Partial Development & Management Plan For:
Quinebaug Solar, LLC
Connecticut Siting Council Petition 1310A

Substation, Switchyard and Project Clearing

October 8, 2020

TETRA TECH

TABLE OF CONTENTS

LIST OF ATTACHMENTS

1 INTRODUCTION

On April 23, 2020, the Connecticut Siting Council (Council) issued the Decision and Order approving the Modified Quinebaug Solar, LLC (Quinebaug Solar) Petition (Petition No. 1310A) pursuant to Connecticut General Statues §4-176 and §16-50k, for the proposed construction, maintenance and operation of an approximately 50 megawatt alternating current solar photovoltaic electric generating facility. Quinebaug Solar consists of approximately 561 acres comprised of 29 separate and abutting privately-owned parcels located generally north of Wauregan Road in Canterbury, Connecticut, and south of Rukstella Road and Allen Hill Road in Brooklyn, Connecticut (Project or Project Site).

This partial Development and Management (D&M) Plan is being provided in compliance with §16-50j-60 through §16-50j-62 of the Regulations of Connecticut State Agencies, and serves to meet the requirements of the Council's Decision and Order as they pertain to site clearing and construction of the Quinebaug Solar Substation and Switchyard. This partial D&M plan is being filed now due to the need to begin clearing within the window allowed for protection of tree-roosting bat species, as well as the long lead time required for construction of the Collector Substation and Canterbury Switching Station. The remaining D&M requirements outlined in the Decision and Order will be filed with the Council at a later date. Figures pertinent to this partial D&M Plan are provided in Attachment A, including Figure 1, which provides an overview map of the Project site.

2 DEVELOPMENT AND MANAGEMENT PLAN

a. Site Plans

The delineation of tree clearing areas for the Project are provided in Attachment A, Figure 4. The final civil drawings for the Substation and Switchyard are included in Attachment B.

b. Final Construction Hours and Schedule

Construction of the Substation and Switchyard will begin in November 2020. Construction hours will be Monday through Saturday between 7:00 a.m. and 7:00 p.m. Work on Sundays would occur on an as-needed basis, and occur between 8:00 a.m. and 5:00 p.m. Construction of the Substation and Switchyard are expected to be completed by October 2021, with the exception of punch list items and final establishment of vegetation cover, which is expected to be completed by Spring 2022. A high-level Project sequence is as follows:

Pre-Construction

1. Mobilize site contractors.
2. Pre-construction meetings.
3. Demarcation of Project work areas and buffer areas.
4. Environmental restriction and safety training for all site personnel.

Construction Phasing - Substation

- Stage 1 – Civil preparations
- Stage 2 – Construction

- Stage 3 – Commissioning

Additional details on substation construction phasing is provided in the Stormwater Pollution Control Plan (SWPCP) in Attachment C.

c. Construction Traffic Control Plan

During construction, access to the Project Site will utilize the two existing access points located along Wauregan Road. Access to the Substation and Switchyard area will be from Wauregan Road.

To minimize the potential for traffic issues during construction, Project construction contractors are responsible for access and traffic control measures, working with representatives from the towns of Brooklyn and Canterbury, as necessary. Such measures will include procedures for safe ingress and egress of construction equipment and other vehicles, such as implementing traffic control patterns if any vehicle or work area protrudes onto any part of a travel lane or shoulder. Since the Project does not propose any work within a travel lane or shoulder, traffic control patterns are not expected to be necessary.

Signs will be erected to identify active construction zones. Construction signage will be consistent with the federal, state and local standards. Signs shall be placed in a position that allows motorists the opportunity to reduce their speed prior to the work area, and will be installed on the same side of the roadway as the work area.

Major equipment and materials will be delivered directly to the Project Site, and the material staging area located directly adjacent to the Substation and Switchyard areas (Attachment A, Figure 2). During construction, there will be a temporary increase in the amount of truck traffic for delivering materials, pouring concrete and removing spoils. To help mitigate traffic issues at the Project Site for the entrance on Wauregan Road, a Town of Canterbury Police Officer or a certified flagger (if Town police officers are unavailable) may be posted at the entrance depending on the type and level of activity.

Contractors for Quinebaug Solar will be responsible for providing notice to the towns of any projected heavy truck traffic days (e.g., material deliveries involving semi-trucks, large concrete pours or hauling out large amounts of spoils).

Delivery of large equipment for the Substation and Switchyard (transformers, control enclosure, and distribution switchgear) will be subject to oversize load permits issued by Connecticut Department of Transportation. Quinebaug Solar and Project contractors will work closely with the towns to coordinate these large deliveries. No underground facilities are present on site within the development area for the Substation and Switchyard, and therefore none will be crossed by any construction or delivery equipment.

d. Department of Energy and Environmental Protection (DEEP) General Permit Registration

Quinebaug Solar is currently working with the Connecticut Department of Energy and Environmental Protection (DEEP) on a General Permit registration and will provide this to the Council upon receipt. The Project's registration was filed on July 19, 2020 and Quinebaug Solar has been in communication with representatives from DEEP during the review process. Registration is anticipated to be received in mid-October, prior to any construction activities occurring on the site. Quinebaug Solar respectfully requests the Council's approval of this partial D&M Plan, contingent on approval of the General Permit Registration from DEEP.

e. Stormwater Pollution Control Plan

A copy of the SWPCP is provided in Attachment C, and this plan is currently under review by DEEP.

f. Clearing, Grubbing, Stabilization, and Stormwater Phasing Plan

This partial D&M Plan covers clearing for the entire Project Site. Quinebaug Solar is proposing to clear forested areas without stumping or grubbing. All earth-disturbing activities will be deferred until the Project receives approval of the SWPCP from DEEP. Proposed clearing activities for the purpose of this partial D&M plan include clearing trees above-ground (retain stumps) in frozen conditions. If reliably frozen conditions do not exist, or if the tree cutting operation will result in ground disturbance or rutting, stormwater controls will be installed prior to any ground disturbance, in accordance with the Project's Soil Erosion and Sediment Control Plans.

Attachment A, Figure 3 represents the areas where vegetation will be removed during the clearing phase of the Project. These clearing limits have been reduced since the site plan was submitted to the Council and the DEEP Natural Diversity Data Base (NDDB) program. This reduction in required clearing enhances the Project commitments made by Quinebaug Solar to protect herpetofauna including eastern spadefoot toad (*Scaphiopus holbrookii*). The amount of clearing has been reduced from 73 acres to 55 acres due to layout changes that are currently underway. All clearing will occur within the Project footprint as approved by the Council in the April 24 Decision and Order.

Prior to site clearing, limits of clearing and delineated natural resources boundaries will be clearly marked in the field. Clearing around resources will occur in accordance with the conditions included in the Final Determination issued by the DEEP NDDB Program.

One small wetland occurs within proximity of the Project Substation, which is located approximately 200 feet north of the Substation at its closest point. This small, isolated wetland is located at the toe of slope of the berm where the existing transmission line crosses through the parcel. No construction vehicles will cross this wetland or any other watercourse on the Project site. While no clearing is required in this area, proper sediment and erosion controls will be installed around the Substation workspace prior to construction to prevent any erosion and sedimentation into this natural resource. As noted above, prior to clearing activities, all natural resources and approved buffers will be clearly marked in the field to identify resource boundaries and to provide a visual aid to construction contractors working in and around sensitive areas.

Grubbing, site stabilization and stormwater phasing plans will be covered in the final D&M plan to be provided to the Council at a later date.

g. DEEP-approved Stormwater Management Plan

The Project's stormwater management plan is currently under review by DEEP and will be provided to the Council upon receipt.

h. Compliance with the DEEP Natural Diversity Database Final Determination

To comply with the March 5, 2020 DEEP NDDB Final Determination, the following items will commence approximately around the time that winter clearing activities are completed (November 1 through March 31:

- An on-site environmental monitor will be employed to monitor American kestrel (*Falco sparverius*) activity and guide construction personnel on avoidance activities required for this species. Commencement of monitoring will coincide with the start of the American kestrel nesting season (March 1 to July 30);
- Exclusion fencing will be installed at the onset of the spring amphibian migratory season, in early March, with installation activities completed prior to the time amphibian migration activities around vernal pools begins on the Project site. On-site monitoring of vernal pools, eastern spadefoot toad (*Scaphiopus holbrookii*), and other listed wildlife species will commence with the installation of exclusion fencing and will continue throughout the summer of 2021. Additional details on environmental monitoring requirements will be provided in the final D&M Plan;
- No clearing will occur within the any of the mapped resource protection areas (Attachment D, Figure 2);
- Remaining compliance requirements identified in the NDDB Final Determination will be provided in the final D&M plan to be submitted at a later date.

The final, NDDB approved, Eastern Spadefoot Toad Protection Summary is provided in Attachment D

i. Compliance with DEEP Stormwater Guidance

As mentioned above, Quinebaug Solar is currently working with DEEP on a General Permit registration and will provide it to the Council upon receipt. This document was filed on July 19, 2020 and registration is anticipated in mid-October, prior to any construction activities on the site.

j. Vegetation Management Plan

Section 3(f) above provides details on site clearing. Limited tree removal and trimming of branches may be required within the Connecticut Light and Power Company d/b/a Eversource Energy (Eversource) right-of-way (ROW). A vegetation management plan will be filed as part of the final D&M plan at a later date.

k. Invasive Species Management Plan

A vegetation management plan will be filed with the final D&M plan at a later date, and will include management of invasive plant species.

l. Pollinator Species Plans

Pollinator plants associated with the planting plan will be provided in the vegetation management plan as part of the final D&M plan to be filed at a later date.

Timber Salvaging Plan

The clearing contractor will have the rights to the salvage value of marketable timber. Any snag/hazard trees in the clearing area will be removed. Quinebaug Solar anticipates repurposing excess soil, stump, and non-marketable wood material on site as much as practical. Any excess material as a result of construction will be properly managed at a designated location within the Project Site (i.e., laydown areas).

Herbicide Use Plan

Within the solar array areas, mowing and trimming is the preferred and primary method to manage vegetation on site. Herbicides may be used as a secondary means of control where necessary. All applications would be handled in spot treatment method and target specific discrete locations; broadcast aerial application of herbicides is not anticipated. Herbicides are only to be used to prevent potential fire hazards and to treat invasive species that cannot be managed with mechanical control. Any herbicide use will comply with the regulations and requirements of DEEP's Pesticide Management Program.

Historical and Archaeological Resource Plan

Quinebaug Solar will follow the historical and archaeological resource protocol approved in the Council's Decision and Order, as well as the those included in the January 9, 2020 correspondence sent to Quinebaug Solar by the State Historic Preservation Office.

3 PROJECT PARCELS

In summary, the proposed lease and purchase arrangements for all Project parcels has not changed from the original Petition. Below is an explanation of ownership and land agreements in relation to the Collector Substation and Canterbury Switching Station.

The Project Substation and Canterbury Switching Station will be subdivided from the existing 60-acre parcel. The land occupied by the Collector Substation will be subdivided, with portions to be owned by a third party; and the Canterbury Switching Station will be subdivided and owned and operated by Eversource (see Attachment A, Figures 2 and 3 for details). The transmission tap line will be granted to Eversource through an easement. Eversource will install two 95-foot tall single-circuit weathering steel dead-end structures (Tap Structures) within the ROW.

Temporary laydown and workspaces for the Substation and Switchyard will be located directly adjacent to the Collector Substation and Canterbury Switching Station for use during construction. This area is identified in Attachment A, Figure 2.

Quinebaug Solar will transfer fee ownership of approximately 0.64 acres of land (Attachment A, Figure 2) comprising the area where the Collector Substation facilities will be installed to a third party, pursuant to a separate commercial agreement, following the Council's approval of this partial D&M Plan. Quinebaug Solar will continue to own and have rights in the Collector Substation facilities pursuant to a long-term easement agreement with a third party. Eversource will be granted a perpetual easement to access the Project Site to install transmission facilities and conduct regular maintenance of the Canterbury Switching Station (Attachment A, Figure 3) and associated infrastructure.

4 PROJECT INTERCONNECTION

Collector Substation

The Quinebaug Collector Substation will include a generator step-up transformer (GSU), which will receive the Project's output from 34.5 kV collection cable lines and step-up the voltage to the interconnection voltage of 115 kV. The Collector Substation also will include a high-voltage circuit breaker for interruption of fault current and a disconnect switch for manual isolation. Instrument transformers will be installed for the protection and control of facilities and communication equipment.

A transmission feeder line will deliver the Project's energy from the high voltage side of the GSU (115 kV) to the point of interconnection (POI) at the new Eversource Canterbury Switching Station.

Electrical Interconnection

The Project holds Independent System Operator-New England (ISO-NE) Generation Interconnection Queue Positions #588 and #841. The Project's ISO-NE System Impact Study report (issued July 16, 2018) concluded the Project, along with identified network upgrades, has no adverse effect on ISO-NE transmission system. Section I.3.9 approval was received from ISO-NE on October 24, 2018. Quinebaug Solar entered into a large generator interconnection agreement with ISO-NE and Eversource on February 4, 2019.

Quinebaug Solar's POI into the ISO-NE grid is the 115-kV bus at Eversource's existing 1607 Transmission Line, in Canterbury, Connecticut. The Project will deliver output to the POI via a transmission feeder bus originating from the Project's Collector Substation, which will be constructed adjacent to Eversource's 1607 Line. The Project also will require a new switching station that will be constructed, operated and owned by Eversource.

Pursuant to the large generator interconnection agreement, Eversource will design, construct, own, and maintain the transmission line structures, and Canterbury Switching Station. Quinebaug Solar will design, construct, own, and maintain the Collector Substation up to the point of change of ownership located on the Collector Substation's bus leading to the Eversource switching station ring bus.

Eversource Canterbury Switching Station

Eversource will construct a new 115 kV switching station on Wauregan Road in Canterbury (Canterbury 67F), across the road from the Project. The switching station area is approximately 1 acre in size, and is located on the east side of a larger parcel that is currently being used as an active gravel yard. The new switching station, to be designated by Eversource as the Canterbury Switching Station, will consist of four 115 kV circuit breakers arranged in a ring bus configuration. Additional components will include two 115 kV line terminals, 115 kV generator lead bus, capacitive-coupled voltage transformers, station service voltage transformers, motor operated disconnect switches, manually operated disconnect switches, wave traps, surge arresters, and a relay and control enclosure approximately 24 feet by 36 feet in size. Within the control enclosure, the switching station also will include a station battery, supervisory control and data acquisition equipment, digital fault recorder, and relay and control panels.

5 PROJECT EQUIPMENT

Collector Substation Equipment

The following is a list of equipment associated with the Collector Substation:

- 34.5 kV to 115 kV GSU transformer;
- High voltage circuit breaker;
- Disconnect switch and instrument transformers;
- Control enclosure;
- Static mast (70-feet); and

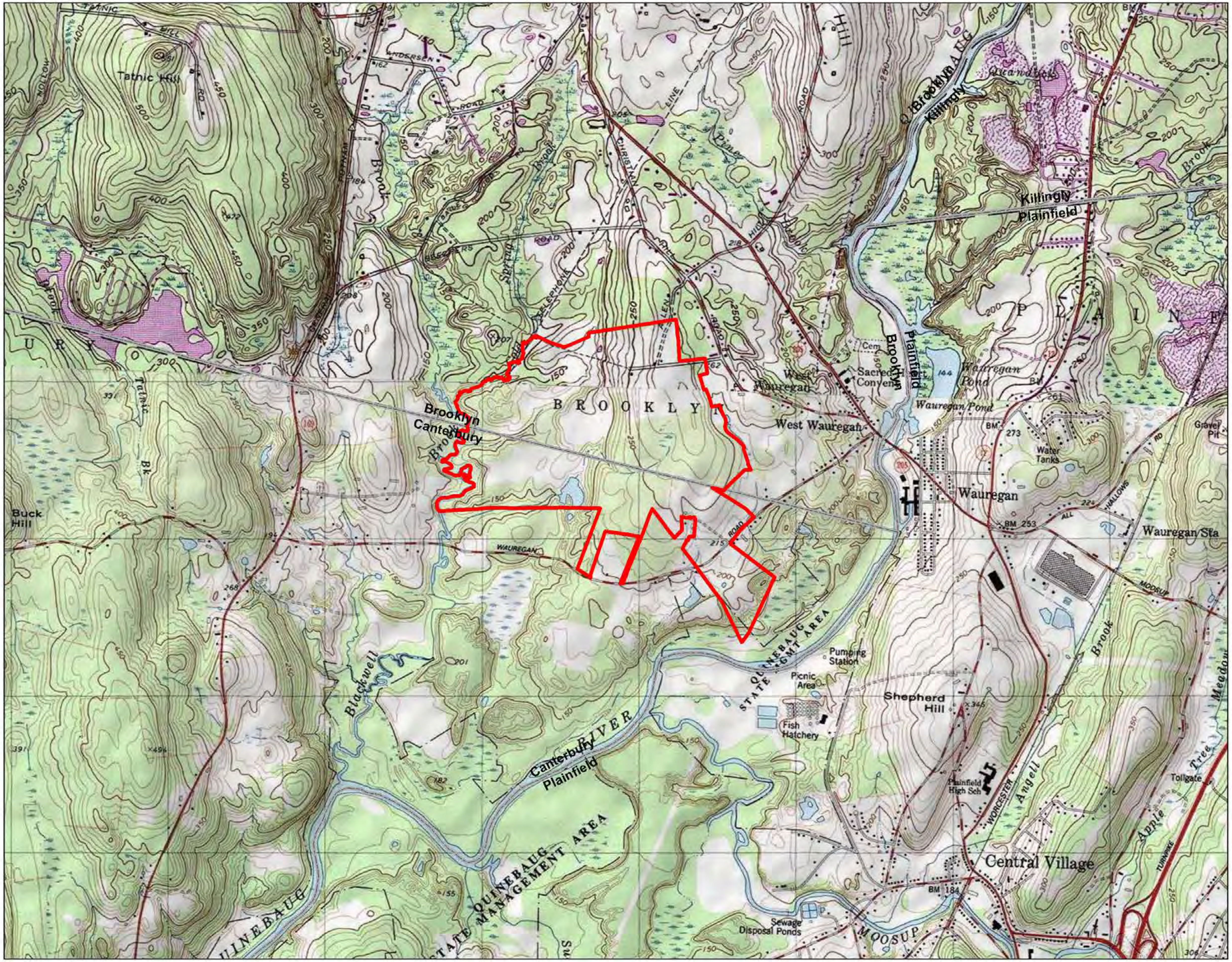
- Termination structure (60-feet).

Switchyard Equipment

The following is a list of equipment associated with the Switchyard:

- Three 115 kV circuit breakers with foundations;
- Six circuit breakers manually operated disconnect switches;
- Three motor operated disconnect switches;
- Three station service voltage transformers;
- Nine capacitor coupled voltage transformers;
- One wave tap;
- Two line terminal structures;
- Bus work, bus support and switch support structures and foundations;
- 24 x 40 x 12-foot pre-fabricated control enclosure; and
- Lightning masts.

ATTACHMENT A – FIGURES



Legend

Study Area

Town Boundary

N

0 1,000 2,000 4,000 Feet

Figure 1. Project Location
Quinebaug Solar Project
Brooklyn/Canterbury, CT

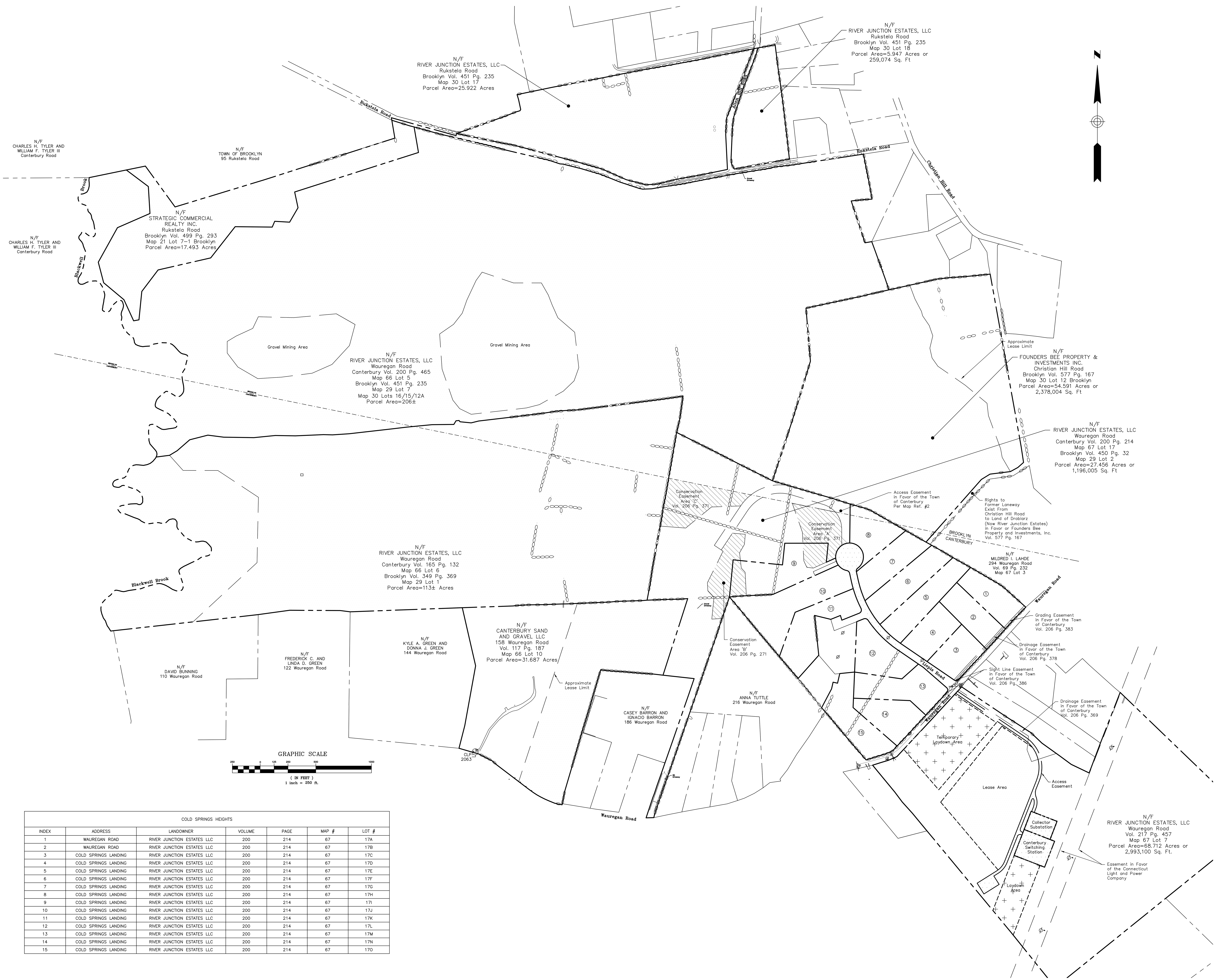
Prepared For: NEXTera ENERGY TRANSMISSION

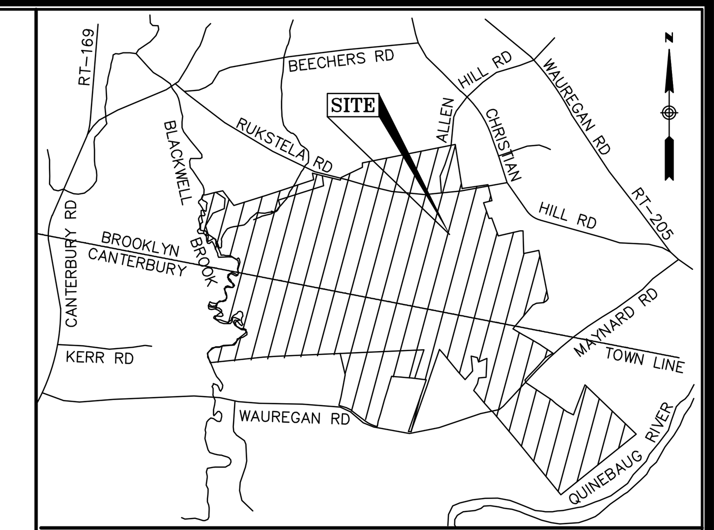
Prepared By: TETRA TECH

Date: 03/2019

Source: ESRI Imagery 2016; NextEra 2017

Coordinate System: North American Datum 83
Universal Transverse Mercator, Zone 19 North





LOCUS MAP
(N.T.S.)

COLD SPRINGS HEIGHTS						
INDEX	ADDRESS	LANDOWNER	VOLUME	PAGE	MAP #	LOT #
1	WAUREGAN ROAD	RIVER JUNCTION ESTATES LLC	200	214	67	17A
2	WAUREGAN ROAD	RIVER JUNCTION ESTATES LLC	200	214	67	17B
3	COLD SPRINGS LANDING	RIVER JUNCTION ESTATES LLC	200	214	67	17C
4	COLD SPRINGS LANDING	RIVER JUNCTION ESTATES LLC	200	214	67	17D
5	COLD SPRINGS LANDING	RIVER JUNCTION ESTATES LLC	200	214	67	17E
6	COLD SPRINGS LANDING	RIVER JUNCTION ESTATES LLC	200	214	67	17F
7	COLD SPRINGS LANDING	RIVER JUNCTION ESTATES LLC	200	214	67	17G
8	COLD SPRINGS LANDING	RIVER JUNCTION ESTATES LLC	200	214	67	17H
9	COLD SPRINGS LANDING	RIVER JUNCTION ESTATES LLC	200	214	67	17I
10	COLD SPRINGS LANDING	RIVER JUNCTION ESTATES LLC	200	214	67	17J
11	COLD SPRINGS LANDING	RIVER JUNCTION ESTATES LLC	200	214	67	17K
12	COLD SPRINGS LANDING	RIVER JUNCTION ESTATES LLC	200	214	67	17L
13	COLD SPRINGS LANDING	RIVER JUNCTION ESTATES LLC	200	214	67	17M
14	COLD SPRINGS LANDING	RIVER JUNCTION ESTATES LLC	200	214	67	17N
15	COLD SPRINGS LANDING	RIVER JUNCTION ESTATES LLC	200	214	67	17O

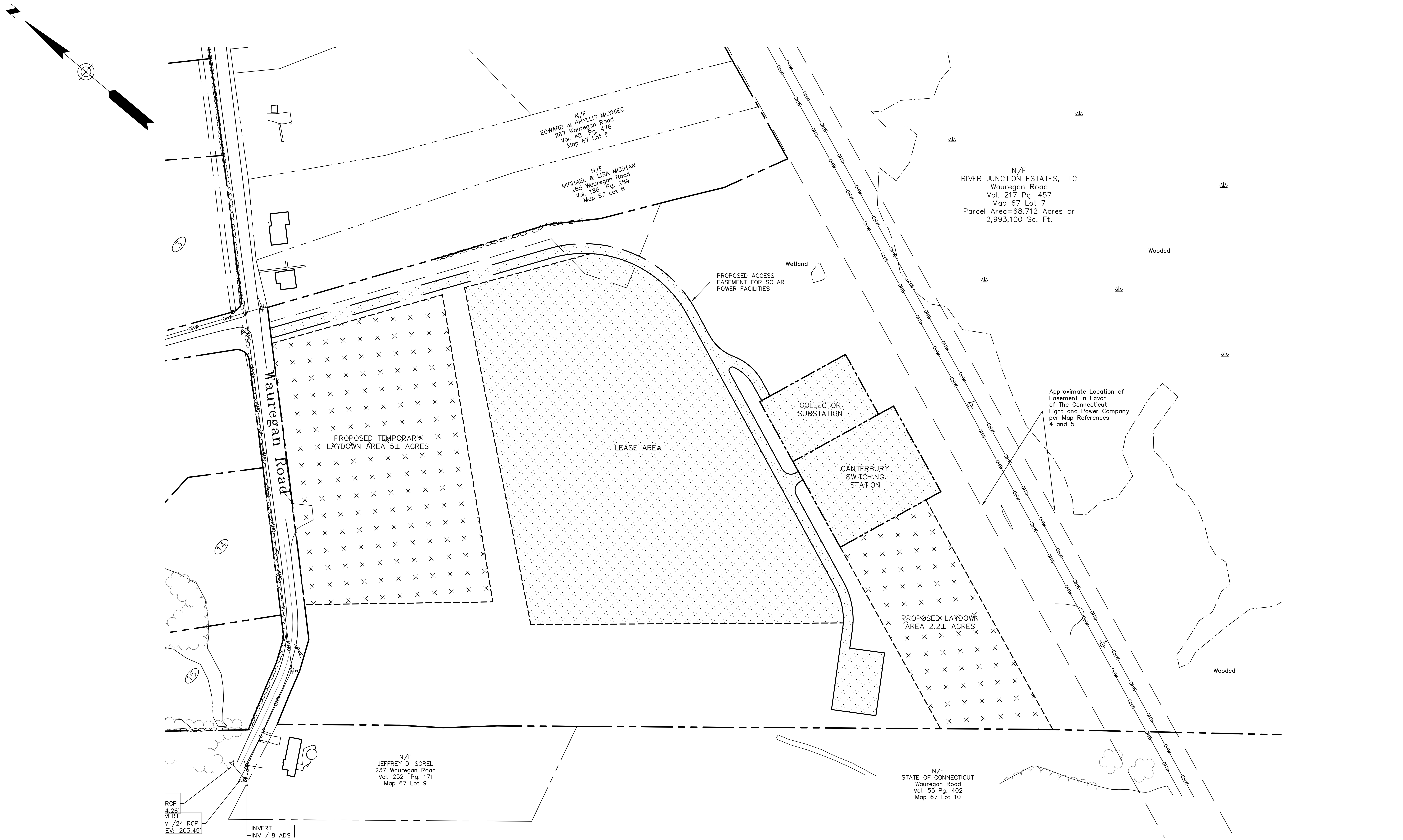
REVISION

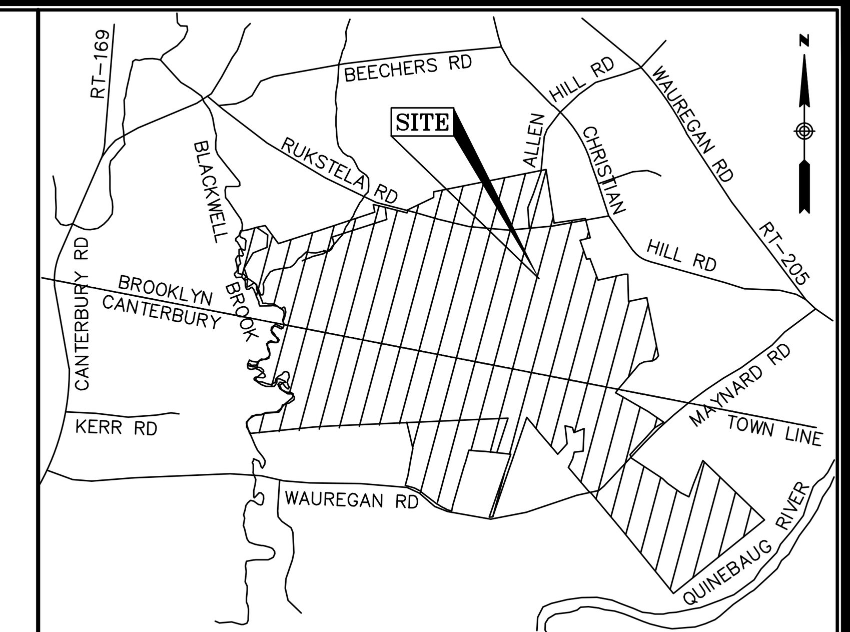
DATE	DESCRIPTION
--/--/--	---

QUINEBAUG SOLAR PROJECT
CANTERBURY AND BROOKLYN
CONNECTICUT

WSP USA Inc.
500 Winding Brook Dr,
Connecticut, CT 06033
860.659.0444

Drawn By	MG	Date September 23, 2019	Job No. 190226A
Surveyed By	N/A		
Checked By	MG	Scale 1" = 250'	Sheet No. 1 OF 1
Book No.	N/A		





LOCUS MAP
(N.T.S.)

LEGEND

ABUTTERS LOT LINE
PROPERTY LINE
EASEMENT
OVERHEAD WIRES
STONE WALL
TREE LINE
WETLAND LINE
UTILITY POLE
DECIDUOUS TREE
CONIFER TREE
SIGN (SINGLE POSTED)
SIGN (DOUBLE POSTED)
MAILBOX
BENCHMARK
WETLANDS
SOLAR POWER FACILITIES AREA
LAYDOWN AREA

GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 100 ft.

REVISION

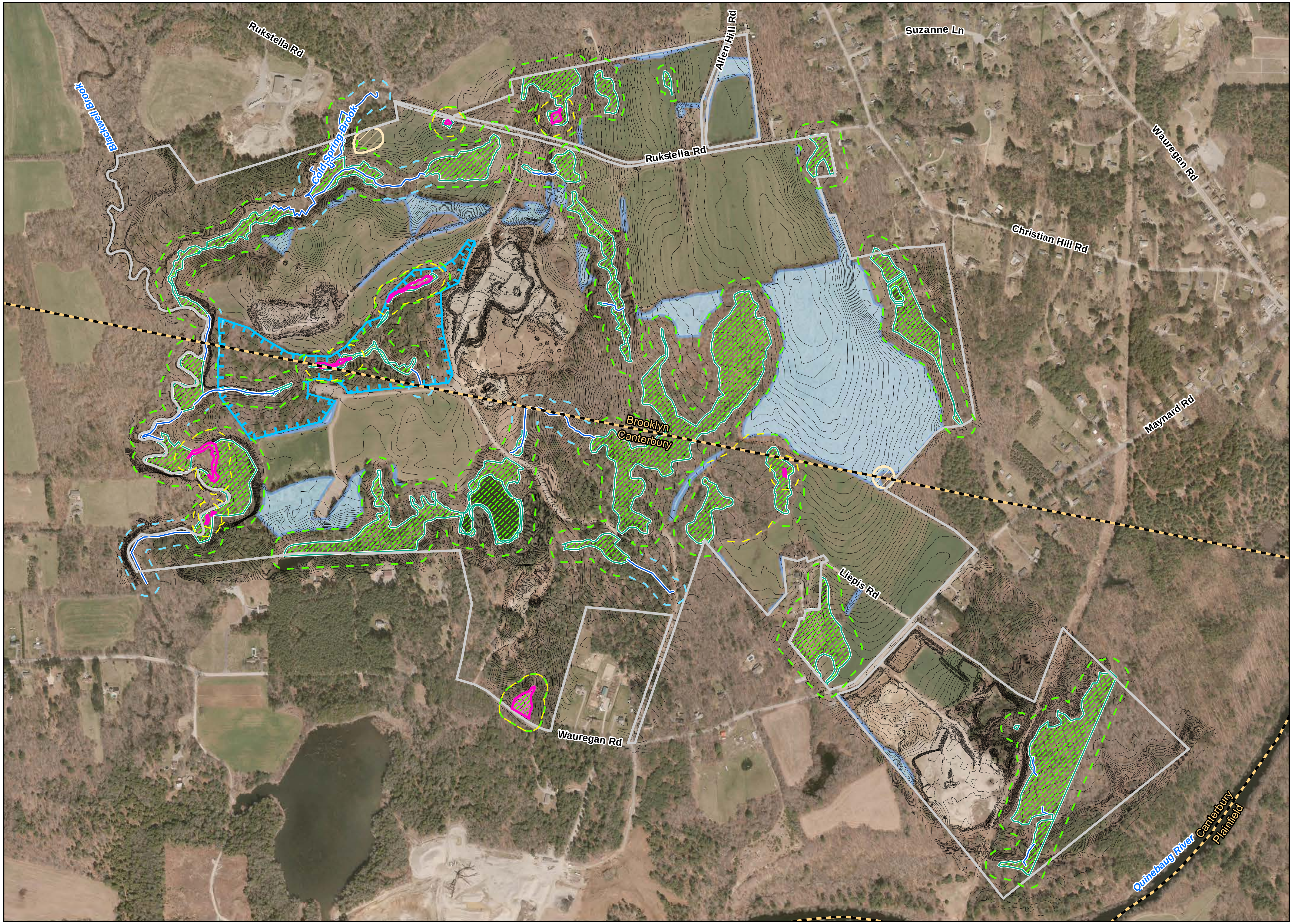
DATE	DESCRIPTION
08/14/2020	REVISED LABELING AND HATCH STYLES

LAND OF
RIVER JUNCTION ESTATES, LLC,
WAUREGAN AND RUKSTELA ROADS
BROOKLYN, CONNECTICUT

wsp

WSP USA Inc.
500 Winding Brook Dr, 1st Floor
Glastonbury, CT 06033
860-659-0444

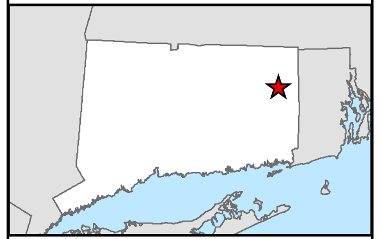
Drawn By ZM	Date		Job No.
Surveyed By JG/ZM	FEBRUARY 28, 2020		190226A
Checked By MG	Scale		Sheet No.
Book No. N/A	1" = 100'		2 OF 2

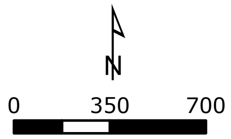


LIMIT OF VEGETATION CLEARING

- Project Site
- Watercourse Buffer
- Wetland Buffer
- Directional Buffer / 100' Vernal Pool Envelope
- 2-foot Contour
- Watercourse
- Wetland Boundary
- Wetland Area
- Herpetofauna Exclusion Area
- Vernal Pool
- Cultural Area
- Limit of Vegetation Clearing
- CT Municipal Boundary

LOCUS MAP





1 in = 700 ft

NOTES

1. Based on 2016 Statewide Orthophotography, Courtesy of CTECO.

Quinebaug Solar
Brooklyn & Canterbury, Connecticut

September 2020

Tighe&Bond
Engineers | Environmental Specialists

V:\Projects\R\R0317\QuinebaugCT_Solar\Maps\FilingFigures_Updated\D&M_Figures\LimitsofVegetationClearing_QuinebaugCT.mxd

R-0317

ATTACHMENT B – QUINEBAUG SOLAR PROJECT SUBSTATION CONSTRUCTION DRAWINGS

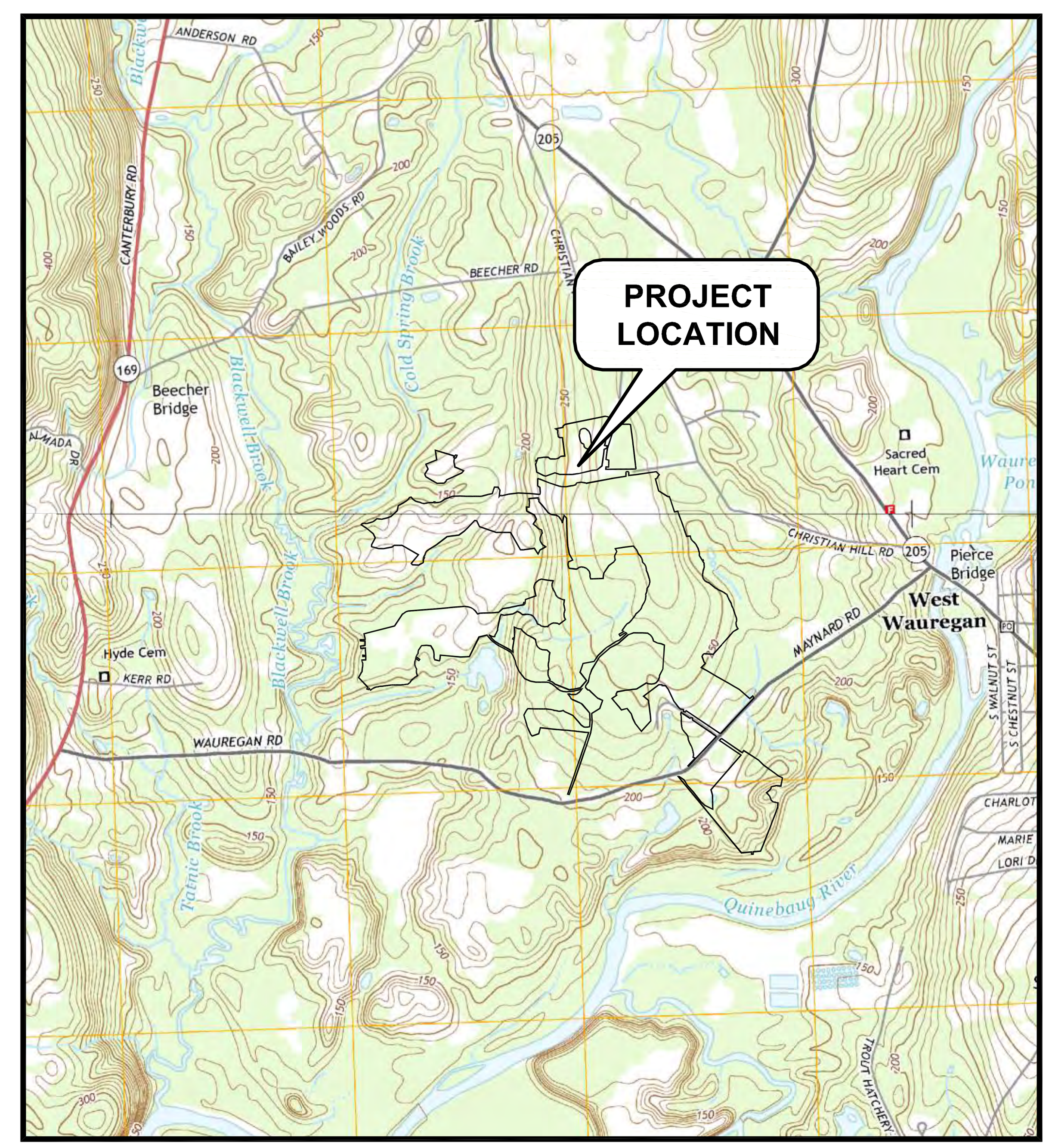
QUINEBAUG SOLAR PROJECT

SUBSTATION CONSTRUCTION DRAWINGS

BROOKLYN AND CANTERBURY, CONNECTICUT

OCTOBER 2020

SHEET NO.	SHEET TITLE
	COVER SHEET
G-001	NOTES AND LEGEND
C-001	EXISTING CONDITIONS AND DEMOLITION PLAN
C-002	PROPOSED CONDITIONS PLAN
C-003	DETAILS



SCALE: 1" = 2,000'

PREPARED BY:

Tighe&Bond

STATE OF CONNECTICUT FRANCIS J. HOEY No. 21807 LICENSED PROFESSIONAL ENGINEER
10.07.2020
FRANCIS J. HOEY III, PE

STATE OF CONNECTICUT BRIAN S. HUNTLEY No. 31180 LICENSED PROFESSIONAL ENGINEER
10-7-20
BRIAN S. HUNTLEY, PE

DEVELOPER
QUINEBAUG SOLAR, LLC
C/O NEXTERA ENERGY RESOURCES, LLC
700 UNIVERSE BOULEVARD
JUNO BEACH, FL 33408

ENGINEER
TIGHE & BOND
213 COURT STREET, #1100
MIDDLETOWN, CONNECTICUT 06457

COMPLETE SET 5 SHEETS

LEGEND

DESCRIPTION	EXISTING	PROPOSED
PROPERTY LINE		
PROPERTY LINE SETBACK		
EASEMENT LINE		
LIMITS OF WORK		
TOWN BOUNDARY		
INTERMEDIATE CONTOURS	124	222
INDEX CONTOURS	120	220
SPOT GRADE	262.69	262.69
MAGNITUDE & DIRECTION OF SLOPE		2%
WATER LINE	W	W
GRAVEL ROAD/DRIVEWAY		
GRAVITY SANITARY SEWER	S	S
SANITARY FORCE MAIN	SFM	SFM
STORM DRAIN	D	D
GAS LINE	G	G
UNDERGROUND ELECTRIC LINE	E	E
OVERHEAD ELECTRIC LINE	OHW	OHW
CHAIN LINK FENCE		
GUARDRAIL		
TREE LINE		
TIER 1 PLANTINGS		
TIER 2 PLANTINGS		
TIER 3 PLANTINGS		
CATCH BASIN	CB	
DRAIN MANHOLE		
ELECTRIC MANHOLE		
SEWER MANHOLE		
TEL-COMM STRUCTURE		
UTILITY POLE		
LIGHT POLE		
WATER GATE		WV
HYDRANT		
SIGN		
FLARED END SECTION		
AREA OF PROPOSED TREE CLEARING - STUMPS TO REMAIN		
AREA OF PROPOSED TREE CLEARING AND GRUBBING		
CONSTRUCTION LAYDOWN AREA		
REMOVE/REMOVE AND DISPOSE		
WETLAND		
HORIZONTAL DIRECTIONAL DRILLING		
DIRECTIONAL BUFFER / 100' VERNAL POOL ENVELOPE		
HERPETOFAUNA PROTECTION AREA		
STONE WALL		
WETLAND BUFFER		
WATERCOURSE BUFFER		
DELINEATED WATERCOURSE		
VERNAL POOL		
DELINEATED WETLAND		
CONSTRUCTION LAYDOWN AREA		

ABBREVIATIONS

ABDN('D)	ABANDON(ED)
AC	ASBESTOS CEMENT PIPE
APPROX.	APPROXIMATE
BC	BITUMINOUS CURB
BFP	BACK FLOW PREVENTOR
BIT	BITUMINOUS
BL	BASELINE
BLDG	BUILDING
BND	BOUND
BOC	BOTTOM OF CURB
BOT	BOTTOM
BS	BOTTOM OF STEP
BW	BOTTOM OF WALL
CATV	CABLE TELEVISION
CB	CATCH BASIN
CEM	CEMENT
CI	CAST IRON PIPE
CL	CENTERLINE
CLF	CHAIN LINK FENCE
CO	CLEAN OUT
CONC	CONCRETE
CPP	CORRUGATED POLYETHYLENE PIPE
CY	CUBIC YARD
DH	DRILL HOLE
DHF	DRILL HOLE IN STONE REMAINS (FOUND)
DI	DUCTILE IRON PIPE
DIA	DIAMETER
DMH	DRAIN MANHOLE
E	EAST
EF	EACH FACE
EG	EXISTING GRADE
EL/ELEV	ELEVATION
ELEC	ELECTRIC
EMH	ELECTRIC MANHOLE
EOP	EDGE OF PAVEMENT
EW	EACH WAY
EXIST	EXISTING
FES	FLARED END SECTION
FF	FINISH FLOOR
FM	FORCE MAIN
G	GAS
GG	GAS GATE
GRAN	GRANITE
HC	HANDICAP
HDPE	HIGH DENSITY POLYETHELENE
HMA	HOT MIX ASPHALT
HYD	HYDRANT
IN	INCHES
INV	INVERT
IPF	IRON PIPE (FOUND)
IRF	IRON PIN (FOUND)
L	LENGTH OF CURB
LF	LINEAR FEET
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MON	MONUMENT
MJ	MECHANICAL JOINT
N	NORTH
NITC	NOT IN THIS CONTRACT
NTS	NOT TO SCALE
N/A	NOT APPLICABLE
N/F	NOW OR FORMERLY
OC	ON CENTER
OCS	OUTLET CONTROL STRUCTURE
OH	OVERHEAD
PB	PLANT BED
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PCPP	PERFORATED CORRUGATED POLYETHYLENE PIPE
PERF	PERFORATED
PI	POINT OF INTERSECTION
PRC	POINT OF REVERSE CURVATURE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE FOOT
PT	POINT OF TANGENCY
PVC	POLYVINYLCHLORIDE
PVMT	PAVEMENT
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
REV	REVISION
ROW	RIGHT OF WAY
RT	RIGHT
R&D	REMOVE AND DISPOSE
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
S	SOUTH
SAN	SANITARY
SB	TOWN LINE MONUMENT
SCH	SCHEDULE
SF	SQUARE FOOT
SMH	SEWER MANHOLE
SS	STAINLESS STEEL
STA	STATION
STL	STEEL
STRM	STORM
T	TANGENT LENGTH
TC	TOP OF CURB
TEL	TEL-DATA
TP	TEST PIT
TS	TOP OF STEP
TW	TOP OF WALL
TYP	TYPICAL
UP	UTILITY POLE
W	WATER
WG	WATER GATE
WV	WATER VALVE
XFMR	TRANSFORMER

GENERAL NOTES

1. PER CONNECTICUT LAW, CALL 811 (CALL BEFORE YOU DIG), THE MUNICIPALITY AND THE PROPERTY OWNER PRIOR TO ANY UNDERGROUND EXCAVATION ON SITE. SUBMIT THE CALL BEFORE YOU DIG VERIFICATION NUMBER TO THE APPROPRIATE MUNICIPALITY PRIOR TO ANY EXCAVATION, DEMOLITION AND REMOVAL OR CONSTRUCTION WORK.
2. OBTAIN, PAY FOR AND COMPLY WITH ADDITIONAL PERMITS, NOTICES AND FEES NECESSARY TO COMPLETE THE WORK. ARRANGE AND PAY FOR NECESSARY INSPECTIONS AND APPROVALS FROM THE AUTHORITIES HAVING JURISDICTION.
3. FIELD VERIFY EXISTING CONDITIONS PRIOR TO CONSTRUCTION. IF FIELD CONDITIONS ARE OBSERVED THAT SIGNIFICANTLY VARY FROM THOSE SHOWN ON THESE PLANS, IMMEDIATELY NOTIFY THE ENGINEER FOR RESOLUTION OF THE CONFLICTING INFORMATION.
4. LIGHT TEXT AND LINES INDICATE APPROXIMATE EXISTING CONDITIONS. BOLD TEXT AND LINES INDICATE PROPOSED WORK.
5. NOTIFY THE ENGINEER OF ANY EXISTING UTILITY DISCOVERED DURING THE WORK THAT IS NOT SHOWN ON THE DRAWINGS.
6. COMPLY WITH LATEST OSHA STANDARDS FOR EXCAVATION WORK. FOLLOW ALL REQUIREMENTS OF OSHA EXCAVATION STANDARDS INCLUDING, BUT NOT LIMITED TO, THE PROVISION FOR A COMPETENT PERSON ON SITE AND ANY REQUIRED DOCUMENTATION REQUIRES CERTIFICATION BY A PROFESSIONAL ENGINEER.
7. MAINTAIN ALL UTILITIES FUNCTIONING PROPERLY IN THE AREAS UNDER CONSTRUCTION PRIOR TO THE TIME WHEN FINAL WORK IS PUT INTO USE. LEAVE ALL PIPES AND STRUCTURES WITHIN THE LIMITS OF THIS CONTRACT IN A CLEAN AND OPERABLE CONDITION AT THE COMPLETION OF THE WORK. TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SAND AND SILT FROM DISTURBED AREAS FROM ENTERING THE SYSTEM. CONTRACTOR IS RESPONSIBLE FOR DAMAGE SUSTAINED TO ANY EXISTING UTILITIES AND IS RESPONSIBLE FOR REPAIRS THAT COMPLY WITH THE REQUIREMENTS OF THE MUNICIPALITY OR RESPECTIVE UTILITY COMPANY AT NO ADDITIONAL COST TO THE OWNER.
8. DISPOSE OF ANY AND ALL DEMOLISHED BUILDING MATERIALS, STORAGE TANKS, PAVEMENT, BITUMINOUS CURBING, CONCRETE, VEGETATION, SURPLUS MATERIAL, SITE RUBBLE AND OTHER DEMOLITION DEBRIS OFF-SITE IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.
9. LOAM AND SEED ALL DISTURBED AREAS UNLESS OTHERWISE SPECIFIED. OVER-EXCAVATE LOAM AND SEED AREAS AS REQUIRED TO PROVIDE REQUIRED LOAM DEPTH AND MEET ADJACENT GRADE.
10. TEST PITS TO LOCATE EXISTING UTILITIES ARE STRONGLY ENCOURAGE AND MAY BE ORDERED BY THE OWNERS PROJECT REPRESENTATIVE.
11. TAKE NECESSARY MEASURES AND PROVIDE CONTINUOUS BARRIERS OF SUFFICIENT TYPE, SIZE AND STRENGTH TO PREVENT ACCESS TO ALL WORK AND STAGING AREAS AT THE COMPLETION OF EACH DAY'S WORK.
12. STORE FUEL, OIL PAINT OR OTHER HAZARDOUS MATERIALS IN A SECONDARY CONTAINER AND REMOVE FROM THE SITE TO A LOCKED INDOOR AREA WITH AN IMPERVIOUS FLOOR DURING NON-WORK HOURS.
13. PROVIDE A SUPPLY OF ABSORBENT SPILL RESPONSE MATERIALS, SUCH AS BOOMS, BLANKETS AND OIL ABSORBENT MATERIALS AT THE CONSTRUCTION SIT AT ALL TIMES TO CLEAN UP POTENTIAL SPILLS OF HAZARDOUS MATERIALS. IMMEDIATELY REPORT SPILLS OF HAZARDOUS MATERIALS TO THE STATE ENVIRONMENTAL AGENCY AND THE MUNICIPALITY WHERE THE WORK IS OCCURRING.
14. REGRADE ALL UNPAVED AREAS DISTURBED BY THE WORK TO ORIGINAL CONTOURS OR PROPOSED CONTOURS AS REQUIRED BY THE DRAWINGS. LOAM AND SEED ALL UNPAVED AREAS DISTURBED BY THE WORK.
15. PROVIDE ACCESS FOR EMERGENCY VEHICLES AT ALL TIMES.
16. ALL PROPOSED WORK MAY BE VARIED IN THE FIELD BY THE OWNERS PROJECT REPRESENTATIVE TO MEET EXISTING CONDITIONS.
17. COORDINATE ALL WORK WITH THAT OF ALL SUBCONTRACTORS, THE OWNER, AND OTHER CONTRACTORS WORKING WITHIN THE PROJECT LIMITS.
18. AREAS OUTSIDE THE LIMIT OF WORK DISTURBED BY CONSTRUCTION WILL BE RETURNED TO THEIR ORIGINAL CONDITION OR BETTER AND WILL BE GRADED TO MEET PROPOSED CONSTRUCTION AS DIRECTED BY THE OWNERS PROJECT REPRESENTATIVE. COST FOR THIS WORK WILL BE BORNE BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
19. CULVERTS TO BE INSPECTED AT COMPLETION OF PROJECT AND REPLACED IF NEEDED DUE TO DAMAGE DURING CONSTRUCTION.
20. UNDERDRAIN SYSTEMS ARE COMMON IN AGRICULTURAL FIELDS AND ARE NOT DOCUMENTED ON SITE NOR LOCATED BY SURVEY. IF UNDERDRAINS ARE DAMAGED DURING CONSTRUCTION THEY SHALL BE REPAIRED SO EXISTING SUBSURFACE DRAINAGE SYSTEM IS FUNCTIONAL AT THE END OF THE CONSTRUCTION.

PLAN REFERENCES

1. EXISTING CONDITIONS ARE BASED ON INFORMATION PROVIDED BY WSP USA INC. IN "PROPERTY AND TOPOGRAPHIC SURVEY", DATED MARCH 22, 2019 AND "ALTA/NSPS LAND TITLE SURVEY", DATED AUGUST 28, 2019.
2. VERNAL POOL SURVEYS WERE CONDUCTED BY TETRA TECH AND SUBCONTRACTORS IN 2016, 2018 AND 2019.
3. WETLAND AND WATERCOURSE DELINEATIONS WERE COMPLETED BY TETRA TECH IN JULY AND AUGUST 2016, FALL 2018 AND WINTER/SPRING 2019.
4. DESIGN PARAMETERS (E.G., INTERROW SPACING, PANEL TILT, LEADING EDGE HEIGHT, ETC.) PROVIDED BY NEXTERA ENERGY.
5. THE HORIZONTAL DATUM REFERENCED IS NAD83 AND THE VERTICAL DATUM IS NAVD 88.

EROSION CONTROL NOTES

1. INSTALL ALL EROSION CONTROL MEASURES SHOWN, SPECIFIED AND REQUIRED BY THE ENGINEER PRIOR TO ANY CONSTRUCTION OR IMMEDIATELY UPON REQUEST. MAINTAIN ALL SUCH CONTROL MEASURES UNTIL FINAL SURFACE TREATMENTS ARE IN PLACE AND/OR UNTIL PERMANENT VEGETATION IS ESTABLISHED.
2. PRIOR TO STARTING WORK, CLEARLY STAKE WORK LIMIT LINE(S). DO NOT DISTURB VEGETATION AND TOPSOIL BEYOND THE PROPOSED LIMIT LINE. COORDINATE WITH THE OWNERS PROJECT REPRESENTATIVE ON LOCATIONS FOR THE TEMPORARY STOCKPILING OF TOPSOIL DURING CONSTRUCTION.
3. SIDE SLOPES, SHOULDER AREAS AND DISTURBED VEGETATED AREAS, SHALL BE GRADED TO A MAXIMUM GRADE OF 3:1, COMPACTED, STABILIZED, AND LOAMED AND SEEDED AS SHOWN ON PLANS. SLOPES STEEPER THAN 3:1 SHALL BE COVERED WITH EROSION CONTROL BLANKETS TO PREVENT EROSION.
4. REMOVE SILT TRAPPED AT BARRIERS AND DISPOSE OF IT IN UPLAND AREAS OUTSIDE OF BUFFER ZONES. REMOVE MATERIALS DEPOSITED IN ANY TEMPORARY SETTLING BASIN AT THE COMPLETION OF PROJECT. RESTORE ALL AREAS DISTURBED BY SETTLING BASINS.
5. SETTLE OR FILTER ALL SILT-LADEN WATER FROM DEWATERING ACTIVITIES IN A SEDIMENTATION OR FILTER BAG TO REMOVE SEDIMENTS PRIOR TO RELEASE TO ANY WATERWAY LOCATED DOWNSTREAM OF THE DEWATERED AREA.
6. SWEEP AND COLLECT ANY SEDIMENT TRACKED ONTO PUBLIC RIGHT-OF-WAYS AT THE END OF EACH DAY.
7. LOAM AND SEED ALL DISTURBED AREAS TO ESTABLISH VEGETATIVE COVER AND STABILIZATION AS SOON AS POSSIBLE FOLLOWING DISTURBANCE.
8. THIS DRAWING SET COVERS POST-CONSTRUCTION STORMWATER CONTROL MEASURES ONLY. REFER TO THE QUINEBAUG SOLAR PROJECT SOIL EROSION AND SEDIMENT CONTROL PLAN DRAWINGS AND STORMWATER POLLUTION CONTROL PLAN FOR CONSTRUCTION STORMWATER CONTROL MEASURES.

Tighe&Bond
Engineers | Environmental Specialists

STATE OF CONNECTICUT FRANCIS J. HOEY III No. 21807 LICENSED PROFESSIONAL ENGINEER
10.07.2020

STATE OF CONNECTICUT BRIAN S. HUNTLEY No. 31180 LICENSED PROFESSIONAL ENGINEER
10-7-20

Quinebaug Solar Project

Quinebaug Solar, LLC

Brooklyn & Canterbury, Connecticut

VERIFY SCALE
BAR IS 1 INCH ON ORIGINAL DRAWING
0 — 1 INCH
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

MARK	DATE	DESCRIPTION

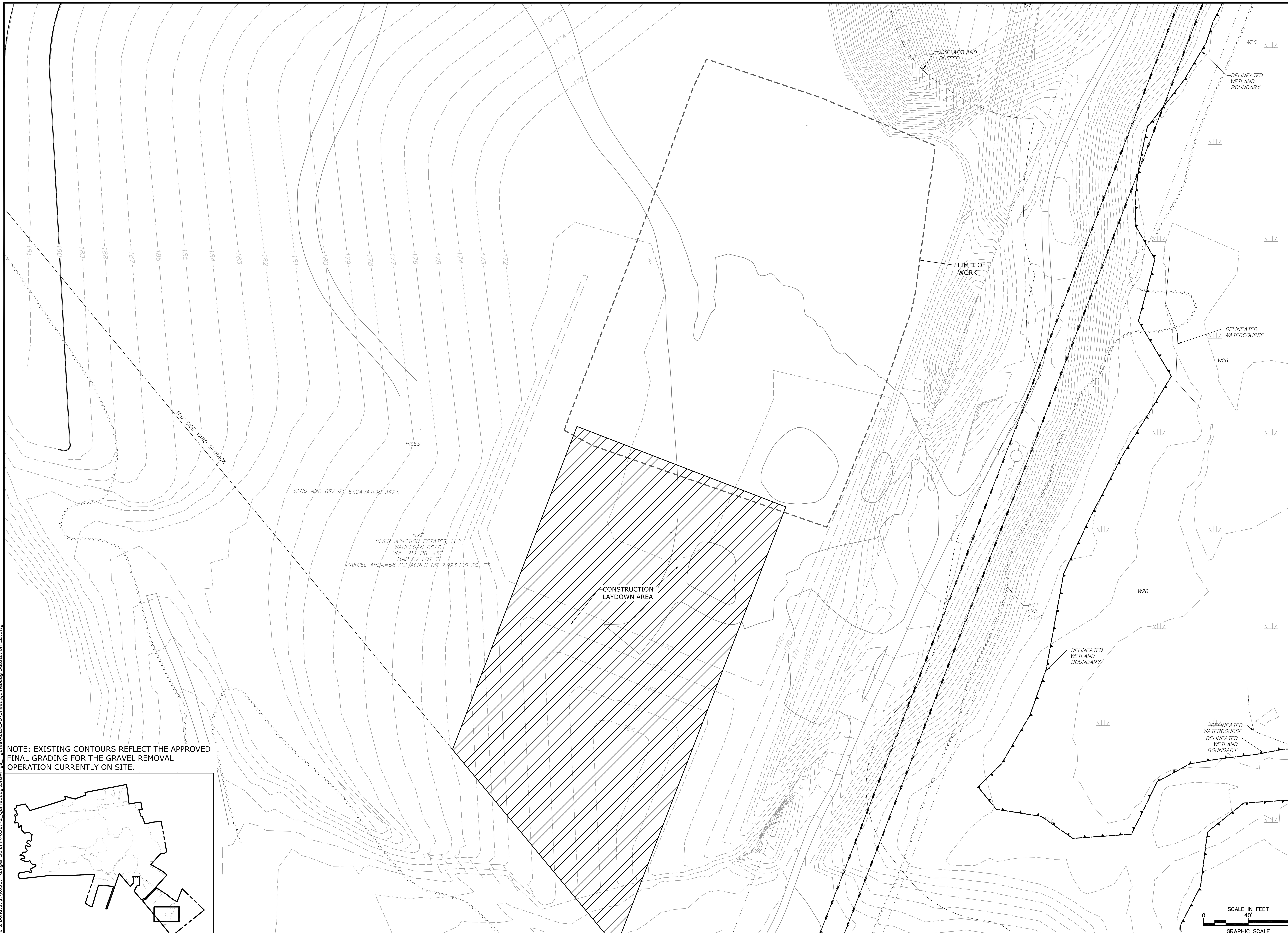
PROJECT NO:	R0317
DATE:	10/2020
FILE: Quinebaug Details Substation CD.dwg	
DRAWN BY:	ALG
CHECKED:	BSH/JEC
APPROVED:	FJH

NOTES AND LEGEND

SCALE: AS SHOWN

G-001

Last Saved: 9/30/2020
Plotted On:Sep 30, 2020-9:22pm By: AGilchrist
Tighe & Bond:C:\Users\agilchrist\Downloads\Quinebaug Details Substation CD - Standard\Quinebaug Details Substation CD.dwg



NOTE: EXISTING CONTOURS REFLECT THE APPROVED FINAL GRADING FOR THE GRAVEL REMOVAL OPERATION CURRENTLY ON SITE.

Last Saved: 10/7/2020
Plotted On:Oct 07, 2020-11:37am By: AGilchrist
Tighe & Bond:J:\R\R0317 Ranger Solar\R-0317-2_Quinebaug\Drawings_Figures\AutoCAD\Sheet\Quinebaug Substation CD.dwg

Tighe&Bond
Engineers | Environmental Specialists

STATE OF CONNECTICUT FRANCIS J. HOEY No. 21607 LICENSED PROFESSIONAL ENGINEER
10-07-2020

STATE OF CONNECTICUT BRIAN S. HUNTLEY No. 31180 LICENSED PROFESSIONAL ENGINEER
10-7-20

Quinebaug Solar Project

Quinebaug Solar, LLC

Brooklyn & Canterbury, Connecticut

VERIFY SCALE
BAR IS 1 INCH ON ORIGINAL DRAWING
0 1 INCH
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

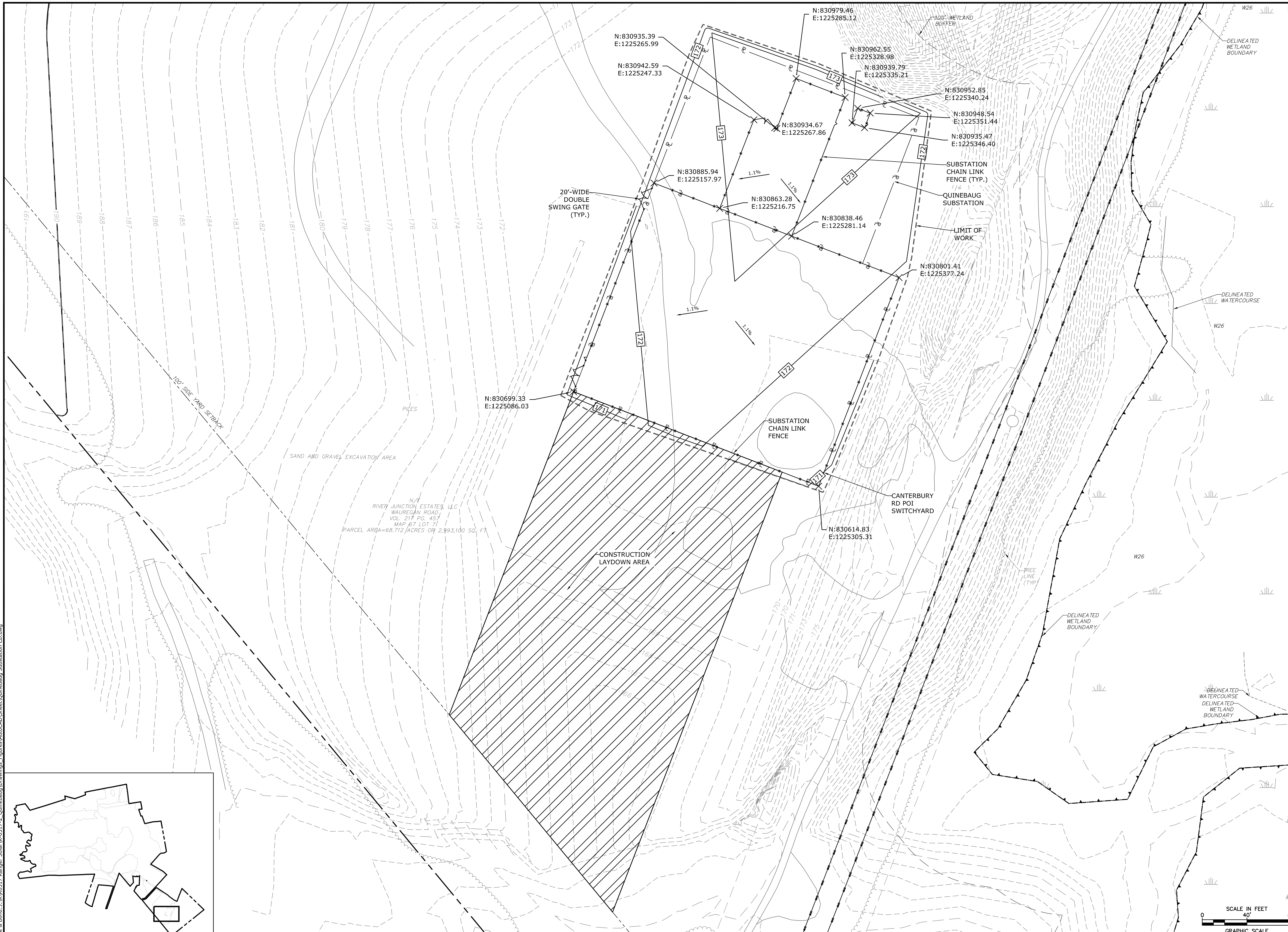
MARK	DATE	DESCRIPTION

PROJECT NO:	R0317
DATE:	10/2020
FILE: Quinebaug Substation CD.dwg	
DRAWN BY:	ALG
CHECKED:	BSH/JEC
APPROVED:	FJH

EXISTING CONDITIONS AND DEMOLITION PLAN

SCALE: 1" = 40'

C-001



Last Saved: 10/7/2020
Plotted On:Oct 07, 2020-11:36am By: AGilchrist
Tighe & Bond:J:\R\R0317 Ranger Solar\R-0317-2_Quinebaug\Drawings_Figures\AutoCAD\Sheet\Quinebaug Substation CD.dwg

Tighe&Bond
Engineers | Environmental Specialists

Quinebaug Solar Project

Quinebaug Solar, LLC

Brooklyn & Canterbury, Connecticut

VERIFY SCALE
BAR IS 1 INCH ON ORIGINAL DRAWING
0 1 INCH
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

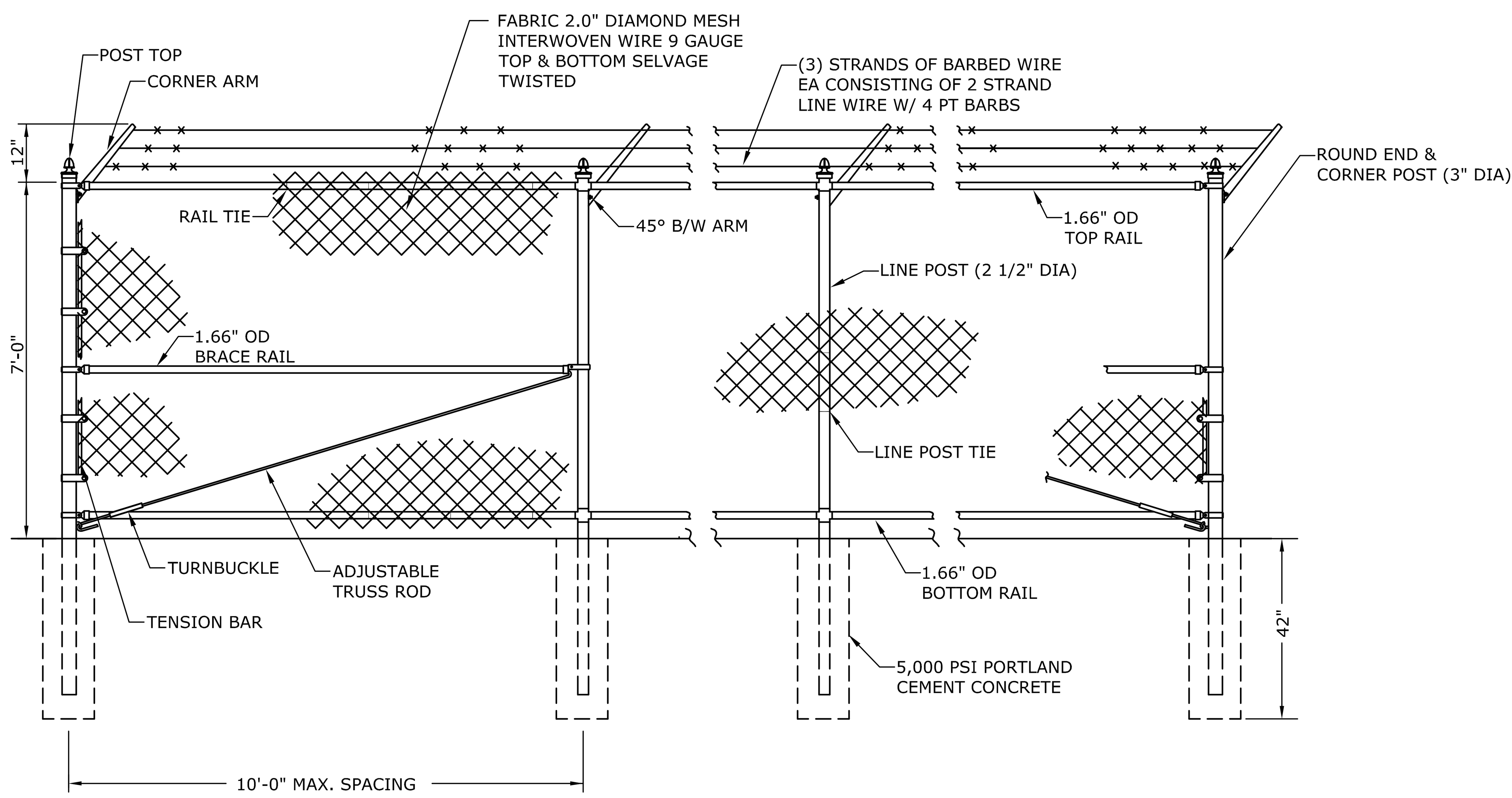
MARK	DATE	DESCRIPTION

PROJECT NO:	R0317
DATE:	10/2020
FILE: Quinebaug Substation CD.dwg	
DRAWN BY:	ALG
CHECKED:	BSH/JEC
APPROVED:	FJH

PROPOSED CONDITIONS PLAN

SCALE: 1" = 40'

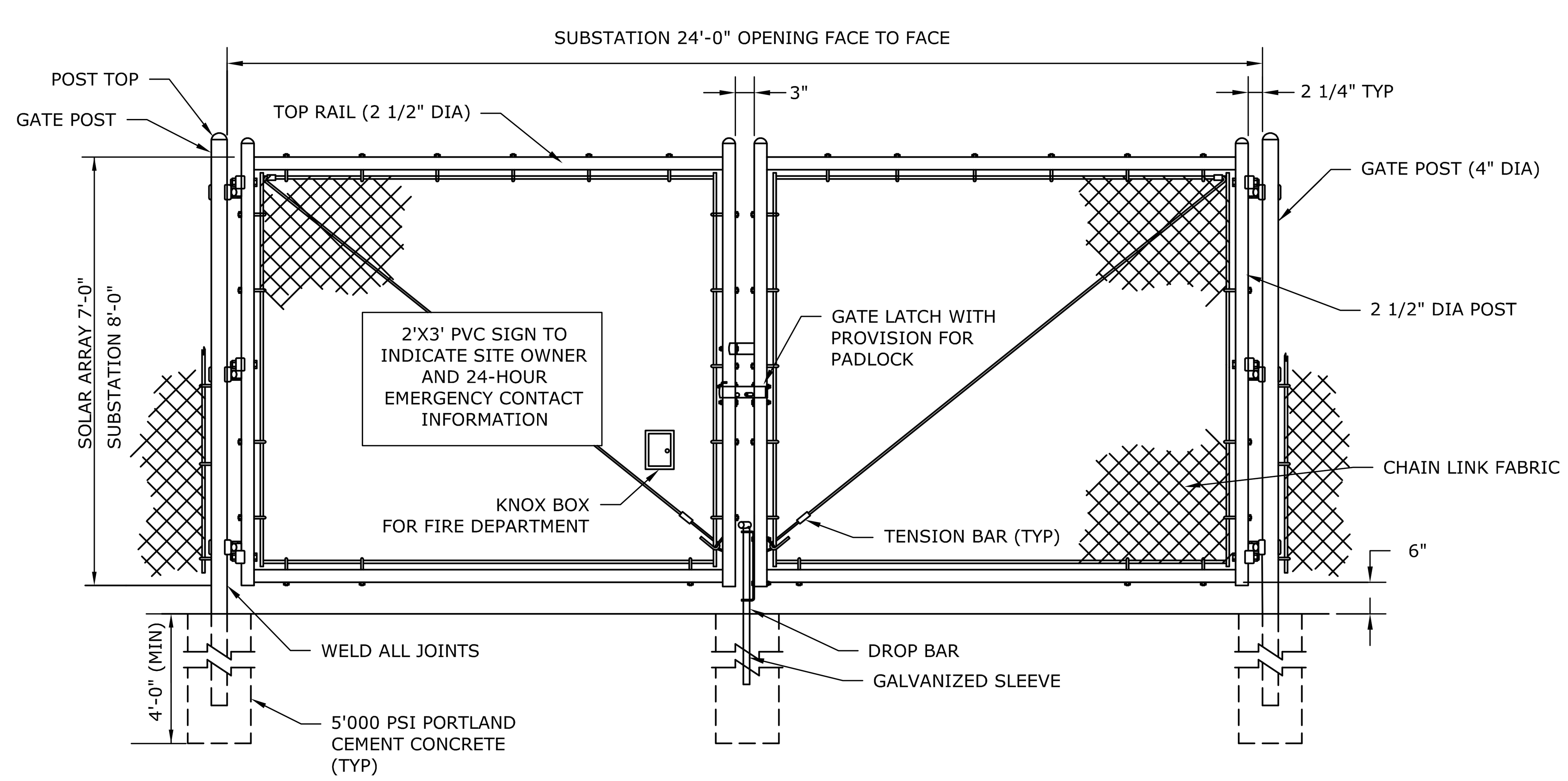
C-002



SUBSTATION CHAIN LINK FENCE
NO SCALE

SUBSTATION CHAIN LINK FENCING NOTES:

1. FOOTING WIDTH TO BE (4)X POST WIDTH.
2. UNLESS OTHERWISE NOTED ON THE SITE PLANS, ALL CHAIN LINK FENCING COMPONENTS SHALL HAVE A HOT DIPPED GALVANIZED FINISH. ANY CHIPS IN THE GALVANIZED FINISH DUE TO SITE INSTALLATION SHOULD BE MINIMIZED AND REPAIRED WITH INDUSTRIAL GRADE GALVANIZED PAINT. ALL CUT ENDS ARE TO BE FINISHED WITH INDUSTRIAL GRADE PAINT ON GALVANIZED FINISH.
3. CHAIN LINK FABRIC SHALL BE MADE OF 9 GAUGE STEEL WIRE, 2" MESH SIZE, AND HOT DIPPED GALVANIZED PRIOR TO WEAVING. THE FABRIC SHALL BE FINISHED WITH A SELVAGE TWIST TOP AND BOTTOM.
4. ALL POSTS ARE TO BE PLUMB IN ALL DIRECTIONS.
5. LINE POSTS TO BE HAMMER DRIVEN. POST END MUST BE CUT TO FINAL HEIGHT AFTER DRIVING IS COMPLETE. CUT END IS TO BE CUT SQUARE AND FREE OF BENDS, MUSHROOMING, AND BURRS. CUT END TO BE TREATED AS PER NOTE #1.
6. LINE & TERMINAL POSTS, BRACE TUBES, TOP RAILS, & GATE POSTS SHALL ALL BE SCHEDULE 40 PIPE. REFERENCED DIAMETER IS NOMINAL.
7. ALL FENCE POSTS TO HAVE CAPS.
8. 3" WILDLIFE PASSAGE TO BE PROVIDED ON PERIMETER FENCE IN ALL AREAS THAT DO NOT ABUT PUBLIC ROADS. 6" GAP TO BE PROVIDED IN AREAS OF WILDLIFE TRAVEL.

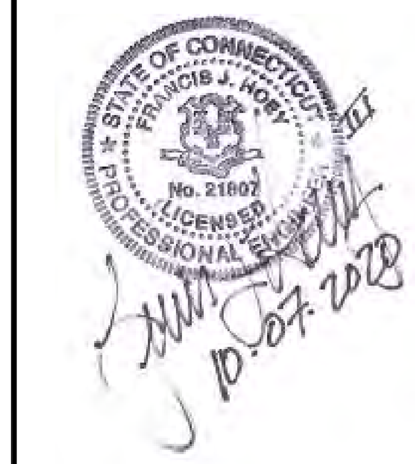


DOUBLE SWING GATE
NO SCALE

DOUBLE SWING GATE NOTES:

1. SUBSTATION GATE TO HAVE THREE (3) STRANDS OF BARBED WIRE. EACH CONSISTING OF 2 STRAND LINE WIRE WITH 4 PT BARBS.
2. FOOTING WIDTH TO BE (4)X POST WIDTH.
3. GATES MAY BE MANUALLY OPERATED.

Tighe&Bond
Engineers | Environmental Specialists



Quinebaug Solar Project

Quinebaug Solar, LLC

Brooklyn & Canterbury, Connecticut

VERIFY SCALE
BAR IS 1 INCH ON ORIGINAL DRAWING
0 — 1 INCH
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

MARK	DATE	DESCRIPTION

PROJECT NO:	R0317
DATE:	10/2020
FILE: Quinebaug Details Substation CD.dwg	
DRAWN BY:	ALG
CHECKED:	BSH/JEC
APPROVED:	FJH

DETAILS

SCALE: AS SHOWN

C-003

ATTACHMENT C – STORMWATER POLLUTION CONTROL PLAN

STORMWATER POLLUTION CONTROL PLAN

Quinebaug Solar Project

PROJECT NAME AND LOCATION:

Name:	Quinebaug Solar Project Brooklyn and Canterbury, Connecticut
Latitude:	41° 44' 56"
Longitude:	-71° 56' 2"

OPERATOR:

Owner:	Quinebaug Solar, LLC
General Contractor:	TBD

CONTENTS

Section 1 Certification Statements

Section 2 Stormwater Pollution Control Plan

Appendices

SECTION 1

Section 1
Certification Statements

1.1 Permittee

Certification Statement

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the General Statutes, pursuant to Section 53a-157b of the General Statutes, and in accordance with any other applicable statute.

Signature: ____________________________________ **Date:** ________________

Name: ___________________________________**Title:**_____________________

Company name: ____

Address: ____

Telephone:______________________________ **Fax:** _______________________

Project Site: Quinebaug Solar Project, Brooklyn and Canterbury, CT

1.2 Contractors and Subcontractors

Each Contractor and Subcontractor that will perform actions on the site which may reasonably be expected to cause or have the potential to cause pollution of the waters of the State shall sign the certification statement included in this plan.

Certification Statement

"I certify under penalty of the law that I have read and understand the terms and conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. I understand that as a contractor or subcontractor at the site, I am authorized by this General Permit, and must comply with the terms and conditions of this General Permit, including but not limited to the requirements of the Stormwater Pollution Control Plan prepared for the site."

CONTRACTOR CERTIFICATION

Signature: ____ **Date:** _________________

Name: ______________________________________**Title:**_______________________

Company name: ____

Address: ____

Telephone:________________________________ **Fax:** _________________________

Project Site: Quinebaug Solar Project, Brooklyn and Canterbury, CT

SUBCONTRACTOR CERTIFICATION

Signature: ____ **Date:** _________________

Name: ______________________________________**Title:**_______________________

Company name: ____

Address: ____

Telephone:________________________________ **Fax:** _________________________

Project Site: Quinebaug Solar Project, Brooklyn and Canterbury, CT

SUBCONTRACTOR CERTIFICATION

Signature: ____ **Date:** _________________

Name: ______________________________________**Title:**_______________________

Company name: ____

Address: ____

Telephone:________________________________ **Fax:** _________________________

Project Site: Quinebaug Solar Project, Brooklyn and Canterbury, CT

SUBCONTRACTOR CERTIFICATION

Signature: ____ **Date:** _________________

Name: ______________________________________**Title:**_______________________

Company name: ____

Address: ____

Telephone:________________________________ **Fax:** _________________________

Project Site: Quinebaug Solar Project, Brooklyn and Canterbury, CT

SUBCONTRACTOR CERTIFICATION

Signature: ____ **Date:** _________________

Name: ______________________________________**Title:**_______________________

Company name: ____

Address: ____

Telephone:________________________________ **Fax:** _________________________

Project Site: Quinebaug Solar Project, Brooklyn and Canterbury, CT

SECTION 2

Section 2
Stormwater Pollution Control Plan

2.1 Responsible Parties

The following Parties are identified in this Plan:

- Permittee: Quinebaug Solar, LLC. The Permittee is the party that initiates, creates or maintains a discharge in accordance with Section 3 of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (General Permit).
- Owner: Quinebaug Solar, LLC. Owner of the proposed solar facility and associated stormwater management measures.
- Contractor: Engineering, Procurement, and Construction (EPC) Contractor hired by Quinebaug Solar, LLC to perform installation of the solar facility and appurtenances.
- Sub-Contractor: Specialty sub-contractor hired by Contractor or Quinebaug Solar, LLC to perform installation of the solar facility and appurtenances.
- Site Superintendent: Representative of Contractor tasked with overseeing daily operations at the site.
- Qualified Inspector: As defined in the GP, means an individual possessing either (1) a professional license or certification by a professional organization recognized by the commissioner related to agronomy, civil engineering, landscape architecture, soil science, and two years of demonstrable and focused experience in erosion and sediment control plan reading, installation, inspection and/or report writing for residential and commercial construction projects in accordance with the Guidelines; or (2) five years of demonstrable and focused experience in erosion and sediment control plan reading, installation, inspection and/or report writing for residential and commercial construction projects in accordance with the Guidelines; or (3) certification by the Connecticut Department of Transportation(DOT).
- Environmental Monitor: Representative of Quinebaug Solar, LLC on-site full time to provide construction and permit compliance oversight.
- Design Engineer: Professional Engineer licensed in the state of CT who stamped the construction-period stormwater design.

2.2 Project Description

Quinebaug Solar, LLC (the Permittee or Owner) is proposing to install a 49.36 megawatt (AC) ground-mounted solar photovoltaic (PV) facility in the Towns of Brooklyn and Canterbury, Connecticut (Project).

The Project Site consists of 30 privately-owned parcels located in the southeast portion of the Town of Brooklyn the northeast portion of the Town of Canterbury, in Windham County, Connecticut. The Project Site is generally bounded by Wauregan Road to the south (Canterbury), Blackwell Brook and Cold Spring Brook to the west, Rukstela Road, Allen Hill Road and forested areas to the north (Brooklyn) and the Quinebaug River to the east.

The Project Site consists of gently sloping hills, large level areas, and a few moderately to steeply sloping areas that currently contain a combination of previously developed areas, overgrown former pasture lands, mixed second-growth woodlands, active gravel mines, and agricultural fields. The Permittee intends to utilize existing roadways that traverse the entire Project Area wherever possible. Land uses in the vicinity of the Project Area include gravel mining, residential development, open space, and agriculture.

The topography of the existing conditions site conveys stormwater towards numerous design points. Blackwell Brook, located to the west of the Project Area, is the receiving water for the majority of the Project Area. Smaller sub-watersheds collect stormwater runoff internally in existing depressed areas. The Project has been designed to avoid construction within areas of steeper slopes where possible.

No floodplain exists within the limits of the subject parcels. The Site contains inland wetlands and watercourses and the Project has been designed to limit impacts to these areas. A description of wetland and watercourse impacts can be found in the Wetland and Watercourse Delineation Report prepared by Tetra Tech Inc. in Exhibit D of the Connecticut Siting Council (CSC) Petition # 1310A (Petition). Additional erosion controls are proposed in steep areas and upstream to sensitive areas.

In the post-construction or proposed condition, stormwater management will be accomplished through the conversion of gravel areas to a grassy meadow condition and the construction of basins and berms designed to provide stormwater basins. The conversion of gravel areas to a grassy meadow offsets the impacts of the proposed gravel access road and concrete equipment pads and conversion of woodland to grassy meadow. The construction of berms adds additional infiltration to attenuate the runoff rate and volume caused by a decrease in the time of concentration with the conversion of woods to meadow.

In the proposed condition, within the solar array, stormwater will fall onto the PV modules and will flow off the edge into the grassy ground cover. Stormwater runoff will continue to flow across the ground surface as under existing conditions generally along existing flow paths. To mitigate for the changes in stormwater flow patterns, engineered basins to mitigate peak discharge rates and to encourage infiltration were incorporated within the solar array. Stormwater runoff quantity will not be increased as part of the proposed development.

The Project is proposed to be constructed in phases to minimize disturbance. Within each Phase, sub-phases will be designed to be less than 10 acres and each sub-phase will have a temporary sediment basin or trap as required. A phased erosion control plan for construction activities can be found in Appendix C. While a total of approximately 234 acres will be disturbed as part of the proposed Project, only 105 +/- acres of that disturbed area will experience any significant grading and/ or clearing activities. Significant grading is not anticipated in most of the proposed array areas. Grading is required in certain areas to flatten steep slopes and to accommodate internal access roads, stormwater features, and the substation.

In the area of the agricultural fields, the site will be planted with a low growing seed mix to stabilize the site.

The proposed scope of work is shown on the drawings in Appendix C.

2.3 Estimated Total Site Area and Total Disturbed Area

Combined, the Project Area/Site parcels encompass approximately 599 acres. As proposed, the Development Area/ limit of work of the proposed Project will occupy approximately 234 acres of the 599-acre Project Area/ Site. While a total of approximately 234 acres will be disturbed as part of the proposed Project, only 105 +/- acres of that disturbed area will experience any significant grading and clearing activities.

2.4 Soils & Geology

Bedrock geology within the Project Area is primarily granite, schist, and gneiss. Glacial till is the dominant surface material, with some stratified deposits in valleys. Open hills with low elevations form in irregular plains (Griffith et al. 2009). Typical soil orders include coarse-loamy and sandy, mesic Inceptisols and some Entisols. Soils are generally well drained silt-loam and sandy-loam and depth to bedrock is greater than 60 inches throughout a majority of the Project Area (USDA NRCS 2008). Approximately 40 percent of the Project Area soils have been regularly tilled for agricultural use or otherwise disturbed from gravel extraction. The soils found on-site included in the table below.

Table 1
NRCS Soil Summary

Map Unit Designation	Soil Association	Additional Description	Hydrologic Soil Group (HSG)
2	Ridgebury association	Fine sandy loam	D
3	Ridgebury, Leicester, and Whitman association	Extremely stony	D
13	Walpole association	Sandy loam	B/D
15	Scarboro association	Muck	A/D
17	Timakwa and Natchaug association	N/A	B/D
23A	Sudbury association	Sandy loam	B
29A, 29B	Agawam association	Fine sandy loam	B
34A, 34B	Merrimac association	Fine sandy loam	A
36A, 36B	Windsor association	Loamy sand	A
38A, 38C, 38E	Hinckley association	Loamy sand	A
45A, 45B, 46B	Woodbridge association	Fine sandy loam	C/D
50B, 51B, 52C	Sutton association	Fine sandy loam	B/D
58C, 59D	Gloucester association	Gravelly sandy loam	A
60B, 61B, 61C, 62D	Canton and Charlton association	Stony	B
73C	Charlton-Chatfield association	Rocky	B
84B, 85B, 86C	Paxton and Montauk association	Fine sandy loam	C
100	Suncook association	Loamy fine sand	A
102	Pootatuck association	Fine sandy loam	B
103	Rippowam association	Fine sandy loam	B/D
108	Saco association	Silt loam	B/D
302	Dumps	N/A	-
305	Udorthents-Pits complex	Gravelly	C
306	Udorthents-Urban land complex	N/A	B
701A, 701B	Ninigret association	Fine sandy loam	C
W	Water	N/A	-

2.1.1 Wetland Soils

General soils observations were made as part of the wetland and watercourse delineation survey effort, and to determine if unique soil conditions occur on site. Soils observed as part of this survey are described in the Wetland and Watercourse Delineation Report provided in Exhibit D of the Petition.

2.1.2 Non-Wetland Soils

Areas mapped by the United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS) as Prime Farmland, Soils of Statewide Importance and Locally Important Farmland soils are located within the Project Site. A Farmland Soil Mitigation Plan has been prepared to minimize and mitigate impacts to agricultural soils. As defined by the USDA NRCS, farmland soils are based on soil type and include Prime Farmland, Soils of Statewide Importance, and Locally Important Farmland. USDA NRCS defines Prime Farmland Soils as those having the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oil seed crops, and that also are available for these uses.

Additionally, in 2016 Tetra Tech performed a site visit, including test pit investigations, to confirm that the soil series mapped for the site were present and matched with those areas designated as Prime, Statewide, and Local Farmland. Test pits were excavated and evaluated in soil areas mapped as Paxton and Montauk soils, as well as in Windsor soils. The results from evaluation of the soil test pits indicated that the Farmland soil series designations shown in the NRCS mapping were generally accurate. Detailed results of this investigation are provided in the Petition.

Portions of the Project Area have been affected by current and historic gravel extraction activities. These areas have modified soil characteristics as a result of the disturbance of and removal of surface soils. These areas exhibit characteristics of undeveloped parent material and would not currently be expected to possess soil quality associated with Prime Farmland. The Farmland Soil Mitigation Plan further quantifies the amount of mapped farmland soils that have been affected by this disturbance

2.1.3 Measured Infiltration Rate

An infiltration test was not performed to determine the infiltration capacity of the existing soils. Infiltration rates assumed in stormwater management calculations were determined in accordance with the National Resource Conservation Service (NRCS) Minimum Infiltration Rates of Hydrologic Soil Groups, as provided in the 2004 Connecticut Stormwater Quality Manual.

2.2 Runoff Curve Number

The weighted runoff curve number "CN" for the existing Project is **62**. The weighted runoff curve number "CN" for the completed Project will be **63**.

2.3 Site Map

See Appendix A, Figure 1 for site location mapping and see Appendix C for detailed site maps.

2.4 Name of Receiving Water

The Quinebaug River is located to the south and east of the Project. Stormwater runoff from the post-construction Project will ultimately discharge to the Quinebaug River.

According to the Thames River Basin Partnership, the Quinebaug River watershed is approximately 255,070 acres and extends into south central Massachusetts and ending where it discharges to Shetucket River in Norwich, Connecticut. According to the State of Connecticut Department of Energy and Environmental Protection (CT DEEP) 2016 Integrated Water Quality Report, the impairments observed in the Quinebaug River include Escherichia coli with potential sources including stormwater, remediation sites, spills, groundwater impacts, industrial discharges, landfills, municipal discharges, illicit discharges, insufficient on-site treatment/septic systems, agricultural activities, and salt storage facilities. The 2016 Report recommended delisting of the Quinebaug River, noting applicable water quality standards had been attained. The proposed Project will not result in an increase in the identified pollutants.

2.5 Sequence of Major Activities

The construction period stormwater design for the Quinebaug Solar Project has been designed in accordance with the CT General Permit, the SESC Manual, and CT DEEP's September 8, 2017 Guidance Document on "*Stormwater Management for Solar Farm Construction Projects*", with the intention of protecting natural resources and adjacent watercourses from adverse impacts during the construction period. The SESC Manual indicates that construction phases should occur in 5-acre areas, with sediment traps designed to hold a volume of water. Particulates then settle out of suspension, with a secondary volume to retain runoff during larger storm events. The trap includes a spillway through which water is allowed to flow onto stable ground. Runoff from the construction area is diverted through use of earthen berms and swales equipped with check dams to reduce the velocity of stormwater flow. The berms and swales direct stormwater to the sediment trap. Perimeter erosion control barriers will be installed along the downgradient edges of the phase prior to conducting any earth-disturbing activities, with other phase demarcation to be determined by the Contractor installed along the limit of work for each phase. Once earth disturbing activities are complete, the ground surface is considered stabilized once it has reached 80% vegetative coverage per the SESC Manual. Seeded areas will be monitored daily and augmented with additional seeding as needed. Temporary stormwater controls may be removed once the contributing area can be considered stable. Larger development areas are allowed up to 10-acres; however, temporary sediment basins will be required.

For the purpose of this Stormwater Pollution Control Plan, the following activities are considered earth disturbing activities: solar infrastructure installation (i.e., driving piles for solar panel racking); tree clearing if ground is not frozen; vegetation grubbing; grading; roadway installation; concrete equipment pad installation; and subsurface utility infrastructure construction. The Project is proposed to be constructed in phases to minimize disturbance: 4 major phases with 47 sub-phases, as shown in Appendix C. Within each major phase, sub-phases will be designed to be less than 10 acres and each will have a temporary sediment basin or trap as required. The major phases include the following:

- Phase 1: Access Road Construction and Staging
- Phase 2: Grubbing for Previously Wooded Areas
- Phase 3: Grassed Area Array and Substation Construction
- Phase 4: Wooded Area Array Construction

Note that Phase 1 must occur before all other phases. Subsequent subphases can occur simultaneously provided that each active subphase has all temporary measures installed and each trap/basin is discharging to stable ground. Phase 2 and Phase 4 occur in the same location, with differing construction activities. Phase 4 is the installation of solar infrastructure in the area that was grubbed and temporarily stabilized in Phase 2.

Two staging areas are proposed as part of this project: approximately 4 acres in the central gravel pit and approximately 5 acres in the area located northwest of the substation and adjacent array. Soil erosion and sediment control measures for staging in these areas will be implemented in Phase 1 and use of this staging area will continue throughout the duration of the project. Ground conditions will be improved as needed for staging activities, which include storing equipment, vehicle parking, and trailer placement.

Construction of the Project is expected to begin in the fourth quarter of 2020 with mobilization of equipment and land clearing efforts. Further site work and land preparation is expected to be complete by the end of the second quarter of 2021. Final site stabilization, testing, and commissioning is expected to be complete in the third quarter of 2021. The following describes the sequence of construction activities:

2.7.1 Pre-Construction

1. Demarcation of clearing limits, selective cutting zones, and buffer areas.
2. Cut trees above ground (retain stumps) in frozen conditions. If reliably frozen conditions do not exist, or if the tree cutting operation results in ground disturbance or rutting, stormwater controls must be installed in accordance with the Soil Erosion and Sediment Control Plans in Appendix C for each area to be cleared prior to the tree clearing.
3. Environmental restriction and safety training for all site personnel.
4. Preconstruction meeting.

2.7.2 Phase 1: Access Road Construction and Staging

1. Flag the limits of construction necessary to facilitate the preconstruction meeting.
2. Environmental restriction and safety training for all site personnel.
3. Preconstruction meeting.
4. Install construction entrance.
5. Install perimeter controls to establish phase work area in accordance with site plan and Stormwater Pollution Control Plan (SWPCP) prior to conducting any earth-disturbing activities.
6. Prior to installing stormwater controls, such as temporary diversions and stone check dams, inspect existing conditions to ensure discharge locations are stable. If not stable, review discharge conditions with the design engineer and implement additional stabilized measures prior to installing surface water controls.
7. Construct temporary sediment traps and/or basins, diversion swales and earthen berms with check dams.
8. Once temporary stormwater controls are established, clear and grub existing stumps.

9. Where applicable, strip, re-distribute, and stabilize all topsoil that is within the footprint of the site roads, site road appurtenances and the collector substation (pursuant to 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, Chapter 4, Part ii and the Farmland Soils Mitigation Plan in Exhibit E).
10. Construct site roads and appurtenances.
11. Stabilize site by hydroseeding with bonded fiber matrix or installing erosion control blanket in all disturbed areas. Monitor seeded areas daily and augment with additional hydroseeding as needed.
12. Upon stabilization, temporary controls may be removed or relocated as necessary and construction may advance on subsequent sub-phases.

2.7.3 Phase 2: Grubbing for Previously Wooded Areas

1. Flag the limits of construction.
2. Install perimeter controls to establish phase work area in accordance with site plan and SWPCP plans prior to conducting any earth-disturbing activities.
3. Prior to installing surface water controls, such as temporary diversions and stone check dams, inspect existing conditions to ensure discharge locations are stable. If not stable, review discharge conditions with the design engineer and implement additional stabilized measures prior to installing surface water controls.
4. Construct temporary sediment traps and/or basins, diversion swales and earthen berms with check dams.
5. Once temporary stormwater controls are established, grub existing stumps from previously cleared trees.
6. Stabilize site by hydroseeding with bonded fiber matrix or installing erosion control blanket in all disturbed areas. Monitor seeded areas daily and augment with additional hydroseeding as needed.
7. Check and repair temporary controls as needed. Temporary controls to remain in place through Phase 4 construction.

2.7.4 Phase 3: Grassed Area Array Construction

1. Flag the limits of construction.
2. Install perimeter controls to establish phase work area in accordance with site plan and SWPCP plans prior to conducting any earth-disturbing activities.
3. Prior to installing surface water controls, such as temporary diversions and stone check dams, inspect existing conditions to ensure discharge locations are stable. If not stable, review discharge conditions with the design engineer and implement additional stabilized measures prior to installing surface water controls.
4. Construct temporary sediment traps and/or basins, diversion swales and earthen berms with check dams.
5. Clear and grub existing stumps as needed.
6. Install solar infrastructure, including racking, solar modules, utility connections, and equipment pads. Solar array construction will begin with posts or ground screws being driven into the ground; racking will then be affixed to the posts; and modules will be mounted and installed on the racks.

7. Construct substation.
8. Stabilize site by hydroseeding with bonded fiber matrix or installing erosion control blanket in all disturbed areas. Monitor seeded areas daily and augment with additional hydroseeding as needed.
9. After site is fully stabilized, remove temporary stormwater controls.

2.7.5 Phase 4: Wooded Area Array Construction

1. Inspect and install perimeter controls established in Phase 2 to ensure phase work area is in accordance with site plan and SWPCP plans prior to conducting any earth-disturbing activities.
2. Inspect and construct temporary sediment traps and/or basins, diversion swales and earthen berms with check dams installed in Phase 2.
3. Install solar infrastructure, including racking, solar modules, utility connections, and equipment pads. Solar array construction will begin with posts or ground screws being driven into the ground; racking will then be affixed to the posts; and modules will be mounted and installed on the racks.
4. Stabilize site by hydroseeding with bonded fiber matrix or installing erosion control blanket in all disturbed areas. Monitor seeded areas daily and augment with additional hydroseeding as needed.
5. After site is fully stabilized, remove temporary stormwater controls. The ground surface is considered stabilized once it has reached 80% vegetative coverage per the SESC Manual.

2.6 Post-Construction Stormwater Management

2.6.1 Site Hydrology and Hydraulic Analysis

Under proposed conditions, large portions of the agricultural uses will be converted to solar array where panels will be installed using driven posts; in some areas, screws or piles may be used in lieu of or in addition to the posts. Existing woodland within the limits of the Project will be cleared and grubbed and allowed to stabilize prior to construction of solar infrastructure.

Following construction, stormwater will fall onto solar panels and will flow off the edge into the vegetated surface and flow along existing flow paths as under existing conditions. Therefore, the only solar panels that are considered impervious will be the most up-gradient panels in each subcatchment.[1] The remainder of the solar facility within the limit of work will be considered meadow, non-grazed. Concrete equipment pads or skids, existing and proposed gravel access roads, woodland, remaining agricultural fields and basins also were included in the post-development analysis.

The topography of the site will be altered in select areas to accommodate the solar array, stormwater berms and basins, and proposed access roads. The delineation of drainage

[1] Cook, L.M. & McCuen, R. H., (2013). Hydrologic Response of Solar Farms. *Journal of Hydrologic Engineering*, 18(5). pp.536-541

areas will not substantially change as a result of the proposed development. The Proposed Conditions Drainage Area Map, provided as Figure 4 in Appendix A, indicates that the four existing conditions design points will be maintained under proposed conditions. The contributing drainage areas will convey stormwater runoff generally as under existing conditions.

The proposed Project will not substantially alter stormwater flow paths and will result in decreased peak discharge rates as a result of stormwater management features designed to reduce peak discharge rates. The existing Site is primarily woodland and grass with existing gravel areas and gravel roads. The CN value for the existing site is 62 and the proposed CN value is 63 for the entire site. Additionally, infiltration to attenuate runoff rate and volume was achieved through the construction of earthen berms.

Table 2.5 presents the results of the pre-development stormwater runoff analysis versus the post-development stormwater runoff analysis for each design point.

Table 2.5
Peak Discharge Rate Comparison

		2-year Storm Event (cfs)	10-year Storm Event (cfs)	25-year Storm Event (cfs)	100-year Storm Event (cfs)
Design Point 1 (West)	Existing	9.2	36.0	55.6	125.5
	Proposed	8.9	35.9	55.3	124.0
Design Point 2 (South)	Existing	9.8	27.1	42.2	126.0
	Proposed	9.2	25.3	37.1	121.4
Design Point 3 (East)	Existing	21.2	51.3	66.0	97.0
	Proposed	19.5	44.6	58.7	96.5
Design Point 4 (Southeast)	Existing	23.8	66.3	87.7	136.9
	Proposed	21.2	61.5	83.7	133.0

Table 2.5 indicates that existing peak discharge rates are reduced for the 2-, 10-, 25- and 100-year storm events.

2.6.2 Best Management Practices and Water Quality

The proposed conditions stormwater management plan for the proposed site has been designed to remove a high percentage of sediments in accordance with the Connecticut Department of Energy and Environmental Protection "Stormwater General Permit Criteria".

The post-construction stormwater management plan for this site uses "Best Management Practices ("BMPs")" to meet or exceed the Connecticut DEEP's goal of 80% removal of total suspended solids and Water Quality requirements. The BMPs include:

Groundwater Recharge: The Project has been designed to utilize a "country drainage" scheme which allows stormwater runoff from impervious surfaces to flow into adjacent grassed areas and allowed to recharge to groundwater as under existing conditions. The Project does not include large, uninterrupted spans of impervious ground coverage. Concrete equipment pads are relatively small in comparison to the overall watershed, will not adversely impact groundwater recharge capabilities of the proposed conditions site. The total development area (area within the limit of work shown on the Project drawings) is 234 acres. Of that 234 acres, impervious ground coverage will increase from 0.08% of the entire Project Area to 2.92% of the entire Project Area. Since this increase is negligible in relation to the entire Project Area and larger watershed, no further calculations to determine the volume of required groundwater recharge have been provided as part of this report.

The required Water Quality Volume (WQV) for the proposed conditions is based on the acreage of impervious surfaces including gravel access roads and impervious concrete pads. While the hydrologic analysis assumed that a portion of the solar panels in each drainage area were considered impervious in order to determine anticipated peak discharge rates, they have been excluded from WQV computations. The panels, as well as the concrete equipment pads, will not be subject to vehicular access, and therefore do not produce any pollutants to stormwater runoff.

All other impervious surfaces, specifically gravel roads, will not be curbed in order to promote a "country drainage" scenario. The lack of curb and gutter will allow stormwater runoff from the roadways to flow through the adjacent grasses. This will remove any sediment from the runoff prior to discharge off-site or to a resource area. The Site Plans indicate that impervious surfaces will be located over 100-feet from any receiving water, providing suitable residence time within the grass to remove sediment from runoff.

2.6.3 Post-Construction Storm Water Management Measures

2.8.3.1 General Permit Coverage Termination

Upon the completion of any and all construction activities on site, the Registrant shall submit a Notice of Termination Form, to the CT DEEP to ensure the proper handling of the permit termination. See Appendix M for a blank form.

Upon completion of the construction activities the Owner (or their delegate) shall conduct monthly inspections of the BMPs which include all areas covered by the SWPCP and all stormwater structures and outfalls on the site for surface or floating debris, oil and sediment for the first 90 days. Following the initial 90 day inspection period, stormwater BMPs shall be inspected in accordance with the recommended schedule outlined in 2002 Connecticut Stormwater Quality Manual, or as further detailed in Section 2.8.3.2 below. The site shall be inspected bi-annually for trash accumulation and surface debris. Routine inspection forms can be found in Appendix I.

2.8.3.2 Operations and Maintenance

The application of no disturbance buffers and establishing meadow habitat are two ways water quality will be protected throughout the life of the Project. Compared to current site uses, the final site stabilization design will result in a net improvement in comparison to current conditions for several areas close to Blackwell Brook and Cold Spring Brook. The post-construction stormwater plan was developed with the intention of protecting natural resources and adjacent watercourses from adverse impacts throughout the operational phase of the Project.

The Owner (or their delegate) will be responsible for implementing the Operations and Maintenance Plan on the entire property that shall cover the following:

Roadway Surface

Regular road maintenance will be employed during operation of the Project. Gravel roadway surfaces shall be observed periodically by the Owner to clean trash and other debris, and to identify areas where concentrated runoff may cause erosion of the roadway surface.

Perform a visual inspection of roadway areas four times per year with one inspection after the last snowfall, but no later than April 1. Repair roadway areas as necessary when erosion is found during the remainder of the year.

Landscape

Meadow vegetation surrounding and underneath the solar PV array will be inspected and mowed twice per year to allow for healthy meadow cover, while preventing woody vegetation growth. The number of mows will be adjusted based on field conditions and actual vegetation growth.

Existing vegetation around the perimeter of the Project Site will be maintained in its native condition. No clearing, grading, stockpiling, storage or development will occur in these areas.

Spill Containment

Any oil or gasoline spills should be cleaned from the site immediately, and the stormwater management system components cleaned. The Owner should not wait until the next inspection to clean the components. A record of spills should be kept in a log book, and reported as required to Connecticut DEEP. See Appendices F and G for reporting forms.

2.7 Pollution Controls

2.7.1 Stabilization Practices

Major erosion and sediment controls are shown on the plans in Appendix C. Stabilization practices include:

1. **Vehicle areas:** Stabilization of construction road access, staging, and parking areas using coarse aggregate.

2. **Temporary Stabilization:** Hydroseed with bonded fiber matrix or install erosion control blankets and broadcast seed areas.

3. **Permanent Vegetation:** Sodding and/or seeding of all disturbed areas.

2.7.2 Erosion and Sediment Controls

Construction phase erosion and sediment controls will include structural controls such as conveyance swales and berms, temporary sediment basins and temporary sediment traps in addition to perimeter controls, check dams, and other measures as required during construction to manage stormwater. Structural controls have been designed in accordance with the 2002 Guidelines for Soil Erosion and Sediment Control manual. Additional details regarding temporary basin and trap location and sizing are provided in Appendices B and C, respectively.

Redundant erosion and sediment controls are proposed to provide additional protection in "Erosion Prone Areas" as identified in Appendix A, Figure 5. These include measures to prevent erosion and sedimentation to adjacent watercourses during construction and protection of water quality for protection of eastern pearlshell (*Margaritifera margaritifera*), a freshwater mussel species that has the potential to occur in the freshwater streams in and adjacent to the Project Area as well as other sensitive aquatic species. These include:

- Establishing a no-disturbance buffer around all wetlands and watercourses that will be fortified by using the best erosion control devices available, to maintain high water quality of the stormwater runoff during heavy rainfall events. Buffers will be a minimum of 100 feet, except in limited circumstances in the vicinity of existing gravel roads (less than 100 feet) that are to be used for site access during construction;
- Redundant erosion control devices will be installed along the gravel access roads to ensure a failsafe system is in place to protect the resources. Regular road maintenance will be employed during construction;
- Redundant erosion control devices installed in erosion prone areas (see Appendix A, Figure 5), and others identified prior to construction, will be regularly monitored during construction to ensure proper stormwater control function is maintained throughout the construction period, and if necessary additional controls will be implemented in these areas as needed to control the volume and quality of water running off the site;
- The forested buffer located established for the herpetofauna avoidance area (located around the cluster of wetlands and vernal pools in the relic stream channel immediately up slope from Cold Spring Brook and Blackwell Brook, see Appendix A, Figure 6) will be left intact between the adjacent watercourses and potential sources of erosion and sedimentation created during Project construction; and
- Maintaining temporary stormwater controls until site is considered stabilized.

Areas where additional erosion control is proposed are indicated in the Appendix C.

2.7.3 Sequence of Major Erosion and Sediment Control Activities

The construction will proceed in sequences as previously described in Section 2.7. The stabilized construction access, staging, and parking areas will be constructed first. The following pollution prevention controls and measures will be implemented throughout the Project:

1. Perimeter erosion controls will be installed prior to conducting any earth-disturbing activities; and construction entrances, and silt fence will be constructed in predetermined locations.
2. Prior to installing surface water controls such as temporary diversions and stone check dam, inspect existing conditions to ensure discharge locations are stable. If not stable, review discharge conditions with the design engineer and implement additional stabilized measures prior to installing surface water controls.
3. Construct temporary sediment traps and/ or basins, diversion swales and earthen berms with check dams.

4. Complete work designated to sequence sub-phase.
5. Stabilize site by hydroseeding with bonded fiber matrix or installing erosion control blanket in all disturbed areas. Monitor hydroseeded areas and erosions control blanketed areas daily and amend with additional seeding as needed.
6. Upon stabilization, temporary controls may be removed in order to construct subsequent sub-phases.

2.7.4 Waste Materials

All trash and construction debris from the site will be hauled to an approved landfill or other legal means of disposal. No construction waste material will be buried on the site. Employee waste and other loose materials will be collected so as to prevent the release of floatables during runoff events.

All personnel will receive instructions regarding the correct procedure for waste disposal. Notices describing these practices shall be posted in the construction office. The site superintendent will be responsible for seeing that these procedures are followed.

2.7.5 Hazardous Waste

No hazardous waste is expected to be generated or encountered during this Project. In the event that hazardous waste is encountered, all hazardous waste materials will be disposed of in the manner specified by local, state or federal regulation or by the manufacturer.

The site superintendent will be responsible for seeing that these practices are followed.

2.7.6 Sanitary Waste

Portable sanitary units will be provided for use by all workers throughout the life of the Project. All sanitary waste will be regularly collected from the portable units by a licensed sanitary waste management contractor.

2.8 Maintenance

To maintain the erosion and sediment controls, the following procedures will be performed.

1. **Sediment Capture Devices:** Sediment will be removed from the upstream or upslope side of the perimeter erosion controls when the depth of accumulated sediment reaches about one-third the height of the structure. Sediment accumulations in temporary traps and basins shall be removed when sediment depth exceeds one half of the wet storage capacity of the basin or trap, or when the depth of the available pool in the basin is reduced to 18 inches.

2. **Temporary Controls:** All temporary controls will be removed after the disturbed areas have been stabilized. The ground surface is considered stabilized once it has reached 80% vegetative coverage per the SESC Manual.

The contractor shall haul off-site and properly dispose of, or use as backfill, sediment that is removed from structural barriers. Sediment temporarily stockpiled on site will be placed in such areas and in such manner as to minimize wash-off into the local drainage system. Berms, perimeter erosion controls, and polyethylene or polypropylene covers are measures which may be utilized in minimizing washoff.

2.8.1 Inspection Procedures

All construction activities submitting a registration for the General Permit shall be inspected initially for Plan implementation and then weekly for routine inspections. Weekly inspection forms can be found in Appendix J. Inspections will be conducted by a Qualified Inspector (defined below at Section 2.10.1.3). The Permittee also will have a full-time, on-site Environmental Monitor to oversee construction and permit compliance throughout the construction process, which will allow for real-time adjustments to be made to protect adjacent natural resources. The Design Engineer will be on-site during the establishment of each major Phase to oversee compliance with the proposed design.

2.80.1.1 Plan Implementation Inspection

Within the first 30 days following commencement of the construction activity on the Site, the Permittee shall contact a qualified soil erosion and sediment control professional or a qualified professional engineer (a Qualified Inspector) to inspect the site. The site shall be inspected at least once and no more than three times during the first 90 days to confirm compliance with the General Permit and proper initial implementation of all controls measures designated in the Plan for the site for the initial phase of construction. The inspection forms can be found in Appendix H, I, and J.

2.10.1.2 Routine Inspections

The Permittee shall routinely inspect the site for compliance with the General Permit and the Plan for the site until a Notice of Termination has been submitted. Inspection procedures for these routine inspections shall be addressed and implemented in the following manner:

a. The Permittee shall maintain a rain gauge on-site to document rainfall amounts. At least once a week and within 24 hours of the end of a storm that generates a discharge, a qualified inspector (provided by the Permittee), as defined in the "Definitions" section (Section 2) of the General Permit, shall inspect, at a minimum, the following: disturbed areas of the construction activity that have not been finally stabilized; all erosion and sedimentation control measures; all structural control measures; soil stockpile areas; washout areas and locations where vehicles enter or exit the site. These areas shall be inspected for evidence of, or the potential for, pollutants entering the drainage system and impacts to the receiving waters. Locations where vehicles enter or exit the site shall also be inspected for evidence of off-site sediment tracking. For storms that end on a weekend, holiday or other time after which normal working hours will not commence within 24 hours, an inspection is required within 24 hours only for storms that equal or exceed 0.5 inches. For storms of less than 0.5 inches, an inspection shall occur immediately upon the start of the subsequent normal working hours. Where sites have been temporarily or finally stabilized, such inspection shall be conducted at least once every month for three months.

b. The Qualified Inspector(s) shall evaluate the effectiveness of erosion and sediment controls, structural controls, stabilization practices, and any other controls implemented to prevent pollution and determine if it is necessary to install, maintain, or repair such controls and/or practices to improve the quality of stormwater discharge(s).

c. A report shall be prepared and retained as part of the Plan. This report shall summarize: the scope of the inspection; name(s) and qualifications of personnel making the inspection; the date(s) of the inspection; weather conditions including precipitation information; major observations relating to erosion and sediment controls and the implementation of the Plan; a description of the stormwater discharge(s) from the site; and any water quality monitoring performed during the inspection. The report shall be signed by the Permittee or his/her authorized representative in accordance with the "Certification of Documents" section (subsection 5(i)) of the General Permit. The report shall include a statement that, in the judgment of the qualified inspector(s) conducting the site inspection, the site is either in compliance or out of compliance with the terms and conditions of the Plan and permit. If the site inspection indicates that the site is out of compliance, the inspection report shall include a summary of the remedial actions required to bring the site back into compliance. Non-engineered corrective actions (as identified in the Guidelines) shall be implemented on site within 24 hours and incorporated into a revised Plan within three (3) calendar days of the date of inspection unless another schedule is specified in the Guidelines. Engineered corrective actions (as identified in the Guidelines) shall be implemented on site within seven (7) days and incorporated into a revised Plan within ten (10) days of the date of inspection, unless another schedule is specified in the Guidelines or is approved by the commissioner. During the period in which any corrective actions are being developed and have not yet been fully implemented, interim measures shall be implemented to minimize the potential for the discharge of pollutants from the site.

d. Inspectors from the CT DEEP may inspect the site for compliance with the General Permit at any time construction activities are ongoing and upon completion of construction activities to verify the final stabilization of the site and/or the installation of post-construction stormwater management measures pursuant to Section 6(a).

e. Additional inspections, reports and documentation may also be required to comply with the "Monitoring Requirements" section (Section 5(c)) of the General Permit.

2.10.1.3 Inspection Personnel Qualifications

The site shall be inspected by a qualified soil erosion and sediment control professional or a qualified professional engineer (Qualified Inspector). The inspector shall be someone who:

a. is not an employee, as defined by the Internal Revenue Service in the Internal Revenue Code of 1986, of the registrant, and

b. has no ownership interest of any kind in the Project for which the registration is being submitted.

2.9 Monitoring

2.9.1 Turbidity Monitoring Requirements

Sampling shall be conducted in accordance with the requirements of the General Permit at least once every month, when there is a discharge of stormwater from the site while construction activity is ongoing, until final stabilization of the drainage area associated with each outfall is achieved.

The Permittee is only required to take samples during normal working hours as defined in Section 2 of the General Permit. The Site's normal working hours must be identified in the Plan pursuant to Section 5(b)(1)(B)(vii) of the General Permit. If sampling is discontinued due to the end of normal working hours, the Permittee shall resume sampling the following morning or the morning of the next working day following a weekend or holiday, as long as the discharge continues.

Sampling may be temporarily suspended any time conditions exist that may reasonably pose a threat to the safety of the person taking the sample. Such conditions may include high winds, lightning, impinging wave or tidal activity, intense rainfall or other hazardous condition. Once the unsafe condition is no longer present, sampling shall resume.

If there is no stormwater discharge during a month, sampling is not required, and the form must be submitted with a notation explaining that a rainfall event did not occur in coincidence with normal working hours.

2.9.2 Sample Collection

All samples shall be collected from discharges resulting from a storm event that occurs at least 24 hours after any previous storm event generating a stormwater discharge. Any sample containing snow or ice melt must be identified on the Stormwater Monitoring Report form. Sampling of snow or ice melt in the absence of a storm event is not a valid sample.

Samples shall be grab samples taken at least three separate times during a storm event and shall be representative of the flow and characteristics of the discharge(s). Samples may be taken manually or by an in-situ turbidity probe or other automatic sampling device equipped to take individual turbidity readings (i.e. not composite). The first sample shall be taken within the first hour of stormwater discharge from the site. In cases where samples are collected manually and the discharge begins outside of normal working hours, the first sample shall be taken at the start of normal working hours.

2.9.3 Sampling Locations

Sampling is required of all point source discharges of stormwater from disturbed areas except as may be modified for linear projects. Where there are two or more discharge points that discharge substantially identical runoff, based on similarities of the exposed soils, slope, and type of stormwater controls used, a sample may be taken from just one of the discharge points. In such case, the Permittee shall report that the results also apply to the substantially identical discharge point(s). No more than 5 substantially identical outfalls may be identified for one representative discharge. If such project is planned to continue for more than one year, the Permittee shall rotate twice per year the location where samples are taken so that a different discharge point is sampled every six months. The Plan must identify each outfall authorized by the permit and describe the rationale for any substantially identical outfall determinations.

All sampling point(s) shall be identified in the Plan and be clearly marked in the field with a flag, stake, or other visible marker. At a minimum, discharge locations from temporary sediment basins and traps will be identified as sampling points. Additional points will be identified during construction in the event that field conditions vary from the available plan information.

2.9.4 Analysis

Sampling and analysis shall be prescribed by 40 CFR Part 136 in accordance with the requirements of the General Permit.

2.9.5 Turbidity Values

The stormwater discharge turbidity value for each sampling point shall be determined by taking the average of the turbidity values of all samples taken at that sampling point during a given storm.

2.9.6 Monitoring Reports

a) Within thirty (30) days following the end of each month, the Permittee shall enter the stormwater sampling result(s) on the Stormwater Monitoring Report (SMR) form, Appendix K, (available at www.ct.gov/deep/stormwater) and submit it in accordance with the NetDMR provisions in subsection f, below, or, if the Permittee has opted out of NetDMR, to the following address:

    Bureau of Materials Management and Compliance Assurance
    Water Permitting and Enforcement Division (Attn: DMR Processing)
    Connecticut Department of Energy and Environmental Protection
    79 Elm Street
    Hartford, CT 06106-5127

b) If there was no discharge during any given monitoring period, the Permittee shall submit the form as required with the words "no discharge" entered in place of the monitoring results.

c) If the Permittee monitors any discharge more frequently than required by this General Permit, the results of this monitoring shall be included in additional SMRs for the month in which the samples were collected.

d) If sampling protocols are modified due to the limitations of normal working hours or unsafe conditions in accordance with Section 5(c1A ii) or (iii) in the General Permit, a description of and reason for the modifications shall be included with the SMR.

e) If the Permittee samples a discharge that is representative of two or more substantially identical discharge points, the Permittee shall include the names or locations of the other discharge points.

f) NetDMR Reporting Requirements

   Prior to one-hundred and eighty (180) days after the issuance of the permit, the Permittee may either submit monitoring data and other reports to the Department in hard copy form or electronically using NetDMR, a web-based tool that allows Permittees to electronically submit stormwater monitoring reports through a secure internet connection. Unless otherwise approved in writing by the commissioner, no later than one-hundred and eighty (180) days after the issuance of the permit the Permittee shall begin reporting electronically using NetDMR. Specific requirements regarding subscription to NetDMR and submittal of data and reports in hard copy form and for submittal using NetDMR are described below:

i. Submittal of NetDMR Subscriber Agreement: On or before fifteen (15) days after the issuance of the permit, the Permittee and/or the person authorized to sign the Permittee's discharge monitoring reports ("Signatory Authority") as described in RCSA Section 22a-430-3(b2) shall contact the Department at deep.netdmr@ct.gov and initiate the NetDMR subscription process for electronic submission of Stormwater Monitoring Report information. Information on NetDMR is available on the Department's website at www.ct.gov/deep/netdmr. On or before ninety (90) days after issuance of this permit the Permittee shall submit a signed and notarized copy of the *Connecticut DEEP NetDMR Subscriber Agreement* to the Department.

ii. Submittal of Reports Using NetDMR: Unless otherwise approved by the commissioner, on or before one-hundred and eighty (180) days after issuance of the permit, the Permittee and/or the Signatory Authority shall electronically submit SMRs required under the permit to the Department using NetDMR in satisfaction of the SMR submission requirements of Sections 5(c2A) of the permit. SMRs shall be submitted electronically to the Department no later than the 30th day of the month following the completed reporting period. Any additional monitoring conducted in accordance with 40 CFR 136 shall be submitted to the Department as an electronic attachment to the SMR in NetDMR. Once a Permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of SMRs to the Department. NetDMR is accessed from: http://www.epa.gov/netdmr.

iii. Submittal of NetDMR Opt-Out Requests If the Permittee is able to demonstrate a reasonable basis, such as technical or administrative infeasibility, that precludes the use of NetDMR for electronically submitting SMRs, the commissioner may approve the submission of SMRs in hard copy form ("opt-out request"). Opt-out requests must be submitted in writing to the Department for written approval on or before fifteen (15) days prior to the date a Permittee would be required under the permit to begin filing SMRs using NetDMR. This demonstration shall be valid for twelve (12) months from the date of the Department's approval and shall thereupon expire. At such time, SMRs shall be submitted electronically to the the Department using NetDMR unless the Permittee submits a renewed opt-out request and such request is approved by the Department. All opt-out requests and requests for the NetDMR subscriber form should be sent to the following address or by email at deep.netdmr@ct.gov:

Attn: NetDMR Coordinator
Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

2.10 Financial Assurance Mechanism

The Permittee will establish a Financial Assurance Mechanism (FAM) in the amount of **$3,400,000** with the CT DEEP prior to initiating construction. The value of the construction period stormwater FAM is based on the cost of construction period stormwater control measures, as outlined in this Plan. A summary of the FAM elements is provided in Appendix N.

2.13 Non-Stormwater Discharges

It is not expected that non-stormwater discharges will occur at the Site during the construction period, however if groundwater is apparent then the following discharge may occur:

1. **Dewatering discharges:** Water pumped from the construction area during dewatering operations.

2.11 Significant-Materials Inventory

Significant materials expected to be found at the construction site include:

- Concrete mix (trucked to the site for proposed site improvements)
- Steel reinforcing bars and related materials
- Photovoltaic panels and related materials
- Diesel fuel and lubricating oils
- Paints
- Fertilizers

This list of significant materials may be reduced or expanded once a contractor has been selected and the materials to be used have been specified. If fewer, or additional, materials are required, the SWPCP will be amended to reflect these changes.

2.12 Spill Prevention and Response Procedures

Spill prevention and response include good housekeeping as well as specific practices for certain products and established procedures for responding to spills.

2.12.1 Good Housekeeping

The following good housekeeping practices will be followed on site during construction of the Project.

1. **Minimize materials:** An effort will be made to store only enough material required to complete the job.

2. **Storage:** All materials stored on site will be stored in a neat, orderly manner in their appropriate containers in a covered area. If storage in a covered area is not possible, the materials shall be covered with polyethylene or polypropylene sheeting to protect them from the elements.

3. **Labeling:** Products will be stored in their original containers with the original manufacturer's label affixed to each container.

4. **Mixing:** Substances will not be mixed with one another unless this is recommended by the manufacturer.

5. **Disposal:** Whenever possible, all of a product will be used prior to disposal of the container. Manufacturers' recommendations for proper use and disposal will be followed.

6. **Inspections:** The site superintendent will inspect the site daily to ensure proper use and disposal of materials on site.

7. **Spoil materials:** Any excavated material that will not be used for fill material and all demolished pavement will be hauled off site and will be disposed of properly.

2.12.2 Product-Specific Practices

Petroleum products: All on-site vehicles will be monitored for leaks and will receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers which are clearly labeled. Any asphalt substances used on site will be applied according to the manufacturer's recommendations.

Concrete trucks: Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash water at the site.

Paints: All containers will be tightly sealed and stored when not required for use. Excess paint will be properly disposed of according to manufacturers' instructions and state and local regulations.

Fertilizers: Fertilizers will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to storm water. Fertilizer will be stored in a covered area, and any partially used bags will be transferred to a sealable plastic bin to avoid spills.

2.12.3 Spill Control and Response Practices

A spill prevention and response team will be designated by the Owner or the site superintendent. In addition, the following practices will be followed for spill cleanup:

1. **Information:** Manufacturers' recommended methods for spill cleanup will be clearly posted, and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.
2. **Equipment:** Materials and equipment necessary for spill cleanup will be present on the site at all times. Equipment and materials will include but not limited to brooms, shovels, rags, gloves, goggles, absorbent materials (sand, sawdust, etc.), and plastic or metal trash containers specifically designed for this purpose. The materials and equipment necessary for spill cleanup will be dependent upon the nature and quantity of the material stored on site.
3. **Response:** All spills will be cleaned up immediately upon discovery.
4. **Safety**: The spill area will be kept well ventilated, and personnel will wear appropriate protective clothing to prevent injury from contact with hazardous substances.

5. **Reporting**: Spills of toxic or hazardous material will be reported to the appropriate state or local government agency, regardless of the spill's size, immediately upon discovery.
6. **Record keeping:** The spill prevention plan will be modified to include measures to prevent a spill from recurring as well as improved methods for cleaning up any future spills. A description of each spill, what caused it, and the cleanup measures used will be kept with the plan.

2.13 Plan Location and Public Access

This SWPCP must be available at the construction site from the date of Project initiation to the date of final stabilization. The SWPCP and all reports required by the General Permit for permit must be retained by the Owner for at least three years from the date on which the site is finally stabilized.

2.14 Reporting and Record Keeping

The Permittee is responsible for keeping the Plan in compliance with the General Permit at all times. For a period of at least five years from the date that construction is complete, the Permittee shall retain copies of the Plan and all reports required by this General Permit, and records of all data used to complete the registration for this General Permit, unless the commissioner specifies another time period in writing. Inspection records must be retained as part of the Plan for a period of five (5) years after the date of inspection.

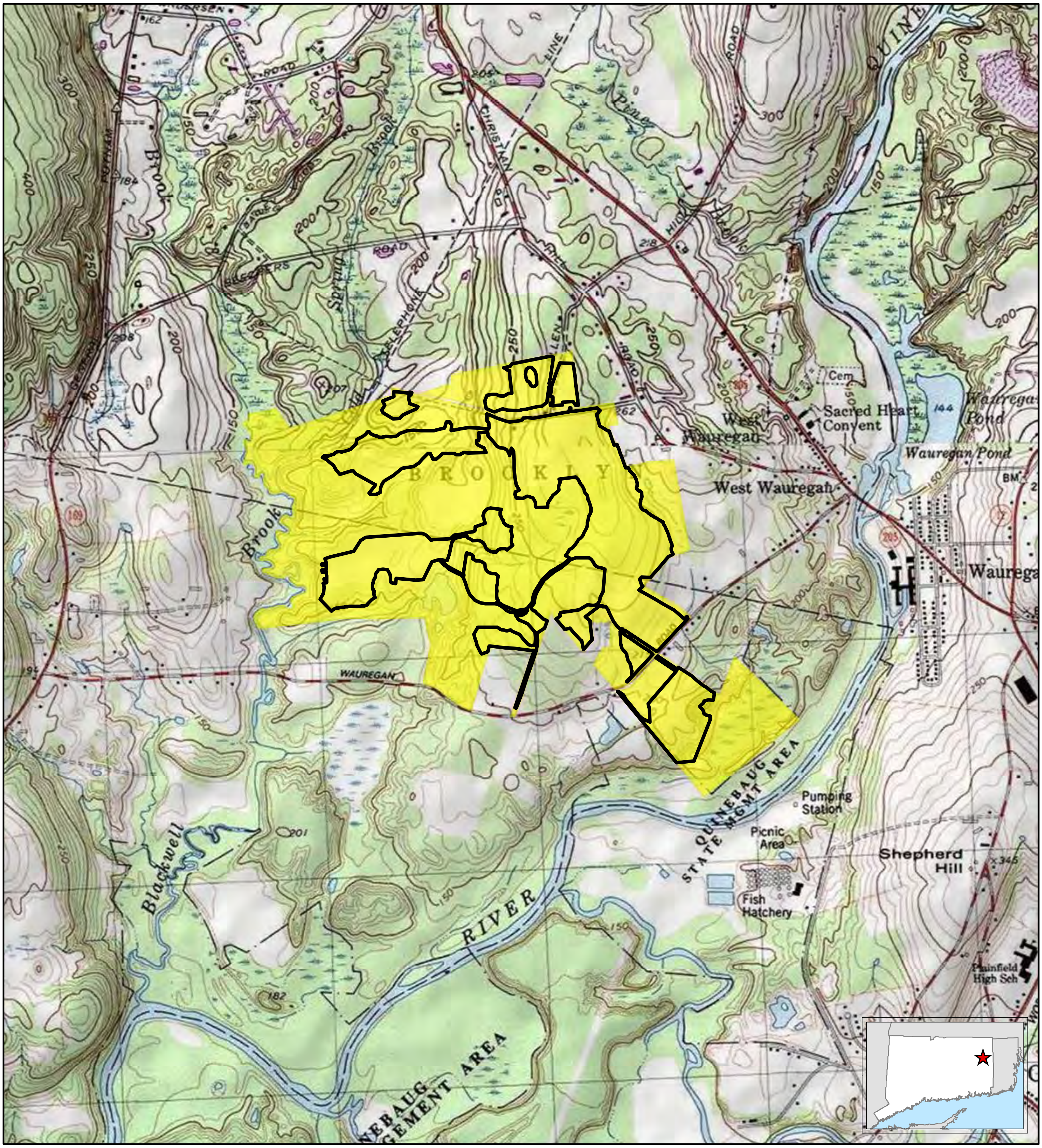
The Permittee shall retain an updated copy of the Plan required by the General Permit at the construction site from the date construction is initiated at the site until the date construction at the site is completed.

Revisions to the plan may involve the following actions:

- The Permittee shall amend the Plan if the actions required by the Plan fail to prevent pollution or fail to otherwise comply with any other provision of the General Permit. The Plan shall also be amended whenever there is a change in contractors or subcontractors at the site, or a change in design, construction, operation, or maintenance at the site which has the potential for the discharge of pollutants to the waters of the state and which has not otherwise been addressed in the Plan.
- The commissioner may notify the Permittee at any time that the Plan and/or the site do not meet one or more of the minimum requirements of the General Permit. Within 7 days of such notice, or such other time as the commissioner may allow, the Permittee shall make the required changes to the Plan and perform all actions required by such revised Plan. Within 15 days of such notice, or such other time as the commissioner may allow, the Permittee shall submit to the commissioner a written certification that the requested changes have been made and implemented and such other information as the commissioner requires, in accordance with the "Duty to Provide Information" and "Certification of Documents" sections (subsections 5(h) and 5(i)) of the General Permit.

In no event shall failure to complete, maintain or update a Plan, in accordance with the "Development of Contents of the Plan" and "Keeping Plans Current" sections (subsections 5(b)(1) and 5(b)(5)) of the General Permit, relieve a Permittee of responsibility to implement any actions required to protect the waters of the state and to comply with all conditions of the permit.

APPENDIX A



Limit of Work/Development Area

Project Site

FIGURE 1

SITE LOCATION

Quinebaug Solar
Brooklyn & Canterbury,
Connecticut

1:24,000

0 1,000 2,000

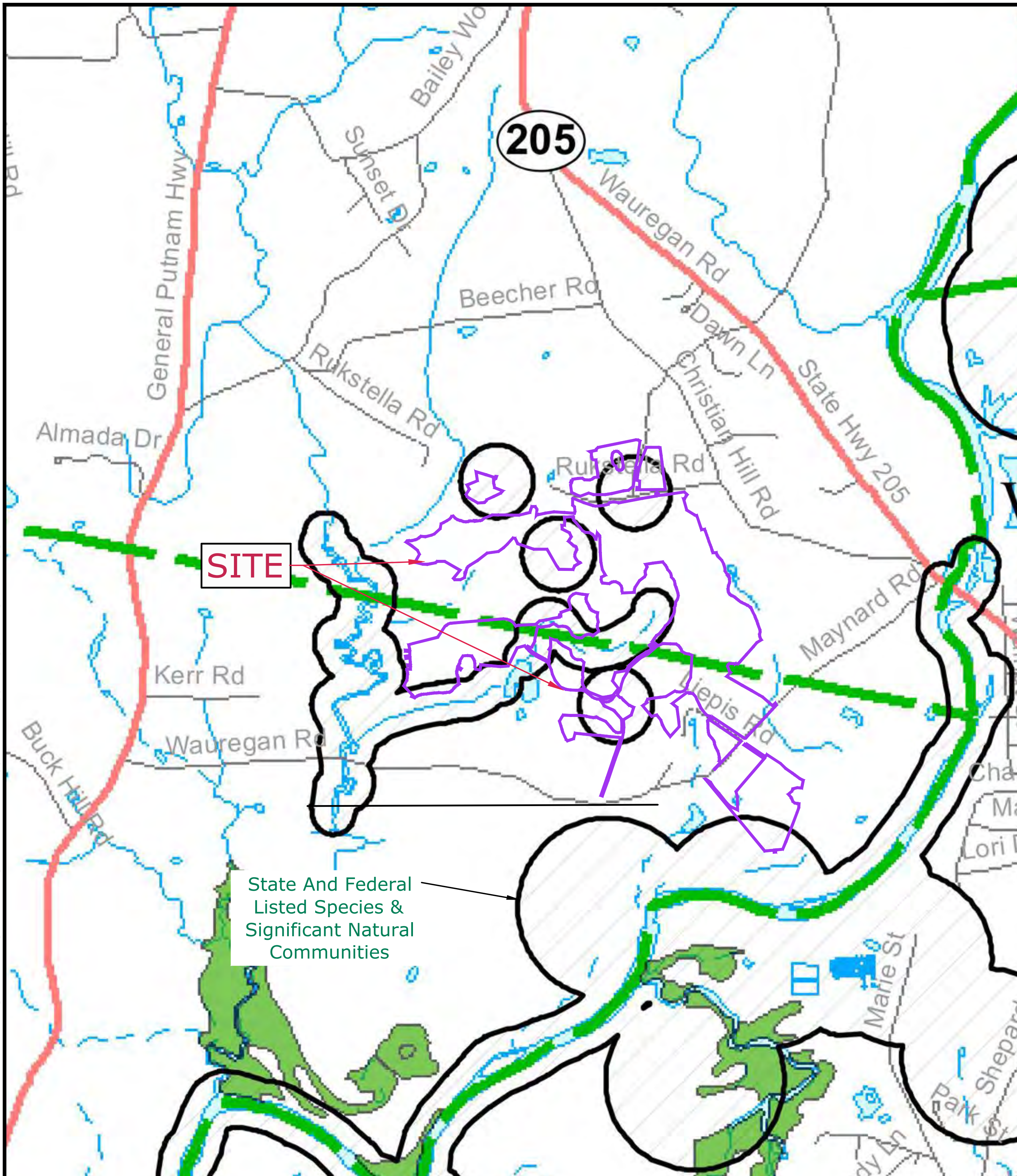
Feet

N

Tighe&Bond
Engineers | Environmental Specialists

Based on USGS Topographic Map for Danielson, CT and Plainfield, CT

October 2019



Tighe & Bond, Inc. J:\R\R0317 Ranger Solar\R-0317-2_Quinebaug\Permitting\Permitting 2019\SWPCP\Appendices\App_A Figures\Figure 2.dwg

Tighe&Bond
www.tighebond.com

Quinebaug Solar Project
Brooklyn & Canterbury, Connecticut

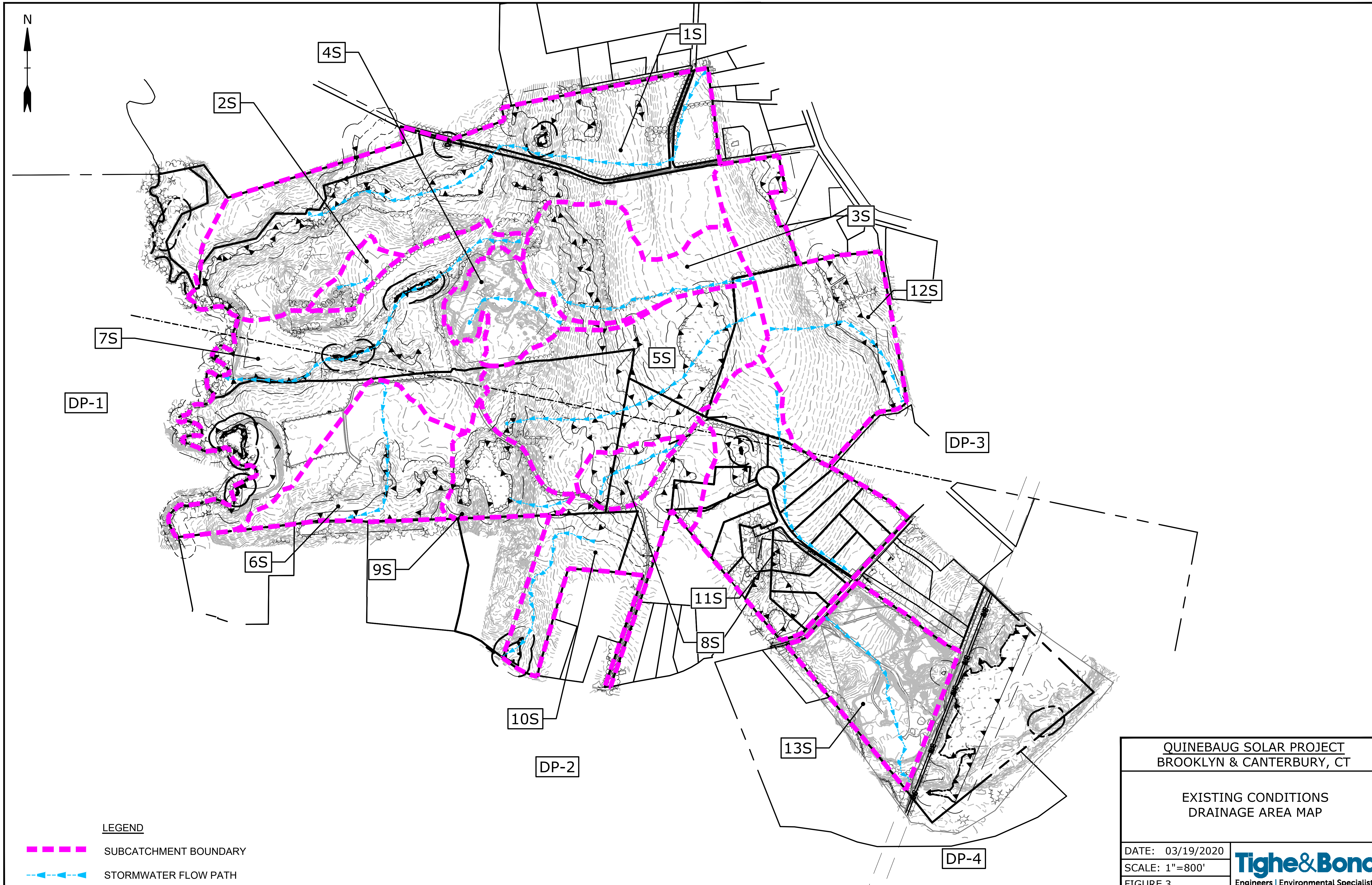
CT DEEP
Endangered Species Map

NORTH

1" = 2000'

FIGURE 2

03/19/2020

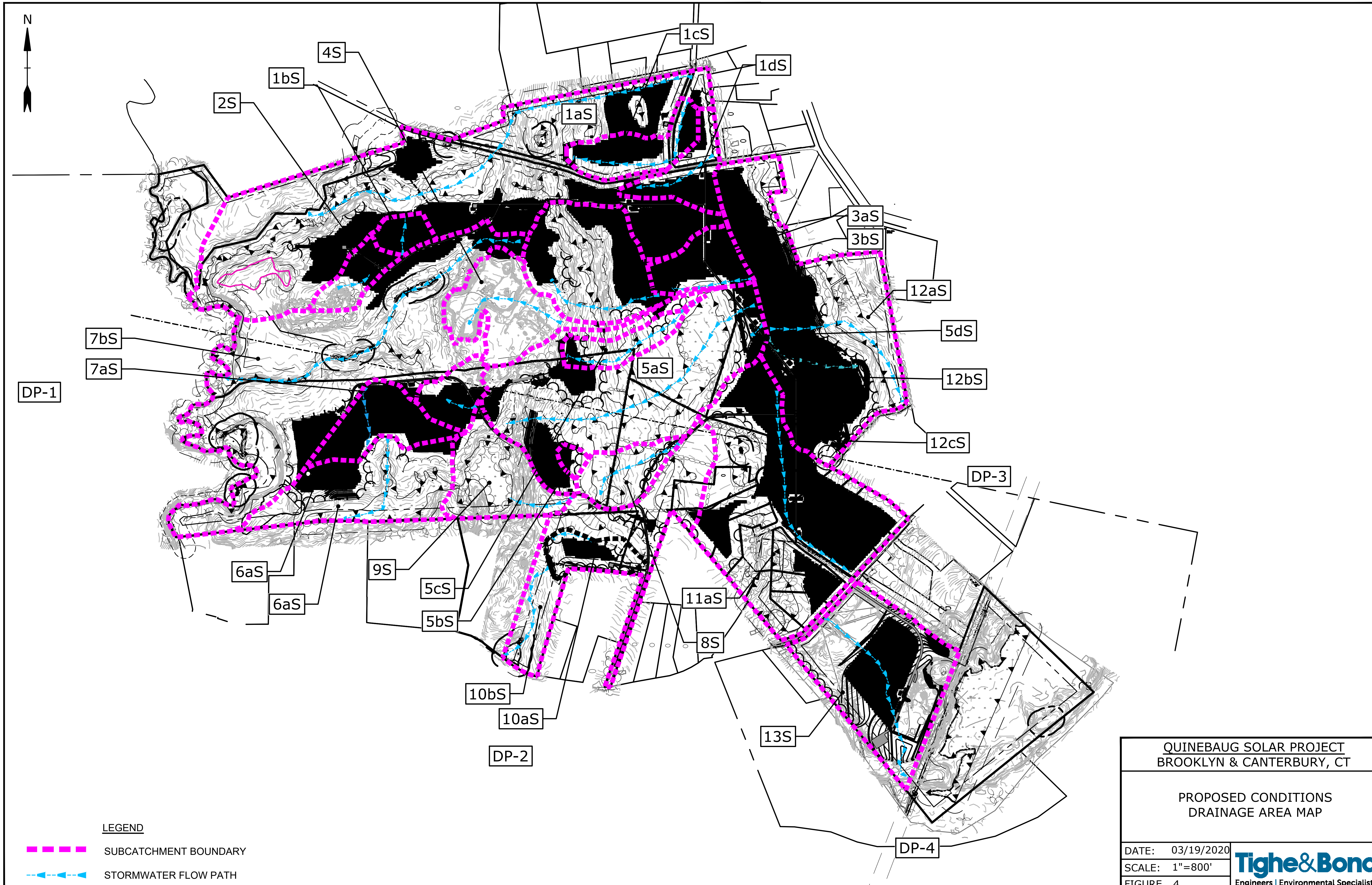


QUINEBAUG SOLAR PROJECT
BROOKLYN & CANTERBURY, CT

EXISTING CONDITIONS
DRAINAGE AREA MAP

DATE: 03/19/2020
SCALE: 1"=800'
FIGURE 3

Tighe&Bond
Engineers | Environmental Specialists

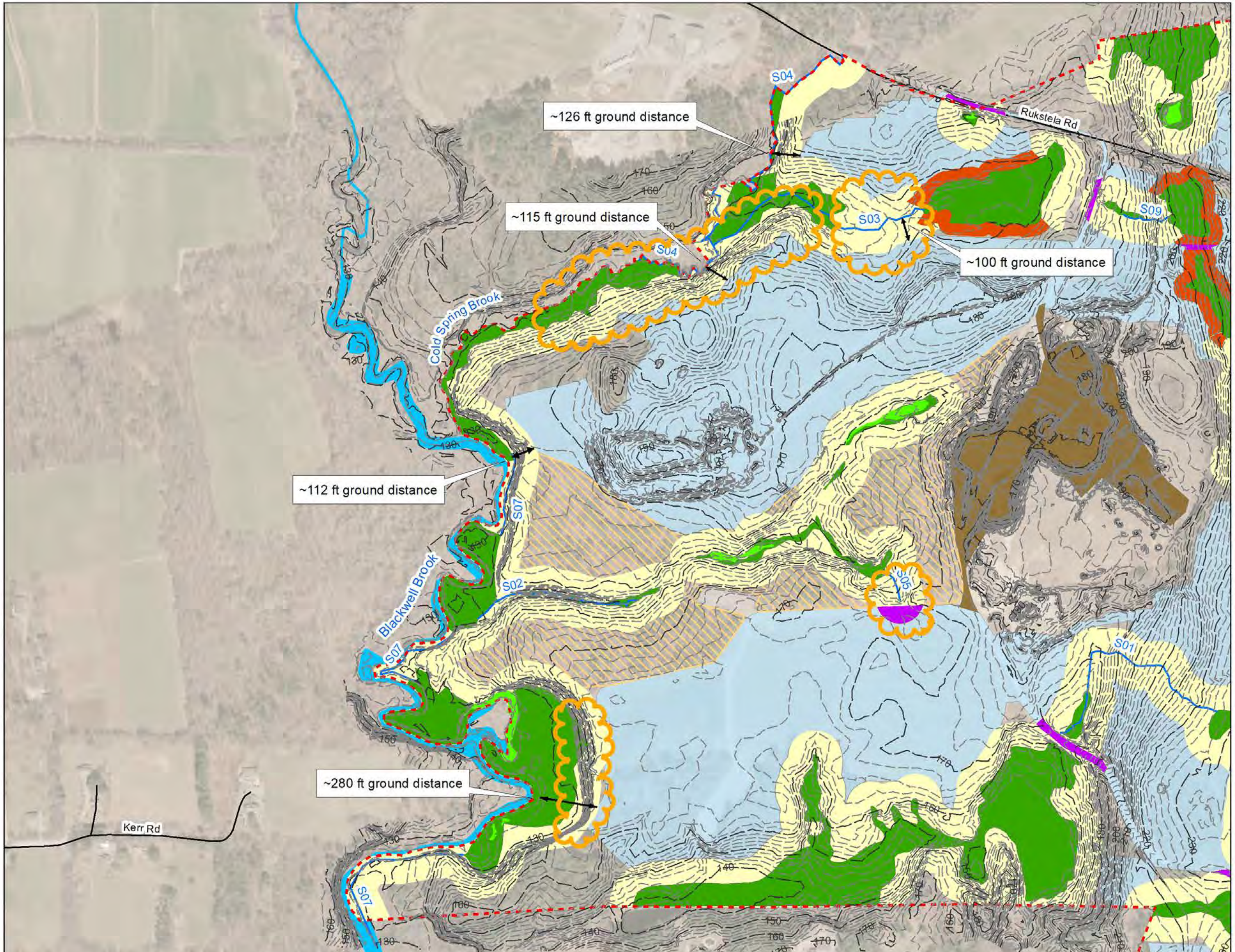


QUINEBAUG SOLAR PROJECT
BROOKLYN & CANTERBURY, CT

PROPOSED CONDITIONS
DRAINAGE AREA MAP

DATE:	03/19/2020
SCALE:	1"=800'
FIGURE	4

Tighe&Bond
Engineers | Environmental Specialists



Limit of Work Distance to Watercourse Features
Quinebaug Solar Project
Brooklyn/Canterbury, CT

Prepared For: NEXTera ENERGY RESOURCES

Prepared By: TETRA TECH

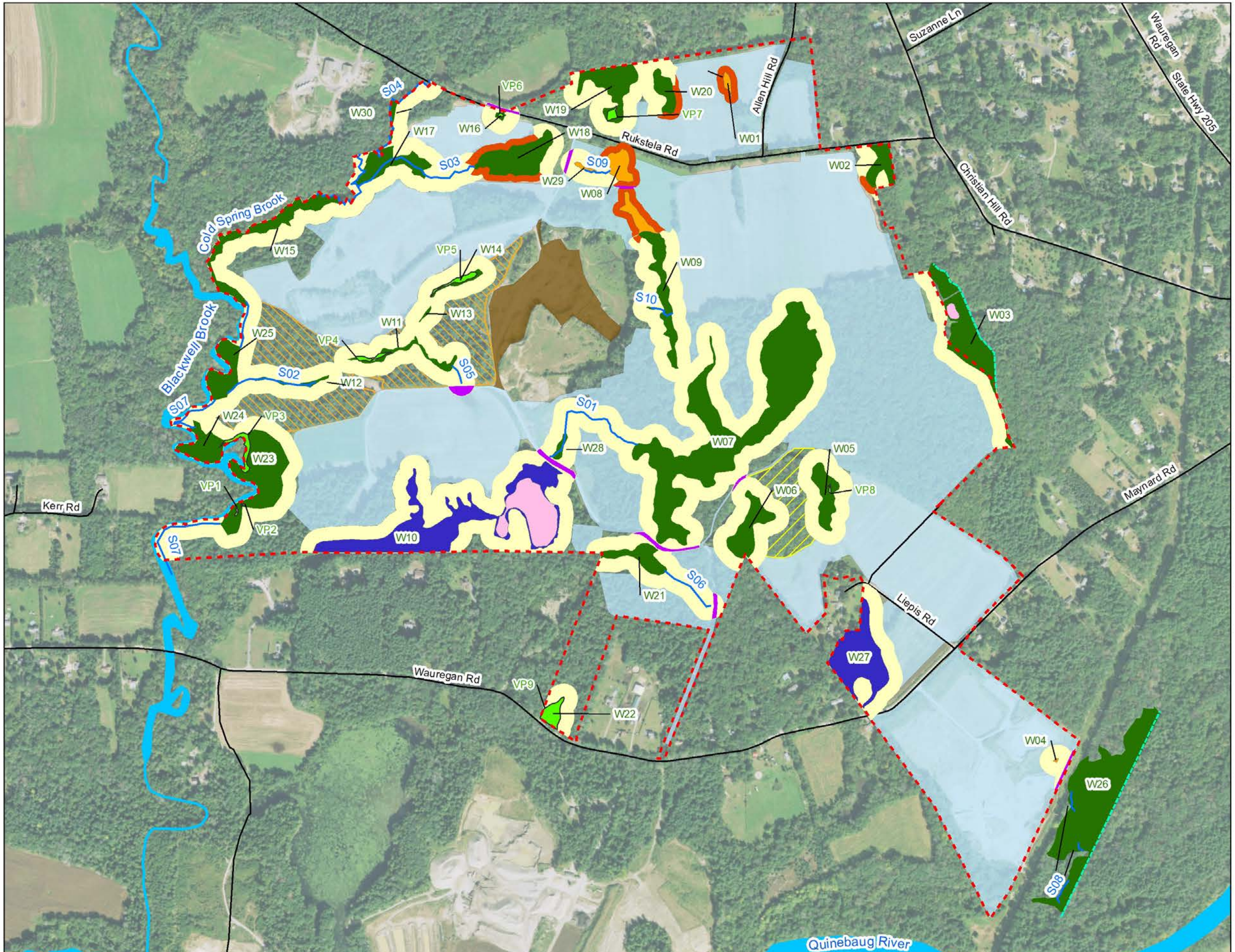
Date: 08/2019

Source: ESRI Imagery 2018; NextEra 2017, USGS National Hydrography Dataset 2019; U.S. Bureau of Census Transportation 2018, Google Earth, 2019

Coordinate System: North American Datum 83 Universal Transverse Mercator, Zone 19 North

Not for Construction

FIGURE 5



Legend

- Study Area
- Delineated Watercourse
- Limit of Wetland Survey
- Road
- Maximum Potential Limit of Work
- Watercourse (NHD)
- Encroachment Area (Along or Adjacent to Existing Roads)
- No Development, Herpetofauna Protection Area
- Potential Laydown (Temporary Disturbance)
- Vernal Pool
- 50' Buffer
- 100' Buffer
- Directional Buffer

Delineated Wetlands

- Emergent Wetland
- Forested Wetland
- Emergent/Scrub-Shrub/Forested Wetland
- Unconsolidated Bottom/Open Water

N

0 400 800 1,600 Feet

Wetlands and Watercourse Buffers
Quinebaug Solar Project
Brooklyn/Canterbury, CT

Prepared For: NEXTera ENERGY TRANSMISSION

Prepared By: TETRA TECH

Date: 08/2019

Source: NAIP Imagery 2018; NextEra 2017, USGS National Hydrography Dataset 2019; U.S. Bureau of Census Transportation 2018

Coordinate System: North American Datum 83 Universal Transverse Mercator, Zone 19 North

Not for Construction

FIGURE 6

APPENDIX B

March 5, 2020

Katelin Nickerson
Senior Environmental Consultant
Tetra Tech, Inc.
451 Presumpscot Street
Portland, ME 04103
Katelin.nickerson@tetratch.com

Re: Quinebaug Solar Project, Wauregan Road and Rukstella Road, Canterbury and Brooklyn, CT
NDDB Final Determination: 201904603

Current data maintained by the Natural Diversity Database (NDDB) indicates that the following species have been documented within the vicinity of the proposed project area:

- American kestrel (*Falco sparverius*) – State Special Concern
- Eastern pearlshell (*Margaritifera margaritifera)* – State Special Concern
- Eastern spadefoot (*Scaphiopus holbrookii)* – State Endangered

Wildlife Division staff have reviewed following material submitted by TetraTech, including but not limited to:

- Environmental Site Conditions Report, April 2019
- Vernal Pool Survey and General Herpetological Inventory of the Quinebaug Solar Project. Prepared by FB Environmental (March 2019)
- Eastern Spadefoot Toad Survey, Quinebaug Solar Project, Brooklyn and Canterbury, Connecticut. Prepared by FB Environmental (March 2019)
- Northern Long-eared Bat (NLEB) Presence/Absence Survey Prepared by Tetra Tech, Inc. for Ranger Solar (September 20, 2016)
- Herpetofauna Avoidance and Mitigation Plan, Quinebaug Solar Project, April 2019
- Quinebaug Solar Project, Additional Wildlife and Resource Evaluation (correspondence), August 28, 2019
- Quinebaug Solar 2019 Spadefoot Surveys (October 7, 2019)
- Quinebaug Solar Project, Eastern Spadefoot Toad Protection, January 17, 2020
- Eastern Spadefoot Toad (*Scaphiopus holbrookii*) Three-Year Monitoring Plan, submitted February 28, 2020, which includes current array layout map and updated conservation area map

American kestrel (*Falco sparverius*)
Habitat for this bird consists of open grassy or shrubby areas with short vegetation and natural tree cavities or nest boxes for nesting; they are limited by habitat in Connecticut. This bird returns to breed in March – July and can benefit from active nest box monitoring and management to decrease competition by starlings. Availability of early successional habitat benefits this species during the post fledgling period and during migration.

Land disturbance activities including digging, ground clearing, heavy machinery driving, staging, or trampling that will occur more than 100 feet into or cut across in a way that fragments large parcels of grassland or shrubland habitat should be done when birds are not breeding. Breeding primarily takes place between March 1 and July 30. Conducting land disturbance activities outside of this breeding season will avoid impact to the individuals. Additionally, do not introduce new traffic or construction noise within a 200m buffer of an active nest or nest box.

Thank you for your August 28, 2019 memo detailing additional protection measures that will be undertaken for this species, which included seasonal clearing restrictions (winter clearing) as well as the following:

- Construction-phase environmental monitoring,
- On-site environmental training for contractors, and
- Minimizing soil disturbance and establishing meadow habitat following construction.

We concur that these additional measures will be protective of this species.

Eastern pearlshell (*Margaritifera margaritifera*)

This freshwater mussel species lives buried in clean, stable, mixed substrate in fast-flowing unpolluted streams and rivers. Its host fish include Atlantic salmon (*Salmo salar*), brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), and rainbow trout (*Onchorhynchus mykiss*). Best habitats are good trout streams that are heavily shaded by a riparian canopy, possess clean cold water with high dissolved oxygen, and have stable channels with substrates of coarse sand, gravel, and cobble. Factors that limit the eastern pearlshell are changes to water quality, including eutrophication, acidification, sedimentation, and increases in water temperature.

DEEP accepts the following measures, outlined in your August 28, 2019 correspondence, intended to prevent erosion and sedimentation to adjacent watercourses during project construction:

- Establish a no-disturbance buffer around all wetlands and watercourses that will be fortified by using the best erosion control devices available to maintain high water quality of the stormwater runoff during heavy rainfall events. Buffers will be a minimum of 100 feet, except in limited circumstances in the vicinity of existing gravel roads (less than 100 feet) that will be used for site access during construction
- Redundant erosion control devices will be installed along the gravel access roads to ensure a failsafe system to protect the resources. Regular road maintenance will be employed during construction and will be maintained during the operation of the Project.
- The herpetofauna avoidance area established around the cluster of wetlands and vernal pools in a relic stream channel immediately up slope from Cold Spring Brook and Blackwell Brook will leave a forested buffer intact between the adjacent watercourses and potential sources of erosion and sedimentation created during Project construction.
- Additional measures are found in the August 28, 2019 memo, sections Stormwater Control and Site Stabilization, Stormwater Pollution Control Plan and Construction Sequence, and Additional Control Measures.

Eastern spadefoot (*Scaphiopus holbrookii*)

Pursuant to the December 18, 2019 meeting, ongoing discussions between Agency Staff and project proponents have resulted in an agreement by all parties to implement Spadefoot toad mitigation measures as outlined in the Quinebaug Solar Hepetofauna Avoidance and Mitigation Plan (April 2019), the Quinebaug Solar Project, Eastern Spadefoot Toad Protection (January 17, 2020), and the Eastern Spadefoot Toad (*Scaphiopus holbrookii*) Three-Year Monitoring Plan (submitted February 28, 2020).

These plans provide details regarding the components of spadefoot toad protection, as highlighted below. Refer to these plans for specific details.

Conservation Areas

- Wetlands and watercourses are outside the limit of work, and include 100-foot buffers, with some exceptions. See Figure 2, Eastern Spadefoot Toad (*Scaphiopus holbrookii*) Three-Year Monitoring Plan (submitted February 28, 2020).
- Conservation area (designated as 'herpetofauna protection area'); ~ 40 acres, which has been updated to include conserved areas around Pool C (~1 acre) and the edge of the gravel extraction area (~7 acres). See Figure 2, Eastern Spadefoot Toad (*Scaphiopus holbrookii*) Three-Year Monitoring Plan (submitted February 28, 2020).
- Conserved areas are to be designated as such for the life of the project, as agreed to in the letter dated January 10, 2020, signed by River Junction Estates LLC, O & G Industries, Inc. and Strategic Commercial Realty DBA Rawson Materials, and provided to DEEP (Attachment 1).

Protection Measures - Construction Activities

- Construction Timing as described in the Quinebaug Solar Herpetofauna Avoidance and Mitigation Plan, including but not limited to restricting tree clearing in vernal pool critical terrestrial habitats to winter (November to March)
- Monitoring during construction as described in the Quinebaug Solar Herpetofauna Avoidance and Mitigation Plan
- Exclusion fencing and relocation as needed as described in the Quinebaug Solar Herpetofauna Avoidance and Mitigation Plan.
- Contractor training – as described in the Quinebaug Solar Herpetofauna Avoidance and Mitigation Plan, including but not limited to hiring an Environmental Monitor, who will create a training curriculum prior to commencement of construction activities.

Post-Construction

- Permanent signage around Pool C (prevent entry of mechanized maintenance equipment)
- Post-construction monitoring – 3 years of monitoring, beginning in 2022 and extending to 2024, will be implemented utilizing survey methods deployed during summer 2019. Monitoring focus will be limited to surveying for breeding evidence at Pool C. Refer to the Eastern Spadefoot Toad (*Scaphiopus holbrookii*) Three-Year Monitoring Plan (submitted February 28, 2020) for details. Annual monitoring reports must be submitted to the Wildlife Division by December 31st each year.
- Note that DEEP would like to clarify the declaration found in the Eastern Spadefoot Toad (*Scaphiopus holbrookii*) Three-Year Monitoring Plan statement; "*Therefore, if breeding of eastern spadefoot toad is not observed during the proposed three-year monitoring effort, it will not be indicative of negative impact or disturbance to the species resulting from Project development. Rather, it will be a continuation of what has been previously observed.*" A parsing of this sentence indicates that Quinebaug Solar is stating that a lack of breeding should not be utilized to conclude there have been negative impacts to the species from project development. DEEP notes that if breeding is not observed, there are no conclusions to be drawn regarding potential impacts to spadefoot toad breeding from project activities.

As the project moves forward, it will be important for your project leaders and herpetologists to work closely with DEEP spadefoot toad biologist, Michael Ravesi (michael.ravesi@ct.gov; 860-424-3104) to ensure that protection measures proposed during construction are properly implemented and that study design for the post-construction monitoring is appropriate for the species and for acquisition of the appropriate data to assess impact associated with and site use of the Quinebaug Solar Project.

Finally, DEEP notes that impact avoidance and mitigation measures agreed to for this project are applicable to this project only and may not be appropriate or deemed acceptable for similar species and conditions at other sites.

The NDDB Determination for Quinebaug Solar Project, Wauregan Road and Rukstella Road, Canterbury and Brooklyn, as described in the submitted information is valid for two years. This determination applies only to the project as described in the submission. Please re-submit an updated Request for Review if there are additional scope of work and/or timeframe changes, including if work has not begun by March 05, 2022.

Natural Diversity Database information includes all information regarding listed species available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey and cooperating units of DEEP, land owners, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as enhance existing data. Such new information is incorporated into the Database and as it becomes available. New information may result in additional review, and new or modified restrictions or conditions may be necessary to remain in compliance with certain state permits.

- During your work listed species may be encountered on site. A report must be submitted by the observer to the Natural Diversity Database promptly and additional review and restrictions or conditions may be necessary to remain in compliance with certain state permits.
- Your project involves the state permit application process or other state involvement, including state funding or state agency actions; please note that consultations with your permit analyst or the agency may result in additional requirements. In this situation, additional evaluation of the proposal by the DEEP Wildlife Division may be necessary and additional information, including but not limited to species-specific site surveys, may be required. Any additional review may result in specific restrictions or conditions relating to listed species that may be found at or in the vicinity of the site.

Jenny Dickson

Jenny Dickson

Director
CT DEEP Wildlife Division
Jenny.dickson@ct.gov

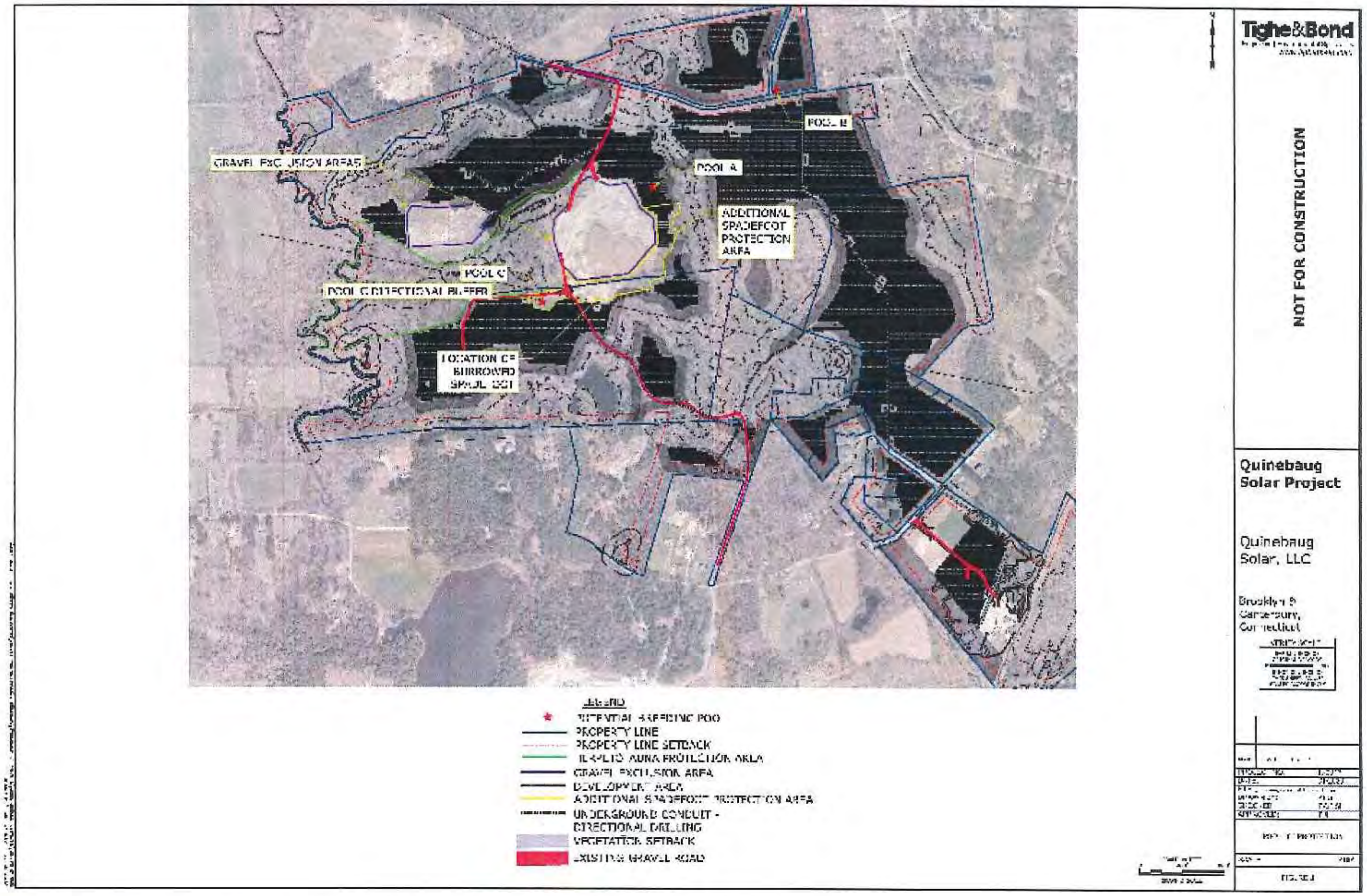


Figure 1: Conceptual layout and maximum Project extent, Quinebaug Solar Project Brooklyn and Canterbury, Connecticut

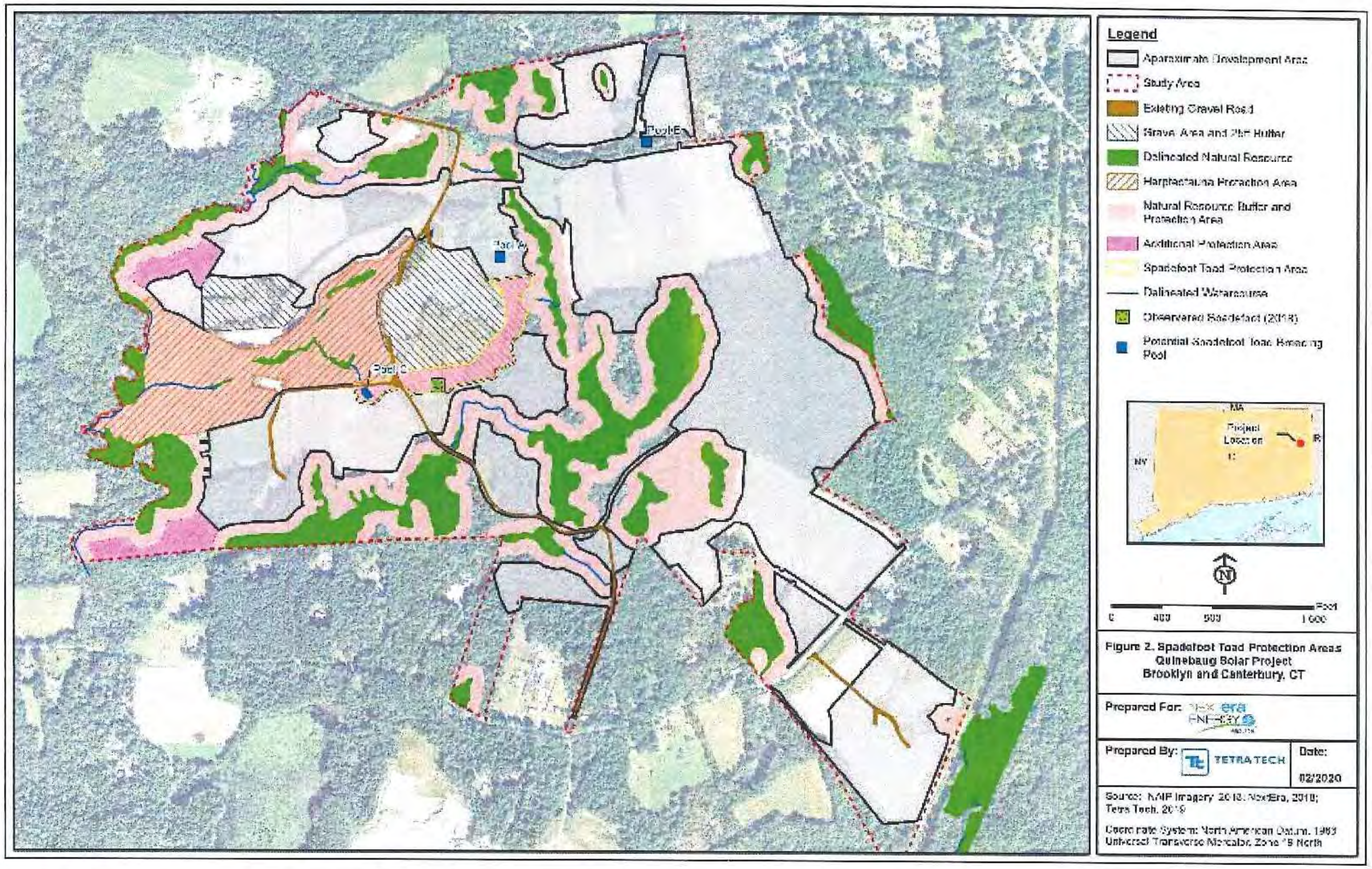


Figure 2: Spadefoot toad protection areas, Quinebaug Solar Project Brooklyn and Canterbury, Connecticut

Attachment 1. Conservation Area Protection Letter

January 10, 2020

Connecticut Department of Energy
and Environmental Protection
79 Elm Street
Hartford, Connecticut 06106

Re: Quinebaug Solar Project - Conservation Areas on the River Junction Estates Land

To Whom This May Concern:

Quinebaug Solar, LLC ("**Quinebaug Solar**") is currently proposing to construct a solar project (the "**Project**") on several parcels of land in the towns of Canterbury and Brooklyn, Connecticut. Quinebaug Solar understands the value of placing certain areas of the solar project in conservation for the duration of the solar project and therefore agrees that it will not develop solar on the areas shown in pink as further denoted on **Exhibit A**, the Conservation Areas Map, attached hereto and hereinafter incorporated by reference (the "**Conservation Areas**").

Further, the landowner, River Junction Estates, LLC and the mineral rights owners O&G Industries, Inc. and Strategic Commercial Realty, Inc. DBA Rawson Materials (collectively, referred to as the "**Land Parties**"), represent and warrant that for the duration of the solar project, the Land Parties will not develop or grant others the right to develop, the Conservation Areas.

Quinebaug Solar and the Land Parties agree that a short form of this letter in a format acceptable to all parties, may be recorded at the request of the Connecticut Department of Energy and Environmental Protection in the land records of the towns where such Conservation Areas lie.

Quinebaug Solar and the Land Parties further agree that the above referenced Conservation Areas shall be effective no earlier than the start of construction of the Project and will not go into effect unless and until all applicable state and local permits have been duly issued.

QUINEBAUG SOLAR
Quinebaug Solar, LLC

By: Kathy Beilhart
Title:
VP of Finance, Accounting, and Tax

LAND PARTIES
Strategic Commercial Realty, Inc.
dba Rawson Materials

By: Jeffrey Rawson
Title: President

O&G Industries, Inc.
Matt Oneglia
By: Matt Oneglia
Title: MVP

River Junction Estates, LLC
Allan R. Rawson
By: Allan Rawson
Title: Manager

APPENDIX C

SOIL EROSION AND SEDIMENT CONTROL
PLAN UNDER SEPARATE COVER

APPENDIX D

Temporary Sediment Basin and Trap Sizing Calculations

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Trap Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

Phase 1A - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	1.3	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**174**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	1,431	Sq. Ft.
D_W=	2	feet
V_W=	**2,433**	**Cu. Ft.**
V_W=	**90**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	1,431	Sq. Ft.
A_d=	1,939	Sq. Ft.
D_d=	2	feet
V_d=	**3,370**	**Cu. Ft.**
V_d=	**125**	**Cu. Yd.**

Provided Storage - Total Storage is provided in two sediment traps

Wet Storage	2,433	Cu. Ft.
	90	Cu. Yd.
Dry Storage	3,370	Cu. Ft.
	125	Cu. Yd.
Total Storage	**5,803**	**Cu. Ft.**
	215	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Trap Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

Phase 1B - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	5	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**670**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	5,453	Sq. Ft.
D_W=	2	feet

V_W=	**9,270**	**Cu. Ft.**
V_W=	**343**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	5,453	Sq. Ft.
A_d=	7,328	Sq. Ft.
D_d=	2	feet

V_d=	**12,781**	**Cu. Ft.**
V_d=	**473**	**Cu. Yd.**

Provided Storage - Total Storage is provided in two sediment traps

Wet Storage	9,270	Cu. Ft.
	343	Cu. Yd.
Dry Storage	12,781	Cu. Ft.
	473	Cu. Yd.
Total Storage	**22,051**	**Cu. Ft.**
	817	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Trap Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

Phase 1C - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	1	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**134**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	1,070	Sq. Ft.
D_W=	2	feet

V_W=	**1,819**	**Cu. Ft.**
V_W=	**67**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} x D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	1,070	Sq. Ft.
A_d=	1,941	Sq. Ft.
D_d=	2	feet

V_d=	**3,011**	**Cu. Ft.**
V_d=	**112**	**Cu. Yd.**

Provided Storage

Wet Storage	1,819	Cu. Ft.
	67	Cu. Yd.
Dry Storage	3,011	Cu. Ft.
	112	Cu. Yd.

Total Storage	**4,830**	**Cu. Ft.**
	179	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Phase 1D - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	1	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**134**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	1,120	Sq. Ft.
D_W=	2	feet

V_W=	**1,904**	**Cu. Ft.**
V_W=	**71**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} x D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	1,120	Sq. Ft.
A_d=	2,104	Sq. Ft.
D_d=	2	feet

V_d=	**3,224**	**Cu. Ft.**
V_d=	**119**	**Cu. Yd.**

Provided Storage

Wet Storage	1,904	Cu. Ft.
	71	Cu. Yd.
Dry Storage	3,224	Cu. Ft.
	119	Cu. Yd.
Total Storage	**5,128**	**Cu. Ft.**
	190	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Phase 1E - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area = 1.8 Acres

Required Storage= 134 Cu. Yds / Acre

Total Required Storage= **241** Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W= 4,557 Sq. Ft.
D_W= 1 feet

V_W= 3,873 Cu. Ft.
V_W= 143 Cu. Yd.

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W= 4,557 Sq. Ft.
A_d= 5,410 Sq. Ft.
D_d= 1 feet

V_d= 4,984 Cu. Ft.
V_d= 185 Cu. Yd.

Provided Storage

Wet Storage 3,873 Cu. Ft.
143.46 Cu. Yd.

Dry Storage 4,984 Cu. Ft.
185 Cu. Yd.

Total Storage 8,857 Cu. Ft.
328 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Trap Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

Phase 1F - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	1.5	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**201**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	2,921	Sq. Ft.
D_W=	2	feet

V_W=	**4,966**	**Cu. Ft.**
V_W=	**184**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} x D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	2,921	Sq. Ft.
A_d=	4,729	Sq. Ft.
D_d=	2	feet

V_d=	**7,650**	**Cu. Ft.**
V_d=	**283**	**Cu. Yd.**

Provided Storage

Wet Storage	4,966	Cu. Ft.
	183.91	Cu. Yd.
Dry Storage	7,650	Cu. Ft.
	283	Cu. Yd.

Total Storage	**12,616**	**Cu. Ft.**
	467	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Phase 1G - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	1.2	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**161**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	2,611	Sq. Ft.
D_W=	1	feet

V_W=	**2,219**	**Cu. Ft.**
V_W=	**82**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	2,611	Sq. Ft.
A_d=	3,645	Sq. Ft.
D_d=	1	feet

V_d=	**3,128**	**Cu. Ft.**
V_d=	**116**	**Cu. Yd.**

Provided Storage

Wet Storage	2,219	Cu. Ft.
	82.20	Cu. Yd.
Dry Storage	3,128	Cu. Ft.
	116	Cu. Yd.

Total Storage	**5,347**	**Cu. Ft.**
	198	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Trap Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

Phase 1H - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	2.4	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**322**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	5,792	Sq. Ft.
D_W=	1	feet

V_W=	**4,923**	**Cu. Ft.**
V_W=	**182**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	5,792	Sq. Ft.
A_d=	6,797	Sq. Ft.
D_d=	1	feet

V_d=	**6,295**	**Cu. Ft.**
V_d=	**233**	**Cu. Yd.**

Provided Storage

Wet Storage	4,923	Cu. Ft.
	182.34	Cu. Yd.
Dry Storage	6,295	Cu. Ft.
	233	Cu. Yd.

Total Storage	**11,218**	**Cu. Ft.**
	415	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Project Name:	Quinebaug Solar Project
Project Number:	R0317
Project Location:	Brooklyn and Canterbury, Connecticut
Description:	Temporary Sediment Trap Sizing Calculation
Prepared By:	ALG
Date:	March 2020

Tighe&Bond
Consulting Engineers
Environmental Specialists

Phase 11 - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area = 1.3 Acres

Required Storage= 134 Cu. Yds / Acre

Total Required Storage= **174** Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W= 2,811 Sq. Ft.

D_W= 1 feet

V_W= 2,389 Cu. Ft.
V_W= 88 Cu. Yd.

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W= 2,811 Sq. Ft.
A_d= 3,456 Sq. Ft.
D_d= 1 feet

V_d= 3,134 Cu. Ft.
V_d= 116 Cu. Yd.

Provided Storage

Wet Storage	2,389	Cu. Ft.
	88.49	Cu. Yd.
Dry Storage	3,134	Cu. Ft.
	116	Cu. Yd.
Total Storage	**5,523**	**Cu. Ft.**
	205	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Trap Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

Phase 1J - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area = 4.1 Acres

Required Storage= 134 Cu. Yds / Acre

Total Required Storage= **549** Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W= 4,666 Sq. Ft.
D_W= 2 feet

V_W=	**7932.2**	**Cu. Ft.**
V_W=	**294**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W= 4,666 Sq. Ft.
A_d= 2,892 Sq. Ft.
D_d= 2 feet

V_d=	**7,558**	**Cu. Ft.**
V_d=	**280**	**Cu. Yd.**

Provided Storage

Wet Storage	7,932	Cu. Ft.
	293.79	Cu. Yd.
Dry Storage	7,558	Cu. Ft.
	280	Cu. Yd.
Total Storage	**15,490**	**Cu. Ft.**
	574	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Trap Sizing Calculation** Prepared By: **ALG** Date: **April 2020**

Phase 1K - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area = 5 Acres

Required Storage= 134 Cu. Yds / Acre

Total Required Storage= **670** Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$V_w = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W= 5,788 Sq. Ft.
D_W= 2 feet

V_W= 9839.6 Cu. Ft.
V_W= 364 Cu. Yd.

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W= 5,788 Sq. Ft.
A_d= 5,788 Sq. Ft.
D_d= 2 feet

V_d= 11,576 Cu. Ft.
V_d= 429 Cu. Yd.

Provided Storage

Wet Storage	9,840	Cu. Ft.
	364.43	Cu. Yd.
Dry Storage	11,576	Cu. Ft.
	429	Cu. Yd.
Total Storage	**21,416**	**Cu. Ft.**
	793	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Phase 2A - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	4.90	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**657**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$V_w = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	5,912	Sq. Ft.
D_W=	2	feet

V_W=	**10,050**	**Cu. Ft.**
V_W=	**372**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	5,912	Sq. Ft.
A_d=	8,579	Sq. Ft.
D_d=	2	feet

V_d=	**14,491**	**Cu. Ft.**
V_d=	**537**	**Cu. Yd.**

Provided Storage

Wet Storage	10,050	Cu. Ft.
	372	Cu. Yd.
Dry Storage	14,491	Cu. Ft.
	537	Cu. Yd.

Total Storage	**24,541**	**Cu. Ft.**
	909	**Cu. Yd.**

Tighe&Bond Consulting Engineers Environmental Specialists	
Project Name:	**Quinebaug Solar Project**
Project Number:	**R-0317**
Project Location:	**Brooklyn and Canterbury, Connecticut**
Description:	**Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG**	Date: **March 2020**

Temporary Sediment Basin 2B/4B

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

V = the volume of sediment trapped in ac. ft./yr.
DA = the total drainage area in acres
A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
DR = the delivery ratio determined from **Figure SB-12**.
TE = the trap efficiency as given above. (Use 0.8)
γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 6.1 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

Figure SB-1 Determining Erosion Rates

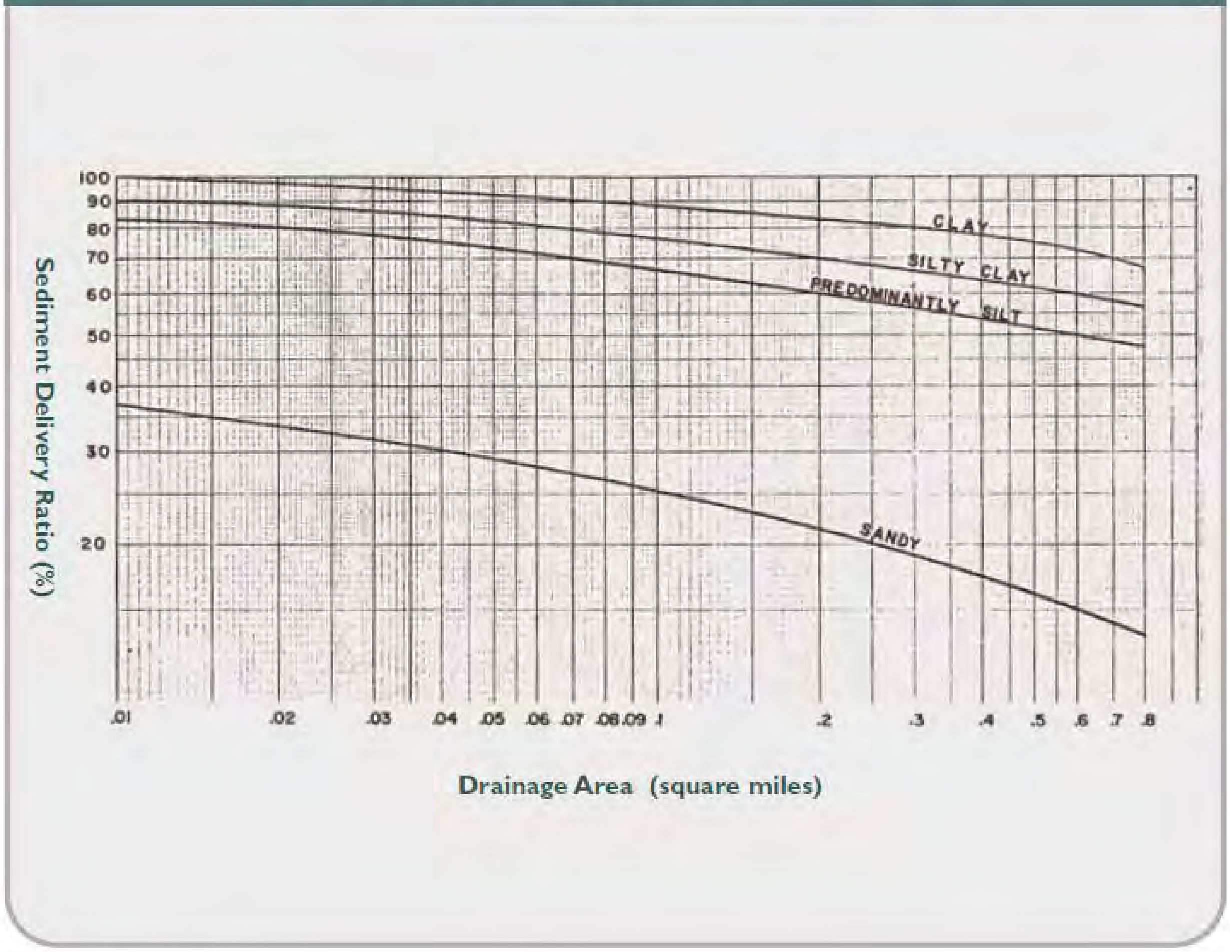
Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

Source: USDA-SCS

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed

DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

γ = Soil Texture is Sand-silt mixtur

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_s Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.070 Acre Ft
V_S = 3042.82 Cu. Ft
112.70 Cu. Yd.

Wet Storage Volume

V_W = 2 * V
V_W = 6086 Cu. Ft
225.39 Cu Yd

Total Required Basin Capacity

Total Volume = V_S + V_W + Residence Storage

Residence Storage = volume to provide 10 hours residence time for a 10 year frequency 24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 11741 Cu. Ft.
435 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Tighe&Bond Consulting Engineers Environmental Specialists	
Project Name:	**Quinebaug Solar Project**
Project Number:	**R0317**
Project Location:	**Brooklyn and Canterbury, Connecticut**
Description:	**Temporary Sediment Trap Sizing Calculation**
Prepared By: **ALG**	Date: **March 2020**

Phase 2C - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	3.50	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**469**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	5,453	Sq. Ft.
D_W=	2	feet
V_W=	**9,270**	**Cu. Ft.**
V_W=	**343**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	5,453	Sq. Ft.
A_d=	7,328	Sq. Ft.
D_d=	2	feet
V_d=	**12,781**	**Cu. Ft.**
V_d=	**473**	**Cu. Yd.**

Provided Storage

Wet Storage	9,270	Cu. Ft.
	343	Cu. Yd.
Dry Storage	12,781	Cu. Ft.
	473	Cu. Yd.
Total Storage	**22,051**	**Cu. Ft.**
	817	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Trap Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

Phase 2D - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	3.00	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**402**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	3,412	Sq. Ft.
D_W=	2	feet

V_W=	**5,800**	**Cu. Ft.**
V_W=	**215**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet.
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	3,412	Sq. Ft.
A_d=	4,973	Sq. Ft.
D_d=	2	feet

V_d=	**8,385**	**Cu. Ft.**
V_d=	**311**	**Cu. Yd.**

Provided Storage

Wet Storage	5,800	Cu. Ft.
	215	Cu. Yd.
Dry Storage	8,385	Cu. Ft.
	311	Cu. Yd.
Total Storage	**14,185**	**Cu. Ft.**
	525	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Temporary Sediment Basin 2E/4E

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

V = the volume of sediment trapped in ac. ft./yr.
DA = the total drainage area in acres
A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
DR = the delivery ratio determined from **Figure SB-12**.
TE = the trap efficiency as given above. (Use 0.8)
γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 9.1 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

Figure SB-1 Determining Erosion Rates

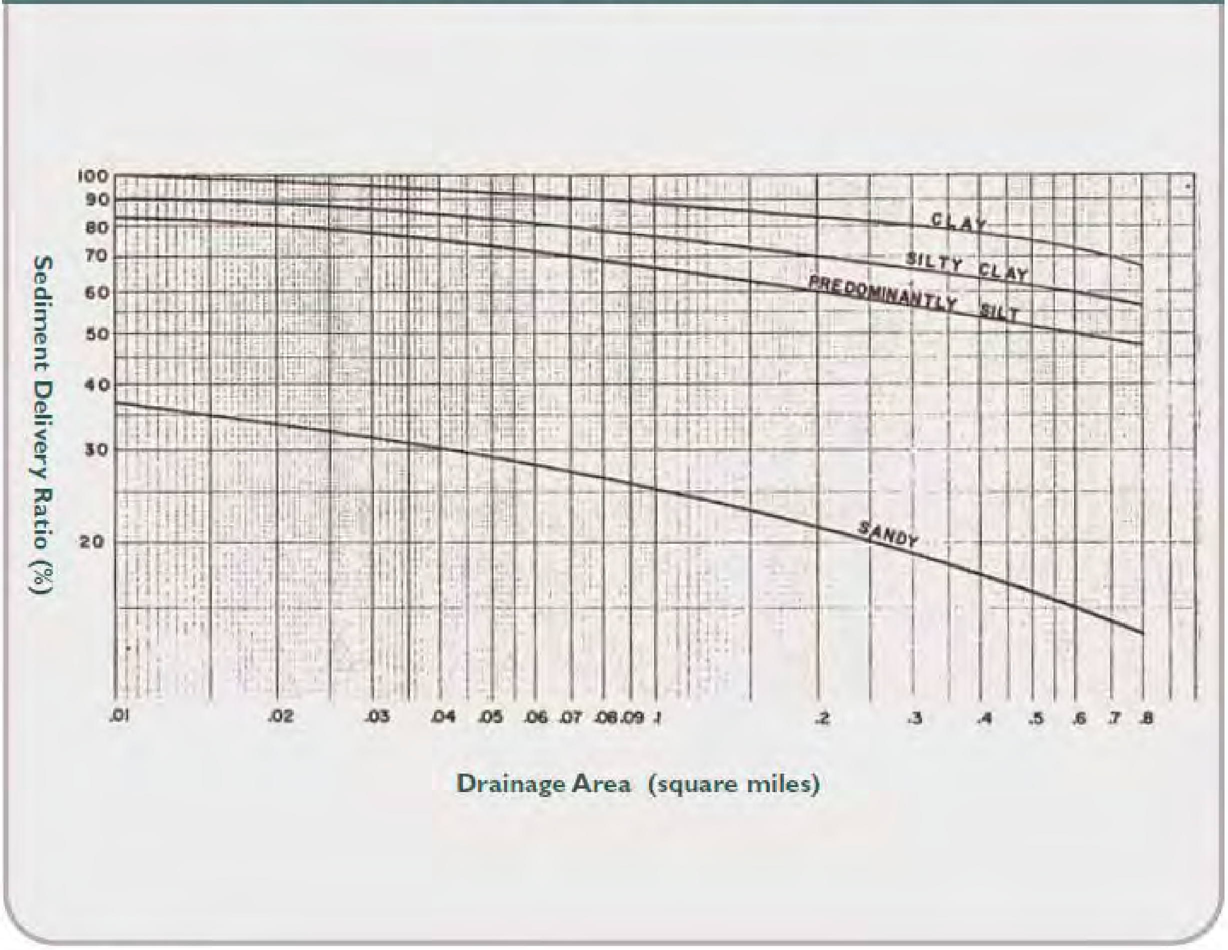
Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

Source: USDA-SCS

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed

DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

γ = Soil Texture is Sand-silt mixtur

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_s Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.104 Acre Ft
V_S = 4539.29 Cu. Ft
168.12 Cu. Yd.

Wet Storage Volume

V_W = 2 * V
V_W = 9079 Cu. Ft
336.24 Cu Yd

Total Required Basin Capacity

Total Volume = V_S + V_W + Residence Storage

Residence Storage = volume to provide 10 hours residence time for a 10 year frequency 24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 16231 Cu. Ft.
601 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Temporary Sediment Basin 2F/4F

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

V = the volume of sediment trapped in ac. ft./yr.
DA = the total drainage area in acres
A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
DR = the delivery ratio determined from **Figure SB-12**.
TE = the trap efficiency as given above. (Use 0.8)
γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 9.2 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

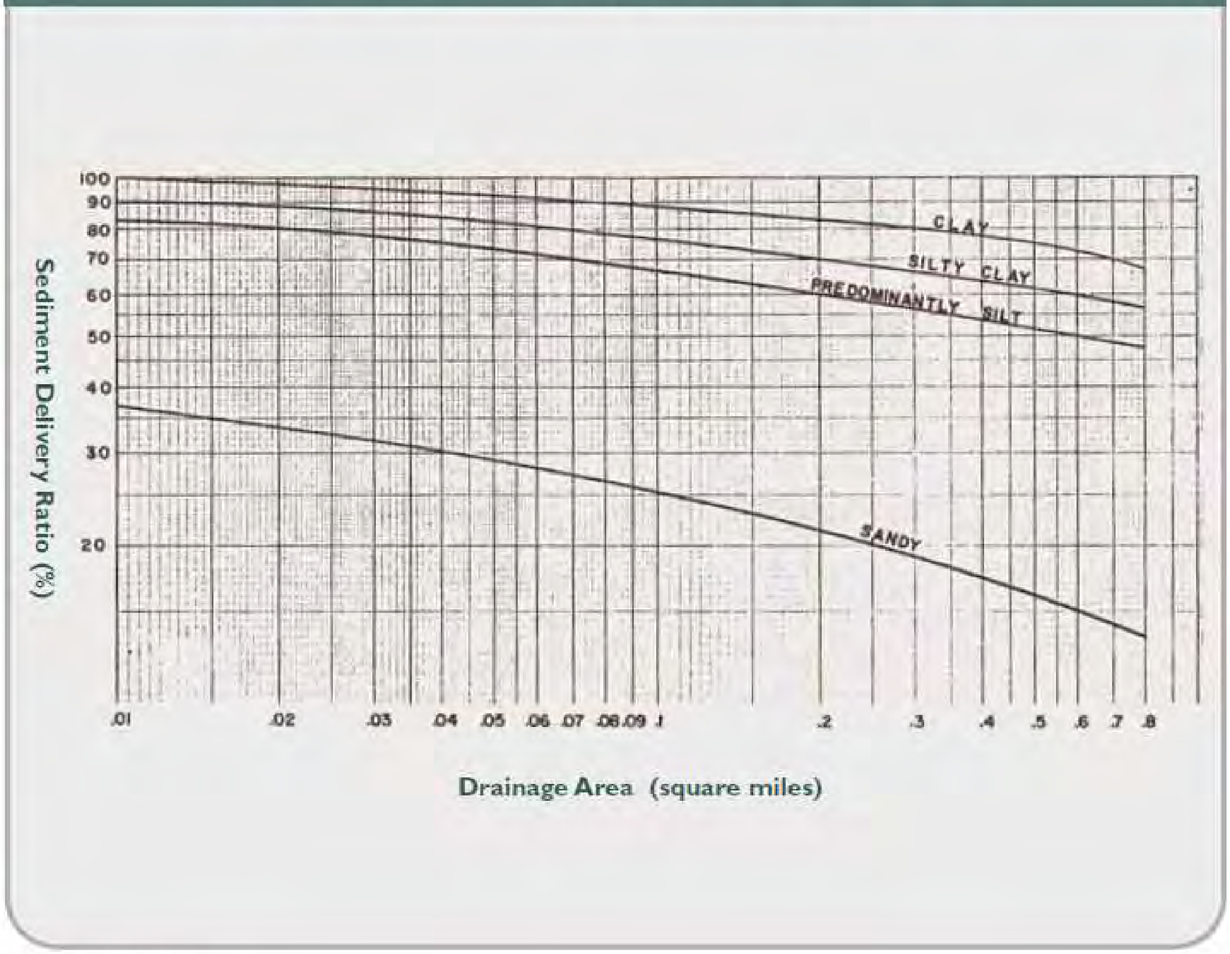
Figure SB-1 Determining Erosion Rates

Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

Source: USDA-SCS

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed
DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

Tighe&Bond
Consulting Engineers
Environmental Specialists

Project Name: **Quinebaug Solar Project**
Project Number: **R-0317**
Project Location: **Brooklyn and Canterbury, Connecticut**
Description: **Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG** Date: **March 2020**

γ = Soil Texture is Sand-silt mixtur

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_s Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.105 Acre Ft
V_S = 4589.18 Cu. Ft
169.97 Cu. Yd.

Wet Storage Volume

V_W = 2 * V
V_W = 9178 Cu. Ft
339.94 Cu Yd

Total Required Basin Capacity

Total Volume = V_S + V_W + Residence Storage

Residence Storage = volume to provide 10 hours residence time for a 10 year frequency
24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 16381 Cu. Ft.
607 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Temporary Sediment Basin 2G/4G

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

V = the volume of sediment trapped in ac. ft./yr.
DA = the total drainage area in acres
A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
DR = the delivery ratio determined from **Figure SB-12**.
TE = the trap efficiency as given above. (Use 0.8)
γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 9.8 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

Figure SB-1 Determining Erosion Rates

Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

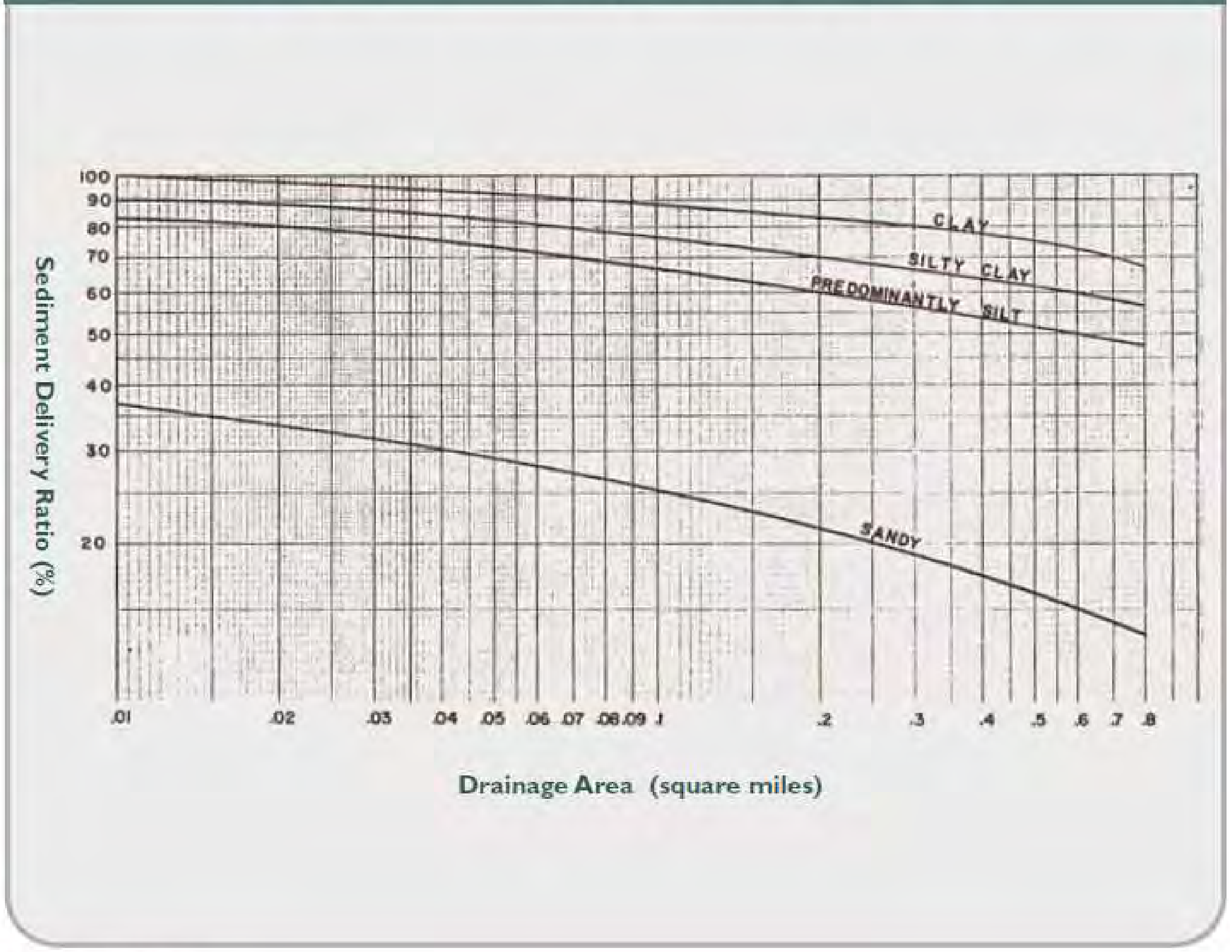
Source: USDA-SCS

Project Name:	**Quinebaug Solar Project**
Project Number:	**R-0317**
Project Location:	**Brooklyn and Canterbury, Connecticut**
Description:	**Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG**	Date: **March 2020**

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed

DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

Tighe&Bond
Consulting Engineers
Environmental Specialists

Project Name: **Quinebaug Solar Project**
Project Number: **R-0317**
Project Location: **Brooklyn and Canterbury, Connecticut**
Description: **Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG** Date: **March 2020**

γ = Soil Texture is Sand-silt mixture

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_s Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.112 Acre Ft
V_S = 4888.47 Cu. Ft
181.05 Cu. Yd.

Wet Storage Volume

V_W = 2 * V
V_W = 9777 Cu. Ft
362.11 Cu Yd

Total Required Basin Capacity

Total Volume = $V_S + V_W$ + Residence Storage

Residence Storage = volume to provide 10 hours residence time for a 10 year frequency 24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 17278 Cu. Ft.
640 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Temporary Sediment Basin 2H/4H

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

V = the volume of sediment trapped in ac. ft./yr.
DA = the total drainage area in acres
A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
DR = the delivery ratio determined from **Figure SB-12**.
TE = the trap efficiency as given above. (Use 0.8)
γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 6.8 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

Figure SB-1 Determining Erosion Rates

Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

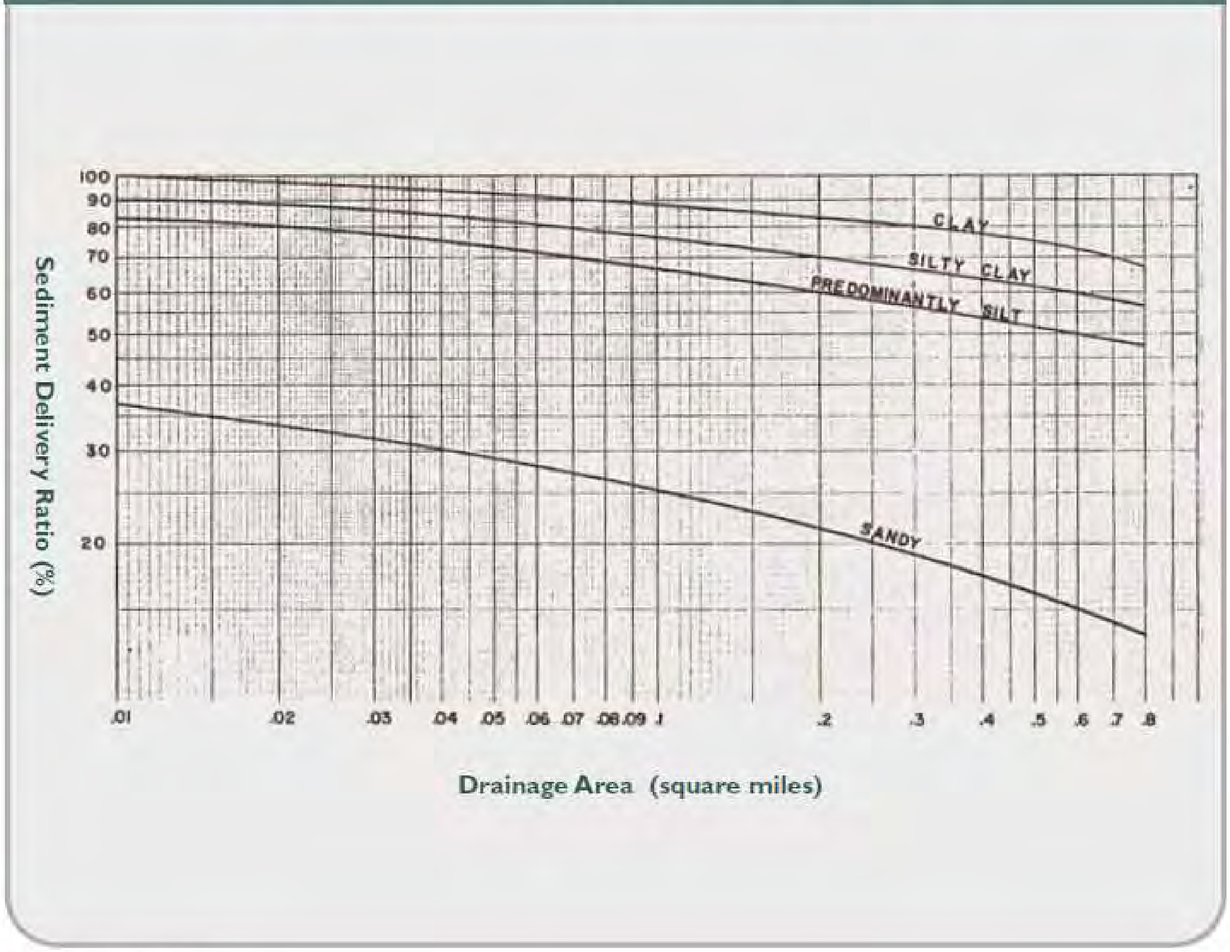
Source: USDA-SCS

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R-0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Basin Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed

DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

Tighe&Bond
Consulting Engineers
Environmental Specialists

Project Name: **Quinebaug Solar Project**
Project Number: **R-0317**
Project Location: **Brooklyn and Canterbury, Connecticut**
Description: **Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG** Date: **March 2020**

γ = Soil Texture is Sand-silt mixtur

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_S Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.078 Acre Ft
V_S = 3392.00 Cu. Ft
125.63 Cu. Yd.

Wet Storage Volume

V_W = 2 * V
V_W = 6784 Cu. Ft
251.26 Cu Yd

Total Required Basin Capacity

Total Volume = V_S + V_W + Residence Storage

Residence Storage = volume to provide 10 hours residence time for a 10 year frequency 24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 12789 Cu. Ft.
474 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Temporary Sediment Basin 2I/4I

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

V = the volume of sediment trapped in ac. ft./yr.
DA = the total drainage area in acres
A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
DR = the delivery ratio determined from **Figure SB-12**.
TE = the trap efficiency as given above. (Use 0.8)
γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 7.4 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

Figure SB-1 Determining Erosion Rates

Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

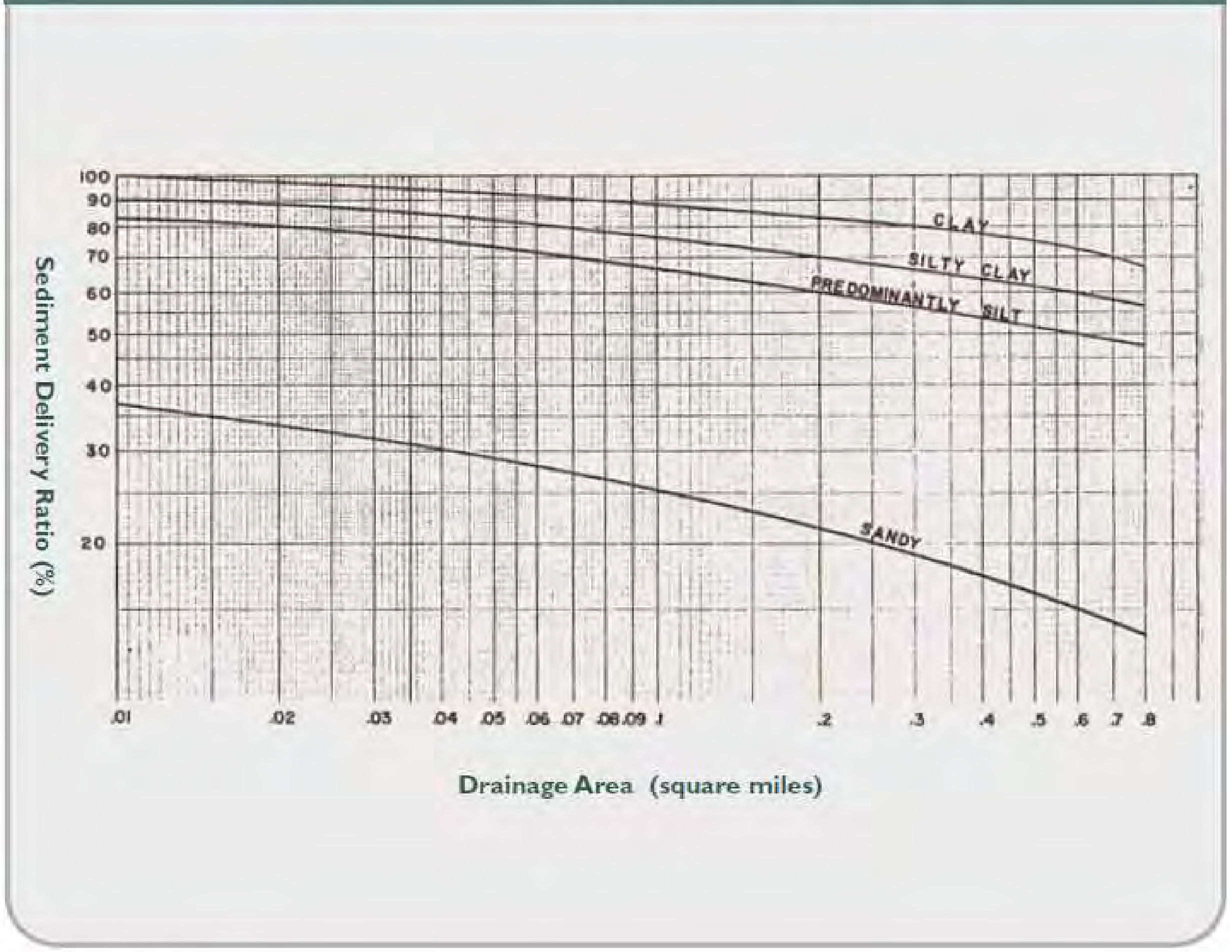
Source: USDA-SCS

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R-0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Basin Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed

DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R-0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Basin Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

γ = Soil Texture is Sand-silt mixtur

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_S Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.085 Acre Ft

V_S = 3691.29 Cu. Ft

136.71 Cu. Yd.

Wet Storage Volume

V_W = 2 * V

V_W = 7383 Cu. Ft

273.43 Cu Yd

Total Required Basin Capacity

Total Volume = V_S + V_W + Residence Storage

Residence Storage = volume to provide 10 hours residence time for a 10 year frequency 24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 13687 Cu. Ft.

507 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Phase 2J - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	5.00	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**670**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$V_w = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	15,602	Sq. Ft.
D_W=	3	feet

V_W=	**39,785**	**Cu. Ft.**
V_W=	**1,474**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	15,602	Sq. Ft.
A_d=	18,366	Sq. Ft.
D_d=	1	feet

V_d=	**16,984**	**Cu. Ft.**
V_d=	**629**	**Cu. Yd.**

Provided Storage

Wet Storage	39,785	Cu. Ft.
	1,474	Cu. Yd.
Dry Storage	16,984	Cu. Ft.
	629	Cu. Yd.

Total Storage	**56,769**	**Cu. Ft.**
	2,103	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Phase 2K - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area = 1.90 Acres

Required Storage= 134 Cu. Yds / Acre

Total Required Storage= **255** Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W= 2,120 Sq. Ft.
D_W= 2 feet

V_W=	**3,604**	**Cu. Ft.**
V_W=	**133**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W= 2,120 Sq. Ft.
A_d= 3,271 Sq. Ft.
D_d= 2 feet

V_d=	**5,391**	**Cu. Ft.**
V_d=	**200**	**Cu. Yd.**

Provided Storage

Wet Storage	3,604	Cu. Ft.
	133	Cu. Yd.
Dry Storage	5,391	Cu. Ft.
	200	Cu. Yd.
Total Storage	**8,995**	**Cu. Ft.**
	333	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Temporary Sediment Basin 2L/4L

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

V = the volume of sediment trapped in ac. ft./yr.
DA = the total drainage area in acres
A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
DR = the delivery ratio determined from **Figure SB-12**.
TE = the trap efficiency as given above. (Use 0.8)
γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 5.8 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

Figure SB-1 Determining Erosion Rates

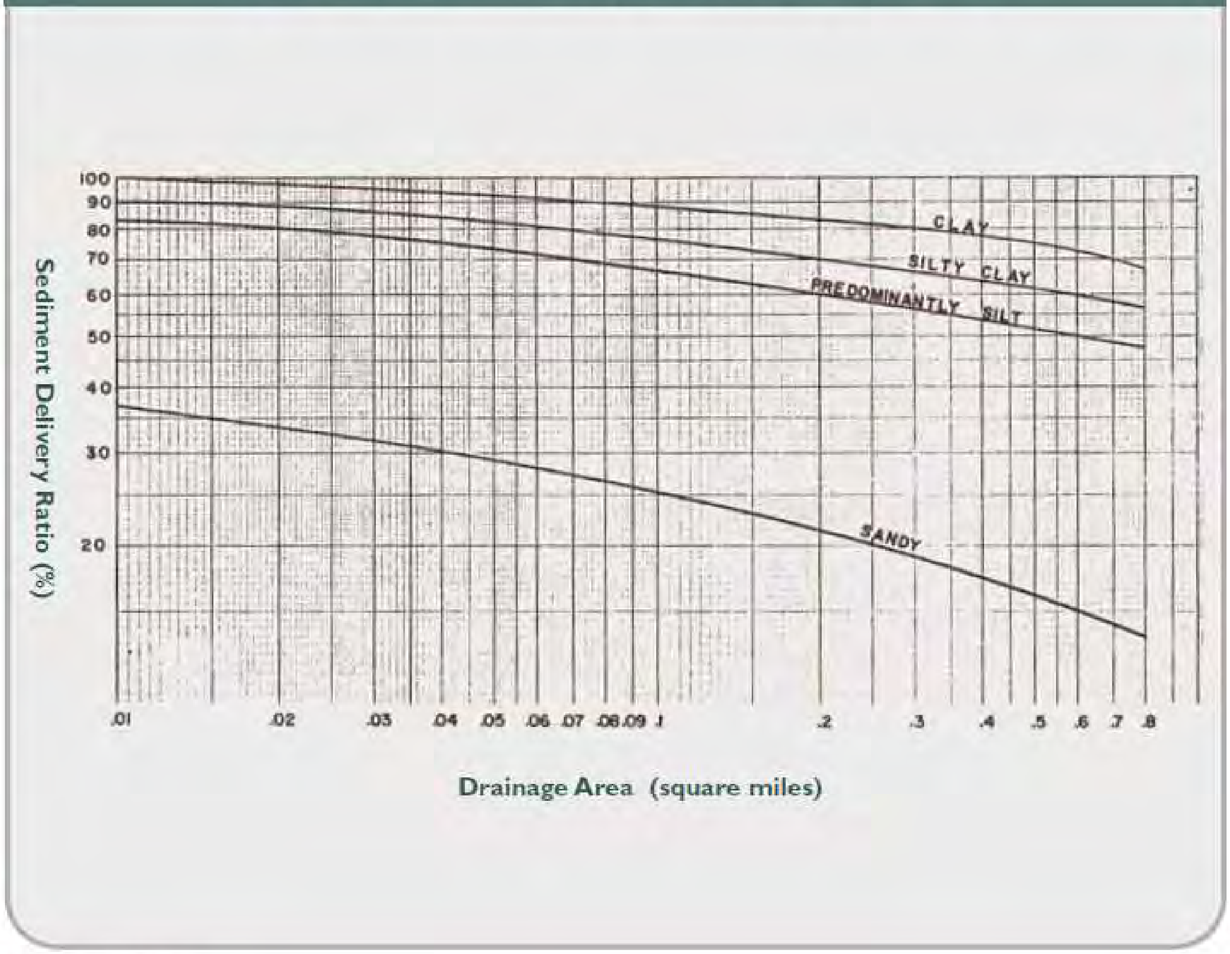
Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

Source: USDA-SCS

Project Name:	**Quinebaug Solar Project**
Project Number:	**R-0317**
Project Location:	**Brooklyn and Canterbury, Connecticut**
Description:	**Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG**	Date: **March 2020**

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed
DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

Tighe&Bond
Consulting Engineers
Environmental Specialists

Project Name:	**Quinebaug Solar Project**
Project Number:	**R-0317**
Project Location:	**Brooklyn and Canterbury, Connecticut**
Description:	**Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG**	Date: **March 2020**

γ = Soil Texture is Sand-silt mixtur

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_S Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.066 Acre Ft
V_S = 2893.18 Cu. Ft
107.15 Cu. Yd.

Wet Storage Volume

V_W = 2 * V
V_W = 5786 Cu. Ft
214.31 Cu Yd

Total Required Basin Capacity

Total Volume = V_S + V_W + Residence Storage

Residence Storage = volume to provide 10 hours residence time for a 10 year frequency 24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 11293 Cu. Ft.
418 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Temporary Sediment Basin 2M/4M

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

V = the volume of sediment trapped in ac. ft./yr.
DA = the total drainage area in acres
A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
DR = the delivery ratio determined from **Figure SB-12**.
TE = the trap efficiency as given above. (Use 0.8)
γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 6.1 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

Figure SB-1 Determining Erosion Rates

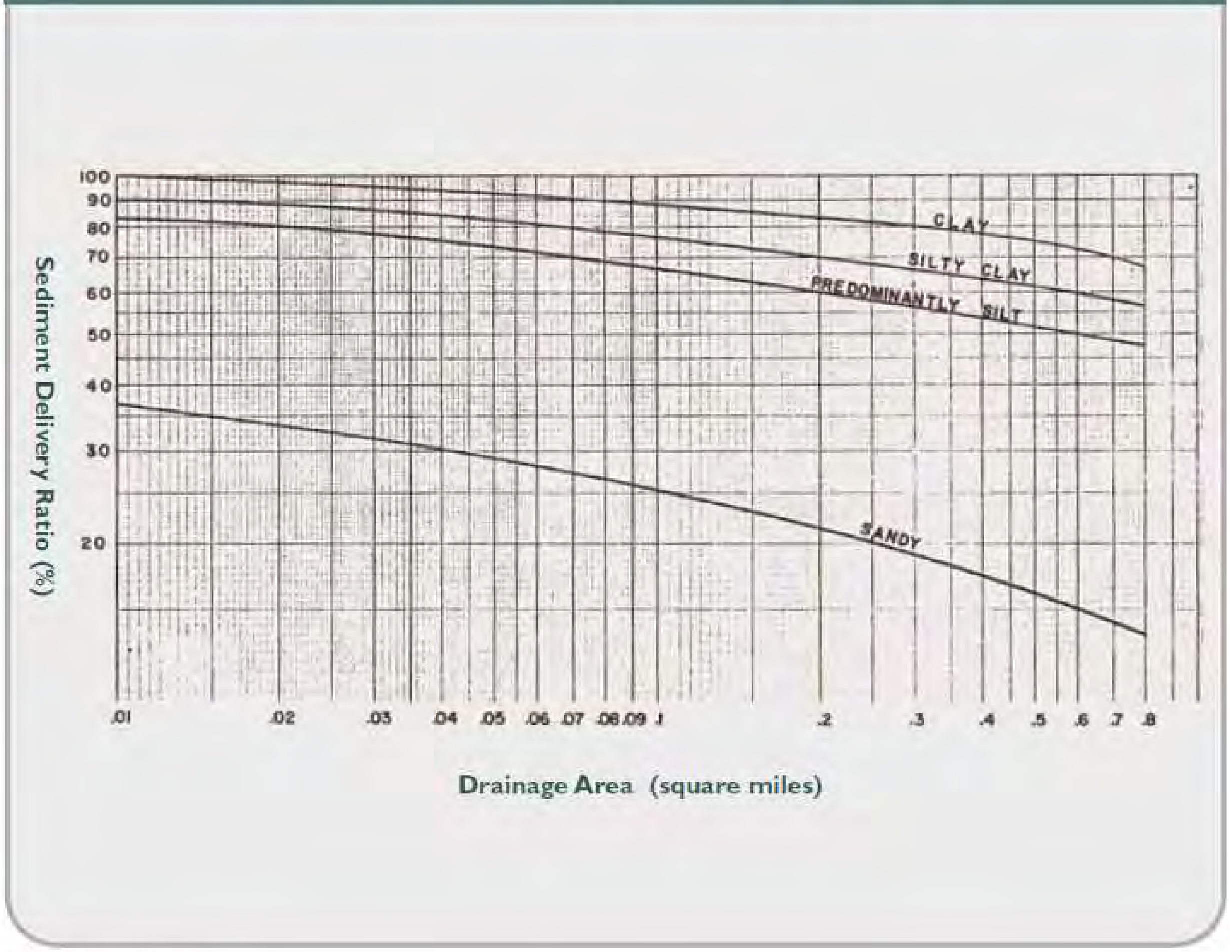
Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

Source: USDA-SCS

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed

DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

Tighe&Bond Consulting Engineers Environmental Specialists	
Project Name:	**Quinebaug Solar Project**
Project Number:	**R-0317**
Project Location:	**Brooklyn and Canterbury, Connecticut**
Description:	**Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG**	Date: **March 2020**

γ = Soil Texture is Sand-silt mixture

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_s Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.070 Acre Ft

V_S = 3042.82 Cu. Ft

112.70 Cu. Yd.

Wet Storage Volume

$V_W = 2 * V$

V_W = 6086 Cu. Ft

225.39 Cu Yd

Total Required Basin Capacity

Total Volume = $V_S + V_W$ + Residence Storage

Residence Storage = volume to provide 10 hours residence time for a 10 year frequency 24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 11741 Cu. Ft.

435 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Temporary Sediment Basin 2N/4N

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

V = the volume of sediment trapped in ac. ft./yr.
DA = the total drainage area in acres
A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
DR = the delivery ratio determined from **Figure SB-12**.
TE = the trap efficiency as given above. (Use 0.8)
γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 9.3 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

Figure SB-1 Determining Erosion Rates

Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

Source: USDA-SCS

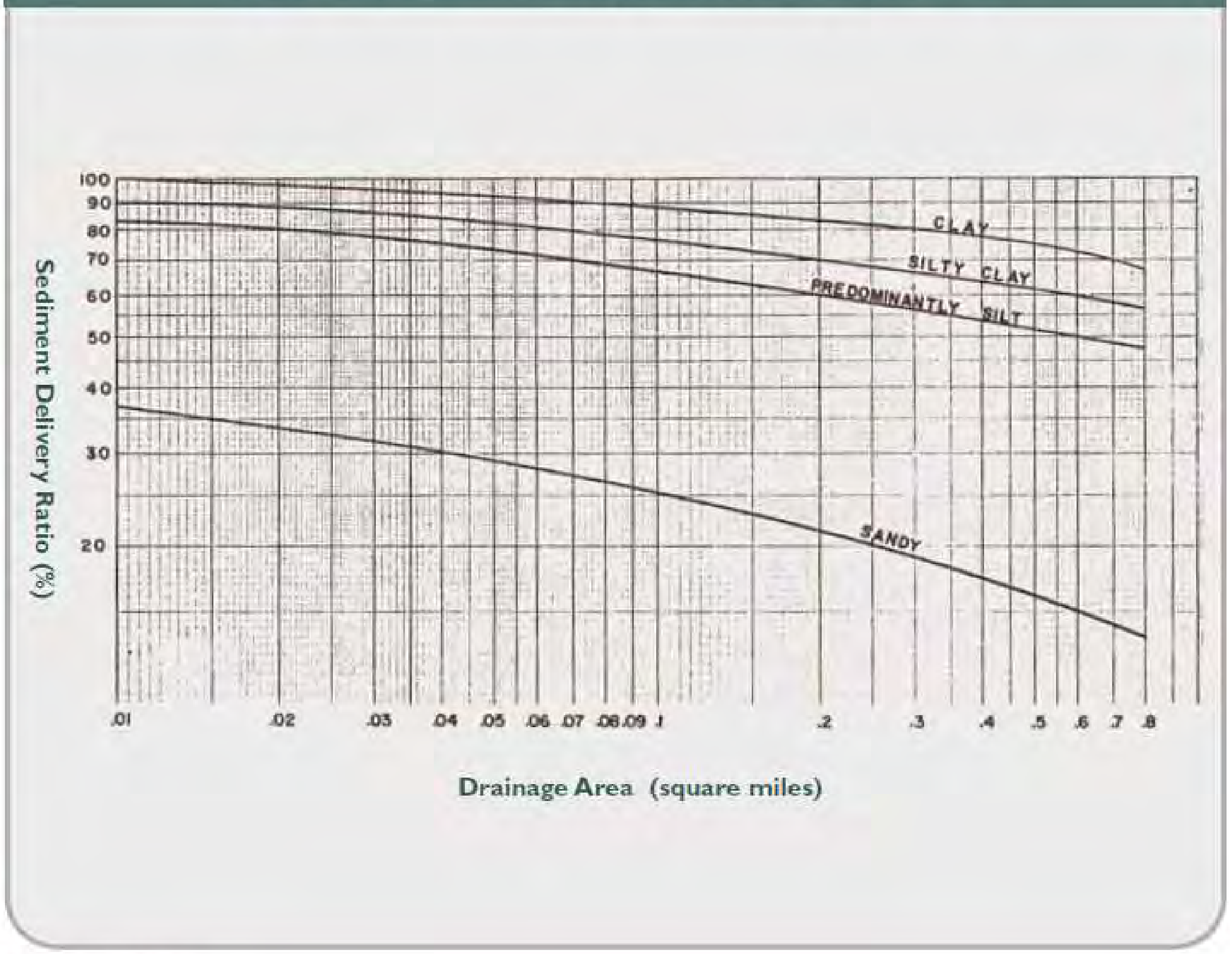
Tighe&Bond
Consulting Engineers
Environmental Specialists

Project Name:	**Quinebaug Solar Project**
Project Number:	**R-0317**
Project Location:	**Brooklyn and Canterbury, Connecticut**
Description:	**Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG**	Date: **March 2020**

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed

DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

Tighe&Bond
Consulting Engineers
Environmental Specialists

Project Name: **Quinebaug Solar Project**
Project Number: **R-0317**
Project Location: **Brooklyn and Canterbury, Connecticut**
Description: **Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG** Date: **March 2020**

γ = Soil Texture is Sand-silt mixture

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_S Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.106 Acre Ft
V_S = 4639.06 Cu. Ft
171.82 Cu. Yd.

Wet Storage Volume

V_W = 2 * V
V_W = 9278 Cu. Ft
343.63 Cu Yd

Total Required Basin Capacity

Total Volume = V_S + V_W + Residence Storage

Residence Storage = volume to provide 10 hours residence time for a 10 year frequency 24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 16530 Cu. Ft.
612 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Trap Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

Phase 2O - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	4.80	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**643**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	5,533	Sq. Ft.
D_W=	2	feet
V_W=	**9,406**	**Cu. Ft.**
V_W=	**348**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_d=	5,533	Sq. Ft.
A_d=	7,712	Sq. Ft.
D_d=	2	feet
V_d=	**13,245**	**Cu. Ft.**
V_d=	**491**	**Cu. Yd.**

Provided Storage

Wet Storage	9,406	Cu. Ft.
	348	Cu. Yd.
Dry Storage	13,245	Cu. Ft.
	491	Cu. Yd.
Total Storage	**22,651**	**Cu. Ft.**
	839	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Trap Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

Phase 2P - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	4.40	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**590**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	5,533	Sq. Ft.
D_W=	2	feet
V_W=	**9,406**	**Cu. Ft.**
V_W=	**348**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} x D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	5,533	Sq. Ft.
A_d=	7,712	Sq. Ft.
D_d=	2	feet
V_d=	**13,245**	**Cu. Ft.**
V_d=	**491**	**Cu. Yd.**

Provided Storage

Wet Storage	9,406	Cu. Ft.
	348	Cu. Yd.
Dry Storage	13,245	Cu. Ft.
	491	Cu. Yd.
Total Storage	**22,651**	**Cu. Ft.**
	839	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Phase 2Q - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area = 4.50 Acres

Required Storage= 134 Cu. Yds / Acre

Total Required Storage= **603** Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W= 5,533 Sq. Ft.
D_W= 2 feet

V_W=	**9,406**	**Cu. Ft.**
V_W=	**348**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} x D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W= 5,533 Sq. Ft.
A_d= 7,712 Sq. Ft.
D_d= 2 feet

V_d=	**13,245**	**Cu. Ft.**
V_d=	**491**	**Cu. Yd.**

Provided Storage

Wet Storage	9,406	Cu. Ft.
	348	Cu. Yd.
Dry Storage	13,245	Cu. Ft.
	491	Cu. Yd.
Total Storage	**22,651**	**Cu. Ft.**
	839	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Trap Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

Phase 3A - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	4.50	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**603**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	4,872	Sq. Ft.
D_W=	2	feet
V_W=	**8,282**	**Cu. Ft.**
V_W=	**307**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	6,583	Sq. Ft.
A_d=	6,583	Sq. Ft.
D_d=	2	feet
V_d=	**13,166**	**Cu. Ft.**
V_d=	**488**	**Cu. Yd.**

Provided Storage

Wet Storage	8,282	Cu. Ft.
	307	Cu. Yd.
Dry Storage	13,166	Cu. Ft.
	488	Cu. Yd.
Total Storage	**21,448**	**Cu. Ft.**
	794	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Temporary Sediment Basin 3B

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

V = the volume of sediment trapped in ac. ft./yr.
DA = the total drainage area in acres
A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
DR = the delivery ratio determined from **Figure SB-12**.
TE = the trap efficiency as given above. (Use 0.8)
γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 7.8 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

Figure SB-1 Determining Erosion Rates

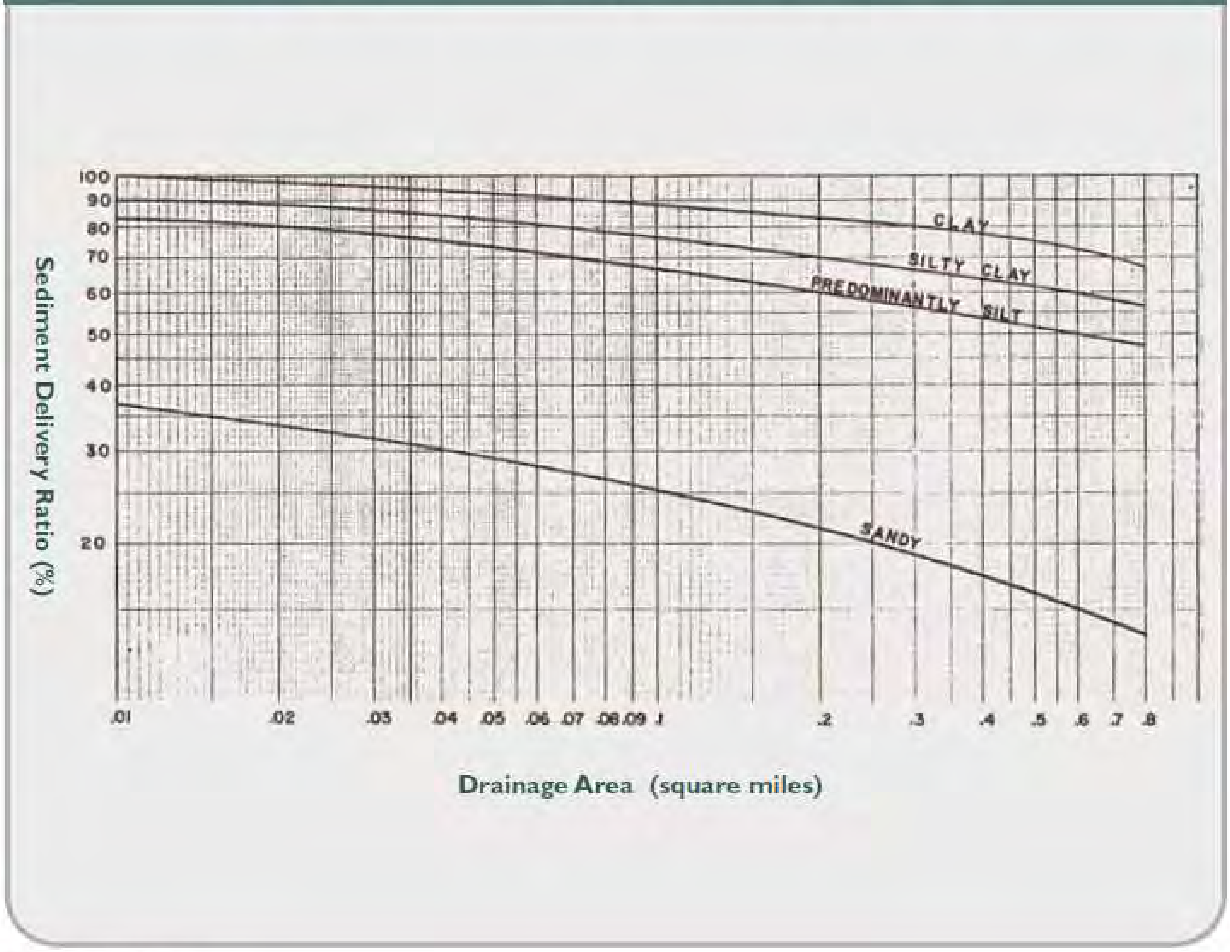
Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

Source: USDA-SCS

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed

DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

Tighe&Bond
Consulting Engineers
Environmental Specialists

Project Name: **Quinebaug Solar Project**
Project Number: **R-0317**
Project Location: **Brooklyn and Canterbury, Connecticut**
Description: **Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG** Date: **March 2020**

γ = Soil Texture is Sand-silt mixtur

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_s Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.089 Acre Ft
V_S = 3890.82 Cu. Ft
144.10 Cu. Yd.

Wet Storage Volume

V_W = 2 * V
V_W = 7782 Cu. Ft
288.21 Cu Yd

Total Required Basin Capacity

Total Volume = V_S + V_W + Residence Storage

Residence Storage = volume to provide 10 hours residence time for a 10 year frequency 24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 14285 Cu. Ft.
529 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Tighe&Bond
Consulting Engineers
Environmental Specialists

Project Name: **Quinebaug Solar Project**
Project Number: **R0317**
Project Location: **Brooklyn and Canterbury, Connecticut**
Description: **Temporary Sediment Trap Sizing Calculation**
Prepared By: **ALG** Date: **March 2020**

Phase 3C - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	3.40	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**456**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	3,619	Sq. Ft.
D_W=	2	feet

V_W=	**6,152**	**Cu. Ft.**
V_W=	**228**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	3,619	Sq. Ft.
A_d=	5,518	Sq. Ft.
D_d=	2	feet

V_d=	**9,137**	**Cu. Ft.**
V_d=	**338**	**Cu. Yd.**

Provided Storage

Wet Storage	6,152	Cu. Ft.
	228	Cu. Yd.
Dry Storage	9,137	Cu. Ft.
	338	Cu. Yd.

Total Storage	**15,289**	**Cu. Ft.**
	566	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Tighe&Bond Consulting Engineers Environmental Specialists	
	Project Name: **Quinebaug Solar Project** Project Number: **R0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Trap Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

Phase 3D - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	4.60	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**616**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	5,171	Sq. Ft.
D_W=	2	feet
V_W=	**8,791**	**Cu. Ft.**
V_W=	**326**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	5,171	Sq. Ft.
A_d=	7,036	Sq. Ft.
D_d=	2	feet
V_d=	**12,207**	**Cu. Ft.**
V_d=	**452**	**Cu. Yd.**

Provided Storage

Wet Storage	8,791	Cu. Ft.
	326	Cu. Yd.
Dry Storage	12,207	Cu. Ft.
	452	Cu. Yd.
Total Storage	**20,998**	**Cu. Ft.**
	778	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Temporary Sediment Basin 3E

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

V = the volume of sediment trapped in ac. ft./yr.
DA = the total drainage area in acres
A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
DR = the delivery ratio determined from **Figure SB-12**.
TE = the trap efficiency as given above. (Use 0.8)
γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 5.8 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

Figure SB-1 Determining Erosion Rates

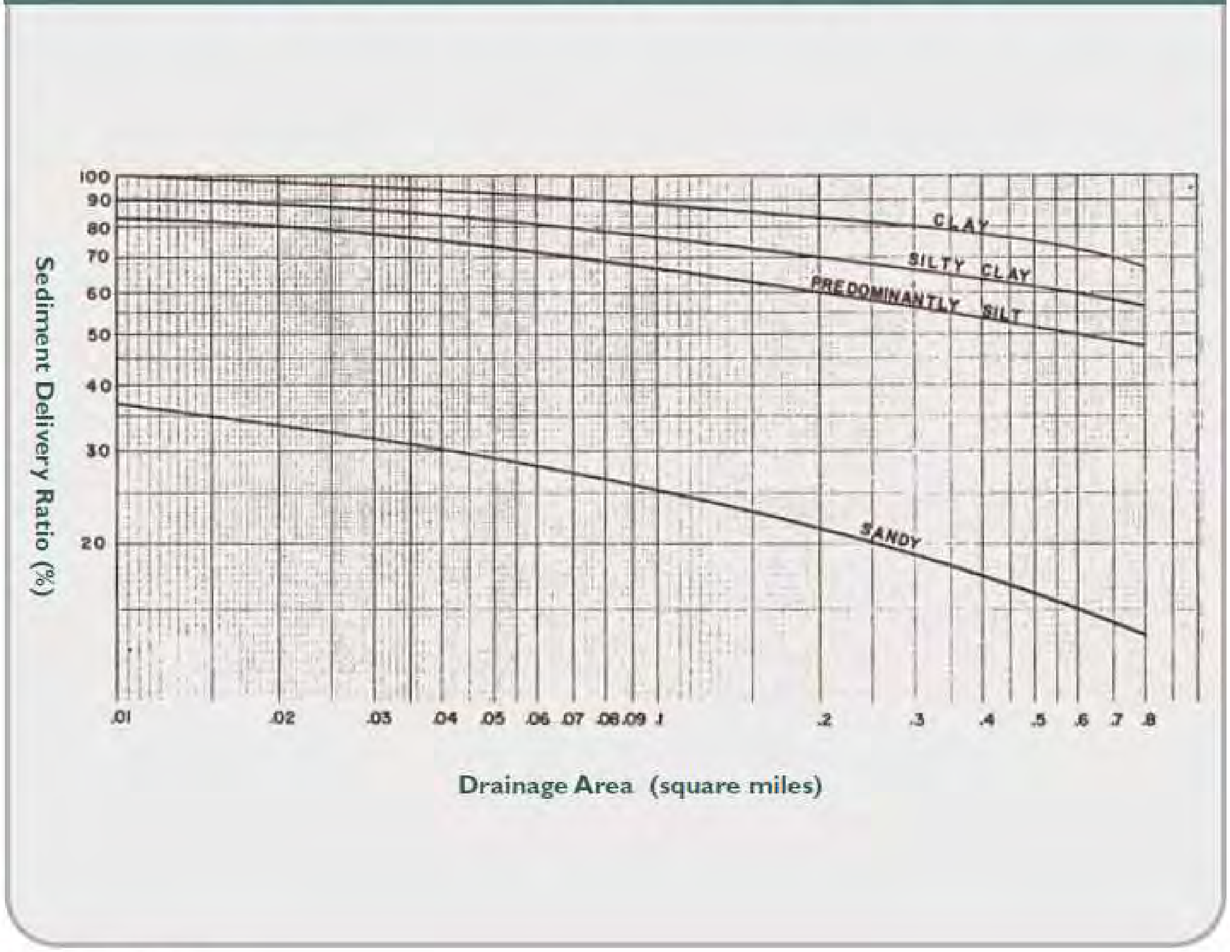
Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

Source: USDA-SCS

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed

DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

Tighe&Bond
Consulting Engineers
Environmental Specialists

Project Name: **Quinebaug Solar Project**
Project Number: **R-0317**
Project Location: **Brooklyn and Canterbury, Connecticut**
Description: **Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG** Date: **March 2020**

γ = Soil Texture is Sand-silt mixtur

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_s Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.066 Acre Ft
V_S = 2893.18 Cu. Ft
107.15 Cu. Yd.

Wet Storage Volume

V_W = 2 * V
V_W = 5786 Cu. Ft
214.31 Cu Yd

Total Required Basin Capacity

Total Volume = V_S + V_W + Residence Storage

Residence Storage = volume to provide 10 hours residence time for a 10 year frequency 24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 11293 Cu. Ft.
418 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Tighe&Bond
Consulting Engineers
Environmental Specialists

Project Name: **Quinebaug Solar Project**
Project Number: **R-0317**
Project Location: **Brooklyn and Canterbury, Connecticut**
Description: **Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG** Date: **March 2020**

Temporary Sediment Basin 3F

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

- V = the volume of sediment trapped in ac. ft./yr.
- DA = the total drainage area in acres
- A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
- DR = the delivery ratio determined from **Figure SB-12**.
- TE = the trap efficiency as given above. (Use 0.8)
- γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 5.9 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

Figure SB-1 Determining Erosion Rates

Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

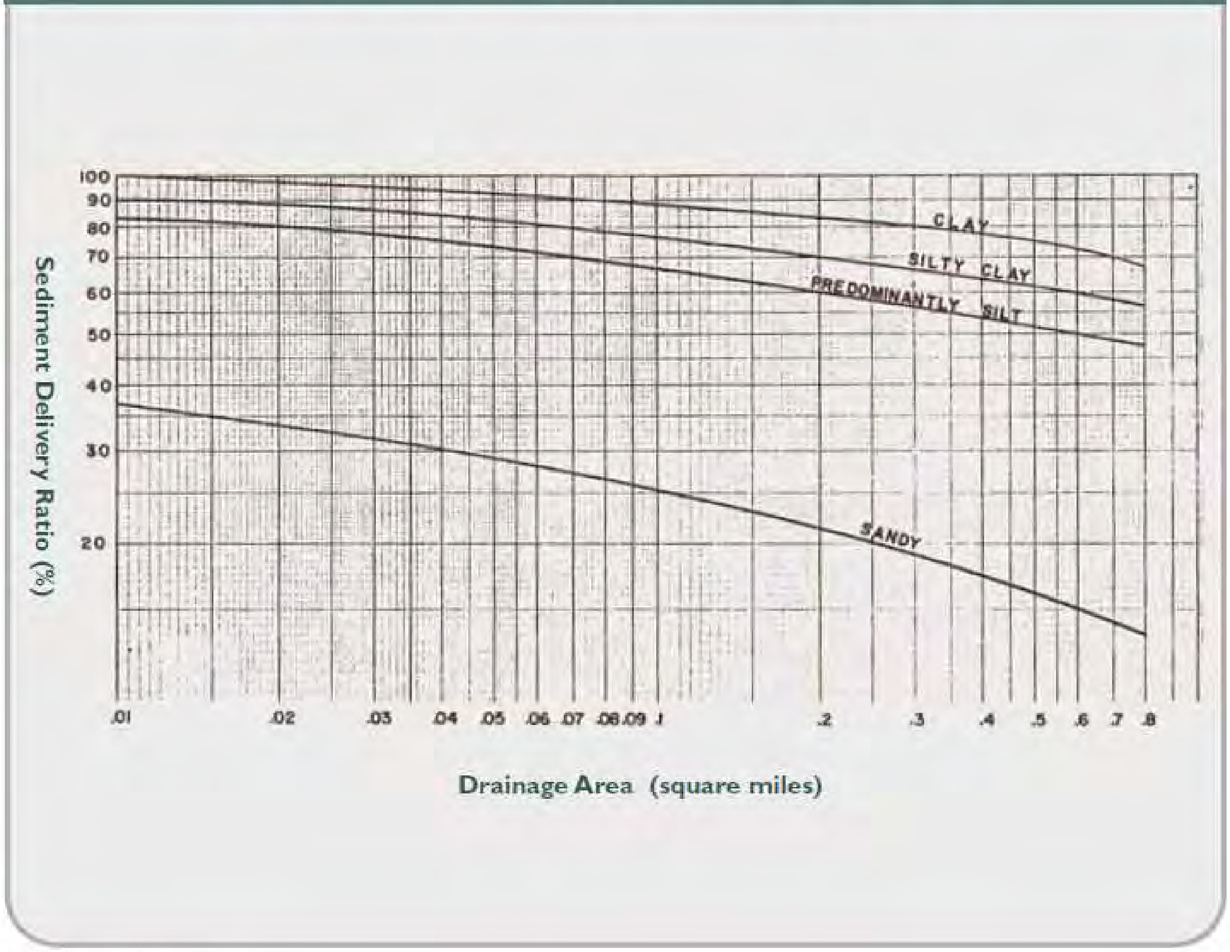
Source: USDA-SCS

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R-0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Basin Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed

DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

Tighe&Bond
Consulting Engineers
Environmental Specialists

Project Name: **Quinebaug Solar Project**
Project Number: **R-0317**
Project Location: **Brooklyn and Canterbury, Connecticut**
Description: **Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG** Date: **March 2020**

γ = Soil Texture is Sand-silt mixtur

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_s Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.068 Acre Ft
V_S = 2943.06 Cu. Ft
109.00 Cu. Yd.

Wet Storage Volume

V_W = 2 * V
V_W = 5886 Cu. Ft
218.00 Cu Yd

Total Required Basin Capacity

Total Volume = V_S + V_W + Residence Storage

Residence Storage = volume to provide 10 hours residence time for a 10 year frequency 24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 11442 Cu. Ft.
424 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Temporary Sediment Basin 3G

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

V = the volume of sediment trapped in ac. ft./yr.
DA = the total drainage area in acres
A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
DR = the delivery ratio determined from **Figure SB-12**.
TE = the trap efficiency as given above. (Use 0.8)
γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 6.1 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

Figure SB-1 Determining Erosion Rates

Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

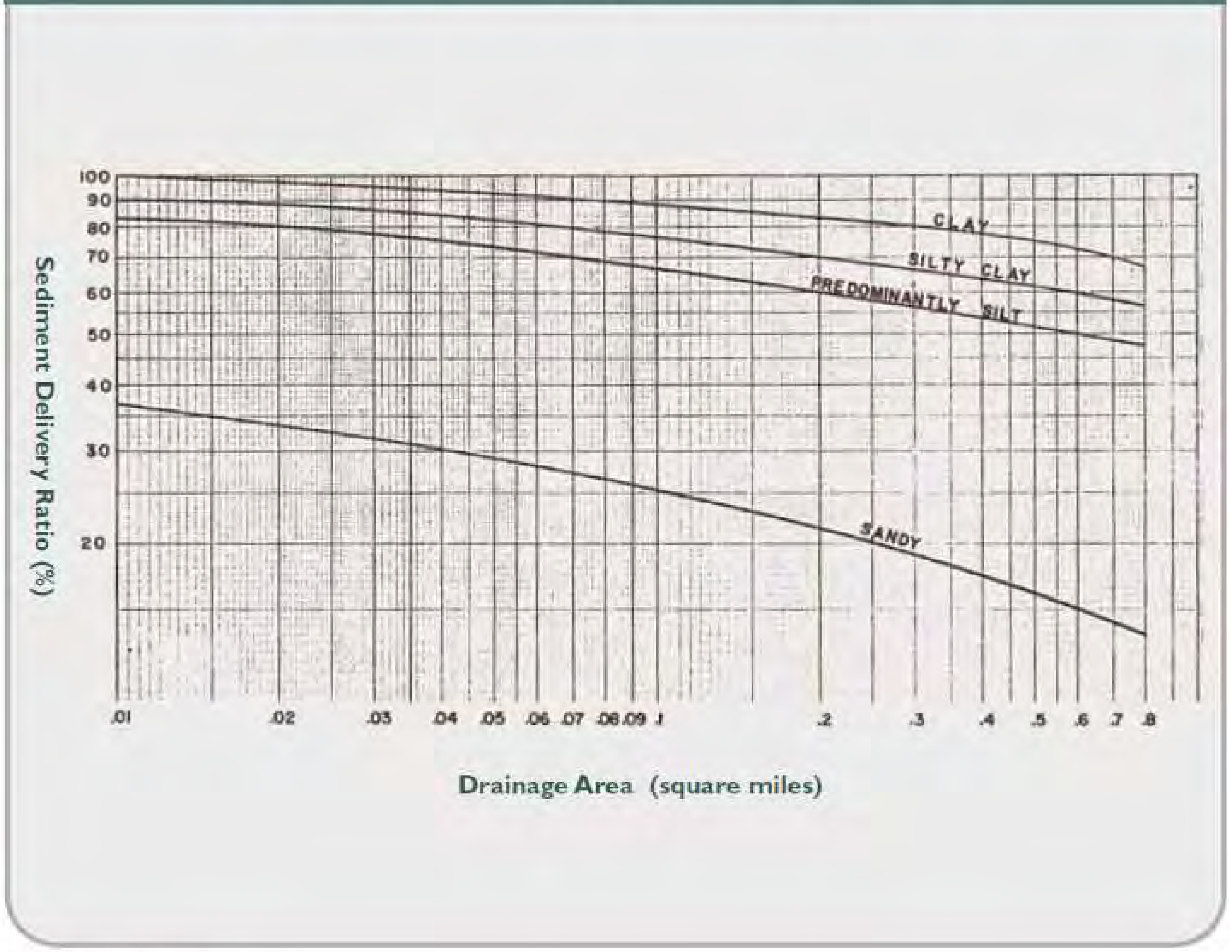
Source: USDA-SCS

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R-0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Basin Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed

DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

Tighe&Bond
Consulting Engineers
Environmental Specialists

Project Name:	**Quinebaug Solar Project**
Project Number:	**R-0317**
Project Location:	**Brooklyn and Canterbury, Connecticut**
Description:	**Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG**	Date: **March 2020**

γ = Soil Texture is Sand-silt mixtur

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_s Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.070 Acre Ft
V_S = 3042.82 Cu. Ft
112.70 Cu. Yd.

Wet Storage Volume

V_W = 2 * V
V_W = 6086 Cu. Ft
225.39 Cu Yd

Total Required Basin Capacity

Total Volume = V_S + V_W + Residence Storage

Residence Storage = volume to provide 10 hours residence time for a 10 year frequency 24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 11741 Cu. Ft.
$\boxed{\textbf{435 Cu. Yd.}}$

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Phase 3H - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	4.60	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**616**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	4,990	Sq. Ft.
D_W=	2	feet

V_W=	**8,483**	**Cu. Ft.**
V_W=	**314**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	4,990	Sq. Ft.
A_d=	7,506	Sq. Ft.
D_d=	2	feet

V_d=	**12,496**	**Cu. Ft.**
V_d=	**463**	**Cu. Yd.**

Provided Storage

Wet Storage	8,483	Cu. Ft.
	314	Cu. Yd.
Dry Storage	12,496	Cu. Ft.
	463	Cu. Yd.

Total Storage	**20,979**	**Cu. Ft.**
	777	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R-0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Basin Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

Temporary Sediment Basin 3I

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

V = the volume of sediment trapped in ac. ft./yr.
DA = the total drainage area in acres
A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
DR = the delivery ratio determined from **Figure SB-12**.
TE = the trap efficiency as given above. (Use 0.8)
γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 6.8 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

Figure SB-1 Determining Erosion Rates

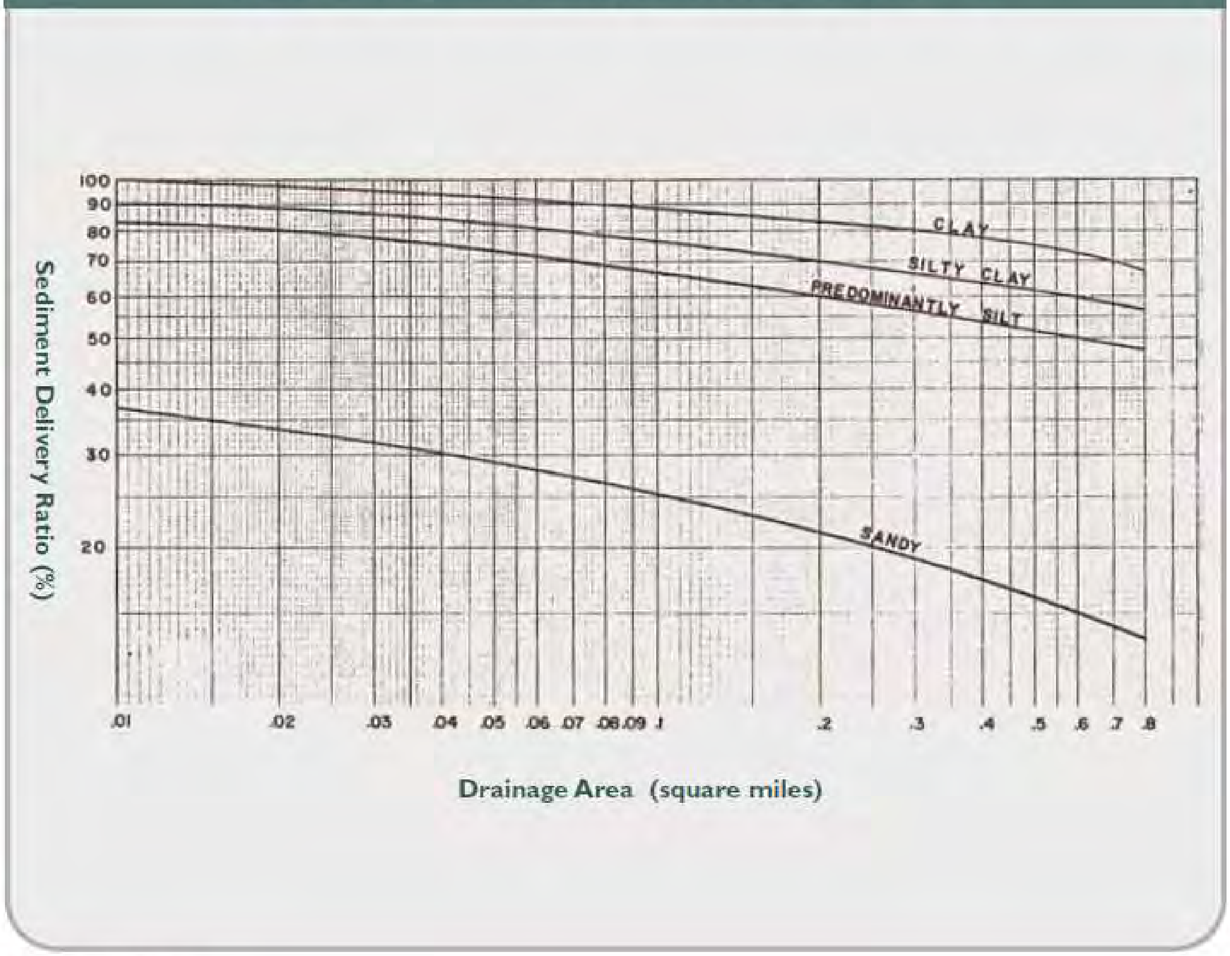
Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

Source: USDA-SCS

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed

DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

γ = Soil Texture is Sand-silt mixture

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_s Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.078 Acre Ft
V_S = 3392.00 Cu. Ft
125.63 Cu. Yd.

Wet Storage Volume

V_W = 2 * V
V_W = 6784 Cu. Ft
251.26 Cu Yd

Total Required Basin Capacity

Total Volume = V_S + V_W + Residence Storage

Residence Storage = volume to provide 10 hours residence time for a 10 year frequency 24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 12789 Cu. Ft.
474 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Tighe&Bond Consulting Engineers Environmental Specialists	
Project Name:	**Quinebaug Solar Project**
Project Number:	**R0317**
Project Location:	**Brooklyn and Canterbury, Connecticut**
Description:	**Temporary Sediment Trap Sizing Calculation**
Prepared By: **ALG**	Date: **March 2020**

Phase 3J - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	4.60	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**616**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	5,859	Sq. Ft.
D_W=	2	feet

V_W=	**9,960**	**Cu. Ft.**
V_W=	**369**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	5,859	Sq. Ft.
A_d=	8,283	Sq. Ft.
D_d=	2	feet

V_d=	**14,142**	**Cu. Ft.**
V_d=	**524**	**Cu. Yd.**

Provided Storage

Wet Storage	9,960	Cu. Ft.
	369	Cu. Yd.
Dry Storage	14,142	Cu. Ft.
	524	Cu. Yd.
Total Storage	**24,102**	**Cu. Ft.**
	893	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Temporary Sediment Basin 3K

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

V = the volume of sediment trapped in ac. ft./yr.
DA = the total drainage area in acres
A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
DR = the delivery ratio determined from **Figure SB-12**.
TE = the trap efficiency as given above. (Use 0.8)
γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 9.2 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

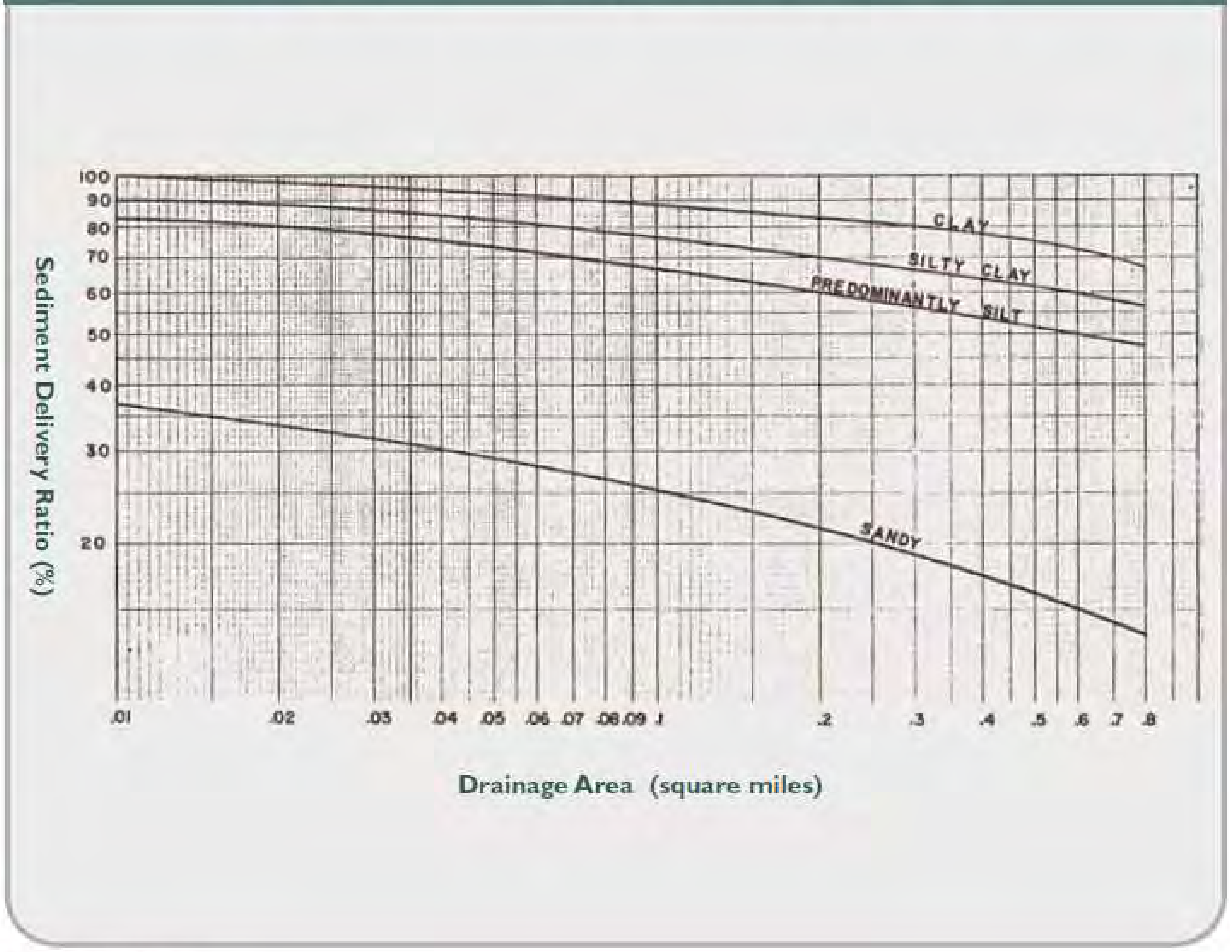
Figure SB-1 Determining Erosion Rates

Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

Source: USDA-SCS

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed
DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

Tighe&Bond
Consulting Engineers
Environmental Specialists

Project Name: **Quinebaug Solar Project**
Project Number: **R-0317**
Project Location: **Brooklyn and Canterbury, Connecticut**
Description: **Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG** Date: **March 2020**

γ = Soil Texture is Sand-silt mixtur

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_s Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.105 Acre Ft
V_S = 4589.18 Cu. Ft
169.97 Cu. Yd.

Wet Storage Volume

V_W = 2 * V
V_W = 9178 Cu. Ft
339.94 Cu Yd

Total Required Basin Capacity

Total Volume = V_S + V_W + Residence Storage

Residence Storage = volume to provide 10 hours residence time for a 10 year frequency 24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 16381 Cu. Ft.
607 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Phase 3L - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	3.80	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**509**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$V_w = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	4,233	Sq. Ft.
D_W=	2	feet
V_W=	**7,196**	**Cu. Ft.**
V_W=	**267**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet.
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	4,233	Sq. Ft.
A_d=	6,452	Sq. Ft.
D_d=	2	feet
V_d=	**10,685**	**Cu. Ft.**
V_d=	**396**	**Cu. Yd.**

Provided Storage

Wet Storage	7,196	Cu. Ft.
	267	Cu. Yd.
Dry Storage	10,685	Cu. Ft.
	396	Cu. Yd.
Total Storage	**17,881**	**Cu. Ft.**
	662	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Tighe&Bond Consulting Engineers Environmental Specialists	
Project Name:	**Quinebaug Solar Project**
Project Number:	**R0317**
Project Location:	**Brooklyn and Canterbury, Connecticut**
Description:	**Temporary Sediment Trap Sizing Calculation**
Prepared By: **ALG**	Date: **March 2020**

Phase 3M - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	5.00	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**670**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	5,788	Sq. Ft.
D_W=	2	feet
V_W=	**9,840**	**Cu. Ft.**
V_W=	**364**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	5,788	Sq. Ft.
A_d=	7,723	Sq. Ft.
D_d=	2	feet
V_d=	**13,511**	**Cu. Ft.**
V_d=	**500**	**Cu. Yd.**

Provided Storage

Wet Storage	9,840	Cu. Ft.
	364	Cu. Yd.
Dry Storage	13,511	Cu. Ft.
	500	Cu. Yd.
Total Storage	**23,351**	**Cu. Ft.**
	865	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Project Name:	**Quinebaug Solar Project**
Project Number:	**R0317**
Project Location:	**Brooklyn and Canterbury, Connecticut**
Description:	**Temporary Sediment Trap Sizing Calculation**
Prepared By: **ALG**	Date: **March 2020**

Phase 3N - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area = 5.00 Acres

Required Storage= 134 Cu. Yds / Acre

Total Required Storage= **670** Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W= 10,953 Sq. Ft.
D_W= 1 feet

V_W= 9,310 Cu. Ft.
V_W= 345 Cu. Yd.

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} x D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W= 10,953 Sq. Ft.
A_d= 12,523 Sq. Ft.
D_d= 1 feet

V_d= 11,738 Cu. Ft.
V_d= 435 Cu. Yd.

Provided Storage

Wet Storage	9,310	Cu. Ft.
	345	Cu. Yd.
Dry Storage	11,738	Cu. Ft.
	435	Cu. Yd.
Total Storage	**21,048**	**Cu. Ft.**
	780	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Phase 3O - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	3.40	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**456**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	3,615	Sq. Ft.
D_W=	2	feet

V_W=	**6,146**	**Cu. Ft.**
V_W=	**228**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	3,615	Sq. Ft.
A_d=	5,328	Sq. Ft.
D_d=	2	feet

V_d=	**8,943**	**Cu. Ft.**
V_d=	**331**	**Cu. Yd.**

Provided Storage

Wet Storage	6,146	Cu. Ft.
	228	Cu. Yd.
Dry Storage	8,943	Cu. Ft.
	331	Cu. Yd.
Total Storage	**15,089**	**Cu. Ft.**
	559	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Phase 3P - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area = 4.60 Acres

Required Storage= 134 Cu. Yds / Acre

Total Required Storage= **616** Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W= 4,913 Sq. Ft.
D_W= 2 feet

V_W= 8,352 Cu. Ft.
V_W= 309 Cu. Yd.

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W= 4,913 Sq. Ft.
A_d= 6,762 Sq. Ft.
D_d= 2 feet

V_d= 11,675 Cu. Ft.
V_d= 432 Cu. Yd.

Provided Storage

Wet Storage	8,352	Cu. Ft.
	309	Cu. Yd.
Dry Storage	11,675	Cu. Ft.
	432	Cu. Yd.
Total Storage	**20,027**	**Cu. Ft.**
	742	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Phase 3Q - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	1.50	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**201**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	1,630	Sq. Ft.
D_W=	2	feet

V_W=	**2,771**	**Cu. Ft.**
V_W=	**103**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} x\, D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	1,630	Sq. Ft.
A_d=	2,789	Sq. Ft.
D_d=	2	feet

V_d=	**4,419**	**Cu. Ft.**
V_d=	**164**	**Cu. Yd.**

Provided Storage

Wet Storage	2,771	Cu. Ft.
	103	Cu. Yd.
Dry Storage	4,419	Cu. Ft.
	164	Cu. Yd.
Total Storage	**7,190**	**Cu. Ft.**
	266	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Temporary Sediment Basin 3R

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

V = the volume of sediment trapped in ac. ft./yr.
DA = the total drainage area in acres
A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
DR = the delivery ratio determined from **Figure SB-12**.
TE = the trap efficiency as given above. (Use 0.8)
γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 10 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

Figure SB-1 Determining Erosion Rates

Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

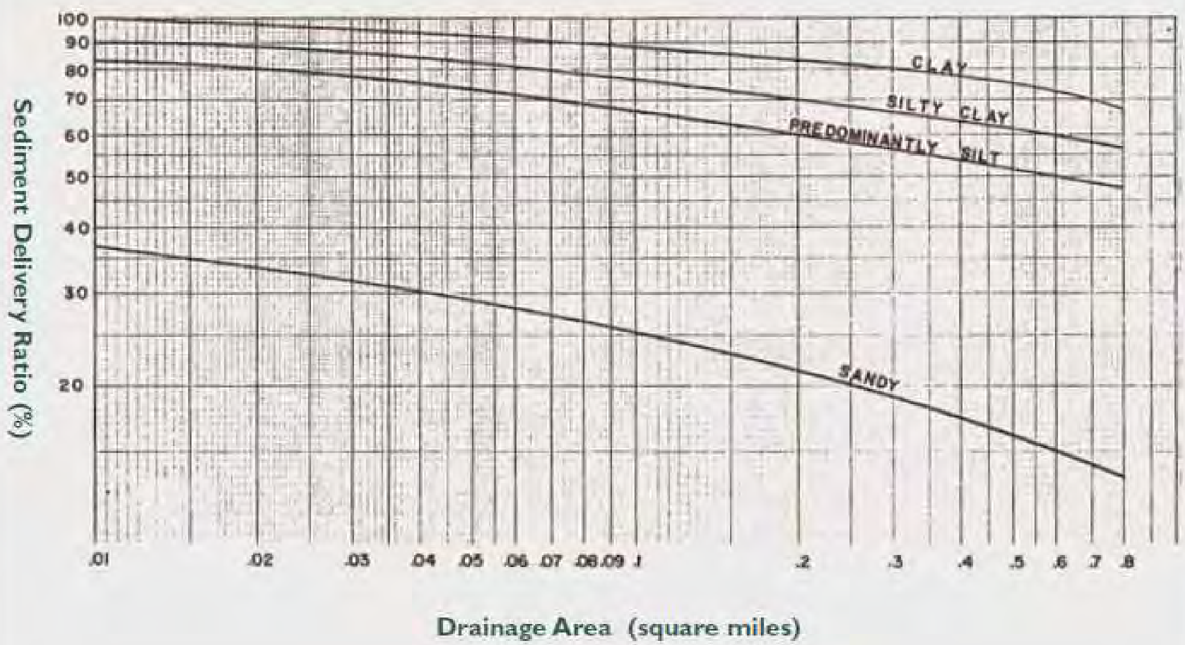
Source: USDA-SCS

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R-0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Basin Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed

DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

Tighe&Bond
Consulting Engineers
Environmental Specialists

Project Name: **Quinebaug Solar Project**
Project Number: **R-0317**
Project Location: **Brooklyn and Canterbury, Connecticut**
Description: **Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG** Date: **March 2020**

γ = Soil Texture is Sand-silt mixture

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_s Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.115 Acre Ft
V_S = 4988.24 Cu. Ft
184.75 Cu. Yd.

Wet Storage Volume

V_W = 2 * V
V_W = 9976 Cu. Ft
369.50 Cu Yd

Total Required Basin Capacity

Total Volume = V_S + V_W + Residence Storage

Residence Storage = volume to provide 10 hours residence time for a 10 year frequency 24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 17578 Cu. Ft.
651 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Phase 3S - Sediment Trap Sizing Calculations

Sediment Storage Volume

Drainage Area =	2.60	Acres
Required Storage=	134	Cu. Yds / Acre
Total Required Storage=	**348**	Cu. Yds

Provided Wet Storage

Wet storage volume may be approximated as follows:

$$Vw = 0.85 \times A_w \times D_w$$

where,

V_w = the wet storage volume in cubic feet
A_w = the surface area of the flooded area at the base of the stone outlet in square feet
D_w = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

A_W=	2,921	Sq. Ft.
D_W=	2	feet

V_W=	**4,966**	**Cu. Ft.**
V_W=	**184**	**Cu. Yd.**

Provided Dry Storage

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_w + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_w = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

A_W=	2,921	Sq. Ft.
A_d=	4,729	Sq. Ft.
D_d=	2	feet

V_d=	**7,650**	**Cu. Ft.**
V_d=	**283**	**Cu. Yd.**

Provided Storage

Wet Storage	4,966	Cu. Ft.
	184	Cu. Yd.
Dry Storage	7,650	Cu. Ft.
	283	Cu. Yd.

Total Storage	**12,616**	**Cu. Ft.**
	467	**Cu. Yd.**

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Temporary Sediment Basin 3T

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

V = the volume of sediment trapped in ac. ft./yr.
DA = the total drainage area in acres
A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
DR = the delivery ratio determined from **Figure SB-12**.
TE = the trap efficiency as given above. (Use 0.8)
γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 8.9 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

Figure SB-1 Determining Erosion Rates

Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

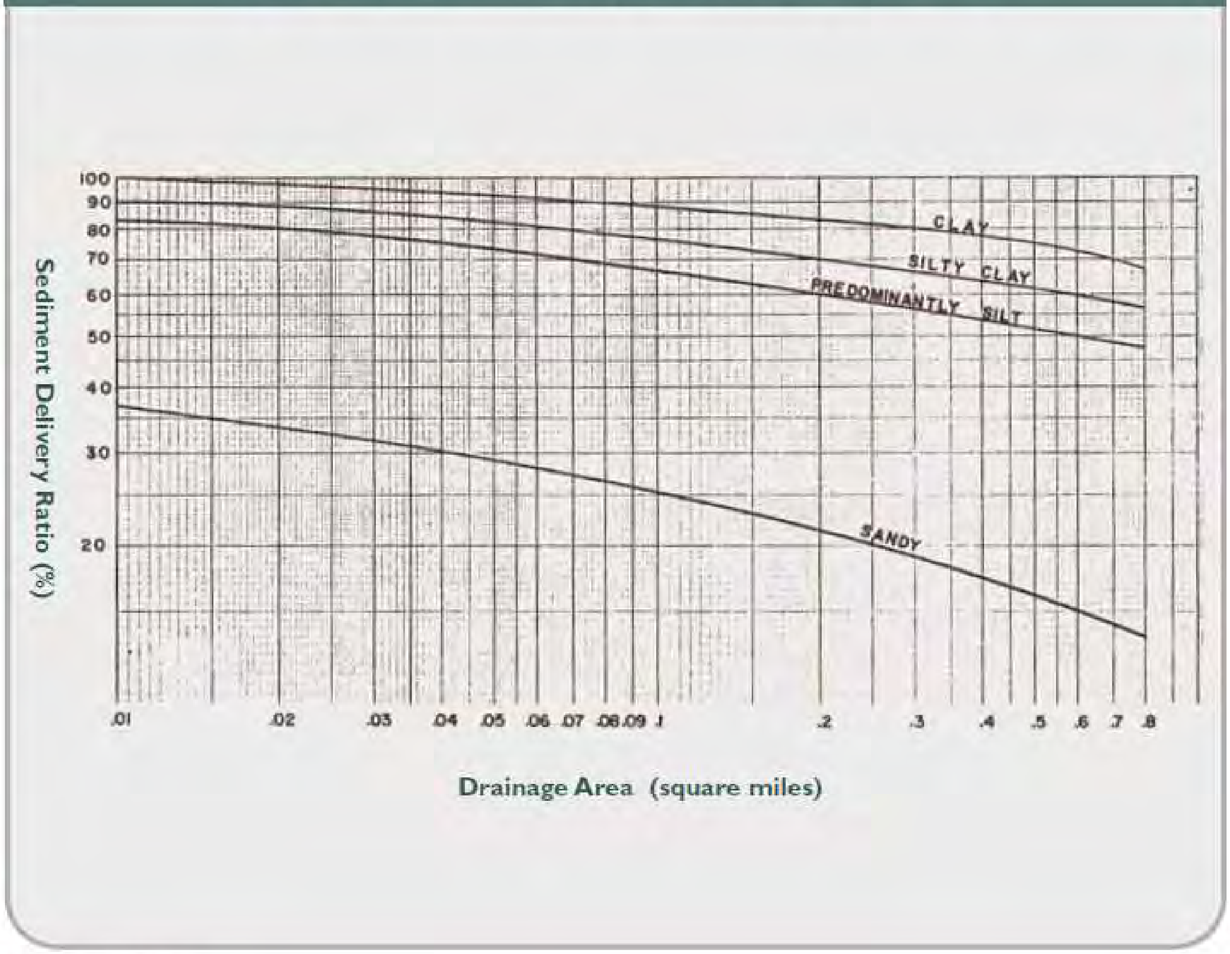
Source: USDA-SCS

Tighe&Bond Consulting Engineers Environmental Specialists	Project Name: **Quinebaug Solar Project** Project Number: **R-0317** Project Location: **Brooklyn and Canterbury, Connecticut** Description: **Temporary Sediment Basin Sizing Calculation** Prepared By: **ALG** Date: **March 2020**

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed

DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

Tighe&Bond
Consulting Engineers
Environmental Specialists

Project Name: **Quinebaug Solar Project**
Project Number: **R-0317**
Project Location: **Brooklyn and Canterbury, Connecticut**
Description: **Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG** Date: **March 2020**

γ = Soil Texture is Sand-silt mixtur

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_s Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.102 Acre Ft
V_S = 4439.53 Cu. Ft
164.43 Cu. Yd.

Wet Storage Volume

V_W = 2 * V
V_W = 8879 Cu. Ft
328.85 Cu Yd

Total Required Basin Capacity

Total Volume = V_S + V_W + Residence Storage

Residence Storage = volume to provide 10 hours residence time for a 10 year frequency 24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 15932 Cu. Ft.
590 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

Temporary Sediment Basin 3U

Sediment Storage Volume

$$V = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

where:

V = the volume of sediment trapped in ac. ft./yr.
DA = the total drainage area in acres
A = the average annual erosion in tons per acre per year using either values from the Universal Soil Loss Equation, the Revised Universal Soil Loss Equation or the values in **Figure SB-1** for the listed land use.
DR = the delivery ratio determined from **Figure SB-12**.
TE = the trap efficiency as given above. (Use 0.8)
γ = the estimated sediment density in the sediment basin in lbs/cu. ft. (from **Figure SB-2**).

DA = 10 Acres

A = Site will be considered a construction area

A = 50.0 ton/acre/yr

Figure SB-1 Determining Erosion Rates

Land Use	Ave. Annual Erosion
Wooded area	0.2 ton/ac/yr
Developed urban areas, grassed areas, pastures, hay fields, abandoned fields with good cover	1.0 ton/ac/yr
Clean tilled cropland (corn, vegetables, etc.)	10 ton/ac/yr
Construction Areas	50 ton/ac/yr

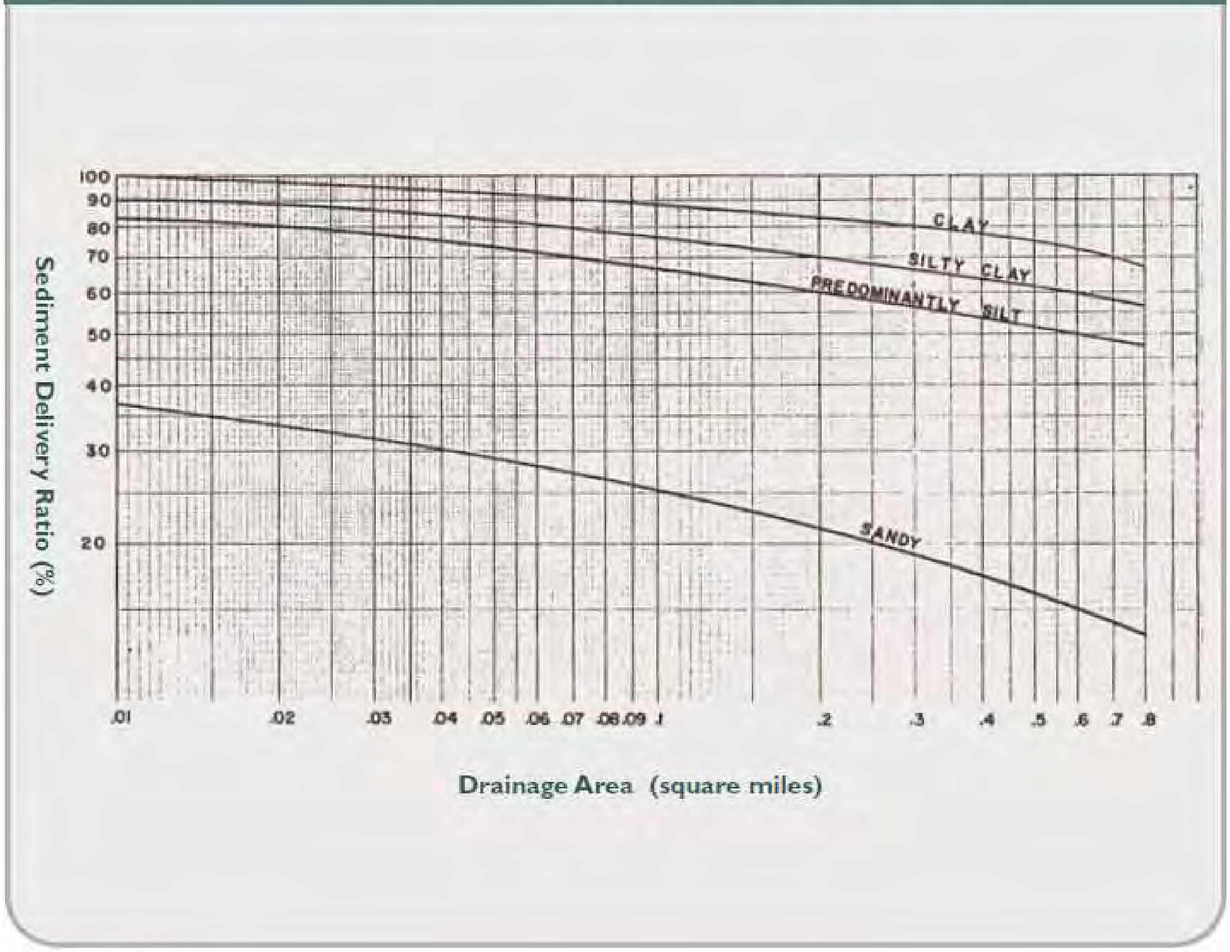
Source: USDA-SCS

Project Name:	**Quinebaug Solar Project**
Project Number:	**R-0317**
Project Location:	**Brooklyn and Canterbury, Connecticut**
Description:	**Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG**	Date: **March 2020**

DR = From figure SB-12 below
Sandy-silt Soil with 0.015625 square miles disturbed

DR = 0.53

Figure SB-12 Sediment Delivery Ratio Vs. Drainage Area Graph



Source: USDA-NRCS

Tighe&Bond
Consulting Engineers
Environmental Specialists

Project Name: **Quinebaug Solar Project**
Project Number: **R-0317**
Project Location: **Brooklyn and Canterbury, Connecticut**
Description: **Temporary Sediment Basin Sizing Calculation**
Prepared By: **ALG** Date: **March 2020**

γ = Soil Texture is Sand-silt mixture

γ = 85

Figure SB-2 Estimated Sediment Density

Soil Texture *	γ_s Submerged (lbs/cu. ft.)
Clay	40-60
Silt	55-75
Clay-silt mixtures (equal parts)	40-65
Sand-silt mixtures (equal parts)	75-95
Clay-silt-sand mixtures (equal parts)	50-80
Sand	85-100
Gravel	85-125
Poorly sorted sand and gravel	95-130

* Use USDA soil data from county soil surveys or sieve analysis to determine soil texture.

Source: USDA-NRCS.

Sediment Storage Volume

$$V_S = \frac{(DA)(A)(DR)(TE)(2{,}000\text{lbs./ton})}{(\gamma)(43{,}560\text{sq.ft./ac})}$$

V_S = 0.115 Acre Ft
V_S = 4988.24 Cu. Ft
184.75 Cu. Yd.

Wet Storage Volume

V_W = 2 * V
V_W = 9976 Cu. Ft
369.50 Cu Yd

Total Required Basin Capacity

Total Volume = V_S + V_W + Residence Storage

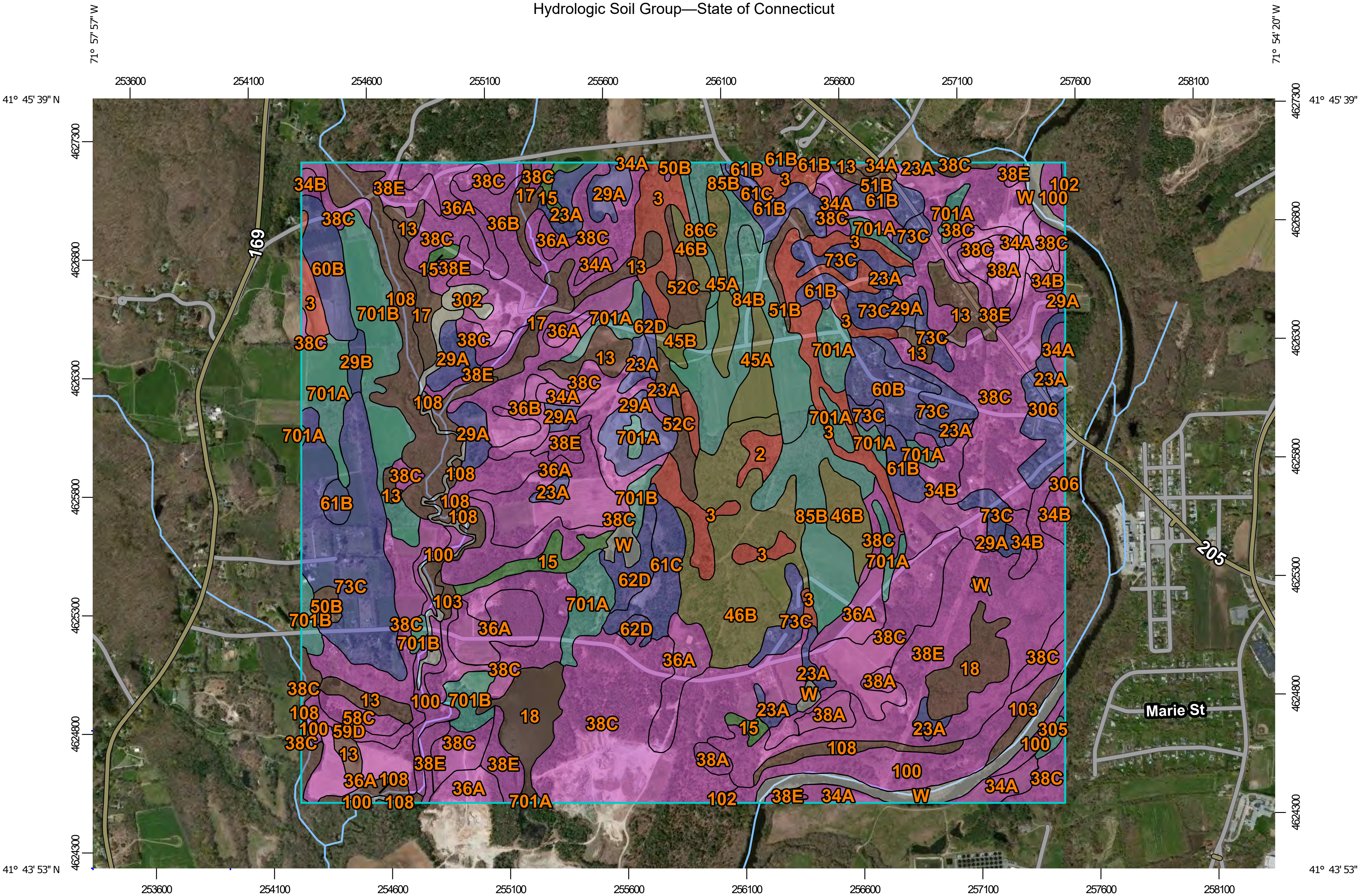
Residence Storage = volume to provide 10 hours residence time for a 10 year frequency 24 hour duration, type III distribution storm

Residence Storage = 2,613 Cu. Ft. as determined by HydroCAD

Total Volume = 17578 Cu. Ft.
651 Cu. Yd.

Calculated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control Section 5-11

NRCS Soils Report



Map Scale: 1:22,900 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 300, 600, 1200, 1800

Feet: 0, 1000, 2000, 4000, 6000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

Streams and Canals

Transportation

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

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

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

Soil Survey Area: State of Connecticut
Survey Area Data: Version 18, Dec 6, 2018

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

Date(s) aerial images were photographed: Mar 30, 2011—May 1, 2011

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Ridgebury fine sandy loam, 0 to 3 percent slopes	D	6.6	0.3%
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	D	91.7	4.2%
13	Walpole sandy loam, 0 to 3 percent slopes	B/D	48.7	2.2%
15	Scarboro muck, 0 to 3 percent slopes	A/D	18.9	0.9%
17	Timakwa and Natchaug soils, 0 to 2 percent slopes	B/D	25.1	1.2%
18	Catden and Freetown soils, 0 to 2 percent slopes	B/D	44.9	2.1%
23A	Sudbury sandy loam, 0 to 5 percent slopes	B	37.0	1.7%
29A	Agawam fine sandy loam, 0 to 3 percent slopes	B	46.6	2.1%
29B	Agawam fine sandy loam, 3 to 8 percent slopes	B	3.8	0.2%
34A	Merrimac fine sandy loam, 0 to 3 percent slopes	A	35.4	1.6%
34B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	41.1	1.9%
36A	Windsor loamy sand, 0 to 3 percent slopes	A	130.8	6.0%
36B	Windsor loamy sand, 3 to 8 percent slopes	A	38.5	1.8%
38A	Hinckley loamy sand, 0 to 3 percent slopes	A	21.0	1.0%
38C	Hinckley loamy sand, 3 to 15 percent slopes	A	510.1	23.5%
38E	Hinckley loamy sand, 15 to 45 percent slopes	A	152.7	7.0%
45A	Woodbridge fine sandy loam, 0 to 3 percent slopes	C/D	27.1	1.3%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
45B	Woodbridge fine sandy loam, 3 to 8 percent slopes	C/D	6.7	0.3%
46B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	C/D	98.7	4.6%
50B	Sutton fine sandy loam, 3 to 8 percent slopes	B/D	4.4	0.2%
51B	Sutton fine sandy loam, 0 to 8 percent slopes, very stony	B/D	8.5	0.4%
52C	Sutton fine sandy loam, 2 to 15 percent slopes, extremely stony	B/D	20.6	1.0%
58C	Gloucester gravelly sandy loam, 8 to 15 percent slopes, very stony	A	7.7	0.4%
59D	Gloucester gravelly sandy loam, 15 to 35 percent slopes, extremely stony	A	5.8	0.3%
60B	Canton and Charlton fine sandy loams, 3 to 8 percent slopes	B	40.9	1.9%
61B	Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony	B	42.2	1.9%
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony	B	23.8	1.1%
62D	Canton and Charlton fine sandy loams, 15 to 35 percent slopes, extremely stony	B	17.6	0.8%
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	B	133.2	6.1%
84B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes	C	50.3	2.3%
85B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes, very stony	C	55.7	2.6%
86C	Paxton and Montauk fine sandy loams, 3 to 15 percent slopes, extremely stony	C	5.9	0.3%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
100	Suncook loamy fine sand	A	64.4	3.0%
102	Pootatuck fine sandy loam	B	1.0	0.0%
103	Rippowam fine sandy loam	B/D	7.8	0.4%
108	Saco silt loam	B/D	82.9	3.8%
302	Dumps		5.0	0.2%
305	Udorthents-Pits complex, gravelly	C	2.3	0.1%
306	Udorthents-Urban land complex	B	15.9	0.7%
701A	Ninigret fine sandy loam, 0 to 3 percent slopes	C	75.8	3.5%
701B	Ninigret fine sandy loam, 3 to 8 percent slopes	C	63.9	2.9%
W	Water		46.2	2.1%
Totals for Area of Interest			**2,167.3**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

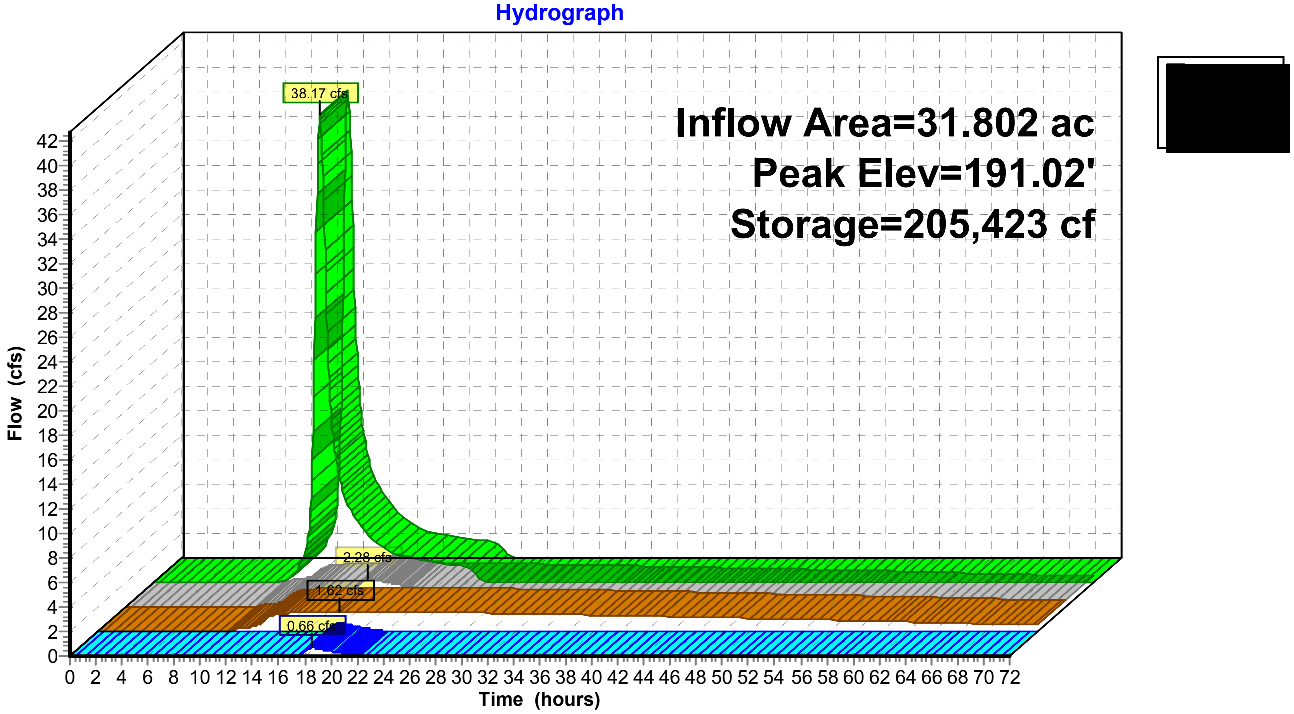
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Long-Term Existing Conditions Hydrology

Pond 3P: Existing Depression



Summary for Pond 4P: Existing Depression

Inflow Area = 16.464 ac, 0.65% Impervious, Inflow Depth = 3.43" for 25-year event
Inflow = 51.12 cfs @ 12.19 hrs, Volume= 4.708 af
Outflow = 1.31 cfs @ 18.19 hrs, Volume= 4.268 af, Atten= 97%, Lag= 360.1 min
Discarded = 1.31 cfs @ 18.19 hrs, Volume= 4.268 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 167.75' @ 18.19 hrs Surf.Area= 55,611 sf Storage= 153,551 cf

Plug-Flow detention time= 1,361.8 min calculated for 4.268 af (91% of inflow)
Center-of-Mass det. time= 1,315.6 min (2,138.0 - 822.4)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	1,773,203 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

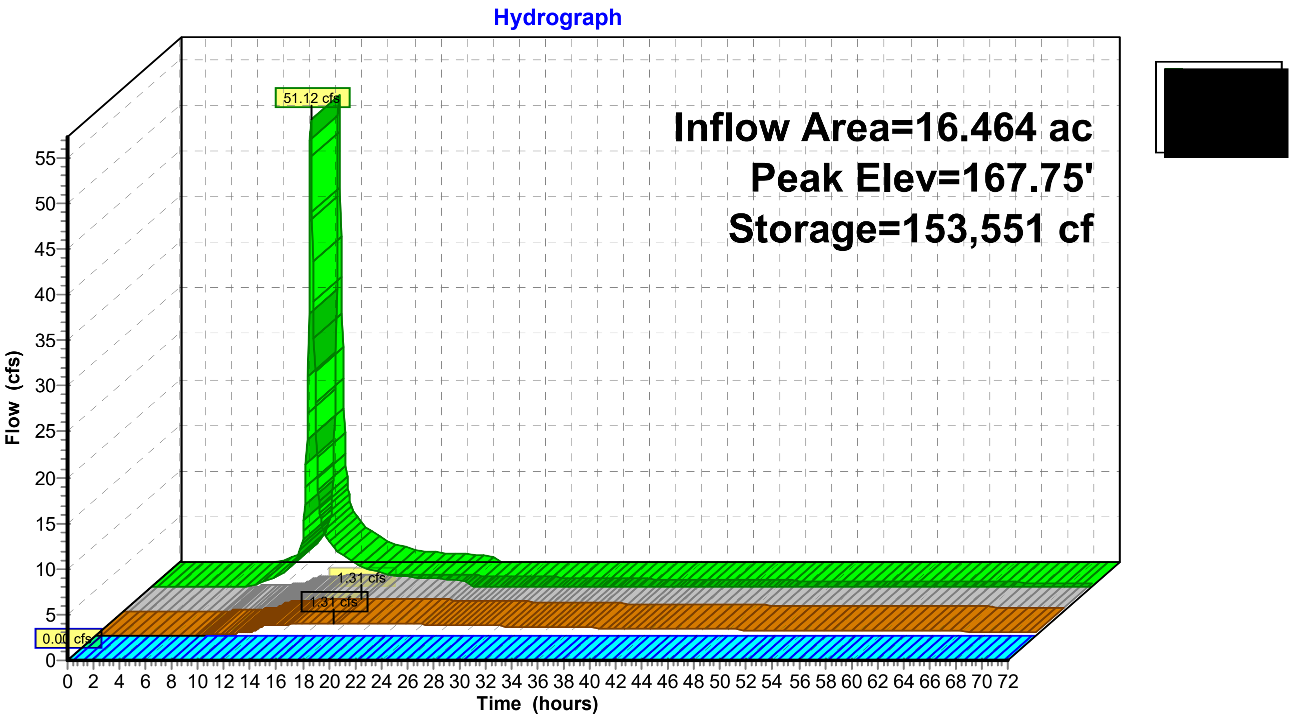
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
162.00	8,040	387.0	0	0	8,040
164.00	20,064	890.0	27,203	27,203	59,171
166.00	31,393	894.0	51,036	78,239	61,043
168.00	59,552	1,582.0	89,455	167,695	196,625
170.00	106,611	3,162.0	163,895	331,590	793,118
172.00	142,449	3,012.0	248,196	579,786	867,073
174.00	182,259	2,708.0	323,891	903,678	1,005,567
176.00	222,778	3,083.0	404,360	1,308,037	1,178,477
178.00	242,528	3,031.0	465,166	1,773,203	1,204,505

Device	Routing	Invert	Outlet Devices
#1	Discarded	162.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	177.00'	**23.0' long x 99.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=1.31 cfs @ 18.19 hrs HW=167.75' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 1.31 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=162.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: Existing Depression



Summary for Pond 5P: Existing Depression

Inflow Area = 68.433 ac, 22.71% Impervious, Inflow Depth = 2.13" for 25-year event
Inflow = 67.21 cfs @ 12.81 hrs, Volume= 12.131 af
Outflow = 64.35 cfs @ 12.96 hrs, Volume= 10.540 af, Atten= 4%, Lag= 8.7 min
Discarded = 0.25 cfs @ 12.96 hrs, Volume= 1.086 af
Primary = 64.10 cfs @ 12.96 hrs, Volume= 9.454 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 167.73' @ 12.96 hrs Surf.Area= 40,503 sf Storage= 123,241 cf

Plug-Flow detention time= 255.8 min calculated for 10.540 af (87% of inflow)
Center-of-Mass det. time= 195.7 min (1,087.1 - 891.3)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	134,374 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

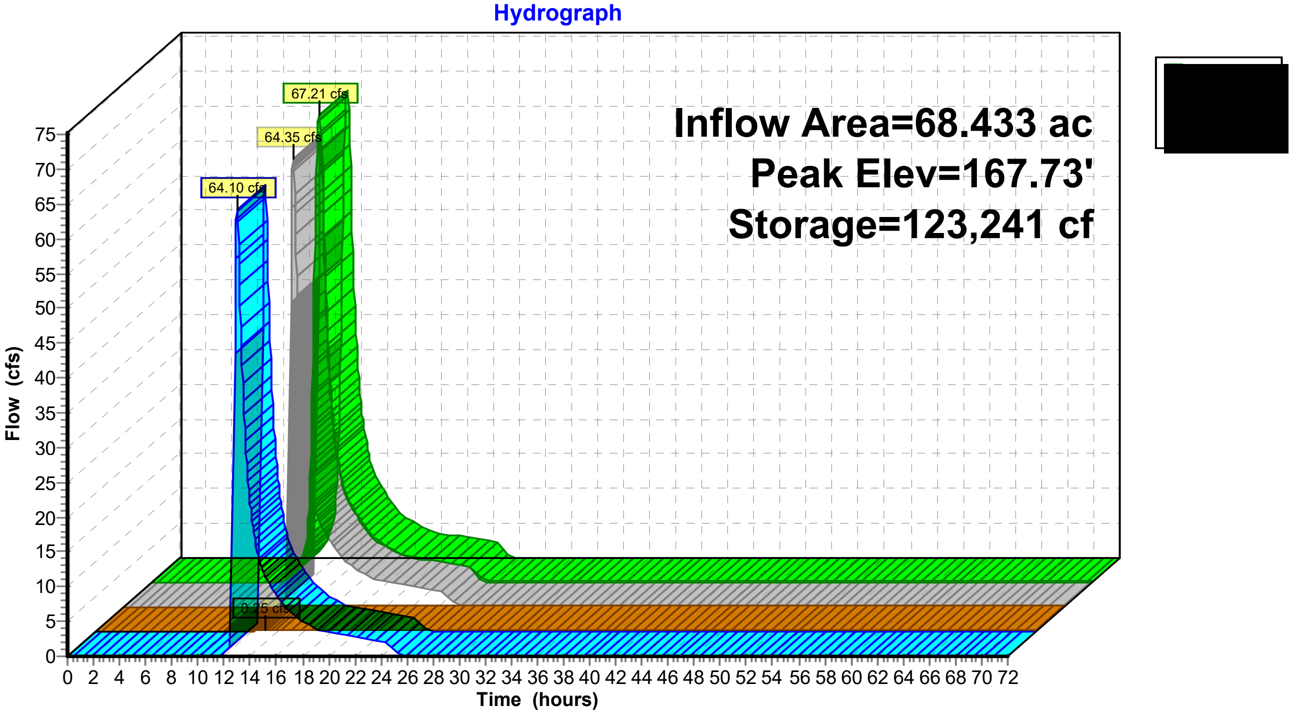
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
162.00	1,686	164.0	0	0	1,686
164.00	17,454	653.0	16,376	16,376	33,489
166.00	29,548	840.0	46,474	62,851	55,756
168.00	42,358	938.0	71,523	134,374	69,736

Device	Routing	Invert	Outlet Devices
#1	Discarded	162.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	167.25'	**71.0' long x 38.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.25 cfs @ 12.96 hrs HW=167.73' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=63.85 cfs @ 12.96 hrs HW=167.73' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 63.85 cfs @ 1.87 fps)

Pond 5P: Existing Depression



Summary for Pond 6P: Existing Wetland

Inflow Area = 116.132 ac, 22.20% Impervious, Inflow Depth = 1.42" for 25-year event
Inflow = 75.06 cfs @ 12.96 hrs, Volume= 13.708 af
Outflow = 33.80 cfs @ 13.77 hrs, Volume= 10.493 af, Atten= 55%, Lag= 48.9 min
Discarded = 0.46 cfs @ 13.77 hrs, Volume= 2.071 af
Primary = 33.34 cfs @ 13.77 hrs, Volume= 8.422 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 141.22' @ 13.77 hrs Surf.Area= 116,048 sf Storage= 233,020 cf

Plug-Flow detention time= 468.9 min calculated for 10.486 af (76% of inflow)
Center-of-Mass det. time= 380.3 min (1,302.0 - 921.8)

Volume	Invert	Avail.Storage	Storage Description
#1	138.00'	330,471 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

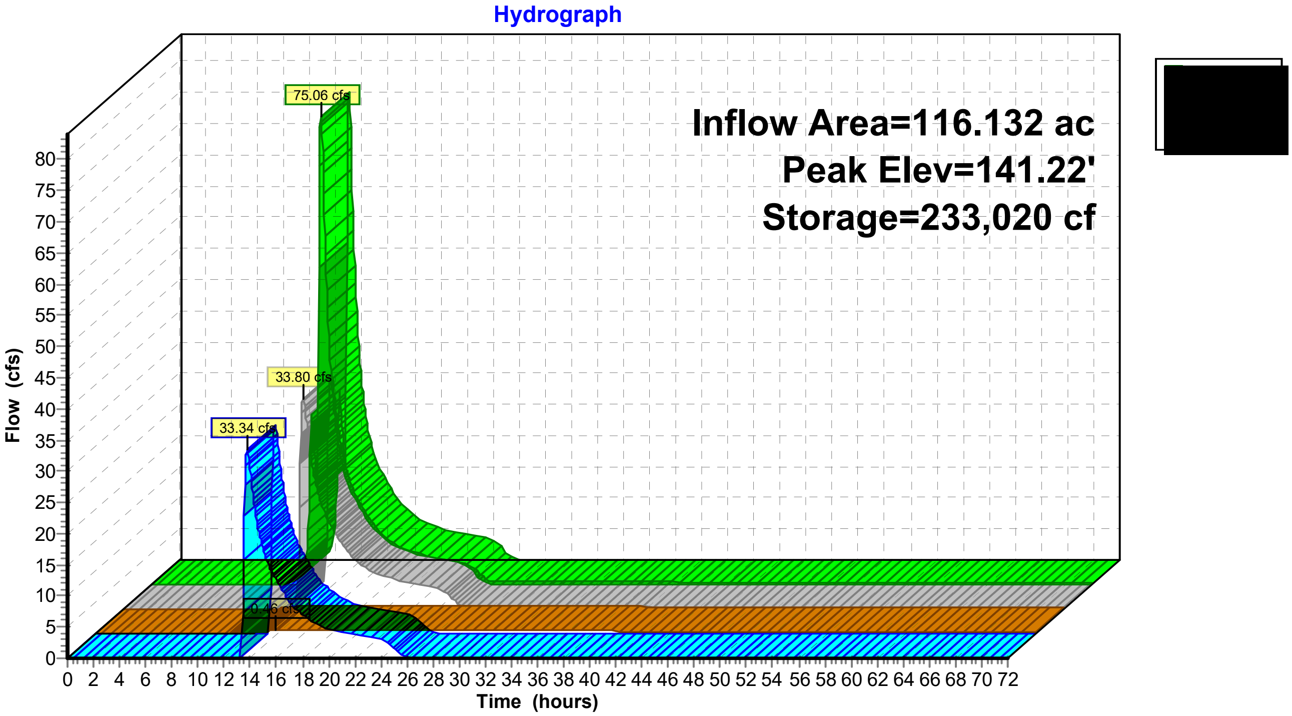
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
138.00	23,460	686.0	0	0	23,460
140.00	91,023	1,816.0	107,129	107,129	248,460
142.00	133,681	2,277.0	223,342	330,471	398,668

Device	Routing	Invert	Outlet Devices
#1	Discarded	138.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	141.00'	**121.0' long x 19.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.46 cfs @ 13.77 hrs HW=141.22' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.46 cfs)

Primary OutFlow Max=33.15 cfs @ 13.77 hrs HW=141.22' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 33.15 cfs @ 1.25 fps)

Pond 6P: Existing Wetland



Summary for Pond 7P: Existing Depression

Inflow Area =	78.568 ac, 13.25% Impervious,	Inflow Depth = 0.67"	for 25-year event	
Inflow =	11.48 cfs @	13.70 hrs, Volume=	4.369 af	
Outflow =	10.27 cfs @	14.14 hrs, Volume=	4.369 af,	Atten= 11%, Lag= 26.5 min
Discarded =	1.31 cfs @	14.14 hrs, Volume=	1.777 af	
Primary =	8.96 cfs @	14.14 hrs, Volume=	2.591 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 147.88' @ 14.14 hrs Surf.Area= 23,512 sf Storage= 29,595 cf

Plug-Flow detention time= 119.3 min calculated for 4.366 af (100% of inflow)
Center-of-Mass det. time= 119.5 min (1,130.5 - 1,011.0)

Volume	Invert	Avail.Storage	Storage Description
#1	146.00'	32,409 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

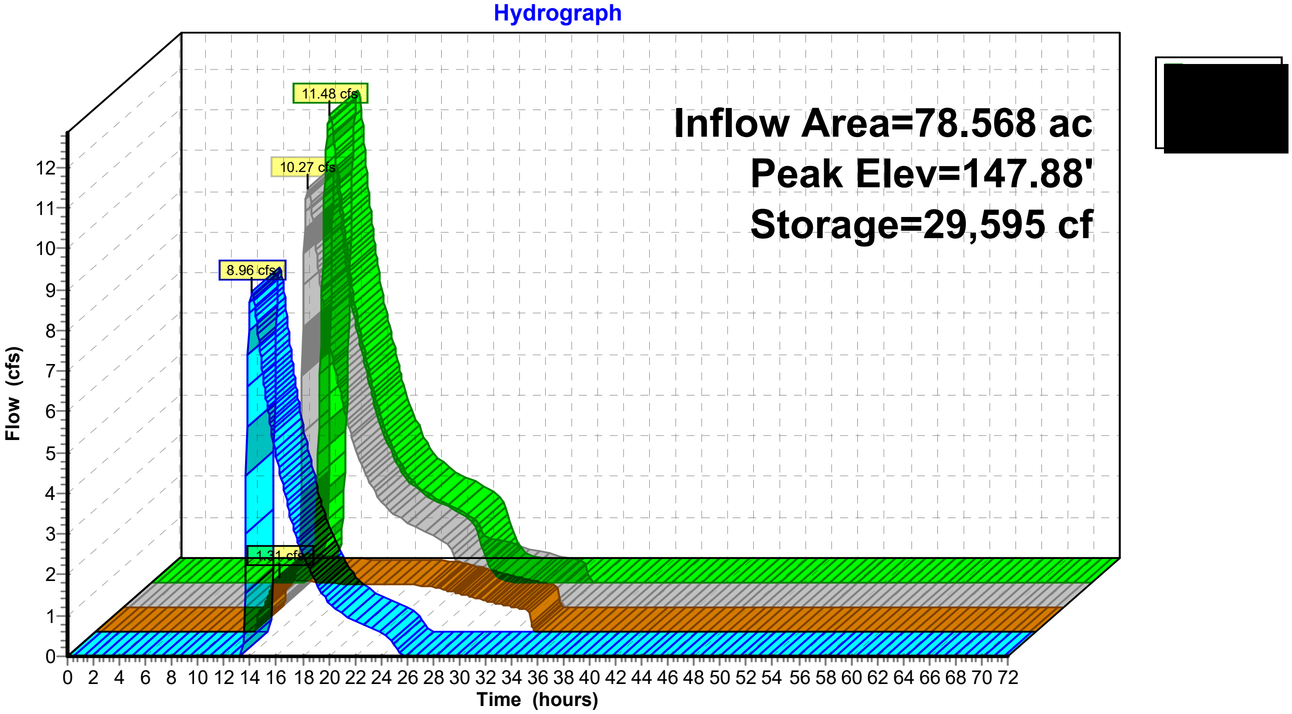
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
146.00	9,050	771.0	0	0	9,050
148.00	24,633	1,236.0	32,409	32,409	83,343

Device	Routing	Invert	Outlet Devices
#1	Primary	147.50'	**14.0' long x 90.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	146.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.31 cfs @ 14.14 hrs HW=147.88' (Free Discharge)
└—**2=Exfiltration** (Exfiltration Controls 1.31 cfs)

Primary OutFlow Max=8.95 cfs @ 14.14 hrs HW=147.88' (Free Discharge)
└—**1=Broad-Crested Rectangular Weir** (Weir Controls 8.95 cfs @ 1.67 fps)

Pond 7P: Existing Depression



Summary for Pond 8P: Existing Wetland

Inflow Area = 8.135 ac, 26.48% Impervious, Inflow Depth = 3.14" for 25-year event
Inflow = 18.78 cfs @ 12.33 hrs, Volume= 2.129 af
Outflow = 0.23 cfs @ 24.27 hrs, Volume= 0.973 af, Atten= 99%, Lag= 716.7 min
Discarded = 0.23 cfs @ 24.27 hrs, Volume= 0.973 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 231.32' @ 24.27 hrs Surf.Area= 57,919 sf Storage= 83,153 cf

Plug-Flow detention time= 1,700.0 min calculated for 0.973 af (46% of inflow)
Center-of-Mass det. time= 1,580.6 min (2,419.9 - 839.2)

Volume	Invert	Avail.Storage	Storage Description
#1	228.00'	130,034 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

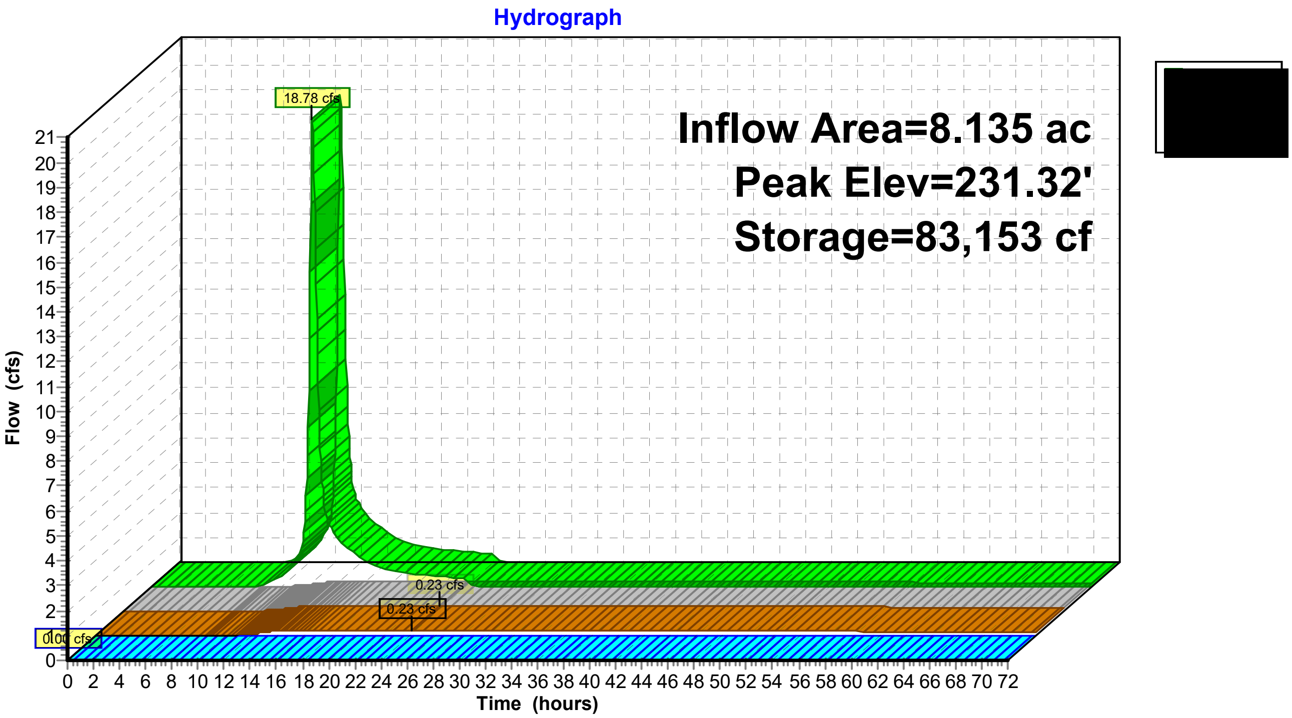
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
228.00	5,806	459.0	0	0	5,806
230.00	25,974	862.0	29,374	29,374	48,191
232.00	79,559	1,189.0	100,661	130,034	101,601

Device	Routing	Invert	Outlet Devices
#1	Discarded	228.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	231.50'	**119.0' long x 196.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.23 cfs @ 24.27 hrs HW=231.32' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=228.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 8P: Existing Wetland



Summary for Pond 9P: Existing Wetland

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

Inflow Area = 83.042 ac, 24.98% Impervious, Inflow Depth = 1.76" for 25-year event
Inflow = 69.61 cfs @ 12.95 hrs, Volume= 12.185 af
Outflow = 69.65 cfs @ 12.96 hrs, Volume= 12.185 af, Atten= 0%, Lag= 0.7 min
Discarded = 0.02 cfs @ 12.96 hrs, Volume= 0.012 af
Primary = 69.63 cfs @ 12.96 hrs, Volume= 12.173 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 148.90' @ 12.96 hrs Surf.Area= 4,687 sf Storage= 2,993 cf

Plug-Flow detention time= 0.9 min calculated for 12.177 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (915.5 - 914.6)

Volume	Invert	Avail.Storage	Storage Description
#1	148.00'	834,530 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

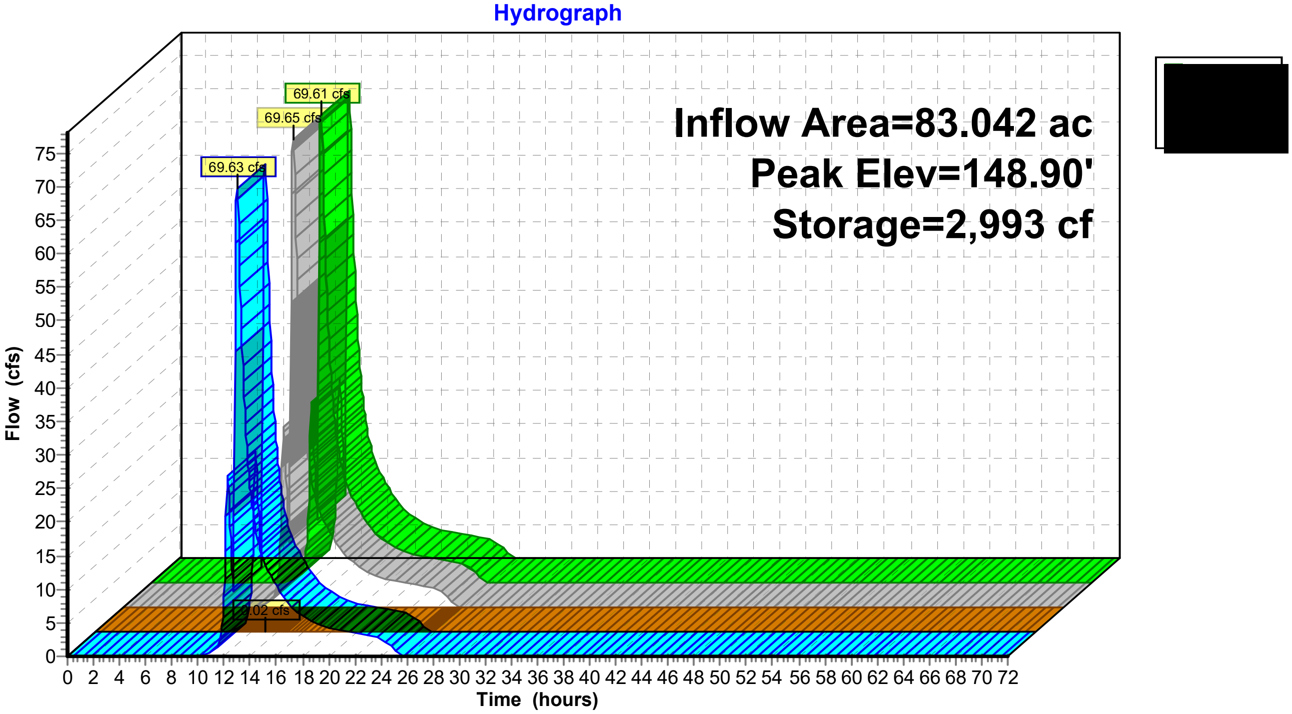
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
148.00	2,138	180.0	0	0	2,138
150.00	9,156	387.0	10,479	10,479	11,495
152.00	135,719	2,199.0	120,084	130,563	384,391
154.00	178,250	2,327.0	313,004	443,567	430,714
156.00	213,235	2,588.0	390,963	834,530	532,915

Device	Routing	Invert	Outlet Devices
#1	Discarded	148.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	148.00'	**31.0' long x 49.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.02 cfs @ 12.96 hrs HW=148.90' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=69.39 cfs @ 12.96 hrs HW=148.90' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 69.39 cfs @ 2.50 fps)

Pond 9P: Existing Wetland



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Drainage Area 1 Runoff Area=5,106,088 sf 8.17% Impervious Runoff Depth=2.44"
Flow Length=4,424' Tc=105.4 min CN=59 Runoff=86.94 cfs 23.804 af

Subcatchment2S: Drainage Area 2 Runoff Area=233,007 sf 0.00% Impervious Runoff Depth=1.11"
Flow Length=289' Tc=12.1 min CN=44 Runoff=3.98 cfs 0.495 af

Subcatchment3S: Drainage Area 3 Runoff Area=1,385,288 sf 3.69% Impervious Runoff Depth=3.54"
Flow Length=2,001' Tc=51.4 min CN=70 Runoff=56.51 cfs 9.369 af

Subcatchment4S: Drainage Area 4 Runoff Area=717,184 sf 0.65% Impervious Runoff Depth=4.71"
Flow Length=974' Tc=13.9 min CN=81 Runoff=69.69 cfs 6.465 af

Subcatchment5S: Drainage Area 5 Runoff Area=2,626,591 sf 22.21% Impervious Runoff Depth=3.54"
Flow Length=2,517' Tc=58.5 min CN=70 Runoff=99.66 cfs 17.765 af

Subcatchment6S: Drainage Area 6 Runoff Area=1,441,381 sf 15.21% Impervious Runoff Depth=1.11"
Flow Length=1,544' Tc=44.6 min CN=44 Runoff=14.84 cfs 3.061 af

Subcatchment7S: Drainage Area 7 Runoff Area=3,422,419 sf 13.25% Impervious Runoff Depth=1.27"
Flow Length=3,232' Tc=99.9 min CN=46 Runoff=26.08 cfs 8.328 af

Subcatchment8S: Drainage Area 8 Runoff Area=354,352 sf 26.48% Impervious Runoff Depth=4.38"
Flow Length=883' Tc=23.6 min CN=78 Runoff=26.18 cfs 2.972 af

Subcatchment9S: Drainage Area 9 Runoff Area=636,379 sf 35.61% Impervious Runoff Depth=3.33"
Flow Length=601' Tc=17.1 min CN=68 Runoff=40.53 cfs 4.053 af

Subcatchment10S: Drainage Area 10 Runoff Area=1,327,824 sf 10.63% Impervious Runoff Depth=3.23"
Flow Length=1,752' Tc=42.6 min CN=67 Runoff=54.43 cfs 8.198 af

Subcatchment11S: Drainage Area 11 Runoff Area=2,488,023 sf 8.41% Impervious Runoff Depth=3.23"
Flow Length=1,904' Tc=43.3 min CN=67 Runoff=101.13 cfs 15.362 af

Subcatchment12S: Drainage Area 12 Runoff Area=2,329,724 sf 9.84% Impervious Runoff Depth=3.64"
Flow Length=1,596' Tc=52.4 min CN=71 Runoff=96.96 cfs 16.221 af

Subcatchment13S: Drainage Area 13 Runoff Area=1,408,782 sf 0.05% Impervious Runoff Depth=3.13"
Flow Length=1,813' Tc=9.8 min CN=66 Runoff=102.00 cfs 8.425 af

Reach DP-1: Off-Site West Inflow=125.52 cfs 33.178 af
Outflow=125.52 cfs 33.178 af

Reach DP-2: Off-Site South Inflow=126.03 cfs 25.599 af
Outflow=126.03 cfs 25.599 af

Reach DP-3: Off-Site East Inflow=96.96 cfs 16.221 af
Outflow=96.96 cfs 16.221 af

Reach DP-4: Off-Site Southeast Inflow=136.92 cfs 23.787 af
Outflow=136.92 cfs 23.787 af

Pond 2P: Existing Depression Peak Elev=168.68' Storage=8,932 cf Inflow=3.98 cfs 0.495 af
Outflow=0.46 cfs 0.495 af

Pond 3P: Existing Depression Peak Elev=191.19' Storage=217,532 cf Inflow=56.51 cfs 9.369 af
Discarded=1.66 cfs 6.050 af Primary=14.79 cfs 2.939 af Outflow=16.45 cfs 8.989 af

Pond 4P: Existing Depression Peak Elev=168.69' Storage=213,410 cf Inflow=69.69 cfs 6.465 af
Discarded=1.75 cfs 5.602 af Primary=0.00 cfs 0.000 af Outflow=1.75 cfs 5.602 af

Pond 5P: Existing Depression Peak Elev=167.89' Storage=129,896 cf Inflow=99.66 cfs 18.304 af
Discarded=0.26 cfs 1.099 af Primary=98.49 cfs 15.612 af Outflow=98.75 cfs 16.711 af

Pond 6P: Existing Wetland Peak Elev=141.45' Storage=260,446 cf Inflow=122.30 cfs 22.712 af
Discarded=0.48 cfs 2.093 af Primary=98.73 cfs 17.400 af Outflow=99.21 cfs 19.493 af

Pond 7P: Existing Depression Peak Elev=148.31' Storage=32,409 cf Inflow=26.08 cfs 8.328 af
Discarded=1.37 cfs 1.894 af Primary=27.17 cfs 6.434 af Outflow=28.55 cfs 8.328 af

Pond 8P: Existing Wetland Peak Elev=231.53' Storage=96,168 cf Inflow=26.18 cfs 2.972 af
Discarded=0.25 cfs 1.095 af Primary=1.68 cfs 0.539 af Outflow=1.93 cfs 1.634 af

Pond 9P: Existing Wetland Peak Elev=149.20' Storage=4,572 cf Inflow=107.83 cfs 19.665 af
Discarded=0.02 cfs 0.014 af Primary=107.77 cfs 19.651 af Outflow=107.79 cfs 19.665 af

Total Runoff Area = 538.959 ac Runoff Volume = 124.519 af Average Runoff Depth = 2.77"
88.80% Pervious = 478.589 ac 11.20% Impervious = 60.370 ac

Summary for Subcatchment 1S: Drainage Area 1

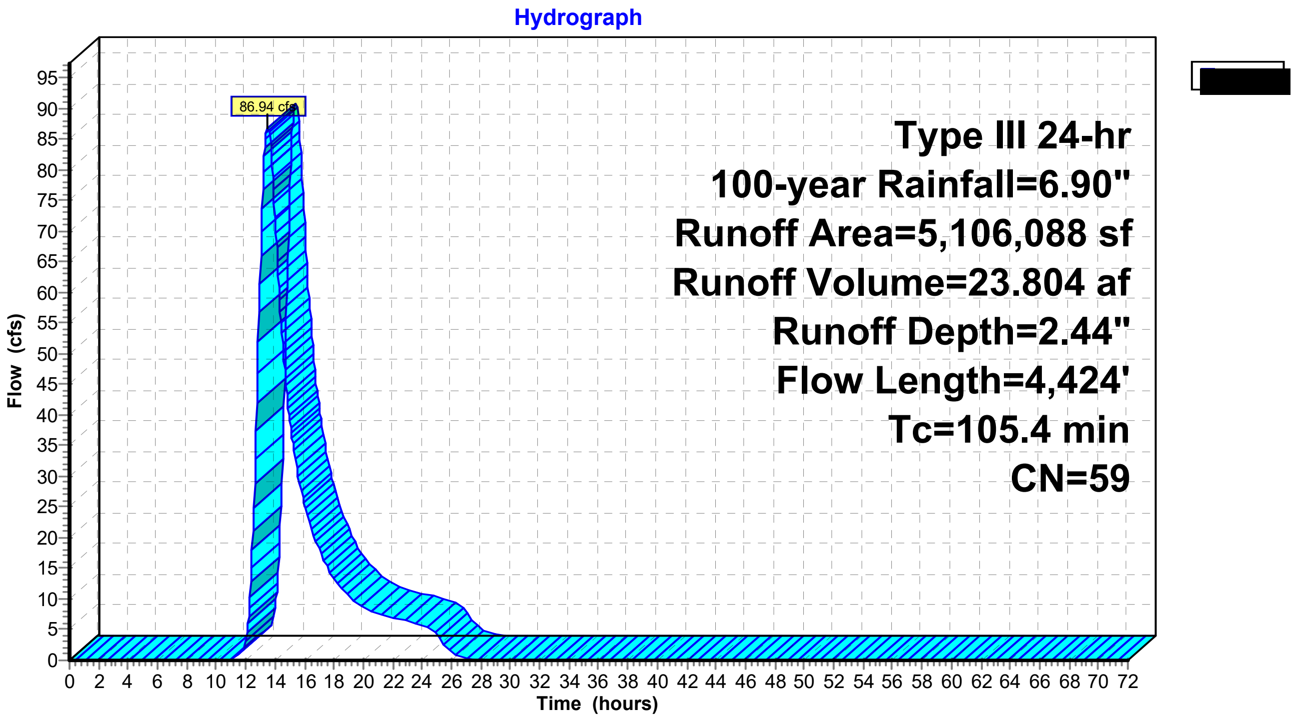
Runoff = 86.94 cfs @ 13.48 hrs, Volume= 23.804 af, Depth= 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	684,739	30	Meadow, non-grazed, HSG A
	599,154	58	Meadow, non-grazed, HSG B
	1,561,585	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	636,961	30	Woods, Good, HSG A
	755,130	55	Woods, Good, HSG B
	382,108	70	Woods, Good, HSG C
	10,840	77	Woods, Good, HSG D
*	33,102	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	417,330	98	Water body
*	25,139	96	Gravel road
*	0	98	Structure
	5,106,088	59	Weighted Average
	4,688,758		91.83% Pervious Area
	417,330		8.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
11.3	356	0.0110	0.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.1	433	0.0020	0.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.3	222	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.5	766	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
46.9	2,597	0.0340	0.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
105.4	4,424	Total			

Subcatchment 1S: Drainage Area 1



Summary for Subcatchment 2S: Drainage Area 2

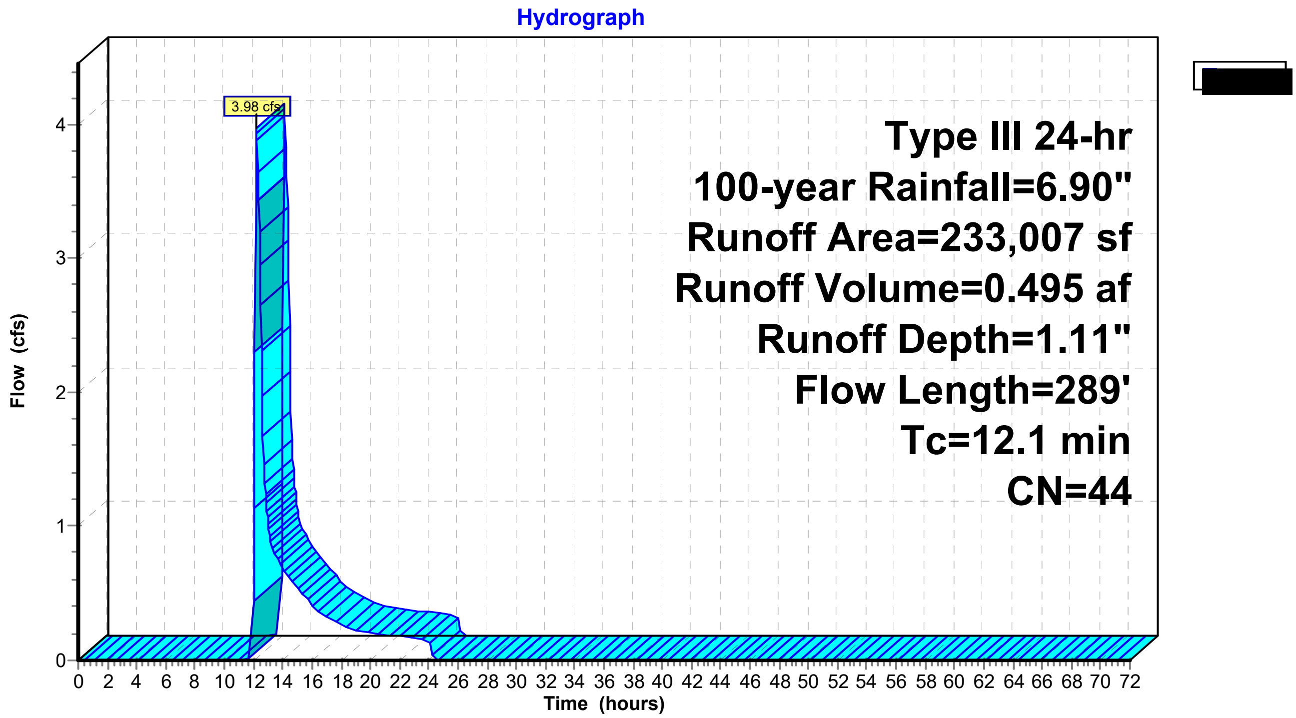
Runoff = 3.98 cfs @ 12.22 hrs, Volume= 0.495 af, Depth= 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	125,846	30	Meadow, non-grazed, HSG A
	32,427	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	16,114	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	58,620	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	0	96	Gravel road
*	0	98	Structure
	233,007	44	Weighted Average
	233,007		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0900	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
5.3	239	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.1	289	Total			

Subcatchment 2S: Drainage Area 2



Summary for Subcatchment 3S: Drainage Area 3

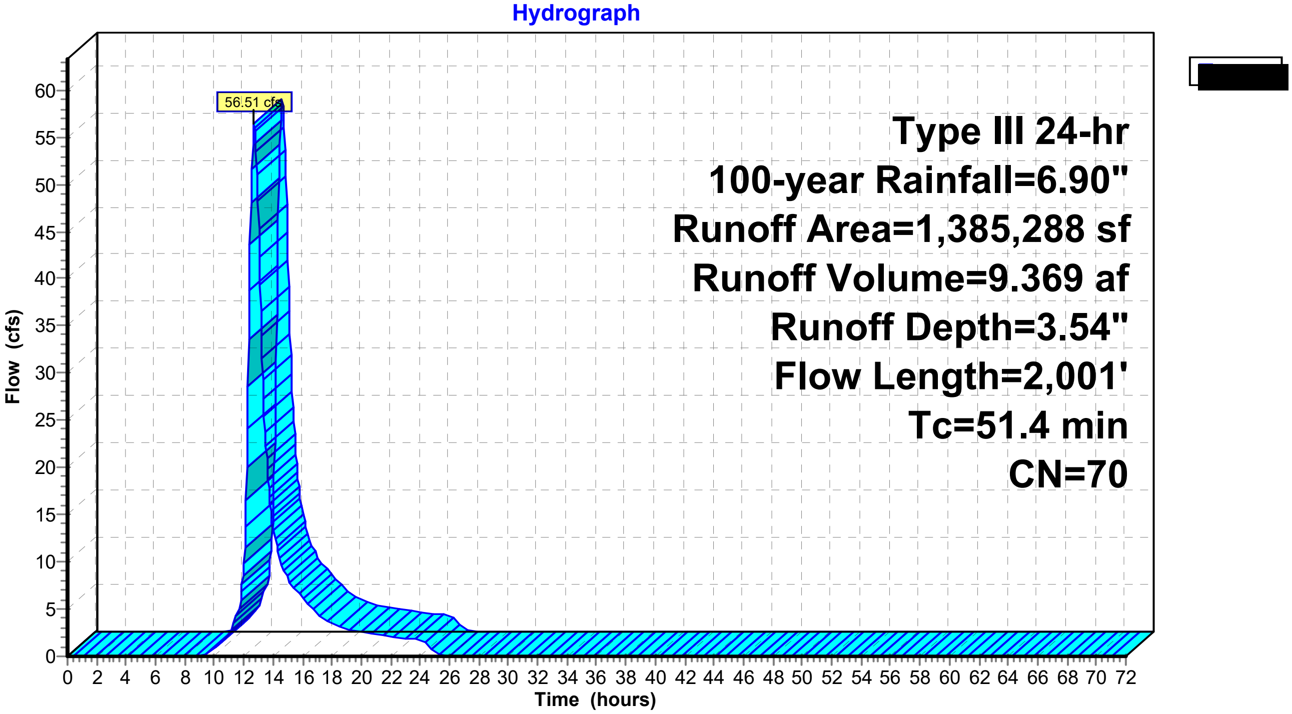
Runoff = 56.51 cfs @ 12.72 hrs, Volume= 9.369 af, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	99,790	58	Meadow, non-grazed, HSG B
	811,823	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	1,798	30	Woods, Good, HSG A
	107,172	55	Woods, Good, HSG B
	142,868	70	Woods, Good, HSG C
	14,571	77	Woods, Good, HSG D
*	59,918	70	Gravel pit, HSG A
*	96,280	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	51,068	98	Water body
*	0	96	Gravel road
*	0	98	Structure
	1,385,288	70	Weighted Average
	1,334,220		96.31% Pervious Area
	51,068		3.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.8	50	0.0080	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.8	166	0.0211	0.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.7	1,110	0.0135	0.81		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.1	675	0.0993	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
51.4	2,001	Total			

Subcatchment 3S: Drainage Area 3



Summary for Subcatchment 4S: Drainage Area 4

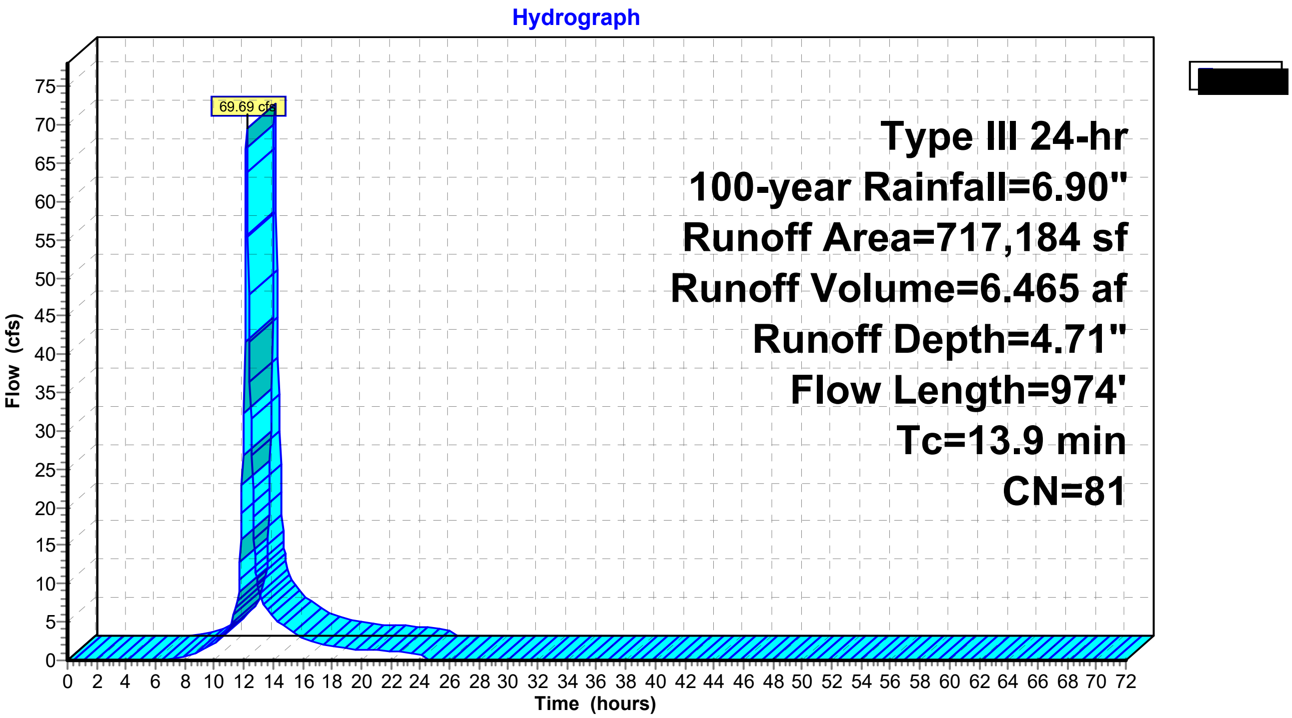
Runoff = 69.69 cfs @ 12.19 hrs, Volume= 6.465 af, Depth= 4.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	18,016	55	Woods, Good, HSG B
	19,532	70	Woods, Good, HSG C
	5,054	77	Woods, Good, HSG D
*	34,397	70	Gravel pit, HSG A
*	500,725	81	Gravel pit, HSG B
*	134,831	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	4,629	98	Water body
*	0	96	Gravel road
*	0	98	Structure
	717,184	81	Weighted Average
	712,555		99.35% Pervious Area
	4,629		0.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.20		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
3.9	384	0.0102	1.63		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	45	0.2700	8.37		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
8.8	269	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	226	0.3100	8.96		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
13.9	974	Total			

Subcatchment 4S: Drainage Area 4



Summary for Subcatchment 5S: Drainage Area 5

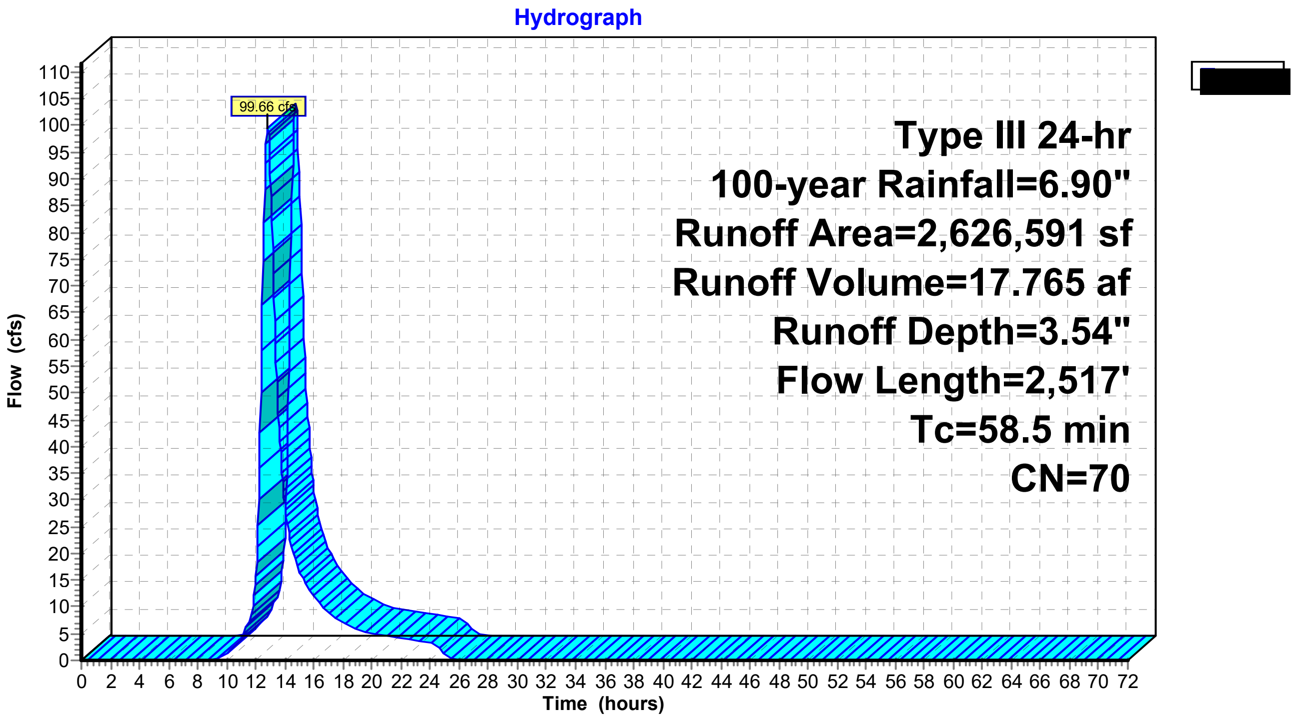
Runoff = 99.66 cfs @ 12.80 hrs, Volume= 17.765 af, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	84,917	30	Meadow, non-grazed, HSG A
	50,852	58	Meadow, non-grazed, HSG B
	93,447	71	Meadow, non-grazed, HSG C
	4,623	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	898,129	55	Woods, Good, HSG B
	661,597	70	Woods, Good, HSG C
	225,490	77	Woods, Good, HSG D
*	15,001	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	583,239	98	Water body
*	9,296	96	Gravel road
*	0	98	Structure
	2,626,591	70	Weighted Average
	2,043,352		77.79% Pervious Area
	583,239		22.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.4	238	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.6	1,240	0.0242	0.78		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.6	509	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.6	480	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
58.5	2,517	Total			

Subcatchment 5S: Drainage Area 5



Summary for Subcatchment 6S: Drainage Area 6

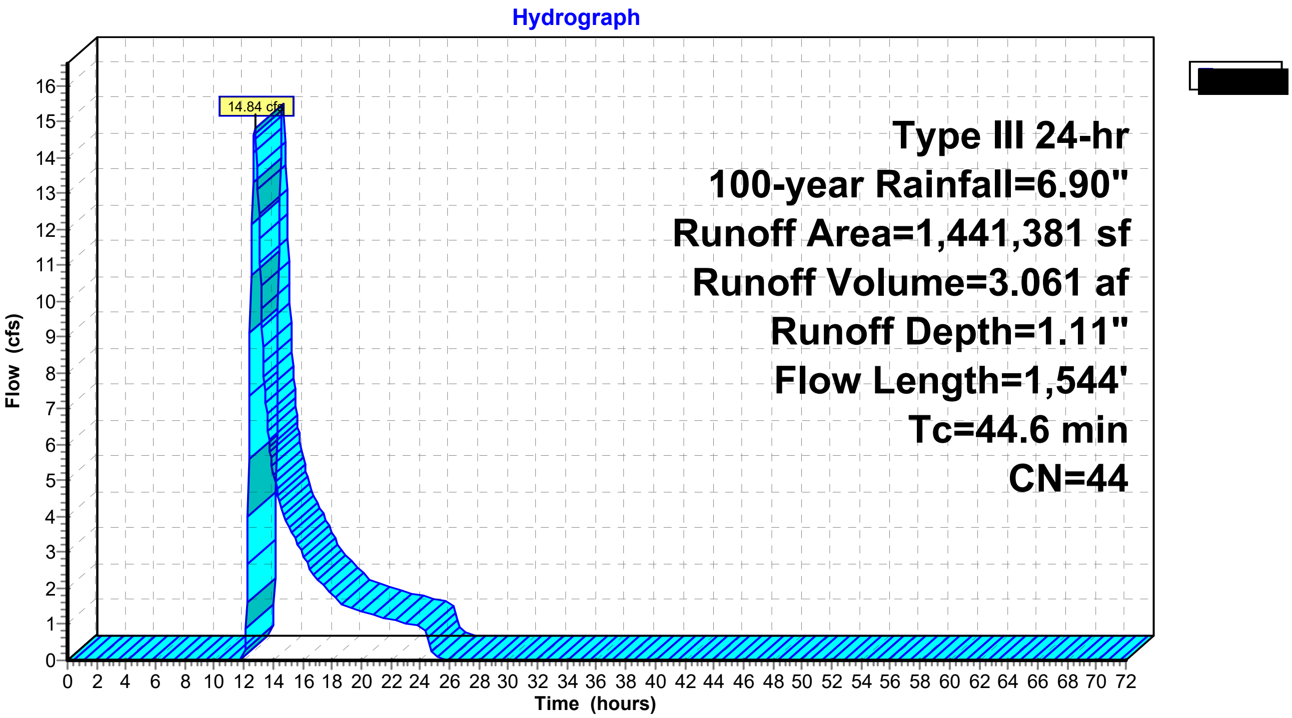
Runoff = 14.84 cfs @ 12.76 hrs, Volume= 3.061 af, Depth= 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	499,950	30	Meadow, non-grazed, HSG A
	97,724	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	564,963	30	Woods, Good, HSG A
	50,036	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	219,272	98	Water body
*	9,436	96	Gravel road
*	0	98	Structure
	1,441,381	44	Weighted Average
	1,222,109		84.79% Pervious Area
	219,272		15.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
13.5	538	0.0090	0.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.1	601	0.0391	0.99		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.7	355	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
44.6	1,544	Total			

Subcatchment 6S: Drainage Area 6



Summary for Subcatchment 7S: Drainage Area 7

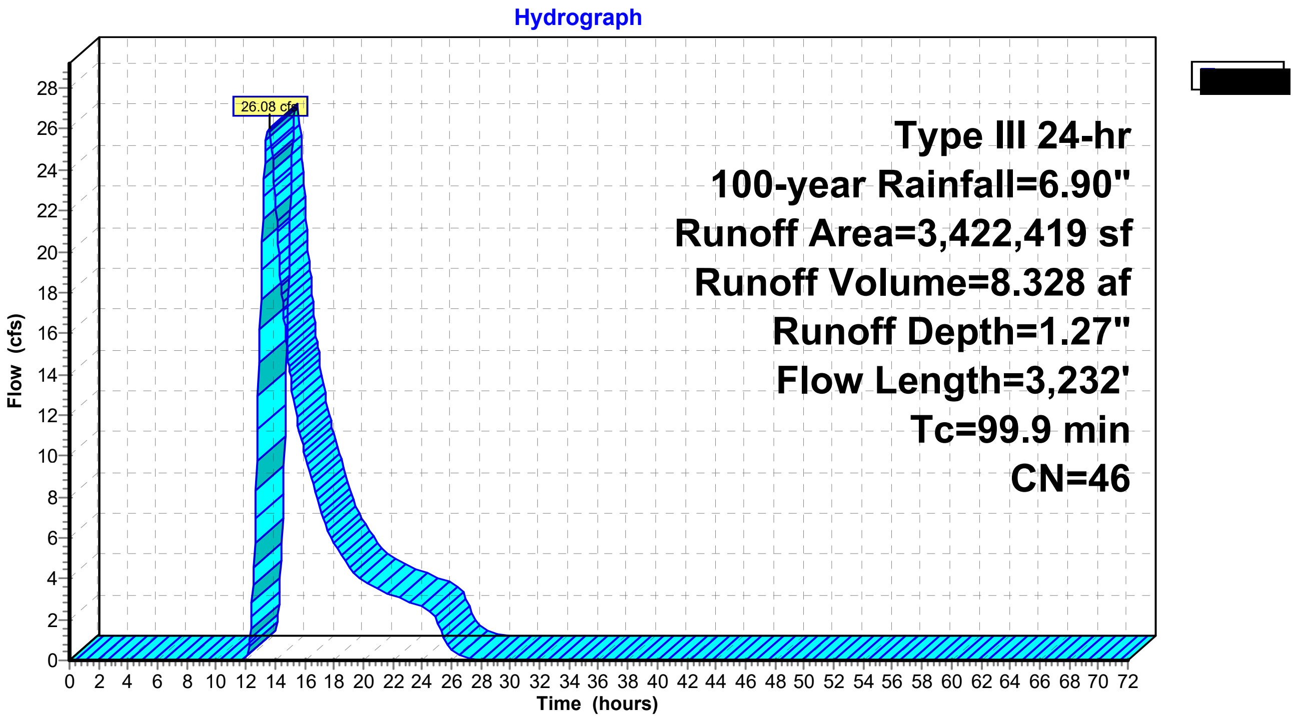
Runoff = 26.08 cfs @ 13.56 hrs, Volume= 8.328 af, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	882,165	30	Meadow, non-grazed, HSG A
	137,268	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	1,413,258	30	Woods, Good, HSG A
	231,279	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	172,138	70	Gravel pit, HSG A
*	88,866	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	453,314	98	Water body
*	44,131	96	Gravel road
*	0	98	Structure
	3,422,419	46	Weighted Average
	2,969,105		86.75% Pervious Area
	453,314		13.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	50	0.1600	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
5.6	346	0.0430	1.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
88.9	2,836	0.0113	0.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
99.9	3,232	Total			

Subcatchment 7S: Drainage Area 7



Summary for Subcatchment 8S: Drainage Area 8

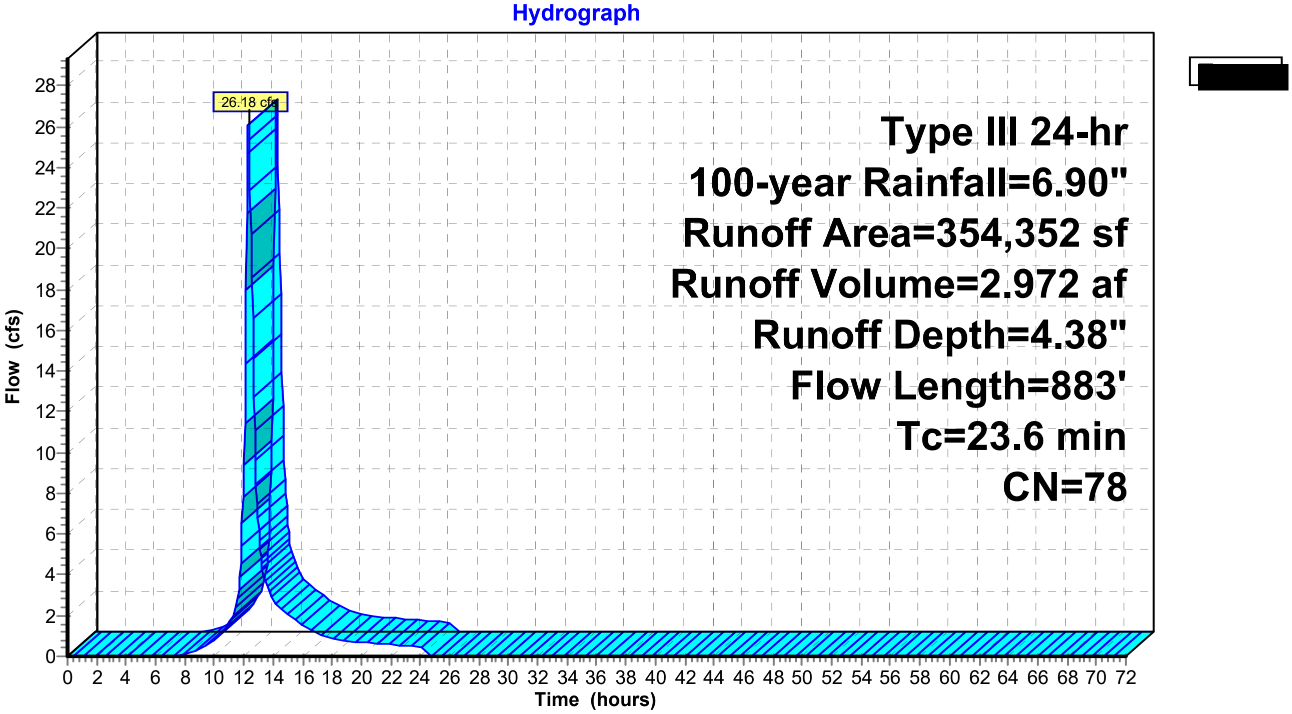
Runoff = 26.18 cfs @ 12.32 hrs, Volume= 2.972 af, Depth= 4.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	14,757	71	Meadow, non-grazed, HSG C
	6,627	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	7,700	55	Woods, Good, HSG B
	188,712	70	Woods, Good, HSG C
	40,001	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	93,828	98	Water body
*	2,727	96	Gravel road
*	0	98	Structure
	354,352	78	Weighted Average
	260,524		73.52% Pervious Area
	93,828		26.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
8.8	390	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	271	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	172	0.0280	0.84		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.6	883	Total			

Subcatchment 8S: Drainage Area 8



Summary for Subcatchment 9S: Drainage Area 9

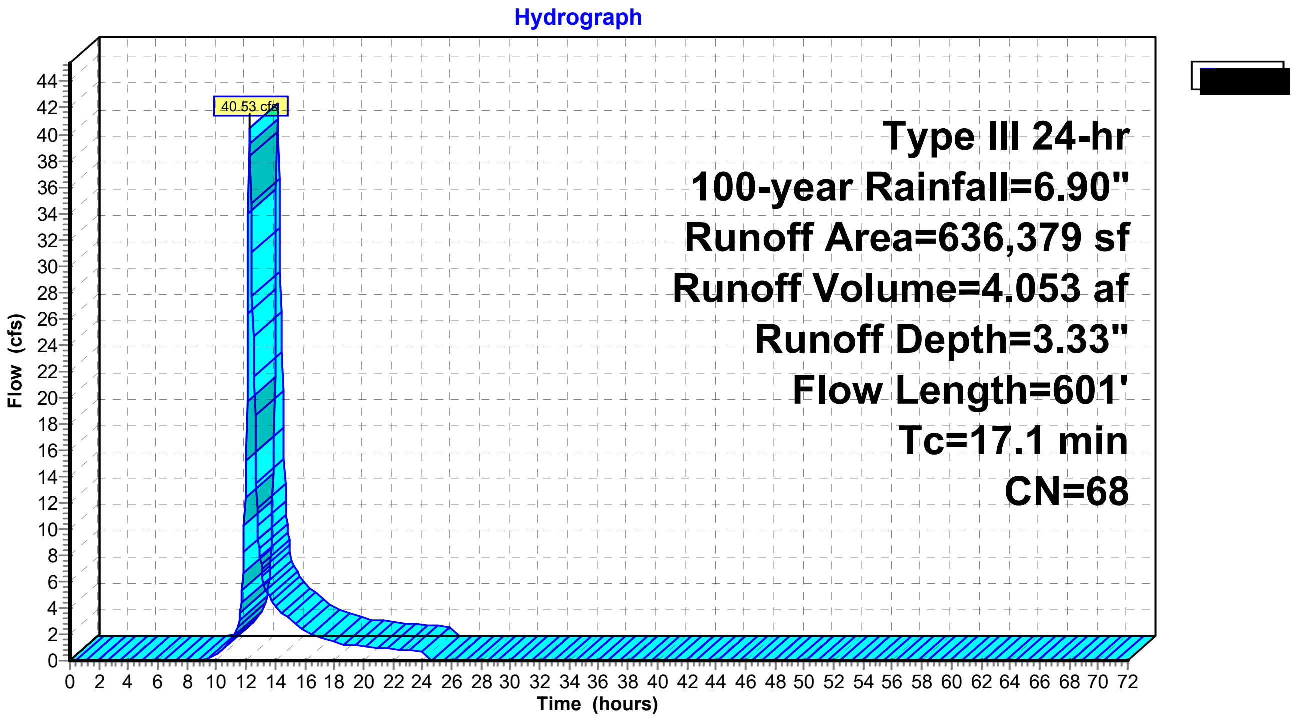
Runoff = 40.53 cfs @ 12.24 hrs, Volume= 4.053 af, Depth= 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	80,860	30	Meadow, non-grazed, HSG A
	29,044	58	Meadow, non-grazed, HSG B
	8,254	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	24,186	30	Woods, Good, HSG A
	229,102	55	Woods, Good, HSG B
	19,896	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	226,618	98	Water body
*	18,419	96	Gravel road
*	0	98	Structure
	636,379	68	Weighted Average
	409,761		64.39% Pervious Area
	226,618		35.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.4	106	0.0610	1.23		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	184	0.0330	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.8	261	0.2470	2.48		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.1	601	Total			

Subcatchment 9S: Drainage Area 9



Summary for Subcatchment 10S: Drainage Area 10

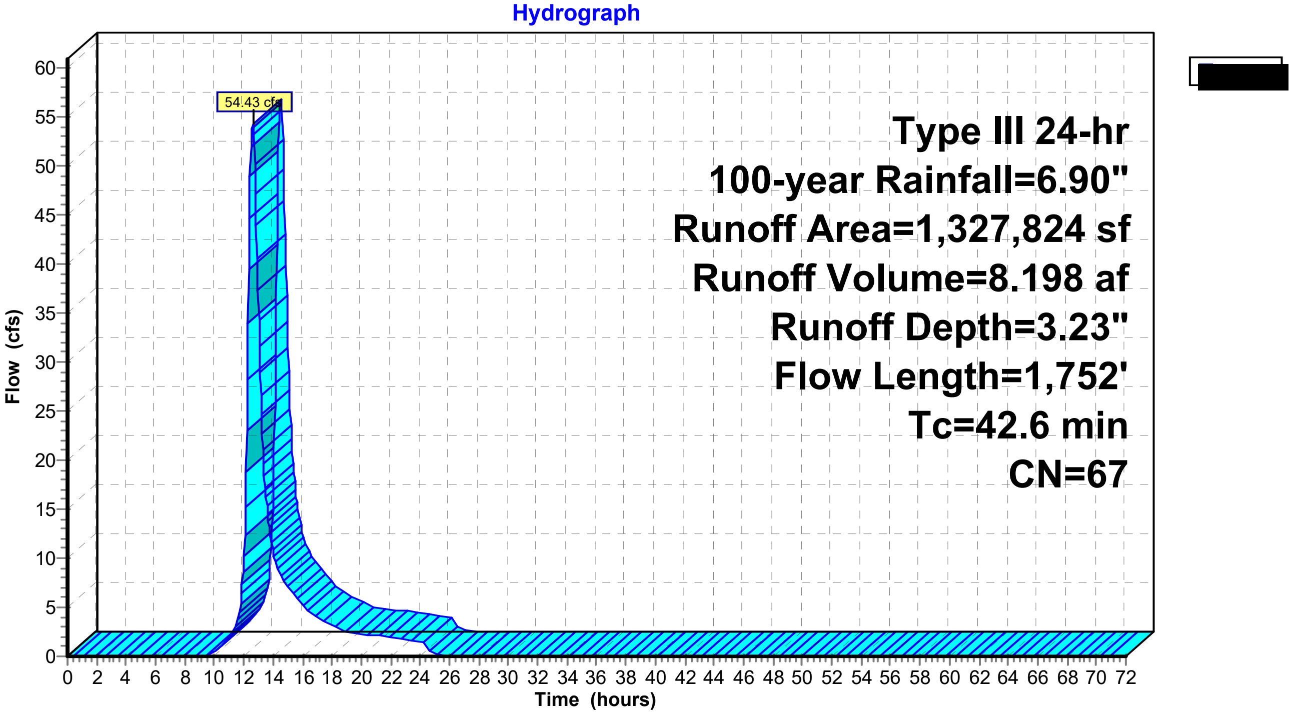
Runoff = 54.43 cfs @ 12.60 hrs, Volume= 8.198 af, Depth= 3.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	13,076	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	110,782	71	Meadow, non-grazed, HSG C
	7,154	78	Meadow, non-grazed, HSG D
	110,901	30	Woods, Good, HSG A
	314,648	55	Woods, Good, HSG B
	510,207	70	Woods, Good, HSG C
	87,476	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	141,195	98	Water body
*	32,385	96	Gravel road
*	0	98	Structure
	1,327,824	67	Weighted Average
	1,186,629		89.37% Pervious Area
	141,195		10.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
29.4	1,139	0.0167	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	72	0.0417	3.29		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
8.5	491	0.0367	0.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
42.6	1,752	Total			

Subcatchment 10S: Drainage Area 10



Summary for Subcatchment 11S: Drainage Area 11

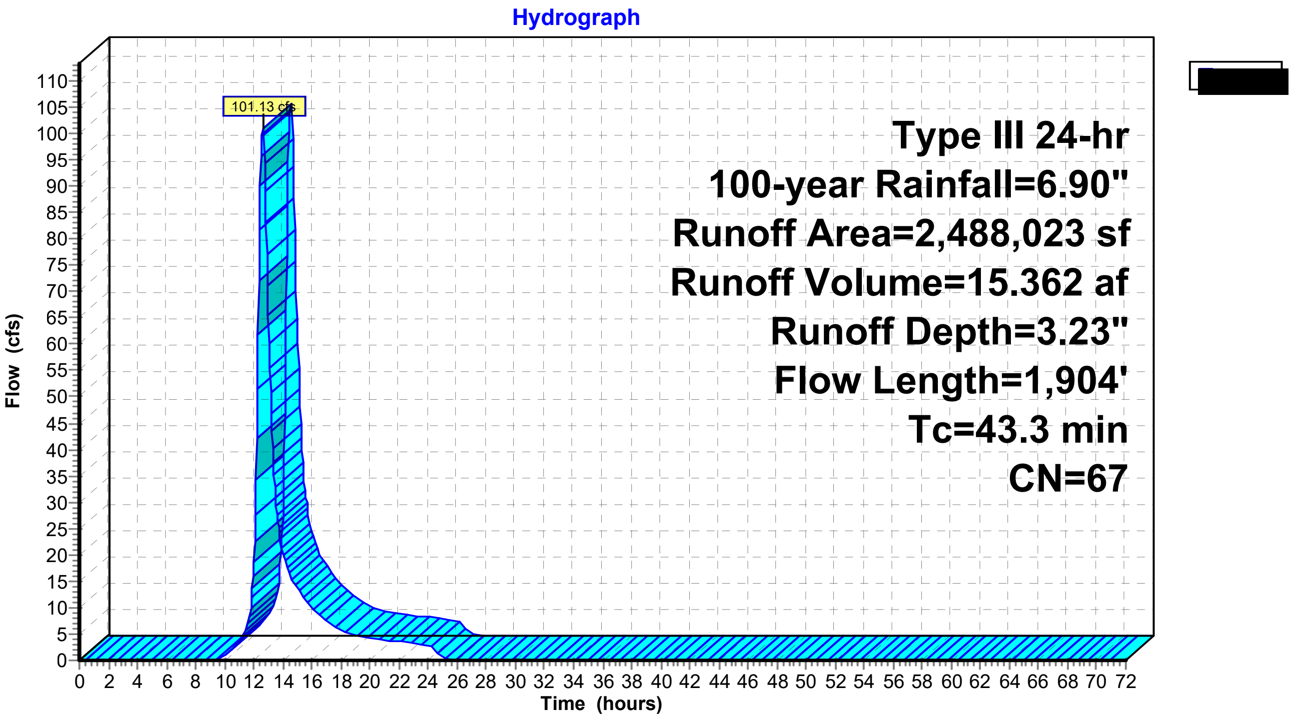
Runoff = 101.13 cfs @ 12.61 hrs, Volume= 15.362 af, Depth= 3.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	324,786	30	Meadow, non-grazed, HSG A
	74,662	58	Meadow, non-grazed, HSG B
	1,249,959	71	Meadow, non-grazed, HSG C
	22,189	78	Meadow, non-grazed, HSG D
	5,299	30	Woods, Good, HSG A
	38,194	55	Woods, Good, HSG B
	471,495	70	Woods, Good, HSG C
	72,253	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	201,207	98	Water body
*	19,973	96	Gravel road
*	8,006	98	Structure
	2,488,023	67	Weighted Average
	2,278,810		91.59% Pervious Area
	209,213		8.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
34.0	1,854	0.0330	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
43.3	1,904	Total			

Subcatchment 11S: Drainage Area 11



Summary for Subcatchment 12S: Drainage Area 12

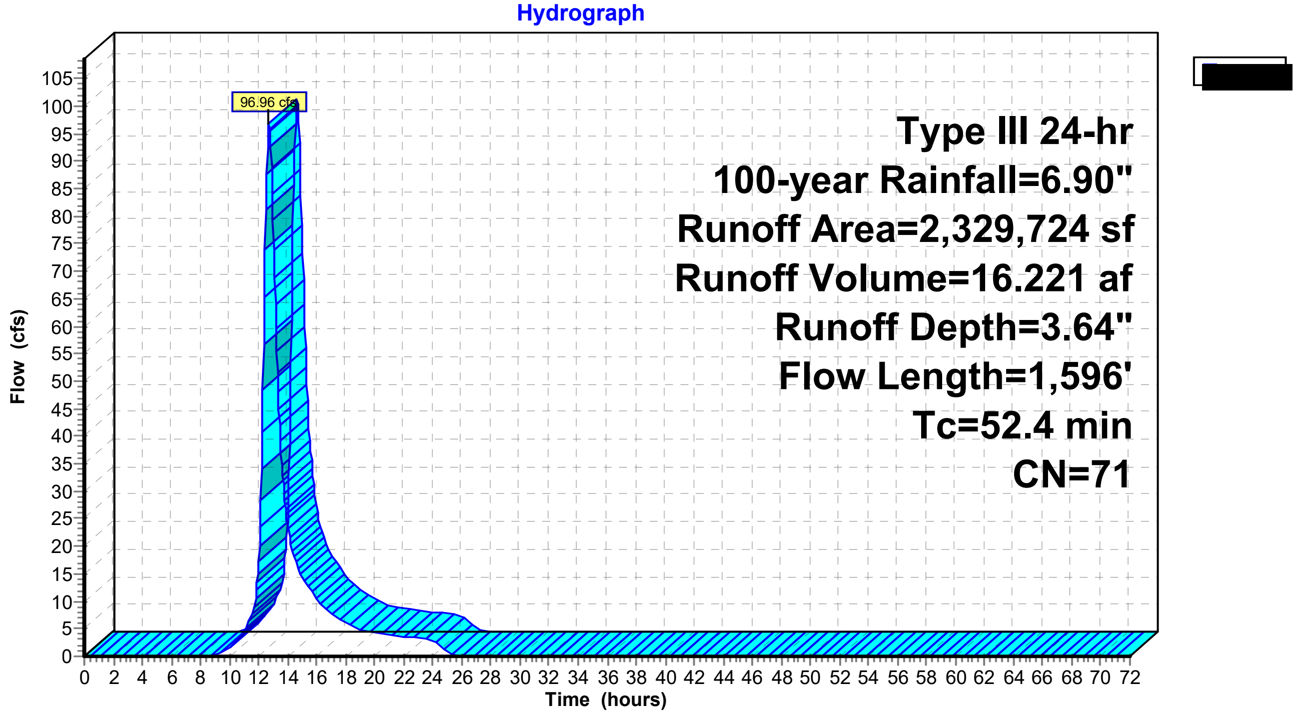
Runoff = 96.96 cfs @ 12.73 hrs, Volume= 16.221 af, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	9,439	58	Meadow, non-grazed, HSG B
	351,871	71	Meadow, non-grazed, HSG C
	38,083	78	Meadow, non-grazed, HSG D
	62,057	30	Woods, Good, HSG A
	183,438	55	Woods, Good, HSG B
	1,230,812	70	Woods, Good, HSG C
	224,776	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	229,248	98	Water body
*	0	96	Gravel road
*	0	98	Structure
	2,329,724	71	Weighted Average
	2,100,476		90.16% Pervious Area
	229,248		9.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	50	0.0140	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
7.5	626	0.0780	1.40		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
30.7	920	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
52.4	1,596	Total			

Subcatchment 12S: Drainage Area 12



Summary for Subcatchment 13S: Drainage Area 13

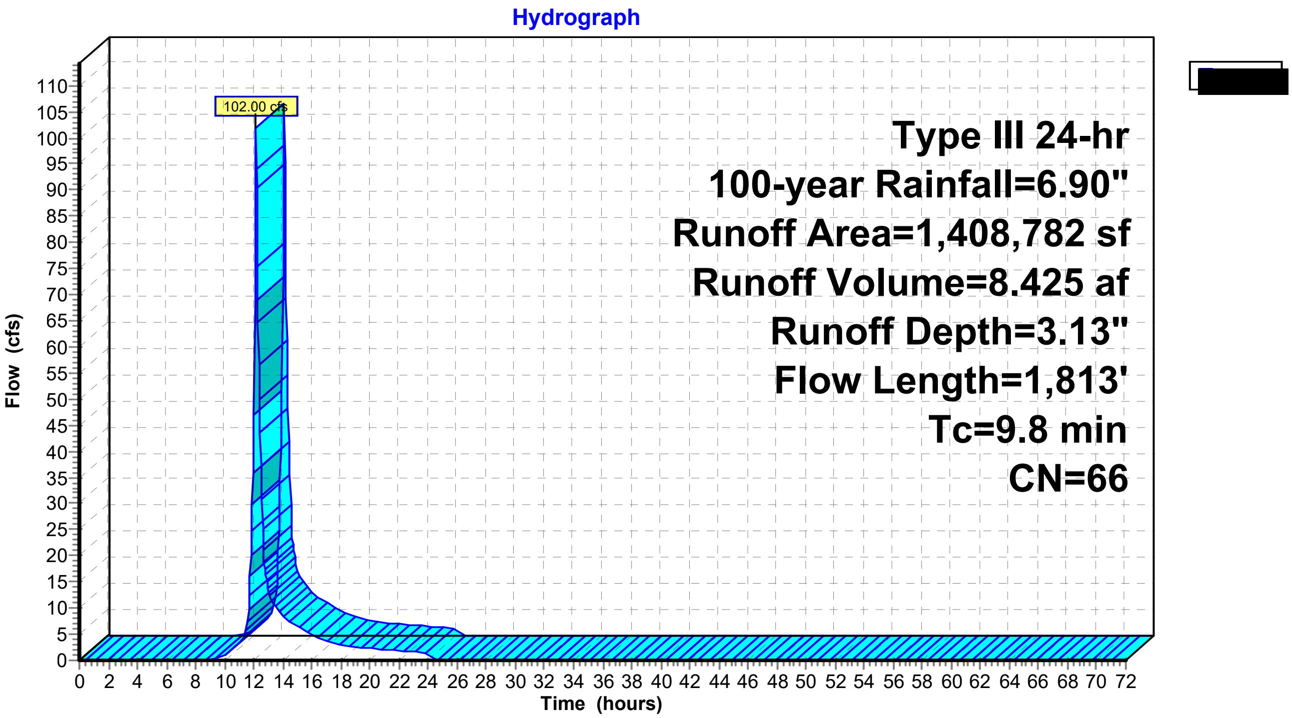
Runoff = 102.00 cfs @ 12.15 hrs, Volume= 8.425 af, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	137,390	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	1,266,167	70	Gravel pit, HSG A
*	4,469	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	756	98	Water body
*	0	96	Gravel road
*	0	98	Structure
	1,408,782	66	Weighted Average
	1,408,026		99.95% Pervious Area
	756		0.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.20		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
9.1	1,763	0.0403	3.23		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.8	1,813	Total			

Subcatchment 13S: Drainage Area 13



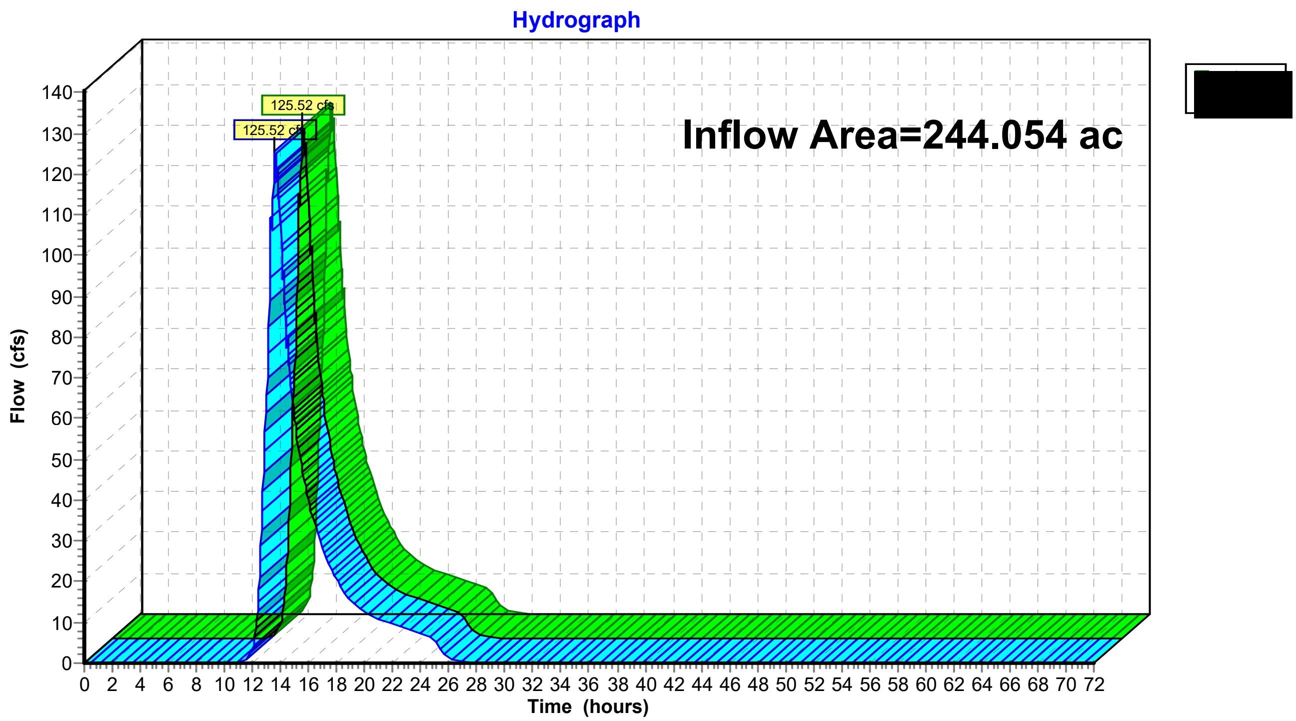
Summary for Reach DP-1: Off-Site West

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 244.054 ac, 8.71% Impervious, Inflow Depth = 1.63" for 100-year event
Inflow = 125.52 cfs @ 13.60 hrs, Volume= 33.178 af
Outflow = 125.52 cfs @ 13.60 hrs, Volume= 33.178 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Off-Site West



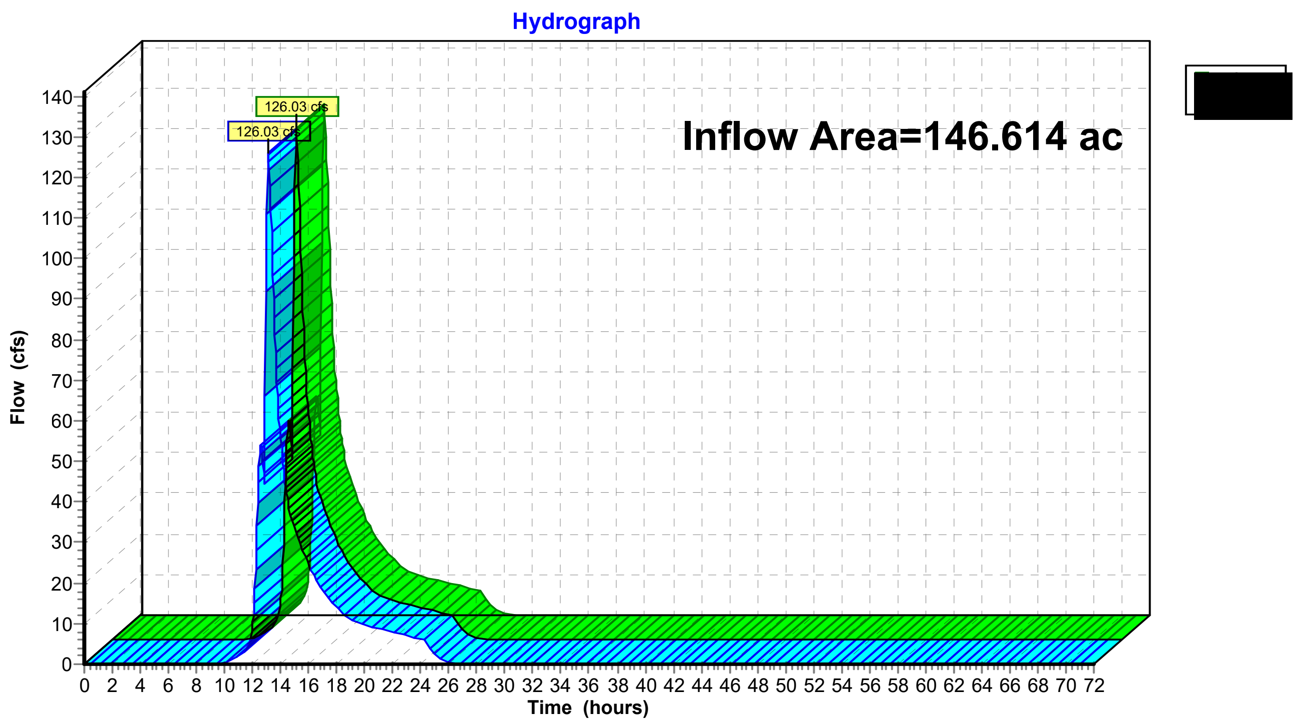
Summary for Reach DP-2: Off-Site South

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	146.614 ac,	19.79% Impervious,	Inflow Depth = 2.10"	for 100-year event
Inflow =	126.03 cfs @	13.12 hrs, Volume=	25.599 af	
Outflow =	126.03 cfs @	13.12 hrs, Volume=	25.599 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: Off-Site South



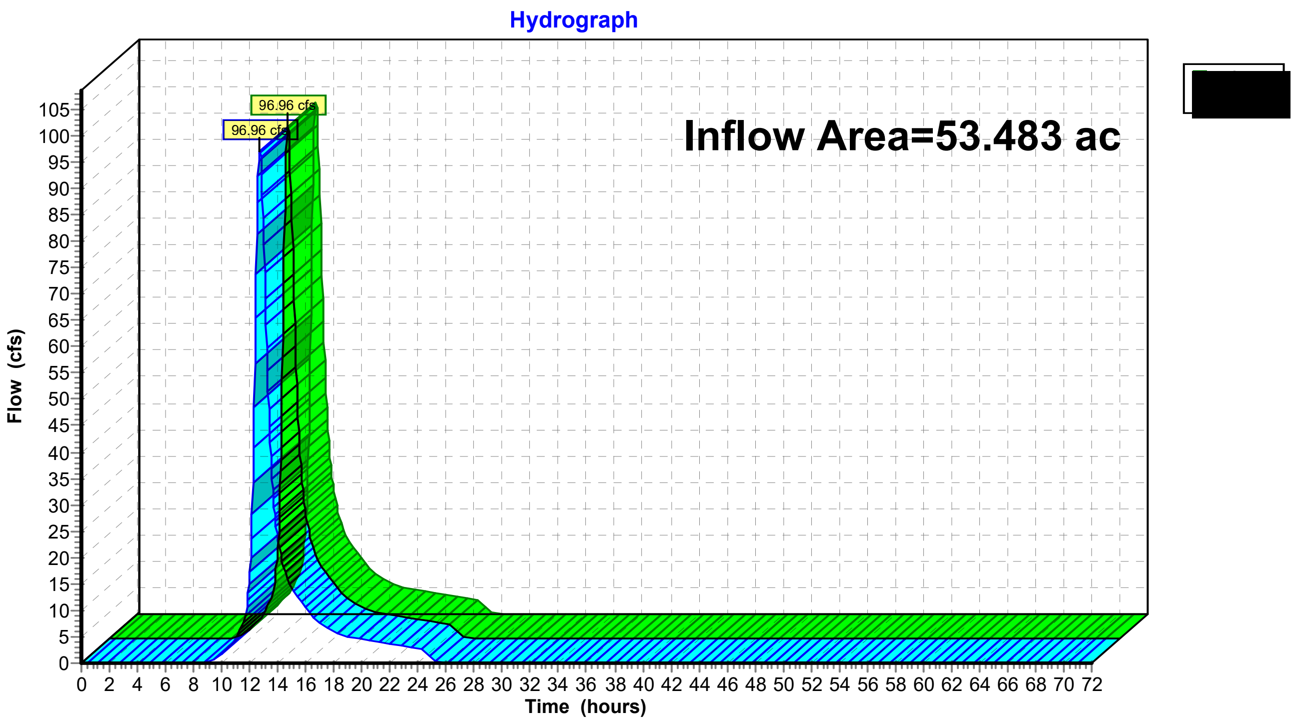
Summary for Reach DP-3: Off-Site East

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	53.483 ac,	9.84% Impervious, Inflow Depth = 3.64"	for 100-year event	
Inflow =	96.96 cfs @	12.73 hrs, Volume=	16.221 af	
Outflow =	96.96 cfs @	12.73 hrs, Volume=	16.221 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-3: Off-Site East



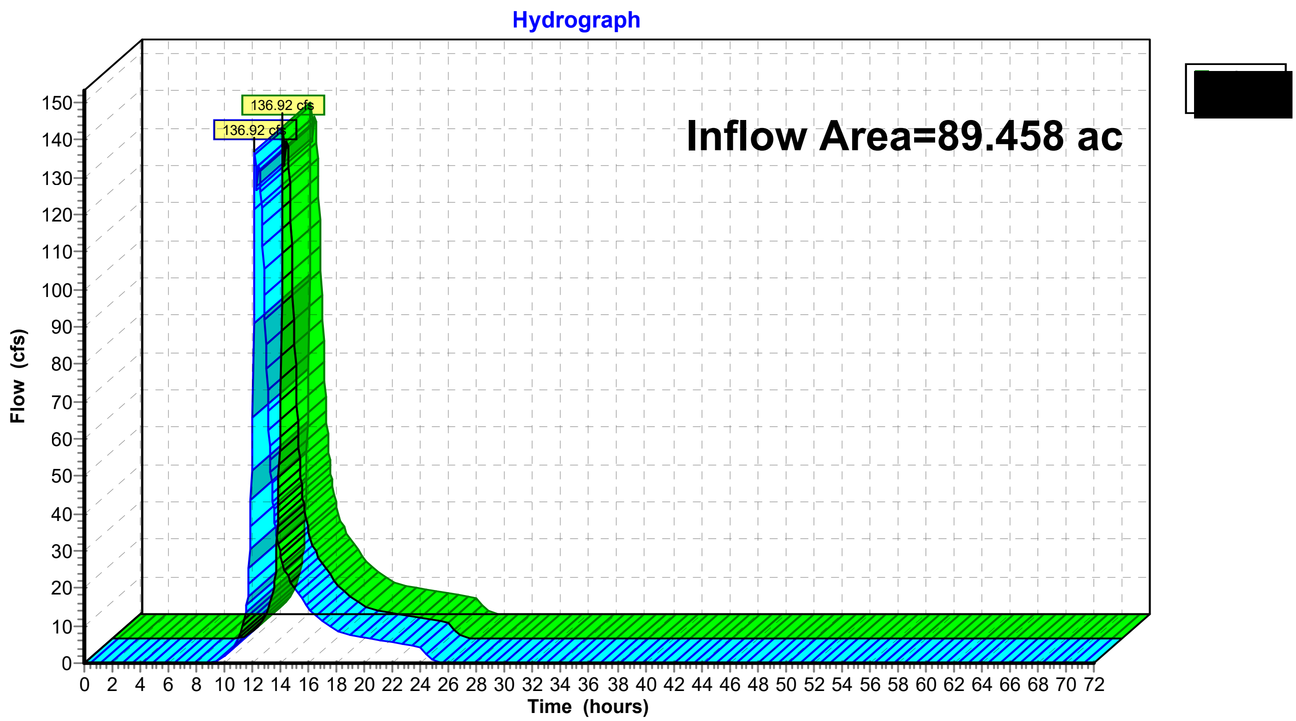
Summary for Reach DP-4: Off-Site Southeast

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 89.458 ac, 5.39% Impervious, Inflow Depth = 3.19" for 100-year event
Inflow = 136.92 cfs @ 12.17 hrs, Volume= 23.787 af
Outflow = 136.92 cfs @ 12.17 hrs, Volume= 23.787 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-4: Off-Site Southeast



Summary for Pond 2P: Existing Depression

Inflow Area =	5.349 ac,	0.00% Impervious, Inflow Depth = 1.11"	for 100-year event	
Inflow =	3.98 cfs @	12.22 hrs, Volume=	0.495 af	
Outflow =	0.46 cfs @	15.61 hrs, Volume=	0.495 af,	Atten= 88%, Lag= 203.6 min
Discarded =	0.46 cfs @	15.61 hrs, Volume=	0.495 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 168.68' @ 15.61 hrs Surf.Area= 19,586 sf Storage= 8,932 cf

Plug-Flow detention time= 252.4 min calculated for 0.494 af (100% of inflow)
Center-of-Mass det. time= 252.4 min (1,163.2 - 910.8)

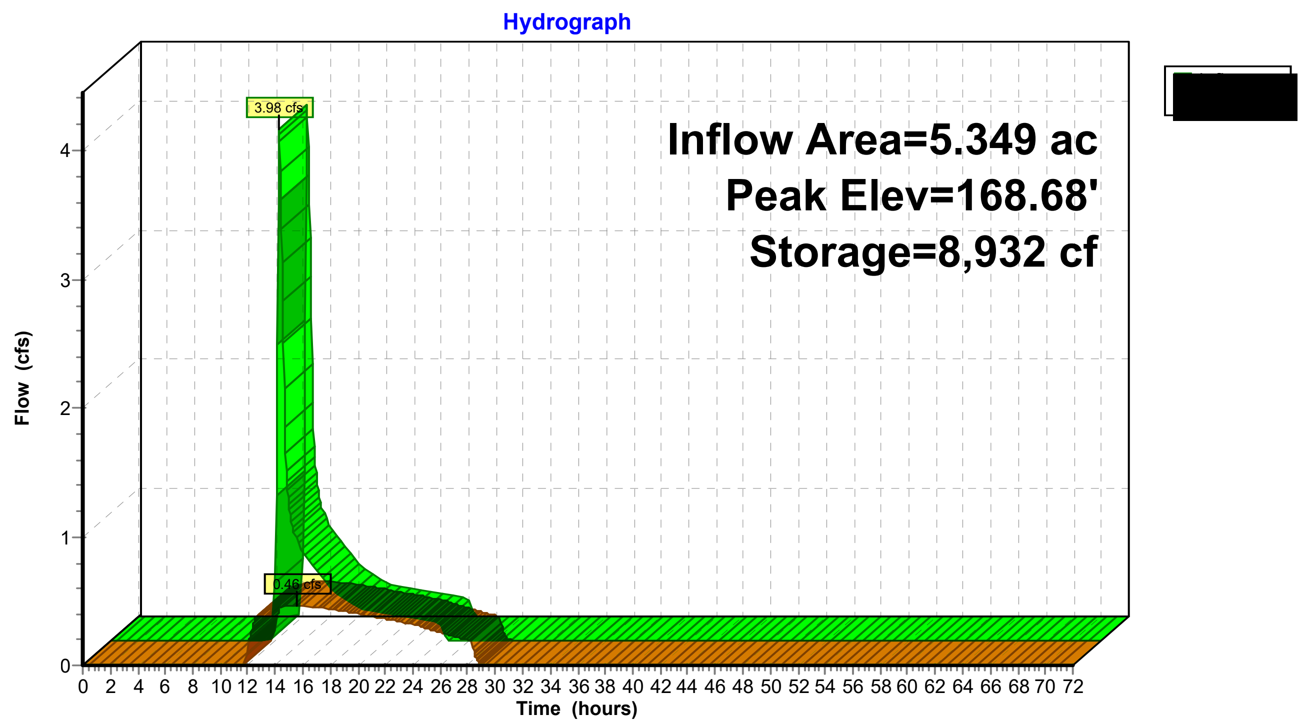
Volume	Invert	Avail.Storage	Storage Description
#1	168.00'	58,289 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
168.00	7,570	407.0	0	0	7,570
170.00	58,771	1,048.0	58,289	58,289	81,803

Device	Routing	Invert	Outlet Devices
#1	Discarded	168.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.46 cfs @ 15.61 hrs HW=168.68' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.46 cfs)

Pond 2P: Existing Depression



Summary for Pond 3P: Existing Depression

Inflow Area = 31.802 ac, 3.69% Impervious, Inflow Depth = 3.54" for 100-year event
Inflow = 56.51 cfs @ 12.72 hrs, Volume= 9.369 af
Outflow = 16.45 cfs @ 13.78 hrs, Volume= 8.989 af, Atten= 71%, Lag= 63.8 min
Discarded = 1.66 cfs @ 13.78 hrs, Volume= 6.050 af
Primary = 14.79 cfs @ 13.78 hrs, Volume= 2.939 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 191.19' @ 13.78 hrs Surf.Area= 70,166 sf Storage= 217,532 cf

Plug-Flow detention time= 954.2 min calculated for 8.989 af (96% of inflow)
Center-of-Mass det. time= 931.5 min (1,805.2 - 873.6)

Volume	Invert	Avail.Storage	Storage Description
#1	186.00'	277,396 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

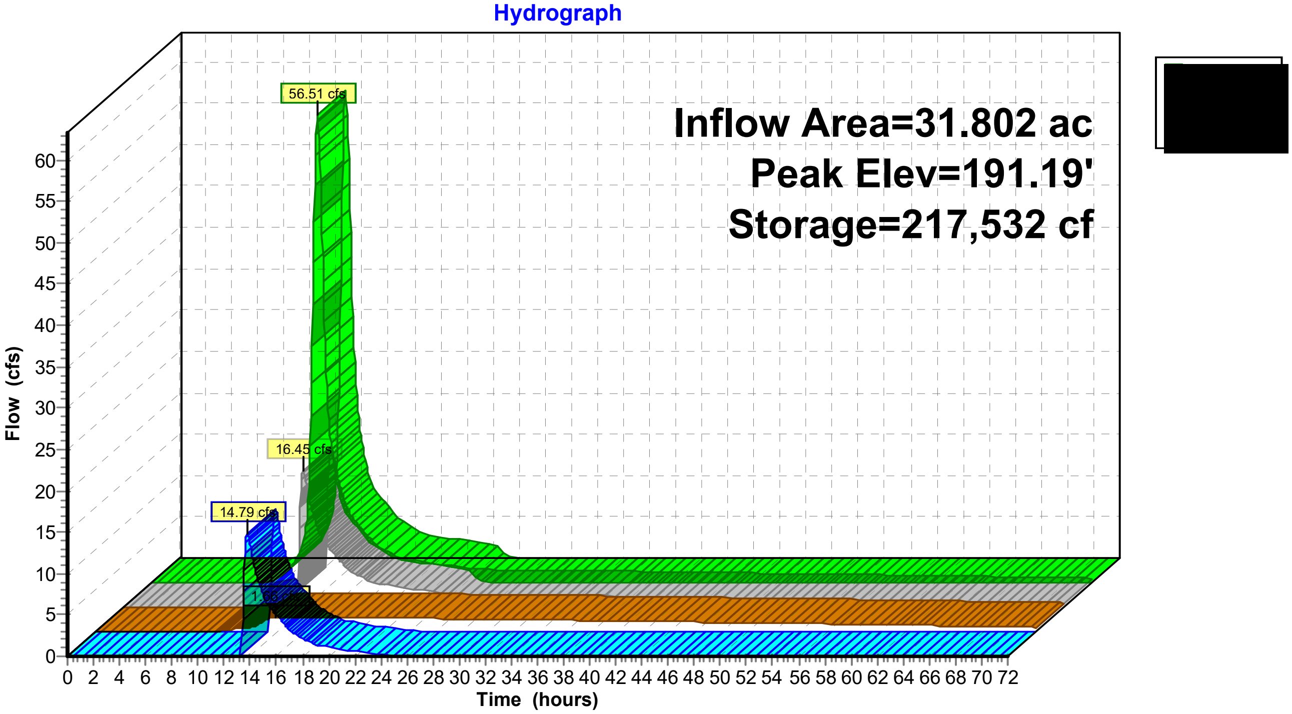
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
186.00	11,737	422.0	0	0	11,737
188.00	36,683	753.0	46,113	46,113	42,709
190.00	58,742	1,001.0	94,563	140,677	77,369
192.00	78,452	1,254.0	136,720	277,396	122,825

Device	Routing	Invert	Outlet Devices
#1	Discarded	186.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	191.00'	**64.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=1.66 cfs @ 13.78 hrs HW=191.19' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 1.66 cfs)

Primary OutFlow Max=14.63 cfs @ 13.78 hrs HW=191.19' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 14.63 cfs @ 1.18 fps)

Pond 3P: Existing Depression



Summary for Pond 4P: Existing Depression

Inflow Area = 16.464 ac, 0.65% Impervious, Inflow Depth = 4.71" for 100-year event
Inflow = 69.69 cfs @ 12.19 hrs, Volume= 6.465 af
Outflow = 1.75 cfs @ 18.09 hrs, Volume= 5.602 af, Atten= 97%, Lag= 354.1 min
Discarded = 1.75 cfs @ 18.09 hrs, Volume= 5.602 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 168.69' @ 18.09 hrs Surf.Area= 74,143 sf Storage= 213,410 cf

Plug-Flow detention time= 1,361.5 min calculated for 5.602 af (87% of inflow)
Center-of-Mass det. time= 1,302.0 min (2,115.4 - 813.4)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	1,773,203 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

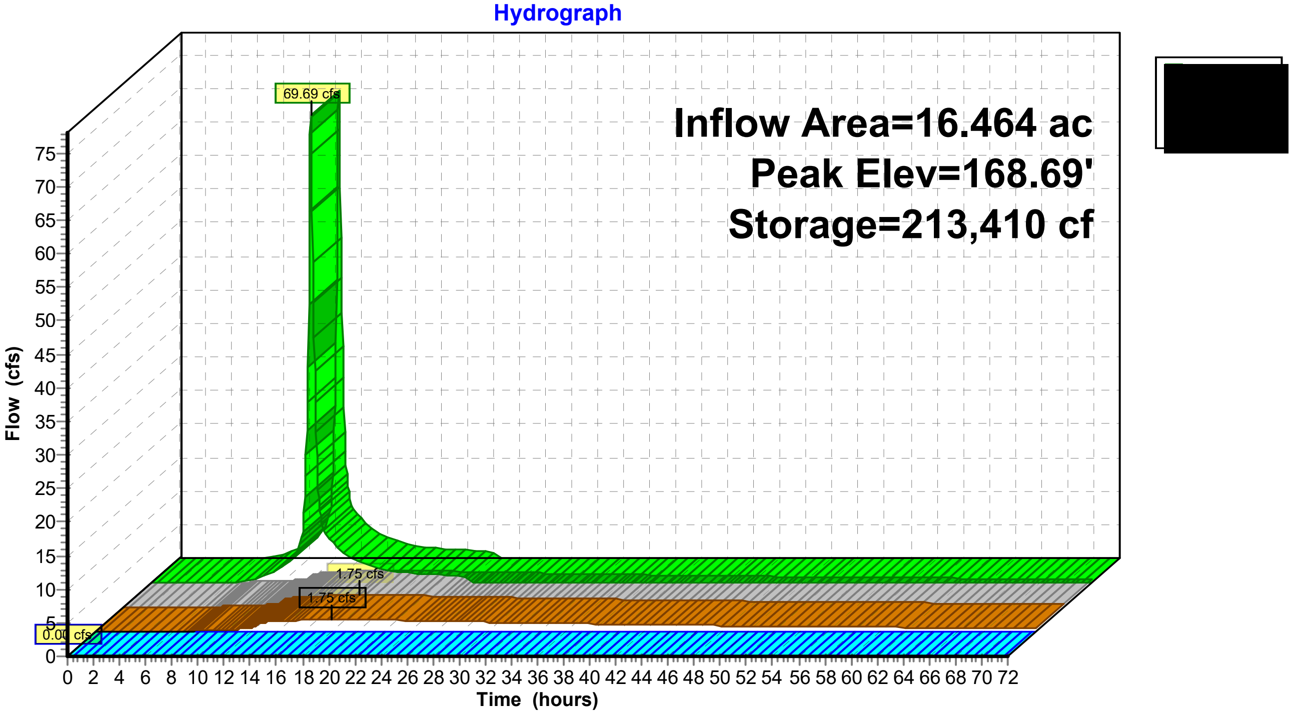
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
162.00	8,040	387.0	0	0	8,040
164.00	20,064	890.0	27,203	27,203	59,171
166.00	31,393	894.0	51,036	78,239	61,043
168.00	59,552	1,582.0	89,455	167,695	196,625
170.00	106,611	3,162.0	163,895	331,590	793,118
172.00	142,449	3,012.0	248,196	579,786	867,073
174.00	182,259	2,708.0	323,891	903,678	1,005,567
176.00	222,778	3,083.0	404,360	1,308,037	1,178,477
178.00	242,528	3,031.0	465,166	1,773,203	1,204,505

Device	Routing	Invert	Outlet Devices
#1	Discarded	162.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	177.00'	**23.0' long x 99.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=1.75 cfs @ 18.09 hrs HW=168.69' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 1.75 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=162.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: Existing Depression



Summary for Pond 5P: Existing Depression

Inflow Area = 68.433 ac, 22.71% Impervious, Inflow Depth = 3.21" for 100-year event
Inflow = 99.66 cfs @ 12.80 hrs, Volume= 18.304 af
Outflow = 98.75 cfs @ 12.86 hrs, Volume= 16.711 af, Atten= 1%, Lag= 3.4 min
Discarded = 0.26 cfs @ 12.86 hrs, Volume= 1.099 af
Primary = 98.49 cfs @ 12.86 hrs, Volume= 15.612 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 167.89' @ 12.86 hrs Surf.Area= 41,617 sf Storage= 129,896 cf

Plug-Flow detention time= 169.8 min calculated for 16.699 af (91% of inflow)
Center-of-Mass det. time= 128.2 min (1,014.2 - 886.0)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	134,374 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

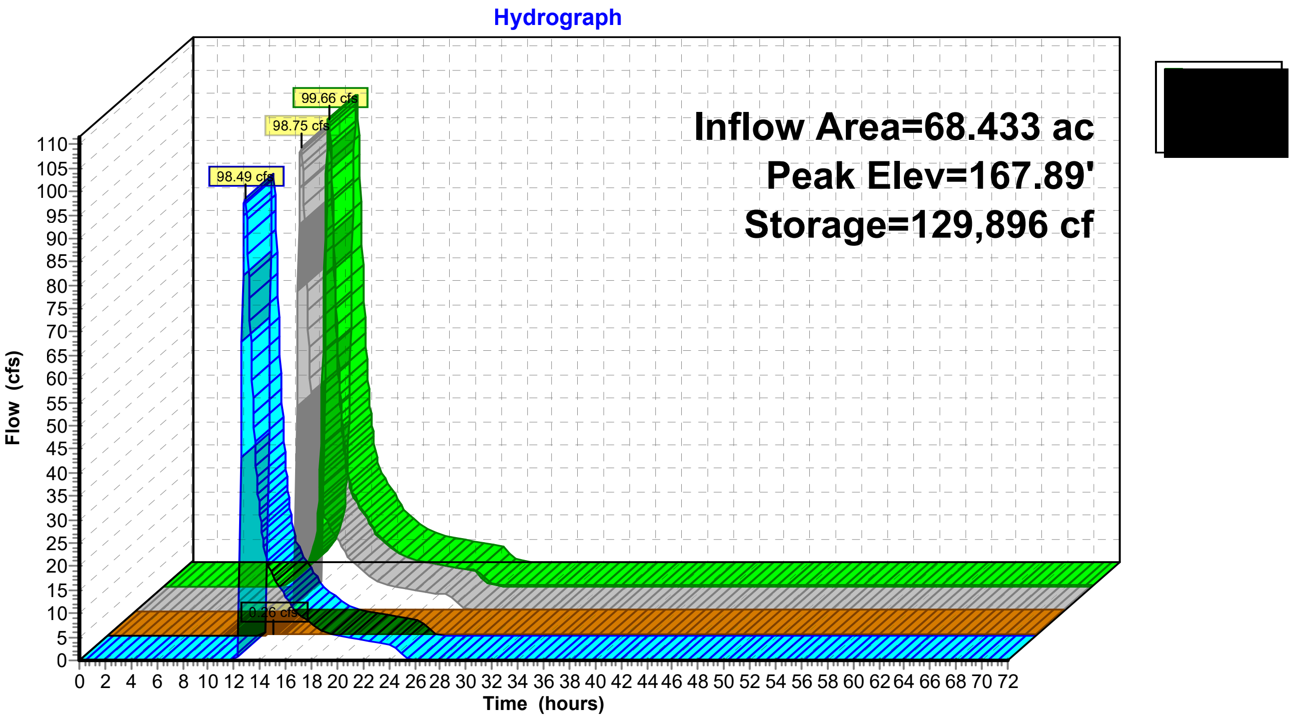
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
162.00	1,686	164.0	0	0	1,686
164.00	17,454	653.0	16,376	16,376	33,489
166.00	29,548	840.0	46,474	62,851	55,756
168.00	42,358	938.0	71,523	134,374	69,736

Device	Routing	Invert	Outlet Devices
#1	Discarded	162.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	167.25'	**71.0' long x 38.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.26 cfs @ 12.86 hrs HW=167.89' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.26 cfs)

Primary OutFlow Max=98.33 cfs @ 12.86 hrs HW=167.89' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 98.33 cfs @ 2.15 fps)

Pond 5P: Existing Depression



Summary for Pond 6P: Existing Wetland

Inflow Area = 116.132 ac, 22.20% Impervious, Inflow Depth = 2.35" for 100-year event
Inflow = 122.30 cfs @ 12.82 hrs, Volume= 22.712 af
Outflow = 99.21 cfs @ 13.16 hrs, Volume= 19.493 af, Atten= 19%, Lag= 20.2 min
Discarded = 0.48 cfs @ 13.16 hrs, Volume= 2.093 af
Primary = 98.73 cfs @ 13.16 hrs, Volume= 17.400 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 141.45' @ 13.16 hrs Surf.Area= 121,139 sf Storage= 260,446 cf

Plug-Flow detention time= 273.7 min calculated for 19.479 af (86% of inflow)
Center-of-Mass det. time= 212.3 min (1,119.0 - 906.8)

Volume	Invert	Avail.Storage	Storage Description
#1	138.00'	330,471 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

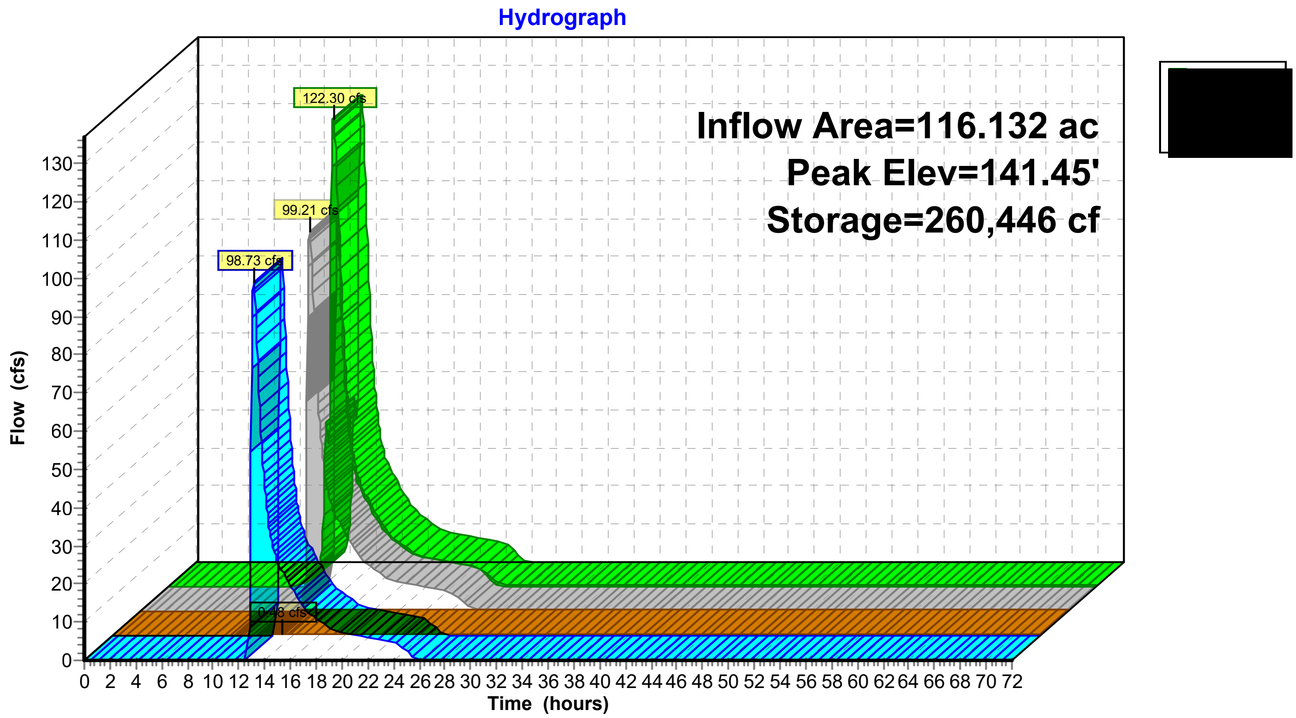
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
138.00	23,460	686.0	0	0	23,460
140.00	91,023	1,816.0	107,129	107,129	248,460
142.00	133,681	2,277.0	223,342	330,471	398,668

Device	Routing	Invert	Outlet Devices
#1	Discarded	138.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	141.00'	**121.0' long x 19.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.48 cfs @ 13.16 hrs HW=141.45' (Free Discharge)
└—**1=Exfiltration** (Exfiltration Controls 0.48 cfs)

Primary OutFlow Max=98.44 cfs @ 13.16 hrs HW=141.45' (Free Discharge)
└—**2=Broad-Crested Rectangular Weir** (Weir Controls 98.44 cfs @ 1.81 fps)

Pond 6P: Existing Wetland



Summary for Pond 7P: Existing Depression

[93] Warning: Storage range exceeded by 0.31'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=13)

Inflow Area = 78.568 ac, 13.25% Impervious, Inflow Depth = 1.27" for 100-year event
Inflow = 26.08 cfs @ 13.56 hrs, Volume= 8.328 af
Outflow = 28.55 cfs @ 13.60 hrs, Volume= 8.328 af, Atten= 0%, Lag= 2.2 min
Discarded = 1.37 cfs @ 13.30 hrs, Volume= 1.894 af
Primary = 27.17 cfs @ 13.60 hrs, Volume= 6.434 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 148.31' @ 13.60 hrs Surf.Area= 24,633 sf Storage= 32,409 cf

Plug-Flow detention time= 70.2 min calculated for 8.328 af (100% of inflow)
Center-of-Mass det. time= 70.2 min (1,053.8 - 983.6)

Volume	Invert	Avail.Storage	Storage Description
#1	146.00'	32,409 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

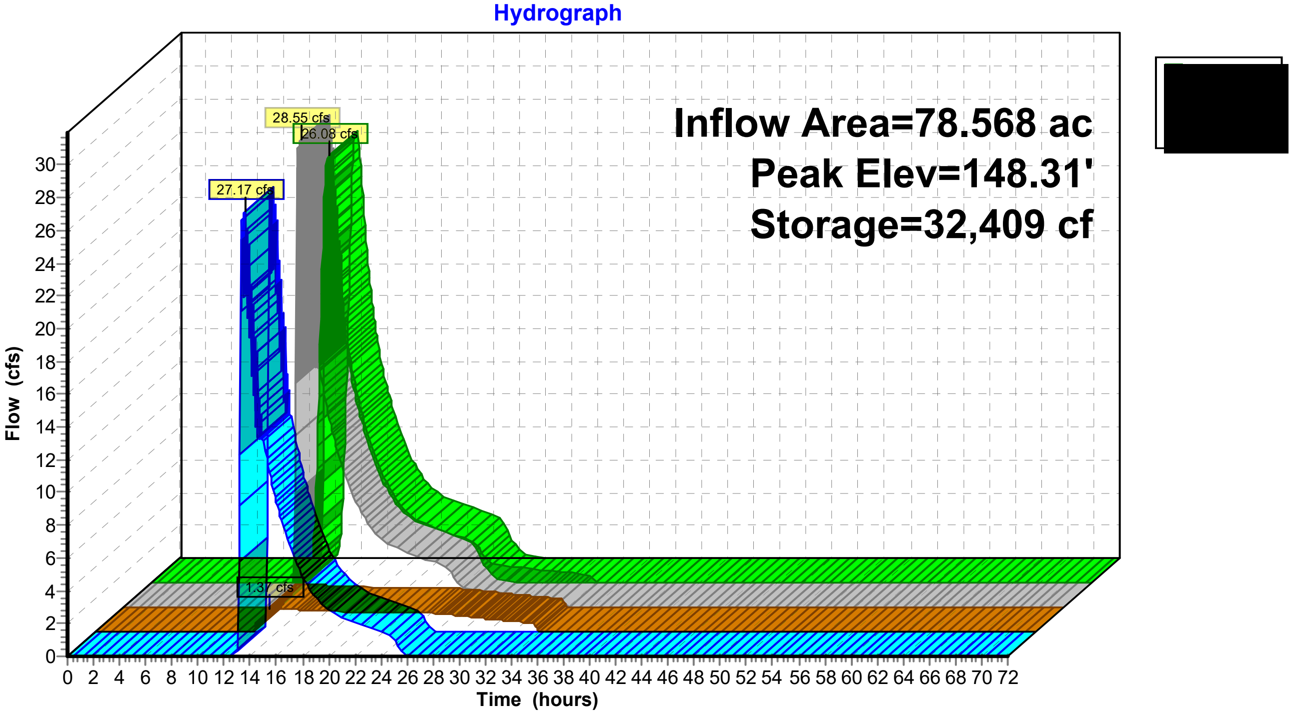
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
146.00	9,050	771.0	0	0	9,050
148.00	24,633	1,236.0	32,409	32,409	83,343

Device	Routing	Invert	Outlet Devices
#1	Primary	147.50'	**14.0' long x 90.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	146.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.37 cfs @ 13.30 hrs HW=148.28' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 1.37 cfs)

Primary OutFlow Max=27.15 cfs @ 13.60 hrs HW=148.31' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 27.15 cfs @ 2.38 fps)

Pond 7P: Existing Depression



Summary for Pond 8P: Existing Wetland

Inflow Area = 8.135 ac, 26.48% Impervious, Inflow Depth = 4.38" for 100-year event
Inflow = 26.18 cfs @ 12.32 hrs, Volume= 2.972 af
Outflow = 1.93 cfs @ 15.25 hrs, Volume= 1.634 af, Atten= 93%, Lag= 175.7 min
Discarded = 0.25 cfs @ 15.25 hrs, Volume= 1.095 af
Primary = 1.68 cfs @ 15.25 hrs, Volume= 0.539 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 231.53' @ 15.25 hrs Surf.Area= 64,285 sf Storage= 96,168 cf

Plug-Flow detention time= 1,240.6 min calculated for 1.634 af (55% of inflow)
Center-of-Mass det. time= 1,130.5 min (1,960.1 - 829.7)

Volume	Invert	Avail.Storage	Storage Description
#1	228.00'	130,034 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

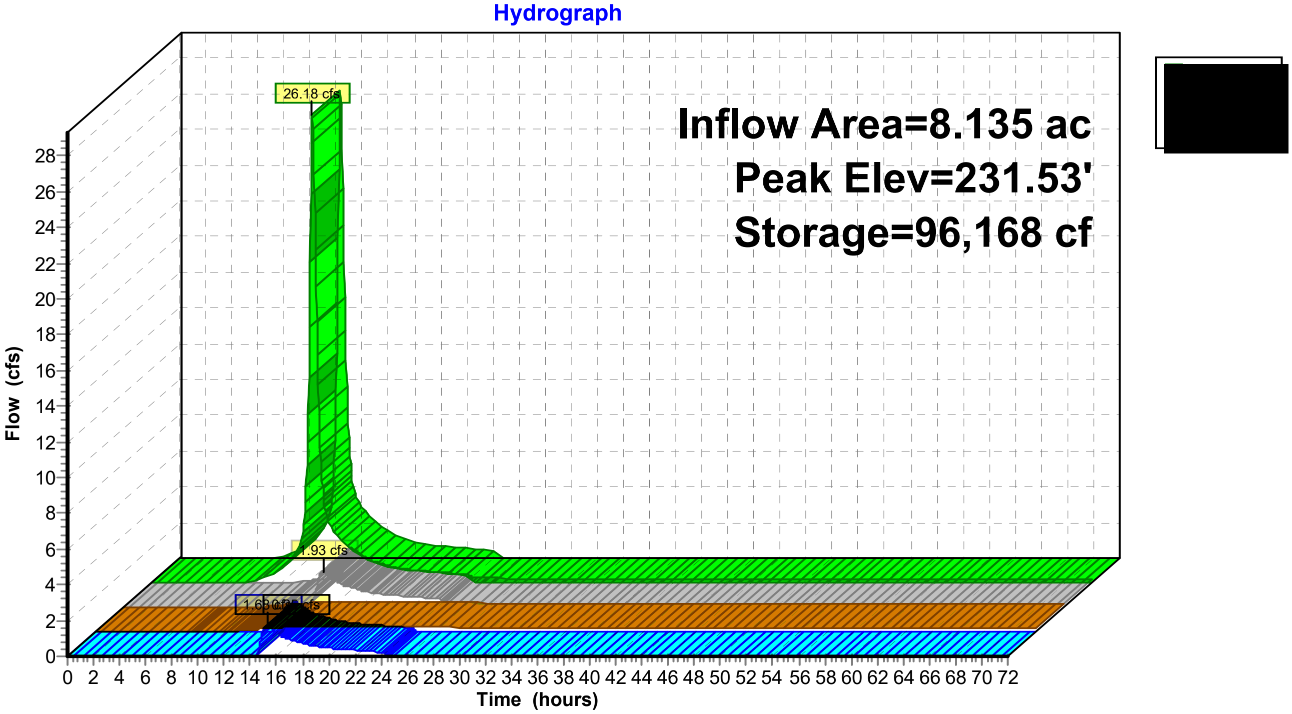
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
228.00	5,806	459.0	0	0	5,806
230.00	25,974	862.0	29,374	29,374	48,191
232.00	79,559	1,189.0	100,661	130,034	101,601

Device	Routing	Invert	Outlet Devices
#1	Discarded	228.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	231.50'	**119.0' long x 196.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.25 cfs @ 15.25 hrs HW=231.53' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=1.51 cfs @ 15.25 hrs HW=231.53' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 1.51 cfs @ 0.45 fps)

Pond 8P: Existing Wetland



Summary for Pond 9P: Existing Wetland

Inflow Area = 83.042 ac, 24.98% Impervious, Inflow Depth = 2.84" for 100-year event
Inflow = 107.83 cfs @ 12.83 hrs, Volume= 19.665 af
Outflow = 107.79 cfs @ 12.84 hrs, Volume= 19.665 af, Atten= 0%, Lag= 0.7 min
Discarded = 0.02 cfs @ 12.84 hrs, Volume= 0.014 af
Primary = 107.77 cfs @ 12.84 hrs, Volume= 19.651 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 149.20' @ 12.84 hrs Surf.Area= 5,767 sf Storage= 4,572 cf

Plug-Flow detention time= 0.8 min calculated for 19.652 af (100% of inflow)
Center-of-Mass det. time= 0.8 min (901.5 - 900.7)

Volume	Invert	Avail.Storage	Storage Description
#1	148.00'	834,530 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

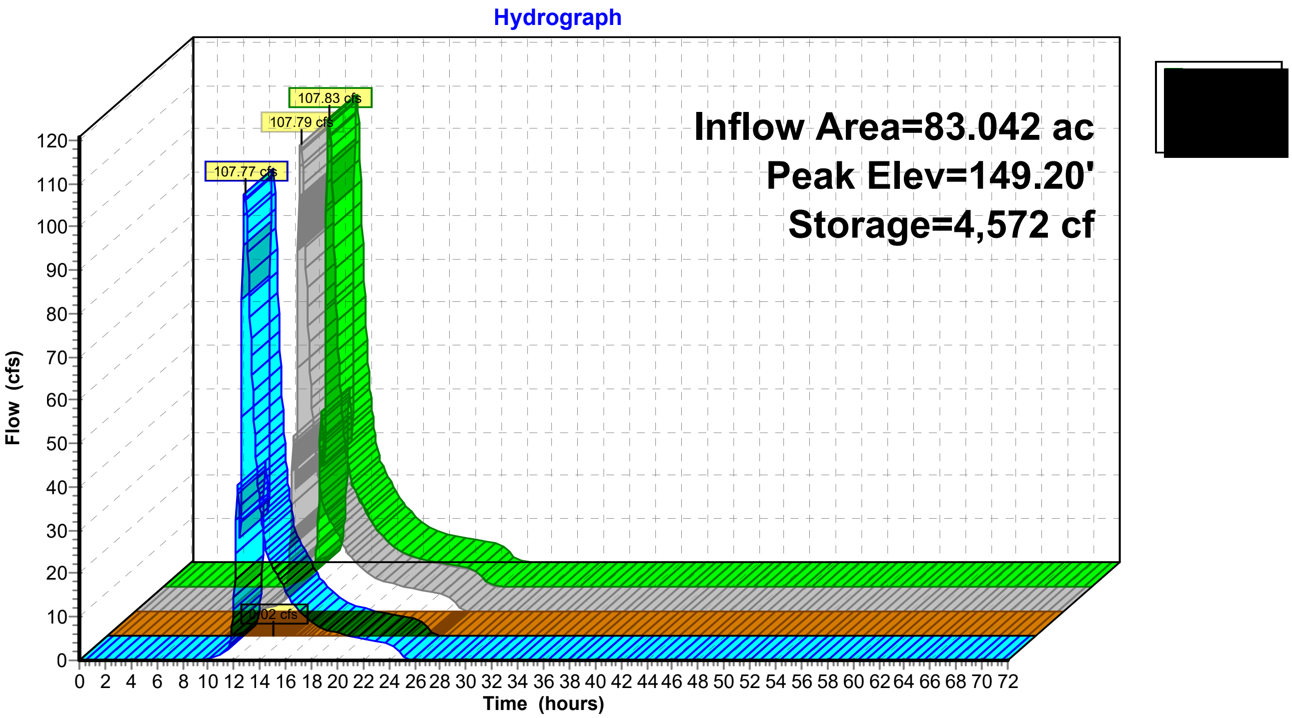
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
148.00	2,138	180.0	0	0	2,138
150.00	9,156	387.0	10,479	10,479	11,495
152.00	135,719	2,199.0	120,084	130,563	384,391
154.00	178,250	2,327.0	313,004	443,567	430,714
156.00	213,235	2,588.0	390,963	834,530	532,915

Device	Routing	Invert	Outlet Devices
#1	Discarded	148.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	148.00'	**31.0' long x 49.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

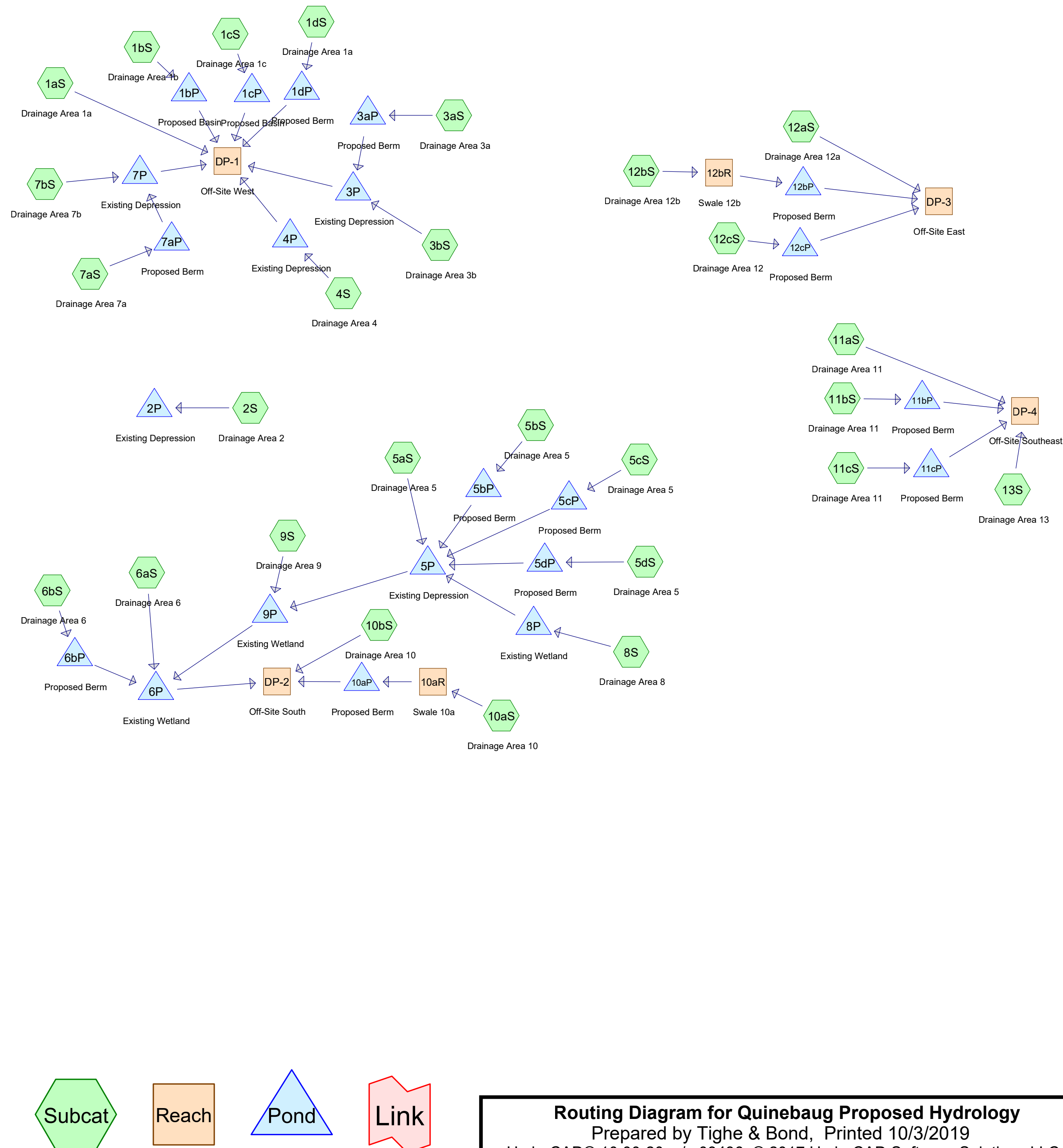
Discarded OutFlow Max=0.02 cfs @ 12.84 hrs HW=149.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=107.66 cfs @ 12.84 hrs HW=149.20' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 107.66 cfs @ 2.89 fps)

Pond 9P: Existing Wetland



Long-Term Proposed Conditions Hydrology



Routing Diagram for Quinebaug Proposed Hydrology
Prepared by Tighe & Bond, Printed 10/3/2019

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.091	98	Basin (1bS, 1cS, 1dS, 5bS, 5cS, 5dS, 6bS, 10aS, 12bS, 12cS)
0.274	98	Equipment pad (1aS, 1dS, 3aS, 5aS, 5dS, 6bS, 7bS, 11aS, 12bS)
37.634	70	Gravel pit, HSG A (1aS, 2S, 3bS, 4S, 5aS, 7aS, 7bS, 13S)
15.848	81	Gravel pit, HSG B (3bS, 4S, 7aS, 7bS, 13S)
3.095	88	Gravel pit, HSG C (4S)
8.951	96	Gravel road (1aS, 1cS, 1dS, 2S, 3aS, 5aS, 5dS, 6aS, 6bS, 7aS, 7bS, 8S, 9S, 10aS, 10bS, 11aS, 11bS, 11cS, 12aS, 12bS, 12cS)
64.972	30	Meadow, non-grazed, HSG A (1aS, 1bS, 2S, 5aS, 6aS, 6bS, 7aS, 7bS, 9S, 10bS, 11aS, 11bS, 11cS, 12aS, 13S)
28.106	58	Meadow, non-grazed, HSG B (1aS, 1bS, 2S, 3bS, 5aS, 5bS, 5cS, 6bS, 7bS, 9S, 10aS, 10bS, 11aS, 12aS)
133.456	71	Meadow, non-grazed, HSG C (1aS, 1cS, 1dS, 3aS, 3bS, 5aS, 5bS, 5cS, 5dS, 8S, 9S, 10aS, 10bS, 11aS, 11bS, 11cS, 12aS, 12bS, 12cS)
8.959	78	Meadow, non-grazed, HSG D (5aS, 5cS, 8S, 10bS, 11aS, 12aS)
2.562	98	Panels (1aS, 1bS, 1cS, 1dS, 2S, 3aS, 5aS, 5bS, 5cS, 5dS, 6bS, 7aS, 7bS, 9S, 10aS, 11bS, 11cS, 12aS, 12bS)
1.154	98	Paved (1aS, 1cS, 1dS)
0.184	98	Structure (11aS)
60.186	98	Water body (1aS, 1cS, 3bS, 4S, 5aS, 5cS, 6aS, 7bS, 8S, 9S, 10bS, 11aS, 12aS, 13S)
56.762	30	Woods, Good, HSG A (1aS, 2S, 3bS, 6aS, 7bS, 9S, 10bS, 11aS, 12aS)
55.096	55	Woods, Good, HSG B (1aS, 3bS, 4S, 5aS, 5cS, 6aS, 7bS, 8S, 9S, 10aS, 10bS, 11aS, 12aS)
41.631	70	Woods, Good, HSG C (1aS, 1cS, 1dS, 3bS, 4S, 5aS, 5cS, 8S, 9S, 10aS, 10bS, 11aS, 12aS)
8.287	77	Woods, Good, HSG D (1aS, 3bS, 4S, 5aS, 5cS, 8S, 10bS, 11aS, 12aS)
533.249	**64**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
159.369	HSG A	1aS, 1bS, 2S, 3bS, 4S, 5aS, 6aS, 6bS, 7aS, 7bS, 9S, 10bS, 11aS, 11bS, 11cS, 12aS, 13S
99.050	HSG B	1aS, 1bS, 2S, 3bS, 4S, 5aS, 5bS, 5cS, 6aS, 6bS, 7aS, 7bS, 8S, 9S, 10aS, 10bS, 11aS, 12aS, 13S
178.182	HSG C	1aS, 1cS, 1dS, 3aS, 3bS, 4S, 5aS, 5bS, 5cS, 5dS, 8S, 9S, 10aS, 10bS, 11aS, 11bS, 11cS, 12aS, 12bS, 12cS
17.246	HSG D	1aS, 3bS, 4S, 5aS, 5cS, 8S, 10bS, 11aS, 12aS
79.402	Other	1aS, 1bS, 1cS, 1dS, 2S, 3aS, 3bS, 4S, 5aS, 5bS, 5cS, 5dS, 6aS, 6bS, 7aS, 7bS, 8S, 9S, 10aS, 10bS, 11aS, 11bS, 11cS, 12aS, 12bS, 12cS, 13S
533.249		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	6.091	6.091	Basin	1bS, 1cS, 1dS, 5bS, 5cS, 5dS, 6bS, 10aS, 12bS, 12cS
0.000	0.000	0.000	0.000	0.274	0.274	Equipment pad	1aS, 1dS, 3aS, 5aS, 5dS, 6bS, 7bS, 11aS, 12bS
37.634	15.848	3.095	0.000	0.000	56.577	Gravel pit	1aS, 2S, 3bS, 4S, 5aS, 7aS, 7bS, 13S
0.000	0.000	0.000	0.000	8.951	8.951	Gravel road	1aS, 1cS, 1dS, 2S, 3aS, 5aS, 5dS, 6aS, 6bS, 7aS, 7bS, 8S, 9S, 10aS, 10bS, 11aS, 11bS, 11cS, 12aS, 12bS, 12cS
64.972	28.106	133.456	8.959	0.000	235.493	Meadow, non-grazed	1aS, 1bS, 1cS, 1dS, 2S, 3aS, 3bS, 5aS, 5bS, 5cS, 5dS, 6aS, 6bS, 7aS, 7bS, 8S, 9S, 10aS, 10bS, 11aS, 11bS, 11cS, 12aS, 12bS, 12cS, 13S
0.000	0.000	0.000	0.000	2.562	2.562	Panels	1aS, 1bS, 1cS, 1dS, 2S, 3aS, 5aS, 5bS, 5cS, 5dS, 6bS, 7aS, 7bS, 9S, 10aS, 11bS, 11cS, 12aS,

Ground Covers (all nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	1.154	1.154	Paved	1aS, 1cS, 1dS
0.000	0.000	0.000	0.000	0.184	0.184	Structure	11aS
0.000	0.000	0.000	0.000	60.186	60.186	Water body	1aS, 1cS, 3bS, 4S, 5aS, 5cS, 6aS, 7bS, 8S, 9S, 10bS, 11aS, 12aS, 13S
56.762	55.096	41.631	8.287	0.000	161.776	Woods, Good	1aS, 1cS, 1dS, 2S, 3bS, 4S, 5aS, 5cS, 6aS, 7bS, 8S, 9S, 10aS, 10bS, 11aS, 12aS
159.369	**99.050**	**178.182**	**17.246**	**79.402**	**533.249**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1aS: Drainage Area 1a Runoff Area=3,964,196 sf 11.60% Impervious Runoff Depth=0.37"
Flow Length=4,424' Tc=105.4 min CN=59 Runoff=7.10 cfs 2.837 af

Subcatchment1bS: Drainage Area 1b Runoff Area=146,589 sf 28.06% Impervious Runoff Depth=0.11"
Flow Length=342' Tc=9.9 min CN=49 Runoff=0.05 cfs 0.030 af

Subcatchment1cS: Drainage Area 1c Runoff Area=408,420 sf 8.65% Impervious Runoff Depth=0.98"
Flow Length=1,734' Tc=30.4 min CN=73 Runoff=5.66 cfs 0.768 af

Subcatchment1dS: Drainage Area 1a Runoff Area=341,088 sf 7.37% Impervious Runoff Depth=1.04"
Flow Length=4,424' Tc=105.4 min CN=74 Runoff=2.43 cfs 0.677 af

Subcatchment2S: Drainage Area 2 Runoff Area=233,007 sf 1.98% Impervious Runoff Depth=0.07"
Flow Length=289' Tc=12.1 min CN=47 Runoff=0.05 cfs 0.033 af

Subcatchment3aS: Drainage Area 3a Runoff Area=359,815 sf 3.27% Impervious Runoff Depth=0.98"
Flow Length=794' Tc=19.3 min CN=73 Runoff=6.03 cfs 0.677 af

Subcatchment3bS: Drainage Area 3b Runoff Area=1,022,537 sf 4.99% Impervious Runoff Depth=0.83"
Flow Length=1,119' Tc=14.7 min CN=70 Runoff=15.24 cfs 1.620 af

Subcatchment4S: Drainage Area 4 Runoff Area=717,184 sf 0.65% Impervious Runoff Depth=1.47"
Flow Length=974' Tc=13.9 min CN=81 Runoff=21.75 cfs 2.016 af

Subcatchment5aS: Drainage Area 5 Runoff Area=2,242,858 sf 25.20% Impervious Runoff Depth=0.93"
Flow Length=2,517' Tc=49.6 min CN=72 Runoff=22.64 cfs 3.989 af

Subcatchment5bS: Drainage Area 5 Runoff Area=52,534 sf 64.34% Impervious Runoff Depth=1.68"
Tc=6.0 min CN=84 Runoff=2.33 cfs 0.169 af

Subcatchment5cS: Drainage Area 5 Runoff Area=271,995 sf 13.40% Impervious Runoff Depth=0.93"
Flow Length=1,346' Tc=29.3 min CN=72 Runoff=3.58 cfs 0.484 af

Subcatchment5dS: Drainage Area 5 Runoff Area=59,233 sf 44.82% Impervious Runoff Depth=1.76"
Flow Length=157' Tc=9.1 min CN=85 Runoff=2.47 cfs 0.199 af

Subcatchment6aS: Drainage Area 6 Runoff Area=972,255 sf 22.55% Impervious Runoff Depth=0.07"
Flow Length=1,544' Tc=44.6 min CN=47 Runoff=0.21 cfs 0.136 af

Subcatchment6bS: Drainage Area 6 Runoff Area=469,126 sf 17.08% Impervious Runoff Depth=0.09"
Flow Length=549' Tc=19.6 min CN=48 Runoff=0.13 cfs 0.081 af

Subcatchment7aS: Drainage Area 7a Runoff Area=264,166 sf 2.54% Impervious Runoff Depth=0.00"
Flow Length=3,124' Tc=95.4 min CN=37 Runoff=0.00 cfs 0.000 af

Subcatchment7bS: Drainage Area 7b Runoff Area=3,158,253 sf 14.64% Impervious Runoff Depth=0.09"
Flow Length=3,232' Tc=99.9 min CN=48 Runoff=0.83 cfs 0.544 af

Subcatchment8S: Drainage Area 8 Runoff Area=354,352 sf 26.48% Impervious Runoff Depth=1.34"
Flow Length=883' Tc=23.6 min CN=79 Runoff=7.84 cfs 0.906 af

Subcatchment9S: Drainage Area 9 Runoff Area=636,379 sf 35.74% Impervious Runoff Depth=0.73"
Flow Length=601' Tc=17.1 min CN=68 Runoff=7.63 cfs 0.892 af

Subcatchment10aS: Drainage Area 10 Runoff Area=255,546 sf 13.96% Impervious Runoff Depth=0.98"
Flow Length=378' Tc=17.2 min CN=73 Runoff=4.49 cfs 0.480 af

Subcatchment10bS: Drainage Area 10 Runoff Area=1,072,278 sf 13.17% Impervious Runoff Depth=0.69"
Flow Length=1,752' Tc=40.2 min CN=67 Runoff=8.19 cfs 1.409 af

Subcatchment11aS: Drainage Area 11 Runoff Area=2,062,963 sf 10.23% Impervious Runoff Depth=0.78"
Flow Length=1,904' Tc=38.3 min CN=69 Runoff=19.13 cfs 3.077 af

Subcatchment11bS: Drainage Area 11 Runoff Area=234,184 sf 1.97% Impervious Runoff Depth=0.48"
Flow Length=1,011' Tc=16.2 min CN=62 Runoff=1.50 cfs 0.215 af

Subcatchment11cS: Drainage Area 11 Runoff Area=190,846 sf 1.10% Impervious Runoff Depth=0.64"
Flow Length=957' Tc=14.0 min CN=66 Runoff=2.03 cfs 0.235 af

Subcatchment12aS: Drainage Area 12a Runoff Area=1,702,429 sf 14.03% Impervious Runoff Depth=0.98"
Flow Length=1,596' Tc=44.7 min CN=73 Runoff=19.51 cfs 3.201 af

Subcatchment12bS: Drainage Area 12b Runoff Area=484,189 sf 7.70% Impervious Runoff Depth=1.04"
Flow Length=902' Tc=14.5 min CN=74 Runoff=9.71 cfs 0.961 af

Subcatchment12cS: Drainage Area 12 Runoff Area=143,106 sf 8.38% Impervious Runoff Depth=1.09"
Tc=6.0 min CN=75 Runoff=3.97 cfs 0.299 af

Subcatchment13S: Drainage Area 13 Runoff Area=1,408,782 sf 0.05% Impervious Runoff Depth=0.64"
Flow Length=1,813' Tc=9.8 min CN=66 Runoff=17.07 cfs 1.733 af

Reach 10aR: Swale 10a Avg. Flow Depth=0.27' Max Vel=3.13 fps Inflow=4.49 cfs 0.480 af
n=0.030 L=736.0' S=0.0299 '/' Capacity=51.58 cfs Outflow=4.28 cfs 0.480 af

Reach 12bR: Swale 12b Avg. Flow Depth=0.44' Max Vel=3.61 fps Inflow=9.71 cfs 0.961 af
n=0.030 L=982.0' S=0.0234 '/' Capacity=45.66 cfs Outflow=9.01 cfs 0.961 af

Reach DP-1: Off-Site West Inflow=8.22 cfs 3.425 af
Outflow=8.22 cfs 3.425 af

Reach DP-2: Off-Site South Inflow=8.19 cfs 1.409 af
Outflow=8.19 cfs 1.409 af

Reach DP-3: Off-Site East Inflow=19.51 cfs 3.201 af
Outflow=19.51 cfs 3.201 af

Reach DP-4: Off-Site Southeast Inflow=26.63 cfs 4.810 af
Outflow=26.63 cfs 4.810 af

Pond 1bP: Proposed Basin Peak Elev=152.00' Storage=18 cf Inflow=0.05 cfs 0.030 af
Discarded=0.05 cfs 0.030 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.030 af

Pond 1cP: Proposed Basin Peak Elev=227.14' Storage=10,637 cf Inflow=5.66 cfs 0.768 af
Discarded=0.08 cfs 0.283 af Primary=3.31 cfs 0.485 af Outflow=3.38 cfs 0.768 af

Pond 1dP: Proposed Berm Peak Elev=257.55' Storage=21,001 cf Inflow=2.43 cfs 0.677 af
Discarded=0.10 cfs 0.438 af Primary=0.26 cfs 0.104 af Outflow=0.36 cfs 0.542 af

Pond 2P: Existing Depression Peak Elev=168.01' Storage=43 cf Inflow=0.05 cfs 0.033 af
Outflow=0.05 cfs 0.033 af

Pond 3aP: Proposed Berm Peak Elev=272.67' Storage=20,362 cf Inflow=6.03 cfs 0.677 af
Discarded=0.22 cfs 0.677 af Primary=0.00 cfs 0.000 af Outflow=0.22 cfs 0.677 af

Pond 3P: Existing Depression Peak Elev=187.90' Storage=42,410 cf Inflow=15.24 cfs 1.620 af
Discarded=0.83 cfs 1.620 af Primary=0.00 cfs 0.000 af Outflow=0.83 cfs 1.620 af

Pond 4P: Existing Depression Peak Elev=165.45' Storage=61,993 cf Inflow=21.75 cfs 2.016 af
Discarded=0.66 cfs 2.015 af Primary=0.00 cfs 0.000 af Outflow=0.66 cfs 2.015 af

Pond 5bP: Proposed Berm Peak Elev=230.67' Storage=3,384 cf Inflow=2.33 cfs 0.169 af
Discarded=0.19 cfs 0.169 af Primary=0.00 cfs 0.000 af Outflow=0.19 cfs 0.169 af

Pond 5cP: Proposed Berm Peak Elev=209.52' Storage=20,270 cf Inflow=3.58 cfs 0.484 af
Discarded=0.02 cfs 0.092 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.092 af

Pond 5dP: Proposed Berm Peak Elev=284.36' Storage=5,256 cf Inflow=2.47 cfs 0.199 af
Discarded=0.10 cfs 0.199 af Primary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.199 af

Pond 5P: Existing Depression Peak Elev=167.32' Storage=107,171 cf Inflow=22.64 cfs 3.989 af
Discarded=0.24 cfs 1.064 af Primary=3.79 cfs 1.343 af Outflow=4.02 cfs 2.407 af

Pond 6bP: Proposed Berm Peak Elev=164.00' Storage=46 cf Inflow=0.13 cfs 0.081 af
Discarded=0.13 cfs 0.081 af Primary=0.00 cfs 0.000 af Outflow=0.13 cfs 0.081 af

Pond 6P: Existing Wetland Peak Elev=139.81' Storage=91,037 cf Inflow=7.58 cfs 2.363 af
Discarded=0.33 cfs 1.333 af Primary=0.00 cfs 0.000 af Outflow=0.33 cfs 1.333 af

Pond 7aP: Proposed Berm Peak Elev=166.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 7P: Existing Depression Peak Elev=146.28' Storage=2,821 cf Inflow=0.83 cfs 0.544 af
Discarded=0.60 cfs 0.544 af Primary=0.00 cfs 0.000 af Outflow=0.60 cfs 0.544 af

Pond 8P: Existing Wetland Peak Elev=230.19' Storage=34,670 cf Inflow=7.84 cfs 0.906 af
Discarded=0.12 cfs 0.485 af Primary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.485 af

Pond 9P: Existing Wetland Peak Elev=148.20' Storage=476 cf Inflow=7.63 cfs 2.235 af
Discarded=0.01 cfs 0.008 af Primary=7.58 cfs 2.227 af Outflow=7.59 cfs 2.235 af

Pond 10aP: Proposed Berm Peak Elev=211.99' Storage=12,122 cf Inflow=4.28 cfs 0.480 af
Discarded=0.28 cfs 0.480 af Primary=0.00 cfs 0.000 af Outflow=0.28 cfs 0.480 af

Pond 11bP: Proposed Berm Peak Elev=220.02' Storage=488 cf Inflow=1.50 cfs 0.215 af
Discarded=1.36 cfs 0.215 af Primary=0.00 cfs 0.000 af Outflow=1.36 cfs 0.215 af

Pond 11cP: Proposed Berm Peak Elev=222.24' Storage=2,325 cf Inflow=2.03 cfs 0.235 af
Discarded=0.55 cfs 0.235 af Primary=0.00 cfs 0.000 af Outflow=0.55 cfs 0.235 af

Pond 12bP: Proposed Berm Peak Elev=252.57' Storage=35,755 cf Inflow=9.01 cfs 0.961 af
Discarded=0.14 cfs 0.630 af Primary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.630 af

Pond 12cP: Proposed Berm Peak Elev=252.14' Storage=10,963 cf Inflow=3.97 cfs 0.299 af
Discarded=0.05 cfs 0.208 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.208 af

Total Runoff Area = 533.249 ac Runoff Volume = 27.667 af Average Runoff Depth = 0.62"
86.79% Pervious = 462.798 ac 13.21% Impervious = 70.450 ac

Summary for Subcatchment 1aS: Drainage Area 1a

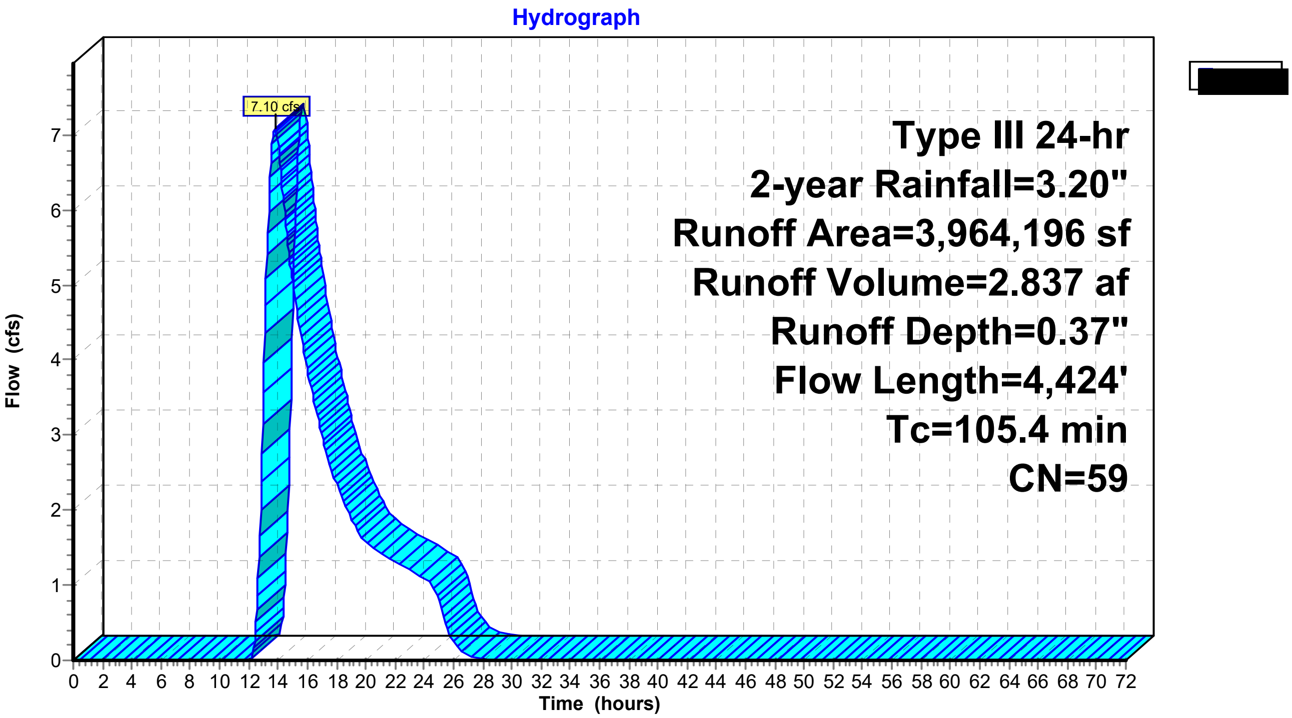
Runoff = 7.10 cfs @ 13.81 hrs, Volume= 2.837 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	482,442	30	Meadow, non-grazed, HSG A
	538,022	58	Meadow, non-grazed, HSG B
	942,184	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	515,616	30	Woods, Good, HSG A
	704,263	55	Woods, Good, HSG B
	225,155	70	Woods, Good, HSG C
	10,840	77	Woods, Good, HSG D
*	33,102	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	414,914	98	Water body
*	52,839	96	Gravel road
*	0	98	Structure
*	1,438	98	Panels
*	4,403	98	Equipment pad
*	38,978	98	Paved
	3,964,196	59	Weighted Average
	3,504,463		88.40% Pervious Area
	459,733		11.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
11.3	356	0.0110	0.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.1	433	0.0020	0.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.3	222	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.5	766	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
46.9	2,597	0.0340	0.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
105.4	4,424	Total			

Subcatchment 1aS: Drainage Area 1a



Summary for Subcatchment 1bS: Drainage Area 1b

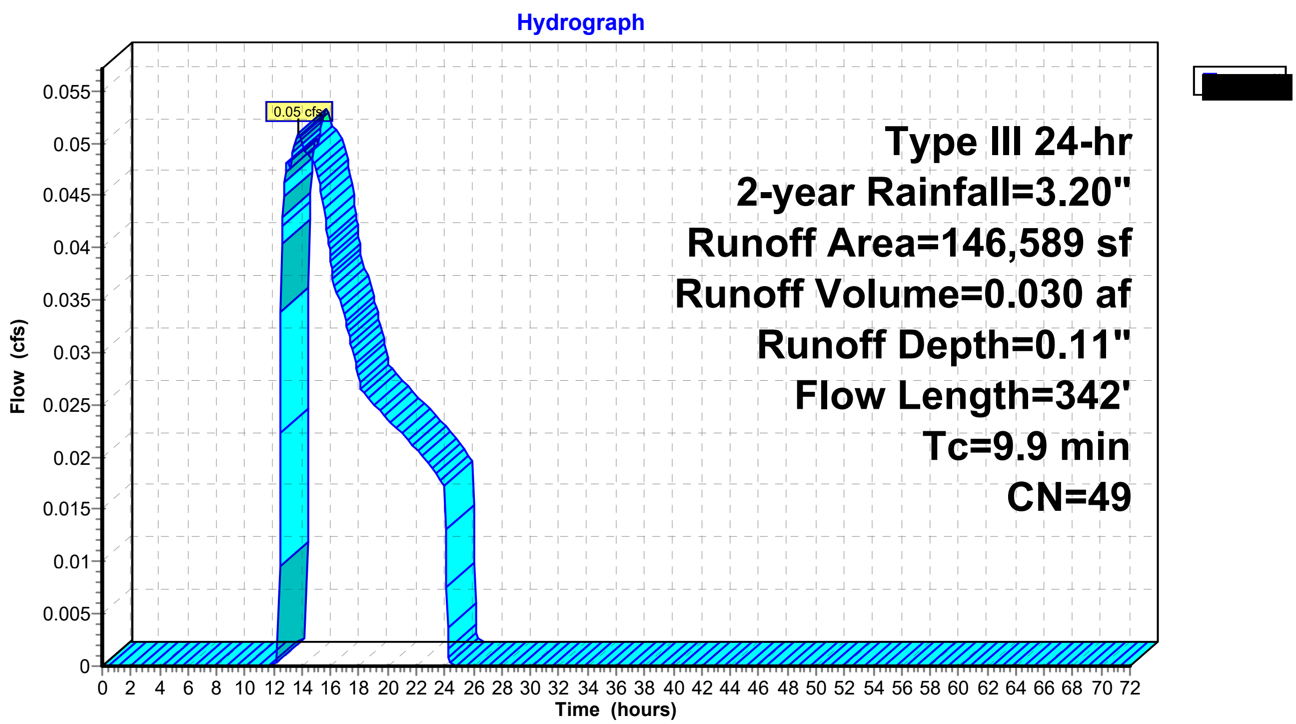
Runoff = 0.05 cfs @ 13.72 hrs, Volume= 0.030 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	103,427	30	Meadow, non-grazed, HSG A
	2,036	58	Meadow, non-grazed, HSG B
*	7,140	98	Panels
*	33,986	98	Basin
	146,589	49	Weighted Average
	105,463		71.94% Pervious Area
	41,126		28.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
2.5	292	0.0762	1.93		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.9	342	Total			

Subcatchment 1bS: Drainage Area 1b



Summary for Subcatchment 1cS: Drainage Area 1c

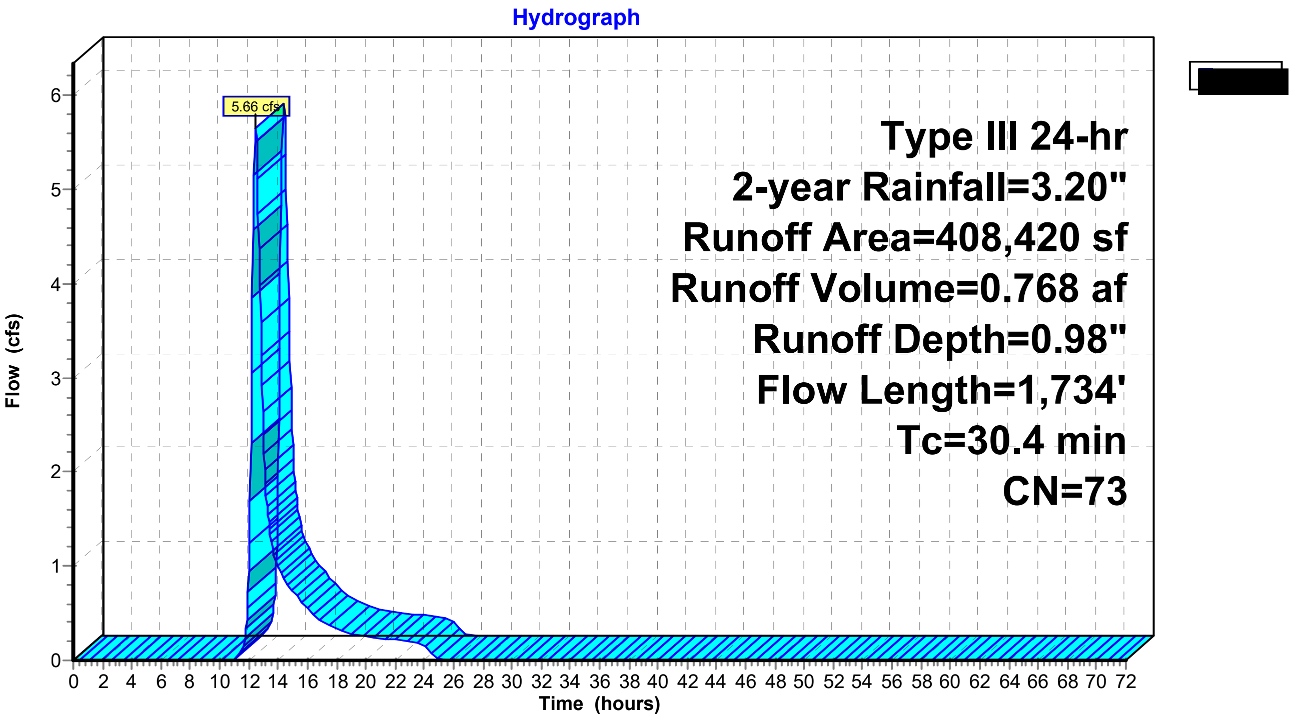
Runoff = 5.66 cfs @ 12.47 hrs, Volume= 0.768 af, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	351,878	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	18,313	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	2,416	98	Water body
*	2,918	96	Gravel road
*	0	98	Structure
*	5,460	98	Panels
*	0	98	Equipment pad
*	10,197	98	Paved
*	17,238	98	Basin
	408,420	73	Weighted Average
	373,109		91.35% Pervious Area
	35,311		8.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
23.3	1,684	0.0297	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
30.4	1,734	Total			

Subcatchment 1cS: Drainage Area 1c



Summary for Subcatchment 1dS: Drainage Area 1a

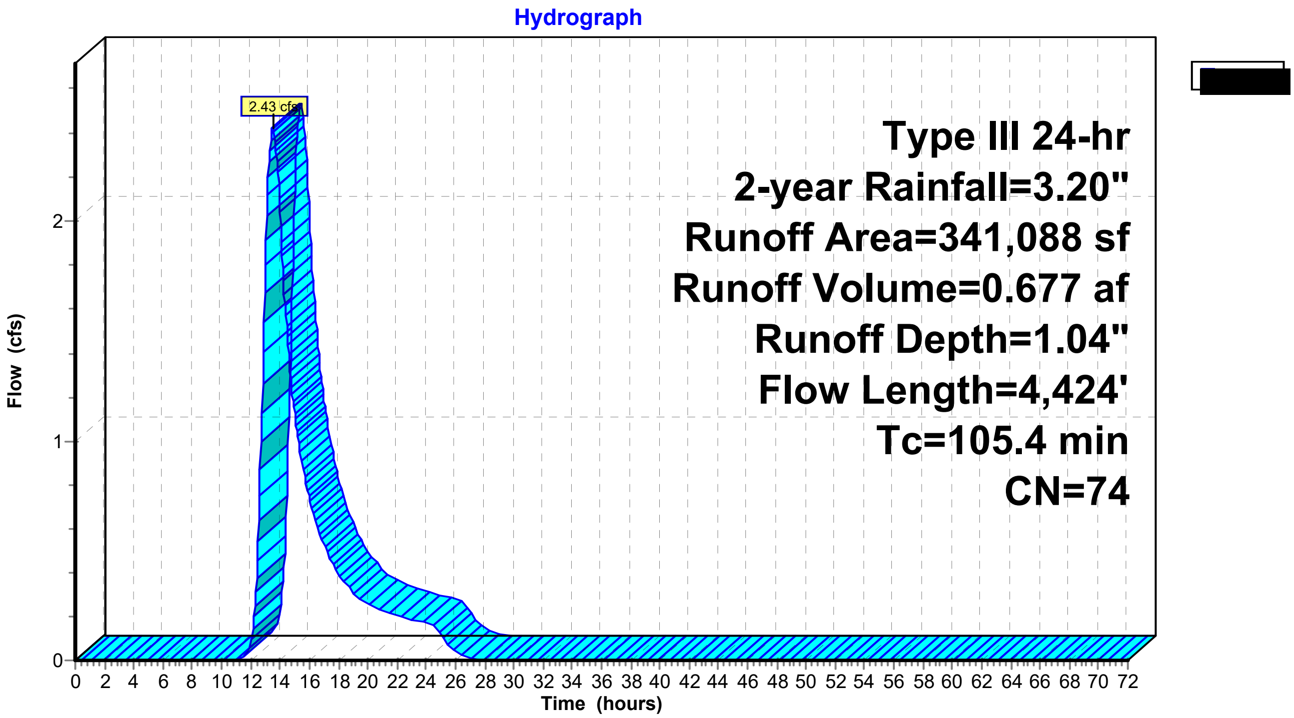
Runoff = 2.43 cfs @ 13.49 hrs, Volume= 0.677 af, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	269,007	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	34,713	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	12,239	96	Gravel road
*	0	98	Structure
*	7,140	98	Panels
*	629	98	Equipment pad
*	1,074	98	Paved
*	16,286	98	Basin
	341,088	74	Weighted Average
	315,959		92.63% Pervious Area
	25,129		7.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
11.3	356	0.0110	0.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.1	433	0.0020	0.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.3	222	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.5	766	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
46.9	2,597	0.0340	0.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
105.4	4,424	Total			

Subcatchment 1dS: Drainage Area 1a



Summary for Subcatchment 2S: Drainage Area 2

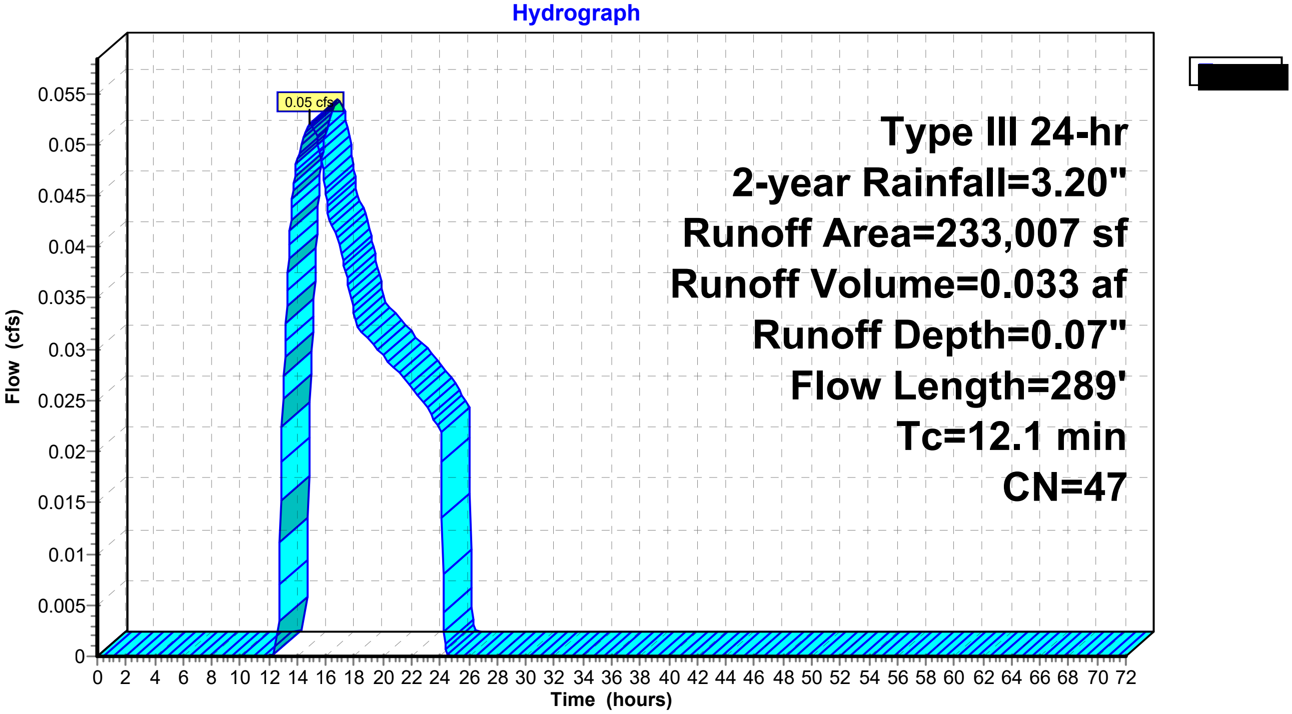
Runoff = 0.05 cfs @ 14.89 hrs, Volume= 0.033 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	117,788	30	Meadow, non-grazed, HSG A
	29,605	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	16,114	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	58,620	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	6,260	96	Gravel road
*	0	98	Structure
*	4,620	98	Panels
	233,007	47	Weighted Average
	228,387		98.02% Pervious Area
	4,620		1.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0900	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
5.3	239	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.1	289	Total			

Subcatchment 2S: Drainage Area 2



Summary for Subcatchment 3aS: Drainage Area 3a

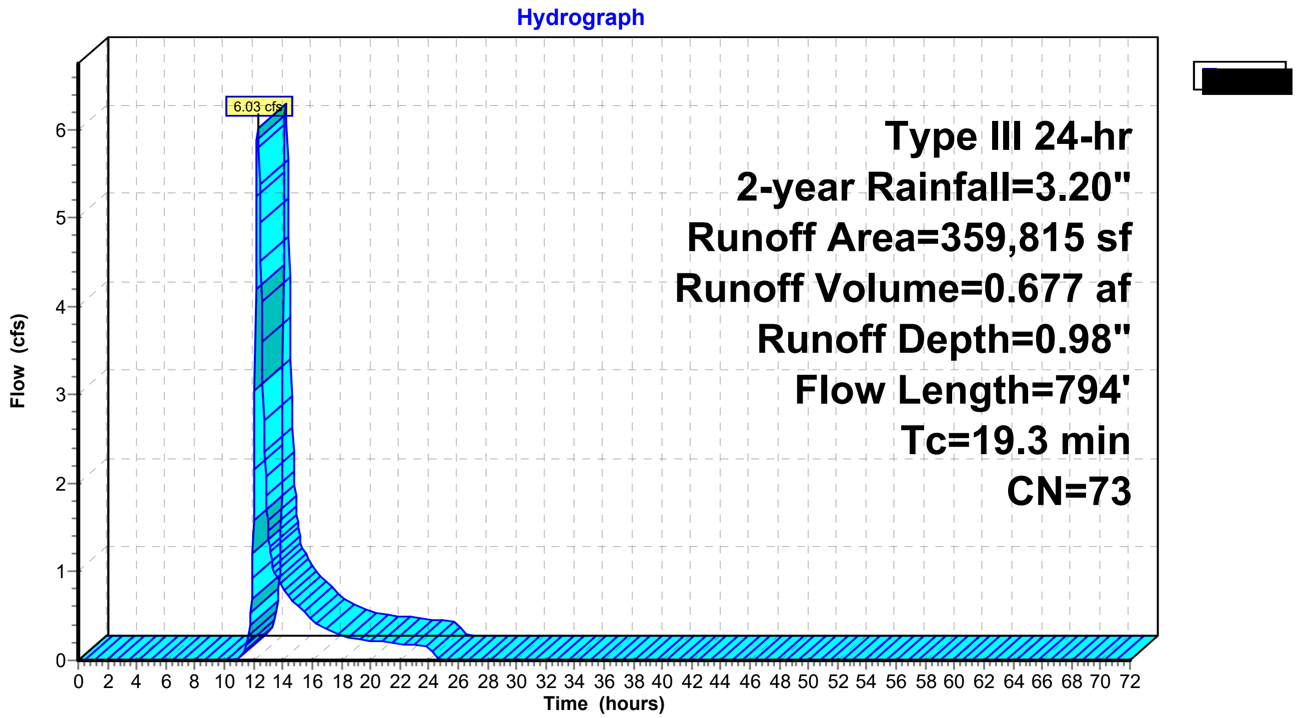
Runoff = 6.03 cfs @ 12.29 hrs, Volume= 0.677 af, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	337,756	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	10,301	96	Gravel road
*	0	98	Structure
*	10,500	98	Panels
*	1,258	98	Equipment pad
	359,815	73	Weighted Average
	348,057		96.73% Pervious Area
	11,758		3.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
11.9	744	0.0222	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.3	794	Total			

Subcatchment 3aS: Drainage Area 3a



Summary for Subcatchment 3bS: Drainage Area 3b

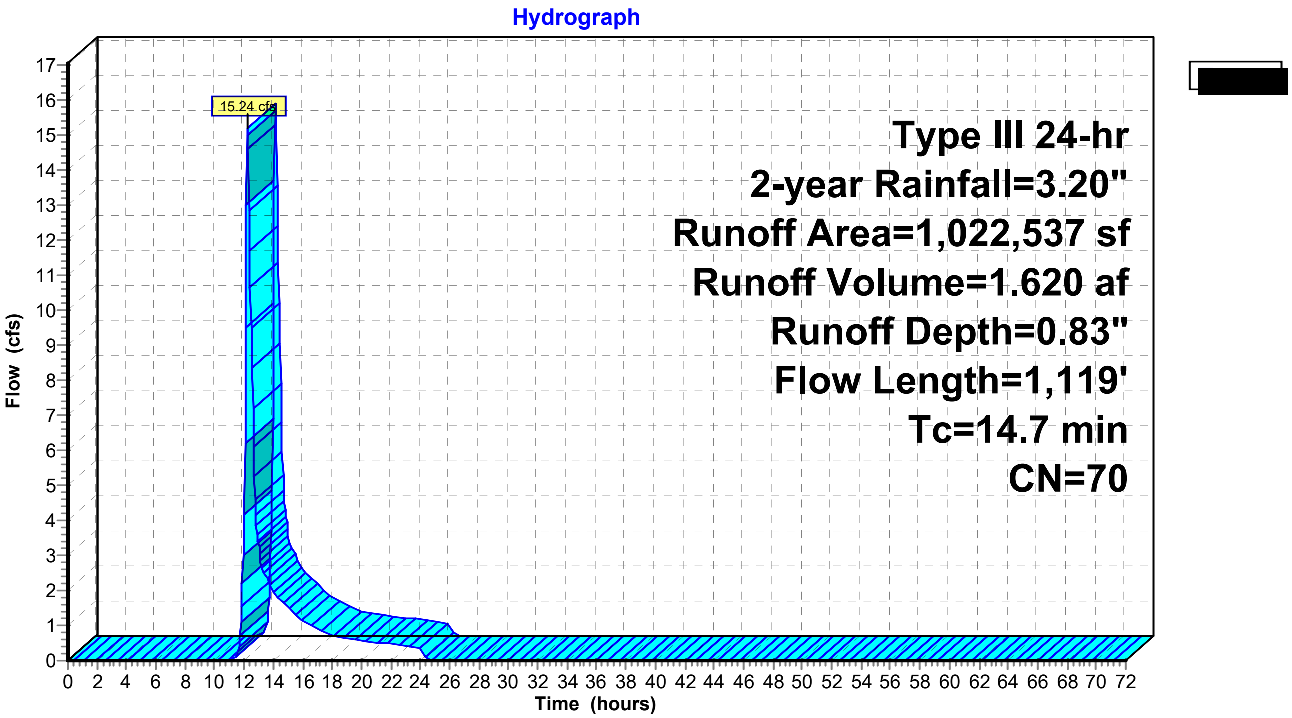
Runoff = 15.24 cfs @ 12.23 hrs, Volume= 1.620 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	99,790	58	Meadow, non-grazed, HSG B
	532,219	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	1,798	30	Woods, Good, HSG A
	107,172	55	Woods, Good, HSG B
	59,721	70	Woods, Good, HSG C
	14,571	77	Woods, Good, HSG D
*	59,918	70	Gravel pit, HSG A
*	96,280	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	51,068	98	Water body
*	0	96	Gravel road
*	0	98	Structure
*	0	98	Panels
*	0	98	Equipment pad
	1,022,537	70	Weighted Average
	971,469		95.01% Pervious Area
	51,068		4.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
9.1	1,069	0.0776	1.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.7	1,119	Total			

Subcatchment 3bS: Drainage Area 3b



Summary for Subcatchment 4S: Drainage Area 4

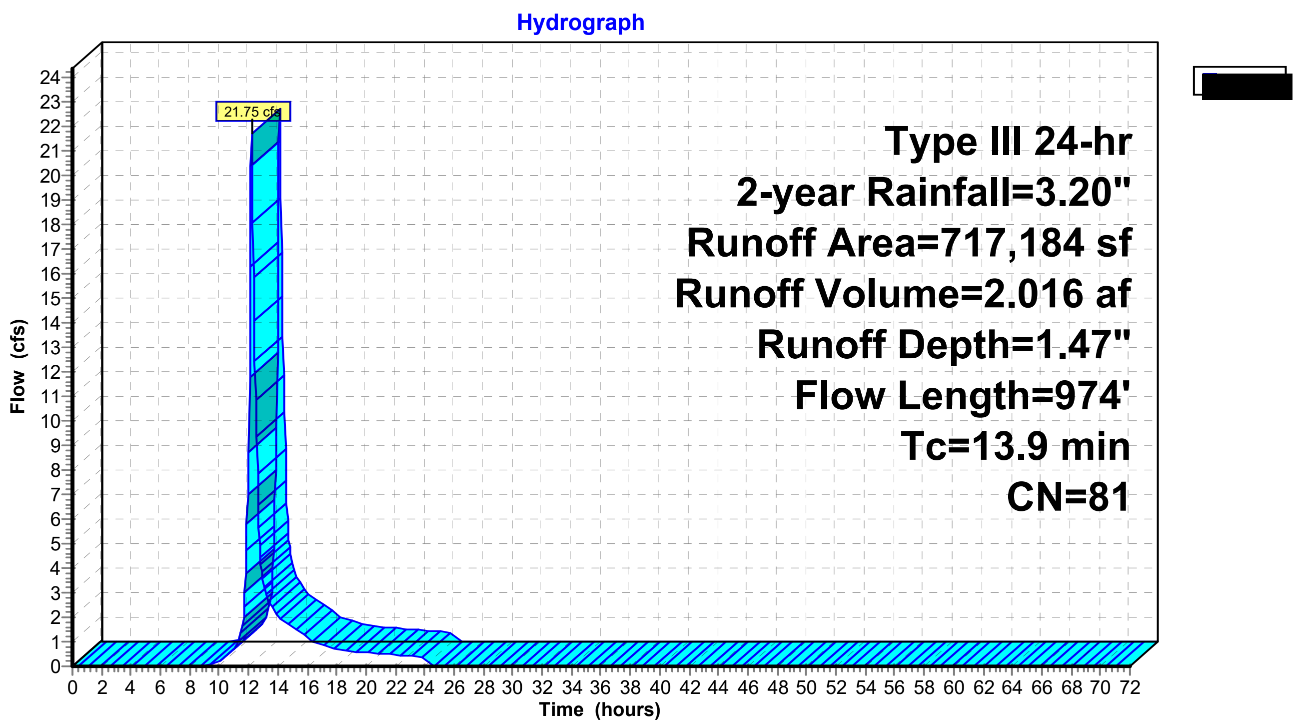
Runoff = 21.75 cfs @ 12.20 hrs, Volume= 2.016 af, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	18,016	55	Woods, Good, HSG B
	19,532	70	Woods, Good, HSG C
	5,054	77	Woods, Good, HSG D
*	34,397	70	Gravel pit, HSG A
*	500,725	81	Gravel pit, HSG B
*	134,831	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	4,629	98	Water body
*	0	96	Gravel road
*	0	98	Structure
	717,184	81	Weighted Average
	712,555		99.35% Pervious Area
	4,629		0.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.20		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
3.9	384	0.0102	1.63		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	45	0.2700	8.37		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
8.8	269	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	226	0.3100	8.96		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
13.9	974	Total			

Subcatchment 4S: Drainage Area 4



Summary for Subcatchment 5aS: Drainage Area 5

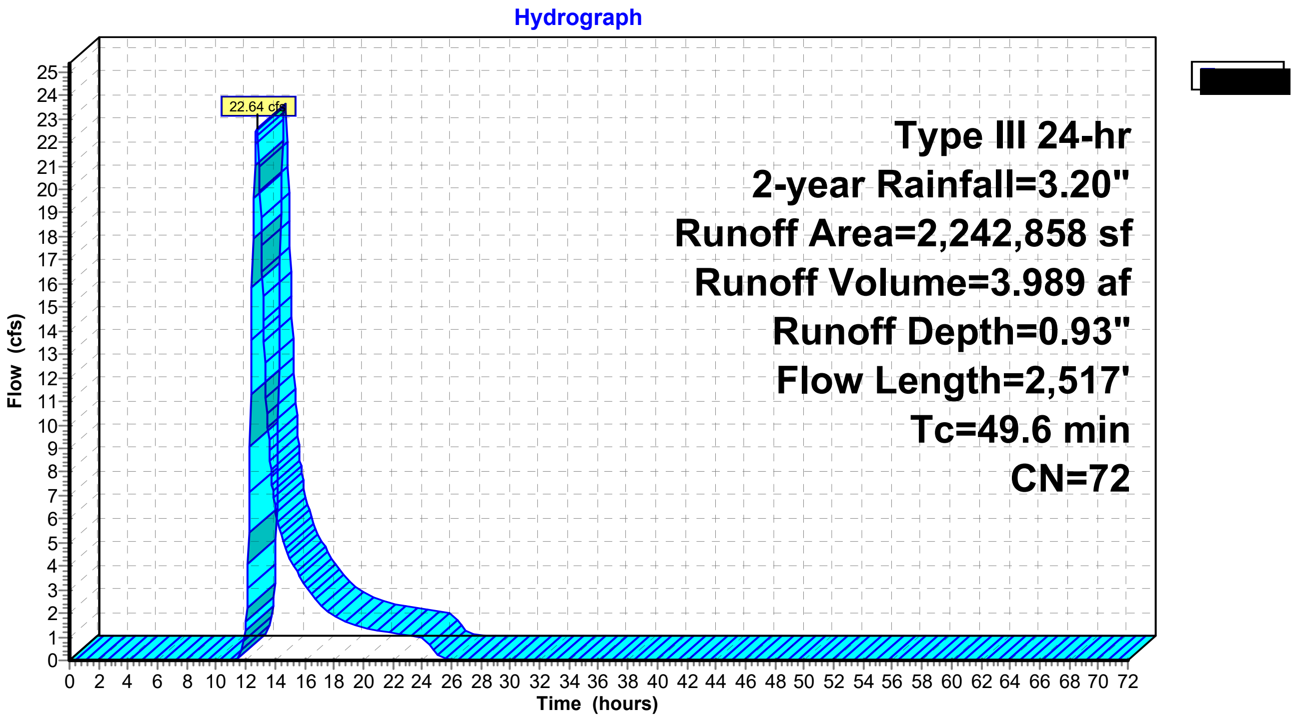
Runoff = 22.64 cfs @ 12.74 hrs, Volume= 3.989 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	84,391	30	Meadow, non-grazed, HSG A
	117,637	58	Meadow, non-grazed, HSG B
	239,197	71	Meadow, non-grazed, HSG C
	91,068	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	597,427	55	Woods, Good, HSG B
	404,182	70	Woods, Good, HSG C
	103,749	77	Woods, Good, HSG D
*	15,001	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	562,885	98	Water body
*	25,012	96	Gravel road
*	0	98	Structure
*	1,680	98	Panels
*	629	98	Equipment pad
	2,242,858	72	Weighted Average
	1,677,664		74.80% Pervious Area
	565,194		25.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.4	238	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.6	1,240	0.0242	0.78		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.6	509	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.6	480	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
49.6	2,517	Total			

Subcatchment 5aS: Drainage Area 5



Summary for Subcatchment 5bS: Drainage Area 5

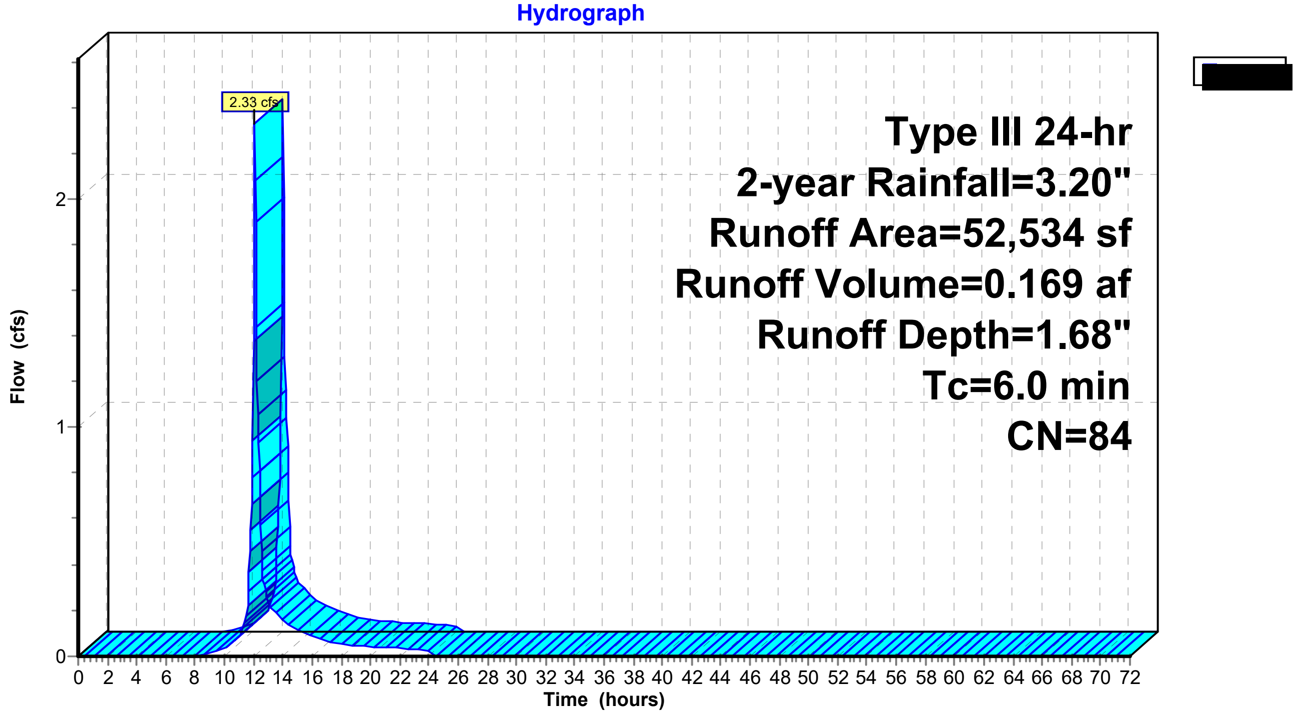
Runoff = 2.33 cfs @ 12.09 hrs, Volume= 0.169 af, Depth= 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	18,465	58	Meadow, non-grazed, HSG B
	267	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	0	96	Gravel road
*	0	98	Structure
*	5,040	98	Panels
*	0	98	Equipment pad
*	28,762	98	Basin
	52,534	84	Weighted Average
	18,732		35.66% Pervious Area
	33,802		64.34% Impervious Area

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

Subcatchment 5bS: Drainage Area 5



Summary for Subcatchment 5cS: Drainage Area 5

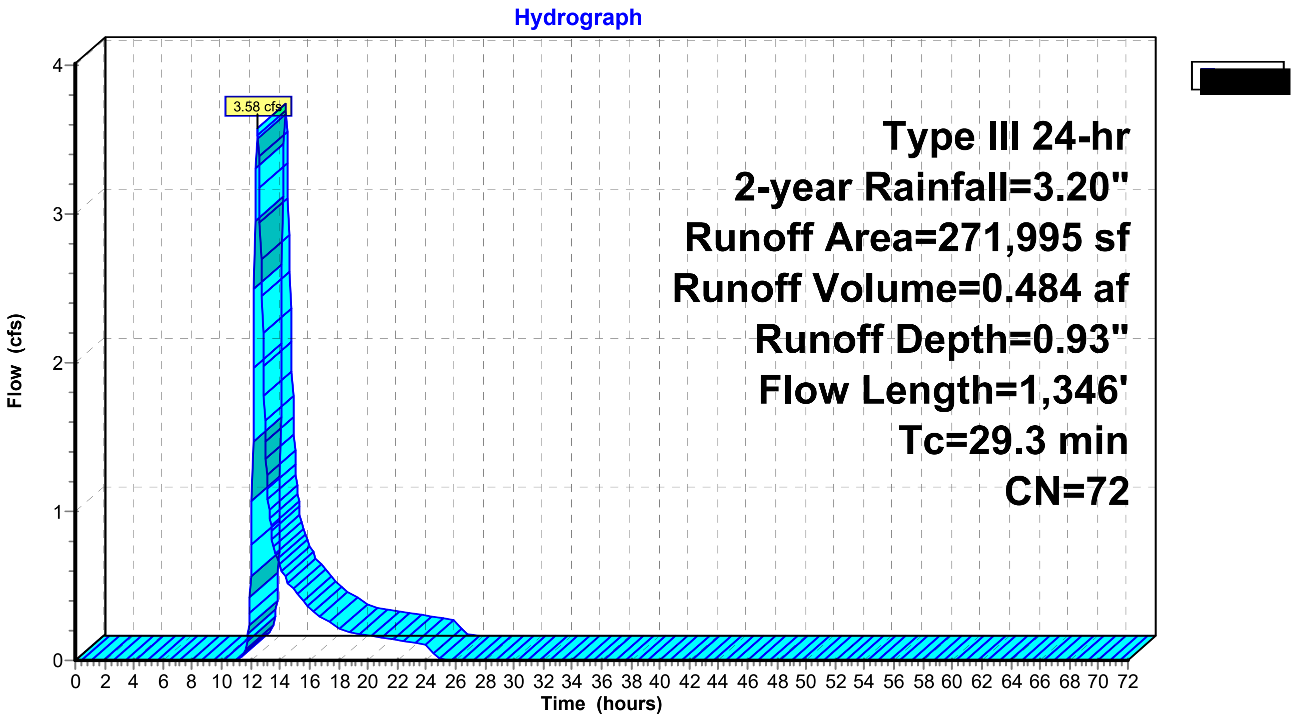
Runoff = 3.58 cfs @ 12.45 hrs, Volume= 0.484 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	53,847	58	Meadow, non-grazed, HSG B
	27,788	71	Meadow, non-grazed, HSG C
	8,123	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	2,622	55	Woods, Good, HSG B
	123,893	70	Woods, Good, HSG C
	19,268	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	20,354	98	Water body
*	0	96	Gravel road
*	0	98	Structure
*	5,460	98	Panels
*	0	98	Equipment pad
*	10,640	98	Basin
	271,995	72	Weighted Average
	235,541		86.60% Pervious Area
	36,454		13.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
17.9	1,030	0.0369	0.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.1	266	0.0902	2.10		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
29.3	1,346	Total			

Subcatchment 5cS: Drainage Area 5



Summary for Subcatchment 5dS: Drainage Area 5

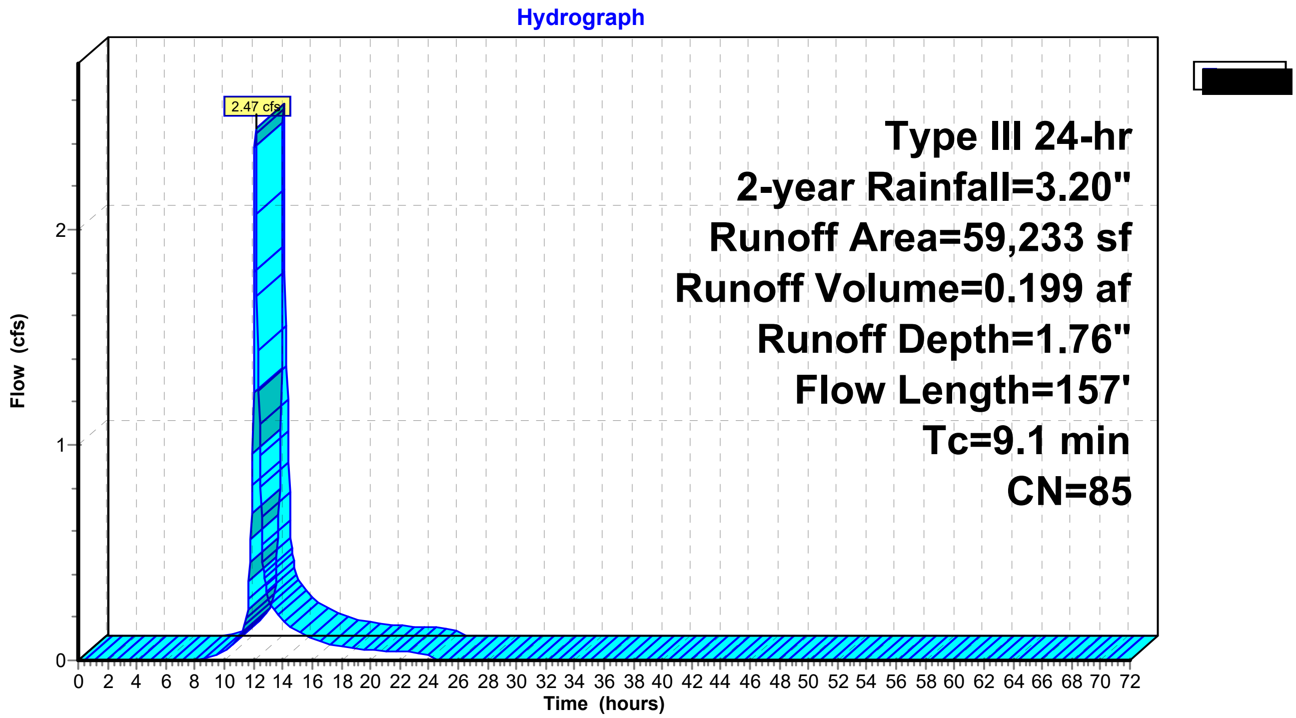
Runoff = 2.47 cfs @ 12.13 hrs, Volume= 0.199 af, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	28,213	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	4,470	96	Gravel road
*	0	98	Structure
*	5,460	98	Panels
*	629	98	Equipment pad
*	20,461	98	Basin
	59,233	85	Weighted Average
	32,683		55.18% Pervious Area
	26,550		44.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.7	107	0.0234	1.07		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.1	157	Total			

Subcatchment 5dS: Drainage Area 5



Summary for Subcatchment 6aS: Drainage Area 6

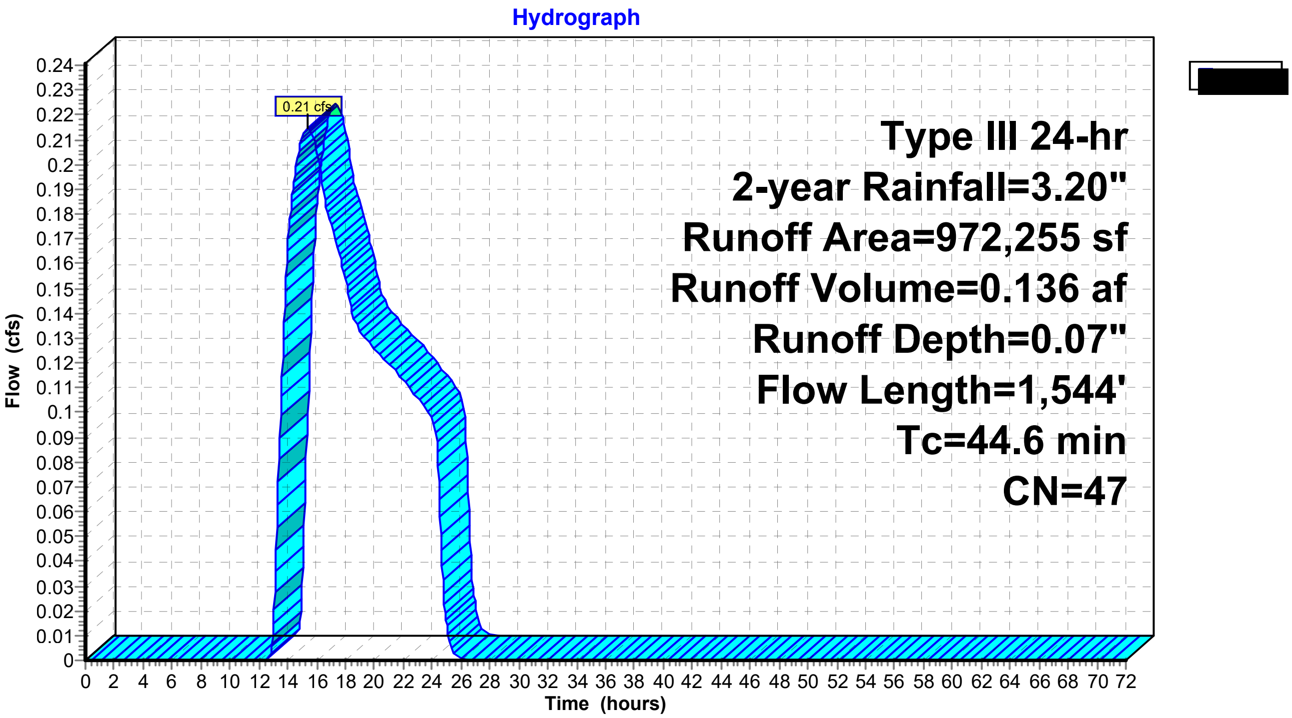
Runoff = 0.21 cfs @ 15.39 hrs, Volume= 0.136 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	301,060	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	390,620	30	Woods, Good, HSG A
	50,036	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	219,272	98	Water body
*	11,267	96	Gravel road
*	0	98	Structure
*	0	98	Panels
*	0	98	Equipment pad
	972,255	47	Weighted Average
	752,983		77.45% Pervious Area
	219,272		22.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
13.5	538	0.0090	0.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.1	601	0.0391	0.99		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.7	355	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
44.6	1,544	Total			

Subcatchment 6aS: Drainage Area 6



Summary for Subcatchment 6bS: Drainage Area 6

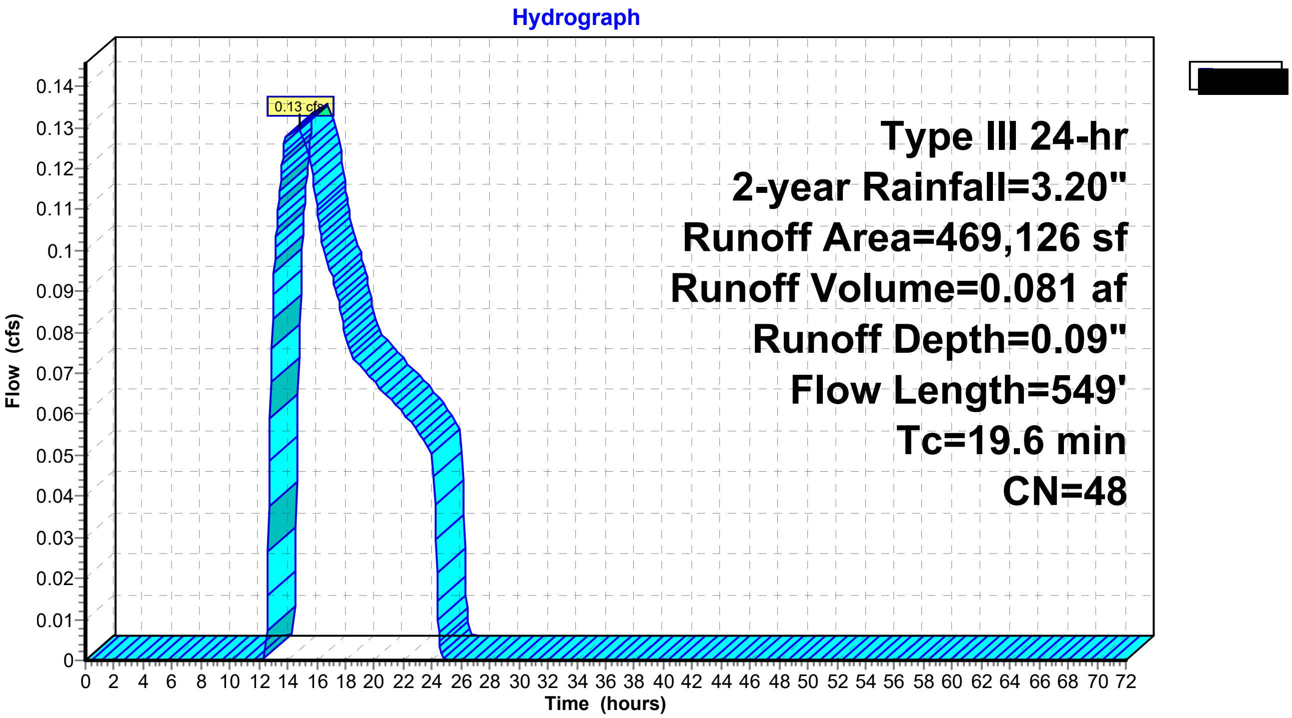
Runoff = 0.13 cfs @ 14.76 hrs, Volume= 0.081 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	288,325	30	Meadow, non-grazed, HSG A
	91,050	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	9,625	96	Gravel road
*	0	98	Structure
*	12,660	98	Panels
*	629	98	Equipment pad
*	66,837	98	Basin
	469,126	48	Weighted Average
	389,000		82.92% Pervious Area
	80,126		17.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.0150	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
13.3	499	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.6	549	Total			

Subcatchment 6bS: Drainage Area 6



Summary for Subcatchment 7aS: Drainage Area 7a

[45] Hint: Runoff=Zero

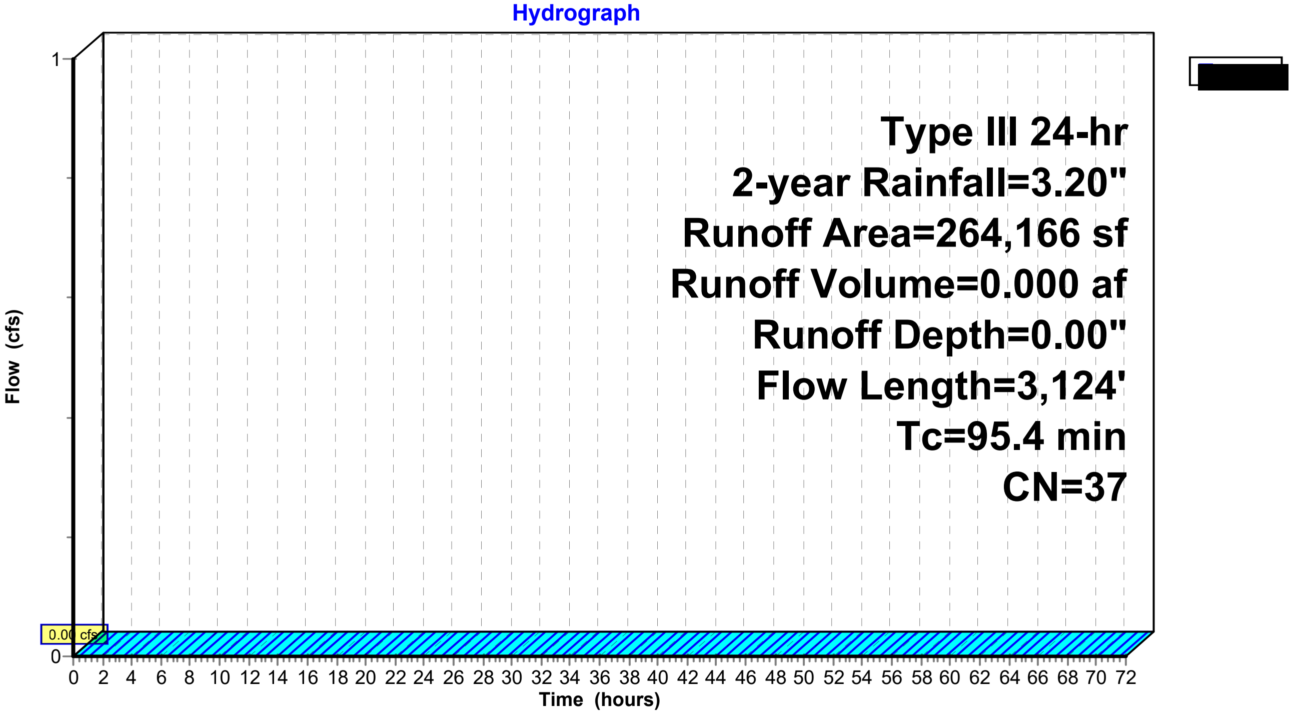
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	231,002	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	7,059	70	Gravel pit, HSG A
*	9,519	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	9,866	96	Gravel road
*	0	98	Structure
*	6,720	98	Panels
*	0	98	Equipment pad
	264,166	37	Weighted Average
	257,446		97.46% Pervious Area
	6,720		2.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
2.9	238	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
88.9	2,836	0.0113	0.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
95.4	3,124	Total			

Subcatchment 7aS: Drainage Area 7a



Summary for Subcatchment 7bS: Drainage Area 7b

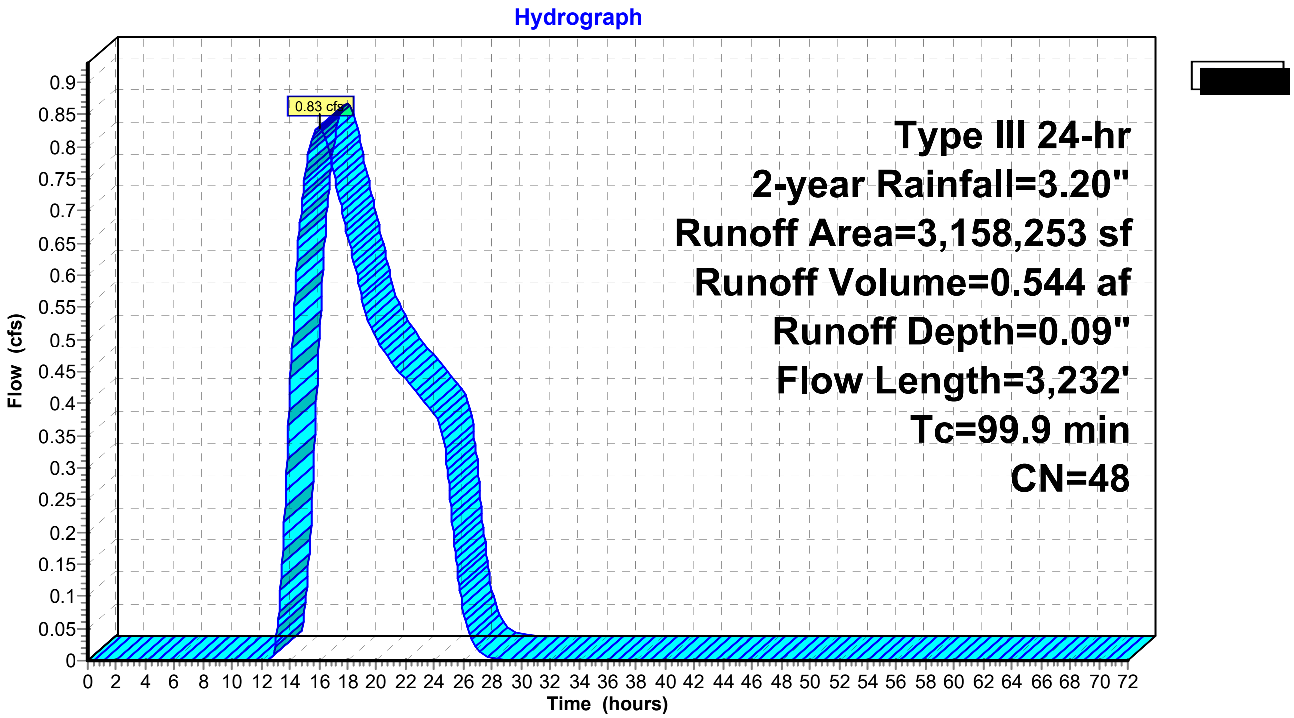
Runoff = 0.83 cfs @ 16.05 hrs, Volume= 0.544 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	648,318	30	Meadow, non-grazed, HSG A
	110,037	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	1,385,107	30	Woods, Good, HSG A
	230,359	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	165,079	70	Gravel pit, HSG A
*	79,347	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	453,314	98	Water body
*	77,609	96	Gravel road
*	0	98	Structure
*	8,454	98	Panels
*	629	98	Equipment pad
	3,158,253	48	Weighted Average
	2,695,856		85.36% Pervious Area
	462,397		14.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	50	0.1600	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
5.6	346	0.0430	1.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
88.9	2,836	0.0113	0.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
99.9	3,232	Total			

Subcatchment 7bS: Drainage Area 7b



Summary for Subcatchment 8S: Drainage Area 8

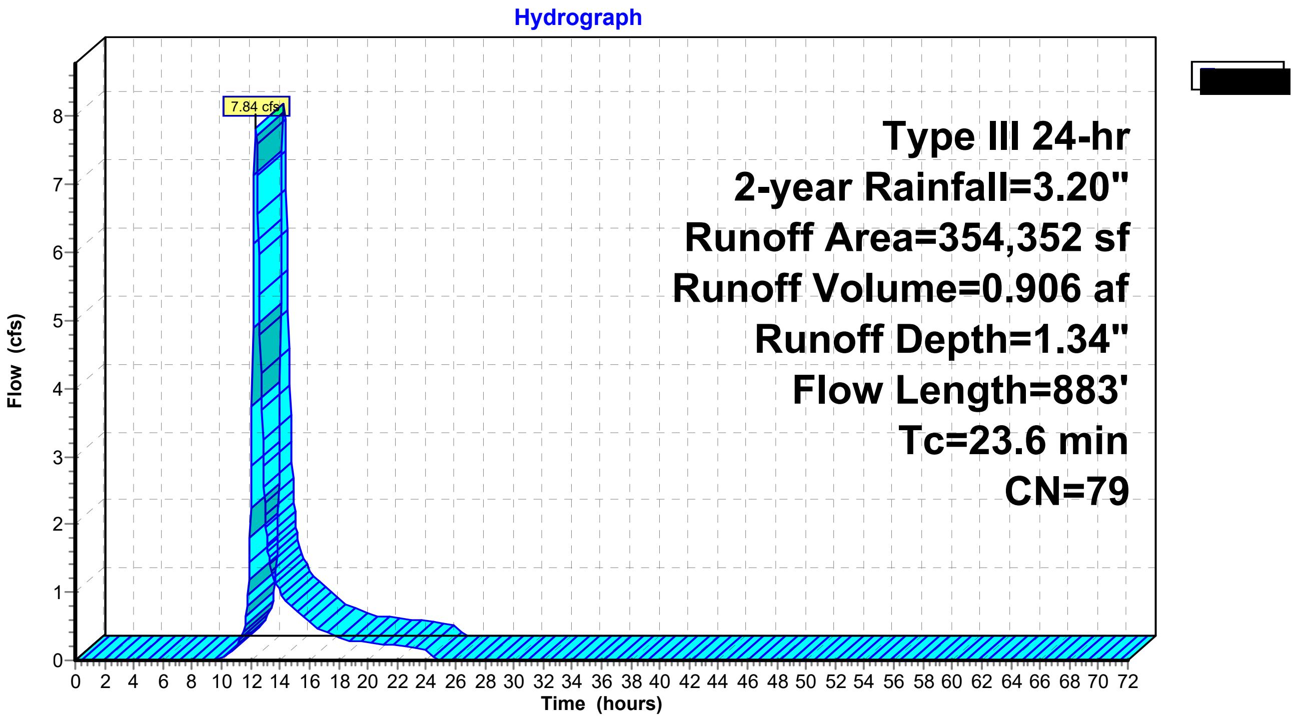
Runoff = 7.84 cfs @ 12.34 hrs, Volume= 0.906 af, Depth= 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	14,757	71	Meadow, non-grazed, HSG C
	6,627	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	7,700	55	Woods, Good, HSG B
	175,484	70	Woods, Good, HSG C
	40,001	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	93,828	98	Water body
*	15,955	96	Gravel road
*	0	98	Structure
	354,352	79	Weighted Average
	260,524		73.52% Pervious Area
	93,828		26.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
8.8	390	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	271	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	172	0.0280	0.84		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.6	883	Total			

Subcatchment 8S: Drainage Area 8



Summary for Subcatchment 9S: Drainage Area 9

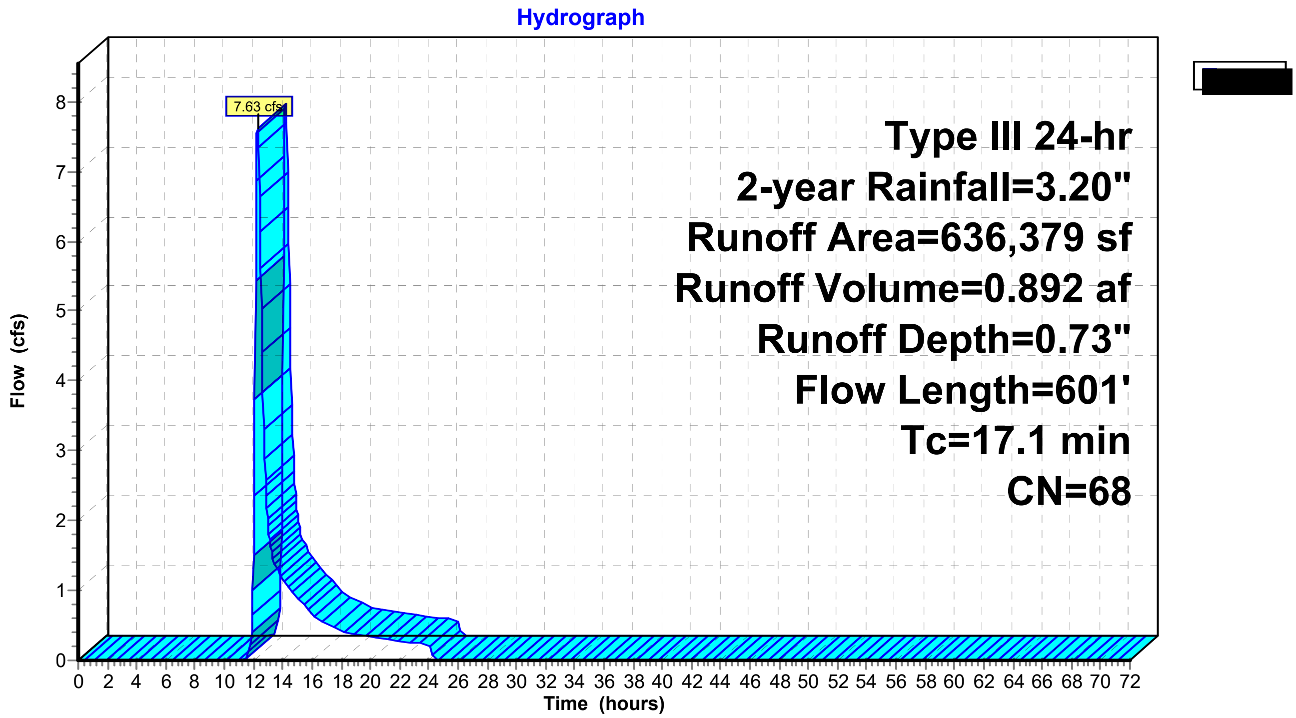
Runoff = 7.63 cfs @ 12.27 hrs, Volume= 0.892 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	80,020	30	Meadow, non-grazed, HSG A
	29,044	58	Meadow, non-grazed, HSG B
	8,254	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	24,186	30	Woods, Good, HSG A
	229,102	55	Woods, Good, HSG B
	19,896	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	226,618	98	Water body
*	18,419	96	Gravel road
*	0	98	Structure
*	840	98	Panels
	636,379	68	Weighted Average
	408,921		64.26% Pervious Area
	227,458		35.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.4	106	0.0610	1.23		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	184	0.0330	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.8	261	0.2470	2.48		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.1	601	Total			

Subcatchment 9S: Drainage Area 9



Summary for Subcatchment 10aS: Drainage Area 10

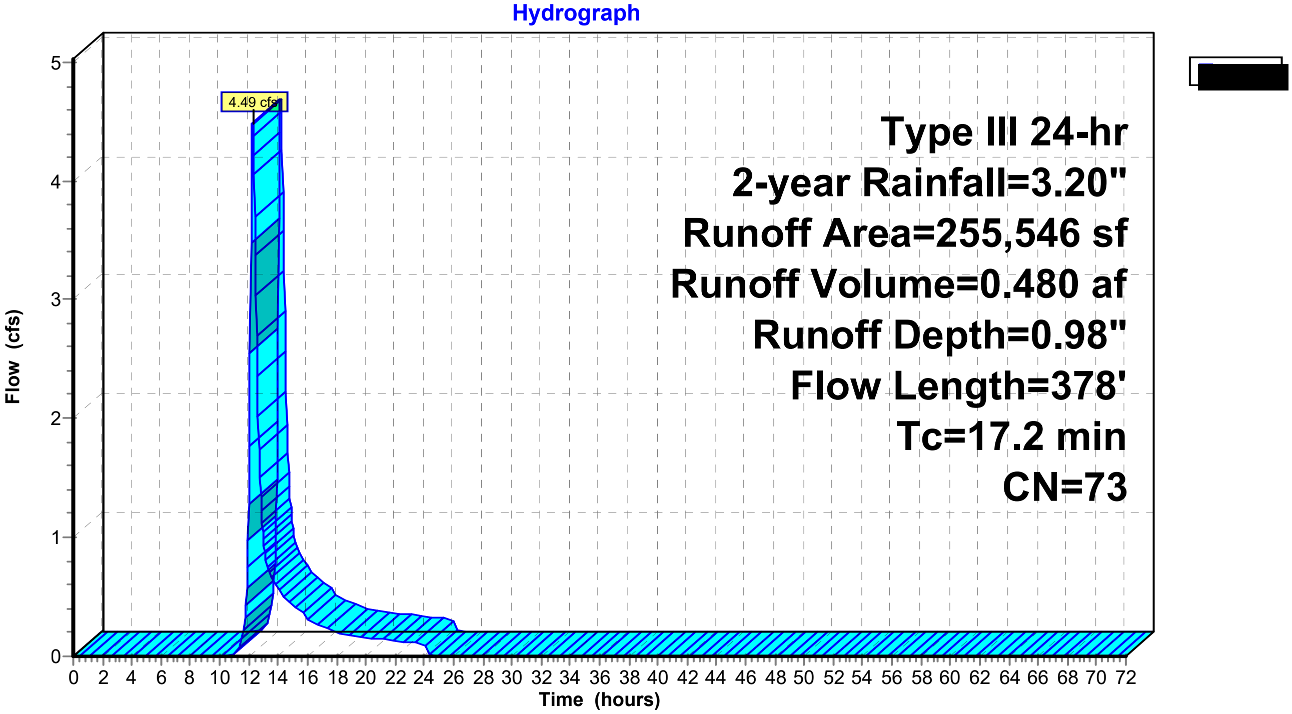
Runoff = 4.49 cfs @ 12.26 hrs, Volume= 0.480 af, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	40,805	58	Meadow, non-grazed, HSG B
	126,615	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	9,453	55	Woods, Good, HSG B
	37,133	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	5,861	96	Gravel road
*	0	98	Structure
*	3,360	98	Panels
*	32,319	98	Basin
	255,546	73	Weighted Average
	219,867		86.04% Pervious Area
	35,679		13.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
4.9	328	0.0488	1.10		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.2	378	Total			

Subcatchment 10aS: Drainage Area 10



Summary for Subcatchment 10bS: Drainage Area 10

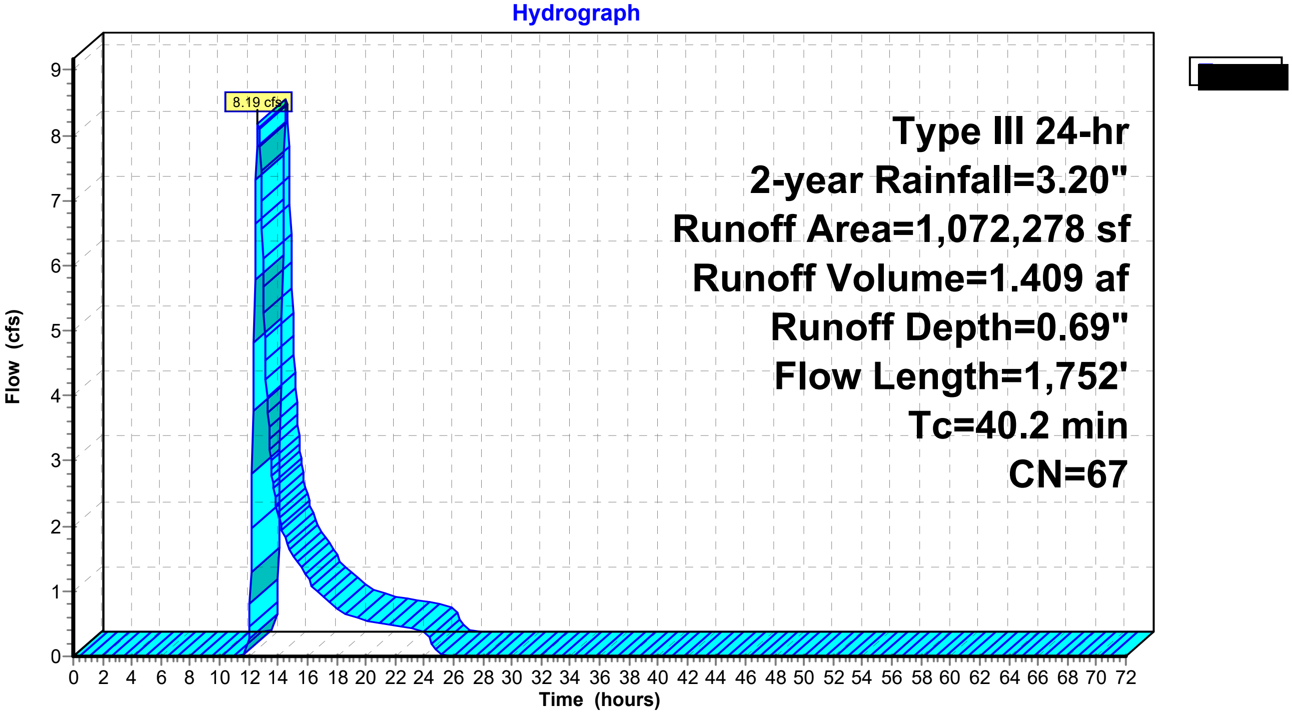
Runoff = 8.19 cfs @ 12.65 hrs, Volume= 1.409 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	13,076	30	Meadow, non-grazed, HSG A
	9,872	58	Meadow, non-grazed, HSG B
	162,839	71	Meadow, non-grazed, HSG C
	21,857	78	Meadow, non-grazed, HSG D
	110,901	30	Woods, Good, HSG A
	222,199	55	Woods, Good, HSG B
	284,517	70	Woods, Good, HSG C
	72,773	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	141,195	98	Water body
*	33,049	96	Gravel road
*	0	98	Structure
*	0	98	Panels
	1,072,278	67	Weighted Average
	931,083		86.83% Pervious Area
	141,195		13.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
29.4	1,139	0.0167	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	72	0.0417	3.29		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.1	491	0.0367	1.34		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
40.2	1,752	Total			

Subcatchment 10bS: Drainage Area 10



Summary for Subcatchment 11aS: Drainage Area 11

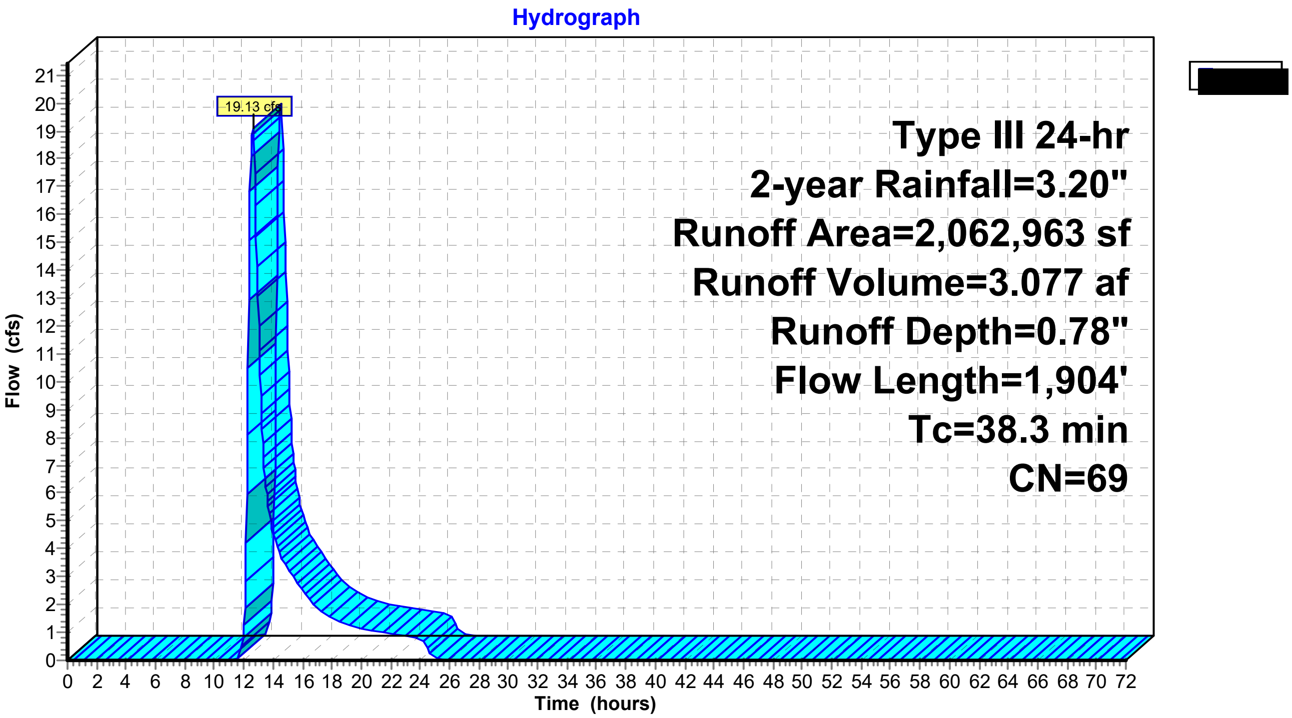
Runoff = 19.13 cfs @ 12.60 hrs, Volume= 3.077 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	230,381	30	Meadow, non-grazed, HSG A
	74,662	58	Meadow, non-grazed, HSG B
	1,245,920	71	Meadow, non-grazed, HSG C
	51,732	78	Meadow, non-grazed, HSG D
	5,299	30	Woods, Good, HSG A
	38,194	55	Woods, Good, HSG B
	116,983	70	Woods, Good, HSG C
	42,710	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	201,207	98	Water body
*	45,982	96	Gravel road
*	8,006	98	Structure
*	1,887	98	Equipment pad
*	0	98	Panels
	2,062,963	69	Weighted Average
	1,851,863		89.77% Pervious Area
	211,100		10.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
34.0	1,854	0.0330	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
38.3	1,904	Total			

Subcatchment 11aS: Drainage Area 11



Summary for Subcatchment 11bS: Drainage Area 11

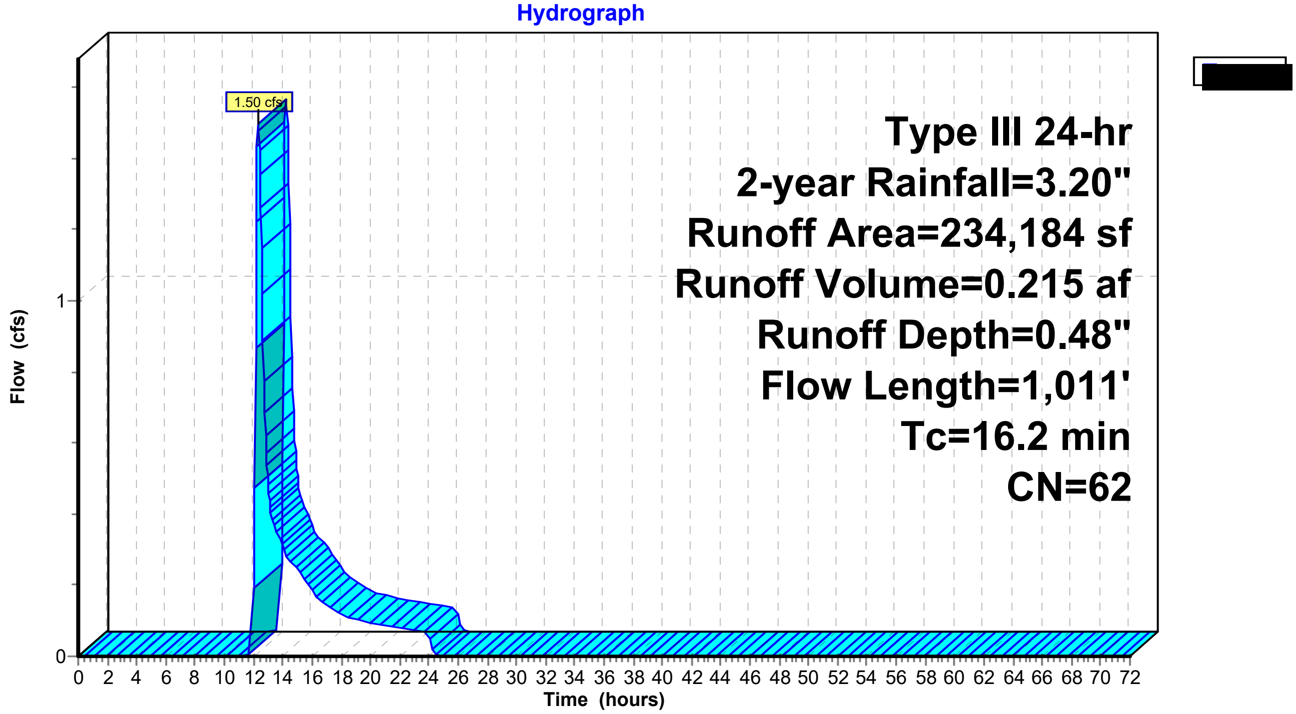
Runoff = 1.50 cfs @ 12.31 hrs, Volume= 0.215 af, Depth= 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	62,296	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	153,054	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	14,214	96	Gravel road
*	0	98	Structure
*	0	98	Equipment pad
*	4,620	98	Panels
	234,184	62	Weighted Average
	229,564		98.03% Pervious Area
	4,620		1.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
10.6	961	0.0468	1.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.2	1,011	Total			

Subcatchment 11bS: Drainage Area 11



Summary for Subcatchment 11cS: Drainage Area 11

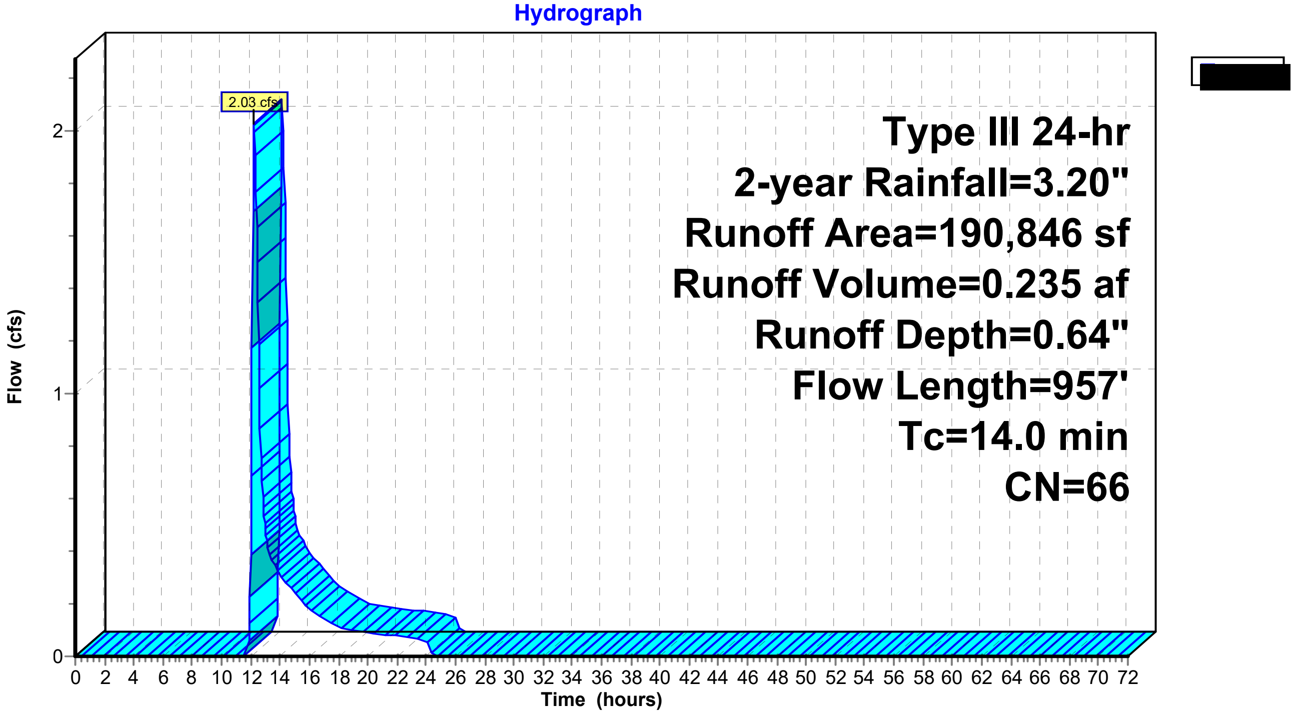
Runoff = 2.03 cfs @ 12.23 hrs, Volume= 0.235 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	27,259	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	158,821	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	2,666	96	Gravel road
*	0	98	Structure
*	0	98	Equipment pad
*	2,100	98	Panels
	190,846	66	Weighted Average
	188,746		98.90% Pervious Area
	2,100		1.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
9.7	907	0.0496	1.56		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.0	957	Total			

Subcatchment 11cS: Drainage Area 11



Summary for Subcatchment 12aS: Drainage Area 12a

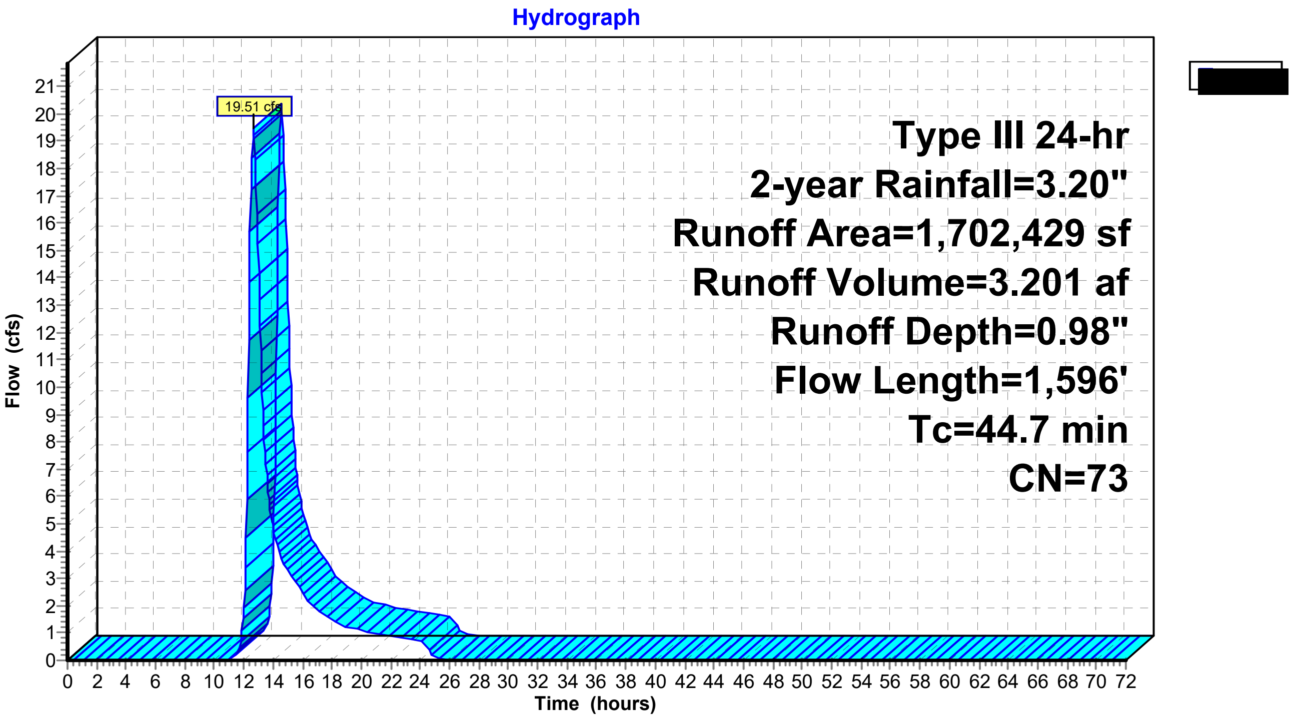
Runoff = 19.51 cfs @ 12.67 hrs, Volume= 3.201 af, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	23,018	30	Meadow, non-grazed, HSG A
	9,439	58	Meadow, non-grazed, HSG B
	654,323	71	Meadow, non-grazed, HSG C
	210,828	78	Meadow, non-grazed, HSG D
	22,923	30	Woods, Good, HSG A
	183,438	55	Woods, Good, HSG B
	293,907	70	Woods, Good, HSG C
	52,031	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	229,248	98	Water body
*	13,614	96	Gravel road
*	0	98	Structure
*	9,660	98	Panels
*	0	98	Equipment pad
	1,702,429	73	Weighted Average
	1,463,521		85.97% Pervious Area
	238,908		14.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0140	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
7.5	626	0.0780	1.40		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
30.7	920	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
44.7	1,596	Total			

Subcatchment 12aS: Drainage Area 12a



Summary for Subcatchment 12bS: Drainage Area 12b

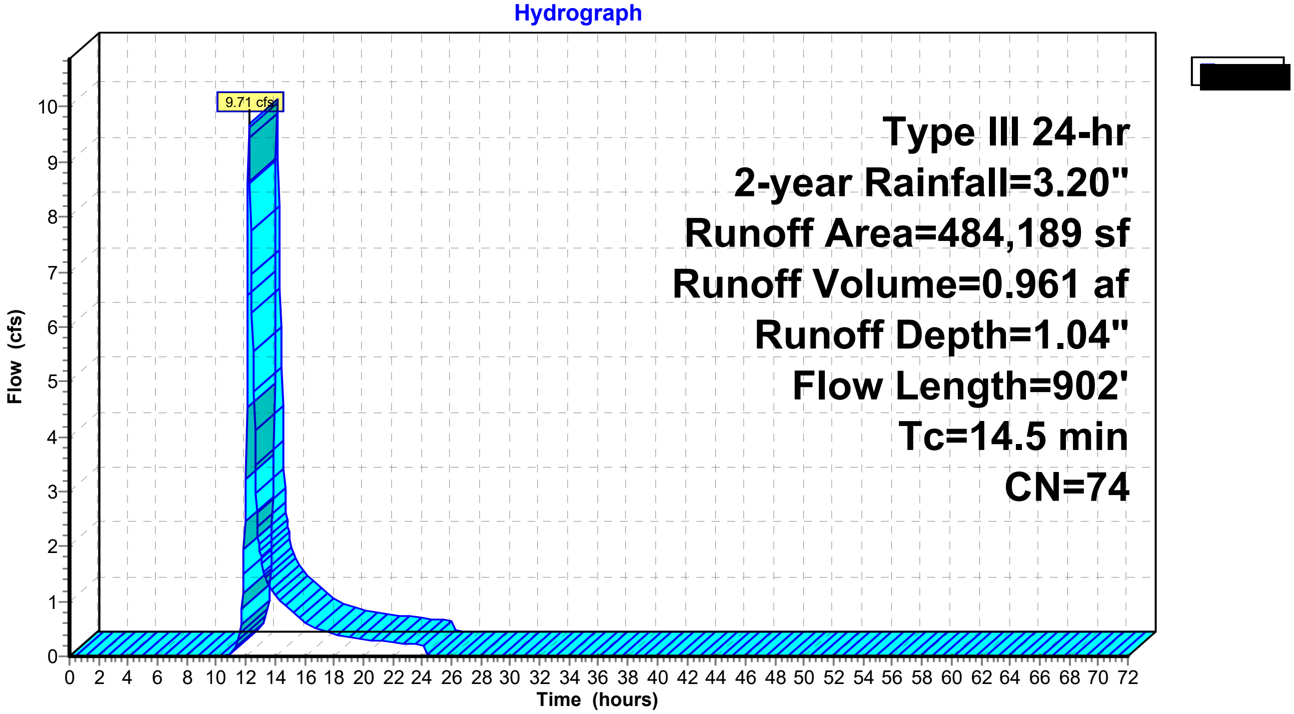
Runoff = 9.71 cfs @ 12.22 hrs, Volume= 0.961 af, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	438,020	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	8,877	96	Gravel road
*	0	98	Structure
*	9,240	98	Panels
*	1,258	98	Equipment pad
*	26,794	98	Basin
	484,189	74	Weighted Average
	446,897		92.30% Pervious Area
	37,292		7.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
10.2	852	0.0393	1.39		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.5	902	Total			

Subcatchment 12bS: Drainage Area 12b



Summary for Subcatchment 12cS: Drainage Area 12

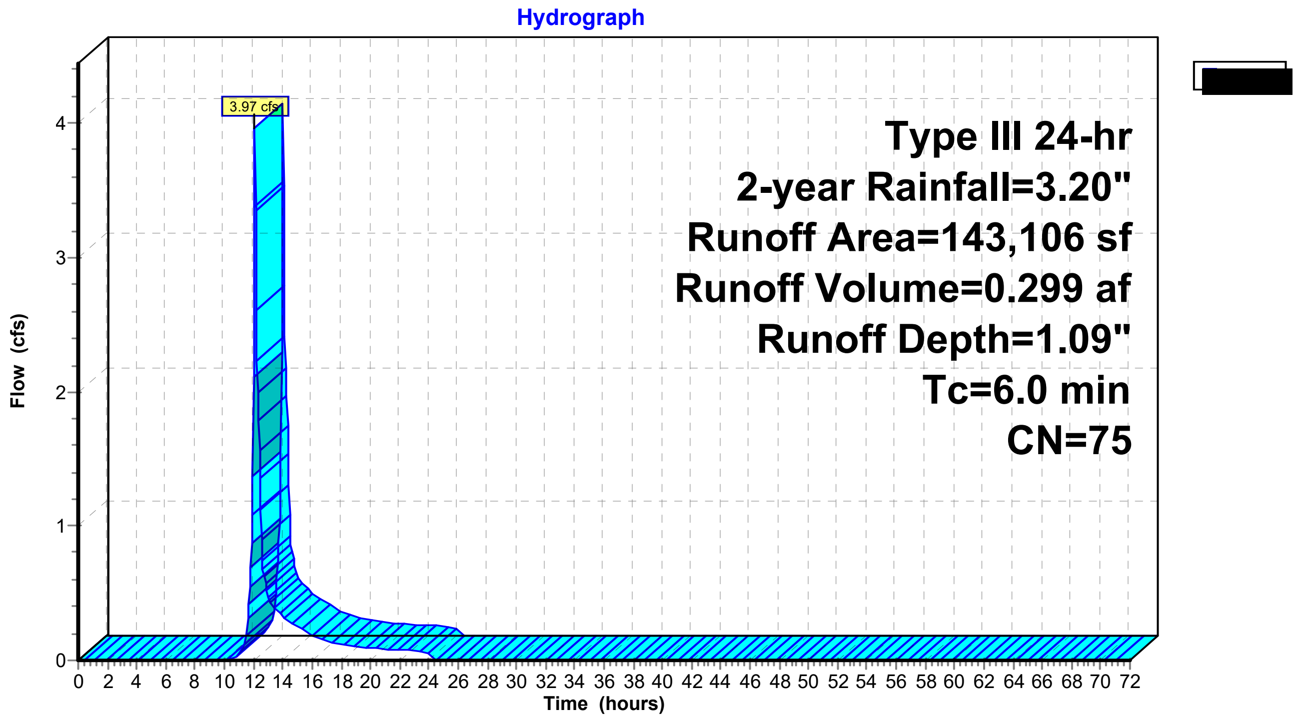
Runoff = 3.97 cfs @ 12.10 hrs, Volume= 0.299 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	122,234	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	8,875	96	Gravel road
*	0	98	Structure
*	0	98	Panels
*	0	98	Equipment pad
*	11,997	98	Basin
	143,106	75	Weighted Average
	131,109		91.62% Pervious Area
	11,997		8.38% Impervious Area

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

Subcatchment 12cS: Drainage Area 12



Summary for Subcatchment 13S: Drainage Area 13

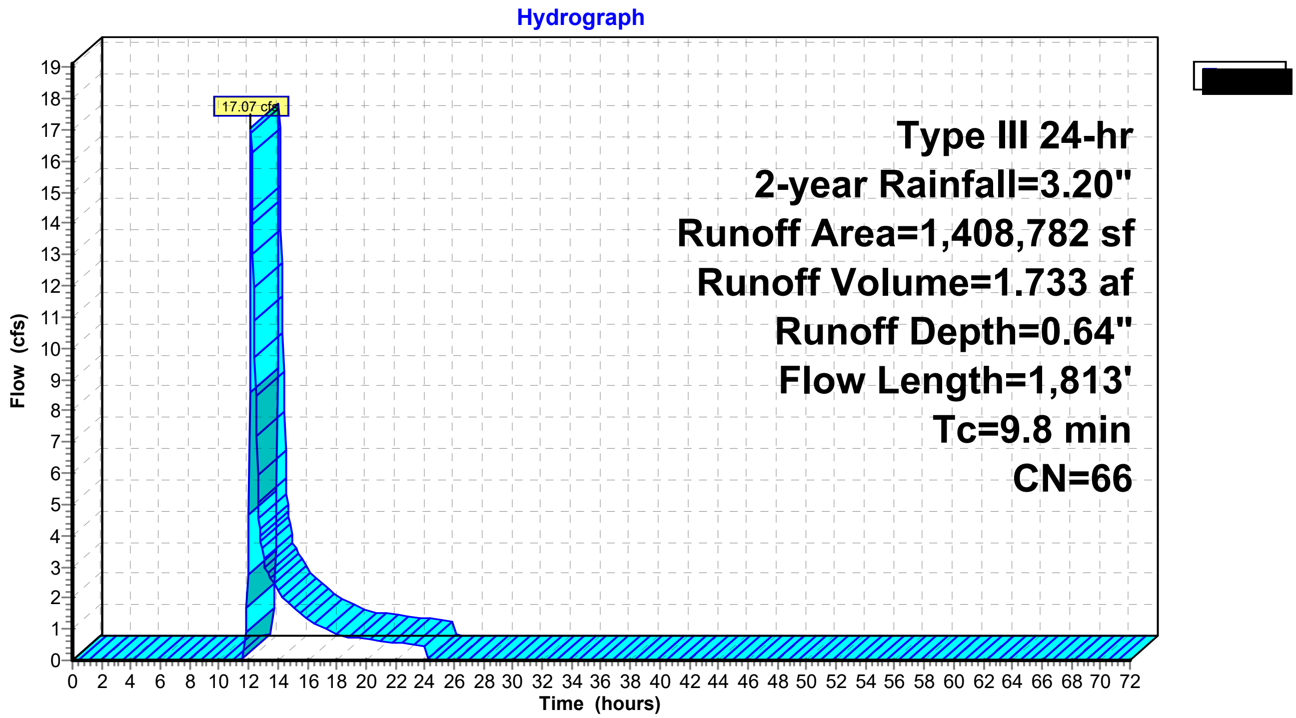
Runoff = 17.07 cfs @ 12.17 hrs, Volume= 1.733 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	137,390	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	1,266,167	70	Gravel pit, HSG A
*	4,469	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	756	98	Water body
*	0	96	Gravel road
*	0	98	Structure
	1,408,782	66	Weighted Average
	1,408,026		99.95% Pervious Area
	756		0.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.20		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
9.1	1,763	0.0403	3.23		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.8	1,813	Total			

Subcatchment 13S: Drainage Area 13



Summary for Reach 10aR: Swale 10a

Inflow Area = 5.867 ac, 13.96% Impervious, Inflow Depth = 0.98" for 2-year event
Inflow = 4.49 cfs @ 12.26 hrs, Volume= 0.480 af
Outflow = 4.28 cfs @ 12.38 hrs, Volume= 0.480 af, Atten= 5%, Lag= 7.2 min

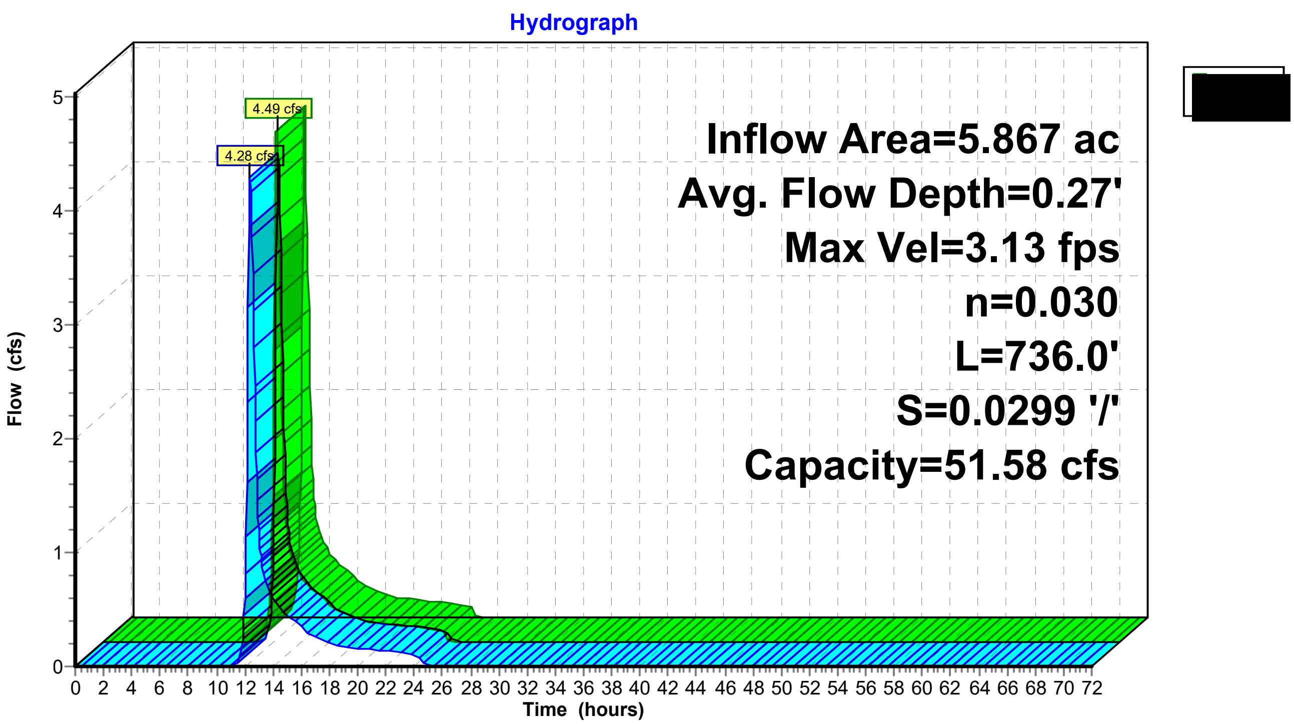
Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.13 fps, Min. Travel Time= 3.9 min
Avg. Velocity = 1.04 fps, Avg. Travel Time= 11.8 min

Peak Storage= 1,017 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 51.58 cfs

4.00' x 1.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 736.0' Slope= 0.0299 '/'
Inlet Invert= 236.00', Outlet Invert= 214.00'

‡

Reach 10aR: Swale 10a



Summary for Reach 12bR: Swale 12b

Inflow Area = 11.115 ac, 7.70% Impervious, Inflow Depth = 1.04" for 2-year event
Inflow = 9.71 cfs @ 12.22 hrs, Volume= 0.961 af
Outflow = 9.01 cfs @ 12.36 hrs, Volume= 0.961 af, Atten= 7%, Lag= 8.5 min

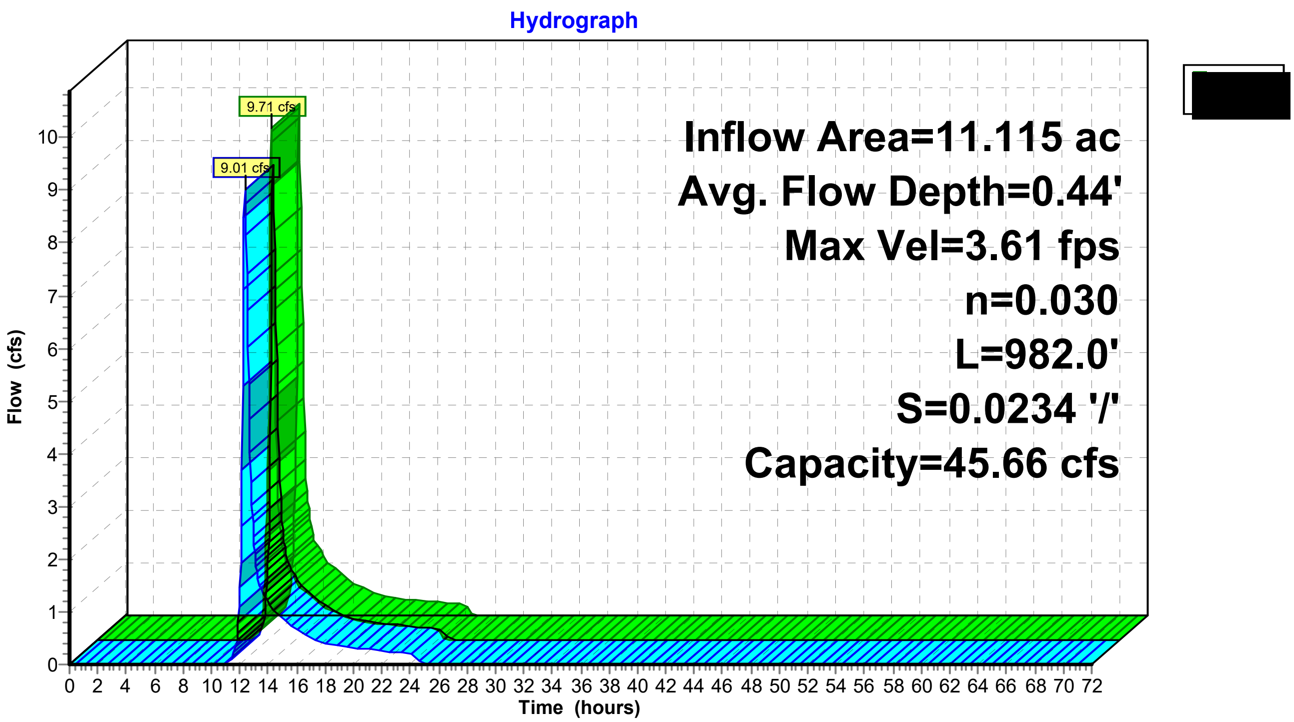
Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.61 fps, Min. Travel Time= 4.5 min
Avg. Velocity = 1.12 fps, Avg. Travel Time= 14.6 min

Peak Storage= 2,461 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 45.66 cfs

4.00' x 1.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 982.0' Slope= 0.0234 '/'
Inlet Invert= 276.00', Outlet Invert= 253.00'

‡

Reach 12bR: Swale 12b



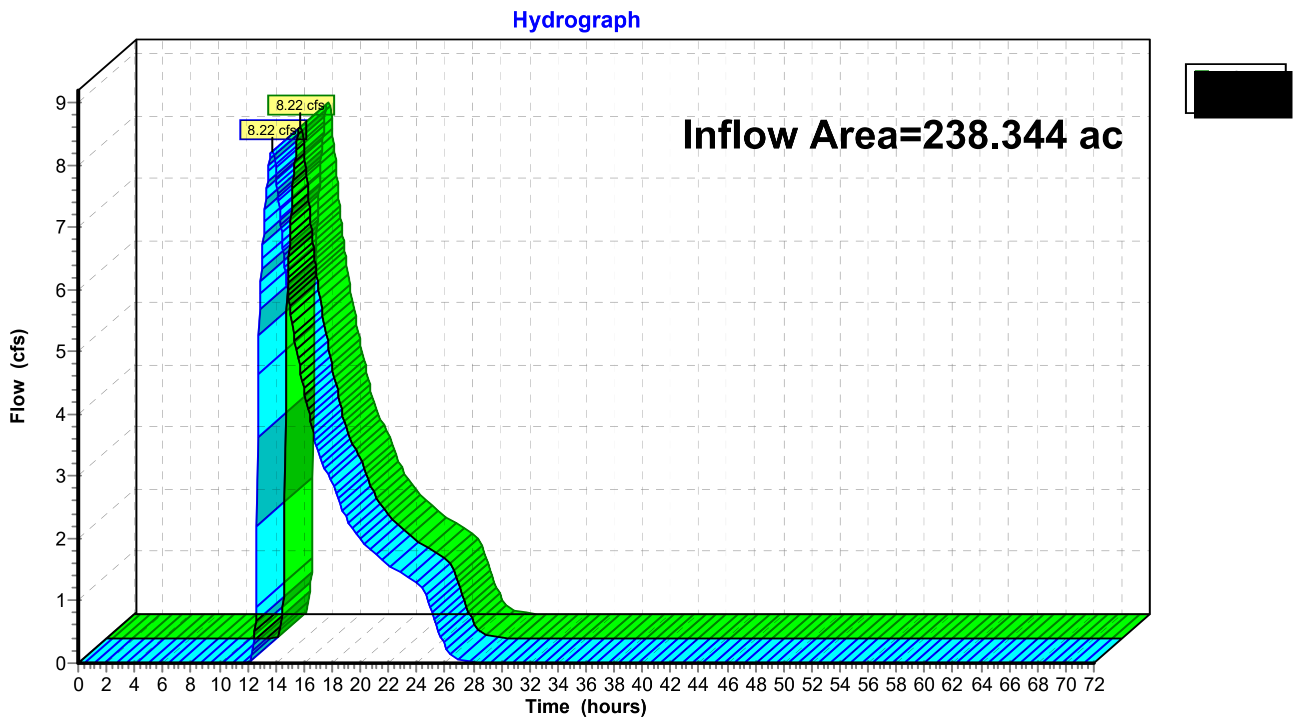
Summary for Reach DP-1: Off-Site West

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 238.344 ac, 10.57% Impervious, Inflow Depth = 0.17" for 2-year event
Inflow = 8.22 cfs @ 13.72 hrs, Volume= 3.425 af
Outflow = 8.22 cfs @ 13.72 hrs, Volume= 3.425 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Off-Site West



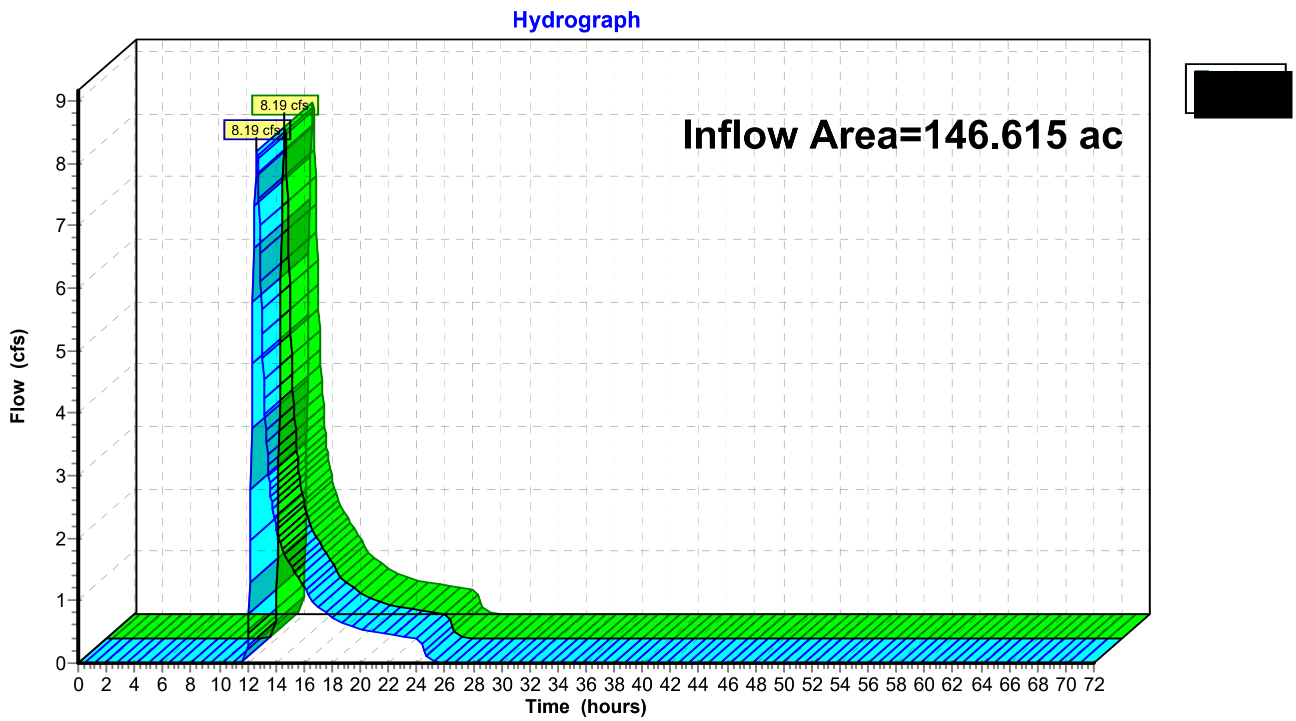
Summary for Reach DP-2: Off-Site South

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 146.615 ac, 22.85% Impervious, Inflow Depth = 0.12" for 2-year event
Inflow = 8.19 cfs @ 12.65 hrs, Volume= 1.409 af
Outflow = 8.19 cfs @ 12.65 hrs, Volume= 1.409 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: Off-Site South



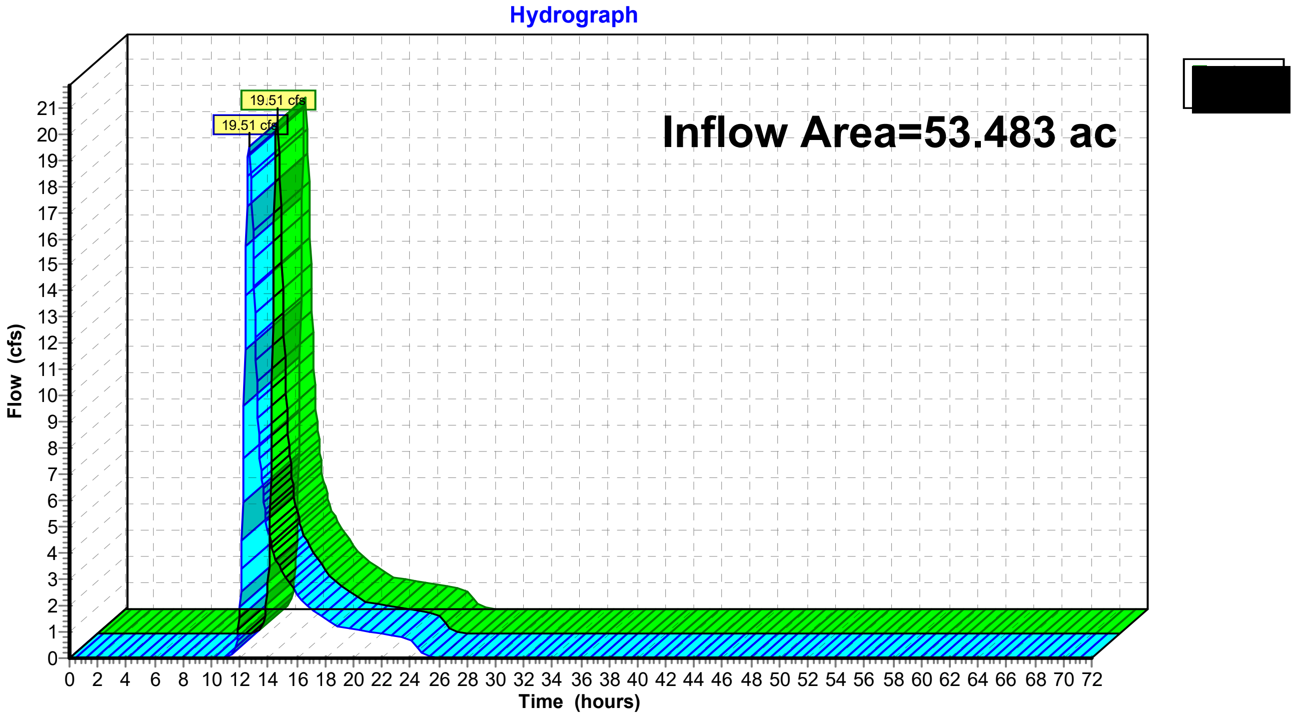
Summary for Reach DP-3: Off-Site East

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 53.483 ac, 12.37% Impervious, Inflow Depth = 0.72" for 2-year event
Inflow = 19.51 cfs @ 12.67 hrs, Volume= 3.201 af
Outflow = 19.51 cfs @ 12.67 hrs, Volume= 3.201 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-3: Off-Site East



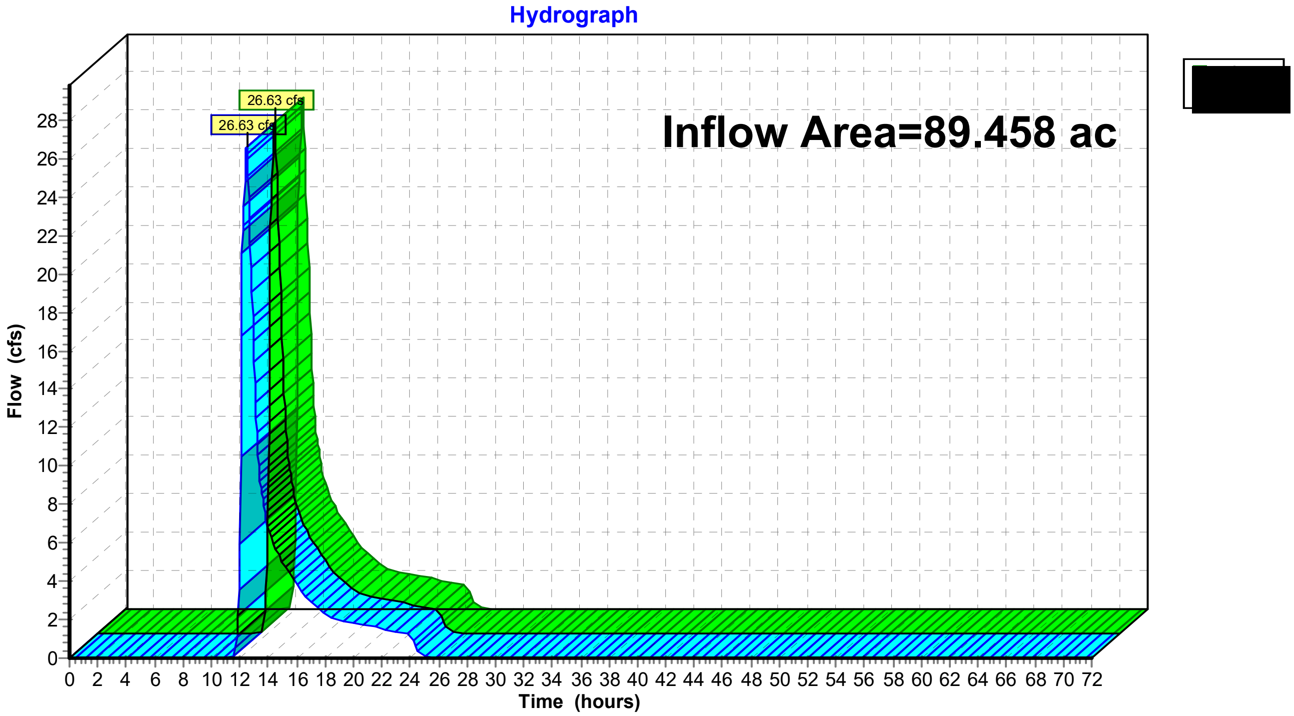
Summary for Reach DP-4: Off-Site Southeast

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 89.458 ac, 5.61% Impervious, Inflow Depth = 0.65" for 2-year event
Inflow = 26.63 cfs @ 12.48 hrs, Volume= 4.810 af
Outflow = 26.63 cfs @ 12.48 hrs, Volume= 4.810 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-4: Off-Site Southeast



Summary for Pond 1bP: Proposed Basin

Inflow Area = 3.365 ac, 28.06% Impervious, Inflow Depth = 0.11" for 2-year event
Inflow = 0.05 cfs @ 13.72 hrs, Volume= 0.030 af
Outflow = 0.05 cfs @ 13.83 hrs, Volume= 0.030 af, Atten= 0%, Lag= 6.2 min
Discarded = 0.05 cfs @ 13.83 hrs, Volume= 0.030 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 152.00' @ 13.83 hrs Surf.Area= 21,734 sf Storage= 18 cf

Plug-Flow detention time= 6.0 min calculated for 0.030 af (100% of inflow)
Center-of-Mass det. time= 6.0 min (1,034.4 - 1,028.5)

Volume	Invert	Avail.Storage	Storage Description
#1	152.00'	55,260 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

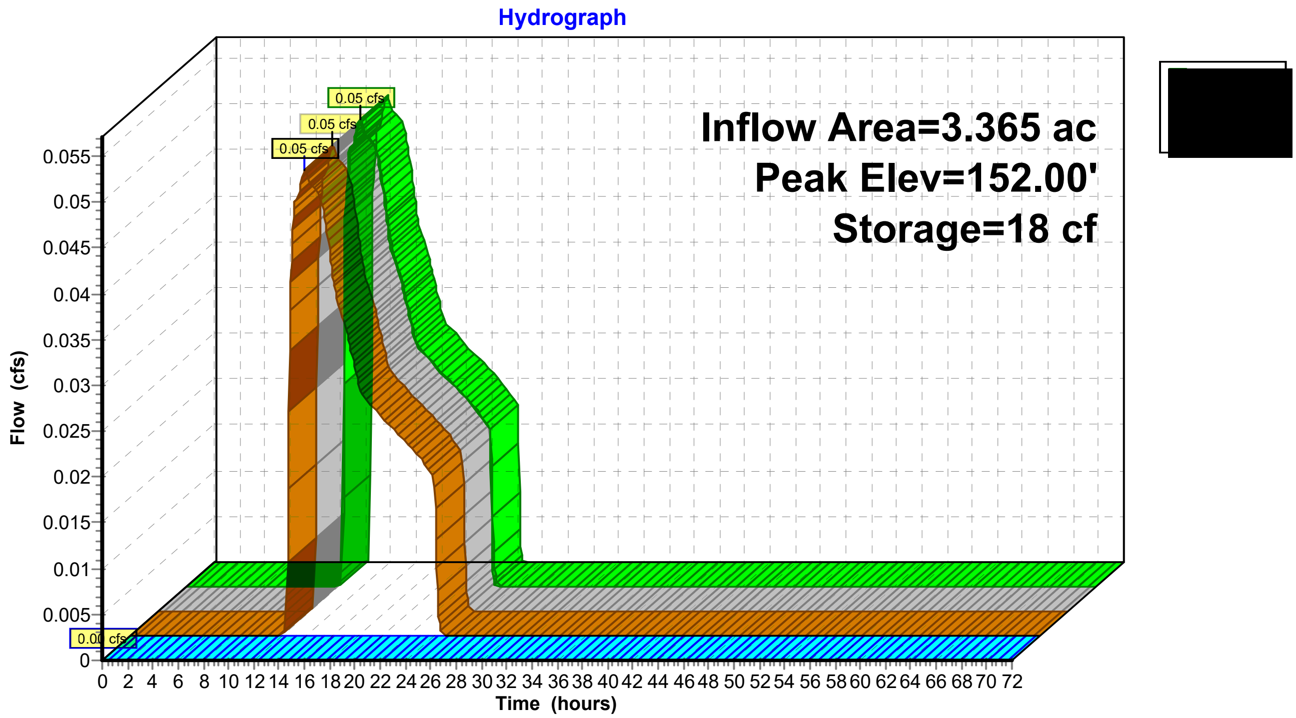
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
152.00	21,729	681.0	0	0	21,729
154.00	33,986	817.0	55,260	55,260	38,010

Device	Routing	Invert	Outlet Devices
#1	Primary	153.50'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	152.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.21 cfs @ 13.83 hrs HW=152.00' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 1.21 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=152.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1bP: Proposed Basin



Summary for Pond 1cP: Proposed Basin

Inflow Area = 9.376 ac, 8.65% Impervious, Inflow Depth = 0.98" for 2-year event
Inflow = 5.66 cfs @ 12.47 hrs, Volume= 0.768 af
Outflow = 3.38 cfs @ 12.83 hrs, Volume= 0.768 af, Atten= 40%, Lag= 22.2 min
Discarded = 0.08 cfs @ 12.83 hrs, Volume= 0.283 af
Primary = 3.31 cfs @ 12.83 hrs, Volume= 0.485 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 227.14' @ 12.83 hrs Surf.Area= 12,142 sf Storage= 10,637 cf

Plug-Flow detention time= 535.9 min calculated for 0.768 af (100% of inflow)
Center-of-Mass det. time= 535.8 min (1,423.9 - 888.0)

Volume	Invert	Avail.Storage	Storage Description
#1	226.00'	23,156 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

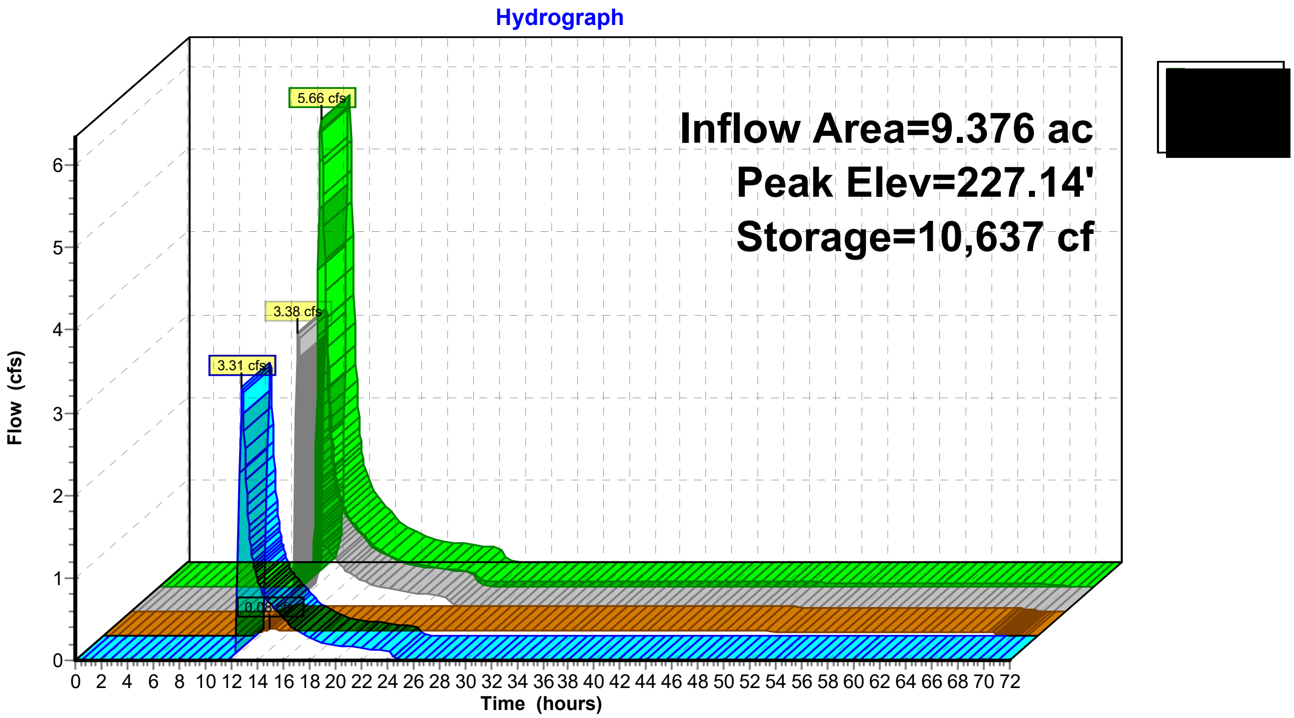
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
226.00	6,727	408.0	0	0	6,727
228.00	17,238	601.0	23,156	23,156	22,256

Device	Routing	Invert	Outlet Devices
#1	Primary	227.00'	**25.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	226.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.08 cfs @ 12.83 hrs HW=227.14' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=3.29 cfs @ 12.83 hrs HW=227.14' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 3.29 cfs @ 0.92 fps)

Pond 1cP: Proposed Basin



Summary for Pond 1dP: Proposed Berm

Inflow Area = 7.830 ac, 7.37% Impervious, Inflow Depth = 1.04" for 2-year event
Inflow = 2.43 cfs @ 13.49 hrs, Volume= 0.677 af
Outflow = 0.36 cfs @ 18.40 hrs, Volume= 0.542 af, Atten= 85%, Lag= 294.5 min
Discarded = 0.10 cfs @ 18.40 hrs, Volume= 0.438 af
Primary = 0.26 cfs @ 18.40 hrs, Volume= 0.104 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 257.55' @ 18.40 hrs Surf.Area= 15,242 sf Storage= 21,001 cf

Plug-Flow detention time= 1,371.4 min calculated for 0.541 af (80% of inflow)
Center-of-Mass det. time= 1,290.0 min (2,244.5 - 954.4)

Volume	Invert	Avail.Storage	Storage Description
#1	256.00'	28,065 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

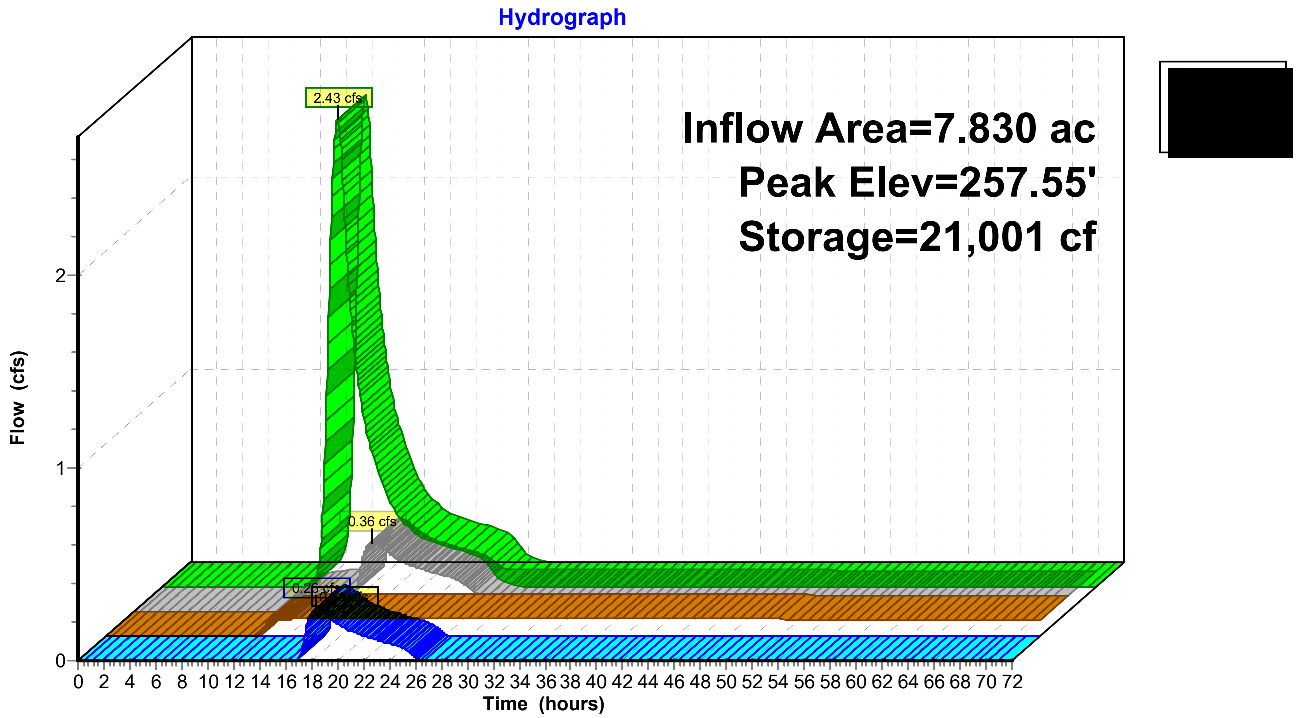
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
256.00	11,894	466.0	0	0	11,894
258.00	16,286	530.0	28,065	28,065	17,063

Device	Routing	Invert	Outlet Devices
#1	Primary	257.50'	**9.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	256.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.10 cfs @ 18.40 hrs HW=257.55' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.26 cfs @ 18.40 hrs HW=257.55' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.26 cfs @ 0.55 fps)

Pond 1dP: Proposed Berm



Summary for Pond 2P: Existing Depression

Inflow Area = 5.349 ac, 1.98% Impervious, Inflow Depth = 0.07" for 2-year event
Inflow = 0.05 cfs @ 14.89 hrs, Volume= 0.033 af
Outflow = 0.05 cfs @ 15.12 hrs, Volume= 0.033 af, Atten= 1%, Lag= 13.5 min
Discarded = 0.05 cfs @ 15.12 hrs, Volume= 0.033 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 168.01' @ 15.12 hrs Surf.Area= 7,646 sf Storage= 43 cf

Plug-Flow detention time= 13.8 min calculated for 0.033 af (100% of inflow)
Center-of-Mass det. time= 13.9 min (1,080.1 - 1,066.2)

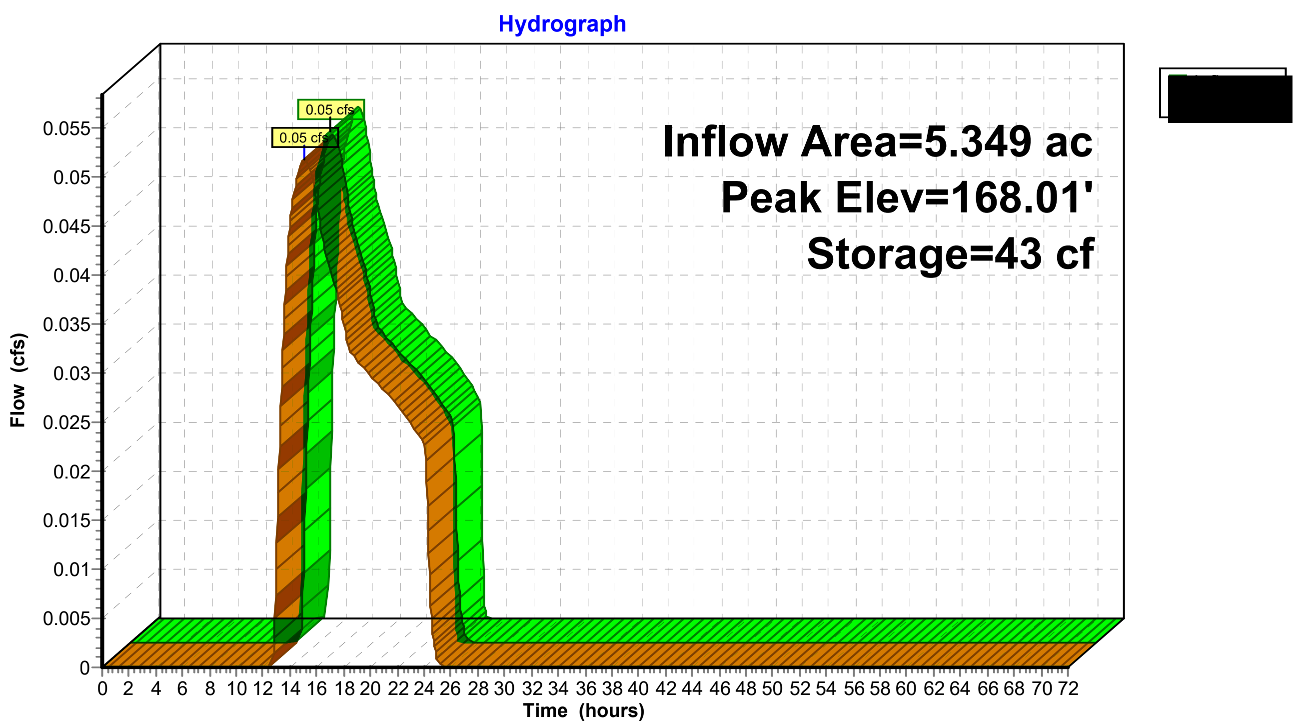
Volume	Invert	Avail.Storage	Storage Description
#1	168.00'	58,289 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
168.00	7,570	407.0	0	0	7,570
170.00	58,771	1,048.0	58,289	58,289	81,803

Device	Routing	Invert	Outlet Devices
#1	Discarded	168.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.18 cfs @ 15.12 hrs HW=168.01' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.18 cfs)

Pond 2P: Existing Depression



Summary for Pond 3aP: Proposed Berm

Inflow Area = 8.260 ac, 3.27% Impervious, Inflow Depth = 0.98" for 2-year event
Inflow = 6.03 cfs @ 12.29 hrs, Volume= 0.677 af
Outflow = 0.22 cfs @ 20.14 hrs, Volume= 0.677 af, Atten= 96%, Lag= 470.9 min
Discarded = 0.22 cfs @ 20.14 hrs, Volume= 0.677 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 272.67' @ 20.14 hrs Surf.Area= 35,098 sf Storage= 20,362 cf

Plug-Flow detention time= 1,018.2 min calculated for 0.676 af (100% of inflow)
Center-of-Mass det. time= 1,018.9 min (1,896.6 - 877.7)

Volume	Invert	Avail.Storage	Storage Description
#1	272.00'	81,503 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

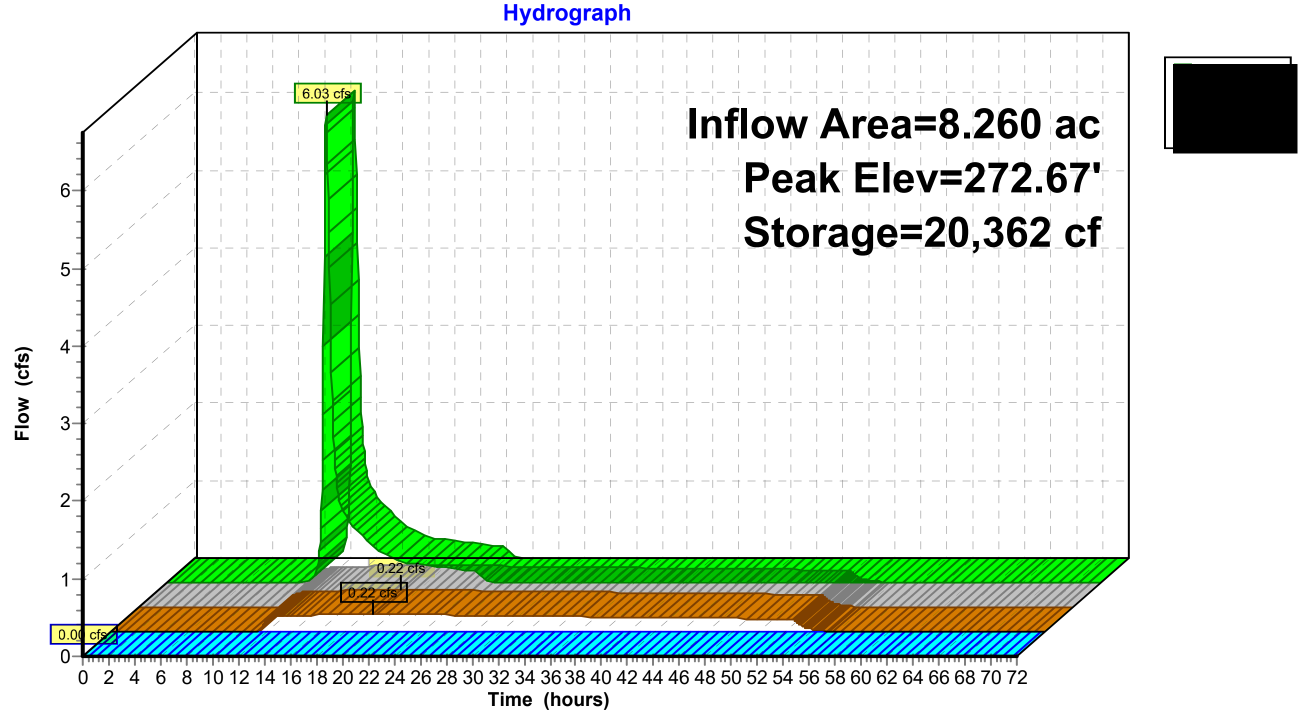
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.00	25,677	871.0	0	0	25,677
274.00	57,990	1,103.0	81,503	81,503	62,174

Device	Routing	Invert	Outlet Devices
#1	Primary	273.75'	**8.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	272.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.22 cfs @ 20.14 hrs HW=272.67' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.22 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=272.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3aP: Proposed Berm



Summary for Pond 3P: Existing Depression

Inflow Area = 31.734 ac, 4.54% Impervious, Inflow Depth = 0.61" for 2-year event
Inflow = 15.24 cfs @ 12.23 hrs, Volume= 1.620 af
Outflow = 0.83 cfs @ 17.41 hrs, Volume= 1.620 af, Atten= 95%, Lag= 311.1 min
Discarded = 0.83 cfs @ 17.41 hrs, Volume= 1.620 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 187.90' @ 17.41 hrs Surf.Area= 35,056 sf Storage= 42,410 cf

Plug-Flow detention time= 652.4 min calculated for 1.619 af (100% of inflow)
Center-of-Mass det. time= 652.9 min (1,536.7 - 883.8)

Volume	Invert	Avail.Storage	Storage Description
#1	186.00'	277,396 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

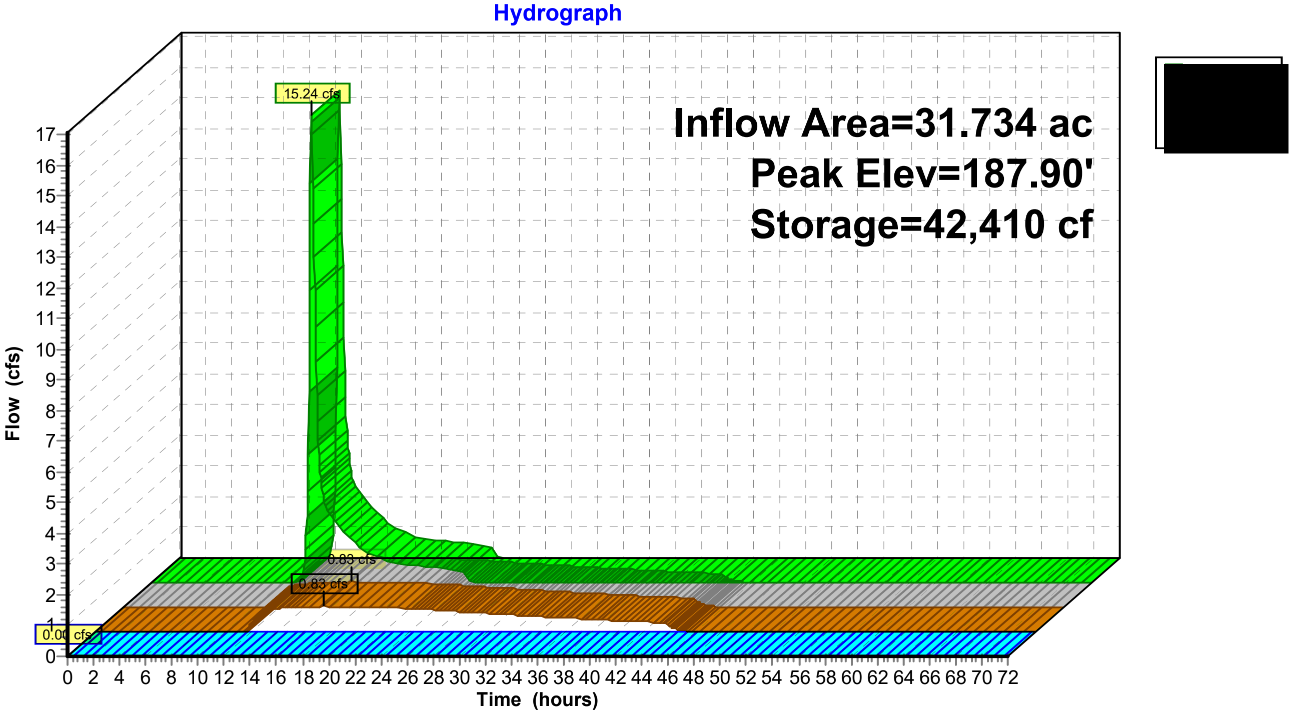
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
186.00	11,737	422.0	0	0	11,737
188.00	36,683	753.0	46,113	46,113	42,709
190.00	58,742	1,001.0	94,563	140,677	77,369
192.00	78,452	1,254.0	136,720	277,396	122,825

Device	Routing	Invert	Outlet Devices
#1	Discarded	186.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	191.00'	**64.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.83 cfs @ 17.41 hrs HW=187.90' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.83 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=186.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Existing Depression



Summary for Pond 4P: Existing Depression

Inflow Area = 16.464 ac, 0.65% Impervious, Inflow Depth = 1.47" for 2-year event
Inflow = 21.75 cfs @ 12.20 hrs, Volume= 2.016 af
Outflow = 0.66 cfs @ 18.17 hrs, Volume= 2.015 af, Atten= 97%, Lag= 358.3 min
Discarded = 0.66 cfs @ 18.17 hrs, Volume= 2.015 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 165.45' @ 18.17 hrs Surf.Area= 28,044 sf Storage= 61,993 cf

Plug-Flow detention time= 1,116.3 min calculated for 2.014 af (100% of inflow)
Center-of-Mass det. time= 1,117.4 min (1,964.2 - 846.9)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	1,773,203 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

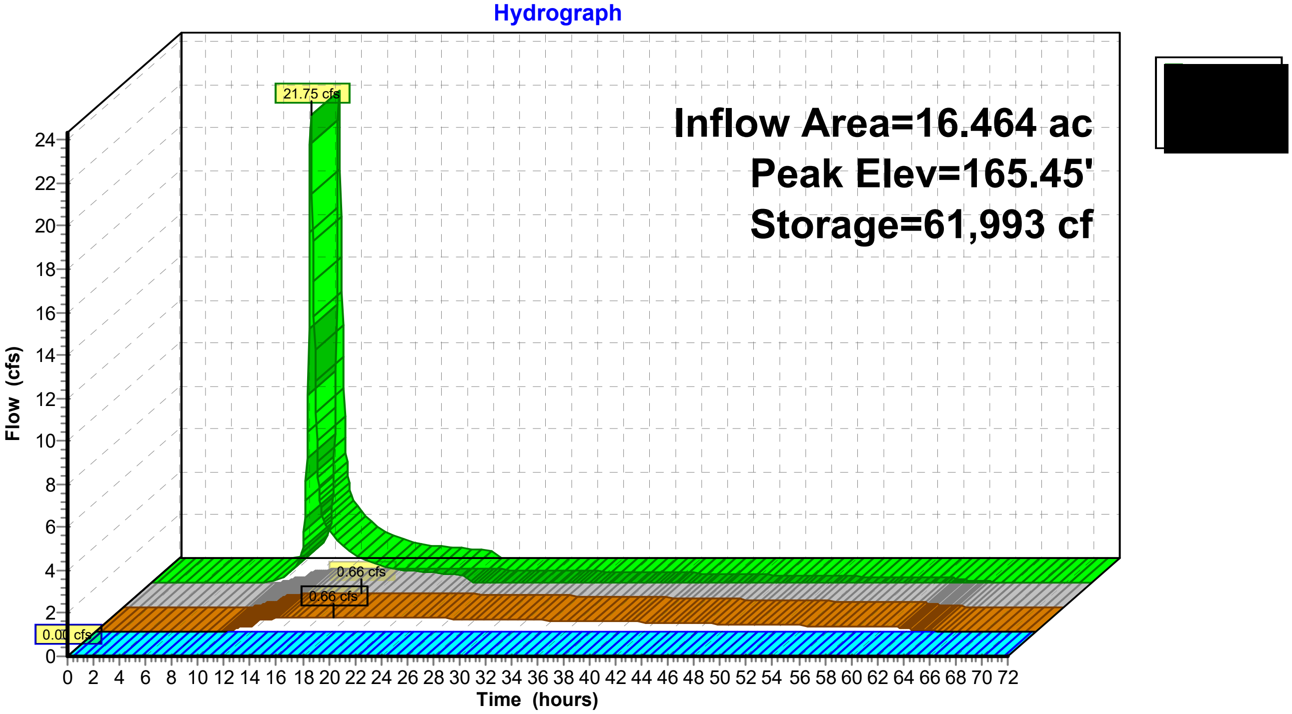
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
162.00	8,040	387.0	0	0	8,040
164.00	20,064	890.0	27,203	27,203	59,171
166.00	31,393	894.0	51,036	78,239	61,043
168.00	59,552	1,582.0	89,455	167,695	196,625
170.00	106,611	3,162.0	163,895	331,590	793,118
172.00	142,449	3,012.0	248,196	579,786	867,073
174.00	182,259	2,708.0	323,891	903,678	1,005,567
176.00	222,778	3,083.0	404,360	1,308,037	1,178,477
178.00	242,528	3,031.0	465,166	1,773,203	1,204,505

Device	Routing	Invert	Outlet Devices
#1	Discarded	162.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	177.00'	**23.0' long x 99.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.66 cfs @ 18.17 hrs HW=165.45' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.66 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=162.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: Existing Depression



Summary for Pond 5bP: Proposed Berm

Inflow Area = 1.206 ac, 64.34% Impervious, Inflow Depth = 1.68" for 2-year event
Inflow = 2.33 cfs @ 12.09 hrs, Volume= 0.169 af
Outflow = 0.19 cfs @ 13.48 hrs, Volume= 0.169 af, Atten= 92%, Lag= 83.2 min
Discarded = 0.19 cfs @ 13.48 hrs, Volume= 0.169 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 230.67' @ 13.48 hrs Surf.Area= 8,126 sf Storage= 3,384 cf

Plug-Flow detention time= 211.4 min calculated for 0.169 af (100% of inflow)
Center-of-Mass det. time= 211.4 min (1,040.9 - 829.6)

Volume	Invert	Avail.Storage	Storage Description
#1	230.00'	26,529 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

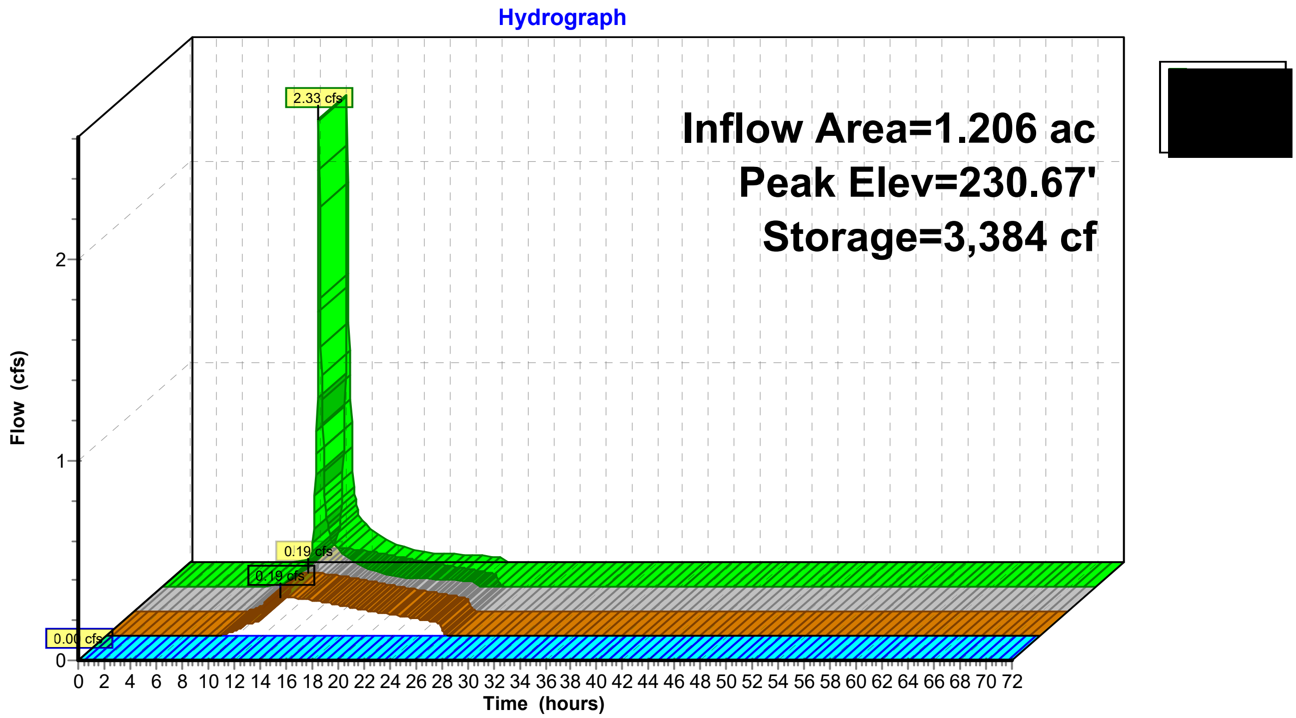
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	2,519	275.0	0	0	2,519
232.00	28,762	1,204.0	26,529	26,529	111,868

Device	Routing	Invert	Outlet Devices
#1	Discarded	230.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	231.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.19 cfs @ 13.48 hrs HW=230.67' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=230.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5bP: Proposed Berm



Summary for Pond 5cP: Proposed Berm

Inflow Area = 6.244 ac, 13.40% Impervious, Inflow Depth = 0.93" for 2-year event
Inflow = 3.58 cfs @ 12.45 hrs, Volume= 0.484 af
Outflow = 0.02 cfs @ 24.62 hrs, Volume= 0.092 af, Atten= 99%, Lag= 730.0 min
Discarded = 0.02 cfs @ 24.62 hrs, Volume= 0.092 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 209.52' @ 24.62 hrs Surf.Area= 9,475 sf Storage= 20,270 cf

Plug-Flow detention time= 1,797.3 min calculated for 0.092 af (19% of inflow)
Center-of-Mass det. time= 1,641.8 min (2,532.2 - 890.4)

Volume	Invert	Avail.Storage	Storage Description
#1	206.00'	37,107 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

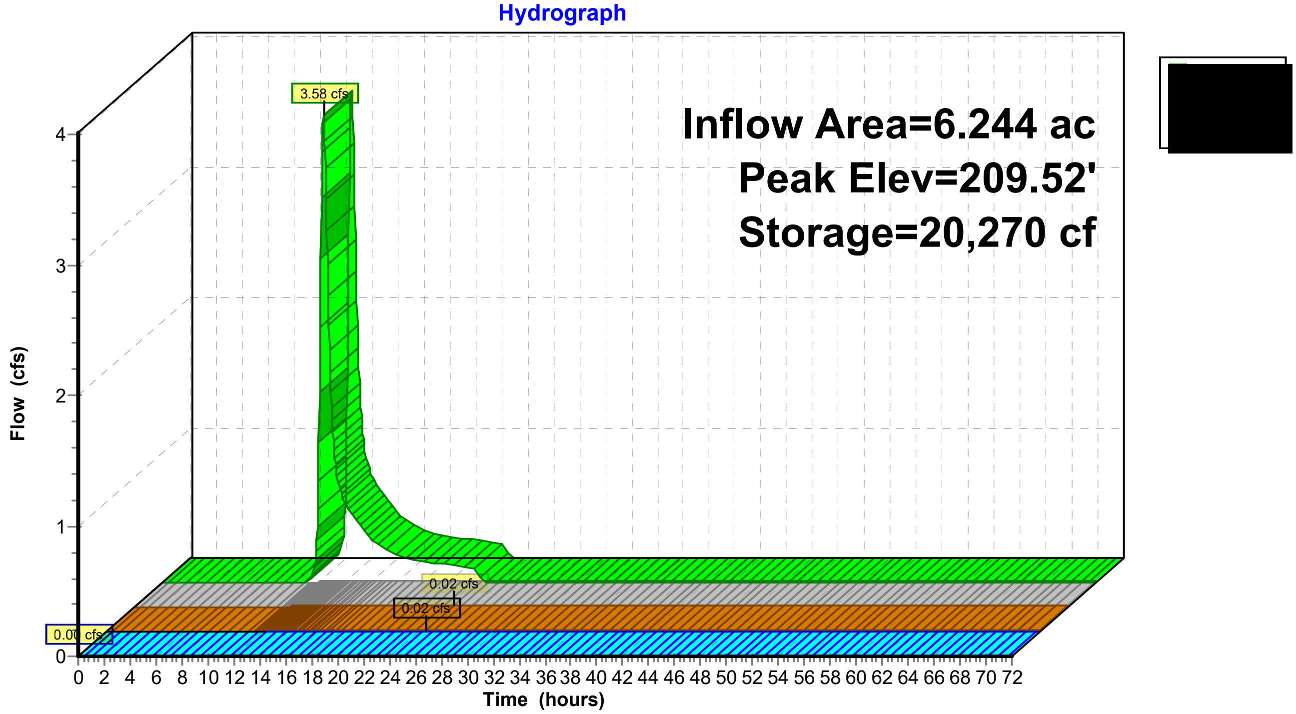
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
206.00	2,702	340.0	0	0	2,702
208.00	6,061	500.0	8,540	8,540	13,430
210.00	10,702	660.0	16,545	25,084	28,245
211.00	13,393	685.0	12,022	37,107	31,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	206.00'	**0.090 in/hr Exfiltration over Surface area**
#2	Primary	210.25'	**4.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.02 cfs @ 24.62 hrs HW=209.52' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=206.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5cP: Proposed Berm



Summary for Pond 5dP: Proposed Berm

Inflow Area = 1.360 ac, 44.82% Impervious, Inflow Depth = 1.76" for 2-year event
Inflow = 2.47 cfs @ 12.13 hrs, Volume= 0.199 af
Outflow = 0.10 cfs @ 16.13 hrs, Volume= 0.199 af, Atten= 96%, Lag= 240.0 min
Discarded = 0.10 cfs @ 16.13 hrs, Volume= 0.199 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 284.36' @ 16.13 hrs Surf.Area= 15,247 sf Storage= 5,256 cf

Plug-Flow detention time= 571.8 min calculated for 0.199 af (100% of inflow)
Center-of-Mass det. time= 572.1 min (1,401.0 - 829.0)

Volume	Invert	Avail.Storage	Storage Description
#1	284.00'	34,488 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

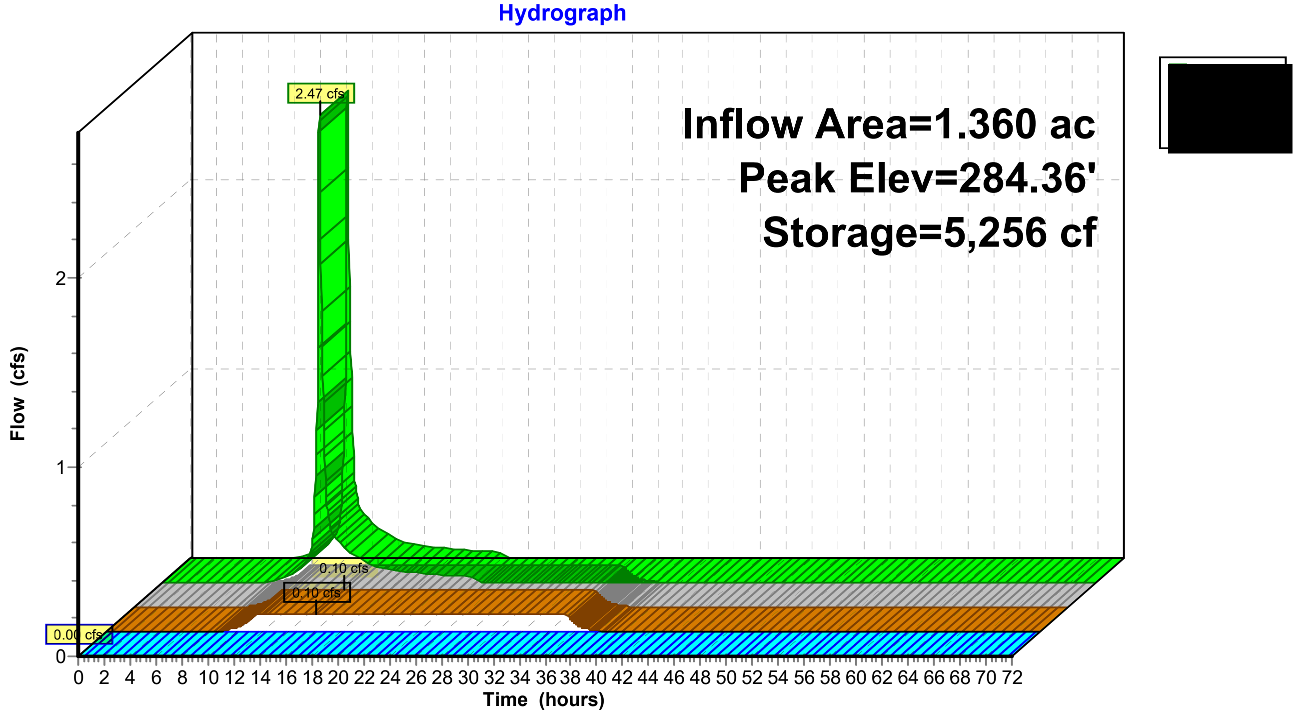
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
284.00	14,216	751.0	0	0	14,216
286.00	20,461	810.0	34,488	34,488	21,709

Device	Routing	Invert	Outlet Devices
#1	Discarded	284.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	285.00'	**8.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.10 cfs @ 16.13 hrs HW=284.36' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=284.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5dP: Proposed Berm



Summary for Pond 5P: Existing Depression

Inflow Area = 68.434 ac, 25.36% Impervious, Inflow Depth = 0.70" for 2-year event
Inflow = 22.64 cfs @ 12.74 hrs, Volume= 3.989 af
Outflow = 4.02 cfs @ 15.21 hrs, Volume= 2.407 af, Atten= 82%, Lag= 147.9 min
Discarded = 0.24 cfs @ 15.21 hrs, Volume= 1.064 af
Primary = 3.79 cfs @ 15.21 hrs, Volume= 1.343 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 167.32' @ 15.21 hrs Surf.Area= 37,747 sf Storage= 107,171 cf

Plug-Flow detention time= 920.3 min calculated for 2.405 af (60% of inflow)
Center-of-Mass det. time= 799.0 min (1,708.2 - 909.2)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	134,374 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

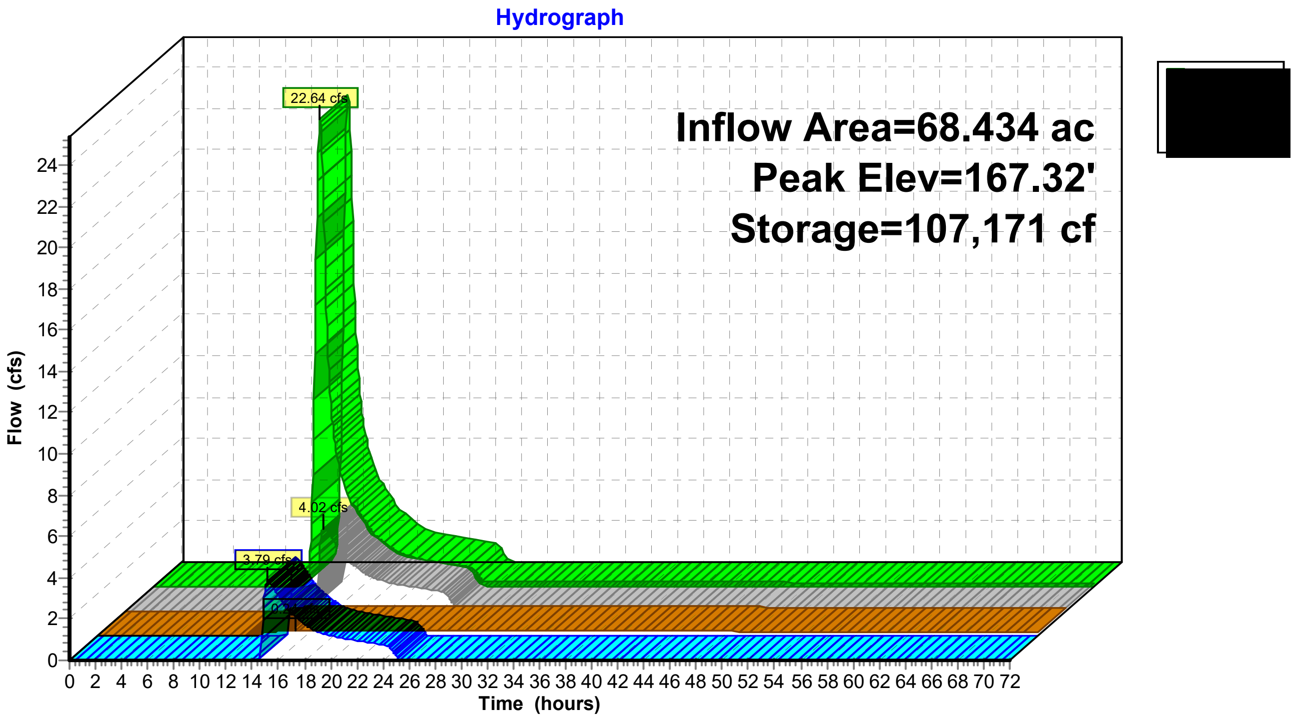
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
162.00	1,686	164.0	0	0	1,686
164.00	17,454	653.0	16,376	16,376	33,489
166.00	29,548	840.0	46,474	62,851	55,756
168.00	42,358	938.0	71,523	134,374	69,736

Device	Routing	Invert	Outlet Devices
#1	Discarded	162.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	167.25'	**71.0' long x 38.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.24 cfs @ 15.21 hrs HW=167.32' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=3.56 cfs @ 15.21 hrs HW=167.32' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 3.56 cfs @ 0.71 fps)

Pond 5P: Existing Depression



Summary for Pond 6bP: Proposed Berm

Inflow Area = 10.770 ac, 17.08% Impervious, Inflow Depth = 0.09" for 2-year event
Inflow = 0.13 cfs @ 14.76 hrs, Volume= 0.081 af
Outflow = 0.13 cfs @ 14.85 hrs, Volume= 0.081 af, Atten= 0%, Lag= 5.3 min
Discarded = 0.13 cfs @ 14.85 hrs, Volume= 0.081 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 164.00' @ 14.85 hrs Surf.Area= 20,627 sf Storage= 46 cf

Plug-Flow detention time= 5.9 min calculated for 0.081 af (100% of inflow)
Center-of-Mass det. time= 5.9 min (1,060.1 - 1,054.2)

Volume	Invert	Avail.Storage	Storage Description
#1	164.00'	83,016 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

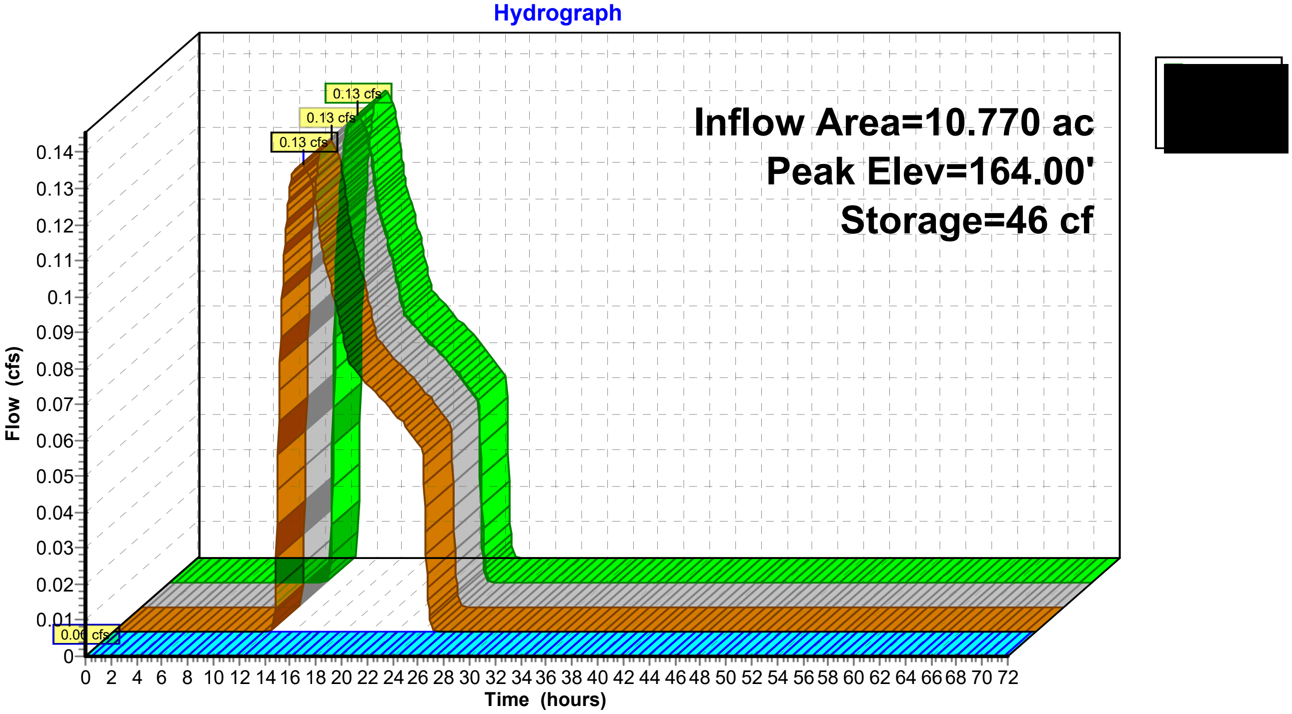
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
164.00	20,590	712.0	0	0	20,590
166.00	66,837	1,639.0	83,016	83,016	194,035

Device	Routing	Invert	Outlet Devices
#1	Primary	165.00'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	164.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.15 cfs @ 14.85 hrs HW=164.00' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 1.15 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=164.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 6bP: Proposed Berm



Summary for Pond 6P: Existing Wetland

Inflow Area = 116.133 ac, 25.36% Impervious, Inflow Depth = 0.24" for 2-year event
Inflow = 7.58 cfs @ 12.29 hrs, Volume= 2.363 af
Outflow = 0.33 cfs @ 24.93 hrs, Volume= 1.333 af, Atten= 96%, Lag= 758.4 min
Discarded = 0.33 cfs @ 24.93 hrs, Volume= 1.333 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 139.81' @ 24.93 hrs Surf.Area= 82,917 sf Storage= 91,037 cf

Plug-Flow detention time= 1,614.6 min calculated for 1.333 af (56% of inflow)
Center-of-Mass det. time= 1,465.3 min (2,488.3 - 1,023.0)

Volume	Invert	Avail.Storage	Storage Description
#1	138.00'	330,471 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

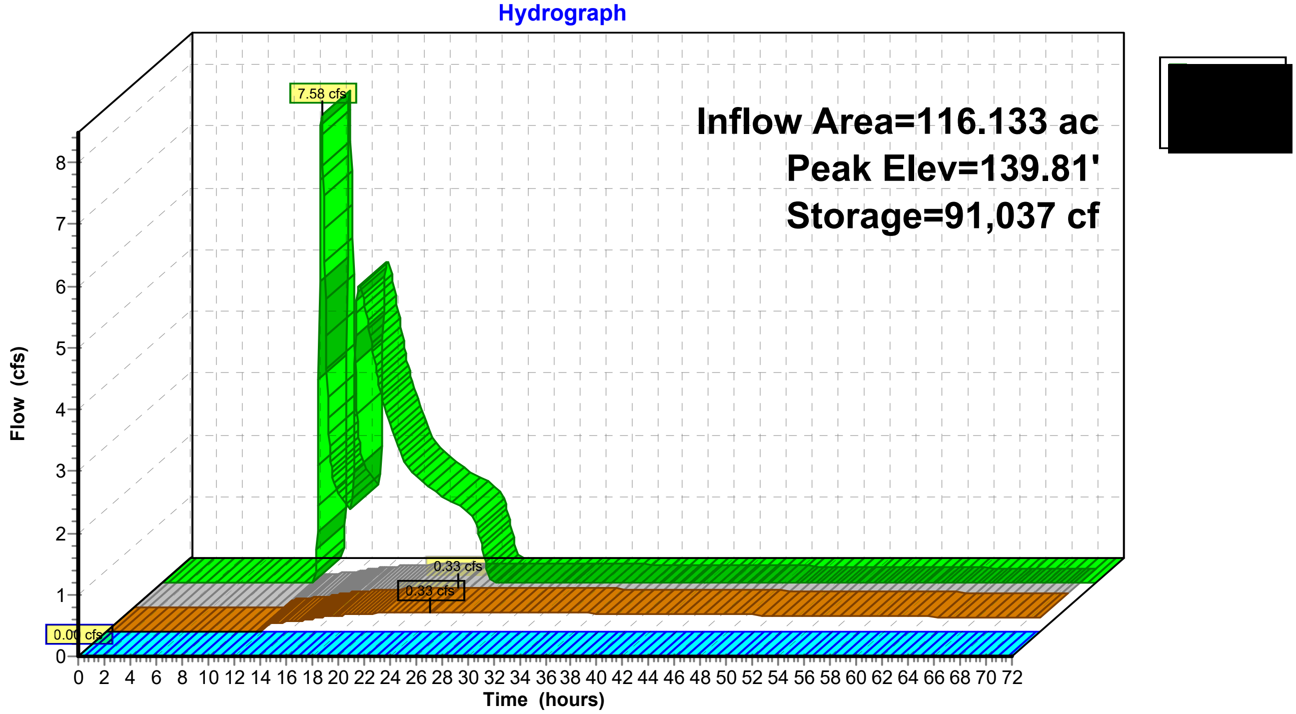
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
138.00	23,460	686.0	0	0	23,460
140.00	91,023	1,816.0	107,129	107,129	248,460
142.00	133,681	2,277.0	223,342	330,471	398,668

Device	Routing	Invert	Outlet Devices
#1	Discarded	138.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	141.00'	**121.0' long x 19.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.33 cfs @ 24.93 hrs HW=139.81' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.33 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=138.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 6P: Existing Wetland



Summary for Pond 7aP: Proposed Berm

Inflow Area = 6.064 ac, 2.54% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 166.00' @ 0.00 hrs Surf.Area= 5,638 sf Storage= 0 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	166.00'	38,794 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

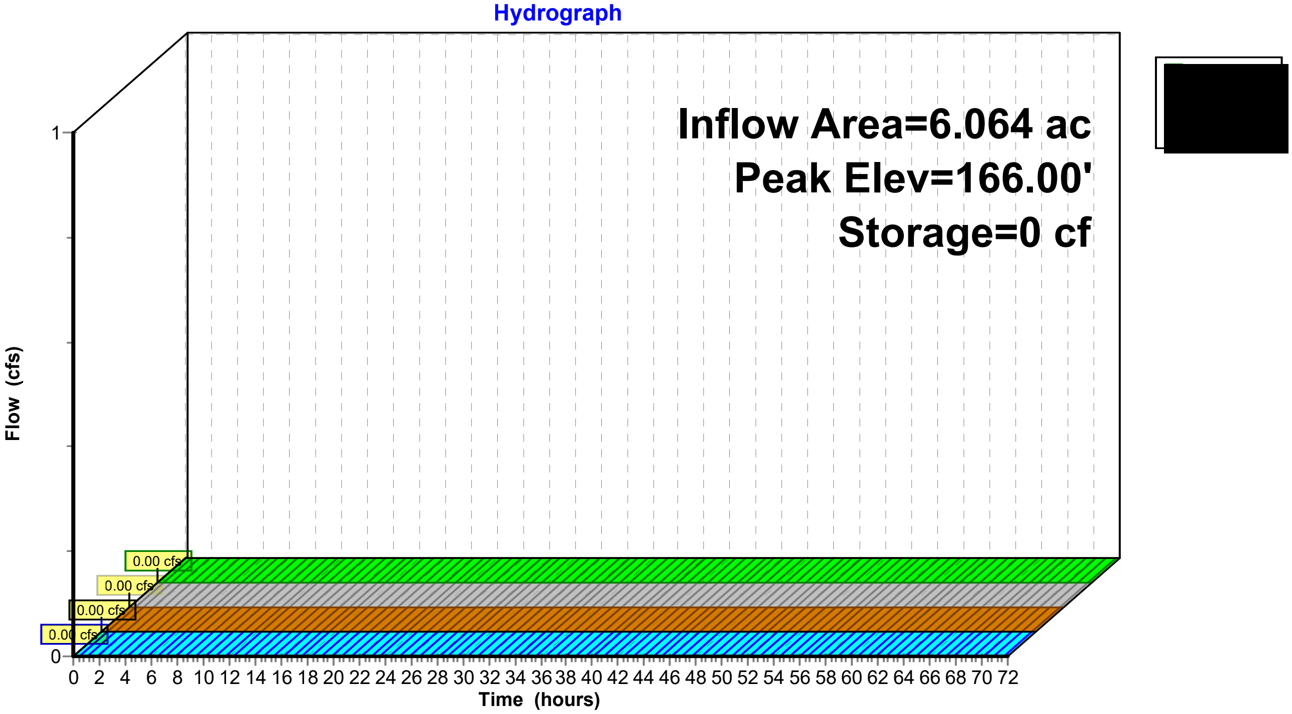
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
166.00	5,638	286.0	0	0	5,638
168.00	37,929	753.0	38,794	38,794	44,264

Device	Routing	Invert	Outlet Devices
#1	Primary	167.50'	**8.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	166.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=166.00' (Free Discharge)
└─**2=Exfiltration** (Passes 0.00 cfs of 0.04 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=166.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 7aP: Proposed Berm



Summary for Pond 7P: Existing Depression

Inflow Area = 78.568 ac, 13.71% Impervious, Inflow Depth = 0.08" for 2-year event
Inflow = 0.83 cfs @ 16.05 hrs, Volume= 0.544 af
Outflow = 0.60 cfs @ 18.60 hrs, Volume= 0.544 af, Atten= 27%, Lag= 152.9 min
Discarded = 0.60 cfs @ 18.60 hrs, Volume= 0.544 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 146.28' @ 18.60 hrs Surf.Area= 10,801 sf Storage= 2,821 cf

Plug-Flow detention time= 47.4 min calculated for 0.544 af (100% of inflow)
Center-of-Mass det. time= 47.3 min (1,176.0 - 1,128.7)

Volume	Invert	Avail.Storage	Storage Description
#1	146.00'	32,409 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

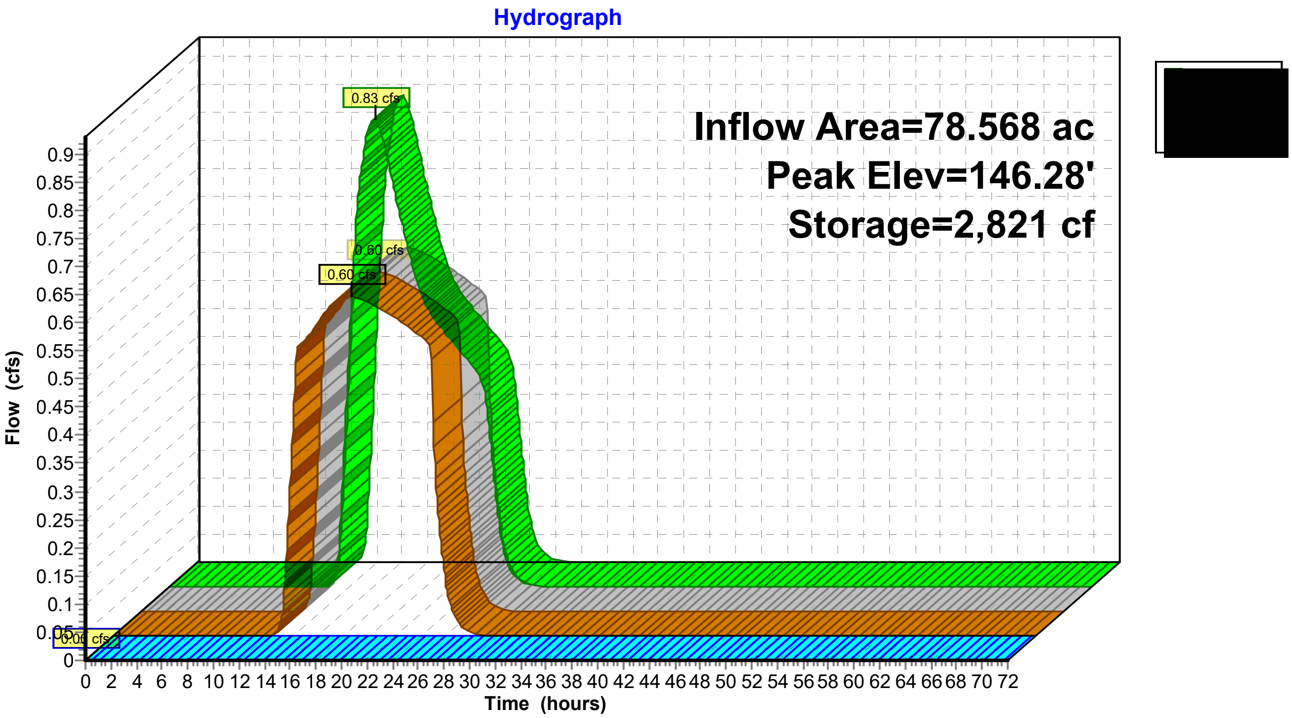
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
146.00	9,050	771.0	0	0	9,050
148.00	24,633	1,236.0	32,409	32,409	83,343

Device	Routing	Invert	Outlet Devices
#1	Primary	147.50'	**14.0' long x 90.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	146.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.60 cfs @ 18.60 hrs HW=146.28' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.60 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=146.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 7P: Existing Depression



Summary for Pond 8P: Existing Wetland

Inflow Area = 8.135 ac, 26.48% Impervious, Inflow Depth = 1.34" for 2-year event
Inflow = 7.84 cfs @ 12.34 hrs, Volume= 0.906 af
Outflow = 0.12 cfs @ 24.27 hrs, Volume= 0.485 af, Atten= 99%, Lag= 715.4 min
Discarded = 0.12 cfs @ 24.27 hrs, Volume= 0.485 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 230.19' @ 24.27 hrs Surf.Area= 29,809 sf Storage= 34,670 cf

Plug-Flow detention time= 1,672.5 min calculated for 0.485 af (54% of inflow)
Center-of-Mass det. time= 1,552.7 min (2,415.0 - 862.3)

Volume	Invert	Avail.Storage	Storage Description
#1	228.00'	130,034 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

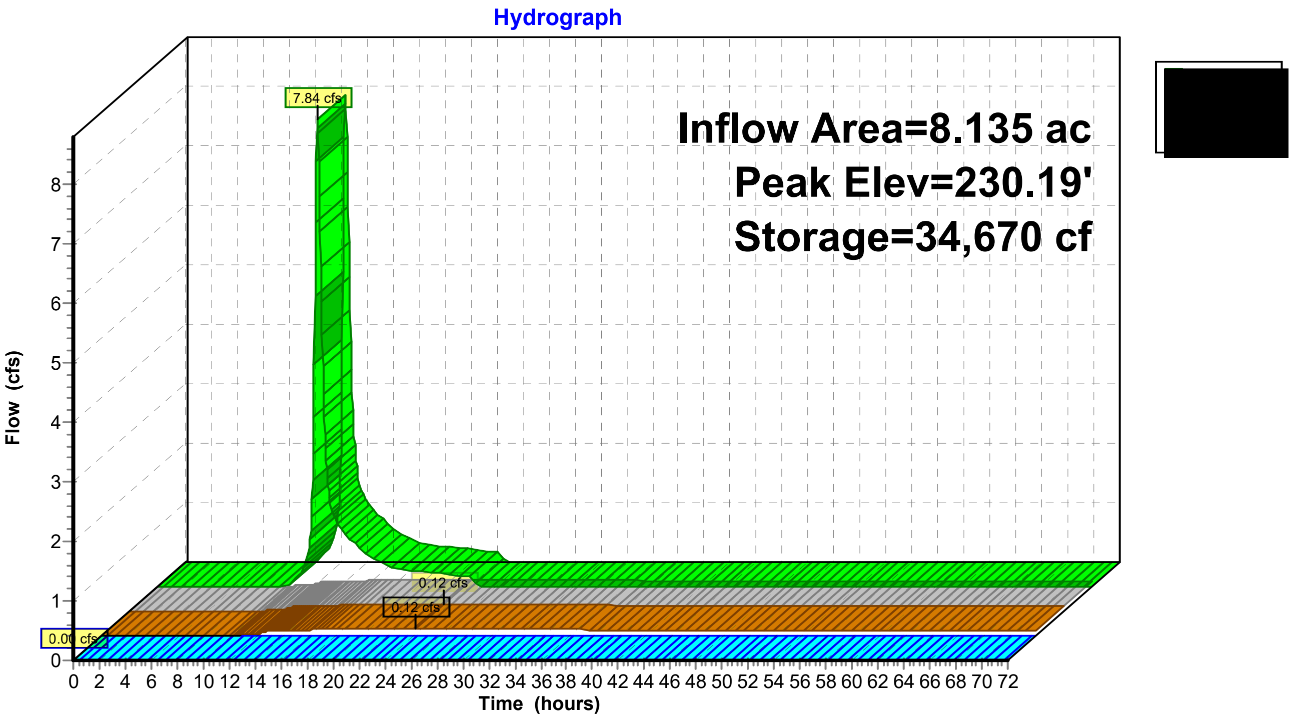
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
228.00	5,806	459.0	0	0	5,806
230.00	25,974	862.0	29,374	29,374	48,191
232.00	79,559	1,189.0	100,661	130,034	101,601

Device	Routing	Invert	Outlet Devices
#1	Discarded	228.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	231.50'	**158.0' long x 196.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.12 cfs @ 24.27 hrs HW=230.19' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=228.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 8P: Existing Wetland



Summary for Pond 9P: Existing Wetland

Inflow Area = 83.043 ac, 27.18% Impervious, Inflow Depth = 0.32" for 2-year event
Inflow = 7.63 cfs @ 12.27 hrs, Volume= 2.235 af
Outflow = 7.59 cfs @ 12.29 hrs, Volume= 2.235 af, Atten= 1%, Lag= 1.0 min
Discarded = 0.01 cfs @ 12.29 hrs, Volume= 0.008 af
Primary = 7.58 cfs @ 12.29 hrs, Volume= 2.227 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 148.20' @ 12.29 hrs Surf.Area= 2,621 sf Storage= 476 cf

Plug-Flow detention time= 1.4 min calculated for 2.233 af (100% of inflow)
Center-of-Mass det. time= 1.4 min (1,018.7 - 1,017.3)

Volume	Invert	Avail.Storage	Storage Description
#1	148.00'	834,530 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

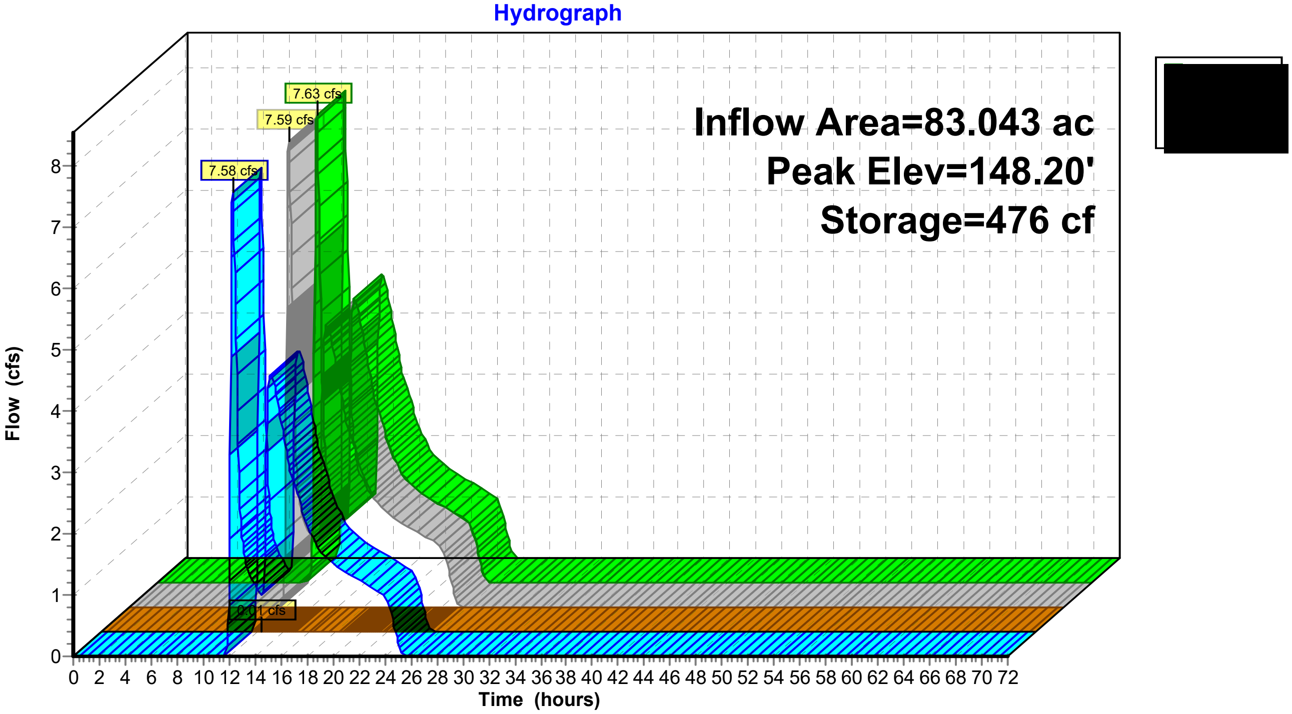
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
148.00	2,138	180.0	0	0	2,138
150.00	9,156	387.0	10,479	10,479	11,495
152.00	135,719	2,199.0	120,084	130,563	384,391
154.00	178,250	2,327.0	313,004	443,567	430,714
156.00	213,235	2,588.0	390,963	834,530	532,915

Device	Routing	Invert	Outlet Devices
#1	Discarded	148.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	148.00'	**31.0' long x 49.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.01 cfs @ 12.29 hrs HW=148.20' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=7.43 cfs @ 12.29 hrs HW=148.20' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 7.43 cfs @ 1.20 fps)

Pond 9P: Existing Wetland



Summary for Pond 10aP: Proposed Berm

Inflow Area = 5.867 ac, 13.96% Impervious, Inflow Depth = 0.98" for 2-year event
Inflow = 4.28 cfs @ 12.38 hrs, Volume= 0.480 af
Outflow = 0.28 cfs @ 16.62 hrs, Volume= 0.480 af, Atten= 93%, Lag= 254.1 min
Discarded = 0.28 cfs @ 16.62 hrs, Volume= 0.480 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 211.99' @ 16.62 hrs Surf.Area= 12,024 sf Storage= 12,122 cf

Plug-Flow detention time= 575.4 min calculated for 0.480 af (100% of inflow)
Center-of-Mass det. time= 575.8 min (1,463.1 - 887.3)

Volume	Invert	Avail.Storage	Storage Description
#1	210.00'	55,040 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

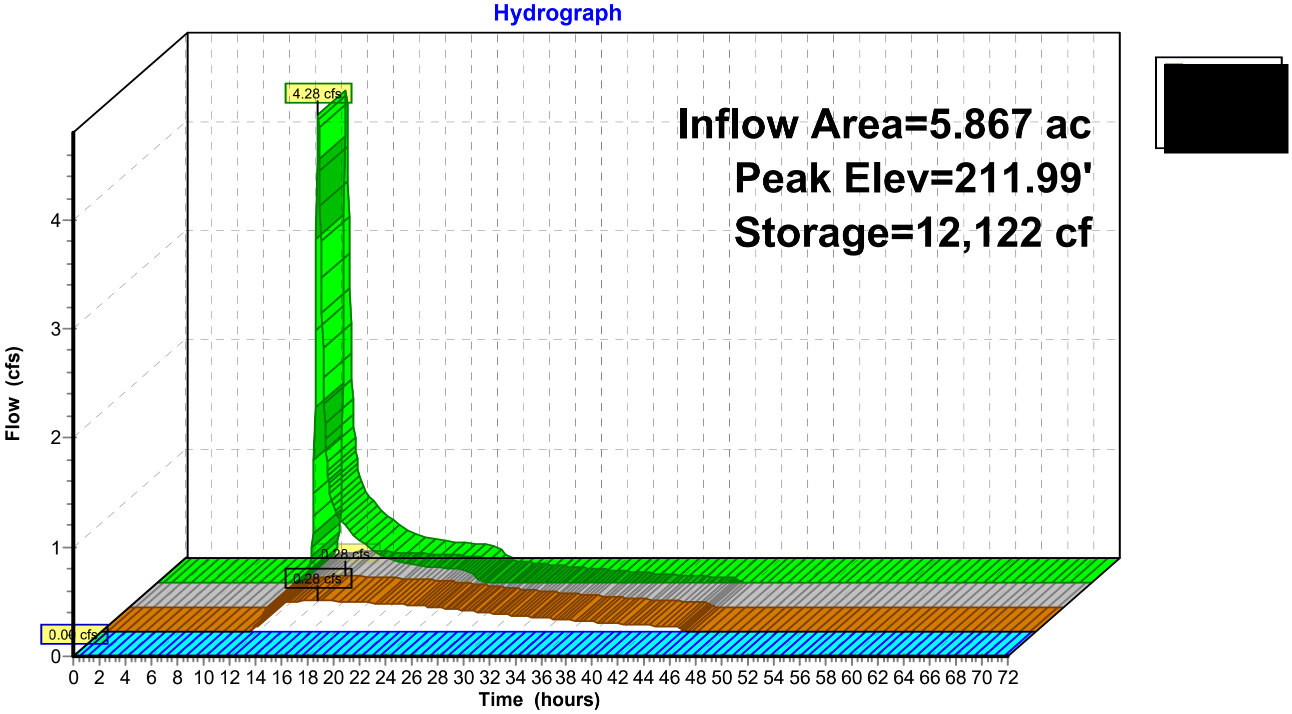
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.00	1,713	254.0	0	0	1,713
212.00	12,100	654.0	12,244	12,244	30,630
214.00	32,319	899.0	42,796	55,040	60,948

Device	Routing	Invert	Outlet Devices
#1	Discarded	210.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	213.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.28 cfs @ 16.62 hrs HW=211.99' (Free Discharge)
└—**1=Exfiltration** (Exfiltration Controls 0.28 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=210.00' (Free Discharge)
└—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 10aP: Proposed Berm



Summary for Pond 11bP: Proposed Berm

Inflow Area = 5.376 ac, 1.97% Impervious, Inflow Depth = 0.48" for 2-year event
Inflow = 1.50 cfs @ 12.31 hrs, Volume= 0.215 af
Outflow = 1.36 cfs @ 12.45 hrs, Volume= 0.215 af, Atten= 9%, Lag= 8.0 min
Discarded = 1.36 cfs @ 12.45 hrs, Volume= 0.215 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 220.02' @ 12.45 hrs Surf.Area= 25,228 sf Storage= 488 cf

Plug-Flow detention time= 6.0 min calculated for 0.215 af (100% of inflow)
Center-of-Mass det. time= 6.0 min (924.9 - 919.0)

Volume	Invert	Avail.Storage	Storage Description
#1	220.00'	66,163 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)
220.00	25,086	664.0	0	0	25,086
222.00	41,783	802.0	66,163	66,163	41,252

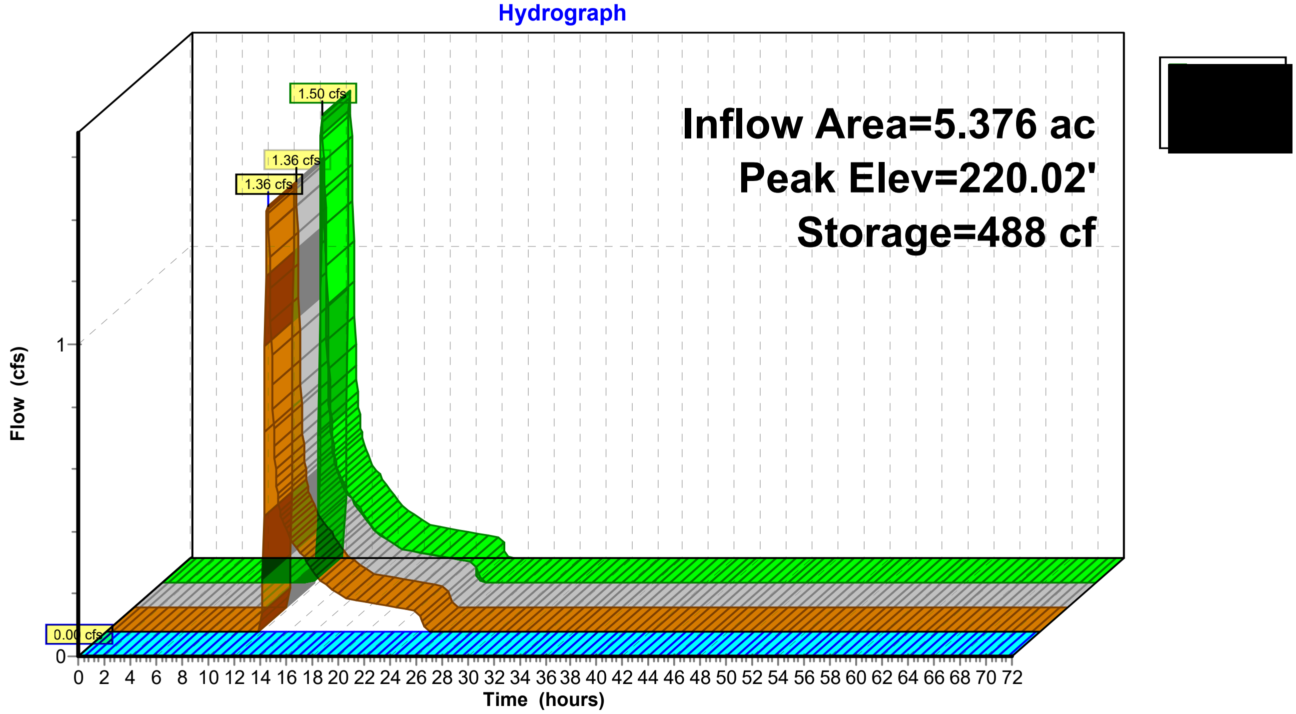
Device	Routing	Invert	Outlet Devices
#1	Primary	221.00'	**30.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	220.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.41 cfs @ 12.45 hrs HW=220.02' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 1.41 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=220.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 11bP: Proposed Berm

Hydrograph



Summary for Pond 11cP: Proposed Berm

Inflow Area =	4.381 ac,	1.10% Impervious, Inflow Depth = 0.64"	for 2-year event	
Inflow =	2.03 cfs @	12.23 hrs, Volume=	0.235 af	
Outflow =	0.55 cfs @	12.88 hrs, Volume=	0.235 af,	Atten= 73%, Lag= 38.6 min
Discarded =	0.55 cfs @	12.88 hrs, Volume=	0.235 af	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 222.24' @ 12.88 hrs Surf.Area= 9,848 sf Storage= 2,325 cf

Plug-Flow detention time= 32.0 min calculated for 0.235 af (100% of inflow)
Center-of-Mass det. time= 32.0 min (930.5 - 898.5)

Volume	Invert	Avail.Storage	Storage Description
#1	222.00'	24,481 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

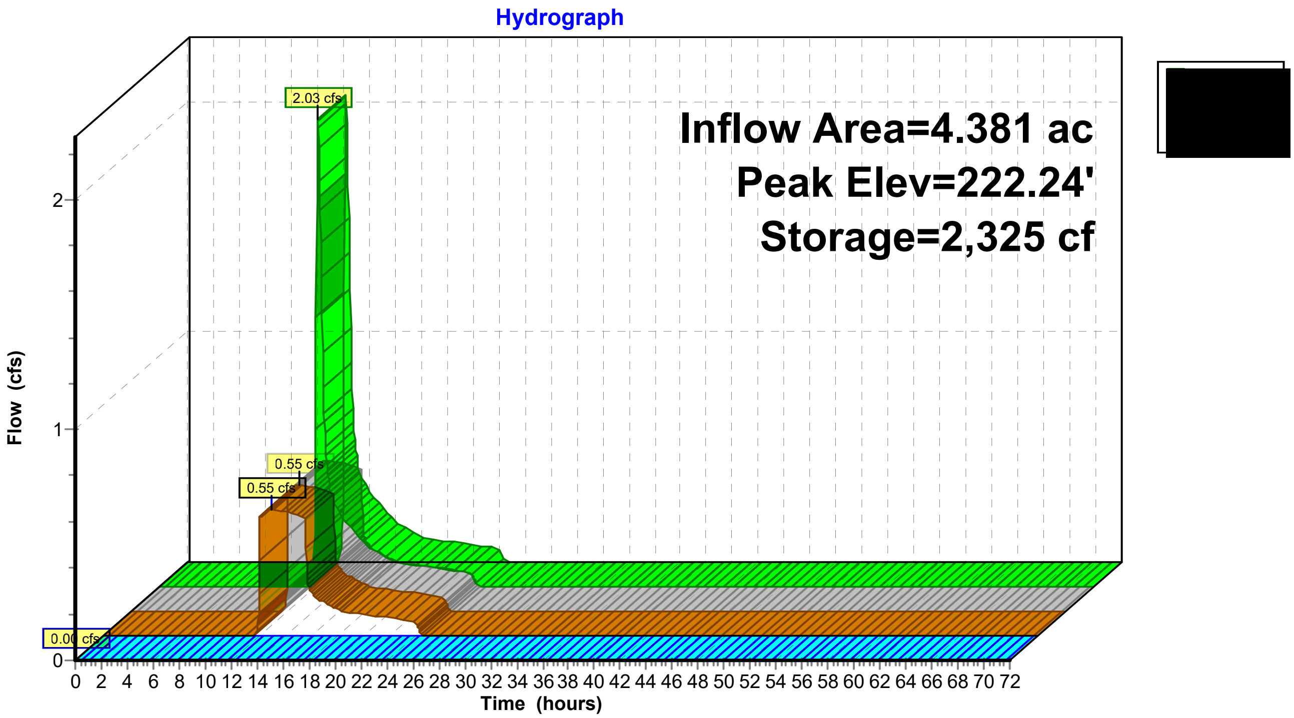
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
222.00	9,148	421.0	0	0	9,148
224.00	15,620	537.0	24,481	24,481	18,043

Device	Routing	Invert	Outlet Devices
#1	Primary	223.75'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	222.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.55 cfs @ 12.88 hrs HW=222.24' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.55 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=222.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 11cP: Proposed Berm



Summary for Pond 12bP: Proposed Berm

Inflow Area = 11.115 ac, 7.70% Impervious, Inflow Depth = 1.04" for 2-year event
Inflow = 9.01 cfs @ 12.36 hrs, Volume= 0.961 af
Outflow = 0.14 cfs @ 24.36 hrs, Volume= 0.630 af, Atten= 98%, Lag= 720.2 min
Discarded = 0.14 cfs @ 24.36 hrs, Volume= 0.630 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 252.57' @ 24.36 hrs Surf.Area= 22,452 sf Storage= 35,755 cf

Plug-Flow detention time= 1,672.8 min calculated for 0.629 af (65% of inflow)
Center-of-Mass det. time= 1,559.6 min (2,442.6 - 883.1)

Volume	Invert	Avail.Storage	Storage Description
#1	250.00'	71,013 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

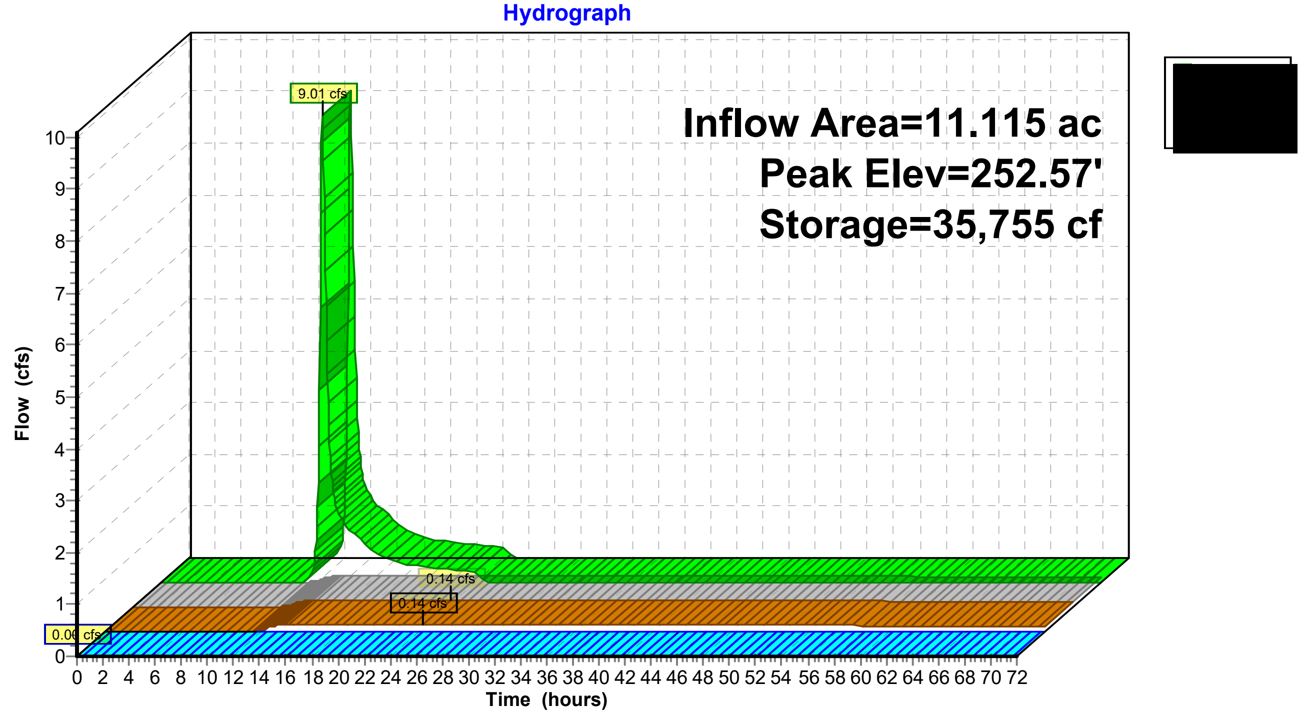
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
250.00	4,608	359.0	0	0	4,608
252.00	20,843	719.0	23,501	23,501	35,509
254.00	26,794	769.0	47,513	71,013	41,614

Device	Routing	Invert	Outlet Devices
#1	Primary	253.00'	**6.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	250.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.14 cfs @ 24.36 hrs HW=252.57' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=250.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12bP: Proposed Berm



Summary for Pond 12cP: Proposed Berm

Inflow Area =	3.285 ac,	8.38% Impervious,	Inflow Depth = 1.09"	for 2-year event
Inflow =	3.97 cfs @	12.10 hrs, Volume=	0.299 af	
Outflow =	0.05 cfs @	24.04 hrs, Volume=	0.208 af,	Atten= 99%, Lag= 716.6 min
Discarded =	0.05 cfs @	24.04 hrs, Volume=	0.208 af	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 252.14' @ 24.04 hrs Surf.Area= 7,932 sf Storage= 10,963 cf

Plug-Flow detention time= 1,628.0 min calculated for 0.208 af (69% of inflow)
Center-of-Mass det. time= 1,524.6 min (2,383.4 - 858.8)

Volume	Invert	Avail.Storage	Storage Description
#1	250.00'	29,339 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

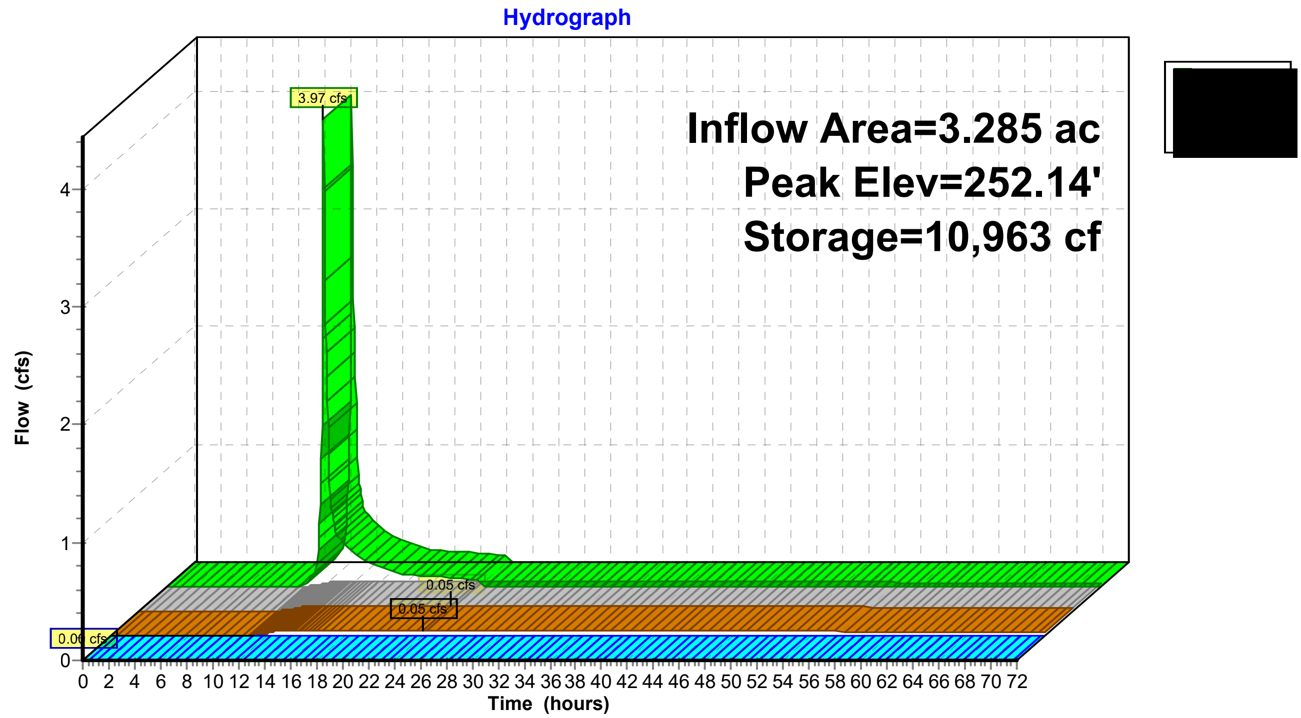
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
250.00	2,632	234.0	0	0	2,632
252.00	7,654	458.0	9,850	9,850	14,987
254.00	11,997	575.0	19,489	29,339	24,660

Device	Routing	Invert	Outlet Devices
#1	Primary	253.75'	**4.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	250.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.05 cfs @ 24.04 hrs HW=252.14' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=250.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12cP: Proposed Berm



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1aS: Drainage Area 1a Runoff Area=3,964,196 sf 11.60% Impervious Runoff Depth=1.12"
Flow Length=4,424' Tc=105.4 min CN=59 Runoff=27.96 cfs 8.513 af

Subcatchment1bS: Drainage Area 1b Runoff Area=146,589 sf 28.06% Impervious Runoff Depth=0.56"
Flow Length=342' Tc=9.9 min CN=49 Runoff=1.01 cfs 0.158 af

Subcatchment1cS: Drainage Area 1c Runoff Area=408,420 sf 8.65% Impervious Runoff Depth=2.12"
Flow Length=1,734' Tc=30.4 min CN=73 Runoff=12.94 cfs 1.660 af

Subcatchment1dS: Drainage Area 1a Runoff Area=341,088 sf 7.37% Impervious Runoff Depth=2.21"
Flow Length=4,424' Tc=105.4 min CN=74 Runoff=5.47 cfs 1.439 af

Subcatchment2S: Drainage Area 2 Runoff Area=233,007 sf 1.98% Impervious Runoff Depth=0.47"
Flow Length=289' Tc=12.1 min CN=47 Runoff=1.14 cfs 0.209 af

Subcatchment3aS: Drainage Area 3a Runoff Area=359,815 sf 3.27% Impervious Runoff Depth=2.12"
Flow Length=794' Tc=19.3 min CN=73 Runoff=13.82 cfs 1.463 af

Subcatchment3bS: Drainage Area 3b Runoff Area=1,022,537 sf 4.99% Impervious Runoff Depth=1.89"
Flow Length=1,119' Tc=14.7 min CN=70 Runoff=38.44 cfs 3.696 af

Subcatchment4S: Drainage Area 4 Runoff Area=717,184 sf 0.65% Impervious Runoff Depth=2.81"
Flow Length=974' Tc=13.9 min CN=81 Runoff=41.95 cfs 3.854 af

Subcatchment5aS: Drainage Area 5 Runoff Area=2,242,858 sf 25.20% Impervious Runoff Depth=2.05"
Flow Length=2,517' Tc=49.6 min CN=72 Runoff=53.17 cfs 8.775 af

Subcatchment5bS: Drainage Area 5 Runoff Area=52,534 sf 64.34% Impervious Runoff Depth=3.09"
Tc=6.0 min CN=84 Runoff=4.25 cfs 0.310 af

Subcatchment5cS: Drainage Area 5 Runoff Area=271,995 sf 13.40% Impervious Runoff Depth=2.05"
Flow Length=1,346' Tc=29.3 min CN=72 Runoff=8.41 cfs 1.064 af

Subcatchment5dS: Drainage Area 5 Runoff Area=59,233 sf 44.82% Impervious Runoff Depth=3.18"
Flow Length=157' Tc=9.1 min CN=85 Runoff=4.44 cfs 0.361 af

Subcatchment6aS: Drainage Area 6 Runoff Area=972,255 sf 22.55% Impervious Runoff Depth=0.47"
Flow Length=1,544' Tc=44.6 min CN=47 Runoff=3.12 cfs 0.871 af

Subcatchment6bS: Drainage Area 6 Runoff Area=469,126 sf 17.08% Impervious Runoff Depth=0.51"
Flow Length=549' Tc=19.6 min CN=48 Runoff=2.44 cfs 0.462 af

Subcatchment7aS: Drainage Area 7a Runoff Area=264,166 sf 2.54% Impervious Runoff Depth=0.11"
Flow Length=3,124' Tc=95.4 min CN=37 Runoff=0.08 cfs 0.053 af

Subcatchment7bS: Drainage Area 7b Runoff Area=3,158,253 sf 14.64% Impervious Runoff Depth=0.51"
Flow Length=3,232' Tc=99.9 min CN=48 Runoff=7.71 cfs 3.111 af

Subcatchment8S: Drainage Area 8 Runoff Area=354,352 sf 26.48% Impervious Runoff Depth=2.63"
Flow Length=883' Tc=23.6 min CN=79 Runoff=15.72 cfs 1.783 af

Subcatchment9S: Drainage Area 9 Runoff Area=636,379 sf 35.74% Impervious Runoff Depth=1.74"
Flow Length=601' Tc=17.1 min CN=68 Runoff=20.47 cfs 2.117 af

Subcatchment10aS: Drainage Area 10 Runoff Area=255,546 sf 13.96% Impervious Runoff Depth=2.12"
Flow Length=378' Tc=17.2 min CN=73 Runoff=10.29 cfs 1.039 af

Subcatchment10bS: Drainage Area 10 Runoff Area=1,072,278 sf 13.17% Impervious Runoff Depth=1.67"
Flow Length=1,752' Tc=40.2 min CN=67 Runoff=22.54 cfs 3.416 af

Subcatchment11aS: Drainage Area 11 Runoff Area=2,062,963 sf 10.23% Impervious Runoff Depth=1.81"
Flow Length=1,904' Tc=38.3 min CN=69 Runoff=49.11 cfs 7.156 af

Subcatchment11bS: Drainage Area 11 Runoff Area=234,184 sf 1.97% Impervious Runoff Depth=1.32"
Flow Length=1,011' Tc=16.2 min CN=62 Runoff=5.47 cfs 0.590 af

Subcatchment11cS: Drainage Area 11 Runoff Area=190,846 sf 1.10% Impervious Runoff Depth=1.59"
Flow Length=957' Tc=14.0 min CN=66 Runoff=5.98 cfs 0.582 af

Subcatchment12aS: Drainage Area 12a Runoff Area=1,702,429 sf 14.03% Impervious Runoff Depth=2.12"
Flow Length=1,596' Tc=44.7 min CN=73 Runoff=44.61 cfs 6.920 af

Subcatchment12bS: Drainage Area 12b Runoff Area=484,189 sf 7.70% Impervious Runoff Depth=2.21"
Flow Length=902' Tc=14.5 min CN=74 Runoff=21.73 cfs 2.043 af

Subcatchment12cS: Drainage Area 12 Runoff Area=143,106 sf 8.38% Impervious Runoff Depth=2.29"
Tc=6.0 min CN=75 Runoff=8.61 cfs 0.626 af

Subcatchment13S: Drainage Area 13 Runoff Area=1,408,782 sf 0.05% Impervious Runoff Depth=1.59"
Flow Length=1,813' Tc=9.8 min CN=66 Runoff=49.82 cfs 4.293 af

Reach 10aR: Swale 10a Avg. Flow Depth=0.43' Max Vel=4.06 fps Inflow=10.29 cfs 1.039 af
n=0.030 L=736.0' S=0.0299 '/' Capacity=51.58 cfs Outflow=10.04 cfs 1.039 af

Reach 12bR: Swale 12b Avg. Flow Depth=0.67' Max Vel=4.60 fps Inflow=21.73 cfs 2.043 af
n=0.030 L=982.0' S=0.0234 '/' Capacity=45.66 cfs Outflow=20.63 cfs 2.043 af

Reach DP-1: Off-Site West Inflow=31.40 cfs 12.135 af
Outflow=31.40 cfs 12.135 af

Reach DP-2: Off-Site South Inflow=22.54 cfs 7.625 af
Outflow=22.54 cfs 7.625 af

Reach DP-3: Off-Site East Inflow=44.61 cfs 7.729 af
Outflow=44.61 cfs 7.729 af

Reach DP-4: Off-Site Southeast Inflow=69.42 cfs 11.449 af
Outflow=69.42 cfs 11.449 af

Pond 1bP: Proposed Basin Peak Elev=152.02' Storage=328 cf Inflow=1.01 cfs 0.158 af
Discarded=0.92 cfs 0.158 af Primary=0.00 cfs 0.000 af Outflow=0.92 cfs 0.158 af

Pond 1cP: Proposed Basin Peak Elev=227.34' Storage=13,095 cf Inflow=12.94 cfs 1.660 af
Discarded=0.08 cfs 0.292 af Primary=12.28 cfs 1.368 af Outflow=12.36 cfs 1.660 af

Pond 1dP: Proposed Berm Peak Elev=257.79' Storage=24,646 cf Inflow=5.47 cfs 1.439 af
Discarded=0.10 cfs 0.449 af Primary=3.43 cfs 0.851 af Outflow=3.52 cfs 1.300 af

Pond 2P: Existing Depression Peak Elev=168.25' Storage=2,295 cf Inflow=1.14 cfs 0.209 af
Outflow=0.27 cfs 0.209 af

Pond 3aP: Proposed Berm Peak Elev=273.41' Storage=50,389 cf Inflow=13.82 cfs 1.463 af
Discarded=0.29 cfs 1.250 af Primary=0.00 cfs 0.000 af Outflow=0.29 cfs 1.250 af

Pond 3P: Existing Depression Peak Elev=189.49' Storage=112,497 cf Inflow=38.44 cfs 3.696 af
Discarded=1.24 cfs 3.696 af Primary=0.00 cfs 0.000 af Outflow=1.24 cfs 3.696 af

Pond 4P: Existing Depression Peak Elev=167.19' Storage=124,488 cf Inflow=41.95 cfs 3.854 af
Discarded=1.11 cfs 3.611 af Primary=0.00 cfs 0.000 af Outflow=1.11 cfs 3.611 af

Pond 5bP: Proposed Berm Peak Elev=231.02' Storage=6,935 cf Inflow=4.25 cfs 0.310 af
Discarded=0.29 cfs 0.310 af Primary=0.00 cfs 0.000 af Outflow=0.29 cfs 0.310 af

Pond 5cP: Proposed Berm Peak Elev=210.45' Storage=30,175 cf Inflow=8.41 cfs 1.064 af
Discarded=0.02 cfs 0.115 af Primary=0.88 cfs 0.394 af Outflow=0.90 cfs 0.509 af

Pond 5dP: Proposed Berm Peak Elev=284.72' Storage=10,955 cf Inflow=4.44 cfs 0.361 af
Discarded=0.10 cfs 0.361 af Primary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.361 af

Pond 5P: Existing Depression Peak Elev=167.62' Storage=118,856 cf Inflow=53.17 cfs 9.169 af
Discarded=0.25 cfs 1.083 af Primary=43.55 cfs 6.496 af Outflow=43.79 cfs 7.579 af

Pond 6bP: Proposed Berm Peak Elev=164.10' Storage=2,066 cf Inflow=2.44 cfs 0.462 af
Discarded=1.24 cfs 0.462 af Primary=0.00 cfs 0.000 af Outflow=1.24 cfs 0.462 af

Pond 6P: Existing Wetland Peak Elev=141.11' Storage=220,087 cf Inflow=50.57 cfs 9.473 af
Discarded=0.45 cfs 2.057 af Primary=11.37 cfs 4.209 af Outflow=11.82 cfs 6.266 af

Pond 7aP: Proposed Berm Peak Elev=166.12' Storage=719 cf Inflow=0.08 cfs 0.053 af
Discarded=0.04 cfs 0.053 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.053 af

Pond 7P: Existing Depression Peak Elev=147.76' Storage=26,747 cf Inflow=7.71 cfs 3.111 af
Discarded=1.25 cfs 1.708 af Primary=4.95 cfs 1.403 af Outflow=6.20 cfs 3.111 af

Pond 8P: Existing Wetland Peak Elev=231.06' Storage=69,294 cf Inflow=15.72 cfs 1.783 af
Discarded=0.20 cfs 0.844 af Primary=0.00 cfs 0.000 af Outflow=0.20 cfs 0.844 af

Pond 9P: Existing Wetland Peak Elev=148.69' Storage=2,089 cf Inflow=47.85 cfs 8.613 af
Discarded=0.02 cfs 0.011 af Primary=47.59 cfs 8.601 af Outflow=47.61 cfs 8.613 af

Pond 10aP: Proposed Berm Peak Elev=213.02' Storage=29,048 cf Inflow=10.04 cfs 1.039 af
Discarded=0.50 cfs 1.039 af Primary=0.00 cfs 0.000 af Outflow=0.50 cfs 1.039 af

Pond 11bP: Proposed Berm Peak Elev=220.24' Storage=6,323 cf Inflow=5.47 cfs 0.590 af
Discarded=1.50 cfs 0.590 af Primary=0.00 cfs 0.000 af Outflow=1.50 cfs 0.590 af

Pond 11cP: Proposed Berm Peak Elev=222.97' Storage=10,253 cf Inflow=5.98 cfs 0.582 af
Discarded=0.67 cfs 0.582 af Primary=0.00 cfs 0.000 af Outflow=0.67 cfs 0.582 af

Pond 12bP: Proposed Berm Peak Elev=253.26' Storage=52,011 cf Inflow=20.63 cfs 2.043 af
Discarded=0.15 cfs 0.707 af Primary=1.95 cfs 0.809 af Outflow=2.10 cfs 1.516 af

Pond 12cP: Proposed Berm Peak Elev=253.56' Storage=24,310 cf Inflow=8.61 cfs 0.626 af
Discarded=0.07 cfs 0.310 af Primary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.310 af

Total Runoff Area = 533.249 ac Runoff Volume = 66.565 af Average Runoff Depth = 1.50"
86.79% Pervious = 462.798 ac 13.21% Impervious = 70.450 ac

Summary for Subcatchment 1aS: Drainage Area 1a

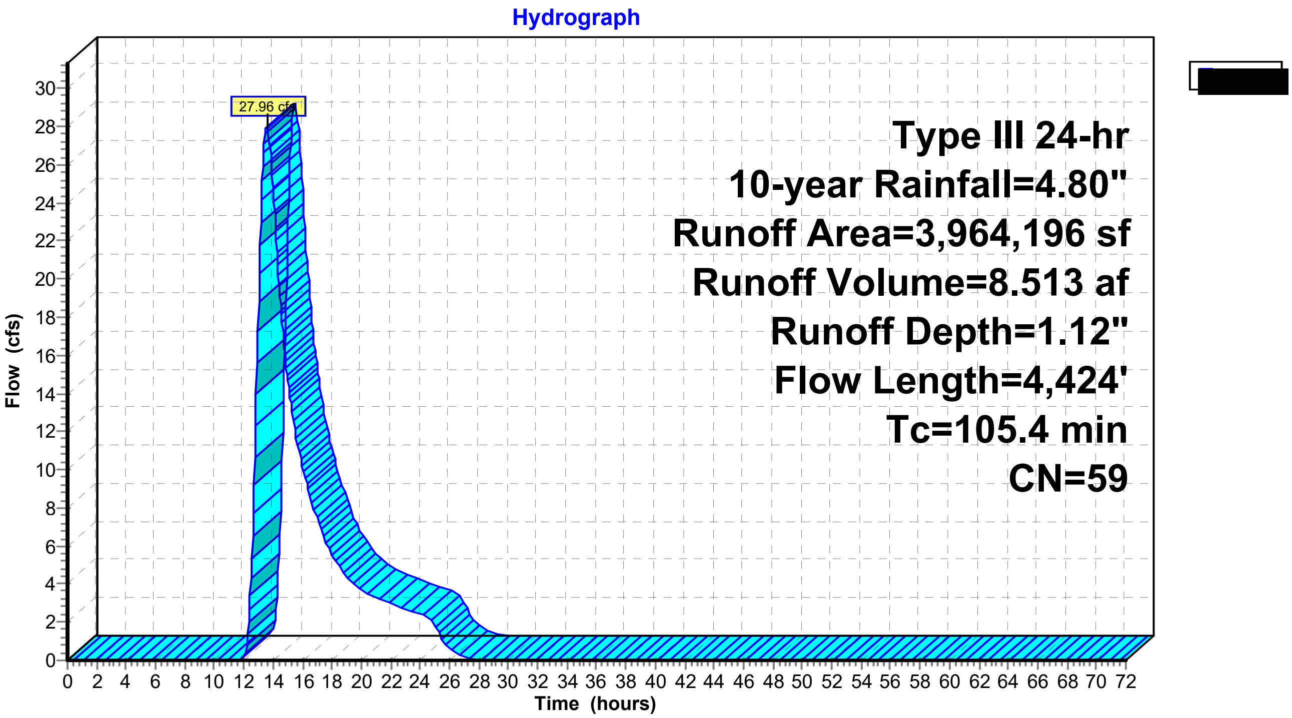
Runoff = 27.96 cfs @ 13.58 hrs, Volume= 8.513 af, Depth= 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	482,442	30	Meadow, non-grazed, HSG A
	538,022	58	Meadow, non-grazed, HSG B
	942,184	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	515,616	30	Woods, Good, HSG A
	704,263	55	Woods, Good, HSG B
	225,155	70	Woods, Good, HSG C
	10,840	77	Woods, Good, HSG D
*	33,102	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	414,914	98	Water body
*	52,839	96	Gravel road
*	0	98	Structure
*	1,438	98	Panels
*	4,403	98	Equipment pad
*	38,978	98	Paved
	3,964,196	59	Weighted Average
	3,504,463		88.40% Pervious Area
	459,733		11.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
11.3	356	0.0110	0.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.1	433	0.0020	0.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.3	222	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.5	766	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
46.9	2,597	0.0340	0.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
105.4	4,424	Total			

Subcatchment 1aS: Drainage Area 1a



Summary for Subcatchment 1bS: Drainage Area 1b

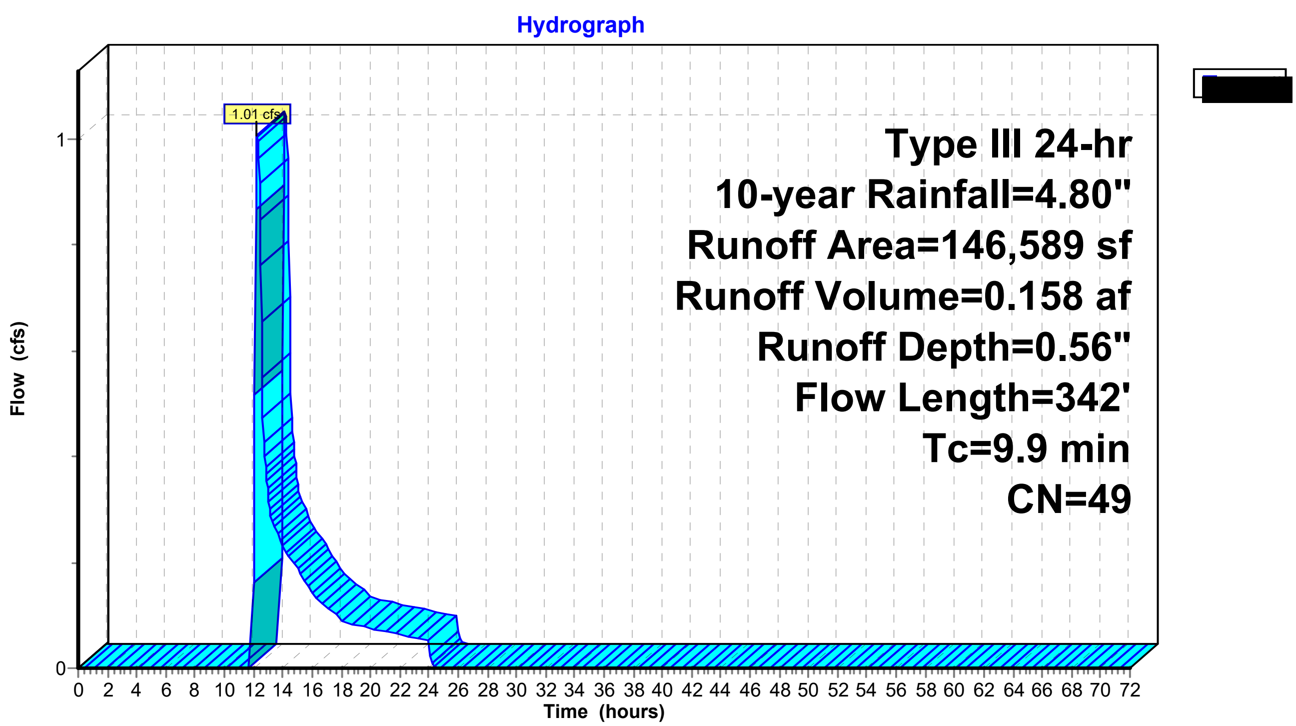
Runoff = 1.01 cfs @ 12.23 hrs, Volume= 0.158 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	103,427	30	Meadow, non-grazed, HSG A
	2,036	58	Meadow, non-grazed, HSG B
*	7,140	98	Panels
*	33,986	98	Basin
	146,589	49	Weighted Average
	105,463		71.94% Pervious Area
	41,126		28.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
2.5	292	0.0762	1.93		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.9	342	Total			

Subcatchment 1bS: Drainage Area 1b



Summary for Subcatchment 1cS: Drainage Area 1c

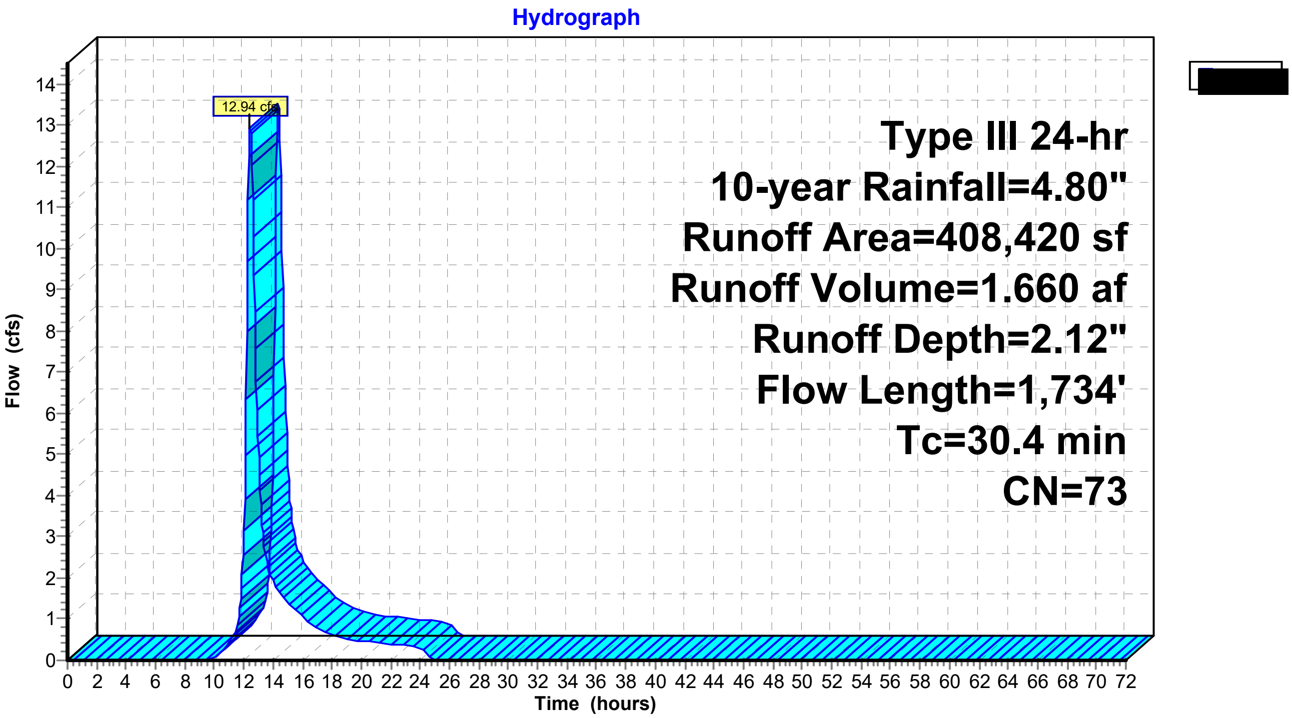
Runoff = 12.94 cfs @ 12.44 hrs, Volume= 1.660 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	351,878	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	18,313	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	2,416	98	Water body
*	2,918	96	Gravel road
*	0	98	Structure
*	5,460	98	Panels
*	0	98	Equipment pad
*	10,197	98	Paved
*	17,238	98	Basin
	408,420	73	Weighted Average
	373,109		91.35% Pervious Area
	35,311		8.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
23.3	1,684	0.0297	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
30.4	1,734	Total			

Subcatchment 1cS: Drainage Area 1c



Summary for Subcatchment 1dS: Drainage Area 1a

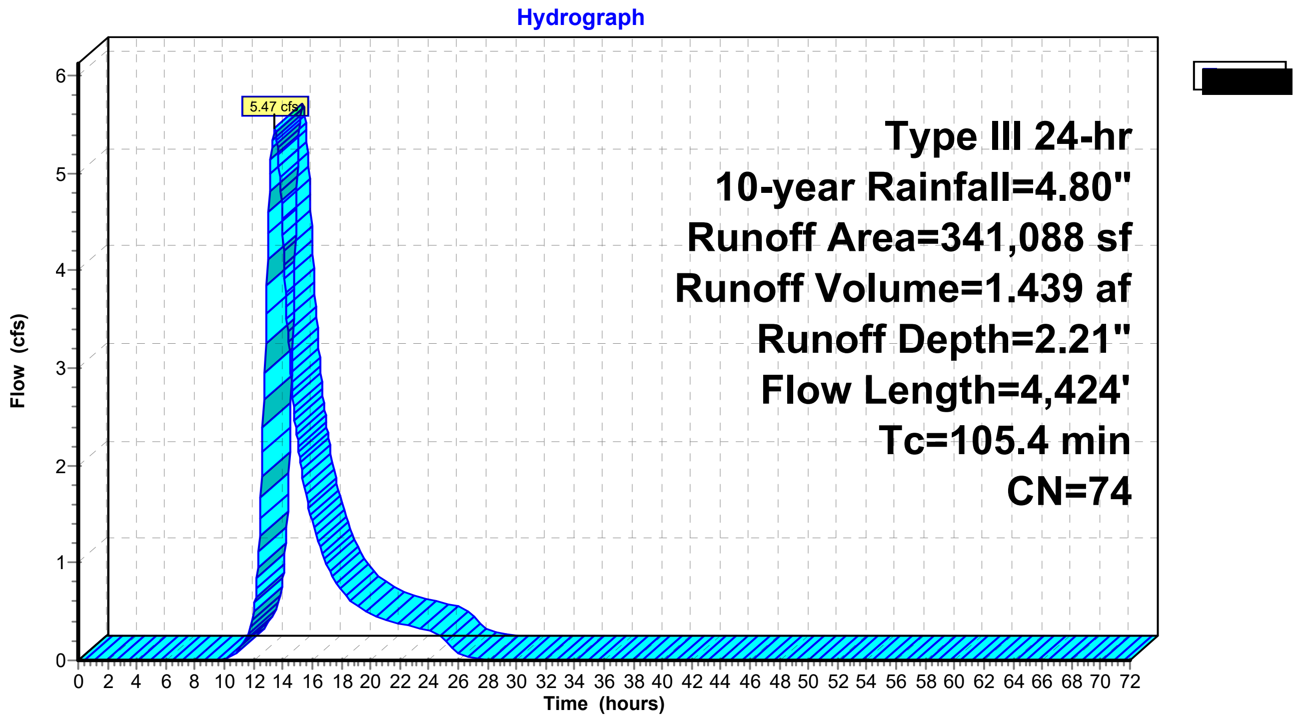
Runoff = 5.47 cfs @ 13.45 hrs, Volume= 1.439 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	269,007	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	34,713	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	12,239	96	Gravel road
*	0	98	Structure
*	7,140	98	Panels
*	629	98	Equipment pad
*	1,074	98	Paved
*	16,286	98	Basin
	341,088	74	Weighted Average
	315,959		92.63% Pervious Area
	25,129		7.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
11.3	356	0.0110	0.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.1	433	0.0020	0.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.3	222	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.5	766	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
46.9	2,597	0.0340	0.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
105.4	4,424	Total			

Subcatchment 1dS: Drainage Area 1a



Summary for Subcatchment 2S: Drainage Area 2

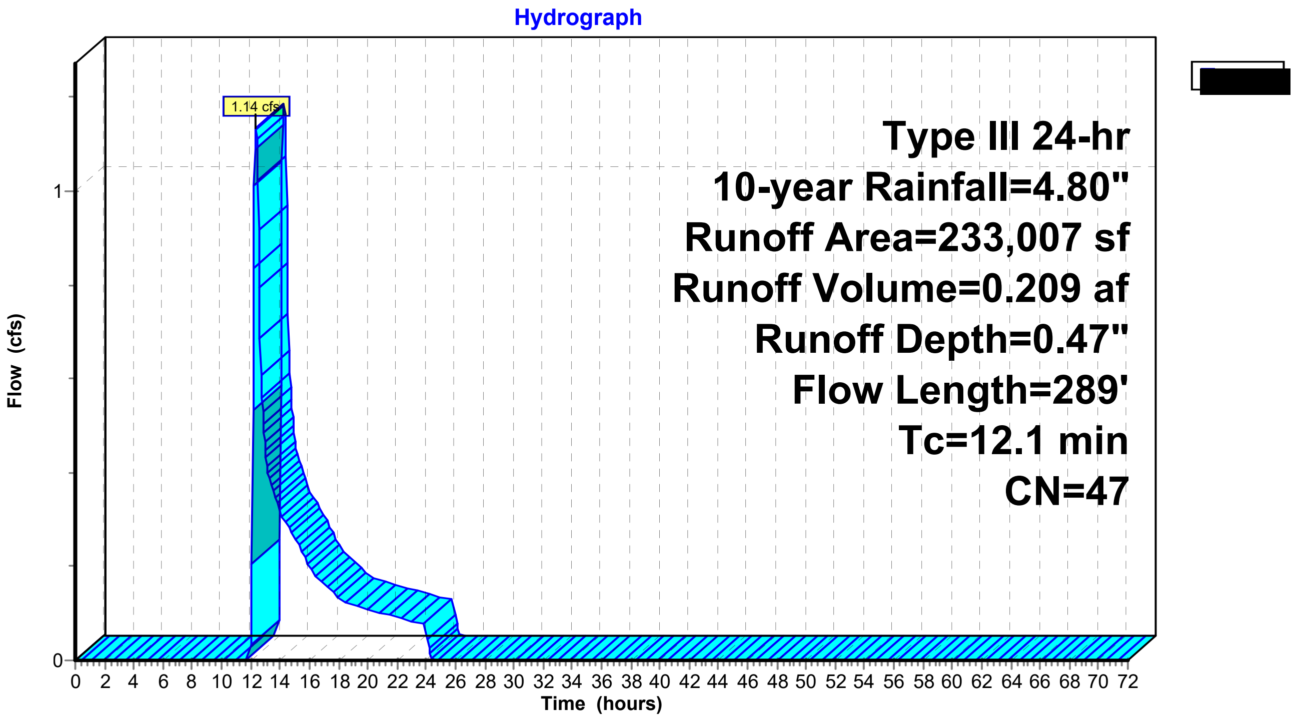
Runoff = 1.14 cfs @ 12.38 hrs, Volume= 0.209 af, Depth= 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	117,788	30	Meadow, non-grazed, HSG A
	29,605	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	16,114	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	58,620	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	6,260	96	Gravel road
*	0	98	Structure
*	4,620	98	Panels
	233,007	47	Weighted Average
	228,387		98.02% Pervious Area
	4,620		1.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0900	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
5.3	239	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.1	289	Total			

Subcatchment 2S: Drainage Area 2



Summary for Subcatchment 3aS: Drainage Area 3a

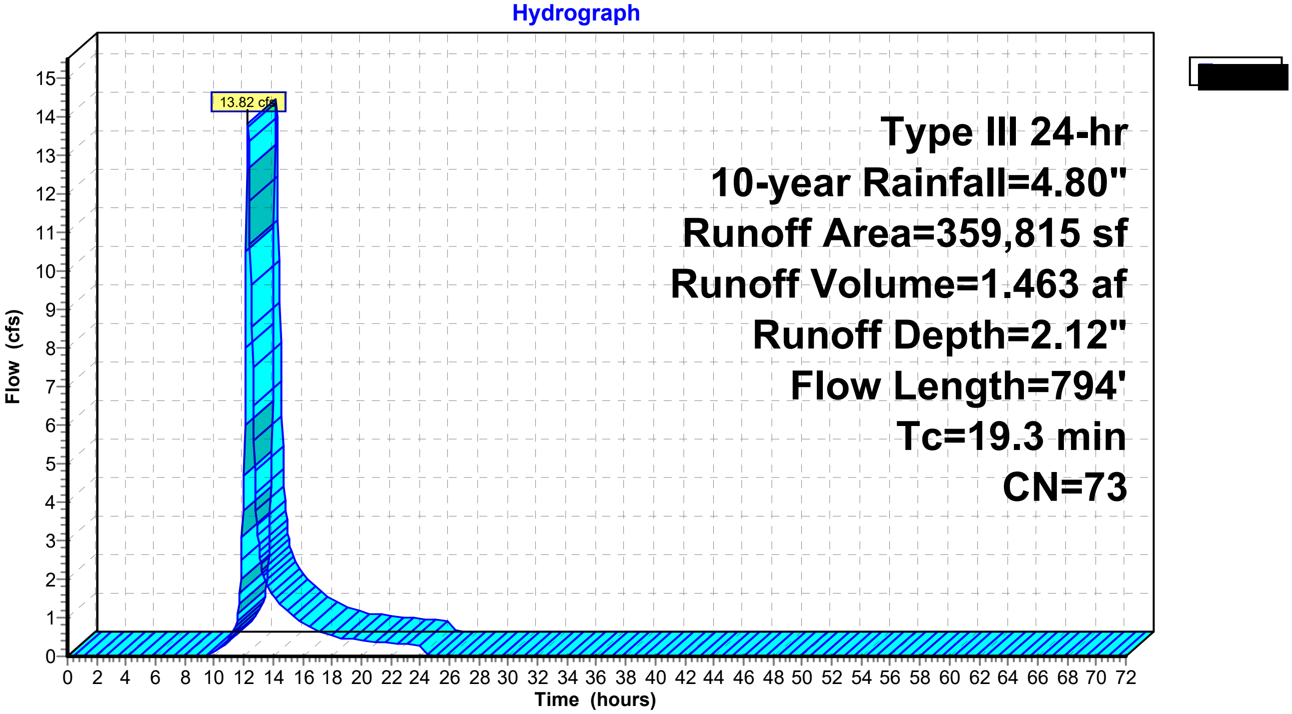
Runoff = 13.82 cfs @ 12.28 hrs, Volume= 1.463 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	337,756	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	10,301	96	Gravel road
*	0	98	Structure
*	10,500	98	Panels
*	1,258	98	Equipment pad
	359,815	73	Weighted Average
	348,057		96.73% Pervious Area
	11,758		3.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
11.9	744	0.0222	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.3	794	Total			

Subcatchment 3aS: Drainage Area 3a



Summary for Subcatchment 3bS: Drainage Area 3b

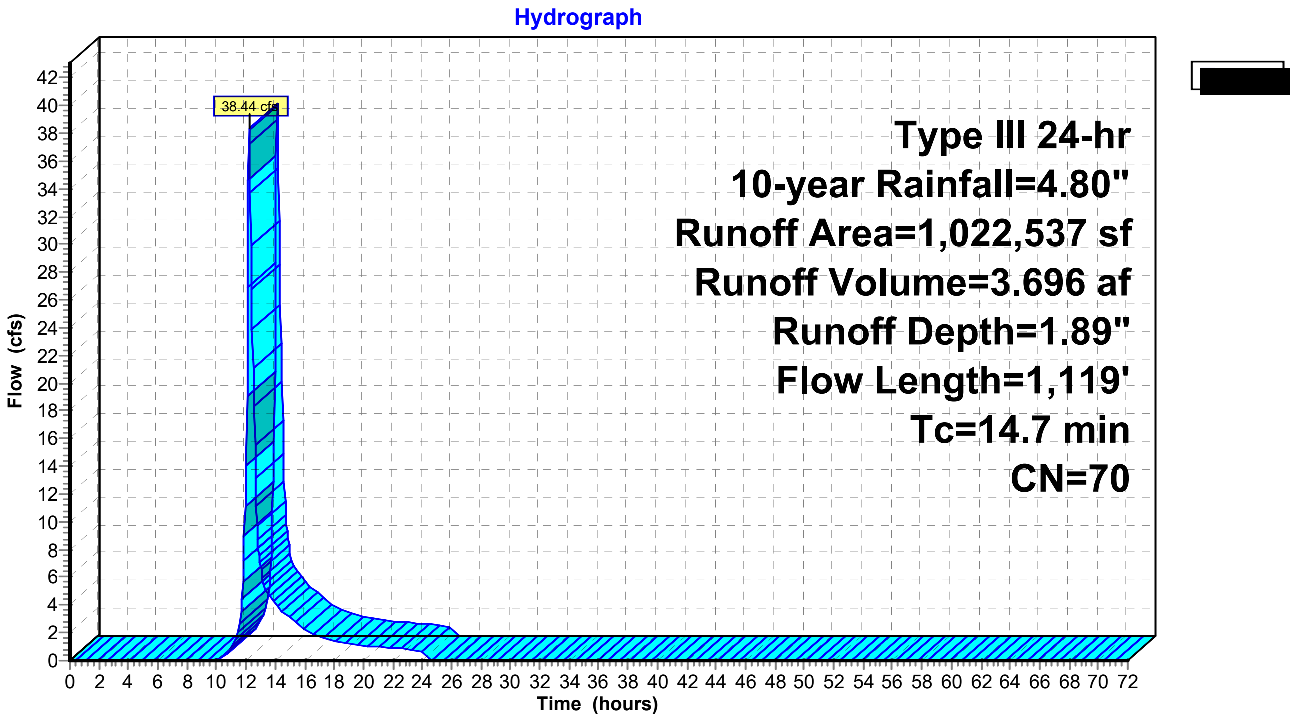
Runoff = 38.44 cfs @ 12.21 hrs, Volume= 3.696 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	99,790	58	Meadow, non-grazed, HSG B
	532,219	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	1,798	30	Woods, Good, HSG A
	107,172	55	Woods, Good, HSG B
	59,721	70	Woods, Good, HSG C
	14,571	77	Woods, Good, HSG D
*	59,918	70	Gravel pit, HSG A
*	96,280	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	51,068	98	Water body
*	0	96	Gravel road
*	0	98	Structure
*	0	98	Panels
*	0	98	Equipment pad
	1,022,537	70	Weighted Average
	971,469		95.01% Pervious Area
	51,068		4.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
9.1	1,069	0.0776	1.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.7	1,119	Total			

Subcatchment 3bS: Drainage Area 3b



Summary for Subcatchment 4S: Drainage Area 4

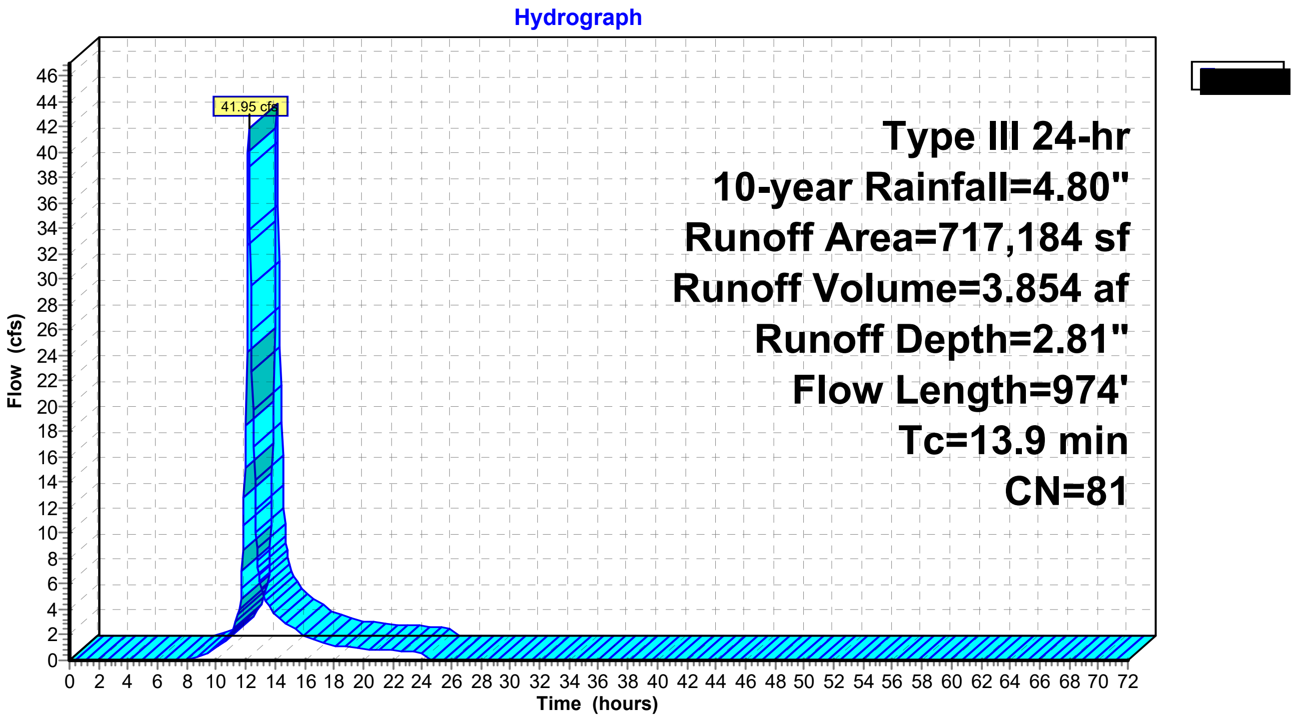
Runoff = 41.95 cfs @ 12.19 hrs, Volume= 3.854 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	18,016	55	Woods, Good, HSG B
	19,532	70	Woods, Good, HSG C
	5,054	77	Woods, Good, HSG D
*	34,397	70	Gravel pit, HSG A
*	500,725	81	Gravel pit, HSG B
*	134,831	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	4,629	98	Water body
*	0	96	Gravel road
*	0	98	Structure
	717,184	81	Weighted Average
	712,555		99.35% Pervious Area
	4,629		0.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.20		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
3.9	384	0.0102	1.63		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	45	0.2700	8.37		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
8.8	269	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	226	0.3100	8.96		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
13.9	974	Total			

Subcatchment 4S: Drainage Area 4



Summary for Subcatchment 5aS: Drainage Area 5

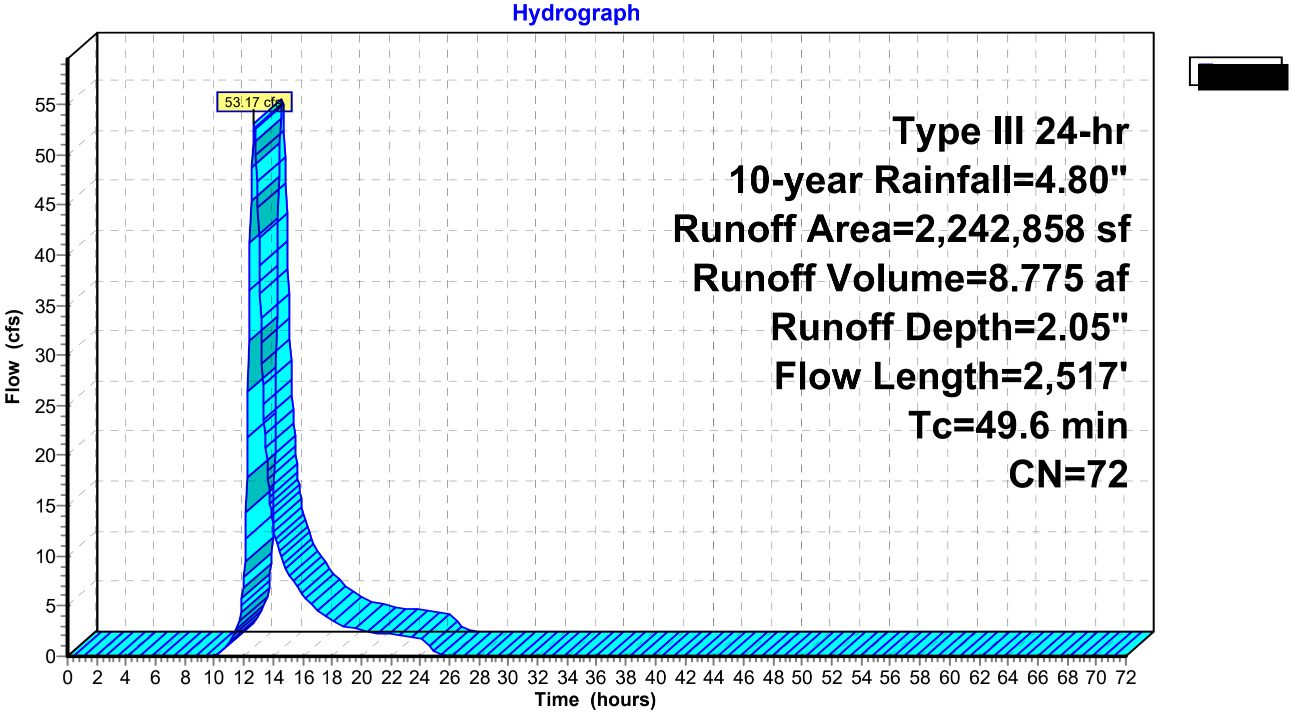
Runoff = 53.17 cfs @ 12.71 hrs, Volume= 8.775 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	84,391	30	Meadow, non-grazed, HSG A
	117,637	58	Meadow, non-grazed, HSG B
	239,197	71	Meadow, non-grazed, HSG C
	91,068	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	597,427	55	Woods, Good, HSG B
	404,182	70	Woods, Good, HSG C
	103,749	77	Woods, Good, HSG D
*	15,001	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	562,885	98	Water body
*	25,012	96	Gravel road
*	0	98	Structure
*	1,680	98	Panels
*	629	98	Equipment pad
	2,242,858	72	Weighted Average
	1,677,664		74.80% Pervious Area
	565,194		25.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.4	238	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.6	1,240	0.0242	0.78		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.6	509	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.6	480	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
49.6	2,517	Total			

Subcatchment 5aS: Drainage Area 5



Summary for Subcatchment 5bS: Drainage Area 5

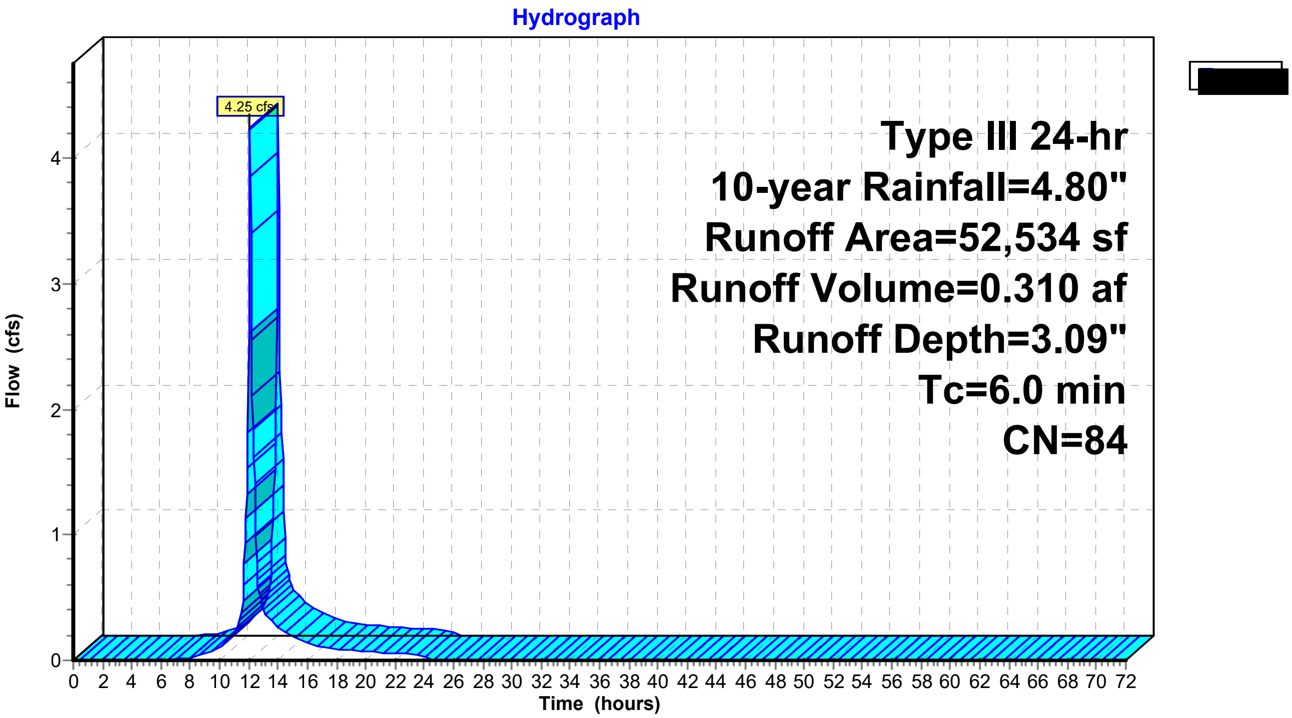
Runoff = 4.25 cfs @ 12.09 hrs, Volume= 0.310 af, Depth= 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	18,465	58	Meadow, non-grazed, HSG B
	267	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	0	96	Gravel road
*	0	98	Structure
*	5,040	98	Panels
*	0	98	Equipment pad
*	28,762	98	Basin
	52,534	84	Weighted Average
	18,732		35.66% Pervious Area
	33,802		64.34% Impervious Area

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

Subcatchment 5bS: Drainage Area 5



Summary for Subcatchment 5cS: Drainage Area 5

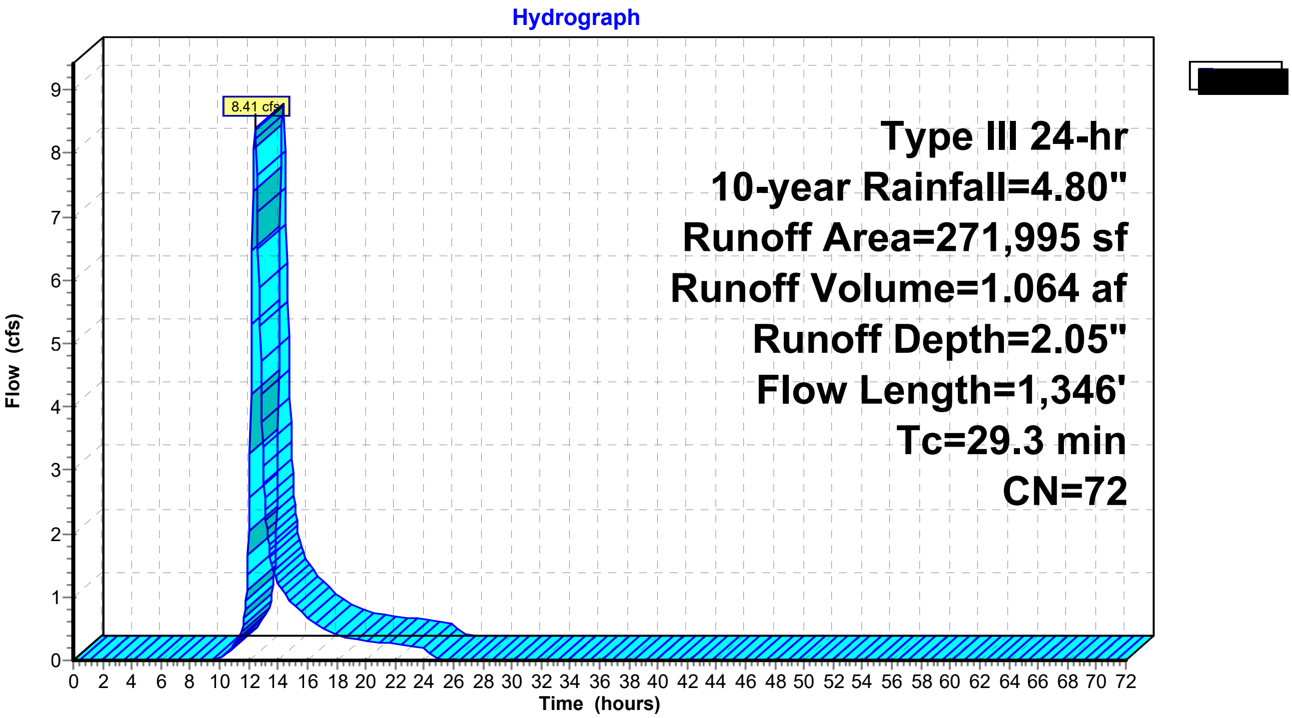
Runoff = 8.41 cfs @ 12.42 hrs, Volume= 1.064 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	53,847	58	Meadow, non-grazed, HSG B
	27,788	71	Meadow, non-grazed, HSG C
	8,123	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	2,622	55	Woods, Good, HSG B
	123,893	70	Woods, Good, HSG C
	19,268	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	20,354	98	Water body
*	0	96	Gravel road
*	0	98	Structure
*	5,460	98	Panels
*	0	98	Equipment pad
*	10,640	98	Basin
	271,995	72	Weighted Average
	235,541		86.60% Pervious Area
	36,454		13.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
17.9	1,030	0.0369	0.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.1	266	0.0902	2.10		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
29.3	1,346	Total			

Subcatchment 5cS: Drainage Area 5



Summary for Subcatchment 5dS: Drainage Area 5

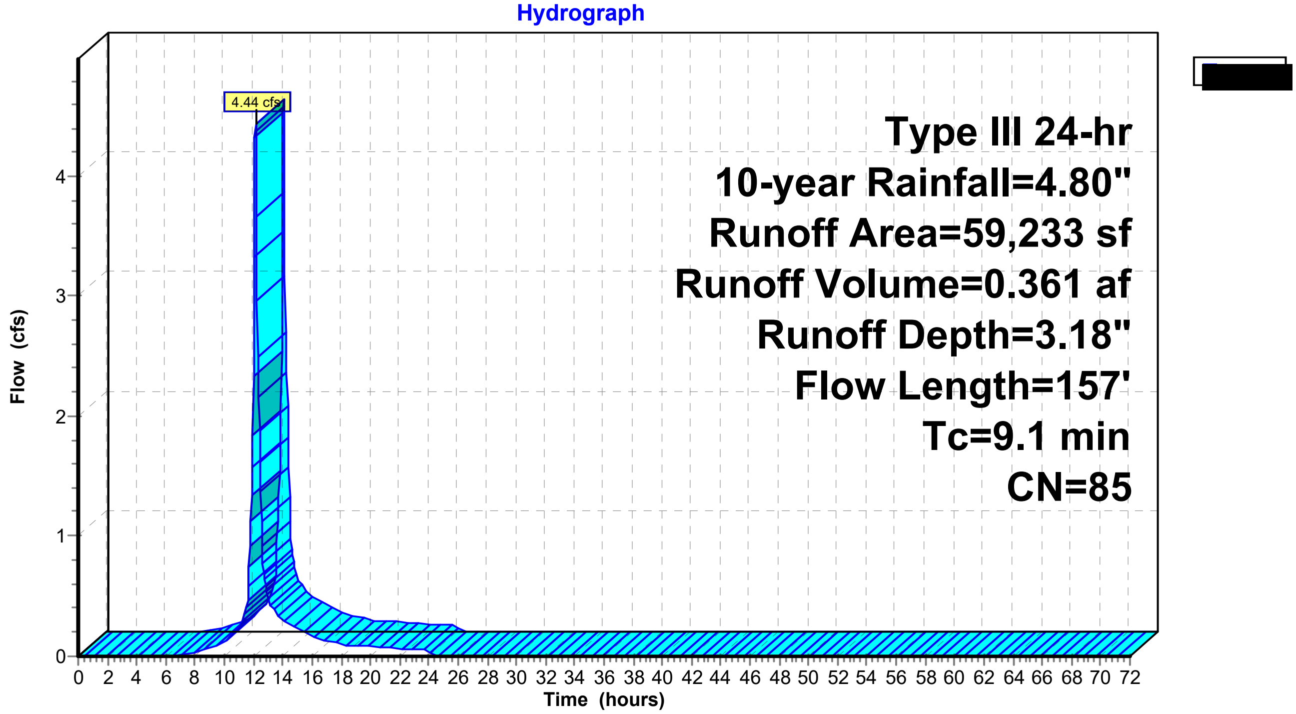
Runoff = 4.44 cfs @ 12.13 hrs, Volume= 0.361 af, Depth= 3.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	28,213	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	4,470	96	Gravel road
*	0	98	Structure
*	5,460	98	Panels
*	629	98	Equipment pad
*	20,461	98	Basin
	59,233	85	Weighted Average
	32,683		55.18% Pervious Area
	26,550		44.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.7	107	0.0234	1.07		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.1	157	Total			

Subcatchment 5dS: Drainage Area 5



Summary for Subcatchment 6aS: Drainage Area 6

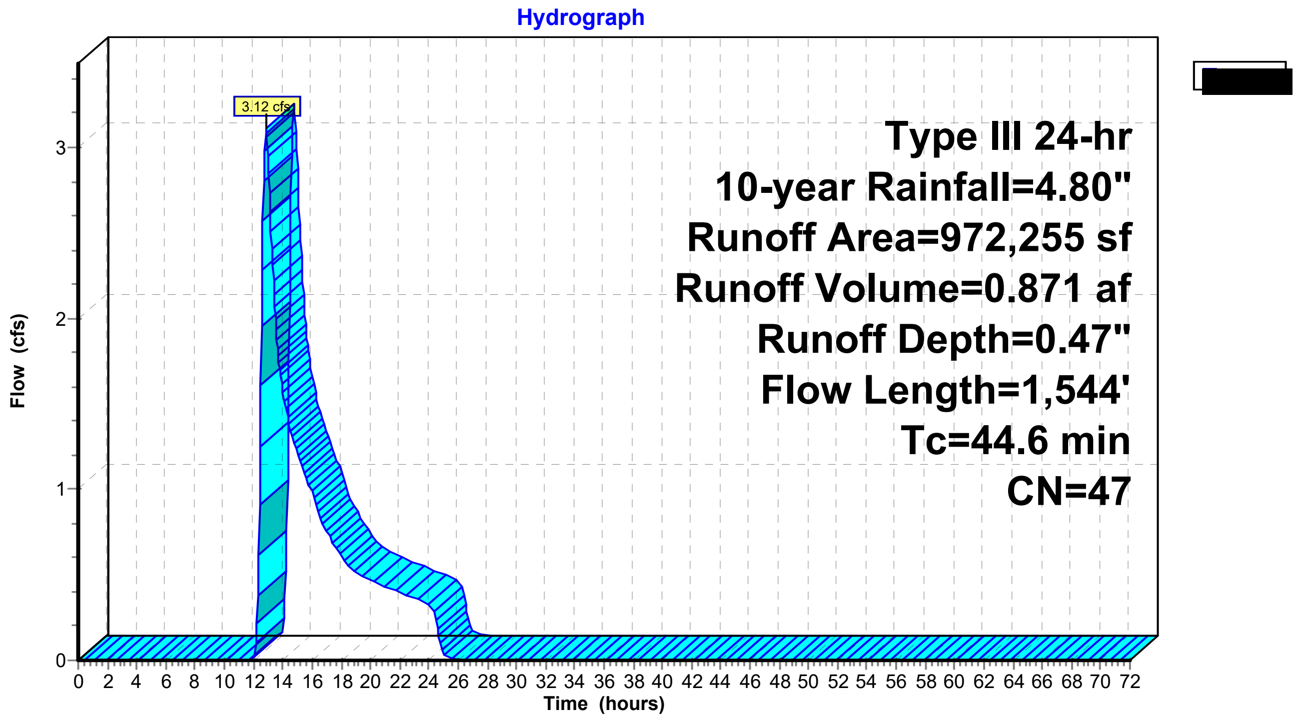
Runoff = 3.12 cfs @ 12.85 hrs, Volume= 0.871 af, Depth= 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	301,060	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	390,620	30	Woods, Good, HSG A
	50,036	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	219,272	98	Water body
*	11,267	96	Gravel road
*	0	98	Structure
*	0	98	Panels
*	0	98	Equipment pad
	972,255	47	Weighted Average
	752,983		77.45% Pervious Area
	219,272		22.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
13.5	538	0.0090	0.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.1	601	0.0391	0.99		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.7	355	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
44.6	1,544	Total			

Subcatchment 6aS: Drainage Area 6



Summary for Subcatchment 6bS: Drainage Area 6

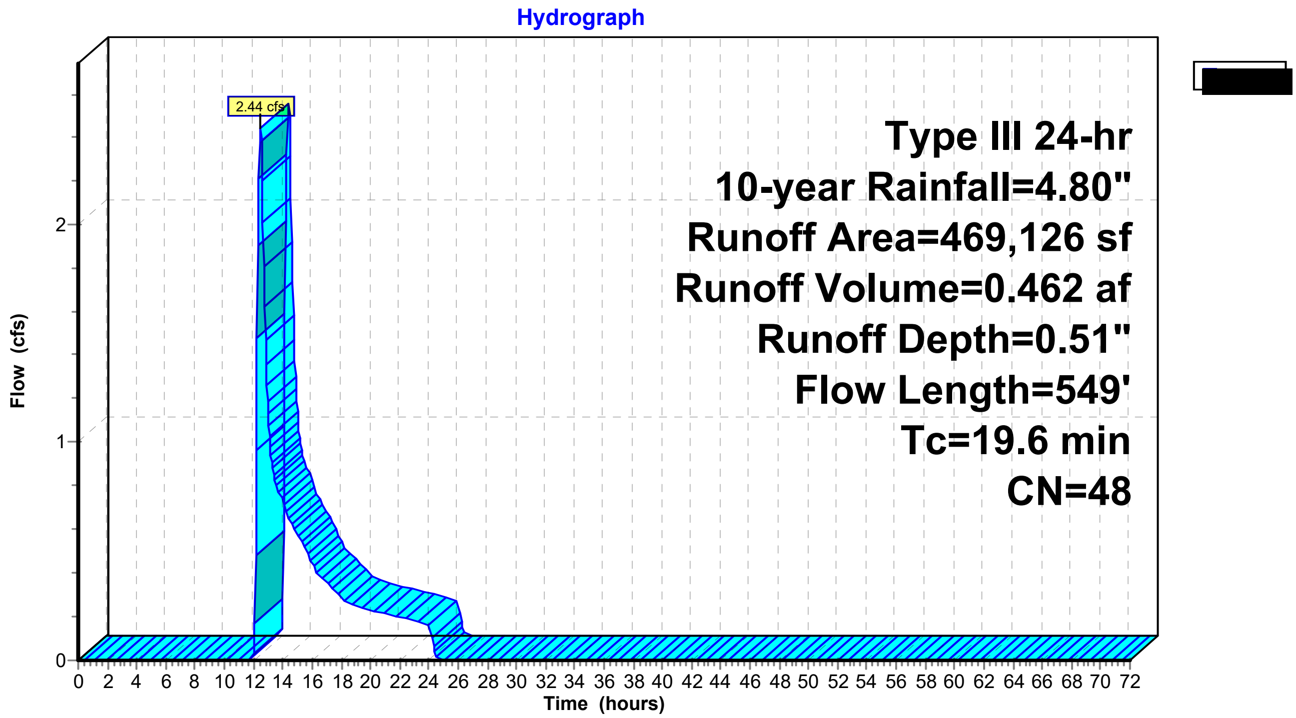
Runoff = 2.44 cfs @ 12.47 hrs, Volume= 0.462 af, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	288,325	30	Meadow, non-grazed, HSG A
	91,050	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	9,625	96	Gravel road
*	0	98	Structure
*	12,660	98	Panels
*	629	98	Equipment pad
*	66,837	98	Basin
	469,126	48	Weighted Average
	389,000		82.92% Pervious Area
	80,126		17.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.0150	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
13.3	499	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.6	549	Total			

Subcatchment 6bS: Drainage Area 6



Summary for Subcatchment 7aS: Drainage Area 7a

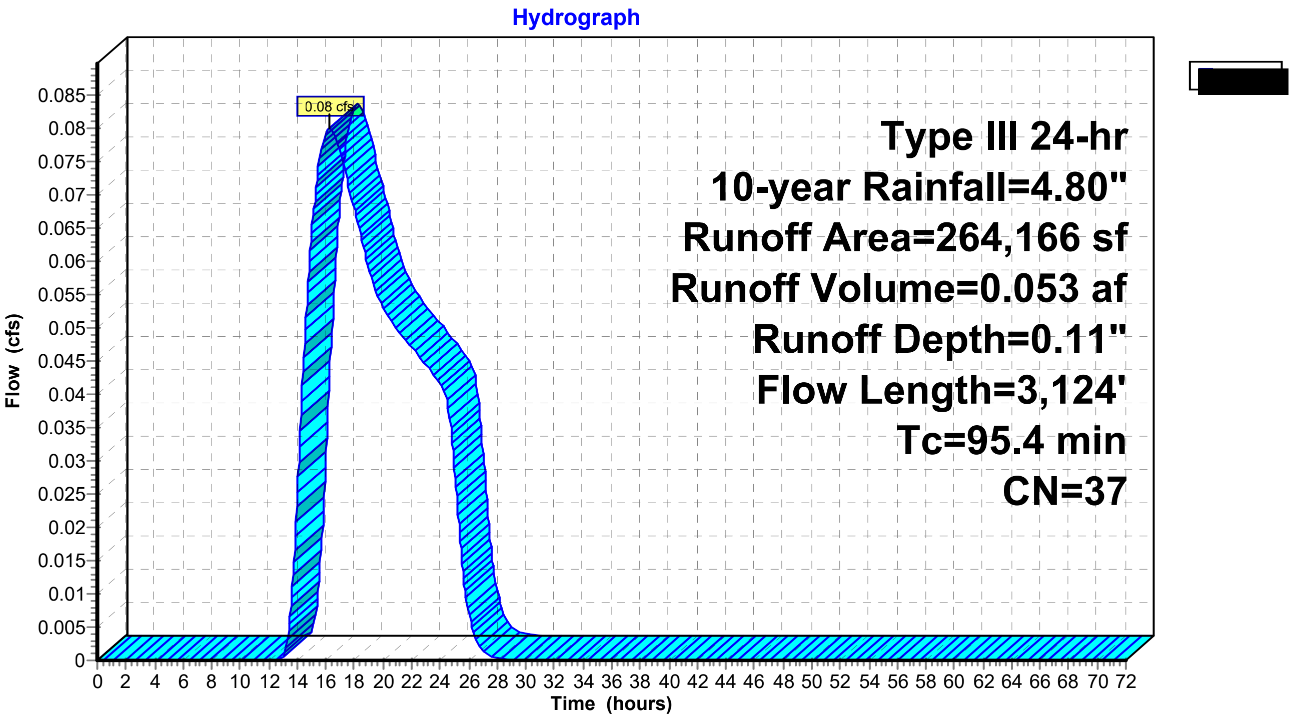
Runoff = 0.08 cfs @ 16.23 hrs, Volume= 0.053 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	231,002	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	7,059	70	Gravel pit, HSG A
*	9,519	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	9,866	96	Gravel road
*	0	98	Structure
*	6,720	98	Panels
*	0	98	Equipment pad
	264,166	37	Weighted Average
	257,446		97.46% Pervious Area
	6,720		2.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
2.9	238	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
88.9	2,836	0.0113	0.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
95.4	3,124	Total			

Subcatchment 7aS: Drainage Area 7a



Summary for Subcatchment 7bS: Drainage Area 7b

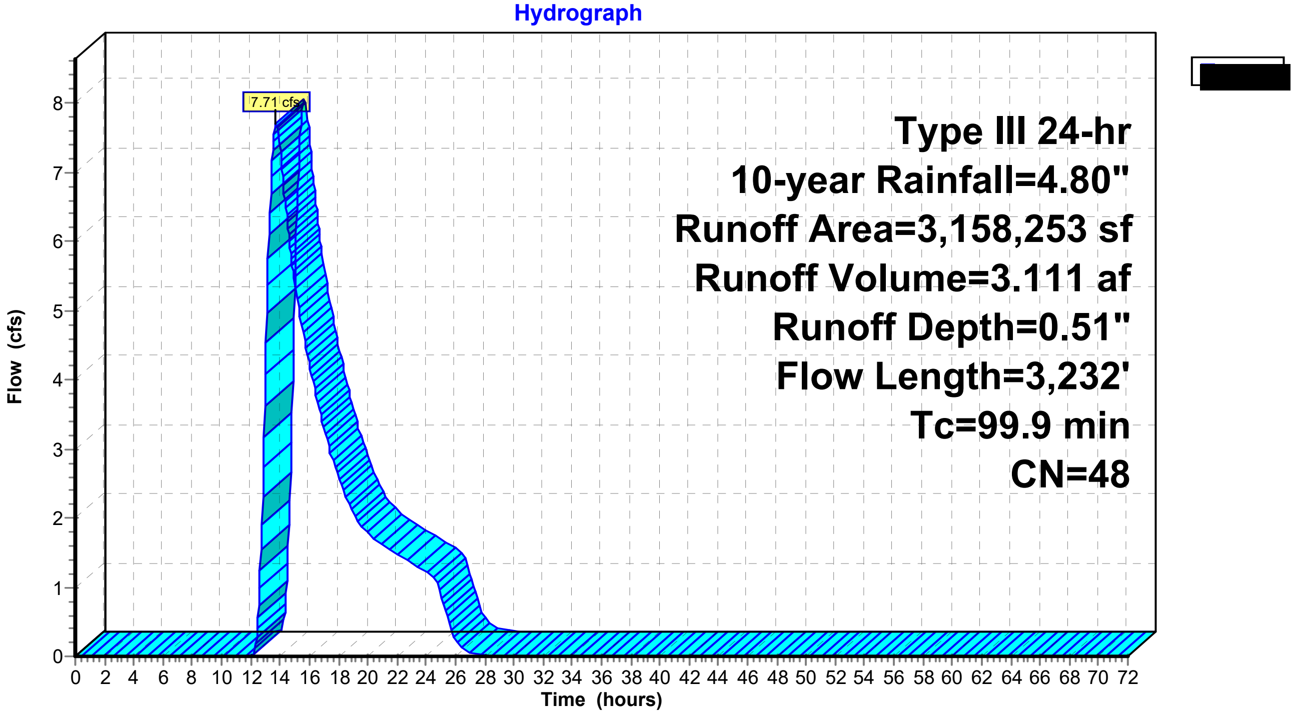
Runoff = 7.71 cfs @ 13.75 hrs, Volume= 3.111 af, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	648,318	30	Meadow, non-grazed, HSG A
	110,037	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	1,385,107	30	Woods, Good, HSG A
	230,359	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	165,079	70	Gravel pit, HSG A
*	79,347	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	453,314	98	Water body
*	77,609	96	Gravel road
*	0	98	Structure
*	8,454	98	Panels
*	629	98	Equipment pad
	3,158,253	48	Weighted Average
	2,695,856		85.36% Pervious Area
	462,397		14.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	50	0.1600	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
5.6	346	0.0430	1.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
88.9	2,836	0.0113	0.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
99.9	3,232	Total			

Subcatchment 7bS: Drainage Area 7b



Summary for Subcatchment 8S: Drainage Area 8

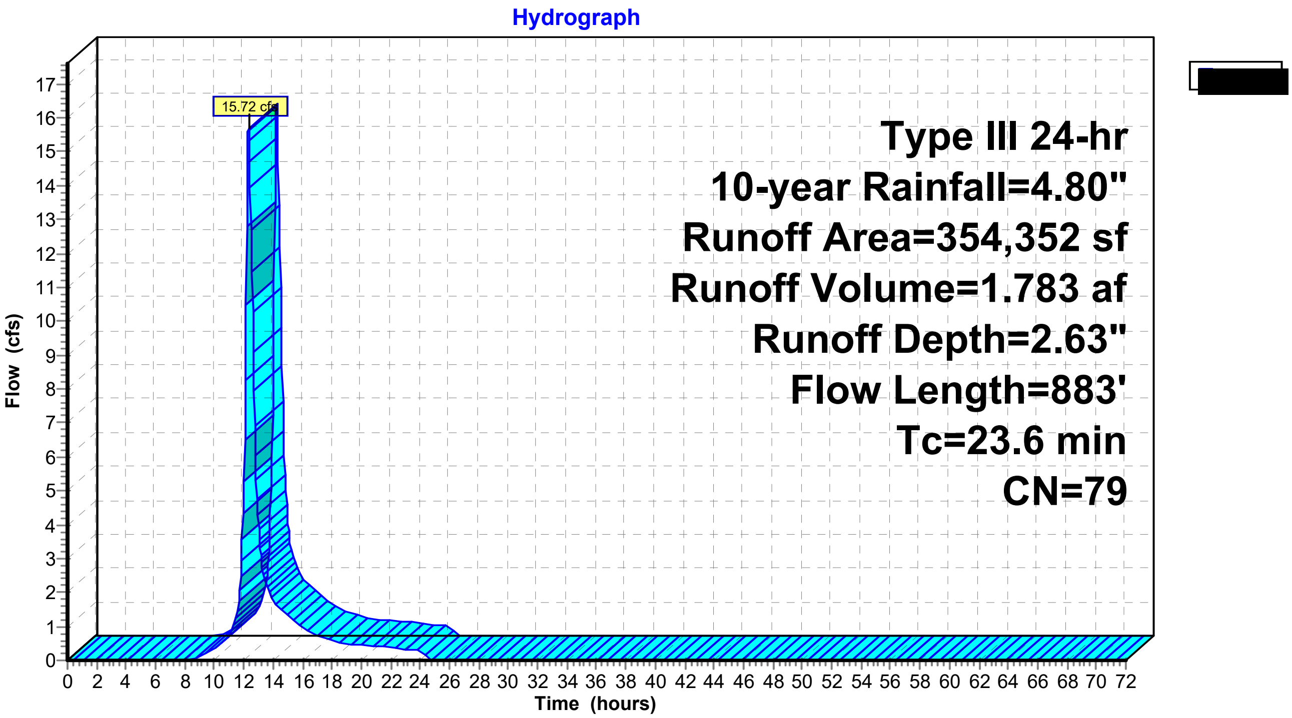
Runoff = 15.72 cfs @ 12.33 hrs, Volume= 1.783 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	14,757	71	Meadow, non-grazed, HSG C
	6,627	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	7,700	55	Woods, Good, HSG B
	175,484	70	Woods, Good, HSG C
	40,001	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	93,828	98	Water body
*	15,955	96	Gravel road
*	0	98	Structure
	354,352	79	Weighted Average
	260,524		73.52% Pervious Area
	93,828		26.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
8.8	390	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	271	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	172	0.0280	0.84		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.6	883	Total			

Subcatchment 8S: Drainage Area 8



Summary for Subcatchment 9S: Drainage Area 9

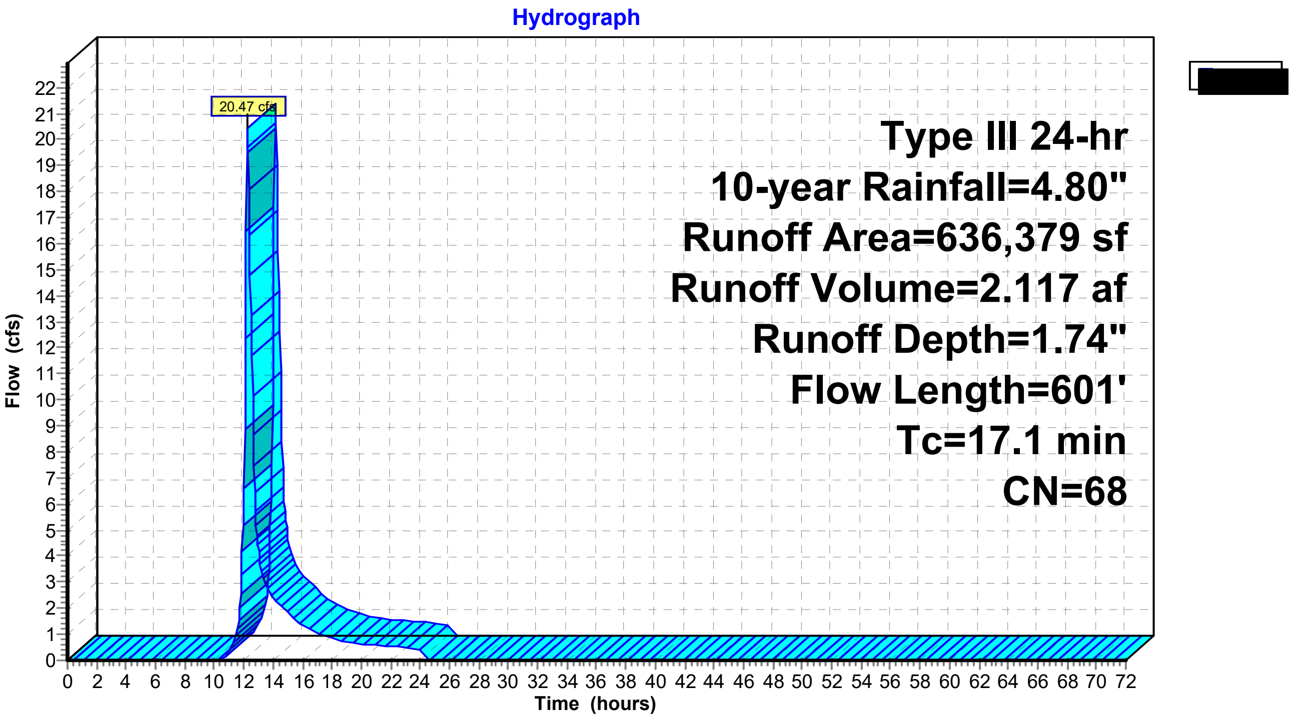
Runoff = 20.47 cfs @ 12.25 hrs, Volume= 2.117 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	80,020	30	Meadow, non-grazed, HSG A
	29,044	58	Meadow, non-grazed, HSG B
	8,254	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	24,186	30	Woods, Good, HSG A
	229,102	55	Woods, Good, HSG B
	19,896	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	226,618	98	Water body
*	18,419	96	Gravel road
*	0	98	Structure
*	840	98	Panels
	636,379	68	Weighted Average
	408,921		64.26% Pervious Area
	227,458		35.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.4	106	0.0610	1.23		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	184	0.0330	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.8	261	0.2470	2.48		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.1	601	Total			

Subcatchment 9S: Drainage Area 9



Summary for Subcatchment 10aS: Drainage Area 10

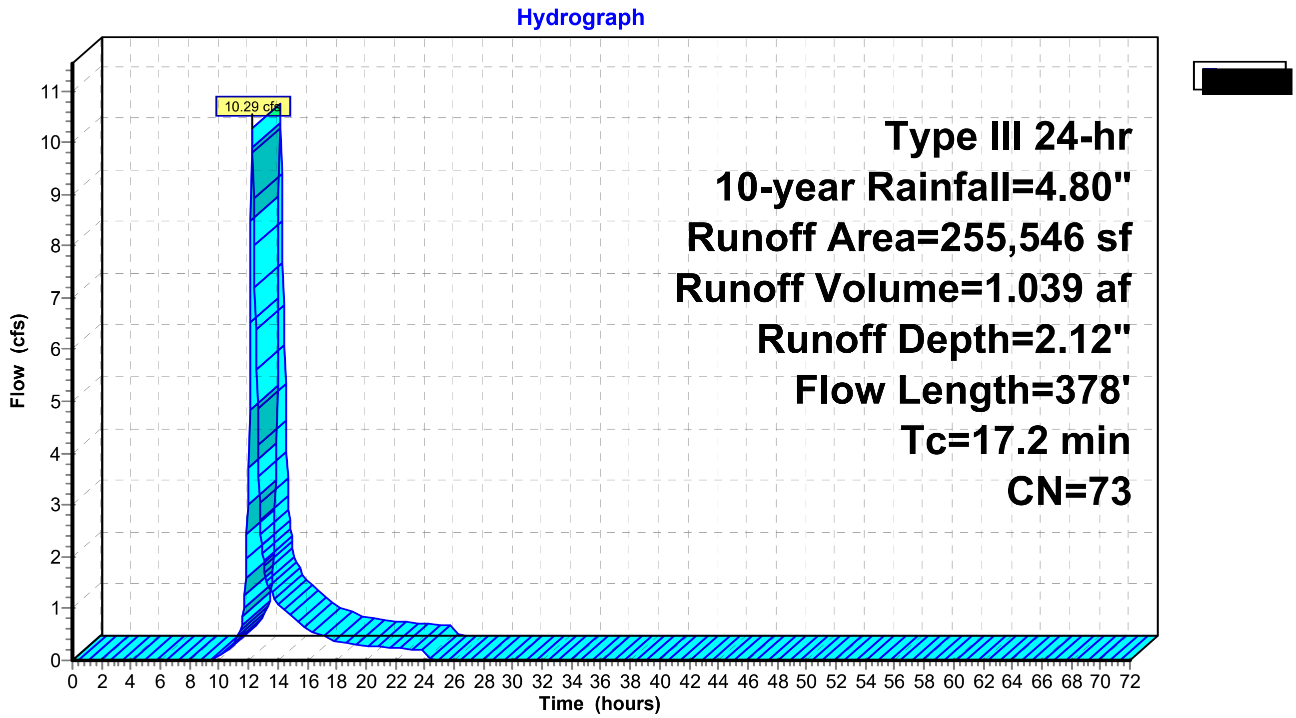
Runoff = 10.29 cfs @ 12.25 hrs, Volume= 1.039 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	40,805	58	Meadow, non-grazed, HSG B
	126,615	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	9,453	55	Woods, Good, HSG B
	37,133	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	5,861	96	Gravel road
*	0	98	Structure
*	3,360	98	Panels
*	32,319	98	Basin
	255,546	73	Weighted Average
	219,867		86.04% Pervious Area
	35,679		13.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
4.9	328	0.0488	1.10		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.2	378	Total			

Subcatchment 10aS: Drainage Area 10



Summary for Subcatchment 10bS: Drainage Area 10

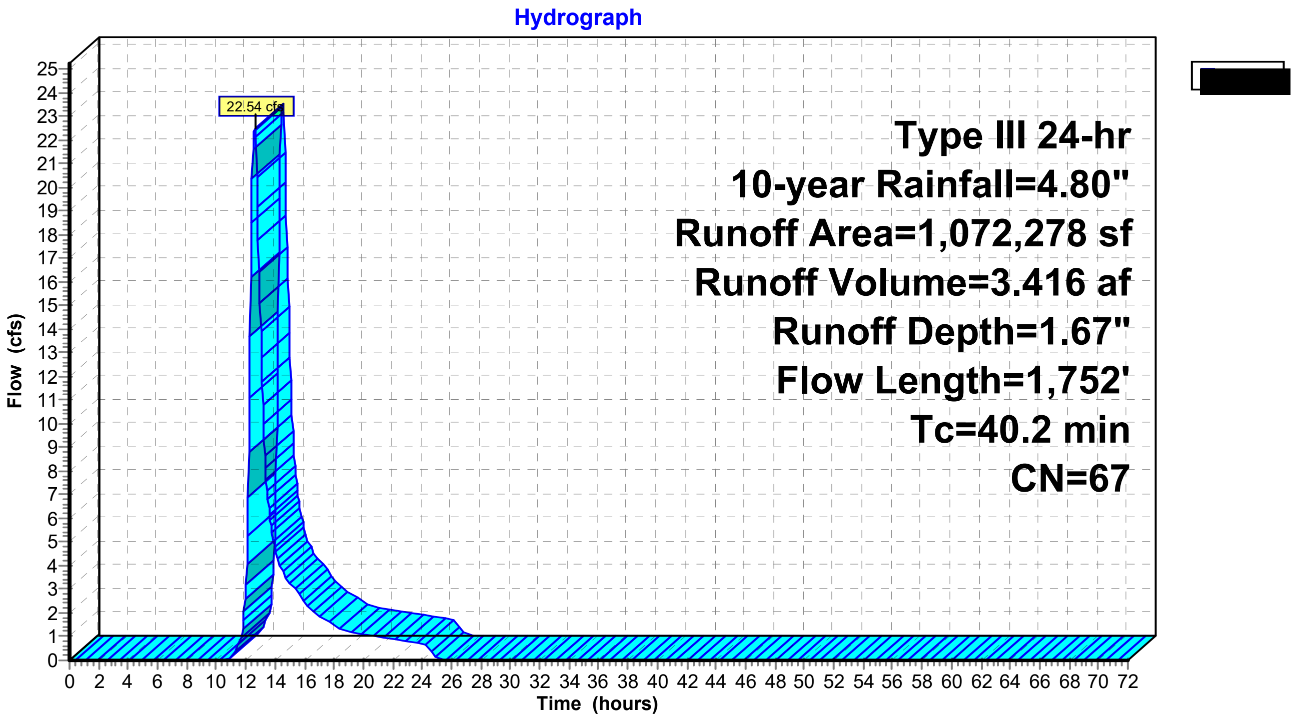
Runoff = 22.54 cfs @ 12.59 hrs, Volume= 3.416 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	13,076	30	Meadow, non-grazed, HSG A
	9,872	58	Meadow, non-grazed, HSG B
	162,839	71	Meadow, non-grazed, HSG C
	21,857	78	Meadow, non-grazed, HSG D
	110,901	30	Woods, Good, HSG A
	222,199	55	Woods, Good, HSG B
	284,517	70	Woods, Good, HSG C
	72,773	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	141,195	98	Water body
*	33,049	96	Gravel road
*	0	98	Structure
*	0	98	Panels
	1,072,278	67	Weighted Average
	931,083		86.83% Pervious Area
	141,195		13.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
29.4	1,139	0.0167	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	72	0.0417	3.29		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.1	491	0.0367	1.34		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
40.2	1,752	Total			

Subcatchment 10bS: Drainage Area 10



Summary for Subcatchment 11aS: Drainage Area 11

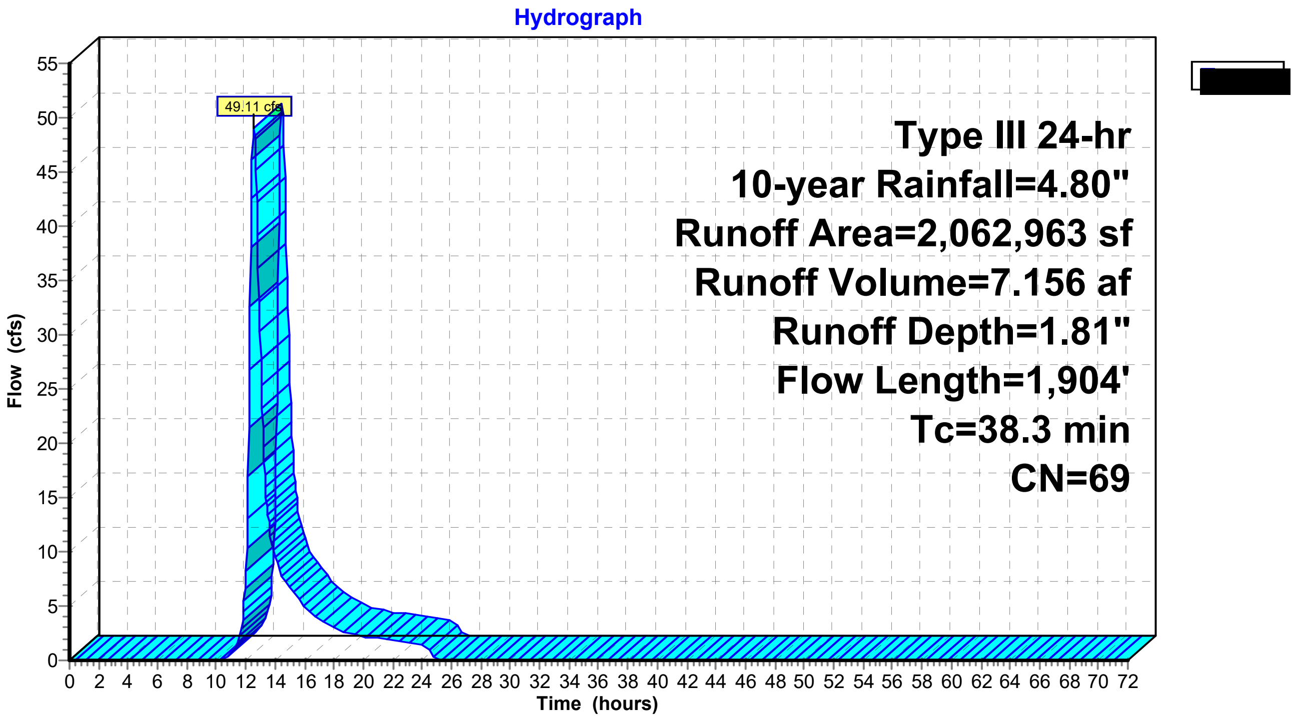
Runoff = 49.11 cfs @ 12.56 hrs, Volume= 7.156 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	230,381	30	Meadow, non-grazed, HSG A
	74,662	58	Meadow, non-grazed, HSG B
	1,245,920	71	Meadow, non-grazed, HSG C
	51,732	78	Meadow, non-grazed, HSG D
	5,299	30	Woods, Good, HSG A
	38,194	55	Woods, Good, HSG B
	116,983	70	Woods, Good, HSG C
	42,710	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	201,207	98	Water body
*	45,982	96	Gravel road
*	8,006	98	Structure
*	1,887	98	Equipment pad
*	0	98	Panels
	2,062,963	69	Weighted Average
	1,851,863		89.77% Pervious Area
	211,100		10.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
34.0	1,854	0.0330	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
38.3	1,904	Total			

Subcatchment 11aS: Drainage Area 11



Summary for Subcatchment 11bS: Drainage Area 11

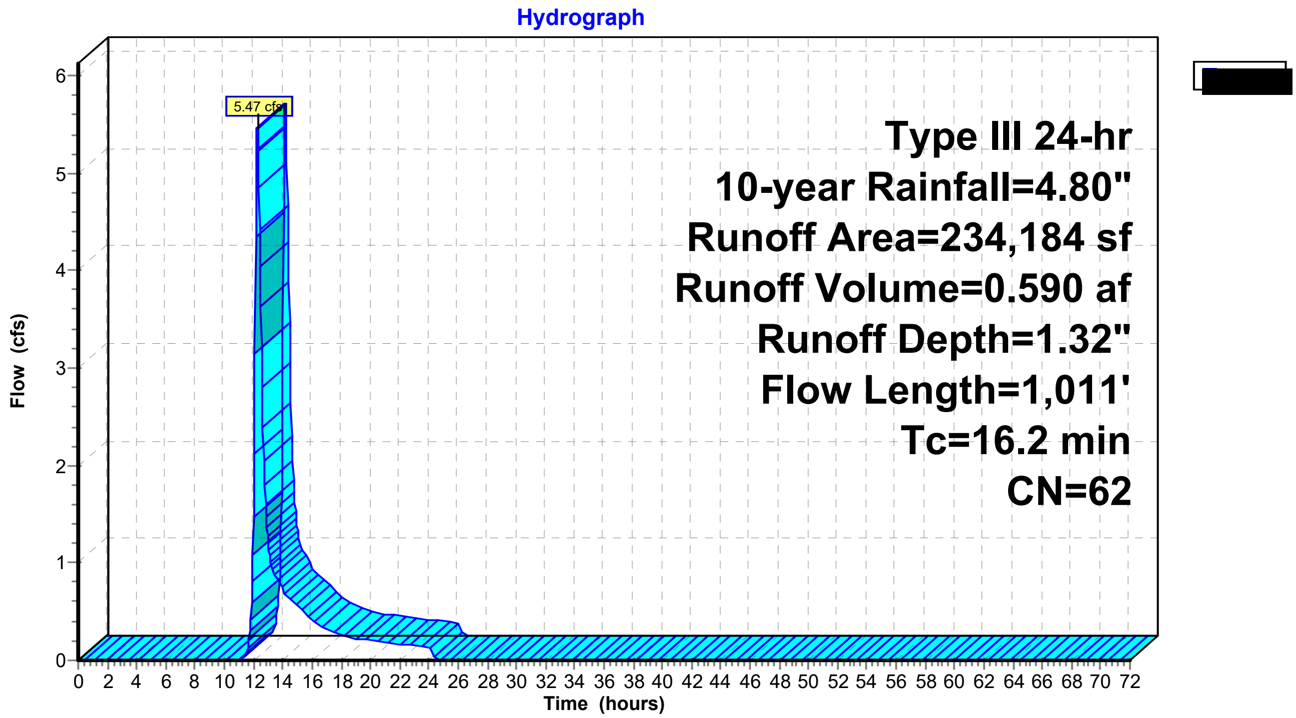
Runoff = 5.47 cfs @ 12.25 hrs, Volume= 0.590 af, Depth= 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	62,296	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	153,054	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	14,214	96	Gravel road
*	0	98	Structure
*	0	98	Equipment pad
*	4,620	98	Panels
	234,184	62	Weighted Average
	229,564		98.03% Pervious Area
	4,620		1.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
10.6	961	0.0468	1.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.2	1,011	Total			

Subcatchment 11bS: Drainage Area 11



Summary for Subcatchment 11cS: Drainage Area 11

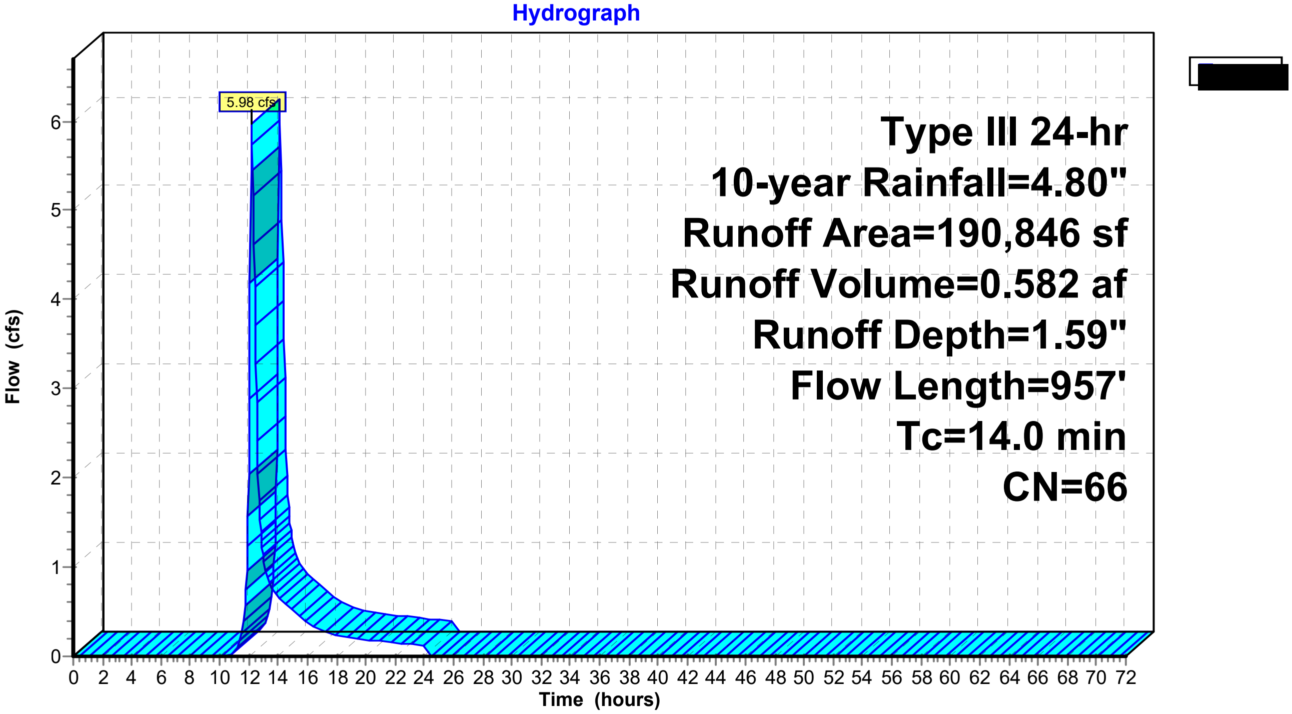
Runoff = 5.98 cfs @ 12.21 hrs, Volume= 0.582 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	27,259	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	158,821	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	2,666	96	Gravel road
*	0	98	Structure
*	0	98	Equipment pad
*	2,100	98	Panels
	190,846	66	Weighted Average
	188,746		98.90% Pervious Area
	2,100		1.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
9.7	907	0.0496	1.56		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.0	957	Total			

Subcatchment 11cS: Drainage Area 11



Summary for Subcatchment 12aS: Drainage Area 12a

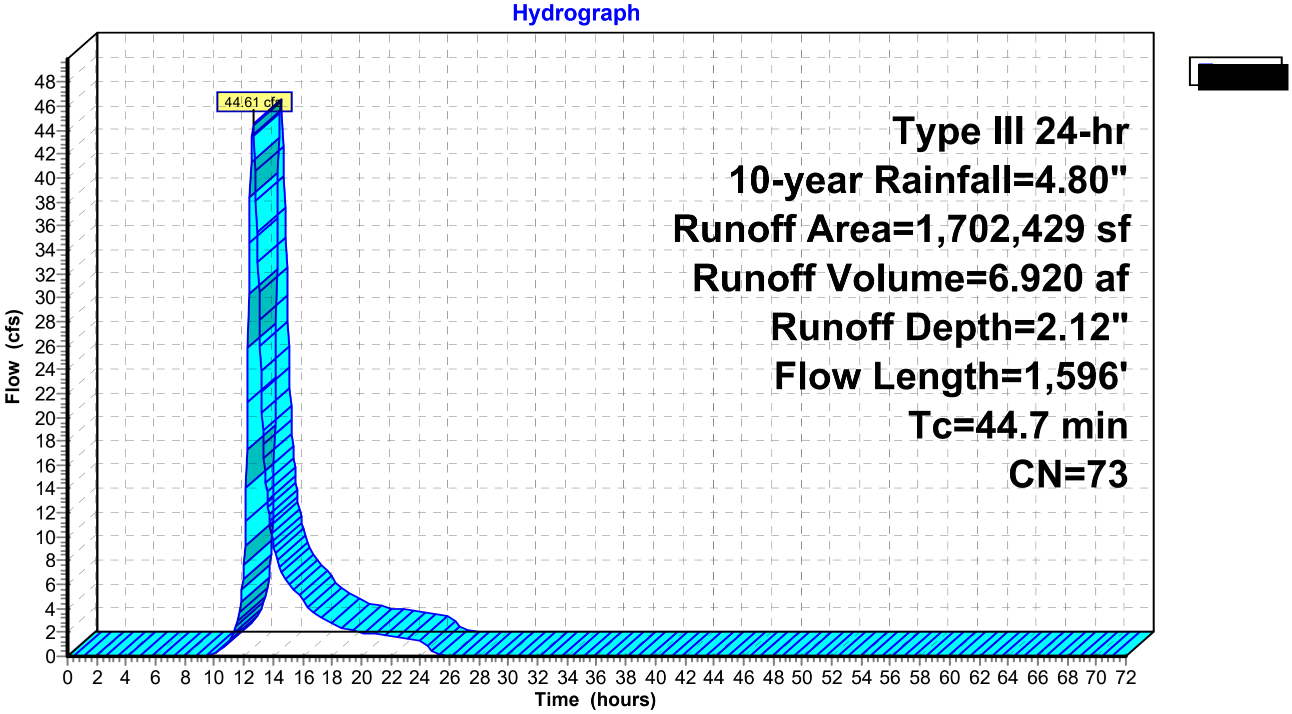
Runoff = 44.61 cfs @ 12.64 hrs, Volume= 6.920 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	23,018	30	Meadow, non-grazed, HSG A
	9,439	58	Meadow, non-grazed, HSG B
	654,323	71	Meadow, non-grazed, HSG C
	210,828	78	Meadow, non-grazed, HSG D
	22,923	30	Woods, Good, HSG A
	183,438	55	Woods, Good, HSG B
	293,907	70	Woods, Good, HSG C
	52,031	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	229,248	98	Water body
*	13,614	96	Gravel road
*	0	98	Structure
*	9,660	98	Panels
*	0	98	Equipment pad
	1,702,429	73	Weighted Average
	1,463,521		85.97% Pervious Area
	238,908		14.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0140	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
7.5	626	0.0780	1.40		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
30.7	920	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
44.7	1,596	Total			

Subcatchment 12aS: Drainage Area 12a



Summary for Subcatchment 12bS: Drainage Area 12b

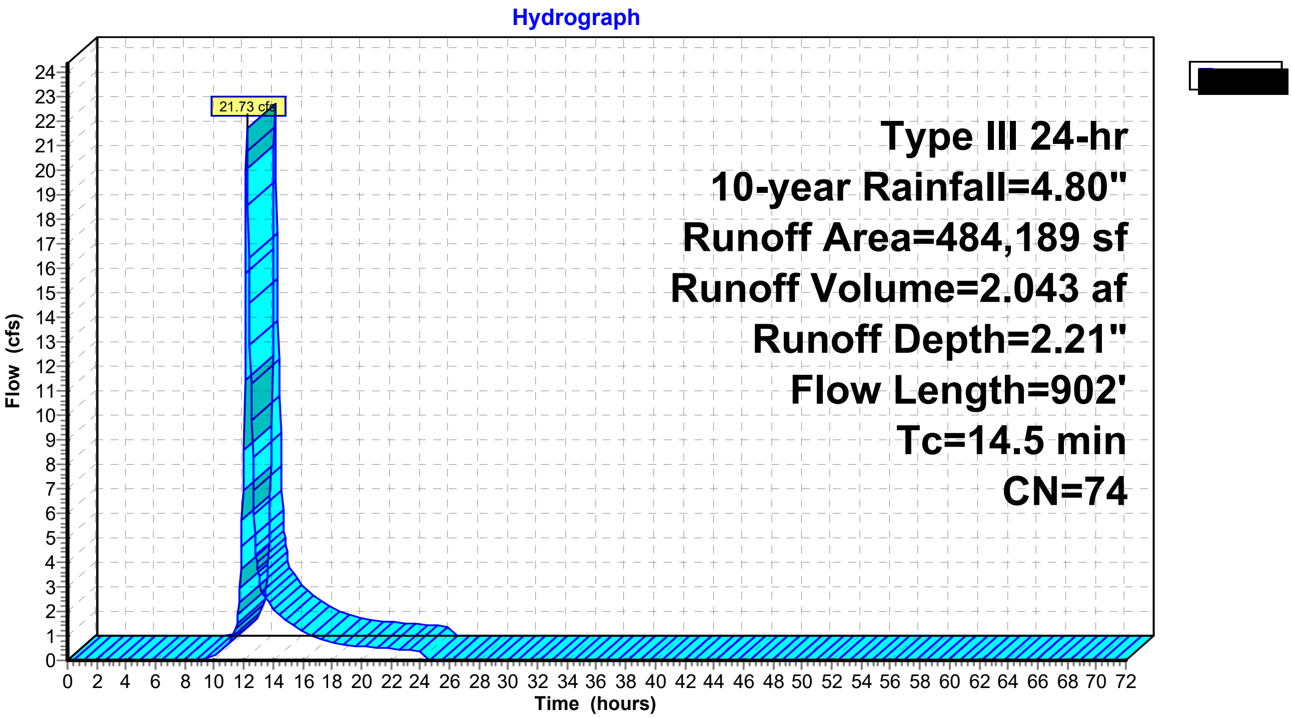
Runoff = 21.73 cfs @ 12.21 hrs, Volume= 2.043 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	438,020	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	8,877	96	Gravel road
*	0	98	Structure
*	9,240	98	Panels
*	1,258	98	Equipment pad
*	26,794	98	Basin
	484,189	74	Weighted Average
	446,897		92.30% Pervious Area
	37,292		7.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
10.2	852	0.0393	1.39		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.5	902	Total			

Subcatchment 12bS: Drainage Area 12b



Summary for Subcatchment 12cS: Drainage Area 12

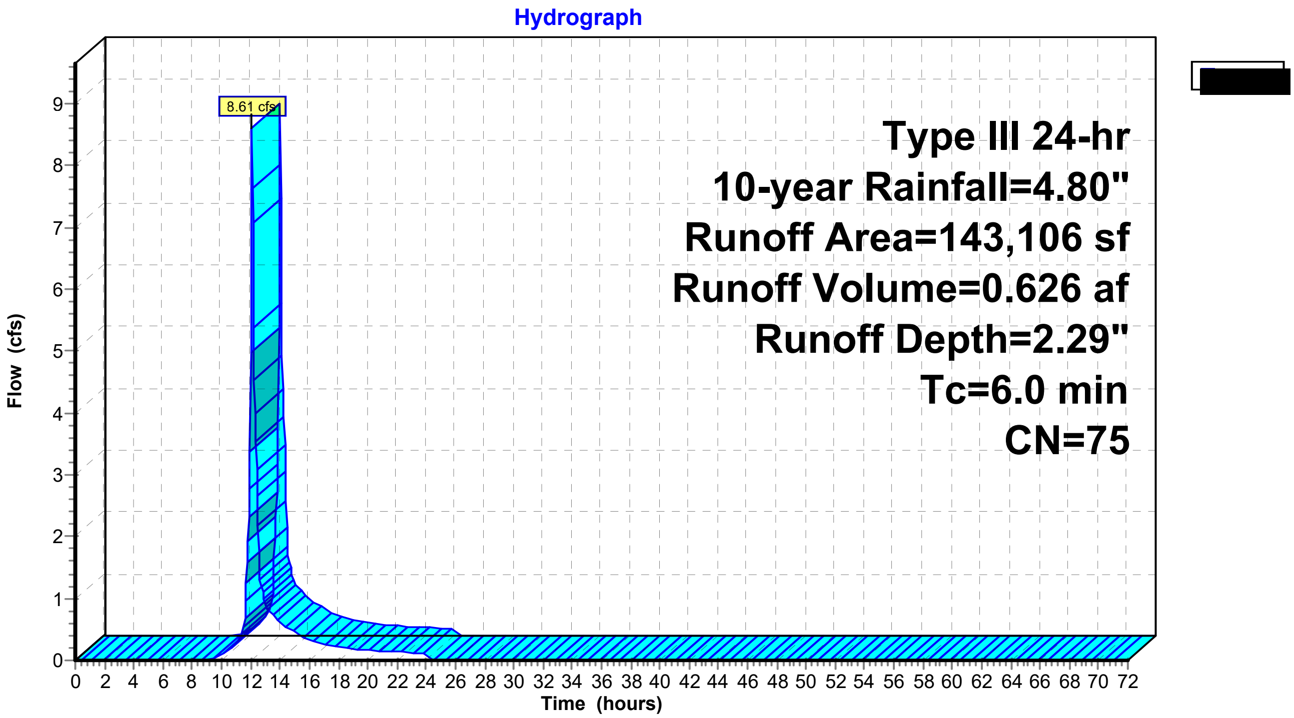
Runoff = 8.61 cfs @ 12.09 hrs, Volume= 0.626 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	122,234	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	8,875	96	Gravel road
*	0	98	Structure
*	0	98	Panels
*	0	98	Equipment pad
*	11,997	98	Basin
	143,106	75	Weighted Average
	131,109		91.62% Pervious Area
	11,997		8.38% Impervious Area

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

Subcatchment 12cS: Drainage Area 12



Summary for Subcatchment 13S: Drainage Area 13

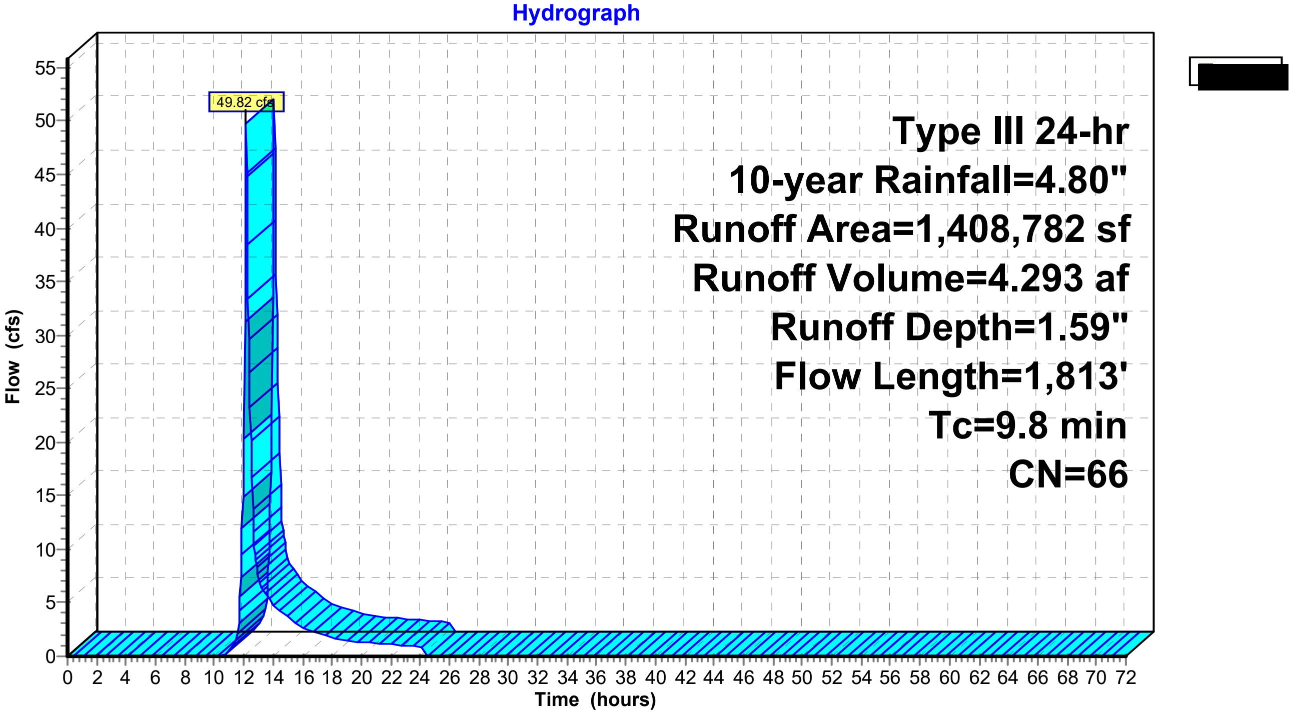
Runoff = 49.82 cfs @ 12.15 hrs, Volume= 4.293 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	137,390	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	1,266,167	70	Gravel pit, HSG A
*	4,469	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	756	98	Water body
*	0	96	Gravel road
*	0	98	Structure
	1,408,782	66	Weighted Average
	1,408,026		99.95% Pervious Area
	756		0.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.20		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
9.1	1,763	0.0403	3.23		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.8	1,813	Total			

Subcatchment 13S: Drainage Area 13



Summary for Reach 10aR: Swale 10a

Inflow Area = 5.867 ac, 13.96% Impervious, Inflow Depth = 2.12" for 10-year event
Inflow = 10.29 cfs @ 12.25 hrs, Volume= 1.039 af
Outflow = 10.04 cfs @ 12.34 hrs, Volume= 1.039 af, Atten= 2%, Lag= 5.4 min

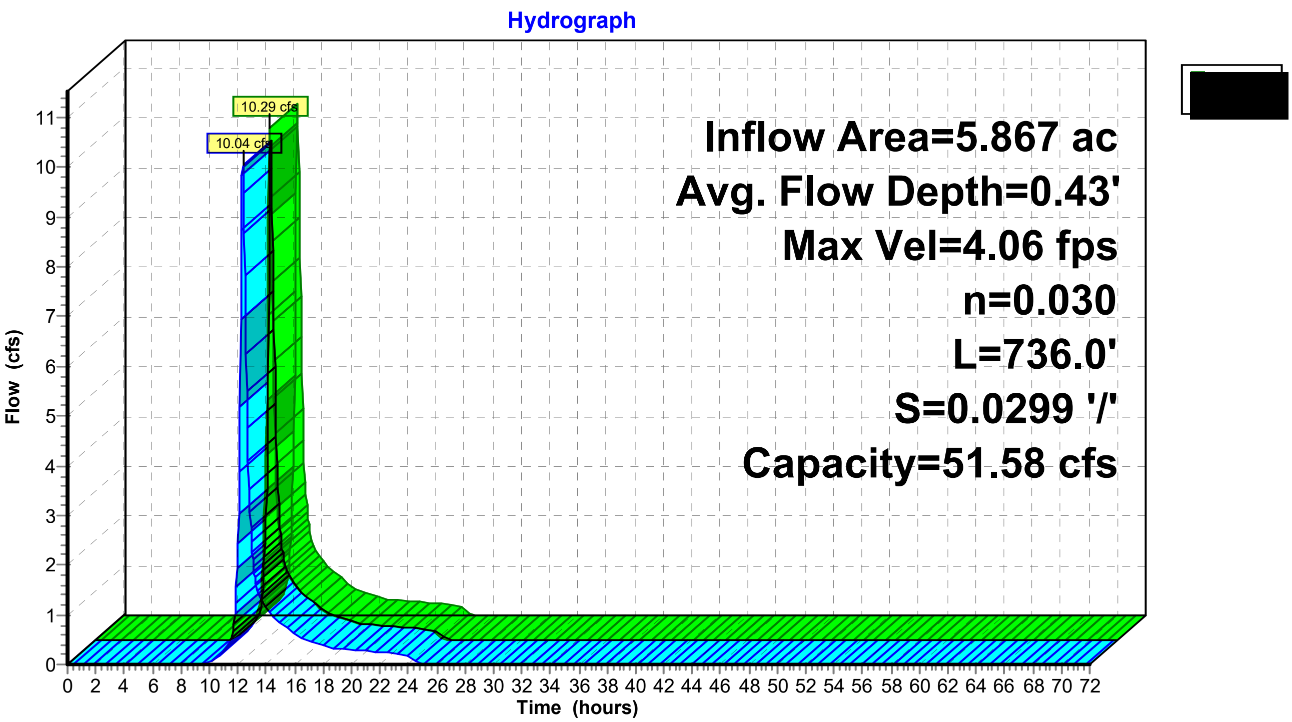
Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.06 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 1.29 fps, Avg. Travel Time= 9.5 min

Peak Storage= 1,819 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.43'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 51.58 cfs

4.00' x 1.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 736.0' Slope= 0.0299 '/'
Inlet Invert= 236.00', Outlet Invert= 214.00'

‡

Reach 10aR: Swale 10a



Summary for Reach 12bR: Swale 12b

Inflow Area = 11.115 ac, 7.70% Impervious, Inflow Depth = 2.21" for 10-year event
Inflow = 21.73 cfs @ 12.21 hrs, Volume= 2.043 af
Outflow = 20.63 cfs @ 12.32 hrs, Volume= 2.043 af, Atten= 5%, Lag= 6.4 min

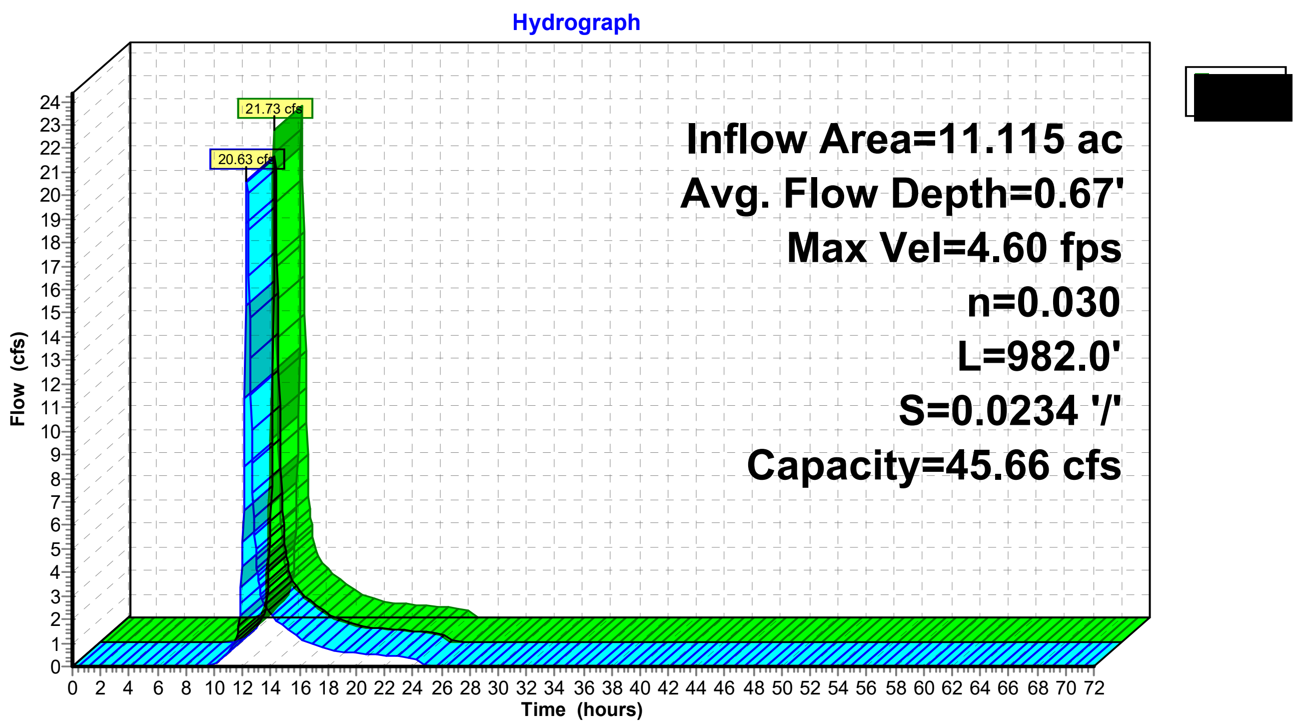
Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.60 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 1.37 fps, Avg. Travel Time= 11.9 min

Peak Storage= 4,439 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.67'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 45.66 cfs

4.00' x 1.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 982.0' Slope= 0.0234 '/'
Inlet Invert= 276.00', Outlet Invert= 253.00'

‡

Reach 12bR: Swale 12b



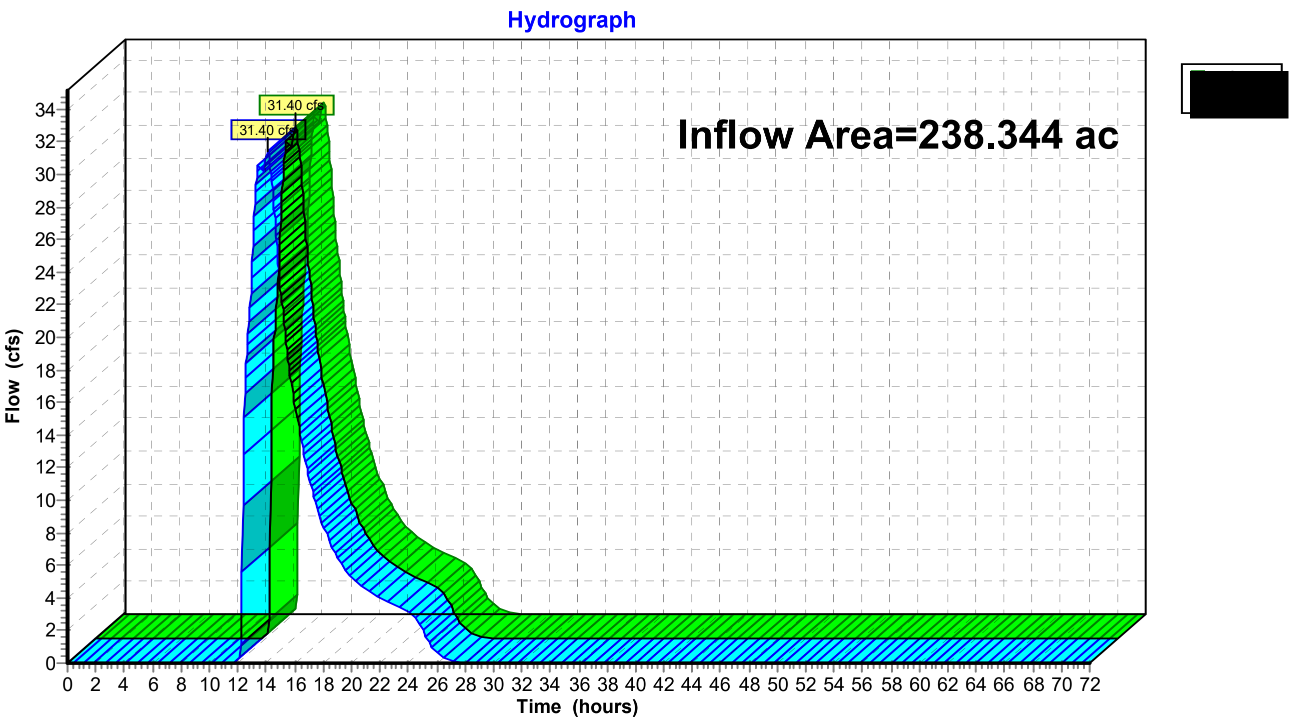
Summary for Reach DP-1: Off-Site West

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 238.344 ac, 10.57% Impervious, Inflow Depth = 0.61" for 10-year event
Inflow = 31.40 cfs @ 14.12 hrs, Volume= 12.135 af
Outflow = 31.40 cfs @ 14.12 hrs, Volume= 12.135 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Off-Site West



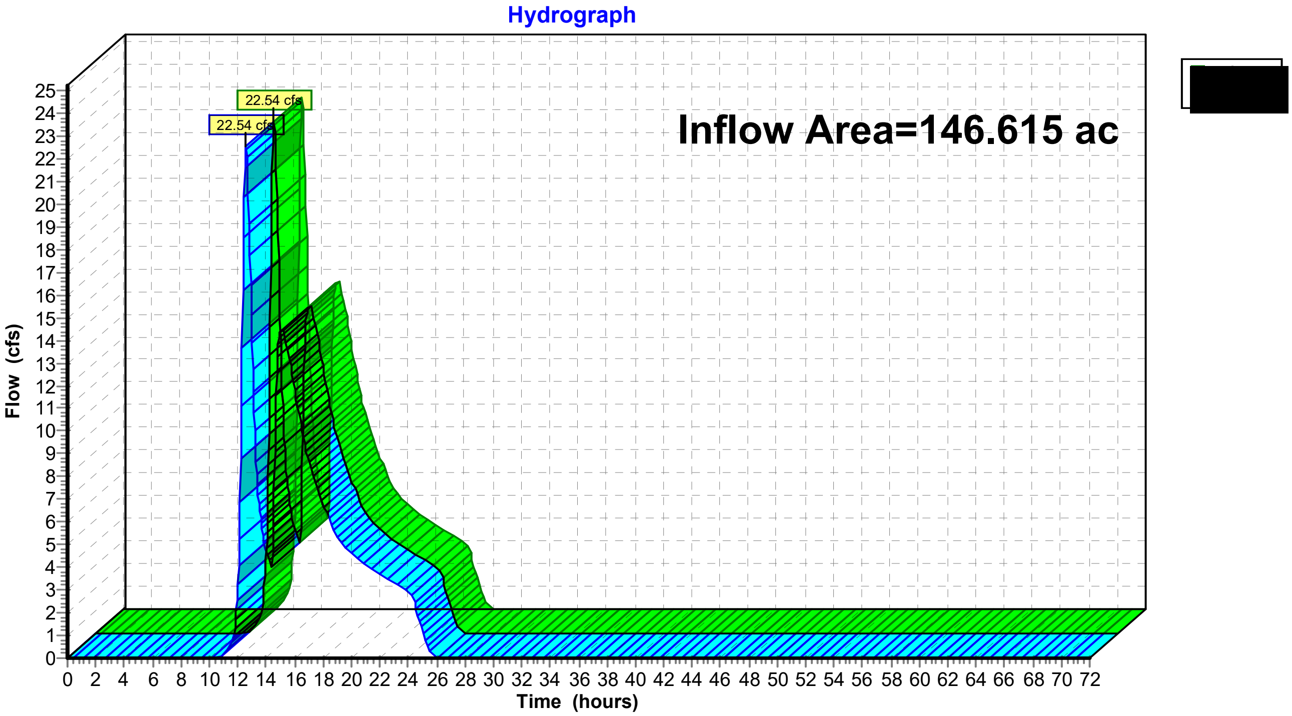
Summary for Reach DP-2: Off-Site South

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	146.615 ac, 22.85% Impervious,	Inflow Depth = 0.62"	for 10-year event	
Inflow =	22.54 cfs @	12.59 hrs, Volume=	7.625 af	
Outflow =	22.54 cfs @	12.59 hrs, Volume=	7.625 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: Off-Site South



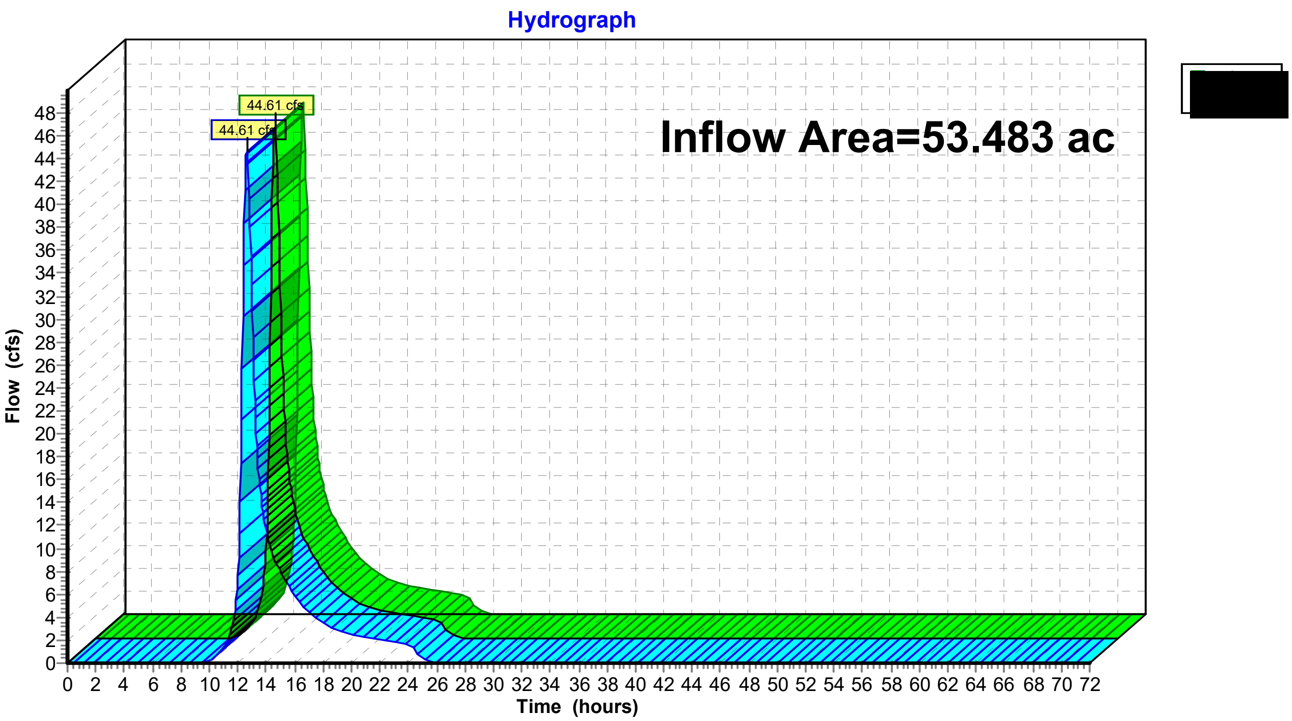
Summary for Reach DP-3: Off-Site East

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 53.483 ac, 12.37% Impervious, Inflow Depth = 1.73" for 10-year event
Inflow = 44.61 cfs @ 12.64 hrs, Volume= 7.729 af
Outflow = 44.61 cfs @ 12.64 hrs, Volume= 7.729 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-3: Off-Site East



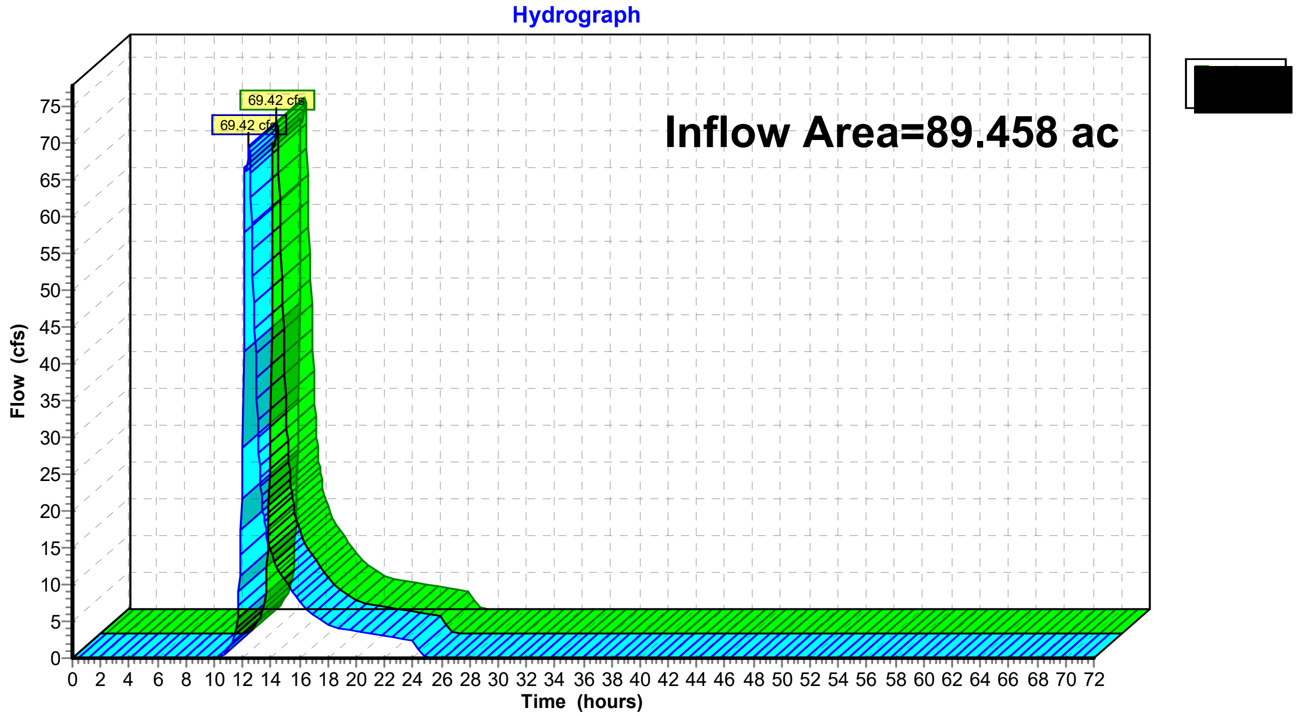
Summary for Reach DP-4: Off-Site Southeast

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 89.458 ac, 5.61% Impervious, Inflow Depth = 1.54" for 10-year event
Inflow = 69.42 cfs @ 12.43 hrs, Volume= 11.449 af
Outflow = 69.42 cfs @ 12.43 hrs, Volume= 11.449 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-4: Off-Site Southeast



Summary for Pond 1bP: Proposed Basin

Inflow Area = 3.365 ac, 28.06% Impervious, Inflow Depth = 0.56" for 10-year event
Inflow = 1.01 cfs @ 12.23 hrs, Volume= 0.158 af
Outflow = 0.92 cfs @ 12.40 hrs, Volume= 0.158 af, Atten= 9%, Lag= 10.1 min
Discarded = 0.92 cfs @ 12.40 hrs, Volume= 0.158 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 152.02' @ 12.40 hrs Surf.Area= 21,811 sf Storage= 328 cf

Plug-Flow detention time= 6.0 min calculated for 0.158 af (100% of inflow)
Center-of-Mass det. time= 6.0 min (935.7 - 929.8)

Volume	Invert	Avail.Storage	Storage Description
#1	152.00'	55,260 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

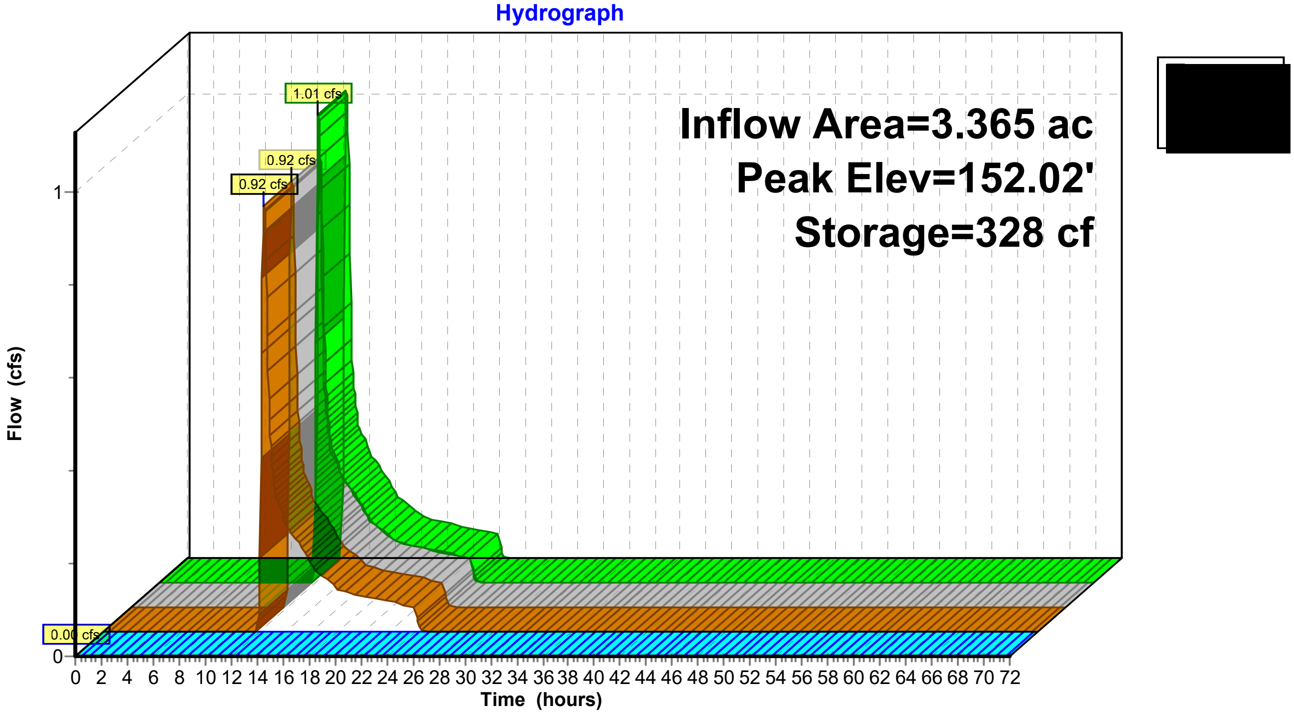
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
152.00	21,729	681.0	0	0	21,729
154.00	33,986	817.0	55,260	55,260	38,010

Device	Routing	Invert	Outlet Devices
#1	Primary	153.50'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	152.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.22 cfs @ 12.40 hrs HW=152.02' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 1.22 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=152.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1bP: Proposed Basin



Summary for Pond 1cP: Proposed Basin

Inflow Area = 9.376 ac, 8.65% Impervious, Inflow Depth = 2.12" for 10-year event
Inflow = 12.94 cfs @ 12.44 hrs, Volume= 1.660 af
Outflow = 12.36 cfs @ 12.53 hrs, Volume= 1.660 af, Atten= 4%, Lag= 5.3 min
Discarded = 0.08 cfs @ 12.53 hrs, Volume= 0.292 af
Primary = 12.28 cfs @ 12.53 hrs, Volume= 1.368 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 227.34' @ 12.53 hrs Surf.Area= 13,218 sf Storage= 13,095 cf

Plug-Flow detention time= 255.3 min calculated for 1.659 af (100% of inflow)
Center-of-Mass det. time= 257.0 min (1,121.7 - 864.7)

Volume	Invert	Avail.Storage	Storage Description
#1	226.00'	23,156 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

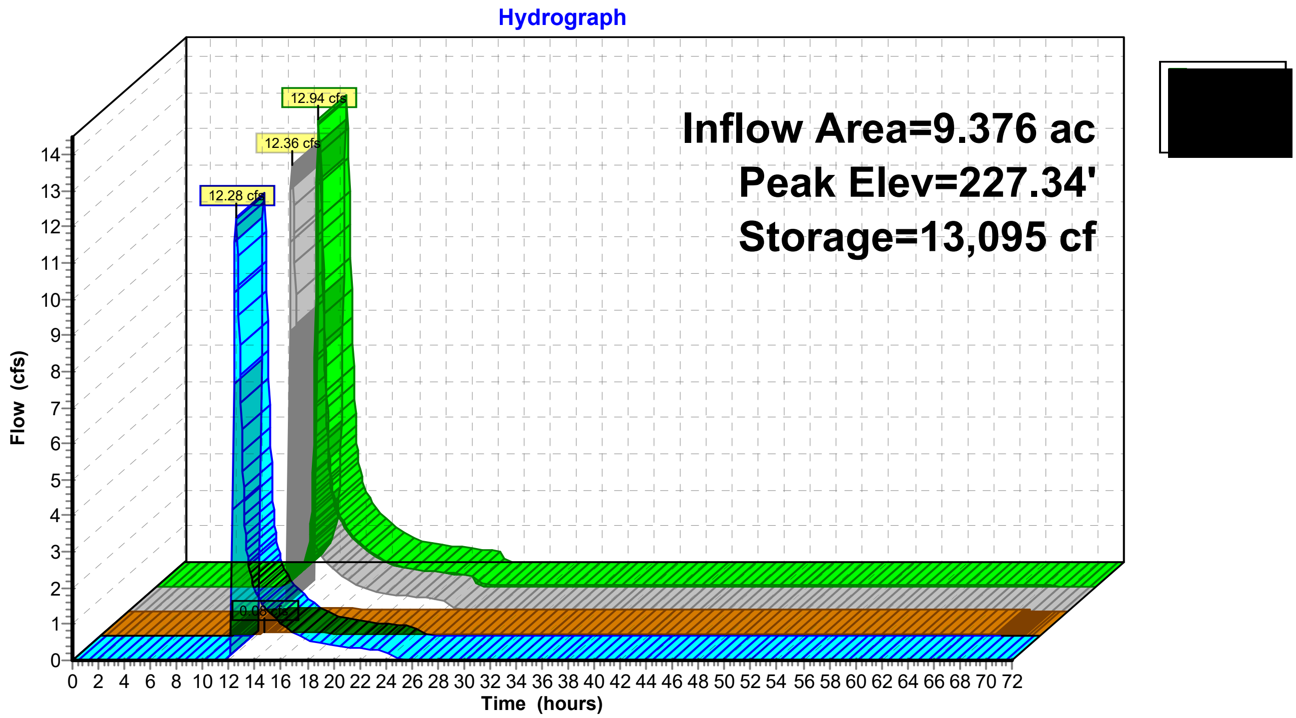
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
226.00	6,727	408.0	0	0	6,727
228.00	17,238	601.0	23,156	23,156	22,256

Device	Routing	Invert	Outlet Devices
#1	Primary	227.00'	**25.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	226.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.08 cfs @ 12.53 hrs HW=227.34' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=12.23 cfs @ 12.53 hrs HW=227.34' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 12.23 cfs @ 1.45 fps)

Pond 1cP: Proposed Basin



Summary for Pond 1dP: Proposed Berm

Inflow Area = 7.830 ac, 7.37% Impervious, Inflow Depth = 2.21" for 10-year event
Inflow = 5.47 cfs @ 13.45 hrs, Volume= 1.439 af
Outflow = 3.52 cfs @ 14.29 hrs, Volume= 1.300 af, Atten= 36%, Lag= 50.4 min
Discarded = 0.10 cfs @ 14.29 hrs, Volume= 0.449 af
Primary = 3.43 cfs @ 14.29 hrs, Volume= 0.851 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 257.79' @ 14.29 hrs Surf.Area= 15,785 sf Storage= 24,646 cf

Plug-Flow detention time= 622.7 min calculated for 1.300 af (90% of inflow)
Center-of-Mass det. time= 574.8 min (1,506.6 - 931.8)

Volume	Invert	Avail.Storage	Storage Description
#1	256.00'	28,065 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

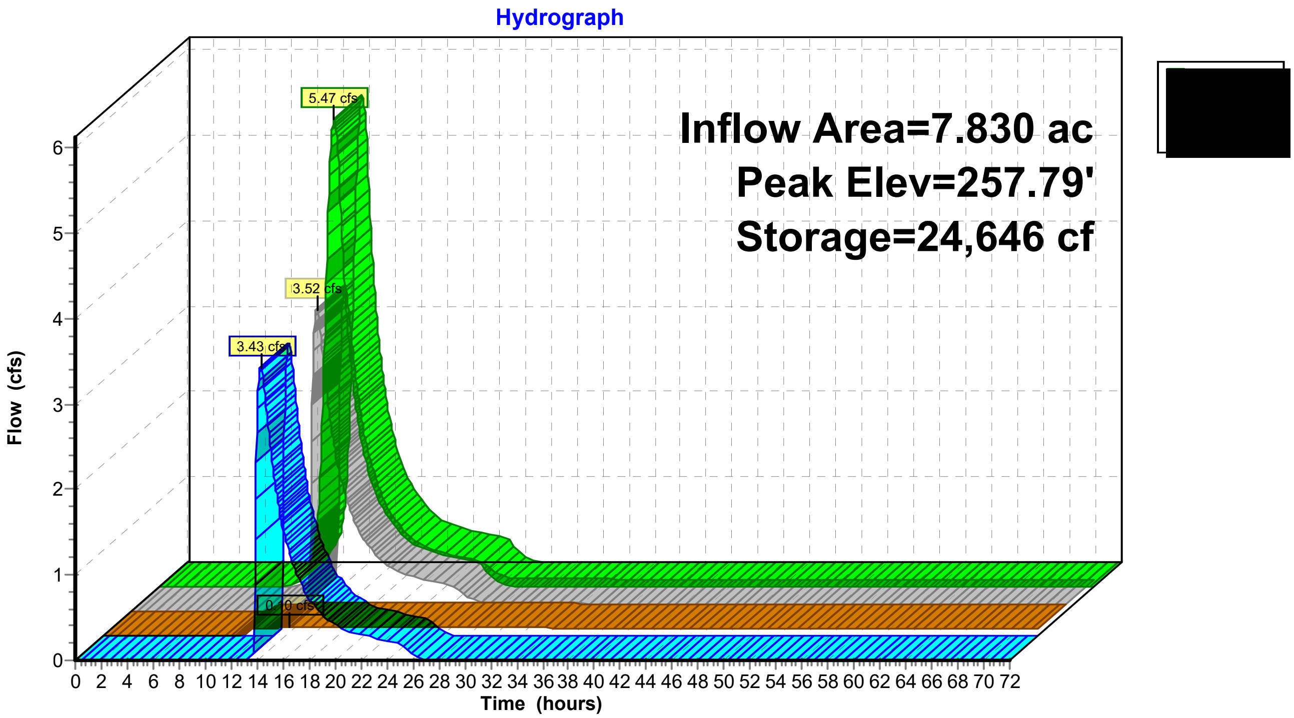
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
256.00	11,894	466.0	0	0	11,894
258.00	16,286	530.0	28,065	28,065	17,063

Device	Routing	Invert	Outlet Devices
#1	Primary	257.50'	**9.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	256.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.10 cfs @ 14.29 hrs HW=257.79' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=3.42 cfs @ 14.29 hrs HW=257.79' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 3.42 cfs @ 1.33 fps)

Pond 1dP: Proposed Berm



Summary for Pond 2P: Existing Depression

Inflow Area = 5.349 ac, 1.98% Impervious, Inflow Depth = 0.47" for 10-year event
Inflow = 1.14 cfs @ 12.38 hrs, Volume= 0.209 af
Outflow = 0.27 cfs @ 14.97 hrs, Volume= 0.209 af, Atten= 77%, Lag= 155.8 min
Discarded = 0.27 cfs @ 14.97 hrs, Volume= 0.209 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 168.25' @ 14.97 hrs Surf.Area= 11,252 sf Storage= 2,295 cf

Plug-Flow detention time= 96.8 min calculated for 0.209 af (100% of inflow)
Center-of-Mass det. time= 96.7 min (1,041.5 - 944.8)

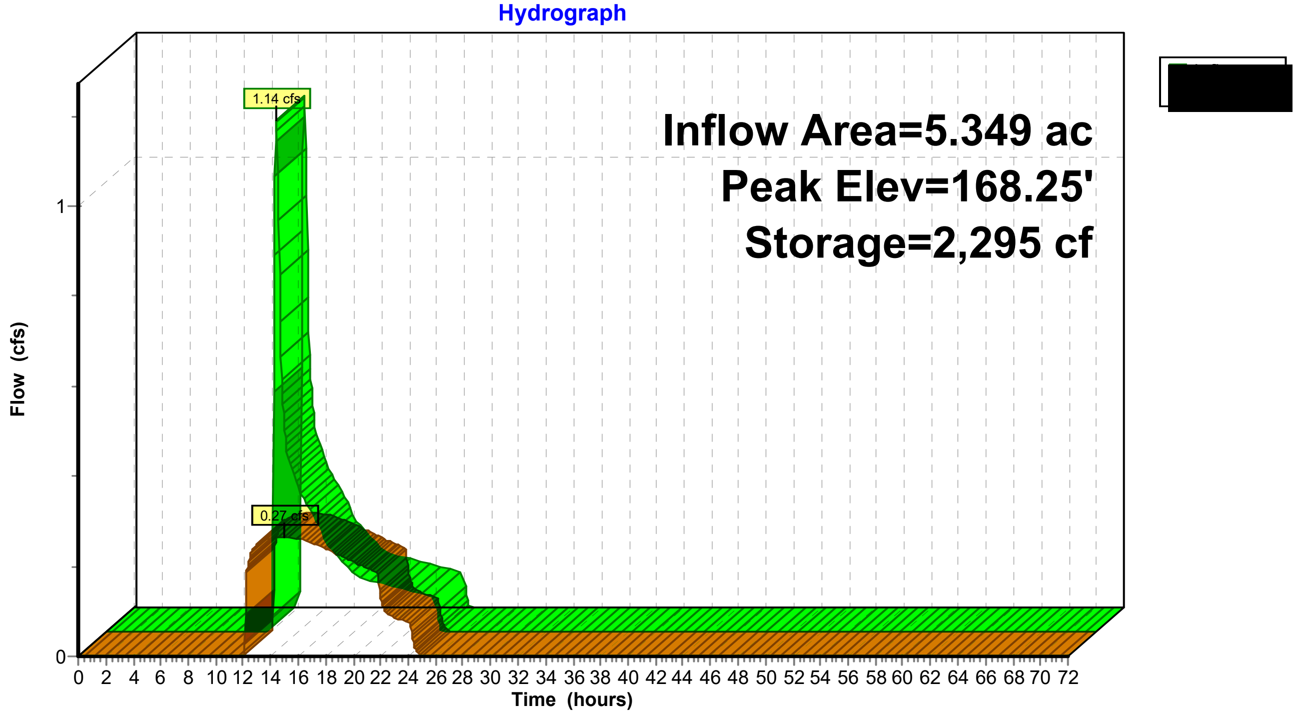
Volume	Invert	Avail.Storage	Storage Description
#1	168.00'	58,289 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
168.00	7,570	407.0	0	0	7,570
170.00	58,771	1,048.0	58,289	58,289	81,803

Device	Routing	Invert	Outlet Devices
#1	Discarded	168.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.27 cfs @ 14.97 hrs HW=168.25' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Pond 2P: Existing Depression



Summary for Pond 3aP: Proposed Berm

Inflow Area = 8.260 ac, 3.27% Impervious, Inflow Depth = 2.12" for 10-year event
Inflow = 13.82 cfs @ 12.28 hrs, Volume= 1.463 af
Outflow = 0.29 cfs @ 23.37 hrs, Volume= 1.250 af, Atten= 98%, Lag= 665.5 min
Discarded = 0.29 cfs @ 23.37 hrs, Volume= 1.250 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 273.41' @ 23.37 hrs Surf.Area= 47,046 sf Storage= 50,389 cf

Plug-Flow detention time= 1,573.7 min calculated for 1.250 af (85% of inflow)
Center-of-Mass det. time= 1,509.3 min (2,363.7 - 854.4)

Volume	Invert	Avail.Storage	Storage Description
#1	272.00'	81,503 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

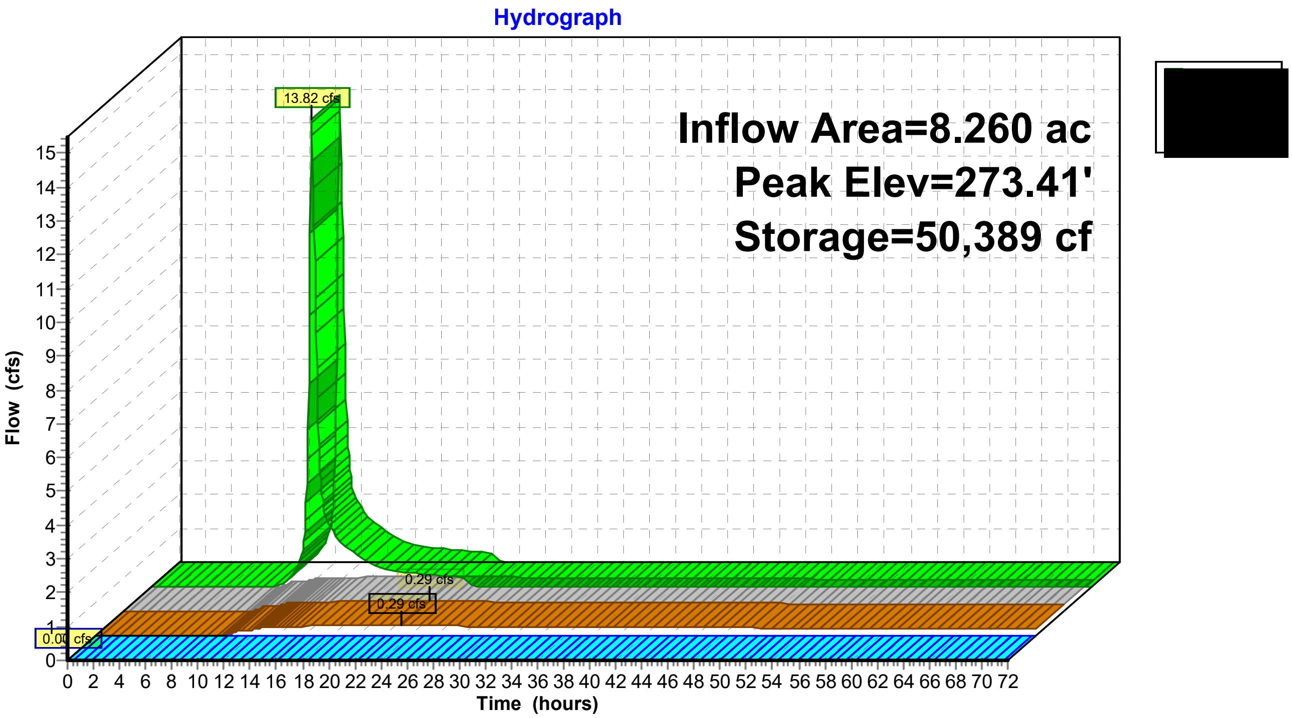
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.00	25,677	871.0	0	0	25,677
274.00	57,990	1,103.0	81,503	81,503	62,174

Device	Routing	Invert	Outlet Devices
#1	Primary	273.75'	**8.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	272.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.29 cfs @ 23.37 hrs HW=273.41' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.29 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=272.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3aP: Proposed Berm



Summary for Pond 3P: Existing Depression

Inflow Area = 31.734 ac, 4.54% Impervious, Inflow Depth = 1.40" for 10-year event
Inflow = 38.44 cfs @ 12.21 hrs, Volume= 3.696 af
Outflow = 1.24 cfs @ 18.56 hrs, Volume= 3.696 af, Atten= 97%, Lag= 381.0 min
Discarded = 1.24 cfs @ 18.56 hrs, Volume= 3.696 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 189.49' @ 18.56 hrs Surf.Area= 52,671 sf Storage= 112,497 cf

Plug-Flow detention time= 1,093.0 min calculated for 3.696 af (100% of inflow)
Center-of-Mass det. time= 1,092.8 min (1,950.8 - 858.0)

Volume	Invert	Avail.Storage	Storage Description
#1	186.00'	277,396 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

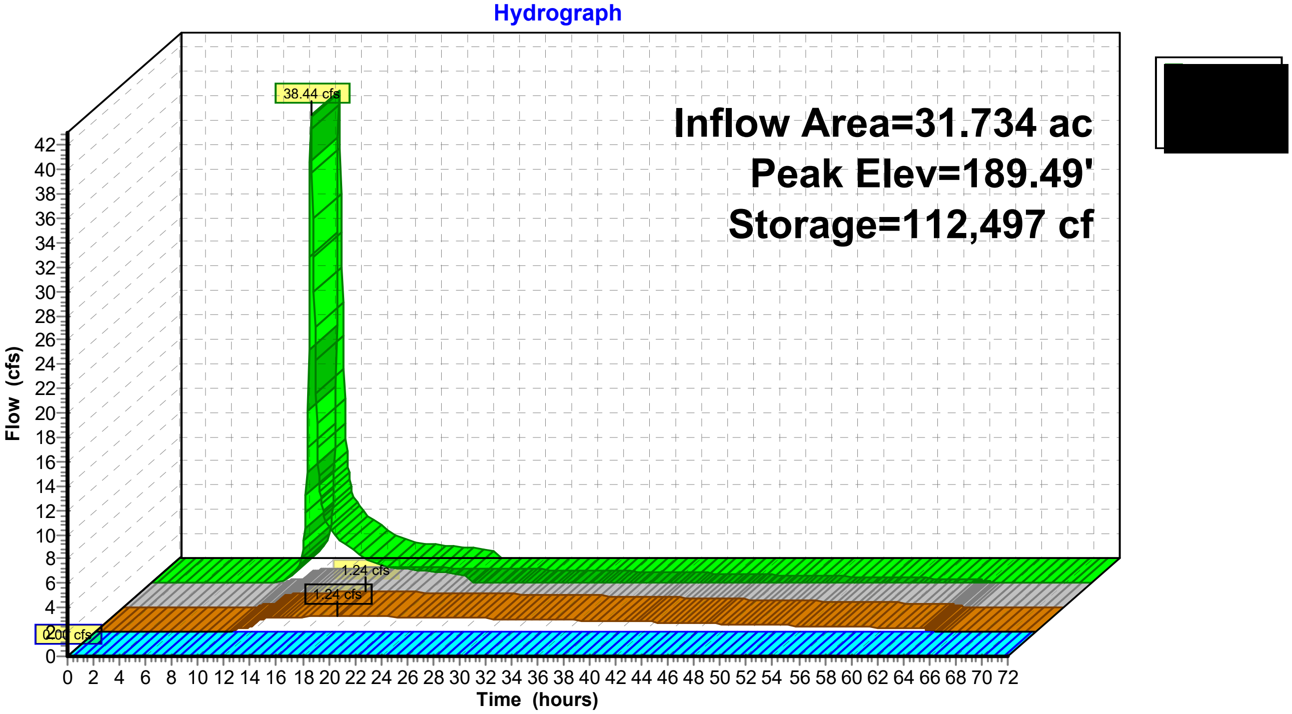
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
186.00	11,737	422.0	0	0	11,737
188.00	36,683	753.0	46,113	46,113	42,709
190.00	58,742	1,001.0	94,563	140,677	77,369
192.00	78,452	1,254.0	136,720	277,396	122,825

Device	Routing	Invert	Outlet Devices
#1	Discarded	186.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	191.00'	**64.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=1.24 cfs @ 18.56 hrs HW=189.49' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 1.24 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=186.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Existing Depression



Summary for Pond 4P: Existing Depression

Inflow Area = 16.464 ac, 0.65% Impervious, Inflow Depth = 2.81" for 10-year event
Inflow = 41.95 cfs @ 12.19 hrs, Volume= 3.854 af
Outflow = 1.11 cfs @ 18.21 hrs, Volume= 3.611 af, Atten= 97%, Lag= 361.0 min
Discarded = 1.11 cfs @ 18.21 hrs, Volume= 3.611 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 167.19' @ 18.21 hrs Surf.Area= 47,032 sf Storage= 124,488 cf

Plug-Flow detention time= 1,348.5 min calculated for 3.608 af (94% of inflow)
Center-of-Mass det. time= 1,316.1 min (2,144.2 - 828.1)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	1,773,203 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

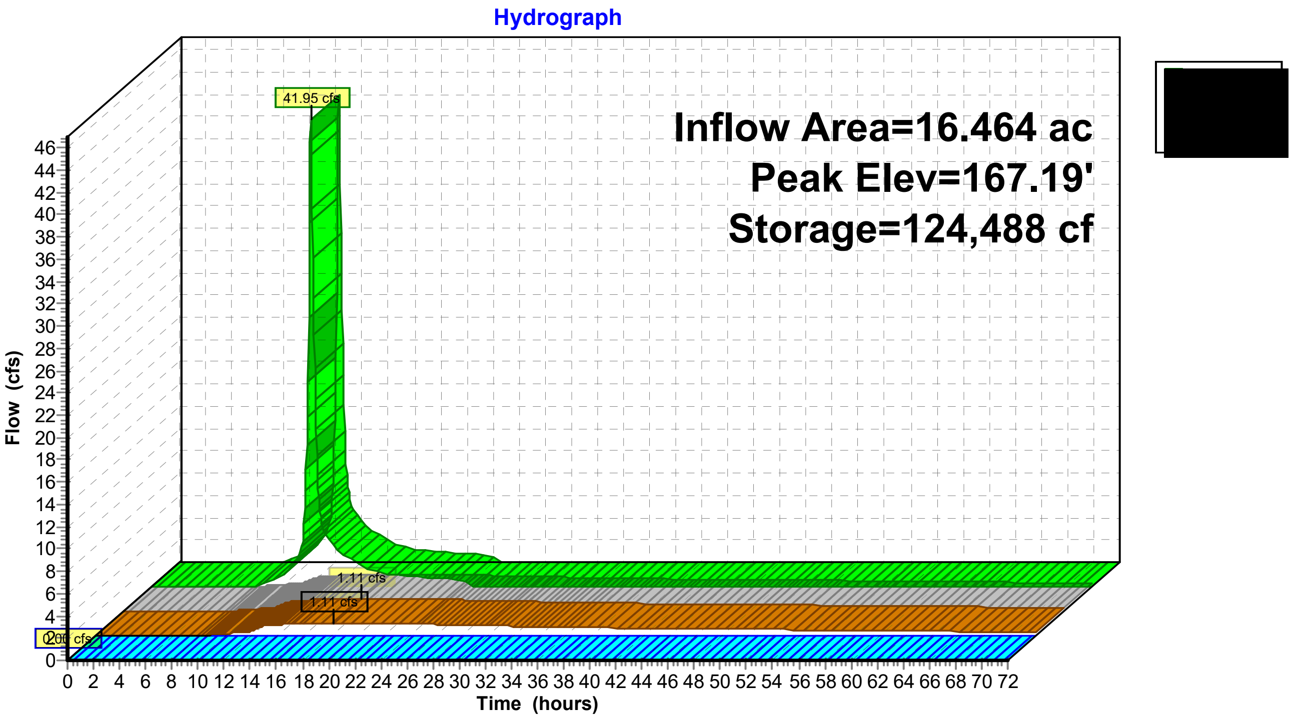
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
162.00	8,040	387.0	0	0	8,040
164.00	20,064	890.0	27,203	27,203	59,171
166.00	31,393	894.0	51,036	78,239	61,043
168.00	59,552	1,582.0	89,455	167,695	196,625
170.00	106,611	3,162.0	163,895	331,590	793,118
172.00	142,449	3,012.0	248,196	579,786	867,073
174.00	182,259	2,708.0	323,891	903,678	1,005,567
176.00	222,778	3,083.0	404,360	1,308,037	1,178,477
178.00	242,528	3,031.0	465,166	1,773,203	1,204,505

Device	Routing	Invert	Outlet Devices
#1	Discarded	162.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	177.00'	**23.0' long x 99.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=1.11 cfs @ 18.21 hrs HW=167.19' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 1.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=162.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: Existing Depression



Summary for Pond 5bP: Proposed Berm

Inflow Area =	1.206 ac,	64.34% Impervious,	Inflow Depth = 3.09"	for 10-year event
Inflow =	4.25 cfs @	12.09 hrs, Volume=	0.310 af	
Outflow =	0.29 cfs @	13.75 hrs, Volume=	0.310 af,	Atten= 93%, Lag= 99.7 min
Discarded =	0.29 cfs @	13.75 hrs, Volume=	0.310 af	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 231.02' @ 13.75 hrs Surf.Area= 12,326 sf Storage= 6,935 cf

Plug-Flow detention time= 296.7 min calculated for 0.310 af (100% of inflow)
Center-of-Mass det. time= 296.8 min (1,108.9 - 812.2)

Volume	Invert	Avail.Storage	Storage Description
#1	230.00'	26,529 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

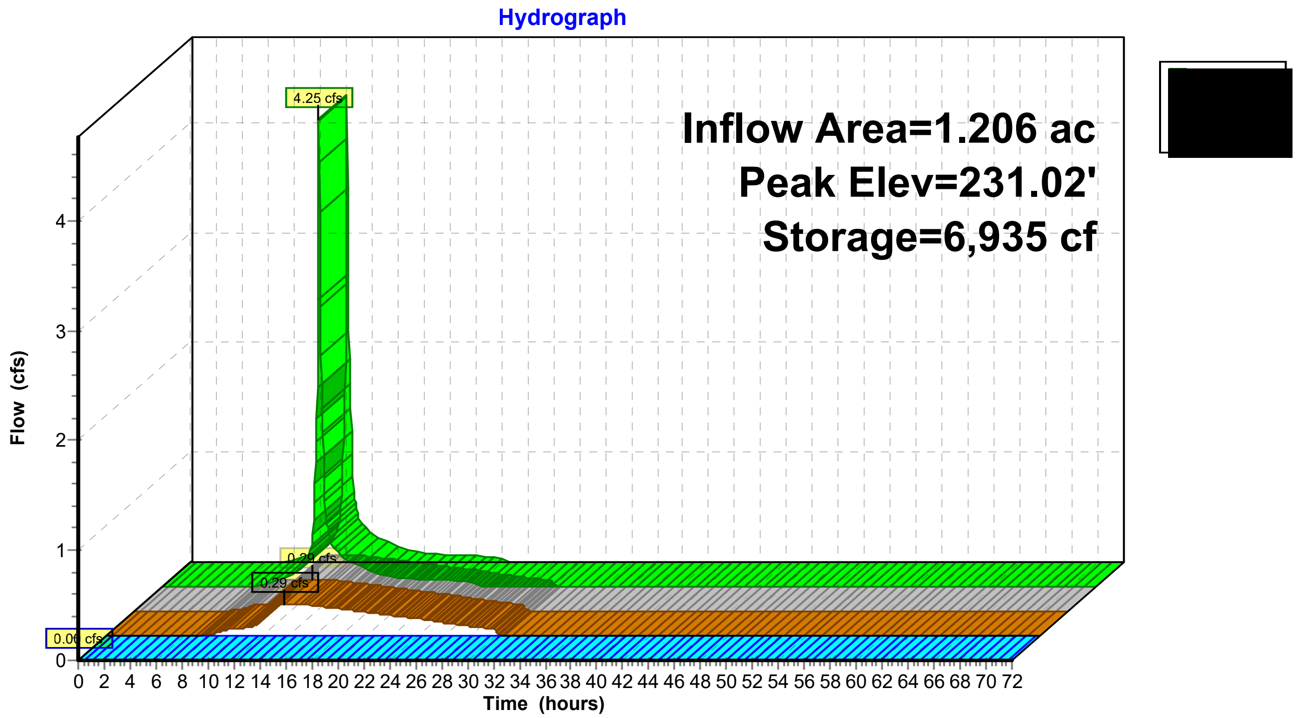
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	2,519	275.0	0	0	2,519
232.00	28,762	1,204.0	26,529	26,529	111,868

Device	Routing	Invert	Outlet Devices
#1	Discarded	230.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	231.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.29 cfs @ 13.75 hrs HW=231.02' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.29 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=230.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5bP: Proposed Berm



Summary for Pond 5cP: Proposed Berm

Inflow Area = 6.244 ac, 13.40% Impervious, Inflow Depth = 2.05" for 10-year event
Inflow = 8.41 cfs @ 12.42 hrs, Volume= 1.064 af
Outflow = 0.90 cfs @ 15.02 hrs, Volume= 0.509 af, Atten= 89%, Lag= 155.8 min
Discarded = 0.02 cfs @ 15.02 hrs, Volume= 0.115 af
Primary = 0.88 cfs @ 15.02 hrs, Volume= 0.394 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 210.45' @ 15.02 hrs Surf.Area= 11,879 sf Storage= 30,175 cf

Plug-Flow detention time= 656.8 min calculated for 0.509 af (48% of inflow)
Center-of-Mass det. time= 531.7 min (1,398.0 - 866.3)

Volume	Invert	Avail.Storage	Storage Description
#1	206.00'	37,107 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

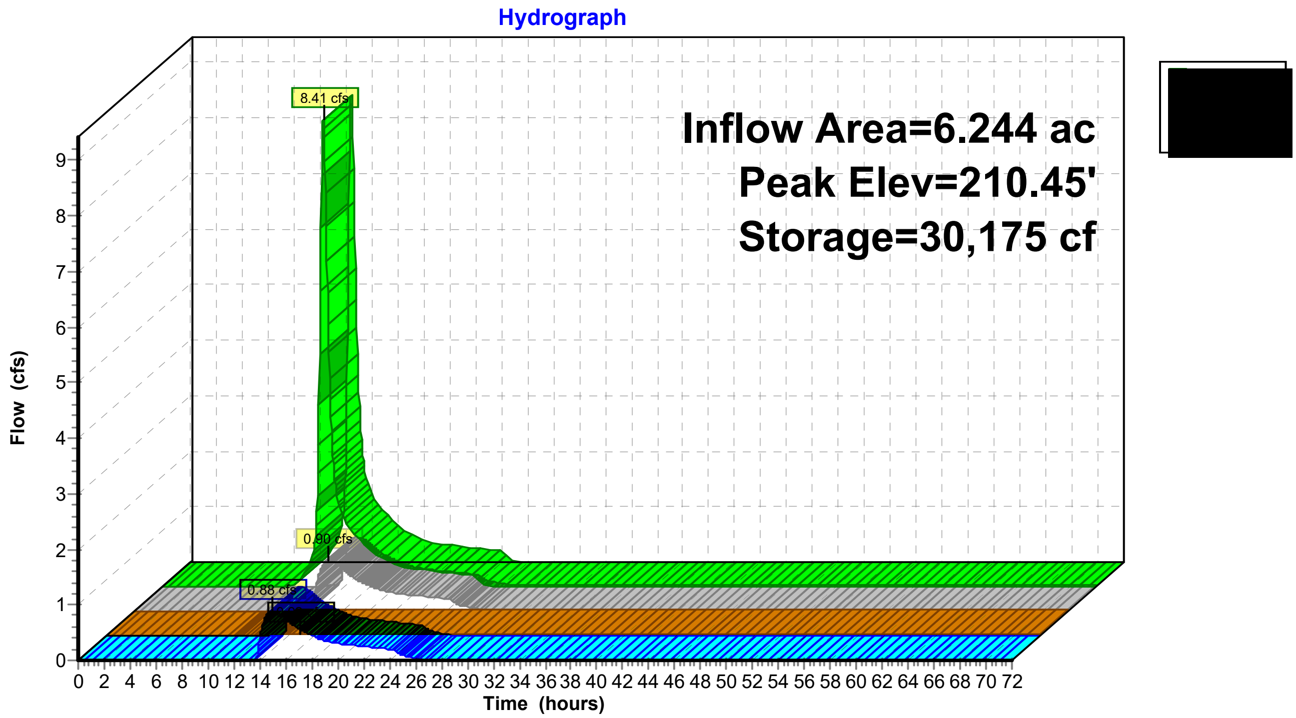
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
206.00	2,702	340.0	0	0	2,702
208.00	6,061	500.0	8,540	8,540	13,430
210.00	10,702	660.0	16,545	25,084	28,245
211.00	13,393	685.0	12,022	37,107	31,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	206.00'	**0.090 in/hr Exfiltration over Surface area**
#2	Primary	210.25'	**4.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.02 cfs @ 15.02 hrs HW=210.45' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.88 cfs @ 15.02 hrs HW=210.45' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.88 cfs @ 1.09 fps)

Pond 5cP: Proposed Berm



Summary for Pond 5dP: Proposed Berm

Inflow Area = 1.360 ac, 44.82% Impervious, Inflow Depth = 3.18" for 10-year event
Inflow = 4.44 cfs @ 12.13 hrs, Volume= 0.361 af
Outflow = 0.10 cfs @ 17.93 hrs, Volume= 0.361 af, Atten= 98%, Lag= 348.0 min
Discarded = 0.10 cfs @ 17.93 hrs, Volume= 0.361 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 284.72' @ 17.93 hrs Surf.Area= 16,327 sf Storage= 10,955 cf

Plug-Flow detention time= 1,064.7 min calculated for 0.361 af (100% of inflow)
Center-of-Mass det. time= 1,064.4 min (1,876.4 - 812.0)

Volume	Invert	Avail.Storage	Storage Description
#1	284.00'	34,488 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

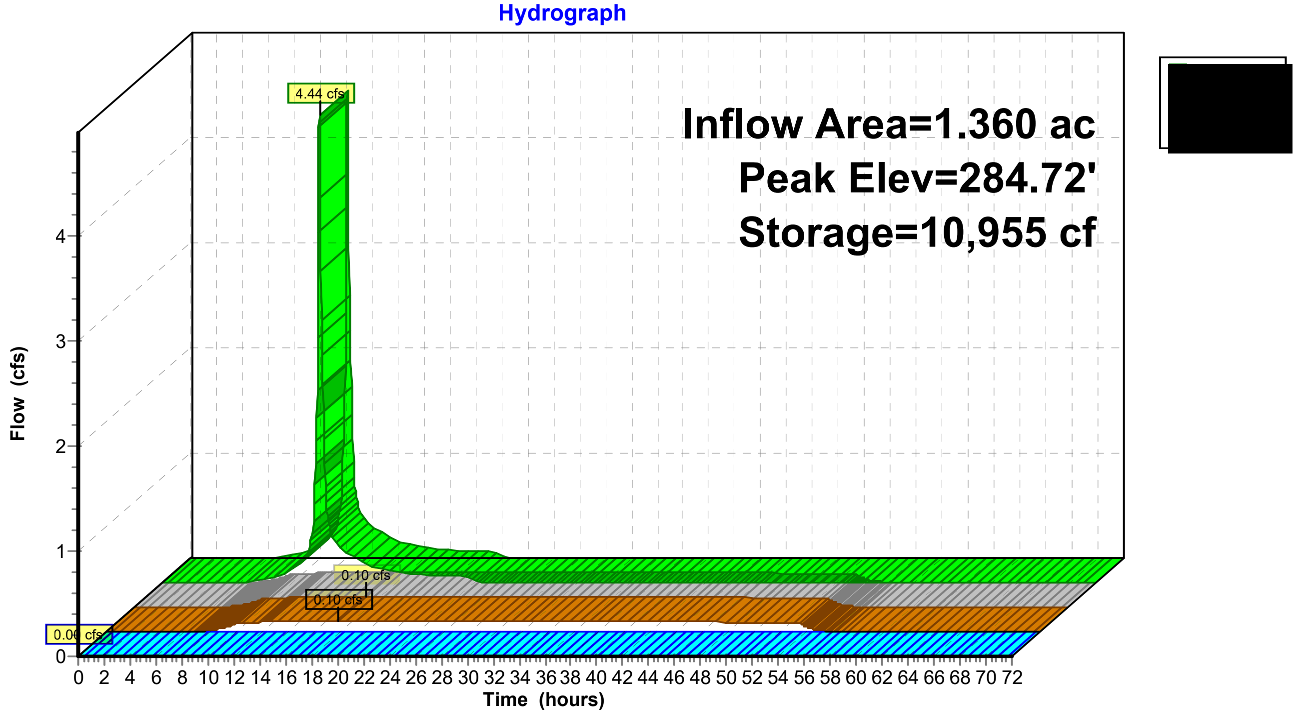
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
284.00	14,216	751.0	0	0	14,216
286.00	20,461	810.0	34,488	34,488	21,709

Device	Routing	Invert	Outlet Devices
#1	Discarded	284.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	285.00'	**8.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.10 cfs @ 17.93 hrs HW=284.72' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=284.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5dP: Proposed Berm



Summary for Pond 5P: Existing Depression

Inflow Area = 68.434 ac, 25.36% Impervious, Inflow Depth = 1.61" for 10-year event
Inflow = 53.17 cfs @ 12.71 hrs, Volume= 9.169 af
Outflow = 43.79 cfs @ 12.97 hrs, Volume= 7.579 af, Atten= 18%, Lag= 16.0 min
Discarded = 0.25 cfs @ 12.97 hrs, Volume= 1.083 af
Primary = 43.55 cfs @ 12.97 hrs, Volume= 6.496 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 167.62' @ 12.97 hrs Surf.Area= 39,761 sf Storage= 118,856 cf

Plug-Flow detention time= 341.8 min calculated for 7.573 af (83% of inflow)
Center-of-Mass det. time= 269.5 min (1,163.1 - 893.5)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	134,374 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

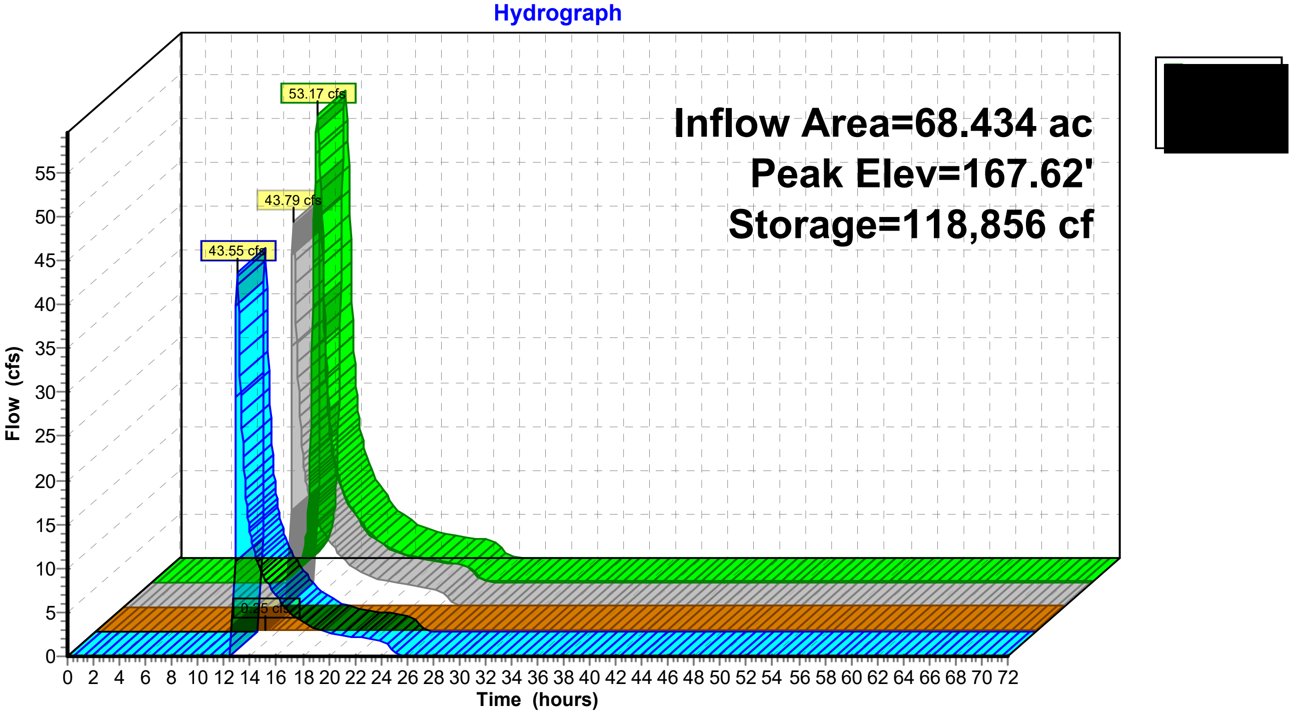
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
162.00	1,686	164.0	0	0	1,686
164.00	17,454	653.0	16,376	16,376	33,489
166.00	29,548	840.0	46,474	62,851	55,756
168.00	42,358	938.0	71,523	134,374	69,736

Device	Routing	Invert	Outlet Devices
#1	Discarded	162.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	167.25'	**71.0' long x 38.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.25 cfs @ 12.97 hrs HW=167.62' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=43.01 cfs @ 12.97 hrs HW=167.62' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 43.01 cfs @ 1.64 fps)

Pond 5P: Existing Depression



Summary for Pond 6bP: Proposed Berm

Inflow Area =	10.770 ac, 17.08% Impervious, Inflow Depth = 0.51" for 10-year event		
Inflow =	2.44 cfs @ 12.47 hrs, Volume=	0.462 af	
Outflow =	1.24 cfs @ 12.92 hrs, Volume=	0.462 af,	Atten= 49%, Lag= 26.9 min
Discarded =	1.24 cfs @ 12.92 hrs, Volume=	0.462 af	
Primary =	0.00 cfs @ 0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 164.10' @ 12.92 hrs Surf.Area= 22,215 sf Storage= 2,066 cf

Plug-Flow detention time= 11.5 min calculated for 0.462 af (100% of inflow)
Center-of-Mass det. time= 11.5 min (956.4 - 945.0)

Volume	Invert	Avail.Storage	Storage Description
#1	164.00'	83,016 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

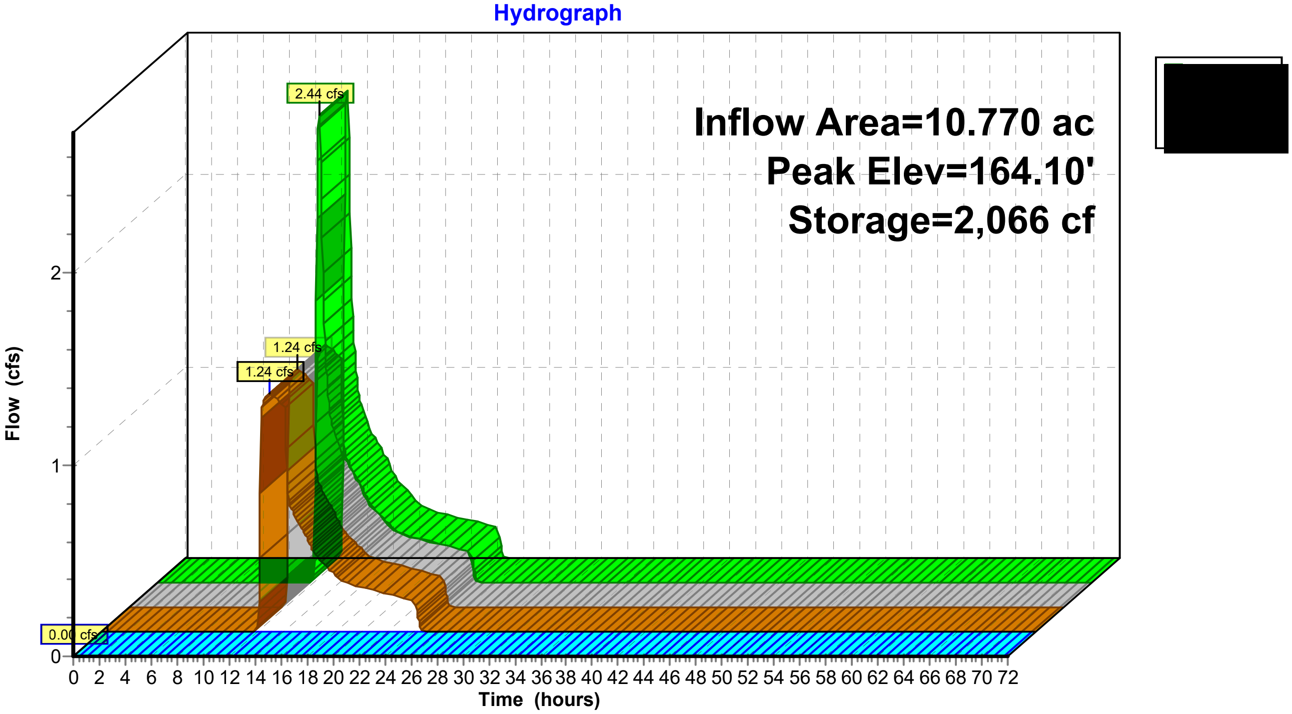
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
164.00	20,590	712.0	0	0	20,590
166.00	66,837	1,639.0	83,016	83,016	194,035

Device	Routing	Invert	Outlet Devices
#1	Primary	165.00'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	164.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.24 cfs @ 12.92 hrs HW=164.10' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 1.24 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=164.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 6bP: Proposed Berm



Summary for Pond 6P: Existing Wetland

Inflow Area = 116.133 ac, 25.36% Impervious, Inflow Depth = 0.98" for 10-year event
Inflow = 50.57 cfs @ 12.98 hrs, Volume= 9.473 af
Outflow = 11.82 cfs @ 15.12 hrs, Volume= 6.266 af, Atten= 77%, Lag= 128.3 min
Discarded = 0.45 cfs @ 15.12 hrs, Volume= 2.057 af
Primary = 11.37 cfs @ 15.12 hrs, Volume= 4.209 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 141.11' @ 15.12 hrs Surf.Area= 113,608 sf Storage= 220,087 cf

Plug-Flow detention time= 731.9 min calculated for 6.261 af (66% of inflow)
Center-of-Mass det. time= 617.6 min (1,550.8 - 933.2)

Volume	Invert	Avail.Storage	Storage Description
#1	138.00'	330,471 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

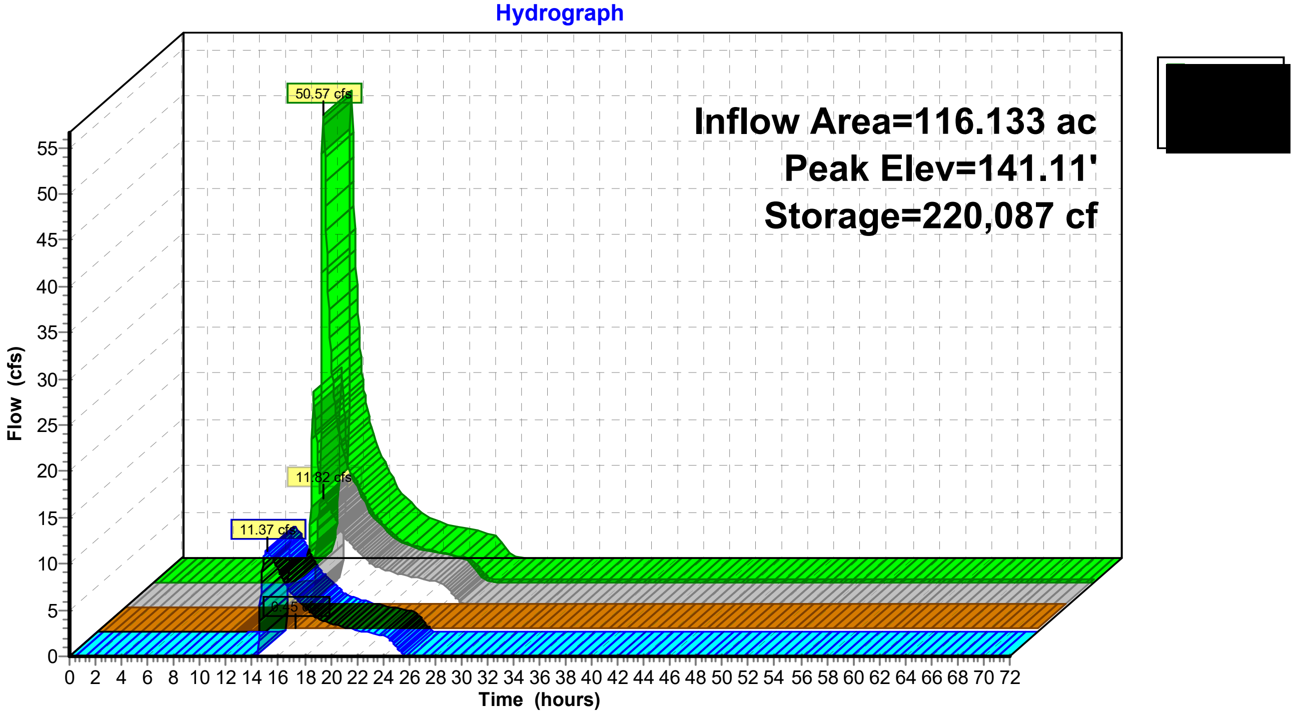
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
138.00	23,460	686.0	0	0	23,460
140.00	91,023	1,816.0	107,129	107,129	248,460
142.00	133,681	2,277.0	223,342	330,471	398,668

Device	Routing	Invert	Outlet Devices
#1	Discarded	138.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	141.00'	**121.0' long x 19.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.45 cfs @ 15.12 hrs HW=141.11' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.45 cfs)

Primary OutFlow Max=11.23 cfs @ 15.12 hrs HW=141.11' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 11.23 cfs @ 0.87 fps)

Pond 6P: Existing Wetland



Summary for Pond 7aP: Proposed Berm

Inflow Area = 6.064 ac, 2.54% Impervious, Inflow Depth = 0.11" for 10-year event
Inflow = 0.08 cfs @ 16.23 hrs, Volume= 0.053 af
Outflow = 0.04 cfs @ 23.82 hrs, Volume= 0.053 af, Atten= 47%, Lag= 455.6 min
Discarded = 0.04 cfs @ 23.82 hrs, Volume= 0.053 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 166.12' @ 23.82 hrs Surf.Area= 6,732 sf Storage= 719 cf

Plug-Flow detention time= 201.7 min calculated for 0.053 af (100% of inflow)
Center-of-Mass det. time= 201.3 min (1,348.1 - 1,146.9)

Volume	Invert	Avail.Storage	Storage Description
#1	166.00'	38,794 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

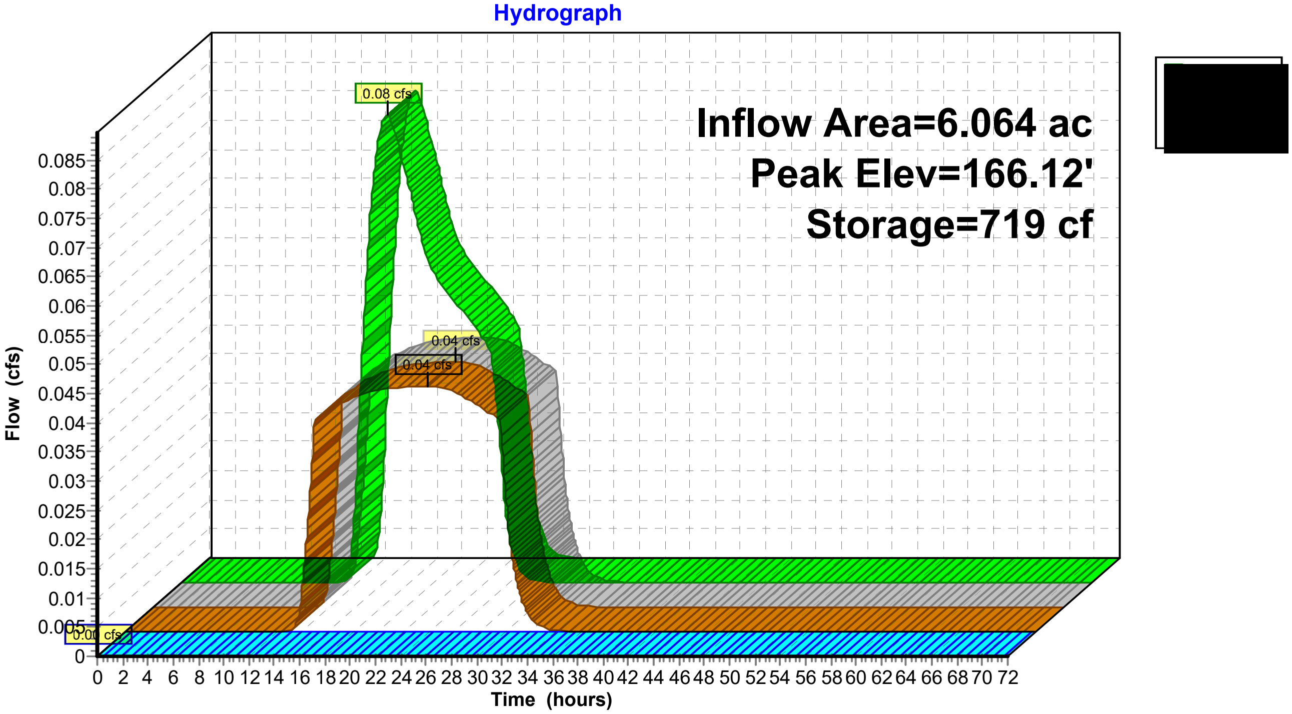
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
166.00	5,638	286.0	0	0	5,638
168.00	37,929	753.0	38,794	38,794	44,264

Device	Routing	Invert	Outlet Devices
#1	Primary	167.50'	**8.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	166.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 23.82 hrs HW=166.12' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=166.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 7aP: Proposed Berm



Summary for Pond 7P: Existing Depression

Inflow Area = 78.568 ac, 13.71% Impervious, Inflow Depth = 0.48" for 10-year event
Inflow = 7.71 cfs @ 13.75 hrs, Volume= 3.111 af
Outflow = 6.20 cfs @ 14.55 hrs, Volume= 3.111 af, Atten= 20%, Lag= 47.5 min
Discarded = 1.25 cfs @ 14.55 hrs, Volume= 1.708 af
Primary = 4.95 cfs @ 14.55 hrs, Volume= 1.403 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 147.76' @ 14.55 hrs Surf.Area= 22,349 sf Storage= 26,747 cf

Plug-Flow detention time= 156.6 min calculated for 3.111 af (100% of inflow)
Center-of-Mass det. time= 156.6 min (1,176.1 - 1,019.6)

Volume	Invert	Avail.Storage	Storage Description
#1	146.00'	32,409 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

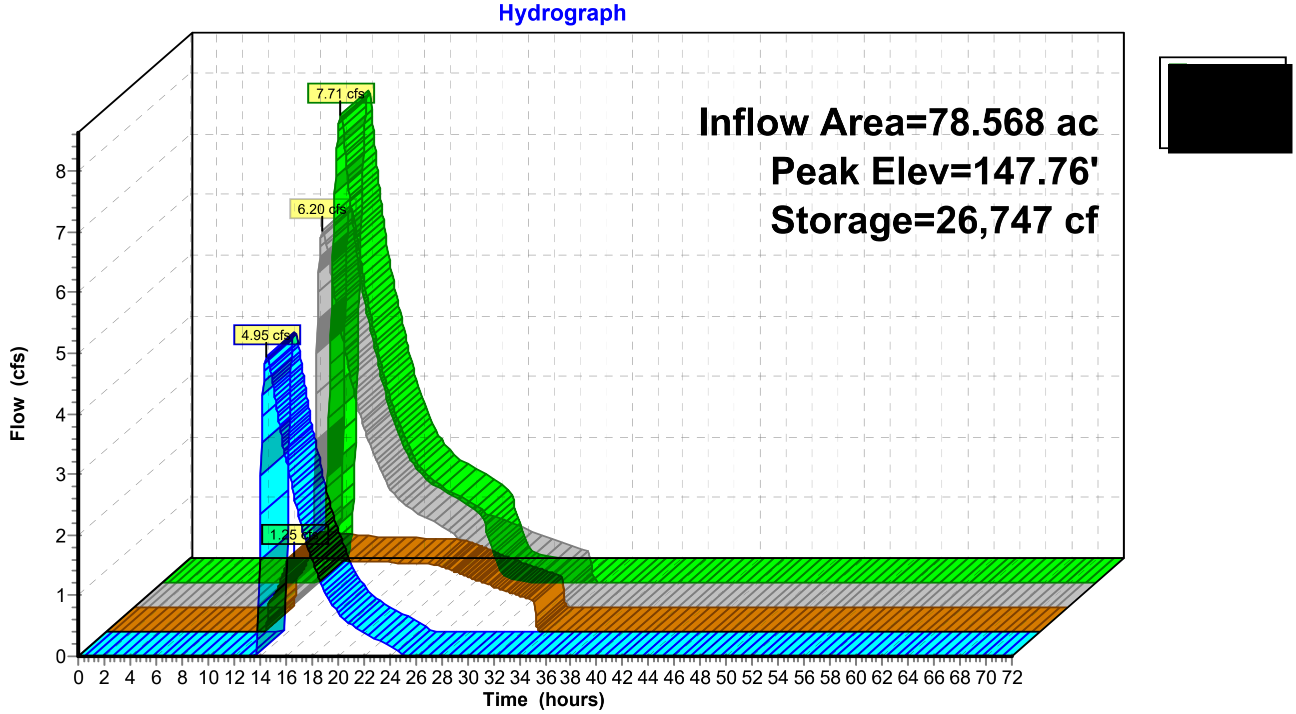
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
146.00	9,050	771.0	0	0	9,050
148.00	24,633	1,236.0	32,409	32,409	83,343

Device	Routing	Invert	Outlet Devices
#1	Primary	147.50'	**14.0' long x 90.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	146.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.25 cfs @ 14.55 hrs HW=147.76' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 1.25 cfs)

Primary OutFlow Max=4.95 cfs @ 14.55 hrs HW=147.76' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 4.95 cfs @ 1.37 fps)

Pond 7P: Existing Depression



Summary for Pond 8P: Existing Wetland

Inflow Area =	8.135 ac,	26.48% Impervious,	Inflow Depth = 2.63"	for 10-year event
Inflow =	15.72 cfs @	12.33 hrs, Volume=	1.783 af	
Outflow =	0.20 cfs @	24.27 hrs, Volume=	0.844 af,	Atten= 99%, Lag= 716.3 min
Discarded =	0.20 cfs @	24.27 hrs, Volume=	0.844 af	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 231.06' @ 24.27 hrs Surf.Area= 50,729 sf Storage= 69,294 cf

Plug-Flow detention time= 1,688.8 min calculated for 0.844 af (47% of inflow)
Center-of-Mass det. time= 1,570.0 min (2,412.6 - 842.6)

Volume	Invert	Avail.Storage	Storage Description
#1	228.00'	130,034 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

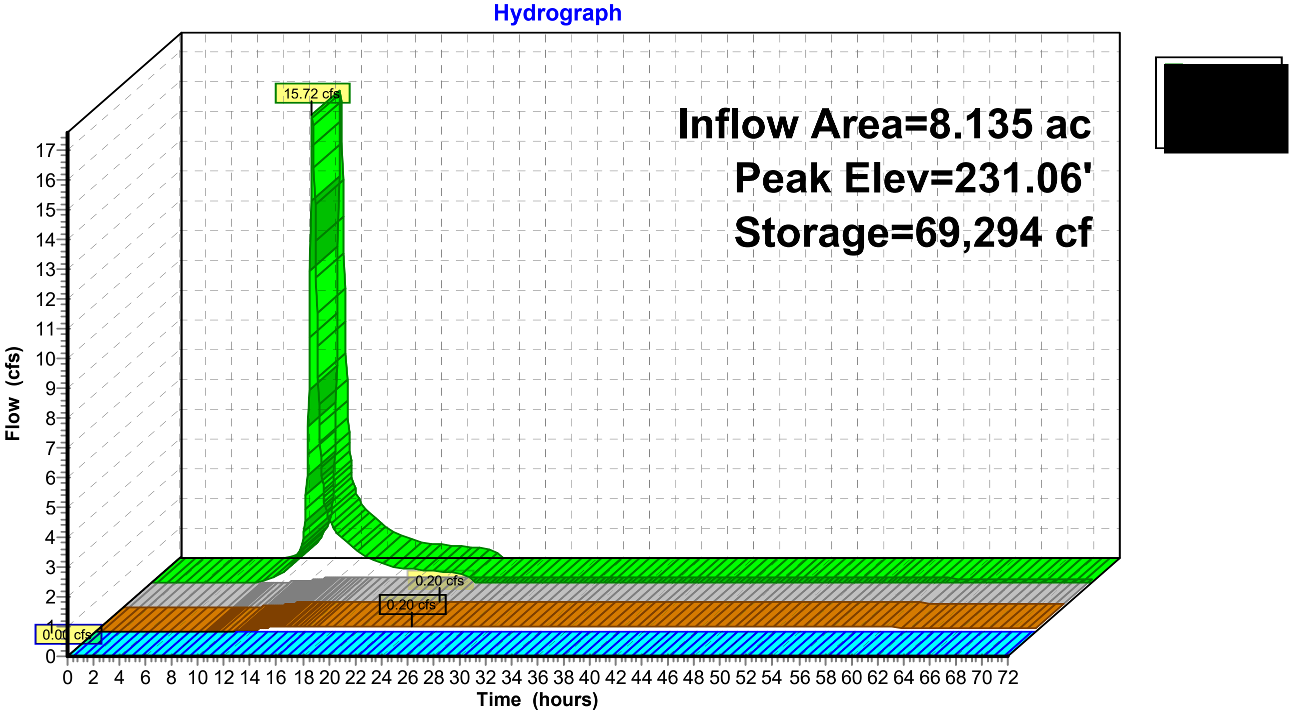
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
228.00	5,806	459.0	0	0	5,806
230.00	25,974	862.0	29,374	29,374	48,191
232.00	79,559	1,189.0	100,661	130,034	101,601

Device	Routing	Invert	Outlet Devices
#1	Discarded	228.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	231.50'	**158.0' long x 196.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.20 cfs @ 24.27 hrs HW=231.06' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=228.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 8P: Existing Wetland



Summary for Pond 9P: Existing Wetland

Inflow Area =	83.043 ac, 27.18% Impervious,	Inflow Depth = 1.24"	for 10-year event	
Inflow =	47.85 cfs @	12.97 hrs, Volume=	8.613 af	
Outflow =	47.61 cfs @	12.98 hrs, Volume=	8.613 af,	Atten= 1%, Lag= 0.9 min
Discarded =	0.02 cfs @	12.98 hrs, Volume=	0.011 af	
Primary =	47.59 cfs @	12.98 hrs, Volume=	8.601 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 148.69' @ 12.98 hrs Surf.Area= 4,009 sf Storage= 2,089 cf

Plug-Flow detention time= 1.0 min calculated for 8.607 af (100% of inflow)
Center-of-Mass det. time= 1.0 min (929.2 - 928.2)

Volume	Invert	Avail.Storage	Storage Description
#1	148.00'	834,530 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

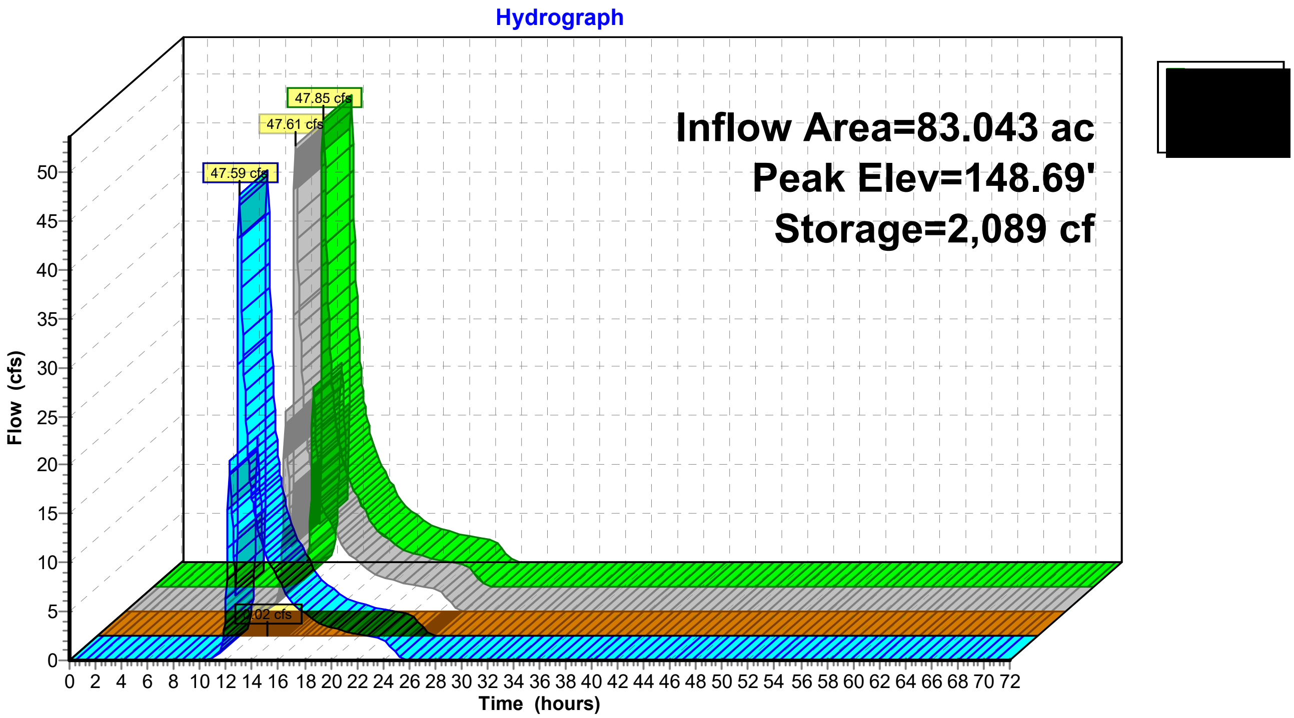
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
148.00	2,138	180.0	0	0	2,138
150.00	9,156	387.0	10,479	10,479	11,495
152.00	135,719	2,199.0	120,084	130,563	384,391
154.00	178,250	2,327.0	313,004	443,567	430,714
156.00	213,235	2,588.0	390,963	834,530	532,915

Device	Routing	Invert	Outlet Devices
#1	Discarded	148.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	148.00'	**31.0' long x 49.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.02 cfs @ 12.98 hrs HW=148.69' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=47.32 cfs @ 12.98 hrs HW=148.69' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 47.32 cfs @ 2.22 fps)

Pond 9P: Existing Wetland



Summary for Pond 10aP: Proposed Berm

Inflow Area = 5.867 ac, 13.96% Impervious, Inflow Depth = 2.12" for 10-year event
Inflow = 10.04 cfs @ 12.34 hrs, Volume= 1.039 af
Outflow = 0.50 cfs @ 16.84 hrs, Volume= 1.039 af, Atten= 95%, Lag= 270.3 min
Discarded = 0.50 cfs @ 16.84 hrs, Volume= 1.039 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 213.02' @ 16.84 hrs Surf.Area= 21,214 sf Storage= 29,048 cf

Plug-Flow detention time= 780.4 min calculated for 1.038 af (100% of inflow)
Center-of-Mass det. time= 781.2 min (1,642.5 - 861.3)

Volume	Invert	Avail.Storage	Storage Description
#1	210.00'	55,040 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

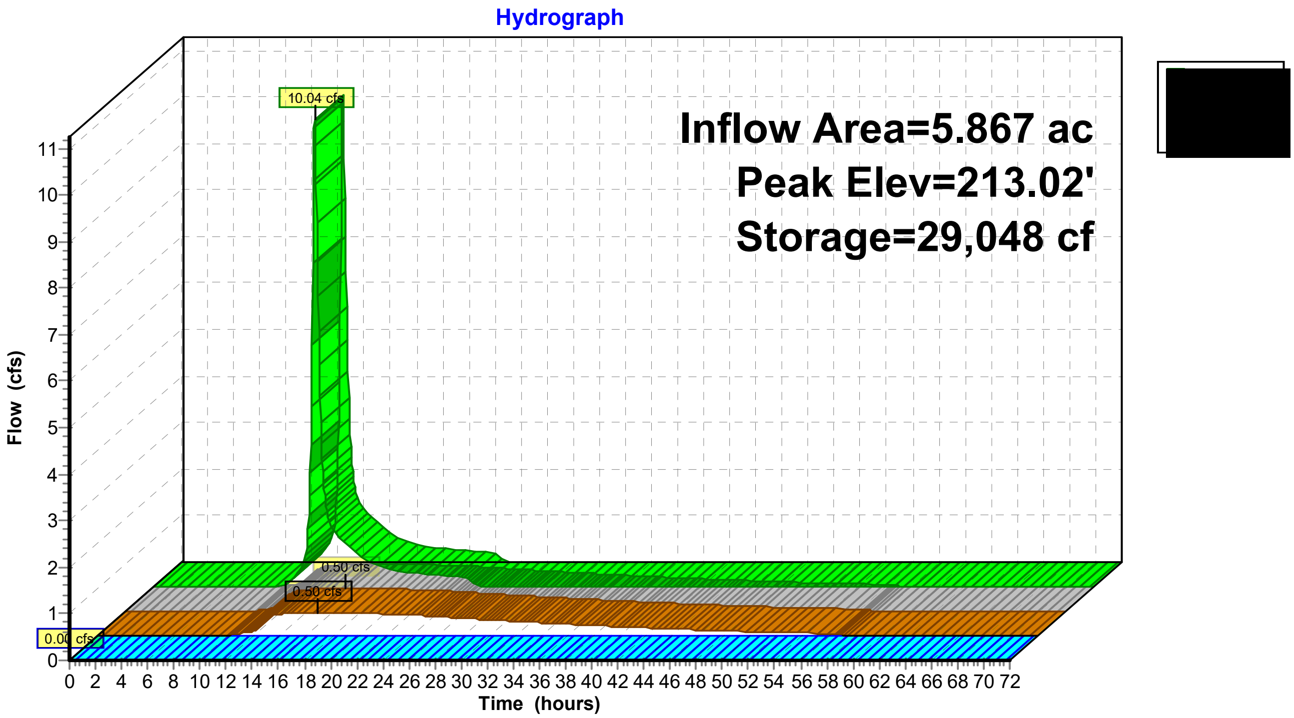
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.00	1,713	254.0	0	0	1,713
212.00	12,100	654.0	12,244	12,244	30,630
214.00	32,319	899.0	42,796	55,040	60,948

Device	Routing	Invert	Outlet Devices
#1	Discarded	210.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	213.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.50 cfs @ 16.84 hrs HW=213.02' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.50 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=210.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 10aP: Proposed Berm



Summary for Pond 11bP: Proposed Berm

Inflow Area =	5.376 ac,	1.97% Impervious, Inflow Depth = 1.32"	for 10-year event	
Inflow =	5.47 cfs @	12.25 hrs, Volume=	0.590 af	
Outflow =	1.50 cfs @	12.84 hrs, Volume=	0.590 af,	Atten= 73%, Lag= 35.2 min
Discarded =	1.50 cfs @	12.84 hrs, Volume=	0.590 af	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 220.24' @ 12.84 hrs Surf.Area= 26,891 sf Storage= 6,323 cf

Plug-Flow detention time= 31.0 min calculated for 0.589 af (100% of inflow)
Center-of-Mass det. time= 31.0 min (912.7 - 881.7)

Volume	Invert	Avail.Storage	Storage Description
#1	220.00'	66,163 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

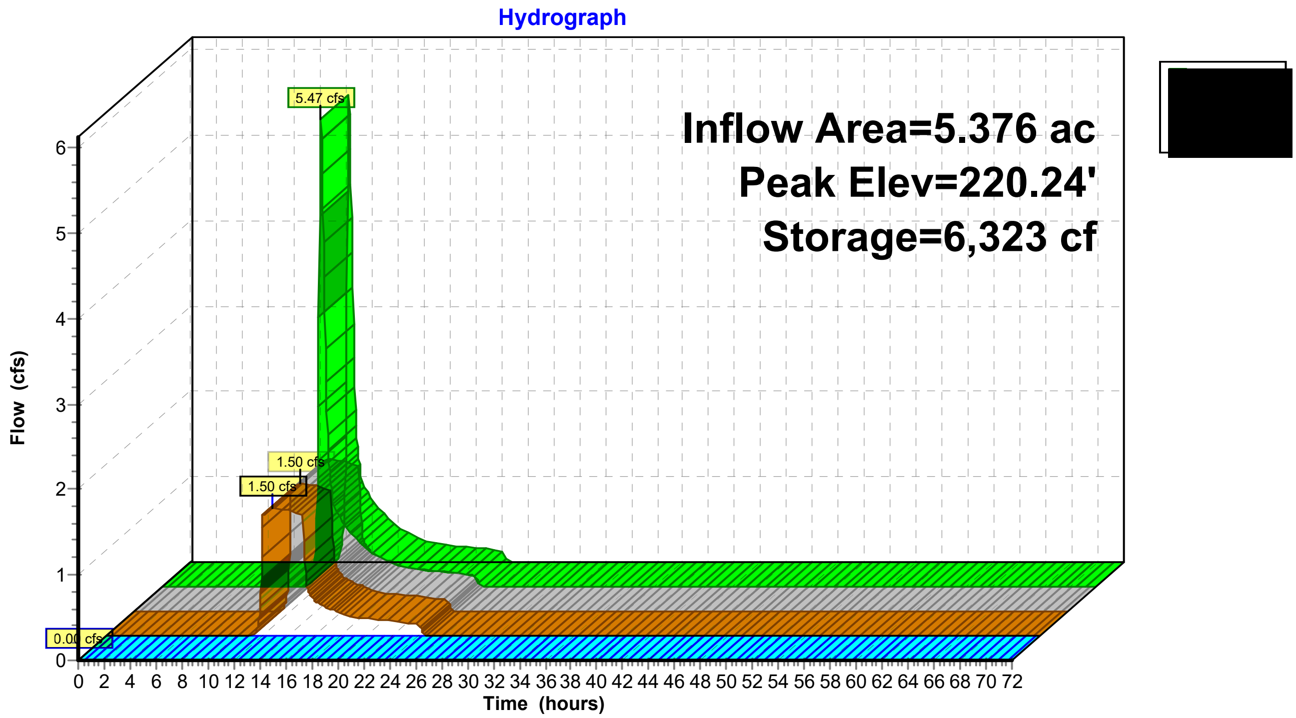
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
220.00	25,086	664.0	0	0	25,086
222.00	41,783	802.0	66,163	66,163	41,252

Device	Routing	Invert	Outlet Devices
#1	Primary	221.00'	**30.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	220.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.50 cfs @ 12.84 hrs HW=220.24' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 1.50 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=220.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 11bP: Proposed Berm



Summary for Pond 11cP: Proposed Berm

Inflow Area = 4.381 ac, 1.10% Impervious, Inflow Depth = 1.59" for 10-year event
Inflow = 5.98 cfs @ 12.21 hrs, Volume= 0.582 af
Outflow = 0.67 cfs @ 13.98 hrs, Volume= 0.582 af, Atten= 89%, Lag= 106.1 min
Discarded = 0.67 cfs @ 13.98 hrs, Volume= 0.582 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 222.97' @ 13.98 hrs Surf.Area= 12,070 sf Storage= 10,253 cf

Plug-Flow detention time= 161.9 min calculated for 0.581 af (100% of inflow)
Center-of-Mass det. time= 161.8 min (1,029.8 - 868.1)

Volume	Invert	Avail.Storage	Storage Description
#1	222.00'	24,481 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

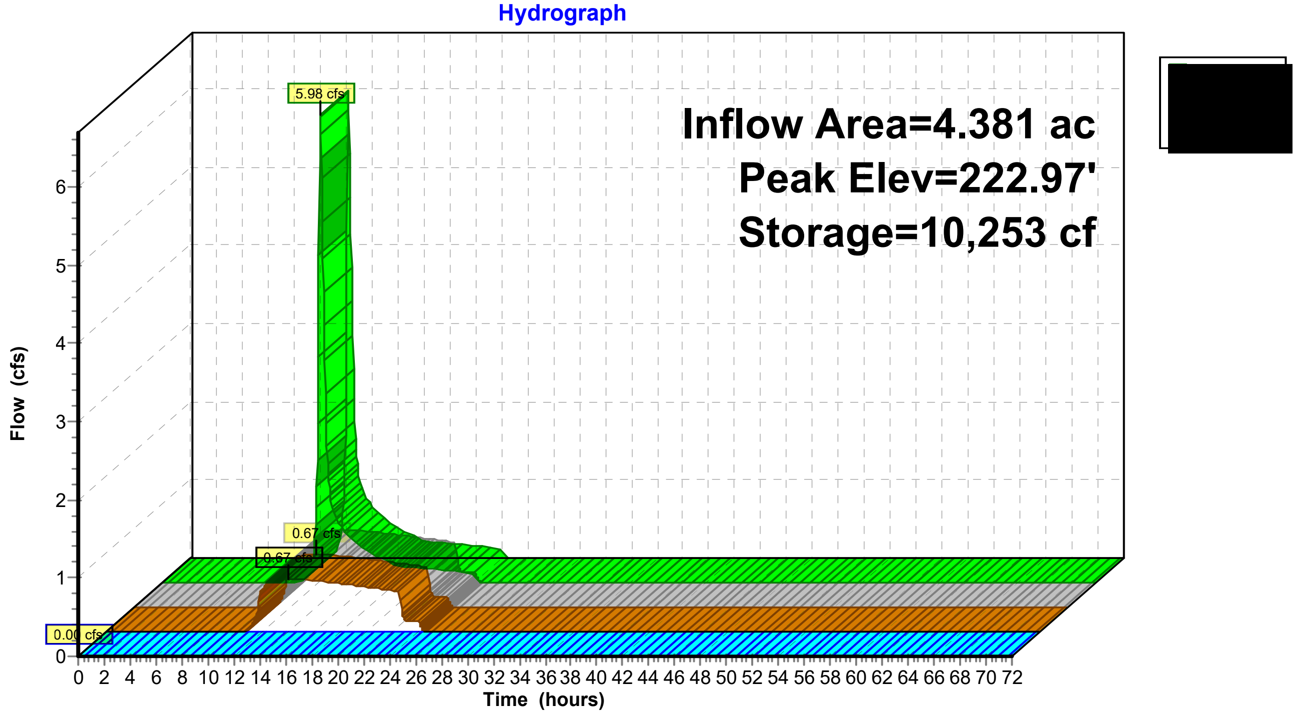
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
222.00	9,148	421.0	0	0	9,148
224.00	15,620	537.0	24,481	24,481	18,043

Device	Routing	Invert	Outlet Devices
#1	Primary	223.75'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	222.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.67 cfs @ 13.98 hrs HW=222.97' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.67 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=222.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 11cP: Proposed Berm



Summary for Pond 12bP: Proposed Berm

[62] Hint: Exceeded Reach 12bR OUTLET depth by 0.07' @ 14.50 hrs

Inflow Area = 11.115 ac, 7.70% Impervious, Inflow Depth = 2.21" for 10-year event
Inflow = 20.63 cfs @ 12.32 hrs, Volume= 2.043 af
Outflow = 2.10 cfs @ 14.14 hrs, Volume= 1.516 af, Atten= 90%, Lag= 109.7 min
Discarded = 0.15 cfs @ 14.14 hrs, Volume= 0.707 af
Primary = 1.95 cfs @ 14.14 hrs, Volume= 0.809 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 253.26' @ 14.14 hrs Surf.Area= 24,502 sf Storage= 52,011 cf

Plug-Flow detention time= 925.1 min calculated for 1.515 af (74% of inflow)
Center-of-Mass det. time= 833.7 min (1,691.3 - 857.6)

Volume	Invert	Avail.Storage	Storage Description
#1	250.00'	71,013 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

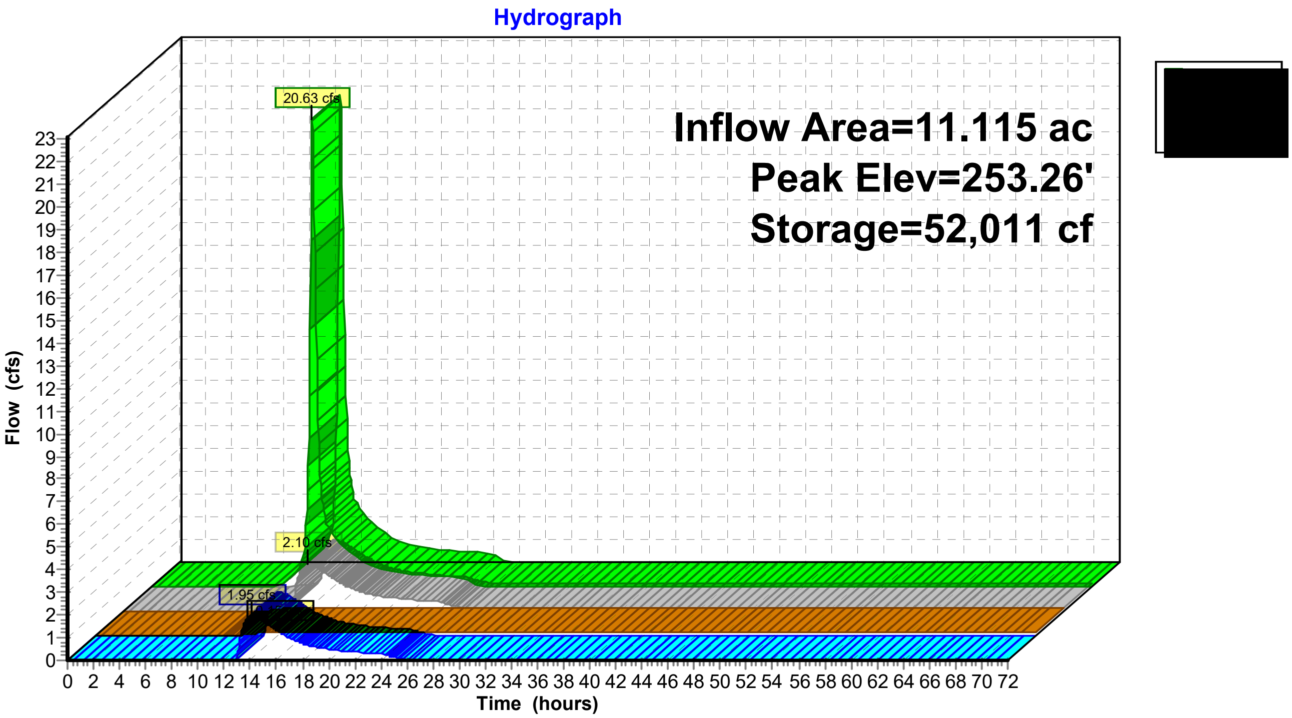
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
250.00	4,608	359.0	0	0	4,608
252.00	20,843	719.0	23,501	23,501	35,509
254.00	26,794	769.0	47,513	71,013	41,614

Device	Routing	Invert	Outlet Devices
#1	Primary	253.00'	**6.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	250.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.15 cfs @ 14.14 hrs HW=253.26' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=1.95 cfs @ 14.14 hrs HW=253.26' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 1.95 cfs @ 1.25 fps)

Pond 12bP: Proposed Berm



Summary for Pond 12cP: Proposed Berm

Inflow Area =	3.285 ac,	8.38% Impervious,	Inflow Depth = 2.29"	for 10-year event
Inflow =	8.61 cfs @	12.09 hrs, Volume=	0.626 af	
Outflow =	0.07 cfs @	24.07 hrs, Volume=	0.310 af,	Atten= 99%, Lag= 718.6 min
Discarded =	0.07 cfs @	24.07 hrs, Volume=	0.310 af	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 253.56' @ 24.07 hrs Surf.Area= 10,962 sf Storage= 24,310 cf

Plug-Flow detention time= 1,721.6 min calculated for 0.310 af (49% of inflow)
Center-of-Mass det. time= 1,603.0 min (2,439.9 - 836.9)

Volume	Invert	Avail.Storage	Storage Description
#1	250.00'	29,339 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

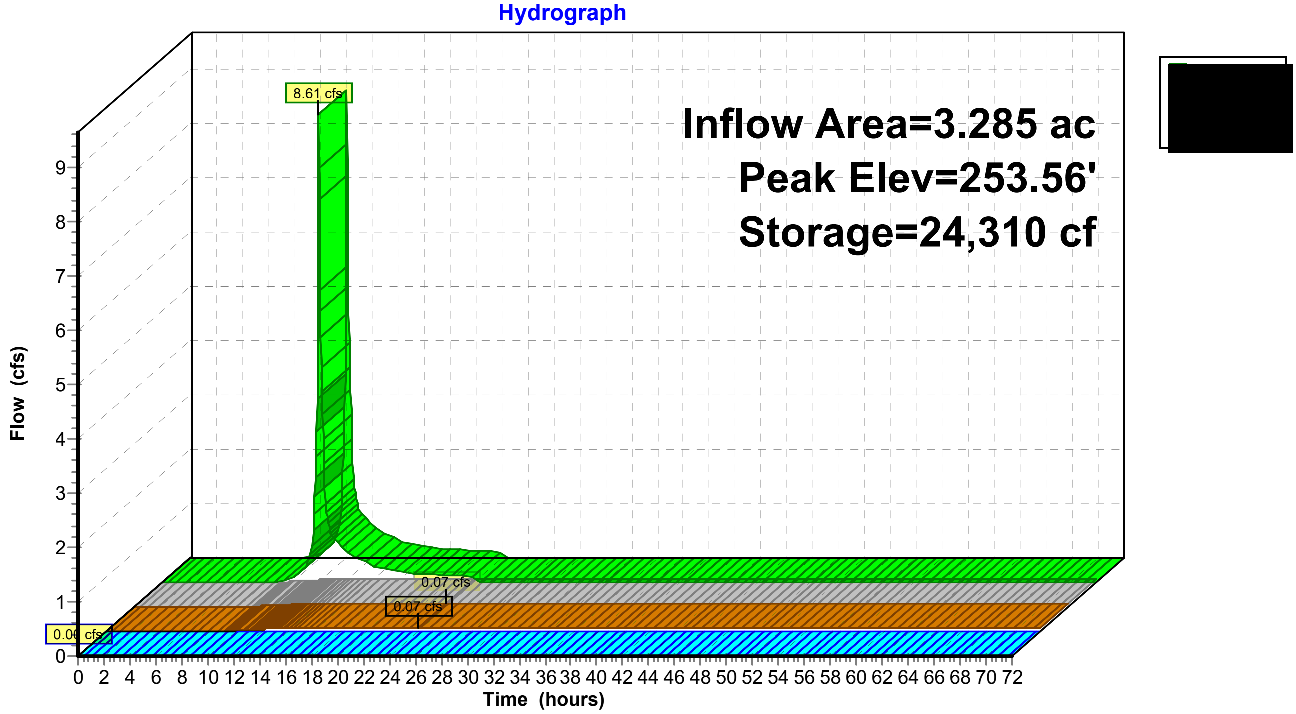
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
250.00	2,632	234.0	0	0	2,632
252.00	7,654	458.0	9,850	9,850	14,987
254.00	11,997	575.0	19,489	29,339	24,660

Device	Routing	Invert	Outlet Devices
#1	Primary	253.75'	**4.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	250.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.07 cfs @ 24.07 hrs HW=253.56' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=250.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12cP: Proposed Berm



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1aS: Drainage Area 1a Runoff Area=3,964,196 sf 11.60% Impervious Runoff Depth=1.53"
Flow Length=4,424' Tc=105.4 min CN=59 Runoff=40.02 cfs 11.584 af

Subcatchment1bS: Drainage Area 1b Runoff Area=146,589 sf 28.06% Impervious Runoff Depth=0.85"
Flow Length=342' Tc=9.9 min CN=49 Runoff=1.94 cfs 0.237 af

Subcatchment1cS: Drainage Area 1c Runoff Area=408,420 sf 8.65% Impervious Runoff Depth=2.68"
Flow Length=1,734' Tc=30.4 min CN=73 Runoff=16.44 cfs 2.093 af

Subcatchment1dS: Drainage Area 1a Runoff Area=341,088 sf 7.37% Impervious Runoff Depth=2.77"
Flow Length=4,424' Tc=105.4 min CN=74 Runoff=6.92 cfs 1.807 af

Subcatchment2S: Drainage Area 2 Runoff Area=233,007 sf 1.98% Impervious Runoff Depth=0.73"
Flow Length=289' Tc=12.1 min CN=47 Runoff=2.20 cfs 0.323 af

Subcatchment3aS: Drainage Area 3a Runoff Area=359,815 sf 3.27% Impervious Runoff Depth=2.68"
Flow Length=794' Tc=19.3 min CN=73 Runoff=17.62 cfs 1.844 af

Subcatchment3bS: Drainage Area 3b Runoff Area=1,022,537 sf 4.99% Impervious Runoff Depth=2.41"
Flow Length=1,119' Tc=14.7 min CN=70 Runoff=49.77 cfs 4.723 af

Subcatchment4S: Drainage Area 4 Runoff Area=717,184 sf 0.65% Impervious Runoff Depth=3.43"
Flow Length=974' Tc=13.9 min CN=81 Runoff=51.12 cfs 4.708 af

Subcatchment5aS: Drainage Area 5 Runoff Area=2,242,858 sf 25.20% Impervious Runoff Depth=2.59"
Flow Length=2,517' Tc=49.6 min CN=72 Runoff=67.96 cfs 11.111 af

Subcatchment5bS: Drainage Area 5 Runoff Area=52,534 sf 64.34% Impervious Runoff Depth=3.73"
Tc=6.0 min CN=84 Runoff=5.11 cfs 0.375 af

Subcatchment5cS: Drainage Area 5 Runoff Area=271,995 sf 13.40% Impervious Runoff Depth=2.59"
Flow Length=1,346' Tc=29.3 min CN=72 Runoff=10.75 cfs 1.347 af

Subcatchment5dS: Drainage Area 5 Runoff Area=59,233 sf 44.82% Impervious Runoff Depth=3.83"
Flow Length=157' Tc=9.1 min CN=85 Runoff=5.32 cfs 0.434 af

Subcatchment6aS: Drainage Area 6 Runoff Area=972,255 sf 22.55% Impervious Runoff Depth=0.73"
Flow Length=1,544' Tc=44.6 min CN=47 Runoff=5.87 cfs 1.348 af

Subcatchment6bS: Drainage Area 6 Runoff Area=469,126 sf 17.08% Impervious Runoff Depth=0.78"
Flow Length=549' Tc=19.6 min CN=48 Runoff=4.47 cfs 0.704 af

Subcatchment7aS: Drainage Area 7a Runoff Area=264,166 sf 2.54% Impervious Runoff Depth=0.23"
Flow Length=3,124' Tc=95.4 min CN=37 Runoff=0.19 cfs 0.116 af

Subcatchment7bS: Drainage Area 7b Runoff Area=3,158,253 sf 14.64% Impervious Runoff Depth=0.78"
Flow Length=3,232' Tc=99.9 min CN=48 Runoff=13.40 cfs 4.739 af

Subcatchment8S: Drainage Area 8 Runoff Area=354,352 sf 26.48% Impervious Runoff Depth=3.24"
Flow Length=883' Tc=23.6 min CN=79 Runoff=19.35 cfs 2.194 af

Subcatchment9S: Drainage Area 9 Runoff Area=636,379 sf 35.74% Impervious Runoff Depth=2.24"
Flow Length=601' Tc=17.1 min CN=68 Runoff=26.87 cfs 2.731 af

Subcatchment10aS: Drainage Area 10 Runoff Area=255,546 sf 13.96% Impervious Runoff Depth=2.68"
Flow Length=378' Tc=17.2 min CN=73 Runoff=13.07 cfs 1.310 af

Subcatchment10bS: Drainage Area 10 Runoff Area=1,072,278 sf 13.17% Impervious Runoff Depth=2.16"
Flow Length=1,752' Tc=40.2 min CN=67 Runoff=29.78 cfs 4.429 af

Subcatchment11aS: Drainage Area 11 Runoff Area=2,062,963 sf 10.23% Impervious Runoff Depth=2.33"
Flow Length=1,904' Tc=38.3 min CN=69 Runoff=63.95 cfs 9.189 af

Subcatchment11bS: Drainage Area 11 Runoff Area=234,184 sf 1.97% Impervious Runoff Depth=1.76"
Flow Length=1,011' Tc=16.2 min CN=62 Runoff=7.57 cfs 0.787 af

Subcatchment11cS: Drainage Area 11 Runoff Area=190,846 sf 1.10% Impervious Runoff Depth=2.08"
Flow Length=957' Tc=14.0 min CN=66 Runoff=7.98 cfs 0.758 af

Subcatchment12aS: Drainage Area 12a Runoff Area=1,702,429 sf 14.03% Impervious Runoff Depth=2.68"
Flow Length=1,596' Tc=44.7 min CN=73 Runoff=56.67 cfs 8.725 af

Subcatchment12bS: Drainage Area 12b Runoff Area=484,189 sf 7.70% Impervious Runoff Depth=2.77"
Flow Length=902' Tc=14.5 min CN=74 Runoff=27.45 cfs 2.565 af

Subcatchment12cS: Drainage Area 12 Runoff Area=143,106 sf 8.38% Impervious Runoff Depth=2.86"
Tc=6.0 min CN=75 Runoff=10.80 cfs 0.783 af

Subcatchment13S: Drainage Area 13 Runoff Area=1,408,782 sf 0.05% Impervious Runoff Depth=2.08"
Flow Length=1,813' Tc=9.8 min CN=66 Runoff=66.38 cfs 5.596 af

Reach 10aR: Swale 10a Avg. Flow Depth=0.49' Max Vel=4.36 fps Inflow=13.07 cfs 1.310 af
n=0.030 L=736.0' S=0.0299 '/' Capacity=51.58 cfs Outflow=12.76 cfs 1.310 af

Reach 12bR: Swale 12b Avg. Flow Depth=0.76' Max Vel=4.91 fps Inflow=27.45 cfs 2.565 af
n=0.030 L=982.0' S=0.0234 '/' Capacity=45.66 cfs Outflow=26.24 cfs 2.565 af

Reach DP-1: Off-Site West Inflow=55.53 cfs 17.542 af
Outflow=55.53 cfs 17.542 af

Reach DP-2: Off-Site South Inflow=36.88 cfs 12.321 af
Outflow=36.88 cfs 12.321 af

Reach DP-3: Off-Site East Inflow=58.47 cfs 10.143 af
Outflow=58.47 cfs 10.143 af

Reach DP-4: Off-Site Southeast Inflow=90.65 cfs 14.785 af
Outflow=90.65 cfs 14.785 af

Pond 1bP: Proposed Basin Peak Elev=152.04' Storage=868 cf Inflow=1.94 cfs 0.237 af
Discarded=1.22 cfs 0.237 af Primary=0.00 cfs 0.000 af Outflow=1.22 cfs 0.237 af

Pond 1cP: Proposed Basin Peak Elev=227.40' Storage=13,901 cf Inflow=16.44 cfs 2.093 af
Discarded=0.08 cfs 0.295 af Primary=15.91 cfs 1.798 af Outflow=16.00 cfs 2.093 af

Pond 1dP: Proposed Berm Peak Elev=257.88' Storage=26,145 cf Inflow=6.92 cfs 1.807 af
Discarded=0.10 cfs 0.453 af Primary=5.36 cfs 1.213 af Outflow=5.46 cfs 1.667 af

Pond 2P: Existing Depression Peak Elev=168.44' Storage=4,882 cf Inflow=2.20 cfs 0.323 af
Outflow=0.35 cfs 0.323 af

Pond 3aP: Proposed Berm Peak Elev=273.71' Storage=65,299 cf Inflow=17.62 cfs 1.844 af
Discarded=0.33 cfs 1.409 af Primary=0.00 cfs 0.000 af Outflow=0.33 cfs 1.409 af

Pond 3P: Existing Depression Peak Elev=190.13' Storage=148,647 cf Inflow=49.77 cfs 4.723 af
Discarded=1.42 cfs 4.718 af Primary=0.00 cfs 0.000 af Outflow=1.42 cfs 4.718 af

Pond 4P: Existing Depression Peak Elev=167.75' Storage=153,551 cf Inflow=51.12 cfs 4.708 af
Discarded=1.31 cfs 4.268 af Primary=0.00 cfs 0.000 af Outflow=1.31 cfs 4.268 af

Pond 5bP: Proposed Berm Peak Elev=231.15' Storage=8,626 cf Inflow=5.11 cfs 0.375 af
Discarded=0.33 cfs 0.375 af Primary=0.00 cfs 0.000 af Outflow=0.33 cfs 0.375 af

Pond 5cP: Proposed Berm Peak Elev=210.59' Storage=31,840 cf Inflow=10.75 cfs 1.347 af
Discarded=0.03 cfs 0.116 af Primary=1.98 cfs 0.676 af Outflow=2.01 cfs 0.792 af

Pond 5dP: Proposed Berm Peak Elev=284.88' Storage=13,671 cf Inflow=5.32 cfs 0.434 af
Discarded=0.11 cfs 0.434 af Primary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.434 af

Pond 5P: Existing Depression Peak Elev=167.73' Storage=123,173 cf Inflow=67.96 cfs 11.788 af
Discarded=0.25 cfs 1.090 af Primary=63.76 cfs 9.107 af Outflow=64.02 cfs 10.196 af

Pond 6bP: Proposed Berm Peak Elev=164.27' Storage=6,088 cf Inflow=4.47 cfs 0.704 af
Discarded=1.41 cfs 0.704 af Primary=0.00 cfs 0.000 af Outflow=1.41 cfs 0.704 af

Pond 6P: Existing Wetland Peak Elev=141.20' Storage=231,206 cf Inflow=76.26 cfs 13.174 af
Discarded=0.46 cfs 2.072 af Primary=29.75 cfs 7.891 af Outflow=30.20 cfs 9.963 af

Pond 7aP: Proposed Berm Peak Elev=166.37' Storage=2,724 cf Inflow=0.19 cfs 0.116 af
Discarded=0.06 cfs 0.116 af Primary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.116 af

Pond 7P: Existing Depression Peak Elev=147.94' Storage=30,870 cf Inflow=13.40 cfs 4.739 af
Discarded=1.34 cfs 1.792 af Primary=10.91 cfs 2.947 af Outflow=12.25 cfs 4.739 af

Pond 8P: Existing Wetland Peak Elev=231.36' Storage=85,720 cf Inflow=19.35 cfs 2.194 af
Discarded=0.23 cfs 0.997 af Primary=0.00 cfs 0.000 af Outflow=0.23 cfs 0.997 af

Pond 9P: Existing Wetland Peak Elev=148.91' Storage=3,026 cf Inflow=70.45 cfs 11.838 af
Discarded=0.02 cfs 0.012 af Primary=70.45 cfs 11.826 af Outflow=70.47 cfs 11.838 af

Pond 10aP: Proposed Berm Peak Elev=213.39' Storage=37,571 cf Inflow=12.76 cfs 1.310 af
Discarded=0.59 cfs 1.310 af Primary=0.00 cfs 0.000 af Outflow=0.59 cfs 1.310 af

Pond 11bP: Proposed Berm Peak Elev=220.39' Storage=10,292 cf Inflow=7.57 cfs 0.787 af
Discarded=1.56 cfs 0.787 af Primary=0.00 cfs 0.000 af Outflow=1.56 cfs 0.787 af

Pond 11cP: Proposed Berm Peak Elev=223.33' Storage=14,814 cf Inflow=7.98 cfs 0.758 af
Discarded=0.74 cfs 0.758 af Primary=0.00 cfs 0.000 af Outflow=0.74 cfs 0.758 af

Pond 12bP: Proposed Berm Peak Elev=253.44' Storage=56,575 cf Inflow=26.24 cfs 2.565 af
Discarded=0.16 cfs 0.712 af Primary=4.56 cfs 1.324 af Outflow=4.71 cfs 2.036 af

Pond 12cP: Proposed Berm Peak Elev=253.83' Storage=27,279 cf Inflow=10.80 cfs 0.783 af
Discarded=0.07 cfs 0.328 af Primary=0.21 cfs 0.095 af Outflow=0.28 cfs 0.423 af

Total Runoff Area = 533.249 ac Runoff Volume = 86.561 af Average Runoff Depth = 1.95"
86.79% Pervious = 462.798 ac 13.21% Impervious = 70.450 ac

Summary for Subcatchment 1aS: Drainage Area 1a

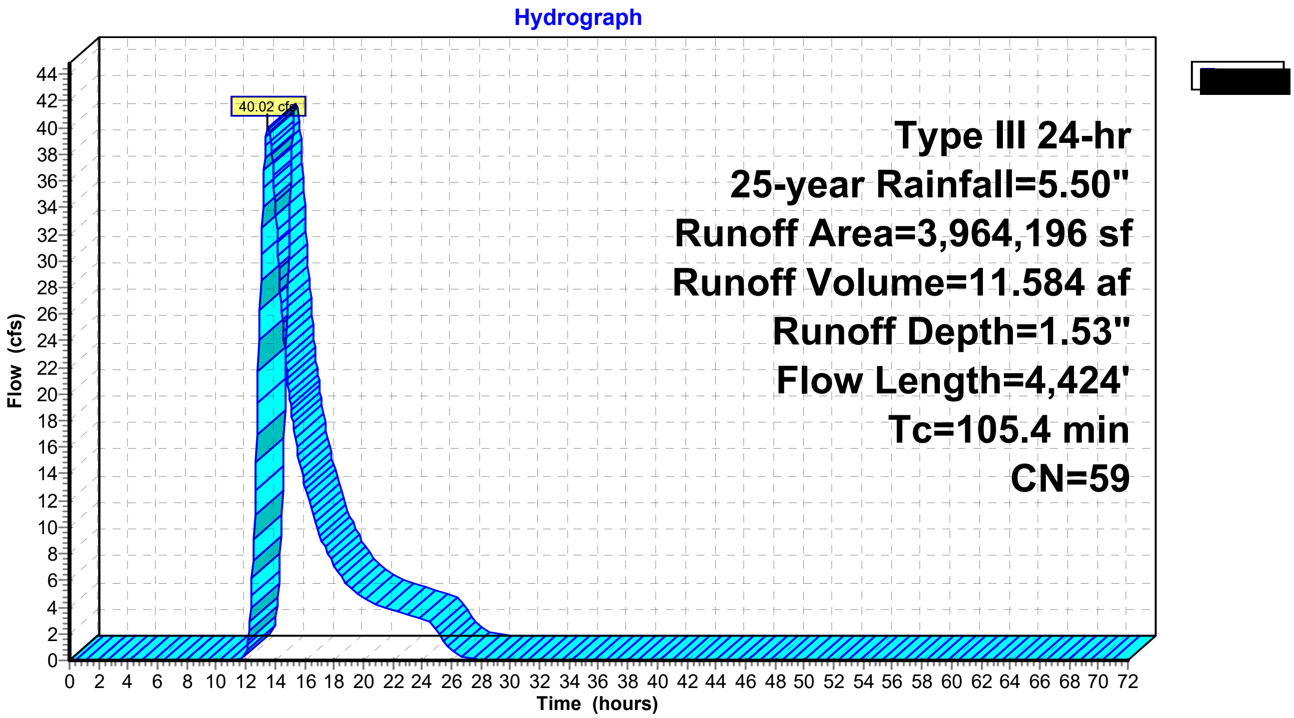
Runoff = 40.02 cfs @ 13.52 hrs, Volume= 11.584 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	482,442	30	Meadow, non-grazed, HSG A
	538,022	58	Meadow, non-grazed, HSG B
	942,184	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	515,616	30	Woods, Good, HSG A
	704,263	55	Woods, Good, HSG B
	225,155	70	Woods, Good, HSG C
	10,840	77	Woods, Good, HSG D
*	33,102	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	414,914	98	Water body
*	52,839	96	Gravel road
*	0	98	Structure
*	1,438	98	Panels
*	4,403	98	Equipment pad
*	38,978	98	Paved
	3,964,196	59	Weighted Average
	3,504,463		88.40% Pervious Area
	459,733		11.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
11.3	356	0.0110	0.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.1	433	0.0020	0.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.3	222	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.5	766	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
46.9	2,597	0.0340	0.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
105.4	4,424	Total			

Subcatchment 1aS: Drainage Area 1a



Summary for Subcatchment 1bS: Drainage Area 1b

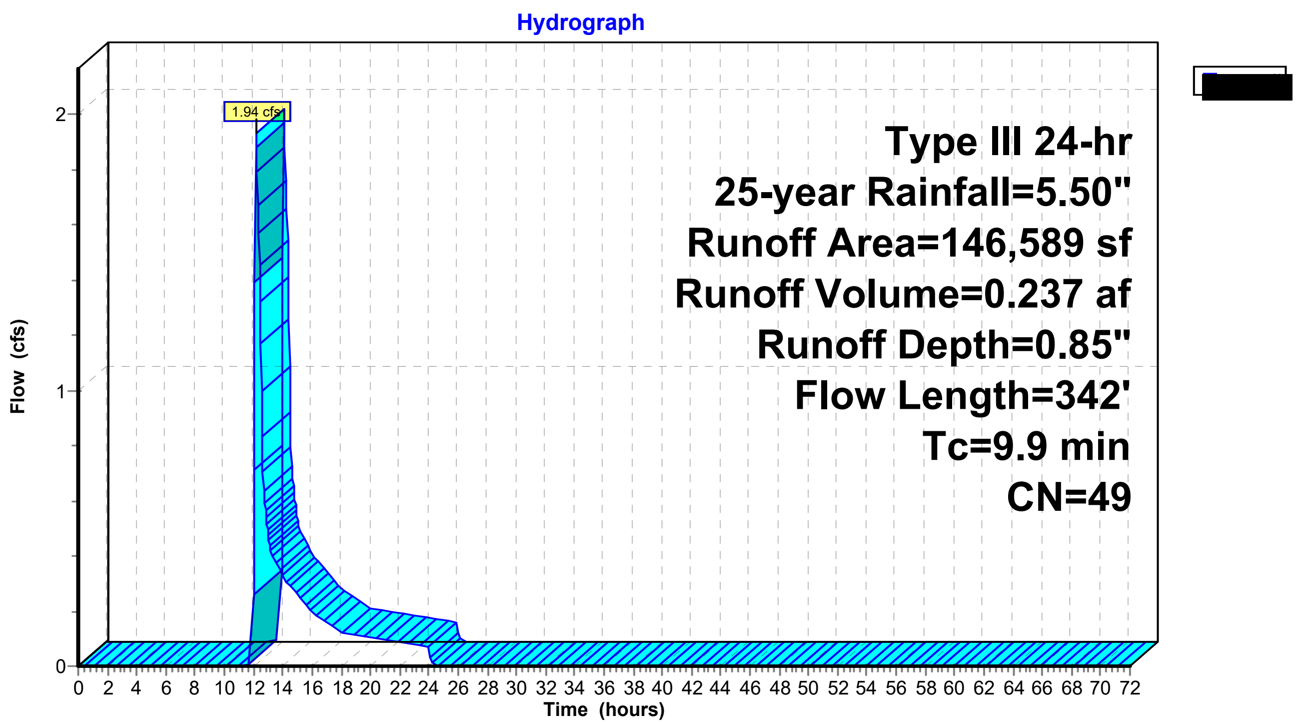
Runoff = 1.94 cfs @ 12.19 hrs, Volume= 0.237 af, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	103,427	30	Meadow, non-grazed, HSG A
	2,036	58	Meadow, non-grazed, HSG B
*	7,140	98	Panels
*	33,986	98	Basin
	146,589	49	Weighted Average
	105,463		71.94% Pervious Area
	41,126		28.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
2.5	292	0.0762	1.93		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.9	342	Total			

Subcatchment 1bS: Drainage Area 1b



Summary for Subcatchment 1cS: Drainage Area 1c

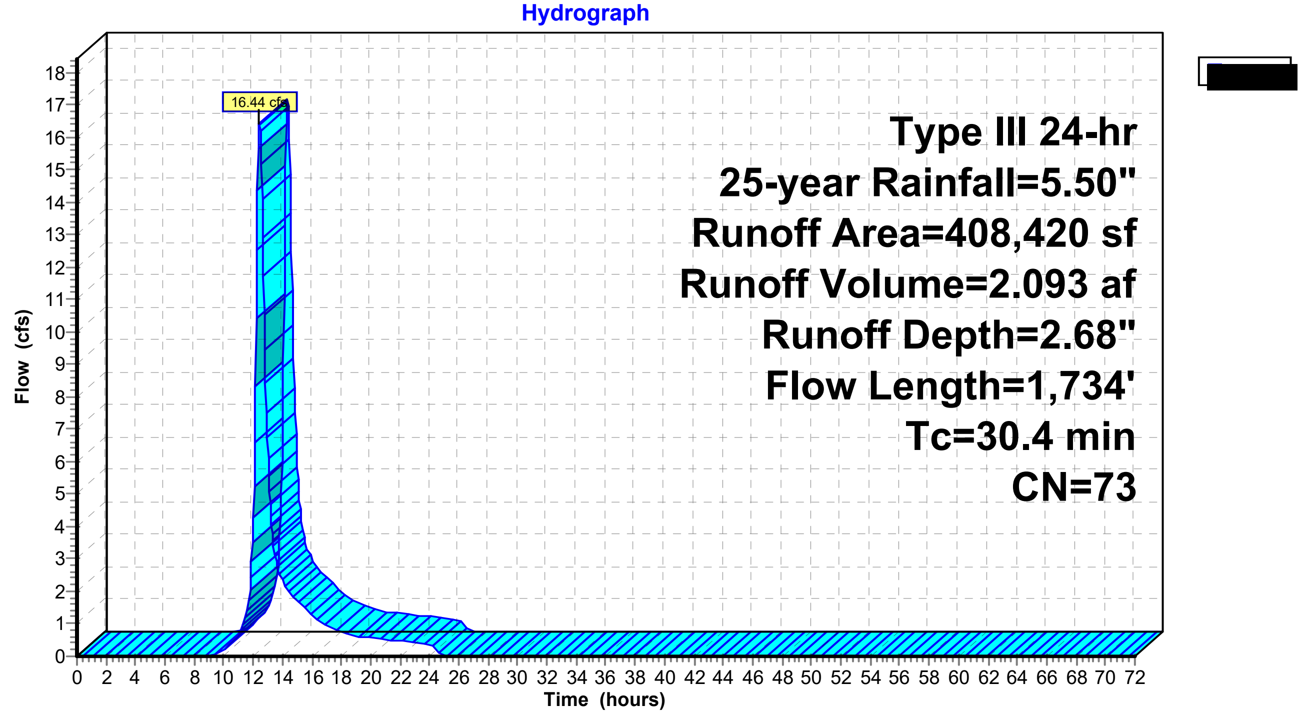
Runoff = 16.44 cfs @ 12.43 hrs, Volume= 2.093 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	351,878	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	18,313	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	2,416	98	Water body
*	2,918	96	Gravel road
*	0	98	Structure
*	5,460	98	Panels
*	0	98	Equipment pad
*	10,197	98	Paved
*	17,238	98	Basin
	408,420	73	Weighted Average
	373,109		91.35% Pervious Area
	35,311		8.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
23.3	1,684	0.0297	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
30.4	1,734	Total			

Subcatchment 1cS: Drainage Area 1c



Summary for Subcatchment 1dS: Drainage Area 1a

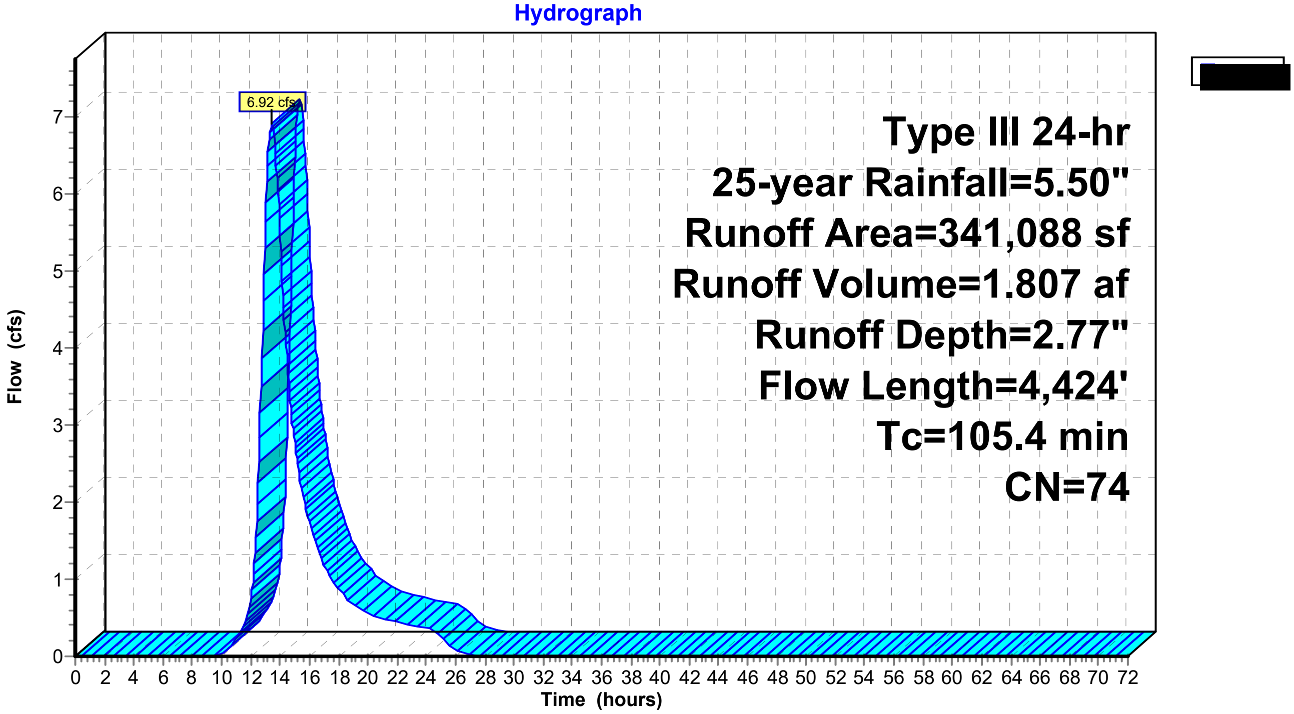
Runoff = 6.92 cfs @ 13.45 hrs, Volume= 1.807 af, Depth= 2.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	269,007	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	34,713	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	12,239	96	Gravel road
*	0	98	Structure
*	7,140	98	Panels
*	629	98	Equipment pad
*	1,074	98	Paved
*	16,286	98	Basin
	341,088	74	Weighted Average
	315,959		92.63% Pervious Area
	25,129		7.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
11.3	356	0.0110	0.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.1	433	0.0020	0.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.3	222	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.5	766	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
46.9	2,597	0.0340	0.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
105.4	4,424	Total			

Subcatchment 1dS: Drainage Area 1a



Summary for Subcatchment 2S: Drainage Area 2

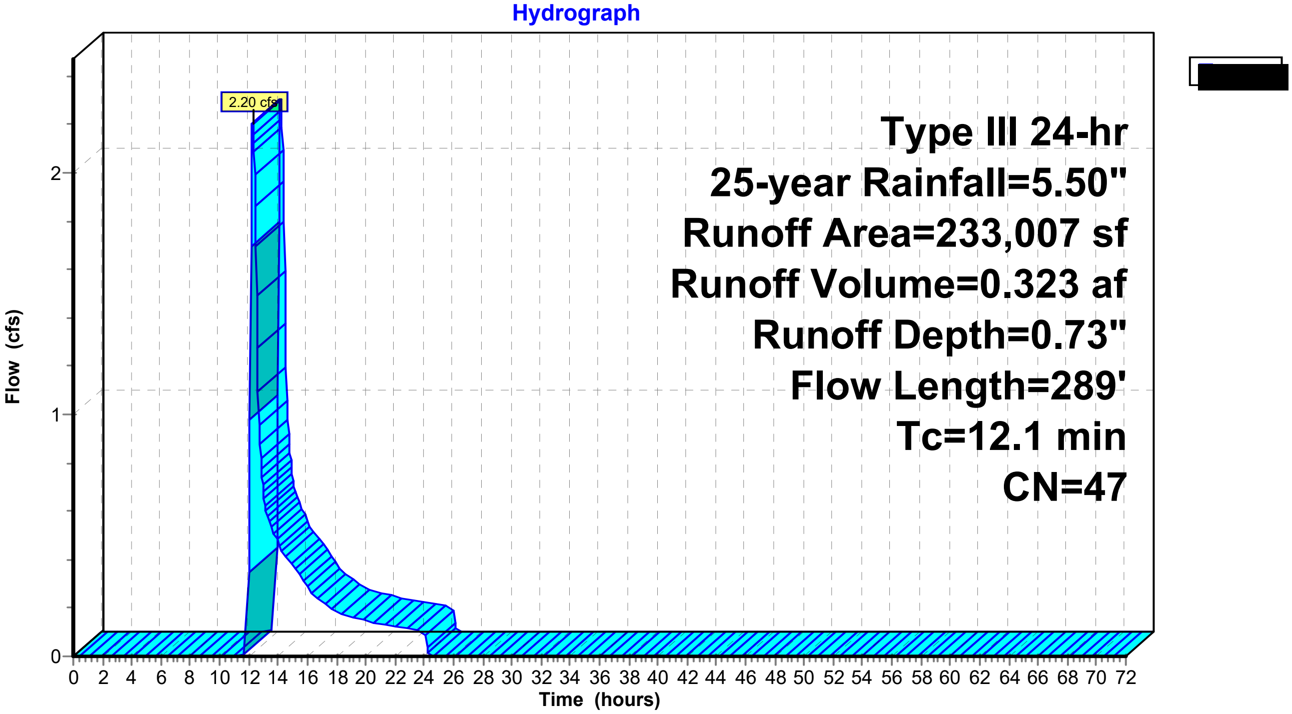
Runoff = 2.20 cfs @ 12.26 hrs, Volume= 0.323 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	117,788	30	Meadow, non-grazed, HSG A
	29,605	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	16,114	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	58,620	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	6,260	96	Gravel road
*	0	98	Structure
*	4,620	98	Panels
	233,007	47	Weighted Average
	228,387		98.02% Pervious Area
	4,620		1.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0900	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
5.3	239	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.1	289	Total			

Subcatchment 2S: Drainage Area 2



Summary for Subcatchment 3aS: Drainage Area 3a

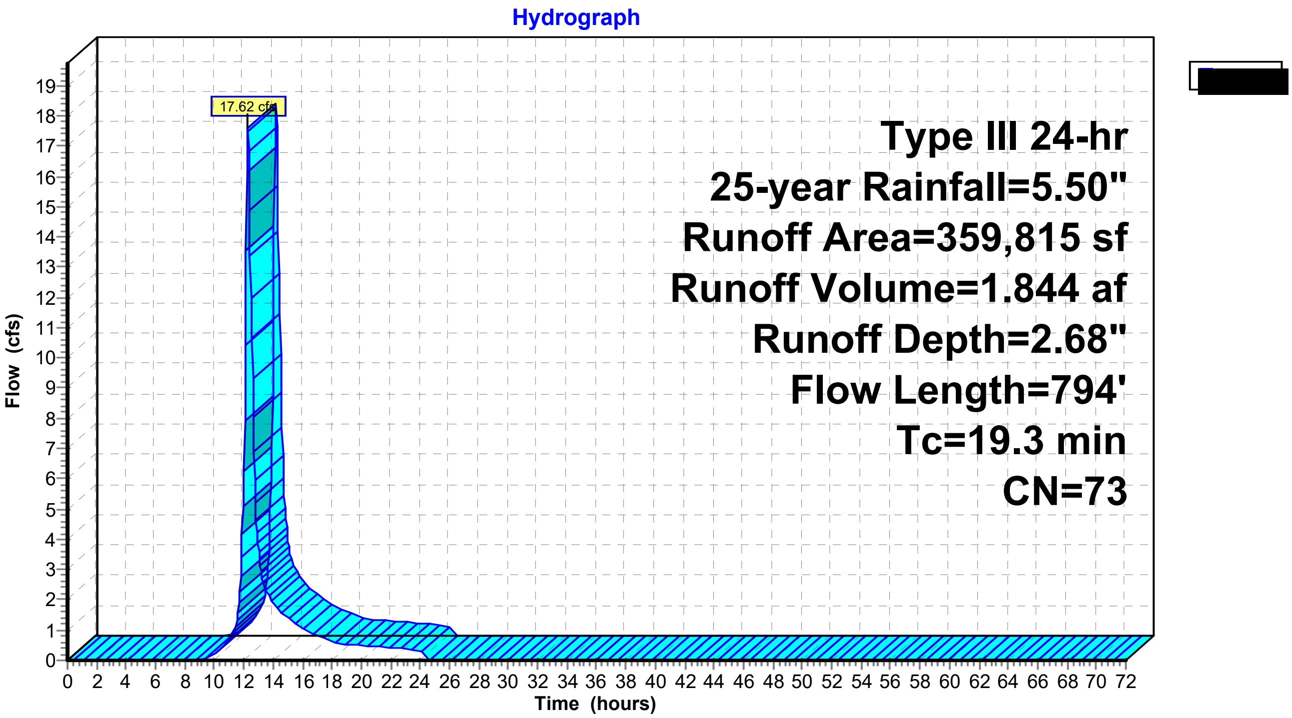
Runoff = 17.62 cfs @ 12.27 hrs, Volume= 1.844 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	337,756	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	10,301	96	Gravel road
*	0	98	Structure
*	10,500	98	Panels
*	1,258	98	Equipment pad
	359,815	73	Weighted Average
	348,057		96.73% Pervious Area
	11,758		3.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
11.9	744	0.0222	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.3	794	Total			

Subcatchment 3aS: Drainage Area 3a



Summary for Subcatchment 3bS: Drainage Area 3b

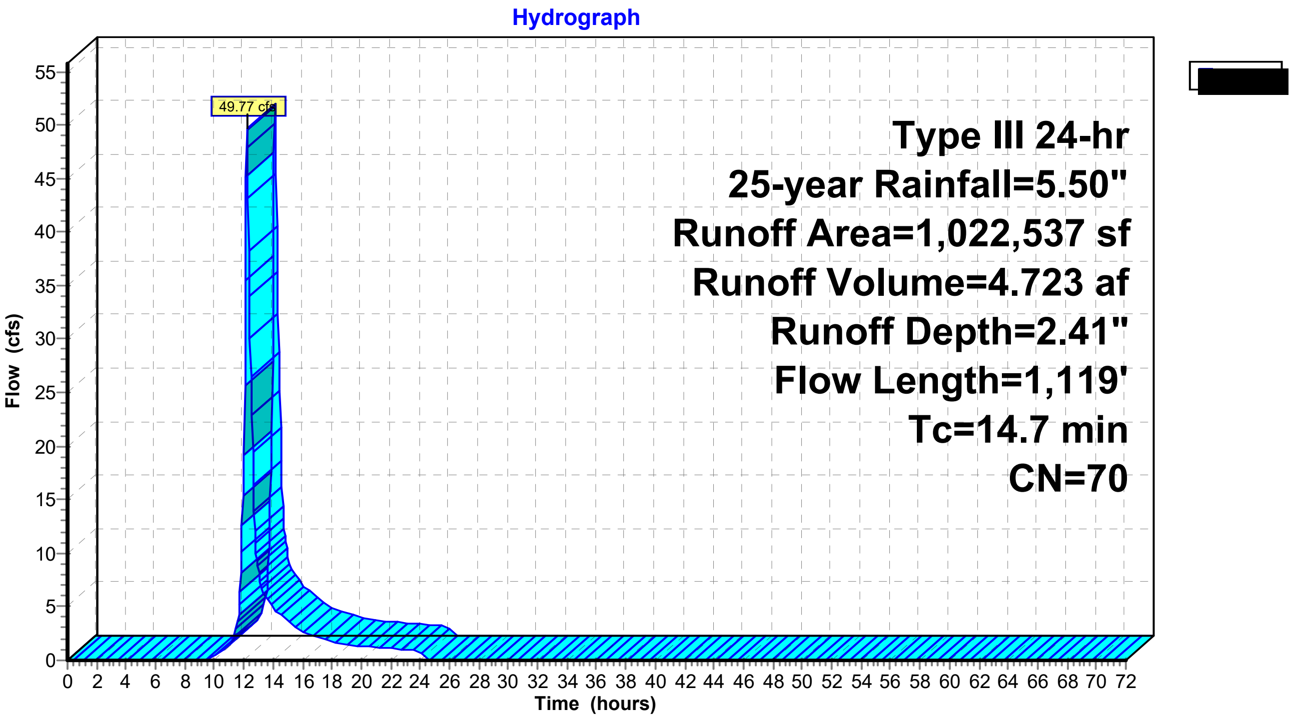
Runoff = 49.77 cfs @ 12.21 hrs, Volume= 4.723 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	99,790	58	Meadow, non-grazed, HSG B
	532,219	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	1,798	30	Woods, Good, HSG A
	107,172	55	Woods, Good, HSG B
	59,721	70	Woods, Good, HSG C
	14,571	77	Woods, Good, HSG D
*	59,918	70	Gravel pit, HSG A
*	96,280	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	51,068	98	Water body
*	0	96	Gravel road
*	0	98	Structure
*	0	98	Panels
*	0	98	Equipment pad
	1,022,537	70	Weighted Average
	971,469		95.01% Pervious Area
	51,068		4.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
9.1	1,069	0.0776	1.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.7	1,119	Total			

Subcatchment 3bS: Drainage Area 3b



Summary for Subcatchment 4S: Drainage Area 4

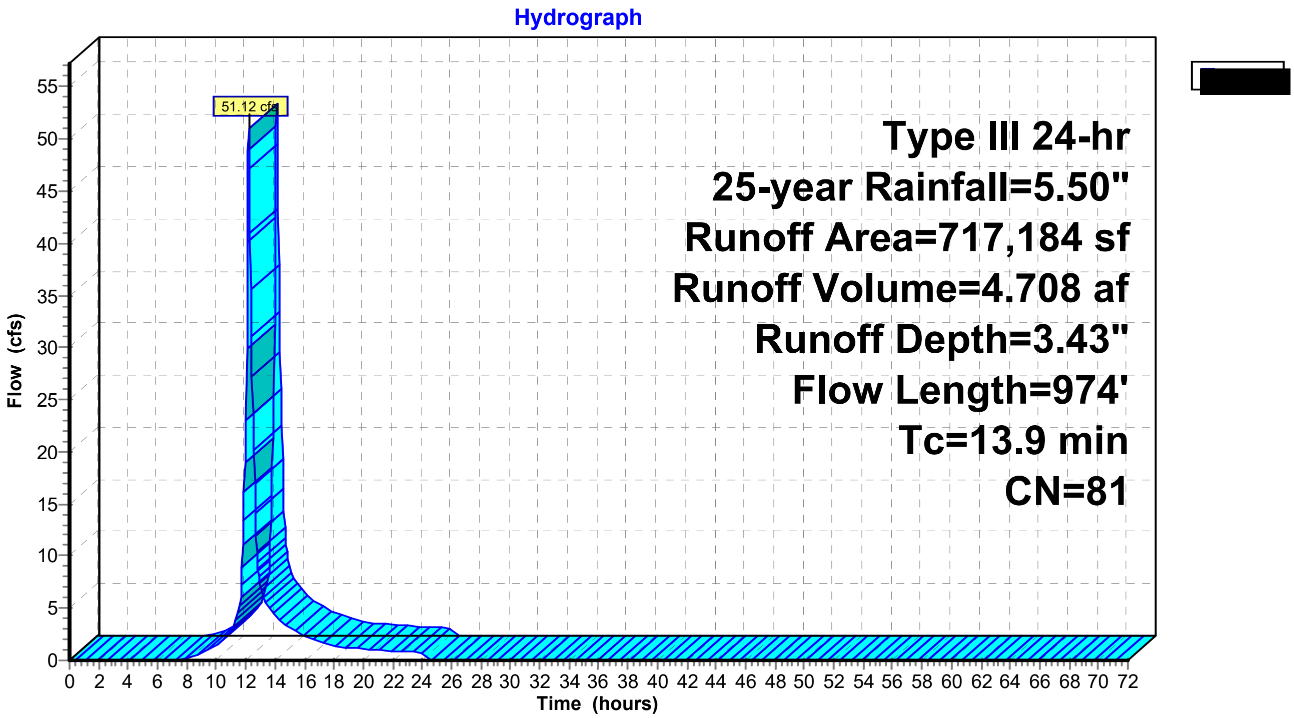
Runoff = 51.12 cfs @ 12.19 hrs, Volume= 4.708 af, Depth= 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	18,016	55	Woods, Good, HSG B
	19,532	70	Woods, Good, HSG C
	5,054	77	Woods, Good, HSG D
*	34,397	70	Gravel pit, HSG A
*	500,725	81	Gravel pit, HSG B
*	134,831	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	4,629	98	Water body
*	0	96	Gravel road
*	0	98	Structure
	717,184	81	Weighted Average
	712,555		99.35% Pervious Area
	4,629		0.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.20		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
3.9	384	0.0102	1.63		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	45	0.2700	8.37		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
8.8	269	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	226	0.3100	8.96		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
13.9	974	Total			

Subcatchment 4S: Drainage Area 4



Summary for Subcatchment 5aS: Drainage Area 5

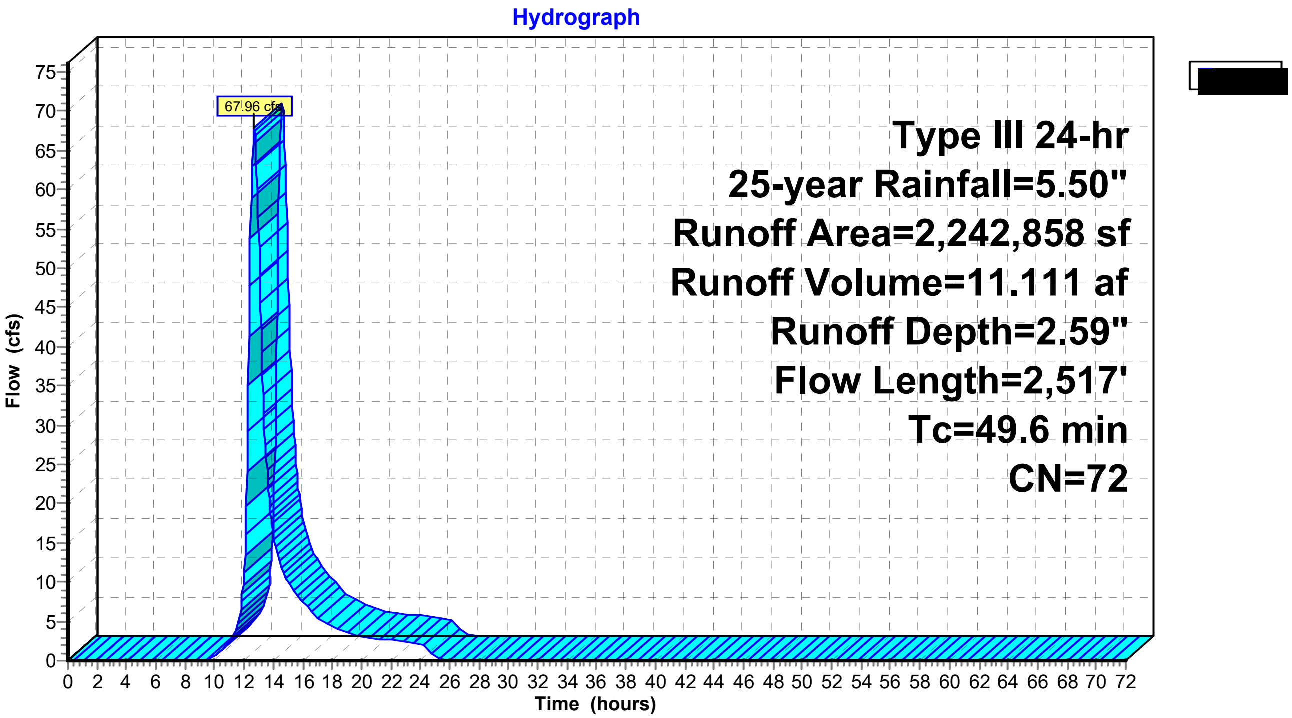
Runoff = 67.96 cfs @ 12.70 hrs, Volume= 11.111 af, Depth= 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	84,391	30	Meadow, non-grazed, HSG A
	117,637	58	Meadow, non-grazed, HSG B
	239,197	71	Meadow, non-grazed, HSG C
	91,068	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	597,427	55	Woods, Good, HSG B
	404,182	70	Woods, Good, HSG C
	103,749	77	Woods, Good, HSG D
*	15,001	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	562,885	98	Water body
*	25,012	96	Gravel road
*	0	98	Structure
*	1,680	98	Panels
*	629	98	Equipment pad
	2,242,858	72	Weighted Average
	1,677,664		74.80% Pervious Area
	565,194		25.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.4	238	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.6	1,240	0.0242	0.78		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.6	509	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.6	480	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
49.6	2,517	Total			

Subcatchment 5aS: Drainage Area 5



Summary for Subcatchment 5bS: Drainage Area 5

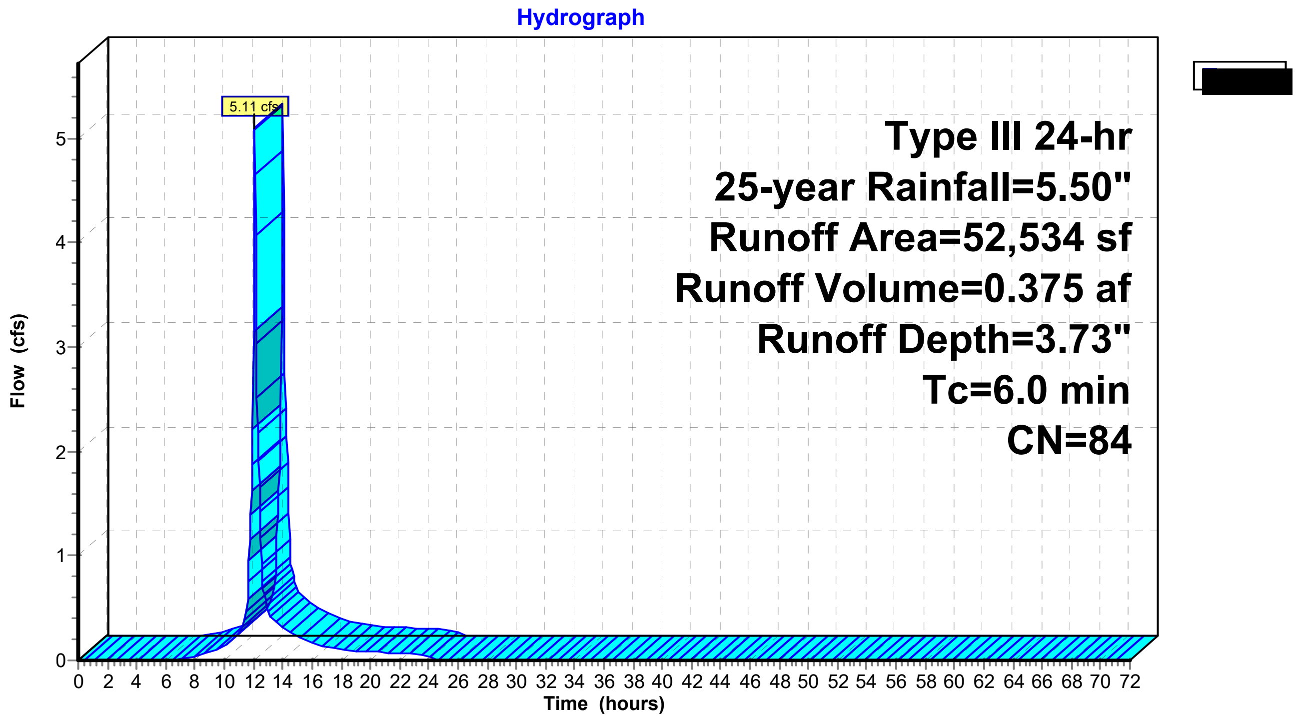
Runoff = 5.11 cfs @ 12.09 hrs, Volume= 0.375 af, Depth= 3.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	18,465	58	Meadow, non-grazed, HSG B
	267	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	0	96	Gravel road
*	0	98	Structure
*	5,040	98	Panels
*	0	98	Equipment pad
*	28,762	98	Basin
	52,534	84	Weighted Average
	18,732		35.66% Pervious Area
	33,802		64.34% Impervious Area

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

Subcatchment 5bS: Drainage Area 5



Summary for Subcatchment 5cS: Drainage Area 5

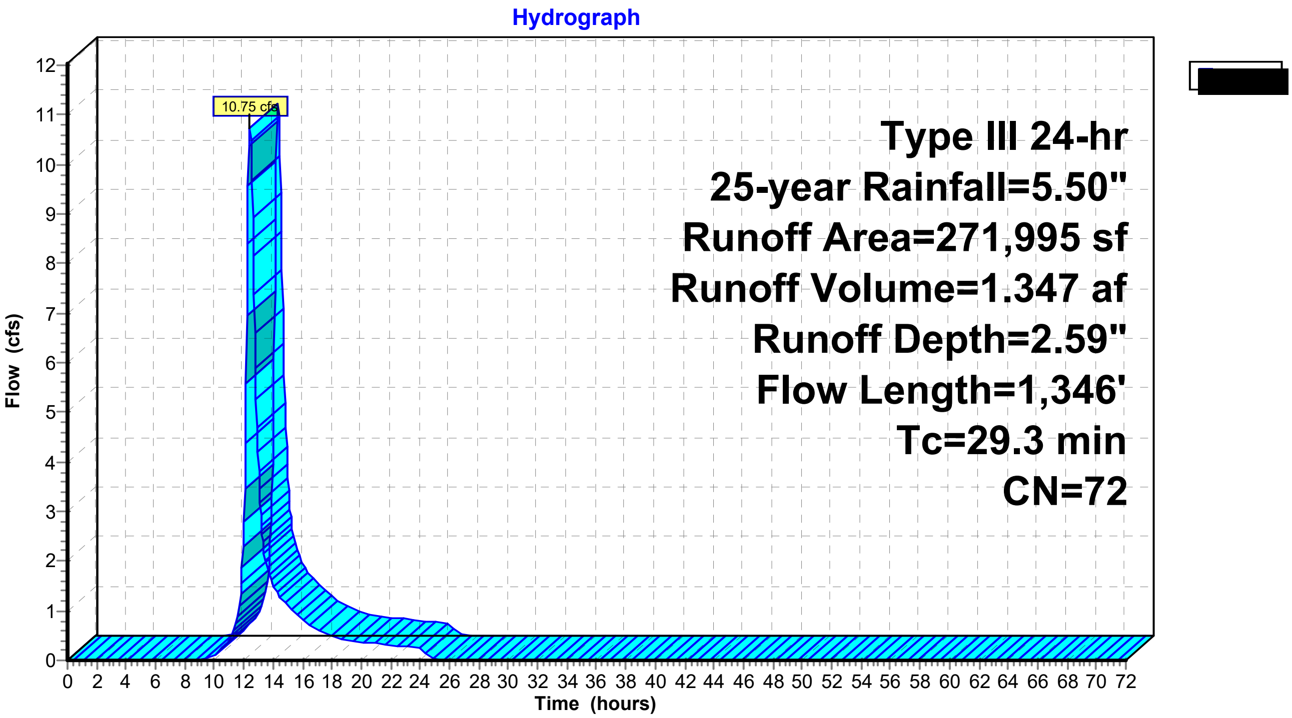
Runoff = 10.75 cfs @ 12.42 hrs, Volume= 1.347 af, Depth= 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	53,847	58	Meadow, non-grazed, HSG B
	27,788	71	Meadow, non-grazed, HSG C
	8,123	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	2,622	55	Woods, Good, HSG B
	123,893	70	Woods, Good, HSG C
	19,268	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	20,354	98	Water body
*	0	96	Gravel road
*	0	98	Structure
*	5,460	98	Panels
*	0	98	Equipment pad
*	10,640	98	Basin
	271,995	72	Weighted Average
	235,541		86.60% Pervious Area
	36,454		13.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
17.9	1,030	0.0369	0.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.1	266	0.0902	2.10		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
29.3	1,346	Total			

Subcatchment 5cS: Drainage Area 5



Summary for Subcatchment 5dS: Drainage Area 5

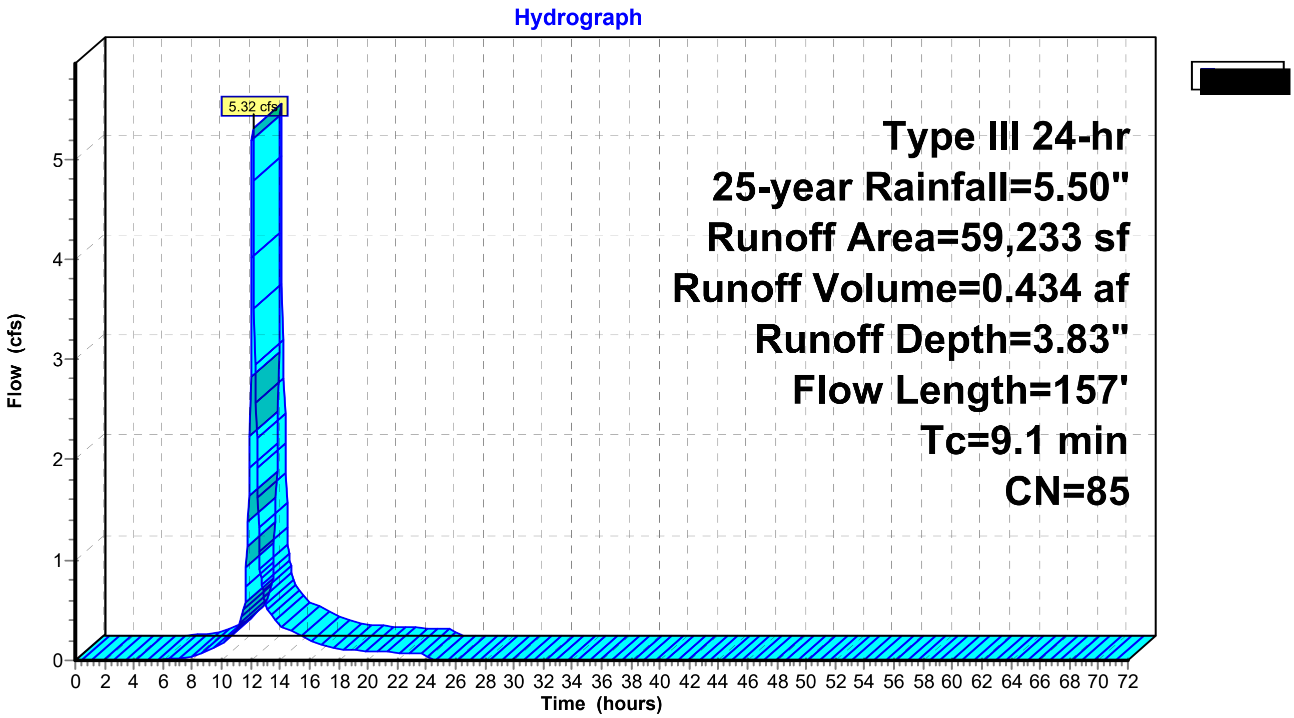
Runoff = 5.32 cfs @ 12.13 hrs, Volume= 0.434 af, Depth= 3.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	28,213	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	4,470	96	Gravel road
*	0	98	Structure
*	5,460	98	Panels
*	629	98	Equipment pad
*	20,461	98	Basin
	59,233	85	Weighted Average
	32,683		55.18% Pervious Area
	26,550		44.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.7	107	0.0234	1.07		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.1	157	Total			

Subcatchment 5dS: Drainage Area 5



Summary for Subcatchment 6aS: Drainage Area 6

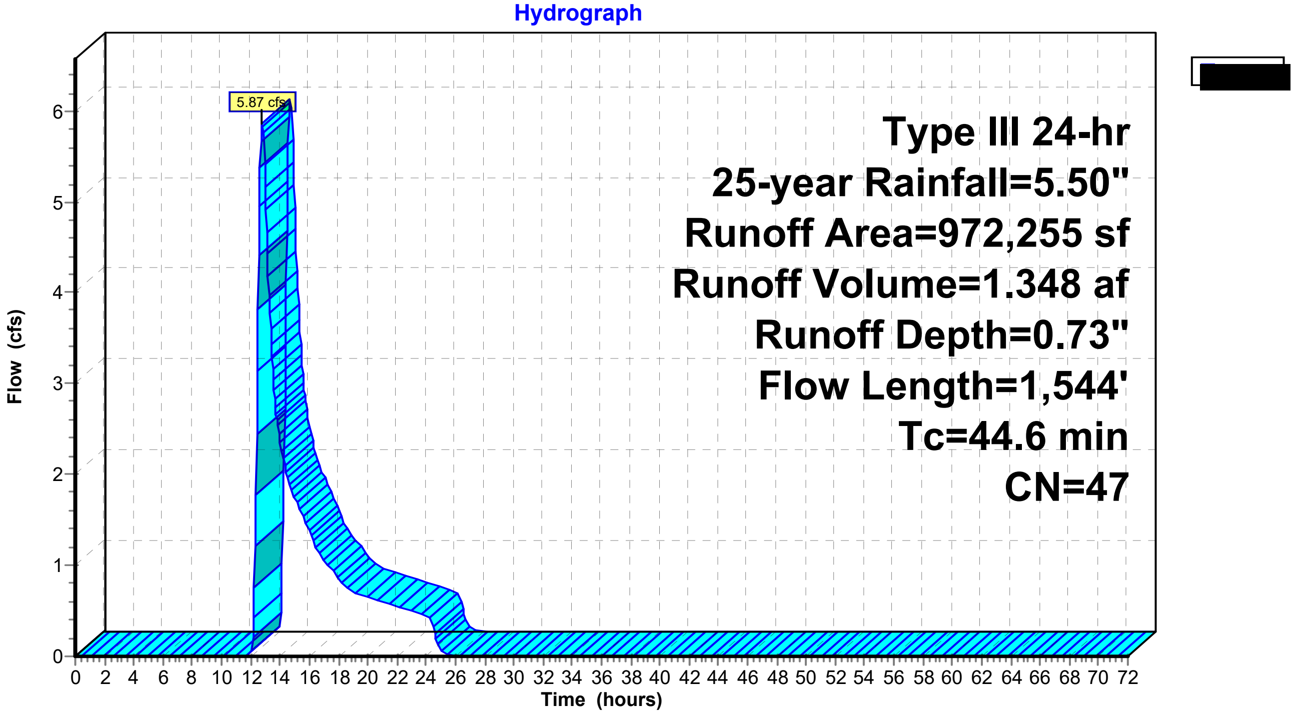
Runoff = 5.87 cfs @ 12.79 hrs, Volume= 1.348 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	301,060	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	390,620	30	Woods, Good, HSG A
	50,036	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	219,272	98	Water body
*	11,267	96	Gravel road
*	0	98	Structure
*	0	98	Panels
*	0	98	Equipment pad
	972,255	47	Weighted Average
	752,983		77.45% Pervious Area
	219,272		22.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
13.5	538	0.0090	0.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.1	601	0.0391	0.99		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.7	355	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
44.6	1,544	Total			

Subcatchment 6aS: Drainage Area 6



Summary for Subcatchment 6bS: Drainage Area 6

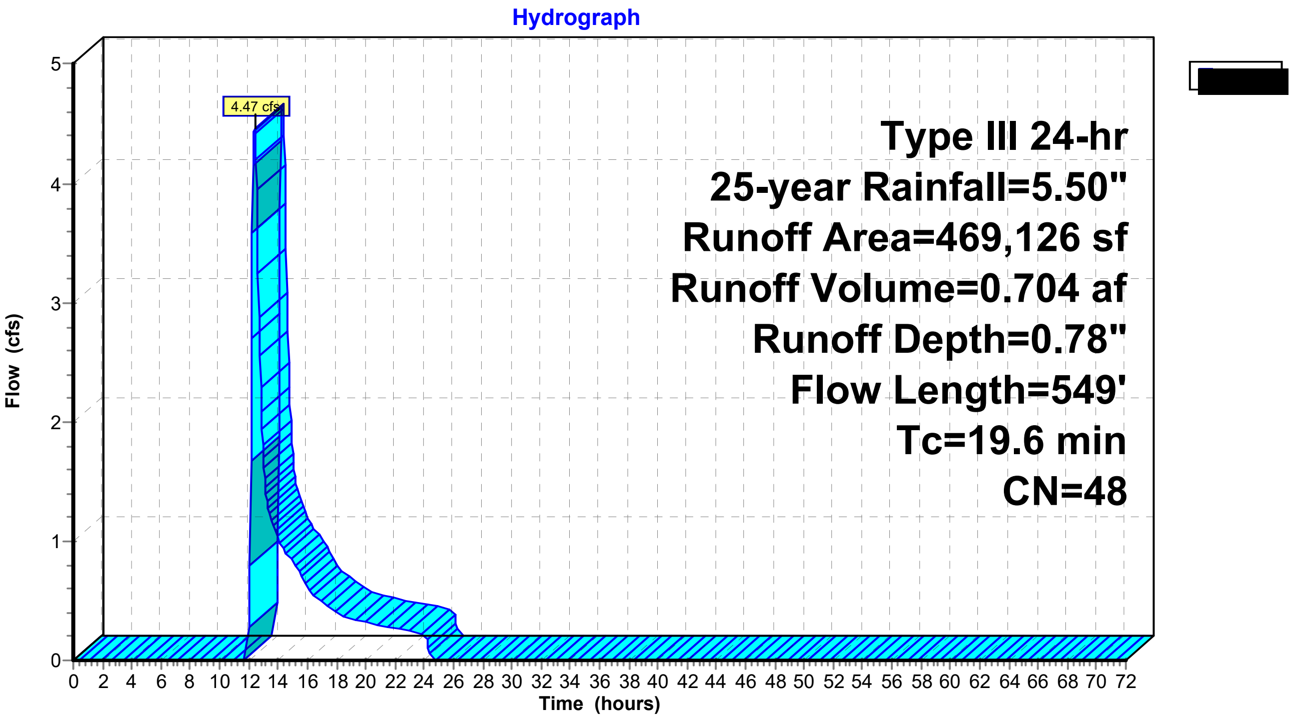
Runoff = 4.47 cfs @ 12.39 hrs, Volume= 0.704 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	288,325	30	Meadow, non-grazed, HSG A
	91,050	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	9,625	96	Gravel road
*	0	98	Structure
*	12,660	98	Panels
*	629	98	Equipment pad
*	66,837	98	Basin
	469,126	48	Weighted Average
	389,000		82.92% Pervious Area
	80,126		17.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.0150	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
13.3	499	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.6	549	Total			

Subcatchment 6bS: Drainage Area 6



Summary for Subcatchment 7aS: Drainage Area 7a

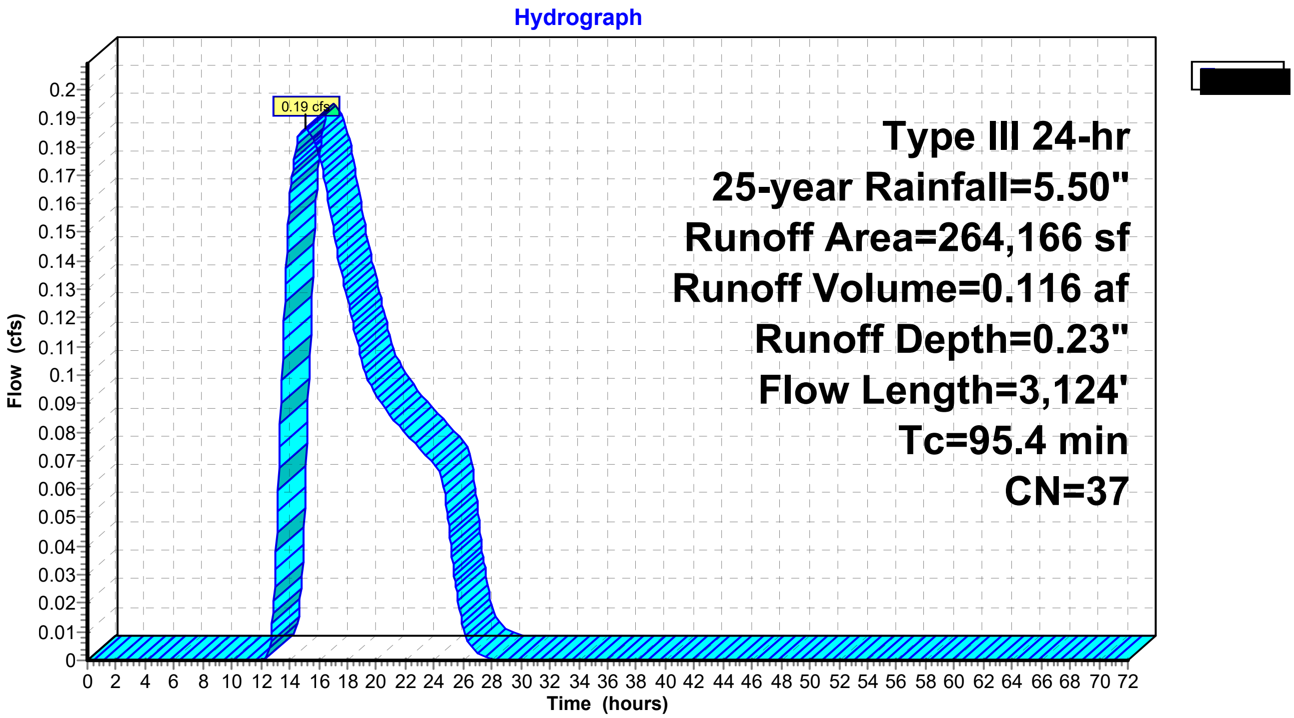
Runoff = 0.19 cfs @ 15.13 hrs, Volume= 0.116 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	231,002	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	7,059	70	Gravel pit, HSG A
*	9,519	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	9,866	96	Gravel road
*	0	98	Structure
*	6,720	98	Panels
*	0	98	Equipment pad
	264,166	37	Weighted Average
	257,446		97.46% Pervious Area
	6,720		2.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
2.9	238	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
88.9	2,836	0.0113	0.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
95.4	3,124	Total			

Subcatchment 7aS: Drainage Area 7a



Summary for Subcatchment 7bS: Drainage Area 7b

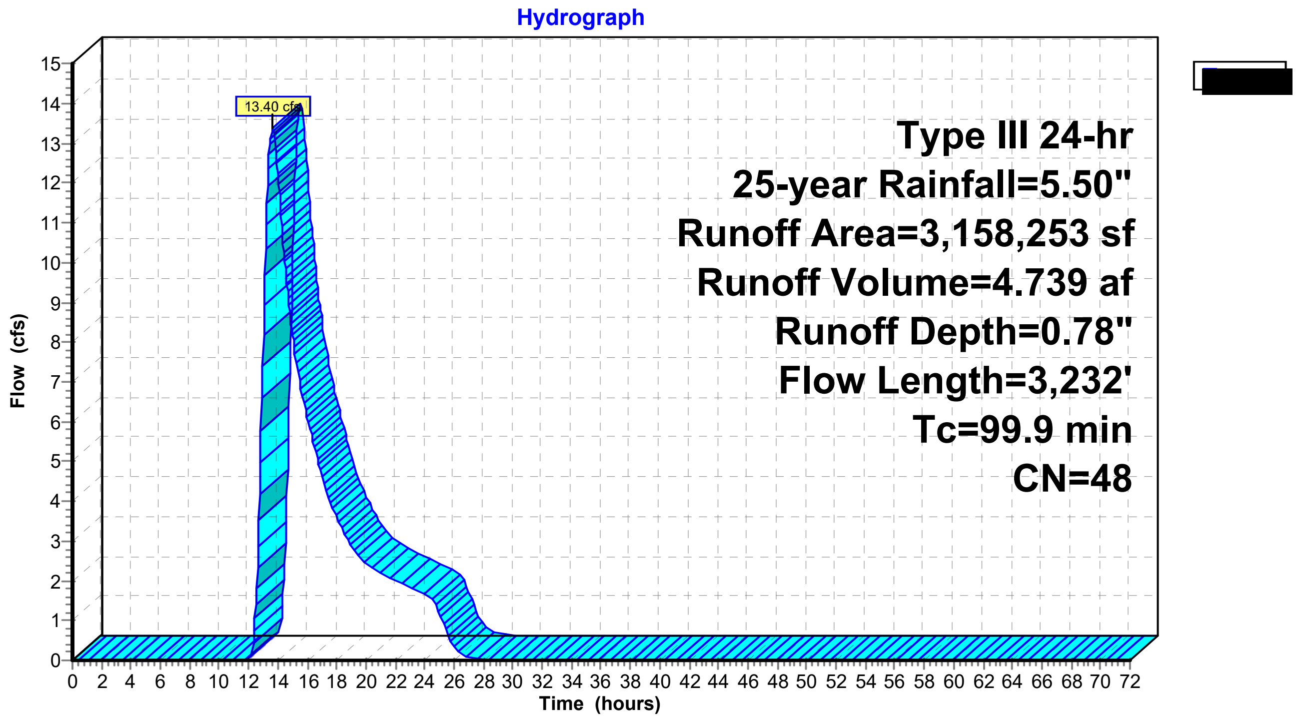
Runoff = 13.40 cfs @ 13.65 hrs, Volume= 4.739 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	648,318	30	Meadow, non-grazed, HSG A
	110,037	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	1,385,107	30	Woods, Good, HSG A
	230,359	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	165,079	70	Gravel pit, HSG A
*	79,347	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	453,314	98	Water body
*	77,609	96	Gravel road
*	0	98	Structure
*	8,454	98	Panels
*	629	98	Equipment pad
	3,158,253	48	Weighted Average
	2,695,856		85.36% Pervious Area
	462,397		14.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	50	0.1600	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
5.6	346	0.0430	1.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
88.9	2,836	0.0113	0.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
99.9	3,232	Total			

Subcatchment 7bS: Drainage Area 7b



Summary for Subcatchment 8S: Drainage Area 8

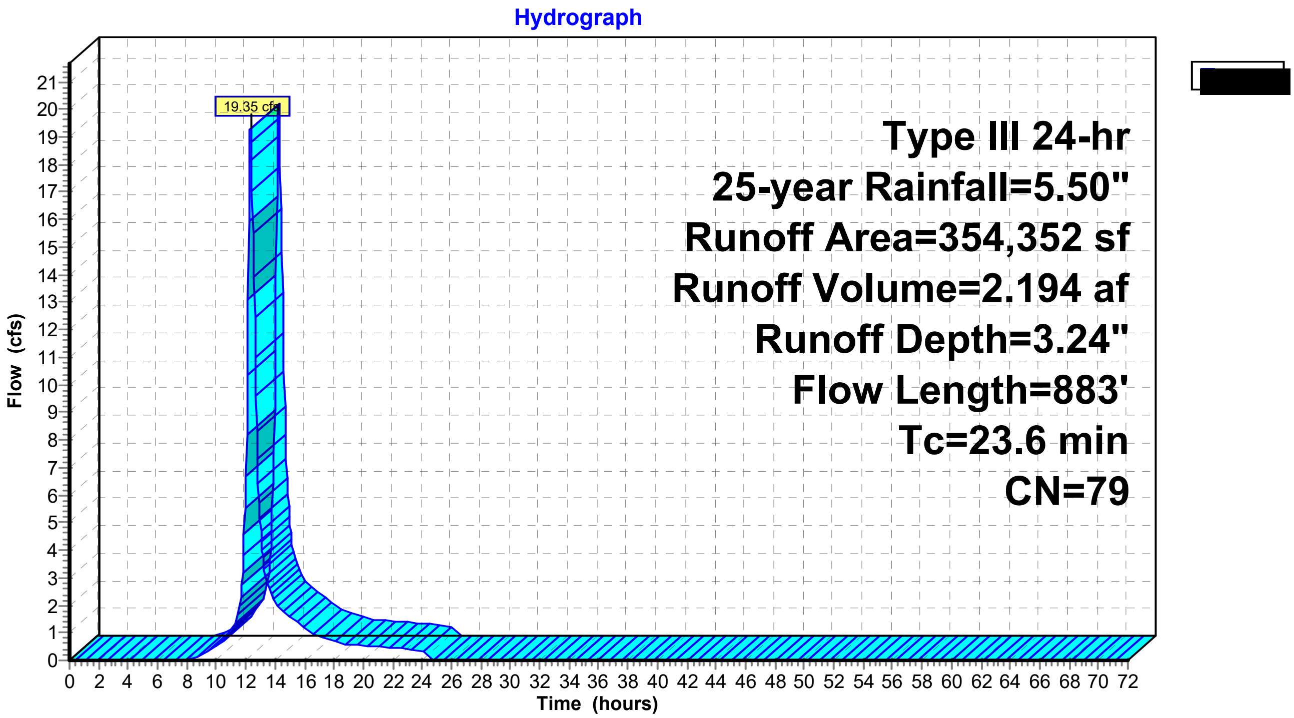
Runoff = 19.35 cfs @ 12.33 hrs, Volume= 2.194 af, Depth= 3.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	14,757	71	Meadow, non-grazed, HSG C
	6,627	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	7,700	55	Woods, Good, HSG B
	175,484	70	Woods, Good, HSG C
	40,001	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	93,828	98	Water body
*	15,955	96	Gravel road
*	0	98	Structure
	354,352	79	Weighted Average
	260,524		73.52% Pervious Area
	93,828		26.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
8.8	390	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	271	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	172	0.0280	0.84		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.6	883	Total			

Subcatchment 8S: Drainage Area 8



Summary for Subcatchment 9S: Drainage Area 9

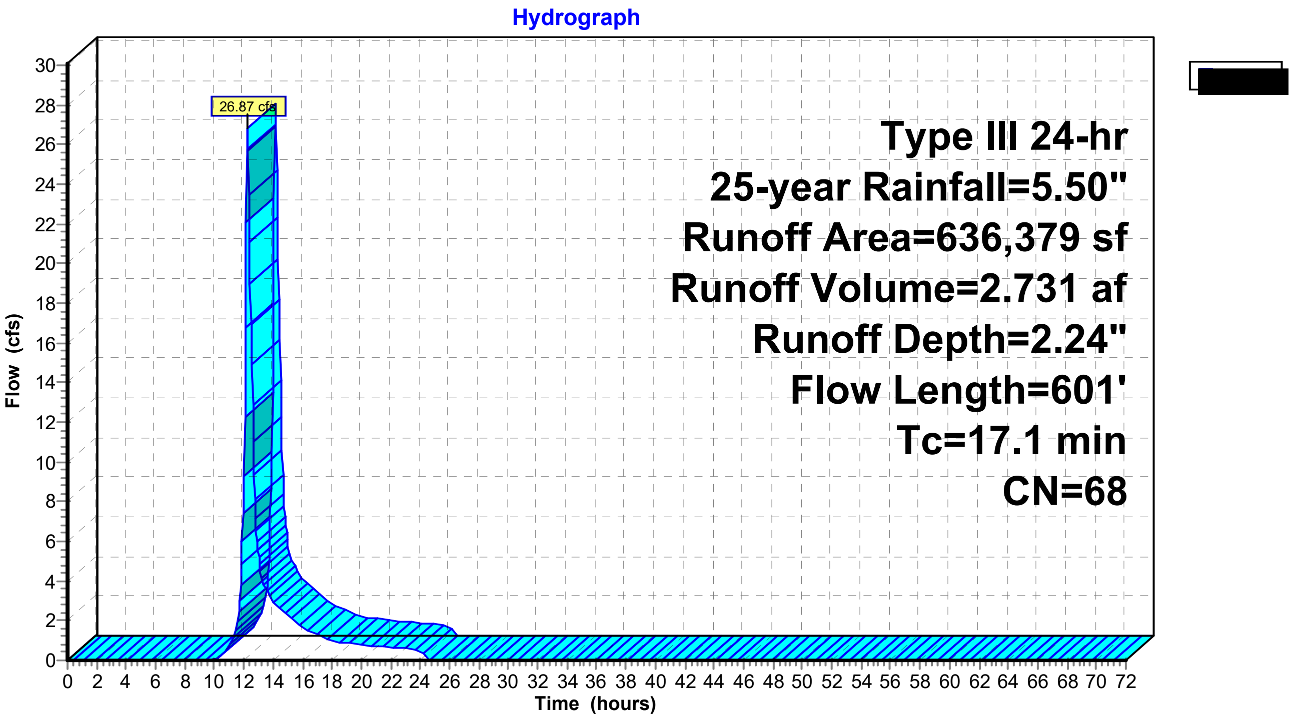
Runoff = 26.87 cfs @ 12.25 hrs, Volume= 2.731 af, Depth= 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	80,020	30	Meadow, non-grazed, HSG A
	29,044	58	Meadow, non-grazed, HSG B
	8,254	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	24,186	30	Woods, Good, HSG A
	229,102	55	Woods, Good, HSG B
	19,896	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	226,618	98	Water body
*	18,419	96	Gravel road
*	0	98	Structure
*	840	98	Panels
	636,379	68	Weighted Average
	408,921		64.26% Pervious Area
	227,458		35.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.4	106	0.0610	1.23		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	184	0.0330	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.8	261	0.2470	2.48		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.1	601	Total			

Subcatchment 9S: Drainage Area 9



Summary for Subcatchment 10aS: Drainage Area 10

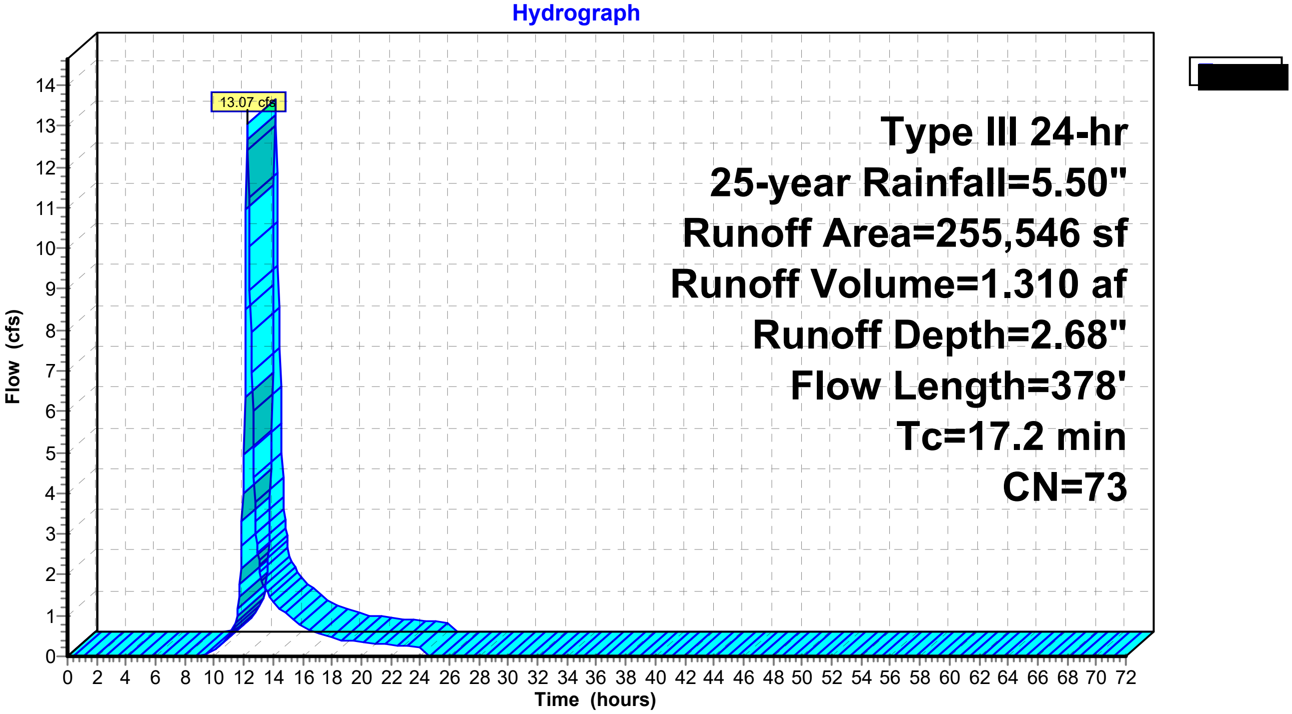
Runoff = 13.07 cfs @ 12.24 hrs, Volume= 1.310 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	40,805	58	Meadow, non-grazed, HSG B
	126,615	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	9,453	55	Woods, Good, HSG B
	37,133	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	5,861	96	Gravel road
*	0	98	Structure
*	3,360	98	Panels
*	32,319	98	Basin
	255,546	73	Weighted Average
	219,867		86.04% Pervious Area
	35,679		13.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
4.9	328	0.0488	1.10		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.2	378	Total			

Subcatchment 10aS: Drainage Area 10



Summary for Subcatchment 10bS: Drainage Area 10

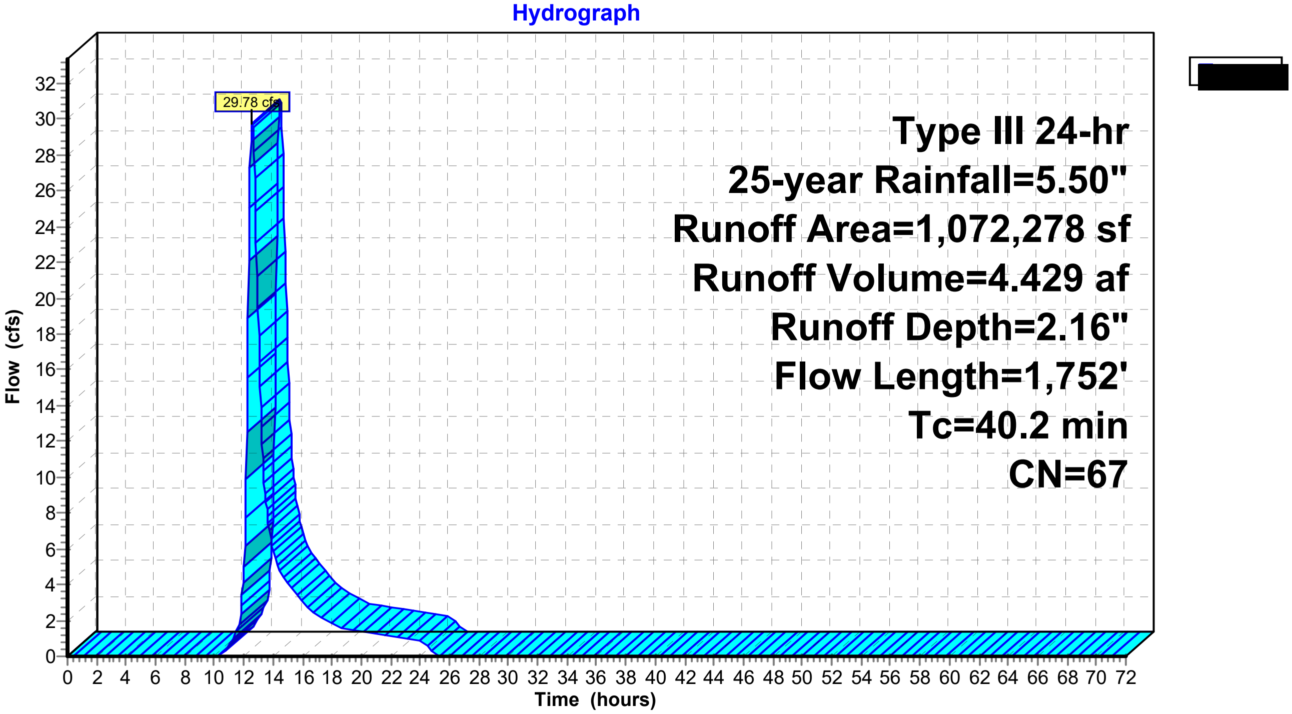
Runoff = 29.78 cfs @ 12.58 hrs, Volume= 4.429 af, Depth= 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	13,076	30	Meadow, non-grazed, HSG A
	9,872	58	Meadow, non-grazed, HSG B
	162,839	71	Meadow, non-grazed, HSG C
	21,857	78	Meadow, non-grazed, HSG D
	110,901	30	Woods, Good, HSG A
	222,199	55	Woods, Good, HSG B
	284,517	70	Woods, Good, HSG C
	72,773	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	141,195	98	Water body
*	33,049	96	Gravel road
*	0	98	Structure
*	0	98	Panels
	1,072,278	67	Weighted Average
	931,083		86.83% Pervious Area
	141,195		13.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
29.4	1,139	0.0167	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	72	0.0417	3.29		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.1	491	0.0367	1.34		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
40.2	1,752	Total			

Subcatchment 10bS: Drainage Area 10



Summary for Subcatchment 11aS: Drainage Area 11

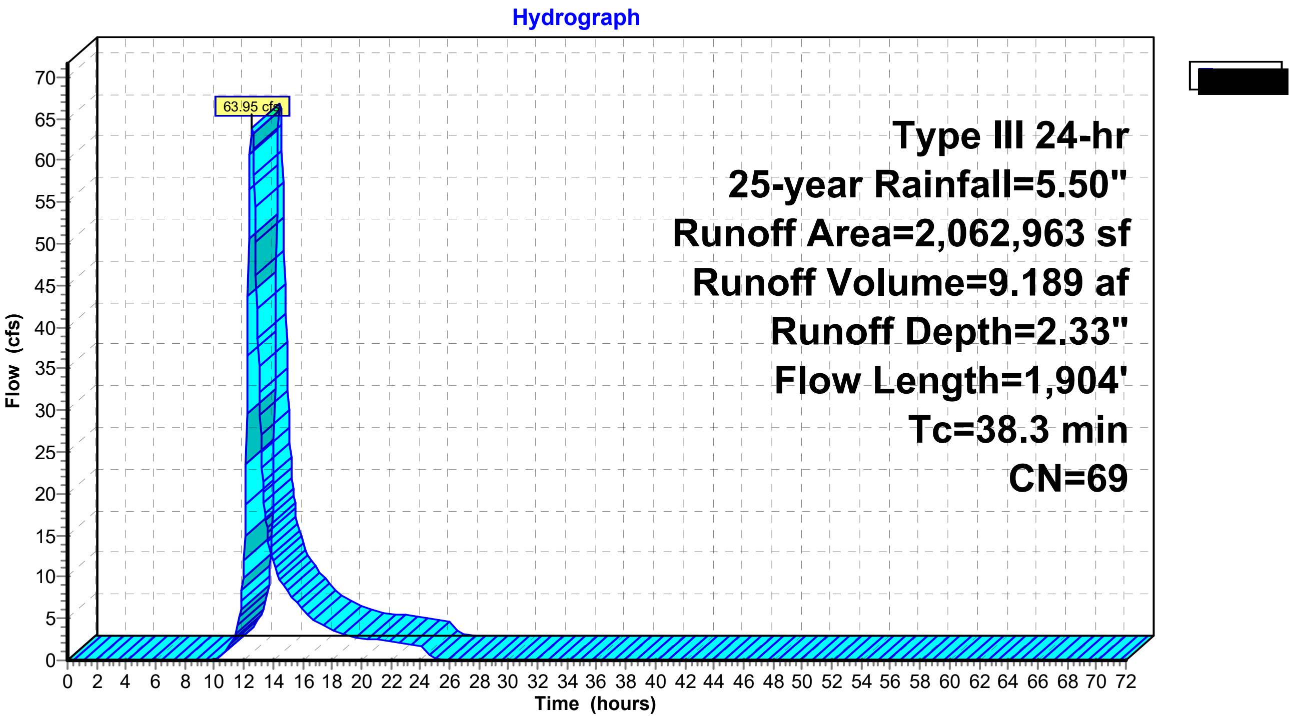
Runoff = 63.95 cfs @ 12.55 hrs, Volume= 9.189 af, Depth= 2.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	230,381	30	Meadow, non-grazed, HSG A
	74,662	58	Meadow, non-grazed, HSG B
	1,245,920	71	Meadow, non-grazed, HSG C
	51,732	78	Meadow, non-grazed, HSG D
	5,299	30	Woods, Good, HSG A
	38,194	55	Woods, Good, HSG B
	116,983	70	Woods, Good, HSG C
	42,710	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	201,207	98	Water body
*	45,982	96	Gravel road
*	8,006	98	Structure
*	1,887	98	Equipment pad
*	0	98	Panels
	2,062,963	69	Weighted Average
	1,851,863		89.77% Pervious Area
	211,100		10.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
34.0	1,854	0.0330	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
38.3	1,904	Total			

Subcatchment 11aS: Drainage Area 11



Summary for Subcatchment 11bS: Drainage Area 11

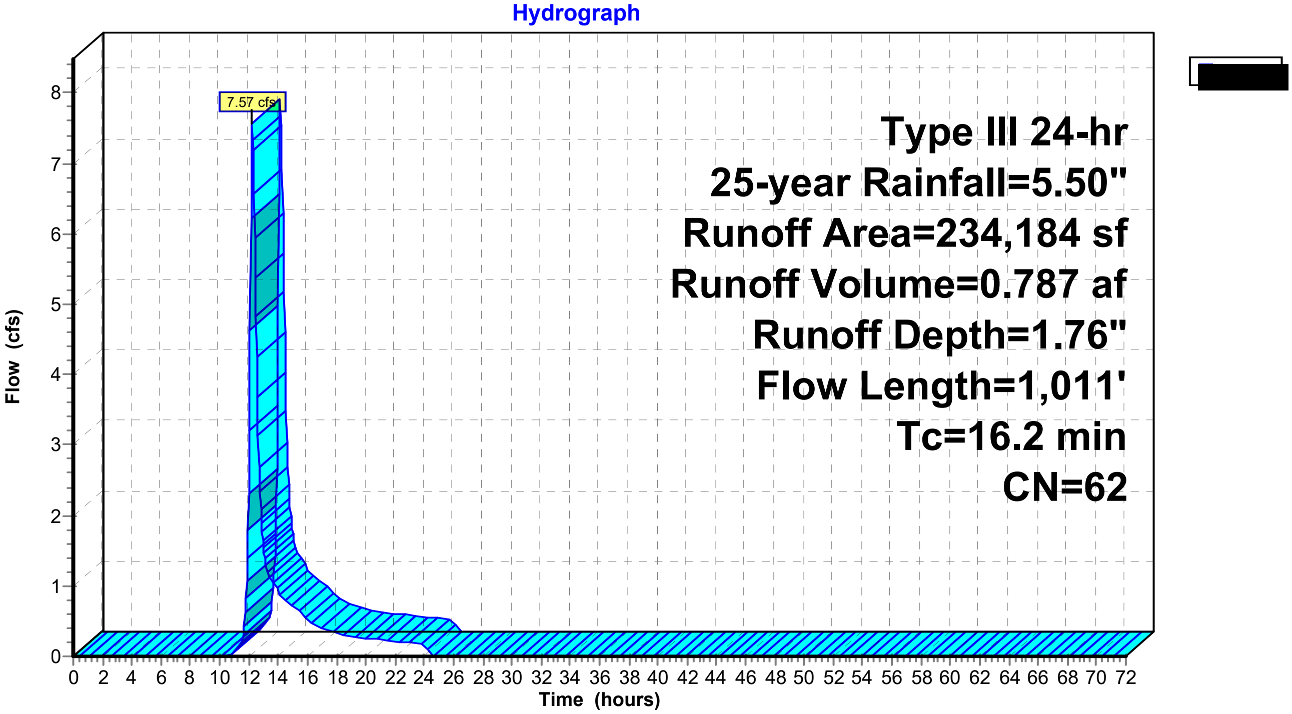
Runoff = 7.57 cfs @ 12.24 hrs, Volume= 0.787 af, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	62,296	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	153,054	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	14,214	96	Gravel road
*	0	98	Structure
*	0	98	Equipment pad
*	4,620	98	Panels
	234,184	62	Weighted Average
	229,564		98.03% Pervious Area
	4,620		1.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
10.6	961	0.0468	1.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.2	1,011	Total			

Subcatchment 11bS: Drainage Area 11



Summary for Subcatchment 11cS: Drainage Area 11

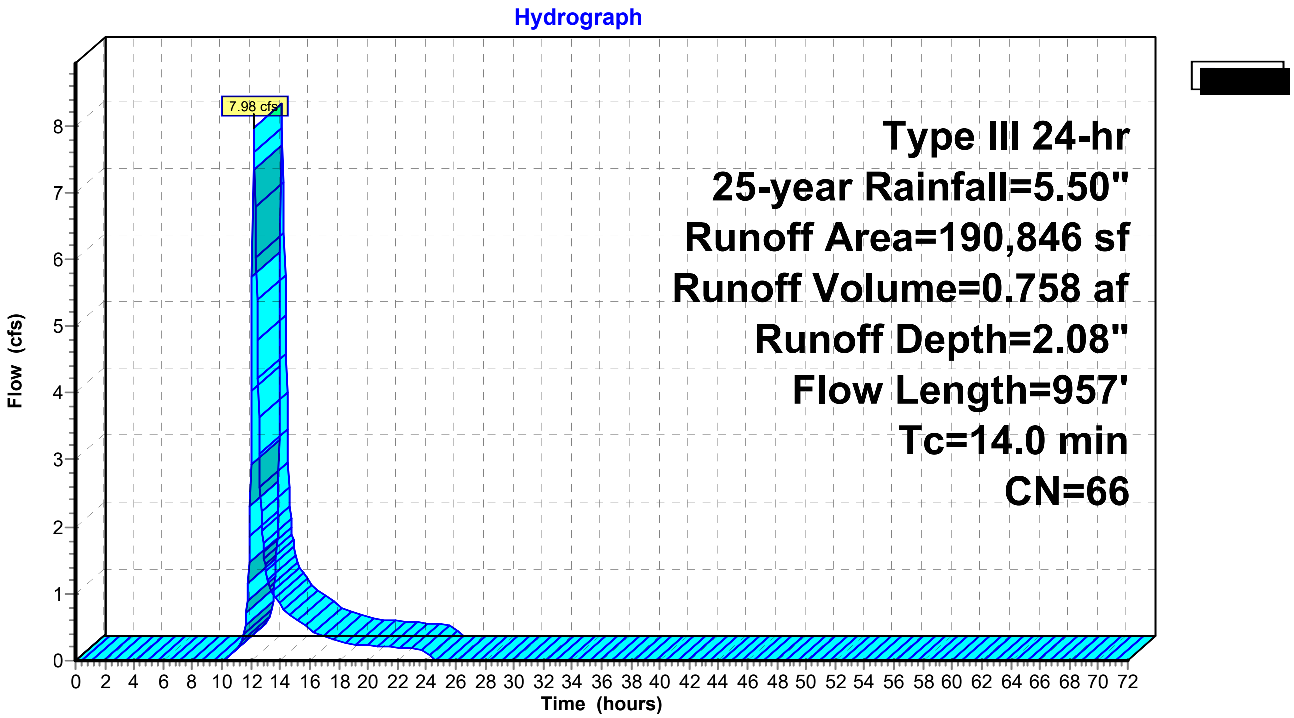
Runoff = 7.98 cfs @ 12.21 hrs, Volume= 0.758 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	27,259	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	158,821	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	2,666	96	Gravel road
*	0	98	Structure
*	0	98	Equipment pad
*	2,100	98	Panels
	190,846	66	Weighted Average
	188,746		98.90% Pervious Area
	2,100		1.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
9.7	907	0.0496	1.56		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.0	957	Total			

Subcatchment 11cS: Drainage Area 11



Summary for Subcatchment 12aS: Drainage Area 12a

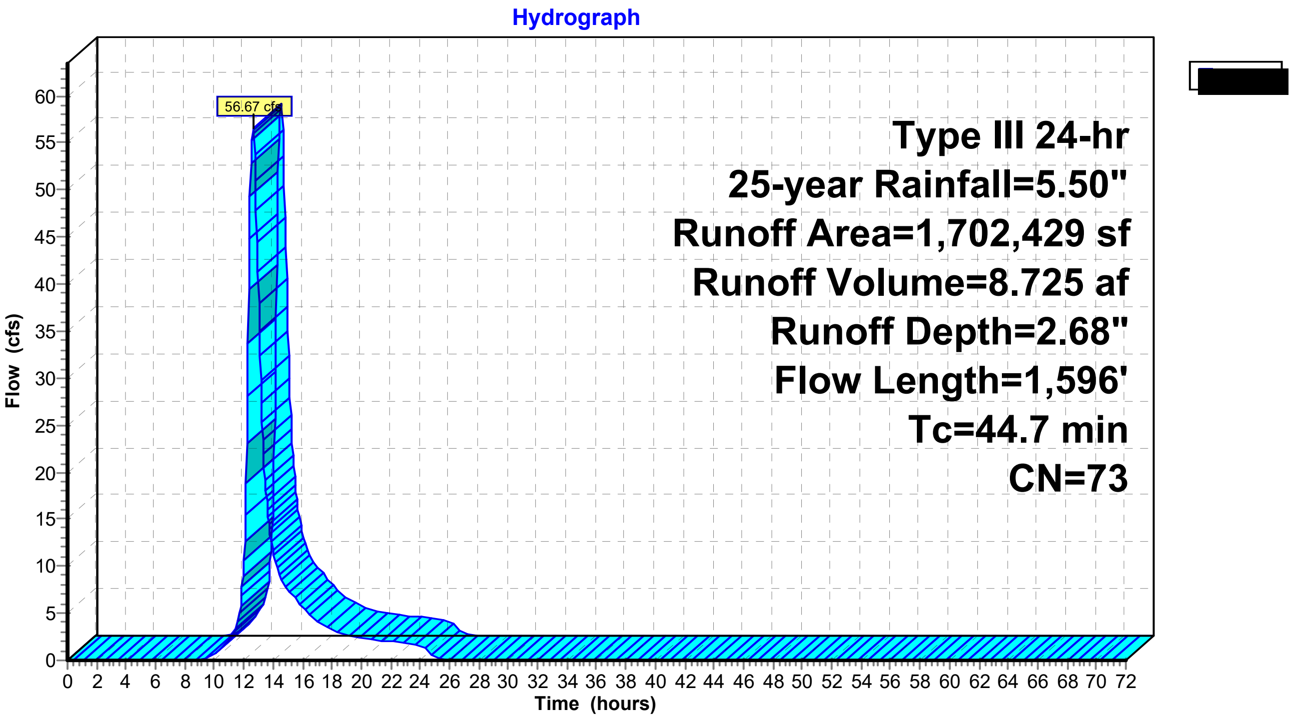
Runoff = 56.67 cfs @ 12.63 hrs, Volume= 8.725 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	23,018	30	Meadow, non-grazed, HSG A
	9,439	58	Meadow, non-grazed, HSG B
	654,323	71	Meadow, non-grazed, HSG C
	210,828	78	Meadow, non-grazed, HSG D
	22,923	30	Woods, Good, HSG A
	183,438	55	Woods, Good, HSG B
	293,907	70	Woods, Good, HSG C
	52,031	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	229,248	98	Water body
*	13,614	96	Gravel road
*	0	98	Structure
*	9,660	98	Panels
*	0	98	Equipment pad
	1,702,429	73	Weighted Average
	1,463,521		85.97% Pervious Area
	238,908		14.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0140	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
7.5	626	0.0780	1.40		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
30.7	920	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
44.7	1,596	Total			

Subcatchment 12aS: Drainage Area 12a



Summary for Subcatchment 12bS: Drainage Area 12b

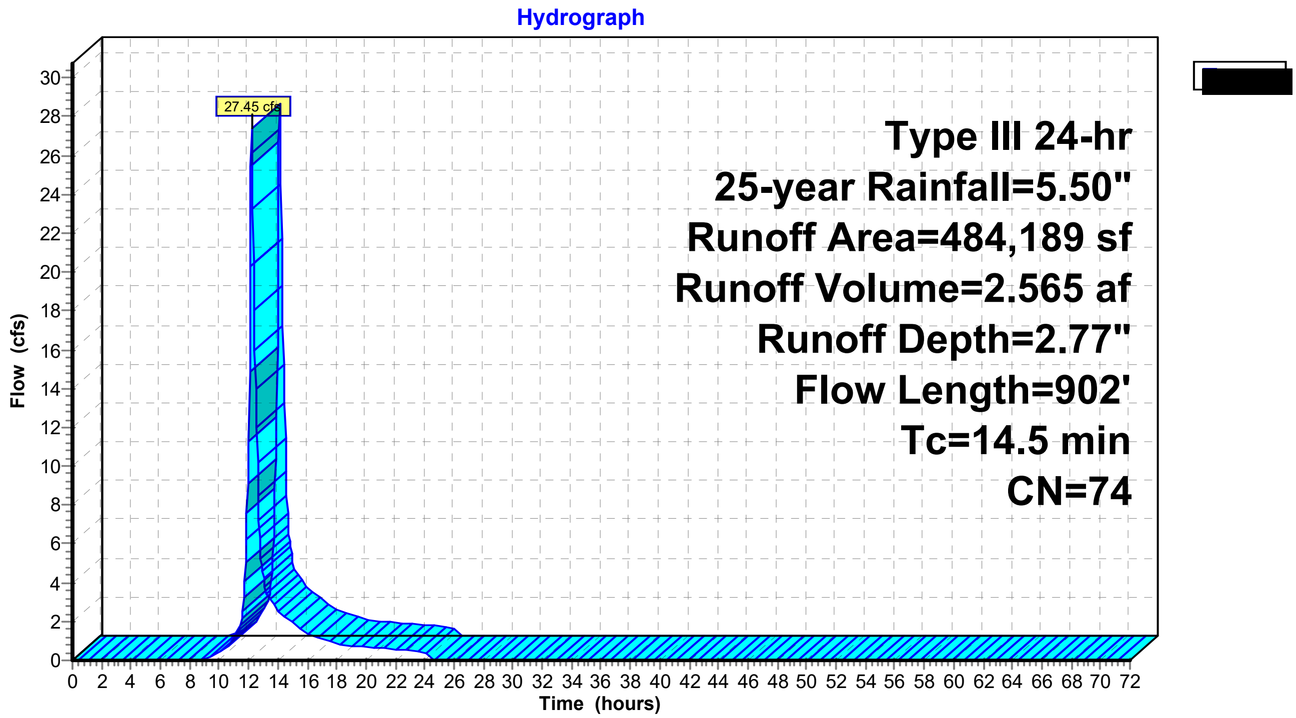
Runoff = 27.45 cfs @ 12.21 hrs, Volume= 2.565 af, Depth= 2.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	438,020	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	8,877	96	Gravel road
*	0	98	Structure
*	9,240	98	Panels
*	1,258	98	Equipment pad
*	26,794	98	Basin
	484,189	74	Weighted Average
	446,897		92.30% Pervious Area
	37,292		7.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
10.2	852	0.0393	1.39		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.5	902	Total			

Subcatchment 12bS: Drainage Area 12b



Summary for Subcatchment 12cS: Drainage Area 12

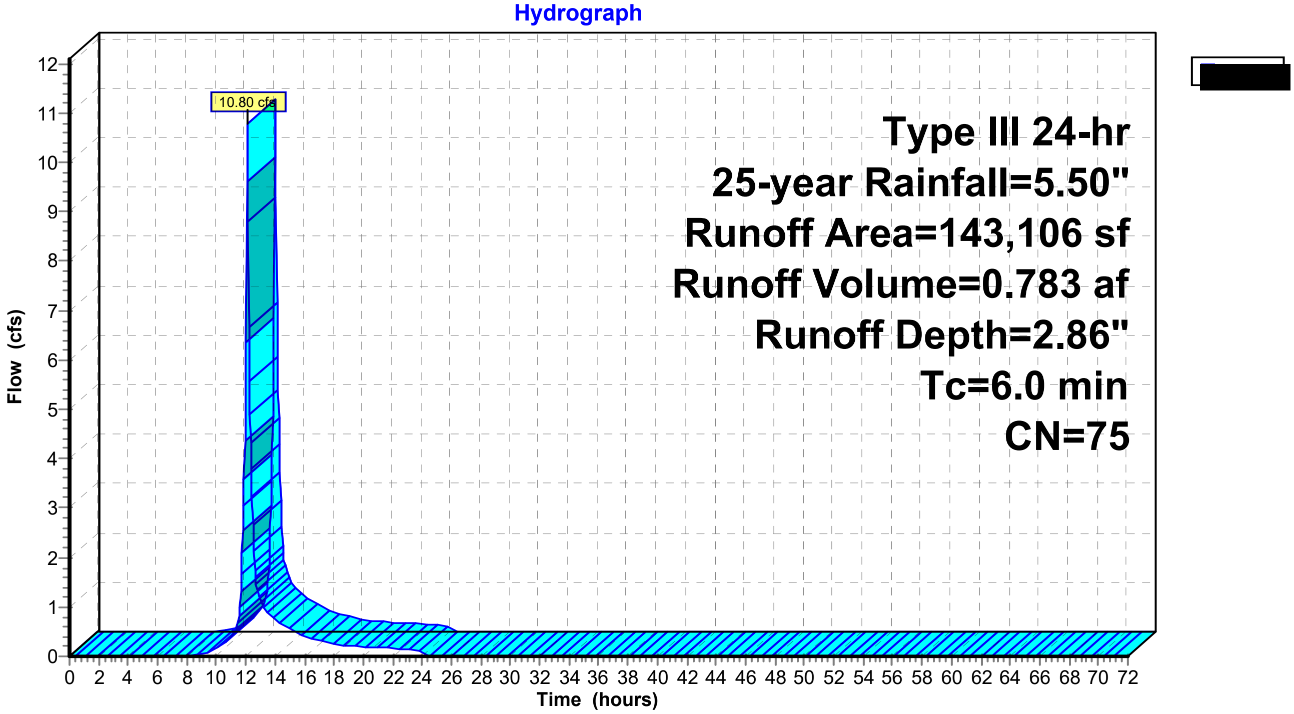
Runoff = 10.80 cfs @ 12.09 hrs, Volume= 0.783 af, Depth= 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	122,234	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	8,875	96	Gravel road
*	0	98	Structure
*	0	98	Panels
*	0	98	Equipment pad
*	11,997	98	Basin
	143,106	75	Weighted Average
	131,109		91.62% Pervious Area
	11,997		8.38% Impervious Area

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

Subcatchment 12cS: Drainage Area 12



Summary for Subcatchment 13S: Drainage Area 13

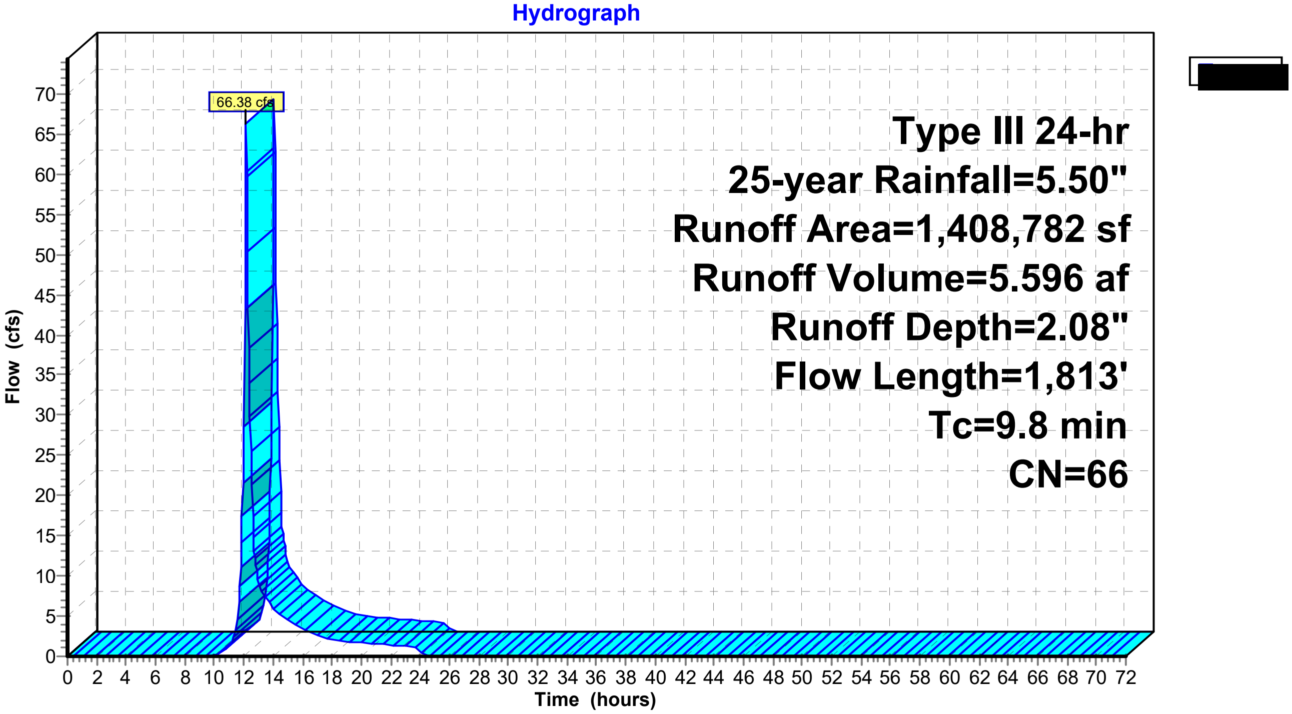
Runoff = 66.38 cfs @ 12.15 hrs, Volume= 5.596 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (sf)	CN	Description
	137,390	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	1,266,167	70	Gravel pit, HSG A
*	4,469	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	756	98	Water body
*	0	96	Gravel road
*	0	98	Structure
	1,408,782	66	Weighted Average
	1,408,026		99.95% Pervious Area
	756		0.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.20		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
9.1	1,763	0.0403	3.23		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.8	1,813	Total			

Subcatchment 13S: Drainage Area 13



Summary for Reach 10aR: Swale 10a

Inflow Area = 5.867 ac, 13.96% Impervious, Inflow Depth = 2.68" for 25-year event
Inflow = 13.07 cfs @ 12.24 hrs, Volume= 1.310 af
Outflow = 12.76 cfs @ 12.33 hrs, Volume= 1.310 af, Atten= 2%, Lag= 5.0 min

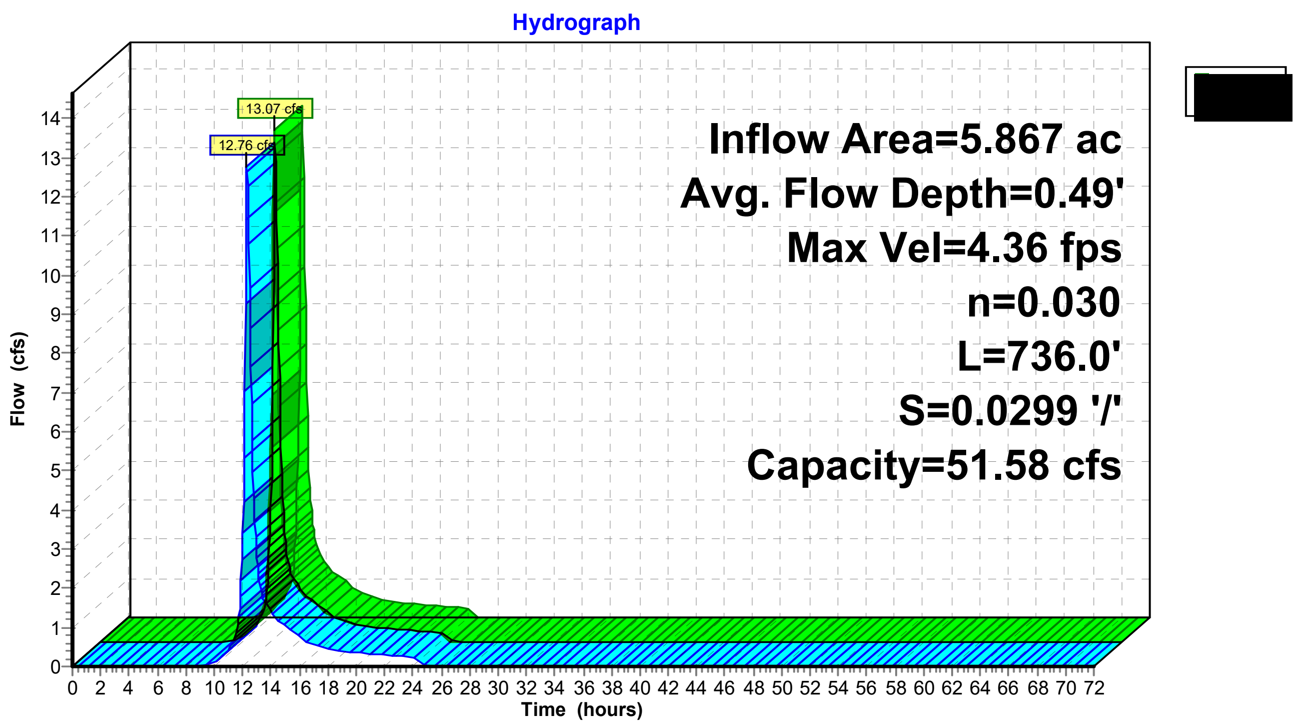
Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.36 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 1.37 fps, Avg. Travel Time= 9.0 min

Peak Storage= 2,157 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 51.58 cfs

4.00' x 1.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 736.0' Slope= 0.0299 '/'
Inlet Invert= 236.00', Outlet Invert= 214.00'

‡

Reach 10aR: Swale 10a



Summary for Reach 12bR: Swale 12b

Inflow Area = 11.115 ac, 7.70% Impervious, Inflow Depth = 2.77" for 25-year event
Inflow = 27.45 cfs @ 12.21 hrs, Volume= 2.565 af
Outflow = 26.24 cfs @ 12.31 hrs, Volume= 2.565 af, Atten= 4%, Lag= 6.0 min

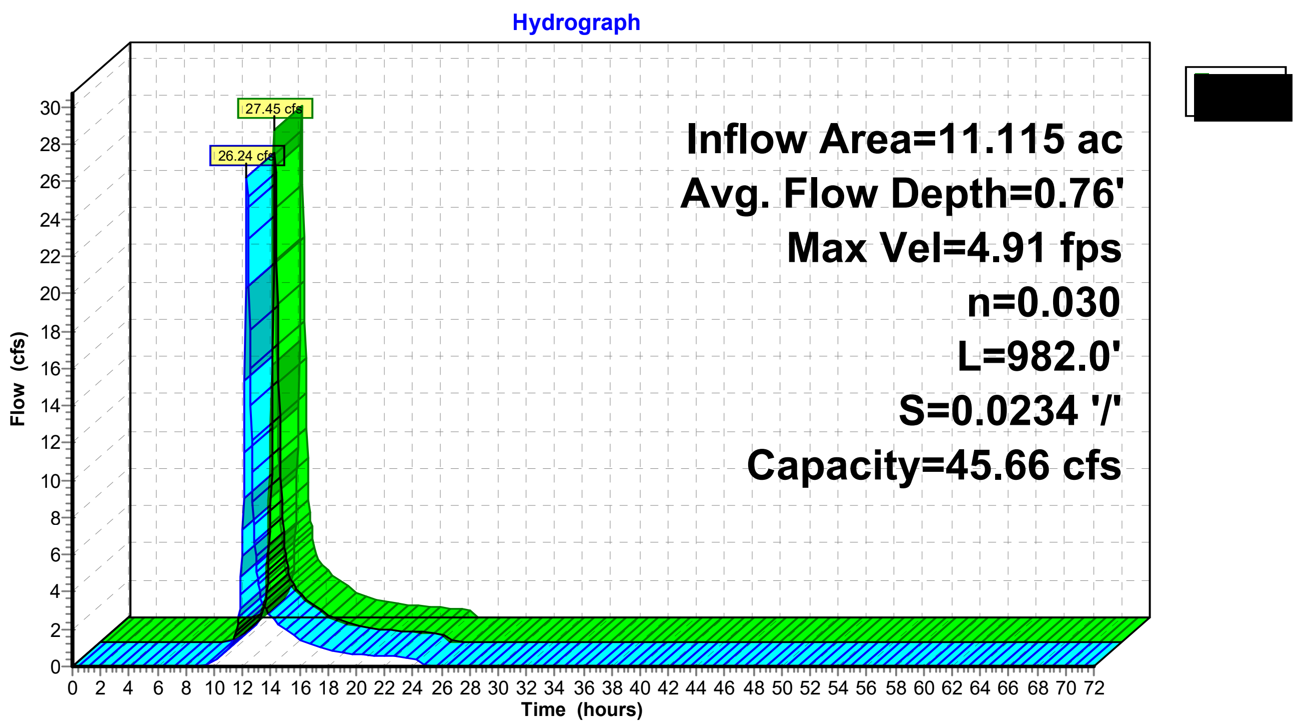
Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.91 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 1.46 fps, Avg. Travel Time= 11.2 min

Peak Storage= 5,268 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.76'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 45.66 cfs

4.00' x 1.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 982.0' Slope= 0.0234 '/'
Inlet Invert= 276.00', Outlet Invert= 253.00'

‡

Reach 12bR: Swale 12b



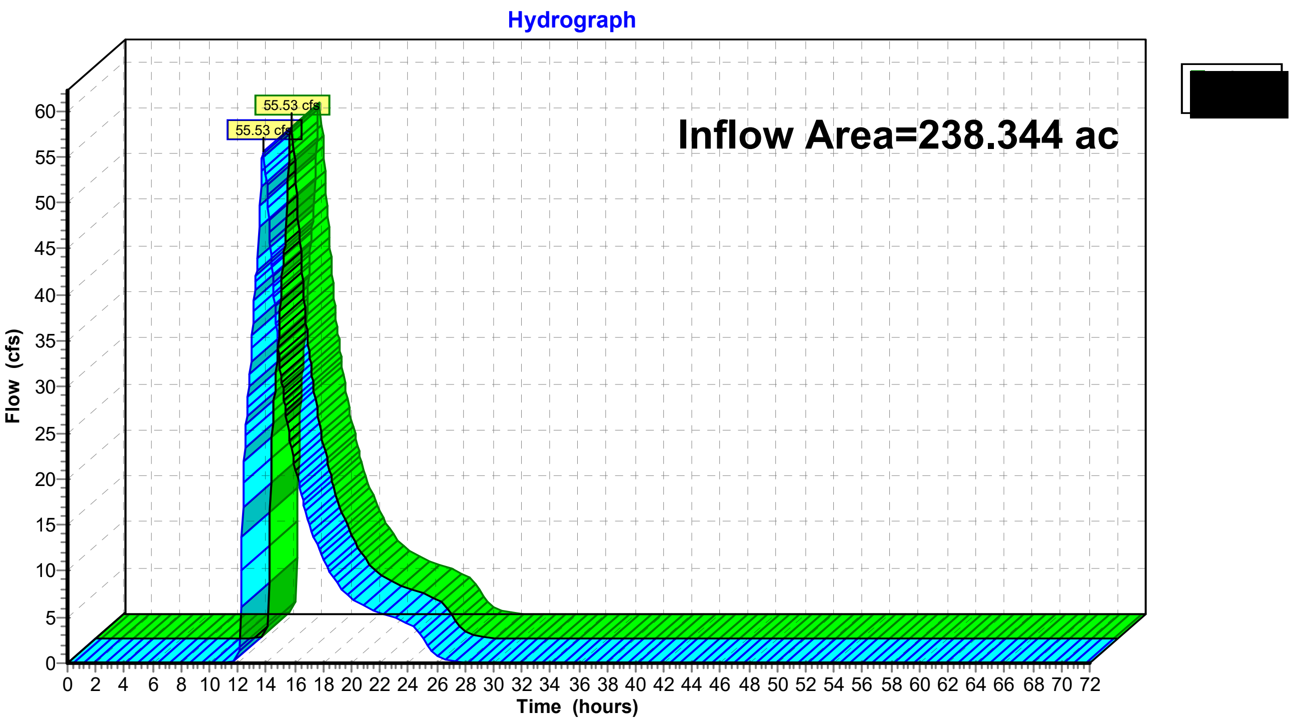
Summary for Reach DP-1: Off-Site West

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	238.344 ac,	10.57% Impervious,	Inflow Depth = 0.88"	for 25-year event
Inflow =	55.53 cfs @	13.80 hrs, Volume=	17.542 af	
Outflow =	55.53 cfs @	13.80 hrs, Volume=	17.542 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Off-Site West



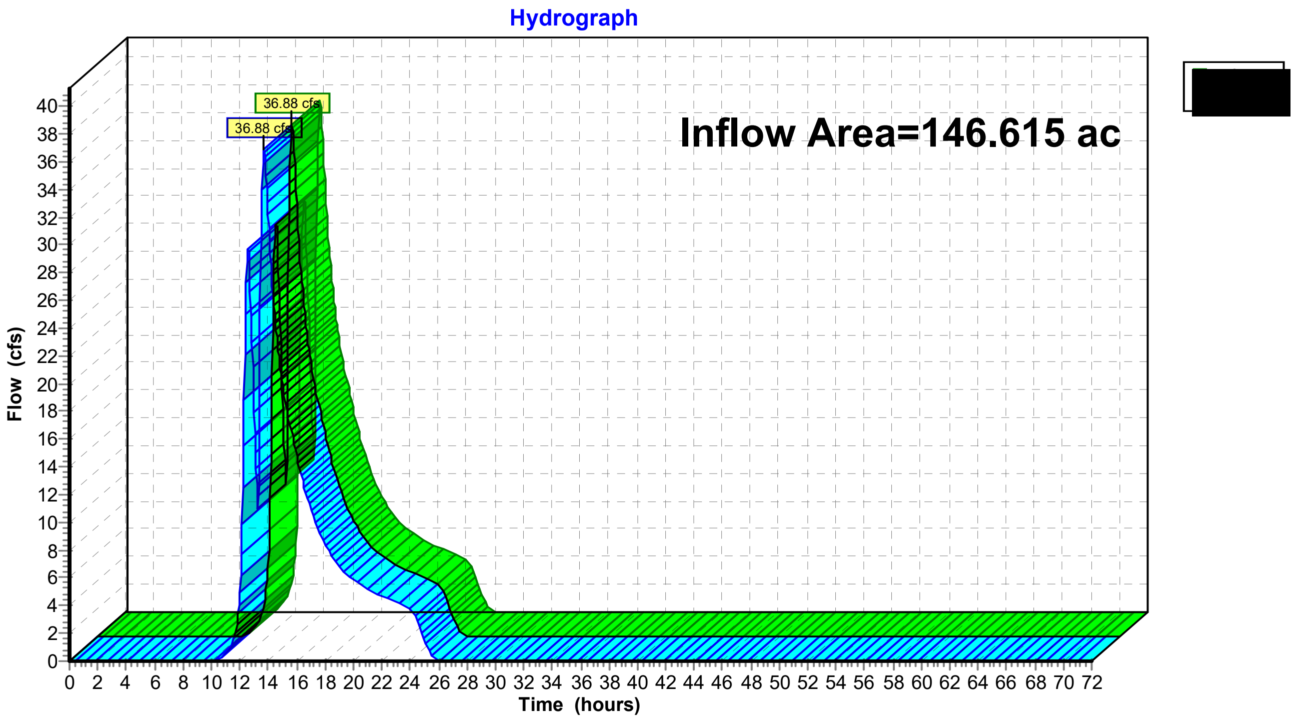
Summary for Reach DP-2: Off-Site South

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	146.615 ac,	22.85% Impervious,	Inflow Depth = 1.01"	for 25-year event
Inflow =	36.88 cfs @	13.69 hrs, Volume=	12.321 af	
Outflow =	36.88 cfs @	13.69 hrs, Volume=	12.321 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: Off-Site South



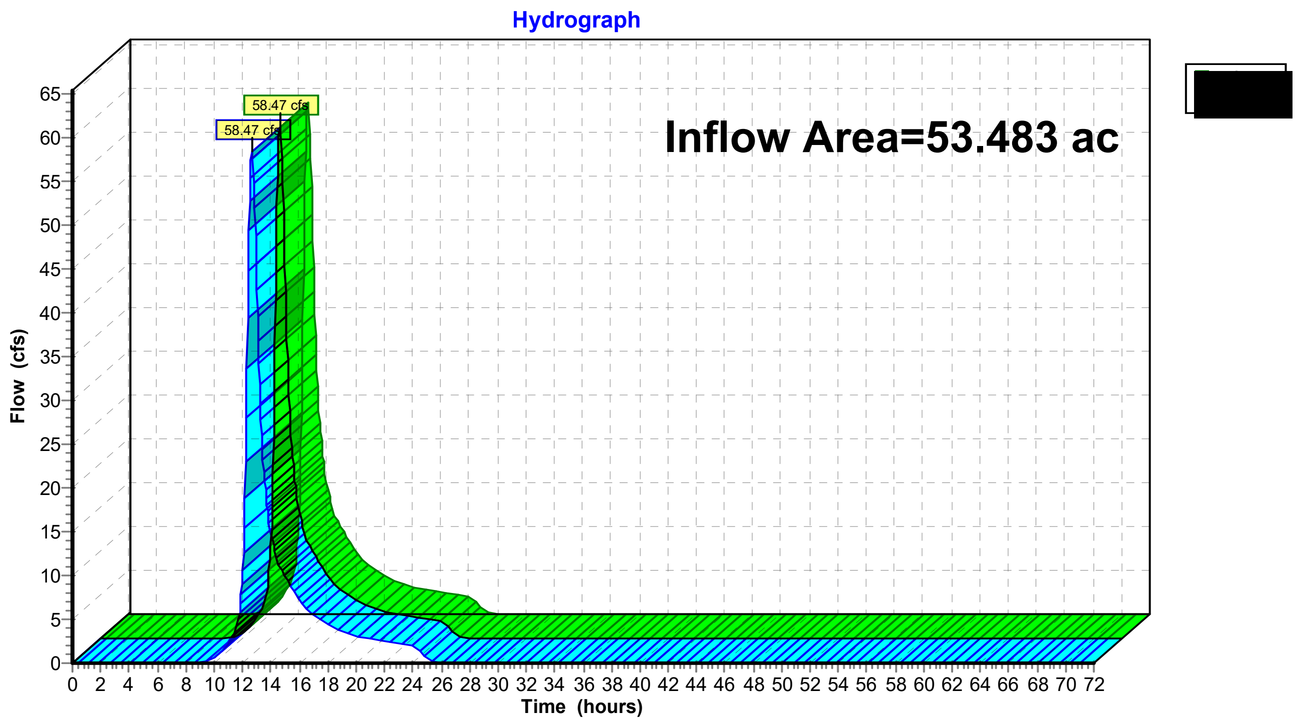
Summary for Reach DP-3: Off-Site East

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 53.483 ac, 12.37% Impervious, Inflow Depth = 2.28" for 25-year event
Inflow = 58.47 cfs @ 12.67 hrs, Volume= 10.143 af
Outflow = 58.47 cfs @ 12.67 hrs, Volume= 10.143 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-3: Off-Site East



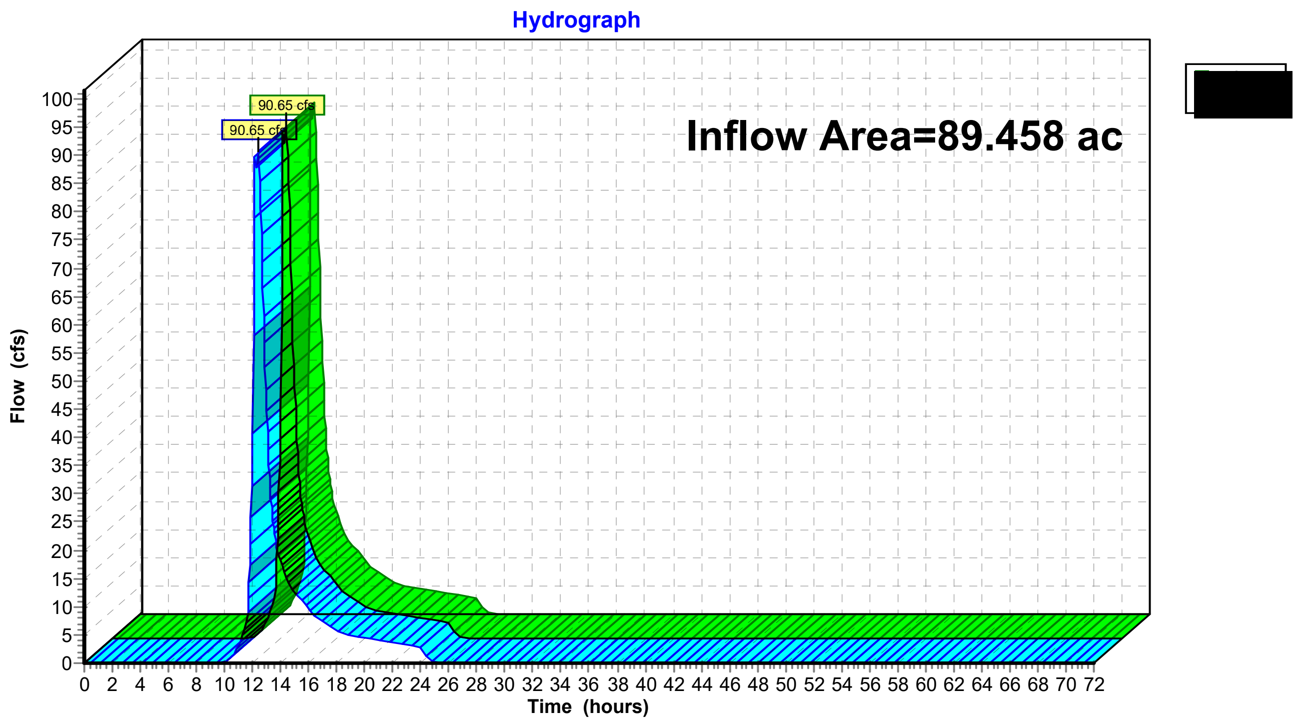
Summary for Reach DP-4: Off-Site Southeast

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 89.458 ac, 5.61% Impervious, Inflow Depth = 1.98" for 25-year event
Inflow = 90.65 cfs @ 12.43 hrs, Volume= 14.785 af
Outflow = 90.65 cfs @ 12.43 hrs, Volume= 14.785 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-4: Off-Site Southeast



Summary for Pond 1bP: Proposed Basin

Inflow Area = 3.365 ac, 28.06% Impervious, Inflow Depth = 0.85" for 25-year event
Inflow = 1.94 cfs @ 12.19 hrs, Volume= 0.237 af
Outflow = 1.22 cfs @ 12.48 hrs, Volume= 0.237 af, Atten= 37%, Lag= 17.6 min
Discarded = 1.22 cfs @ 12.48 hrs, Volume= 0.237 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 152.04' @ 12.48 hrs Surf.Area= 21,946 sf Storage= 868 cf

Plug-Flow detention time= 6.9 min calculated for 0.237 af (100% of inflow)
Center-of-Mass det. time= 6.9 min (918.6 - 911.7)

Volume	Invert	Avail.Storage	Storage Description
#1	152.00'	55,260 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

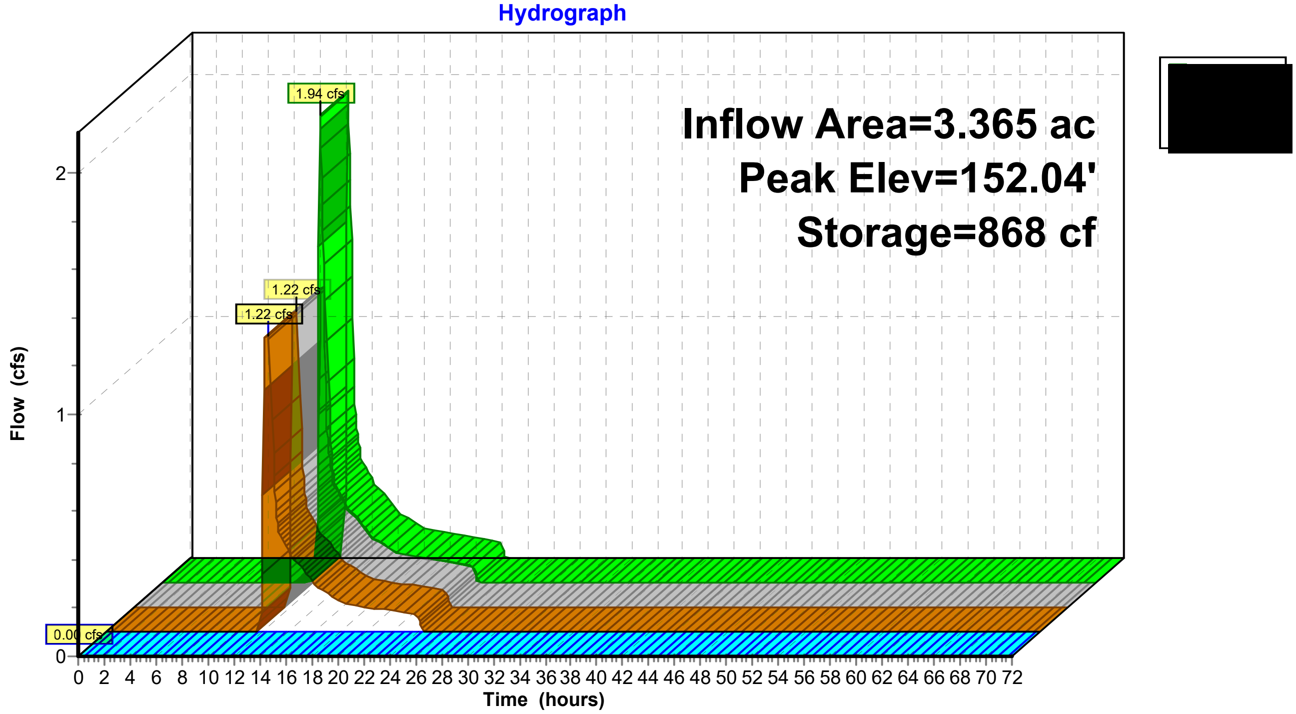
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
152.00	21,729	681.0	0	0	21,729
154.00	33,986	817.0	55,260	55,260	38,010

Device	Routing	Invert	Outlet Devices
#1	Primary	153.50'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	152.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.22 cfs @ 12.48 hrs HW=152.04' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 1.22 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=152.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1bP: Proposed Basin



Summary for Pond 1cP: Proposed Basin

Inflow Area = 9.376 ac, 8.65% Impervious, Inflow Depth = 2.68" for 25-year event
Inflow = 16.44 cfs @ 12.43 hrs, Volume= 2.093 af
Outflow = 16.00 cfs @ 12.50 hrs, Volume= 2.093 af, Atten= 3%, Lag= 4.1 min
Discarded = 0.08 cfs @ 12.50 hrs, Volume= 0.295 af
Primary = 15.91 cfs @ 12.50 hrs, Volume= 1.798 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 227.40' @ 12.50 hrs Surf.Area= 13,561 sf Storage= 13,901 cf

Plug-Flow detention time= 207.1 min calculated for 2.093 af (100% of inflow)
Center-of-Mass det. time= 207.1 min (1,065.0 - 857.9)

Volume	Invert	Avail.Storage	Storage Description
#1	226.00'	23,156 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

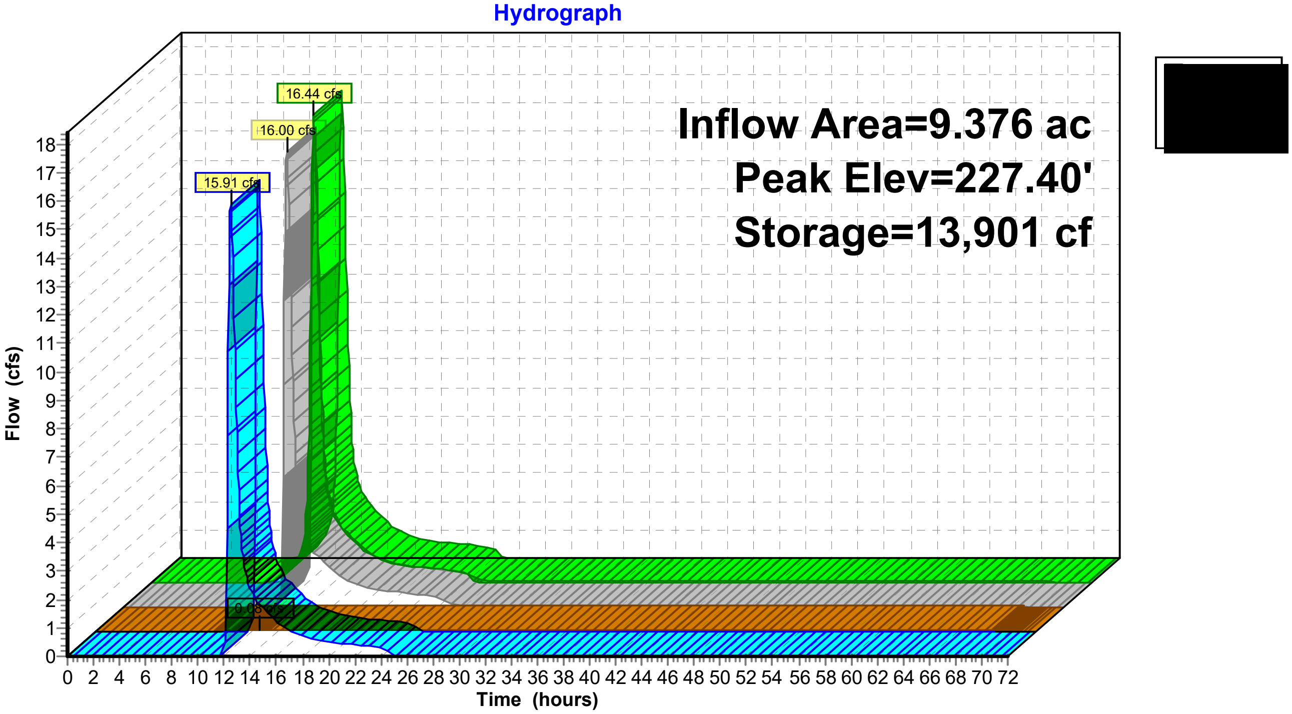
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
226.00	6,727	408.0	0	0	6,727
228.00	17,238	601.0	23,156	23,156	22,256

Device	Routing	Invert	Outlet Devices
#1	Primary	227.00'	**25.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	226.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.08 cfs @ 12.50 hrs HW=227.40' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=15.91 cfs @ 12.50 hrs HW=227.40' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 15.91 cfs @ 1.60 fps)

Pond 1cP: Proposed Basin



Summary for Pond 1dP: Proposed Berm

Inflow Area = 7.830 ac, 7.37% Impervious, Inflow Depth = 2.77" for 25-year event
Inflow = 6.92 cfs @ 13.45 hrs, Volume= 1.807 af
Outflow = 5.46 cfs @ 14.01 hrs, Volume= 1.667 af, Atten= 21%, Lag= 33.5 min
Discarded = 0.10 cfs @ 14.01 hrs, Volume= 0.453 af
Primary = 5.36 cfs @ 14.01 hrs, Volume= 1.213 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 257.88' @ 14.01 hrs Surf.Area= 16,006 sf Storage= 26,145 cf

Plug-Flow detention time= 495.6 min calculated for 1.667 af (92% of inflow)
Center-of-Mass det. time= 455.4 min (1,380.6 - 925.2)

Volume	Invert	Avail.Storage	Storage Description
#1	256.00'	28,065 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

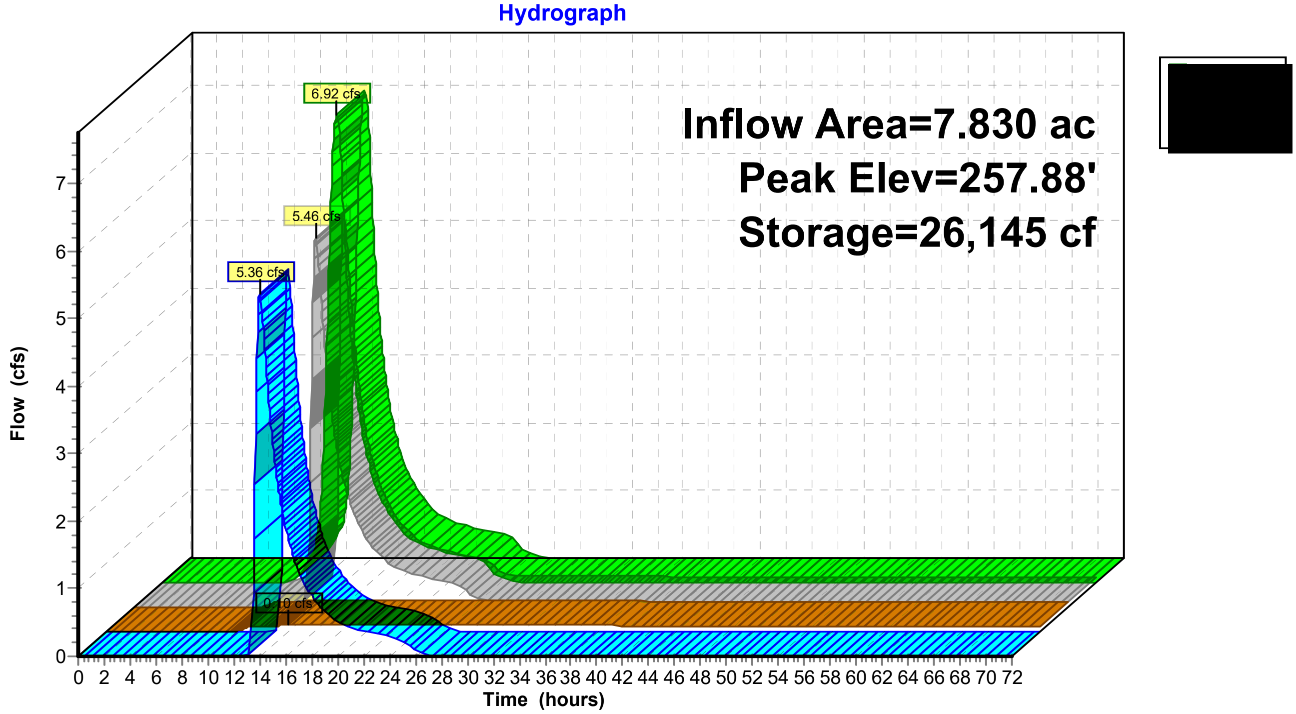
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
256.00	11,894	466.0	0	0	11,894
258.00	16,286	530.0	28,065	28,065	17,063

Device	Routing	Invert	Outlet Devices
#1	Primary	257.50'	**9.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	256.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.10 cfs @ 14.01 hrs HW=257.88' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=5.35 cfs @ 14.01 hrs HW=257.88' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 5.35 cfs @ 1.56 fps)

Pond 1dP: Proposed Berm



Summary for Pond 2P: Existing Depression

Inflow Area = 5.349 ac, 1.98% Impervious, Inflow Depth = 0.73" for 25-year event
Inflow = 2.20 cfs @ 12.26 hrs, Volume= 0.323 af
Outflow = 0.35 cfs @ 15.32 hrs, Volume= 0.323 af, Atten= 84%, Lag= 183.7 min
Discarded = 0.35 cfs @ 15.32 hrs, Volume= 0.323 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 168.44' @ 15.32 hrs Surf.Area= 14,780 sf Storage= 4,882 cf

Plug-Flow detention time= 175.3 min calculated for 0.323 af (100% of inflow)
Center-of-Mass det. time= 175.2 min (1,099.1 - 923.8)

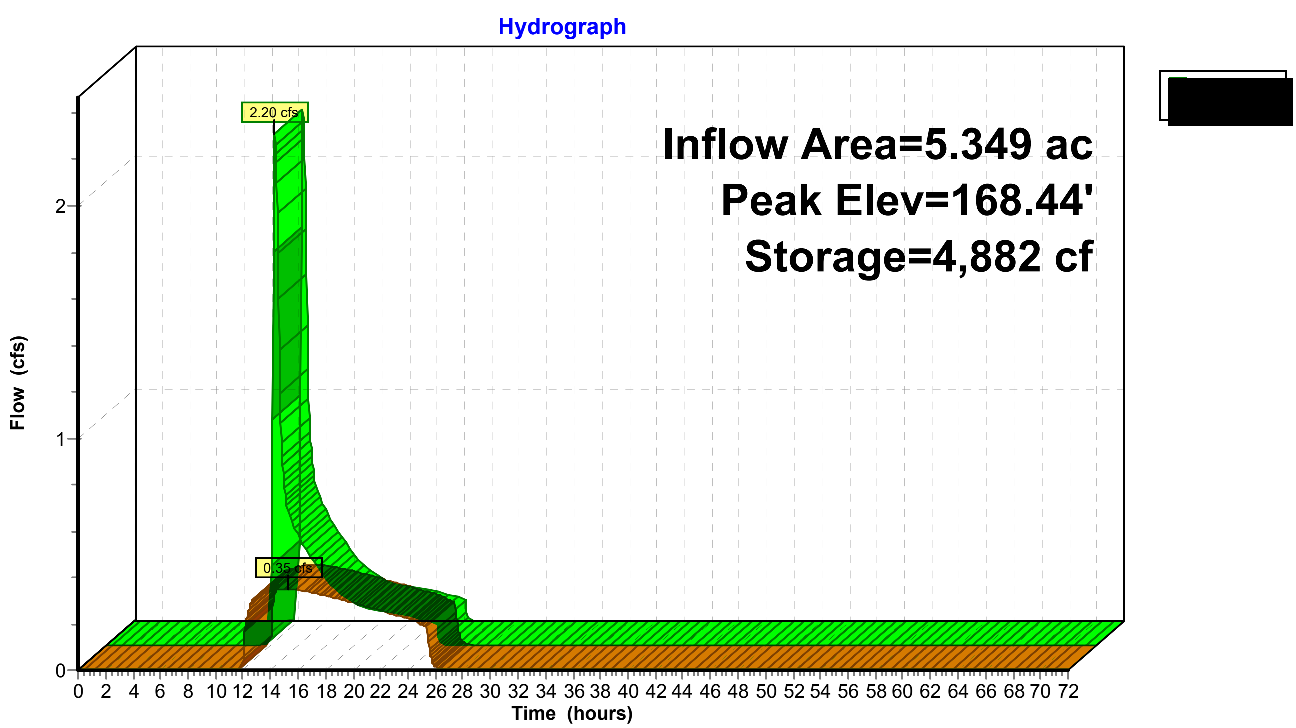
Volume	Invert	Avail.Storage	Storage Description
#1	168.00'	58,289 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
168.00	7,570	407.0	0	0	7,570
170.00	58,771	1,048.0	58,289	58,289	81,803

Device	Routing	Invert	Outlet Devices
#1	Discarded	168.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.35 cfs @ 15.32 hrs HW=168.44' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.35 cfs)

Pond 2P: Existing Depression



Summary for Pond 3aP: Proposed Berm

Inflow Area = 8.260 ac, 3.27% Impervious, Inflow Depth = 2.68" for 25-year event
Inflow = 17.62 cfs @ 12.27 hrs, Volume= 1.844 af
Outflow = 0.33 cfs @ 23.98 hrs, Volume= 1.409 af, Atten= 98%, Lag= 702.6 min
Discarded = 0.33 cfs @ 23.98 hrs, Volume= 1.409 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 273.71' @ 23.98 hrs Surf.Area= 52,433 sf Storage= 65,299 cf

Plug-Flow detention time= 1,607.0 min calculated for 1.409 af (76% of inflow)
Center-of-Mass det. time= 1,520.3 min (2,367.9 - 847.6)

Volume	Invert	Avail.Storage	Storage Description
#1	272.00'	81,503 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

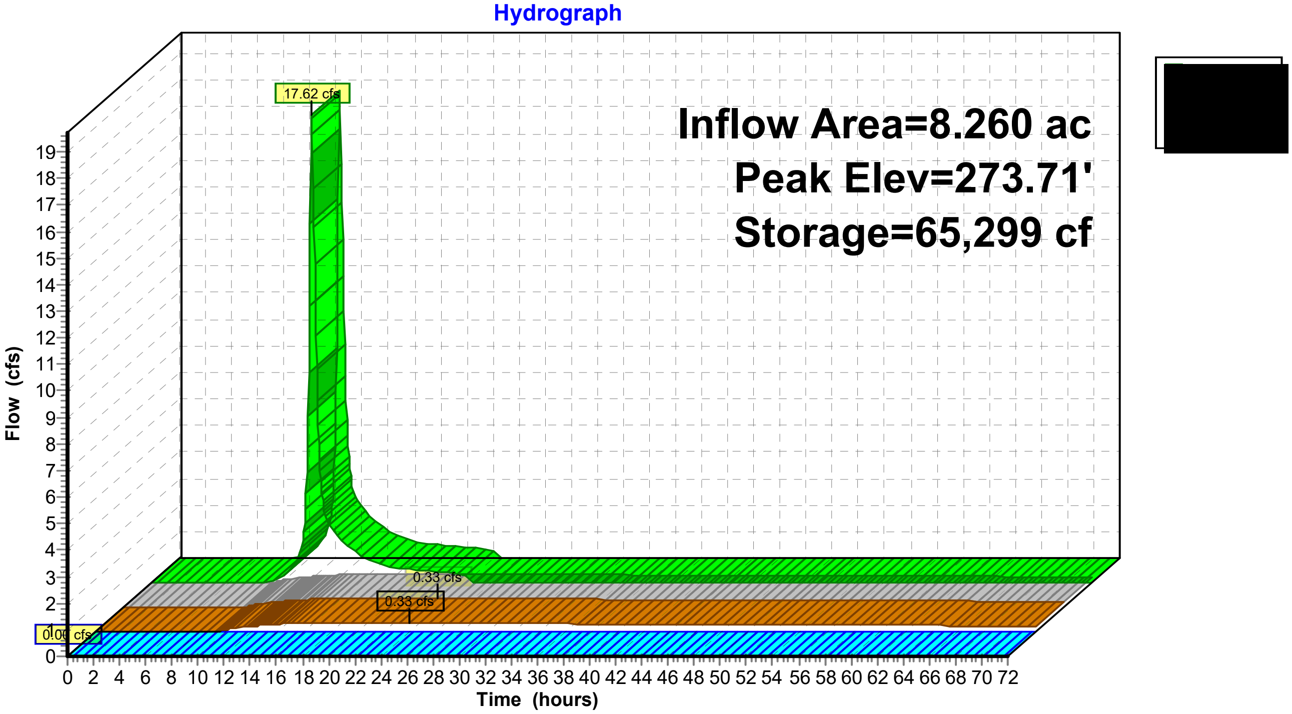
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.00	25,677	871.0	0	0	25,677
274.00	57,990	1,103.0	81,503	81,503	62,174

Device	Routing	Invert	Outlet Devices
#1	Primary	273.75'	**8.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	272.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.33 cfs @ 23.98 hrs HW=273.71' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.33 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=272.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3aP: Proposed Berm



Summary for Pond 3P: Existing Depression

Inflow Area = 31.734 ac, 4.54% Impervious, Inflow Depth = 1.79" for 25-year event
Inflow = 49.77 cfs @ 12.21 hrs, Volume= 4.723 af
Outflow = 1.42 cfs @ 19.26 hrs, Volume= 4.718 af, Atten= 97%, Lag= 422.9 min
Discarded = 1.42 cfs @ 19.26 hrs, Volume= 4.718 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 190.13' @ 19.26 hrs Surf.Area= 59,976 sf Storage= 148,647 cf

Plug-Flow detention time= 1,257.9 min calculated for 4.718 af (100% of inflow)
Center-of-Mass det. time= 1,257.3 min (2,108.0 - 850.7)

Volume	Invert	Avail.Storage	Storage Description
#1	186.00'	277,396 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

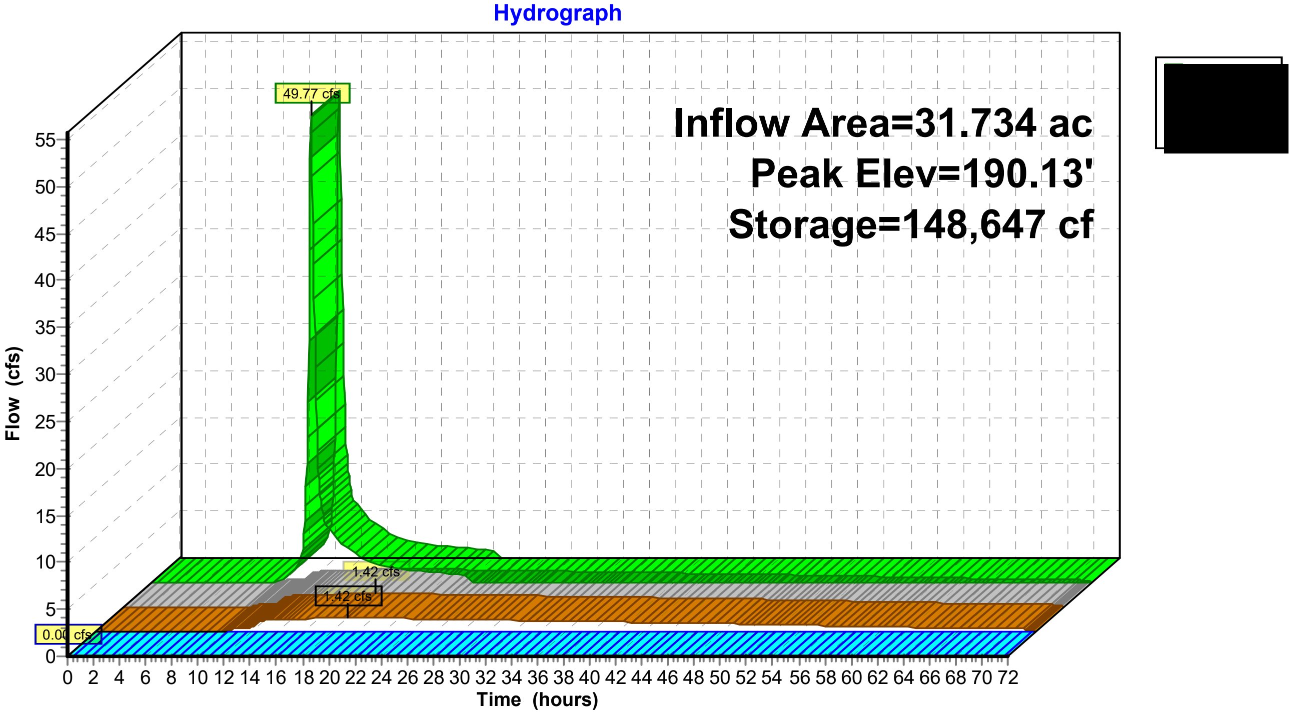
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
186.00	11,737	422.0	0	0	11,737
188.00	36,683	753.0	46,113	46,113	42,709
190.00	58,742	1,001.0	94,563	140,677	77,369
192.00	78,452	1,254.0	136,720	277,396	122,825

Device	Routing	Invert	Outlet Devices
#1	Discarded	186.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	191.00'	**64.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=1.42 cfs @ 19.26 hrs HW=190.13' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 1.42 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=186.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Existing Depression



Summary for Pond 4P: Existing Depression

Inflow Area = 16.464 ac, 0.65% Impervious, Inflow Depth = 3.43" for 25-year event
Inflow = 51.12 cfs @ 12.19 hrs, Volume= 4.708 af
Outflow = 1.31 cfs @ 18.19 hrs, Volume= 4.268 af, Atten= 97%, Lag= 360.1 min
Discarded = 1.31 cfs @ 18.19 hrs, Volume= 4.268 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 167.75' @ 18.19 hrs Surf.Area= 55,611 sf Storage= 153,551 cf

Plug-Flow detention time= 1,361.8 min calculated for 4.268 af (91% of inflow)
Center-of-Mass det. time= 1,315.6 min (2,138.0 - 822.4)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	1,773,203 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

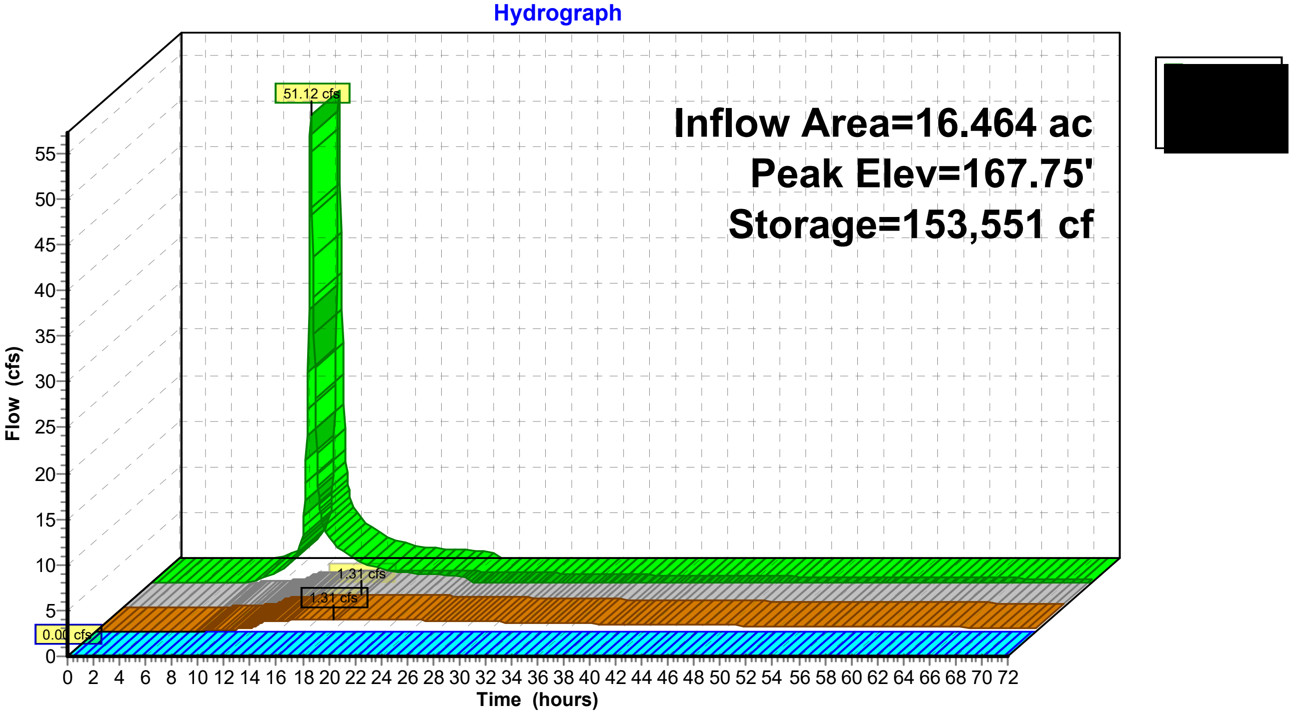
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
162.00	8,040	387.0	0	0	8,040
164.00	20,064	890.0	27,203	27,203	59,171
166.00	31,393	894.0	51,036	78,239	61,043
168.00	59,552	1,582.0	89,455	167,695	196,625
170.00	106,611	3,162.0	163,895	331,590	793,118
172.00	142,449	3,012.0	248,196	579,786	867,073
174.00	182,259	2,708.0	323,891	903,678	1,005,567
176.00	222,778	3,083.0	404,360	1,308,037	1,178,477
178.00	242,528	3,031.0	465,166	1,773,203	1,204,505

Device	Routing	Invert	Outlet Devices
#1	Discarded	162.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	177.00'	**23.0' long x 99.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=1.31 cfs @ 18.19 hrs HW=167.75' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 1.31 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=162.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: Existing Depression



Summary for Pond 5bP: Proposed Berm

Inflow Area = 1.206 ac, 64.34% Impervious, Inflow Depth = 3.73" for 25-year event
Inflow = 5.11 cfs @ 12.09 hrs, Volume= 0.375 af
Outflow = 0.33 cfs @ 13.82 hrs, Volume= 0.375 af, Atten= 93%, Lag= 103.9 min
Discarded = 0.33 cfs @ 13.82 hrs, Volume= 0.375 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 231.15' @ 13.82 hrs Surf.Area= 14,083 sf Storage= 8,626 cf

Plug-Flow detention time= 325.7 min calculated for 0.375 af (100% of inflow)
Center-of-Mass det. time= 325.8 min (1,132.6 - 806.8)

Volume	Invert	Avail.Storage	Storage Description
#1	230.00'	26,529 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

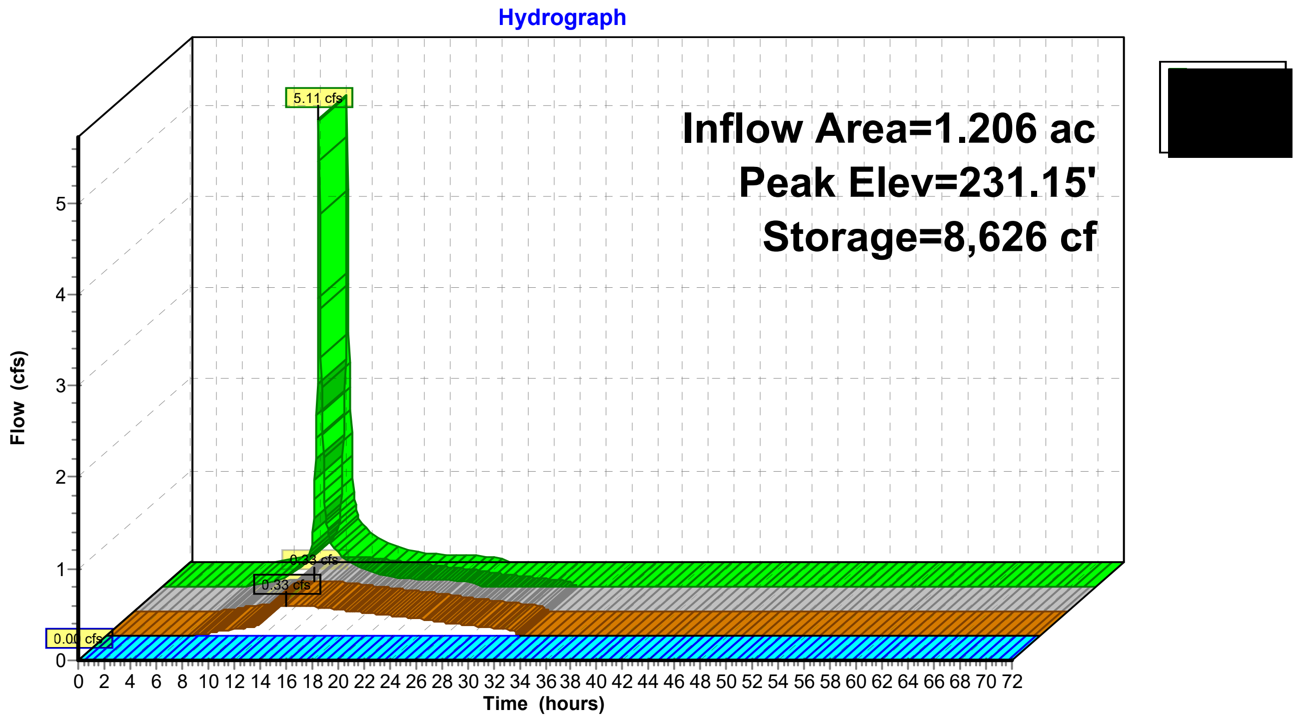
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	2,519	275.0	0	0	2,519
232.00	28,762	1,204.0	26,529	26,529	111,868

Device	Routing	Invert	Outlet Devices
#1	Discarded	230.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	231.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.33 cfs @ 13.82 hrs HW=231.15' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.33 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=230.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5bP: Proposed Berm



Summary for Pond 5cP: Proposed Berm

Inflow Area = 6.244 ac, 13.40% Impervious, Inflow Depth = 2.59" for 25-year event
Inflow = 10.75 cfs @ 12.42 hrs, Volume= 1.347 af
Outflow = 2.01 cfs @ 13.47 hrs, Volume= 0.792 af, Atten= 81%, Lag= 63.2 min
Discarded = 0.03 cfs @ 13.47 hrs, Volume= 0.116 af
Primary = 1.98 cfs @ 13.47 hrs, Volume= 0.676 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 210.59' @ 13.47 hrs Surf.Area= 12,251 sf Storage= 31,840 cf

Plug-Flow detention time= 472.3 min calculated for 0.791 af (59% of inflow)
Center-of-Mass det. time= 361.0 min (1,220.3 - 859.3)

Volume	Invert	Avail.Storage	Storage Description
#1	206.00'	37,107 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

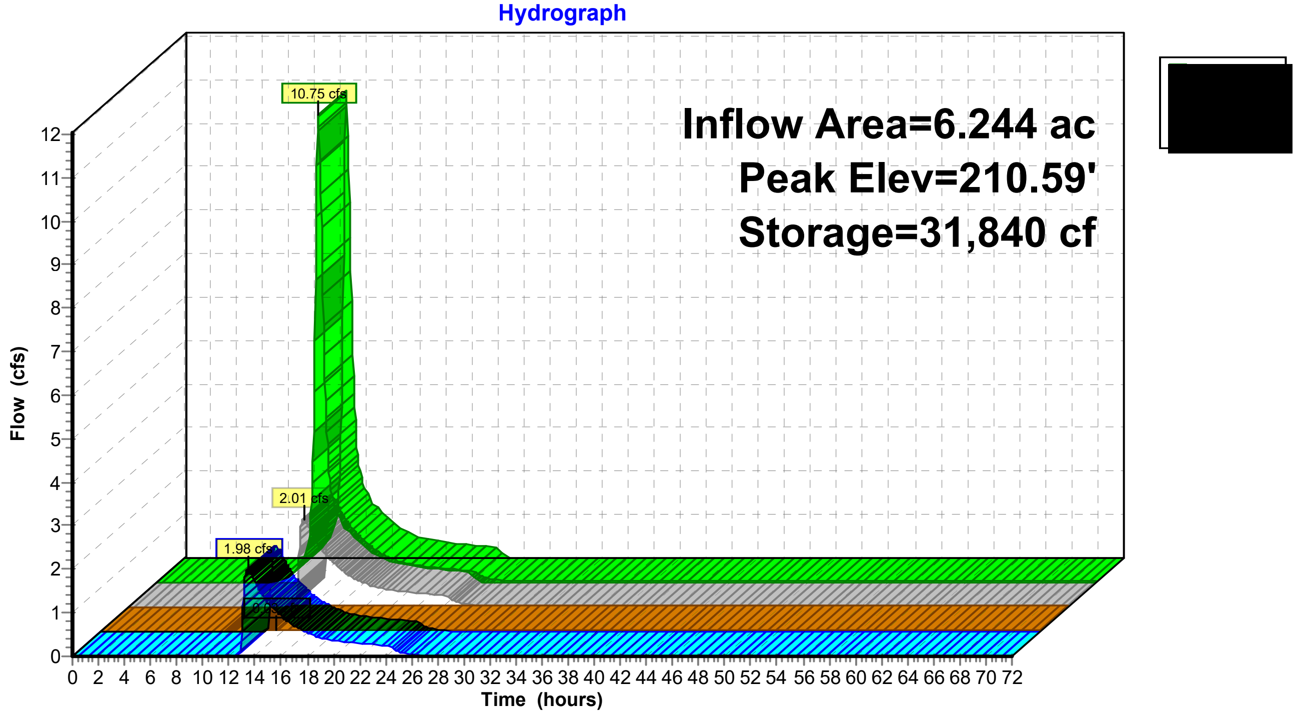
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
206.00	2,702	340.0	0	0	2,702
208.00	6,061	500.0	8,540	8,540	13,430
210.00	10,702	660.0	16,545	25,084	28,245
211.00	13,393	685.0	12,022	37,107	31,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	206.00'	**0.090 in/hr Exfiltration over Surface area**
#2	Primary	210.25'	**4.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.03 cfs @ 13.47 hrs HW=210.59' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=1.98 cfs @ 13.47 hrs HW=210.59' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 1.98 cfs @ 1.46 fps)

Pond 5cP: Proposed Berm



Summary for Pond 5dP: Proposed Berm

Inflow Area = 1.360 ac, 44.82% Impervious, Inflow Depth = 3.83" for 25-year event
Inflow = 5.32 cfs @ 12.13 hrs, Volume= 0.434 af
Outflow = 0.11 cfs @ 18.79 hrs, Volume= 0.434 af, Atten= 98%, Lag= 399.5 min
Discarded = 0.11 cfs @ 18.79 hrs, Volume= 0.434 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 284.88' @ 18.79 hrs Surf.Area= 16,830 sf Storage= 13,671 cf

Plug-Flow detention time= 1,278.1 min calculated for 0.434 af (100% of inflow)
Center-of-Mass det. time= 1,278.0 min (2,084.7 - 806.8)

Volume	Invert	Avail.Storage	Storage Description
#1	284.00'	34,488 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

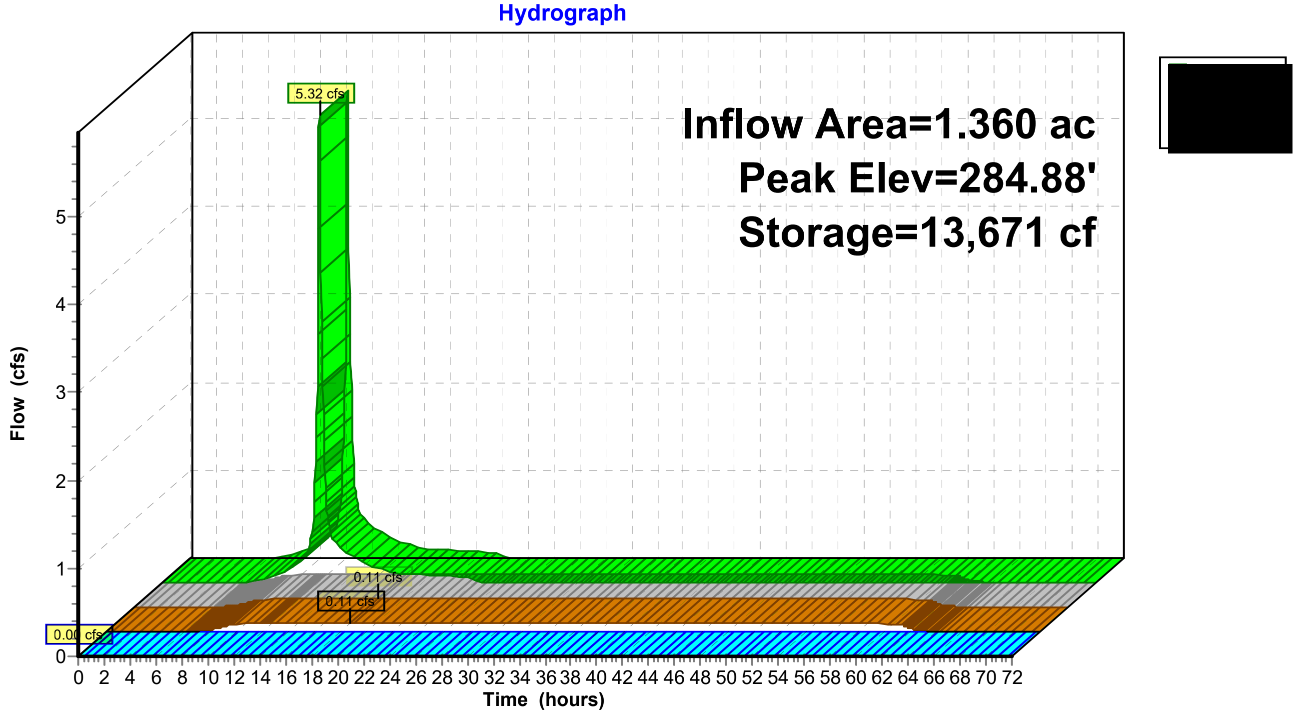
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
284.00	14,216	751.0	0	0	14,216
286.00	20,461	810.0	34,488	34,488	21,709

Device	Routing	Invert	Outlet Devices
#1	Discarded	284.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	285.00'	**8.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.11 cfs @ 18.79 hrs HW=284.88' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=284.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5dP: Proposed Berm



Summary for Pond 5P: Existing Depression

Inflow Area = 68.434 ac, 25.36% Impervious, Inflow Depth = 2.07" for 25-year event
Inflow = 67.96 cfs @ 12.70 hrs, Volume= 11.788 af
Outflow = 64.02 cfs @ 12.84 hrs, Volume= 10.196 af, Atten= 6%, Lag= 8.8 min
Discarded = 0.25 cfs @ 12.84 hrs, Volume= 1.090 af
Primary = 63.76 cfs @ 12.84 hrs, Volume= 9.107 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 167.73' @ 12.84 hrs Surf.Area= 40,492 sf Storage= 123,173 cf

Plug-Flow detention time= 264.9 min calculated for 10.196 af (86% of inflow)
Center-of-Mass det. time= 203.2 min (1,088.7 - 885.5)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	134,374 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

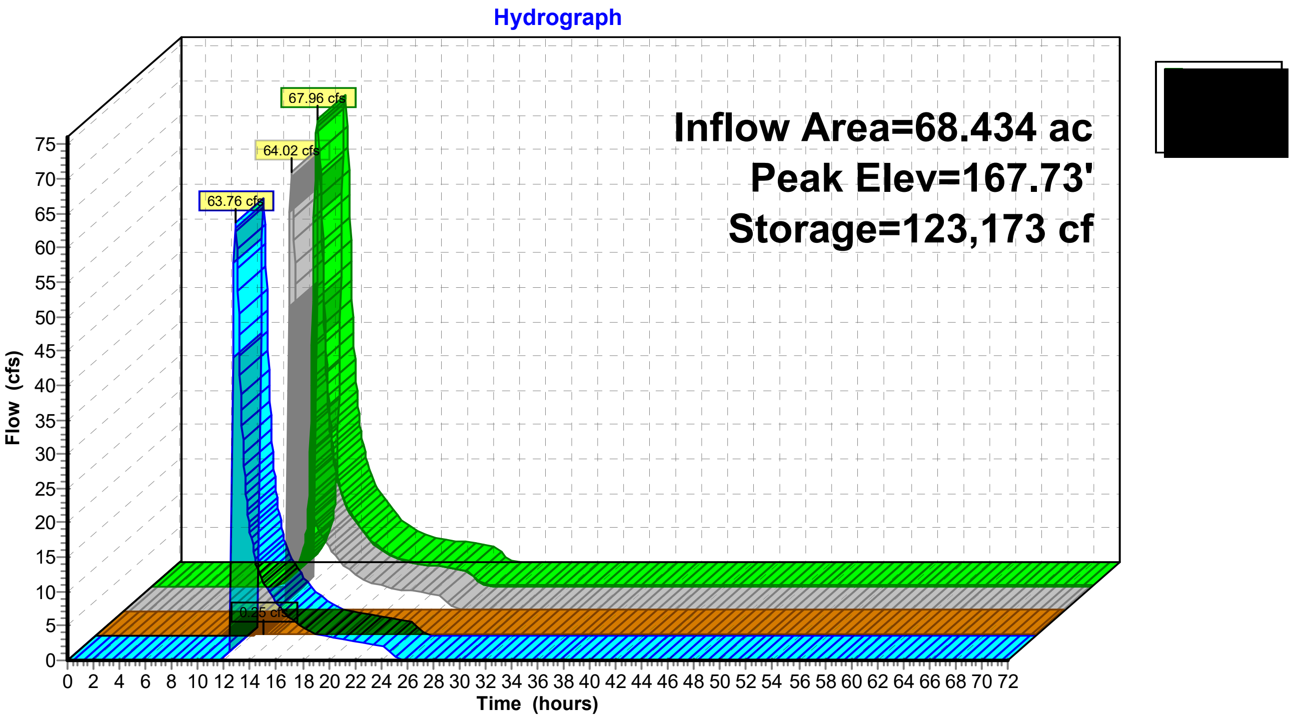
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
162.00	1,686	164.0	0	0	1,686
164.00	17,454	653.0	16,376	16,376	33,489
166.00	29,548	840.0	46,474	62,851	55,756
168.00	42,358	938.0	71,523	134,374	69,736

Device	Routing	Invert	Outlet Devices
#1	Discarded	162.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	167.25'	**71.0' long x 38.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.25 cfs @ 12.84 hrs HW=167.73' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=63.54 cfs @ 12.84 hrs HW=167.73' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 63.54 cfs @ 1.87 fps)

Pond 5P: Existing Depression



Summary for Pond 6bP: Proposed Berm

Inflow Area = 10.770 ac, 17.08% Impervious, Inflow Depth = 0.78" for 25-year event
Inflow = 4.47 cfs @ 12.39 hrs, Volume= 0.704 af
Outflow = 1.41 cfs @ 13.19 hrs, Volume= 0.704 af, Atten= 69%, Lag= 48.2 min
Discarded = 1.41 cfs @ 13.19 hrs, Volume= 0.704 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 164.27' @ 13.19 hrs Surf.Area= 25,219 sf Storage= 6,088 cf

Plug-Flow detention time= 36.0 min calculated for 0.703 af (100% of inflow)
Center-of-Mass det. time= 36.0 min (961.6 - 925.6)

Volume	Invert	Avail.Storage	Storage Description
#1	164.00'	83,016 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

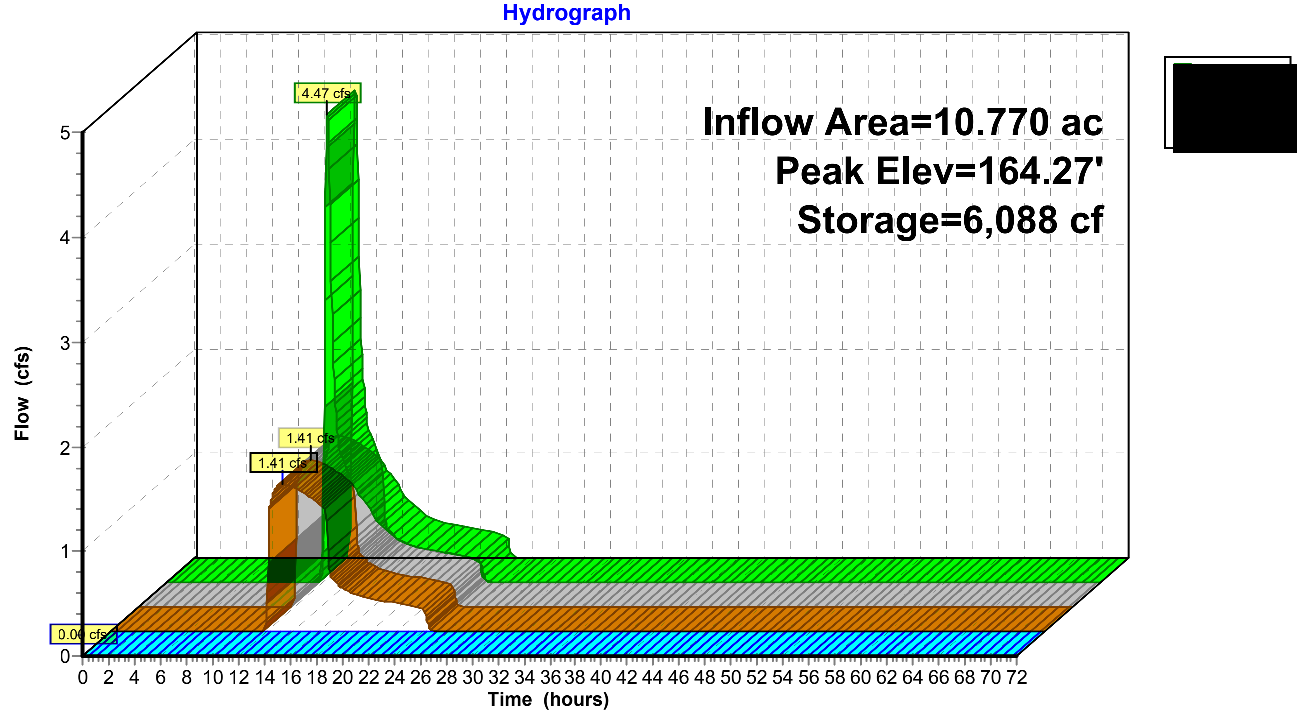
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
164.00	20,590	712.0	0	0	20,590
166.00	66,837	1,639.0	83,016	83,016	194,035

Device	Routing	Invert	Outlet Devices
#1	Primary	165.00'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	164.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.41 cfs @ 13.19 hrs HW=164.27' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 1.41 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=164.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 6bP: Proposed Berm



Summary for Pond 6P: Existing Wetland

Inflow Area = 116.133 ac, 25.36% Impervious, Inflow Depth = 1.36" for 25-year event
Inflow = 76.26 cfs @ 12.84 hrs, Volume= 13.174 af
Outflow = 30.20 cfs @ 13.72 hrs, Volume= 9.963 af, Atten= 60%, Lag= 52.6 min
Discarded = 0.46 cfs @ 13.72 hrs, Volume= 2.072 af
Primary = 29.75 cfs @ 13.72 hrs, Volume= 7.891 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 141.20' @ 13.72 hrs Surf.Area= 115,708 sf Storage= 231,206 cf

Plug-Flow detention time= 490.9 min calculated for 9.956 af (76% of inflow)
Center-of-Mass det. time= 400.0 min (1,316.2 - 916.2)

Volume	Invert	Avail.Storage	Storage Description
#1	138.00'	330,471 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

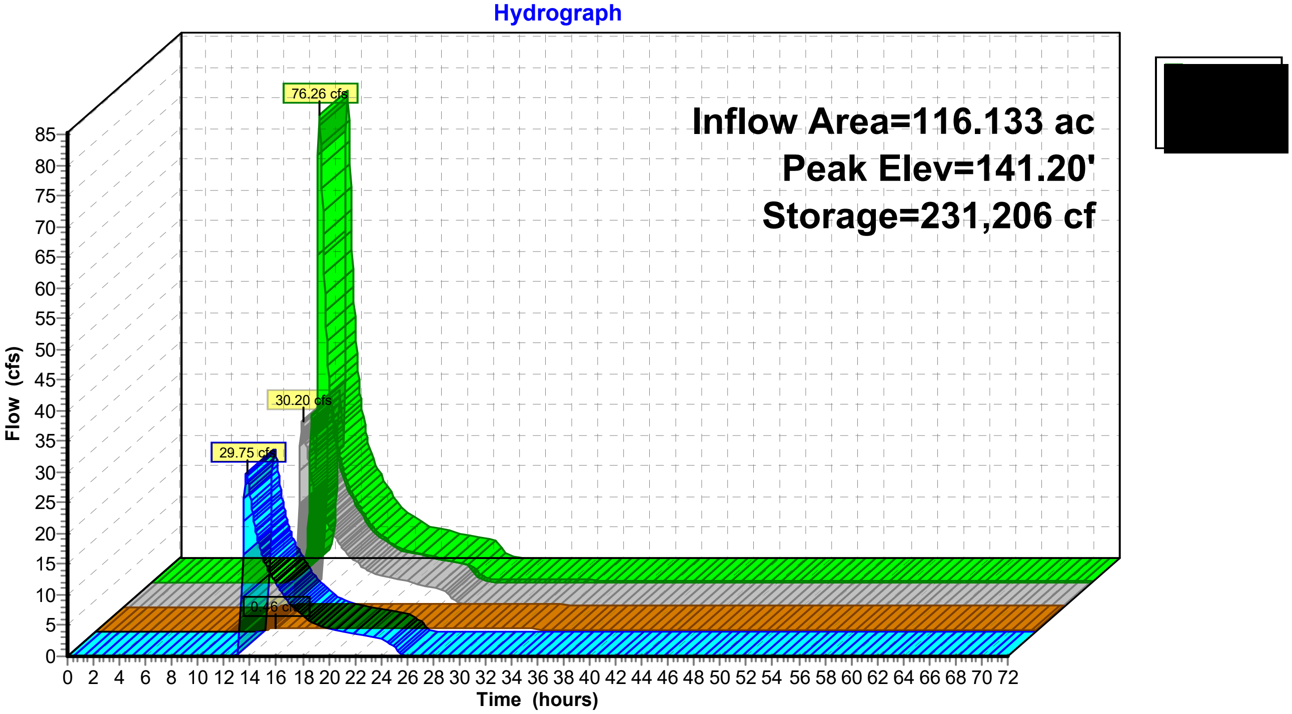
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
138.00	23,460	686.0	0	0	23,460
140.00	91,023	1,816.0	107,129	107,129	248,460
142.00	133,681	2,277.0	223,342	330,471	398,668

Device	Routing	Invert	Outlet Devices
#1	Discarded	138.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	141.00'	**121.0' long x 19.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.46 cfs @ 13.72 hrs HW=141.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.46 cfs)

Primary OutFlow Max=29.66 cfs @ 13.72 hrs HW=141.20' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 29.66 cfs @ 1.21 fps)

Pond 6P: Existing Wetland



Summary for Pond 7aP: Proposed Berm

Inflow Area =	6.064 ac,	2.54% Impervious,	Inflow Depth = 0.23"	for 25-year event
Inflow =	0.19 cfs @	15.13 hrs, Volume=	0.116 af	
Outflow =	0.06 cfs @	24.70 hrs, Volume=	0.116 af,	Atten= 69%, Lag= 574.2 min
Discarded =	0.06 cfs @	24.70 hrs, Volume=	0.116 af	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 166.37' @ 24.70 hrs Surf.Area= 9,406 sf Storage= 2,724 cf

Plug-Flow detention time= 527.5 min calculated for 0.116 af (100% of inflow)
Center-of-Mass det. time= 527.1 min (1,616.7 - 1,089.6)

Volume	Invert	Avail.Storage	Storage Description
#1	166.00'	38,794 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

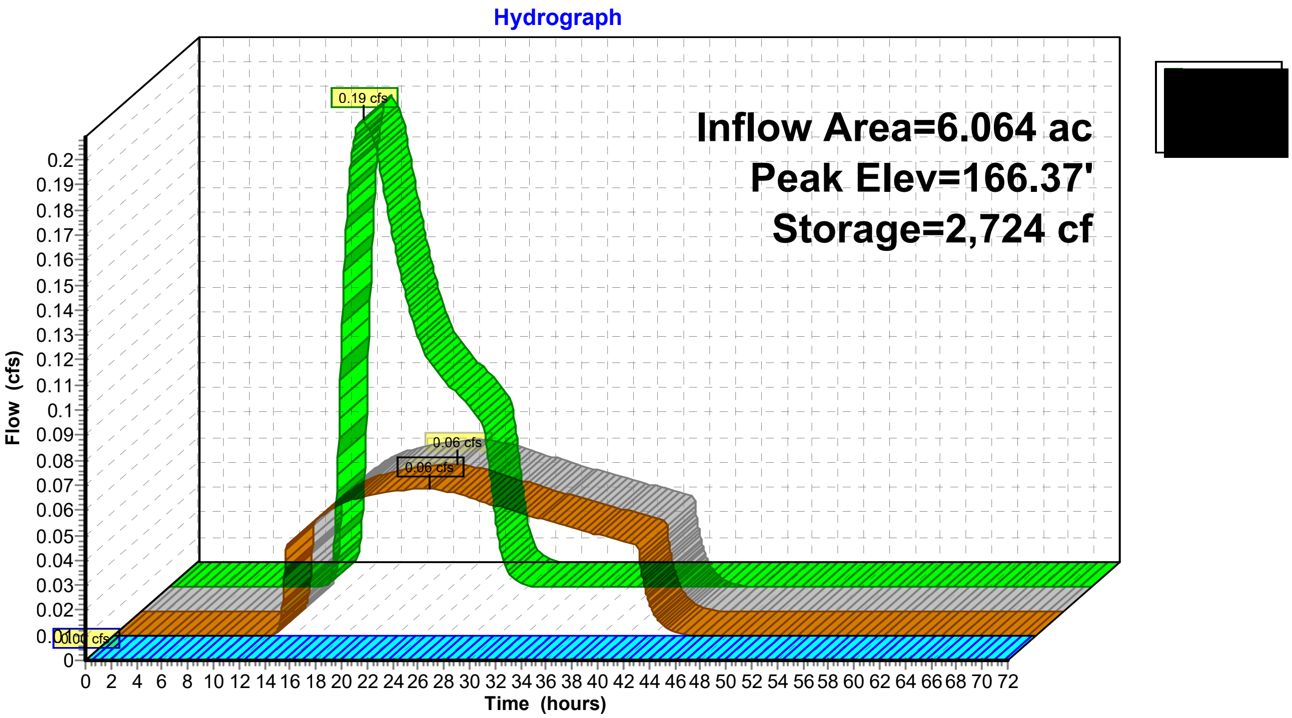
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
166.00	5,638	286.0	0	0	5,638
168.00	37,929	753.0	38,794	38,794	44,264

Device	Routing	Invert	Outlet Devices
#1	Primary	167.50'	**8.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	166.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.06 cfs @ 24.70 hrs HW=166.37' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=166.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 7aP: Proposed Berm



Summary for Pond 7P: Existing Depression

Inflow Area = 78.568 ac, 13.71% Impervious, Inflow Depth = 0.72" for 25-year event
Inflow = 13.40 cfs @ 13.65 hrs, Volume= 4.739 af
Outflow = 12.25 cfs @ 14.00 hrs, Volume= 4.739 af, Atten= 9%, Lag= 21.1 min
Discarded = 1.34 cfs @ 14.00 hrs, Volume= 1.792 af
Primary = 10.91 cfs @ 14.00 hrs, Volume= 2.947 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 147.94' @ 14.00 hrs Surf.Area= 24,023 sf Storage= 30,870 cf

Plug-Flow detention time= 111.9 min calculated for 4.739 af (100% of inflow)
Center-of-Mass det. time= 111.9 min (1,112.0 - 1,000.1)

Volume	Invert	Avail.Storage	Storage Description
#1	146.00'	32,409 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

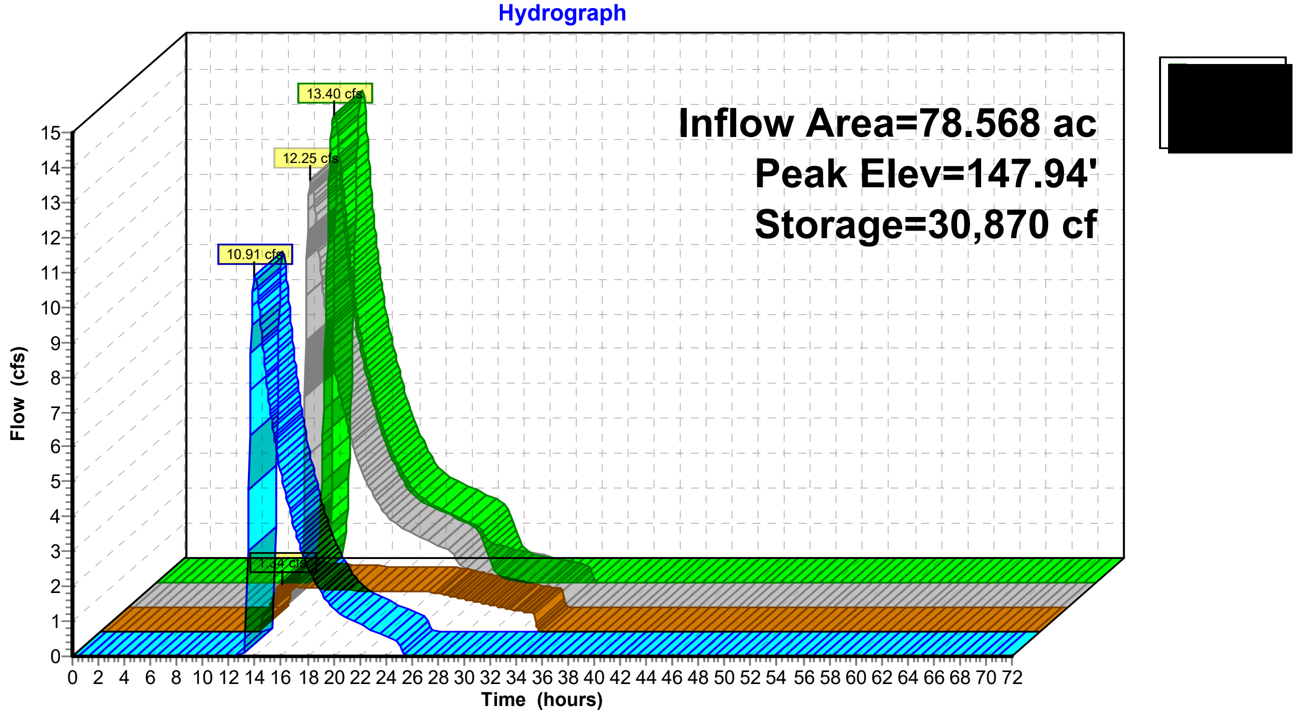
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
146.00	9,050	771.0	0	0	9,050
148.00	24,633	1,236.0	32,409	32,409	83,343

Device	Routing	Invert	Outlet Devices
#1	Primary	147.50'	**14.0' long x 90.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	146.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.34 cfs @ 14.00 hrs HW=147.94' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 1.34 cfs)

Primary OutFlow Max=10.91 cfs @ 14.00 hrs HW=147.94' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 10.91 cfs @ 1.78 fps)

Pond 7P: Existing Depression



Summary for Pond 8P: Existing Wetland

Inflow Area = 8.135 ac, 26.48% Impervious, Inflow Depth = 3.24" for 25-year event
Inflow = 19.35 cfs @ 12.33 hrs, Volume= 2.194 af
Outflow = 0.23 cfs @ 24.27 hrs, Volume= 0.997 af, Atten= 99%, Lag= 716.7 min
Discarded = 0.23 cfs @ 24.27 hrs, Volume= 0.997 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 231.36' @ 24.27 hrs Surf.Area= 59,201 sf Storage= 85,720 cf

Plug-Flow detention time= 1,701.7 min calculated for 0.997 af (45% of inflow)
Center-of-Mass det. time= 1,582.7 min (2,419.3 - 836.7)

Volume	Invert	Avail.Storage	Storage Description
#1	228.00'	130,034 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

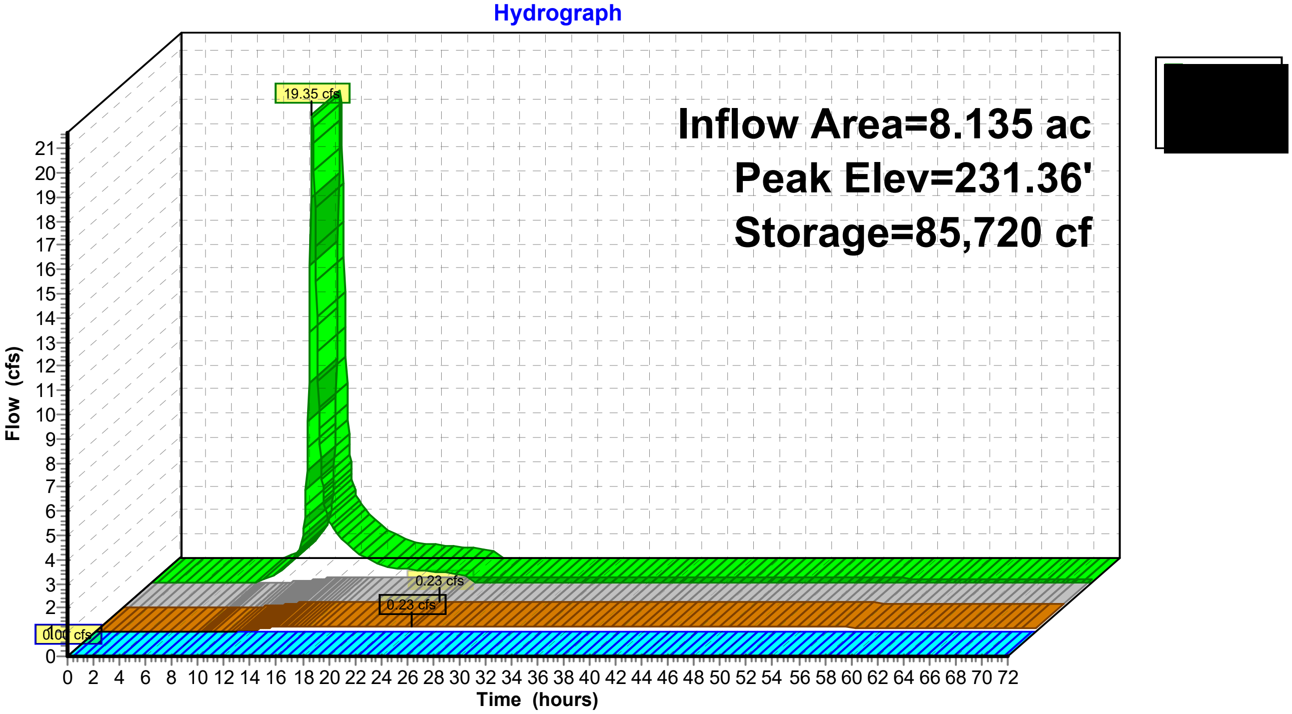
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
228.00	5,806	459.0	0	0	5,806
230.00	25,974	862.0	29,374	29,374	48,191
232.00	79,559	1,189.0	100,661	130,034	101,601

Device	Routing	Invert	Outlet Devices
#1	Discarded	228.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	231.50'	**158.0' long x 196.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.23 cfs @ 24.27 hrs HW=231.36' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=228.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 8P: Existing Wetland



Summary for Pond 9P: Existing Wetland

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

Inflow Area = 83.043 ac, 27.18% Impervious, Inflow Depth = 1.71" for 25-year event
Inflow = 70.45 cfs @ 12.83 hrs, Volume= 11.838 af
Outflow = 70.47 cfs @ 12.84 hrs, Volume= 11.838 af, Atten= 0%, Lag= 1.0 min
Discarded = 0.02 cfs @ 12.84 hrs, Volume= 0.012 af
Primary = 70.45 cfs @ 12.84 hrs, Volume= 11.826 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 148.91' @ 12.84 hrs Surf.Area= 4,711 sf Storage= 3,026 cf

Plug-Flow detention time= 0.9 min calculated for 11.838 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (912.0 - 911.1)

Volume	Invert	Avail.Storage	Storage Description
#1	148.00'	834,530 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

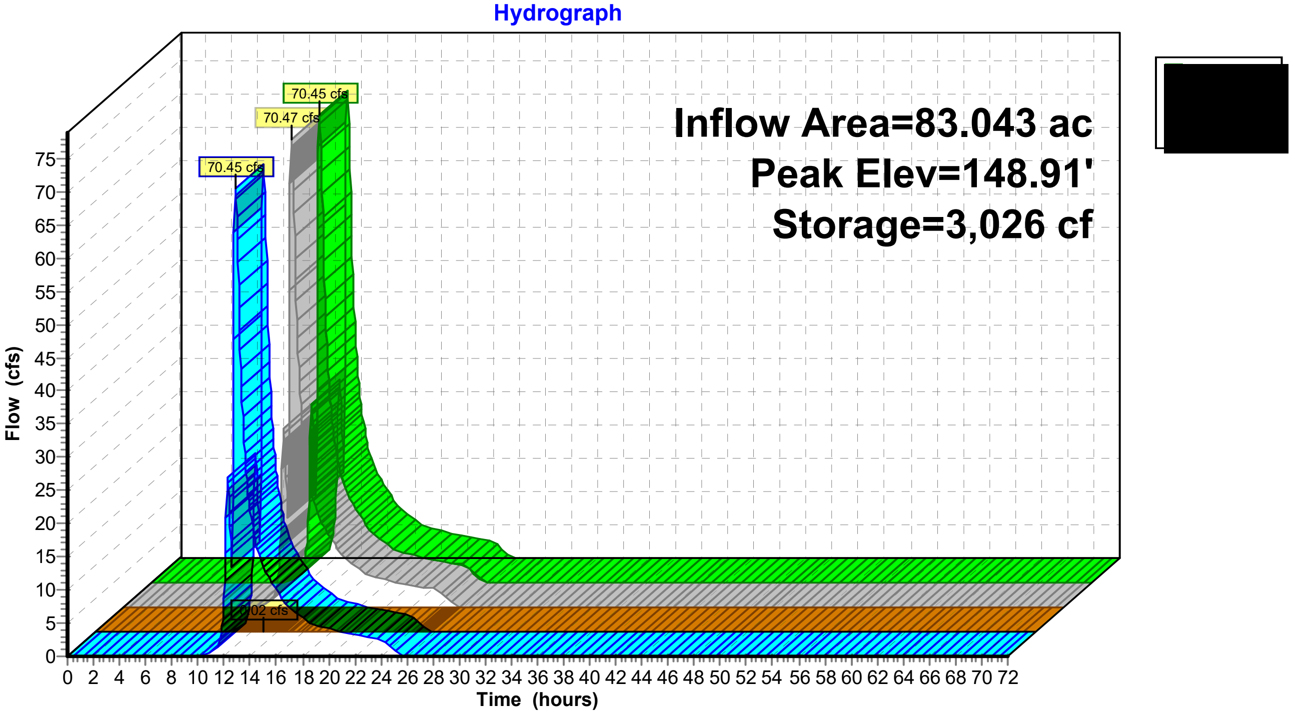
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
148.00	2,138	180.0	0	0	2,138
150.00	9,156	387.0	10,479	10,479	11,495
152.00	135,719	2,199.0	120,084	130,563	384,391
154.00	178,250	2,327.0	313,004	443,567	430,714
156.00	213,235	2,588.0	390,963	834,530	532,915

Device	Routing	Invert	Outlet Devices
#1	Discarded	148.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	148.00'	**31.0' long x 49.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.02 cfs @ 12.84 hrs HW=148.90' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=70.27 cfs @ 12.84 hrs HW=148.90' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 70.27 cfs @ 2.51 fps)

Pond 9P: Existing Wetland



Summary for Pond 10aP: Proposed Berm

Inflow Area = 5.867 ac, 13.96% Impervious, Inflow Depth = 2.68" for 25-year event
Inflow = 12.76 cfs @ 12.33 hrs, Volume= 1.310 af
Outflow = 0.59 cfs @ 16.93 hrs, Volume= 1.310 af, Atten= 95%, Lag= 276.0 min
Discarded = 0.59 cfs @ 16.93 hrs, Volume= 1.310 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 213.39' @ 16.93 hrs Surf.Area= 25,122 sf Storage= 37,571 cf

Plug-Flow detention time= 850.9 min calculated for 1.309 af (100% of inflow)
Center-of-Mass det. time= 851.8 min (1,705.7 - 853.9)

Volume	Invert	Avail.Storage	Storage Description
#1	210.00'	55,040 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

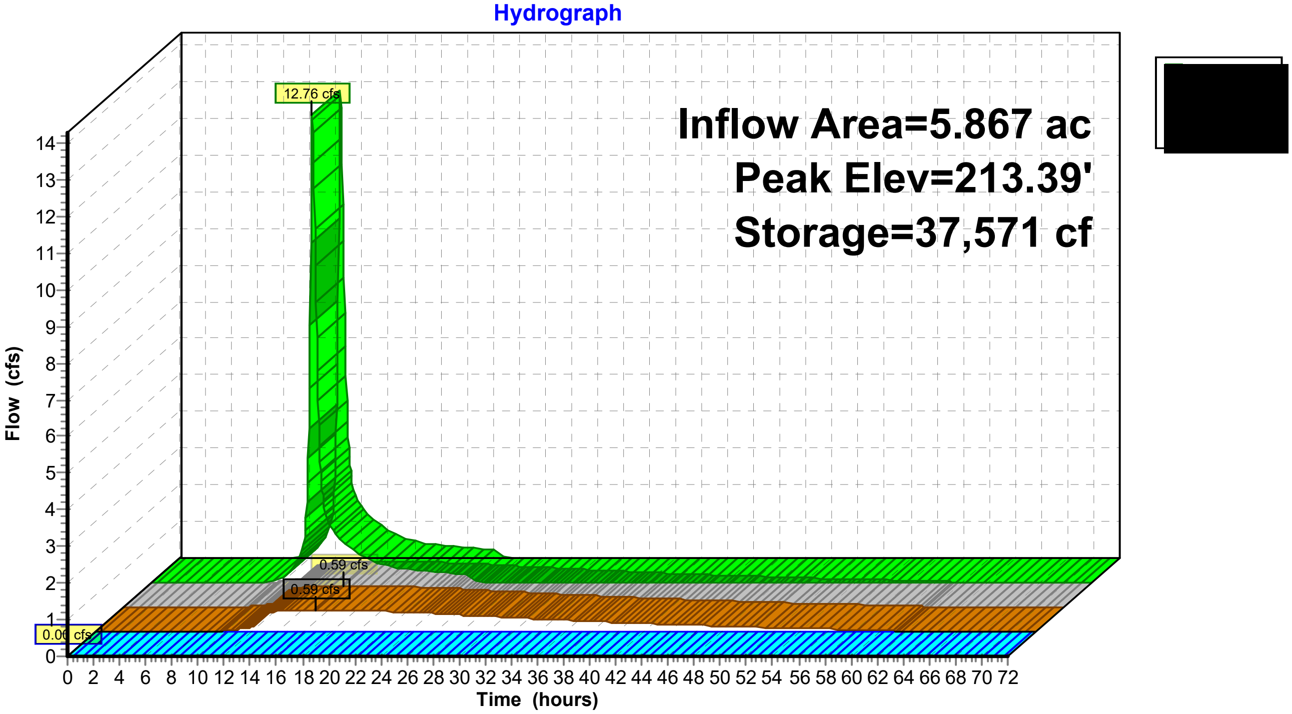
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.00	1,713	254.0	0	0	1,713
212.00	12,100	654.0	12,244	12,244	30,630
214.00	32,319	899.0	42,796	55,040	60,948

Device	Routing	Invert	Outlet Devices
#1	Discarded	210.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	213.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.59 cfs @ 16.93 hrs HW=213.39' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.59 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=210.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 10aP: Proposed Berm



Summary for Pond 11bP: Proposed Berm

Inflow Area =	5.376 ac,	1.97% Impervious,	Inflow Depth = 1.76"	for 25-year event	
Inflow =	7.57 cfs @	12.24 hrs,	Volume=	0.787 af	
Outflow =	1.56 cfs @	13.00 hrs,	Volume=	0.787 af,	Atten= 79%, Lag= 45.1 min
Discarded =	1.56 cfs @	13.00 hrs,	Volume=	0.787 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 220.39' @ 13.00 hrs Surf.Area= 27,994 sf Storage= 10,292 cf

Plug-Flow detention time= 54.5 min calculated for 0.786 af (100% of inflow)
Center-of-Mass det. time= 54.5 min (927.0 - 872.5)

Volume	Invert	Avail.Storage	Storage Description
#1	220.00'	66,163 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

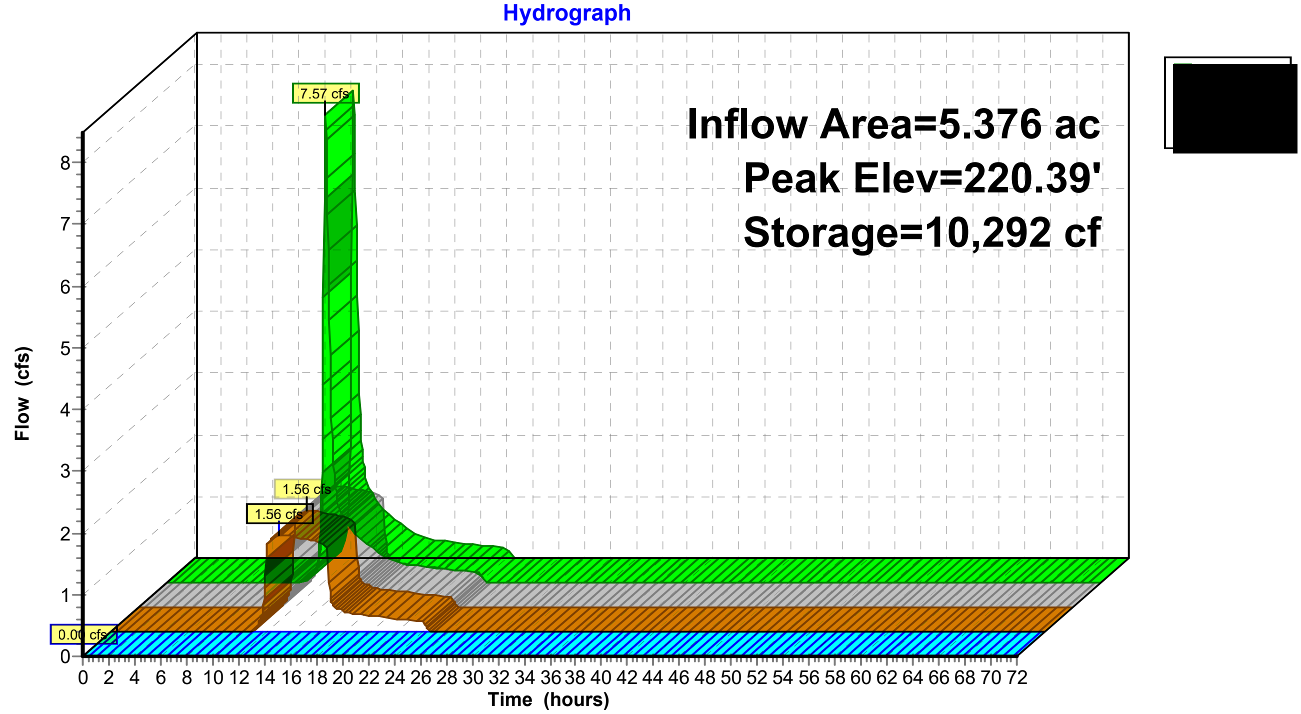
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
220.00	25,086	664.0	0	0	25,086
222.00	41,783	802.0	66,163	66,163	41,252

Device	Routing	Invert	Outlet Devices
#1	Primary	221.00'	**30.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	220.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.56 cfs @ 13.00 hrs HW=220.39' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 1.56 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=220.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 11bP: Proposed Berm



Summary for Pond 11cP: Proposed Berm

Inflow Area = 4.381 ac, 1.10% Impervious, Inflow Depth = 2.08" for 25-year event
Inflow = 7.98 cfs @ 12.21 hrs, Volume= 0.758 af
Outflow = 0.74 cfs @ 14.37 hrs, Volume= 0.758 af, Atten= 91%, Lag= 129.7 min
Discarded = 0.74 cfs @ 14.37 hrs, Volume= 0.758 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 223.33' @ 14.37 hrs Surf.Area= 13,259 sf Storage= 14,814 cf

Plug-Flow detention time= 223.7 min calculated for 0.758 af (100% of inflow)
Center-of-Mass det. time= 223.6 min (1,083.6 - 860.0)

Volume	Invert	Avail.Storage	Storage Description
#1	222.00'	24,481 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

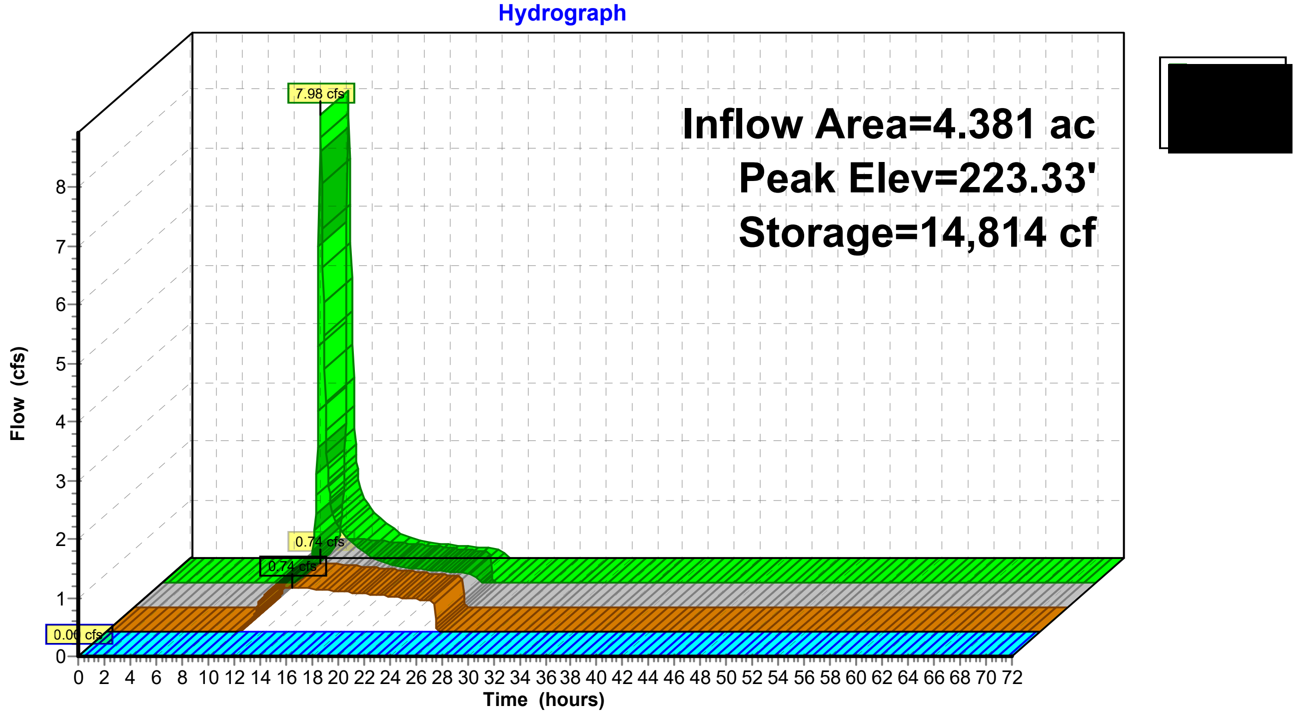
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
222.00	9,148	421.0	0	0	9,148
224.00	15,620	537.0	24,481	24,481	18,043

Device	Routing	Invert	Outlet Devices
#1	Primary	223.75'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	222.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.74 cfs @ 14.37 hrs HW=223.33' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.74 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=222.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 11cP: Proposed Berm



Summary for Pond 12bP: Proposed Berm

[62] Hint: Exceeded Reach 12bR OUTLET depth by 0.17' @ 13.25 hrs

Inflow Area = 11.115 ac, 7.70% Impervious, Inflow Depth = 2.77" for 25-year event
Inflow = 26.24 cfs @ 12.31 hrs, Volume= 2.565 af
Outflow = 4.71 cfs @ 13.05 hrs, Volume= 2.036 af, Atten= 82%, Lag= 44.8 min
Discarded = 0.16 cfs @ 13.05 hrs, Volume= 0.712 af
Primary = 4.56 cfs @ 13.05 hrs, Volume= 1.324 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 253.44' @ 13.05 hrs Surf.Area= 25,062 sf Storage= 56,575 cf

Plug-Flow detention time= 713.5 min calculated for 2.035 af (79% of inflow)
Center-of-Mass det. time= 634.3 min (1,484.6 - 850.3)

Volume	Invert	Avail.Storage	Storage Description
#1	250.00'	71,013 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

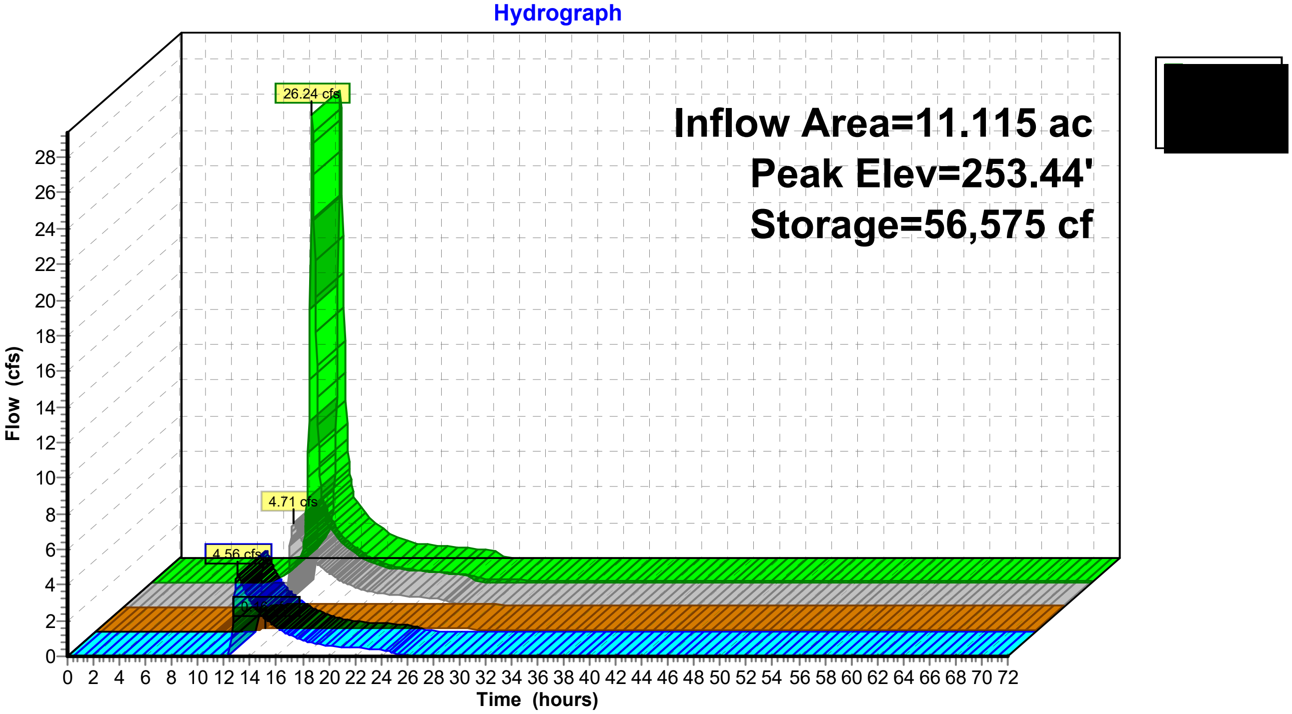
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
250.00	4,608	359.0	0	0	4,608
252.00	20,843	719.0	23,501	23,501	35,509
254.00	26,794	769.0	47,513	71,013	41,614

Device	Routing	Invert	Outlet Devices
#1	Primary	253.00'	**6.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	250.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.16 cfs @ 13.05 hrs HW=253.44' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=4.55 cfs @ 13.05 hrs HW=253.44' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 4.55 cfs @ 1.71 fps)

Pond 12bP: Proposed Berm



Summary for Pond 12cP: Proposed Berm

Inflow Area =	3.285 ac,	8.38% Impervious, Inflow Depth = 2.86"	for 25-year event	
Inflow =	10.80 cfs @	12.09 hrs, Volume=	0.783 af	
Outflow =	0.28 cfs @	17.54 hrs, Volume=	0.423 af,	Atten= 97%, Lag= 326.8 min
Discarded =	0.07 cfs @	17.54 hrs, Volume=	0.328 af	
Primary =	0.21 cfs @	17.54 hrs, Volume=	0.095 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 253.83' @ 17.54 hrs Surf.Area= 11,579 sf Storage= 27,279 cf

Plug-Flow detention time= 1,430.4 min calculated for 0.423 af (54% of inflow)
Center-of-Mass det. time= 1,315.8 min (2,146.2 - 830.4)

Volume	Invert	Avail.Storage	Storage Description
#1	250.00'	29,339 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

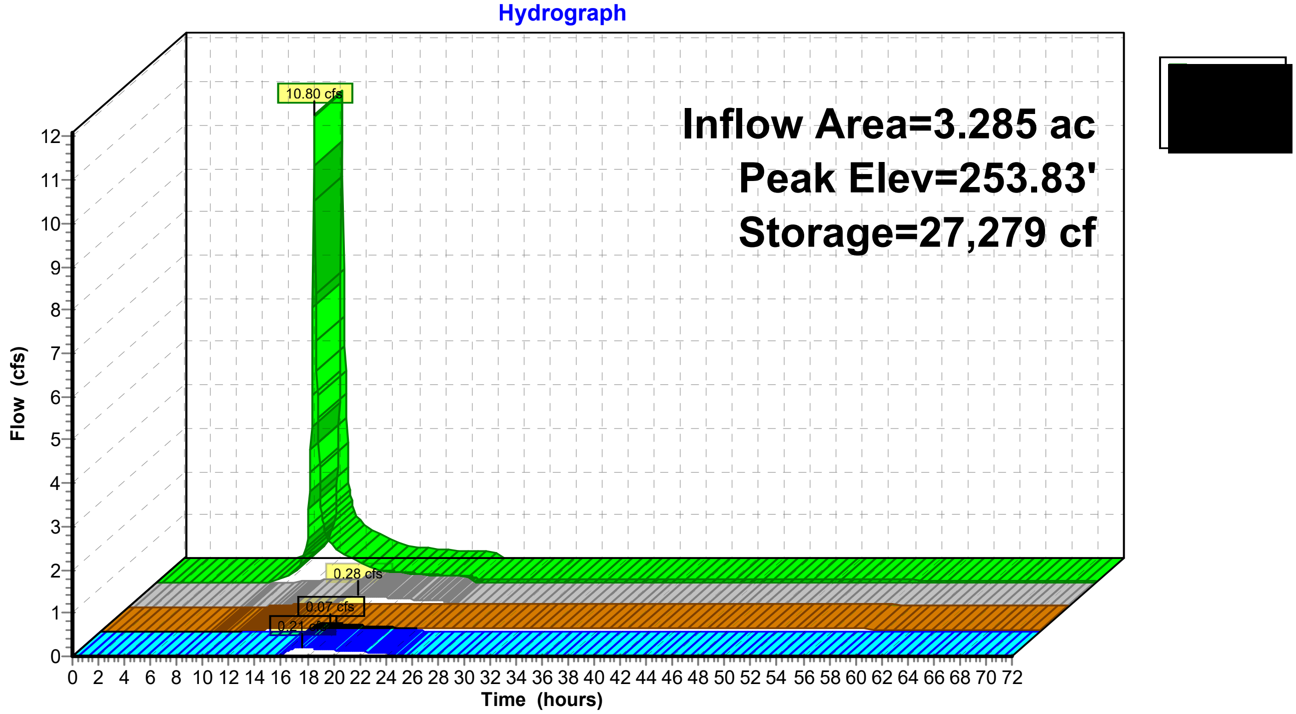
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
250.00	2,632	234.0	0	0	2,632
252.00	7,654	458.0	9,850	9,850	14,987
254.00	11,997	575.0	19,489	29,339	24,660

Device	Routing	Invert	Outlet Devices
#1	Primary	253.75'	**4.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	250.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.07 cfs @ 17.54 hrs HW=253.83' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.20 cfs @ 17.54 hrs HW=253.83' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.20 cfs @ 0.67 fps)

Pond 12cP: Proposed Berm



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1aS: Drainage Area 1a Runoff Area=3,964,196 sf 11.60% Impervious Runoff Depth=2.44"
Flow Length=4,424' Tc=105.4 min CN=59 Runoff=67.50 cfs 18.481 af

Subcatchment1bS: Drainage Area 1b Runoff Area=146,589 sf 28.06% Impervious Runoff Depth=1.52"
Flow Length=342' Tc=9.9 min CN=49 Runoff=4.39 cfs 0.428 af

Subcatchment1cS: Drainage Area 1c Runoff Area=408,420 sf 8.65% Impervious Runoff Depth=3.85"
Flow Length=1,734' Tc=30.4 min CN=73 Runoff=23.76 cfs 3.008 af

Subcatchment1dS: Drainage Area 1a Runoff Area=341,088 sf 7.37% Impervious Runoff Depth=3.96"
Flow Length=4,424' Tc=105.4 min CN=74 Runoff=9.94 cfs 2.581 af

Subcatchment2S: Drainage Area 2 Runoff Area=233,007 sf 1.98% Impervious Runoff Depth=1.35"
Flow Length=289' Tc=12.1 min CN=47 Runoff=5.46 cfs 0.604 af

Subcatchment3aS: Drainage Area 3a Runoff Area=359,815 sf 3.27% Impervious Runoff Depth=3.85"
Flow Length=794' Tc=19.3 min CN=73 Runoff=25.45 cfs 2.650 af

Subcatchment3bS: Drainage Area 3b Runoff Area=1,022,537 sf 4.99% Impervious Runoff Depth=3.54"
Flow Length=1,119' Tc=14.7 min CN=70 Runoff=73.71 cfs 6.916 af

Subcatchment4S: Drainage Area 4 Runoff Area=717,184 sf 0.65% Impervious Runoff Depth=4.71"
Flow Length=974' Tc=13.9 min CN=81 Runoff=69.69 cfs 6.465 af

Subcatchment5aS: Drainage Area 5 Runoff Area=2,242,858 sf 25.20% Impervious Runoff Depth=3.74"
Flow Length=2,517' Tc=49.6 min CN=72 Runoff=98.99 cfs 16.065 af

Subcatchment5bS: Drainage Area 5 Runoff Area=52,534 sf 64.34% Impervious Runoff Depth=5.04"
Tc=6.0 min CN=84 Runoff=6.82 cfs 0.507 af

Subcatchment5cS: Drainage Area 5 Runoff Area=271,995 sf 13.40% Impervious Runoff Depth=3.74"
Flow Length=1,346' Tc=29.3 min CN=72 Runoff=15.65 cfs 1.948 af

Subcatchment5dS: Drainage Area 5 Runoff Area=59,233 sf 44.82% Impervious Runoff Depth=5.16"
Flow Length=157' Tc=9.1 min CN=85 Runoff=7.07 cfs 0.584 af

Subcatchment6aS: Drainage Area 6 Runoff Area=972,255 sf 22.55% Impervious Runoff Depth=1.35"
Flow Length=1,544' Tc=44.6 min CN=47 Runoff=13.37 cfs 2.520 af

Subcatchment6bS: Drainage Area 6 Runoff Area=469,126 sf 17.08% Impervious Runoff Depth=1.44"
Flow Length=549' Tc=19.6 min CN=48 Runoff=10.07 cfs 1.292 af

Subcatchment7aS: Drainage Area 7a Runoff Area=264,166 sf 2.54% Impervious Runoff Depth=0.60"
Flow Length=3,124' Tc=95.4 min CN=37 Runoff=0.67 cfs 0.301 af

Subcatchment7bS: Drainage Area 7b Runoff Area=3,158,253 sf 14.64% Impervious Runoff Depth=1.44"
Flow Length=3,232' Tc=99.9 min CN=48 Runoff=28.47 cfs 8.696 af

Subcatchment8S: Drainage Area 8 Runoff Area=354,352 sf 26.48% Impervious Runoff Depth=4.49"
Flow Length=883' Tc=23.6 min CN=79 Runoff=26.79 cfs 3.046 af

Subcatchment9S: Drainage Area 9 Runoff Area=636,379 sf 35.74% Impervious Runoff Depth=3.33"
Flow Length=601' Tc=17.1 min CN=68 Runoff=40.53 cfs 4.053 af

Subcatchment10aS: Drainage Area 10 Runoff Area=255,546 sf 13.96% Impervious Runoff Depth=3.85"
Flow Length=378' Tc=17.2 min CN=73 Runoff=18.88 cfs 1.882 af

Subcatchment10bS: Drainage Area 10 Runoff Area=1,072,278 sf 13.17% Impervious Runoff Depth=3.23"
Flow Length=1,752' Tc=40.2 min CN=67 Runoff=45.38 cfs 6.621 af

Subcatchment11aS: Drainage Area 11 Runoff Area=2,062,963 sf 10.23% Impervious Runoff Depth=3.43"
Flow Length=1,904' Tc=38.3 min CN=69 Runoff=95.49 cfs 13.545 af

Subcatchment11bS: Drainage Area 11 Runoff Area=234,184 sf 1.97% Impervious Runoff Depth=2.73"
Flow Length=1,011' Tc=16.2 min CN=62 Runoff=12.21 cfs 1.222 af

Subcatchment11cS: Drainage Area 11 Runoff Area=190,846 sf 1.10% Impervious Runoff Depth=3.13"
Flow Length=957' Tc=14.0 min CN=66 Runoff=12.27 cfs 1.141 af

Subcatchment12aS: Drainage Area 12a Runoff Area=1,702,429 sf 14.03% Impervious Runoff Depth=3.85"
Flow Length=1,596' Tc=44.7 min CN=73 Runoff=81.84 cfs 12.536 af

Subcatchment12bS: Drainage Area 12b Runoff Area=484,189 sf 7.70% Impervious Runoff Depth=3.96"
Flow Length=902' Tc=14.5 min CN=74 Runoff=39.32 cfs 3.663 af

Subcatchment12cS: Drainage Area 12 Runoff Area=143,106 sf 8.38% Impervious Runoff Depth=4.06"
Tc=6.0 min CN=75 Runoff=15.32 cfs 1.112 af

Subcatchment13S: Drainage Area 13 Runoff Area=1,408,782 sf 0.05% Impervious Runoff Depth=3.13"
Flow Length=1,813' Tc=9.8 min CN=66 Runoff=102.00 cfs 8.425 af

Reach 10aR: Swale 10a Avg. Flow Depth=0.60' Max Vel=4.85 fps Inflow=18.88 cfs 1.882 af
n=0.030 L=736.0' S=0.0299 '/' Capacity=51.58 cfs Outflow=18.51 cfs 1.882 af

Reach 12bR: Swale 12b Avg. Flow Depth=0.91' Max Vel=5.43 fps Inflow=39.32 cfs 3.663 af
n=0.030 L=982.0' S=0.0234 '/' Capacity=45.66 cfs Outflow=37.96 cfs 3.663 af

Reach DP-1: Off-Site West Inflow=117.65 cfs 31.164 af
Outflow=117.65 cfs 31.164 af

Reach DP-2: Off-Site South Inflow=123.74 cfs 23.593 af
Outflow=123.74 cfs 23.593 af

Reach DP-3: Off-Site East Inflow=96.14 cfs 15.364 af
Outflow=96.14 cfs 15.364 af

Reach DP-4: Off-Site Southeast Inflow=141.20 cfs 22.076 af
Outflow=141.20 cfs 22.076 af

Pond 1bP: Proposed Basin Peak Elev=152.18' Storage=3,887 cf Inflow=4.39 cfs 0.428 af
Discarded=1.27 cfs 0.428 af Primary=0.00 cfs 0.000 af Outflow=1.27 cfs 0.428 af

Pond 1cP: Proposed Basin Peak Elev=227.50' Storage=15,328 cf Inflow=23.76 cfs 3.008 af
Discarded=0.09 cfs 0.301 af Primary=23.20 cfs 2.706 af Outflow=23.29 cfs 3.007 af

Pond 1dP: Proposed Berm Peak Elev=258.07' Storage=28,065 cf Inflow=9.94 cfs 2.581 af
Discarded=0.10 cfs 0.460 af Primary=10.46 cfs 1.978 af Outflow=10.56 cfs 2.439 af

Pond 2P: Existing Depression Peak Elev=168.82' Storage=11,806 cf Inflow=5.46 cfs 0.604 af
Outflow=0.54 cfs 0.604 af

Pond 3aP: Proposed Berm Peak Elev=273.92' Storage=77,126 cf Inflow=25.45 cfs 2.650 af
Discarded=0.35 cfs 1.485 af Primary=1.41 cfs 0.662 af Outflow=1.76 cfs 2.148 af

Pond 3P: Existing Depression Peak Elev=191.09' Storage=209,971 cf Inflow=73.71 cfs 7.578 af
Discarded=1.63 cfs 6.022 af Primary=4.44 cfs 1.201 af Outflow=6.07 cfs 7.224 af

Pond 4P: Existing Depression Peak Elev=168.69' Storage=213,410 cf Inflow=69.69 cfs 6.465 af
Discarded=1.75 cfs 5.602 af Primary=0.00 cfs 0.000 af Outflow=1.75 cfs 5.602 af

Pond 5bP: Proposed Berm Peak Elev=231.37' Storage=12,157 cf Inflow=6.82 cfs 0.507 af
Discarded=0.41 cfs 0.507 af Primary=0.00 cfs 0.000 af Outflow=0.41 cfs 0.507 af

Pond 5cP: Proposed Berm Peak Elev=211.00' Storage=37,107 cf Inflow=15.65 cfs 1.948 af
Discarded=0.03 cfs 0.117 af Primary=7.01 cfs 1.275 af Outflow=7.04 cfs 1.392 af

Pond 5dP: Proposed Berm Peak Elev=285.06' Storage=16,689 cf Inflow=7.07 cfs 0.584 af
Discarded=0.11 cfs 0.499 af Primary=0.27 cfs 0.085 af Outflow=0.38 cfs 0.584 af

Pond 5P: Existing Depression Peak Elev=167.92' Storage=130,811 cf Inflow=104.68 cfs 18.038 af
Discarded=0.26 cfs 1.103 af Primary=103.33 cfs 15.341 af Outflow=103.59 cfs 16.444 af

Pond 6bP: Proposed Berm Peak Elev=164.68' Storage=18,141 cf Inflow=10.07 cfs 1.292 af
Discarded=1.86 cfs 1.292 af Primary=0.00 cfs 0.000 af Outflow=1.86 cfs 1.292 af

Pond 6P: Existing Wetland Peak Elev=141.45' Storage=260,357 cf Inflow=128.43 cfs 21.900 af
Discarded=0.48 cfs 2.092 af Primary=98.49 cfs 16.592 af Outflow=98.97 cfs 18.685 af

Pond 7aP: Proposed Berm Peak Elev=166.87' Storage=9,092 cf Inflow=0.67 cfs 0.301 af
Discarded=0.10 cfs 0.301 af Primary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.301 af

Pond 7P: Existing Depression Peak Elev=148.48' Storage=32,409 cf Inflow=28.47 cfs 8.696 af
Discarded=1.37 cfs 1.899 af Primary=35.72 cfs 6.797 af Outflow=37.09 cfs 8.696 af

Pond 8P: Existing Wetland Peak Elev=231.53' Storage=96,027 cf Inflow=26.79 cfs 3.046 af
Discarded=0.25 cfs 1.096 af Primary=1.96 cfs 0.612 af Outflow=2.21 cfs 1.709 af

Pond 9P: Existing Wetland Peak Elev=149.25' Storage=4,885 cf Inflow=115.16 cfs 19.394 af
Discarded=0.02 cfs 0.014 af Primary=115.06 cfs 19.380 af Outflow=115.08 cfs 19.394 af

Pond 10aP: Proposed Berm Peak Elev=213.67' Storage=45,007 cf Inflow=18.51 cfs 1.882 af
Discarded=0.67 cfs 1.502 af Primary=1.69 cfs 0.380 af Outflow=2.36 cfs 1.882 af

Pond 11bP: Proposed Berm Peak Elev=220.72' Storage=19,970 cf Inflow=12.21 cfs 1.222 af
Discarded=1.71 cfs 1.222 af Primary=0.00 cfs 0.000 af Outflow=1.71 cfs 1.222 af

Pond 11cP: Proposed Berm Peak Elev=223.85' Storage=22,247 cf Inflow=12.27 cfs 1.141 af
Discarded=0.84 cfs 1.036 af Primary=0.82 cfs 0.105 af Outflow=1.67 cfs 1.141 af

Pond 12bP: Proposed Berm Peak Elev=253.92' Storage=69,005 cf Inflow=37.96 cfs 3.663 af
Discarded=0.17 cfs 0.721 af Primary=14.32 cfs 2.411 af Outflow=14.49 cfs 3.132 af

Pond 12cP: Proposed Berm Peak Elev=253.99' Storage=29,183 cf Inflow=15.32 cfs 1.112 af
Discarded=0.07 cfs 0.334 af Primary=1.13 cfs 0.417 af Outflow=1.21 cfs 0.751 af

Total Runoff Area = 533.249 ac Runoff Volume = 130.291 af Average Runoff Depth = 2.93"
86.79% Pervious = 462.798 ac 13.21% Impervious = 70.450 ac

Summary for Subcatchment 1aS: Drainage Area 1a

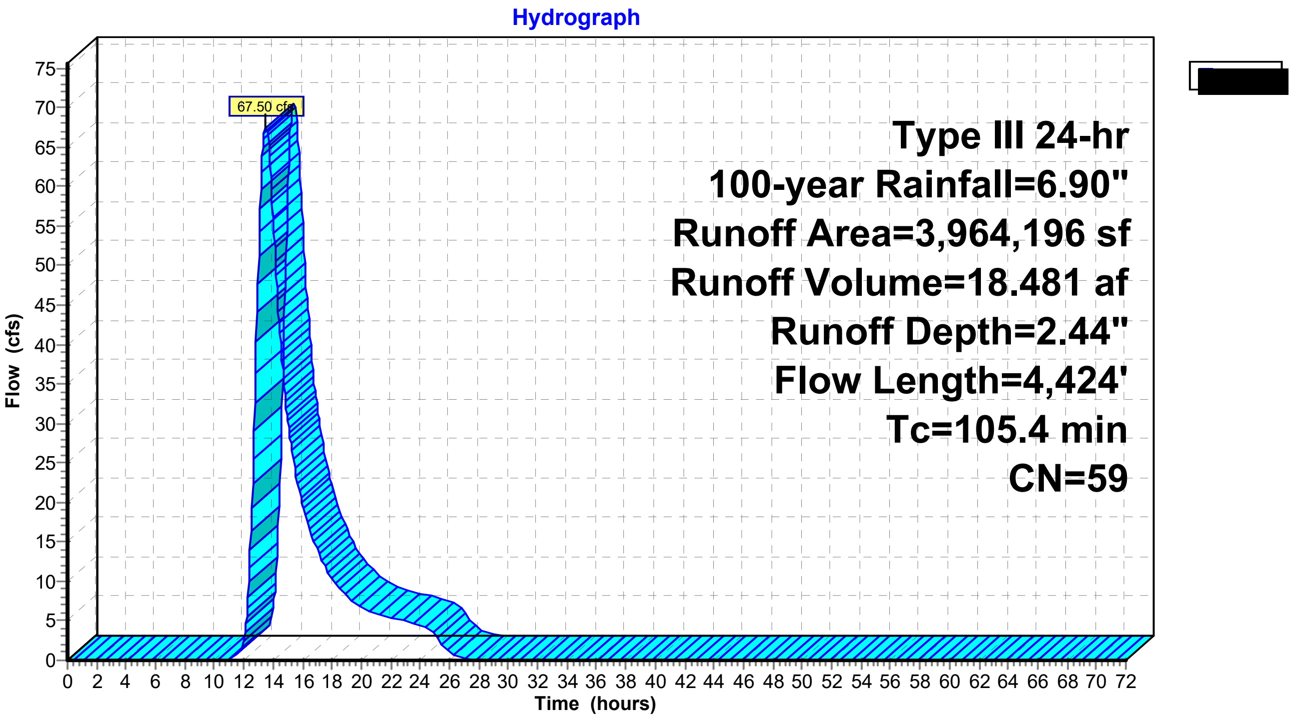
Runoff = 67.50 cfs @ 13.48 hrs, Volume= 18.481 af, Depth= 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	482,442	30	Meadow, non-grazed, HSG A
	538,022	58	Meadow, non-grazed, HSG B
	942,184	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	515,616	30	Woods, Good, HSG A
	704,263	55	Woods, Good, HSG B
	225,155	70	Woods, Good, HSG C
	10,840	77	Woods, Good, HSG D
*	33,102	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	414,914	98	Water body
*	52,839	96	Gravel road
*	0	98	Structure
*	1,438	98	Panels
*	4,403	98	Equipment pad
*	38,978	98	Paved
	3,964,196	59	Weighted Average
	3,504,463		88.40% Pervious Area
	459,733		11.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
11.3	356	0.0110	0.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.1	433	0.0020	0.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.3	222	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.5	766	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
46.9	2,597	0.0340	0.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
105.4	4,424	Total			

Subcatchment 1aS: Drainage Area 1a



Summary for Subcatchment 1bS: Drainage Area 1b

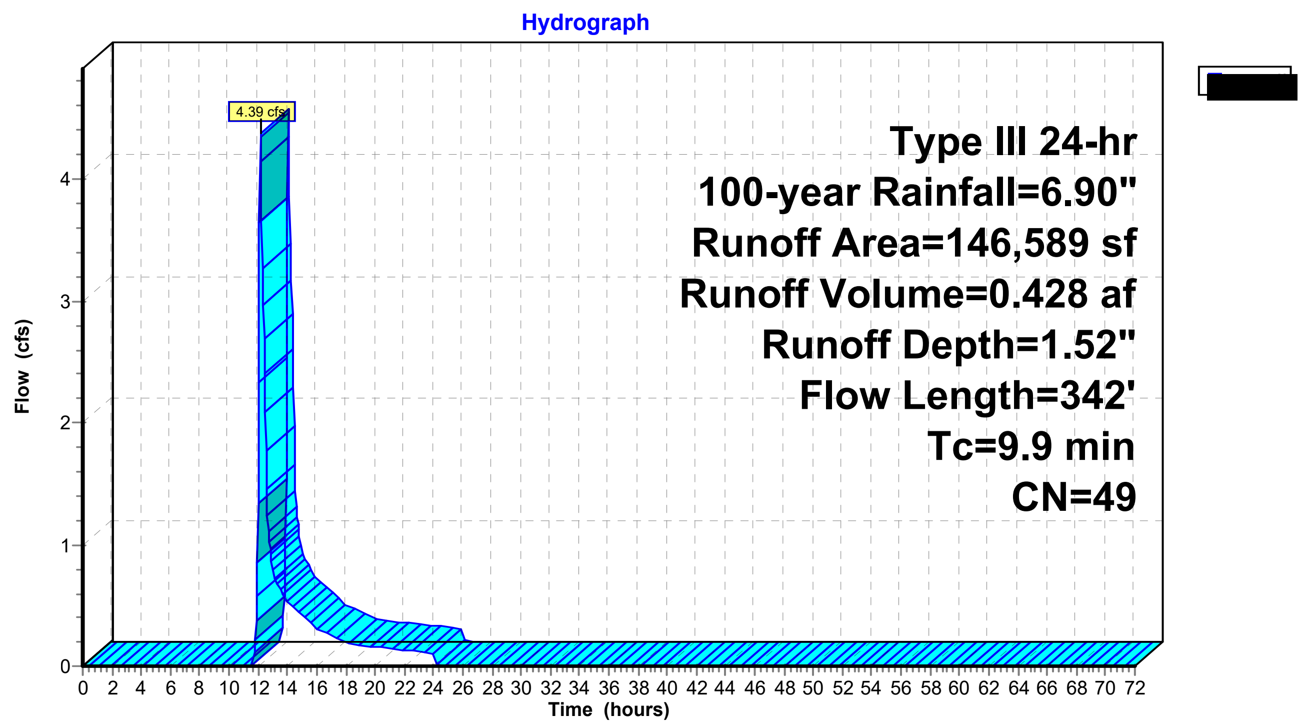
Runoff = 4.39 cfs @ 12.16 hrs, Volume= 0.428 af, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	103,427	30	Meadow, non-grazed, HSG A
	2,036	58	Meadow, non-grazed, HSG B
*	7,140	98	Panels
*	33,986	98	Basin
	146,589	49	Weighted Average
	105,463		71.94% Pervious Area
	41,126		28.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
2.5	292	0.0762	1.93		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.9	342	Total			

Subcatchment 1bS: Drainage Area 1b



Summary for Subcatchment 1cS: Drainage Area 1c

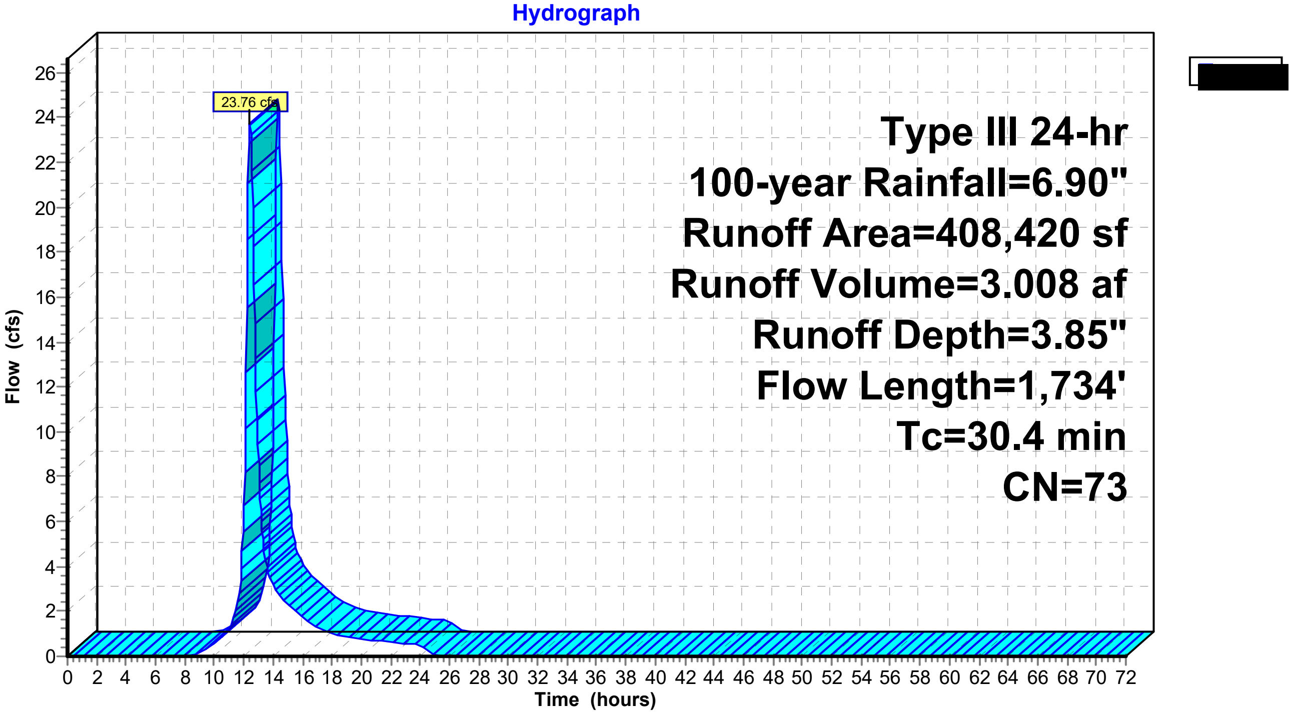
Runoff = 23.76 cfs @ 12.42 hrs, Volume= 3.008 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	351,878	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	18,313	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	2,416	98	Water body
*	2,918	96	Gravel road
*	0	98	Structure
*	5,460	98	Panels
*	0	98	Equipment pad
*	10,197	98	Paved
*	17,238	98	Basin
	408,420	73	Weighted Average
	373,109		91.35% Pervious Area
	35,311		8.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
23.3	1,684	0.0297	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
30.4	1,734	Total			

Subcatchment 1cS: Drainage Area 1c



Summary for Subcatchment 1dS: Drainage Area 1a

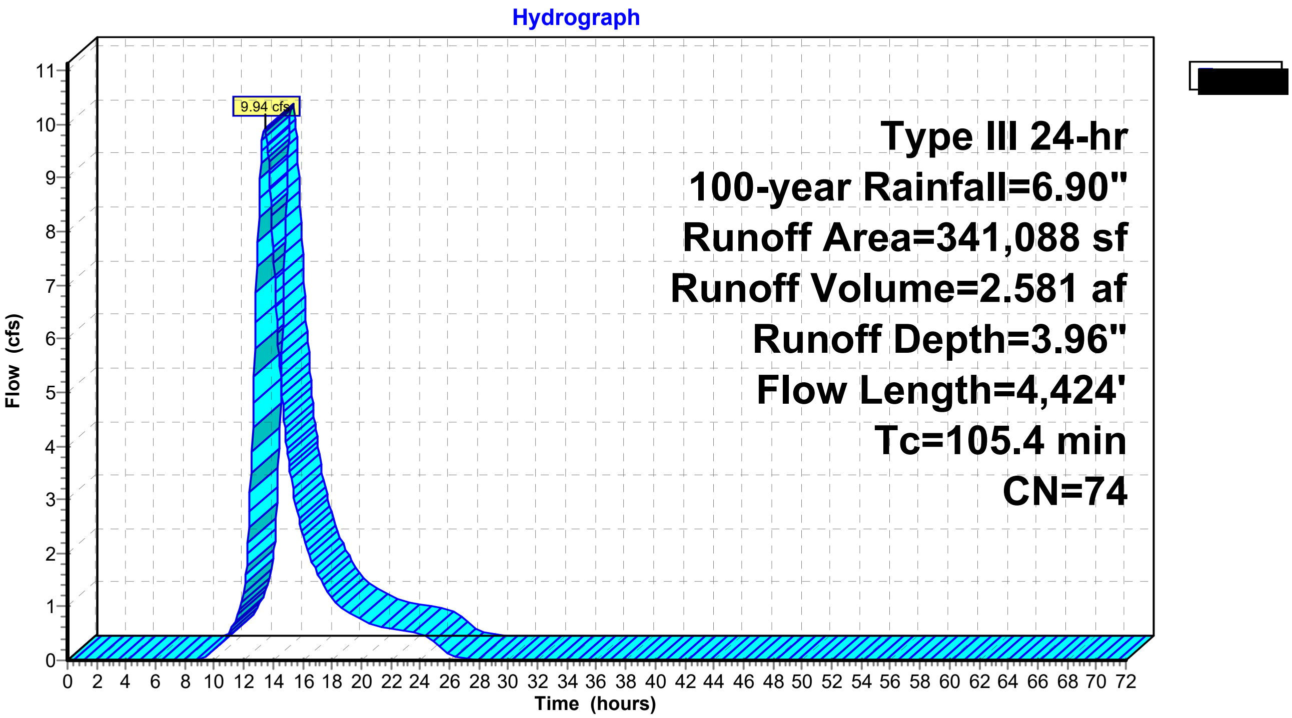
Runoff = 9.94 cfs @ 13.44 hrs, Volume= 2.581 af, Depth= 3.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	269,007	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	34,713	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	12,239	96	Gravel road
*	0	98	Structure
*	7,140	98	Panels
*	629	98	Equipment pad
*	1,074	98	Paved
*	16,286	98	Basin
	341,088	74	Weighted Average
	315,959		92.63% Pervious Area
	25,129		7.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
11.3	356	0.0110	0.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.1	433	0.0020	0.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.3	222	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.5	766	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
46.9	2,597	0.0340	0.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
105.4	4,424	Total			

Subcatchment 1dS: Drainage Area 1a



Summary for Subcatchment 2S: Drainage Area 2

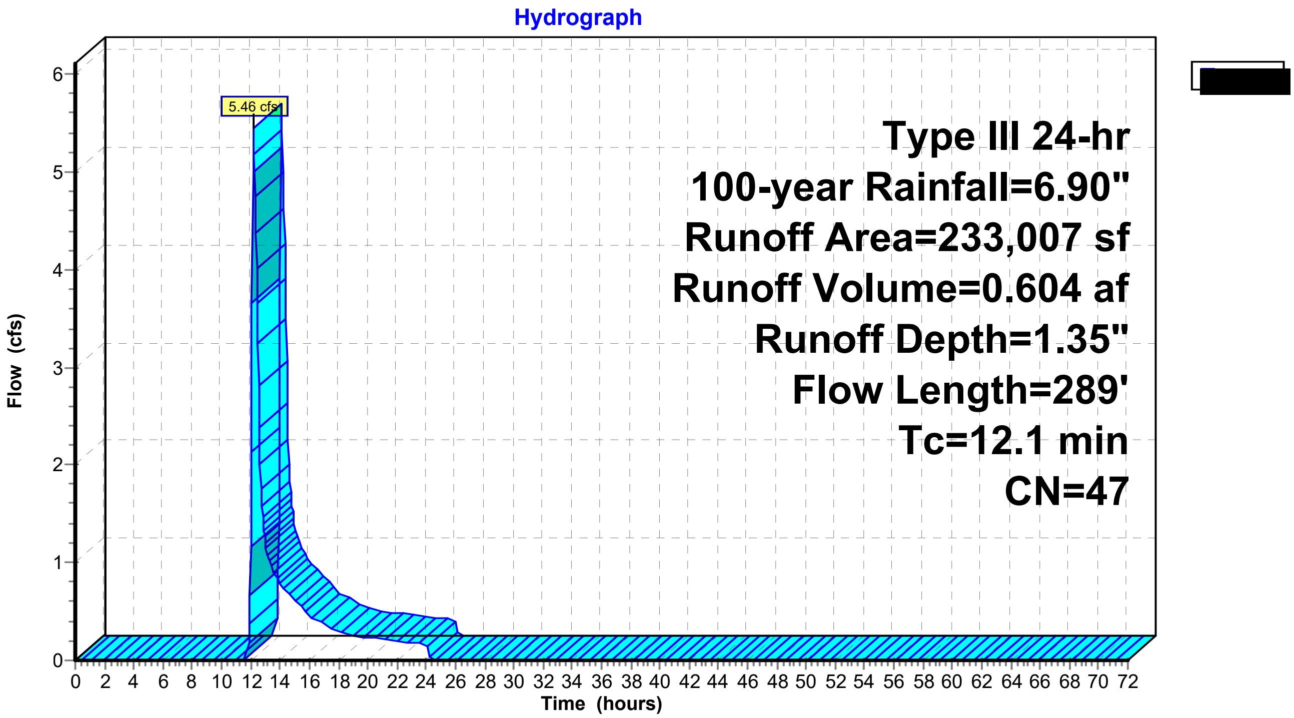
Runoff = 5.46 cfs @ 12.21 hrs, Volume= 0.604 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	117,788	30	Meadow, non-grazed, HSG A
	29,605	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	16,114	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	58,620	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	6,260	96	Gravel road
*	0	98	Structure
*	4,620	98	Panels
	233,007	47	Weighted Average
	228,387		98.02% Pervious Area
	4,620		1.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0900	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
5.3	239	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.1	289	Total			

Subcatchment 2S: Drainage Area 2



Summary for Subcatchment 3aS: Drainage Area 3a

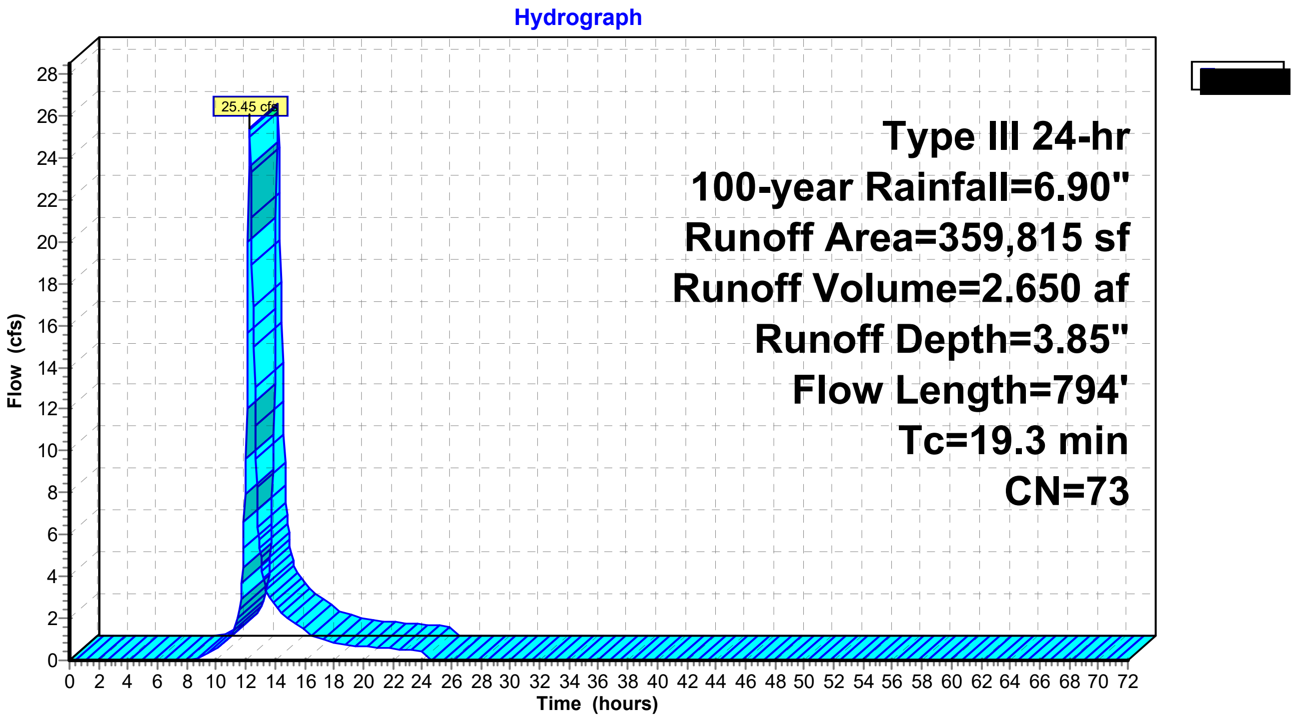
Runoff = 25.45 cfs @ 12.27 hrs, Volume= 2.650 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	337,756	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	10,301	96	Gravel road
*	0	98	Structure
*	10,500	98	Panels
*	1,258	98	Equipment pad
	359,815	73	Weighted Average
	348,057		96.73% Pervious Area
	11,758		3.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
11.9	744	0.0222	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.3	794	Total			

Subcatchment 3aS: Drainage Area 3a



Summary for Subcatchment 3bS: Drainage Area 3b

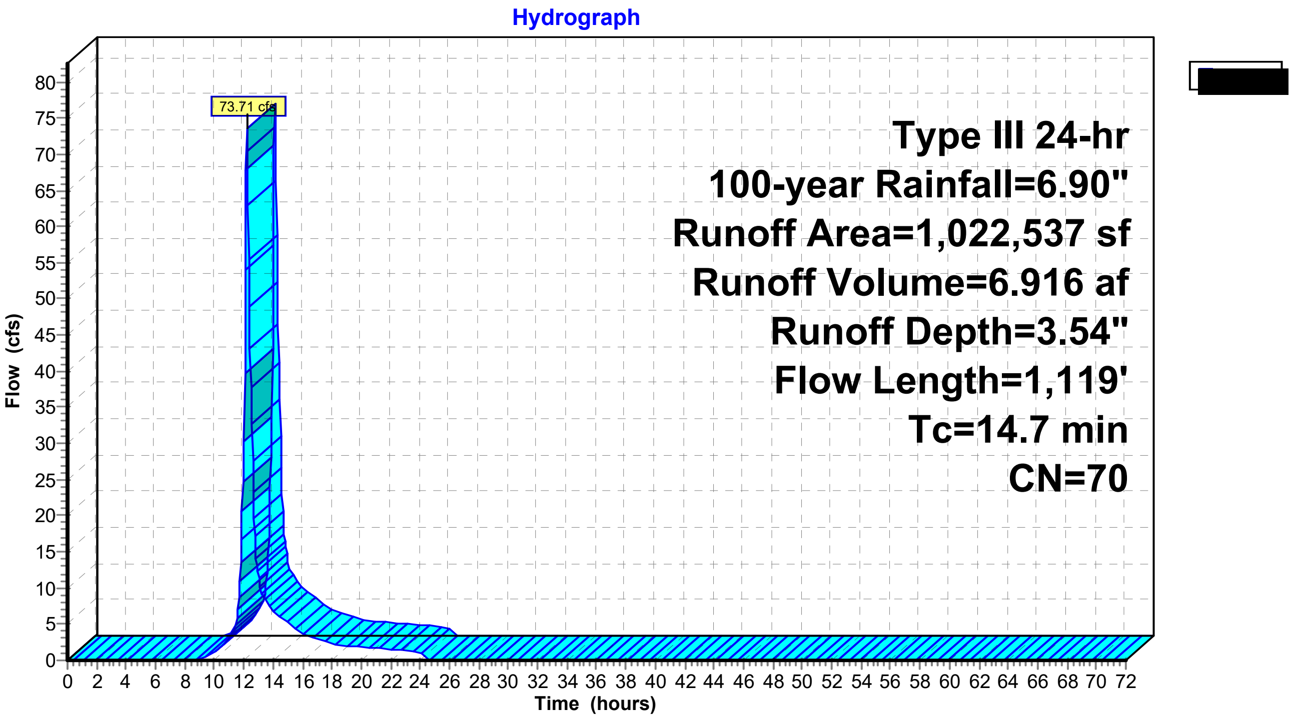
Runoff = 73.71 cfs @ 12.21 hrs, Volume= 6.916 af, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	99,790	58	Meadow, non-grazed, HSG B
	532,219	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	1,798	30	Woods, Good, HSG A
	107,172	55	Woods, Good, HSG B
	59,721	70	Woods, Good, HSG C
	14,571	77	Woods, Good, HSG D
*	59,918	70	Gravel pit, HSG A
*	96,280	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	51,068	98	Water body
*	0	96	Gravel road
*	0	98	Structure
*	0	98	Panels
*	0	98	Equipment pad
	1,022,537	70	Weighted Average
	971,469		95.01% Pervious Area
	51,068		4.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
9.1	1,069	0.0776	1.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.7	1,119	Total			

Subcatchment 3bS: Drainage Area 3b



Summary for Subcatchment 4S: Drainage Area 4

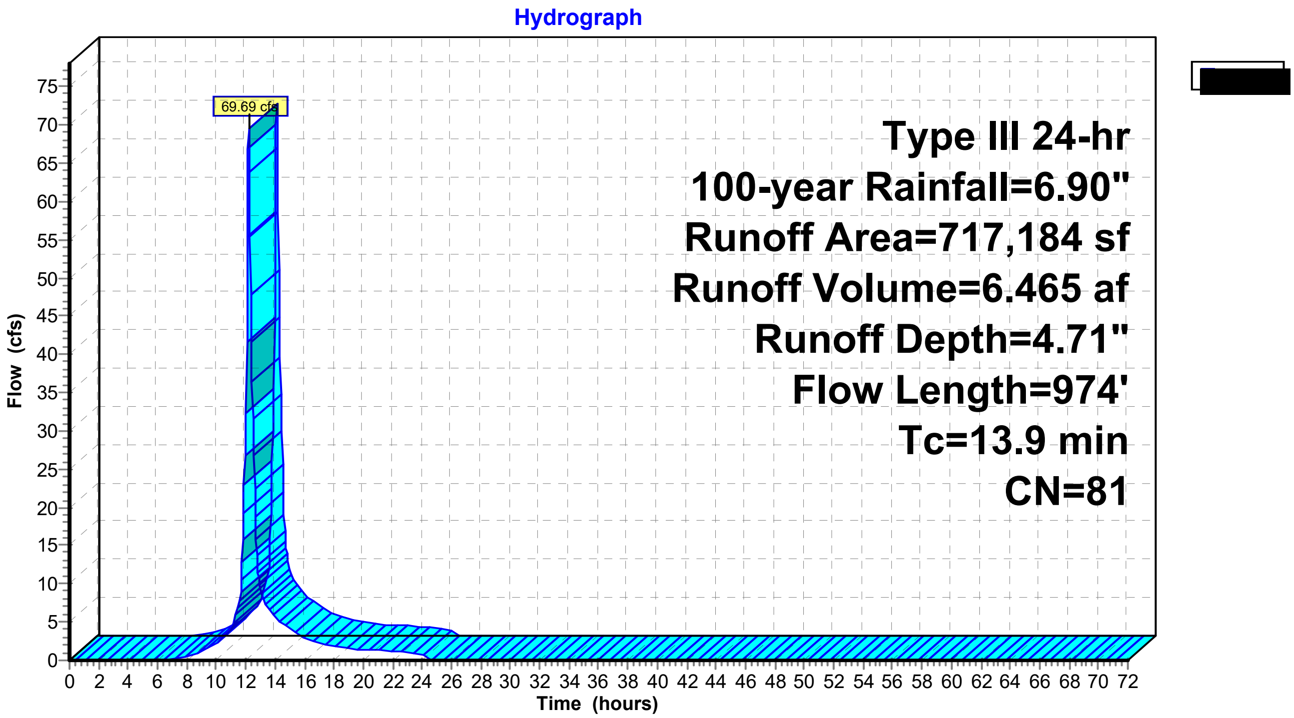
Runoff = 69.69 cfs @ 12.19 hrs, Volume= 6.465 af, Depth= 4.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	18,016	55	Woods, Good, HSG B
	19,532	70	Woods, Good, HSG C
	5,054	77	Woods, Good, HSG D
*	34,397	70	Gravel pit, HSG A
*	500,725	81	Gravel pit, HSG B
*	134,831	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	4,629	98	Water body
*	0	96	Gravel road
*	0	98	Structure
	717,184	81	Weighted Average
	712,555		99.35% Pervious Area
	4,629		0.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.20		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
3.9	384	0.0102	1.63		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	45	0.2700	8.37		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
8.8	269	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	226	0.3100	8.96		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
13.9	974	Total			

Subcatchment 4S: Drainage Area 4



Summary for Subcatchment 5aS: Drainage Area 5

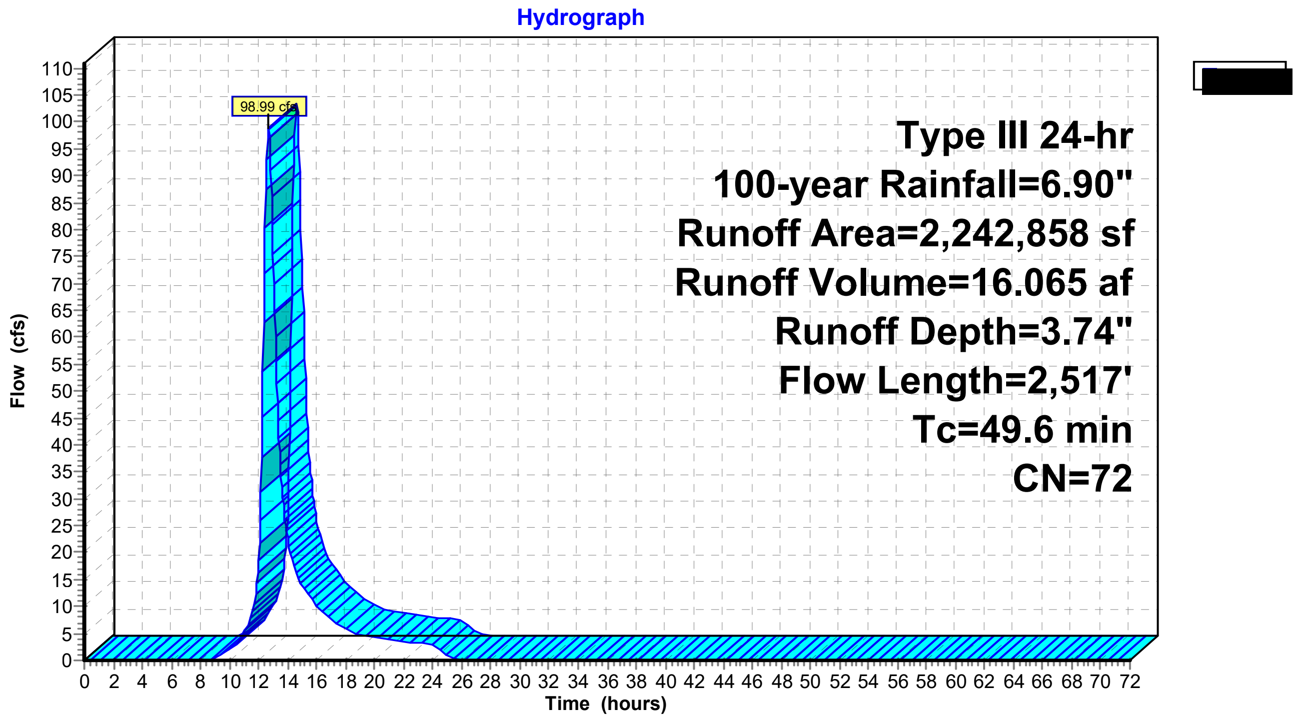
Runoff = 98.99 cfs @ 12.68 hrs, Volume= 16.065 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	84,391	30	Meadow, non-grazed, HSG A
	117,637	58	Meadow, non-grazed, HSG B
	239,197	71	Meadow, non-grazed, HSG C
	91,068	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	597,427	55	Woods, Good, HSG B
	404,182	70	Woods, Good, HSG C
	103,749	77	Woods, Good, HSG D
*	15,001	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	562,885	98	Water body
*	25,012	96	Gravel road
*	0	98	Structure
*	1,680	98	Panels
*	629	98	Equipment pad
	2,242,858	72	Weighted Average
	1,677,664		74.80% Pervious Area
	565,194		25.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.4	238	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.6	1,240	0.0242	0.78		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.6	509	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.6	480	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
49.6	2,517	Total			

Subcatchment 5aS: Drainage Area 5



Summary for Subcatchment 5bS: Drainage Area 5

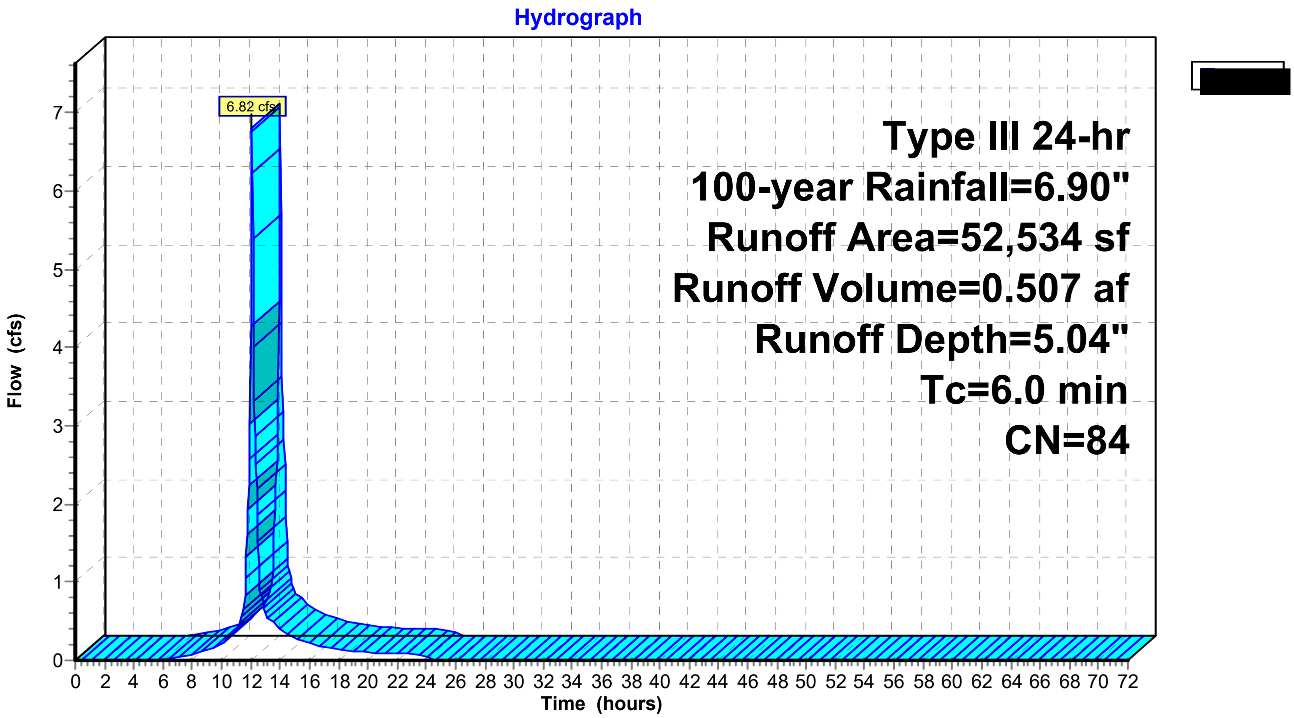
Runoff = 6.82 cfs @ 12.09 hrs, Volume= 0.507 af, Depth= 5.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	18,465	58	Meadow, non-grazed, HSG B
	267	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	0	96	Gravel road
*	0	98	Structure
*	5,040	98	Panels
*	0	98	Equipment pad
*	28,762	98	Basin
	52,534	84	Weighted Average
	18,732		35.66% Pervious Area
	33,802		64.34% Impervious Area

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

Subcatchment 5bS: Drainage Area 5



Summary for Subcatchment 5cS: Drainage Area 5

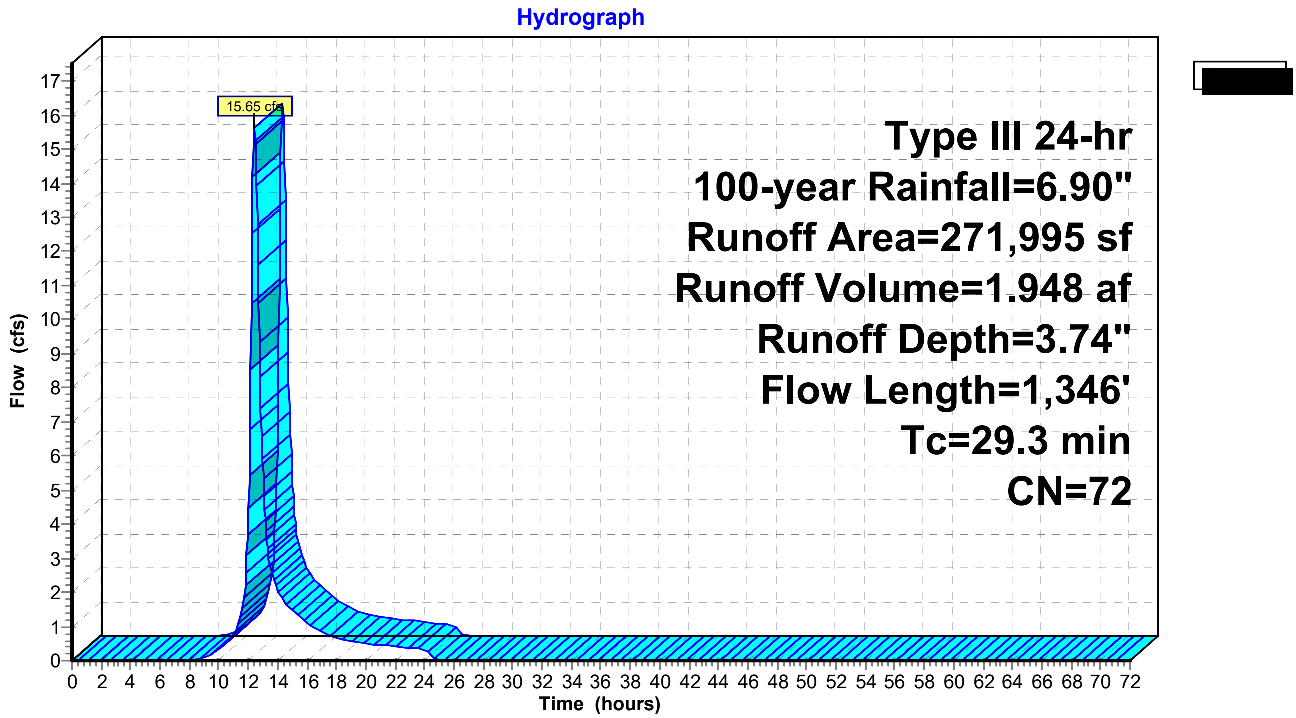
Runoff = 15.65 cfs @ 12.41 hrs, Volume= 1.948 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	53,847	58	Meadow, non-grazed, HSG B
	27,788	71	Meadow, non-grazed, HSG C
	8,123	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	2,622	55	Woods, Good, HSG B
	123,893	70	Woods, Good, HSG C
	19,268	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	20,354	98	Water body
*	0	96	Gravel road
*	0	98	Structure
*	5,460	98	Panels
*	0	98	Equipment pad
*	10,640	98	Basin
	271,995	72	Weighted Average
	235,541		86.60% Pervious Area
	36,454		13.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
17.9	1,030	0.0369	0.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.1	266	0.0902	2.10		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
29.3	1,346	Total			

Subcatchment 5cS: Drainage Area 5



Summary for Subcatchment 5dS: Drainage Area 5

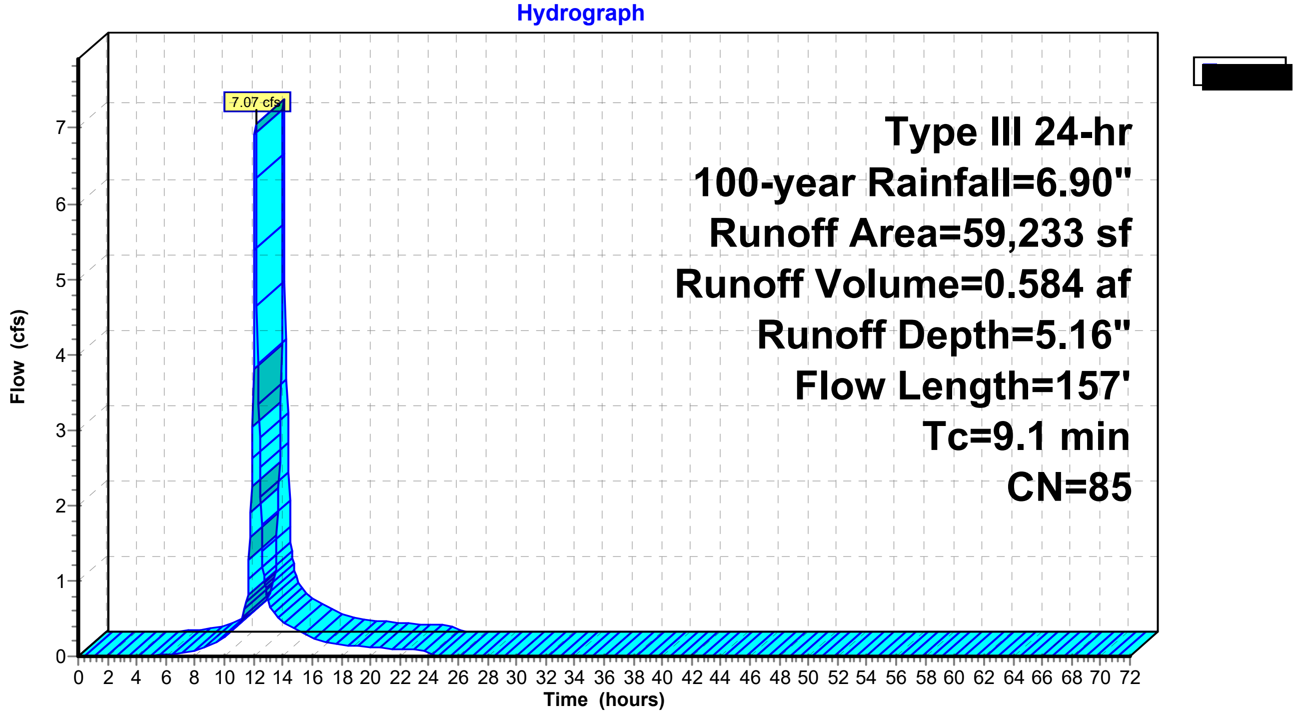
Runoff = 7.07 cfs @ 12.13 hrs, Volume= 0.584 af, Depth= 5.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	28,213	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	4,470	96	Gravel road
*	0	98	Structure
*	5,460	98	Panels
*	629	98	Equipment pad
*	20,461	98	Basin
	59,233	85	Weighted Average
	32,683		55.18% Pervious Area
	26,550		44.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.7	107	0.0234	1.07		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.1	157	Total			

Subcatchment 5dS: Drainage Area 5



Summary for Subcatchment 6aS: Drainage Area 6

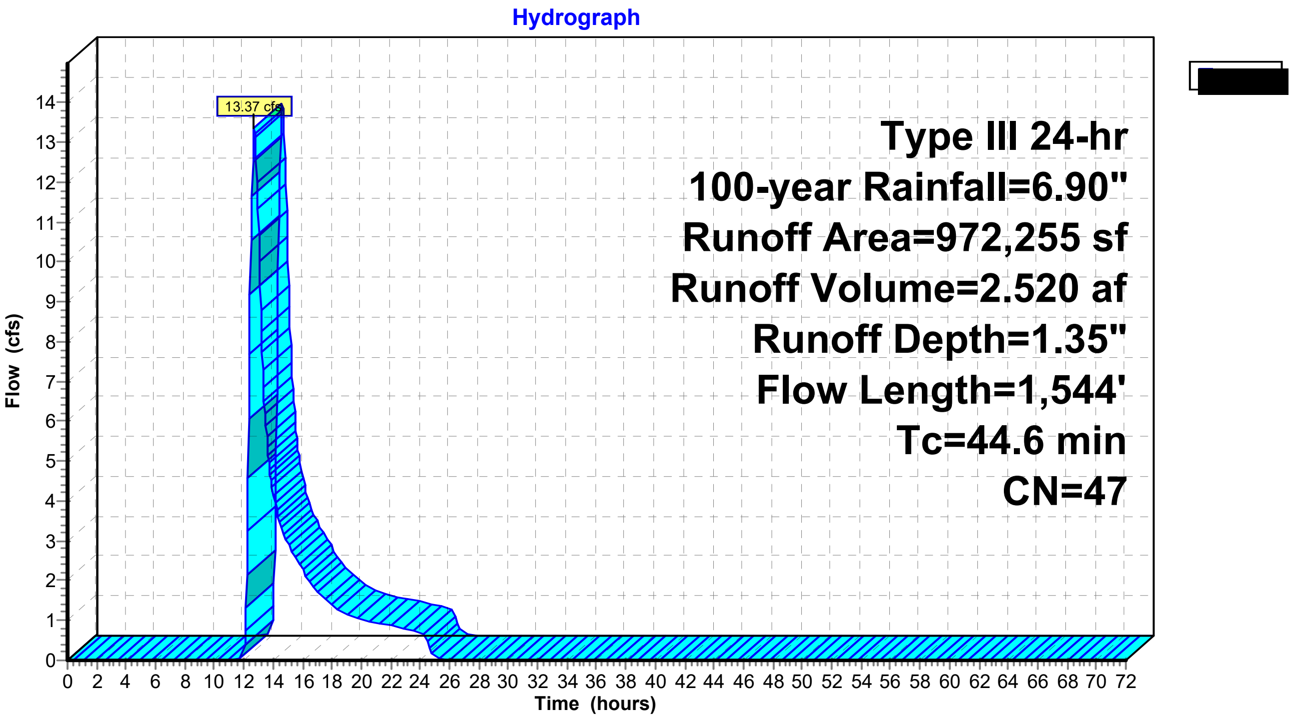
Runoff = 13.37 cfs @ 12.73 hrs, Volume= 2.520 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	301,060	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	390,620	30	Woods, Good, HSG A
	50,036	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	219,272	98	Water body
*	11,267	96	Gravel road
*	0	98	Structure
*	0	98	Panels
*	0	98	Equipment pad
	972,255	47	Weighted Average
	752,983		77.45% Pervious Area
	219,272		22.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
13.5	538	0.0090	0.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.1	601	0.0391	0.99		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.7	355	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
44.6	1,544	Total			

Subcatchment 6aS: Drainage Area 6



Summary for Subcatchment 6bS: Drainage Area 6

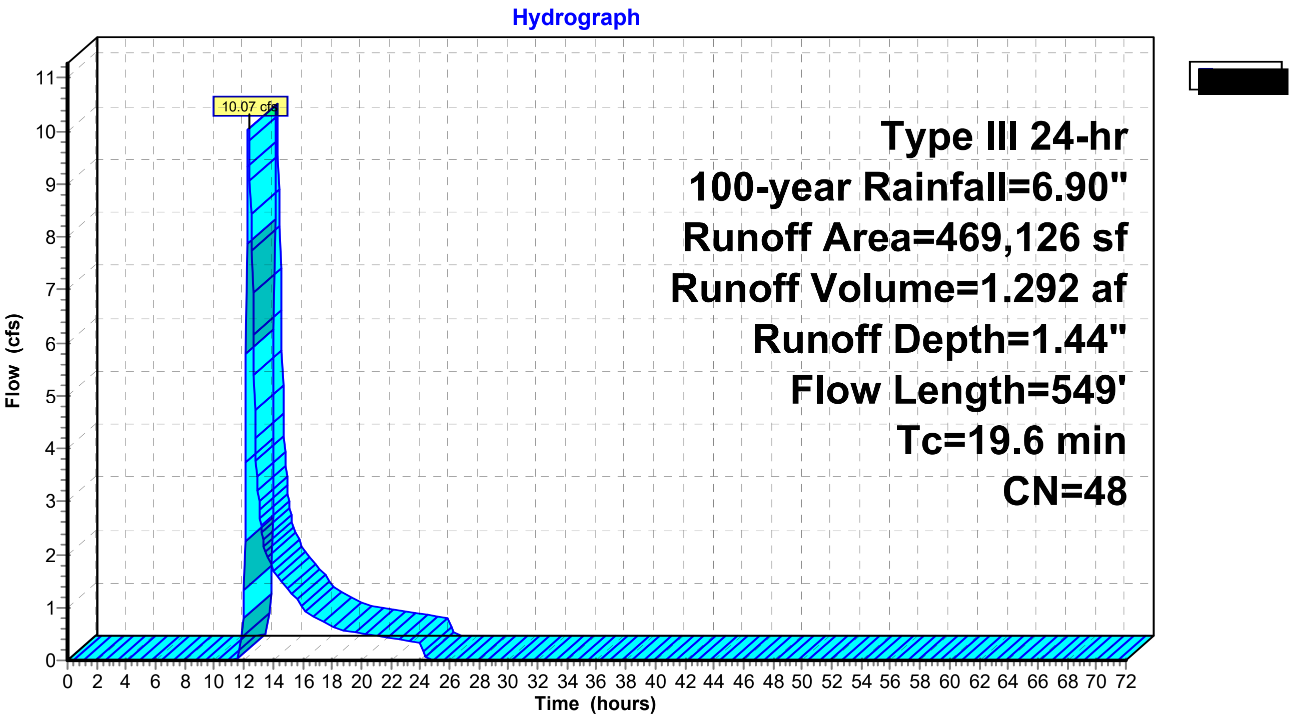
Runoff = 10.07 cfs @ 12.33 hrs, Volume= 1.292 af, Depth= 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	288,325	30	Meadow, non-grazed, HSG A
	91,050	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	9,625	96	Gravel road
*	0	98	Structure
*	12,660	98	Panels
*	629	98	Equipment pad
*	66,837	98	Basin
	469,126	48	Weighted Average
	389,000		82.92% Pervious Area
	80,126		17.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.0150	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
13.3	499	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.6	549	Total			

Subcatchment 6bS: Drainage Area 6



Summary for Subcatchment 7aS: Drainage Area 7a

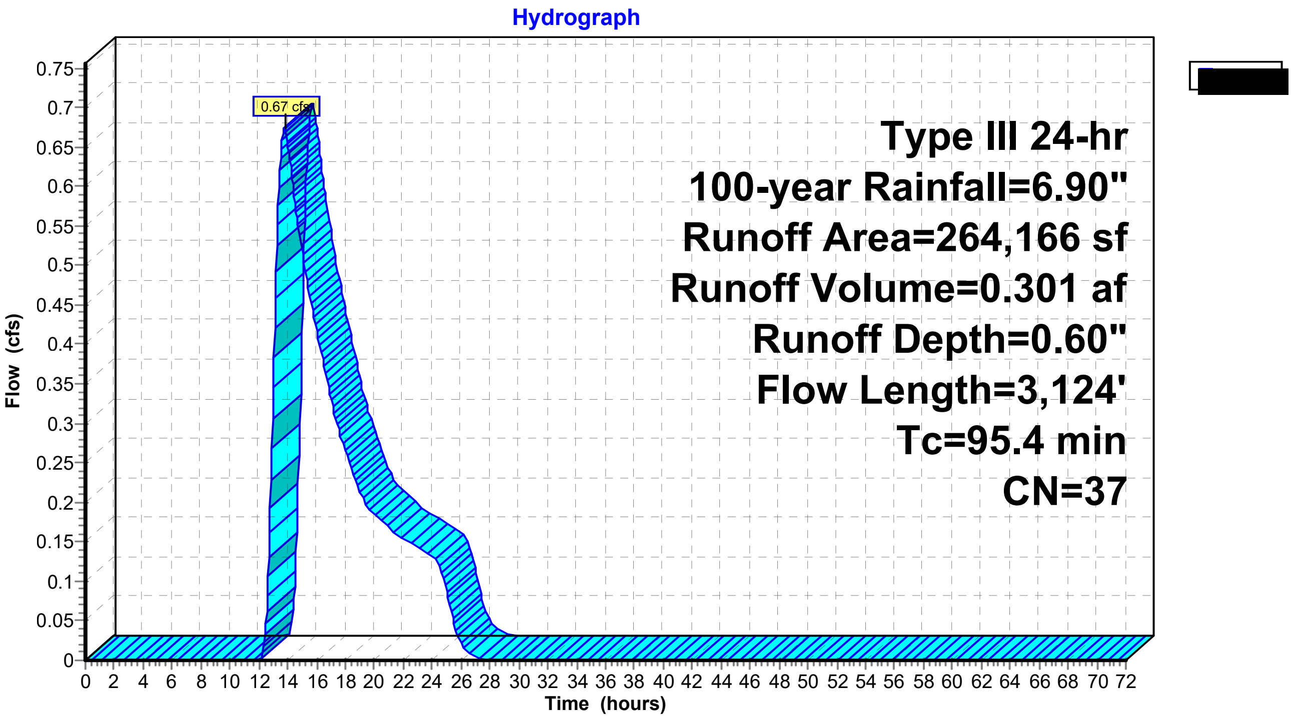
Runoff = 0.67 cfs @ 13.79 hrs, Volume= 0.301 af, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	231,002	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	7,059	70	Gravel pit, HSG A
*	9,519	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	9,866	96	Gravel road
*	0	98	Structure
*	6,720	98	Panels
*	0	98	Equipment pad
	264,166	37	Weighted Average
	257,446		97.46% Pervious Area
	6,720		2.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
2.9	238	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
88.9	2,836	0.0113	0.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
95.4	3,124	Total			

Subcatchment 7aS: Drainage Area 7a



Summary for Subcatchment 7bS: Drainage Area 7b

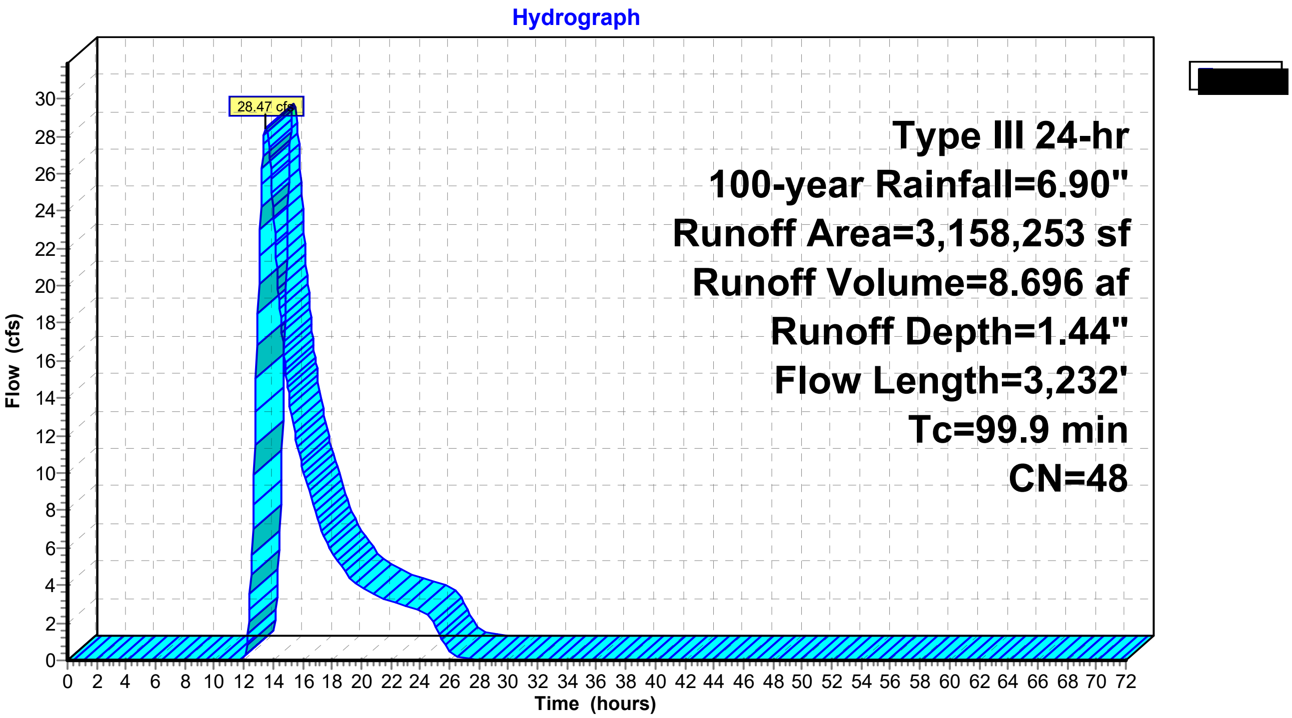
Runoff = 28.47 cfs @ 13.53 hrs, Volume= 8.696 af, Depth= 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	648,318	30	Meadow, non-grazed, HSG A
	110,037	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	1,385,107	30	Woods, Good, HSG A
	230,359	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	165,079	70	Gravel pit, HSG A
*	79,347	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	453,314	98	Water body
*	77,609	96	Gravel road
*	0	98	Structure
*	8,454	98	Panels
*	629	98	Equipment pad
	3,158,253	48	Weighted Average
	2,695,856		85.36% Pervious Area
	462,397		14.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	50	0.1600	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
5.6	346	0.0430	1.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
88.9	2,836	0.0113	0.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
99.9	3,232	Total			

Subcatchment 7bS: Drainage Area 7b



Summary for Subcatchment 8S: Drainage Area 8

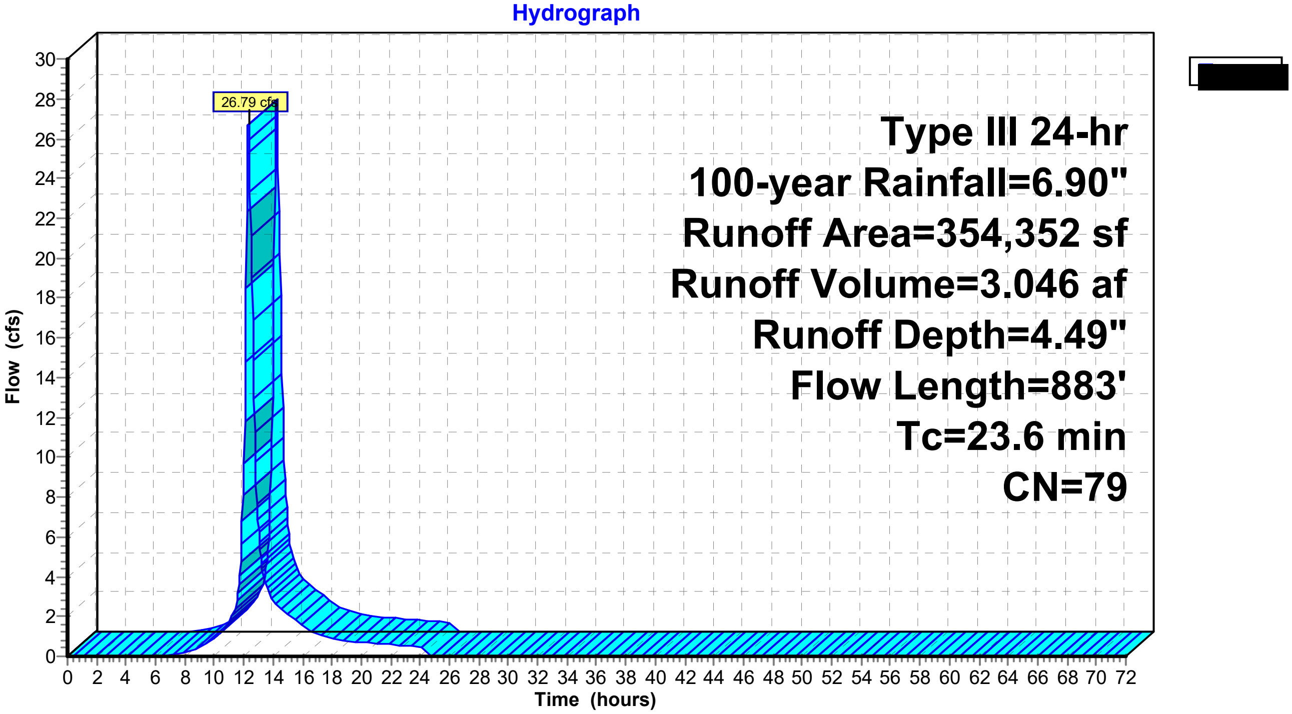
Runoff = 26.79 cfs @ 12.32 hrs, Volume= 3.046 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	14,757	71	Meadow, non-grazed, HSG C
	6,627	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	7,700	55	Woods, Good, HSG B
	175,484	70	Woods, Good, HSG C
	40,001	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	93,828	98	Water body
*	15,955	96	Gravel road
*	0	98	Structure
	354,352	79	Weighted Average
	260,524		73.52% Pervious Area
	93,828		26.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
8.8	390	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	271	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	172	0.0280	0.84		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.6	883	Total			

Subcatchment 8S: Drainage Area 8



Summary for Subcatchment 9S: Drainage Area 9

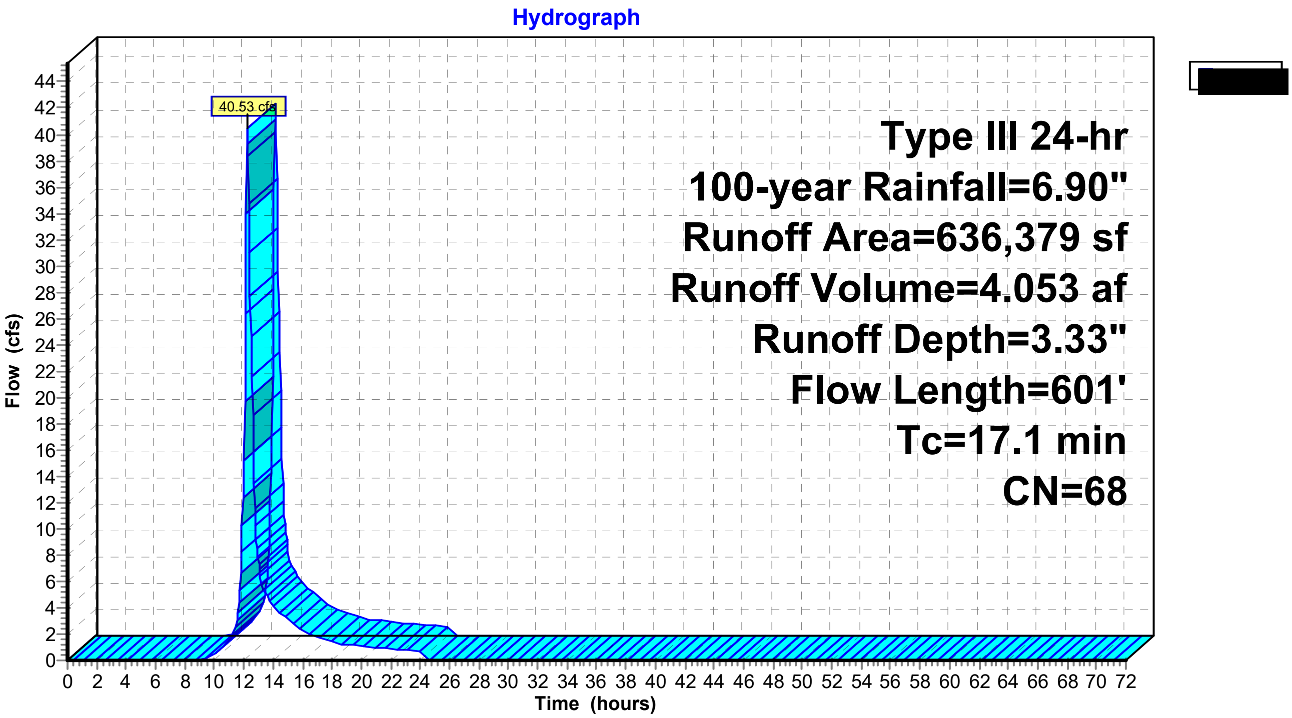
Runoff = 40.53 cfs @ 12.24 hrs, Volume= 4.053 af, Depth= 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	80,020	30	Meadow, non-grazed, HSG A
	29,044	58	Meadow, non-grazed, HSG B
	8,254	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	24,186	30	Woods, Good, HSG A
	229,102	55	Woods, Good, HSG B
	19,896	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	226,618	98	Water body
*	18,419	96	Gravel road
*	0	98	Structure
*	840	98	Panels
	636,379	68	Weighted Average
	408,921		64.26% Pervious Area
	227,458		35.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.4	106	0.0610	1.23		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	184	0.0330	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.8	261	0.2470	2.48		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.1	601	Total			

Subcatchment 9S: Drainage Area 9



Summary for Subcatchment 10aS: Drainage Area 10

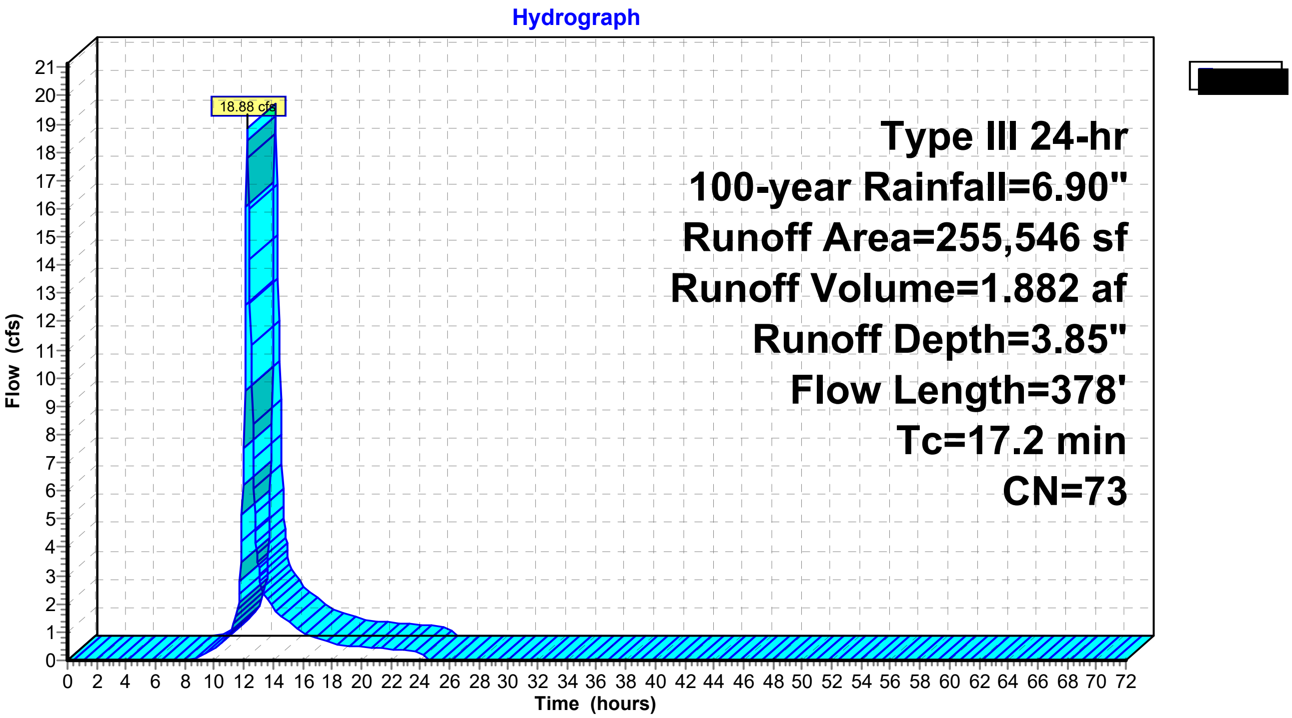
Runoff = 18.88 cfs @ 12.24 hrs, Volume= 1.882 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	40,805	58	Meadow, non-grazed, HSG B
	126,615	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	9,453	55	Woods, Good, HSG B
	37,133	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	5,861	96	Gravel road
*	0	98	Structure
*	3,360	98	Panels
*	32,319	98	Basin
	255,546	73	Weighted Average
	219,867		86.04% Pervious Area
	35,679		13.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
4.9	328	0.0488	1.10		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.2	378	Total			

Subcatchment 10aS: Drainage Area 10



Summary for Subcatchment 10bS: Drainage Area 10

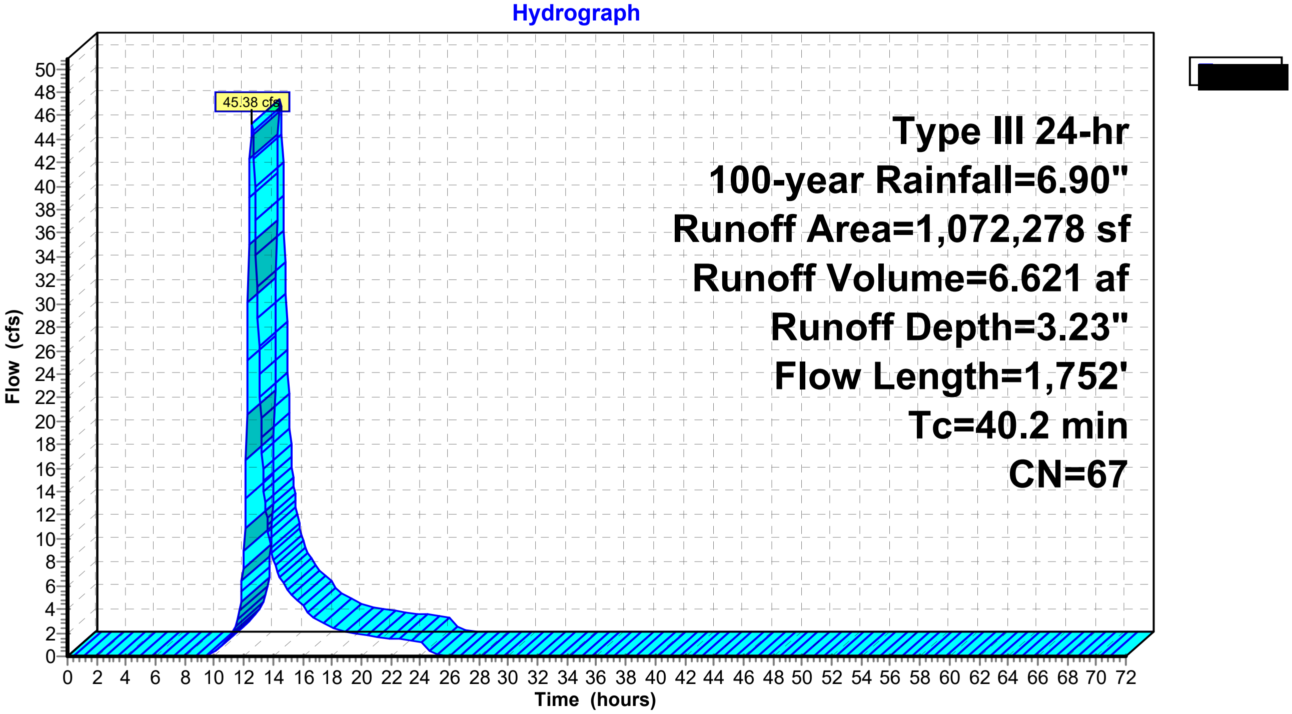
Runoff = 45.38 cfs @ 12.57 hrs, Volume= 6.621 af, Depth= 3.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	13,076	30	Meadow, non-grazed, HSG A
	9,872	58	Meadow, non-grazed, HSG B
	162,839	71	Meadow, non-grazed, HSG C
	21,857	78	Meadow, non-grazed, HSG D
	110,901	30	Woods, Good, HSG A
	222,199	55	Woods, Good, HSG B
	284,517	70	Woods, Good, HSG C
	72,773	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	141,195	98	Water body
*	33,049	96	Gravel road
*	0	98	Structure
*	0	98	Panels
	1,072,278	67	Weighted Average
	931,083		86.83% Pervious Area
	141,195		13.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
29.4	1,139	0.0167	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	72	0.0417	3.29		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.1	491	0.0367	1.34		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
40.2	1,752	Total			

Subcatchment 10bS: Drainage Area 10



Summary for Subcatchment 11aS: Drainage Area 11

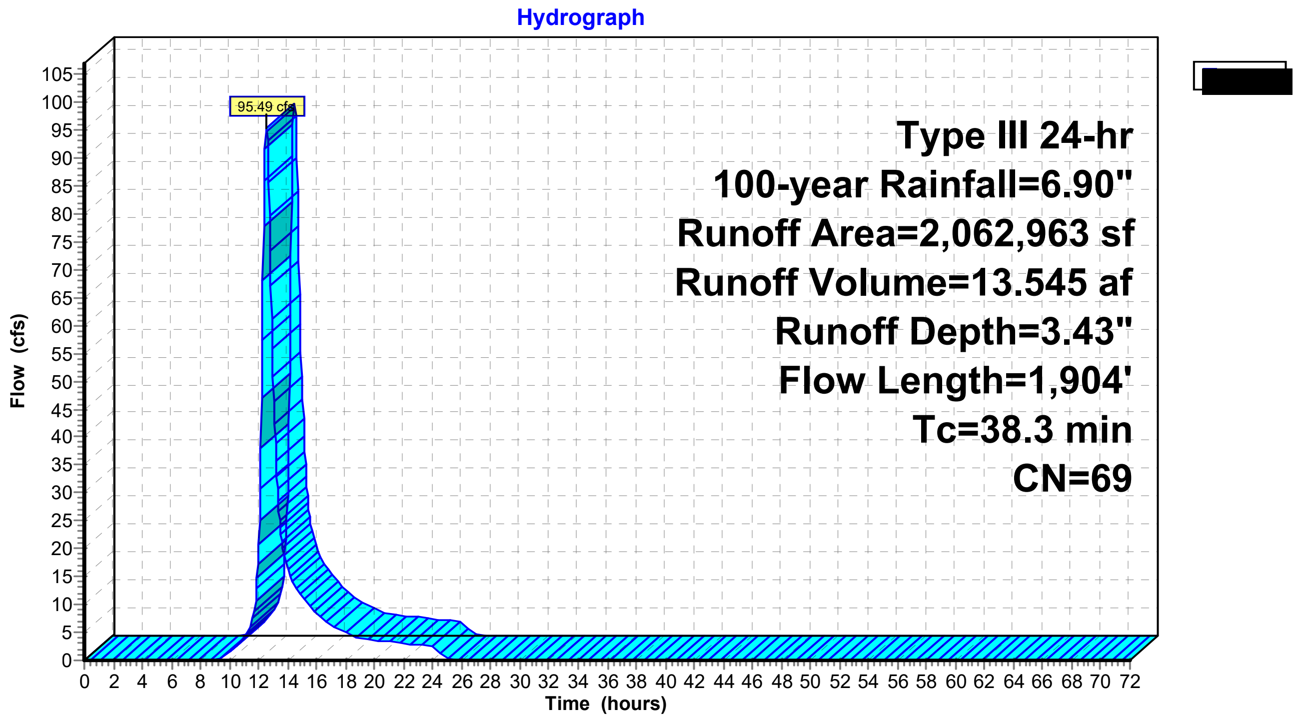
Runoff = 95.49 cfs @ 12.54 hrs, Volume= 13.545 af, Depth= 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	230,381	30	Meadow, non-grazed, HSG A
	74,662	58	Meadow, non-grazed, HSG B
	1,245,920	71	Meadow, non-grazed, HSG C
	51,732	78	Meadow, non-grazed, HSG D
	5,299	30	Woods, Good, HSG A
	38,194	55	Woods, Good, HSG B
	116,983	70	Woods, Good, HSG C
	42,710	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	201,207	98	Water body
*	45,982	96	Gravel road
*	8,006	98	Structure
*	1,887	98	Equipment pad
*	0	98	Panels
	2,062,963	69	Weighted Average
	1,851,863		89.77% Pervious Area
	211,100		10.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
34.0	1,854	0.0330	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
38.3	1,904	Total			

Subcatchment 11aS: Drainage Area 11



Summary for Subcatchment 11bS: Drainage Area 11

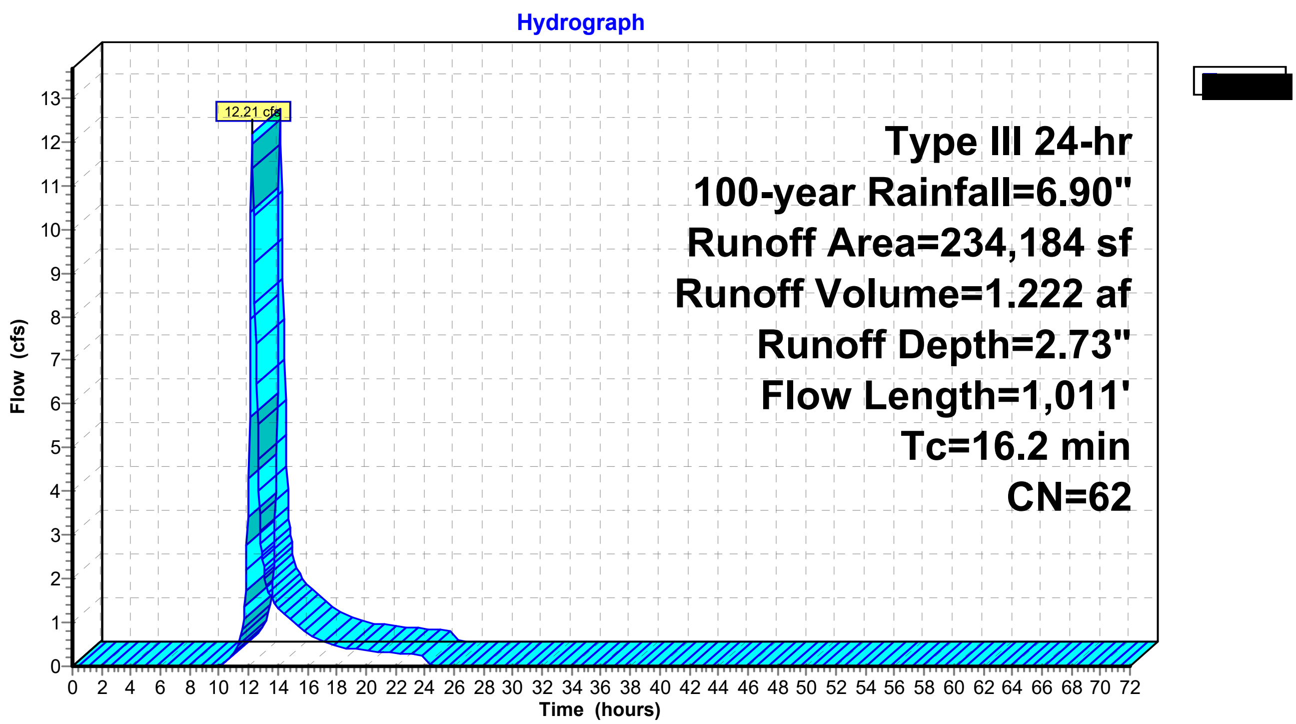
Runoff = 12.21 cfs @ 12.24 hrs, Volume= 1.222 af, Depth= 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	62,296	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	153,054	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	14,214	96	Gravel road
*	0	98	Structure
*	0	98	Equipment pad
*	4,620	98	Panels
	234,184	62	Weighted Average
	229,564		98.03% Pervious Area
	4,620		1.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
10.6	961	0.0468	1.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.2	1,011	Total			

Subcatchment 11bS: Drainage Area 11



Summary for Subcatchment 11cS: Drainage Area 11

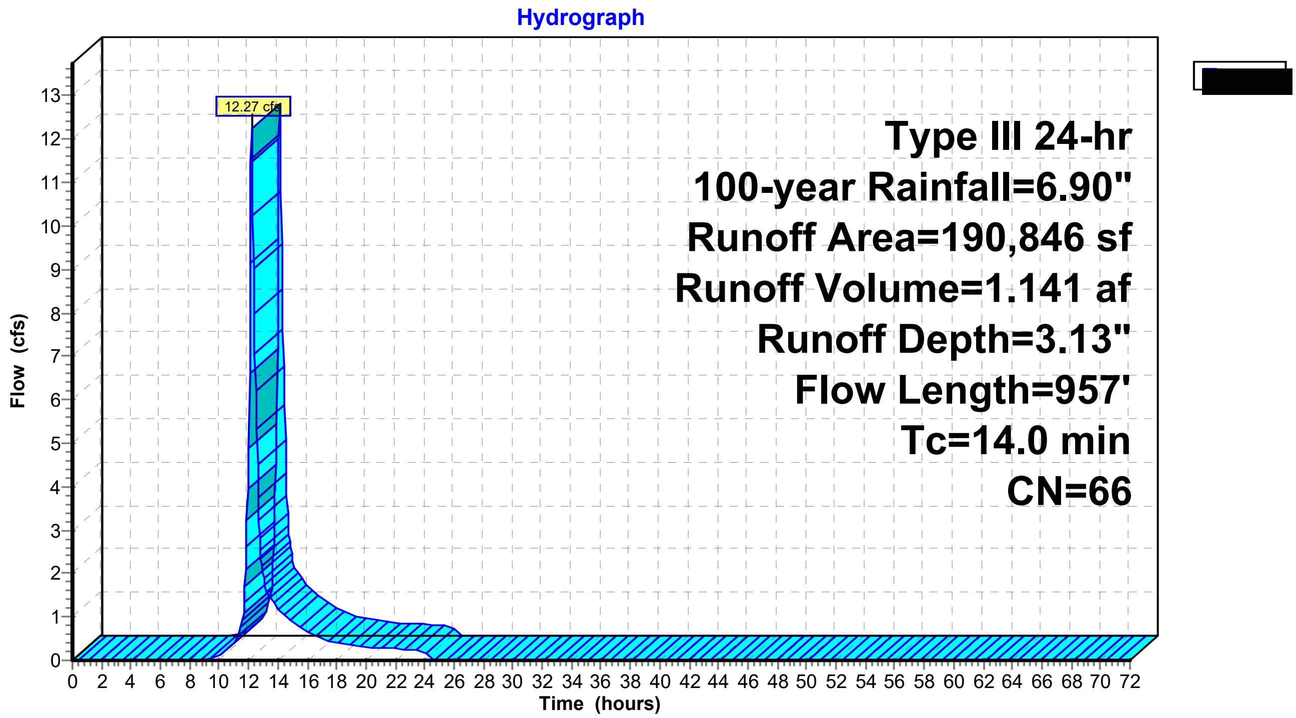
Runoff = 12.27 cfs @ 12.20 hrs, Volume= 1.141 af, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	27,259	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	158,821	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	2,666	96	Gravel road
*	0	98	Structure
*	0	98	Equipment pad
*	2,100	98	Panels
	190,846	66	Weighted Average
	188,746		98.90% Pervious Area
	2,100		1.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
9.7	907	0.0496	1.56		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.0	957	Total			

Subcatchment 11cS: Drainage Area 11



Summary for Subcatchment 12aS: Drainage Area 12a

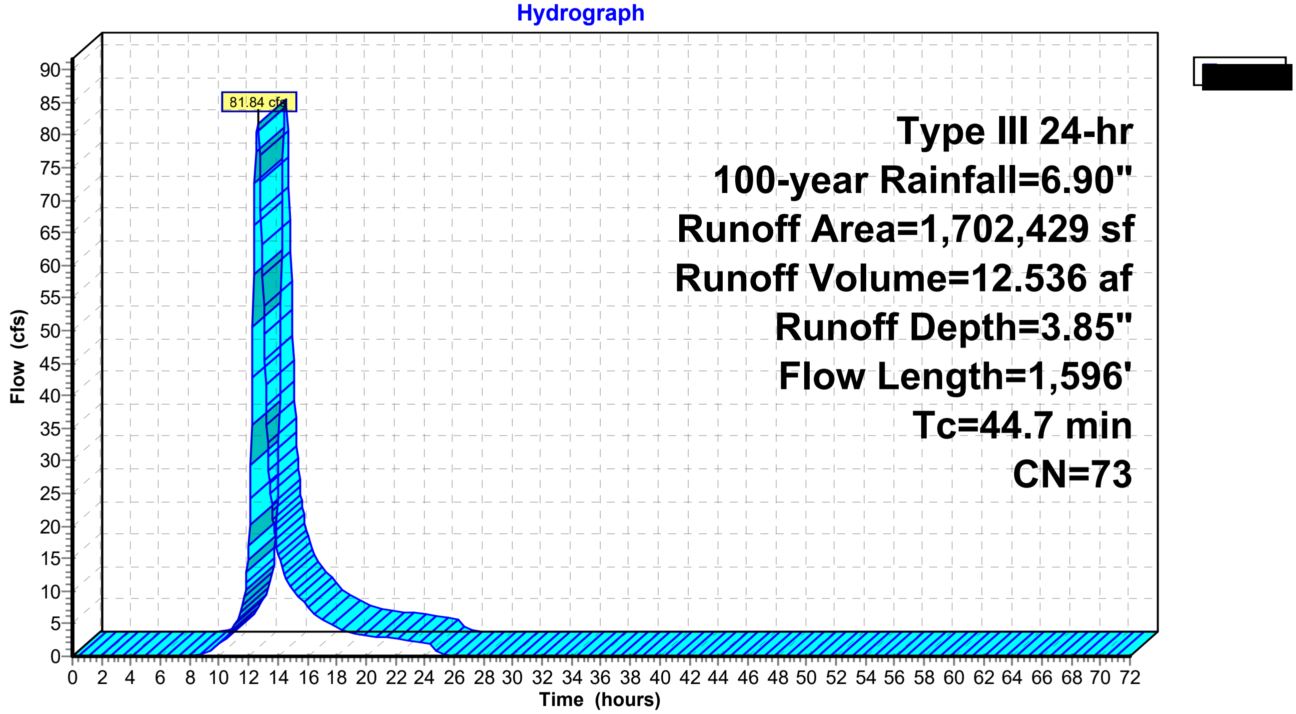
Runoff = 81.84 cfs @ 12.62 hrs, Volume= 12.536 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	23,018	30	Meadow, non-grazed, HSG A
	9,439	58	Meadow, non-grazed, HSG B
	654,323	71	Meadow, non-grazed, HSG C
	210,828	78	Meadow, non-grazed, HSG D
	22,923	30	Woods, Good, HSG A
	183,438	55	Woods, Good, HSG B
	293,907	70	Woods, Good, HSG C
	52,031	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	229,248	98	Water body
*	13,614	96	Gravel road
*	0	98	Structure
*	9,660	98	Panels
*	0	98	Equipment pad
	1,702,429	73	Weighted Average
	1,463,521		85.97% Pervious Area
	238,908		14.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0140	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
7.5	626	0.0780	1.40		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
30.7	920	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
44.7	1,596	Total			

Subcatchment 12aS: Drainage Area 12a



Summary for Subcatchment 12bS: Drainage Area 12b

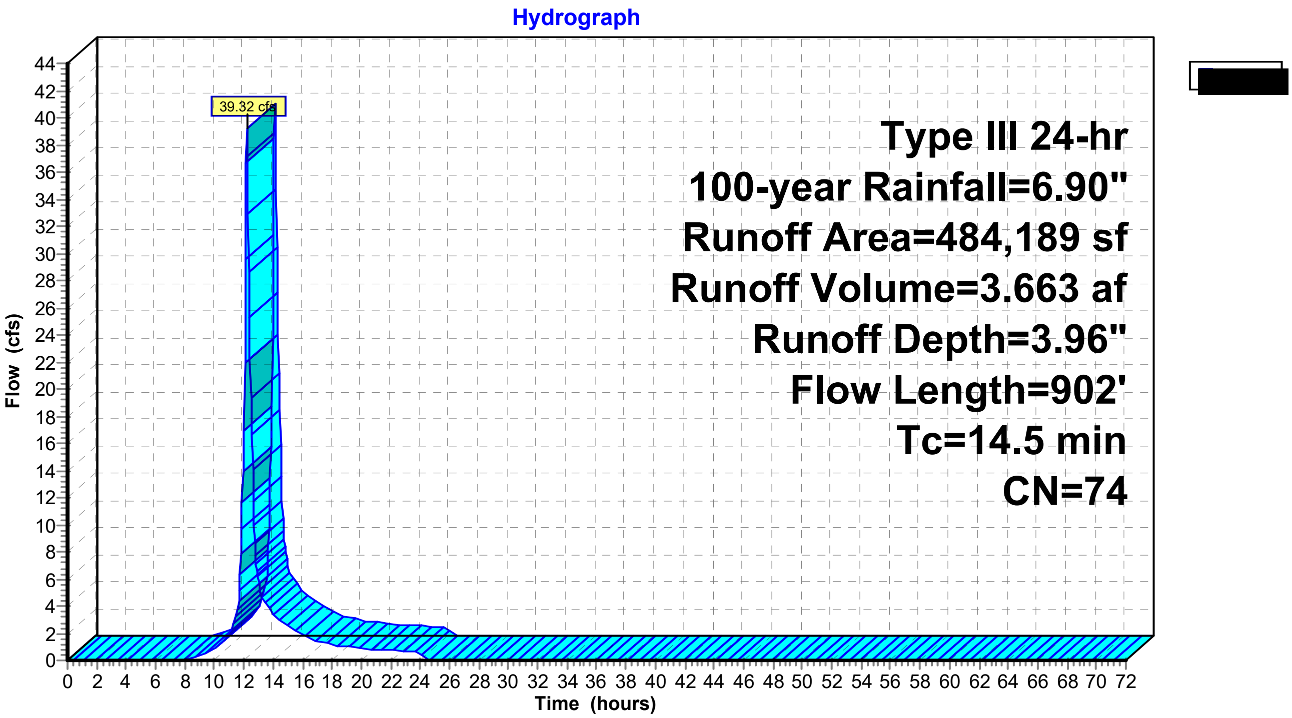
Runoff = 39.32 cfs @ 12.20 hrs, Volume= 3.663 af, Depth= 3.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	438,020	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	8,877	96	Gravel road
*	0	98	Structure
*	9,240	98	Panels
*	1,258	98	Equipment pad
*	26,794	98	Basin
	484,189	74	Weighted Average
	446,897		92.30% Pervious Area
	37,292		7.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
10.2	852	0.0393	1.39		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.5	902	Total			

Subcatchment 12bS: Drainage Area 12b



Summary for Subcatchment 12cS: Drainage Area 12

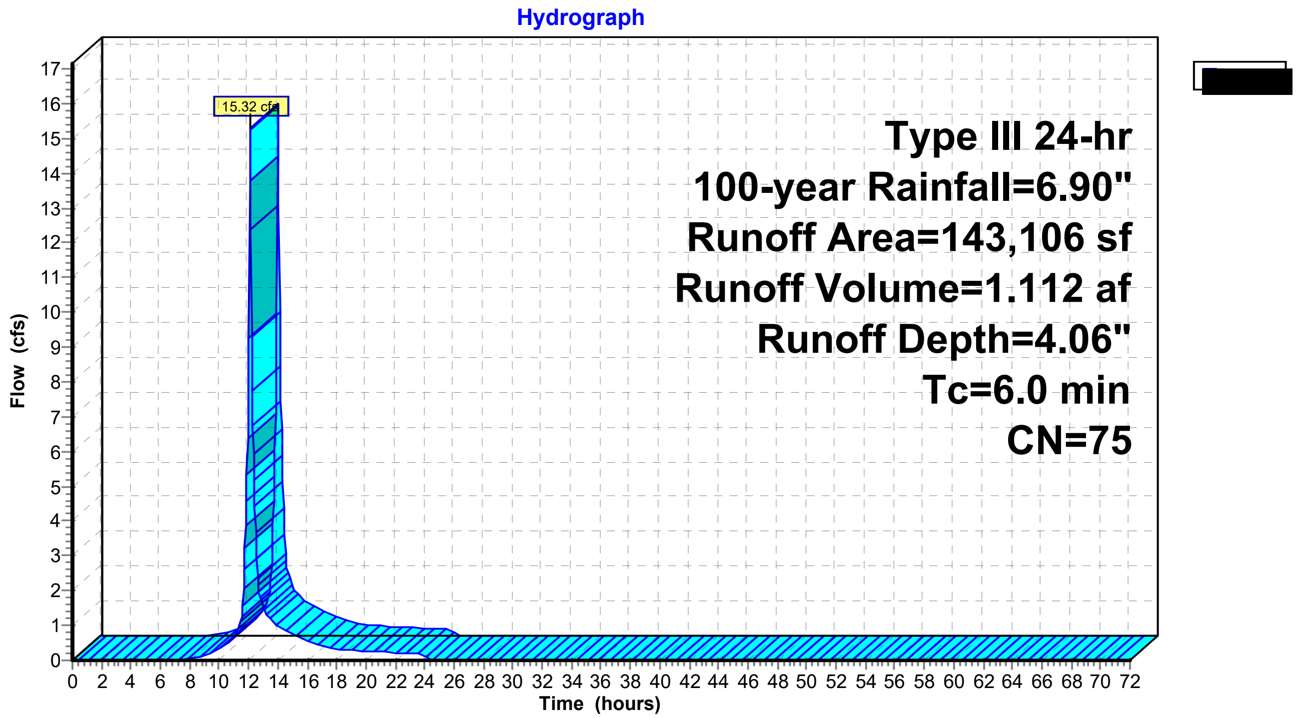
Runoff = 15.32 cfs @ 12.09 hrs, Volume= 1.112 af, Depth= 4.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	0	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	122,234	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	0	70	Gravel pit, HSG A
*	0	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	0	98	Water body
*	8,875	96	Gravel road
*	0	98	Structure
*	0	98	Panels
*	0	98	Equipment pad
*	11,997	98	Basin
	143,106	75	Weighted Average
	131,109		91.62% Pervious Area
	11,997		8.38% Impervious Area

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

Subcatchment 12cS: Drainage Area 12



Summary for Subcatchment 13S: Drainage Area 13

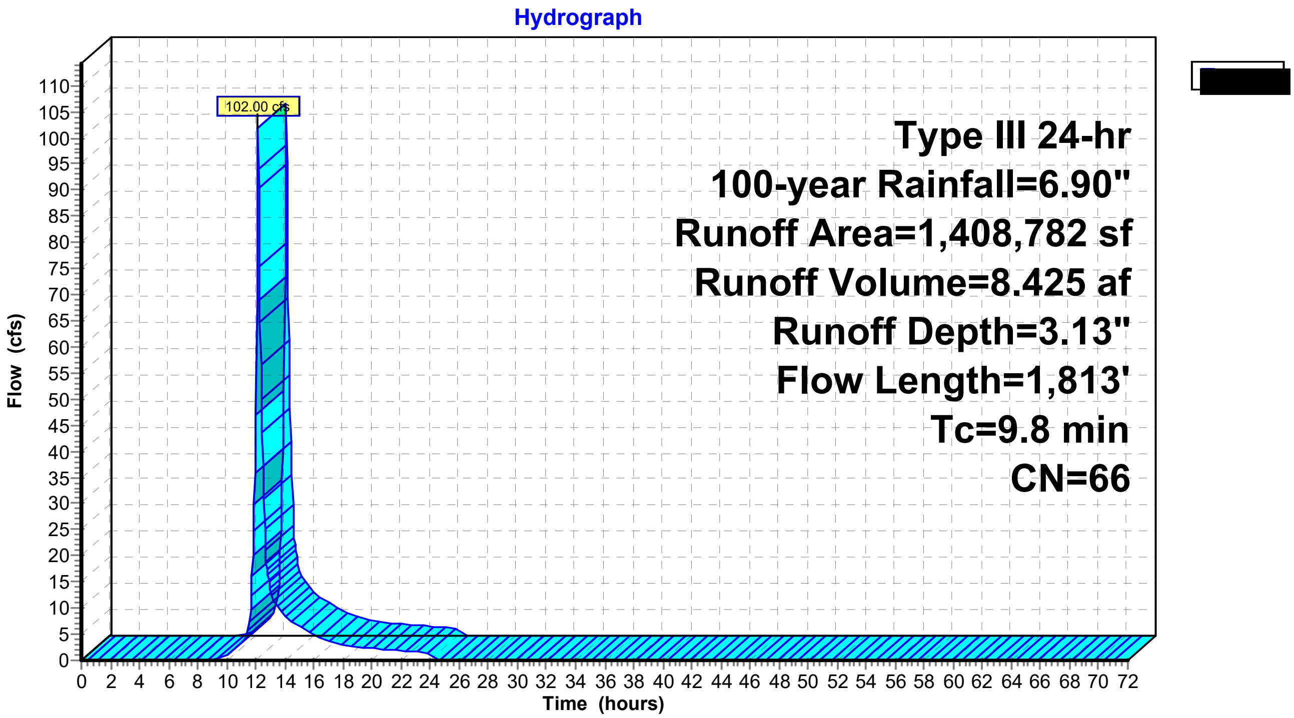
Runoff = 102.00 cfs @ 12.15 hrs, Volume= 8.425 af, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (sf)	CN	Description
	137,390	30	Meadow, non-grazed, HSG A
	0	58	Meadow, non-grazed, HSG B
	0	71	Meadow, non-grazed, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	30	Woods, Good, HSG A
	0	55	Woods, Good, HSG B
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
*	1,266,167	70	Gravel pit, HSG A
*	4,469	81	Gravel pit, HSG B
*	0	88	Gravel pit, HSG C
*	0	92	Gravel pit, HSG D
*	756	98	Water body
*	0	96	Gravel road
*	0	98	Structure
	1,408,782	66	Weighted Average
	1,408,026		99.95% Pervious Area
	756		0.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.20		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
9.1	1,763	0.0403	3.23		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.8	1,813	Total			

Subcatchment 13S: Drainage Area 13



Summary for Reach 10aR: Swale 10a

Inflow Area = 5.867 ac, 13.96% Impervious, Inflow Depth = 3.85" for 100-year event
Inflow = 18.88 cfs @ 12.24 hrs, Volume= 1.882 af
Outflow = 18.51 cfs @ 12.32 hrs, Volume= 1.882 af, Atten= 2%, Lag= 4.6 min

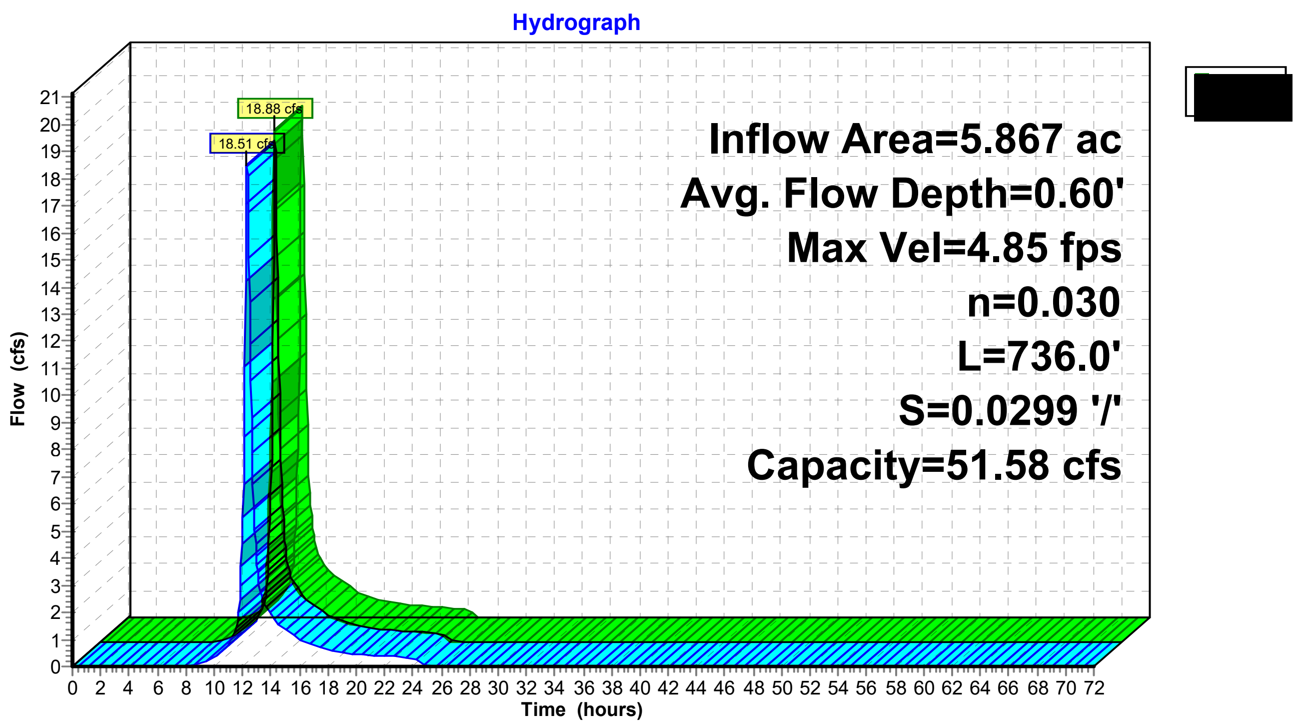
Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.85 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 1.51 fps, Avg. Travel Time= 8.1 min

Peak Storage= 2,815 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.60'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 51.58 cfs

4.00' x 1.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 736.0' Slope= 0.0299 '/'
Inlet Invert= 236.00', Outlet Invert= 214.00'

‡

Reach 10aR: Swale 10a



Summary for Reach 12bR: Swale 12b

Inflow Area = 11.115 ac, 7.70% Impervious, Inflow Depth = 3.96" for 100-year event
Inflow = 39.32 cfs @ 12.20 hrs, Volume= 3.663 af
Outflow = 37.96 cfs @ 12.29 hrs, Volume= 3.663 af, Atten= 3%, Lag= 5.5 min

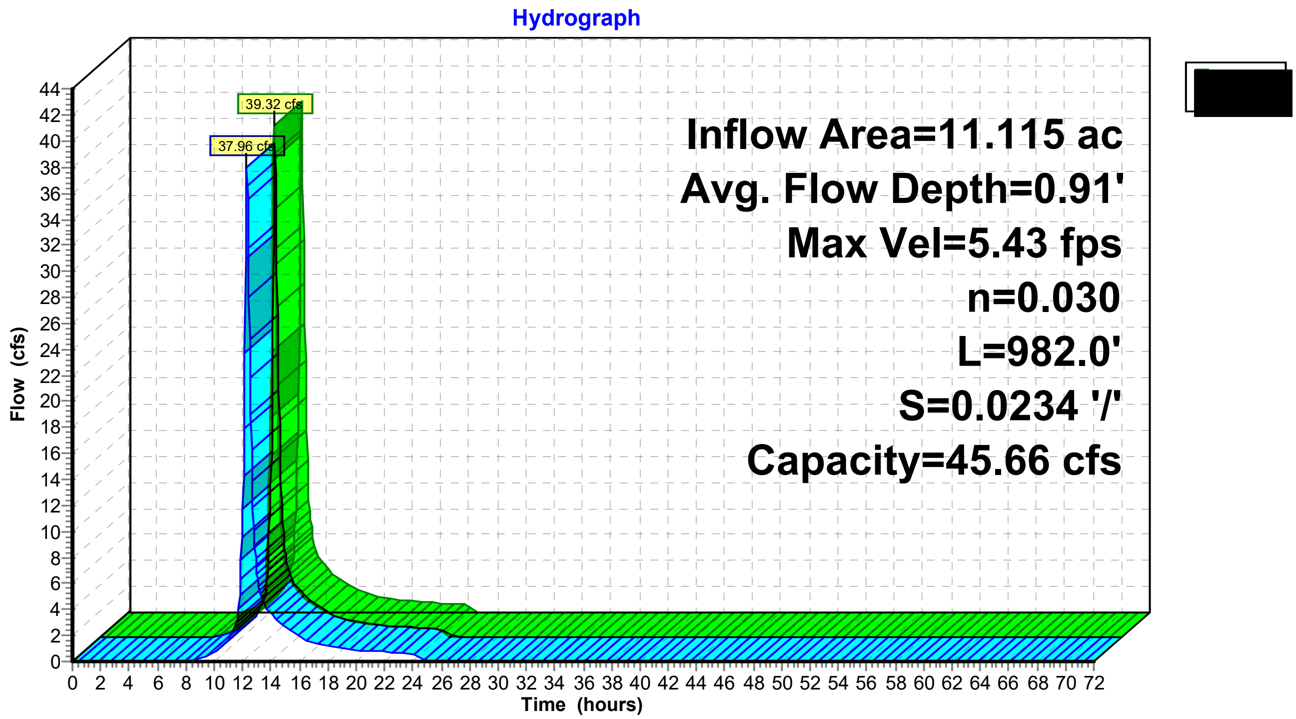
Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.43 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 1.60 fps, Avg. Travel Time= 10.2 min

Peak Storage= 6,866 cf @ 12.24 hrs
Average Depth at Peak Storage= 0.91'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 45.66 cfs

4.00' x 1.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 982.0' Slope= 0.0234 '/'
Inlet Invert= 276.00', Outlet Invert= 253.00'

‡

Reach 12bR: Swale 12b



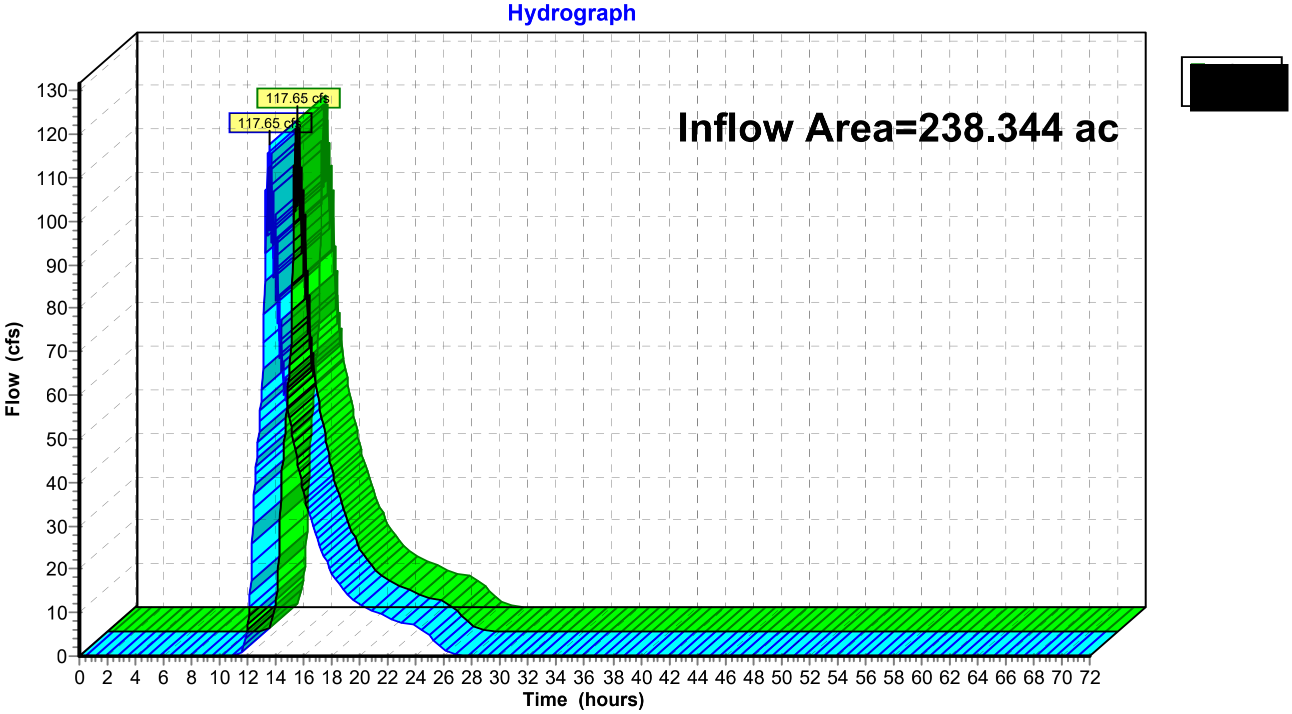
Summary for Reach DP-1: Off-Site West

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 238.344 ac, 10.57% Impervious, Inflow Depth = 1.57" for 100-year event
Inflow = 117.65 cfs @ 13.55 hrs, Volume= 31.164 af
Outflow = 117.65 cfs @ 13.55 hrs, Volume= 31.164 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Off-Site West



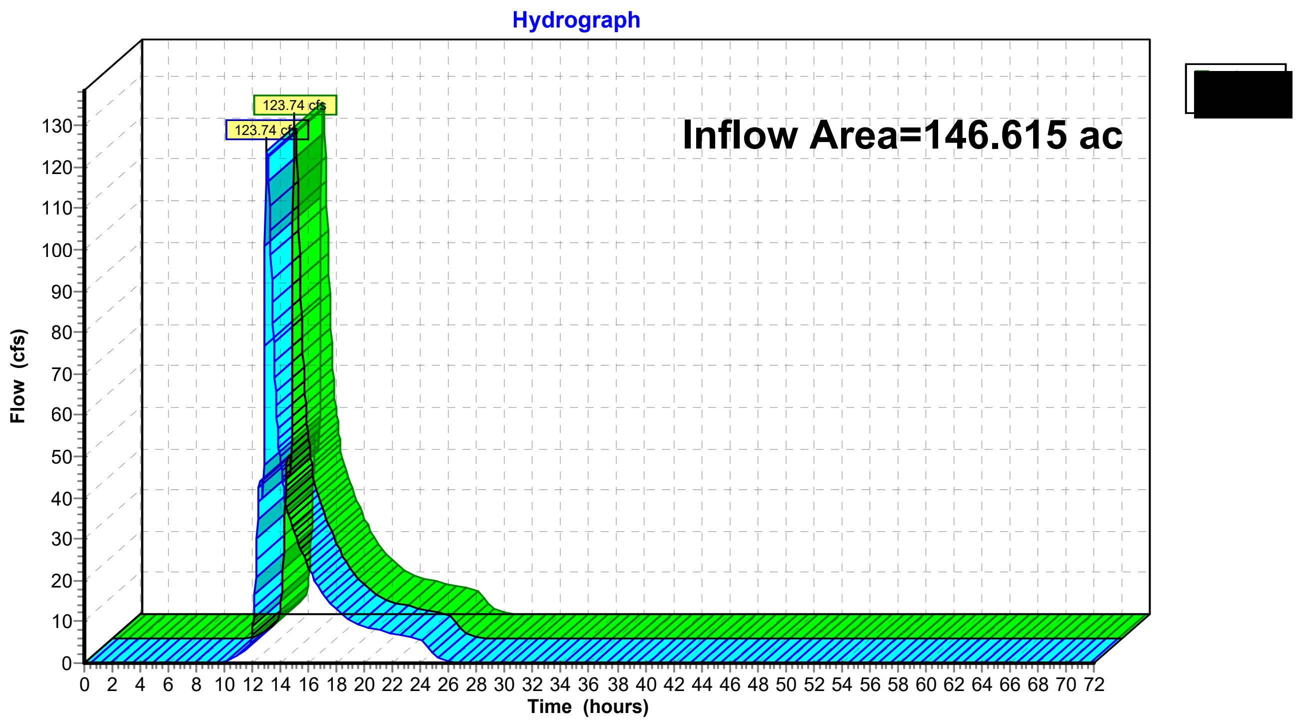
Summary for Reach DP-2: Off-Site South

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 146.615 ac, 22.85% Impervious, Inflow Depth = 1.93" for 100-year event
Inflow = 123.74 cfs @ 13.04 hrs, Volume= 23.593 af
Outflow = 123.74 cfs @ 13.04 hrs, Volume= 23.593 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: Off-Site South



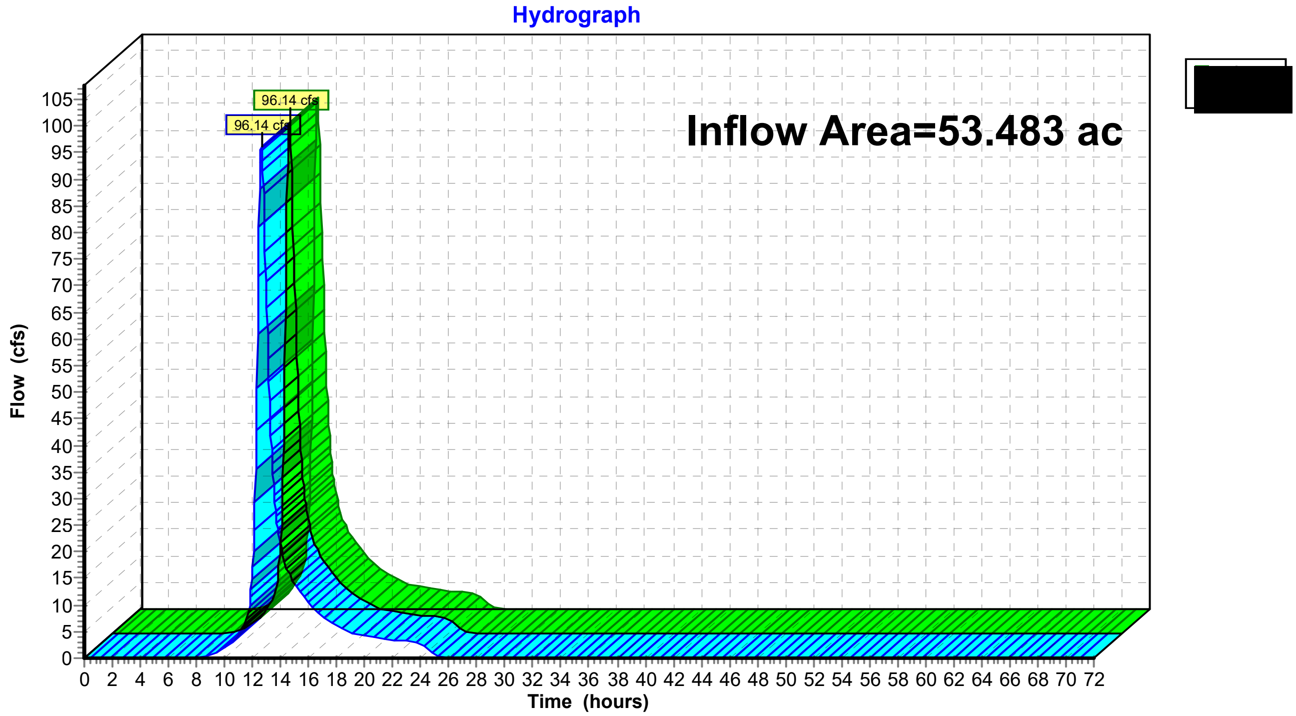
Summary for Reach DP-3: Off-Site East

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 53.483 ac, 12.37% Impervious, Inflow Depth = 3.45" for 100-year event
Inflow = 96.14 cfs @ 12.64 hrs, Volume= 15.364 af
Outflow = 96.14 cfs @ 12.64 hrs, Volume= 15.364 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-3: Off-Site East



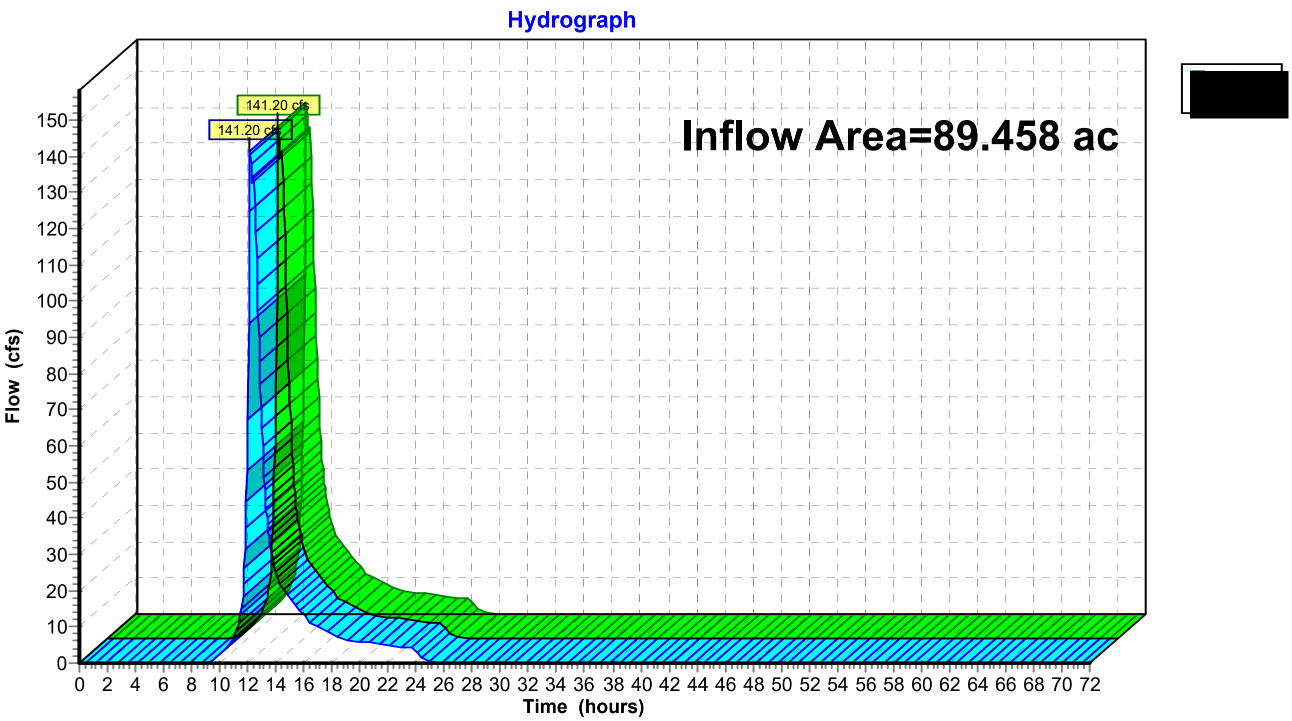
Summary for Reach DP-4: Off-Site Southeast

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	89.458 ac,	5.61% Impervious, Inflow Depth = 2.96"	for 100-year event	
Inflow =	141.20 cfs @	12.17 hrs, Volume=	22.076 af	
Outflow =	141.20 cfs @	12.17 hrs, Volume=	22.076 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-4: Off-Site Southeast



Summary for Pond 1bP: Proposed Basin

Inflow Area = 3.365 ac, 28.06% Impervious, Inflow Depth = 1.52" for 100-year event
Inflow = 4.39 cfs @ 12.16 hrs, Volume= 0.428 af
Outflow = 1.27 cfs @ 12.65 hrs, Volume= 0.428 af, Atten= 71%, Lag= 29.1 min
Discarded = 1.27 cfs @ 12.65 hrs, Volume= 0.428 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 152.18' @ 12.65 hrs Surf.Area= 22,693 sf Storage= 3,887 cf

Plug-Flow detention time= 21.1 min calculated for 0.427 af (100% of inflow)
Center-of-Mass det. time= 21.0 min (910.0 - 888.9)

Volume	Invert	Avail.Storage	Storage Description
#1	152.00'	55,260 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

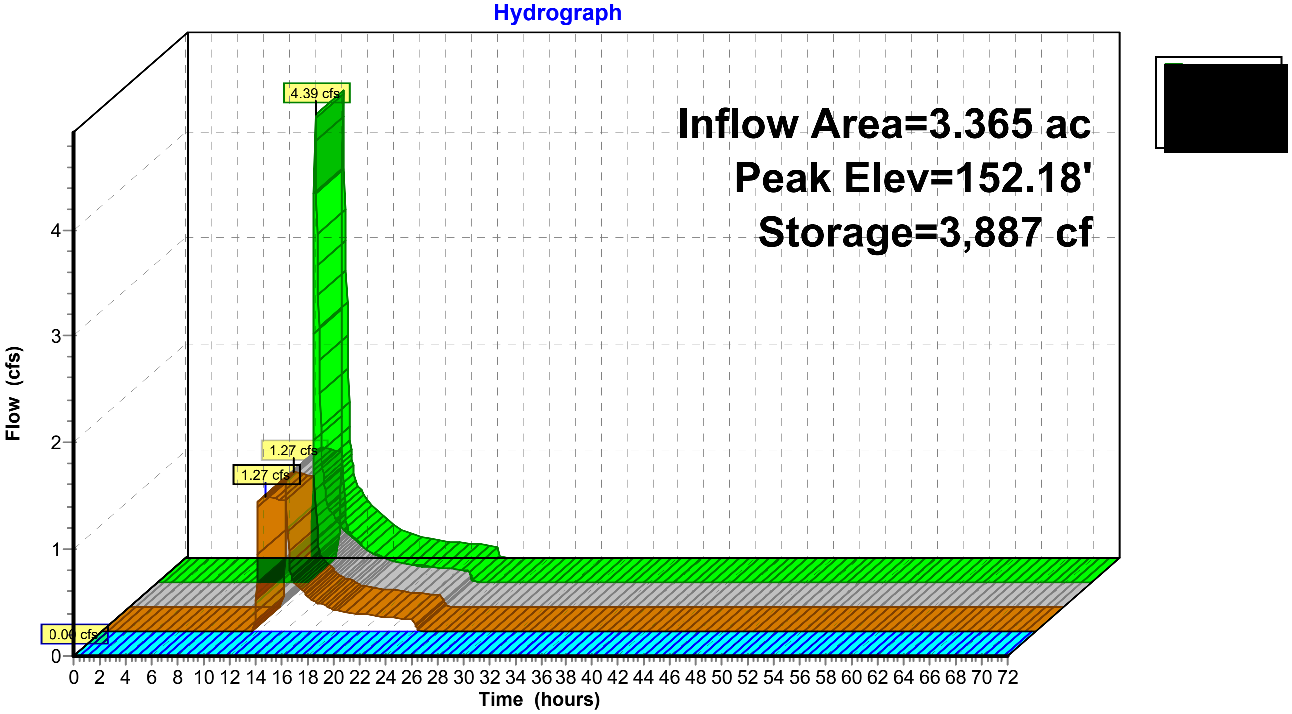
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
152.00	21,729	681.0	0	0	21,729
154.00	33,986	817.0	55,260	55,260	38,010

Device	Routing	Invert	Outlet Devices
#1	Primary	153.50'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	152.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.27 cfs @ 12.65 hrs HW=152.18' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 1.27 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=152.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1bP: Proposed Basin



Summary for Pond 1cP: Proposed Basin

Inflow Area = 9.376 ac, 8.65% Impervious, Inflow Depth = 3.85" for 100-year event
Inflow = 23.76 cfs @ 12.42 hrs, Volume= 3.008 af
Outflow = 23.29 cfs @ 12.48 hrs, Volume= 3.007 af, Atten= 2%, Lag= 3.4 min
Discarded = 0.09 cfs @ 12.48 hrs, Volume= 0.301 af
Primary = 23.20 cfs @ 12.48 hrs, Volume= 2.706 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 227.50' @ 12.48 hrs Surf.Area= 14,158 sf Storage= 15,328 cf

Plug-Flow detention time= 147.1 min calculated for 3.005 af (100% of inflow)
Center-of-Mass det. time= 148.9 min (996.4 - 847.5)

Volume	Invert	Avail.Storage	Storage Description
#1	226.00'	23,156 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

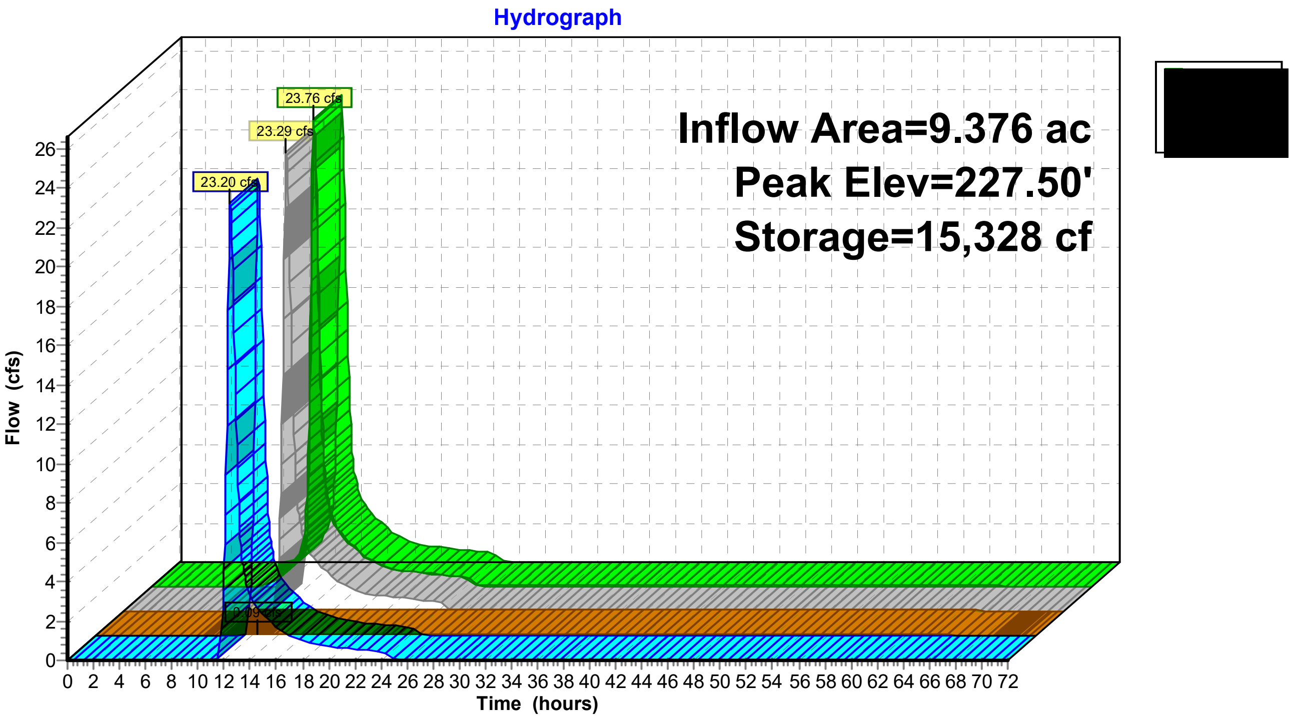
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
226.00	6,727	408.0	0	0	6,727
228.00	17,238	601.0	23,156	23,156	22,256

Device	Routing	Invert	Outlet Devices
#1	Primary	227.00'	**25.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	226.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.09 cfs @ 12.48 hrs HW=227.50' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=23.12 cfs @ 12.48 hrs HW=227.50' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 23.12 cfs @ 1.85 fps)

Pond 1cP: Proposed Basin



Summary for Pond 1dP: Proposed Berm

[93] Warning: Storage range exceeded by 0.07'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=1)

Inflow Area = 7.830 ac, 7.37% Impervious, Inflow Depth = 3.96" for 100-year event
Inflow = 9.94 cfs @ 13.44 hrs, Volume= 2.581 af
Outflow = 10.56 cfs @ 13.55 hrs, Volume= 2.439 af, Atten= 0%, Lag= 7.0 min
Discarded = 0.10 cfs @ 13.55 hrs, Volume= 0.460 af
Primary = 10.46 cfs @ 13.55 hrs, Volume= 1.978 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 258.07' @ 13.55 hrs Surf.Area= 16,286 sf Storage= 28,065 cf

Plug-Flow detention time= 348.2 min calculated for 2.437 af (94% of inflow)
Center-of-Mass det. time= 319.9 min (1,234.9 - 914.9)

Volume	Invert	Avail.Storage	Storage Description
#1	256.00'	28,065 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

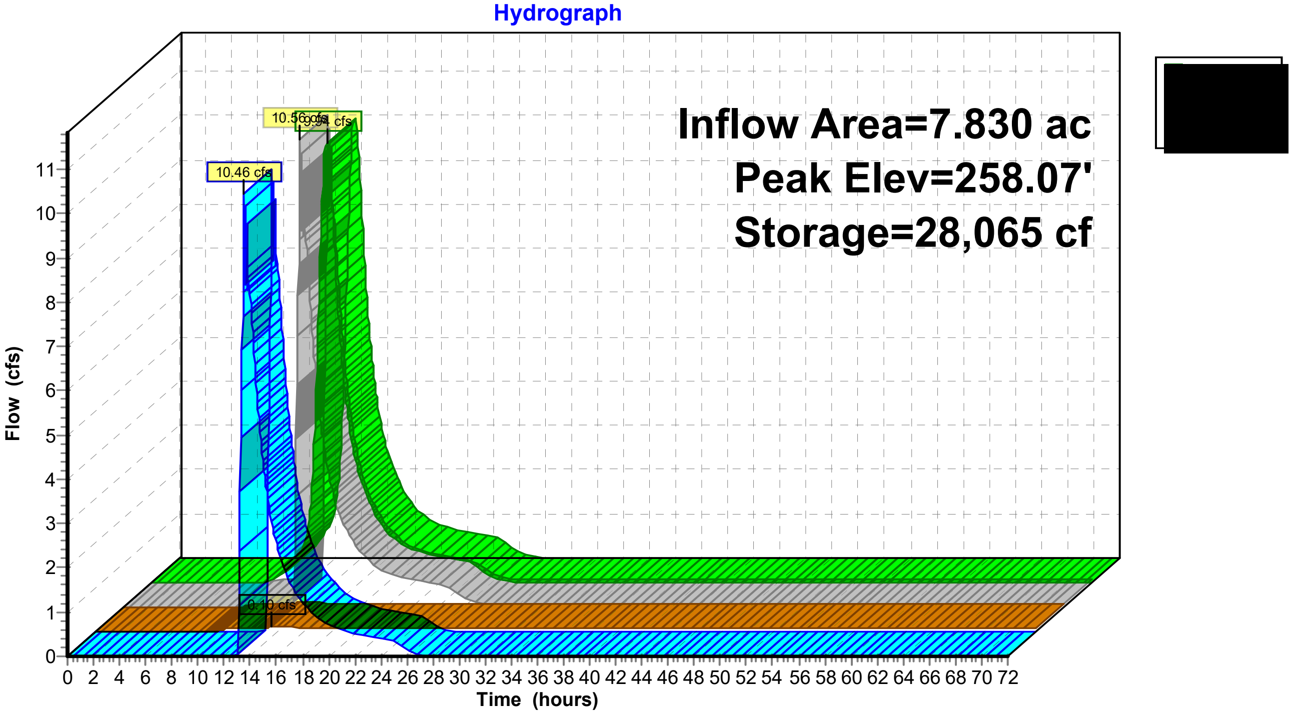
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
256.00	11,894	466.0	0	0	11,894
258.00	16,286	530.0	28,065	28,065	17,063

Device	Routing	Invert	Outlet Devices
#1	Primary	257.50'	**9.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	256.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.10 cfs @ 13.55 hrs HW=258.07' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=10.33 cfs @ 13.55 hrs HW=258.07' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 10.33 cfs @ 2.02 fps)

Pond 1dP: Proposed Berm



Summary for Pond 2P: Existing Depression

Inflow Area =	5.349 ac,	1.98% Impervious, Inflow Depth = 1.35"	for 100-year event	
Inflow =	5.46 cfs @	12.21 hrs, Volume=	0.604 af	
Outflow =	0.54 cfs @	15.58 hrs, Volume=	0.604 af,	Atten= 90%, Lag= 202.3 min
Discarded =	0.54 cfs @	15.58 hrs, Volume=	0.604 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 168.82' @ 15.58 hrs Surf.Area= 22,660 sf Storage= 11,806 cf

Plug-Flow detention time= 290.4 min calculated for 0.604 af (100% of inflow)
Center-of-Mass det. time= 290.4 min (1,188.6 - 898.2)

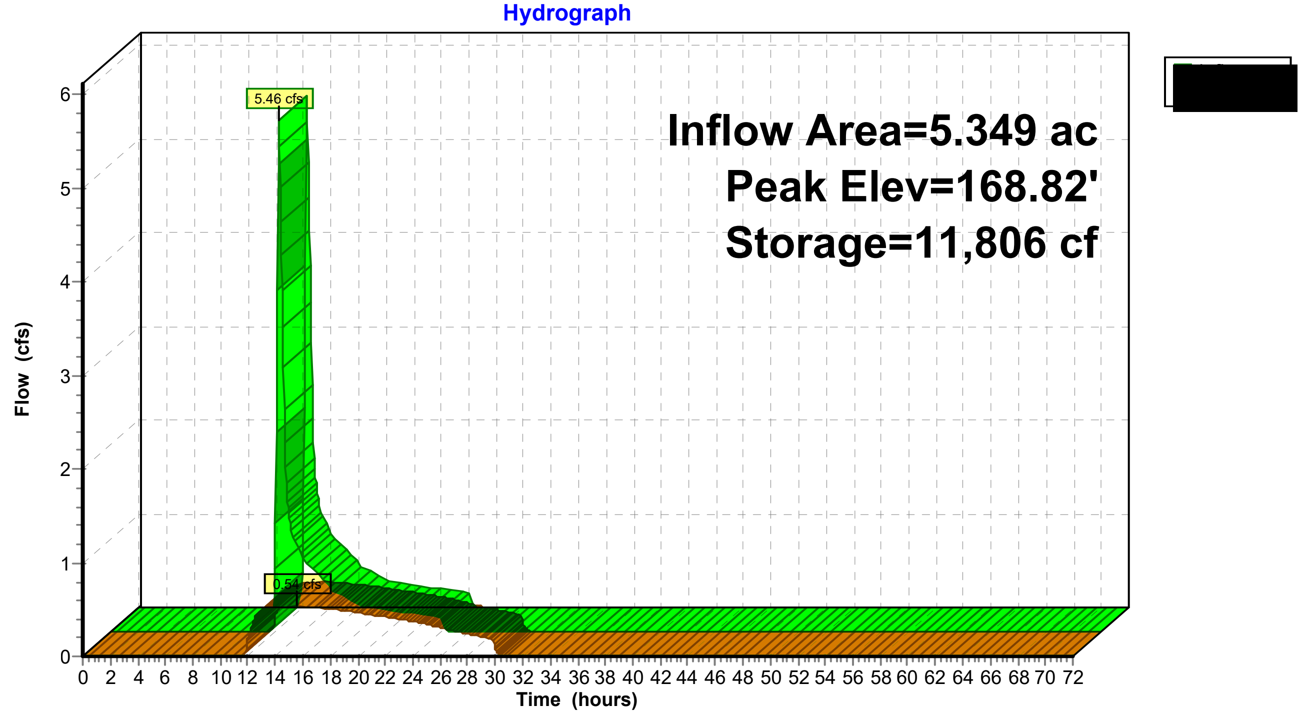
Volume	Invert	Avail.Storage	Storage Description
#1	168.00'	58,289 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
168.00	7,570	407.0	0	0	7,570
170.00	58,771	1,048.0	58,289	58,289	81,803

Device	Routing	Invert	Outlet Devices
#1	Discarded	168.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.54 cfs @ 15.58 hrs HW=168.82' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.54 cfs)

Pond 2P: Existing Depression



Summary for Pond 3aP: Proposed Berm

Inflow Area = 8.260 ac, 3.27% Impervious, Inflow Depth = 3.85" for 100-year event
Inflow = 25.45 cfs @ 12.27 hrs, Volume= 2.650 af
Outflow = 1.76 cfs @ 15.34 hrs, Volume= 2.148 af, Atten= 93%, Lag= 184.0 min
Discarded = 0.35 cfs @ 15.34 hrs, Volume= 1.485 af
Primary = 1.41 cfs @ 15.34 hrs, Volume= 0.662 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 273.92' @ 15.34 hrs Surf.Area= 56,516 sf Storage= 77,126 cf

Plug-Flow detention time= 1,177.9 min calculated for 2.148 af (81% of inflow)
Center-of-Mass det. time= 1,102.6 min (1,939.8 - 837.2)

Volume	Invert	Avail.Storage	Storage Description
#1	272.00'	81,503 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

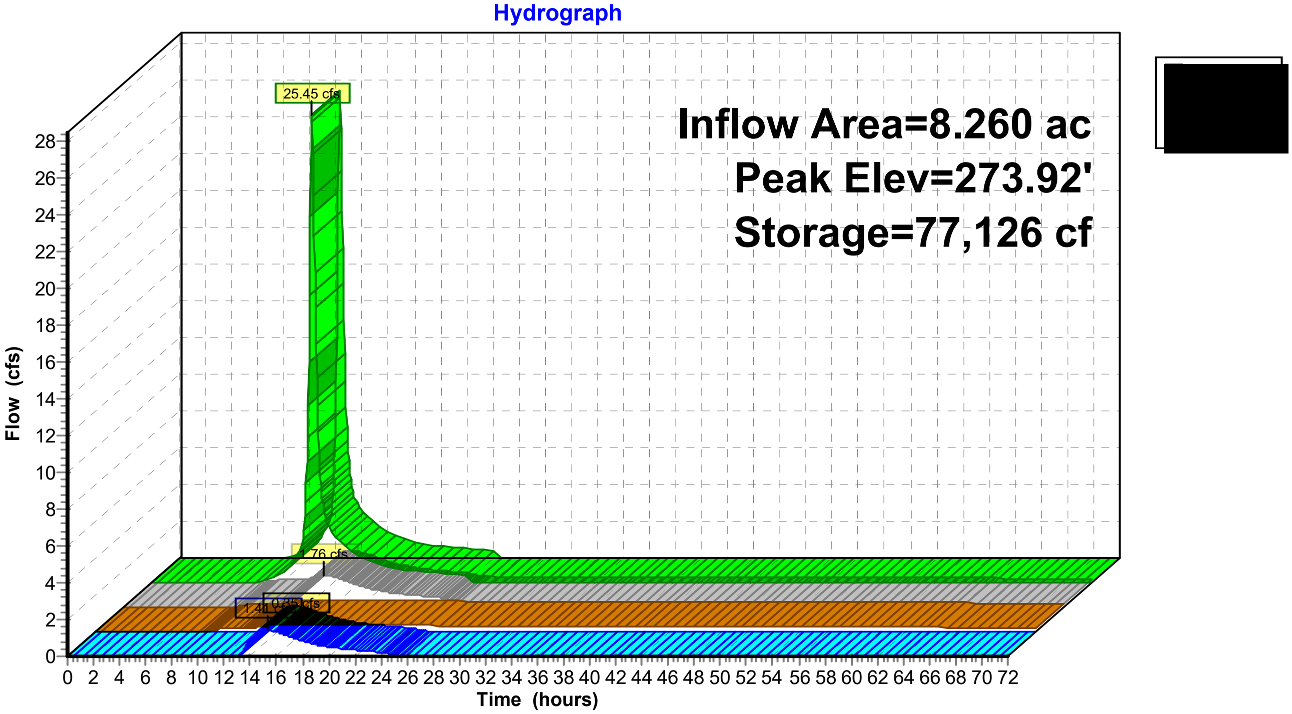
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.00	25,677	871.0	0	0	25,677
274.00	57,990	1,103.0	81,503	81,503	62,174

Device	Routing	Invert	Outlet Devices
#1	Primary	273.75'	**8.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	272.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.35 cfs @ 15.34 hrs HW=273.92' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.35 cfs)

Primary OutFlow Max=1.41 cfs @ 15.34 hrs HW=273.92' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 1.41 cfs @ 1.01 fps)

Pond 3aP: Proposed Berm



Summary for Pond 3P: Existing Depression

Inflow Area = 31.734 ac, 4.54% Impervious, Inflow Depth = 2.87" for 100-year event
Inflow = 73.71 cfs @ 12.21 hrs, Volume= 7.578 af
Outflow = 6.07 cfs @ 15.35 hrs, Volume= 7.224 af, Atten= 92%, Lag= 188.4 min
Discarded = 1.63 cfs @ 15.35 hrs, Volume= 6.022 af
Primary = 4.44 cfs @ 15.35 hrs, Volume= 1.201 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 191.09' @ 15.35 hrs Surf.Area= 69,085 sf Storage= 209,971 cf

Plug-Flow detention time= 1,175.7 min calculated for 7.219 af (95% of inflow)
Center-of-Mass det. time= 1,151.6 min (2,009.6 - 858.1)

Volume	Invert	Avail.Storage	Storage Description
#1	186.00'	277,396 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

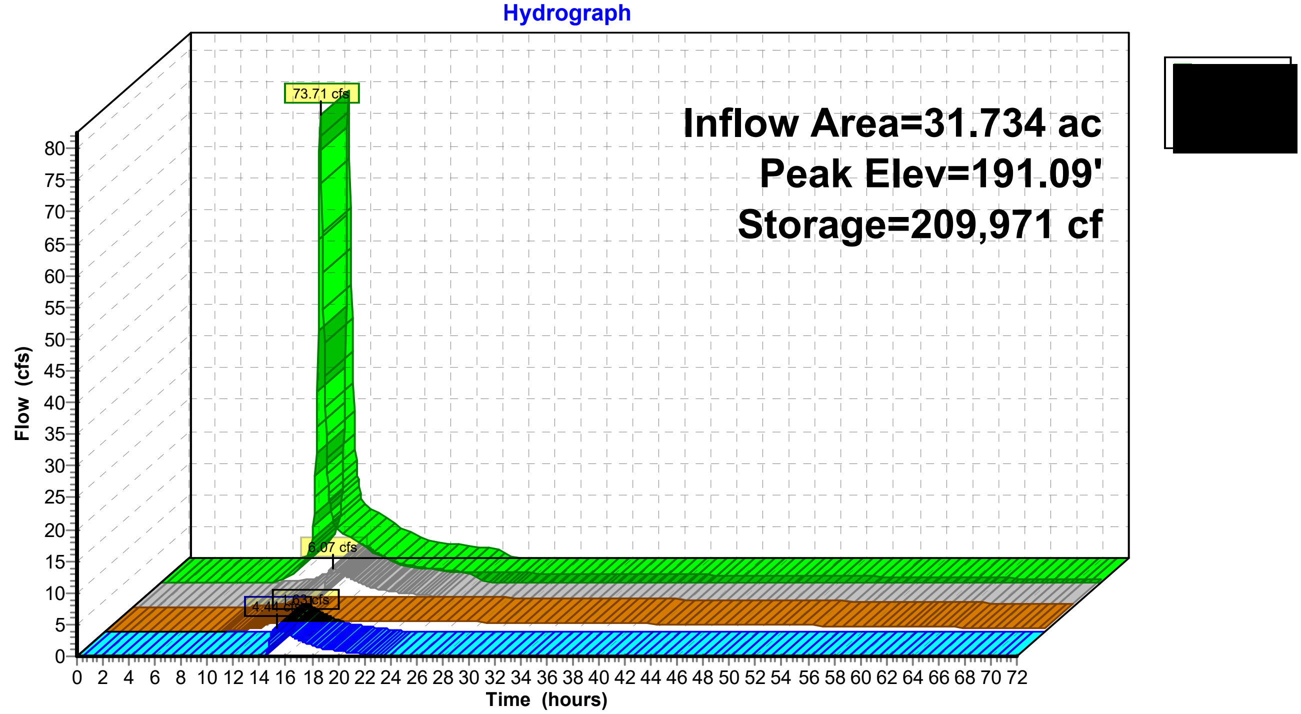
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
186.00	11,737	422.0	0	0	11,737
188.00	36,683	753.0	46,113	46,113	42,709
190.00	58,742	1,001.0	94,563	140,677	77,369
192.00	78,452	1,254.0	136,720	277,396	122,825

Device	Routing	Invert	Outlet Devices
#1	Discarded	186.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	191.00'	**64.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=1.63 cfs @ 15.35 hrs HW=191.09' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 1.63 cfs)

Primary OutFlow Max=4.28 cfs @ 15.35 hrs HW=191.09' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 4.28 cfs @ 0.78 fps)

Pond 3P: Existing Depression



Summary for Pond 4P: Existing Depression

Inflow Area = 16.464 ac, 0.65% Impervious, Inflow Depth = 4.71" for 100-year event
Inflow = 69.69 cfs @ 12.19 hrs, Volume= 6.465 af
Outflow = 1.75 cfs @ 18.09 hrs, Volume= 5.602 af, Atten= 97%, Lag= 354.1 min
Discarded = 1.75 cfs @ 18.09 hrs, Volume= 5.602 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 168.69' @ 18.09 hrs Surf.Area= 74,143 sf Storage= 213,410 cf

Plug-Flow detention time= 1,361.5 min calculated for 5.602 af (87% of inflow)
Center-of-Mass det. time= 1,302.0 min (2,115.4 - 813.4)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	1,773,203 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

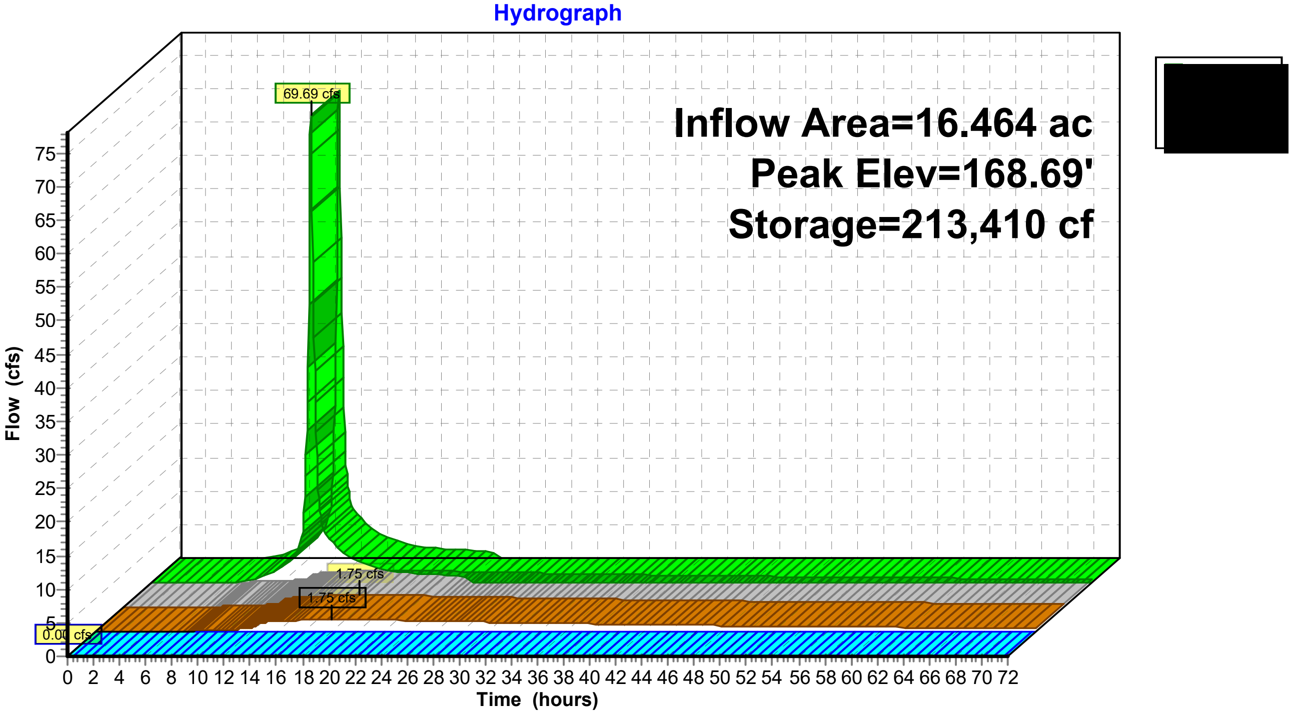
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
162.00	8,040	387.0	0	0	8,040
164.00	20,064	890.0	27,203	27,203	59,171
166.00	31,393	894.0	51,036	78,239	61,043
168.00	59,552	1,582.0	89,455	167,695	196,625
170.00	106,611	3,162.0	163,895	331,590	793,118
172.00	142,449	3,012.0	248,196	579,786	867,073
174.00	182,259	2,708.0	323,891	903,678	1,005,567
176.00	222,778	3,083.0	404,360	1,308,037	1,178,477
178.00	242,528	3,031.0	465,166	1,773,203	1,204,505

Device	Routing	Invert	Outlet Devices
#1	Discarded	162.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	177.00'	**23.0' long x 99.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=1.75 cfs @ 18.09 hrs HW=168.69' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 1.75 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=162.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: Existing Depression



Summary for Pond 5bP: Proposed Berm

Inflow Area = 1.206 ac, 64.34% Impervious, Inflow Depth = 5.04" for 100-year event
Inflow = 6.82 cfs @ 12.09 hrs, Volume= 0.507 af
Outflow = 0.41 cfs @ 13.93 hrs, Volume= 0.507 af, Atten= 94%, Lag= 110.4 min
Discarded = 0.41 cfs @ 13.93 hrs, Volume= 0.507 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 231.37' @ 13.93 hrs Surf.Area= 17,444 sf Storage= 12,157 cf

Plug-Flow detention time= 374.4 min calculated for 0.507 af (100% of inflow)
Center-of-Mass det. time= 374.6 min (1,172.9 - 798.3)

Volume	Invert	Avail.Storage	Storage Description
#1	230.00'	26,529 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

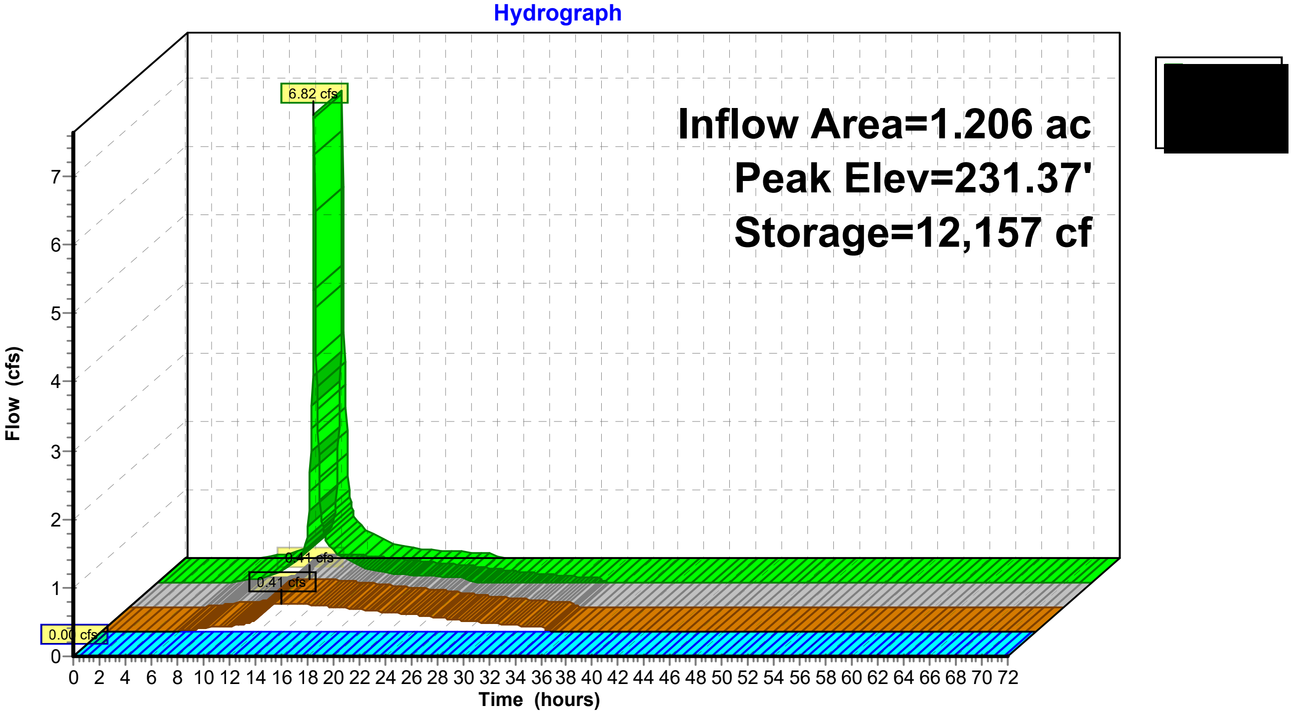
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	2,519	275.0	0	0	2,519
232.00	28,762	1,204.0	26,529	26,529	111,868

Device	Routing	Invert	Outlet Devices
#1	Discarded	230.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	231.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.41 cfs @ 13.93 hrs HW=231.37' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.41 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=230.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5bP: Proposed Berm



Summary for Pond 5cP: Proposed Berm

Inflow Area = 6.244 ac, 13.40% Impervious, Inflow Depth = 3.74" for 100-year event
Inflow = 15.65 cfs @ 12.41 hrs, Volume= 1.948 af
Outflow = 7.04 cfs @ 12.87 hrs, Volume= 1.392 af, Atten= 55%, Lag= 27.7 min
Discarded = 0.03 cfs @ 12.87 hrs, Volume= 0.117 af
Primary = 7.01 cfs @ 12.87 hrs, Volume= 1.275 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 211.00' @ 12.87 hrs Surf.Area= 13,393 sf Storage= 37,107 cf

Plug-Flow detention time= 314.8 min calculated for 1.392 af (71% of inflow)
Center-of-Mass det. time= 220.2 min (1,068.9 - 848.7)

Volume	Invert	Avail.Storage	Storage Description
#1	206.00'	37,107 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

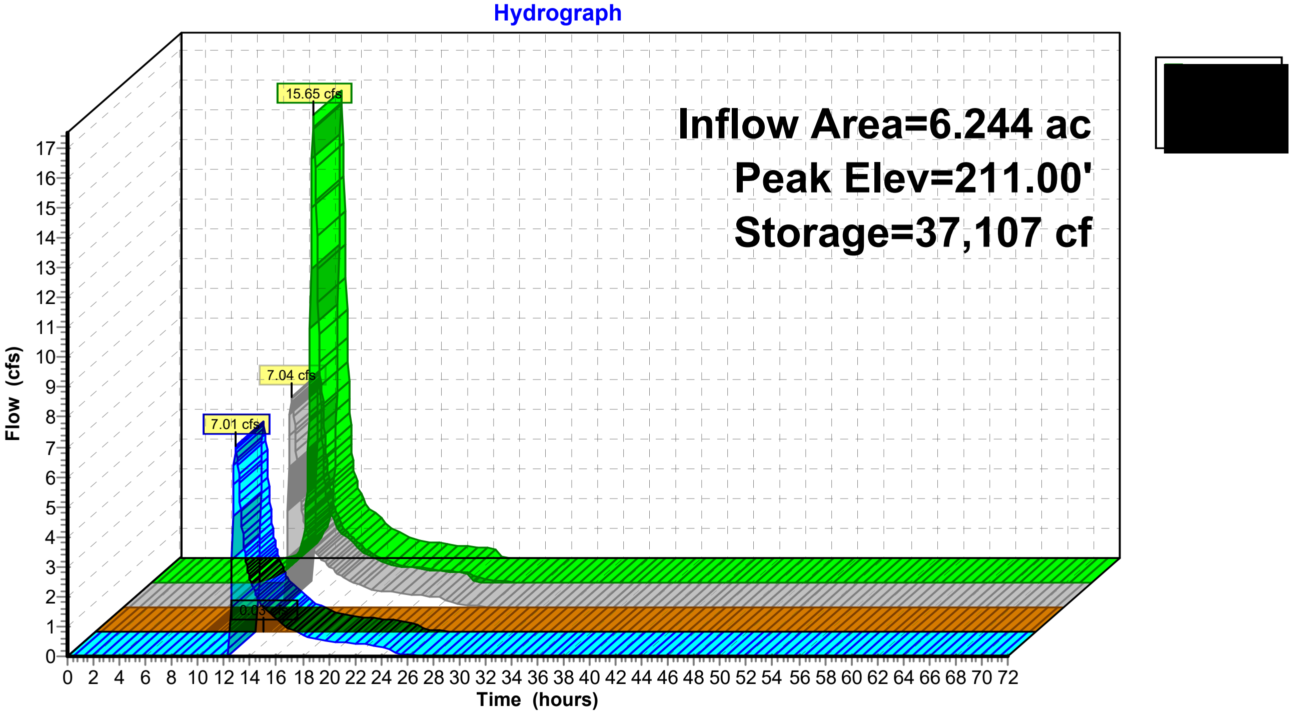
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
206.00	2,702	340.0	0	0	2,702
208.00	6,061	500.0	8,540	8,540	13,430
210.00	10,702	660.0	16,545	25,084	28,245
211.00	13,393	685.0	12,022	37,107	31,004

Device	Routing	Invert	Outlet Devices
#1	Discarded	206.00'	**0.090 in/hr Exfiltration over Surface area**
#2	Primary	210.25'	**4.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.03 cfs @ 12.87 hrs HW=211.00' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=6.99 cfs @ 12.87 hrs HW=211.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 6.99 cfs @ 2.33 fps)

Pond 5cP: Proposed Berm



Summary for Pond 5dP: Proposed Berm

Inflow Area = 1.360 ac, 44.82% Impervious, Inflow Depth = 5.16" for 100-year event
Inflow = 7.07 cfs @ 12.13 hrs, Volume= 0.584 af
Outflow = 0.38 cfs @ 14.66 hrs, Volume= 0.584 af, Atten= 95%, Lag= 152.0 min
Discarded = 0.11 cfs @ 14.66 hrs, Volume= 0.499 af
Primary = 0.27 cfs @ 14.66 hrs, Volume= 0.085 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 285.06' @ 14.66 hrs Surf.Area= 17,379 sf Storage= 16,689 cf

Plug-Flow detention time= 1,247.2 min calculated for 0.584 af (100% of inflow)
Center-of-Mass det. time= 1,248.2 min (2,046.7 - 798.5)

Volume	Invert	Avail.Storage	Storage Description
#1	284.00'	34,488 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

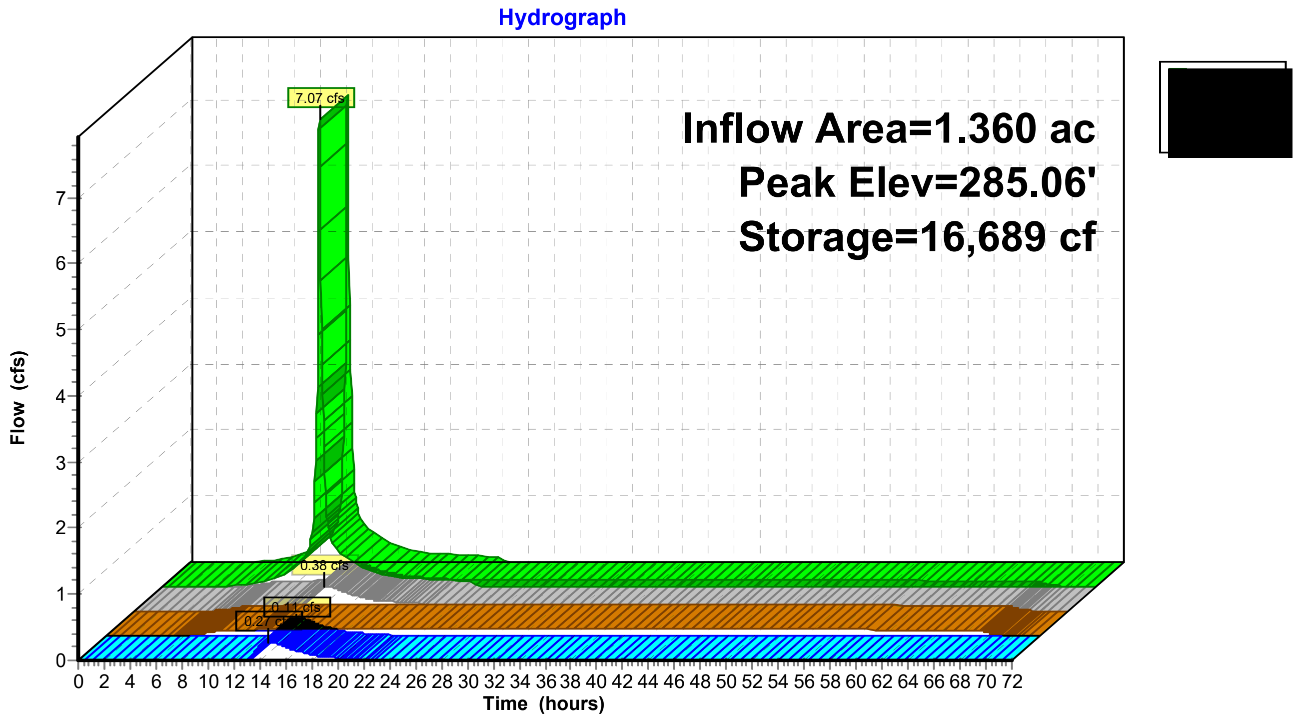
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
284.00	14,216	751.0	0	0	14,216
286.00	20,461	810.0	34,488	34,488	21,709

Device	Routing	Invert	Outlet Devices
#1	Discarded	284.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	285.00'	**8.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.11 cfs @ 14.66 hrs HW=285.06' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.27 cfs @ 14.66 hrs HW=285.06' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.27 cfs @ 0.59 fps)

Pond 5dP: Proposed Berm



Summary for Pond 5P: Existing Depression

Inflow Area = 68.434 ac, 25.36% Impervious, Inflow Depth = 3.16" for 100-year event
Inflow = 104.68 cfs @ 12.71 hrs, Volume= 18.038 af
Outflow = 103.59 cfs @ 12.77 hrs, Volume= 16.444 af, Atten= 1%, Lag= 3.3 min
Discarded = 0.26 cfs @ 12.77 hrs, Volume= 1.103 af
Primary = 103.33 cfs @ 12.77 hrs, Volume= 15.341 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 167.92' @ 12.77 hrs Surf.Area= 41,769 sf Storage= 130,811 cf

Plug-Flow detention time= 173.0 min calculated for 16.433 af (91% of inflow)
Center-of-Mass det. time= 130.9 min (1,010.4 - 879.5)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	134,374 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

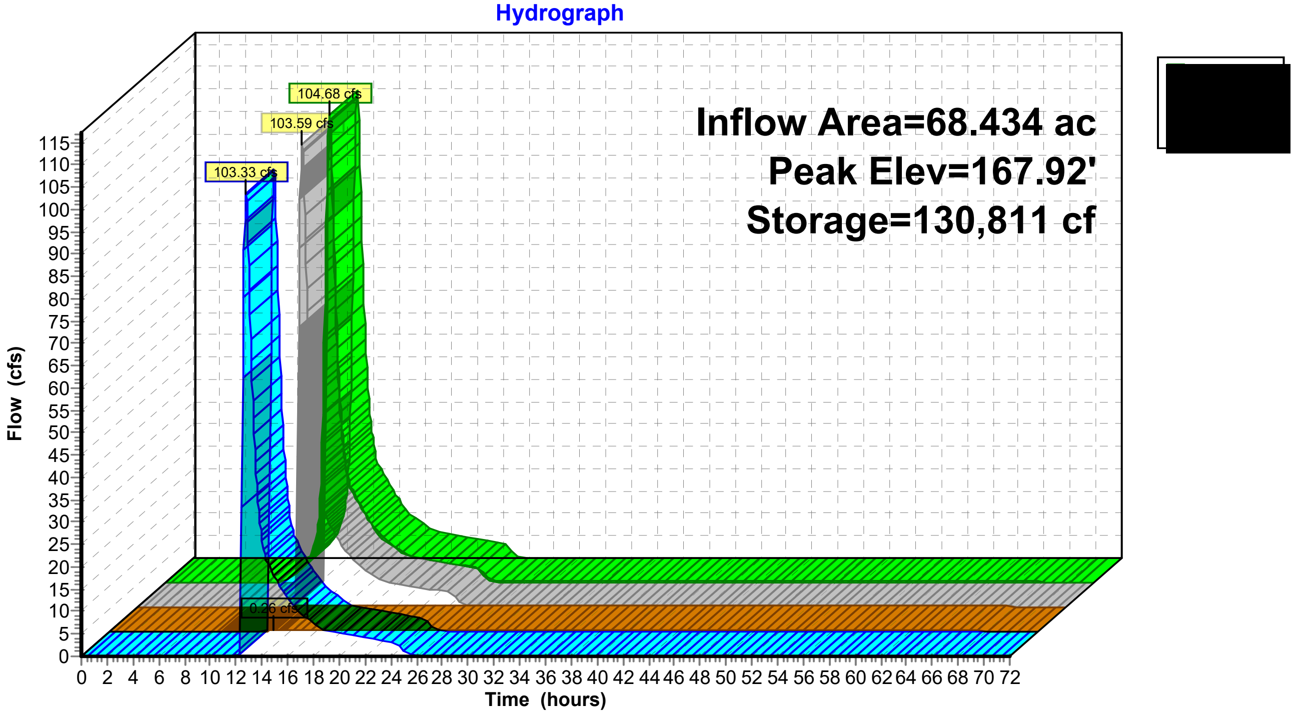
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
162.00	1,686	164.0	0	0	1,686
164.00	17,454	653.0	16,376	16,376	33,489
166.00	29,548	840.0	46,474	62,851	55,756
168.00	42,358	938.0	71,523	134,374	69,736

Device	Routing	Invert	Outlet Devices
#1	Discarded	162.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	167.25'	**71.0' long x 38.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.26 cfs @ 12.77 hrs HW=167.91' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.26 cfs)

Primary OutFlow Max=103.05 cfs @ 12.77 hrs HW=167.91' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 103.05 cfs @ 2.18 fps)

Pond 5P: Existing Depression



Summary for Pond 6bP: Proposed Berm

Inflow Area =	10.770 ac, 17.08% Impervious,	Inflow Depth = 1.44"	for 100-year event
Inflow =	10.07 cfs @ 12.33 hrs,	Volume= 1.292 af	
Outflow =	1.86 cfs @ 13.81 hrs,	Volume= 1.292 af,	Atten= 82%, Lag= 88.8 min
Discarded =	1.86 cfs @ 13.81 hrs,	Volume= 1.292 af	
Primary =	0.00 cfs @ 0.00 hrs,	Volume= 0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 164.68' @ 13.81 hrs Surf.Area= 33,330 sf Storage= 18,141 cf

Plug-Flow detention time= 104.7 min calculated for 1.291 af (100% of inflow)
Center-of-Mass det. time= 104.7 min (1,006.1 - 901.4)

Volume	Invert	Avail.Storage	Storage Description
#1	164.00'	83,016 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

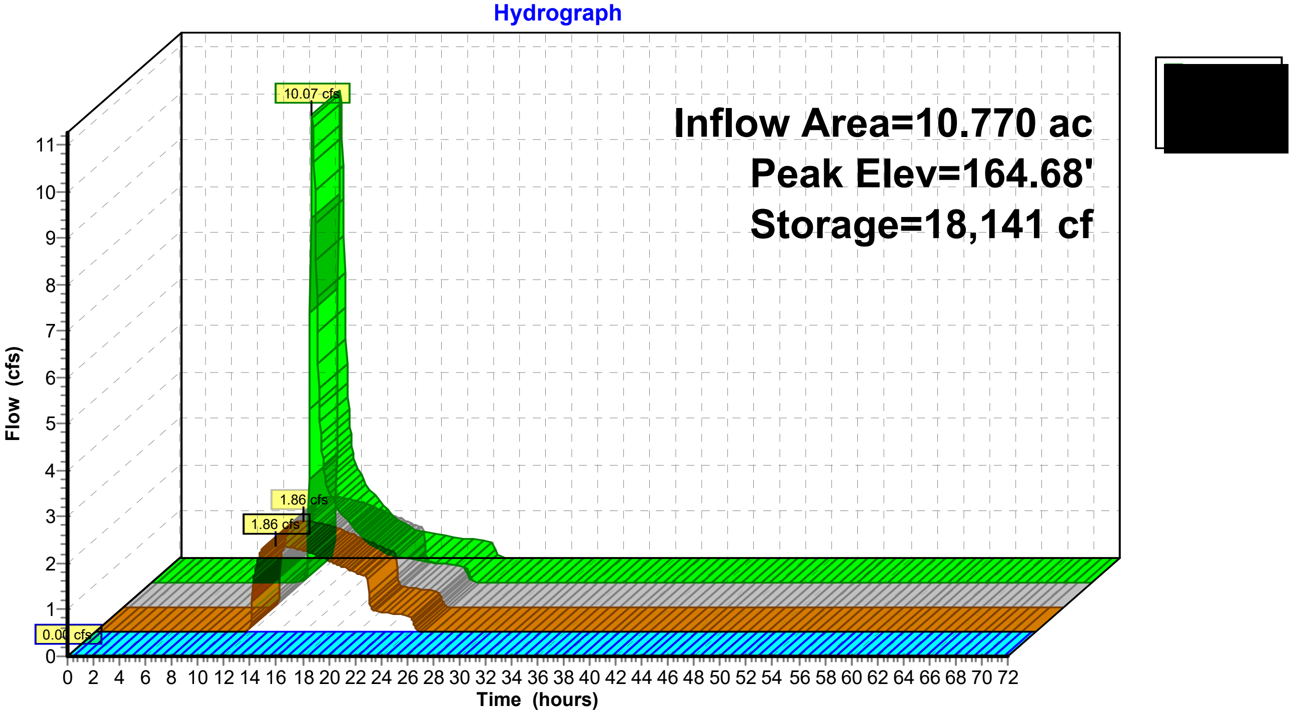
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
164.00	20,590	712.0	0	0	20,590
166.00	66,837	1,639.0	83,016	83,016	194,035

Device	Routing	Invert	Outlet Devices
#1	Primary	165.00'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	164.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.86 cfs @ 13.81 hrs HW=164.68' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 1.86 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=164.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 6bP: Proposed Berm



Summary for Pond 6P: Existing Wetland

Inflow Area = 116.133 ac, 25.36% Impervious, Inflow Depth = 2.26" for 100-year event
Inflow = 128.43 cfs @ 12.73 hrs, Volume= 21.900 af
Outflow = 98.97 cfs @ 13.07 hrs, Volume= 18.685 af, Atten= 23%, Lag= 20.1 min
Discarded = 0.48 cfs @ 13.07 hrs, Volume= 2.092 af
Primary = 98.49 cfs @ 13.07 hrs, Volume= 16.592 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 141.45' @ 13.07 hrs Surf.Area= 121,123 sf Storage= 260,357 cf

Plug-Flow detention time= 283.5 min calculated for 18.672 af (85% of inflow)
Center-of-Mass det. time= 220.6 min (1,121.0 - 900.4)

Volume	Invert	Avail.Storage	Storage Description
#1	138.00'	330,471 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

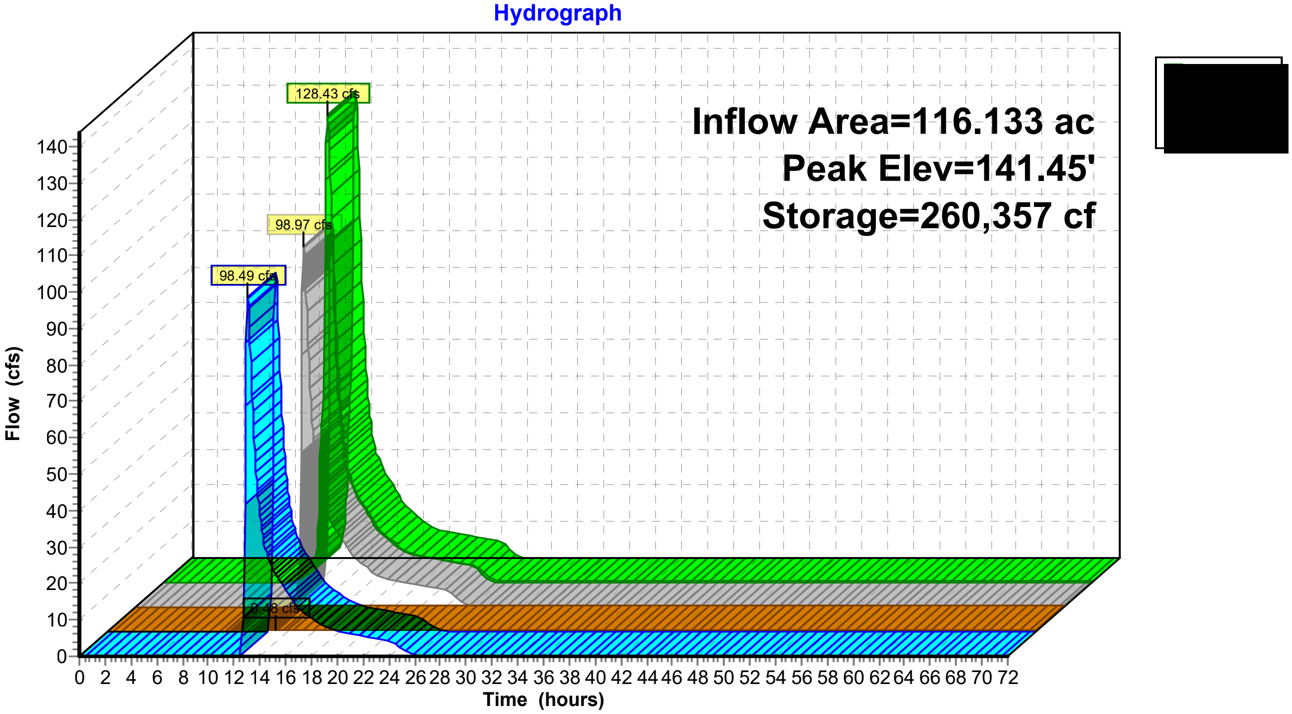
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
138.00	23,460	686.0	0	0	23,460
140.00	91,023	1,816.0	107,129	107,129	248,460
142.00	133,681	2,277.0	223,342	330,471	398,668

Device	Routing	Invert	Outlet Devices
#1	Discarded	138.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	141.00'	**121.0' long x 19.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.48 cfs @ 13.07 hrs HW=141.45' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.48 cfs)

Primary OutFlow Max=98.03 cfs @ 13.07 hrs HW=141.45' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 98.03 cfs @ 1.81 fps)

Pond 6P: Existing Wetland



Summary for Pond 7aP: Proposed Berm

Inflow Area = 6.064 ac, 2.54% Impervious, Inflow Depth = 0.60" for 100-year event
Inflow = 0.67 cfs @ 13.79 hrs, Volume= 0.301 af
Outflow = 0.10 cfs @ 24.86 hrs, Volume= 0.301 af, Atten= 85%, Lag= 664.4 min
Discarded = 0.10 cfs @ 24.86 hrs, Volume= 0.301 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 166.87' @ 24.86 hrs Surf.Area= 16,166 sf Storage= 9,092 cf

Plug-Flow detention time= 1,071.3 min calculated for 0.301 af (100% of inflow)
Center-of-Mass det. time= 1,071.3 min (2,102.3 - 1,031.1)

Volume	Invert	Avail.Storage	Storage Description
#1	166.00'	38,794 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

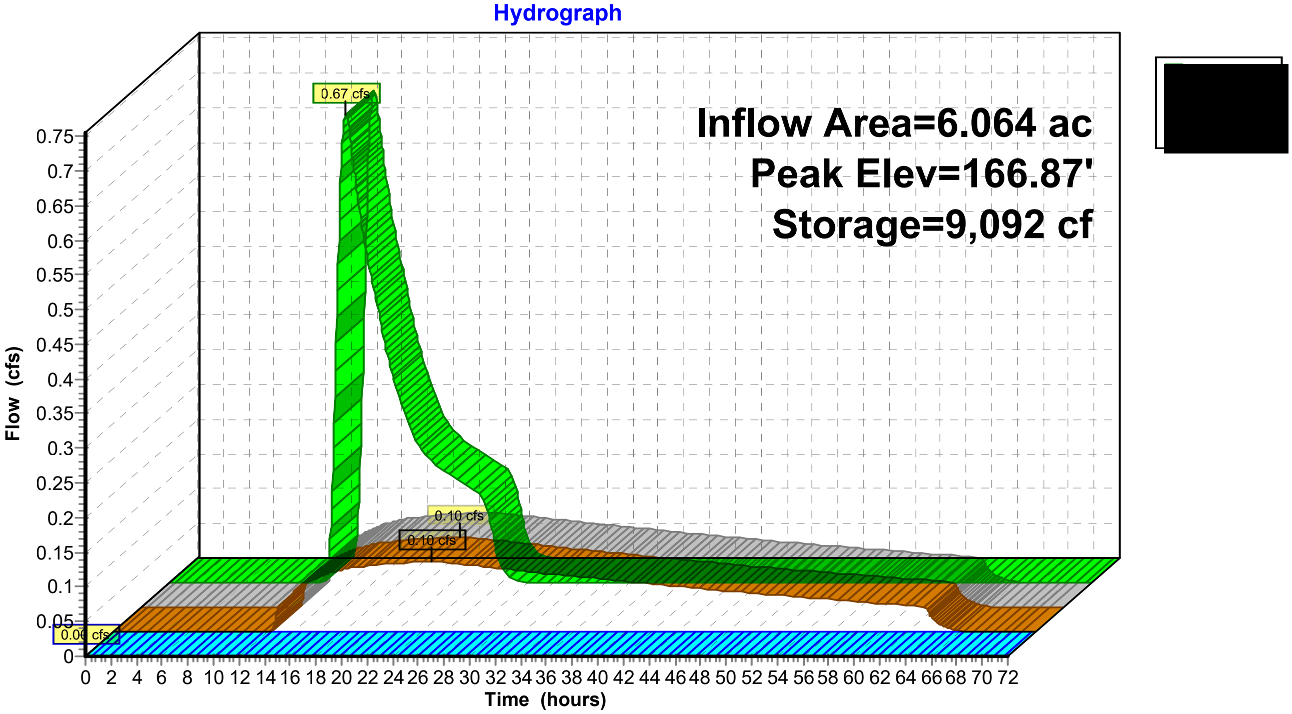
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
166.00	5,638	286.0	0	0	5,638
168.00	37,929	753.0	38,794	38,794	44,264

Device	Routing	Invert	Outlet Devices
#1	Primary	167.50'	**8.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	166.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.10 cfs @ 24.86 hrs HW=166.87' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=166.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 7aP: Proposed Berm



Summary for Pond 7P: Existing Depression

[93] Warning: Storage range exceeded by 0.48'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=15)

Inflow Area = 78.568 ac, 13.71% Impervious, Inflow Depth = 1.33" for 100-year event
Inflow = 28.47 cfs @ 13.53 hrs, Volume= 8.696 af
Outflow = 37.09 cfs @ 13.55 hrs, Volume= 8.696 af, Atten= 0%, Lag= 1.1 min
Discarded = 1.37 cfs @ 13.20 hrs, Volume= 1.899 af
Primary = 35.72 cfs @ 13.55 hrs, Volume= 6.797 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 148.48' @ 13.55 hrs Surf.Area= 24,633 sf Storage= 32,409 cf

Plug-Flow detention time= 67.3 min calculated for 8.690 af (100% of inflow)
Center-of-Mass det. time= 67.5 min (1,043.5 - 976.0)

Volume	Invert	Avail.Storage	Storage Description
#1	146.00'	32,409 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

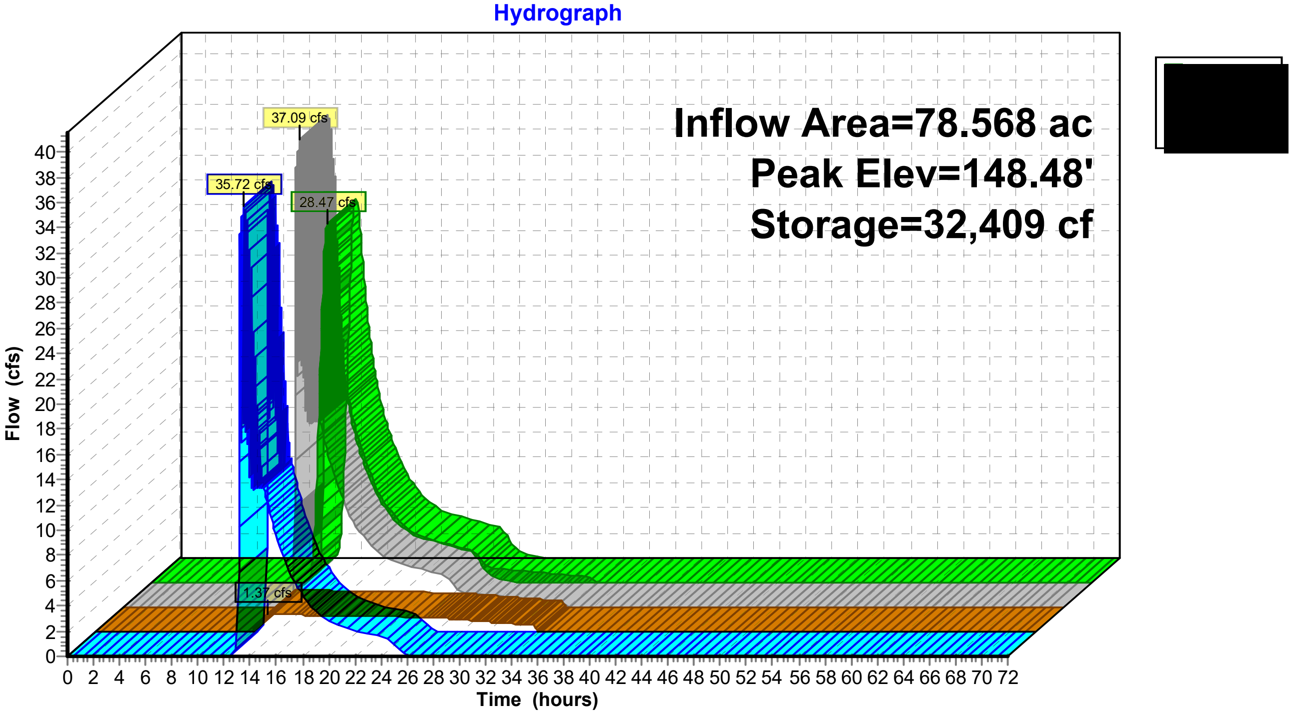
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
146.00	9,050	771.0	0	0	9,050
148.00	24,633	1,236.0	32,409	32,409	83,343

Device	Routing	Invert	Outlet Devices
#1	Primary	147.50'	**14.0' long x 90.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	146.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.37 cfs @ 13.20 hrs HW=148.05' (Free Discharge)
2=Exfiltration (Exfiltration Controls 1.37 cfs)

Primary OutFlow Max=35.69 cfs @ 13.55 hrs HW=148.48' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 35.69 cfs @ 2.60 fps)

Pond 7P: Existing Depression



Summary for Pond 8P: Existing Wetland

Inflow Area = 8.135 ac, 26.48% Impervious, Inflow Depth = 4.49" for 100-year event
Inflow = 26.79 cfs @ 12.32 hrs, Volume= 3.046 af
Outflow = 2.21 cfs @ 14.80 hrs, Volume= 1.709 af, Atten= 92%, Lag= 148.7 min
Discarded = 0.25 cfs @ 14.80 hrs, Volume= 1.096 af
Primary = 1.96 cfs @ 14.80 hrs, Volume= 0.612 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 231.53' @ 14.80 hrs Surf.Area= 64,218 sf Storage= 96,027 cf

Plug-Flow detention time= 1,192.1 min calculated for 1.707 af (56% of inflow)
Center-of-Mass det. time= 1,084.9 min (1,912.2 - 827.3)

Volume	Invert	Avail.Storage	Storage Description
#1	228.00'	130,034 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

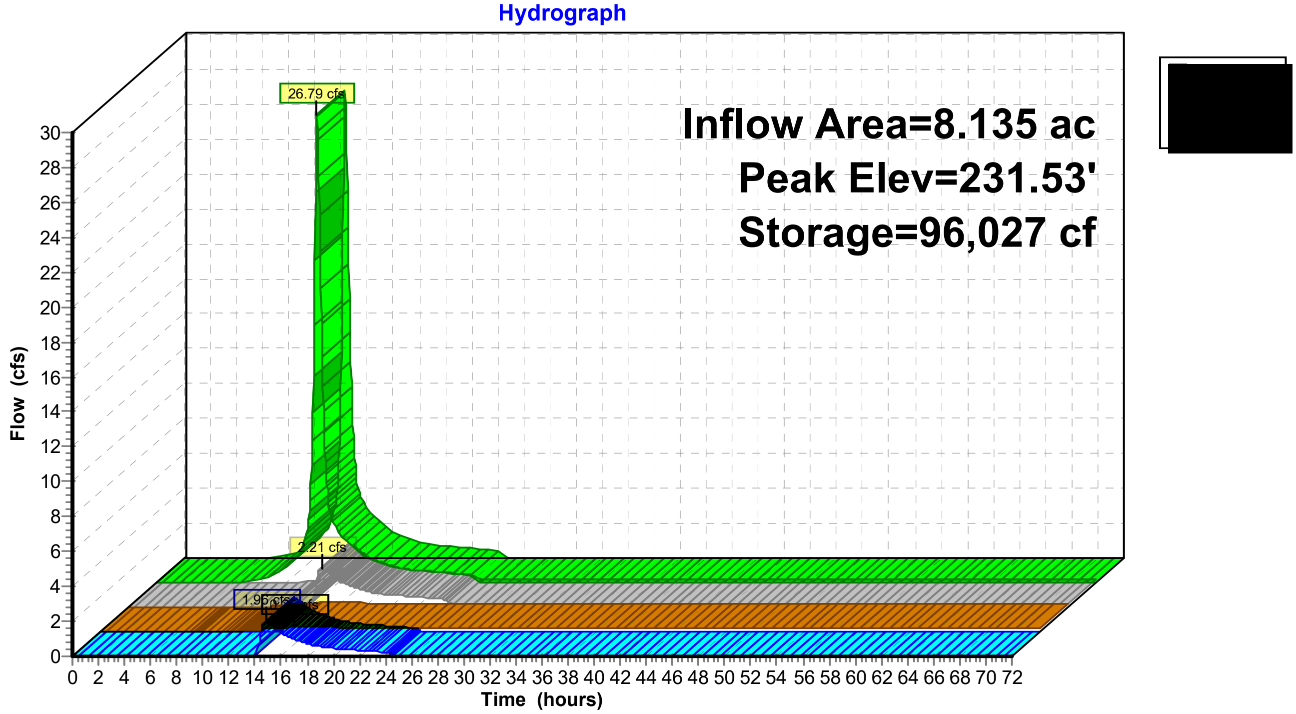
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
228.00	5,806	459.0	0	0	5,806
230.00	25,974	862.0	29,374	29,374	48,191
232.00	79,559	1,189.0	100,661	130,034	101,601

Device	Routing	Invert	Outlet Devices
#1	Discarded	228.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	231.50'	**158.0' long x 196.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.25 cfs @ 14.80 hrs HW=231.53' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=1.78 cfs @ 14.80 hrs HW=231.53' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 1.78 cfs @ 0.43 fps)

Pond 8P: Existing Wetland



Summary for Pond 9P: Existing Wetland

Inflow Area = 83.043 ac, 27.18% Impervious, Inflow Depth = 2.80" for 100-year event
Inflow = 115.16 cfs @ 12.72 hrs, Volume= 19.394 af
Outflow = 115.08 cfs @ 12.73 hrs, Volume= 19.394 af, Atten= 0%, Lag= 0.7 min
Discarded = 0.02 cfs @ 12.73 hrs, Volume= 0.014 af
Primary = 115.06 cfs @ 12.73 hrs, Volume= 19.380 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 149.25' @ 12.73 hrs Surf.Area= 5,969 sf Storage= 4,885 cf

Plug-Flow detention time= 0.8 min calculated for 19.381 af (100% of inflow)
Center-of-Mass det. time= 0.8 min (896.8 - 896.0)

Volume	Invert	Avail.Storage	Storage Description
#1	148.00'	834,530 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

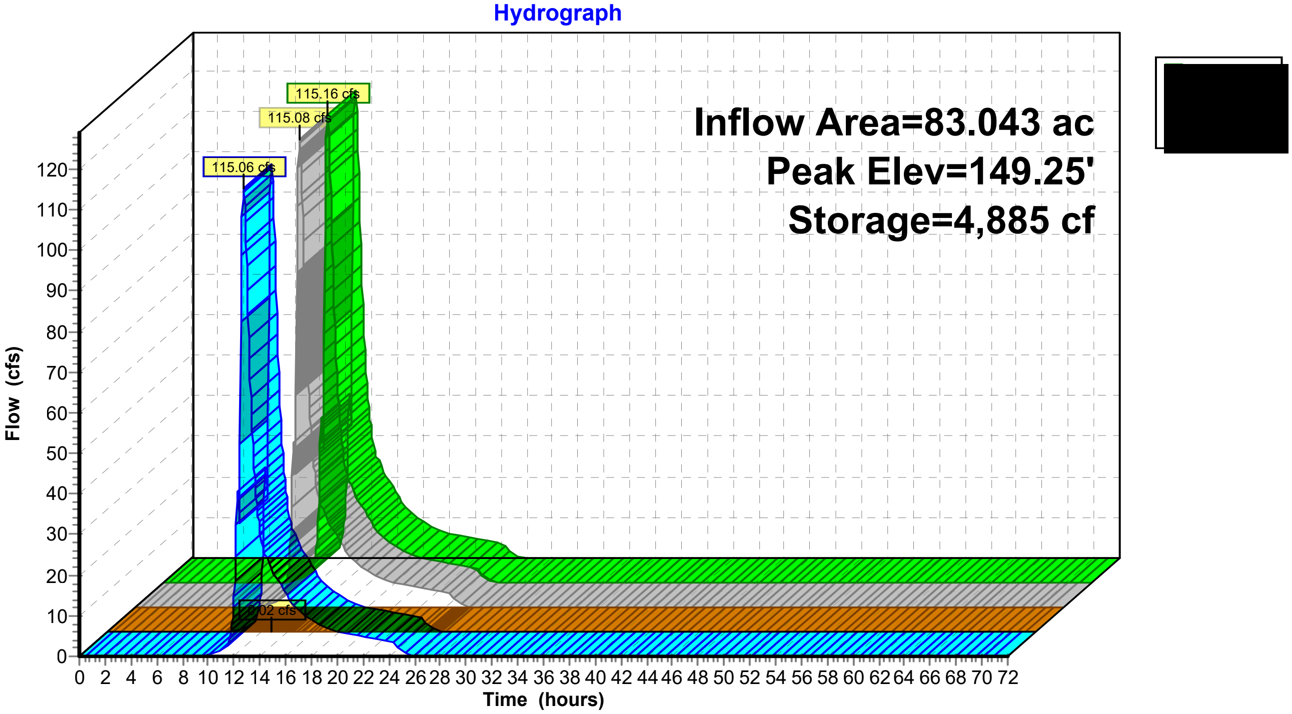
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
148.00	2,138	180.0	0	0	2,138
150.00	9,156	387.0	10,479	10,479	11,495
152.00	135,719	2,199.0	120,084	130,563	384,391
154.00	178,250	2,327.0	313,004	443,567	430,714
156.00	213,235	2,588.0	390,963	834,530	532,915

Device	Routing	Invert	Outlet Devices
#1	Discarded	148.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	148.00'	**31.0' long x 49.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.02 cfs @ 12.73 hrs HW=149.25' (Free Discharge)
└—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=114.84 cfs @ 12.73 hrs HW=149.25' (Free Discharge)
└—**2=Broad-Crested Rectangular Weir** (Weir Controls 114.84 cfs @ 2.96 fps)

Pond 9P: Existing Wetland



Summary for Pond 10aP: Proposed Berm

Inflow Area =	5.867 ac,	13.96% Impervious,	Inflow Depth = 3.85"	for 100-year event
Inflow =	18.51 cfs @	12.32 hrs, Volume=	1.882 af	
Outflow =	2.36 cfs @	13.45 hrs, Volume=	1.882 af,	Atten= 87%, Lag= 68.1 min
Discarded =	0.67 cfs @	13.45 hrs, Volume=	1.502 af	
Primary =	1.69 cfs @	13.45 hrs, Volume=	0.380 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 213.67' @ 13.45 hrs Surf.Area= 28,297 sf Storage= 45,007 cf

Plug-Flow detention time= 713.6 min calculated for 1.882 af (100% of inflow)
Center-of-Mass det. time= 713.6 min (1,556.2 - 842.6)

Volume	Invert	Avail.Storage	Storage Description
#1	210.00'	55,040 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

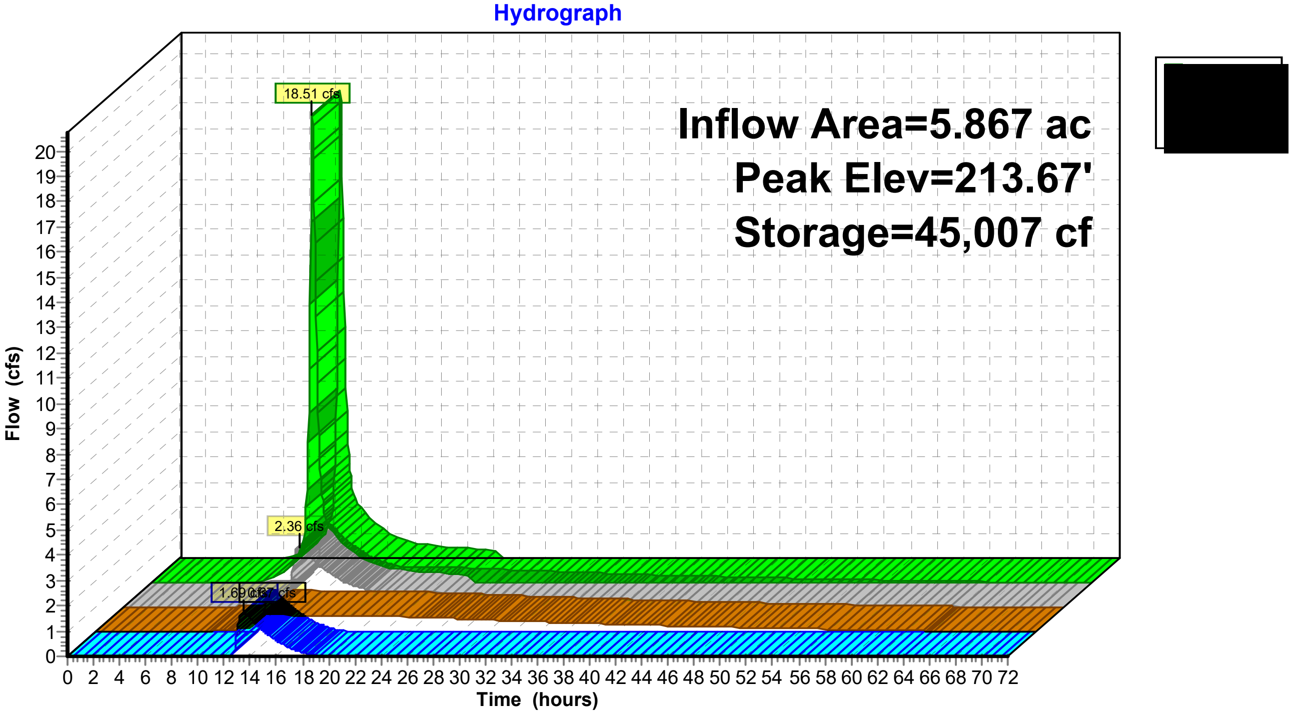
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.00	1,713	254.0	0	0	1,713
212.00	12,100	654.0	12,244	12,244	30,630
214.00	32,319	899.0	42,796	55,040	60,948

Device	Routing	Invert	Outlet Devices
#1	Discarded	210.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	213.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.67 cfs @ 13.45 hrs HW=213.67' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.67 cfs)

Primary OutFlow Max=1.68 cfs @ 13.45 hrs HW=213.67' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 1.68 cfs @ 1.00 fps)

Pond 10aP: Proposed Berm



Summary for Pond 11bP: Proposed Berm

Inflow Area = 5.376 ac, 1.97% Impervious, Inflow Depth = 2.73" for 100-year event
Inflow = 12.21 cfs @ 12.24 hrs, Volume= 1.222 af
Outflow = 1.71 cfs @ 13.35 hrs, Volume= 1.222 af, Atten= 86%, Lag= 66.5 min
Discarded = 1.71 cfs @ 13.35 hrs, Volume= 1.222 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 220.72' @ 13.35 hrs Surf.Area= 30,596 sf Storage= 19,970 cf

Plug-Flow detention time= 111.9 min calculated for 1.221 af (100% of inflow)
Center-of-Mass det. time= 111.9 min (970.9 - 859.1)

Volume	Invert	Avail.Storage	Storage Description
#1	220.00'	66,163 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

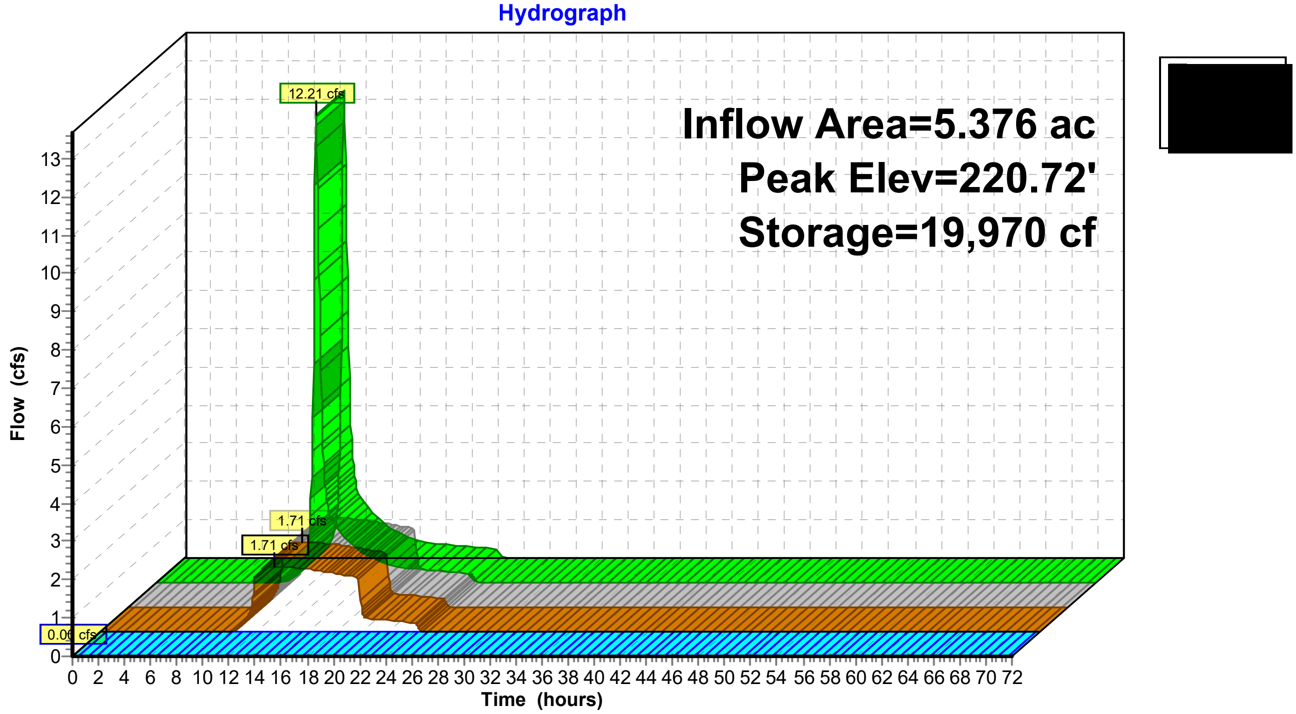
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
220.00	25,086	664.0	0	0	25,086
222.00	41,783	802.0	66,163	66,163	41,252

Device	Routing	Invert	Outlet Devices
#1	Primary	221.00'	**30.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	220.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.71 cfs @ 13.35 hrs HW=220.72' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 1.71 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=220.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 11bP: Proposed Berm



Summary for Pond 11cP: Proposed Berm

Inflow Area =	4.381 ac,	1.10% Impervious, Inflow Depth = 3.13"	for 100-year event	
Inflow =	12.27 cfs @	12.20 hrs, Volume=	1.141 af	
Outflow =	1.67 cfs @	13.17 hrs, Volume=	1.141 af,	Atten= 86%, Lag= 57.8 min
Discarded =	0.84 cfs @	13.17 hrs, Volume=	1.036 af	
Primary =	0.82 cfs @	13.17 hrs, Volume=	0.105 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 223.85' @ 13.17 hrs Surf.Area= 15,091 sf Storage= 22,247 cf

Plug-Flow detention time= 270.3 min calculated for 1.141 af (100% of inflow)
Center-of-Mass det. time= 270.3 min (1,118.1 - 847.9)

Volume	Invert	Avail.Storage	Storage Description
#1	222.00'	24,481 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

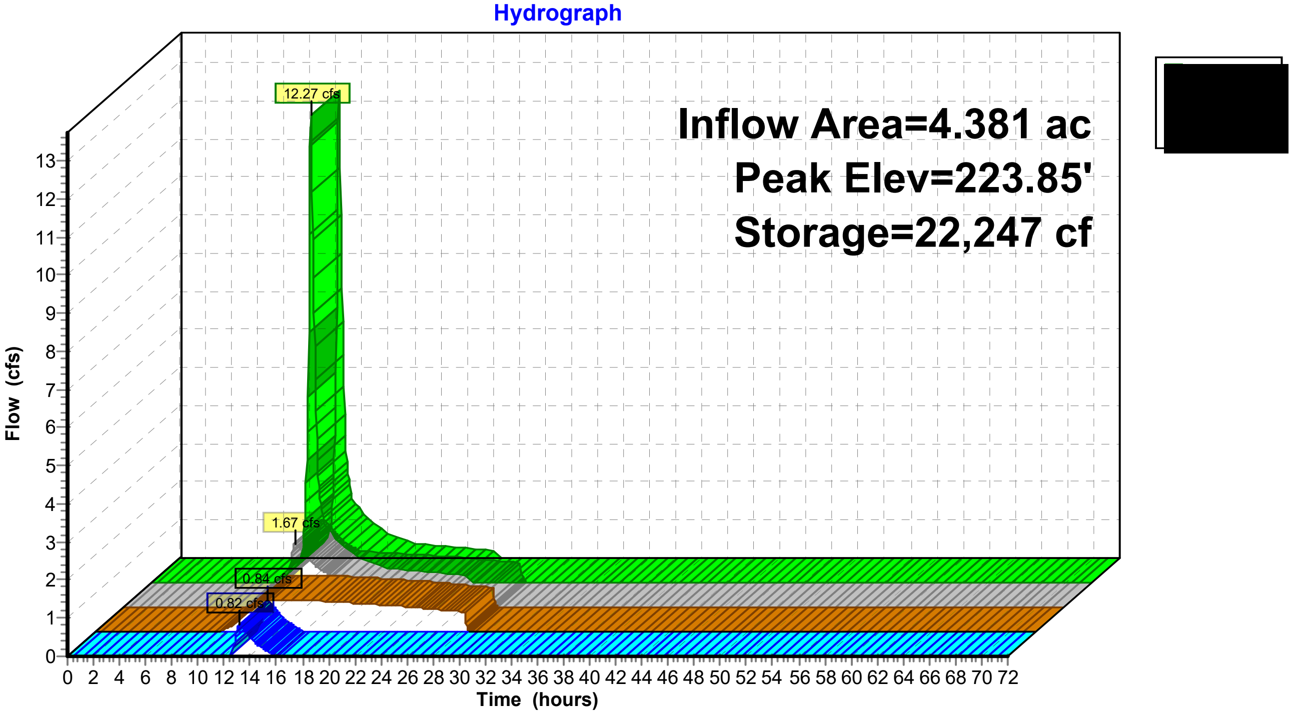
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
222.00	9,148	421.0	0	0	9,148
224.00	15,620	537.0	24,481	24,481	18,043

Device	Routing	Invert	Outlet Devices
#1	Primary	223.75'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	222.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.84 cfs @ 13.17 hrs HW=223.85' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.84 cfs)

Primary OutFlow Max=0.82 cfs @ 13.17 hrs HW=223.85' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.82 cfs @ 0.79 fps)

Pond 11cP: Proposed Berm



Summary for Pond 12bP: Proposed Berm

[62] Hint: Exceeded Reach 12bR OUTLET depth by 0.46' @ 12.80 hrs

Inflow Area = 11.115 ac, 7.70% Impervious, Inflow Depth = 3.96" for 100-year event
Inflow = 37.96 cfs @ 12.29 hrs, Volume= 3.663 af
Outflow = 14.49 cfs @ 12.69 hrs, Volume= 3.132 af, Atten= 62%, Lag= 23.9 min
Discarded = 0.17 cfs @ 12.69 hrs, Volume= 0.721 af
Primary = 14.32 cfs @ 12.69 hrs, Volume= 2.411 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 253.92' @ 12.69 hrs Surf.Area= 26,556 sf Storage= 69,005 cf

Plug-Flow detention time= 489.1 min calculated for 3.130 af (85% of inflow)
Center-of-Mass det. time= 426.9 min (1,266.0 - 839.1)

Volume	Invert	Avail.Storage	Storage Description
#1	250.00'	71,013 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

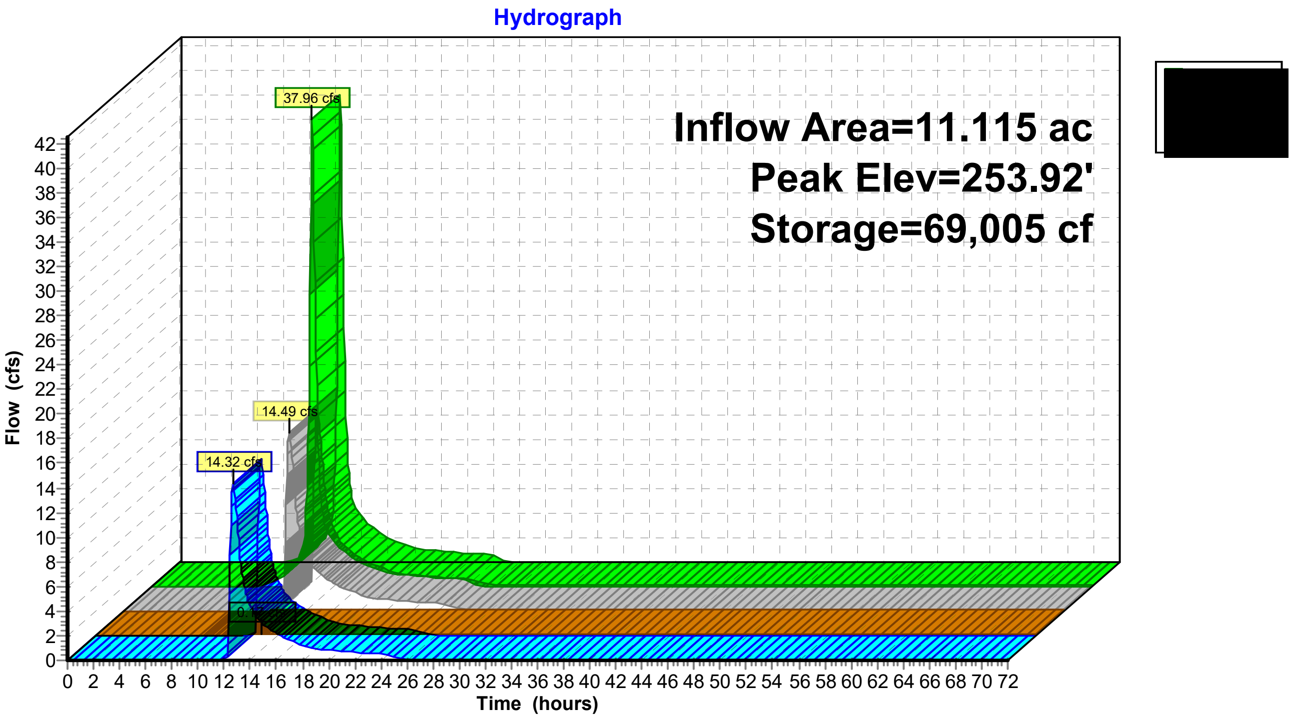
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
250.00	4,608	359.0	0	0	4,608
252.00	20,843	719.0	23,501	23,501	35,509
254.00	26,794	769.0	47,513	71,013	41,614

Device	Routing	Invert	Outlet Devices
#1	Primary	253.00'	**6.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	250.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.17 cfs @ 12.69 hrs HW=253.92' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=14.29 cfs @ 12.69 hrs HW=253.92' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 14.29 cfs @ 2.58 fps)

Pond 12bP: Proposed Berm



Summary for Pond 12cP: Proposed Berm

Inflow Area =	3.285 ac,	8.38% Impervious,	Inflow Depth = 4.06"	for 100-year event	
Inflow =	15.32 cfs @	12.09 hrs,	Volume=	1.112 af	
Outflow =	1.21 cfs @	13.47 hrs,	Volume=	0.751 af,	Atten= 92%, Lag= 82.8 min
Discarded =	0.07 cfs @	13.47 hrs,	Volume=	0.334 af	
Primary =	1.13 cfs @	13.47 hrs,	Volume=	0.417 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 253.99' @ 13.47 hrs Surf.Area= 11,966 sf Storage= 29,183 cf

Plug-Flow detention time= 886.2 min calculated for 0.750 af (67% of inflow)
Center-of-Mass det. time= 789.1 min (1,609.4 - 820.3)

Volume	Invert	Avail.Storage	Storage Description
#1	250.00'	29,339 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

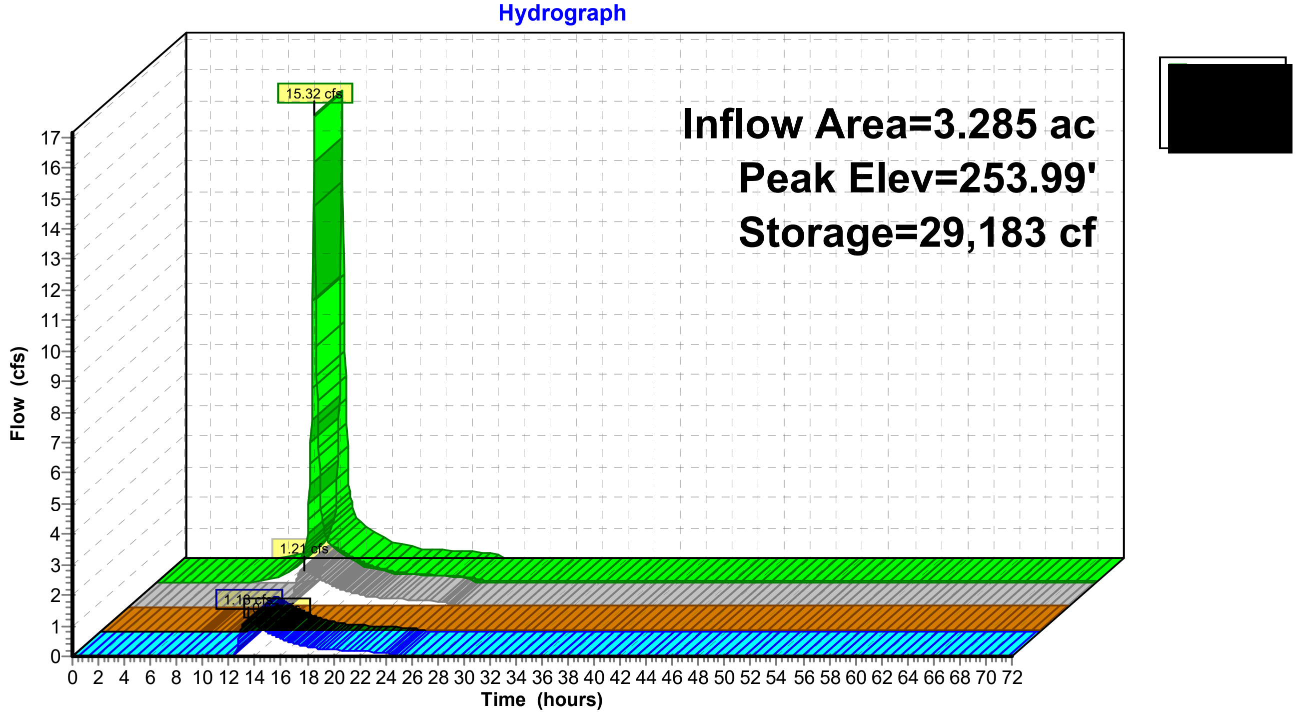
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
250.00	2,632	234.0	0	0	2,632
252.00	7,654	458.0	9,850	9,850	14,987
254.00	11,997	575.0	19,489	29,339	24,660

Device	Routing	Invert	Outlet Devices
#1	Primary	253.75'	**4.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	250.00'	**0.270 in/hr Exfiltration over Surface area**

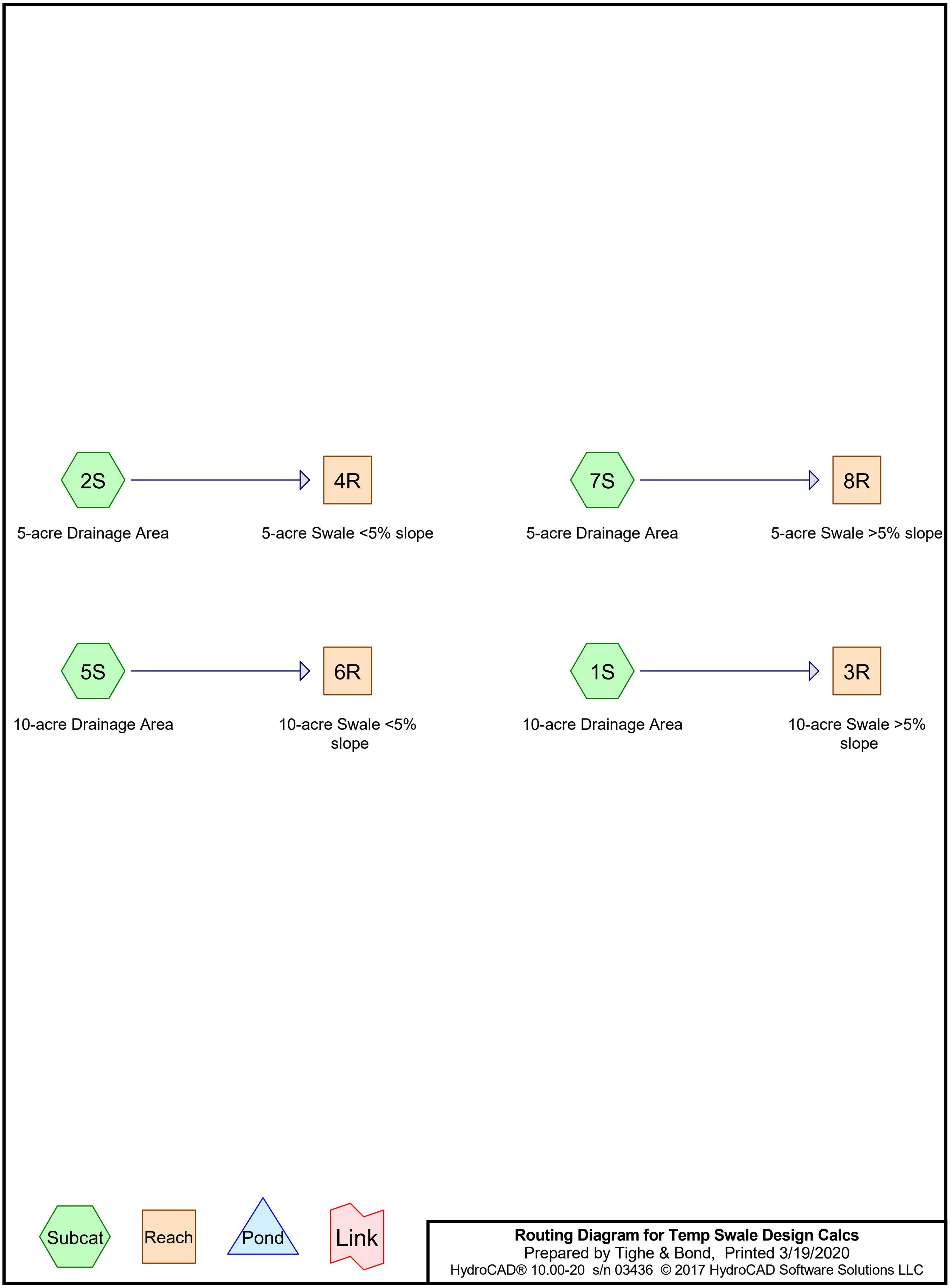
Discarded OutFlow Max=0.07 cfs @ 13.47 hrs HW=253.99' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=1.13 cfs @ 13.47 hrs HW=253.99' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 1.13 cfs @ 1.19 fps)

Pond 12cP: Proposed Berm



Temporary Swale
Design Hydrology



Routing Diagram for Temp Swale Design Calcs
Prepared by Tighe & Bond, Printed 3/19/2020
HydroCAD® 10.00-20 s/n 03436 © 2017 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
30.000	82	Dirt roads, HSG B (1S, 2S, 5S, 7S)
30.000	**82**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
30.000	HSG B	1S, 2S, 5S, 7S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
30.000		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	30.000	0.000	0.000	0.000	30.000	Dirt roads	1S, 2S, 5S, 7S
0.000	**30.000**	**0.000**	**0.000**	**0.000**	**30.000**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: 10-acre Drainage Area Runoff Area=10.000 ac 0.00% Impervious Runoff Depth>2.63"
Tc=6.0 min CN=82 Runoff=32.26 cfs 2.192 af

Subcatchment 2S: 5-acre Drainage Area Runoff Area=5.000 ac 0.00% Impervious Runoff Depth>2.63"
Tc=6.0 min CN=82 Runoff=16.13 cfs 1.096 af

Subcatchment 5S: 10-acre Drainage Area Runoff Area=10.000 ac 0.00% Impervious Runoff Depth>2.63"
Tc=6.0 min CN=82 Runoff=32.26 cfs 2.192 af

Subcatchment 7S: 5-acre Drainage Area Runoff Area=5.000 ac 0.00% Impervious Runoff Depth>2.63"
Tc=6.0 min CN=82 Runoff=16.13 cfs 1.096 af

Reach 3R: 10-acre Swale >5% slope Avg. Flow Depth=0.81' Max Vel=7.35 fps Inflow=32.26 cfs 2.192 af
n=0.030 L=100.0' S=0.0500 '/' Capacity=49.53 cfs Outflow=32.00 cfs 2.191 af

Reach 4R: 5-acre Swale <5% slope Avg. Flow Depth=0.92' Max Vel=2.59 fps Inflow=16.13 cfs 1.096 af
n=0.030 L=100.0' S=0.0050 '/' Capacity=18.92 cfs Outflow=15.68 cfs 1.095 af

Reach 6R: 10-acre Swale <5% slope Avg. Flow Depth=1.41' Max Vel=3.16 fps Inflow=32.26 cfs 2.192 af
n=0.030 L=100.0' S=0.0050 '/' Capacity=36.76 cfs Outflow=31.55 cfs 2.190 af

Reach 8R: 5-acre Swale >5% slope Avg. Flow Depth=0.77' Max Vel=6.35 fps Inflow=16.13 cfs 1.096 af
n=0.030 L=100.0' S=0.0500 '/' Capacity=29.60 cfs Outflow=15.98 cfs 1.096 af

Total Runoff Area = 30.000 ac Runoff Volume = 6.576 af Average Runoff Depth = 2.63"
100.00% Pervious = 30.000 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: 10-acre Drainage Area

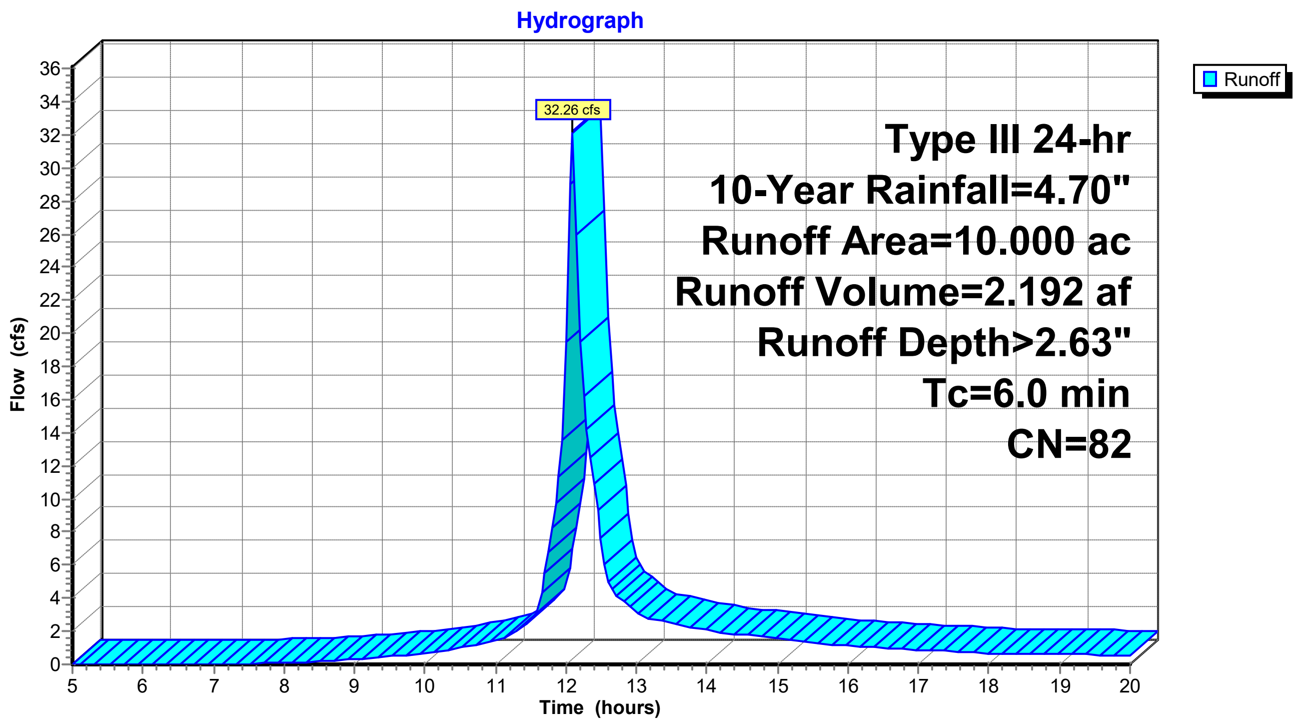
Runoff = 32.26 cfs @ 12.09 hrs, Volume= 2.192 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description
10.000	82	Dirt roads, HSG B
10.000		100.00% Pervious Area

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

Subcatchment 1S: 10-acre Drainage Area



Summary for Subcatchment 2S: 5-acre Drainage Area

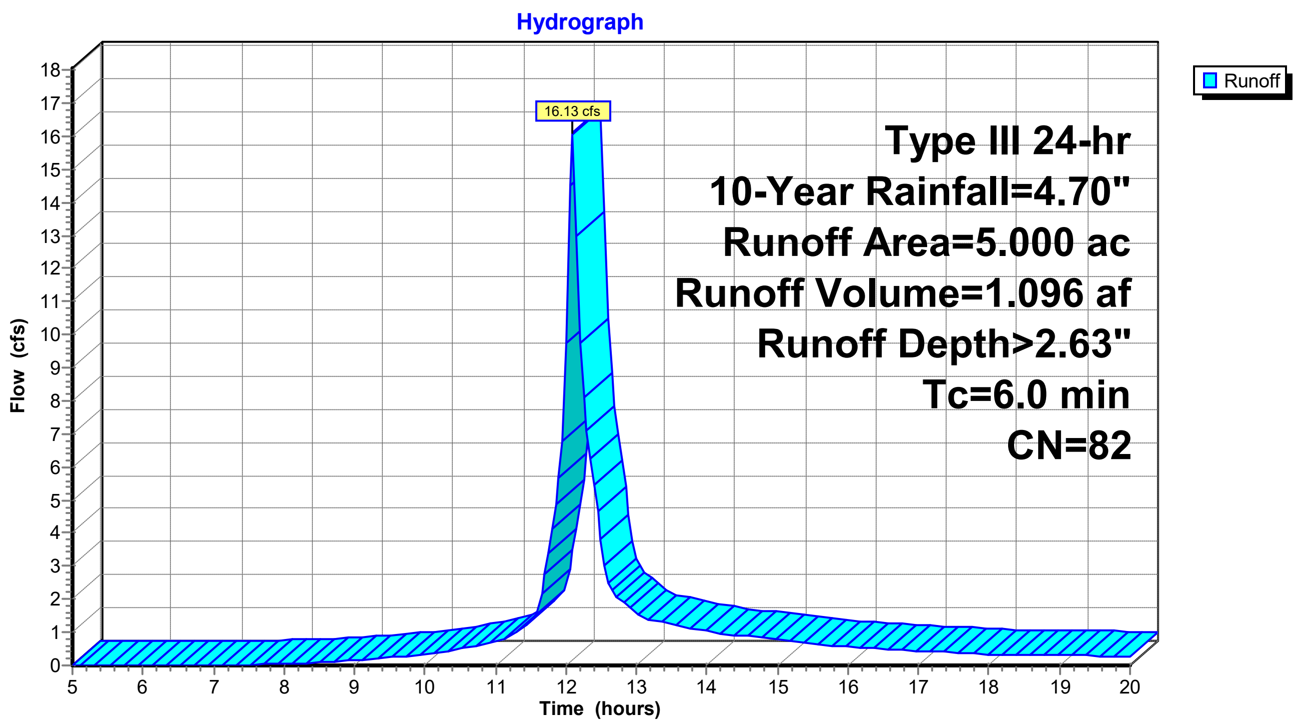
Runoff = 16.13 cfs @ 12.09 hrs, Volume= 1.096 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description
5.000	82	Dirt roads, HSG B
5.000		100.00% Pervious Area

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

Subcatchment 2S: 5-acre Drainage Area



Summary for Subcatchment 5S: 10-acre Drainage Area

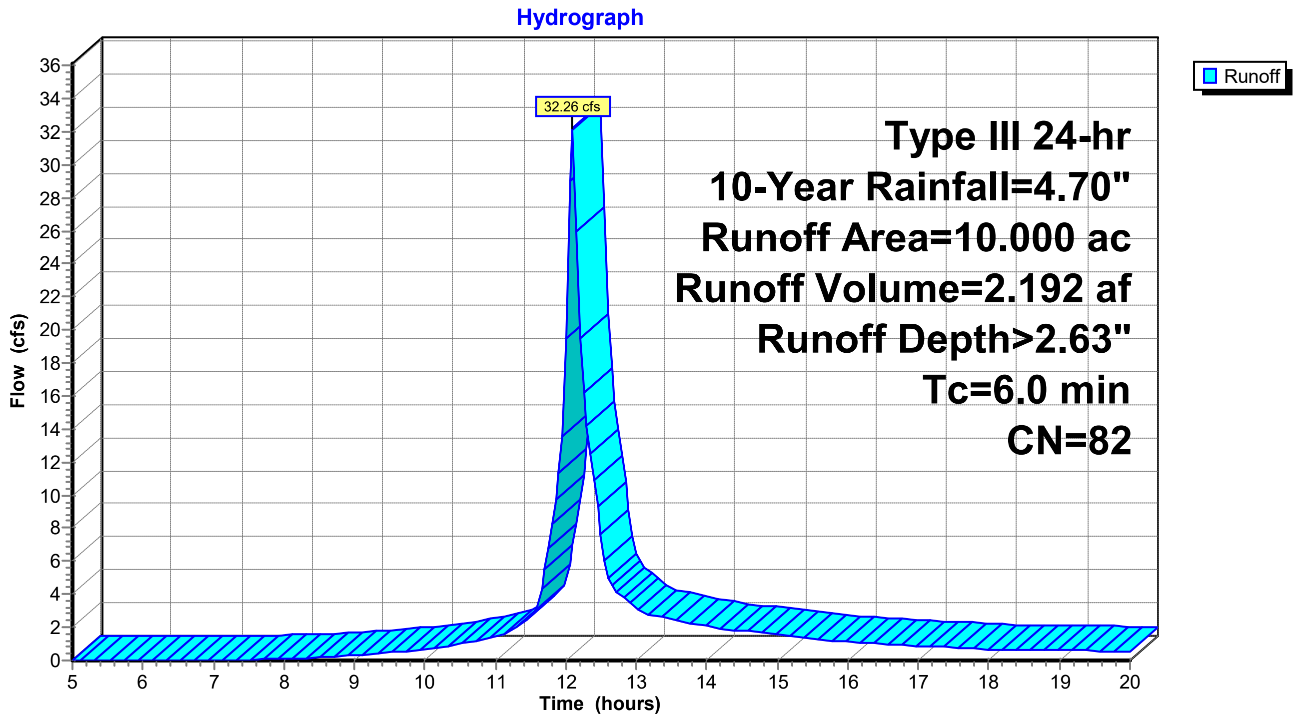
Runoff = 32.26 cfs @ 12.09 hrs, Volume= 2.192 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description
10.000	82	Dirt roads, HSG B
10.000		100.00% Pervious Area

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

Subcatchment 5S: 10-acre Drainage Area



Summary for Subcatchment 7S: 5-acre Drainage Area

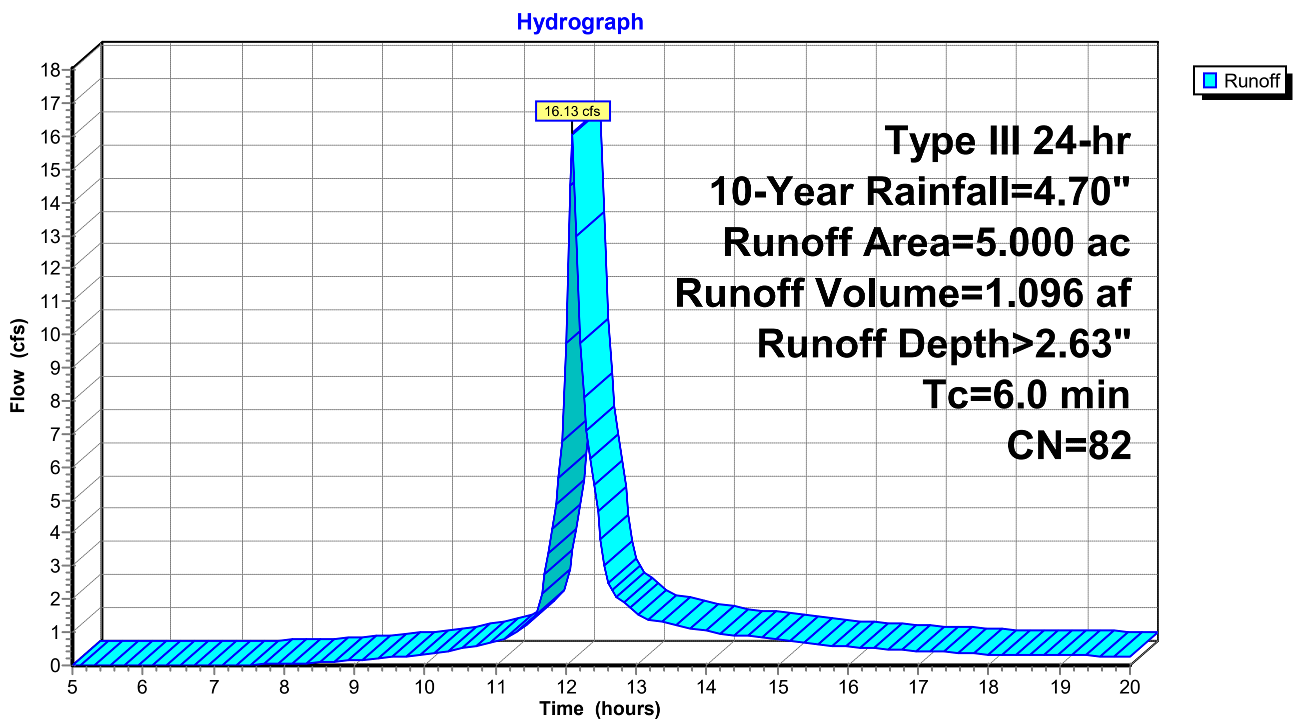
Runoff = 16.13 cfs @ 12.09 hrs, Volume= 1.096 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description
5.000	82	Dirt roads, HSG B
5.000		100.00% Pervious Area

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

Subcatchment 7S: 5-acre Drainage Area



Summary for Reach 3R: 10-acre Swale >5% slope

Inflow Area = 10.000 ac, 0.00% Impervious, Inflow Depth > 2.63" for 10-Year event
Inflow = 32.26 cfs @ 12.09 hrs, Volume= 2.192 af
Outflow = 32.00 cfs @ 12.10 hrs, Volume= 2.191 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.35 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.61 fps, Avg. Travel Time= 0.6 min

Peak Storage= 440 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.81'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 49.53 cfs

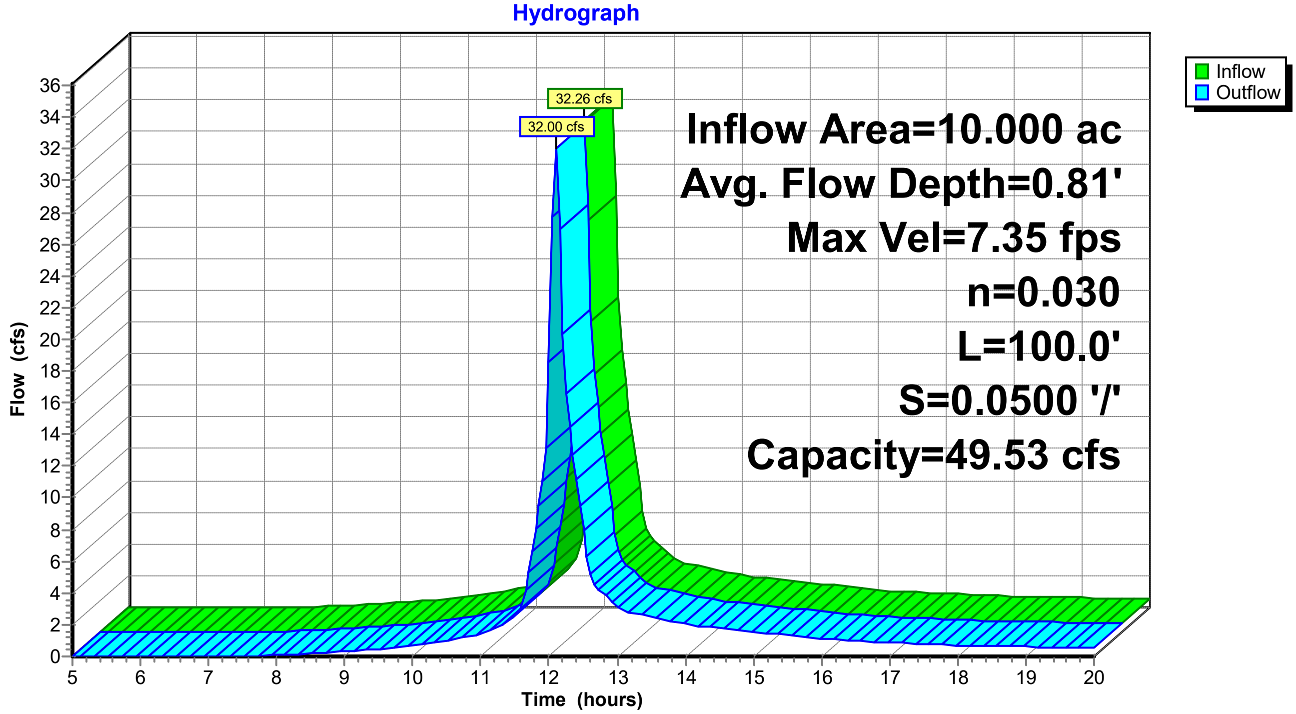
Custom cross-section, Length= 100.0' Slope= 0.0500 '/'
Constant n= 0.030 Short grass
Inlet Invert= 5.00', Outlet Invert= 0.00'

‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	0.00	0.00
3.00	-1.00	1.00
6.00	-1.00	1.00
9.00	0.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	3.0	0	0.00
1.00	6.0	9.3	600	49.53

Reach 3R: 10-acre Swale >5% slope



Summary for Reach 4R: 5-acre Swale <5% slope

Inflow Area = 5.000 ac, 0.00% Impervious, Inflow Depth > 2.63" for 10-Year event
Inflow = 16.13 cfs @ 12.09 hrs, Volume= 1.096 af
Outflow = 15.68 cfs @ 12.11 hrs, Volume= 1.095 af, Atten= 3%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.59 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.90 fps, Avg. Travel Time= 1.9 min

Peak Storage= 624 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.92'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 18.92 cfs

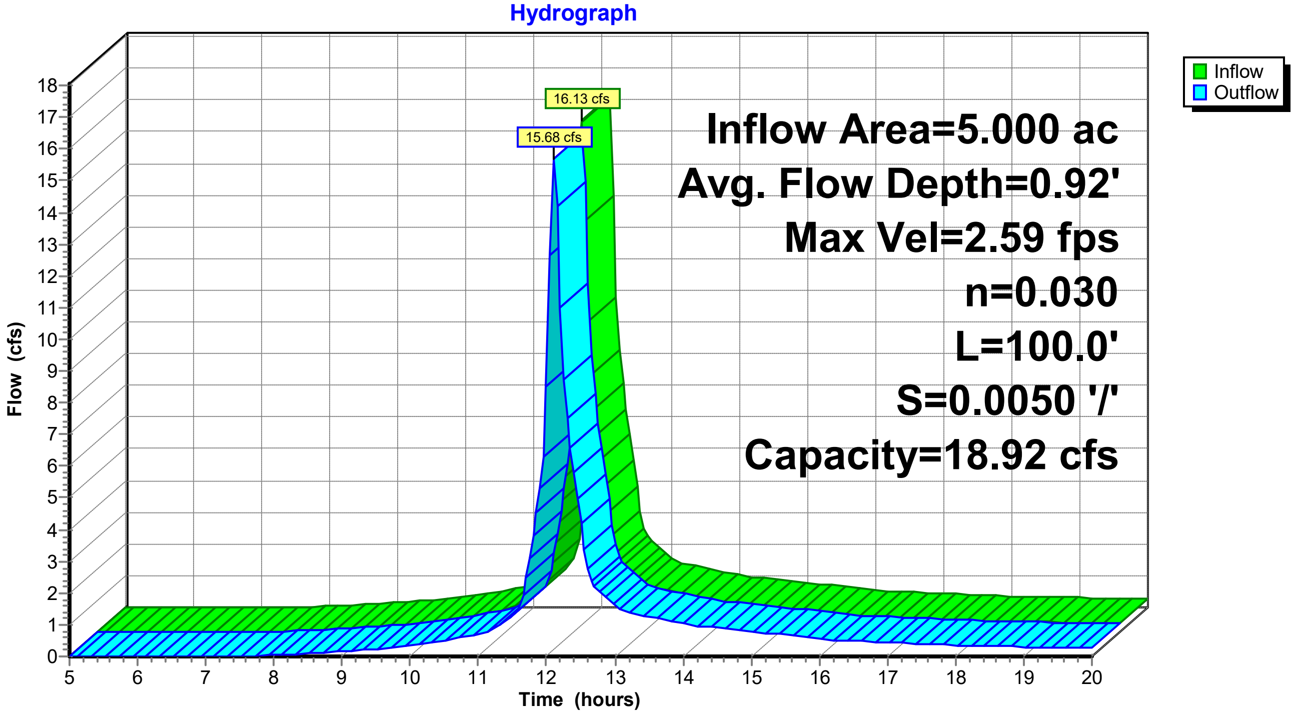
Custom cross-section, Length= 100.0' Slope= 0.0050 '/'
Constant n= 0.030 Short grass
Inlet Invert= 0.50', Outlet Invert= 0.00'


‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	0.00	0.00
3.00	-1.00	1.00
7.00	-1.00	1.00
10.00	0.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	4.0	0	0.00
1.00	7.0	10.3	700	18.92

Reach 4R: 5-acre Swale <5% slope



Summary for Reach 6R: 10-acre Swale <5% slope

Inflow Area = 10.000 ac, 0.00% Impervious, Inflow Depth > 2.63" for 10-Year event
Inflow = 32.26 cfs @ 12.09 hrs, Volume= 2.192 af
Outflow = 31.55 cfs @ 12.11 hrs, Volume= 2.190 af, Atten= 2%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.16 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.20 fps, Avg. Travel Time= 1.4 min

Peak Storage= 1,023 cf @ 12.10 hrs
Average Depth at Peak Storage= 1.41'
Bank-Full Depth= 1.50' Flow Area= 11.3 sf, Capacity= 36.76 cfs

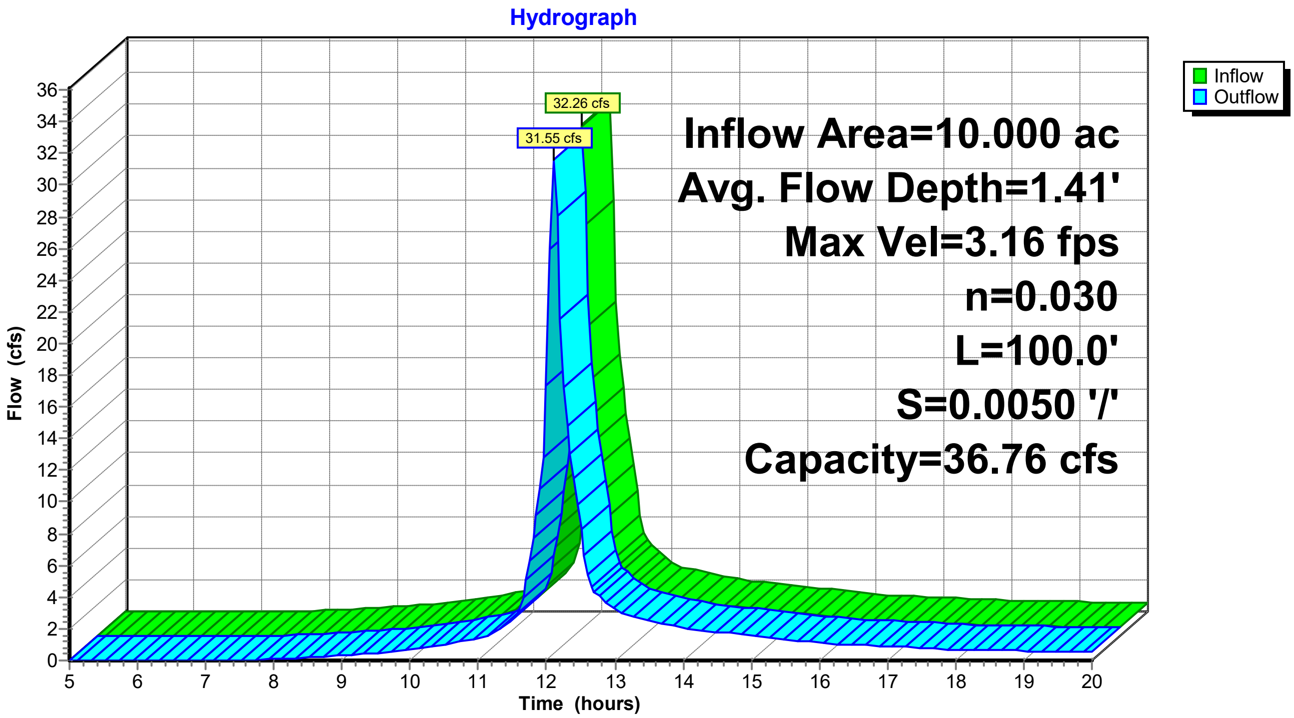
Custom cross-section, Length= 100.0' Slope= 0.0050 '/'
Constant n= 0.030 Short grass
Inlet Invert= 0.50', Outlet Invert= 0.00'

‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	0.00	0.00
4.50	-1.50	1.50
7.50	-1.50	1.50
12.00	0.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	3.0	0	0.00
1.50	11.3	12.5	1,125	36.76

Reach 6R: 10-acre Swale <5% slope



Summary for Reach 8R: 5-acre Swale >5% slope

Inflow Area = 5.000 ac, 0.00% Impervious, Inflow Depth > 2.63" for 10-Year event
Inflow = 16.13 cfs @ 12.09 hrs, Volume= 1.096 af
Outflow = 15.98 cfs @ 12.10 hrs, Volume= 1.096 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.35 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.55 fps, Avg. Travel Time= 0.7 min

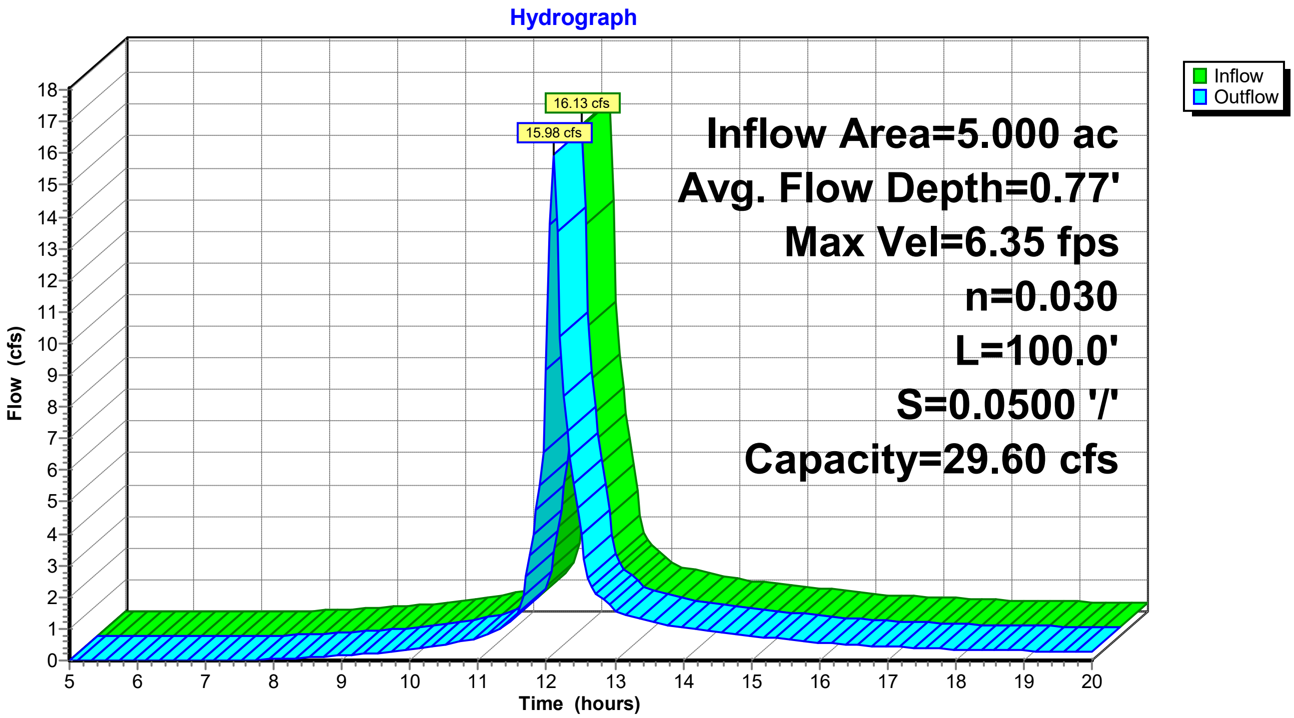
Peak Storage= 255 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.77'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 29.60 cfs

Custom cross-section, Length= 100.0' Slope= 0.0500 '/'
Constant n= 0.030 Short grass
Inlet Invert= 5.00', Outlet Invert= 0.00'

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	0.00	0.00
3.00	-1.00	1.00
4.00	-1.00	1.00
7.00	0.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	1.0	0	0.00
1.00	4.0	7.3	400	29.60

Reach 8R: 5-acre Swale >5% slope



APPENDIX E

Project Name: Quinebaug Solar Project

Stormwater Pollution Control Plan

Sweeping Schedule and Reciepts

All parking areas, sidewalks, driveways and other impervious surfaces (except roofs) shall be swept clean of sand, litter and any other pollutants at least twice a year, once between November 14 and December 15 (after leaf fall) and once during the month of April (after snow melt) and at other times as may be necessary. The following table shall be completed by a member of the Pollution Prevention Team (PPT) after each sweeping. Reciepts shall be kept in a pocket accompanying the schedule sheets in this attachment

Date (MM/DD/YY)	Company/Person Sweeping	Supervising Team Member	Comments

APPENDIX F

Project Name: Quinebaug Solar Project

Stormwater Pollution Control Plan

Potential Spill Location Information

Spill cleanup equipment is kept

____

(where)

And includes-

____

(what; speedi-dri, brooms, etc.)

And all personal are instructed in its location and use.

Types of materials present on-site which could potentially spill and discharge to stormwater include:
1.
2.
3.
4.
5.
6.

Areas where spills may potentially occur and discharge to stormwater include:
1.
2.
3.
4.
5.
6.

Measures used to minimize the possibility of spills include:
1.
2.
3.
4.
5.
6.

APPENDIX G

Project Name: Quinebaug Solar Project

Stormwater Pollution Control Plan

Spill Incident Recording Form

A history of spills and/or leaks is shown below. (*Make additional copies of table if needed).*

Date (MM/DD/YY)	(check one)		Location (as indicated	Description				Response Procedures	Measures to prevent reoccurance
	Spill	Leak		Type of Material	Quantity	Source if Known	Reason		

Tighe&Bond

APPENDIX H

Connecticut Department of Environmental Protection
Oil and Chemical Spill Response Division
Report of Petroleum or Chemical Product Discharge, Spillage or Release

1. When did the incident occur? Date___/___/___ Time
month/day/year

2. Where did the incident occur?

____

3. How did the incident occur? (describe the cause)

____

4. Under whose control was the hazardous material at the time of the incident?
Name: ____

Mailing & Street Address: __________________________________

Town:____________________ State: _____ Zip:________ Phone:__________

5. Who is the owner of the property onto which the spill occurred?

____

If this is a corporate property or jointly owned property, who represents the owner?

Corporate Property ☐ Jointly-owned property ☐

Name: ____

Mailing & Street address__________________________________

Town:____________________ State:____ Zip:________ Phone:__________

6. When was the incident verbally reported to the Department of Environmental Protection?
Date___/___/___ Time ___:___
Month/day/year

7. Who reported the incident and whom were they representing?
Name:____

Mailing & Street Address:__________________________________

Town:____________________ State: ____ Zip:________ Phone:__________

8. What were the chemicals or petroleum products, etc. released, spilled or discharged? Give an exact description of each of the materials involved in the incident, including chemical names, percent concentrations, trade names, etc.

If the chemicals are Extremely Hazardous substances or CERCLA hazardous substances they must be identified as such and include the reportable quantity (RQ). Please attach a Material Safety Data Sheet (MSDS) for each chemical involved.

What were the quantities of hazardous materials that were released, spilled or discharged to each environmental medium (air, surface water, soil, and/or ground water)? [NOTE: Connecticut General Statutes requires the reporting of any amount of any substance or material released to the environment].

9. Did any of these hazardous materials travel beyond the property line? [NOTE: Materials that enter the ground water are considered to have gone beyond the property line.]

10. What actions were taken to respond to and contain the release, spill or discharge?

11. What actions are being taken to prevent reoccurrence of an incident of this type? (Attach additional sheets if necessary.)

12. Were there any injuries as a result of the incident? If so, list the names of injured individuals, their addresses, phone numbers and describe their injuries. (Attach additional sheets if necessary)

Name:____

Mailing & Street Address:________________________________

Town:________________ State:_____ Zip:_______ Telephone:__________

13. What is the appropriate advice regarding medical attention necessary for exposed individuals?

14. Are there any known or anticipated health risks, acute or chronic, associated with the release of these hazardous materials or medical advice that should be communicated?

15. Was the incident completely cleaned up by the time this report was submitted? If not, what are the anticipated remedial actions and their duration?

16. CERTIFICATION: I hereby affirm that the foregoing statement is true to the best of my knowledge.

Signature	Title	Date
Print Name		Telephone
Street Address/P.O. Box	City/Town	State & Zip

This form may be reproduced as long as it contains all of the information requested and is on an 81/2 X 11 sheet of white paper, black type format. For serious incidents the questions may be answered in narrative format which must include the preparer's affidavit.

Mail to:

State of Connecticut
Department of Environmental Protection
Bureau of Waste Management
Oil and Chemical Response Division
79 Elm Street
Hartford, CT 06106-5127
www.dep.state.ct.us

Phone:	**Routine calls**	**(860) 424-3024**
	Emergency 24 hrs	**(860) 424-3338**

APPENDIX I

Project Name: Quinebaug Solar Project

Stormwater Pollution Control Plan

Monthly Inspection Checklist for Year 20___

The site is inspected weekly for trash and debris. The table on this page is initialed each month by a member of the PPT. If any problems are observed, write “No” in the “OK?” column and note the problem and measures taken in the space in the following table. Make a new copy of this table for each new year.

Date (List Day	Initials	OK?	Problems Noted and Measures Taken
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			
Drainage Structures and outfalls were cleaned on ___________ ___, ________ (Month, day, year)			

By

____

(Company)

APPENDIX J

Project Name: Quinebaug Solar Project

Stormwater Pollution Control Plan

Weekly Inspection Checklist for Year 20___

Report Number:	Page:

The site is inspected weekly for trash and debris. The table on this page is initialed each week by a member of the PPT. If any problems are observed, write "No" in the "OK?" column and note the problem and measures taken in the space following the table. Make a new copy of this table for each new year

Date (MM/DD/YY)	Initials	OK?	Date (MM/DD/YY)	Initials	OK?	Date (MM/DD/YY)	Initials	OK?

Comments or problems and measures taken:

Project Name: Quinebaug Solar Project

Stormwater Pollution Control Plan

Inspection Report Form for Stabilization Measures

Report Number:	Page:

Project Phase:

□ Initial □ Intermediate □ Final

Inspector: ______________________ **Date:** __________

No. of Days Since Last Rainfall: __________ **Inches:** __________

Area	Date Last Disturbed	Date of Next Disturbance	Stabilized?	Stabilized With	Condition

Stabilization Notes:

Stabilization Key

CE = Construction Entrance TV = Temporary Vegetation

PV = Permanent Vegetation

To be performed by: ______________________ **On or before:** __________

Project Name: Quinebaug Solar Project

Stormwater Pollution Control Plan

Inspection Report Form for Stabilization Measures

Report Number:	Page:

Project Phase:

☐ Initial ☐ Intermediate ☐ Final

Inspector: ______________________ **Date:** __________

No. of Days Since Last Rainfall: __________ **Inches:** __________

Control Location	In Place?	Condition	Sediment Depth	Washed Out / Overtopped?

Structural Notes:

To be performed by: ______________________ **On or before:** __________

Project Name: Quinebaug Solar Project

Stormwater Pollution Control Plan

Inspection Report Form for Stabilization Measures

Report Number:	Page:

Project Phase:

□ Initial □ Intermediate □ Final

Inspector: ______________________________ **Date:** __________

No. of Days Since Last Rainfall: __________ **Inches:** __________

Summary of Required Changes

Reasons for Change

To be performed by: ____________________ **On or before:** __________

Project Name: Quinebaug Solar Project

Stormwater Pollution Control Plan

Inspection Report Form for Stabilization Measures

Report Number:	Page:

Project Phase:

☐ Initial ☐ Intermediate ☐ Final

Inspector: ______________________ **Date:** __________

No. of Days Since Last Rainfall: __________ **Inches:** __________

Comments

Maintenance and Other Actions Required (Not Noted Elsewhere):

To be performed by: ______________ **On or before:** __________

Project Name: Quinebaug Solar Project

Stormwater Pollution Control Plan

Inspection Report Form for Stabilization Measures

Report Number:	Page:

This certification must be completed after each inspection to signify that the inspection has been properly completed and the site has been found to be in compliance with the Stormwater Pollution Control Plan.

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals resposnible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the General Statutes, pursuant to Section 53a-157b of the General Statutes, and in accordance with any other applicable statute.

Signed: ______________________________

Name: ______________________________

Title: ______________________________

Company: ______________________________

Address: ______________________________

Telephone: ______________________________

Date: ______________________________

APPENDIX K

Project Name: Quinebaug Solar Project

Stormwater Pollution Control Plan

Comprehensive Annual Stormwater Evaluation and Inspection Report

Once a year, a member of the PPT shall conduct a Comprehensive Annual Stormwater Evaluation and Inspection of all aspects and provisions of the SWPCP. The following report is prepared and a copy maintained on site in the files of the facility. The Comprehensive Annual Stormwater Evaluation and Inspection Report is reviewed and signed by the same party who signed the registration or by their replacement of equivalent position.

Inspection:

Date of Inspection:

Reviewed By:

Update the PPT if necessary. PPT updated? [ ] Yes [ ] No

Review the SMP. Areas of SMP need to be updated? [ ] Yes [ ] No

Review the checklists within the Attachments K & L of the SWPCP. Update the checklists, spill plan and maintenance practices as necessary. Changes to the checklists, spill plan or maintenance practices are noted here and in the appropriate section of the Plan. (Copy this sheet as necessary).

Additional Comments:

APPENDIX L

Connecticut Department of
Energy & Environmental Protection
Bureau of Materials Management & Compliance Assurance
Water Permitting & Enforcement Division

General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, issued 8/21/13, effective 10/1/13
Stormwater Monitoring Report

SITE INFORMATION

Permittee: ______________________

Mailing Address: ______________________

Business Phone: ______________ ext.: ________ Fax: ________

Contact Person: ______________ Title: ______________

Site Name: ______________________

Site Address: ______________________

Receiving Water (name, basin): ______________________

Stormwater Permit No. GSN______________

SAMPLING INFORMATION (Submit a separate form for each outfall)

Outfall Designation: ______________ Date/Time Collected: ______________

Outfall Location(s) (lat/lon or map link): ______________________

Person Collecting Sample: ______________________

Storm Magnitude (inches): ______________ Storm Duration (hours): ______________

Size of Disturbed Area at any time: ______________

MONITORING RESULTS

Sample #	Parameter	Method	Results (units)	Laboratory (if applicable)
1	Turbidity			
2	Turbidity			
3	Turbidity			
4	Turbidity			

(provide an attachment if more than 4 samples were taken for this outfall) Avg =

STATEMENT OF ACKNOWLEDGMENT

I certify that the data reported on this document were prepared under my direction or supervision in accordance with the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. The information submitted is, to the best of my knowledge and belief, true, accurate and complete.

Authorized Official: ______________________

Signature: ______________ Date: ______________

Please send completed form to:

DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION
BUREAU OF MATERIALS MANAGEMENT AND COMPLIANCE ASSURANCE
79 ELM STREET
HARTFORD, CT 06106-5127
ATTN: NEAL WILLIAMS

APPENDIX M

General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

Notice of Termination Form

Please complete and submit this form in accordance with the general permit (DEP-PED-GP-015) in order to ensure the proper handling of your termination. Print or type unless otherwise noted.

Note: Ensure that for commercial and industrial facilities, registrations under the *General Permit for the Discharge of Stormwater Associated with Industrial Activity* (DEP-PED-GP-014) or the *General Permit for the Discharge of Stormwater from Commercial Activities* (DEP-PED-GP-004) have been filed where applicable. For questions about the applicability of these general permits, please call the Department at 860-424-3018.

Part I: Registrant Information

1. Permit number: ***GSN***
2. Fill in the name of the registrant(s) as indicated on the registration certificate:

   Registrant:
3. Site Address:

   City/Town: State: Zip Code:
4. Date all storm drainage structures were cleaned of construction sediment:

   Date of Completion of Construction:

   Date of Last Inspection (must be at least three months after final stabilization pursuant to Section 6(b)(6)(D) of the general permit):
5. Check the post-construction activities at the site (check all that apply):

   ☐ Industrial ☐ Residential ☐ Commercial ☐ Capped Landfill

   ☐ Other (describe):

Part II: Certification

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."

Signature of Permittee	Date
Name of Permittee (print or type)	Title (if applicable)

Note: Please submit this Notice of Termination Form to:

STORMWATER PERMIT COORDINATOR
BUREAU OF WATER MANAGEMENT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

APPENDIX N

Tighe&Bond

Estimated Stormwater Control Measure Costs

Quinebaug Solar
Brooklyn & Canterbury, CT
March 2020

Item	Description	Quantity	Unit	Unit Price	Total
1	Temporary Erosion & Sediment Control	75,000	LF	$8	$600,000
2	Hydroseed and Mulch	234	AC	$3,500	$819,000
3	Temporary Sediment Trap	29	EA	$15,600	$452,400
4	Temporary Sediment Basin	18	EA	$20,000	$360,000
5	Temporary Soil Stockpiling	1	LS	$18,500	$18,500
6	CT DEEP Approved Monitor Visit	26	EA	$1,500	$39,000
7	8" HDPE Culvert	139	LF	$68	$9,452
8	15" HDPE Culvert	111	LF	$78	$8,658
9	Outlet Protection	5	EA	$1,200	$6,000
				Subtotal	$2,313,010
				Contingency (10%)	$231,301
				Complicated Site Factor (25%)	$578,253
				Administration Fee (10%)	$231,301
				Total	**$3,353,865**

ATTACHMENT D – EASTERN SPADEFOOT TOAD PROTECTION SUMMARY

January 17, 2020

Ms. Dawn McKay and Ms. Robin Blum
Wildlife Division, Bureau of Natural Resources
Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, Connecticut 06106-5127

Subject: Quinebaug Solar Project, Eastern Spadefoot Toad Protection – Request #201904603

Dear Ms. McKay and Ms. Blum,

We are writing to follow up with you regarding the avoidance and mitigation measures to be implemented for the protection of eastern spadefoot toad (*Scaphiopus holbrookii*) at the Quinebaug Solar Project (Project) site located in Brooklyn and Canterbury, Connecticut. This supplemental information is being provided in response to requests from you and other representatives from the Department of Energy and Environmental Protection (DEEP) and the Natural Diversity Data Base (NDDB) Program. This letter provides a summary of field surveys completed and their results, and the measures proposed by the Project to protect eastern spadefoot toads.

During a December 18, 2019 meeting between members of DEEP and representatives of the Quinebaug Solar team, additional information was requested concerning the basis for the Project's Avoidance and Mitigation Plan as it applies to the protection of eastern spadefoot toad. Specifically, we were asked to provide information regarding the protection of potential breeding pools that were identified during the two-year field study, documentation of conservation restrictions as they apply to the 'conservation areas', the location of the potential breeding pools plotted together with the areas proposed for development and conservation, rationale for any changes in the number, location or spatial extent of the previously defined potential breeding pools, and the proposed mitigation strategies for encroachments on any/all breeding pool areas. Our team also was informed during this meeting that an Incidental Take Report would not be required for this Project.

Based on the results of two years of species-specific surveys, the three identified potential breeding pools were not found to be utilized for breeding by eastern spadefoot toads and therefore were not prioritized for protection in the original avoidance and mitigation plan for the Project. Although we acknowledge that this particular species can skip more than two consecutive years of breeding, concurrent surveys of known eastern spadefoot toad breeding pools in the Town of Plainfield were conducted in August of 2019 that indicated a breeding event likely occurred nearby that year. Furthermore, 161.5 person hours of searching during suitable conditions yielded only three individual toads during this survey period, which suggests that population density of the species within the survey area might be low.

Nevertheless, we understand the NDDB has identified these potential breeding pools and adjacent upland habitat as an area of concern despite the absence of any observations of breeding over a two-year period. In recognition of these concerns, Quinebaug Solar proposes a revised layout of the Project. This proposed layout will protect potential breeding pool C and adjacent upland habitat which we believe is the most appropriate area to conserve for several reasons discussed below. Attachment A, Figure 1 and Figure 2 show the approximately 8 additional acres of species-specific habitat protection now incorporated into the Project design. In other words, based on NDDB's concerns, we will treat potential breeding pool C *as though it were a confirmed eastern spadefoot toad breeding pool*, and provide a connection between this pool, adjacent upland habitat and the previously designated herpetofauna protection area. Figure 1 and Figure 2 outline proposed Project changes that include protection of potential breeding pool C, as well as an expanded protection area within eastern spadefoot toad preferred habitat along the edge of the existing gravel extraction area and the slight modifications that will be made to the Project's development footprint upon approval by NDDB.

Eastern Spadefoot Toad Field Studies

Nocturnal field surveys were completed by FB Environmental over the summer of 2018 to determine presence of the eastern spadefoot toad within the Project's Study Area[1]. During this survey period, three eastern spadefoot toads were observed in the Study Area. All were radio-tagged and tracked to monitor their movements within the site. Additionally, potential breeding pools identified within the Study Area were checked during appropriate conditions (i.e., following heavy rain events) to determine if breeding activity had occurred. In addition to the 16 nights spent on site in 2018 performing these nocturnal surveys, diurnal herpetofauna surveys were completed over the summer of 2018 and included completion of a general herpetofauna inventory and vernal pool surveys.

Due to the observations of individual eastern spadefoot toads on the site in 2018, and to account for the sporadic and unpredictable breeding behavior of eastern spadefoot toad (no eastern spadefoot toad breeding events were observed/reported in Connecticut in 2018). Quinebaug Solar elected to conduct a second year of eastern spadefoot toad surveys over the spring and summer of 2019 to determine the possible presence of eastern spadefoot toad breeding pools within the Project Study Area. Furthermore, a known eastern spadefoot toad breeding site in proximity to the Project Study Area was surveyed concurrently in 2019 as a reference site.

Over the summer of 2019, eight separate surveys were conducted at three potential breeding pools identified within the Study Area, generally within 24 hours after a heavy rainfall event. Two of these pools were identified in the summer of 2018 and one additional potential breeding pool was identified during the 2019 survey effort. The location of all three pools are identified in Attachment A, Figure 1 and Figure 2. These pools have very short hydroperiods and do not meet the criteria to be considered wetlands per U.S. Army Corps of Engineers or State of Connecticut definitions, but they nonetheless have the potential to provide breeding habitat for eastern spadefoot toads.[2] A brief summary of survey activities at the potential breeding pools follows. Further details of the 2018 and 2019 field surveys are provided in the respective technical report and memorandum previously submitted to NDDB.

[1] An area approximately 460 acres in size that encompasses the proposed footprint.

[2] Note, however, that the hydroperiods of these pools are too short to support other pool-breeding species such as wood frog (*Lithobates sylvaticus*) and spotted salamander (*Ambystoma maculatum*).

Potential Breeding Pools

Potential Breeding Pool A

Potential breeding pool A lies northeast of the gravel extraction area at the center of the site. An access road to an adjacent hayfield traverses the pool. On April 19, 2018 the pool was observed to be approximately 50 to 75 feet in diameter with 2+ feet of standing water at its deepest point. Later, during a field investigation on May 7, 2018 the pool was observed to be completely dry. Tire ruts in the pool contained only several inches of water on September 19, 2018 after precipitation events resulted in a total of 2+ inches of rain in the preceding week.

During 2019 field surveys Potential breeding pool A was observed to be inundated on April 17. No amphibian egg masses were observed in the pool. The pool was found to be dry on all subsequent visits with the exception of a visit on August 7, 2019 where the interior of the pool had one inch of water due to a heavy rainfall event that occurred preceding the survey. No amphibian egg masses or larvae were observed in the pool during any of the 2018 or 2019 site visits.

Potential Breeding Pool B

Potential breeding pool B is located in an active corn field near the intersection of Rukstela Road and Allen Hill Road. On April 19, 2018 the pool was observed to be approximately 50 feet in diameter with up to 1 foot of standing water. During this time American toad (*Anaxyrus americanus*) tadpoles were observed in this pool, but the pool dried up prior to their metamorphosis.

In 2019 potential breeding pool B was observed to contain three American toad egg masses on April 17, 2019. The pool contained no water during subsequent site visits. Planted corn was growing from the pool area during July and August 2019 site visits. Corn was harvested before or during early September, at which time the pool contained no water.

Potential Breeding Pool C

Potential breeding pool C was first observed on June 20, 2019[3], at which time its basin contained no standing water, but did contain a visibly damp substrate. This pool is located within an active agricultural field and is approximately 60-feet in diameter following larger rain events. Visual encounter searches in and around the pool depression during the 2019 season yielded the detection of American toad metamorphs, which likely originated from the pool.

On July 26, 2019 the pool contained no standing water, but soil within its basin was damp, indicating recent inundation. Furthermore, no corn was observed in the basin undoubtedly due to the previous presence of enough standing water to inhibit vegetation growth in this area.

Potential breeding pool C contained no water at the start of a nocturnal survey event on August 7, 2019. During heavy rainfall that occurred that night, the pool filled to a depth of one foot in approximately 30 minutes, mainly from run-off from the access road to the athletic field. No eastern spadefoot toad breeding activity was detected, nor were any individuals detected in the vicinity of the pool or elsewhere on site during the survey.

[3] Potential breeding pool C was not initially observed during the 2018 surveys due to the pool being obscured by vegetation (corn).

On August 29, 2019 the pool contained 12 to 18 inches of water following a heavy rainfall event that occurred the previous evening. No amphibian egg masses were observed in the pool. The pool was dry on September 7 and September 26, 2019.

Species Protection

Of the Project's conserved wetland and buffer areas, all of which may serve as eastern spadefoot toad habitat and connectivity corridors, the most notable is the intact forested area comprised of the Blackwell Brook floodplain and a relict stream channel that extends to the east. This area, designated as the herpetofauna protection area, is home to the greatest diversity and abundance of herpetofauna on the site (see FB Environmental's 2018 *Vernal Pool Survey and General Herpetological Inventory of the Quinebaug Solar Project* report, provided in April 2019). With the addition of conserved zones around potential breeding pool C (approximately one acre) and the edge of the gravel extraction area (approximately 7 acres), this combined forested-open canopy complex serves as the core conservation asset for eastern spadefoot toad within the Study Area. Of specific benefit to eastern spadefoot toads, this combined area is largely underlain by Hinckley soils, has open canopy areas that provide the eastern spadefoot toad's preferred groundcover types, and was the site of one of the three eastern spadefoot toad detections in the Study Area (Attachment A, Figure 1 and Figure 2).

Despite considerable survey efforts completed in 2018 and 2019, there was no confirmation that the eastern spadefoot toad breeds anywhere within the Study Area. However, as an additional precautionary measure, we have included the pool which we feel has the greatest potential to be a breeding pool (potential breeding pool C) within the overall herpetological conservation area, along with a directional buffer that connects the pool to the core conservation area and the area of suitable eastern spadefoot toad habitat that is present along the edge of the gravel extraction area. The effort made to protect this additional area addresses concerns raised by NDDB that increased protection of habitat and potential breeding areas are warranted due to the possibility of a local breeding population.

Based on the physical characteristics of potential breeding pool C, its proximity to preferred eastern spadefoot toad habitat including Hinckley soils, and its location near one individual eastern spadefoot toad that was observation in 2018, we feel this area has the highest probability of successfully supporting a breeding population of eastern spadefoot toads if a significant population were to exist. Specifically, potential breeding pool C's hydroperiod was likely long enough to produce the American toad metamorphs encountered in the vicinity of the pool depression in 2019, making it a reasonable assumption that the eastern spadefoot toad also could successfully breed there in some years.[4] Potential breeding pool C also is situated just over 500 feet west of where one of the three individual eastern spadefoot toads was observed in 2018 (Attachment A, Figure 1 and Figure 2).

Potential breeding pools A and B are not good candidates for the same precautionary measures afforded to potential breeding pool C because their physical characteristics make them less likely to be used by eastern spadefoot toads. Eastern spadefoot toads have been documented to breed anywhere from March through October in Connecticut. Pools capable of becoming inundated at any time during this time

[4] Eastern spadefoot toad metamorphs can emerge in as little as two weeks after eggs are laid; American toads need somewhat longer, while wood frogs and other vernal pool amphibians need a considerably longer timeframe.

window provide more opportunities for use by the species and are thus more likely to be used. Potential breeding pools A and B were not observed to have any significant degree of inundation other than during spring, despite numerous observations of the pool during the summer and fall seasons over multiple years. In our experience, Potential breeding pool A when dry, becomes almost completely covered with upland vegetation, leaving hardened ruts in the access road that bisects the pool as the only indication that the depression is ever inundated. No amphibian egg masses of any kind have been observed in potential breeding pool A. Potential breeding pool B is situated within an active cornfield and becomes indistinguishable once planted corn matures; the depression is undetectable when not inundated. In contrast, Potential breeding pool C's depression remains visible throughout the year, and as mentioned above, prevents the growth of corn. Unlike potential breeding pool C, which appears to have successfully produced American toads, potential breeding pool B served as a sink (i.e. a reproductive dead end) for American toads.

We understand that the conservation of preferred habitat is important for protection of the species. The additional protection areas described in this letter and depicted in Attachment A, Figure 1 and Figure 2, along with a properly implemented Avoidance and Mitigation Plan will protect habitat as well as individuals or potential breeding populations that could occur at the site.

The identified protection areas will be designated as such for the life of the Project, which means they will remain as-is, excluded from development and not disturbed by Project construction, operation, or decommissioning activities. The Project land use agreement (Attachment B) includes the conservation restrictions for the protection of all designated conservation or protection areas for wetlands, watercourses, herpetofauna and eastern spadefoot toad. This draft agreement will be signed by the all parties once all conservation areas are finalized upon receipt of a final determination from NDDB.

Project Development and Operation

We believe these additional protection areas adequately protect a potential breeding population of eastern spadefoot toads as well as other sensitive species that are known to occur or may occur within the Project Site. The habitat conservation around the gravel extraction area is the result of recent negotiations between Quinebaug Solar and the current landowner. Based on these negotiations, arrays have been re-arranged slightly and additional protection areas have been incorporated into the Project design, the updated development footprint is depicted in both figures in Attachment A. An example of the habitat conservation agreement is provided in Attachment B. Upon issuance of final determination by NDDB, the agreement will be signed by Quinebaug Solar, the landowner, and the mineral rights owner. This agreement will protect the designated area for the life of the project.

The Herpetofauna Avoidance and Mitigation Plan submitted to NDDB along with the Environmental Site Conditions Report outlines the measures that will be implemented during construction to protect eastern spadefoot toad. This includes environmental monitoring of the site during construction, installation of exclusion fencing, and provision of contractor training. These measures will apply to the additional areas described in this letter. Potential breeding pool C and adjacent areas will be monitored during Project construction. If individual eastern spadefoot toads are observed within the construction area, they will be relocated to areas outside of the exclusion fence. In addition, the protection area will be specifically flagged to prevent construction activities. Monitoring during construction will be done by a qualified biologist with a scientific collection permit and the ability to handle this listed species. During the operations phase of the Project, potential breeding pool C and directional buffer area will be avoided except for vegetation maintenance which would occur outside of the actual depression. Permanent signage will be installed to prevent mechanized vegetation maintenance equipment from entering the depression.

The attached figures depict all the areas within the Project Study Area that are currently being protected from development. These protection areas will preserve habitat and serve as a refuge for sensitive natural resources and listed species known to occur on the Project site, including eastern spadefoot toad. It is this Project team's position that the protections being offered by Quinebaug Solar are adequate for the scope of the Project and the anticipated resulting environmental impacts.

We hope that this supplemental submission addresses DEEP's concerns. Please feel free contact us if you have any further questions regarding any of the environmental reports, data or supporting Project information that has been previously provided, or regarding any of the information provided in this letter. We would appreciate a response as soon as practicable.

Respectfully submitted,

Katelin Nickerson

Katelin Nickerson Project Manager, Senior Wetland Scientist
Tetra Tech, Inc.
451 Presumpscot Street
Portland, ME 04103
katelin.nickerson@tetratech.com

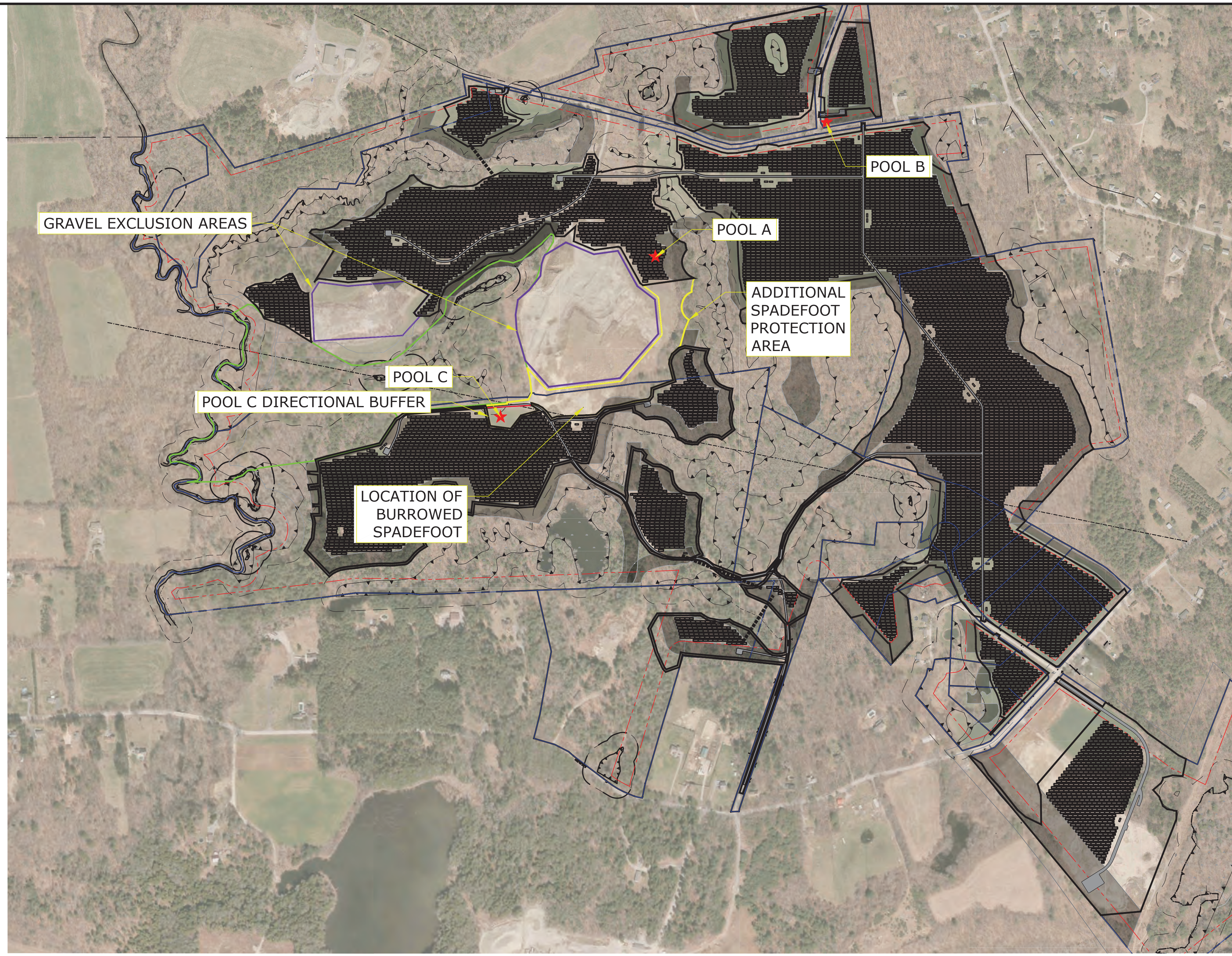
Kevin Ryan

Kevin J. Ryan, Ph.D.
Manager, Ecological Services
FB Environmental Associates
97A Exchange St., Suite 305
Portland, ME 04101
kevinr@fbenvironmental.com

cc. Hagen Lee, Jon Gravel – NextEra

Attachments
Attachment A – Figures
Attachment B – Conservation Agreement

Attachment A – Figures



LEGEND

★ POTENTIAL BREEDING POOL
PROPERTY LINE
PROPERTY LINE SETBACK
HERPETOFAUNA PROTECTION AREA
GRAVEL EXCLUSION AREA
DEVELOPMENT AREA
ADDITIONAL SPADEFOOT PROTECTION AREA
UNDERGROUND CONDUIT - DIRECTIONAL DRILLING
VEGETATION SETBACK

DRAFT - Conceptual layout for NDDB review

SCALE IN FEET
0 400' 800'
GRAPHIC SCALE

Tighe&Bond
Engineers | Environmental Specialists
www.tighebond.com

NOT FOR CONSTRUCTION

Quinebaug Solar Project

Quinebaug Solar, LLC

Brooklyn & Canterbury, Connecticut

VERIFY SCALE
BAR IS 1 INCH ON ORIGINAL DRAWING
0 1 INCH
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

MARK	DATE	DESCRIPTION

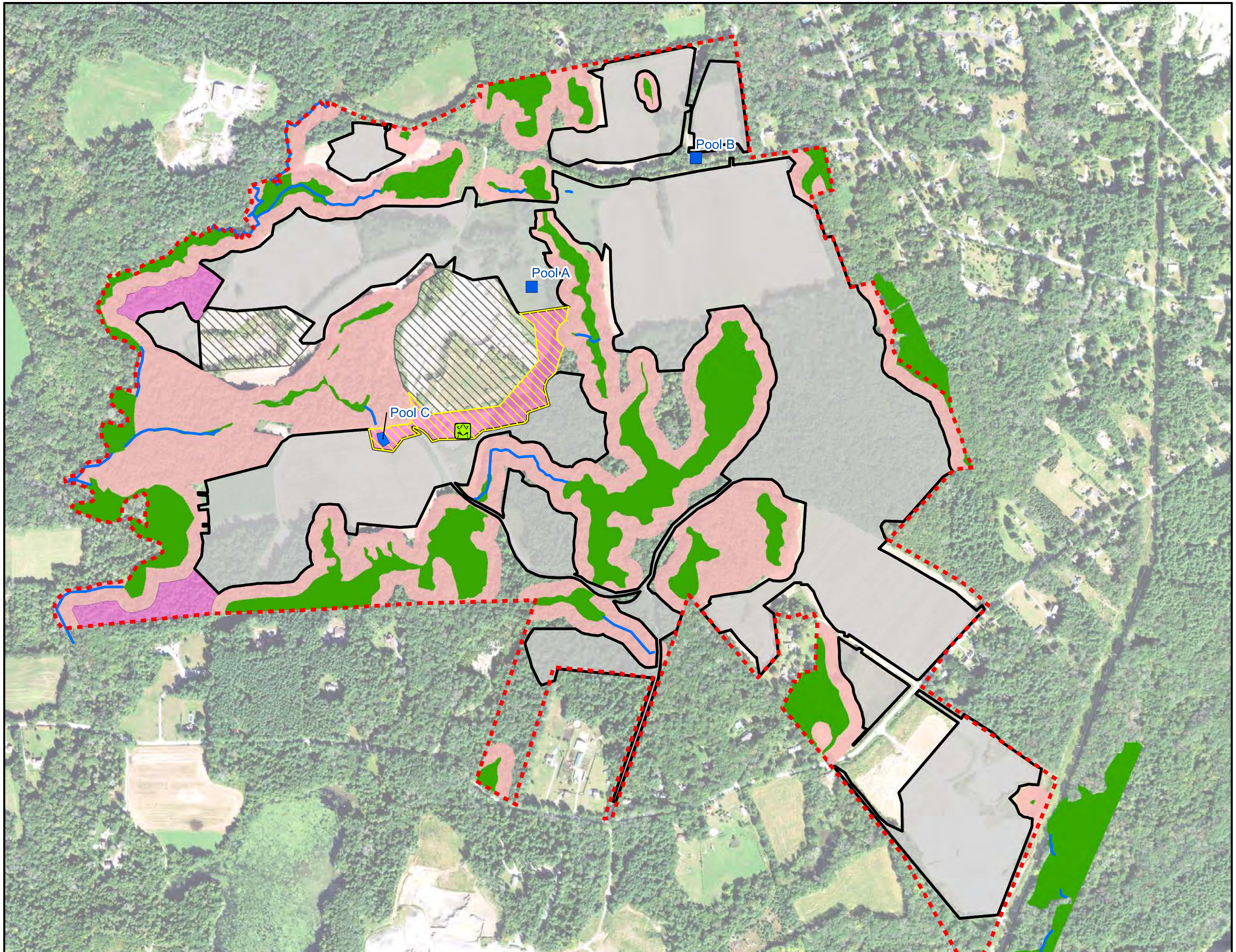
PROJECT NO: R-0317
DATE: 01/2020
FILE: Quinebaug Design 4.4 - Pool C.dwg
DRAWN BY: ALG
CHECKED: BA/BSH
APPROVED: FJH

POOL "C" PROTECTION

SCALE: 1"=400'

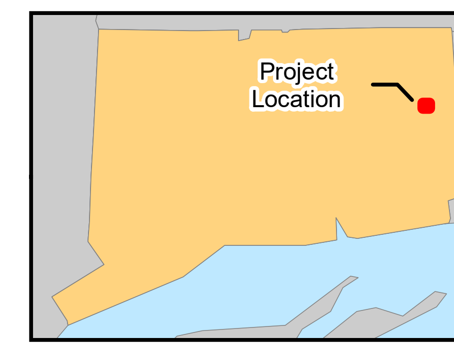
FIGURE 1

Last Saved/17/2020
Plotted On:Jan 17, 2020-2:37pm By: AGilchrist
Tighe & Bond: \R\R0317 Ranger Solar\R-0317-2_Quinebaug\Drawings_Figures\AutoCAD\Xref\Quinebaug Design 4.4 - Pool C.dwg



Legend

- Approximate Development Area
- Study Area
- Gravel Area and 25ft Buffer
- Delineated Natural Resource
- Natural Resource Buffer and Protection Area
- Additional Protection Area
- Spadefoot Toad Protection Area
- Delineated Watercourse
- Burrowed Spadefoot Toad
- Potential Spadefoot Toad Breeding Pool



Feet
0 400 800 1,600

Figure 2. Spadefoot Toad Protection Areas
Quinebaug Solar Project
Brooklyn and Canterbury, CT

Prepared For: NEXTera ENERGY RESOURCES

Prepared By: TETRA TECH

Date: 01/2020

Source: Esri, et. al., 2016; NextEra, 2018; Tetra Tech, 2019

Coordinate System: North American Datum, 1983 Universal Transverse Mercator, Zone 19 North

Not for Construction

Attachment B – Conservation Agreement

January 10, 2020

Connecticut Department of Energy
and Environmental Protection
79 Elm Street
Hartford, Connecticut 06106

Re: Quinebaug Solar Project - Conservation Areas on the River Junction Estates Land

To Whom This May Concern:

Quinebaug Solar, LLC ("**Quinebaug Solar**") is currently proposing to construct a solar project on several parcels of land in the towns of Canterbury and Brooklyn, Connecticut. Quinebaug Solar understands the value of placing certain areas of the solar project in conservation for the duration of the solar project and therefore agrees that it will not develop solar on the areas shown in pink as further denoted on **Exhibit A**, the Conservation Areas Map, attached hereto and hereinafter incorporated by reference (the "**Conservation Areas**").

Further, the landowner, River Junction Estates, LLC and the mineral rights owners O&G Industries, Inc. and Strategic Commercial Realty, Inc. DBA Rawson Materials (collectively, referred to as the "**Land Parties**"), represent and warrant that for the duration of the solar project, the Land Parties will not develop or grant others the right to develop, the Conservation Areas.

Quinebaug Solar and the Land Parties agree that a short form of this letter in a format acceptable to all parties, may be recorded at the request of the Connecticut Department of Energy and Environmental Protection in the land records of the towns where such Conservation Areas lie.

QUINEBAUG SOLAR
Quinebaug Solar, LLC

____
By:
Title:

LAND PARTIES
Strategic Commercial Realty, Inc.
dba Rawson Materials

____
By:
Title:

O&G Industries, Inc.

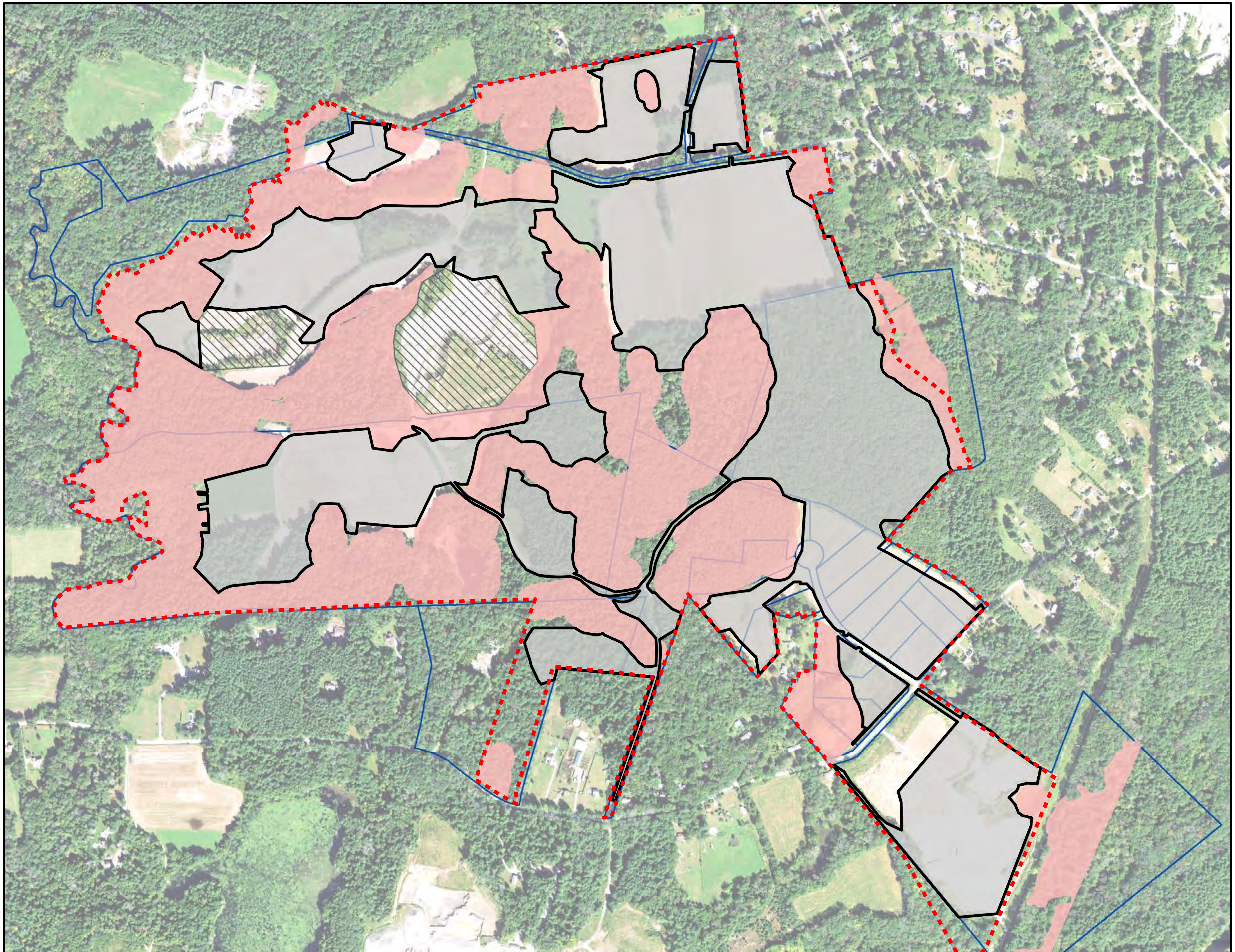
____
By:
Title:

River Junction Estates, LLC

____
By:
Title:

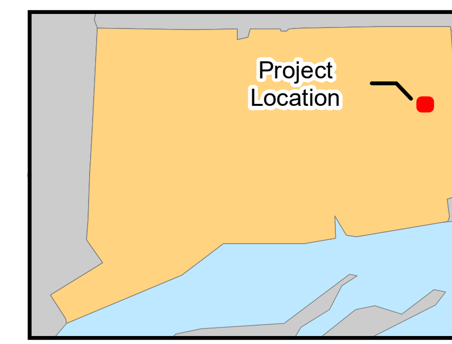
EXHIBIT A

Conservation Areas Map



Legend

- Approximate Development Area
- Study Area
- Gravel Area and 25ft Buffer
- Natural Resource Buffer and Protection Area
- Property Line



N

0 400 800 1,600 Feet

Conservation Areas
Quinebaug Solar Project
Brooklyn and Canterbury, CT

Prepared For: NextEra Energy Resources

Prepared By: Tetra Tech

Date: 01/2020

Source: Esri, et. al., 2016; NextEra, 2018; Tetra Tech, 2019

Coordinate System: North American Datum, 1983 Universal Transverse Mercator, Zone 19 North

Not for Construction