Pool (Wet Ponds) (monthly)		
1. Undesirable vegetative growth		
2. Floating or floatable debris removal required		
3. Visible pollution		
4. Shoreline problem		
Sediment Forebay		
1. Sedimentation noted		
2. Sediment cleanout when depth < 50% design depth		
Dry Pond Areas		
1. Vegetation adequate		
2. Undesirable vegetative growth		
3. Undesirable woody vegetation		
4. Low flow channels clear of obstructions		
5. Standing water or wet spots		
6. Sediment and / or trash accumulation		
Condition of Outfalls (Annual, After Major Storms)		
1. Riprap failures		
2. Slope erosion		
3. Storm drain pipes		
4. Endwalls / Headwalls		

STORMWATER POND/ WETLAND

Project Name:			Location:		
Site Status:			Weather Condition:		
Inspector:		Date:		Time:	
Maintenance Item		Satisfactory/ Unsatisfactory		Comments	
Other (monthly)					
1. Encroachment on pond, wetland or easement area					
2. Complaints from residents					
3. Aesthetics					
a. Grass growing required					
b. Graffiti removal needed					
4. Conditions of maintenance access routes.					
5. Signs of hydrocarbon build-up					
6. Any public hazards (specify)					
Wetland Vegetation (Annual)					
1. Vegetation healthy and growing					
Wetland maintaining 50% surface area coverage of wetland plants after the second growing season. (If unsatisfactory, reinforcement plantings needed)					
2. Dominant wetland plants:					
Survival of desired wetland plant species					
Distribution according to landscaping plan?					
3. Evidence of invasive species					
4. Maintenance of adequate water depths for desired wetland plant species					
5. Harvesting of emergent plantings needed					
6. Have sediment accumulations reduced pool volume significantly or are plants choked with sediment?					

STORMWATER POND/ WETLAND

Project Name:

Location:

Site Status:

**Weather
Condition:**

Inspector:

Date:

Time:

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
7. Eutrophication level of the wetland.		

Comments:

Actions to be Taken:
