

THE GLEN AT GOOSE ROCKS

STORMWATER MANAGEMENT REPORT

Prepared for: K.J. Trudo Properties, LLC
20 Apple Blossom Lane,
Kennebunkport, ME 04046

Prepared by:



September 2022 (REV April 2023)

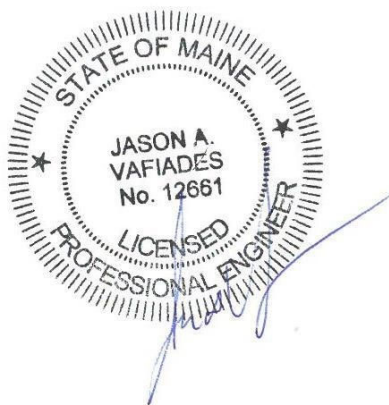


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INTRODUCTION

The applicant proposes to create a 9-lot residential subdivision with the associated access road, electrical utilities and stormwater management. The project site is located on Goose Rocks Road, between Arundel Road and Whitten Hill Road. The subject parcel is identified as Tax Map 15 (b), Block 1, Lot 1 by the Town of Kennebunkport Assessor's Maps. As shown on the Town of Kennebunkport Zoning Map, the subject parcel is in both the Farm and Forest Zone and Shoreland Zone. As shown by FEMA Flood Plain Maps, an area of the subject parcel contains a Zone B flood-prone area.

The proposed development includes a 1,326-foot long roadway and a 746-foot long roadway. Both roadways will be paved with 20-foot wide travel ways and 3-foot wide shoulders, as well as ditches on both sides.

The residences will be served with individual wells and individual septic tanks. There will be one wetland crossing and two stream crossings. The primary stormwater infrastructure will consist of three bioretention filter gardens and a single gravel wetland.

The total estimated wetland impacts will be approximately 8,575 sf. The total new impervious area will be approximately 2.61 ac and the total new developed area will be approximately 5.42 ac.

EXISTING CONDITIONS

The subject parcel is recorded to be 43.54 acres. The project site is currently undeveloped and wooded. The topography of most of the site (south-southeasterly area) is flat with some moderately sloped hills (0-8% slopes). The northwesterly area of the site is more sloped (8-12% slopes). The site is divided into two subcatchments. The larger subcatchment drains in a southeasterly direction, with a stream named Smith Brook running through the site. Stormwater runoff exits the site through a cross culvert under Goose Rocks Road, traveling southeast. Site drainage is tributary to the Batson River to the southeast. The smaller subcatchment, a southwesterly area of the site, drains off-site through the southwest property boundary.

A Class-A High-Intensity Soil Survey (HISS) was completed by Longview Partners (LVP). The predominant soil types are classified primarily as hydrologic soil groups D and C/D. For the purposes of this report, given the high water table and abundance of ledge and clays, all soils have been modeled as HSG D soils per guidance from the

STORMWATER MANAGEMENT

New stormwater Best Management Practices (BMP's) have been designed to provide detention and water quality treatment for runoff from new impervious areas associated with new infrastructure development before allowing it to drain in a controlled manner to the existing receiving waters.

The new stormwater management system will maintain the existing drainage patterns at the site, while protecting water quality and ensuring that there is no increase in peak runoff from the property during design storm conditions. This stormwater management analysis has been prepared in accordance with the Maine

Department of Environmental Protection (MDEP) Chapter 500 Regulations for Basic, General and Flooding Standards to ensure that the planned development will not result in a degradation of water quality or any other significant impacts to locations downstream of the development site as a result of stormwater runoff. Stormwater BMP designations and details can be found in the accompanying project plan set.

METHODOLOGY AND MODELING

Runoff and routing calculations have been performed for the watershed areas affected by the proposed development under pre-development and post-development conditions scenarios. Time of concentration and runoff curve number calculations have been performed using the method described in Natural Resource Conservation Service (NRCS) Technical Release 55 (TR-55) – Urban Hydrology for Small Watersheds. The TR-20 based HydroCAD modeling software has been utilized to perform the more complex runoff and routing calculations, some of which are beyond the scope of the TR-55 method. Time of concentration calculations have been amended where the value given by the TR-55 method is less than six minutes (0.1 hr). In these cases, a standard minimum value of six minutes has been used to keep this parameter within the acceptable working range of the model and prevent computational errors.

Design rainfall events have been modeled using the SCS Type III Hydrograph for 24-hour duration storms. The rainfall depth for each return period is taken from Maine Department of Environmental Protection Chapter 500 Stormwater Management, Appendix H (York County). The rainfall depth values for standard design storm frequencies are shown in the table below.

TABLE I - 24-Hr Rainfall Depths for York County at Design Storm Frequencies				
<i>Maine Chapter 500: Stormwater Management, Appendix H</i>				
Frequency	2-Year	10-Year	25-Year	100-Year
Rainfall Depth	3.3 in	4.9 in	6.2 in	8.7 in

TABLE 2 – SOIL TYPES (LVP)	
Soil Type	Hydrologic Soil Group
Biddeford	D
Lyman-Tunbridge Complex	C/D
Lyman-Tunbridge-Rock Outcrop Complex	C/D
Naskeag	D
Scantic	D

PROPOSED BMPS

Stormwater runoff from the new developed area at the project site will be captured and treated in a series of new Best Management Practices (BMPs). This includes vegetated roadside swales, three 15" HDPE culverts, three 48" HDPE culverts, one 60" HDPE culvert, riprap inlets and outlets, three bioretention filters and one gravel wetland. Bioretention filters are shallow depressed beds with filtering soil media that are planted with native plants and grasses. They ultimately drain via under drain. The gravel wetlands are shallow grassed depressions filled with a filtering soil media and planted with native wetland plants and grasses. Although primarily designed for quality treatment, the bio-filters and gravel wetlands also provide detention storage, providing a reduction in the peak runoff rate to downstream receiving areas. The slow discharge through the underdrain system provides extended base flows and protects downstream receiving waters from erosive peak flows after storm events. The overflow spillway allows excess flow to pass through the system without causing damage during severe storm events.

NRCS Code 378, the Stormwater Management for Maine: Best Management Practices (MEDEP, 2016) and the Maine Erosion and Sediment Control Best Management Practices (BMPs) Manual for Designers and Engineers (October 2016) have been used as guidelines in the design of the stormwater system.

CONDITIONS ANALYSIS

Pre-Development Conditions

In the pre-development condition, the project site is divided into two subcatchments. The largest subcatchment (1S) contains the majority of the watershed and the site. 1S has a stream running through it which exits the site through a culvert under Goose Rocks Road. The smaller subcatchment (2S) drains through the southwestern property boundary.

A summary of the subcatchment areas is given in the table below. Full details of pre-development subcatchment areas, cover conditions and time of concentration flow paths are described in detail in the supporting HydroCAD documentation included in Attachment C of this report. A Pre-Development Conditions Watershed Plan is included in Attachment A of this report.

PRE-DEVELOPMENT WATERSHED CHARACTERISTICS			
SUBCATCHMENT	AREA (ac)	CN	Tc (mins)
1S	99.53	74	101.70
2S	2.38	75	39.20
TOTAL AREA	101.91		

Post-Development Conditions

In the post-development condition, the site is divided into six subcatchment areas. The site is divided into similar subcatchment areas that have been adjusted to reflect the proposed improvements. The most notable difference is that subcatchment 1S becomes divided into five subcatchments (10S - 14S) such that it includes subcatchments for each of the BMP treatment areas. The overall drainage of the site is mostly unchanged, with two similar Points of Analysis (POA's) where stormwater runoff exits the site. A full listing of the post-development areas in the overall model is shown in the following table. Full details of the post-development subcatchment areas, cover conditions and time of concentration flow paths are described in detail in the supporting HydroCAD documentation included in Attachment C of this report. A Post-Development Conditions Watershed Plan is included in Attachment A of this report.

POST-DEVELOPMENT WATERSHED CHARACTERISTICS			
SUBCATCHMENT	AREA (ac)	CN	Tc (mins)
10S	97.61	74	101.70
11S	0.90	87	6.0
12S	0.30	87	6.0
13S	0.42	88	6.0
14S	0.20	89	6.0
20S	2.38	75	39.20
TOTAL AREA	101.91		

STORMWATER QUANTITY ANALYSIS

The table below summarizes the peak runoff values for pre-development and post-development conditions during each of the analyzed design storm events. Peak flows for each POA have either been maintained or reduced in the post-development condition.

PEAK RATES (CFS)						
POA	2-Year		10-Year		25-Year	
	Pre	Post	Pre	Post	Pre	Post
POA-1	29.54	29.13	89.53	76.82	124.68	112.68
POA-2	1.55	1.55	3.26	3.26	4.78	4.78

STORMWATER QUALITY ANALYSIS

The project has been designed in accordance with Stormwater Law (Chapter 500) to meet “General Standards”, which requires water quality treatment for 75% of new impervious areas and 50% of new developed areas for any linear portion of a project.

The project will utilize three new bioretention gardens and one new gravel wetland to treat the linear portion of the project and forested buffers to treat the nonlinear portion of the project. The BMPs have been designed in accordance with the latest version of the Maine Department of Environmental Protection BMPs Technical Design Manual, to achieve the following stormwater quality treatment percentages.

STORMWATER QUALITY CALCULATIONS: LINEAR TREATMENT										
THE GLEN AT GOOSE ROCKS - GOOSE ROCKS ROAD, KENNEBUNKPORT, MAINE										
SUBCATCHMENT	DESCRIPTION	IMPERVIOUS TREATMENT TARGET: 75%				DEVELOPED AREA TREATMENT TARGET: 50%				
		AREA (SF)	TREATED (SF)	TREATED BY	TREATED AREA (%)	DESCRIPTION	AREA (SF)	TREATED	TREATED BY	TREATED AREA
RA-1	UNTREATED ROW*	3960	0	NONE	0%	UNTREATED ROW	12700	0	NONE	0%
RA-2	TREATED ROW	19305	19305	BIO-1	100%	TREATED ROW	39200	39200	BIO-1	100%
RA-3	TREATED ROW	6955	6955	BIO-2	100%	TREATED ROW	13100	13100	BIO-2	100%
RA-4	TREATED ROW	9490	9490	BIO-3	100%	TREATED ROW	18240	22785	BIO-3	125%
RA-5	UNTREATED TREATED ROW **	2850	0	NONE	0%	UNTREATED ROW	5105	0	NONE	0%
RA-6	TREATED ROW	4930	4930	GW 1	100%	TREATED ROW	8785	8785	GW-1	100%
Totals		47490	40680		85.7%		97130	83870		86%

* 4575 SF OF IMPERVIOUS REMOVED FROM CALCULATION IN WETLAND CROSSINGS WITH PROPERLY SIZED WETLAND CONNECTION CULVERTS.

** 1725 SF OF IMPERVIOUS REMOVED FROM CALCULATION IN WETLAND CROSSINGS WITH PROPERLY SIZED WETLAND CONNECTION CULVERTS.

STORMWATER QUALITY CALCULATIONS: NON-LINEAR TREATMENT										
THE GLEN AT GOOSE ROCKS - GOOSE ROCKS ROAD, KENNEBUNKPORT, MAINE										
SUBCATCHMENT	DESCRIPTION	IMPERVIOUS TREATMENT TARGET: 95%				DEVELOPED AREA TREATMENT TARGET: 80%				
		AREA (SF)	TREATED (SF)	TREATED BY	TREATED AREA (%)	DESCRIPTION	AREA (SF)	TREATED	TREATED BY	TREATED AREA
LOT 1	HOUSE AND DRIVE	7000	7000	LOT BUFFER*	100%	HOUSE, DRIVE, LAWN	17000	17000	LOT BUFFER*	100%
LOT 2	HOUSE AND DRIVE	8500	5500	LOT BUFFER*	65%	HOUSE, DRIVE, LAWN	20000	16000	LOT BUFFER*	80%
LOT 3	HOUSE AND DRIVE	3500	3500	LOT BUFFER*	100%	HOUSE, DRIVE, LAWN	9000	9000	LOT BUFFER*	100%
LOT 4	HOUSE AND DRIVE	9000	9000	LOT BUFFER*	100%	HOUSE, DRIVE, LAWN	20000	2000	LOT BUFFER*	10%
LOT 5	HOUSE AND DRIVE	9000	9000	LOT BUFFER*	100%	HOUSE, DRIVE, LAWN	13000	13000	LOT BUFFER*	100%
LOT 6	HOUSE AND DRIVE	5000	5000	LOT BUFFER*	100%	HOUSE, DRIVE, LAWN	12500	12500	LOT BUFFER*	100%
LOT 7	HOUSE AND DRIVE	10000	10000	LOT BUFFER*	100%	HOUSE, DRIVE, LAWN	22500	22500	LOT BUFFER*	100%
LOT 8	HOUSE AND DRIVE	6000	6000	LOT BUFFER*	100%	HOUSE, DRIVE, LAWN	10000	10000	LOT BUFFER*	100%
LOT 9	HOUSE AND DRIVE	8000	8000	LOT BUFFER*	100%	HOUSE, DRIVE, LAWN	15000	15000	LOT BUFFER*	100%
Totals		66000	63000		95.5%		139000	117000		84%

SOIL EROSION AND SEDIMENT CONTROL

A comprehensive Soil Erosion and Sediment Control (SESC) narrative has been prepared that includes Best Management Practices (BMPs) associated with the proposed construction activities. The location of SESC BMPs is shown on the accompanying plans. These are further described on the details and notes sheets in the accompanying plan set.

The Erosion and Sediment Control Report outlines the required construction measures and techniques that will reduce potential degradation of the water quality at downstream locations. Temporary erosion control measures will be incorporated during construction, and long-term surface stabilization practices have been designed as part of the site development, thus minimizing the potential for erosion and sediment transport.

These measures include the constructed BMPs for filtration of runoff from smaller storm events, riprap, permanent seeding and other vegetative stabilization measures. Detailed information on the specific erosion and sedimentation control practices that are to be used on the site are provided on the following plan sheet, which will be included as part of the construction documents for the project.

STORMWATER MAINTENANCE PLAN

The effectiveness of water quality management provisions and other components of the stormwater management system are dependent on their design, upkeep, and maintenance to assure they meet their intended function over an extended period of time. It is critical that the stormwater management facilities are regularly inspected and that maintenance is performed on an as-needed basis.

A Stormwater Management Inspection and Maintenance Manual has been prepared specifically for the project and is included in Attachment D of this section.

CONCLUSIONS

The stormwater management system designed for this project will mitigate impacts of development on stormwater runoff peak discharge rates and provide treatment of non-point source pollutants in the runoff in accordance with Maine's Stormwater Management Act and Regulations. Based on the analysis described in this report, it is expected that runoff from the proposed development will not cause adverse impacts to downstream properties.

Limitations

This analysis is based on the information available to the engineer on site conditions and has been conducted using standard industry software designed to analyze *comparative* changes in land cover conditions. The accuracy of the runoff and routing calculations is limited by the methodology used in the software and the results should be viewed as suitable for comparative studies only.

References

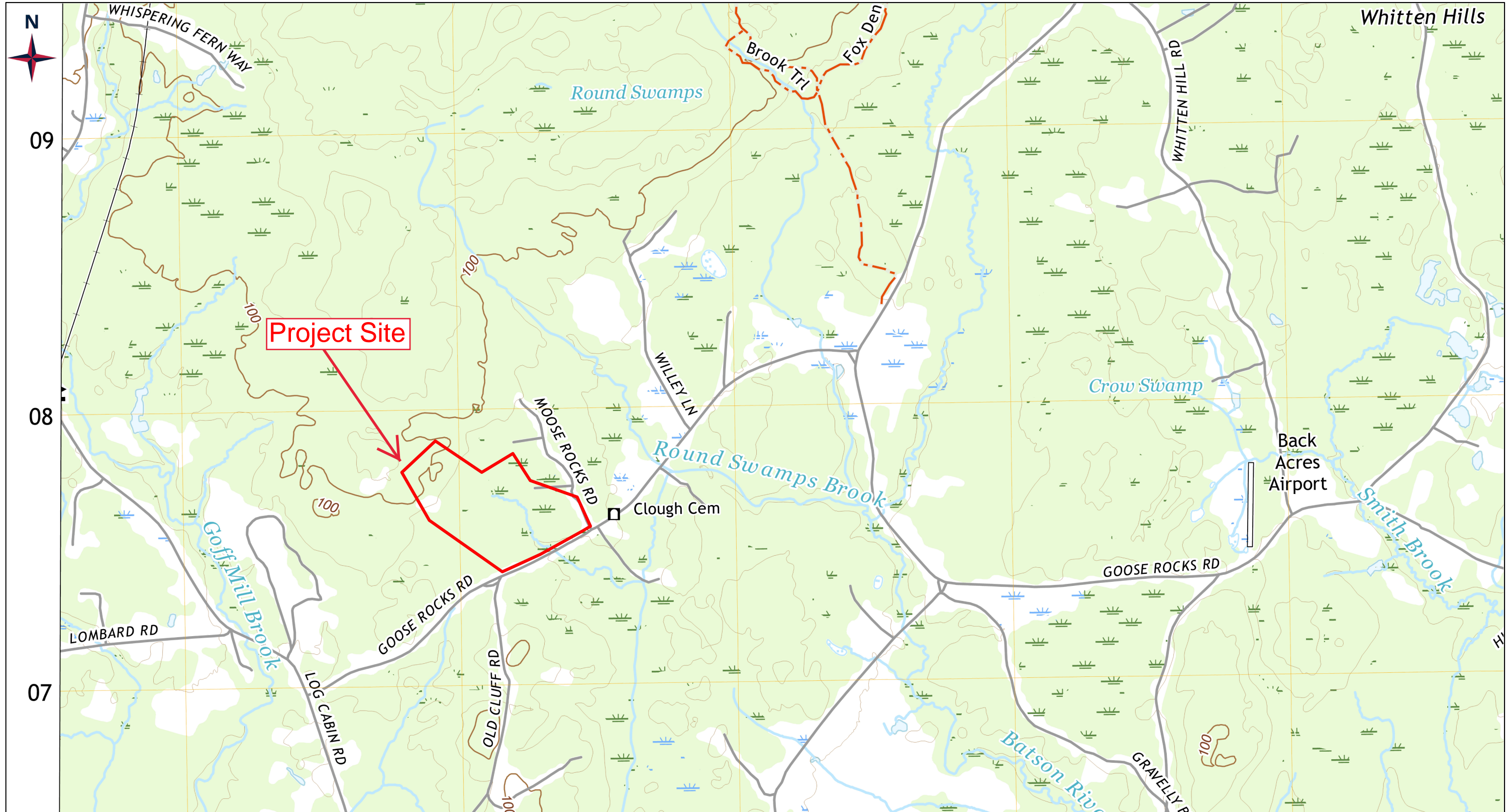
- I. NRCS Web Soil Survey
2. NRCS TR-378
3. Stormwater Management for Maine BMPs Design Manual
4. Maine Erosion and Sediment Control Best Management Practices (BMPs): Manual for Designers and Engineers (October 2016)

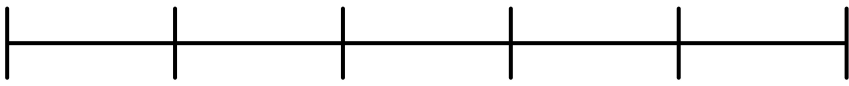

FIGURES AND ATTACHMENTS

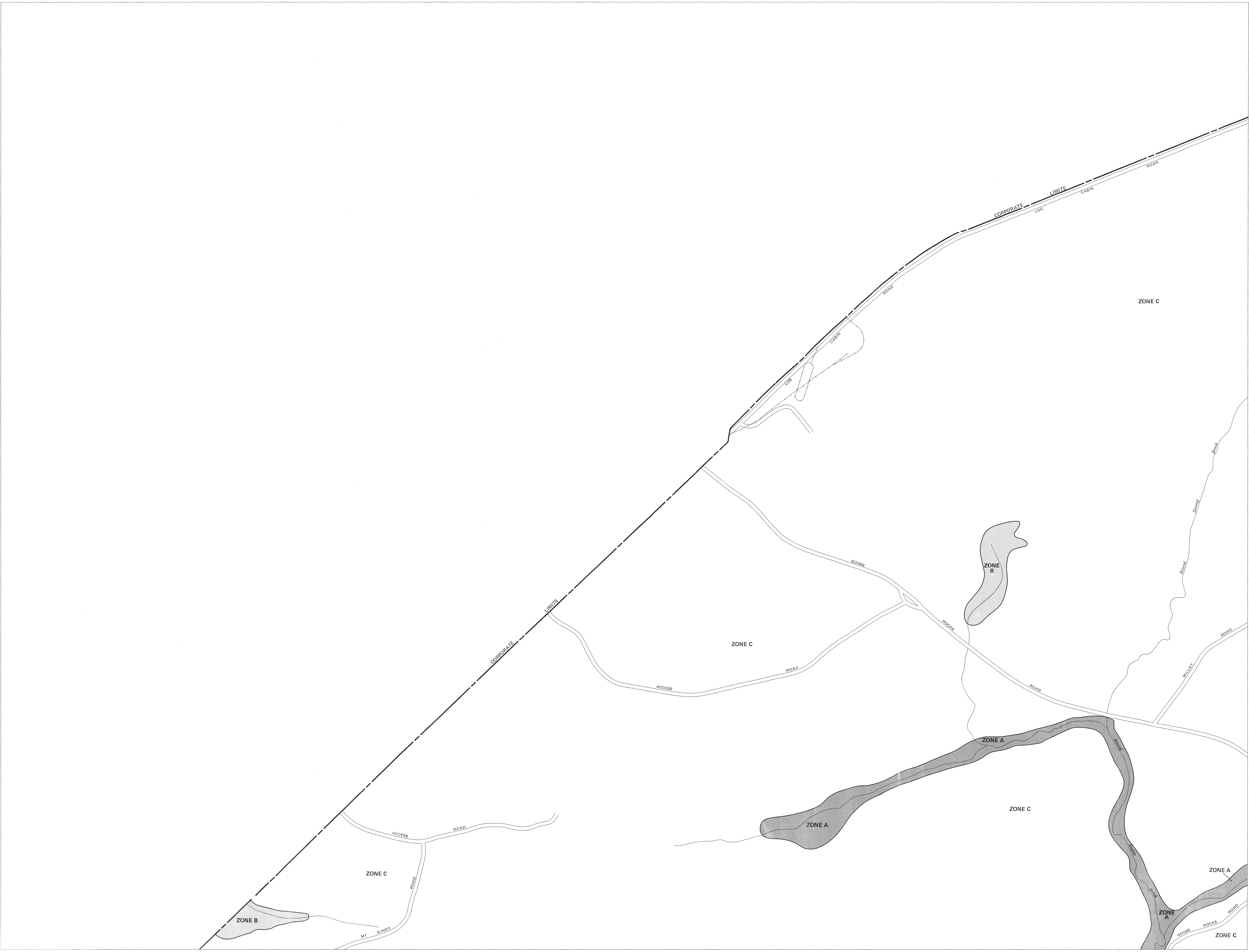
- I. Figure 1 USGS Location Map
- II. Figure 2 FEMA Flood Map
- III. Attachment A Pre-Development & Post-Development Watershed Maps
- IV. Attachment B Water Quality Calculations

- V. Attachment C TR-20 Computations (HydroCAD)
 - i. Pre-Development Model
 - ii. Post-Development Model
- VI. Attachment D Stormwater Operations and Maintenance Manual
- VII. Attachment E Class-A High Intensity Soil Survey

FIGURES



 <p>0 ft 1000 ft 2000 ft 3000 ft 4000 ft 5000 ft</p>	<p>Created By: Lucien Langlois Date Created: 2/18/2022 Source: U.S.G.S. Projection: UTM 19N (NAD83) Project # 21-059</p>	<p>USGS Location Map K.J. Trudo Properties, LLC 20 Apple Blossom Lane Kennebunkport, ME 04046</p>	 <p>Atlantic Resource Consultants 541 US Route One Freeport, ME 04032 Tel: 207.869.9050</p>
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KEY TO MAP

500-Year Flood Boundary
100-Year Flood Boundary
Zone Designations*

100-Year Flood Boundary
Base Flood Elevation Line With Elevation In Feet**
Base Flood Elevation in Feet Where Uniform Within Zone**
Elevation Reference Mark
Zone D Boundary
River Mile

ZONE B
ZONE A1
ZONE A5
ZONE B

513
(EL 987)

RM7x
M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

***EXPLANATION OF ZONE DESIGNATIONS**

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; on certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

Coastal base flood elevations shown on this map include the effects of wave action.

Coastal base flood elevations apply only landward of the shoreline shown on this map.

INITIAL IDENTIFICATION:
DECEMBER 6, 1974

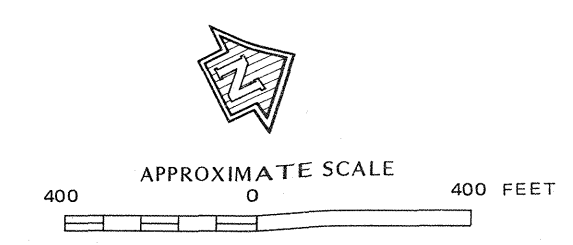
FLOOD HAZARD BOUNDARY MAP REVISIONS:
DECEMBER 3, 1976

FLOOD INSURANCE RATE MAP EFFECTIVE:
APRIL 18, 1983

FLOOD INSURANCE RATE MAP REVISIONS:

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actual rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620.



NATIONAL FLOOD INSURANCE PROGRAM


FIRM
FLOOD INSURANCE RATE MAP

TOWN OF KENNEBUNKPORT, MAINE YORK COUNTY

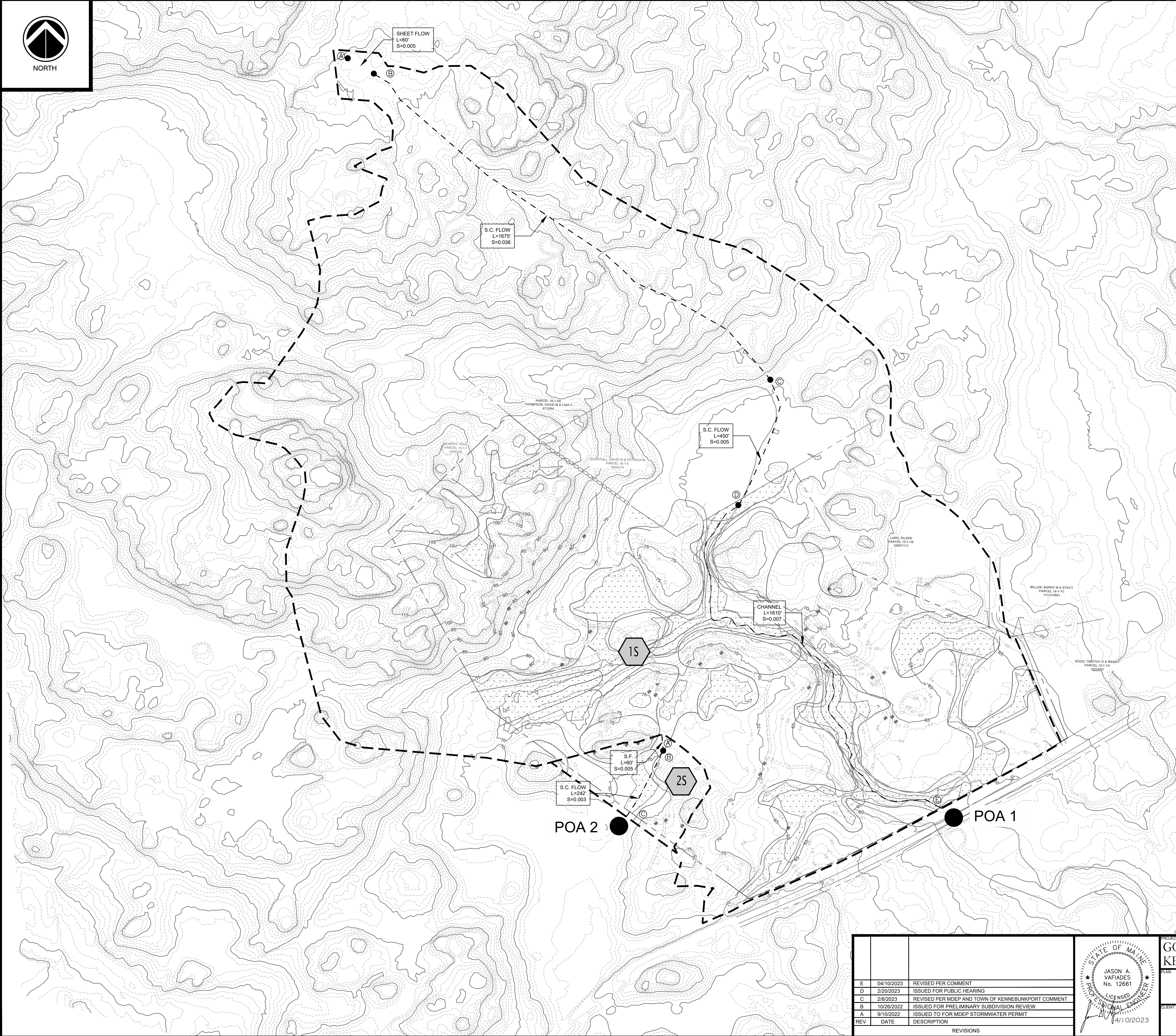
PANEL 1 OF 8
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
230170 0001 B

EFFECTIVE DATE:
APRIL 18, 1983

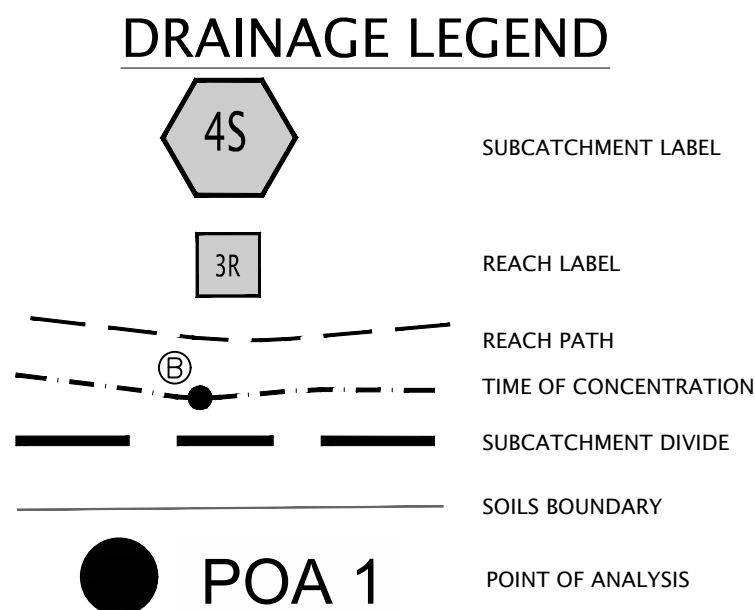

Federal Emergency Management Agency

ATTACHMENT A – WATERSHED MAPS



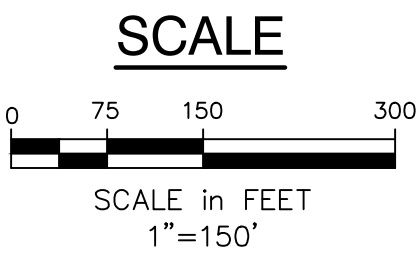
SOILS LEGEND	
SOIL NAME	HYDROLOGIC SOIL GROUP
Biddeford 0-3 % slopes	D
Lyman-Tunbridge Complex, 3-8% slopes	C/D
Lyman-Tunbridge-Rock Outcrop Complex, 3-20% slopes	C/D
Lyman-Tunbridge Complex, 3-8% slopes	C/D
Naskeag, 0-8% slopes	C
Scantic, 0-3% slopes	D

NOTE: ALL WETLAND AREA SOIL TYPES ARE CONSIDERED TO BE HYDROLOGIC SOIL GROUP D

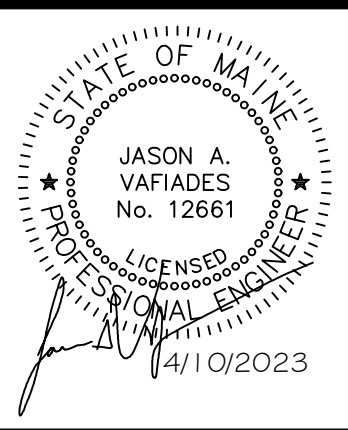


LEGEND	
EXISTING	DESCRIPTION
---	BOUNDARY LINE/R.O.W.
	WETLANDS
---	EDGE WETLAND
---	GRAVEL ROAD
---122---120---	CONTOURS

FOR PERMITTING ONLY
NOT FOR CONSTRUCTION

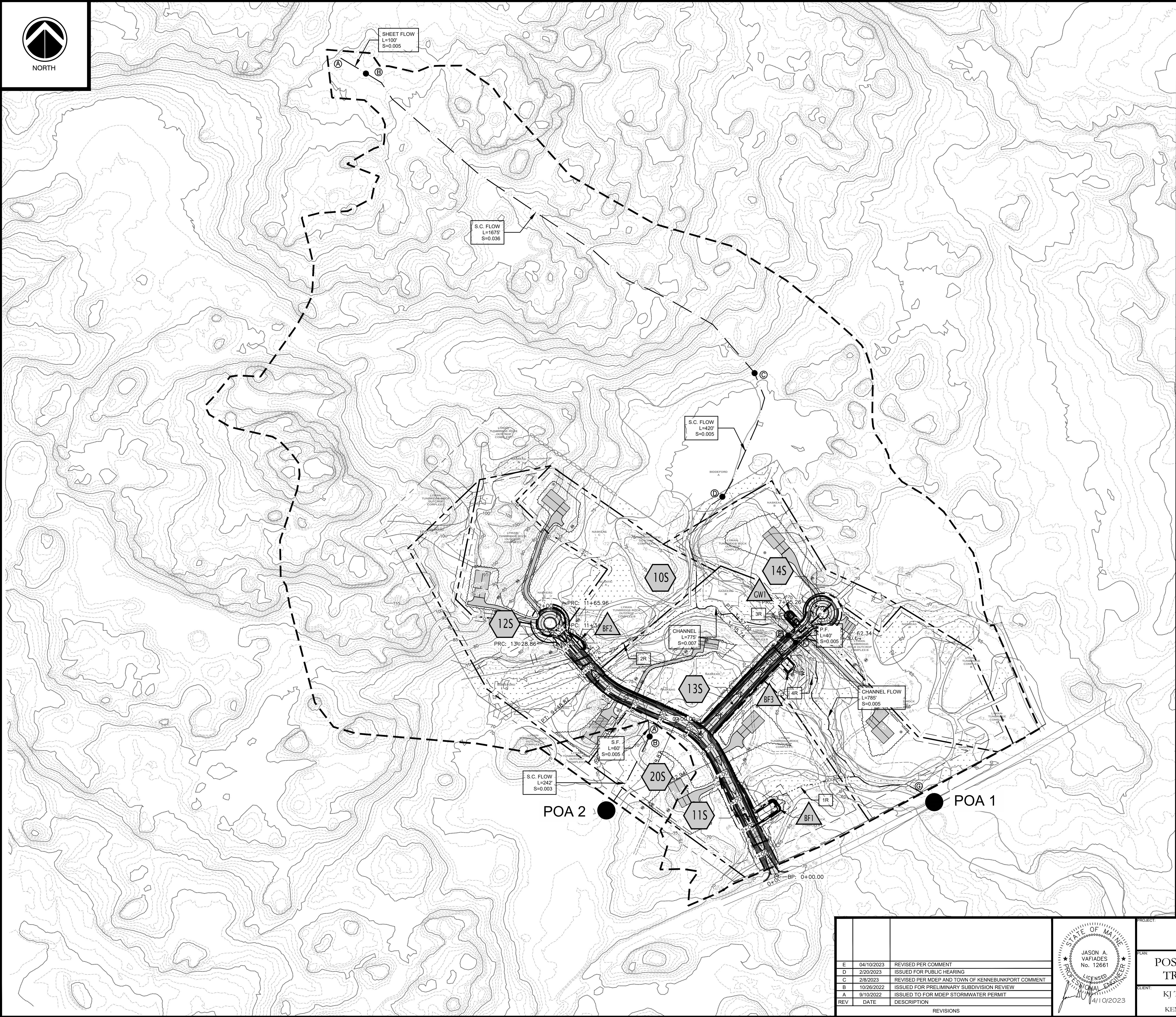


REV	DATE	DESCRIPTION
E	04/10/2023	REVISED PER COMMENT
D	2/20/2023	ISSUED FOR PUBLIC HEARING
C	2/8/2023	REVISED PER MDEP AND TOWN OF KENNEBUNKPORT COMMENT
B	10/26/2022	ISSUED FOR PRELIMINARY SUBDIVISION REVIEW
A	9/10/2022	ISSUED TO FOR MDEP STORMWATER PERMIT
REV	DATE	DESCRIPTION
REVISIONS		



PROJECT:	GOOSE ROCKS SUBDIVISION KENNEBUNKPORT, ME 04046
PLAN:	PRE-DEVELOPMENT DRAINAGE PLAN
CLIENT:	

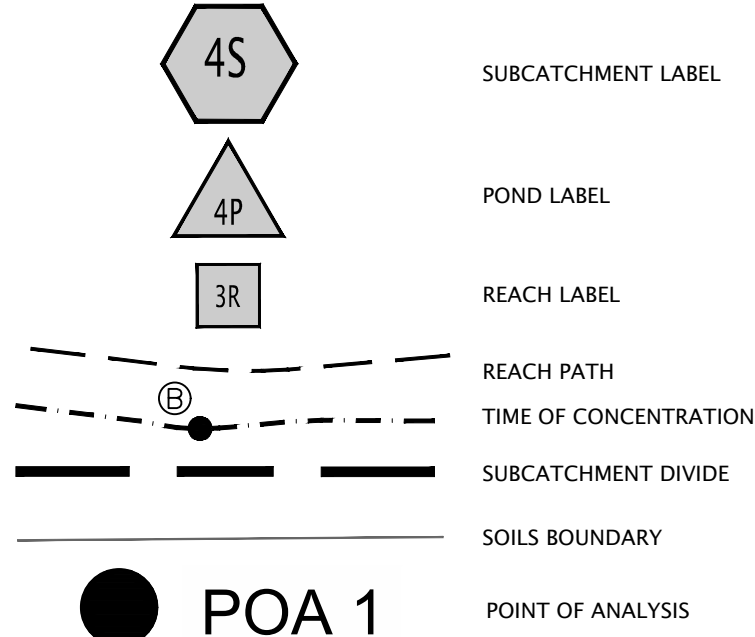
		Atlantic Resource Consultants 541 US Route One Freeport, ME 04032 Tel: 207.869.9050	
DRAWN:	ZWG	DATE:	APRIL 2023
DESIGNED:	JAV	SCALE:	1"=150'
CHECKED:	APP	JOB NO.	21-059
FILE NAME:			
SHEET:	D-100		



SOILS LEGEND	
SOIL NAME	HYDROLOGIC SOIL GROUP
Biddeford 0-3 % slopes	D
Lyman-Tunbridge Complex, 3-8% slopes	C/D
Lyman-Tunbridge-Rock Outcrop Complex, 3-20% slopes	C/D
Lyman-Tunbridge Complex, 3-8% slopes	C/D
Naskeag, 0-8% slopes	C
Scantic, 0-3% slopes	D

NOTE: ALL WETLAND AREA SOIL TYPES ARE CONSIDERED TO BE HYDROLOGIC SOIL GROUP D

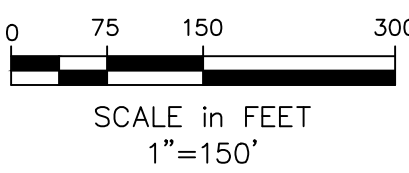
DRAINAGE LEGEND



LEGEND

EXISTING	DESCRIPTION	PROPOSED
---	BOUNDARY LINE/R.O.W.	---
---	WETLANDS	---
---	EDGE WETLAND	---
---	EDGE PAVEMENT	---
---	GRAVEL ROAD	---
---	CONTOURS	---
---	CULVERT	---
---	RIPRAP	---

SCALE



FOR PERMITTING ONLY
NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION
E	04/10/2023	REVISED PER COMMENT
D	2/20/2023	ISSUED FOR PUBLIC HEARING
C	2/8/2023	REVISED PER MDEP AND TOWN OF KENNEBUNKPORT COMMENT
B	10/26/2022	ISSUED FOR PRELIMINARY SUBDIVISION REVIEW
A	9/10/2022	ISSUED FOR MDEP STORMWATER PERMIT
REV	DATE	DESCRIPTION
REVISIONS		



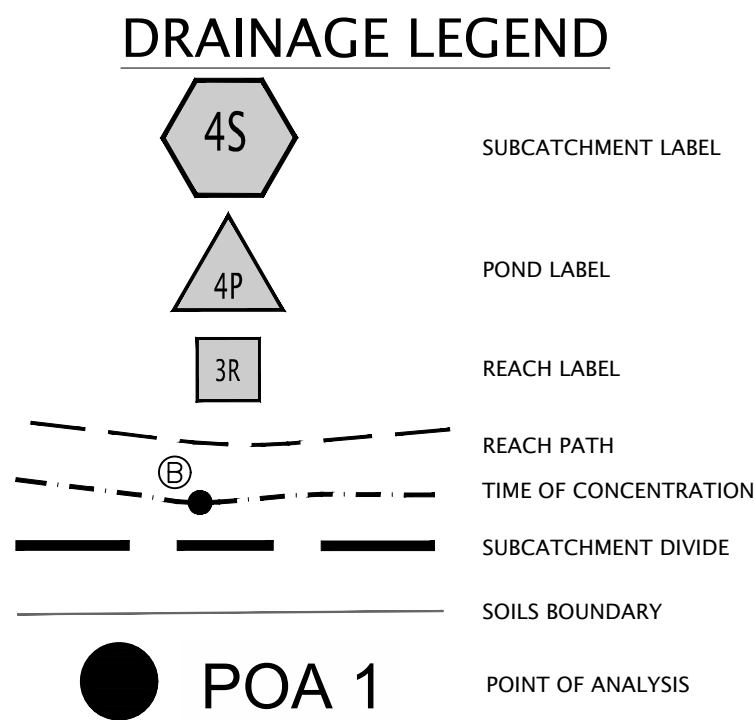
THE GLEN AT GOOSE ROCKS	
POST-DEVELOPMENT TREATMENT PLAN	
KJ TRUDO PROPERTIES, LLC 20 APPLE BLOSSOM LANE KENNEBUNKPORT, MAINE 04046	

Atlantic Resource Consultants 541 US Route One Freeport, ME 04032 Tel: 207.869.9050	
DRAWN: ZWG	DATE: APRIL 2023
DESIGNED: JAV	SCALE: 1"=150'
CHECKED: JAV	JOB NO. 21-059
FILE NAME:	
SHEET: D-101	



SOILS LEGEND	
SOIL NAME	HYDROLOGIC SOIL GROUP
Biddeford 0-3 % slopes	D
Lyman-Tunbridge Complex, 3-8% slopes	C/D
Lyman-Tunbridge-Rock Outcrop Complex, 3-20% slopes	C/D
Lyman-Tunbridge Complex, 3-8% slopes	C/D
Naskeag, 0-8% slopes	C
Scantic, 0-3% slopes	D

NOTE: ALL WETLAND AREA SOIL TYPES ARE CONSIDERED TO BE HYDROLOGIC SOIL GROUP D

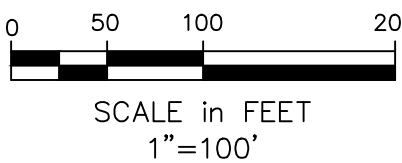


LEGEND

EXISTING	DESCRIPTION	PROPOSED
---	BOUNDARY LINE/R.O.W.	---
---	WETLANDS	---
---	EDGE WETLAND	---
---	EDGE PAVEMENT	---
---	GRAVEL ROAD	---
---	CONTOURS	---
---	CULVERT	---
---	RIPRAP	---

- LOT BUFFERS
- ROADWAY TREATED BY BIO-FILTERS
- ROADWAY TREATED BY GRAVEL WETLAND
- UNTREATED ROADWAY

SCALE



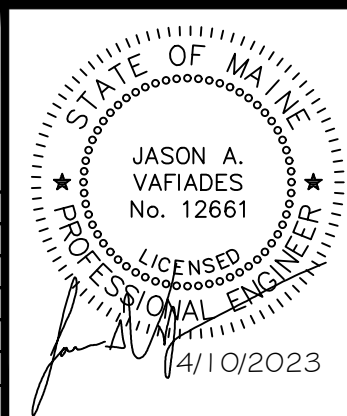
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STORMWATER QUALITY CALCULATIONS: LINEAR TREATMENT									
THE GLEN AT GOOSE ROCKS - GOOSE ROCKS ROAD, KENNEBUNKPORT, MAINE									
IMPERVIOUS TREATMENT TARGET: 75%					DEVELOPED AREA TREATMENT TARGET: 50%				
SUBCATCHMENT	DESCRIPTION	AREA (SF)	TREATED (SF)	TREATED BY	TREATED AREA (%)	DESCRIPTION	AREA (SF)	TREATED	TREATED BY
RA-1	UNTREATED ROW*	3960	0	NONE	0%	UNTREATED ROW	12700	0	NONE
RA-2	TREATED ROW	19305	19305	BIO-1	100%	TREATED ROW	39200	39200	BIO-1
RA-3	TREATED ROW	6955	6955	BIO-2	100%	TREATED ROW	13100	13100	BIO-2
RA-4	TREATED ROW	9490	9490	BIO-3	100%	TREATED ROW	18240	22785	BIO-3
RA-5	UNTREATED TREATED ROW **	2850	0	NONE	0%	UNTREATED ROW	5105	0	NONE
RA-6	TREATED ROW	4930	4930	GW 1	100%	TREATED ROW	8785	8785	GW-1
Totals		47490	40680		85.7%		97130	83870	86%

* 4575 SF OF IMPERVIOUS REMOVED FROM CALCULATION IN WETLAND CROSSINGS WITH PROPERLY SIZED WETLAND CONNECTION CULVERTS.
** 1725 SF OF IMPERVIOUS REMOVED FROM CALCULATION IN WETLAND CROSSINGS WITH PROPERLY SIZED WETLAND CONNECTION CULVERTS.

STORMWATER QUALITY CALCULATIONS: NON-LINEAR TREATMENT									
THE GLEN AT GOOSE ROCKS - GOOSE ROCKS ROAD, KENNEBUNKPORT, MAINE									
IMPERVIOUS TREATMENT TARGET: 95%					DEVELOPED AREA TREATMENT TARGET: 80%				
SUBCATCHMENT	DESCRIPTION	AREA (SF)	TREATED (SF)	TREATED BY	TREATED AREA (%)	DESCRIPTION	AREA (SF)	TREATED	TREATED BY
LOT 1	HOUSE AND DRIVE	7000	7000	LOT BUFFER*	100%	HOUSE, DRIVE, LAWN	17000	17000	LOT BUFFER*
LOT 2	HOUSE AND DRIVE	8500	5500	LOT BUFFER*	65%	HOUSE, DRIVE, LAWN	20000	16000	LOT BUFFER*
LOT 3	HOUSE AND DRIVE	3500	3500	LOT BUFFER*	100%	HOUSE, DRIVE, LAWN	9000	9000	LOT BUFFER*
LOT 4	HOUSE AND DRIVE	9000	9000	LOT BUFFER*	100%	HOUSE, DRIVE, LAWN	20000	2000	LOT BUFFER*
LOT 5	HOUSE AND DRIVE	9000	9000	LOT BUFFER*	100%	HOUSE, DRIVE, LAWN	13000	13000	LOT BUFFER*
LOT 6	HOUSE AND DRIVE	5000	5000	LOT BUFFER*	100%	HOUSE, DRIVE, LAWN	12500	12500	LOT BUFFER*
LOT 7	HOUSE AND DRIVE	10000	10000	LOT BUFFER*	100%	HOUSE, DRIVE, LAWN	22500	22500	LOT BUFFER*
LOT 8	HOUSE AND DRIVE	6000	6000	LOT BUFFER*	100%	HOUSE, DRIVE, LAWN	10000	10000	LOT BUFFER*
LOT 9	HOUSE AND DRIVE	8000	8000	LOT BUFFER*	100%	HOUSE, DRIVE, LAWN	15000	15000	LOT BUFFER*
Totals		66000	63000		95.5%		139000	117000	84%

REV	DATE	DESCRIPTION
E	04/10/2023	REVISED PER COMMENT
D	2/20/2023	ISSUED FOR PUBLIC HEARING
C	2/8/2023	REVISED PER MDEP AND TOWN OF KENNEBUNKPORT COMMENT
B	10/26/2022	ISSUED FOR PRELIMINARY SUBDIVISION REVIEW
A	9/10/2022	ISSUED TO FOR MDEP STORMWATER PERMIT
REV	DATE	DESCRIPTION



PROJECT: THE GLEN AT GOOSE ROCKS

PLAN: POST-DEVELOPMENT TREATMENT PLAN

CLIENT: KJ TRUDO PROPERTIES, LLC
20 APPLE BLOSSOM LANE
KENNEBUNKPORT, MAINE 04046

Atlantic Resource Consultants
541 US Route One
Freeport, ME 04032
Tel: 207.869.9050

DRAWN: ZWG
DESIGNED: JAV
CHECKED: JAV
FILE NAME:
SHEET: D-102

DATE: APRIL 2023
SCALE: 1"=150'
JOB NO. 21-059

ATTACHMENT B – WATER QUALITY CALCULATIONS

Bioretention Basin B-1 Sizing		
		Units
Impervious Area	19,305	SF
Landscaped Area	19,900	SF
Storage Volume Required	2,272	CF
Surface Area Required	1,948	SF
Ponding Depth for Water Quality Volume	6	In
Bed Surface Area Provided	1,998	SF
Total Water Quality Storage Volume Provided	2,861	CF
Provided		

Bioretention Basin B-2 Sizing		
		Units
Impervious Area	6,955	SF
Landscaped Area	6,145	SF
Storage Volume Required	784	CF
Surface Area Required	671	SF
Ponding Depth for Water Quality Volume	6	In
Bed Surface Area Provided	733	SF
Total Water Quality Storage Volume Provided	1,578	CF
Provided		

Bioretention Basin B-3 Sizing		
		Units
Impervious Area	9,490	SF
Landscaped Area	8,750	SF
Storage Volume Required	1,083	CF
Surface Area Required	927	SF
Ponding Depth for Water Quality Volume	6	In
Bed Surface Area Provided	928	SF
Total Water Quality Storage Volume Provided	1,343	CF
Provided		

Gravel Wetland #1 Sizing		
		Units
Impervious Area	4,930	SF
Landscaped Area	3,860	SF
Forebay Volume	54	CF
Storage Volume Required	540	CF
Surface Area Required	324	SF
Bed Surface Area Provided	325	SF
Total Water Quality Storage Volume Provided	381	CF

21-059 Post - Revised 4-11-23

Type III 24-hr 25-Yr Storm Rainfall=6.20"

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Stage-Area-Storage for Pond BF1: Bioretention Cell 1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
63.50	1,998	0	66.15	2,086	2,095
63.55	1,998	40	66.20	2,115	2,200
63.60	1,998	80	66.25	2,145	2,306
63.65	1,998	120	66.30	2,174	2,414
63.70	1,998	160	66.35	2,203	2,523
63.75	1,998	200	66.40	2,233	2,634
63.80	1,998	240	66.45	2,262	2,747
63.85	1,998	280	66.50	2,292	2,861
63.90	1,998	320	66.55	2,321	2,976
63.95	1,998	360	66.60	2,350	3,093
64.00	1,998	400	66.65	2,380	3,211
64.05	1,998	440	66.70	2,409	3,331
64.10	1,998	480	66.75	2,438	3,452
64.15	1,998	519	66.80	2,468	3,574
64.20	1,998	559	66.85	2,497	3,699
64.25	1,998	599	66.90	2,526	3,824
64.30	1,998	639	66.95	2,556	3,951
64.35	1,998	679	67.00	2,585	4,080
64.40	1,998	719	67.05	2,585	4,080
64.45	1,998	759	67.10	2,585	4,080
64.50	1,998	799	67.15	2,585	4,080
64.55	1,998	832	67.20	2,585	4,080
64.60	1,998	865	67.25	2,585	4,080
64.65	1,998	898	67.30	2,585	4,080
64.70	1,998	931	67.35	2,585	4,080
64.75	1,998	964	67.40	2,585	4,080
64.80	1,998	997			
64.85	1,998	1,030			
64.90	1,998	1,063			
64.95	1,998	1,096			
65.00	1,998	1,129			
65.05	1,998	1,162			
65.10	1,998	1,195			
65.15	1,998	1,228			
65.20	1,998	1,261			
65.25	1,998	1,294			
65.30	1,998	1,327			
65.35	1,998	1,360			
65.40	1,998	1,393			
65.45	1,998	1,426			
65.50	1,998	1,459			
65.55	1,998	1,492			
65.60	1,998	1,524			
65.65	1,998	1,557			
65.70	1,998	1,590			
65.75	1,998	1,623			
65.80	1,998	1,656			
65.85	1,998	1,689			
65.90	1,998	1,722			
65.95	1,998	1,755			
66.00	1,998	1,788			
66.05	2,027	1,889			
66.10	2,057	1,991			

21-059 Post - Revised 4-11-23

Type III 24-hr 25-Yr Storm Rainfall=6.20"

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Stage-Area-Storage for Pond BF2: Bioretention Cell 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
70.00	733	0	72.65	788	770
70.05	733	15	72.70	807	810
70.10	733	29	72.75	825	851
70.15	733	44	72.80	843	892
70.20	733	59	72.85	862	935
70.25	733	73	72.90	880	979
70.30	733	88	72.95	899	1,023
70.35	733	103	73.00	917	1,069
70.40	733	117	73.05	937	1,115
70.45	733	132	73.10	958	1,162
70.50	733	147	73.15	978	1,211
70.55	733	161	73.20	999	1,260
70.60	733	176	73.25	1,019	1,311
70.65	733	191	73.30	1,040	1,362
70.70	733	205	73.35	1,060	1,415
70.75	733	220	73.40	1,081	1,468
70.80	733	235	73.45	1,101	1,523
70.85	733	249	73.50	1,122	1,578
70.90	733	264	73.55	1,142	1,635
70.95	733	279	73.60	1,162	1,692
71.00	733	293	73.65	1,183	1,751
71.05	733	305	73.70	1,203	1,811
71.10	733	317	73.75	1,224	1,871
71.15	733	329	73.80	1,244	1,933
71.20	733	342	73.85	1,265	1,996
71.25	733	354	73.90	1,285	2,059
71.30	733	366	73.95	1,306	2,124
71.35	733	378	74.00	1,326	2,190
71.40	733	390			
71.45	733	402			
71.50	733	414			
71.55	733	426			
71.60	733	438			
71.65	733	450			
71.70	733	463			
71.75	733	475			
71.80	733	487			
71.85	733	499			
71.90	733	511			
71.95	733	523			
72.00	733	535			
72.05	733	547			
72.10	733	559			
72.15	733	571			
72.20	733	583			
72.25	733	596			
72.30	733	608			
72.35	733	620			
72.40	733	632			
72.45	733	644			
72.50	733	656			
72.55	751	693			
72.60	770	731			

21-059 Post - Revised 4-11-23*Type III 24-hr 25-Yr Storm Rainfall=6.20"*

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Stage-Area-Storage for Pond BF3: Bioretention Cell 3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
64.50	928	0	67.15	986	974
64.55	928	19	67.20	1,005	1,024
64.60	928	37	67.25	1,024	1,075
64.65	928	56	67.30	1,043	1,126
64.70	928	74	67.35	1,063	1,179
64.75	928	93	67.40	1,082	1,233
64.80	928	111	67.45	1,101	1,287
64.85	928	130	67.50	1,121	1,343
64.90	928	148	67.55	1,140	1,399
64.95	928	167	67.60	1,159	1,457
65.00	928	186	67.65	1,178	1,515
65.05	928	204	67.70	1,198	1,574
65.10	928	223	67.75	1,217	1,635
65.15	928	241	67.80	1,236	1,696
65.20	928	260	67.85	1,255	1,758
65.25	928	278	67.90	1,275	1,822
65.30	928	297	67.95	1,294	1,886
65.35	928	316	68.00	1,313	1,951
65.40	928	334			
65.45	928	353			
65.50	928	371			
65.55	928	387			
65.60	928	402			
65.65	928	417			
65.70	928	432			
65.75	928	448			
65.80	928	463			
65.85	928	478			
65.90	928	494			
65.95	928	509			
66.00	928	524			
66.05	928	540			
66.10	928	555			
66.15	928	570			
66.20	928	586			
66.25	928	601			
66.30	928	616			
66.35	928	632			
66.40	928	647			
66.45	928	662			
66.50	928	677			
66.55	928	693			
66.60	928	708			
66.65	928	723			
66.70	928	739			
66.75	928	754			
66.80	928	769			
66.85	928	785			
66.90	928	800			
66.95	928	815			
67.00	928	831			
67.05	947	877			
67.10	966	925			

21-059 Post - Revised 4-11-23*Type III 24-hr 25-Yr Storm Rainfall=6.20"*

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Stage-Area-Storage for Pond GW1: Gravel Wetland 1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
65.83	325	0
65.93	325	13
66.03	325	26
66.13	325	39
66.23	325	52
66.33	325	65
66.43	325	78
66.53	325	91
66.63	325	104
66.73	325	117
66.83	325	130
66.93	325	143
67.03	325	156
67.13	325	169
67.23	325	182
67.33	325	195
67.43	325	208
67.53	325	221
67.63	325	234
67.73	325	247
67.83	325	260
67.93	325	271
68.03	325	283
68.13	325	294
68.23	325	306
68.33	325	317
68.43	325	322
68.53	325	327
68.63	325	331
68.73	325	336
68.83	325	341
68.93	325	346
69.03	335	359
69.13	367	395
69.23	400	433
69.33	433	475
69.43	465	519
69.53	498	568
69.63	530	619
69.73	563	674
69.83	596	732
69.93	628	793
70.03	666	857
70.13	716	926
70.23	766	1,000
70.33	815	1,079
70.43	865	1,164
70.53	915	1,253
70.63	966	1,347
70.73	1,017	1,446
70.83	1,068	1,550
70.93	1,119	1,659

Orifice Sizing B-1		Units
<u>Calculate Orifice from Filter Area</u>		
Y=0.035x^0.4599 (decimal)		1.1535
x= Filter surface area in square feet	1998	
Y=Orifice diameter (inches)		1 2/16
<u>Calculate Orifice from Water Quality Volume</u>		
Y=0.0137x^0.5372		0.98529
x= Water quality volume in cubic feet	2861.0	
Y=Orifice diameter (inches)		1

Orifice Sizing B-2

Units

Calculate Orifice from Filter Area

$Y = 0.035x^{0.4599}$ (decimal)

0.7273

x= Filter surface area in square feet

733

Y=Orifice diameter (inches)

12/16

Calculate Orifice from Water Quality Volume

$Y = 0.0137x^{0.5372}$

0.71572

x= Water quality volume in cubic feet

1578.0

Y=Orifice diameter (inches)

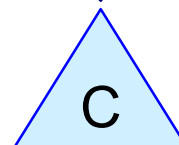
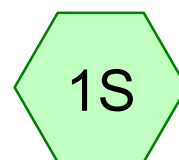
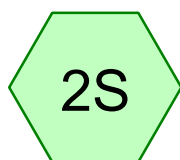
11/16

Orifice Sizing B-3		Units
<u>Calculate Orifice from Filter Area</u>		
Y=0.035x^0.4599 (decimal)		0.8107
x= Filter surface area in square feet	928	
Y=Orifice diameter (inches)		13/16
<u>Calculate Orifice from Water Quality Volume</u>		
Y=0.0137x^0.5372		0.65633
x= Water quality volume in cubic feet	1343.0	
Y=Orifice diameter (inches)		11/16

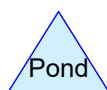
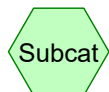
Orifice Sizing GW-1		Units
<u>Calculate Orifice from Filter Area</u>		
Y=0.035x^0.4599 (decimal)		0.5004
x= Filter surface area in square feet	325	
Y=Orifice diameter (inches)		8/16
<u>Calculate Orifice from Water Quality Volume</u>		
Y=0.0137x^0.5372		0.33357
x= Water quality volume in cubic feet	381.0	
Y=Orifice diameter (inches)		5/16

ATTACHMENT C – HYDROCAD RUNOFF AND ROUTING CALCULATIONS

ATTACHMENT C (I) – PRE-DEVELOPMENT MODEL



GOOSE ROCKS ROAD



Routing Diagram for 21-059 Pre

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21-059 Pre

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.471	96	Gravel Roads (1S)
15.600	79	Woods, Fair, HSG D (O/S) (1S)
11.260	70	Woods, Good, HSG C (1S, 2S)
44.299	70	Woods, Good, HSG C (O/S) (1S)
28.499	77	Woods, Good, HSG D (1S, 2S)
1.783	77	Woods, Good, HSG D (O/S) (1S)
101.911	74	TOTAL AREA

21-059 Pre*Type III 24-hr 2-Yr Storm Rainfall=3.30"*

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Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 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:Runoff Area=4,335,675 sf 0.00% Impervious Runoff Depth=1.10"
Flow Length=3,835' Tc=101.7 min CN=74 Runoff=33.94 cfs 9.157 af**Subcatchment2S:**Runoff Area=103,566 sf 0.00% Impervious Runoff Depth=1.16"
Flow Length=302' Tc=39.2 min CN=75 Runoff=1.55 cfs 0.230 af**Pond C: GOOSE ROCKS ROAD**Peak Elev=60.95' Storage=92,607 cf Inflow=33.94 cfs 9.157 af
Primary=0.00 cfs 0.000 af Secondary=29.54 cfs 7.563 af Outflow=29.54 cfs 7.563 af**Link POA1:**Inflow=29.54 cfs 7.563 af
Primary=29.54 cfs 7.563 af**Link POA2:**Inflow=1.55 cfs 0.230 af
Primary=1.55 cfs 0.230 af**Total Runoff Area = 101.911 ac Runoff Volume = 9.387 af Average Runoff Depth = 1.11"**
100.00% Pervious = 101.911 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S:

Runoff = 33.94 cfs @ 13.45 hrs, Volume= 9.157 af, Depth= 1.10"

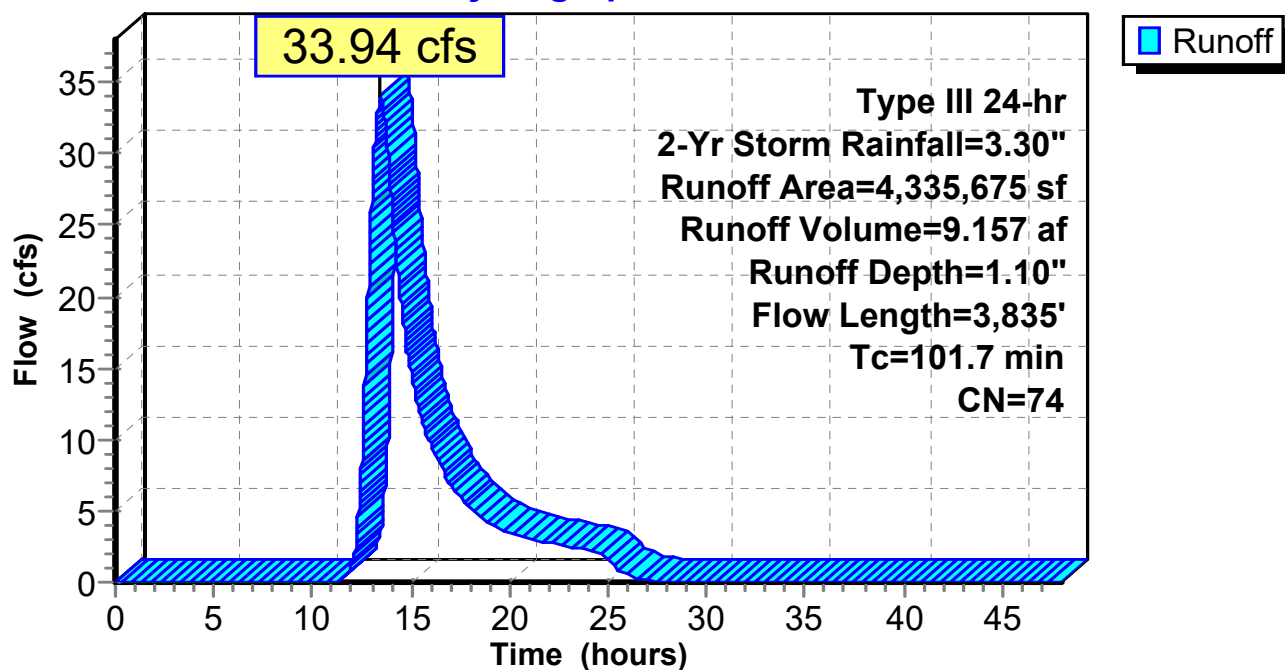
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.30"

Area (sf)	CN	Description
453,700	70	Woods, Good, HSG C
* 1,174,610	77	Woods, Good, HSG D
* 20,500	96	Gravel Roads
* 679,545	79	Woods, Fair, HSG D (O/S)
* 1,929,660	70	Woods, Good, HSG C (O/S)
* 77,660	77	Woods, Good, HSG D (O/S)
4,335,675	74	Weighted Average
4,335,675		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.8	100	0.0050	0.05		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.30"
29.4	1,675	0.0360	0.95		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
21.2	450	0.0050	0.35		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
14.3	1,610	0.0070	1.88	75.31	Channel Flow, D-E STREAM CHANNEL Area= 40.0 sf Perim= 30.0' r= 1.33' n= 0.080 Earth, long dense weeds
101.7	3,835	Total			

Subcatchment 1S:

Hydrograph



21-059 Pre

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Type III 24-hr 2-Yr Storm Rainfall=3.30"

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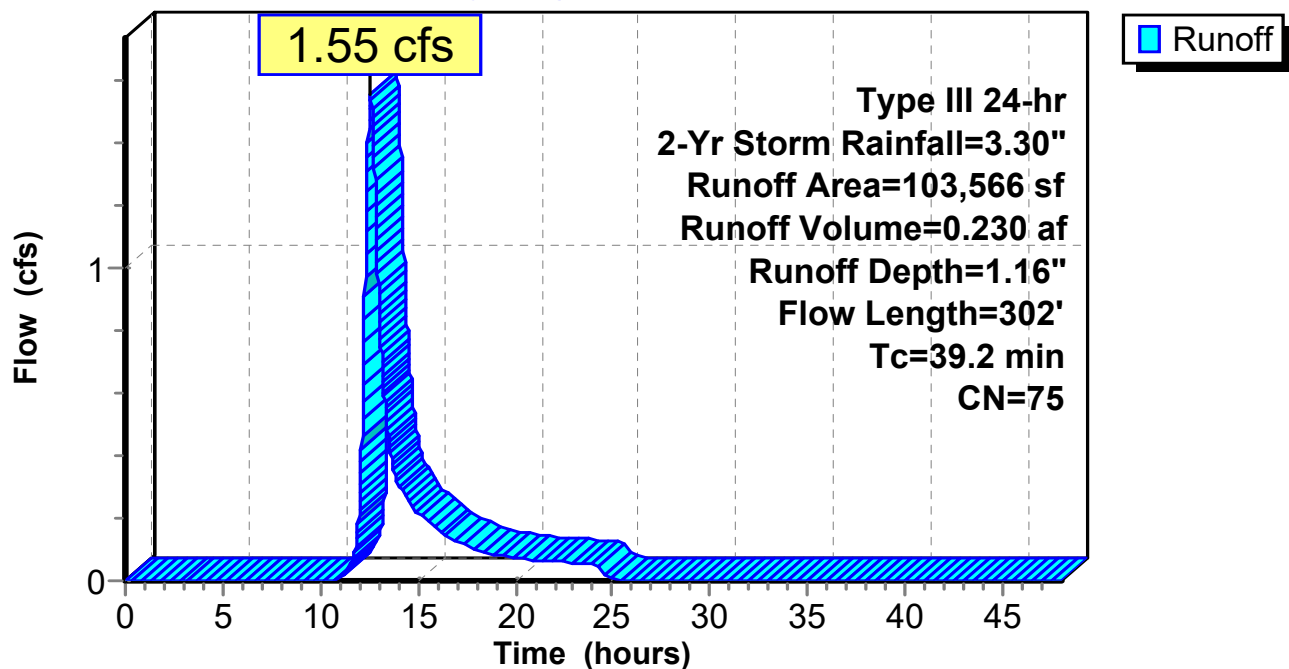
Summary for Subcatchment 2S:

Runoff = 1.55 cfs @ 12.58 hrs, Volume= 0.230 af, Depth= 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.30"

Area (sf)	CN	Description
30,010	77	Woods, Good, HSG D
36,778	77	Woods, Good, HSG D
36,778	70	Woods, Good, HSG C
103,566	75	Weighted Average
103,566		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.5	60	0.0050	0.04		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.30"
14.7	242	0.0030	0.27		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
39.2	302	Total			

Subcatchment 2S:**Hydrograph**

Summary for Pond C: GOOSE ROCKS ROAD

Inflow Area = 99.533 ac, 0.00% Impervious, Inflow Depth = 1.10" for 2-Yr Storm event
 Inflow = 33.94 cfs @ 13.45 hrs, Volume= 9.157 af
 Outflow = 29.54 cfs @ 13.87 hrs, Volume= 7.563 af, Atten= 13%, Lag= 25.2 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 29.54 cfs @ 13.87 hrs, Volume= 7.563 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 60.95' @ 13.87 hrs Surf.Area= 73,358 sf Storage= 92,607 cf

Plug-Flow detention time= 125.4 min calculated for 7.563 af (83% of inflow)
 Center-of-Mass det. time= 50.4 min (999.4 - 949.0)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	96,625 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.00	7,230	0	0
59.00	16,340	11,785	11,785
60.00	39,010	27,675	39,460
61.00	75,320	57,165	96,625

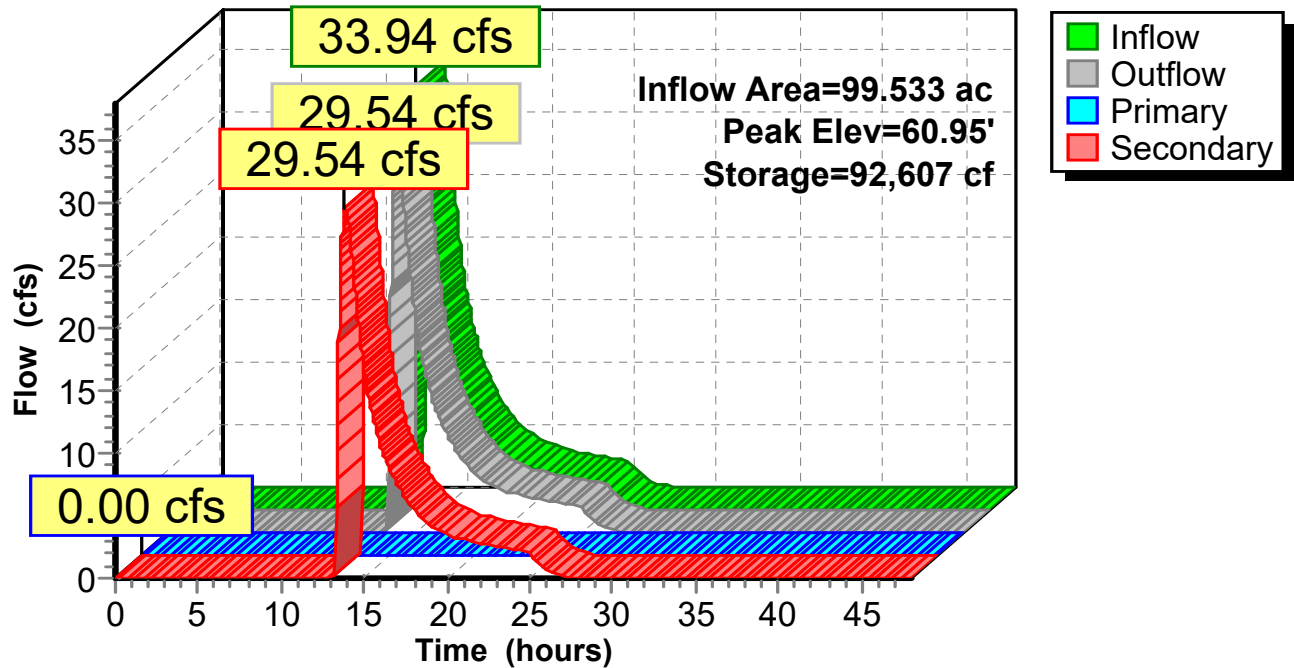
Device	Routing	Invert	Outlet Devices
#1	Primary	258.00'	30.0" Round Culvert w/ 6.0" inside fill L= 50.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 257.50' / 256.50' S= 0.0200 ' S Cc= 0.900 n= 0.021 Corrugated metal, Flow Area= 4.21 sf
#2	Secondary	60.60'	50.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=58.00' (Free Discharge)

↑1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=27.41 cfs @ 13.87 hrs HW=60.95' (Free Discharge)

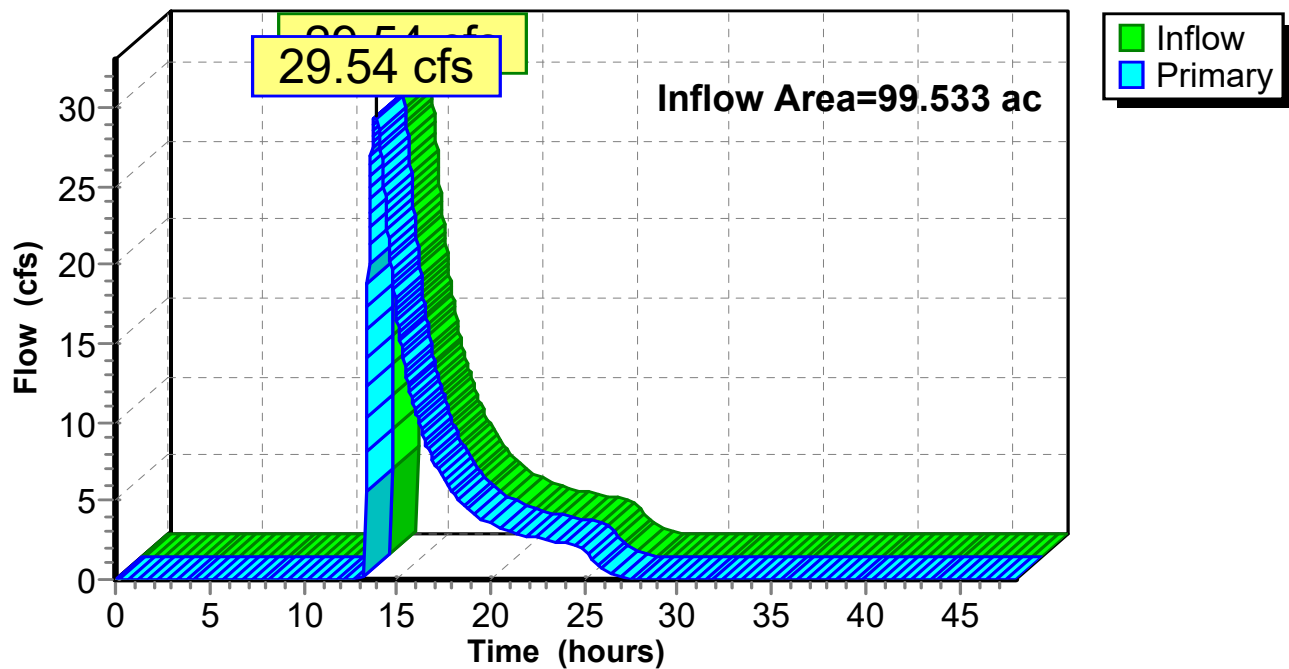
↑2=Broad-Crested Rectangular Weir (Weir Controls 27.41 cfs @ 1.58 fps)

Pond C: GOOSE ROCKS ROAD**Hydrograph**

Summary for Link POA1:

Inflow Area = 99.533 ac, 0.00% Impervious, Inflow Depth = 0.91" for 2-Yr Storm event
Inflow = 29.54 cfs @ 13.87 hrs, Volume= 7.563 af
Primary = 29.54 cfs @ 13.87 hrs, Volume= 7.563 af, Atten= 0%, Lag= 0.0 min

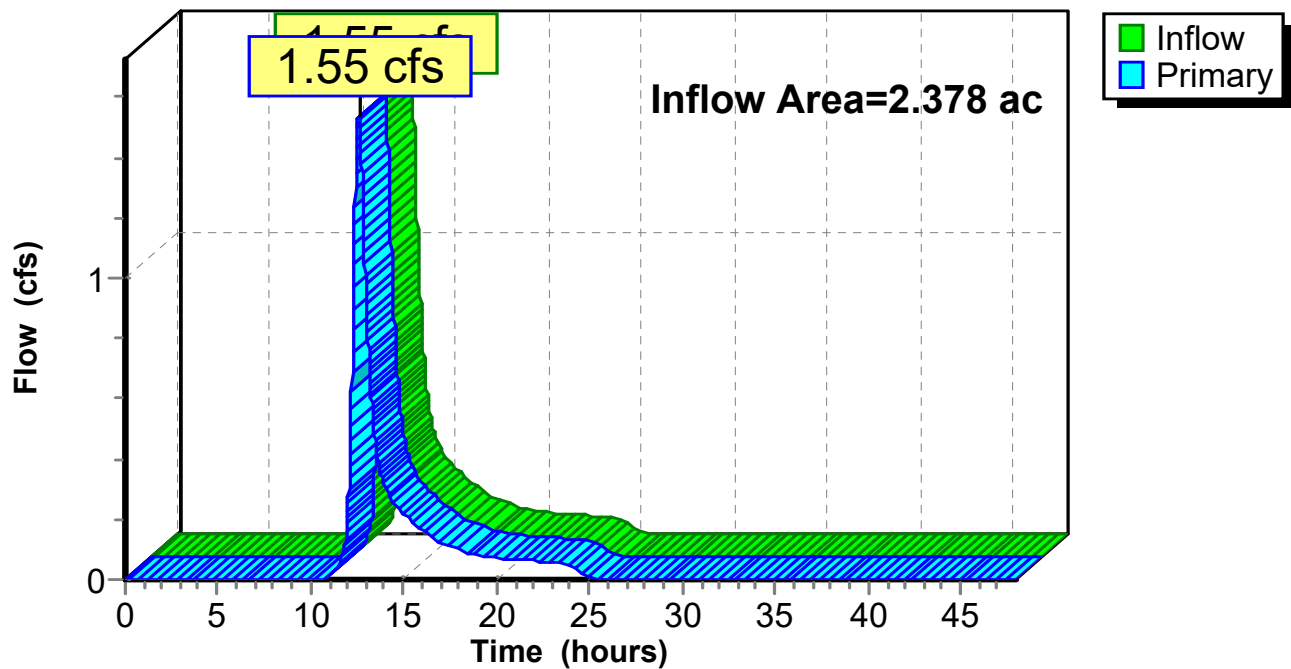
Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Link POA1:**Hydrograph**

Summary for Link POA2:

Inflow Area = 2.378 ac, 0.00% Impervious, Inflow Depth = 1.16" for 2-Yr Storm event
Inflow = 1.55 cfs @ 12.58 hrs, Volume= 0.230 af
Primary = 1.55 cfs @ 12.58 hrs, Volume= 0.230 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Link POA2:**Hydrograph**

Summary for Subcatchment 1S:

Runoff = 73.72 cfs @ 13.43 hrs, Volume= 18.951 af, Depth= 2.28"

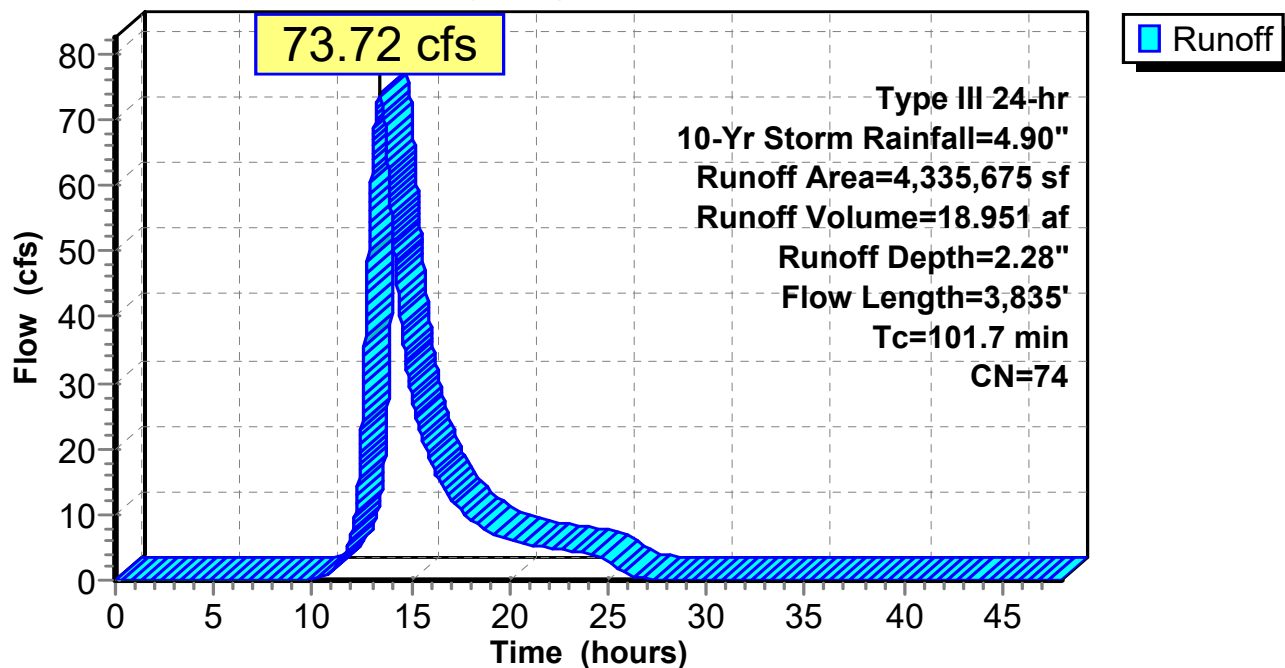
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.90"

Area (sf)	CN	Description
453,700	70	Woods, Good, HSG C
* 1,174,610	77	Woods, Good, HSG D
* 20,500	96	Gravel Roads
* 679,545	79	Woods, Fair, HSG D (O/S)
* 1,929,660	70	Woods, Good, HSG C (O/S)
* 77,660	77	Woods, Good, HSG D (O/S)
4,335,675	74	Weighted Average
4,335,675		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.8	100	0.0050	0.05		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.30"
29.4	1,675	0.0360	0.95		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
21.2	450	0.0050	0.35		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
14.3	1,610	0.0070	1.88	75.31	Channel Flow, D-E STREAM CHANNEL Area= 40.0 sf Perim= 30.0' r= 1.33' n= 0.080 Earth, long dense weeds
101.7	3,835	Total			

Subcatchment 1S:

Hydrograph



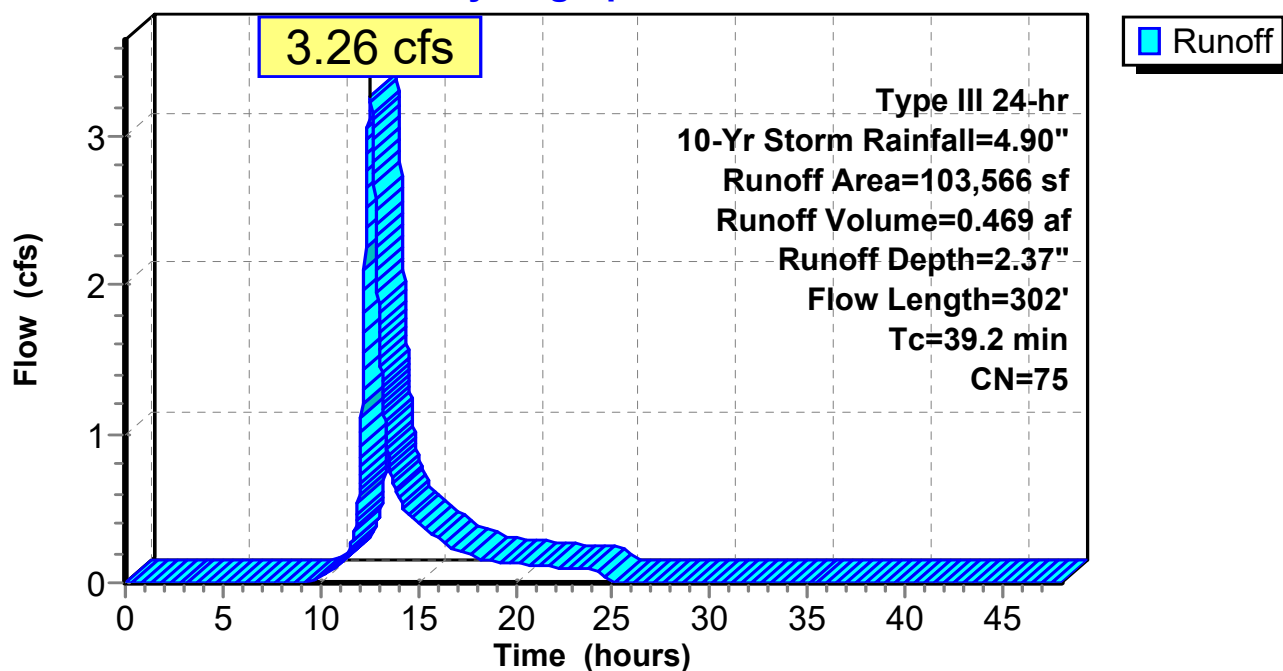
Summary for Subcatchment 2S:

Runoff = 3.26 cfs @ 12.56 hrs, Volume= 0.469 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.90"

Area (sf)	CN	Description
30,010	77	Woods, Good, HSG D
36,778	77	Woods, Good, HSG D
36,778	70	Woods, Good, HSG C
103,566	75	Weighted Average
103,566		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.5	60	0.0050	0.04		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.30"
14.7	242	0.0030	0.27		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
39.2	302	Total			

Subcatchment 2S:**Hydrograph**

Summary for Pond C: GOOSE ROCKS ROAD

Inflow Area = 99.533 ac, 0.00% Impervious, Inflow Depth = 2.28" for 10-Yr Storm event
 Inflow = 73.72 cfs @ 13.43 hrs, Volume= 18.951 af
 Outflow = 89.53 cfs @ 13.44 hrs, Volume= 17.358 af, Atten= 0%, Lag= 0.3 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 89.53 cfs @ 13.44 hrs, Volume= 17.358 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 61.30' @ 13.44 hrs Surf.Area= 75,320 sf Storage= 96,625 cf

Plug-Flow detention time= 71.2 min calculated for 17.358 af (92% of inflow)
 Center-of-Mass det. time= 28.4 min (955.7 - 927.3)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	96,625 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.00	7,230	0	0
59.00	16,340	11,785	11,785
60.00	39,010	27,675	39,460
61.00	75,320	57,165	96,625

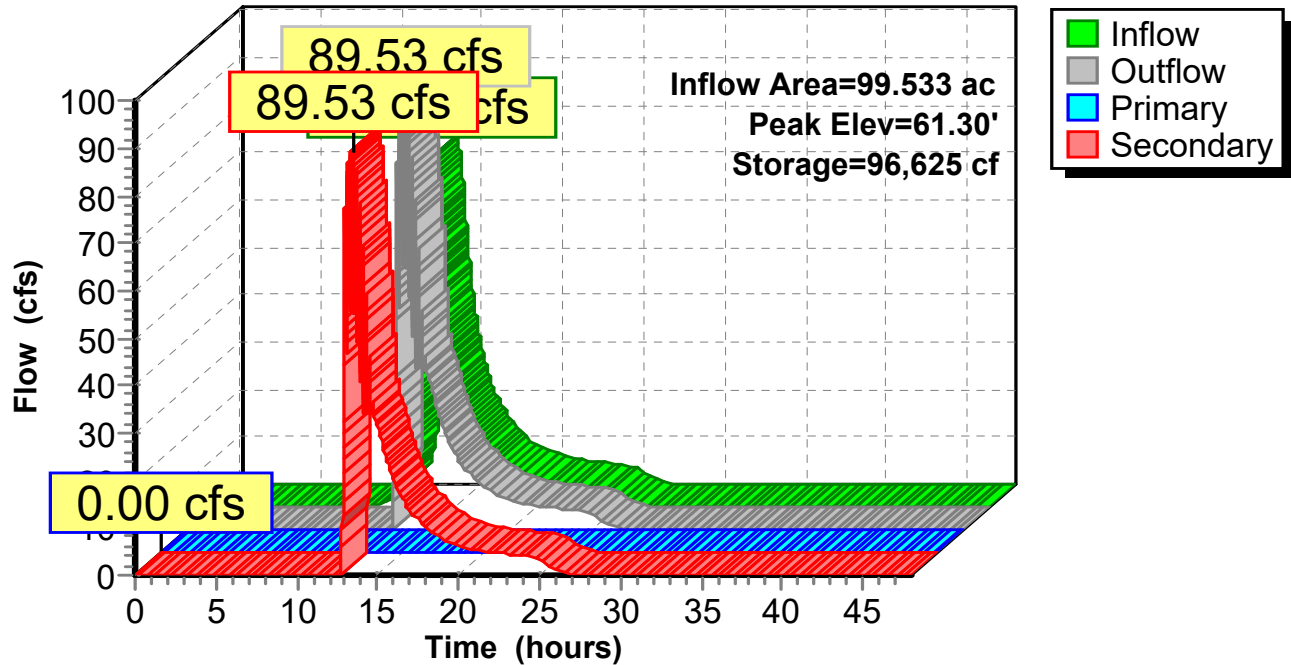
Device	Routing	Invert	Outlet Devices
#1	Primary	258.00'	30.0" Round Culvert w/ 6.0" inside fill L= 50.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 257.50' / 256.50' S= 0.0200 ' S Cc= 0.900 n= 0.021 Corrugated metal, Flow Area= 4.21 sf
#2	Secondary	60.60'	50.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=58.00' (Free Discharge)

↑**1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=77.60 cfs @ 13.44 hrs HW=61.30' (Free Discharge)

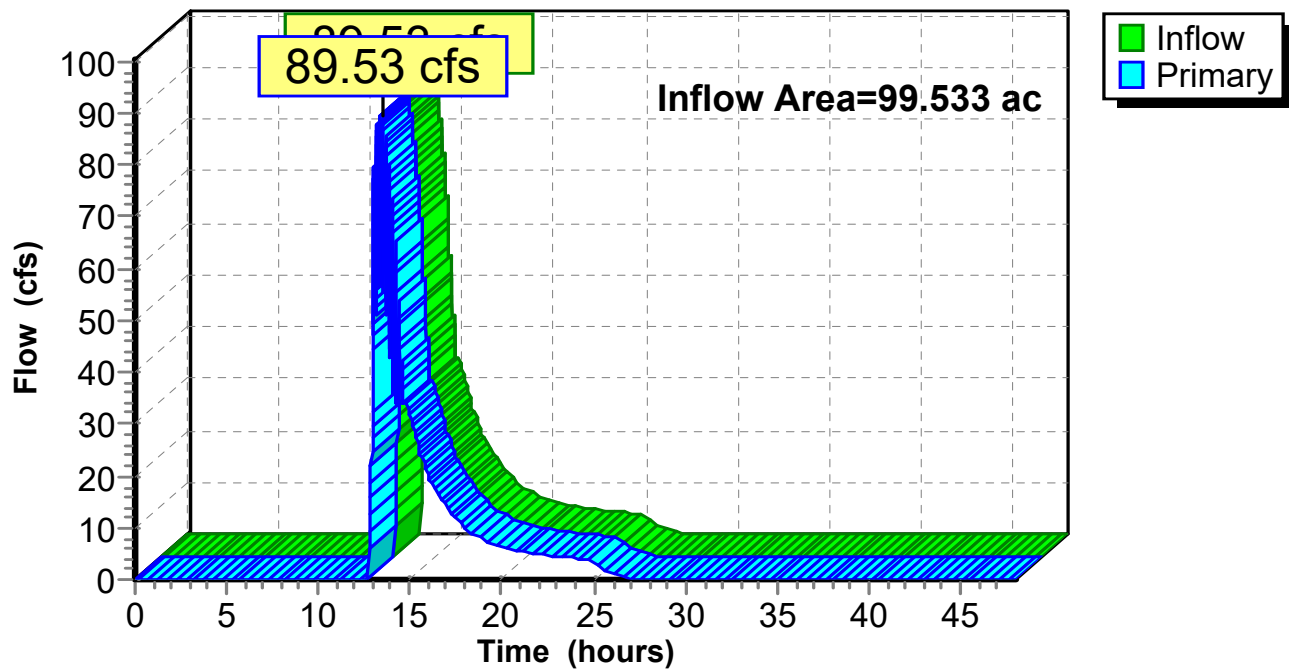
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 77.60 cfs @ 2.23 fps)

Pond C: GOOSE ROCKS ROAD**Hydrograph**

Summary for Link POA1:

Inflow Area = 99.533 ac, 0.00% Impervious, Inflow Depth = 2.09" for 10-Yr Storm event
Inflow = 89.53 cfs @ 13.44 hrs, Volume= 17.358 af
Primary = 89.53 cfs @ 13.44 hrs, Volume= 17.358 af, Atten= 0%, Lag= 0.0 min

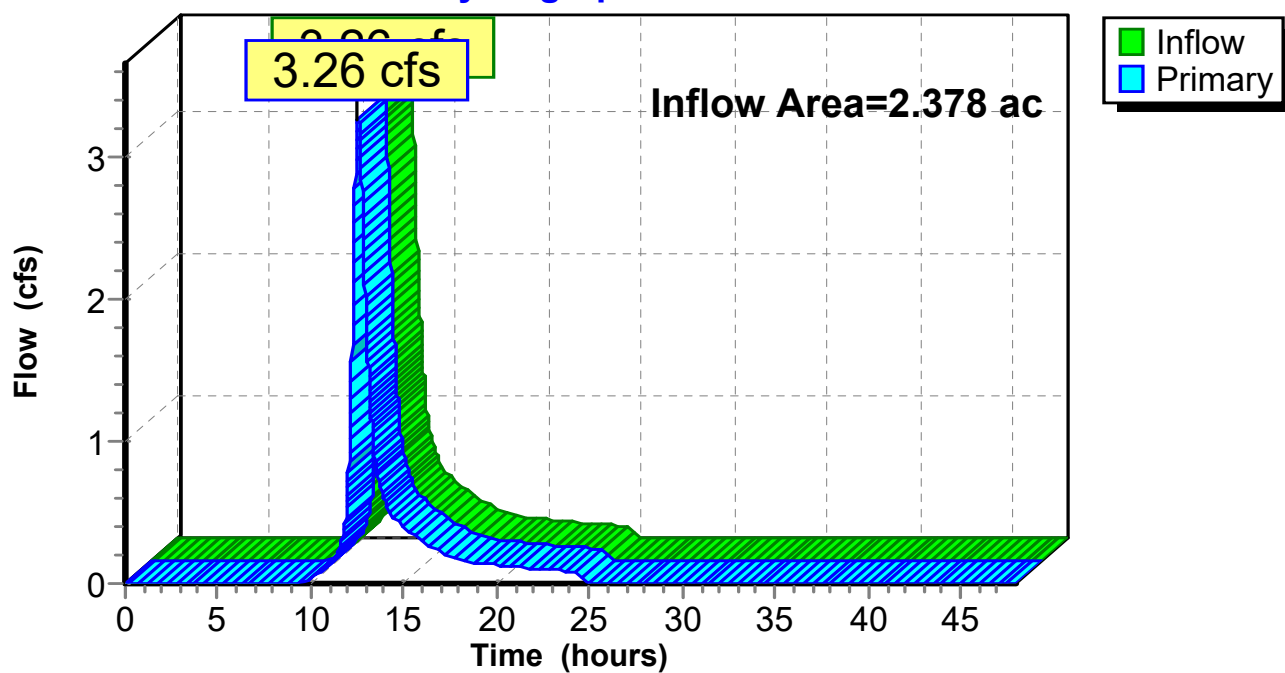
Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Link POA1:**Hydrograph**

Summary for Link POA2:

Inflow Area = 2.378 ac, 0.00% Impervious, Inflow Depth = 2.37" for 10-Yr Storm event
Inflow = 3.26 cfs @ 12.56 hrs, Volume= 0.469 af
Primary = 3.26 cfs @ 12.56 hrs, Volume= 0.469 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Link POA2:**Hydrograph**

Summary for Subcatchment 1S:

Runoff = 109.19 cfs @ 13.34 hrs, Volume= 27.818 af, Depth= 3.35"

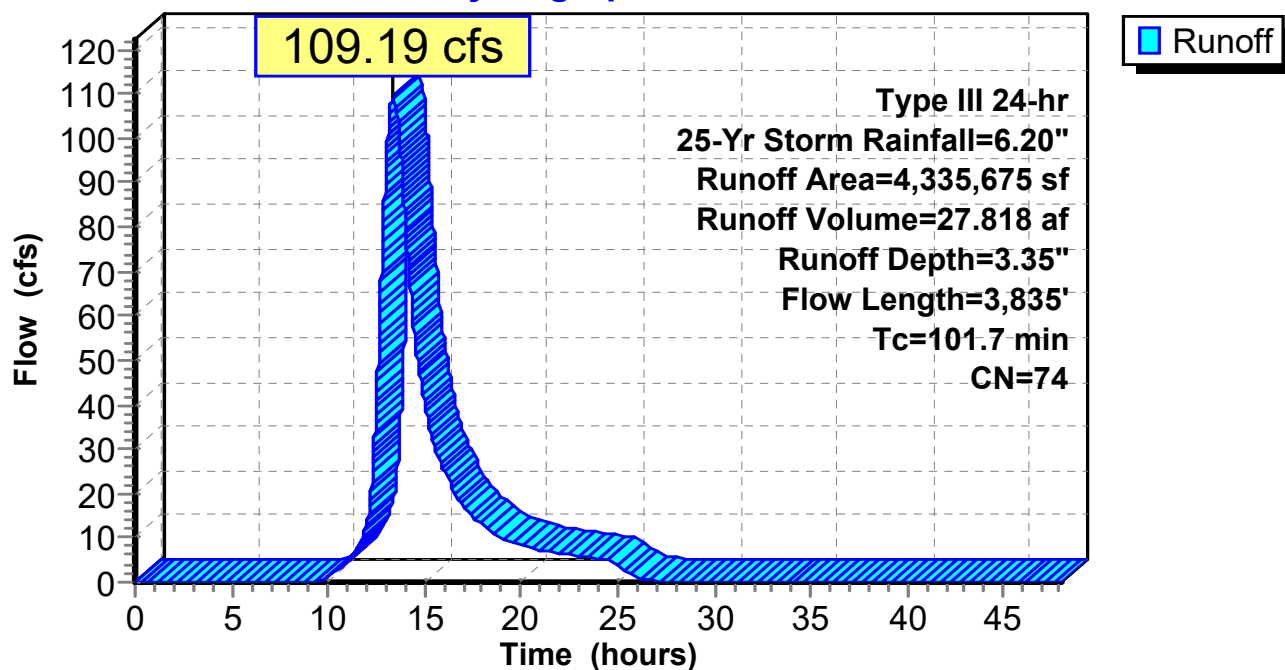
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Yr Storm Rainfall=6.20"

Area (sf)	CN	Description
453,700	70	Woods, Good, HSG C
* 1,174,610	77	Woods, Good, HSG D
* 20,500	96	Gravel Roads
* 679,545	79	Woods, Fair, HSG D (O/S)
* 1,929,660	70	Woods, Good, HSG C (O/S)
* 77,660	77	Woods, Good, HSG D (O/S)
4,335,675	74	Weighted Average
4,335,675		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.8	100	0.0050	0.05		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.30"
29.4	1,675	0.0360	0.95		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
21.2	450	0.0050	0.35		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
14.3	1,610	0.0070	1.88	75.31	Channel Flow, D-E STREAM CHANNEL Area= 40.0 sf Perim= 30.0' r= 1.33' n= 0.080 Earth, long dense weeds
101.7	3,835	Total			

Subcatchment 1S:

Hydrograph



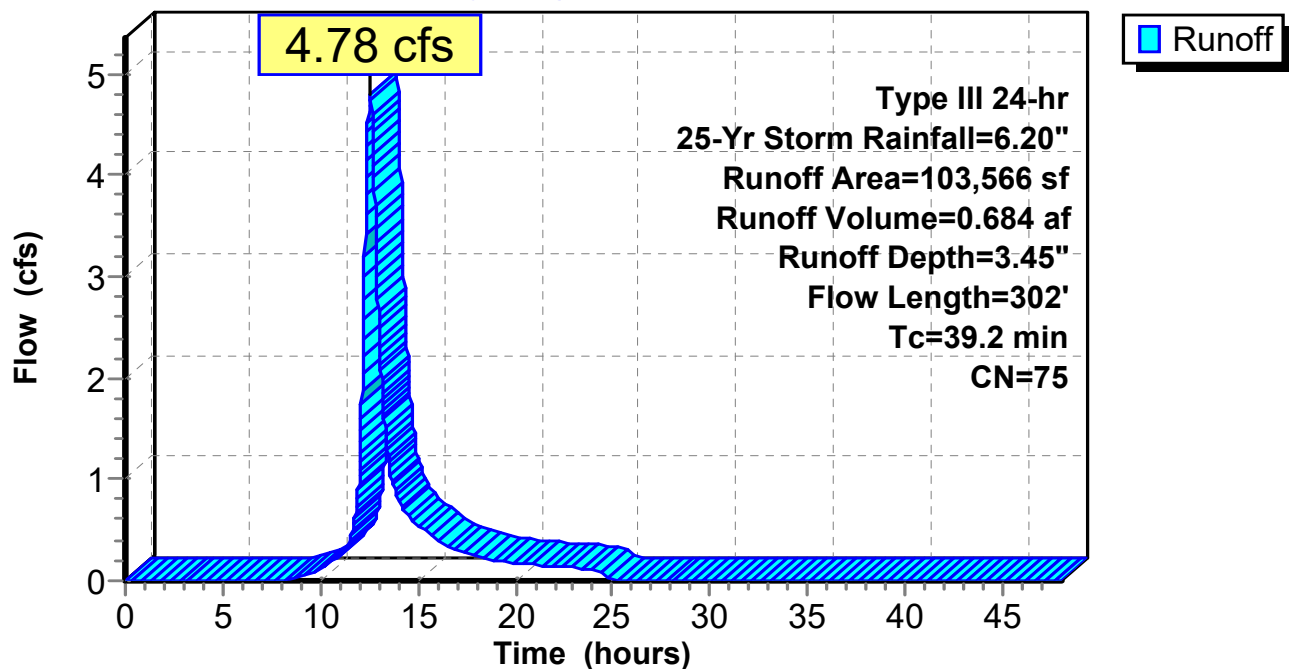
Summary for Subcatchment 2S:

Runoff = 4.78 cfs @ 12.54 hrs, Volume= 0.684 af, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Yr Storm Rainfall=6.20"

Area (sf)	CN	Description
30,010	77	Woods, Good, HSG D
36,778	77	Woods, Good, HSG D
36,778	70	Woods, Good, HSG C
103,566	75	Weighted Average
103,566		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.5	60	0.0050	0.04		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.30"
14.7	242	0.0030	0.27		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
39.2	302	Total			

Subcatchment 2S:**Hydrograph**

Summary for Pond C: GOOSE ROCKS ROAD

Inflow Area = 99.533 ac, 0.00% Impervious, Inflow Depth = 3.35" for 25-Yr Storm event
 Inflow = 109.19 cfs @ 13.34 hrs, Volume= 27.818 af
 Outflow = 124.68 cfs @ 13.34 hrs, Volume= 26.225 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 124.68 cfs @ 13.34 hrs, Volume= 26.225 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 61.48' @ 13.34 hrs Surf.Area= 75,320 sf Storage= 96,625 cf

Plug-Flow detention time= 53.2 min calculated for 26.214 af (94% of inflow)
 Center-of-Mass det. time= 22.2 min (938.4 - 916.2)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	96,625 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.00	7,230	0	0
59.00	16,340	11,785	11,785
60.00	39,010	27,675	39,460
61.00	75,320	57,165	96,625

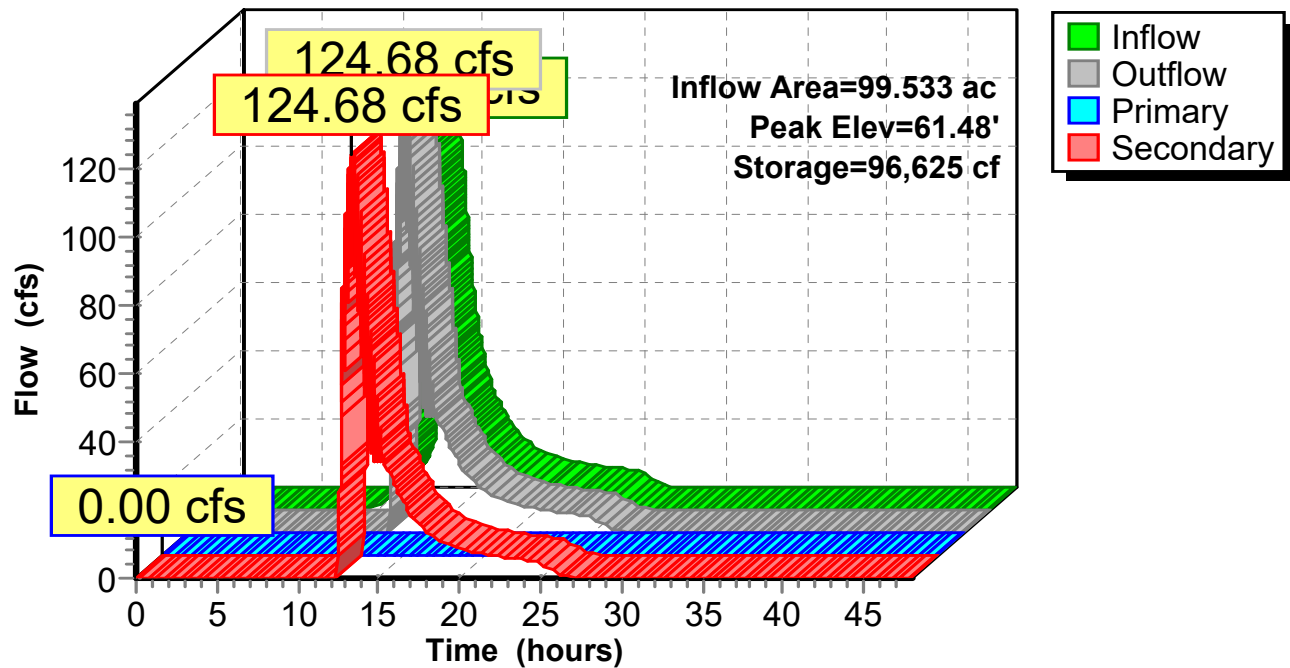
Device	Routing	Invert	Outlet Devices
#1	Primary	258.00'	30.0" Round Culvert w/ 6.0" inside fill L= 50.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 257.50' / 256.50' S= 0.0200 ' S Cc= 0.900 n= 0.021 Corrugated metal, Flow Area= 4.21 sf
#2	Secondary	60.60'	50.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=58.00' (Free Discharge)

↑**1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=109.66 cfs @ 13.34 hrs HW=61.48' (Free Discharge)

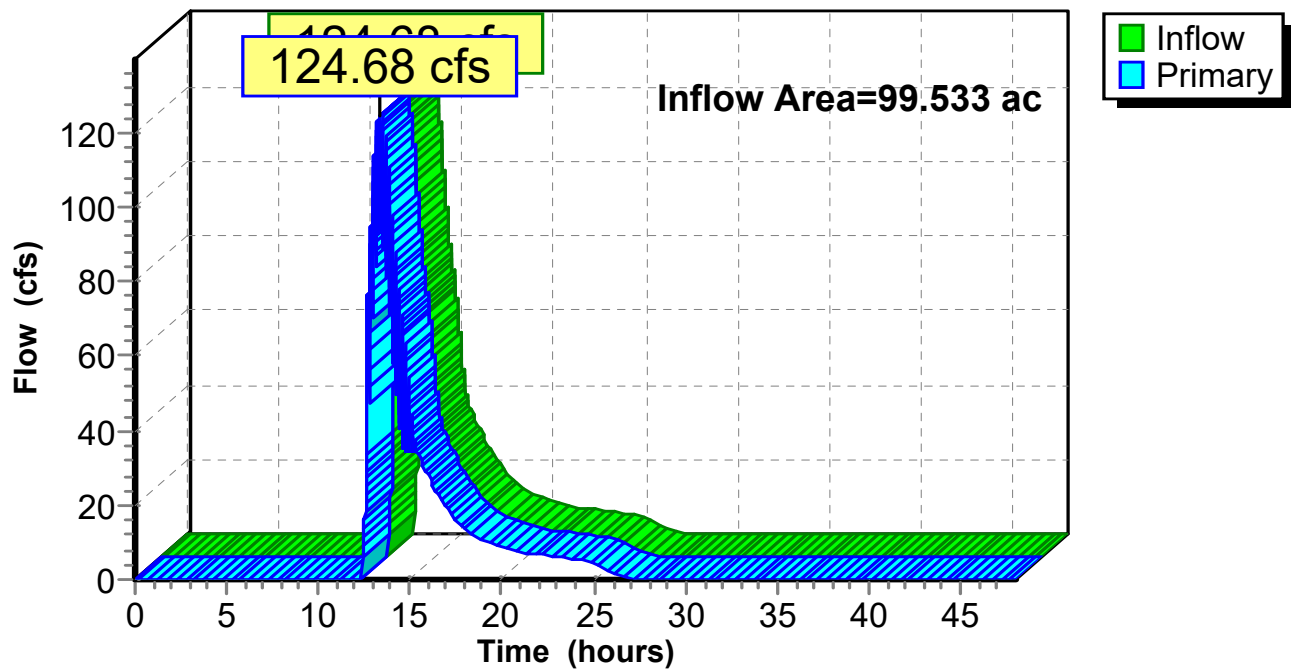
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 109.66 cfs @ 2.48 fps)

Pond C: GOOSE ROCKS ROAD**Hydrograph**

Summary for Link POA1:

Inflow Area = 99.533 ac, 0.00% Impervious, Inflow Depth = 3.16" for 25-Yr Storm event
Inflow = 124.68 cfs @ 13.34 hrs, Volume= 26.225 af
Primary = 124.68 cfs @ 13.34 hrs, Volume= 26.225 af, Atten= 0%, Lag= 0.0 min

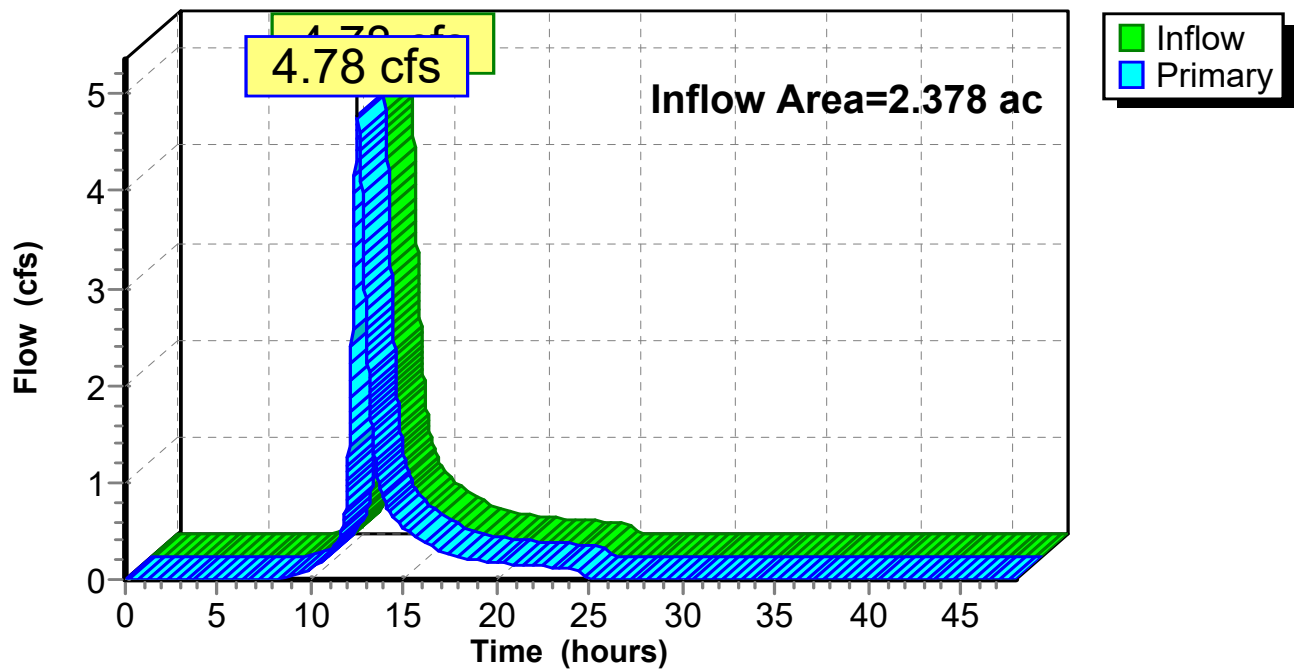
Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Link POA1:**Hydrograph**

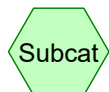
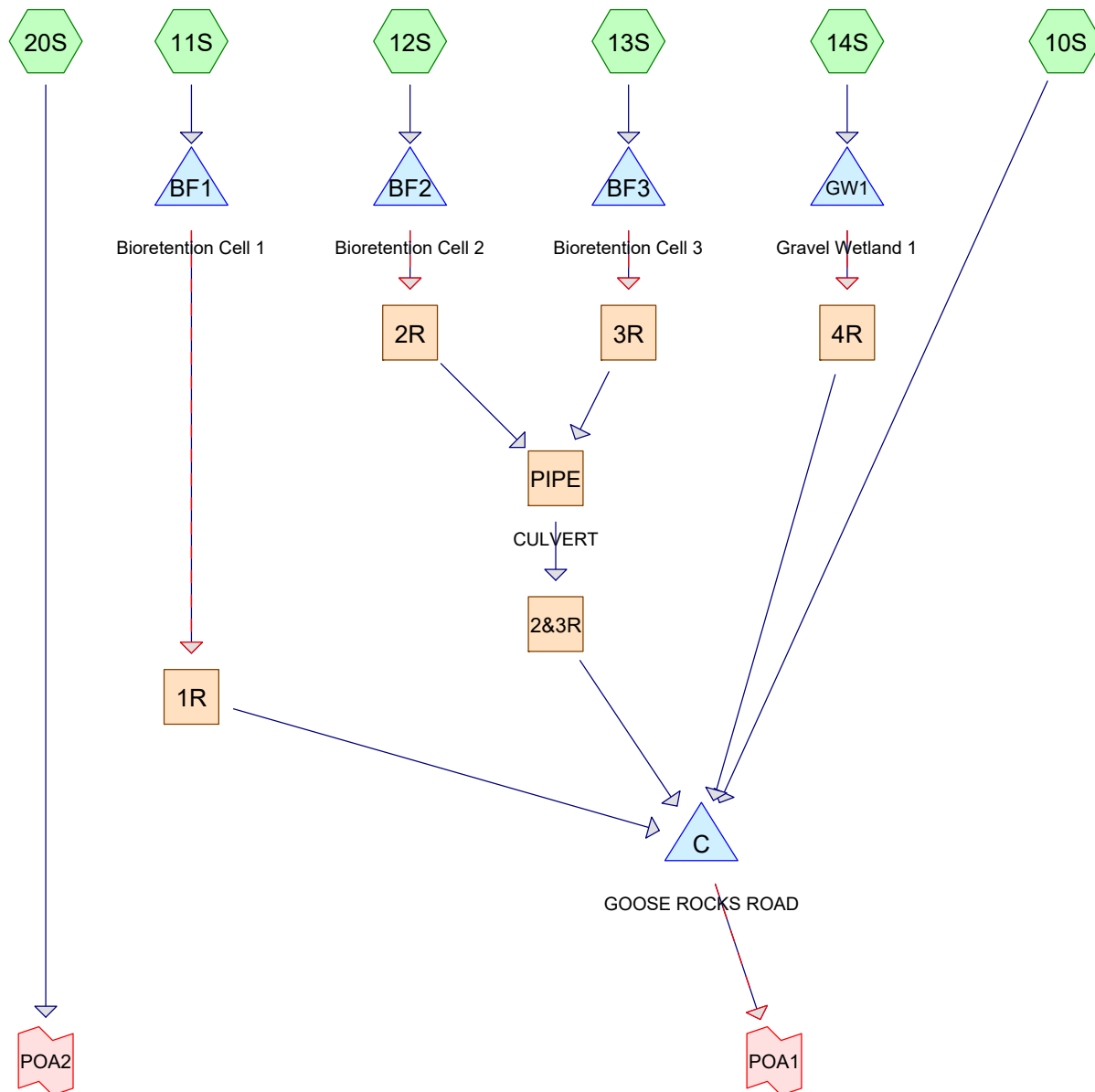
Summary for Link POA2:

Inflow Area = 2.378 ac, 0.00% Impervious, Inflow Depth = 3.45" for 25-Yr Storm event
Inflow = 4.78 cfs @ 12.54 hrs, Volume= 0.684 af
Primary = 4.78 cfs @ 12.54 hrs, Volume= 0.684 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Link POA2:**Hydrograph**

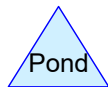
ATTACHMENT C (II) – POST-DEVELOPMENT MODEL



Subcat



Reach



Pond



Link

Routing Diagram for 21-059 Post - Revised 4-11-23

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21-059 Post - Revised 4-11-23

Prepared by Atlantic Resource Consultants

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.629	74	>75% Grass cover, Good, HSG C (11S, 12S, 13S, 14S, 20S)
0.838	74	>75% Grass cover, Good, HSG C (Lawn) (10S)
0.160	74	>75% Grass cover, Good, HSG C (Road) (10S)
0.373	80	>75% Grass cover, Good, HSG D (11S, 13S, 14S)
0.838	80	>75% Grass cover, Good, HSG D (Lawn) (10S)
0.160	80	>75% Grass cover, Good, HSG D (Road) (10S)
0.057	98	Lot (20S)
0.934	98	New Road (11S, 12S, 13S, 14S)
0.301	98	Road HSG D (10S)
0.758	98	Unconnected roofs, HSG C and driveway (10S)
0.758	98	Unconnected roofs, HSG D and driveway (10S)
15.600	79	Woods, Fair, HSG D (O/S) (10S)
10.736	70	Woods, Good, HSG C (10S, 20S)
44.299	70	Woods, Good, HSG C (O/S) (10S)
22.894	77	Woods, Good, HSG D (10S, 20S)
1.783	77	Woods, Good, HSG D (O/S) (10S)
0.689	77	Woods, Good, HSG D (Wetlands) (20S)
101.807	74	TOTAL AREA

21-059 Post - Revised 4-11-23*Type III 24-hr 2-Yr Storm Rainfall=3.30"*

Prepared by Atlantic Resource Consultants

Printed 4/11/2023

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Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 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 10S: Runoff Area=4,251,805 sf 1.86% Impervious Runoff Depth=1.10"
 Flow Length=3,835' Tc=101.7 min CN=74 Runoff=33.28 cfs 8.979 af

Subcatchment 11S: Runoff Area=39,205 sf 49.24% Impervious Runoff Depth=2.00"
 Tc=6.0 min CN=87 Runoff=2.11 cfs 0.150 af

Subcatchment 12S: Runoff Area=13,100 sf 53.09% Impervious Runoff Depth=2.00"
 Tc=6.0 min CN=87 Runoff=0.70 cfs 0.050 af

Subcatchment 13S: Runoff Area=18,240 sf 52.03% Impervious Runoff Depth=2.09"
 Tc=6.0 min CN=88 Runoff=1.02 cfs 0.073 af

Subcatchment 14S: Runoff Area=8,790 sf 56.09% Impervious Runoff Depth=2.17"
 Tc=6.0 min CN=89 Runoff=0.51 cfs 0.037 af

Subcatchment 20S: Runoff Area=103,566 sf 2.41% Impervious Runoff Depth=1.16"
 Flow Length=302' Tc=39.2 min CN=75 Runoff=1.55 cfs 0.230 af

Reach 1R: Avg. Flow Depth=0.05' Max Vel=0.35 fps Inflow=0.53 cfs 0.142 af
 n=0.080 L=445.0' S=0.0213 ' Capacity=82.80 cfs Outflow=0.34 cfs 0.141 af

Reach 2&3R: Avg. Flow Depth=0.03' Max Vel=0.15 fps Inflow=0.30 cfs 0.118 af
 n=0.080 L=776.0' S=0.0077 ' Capacity=49.83 cfs Outflow=0.09 cfs 0.118 af

Reach 2R: Avg. Flow Depth=0.02' Max Vel=0.12 fps Inflow=0.10 cfs 0.048 af
 n=0.080 L=740.0' S=0.0081 ' Capacity=51.03 cfs Outflow=0.05 cfs 0.048 af

Reach 3R: Avg. Flow Depth=0.04' Max Vel=0.40 fps Inflow=0.32 cfs 0.070 af
 n=0.080 L=90.0' S=0.0389 ' Capacity=111.75 cfs Outflow=0.30 cfs 0.070 af

Reach 4R: Avg. Flow Depth=0.01' Max Vel=0.11 fps Inflow=0.03 cfs 0.029 af
 n=0.080 L=640.0' S=0.0094 ' Capacity=54.87 cfs Outflow=0.03 cfs 0.029 af

Reach PIPE: CULVERT Avg. Flow Depth=0.06' Max Vel=1.42 fps Inflow=0.30 cfs 0.118 af
 48.0" Round Pipe w/ 12.0" inside fill n=0.012 L=35.0' S=0.0051 ' Capacity=80.80 cfs Outflow=0.30 cfs 0.118 af

Pond BF1: Bioretention Cell 1 Peak Elev=66.65' Storage=3,206 cf Inflow=2.11 cfs 0.150 af
 Primary=0.53 cfs 0.142 af Secondary=0.00 cfs 0.000 af Outflow=0.53 cfs 0.142 af

Pond BF2: Bioretention Cell 2 Peak Elev=73.03' Storage=1,100 cf Inflow=0.70 cfs 0.050 af
 Primary=0.10 cfs 0.048 af Secondary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.048 af

Pond BF3: Bioretention Cell 3 Peak Elev=67.60' Storage=1,457 cf Inflow=1.02 cfs 0.073 af
 Primary=0.32 cfs 0.070 af Secondary=0.00 cfs 0.000 af Outflow=0.32 cfs 0.070 af

Pond C: GOOSE ROCKS ROAD Peak Elev=60.94' Storage=92,257 cf Inflow=33.57 cfs 9.267 af
 Primary=0.00 cfs 0.000 af Secondary=29.13 cfs 7.674 af Outflow=29.13 cfs 7.674 af

21-059 Post - Revised 4-11-23*Type III 24-hr 2-Yr Storm Rainfall=3.30"*

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Pond GW1: Gravel Wetland 1

Peak Elev=70.16' Storage=945 cf Inflow=0.51 cfs 0.037 af
Primary=0.03 cfs 0.029 af Secondary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.029 af

Link POA1:

Inflow=29.13 cfs 7.674 af
Primary=29.13 cfs 7.674 af

Link POA2:

Inflow=1.55 cfs 0.230 af
Primary=1.55 cfs 0.230 af

Total Runoff Area = 101.807 ac Runoff Volume = 9.520 af Average Runoff Depth = 1.12"
97.24% Pervious = 98.999 ac 2.76% Impervious = 2.807 ac

21-059 Post - Revised 4-11-23

Type III 24-hr 2-Yr Storm Rainfall=3.30"

Prepared by Atlantic Resource Consultants

Printed 4/11/2023

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Summary for Subcatchment 10S:

Runoff = 33.28 cfs @ 13.45 hrs, Volume= 8.979 af, Depth= 1.10"

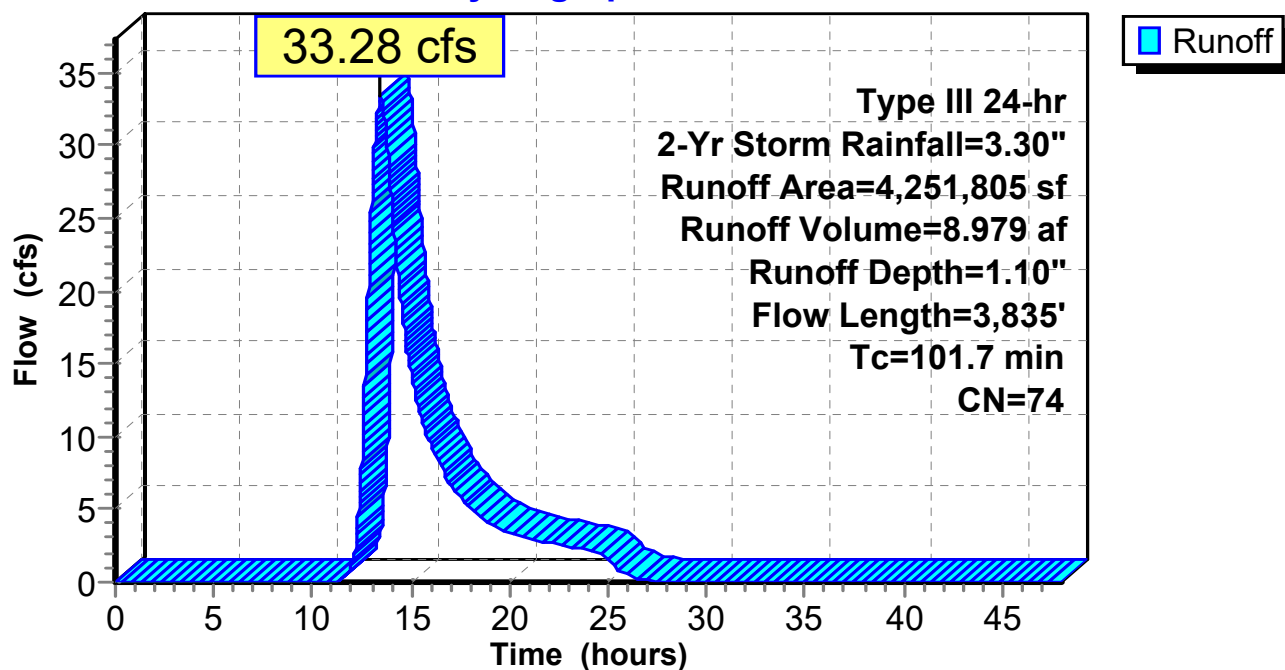
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.30"

Area (sf)	CN	Description
438,403	70	Woods, Good, HSG C
* 960,471	77	Woods, Good, HSG D
* 679,545	79	Woods, Fair, HSG D (O/S)
* 1,929,660	70	Woods, Good, HSG C (O/S)
* 77,660	77	Woods, Good, HSG D (O/S)
* 6,978	74	>75% Grass cover, Good, HSG C (Road)
* 6,978	80	>75% Grass cover, Good, HSG D (Road)
* 36,500	74	>75% Grass cover, Good, HSG C (Lawn)
* 36,500	80	>75% Grass cover, Good, HSG D (Lawn)
* 33,000	98	Unconnected roofs, HSG C and driveway
* 33,000	98	Unconnected roofs, HSG D and driveway
* 13,110	98	Road HSG D
4,251,805	74	Weighted Average
4,172,695		98.14% Pervious Area
79,110		1.86% Impervious Area
66,000		83.43% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.8	100	0.0050	0.05		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.30"
29.4	1,675	0.0360	0.95		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
21.2	450	0.0050	0.35		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
14.3	1,610	0.0070	1.88	75.31	Channel Flow, D-E STREAM CHANNEL Area= 40.0 sf Perim= 30.0' r= 1.33' n= 0.080 Earth, long dense weeds
101.7	3,835	Total			

Subcatchment 10S:

Hydrograph



Summary for Subcatchment 11S:

Runoff = 2.11 cfs @ 12.09 hrs, Volume= 0.150 af, Depth= 2.00"

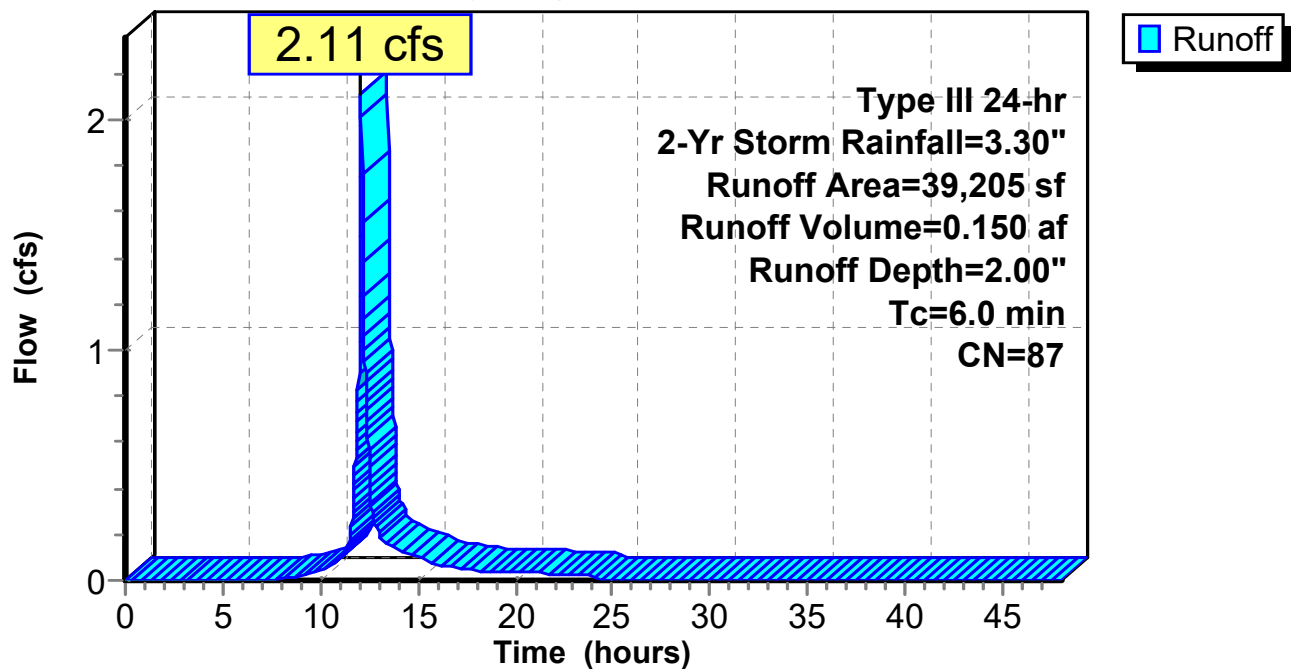
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.30"

	Area (sf)	CN	Description
*	19,305	98	New Road
	9,950	74	>75% Grass cover, Good, HSG C
	9,950	80	>75% Grass cover, Good, HSG D
	39,205	87	Weighted Average
	19,900		50.76% Pervious Area
	19,305		49.24% Impervious Area

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

Subcatchment 11S:

Hydrograph



Summary for Subcatchment 12S:

Runoff = 0.70 cfs @ 12.09 hrs, Volume= 0.050 af, Depth= 2.00"

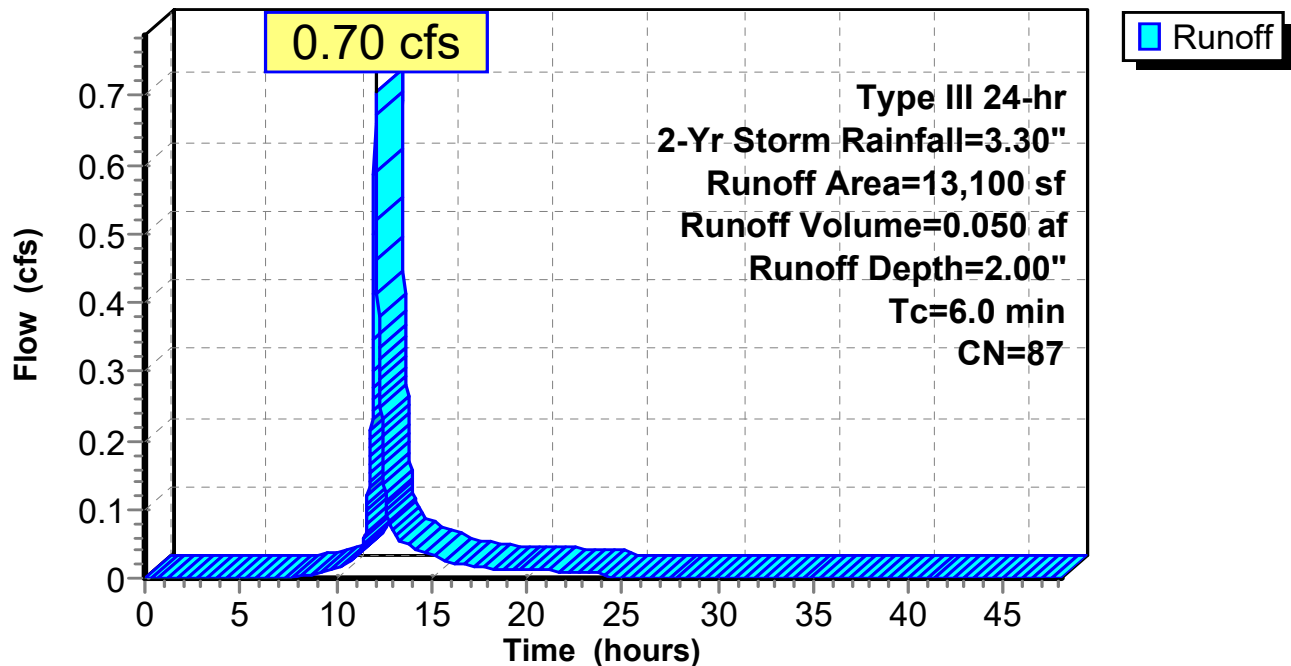
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.30"

Area (sf)	CN	Description
6,145	74	>75% Grass cover, Good, HSG C
* 6,955	98	New Road
13,100	87	Weighted Average
6,145		46.91% Pervious Area
6,955		53.09% Impervious Area

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

Subcatchment 12S:

Hydrograph



Summary for Subcatchment 13S:

Runoff = 1.02 cfs @ 12.09 hrs, Volume= 0.073 af, Depth= 2.09"

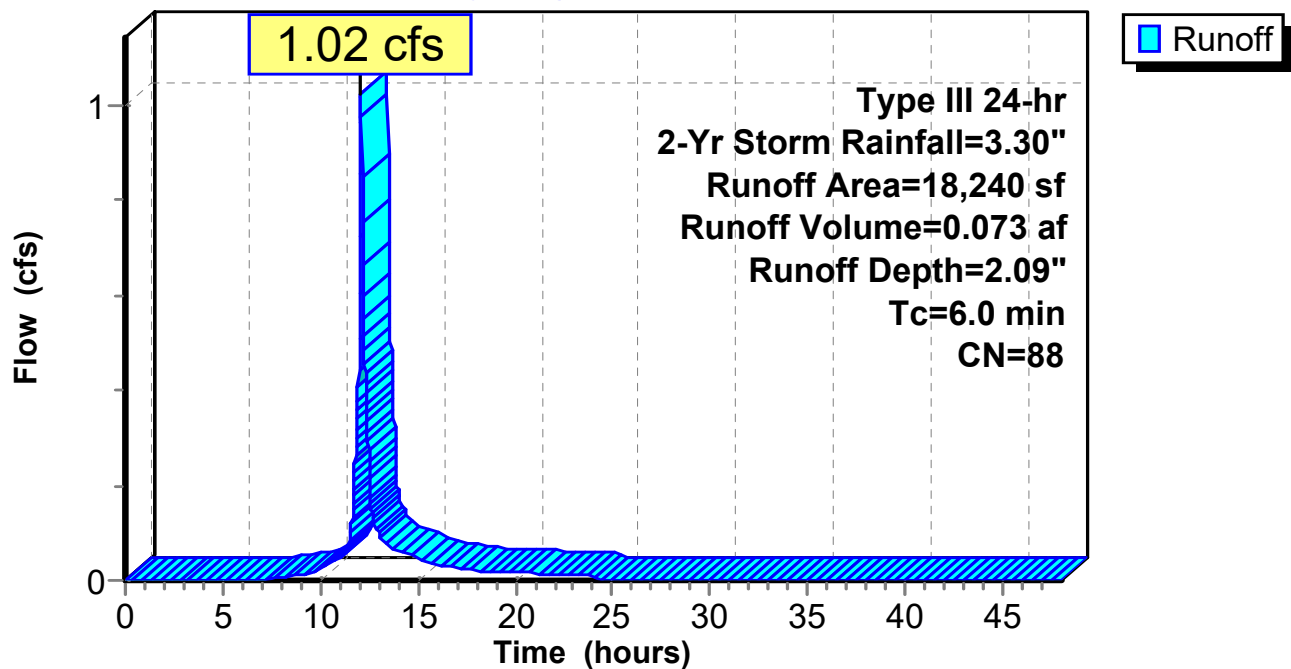
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.30"

Area (sf)	CN	Description
4,375	74	>75% Grass cover, Good, HSG C
4,375	80	>75% Grass cover, Good, HSG D
* 9,490	98	New Road
18,240	88	Weighted Average
8,750		47.97% Pervious Area
9,490		52.03% Impervious Area

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

Subcatchment 13S:

Hydrograph



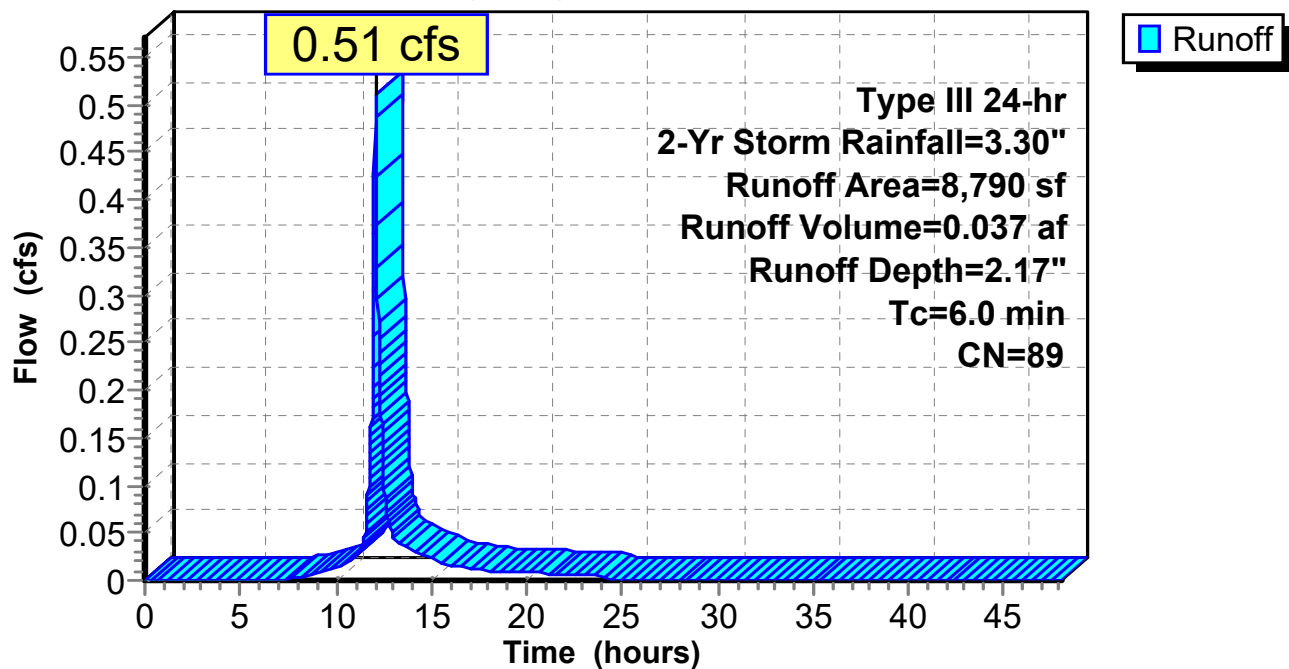
Summary for Subcatchment 14S:

Runoff = 0.51 cfs @ 12.09 hrs, Volume= 0.037 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.30"

Area (sf)	CN	Description
1,930	74	>75% Grass cover, Good, HSG C
1,930	80	>75% Grass cover, Good, HSG D
* 4,930	98	New Road
8,790	89	Weighted Average
3,860		43.91% Pervious Area
4,930		56.09% Impervious Area

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

Subcatchment 14S:**Hydrograph**

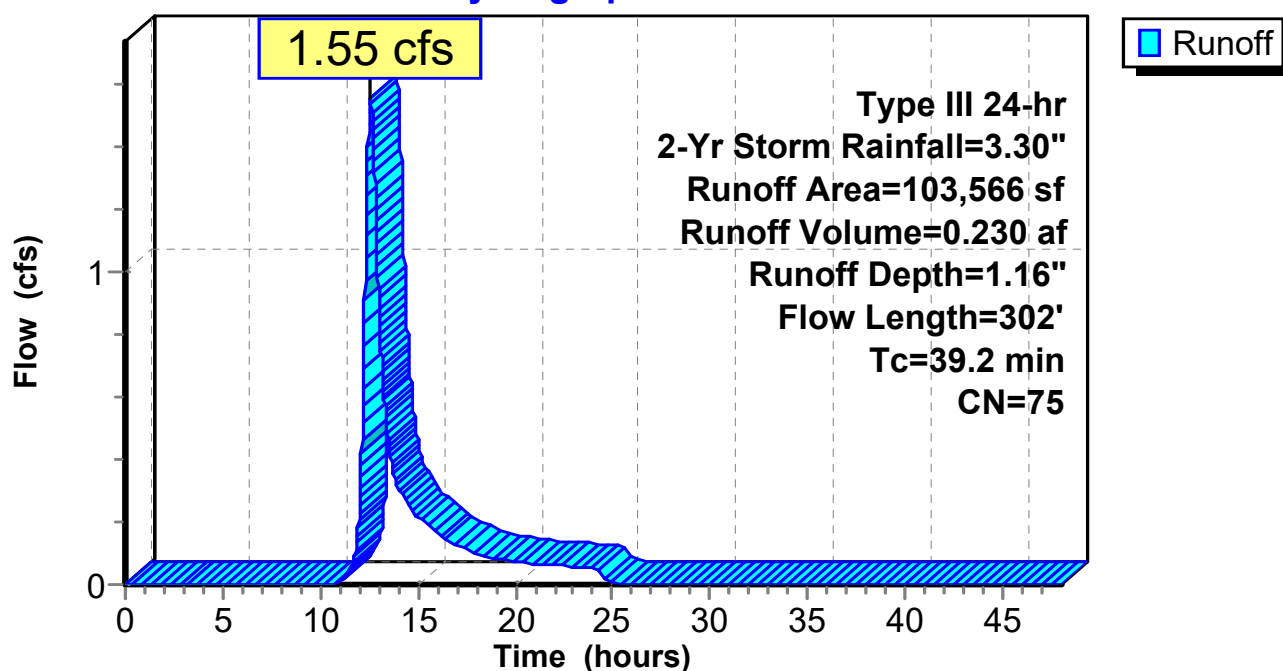
Summary for Subcatchment 20S:

Runoff = 1.55 cfs @ 12.58 hrs, Volume= 0.230 af, Depth= 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Yr Storm Rainfall=3.30"

	Area (sf)	CN	Description
*	30,010	77	Woods, Good, HSG D (Wetlands)
	36,778	77	Woods, Good, HSG D
	29,278	70	Woods, Good, HSG C
*	2,500	98	Lot
	5,000	74	>75% Grass cover, Good, HSG C
	103,566	75	Weighted Average
	101,066		97.59% Pervious Area
	2,500		2.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.5	60	0.0050	0.04		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.30"
14.7	242	0.0030	0.27		Shallow Concentrated Flow, B-POA2 Woodland Kv= 5.0 fps
39.2	302	Total			

Subcatchment 20S:**Hydrograph**

Summary for Reach 1R:

Inflow Area = 0.900 ac, 49.24% Impervious, Inflow Depth > 1.89" for 2-Yr Storm event
 Inflow = 0.53 cfs @ 12.48 hrs, Volume= 0.142 af
 Outflow = 0.34 cfs @ 13.10 hrs, Volume= 0.141 af, Atten= 35%, Lag= 37.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 0.35 fps, Min. Travel Time= 21.4 min
 Avg. Velocity = 0.16 fps, Avg. Travel Time= 47.6 min

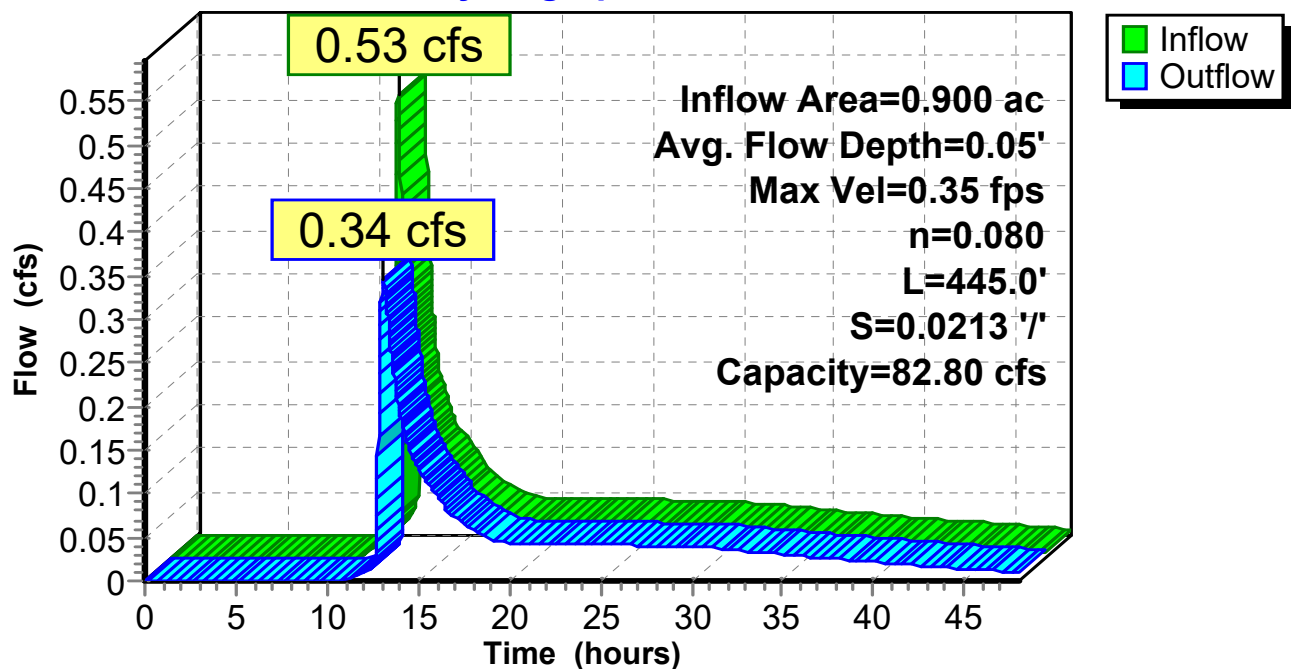
Peak Storage= 442 cf @ 12.75 hrs
 Average Depth at Peak Storage= 0.05'
 Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 82.80 cfs

20.00' x 1.00' deep channel, n= 0.080 Earth, long dense weeds
 Side Slope Z-value= 20.0 '/' Top Width= 60.00'
 Length= 445.0' Slope= 0.0213 '/'
 Inlet Invert= 67.50', Outlet Invert= 58.00'



Reach 1R:

Hydrograph



Summary for Reach 2&3R:

Inflow Area = 0.719 ac, 52.47% Impervious, Inflow Depth > 1.97" for 2-Yr Storm event
 Inflow = 0.30 cfs @ 12.54 hrs, Volume= 0.118 af
 Outflow = 0.09 cfs @ 14.83 hrs, Volume= 0.118 af, Atten= 69%, Lag= 137.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 0.15 fps, Min. Travel Time= 84.3 min
 Avg. Velocity = 0.11 fps, Avg. Travel Time= 121.1 min

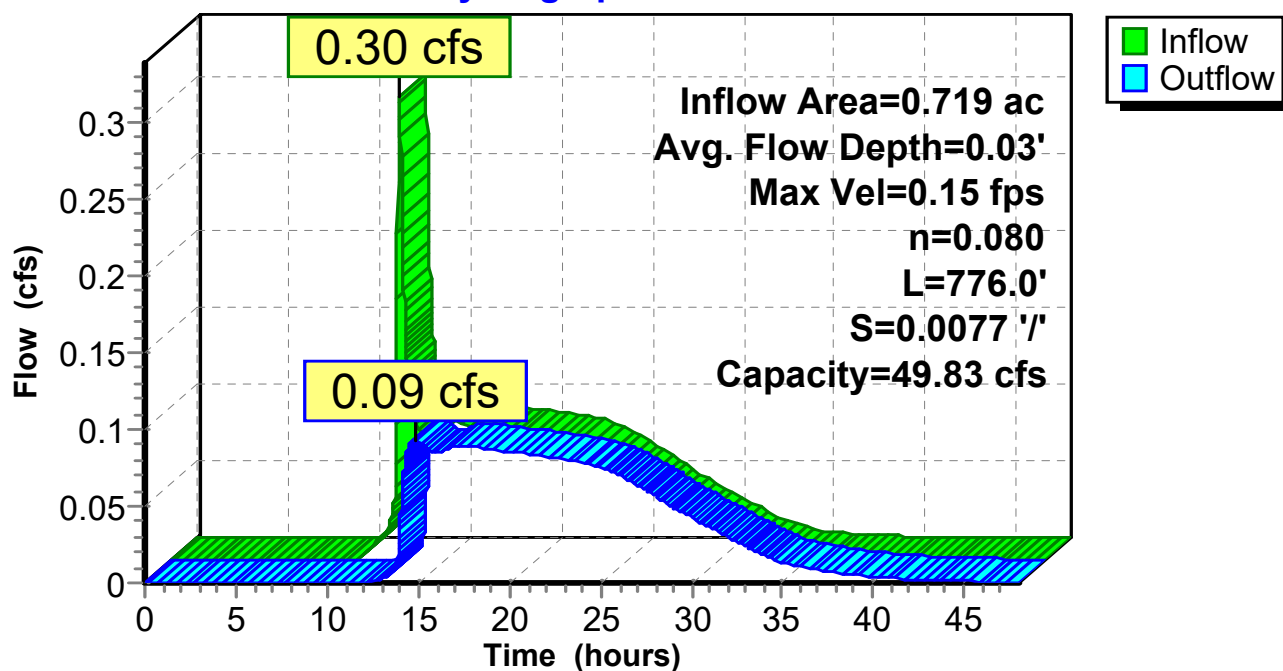
Peak Storage= 471 cf @ 13.43 hrs
 Average Depth at Peak Storage= 0.03'
 Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 49.83 cfs

20.00' x 1.00' deep channel, n= 0.080 Earth, long dense weeds
 Side Slope Z-value= 20.0 '/' Top Width= 60.00'
 Length= 776.0' Slope= 0.0077 '/'
 Inlet Invert= 64.00', Outlet Invert= 58.00'



Reach 2&3R:

Hydrograph



Summary for Reach 2R:

Inflow Area = 0.301 ac, 53.09% Impervious, Inflow Depth = 1.91" for 2-Yr Storm event
 Inflow = 0.10 cfs @ 12.62 hrs, Volume= 0.048 af
 Outflow = 0.05 cfs @ 15.71 hrs, Volume= 0.048 af, Atten= 54%, Lag= 185.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 0.12 fps, Min. Travel Time= 103.1 min
 Avg. Velocity= 0.09 fps, Avg. Travel Time= 138.2 min

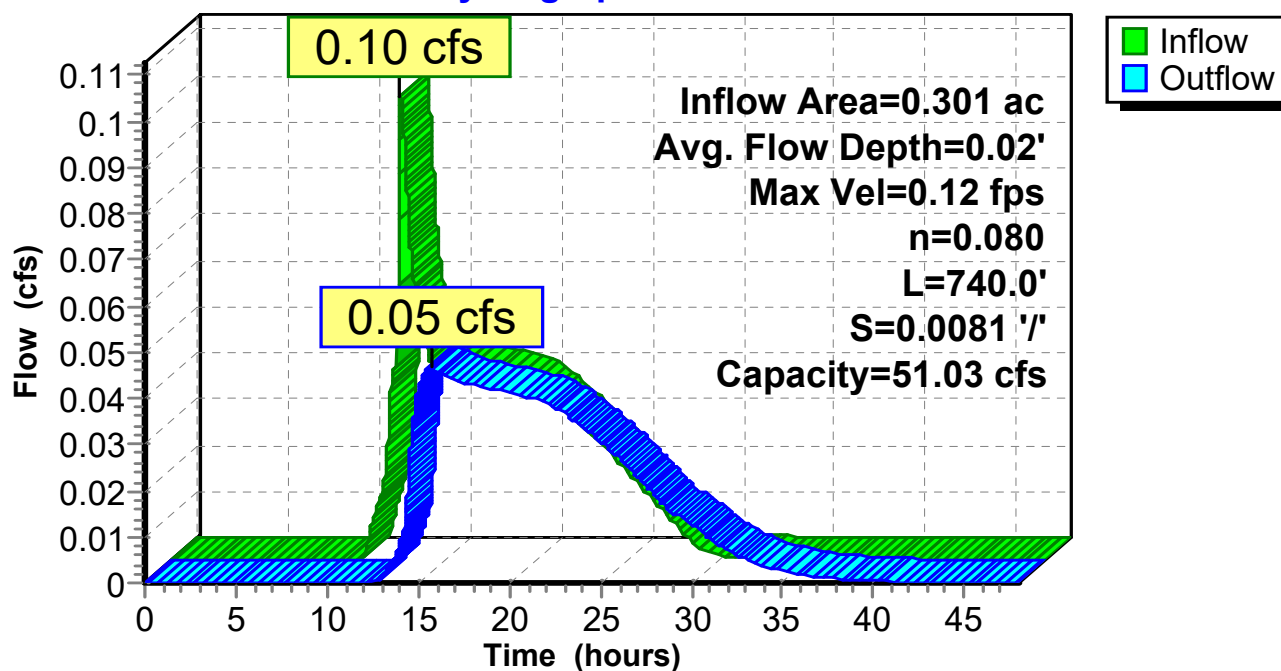
Peak Storage= 289 cf @ 13.99 hrs
 Average Depth at Peak Storage= 0.02'
 Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 51.03 cfs

20.00' x 1.00' deep channel, n= 0.080 Earth, long dense weeds
 Side Slope Z-value= 20.0 '/' Top Width= 60.00'
 Length= 740.0' Slope= 0.0081 '/'
 Inlet Invert= 70.00', Outlet Invert= 64.00'



Reach 2R:

Hydrograph



Summary for Reach 3R:

Inflow Area = 0.419 ac, 52.03% Impervious, Inflow Depth = 2.01" for 2-Yr Storm event
 Inflow = 0.32 cfs @ 12.42 hrs, Volume= 0.070 af
 Outflow = 0.30 cfs @ 12.53 hrs, Volume= 0.070 af, Atten= 4%, Lag= 6.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 0.40 fps, Min. Travel Time= 3.8 min
 Avg. Velocity = 0.18 fps, Avg. Travel Time= 8.4 min

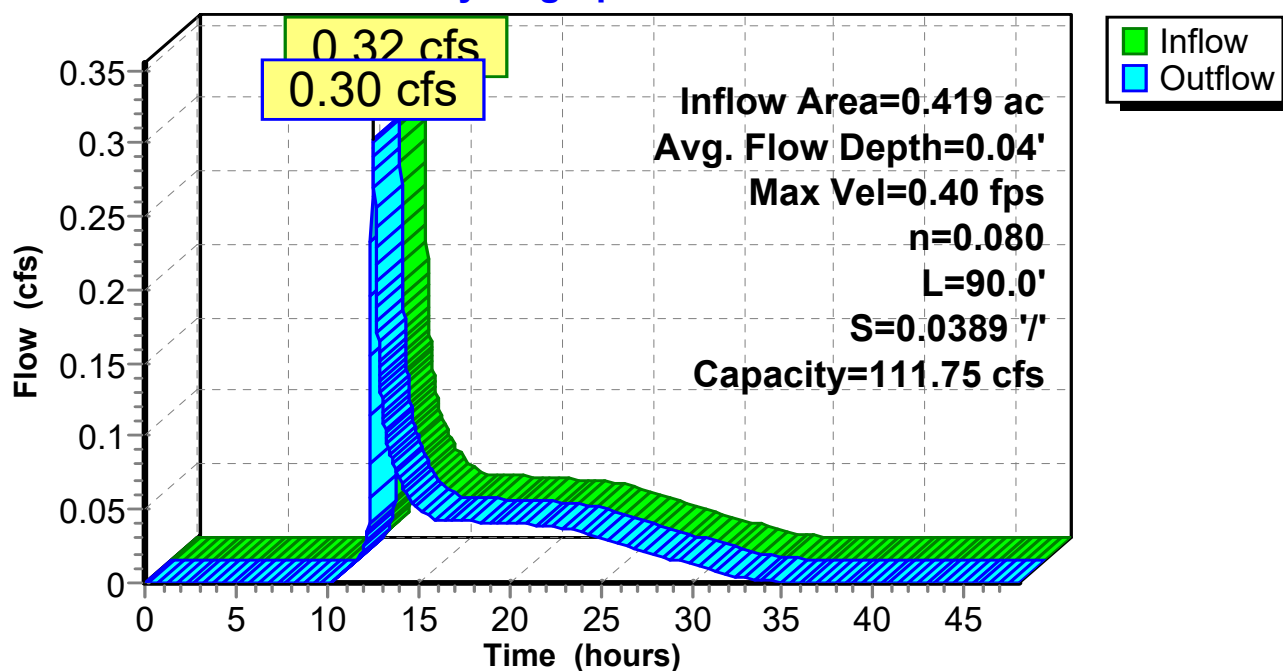
Peak Storage= 69 cf @ 12.47 hrs
 Average Depth at Peak Storage= 0.04'
 Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 111.75 cfs

20.00' x 1.00' deep channel, n= 0.080 Earth, long dense weeds
 Side Slope Z-value= 20.0 '/' Top Width= 60.00'
 Length= 90.0' Slope= 0.0389 '/'
 Inlet Invert= 68.50', Outlet Invert= 65.00'



Reach 3R:

Hydrograph



Summary for Reach 4R:

Inflow Area = 0.202 ac, 56.09% Impervious, Inflow Depth = 1.72" for 2-Yr Storm event
 Inflow = 0.03 cfs @ 13.89 hrs, Volume= 0.029 af
 Outflow = 0.03 cfs @ 18.32 hrs, Volume= 0.029 af, Atten= 5%, Lag= 265.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 0.11 fps, Min. Travel Time= 97.8 min
 Avg. Velocity= 0.09 fps, Avg. Travel Time= 118.4 min

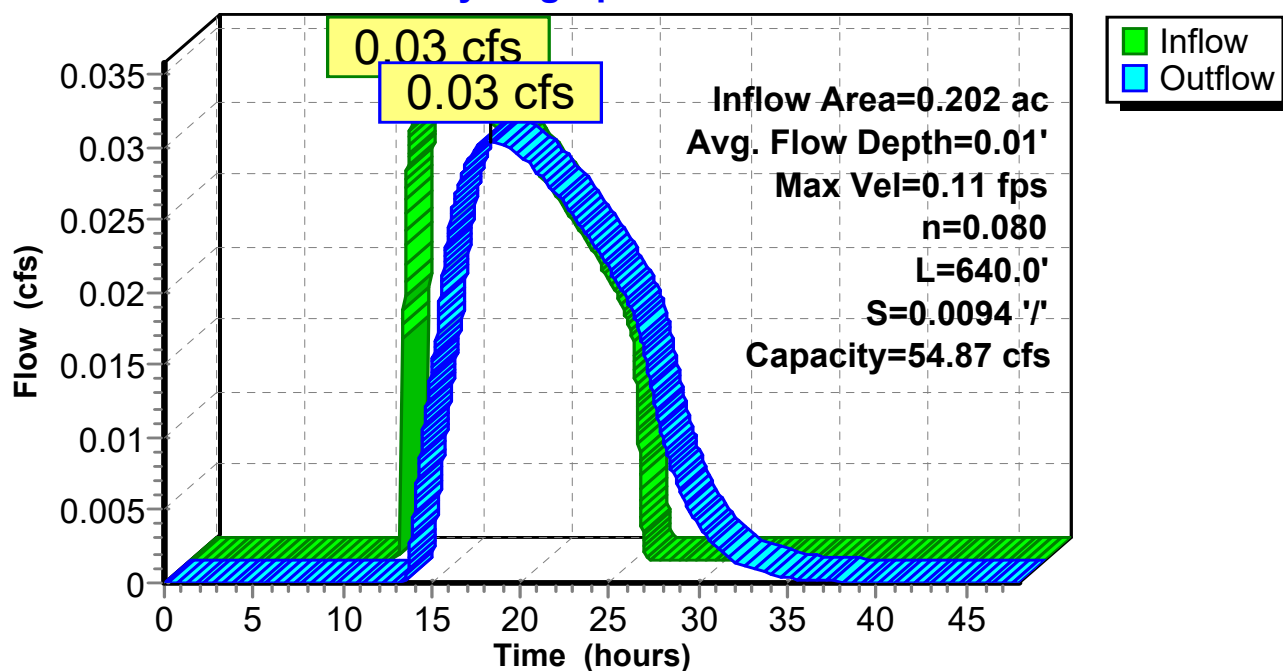
Peak Storage= 178 cf @ 16.69 hrs
 Average Depth at Peak Storage= 0.01'
 Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 54.87 cfs

20.00' x 1.00' deep channel, n= 0.080 Earth, long dense weeds
 Side Slope Z-value= 20.0 '/' Top Width= 60.00'
 Length= 640.0' Slope= 0.0094 '/'
 Inlet Invert= 64.00', Outlet Invert= 58.00'



Reach 4R:

Hydrograph



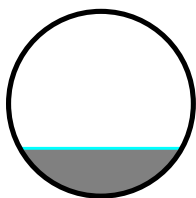
Summary for Reach PIPE: CULVERT

Inflow Area = 0.719 ac, 52.47% Impervious, Inflow Depth > 1.97" for 2-Yr Storm event
 Inflow = 0.30 cfs @ 12.53 hrs, Volume= 0.118 af
 Outflow = 0.30 cfs @ 12.54 hrs, Volume= 0.118 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 1.42 fps, Min. Travel Time= 0.4 min
 Avg. Velocity= 1.03 fps, Avg. Travel Time= 0.6 min

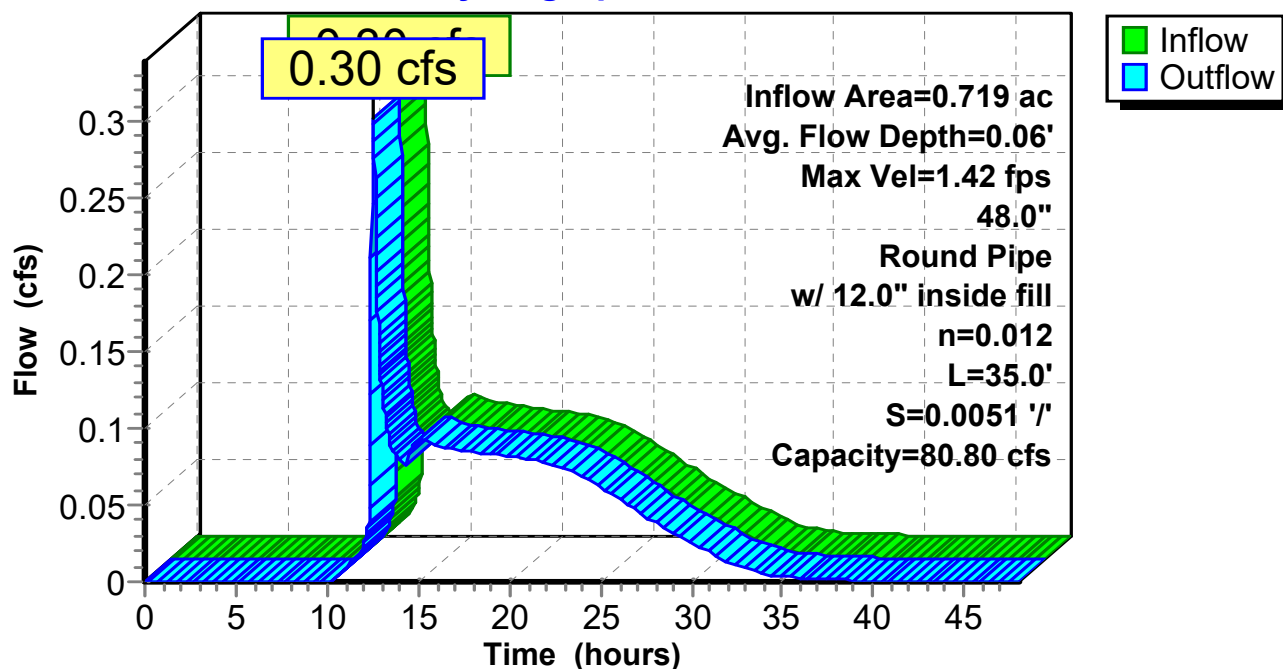
Peak Storage= 7 cf @ 12.54 hrs
 Average Depth at Peak Storage= 1.06' above invert (0.06' above fill)
 Bank-Full Depth= 4.00' above invert (3.00' above fill) Flow Area= 10.1 sf, Capacity= 80.80 cfs

48.0" Round Pipe w/ 12.0" inside fill
 n= 0.012 Corrugated PP, smooth interior
 Length= 35.0' Slope= 0.0051 '/'
 Inlet Invert= 69.00', Outlet Invert= 68.82'



Reach PIPE: CULVERT

Hydrograph



Summary for Pond BF1: Bioretention Cell 1

Inflow Area = 0.900 ac, 49.24% Impervious, Inflow Depth = 2.00" for 2-Yr Storm event
 Inflow = 2.11 cfs @ 12.09 hrs, Volume= 0.150 af
 Outflow = 0.53 cfs @ 12.48 hrs, Volume= 0.142 af, Atten= 75%, Lag= 23.5 min
 Primary = 0.53 cfs @ 12.48 hrs, Volume= 0.142 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 66.65' @ 12.48 hrs Surf.Area= 2,378 sf Storage= 3,206 cf

Plug-Flow detention time= 540.7 min calculated for 0.142 af (95% of inflow)
 Center-of-Mass det. time= 510.9 min (1,328.5 - 817.6)

Volume	Invert	Avail.Storage	Storage Description
#1	63.50'	4,080 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
63.50	1,998	0.0	0	0
64.50	1,998	40.0	799	799
66.00	1,998	33.0	989	1,788
67.00	2,585	100.0	2,292	4,080

Device	Routing	Invert	Outlet Devices
#1	Primary	63.83'	12.0" Round Culvert L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.83' / 63.33' S= 0.0250 ' S= 0.0250 ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	63.83'	1.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	66.50'	10.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	66.85'	4.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.53 cfs @ 12.48 hrs HW=66.65' (Free Discharge)

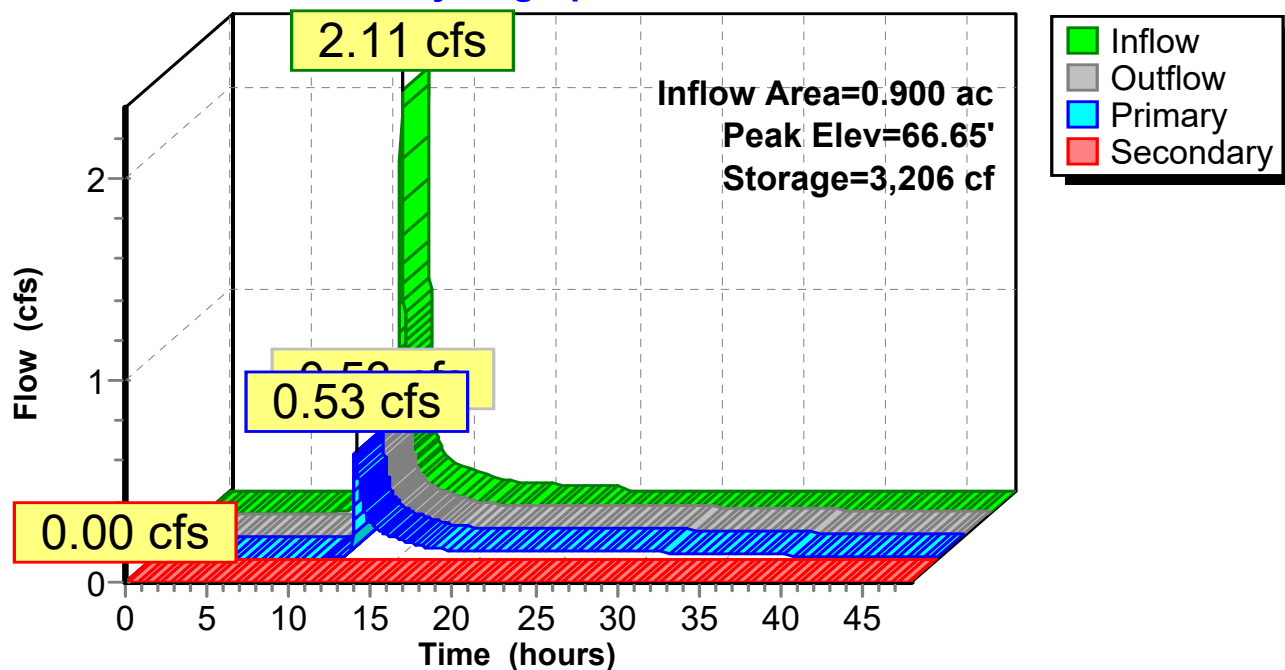
↑ **1=Culvert** (Passes 0.53 cfs of 4.55 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 8.02 fps)
 ↑ **3=Orifice/Grate** (Weir Controls 0.49 cfs @ 1.26 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=63.50' (Free Discharge)

↑ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond BF1: Bioretention Cell 1

Hydrograph



Summary for Pond BF2: Bioretention Cell 2

Inflow Area = 0.301 ac, 53.09% Impervious, Inflow Depth = 2.00" for 2-Yr Storm event
 Inflow = 0.70 cfs @ 12.09 hrs, Volume= 0.050 af
 Outflow = 0.10 cfs @ 12.62 hrs, Volume= 0.048 af, Atten= 86%, Lag= 32.2 min
 Primary = 0.10 cfs @ 12.62 hrs, Volume= 0.048 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 73.03' @ 12.62 hrs Surf.Area= 931 sf Storage= 1,100 cf

Plug-Flow detention time= 291.9 min calculated for 0.048 af (96% of inflow)
 Center-of-Mass det. time= 267.1 min (1,084.7 - 817.6)

Volume	Invert	Avail.Storage	Storage Description	
#1	70.00'	2,190 cf	Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
70.00	733	0.0	0	0
71.00	733	40.0	293	293
72.50	733	33.0	363	656
73.00	917	100.0	413	1,069
74.00	1,326	100.0	1,122	2,190

Device	Routing	Invert	Outlet Devices
#1	Primary	70.33'	12.0" Round Culvert L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 70.33' / 70.29' S= 0.0057 ' / Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	70.33'	1.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	73.00'	10.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	73.50'	4.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.10 cfs @ 12.62 hrs HW=73.03' (Free Discharge)

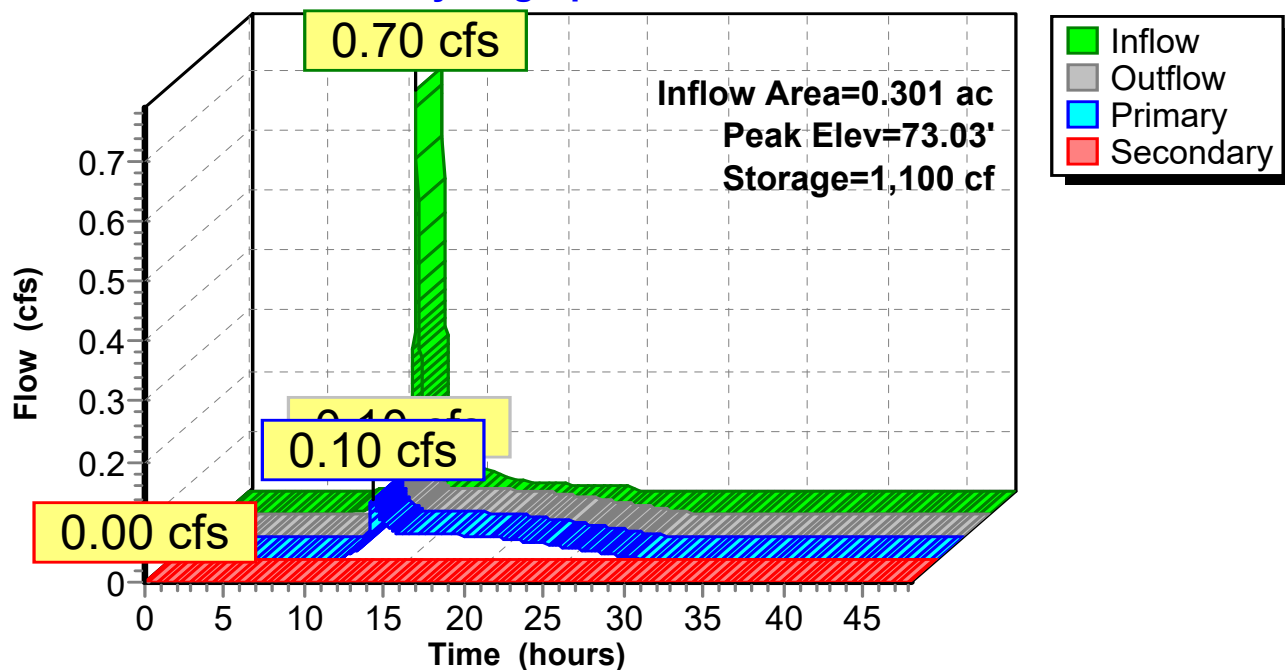
↑ **1=Culvert** (Passes 0.10 cfs of 4.43 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.86 fps)
 ↑ **3=Orifice/Grate** (Weir Controls 0.05 cfs @ 0.60 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=70.00' (Free Discharge)

↑ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond BF2: Bioretention Cell 2

Hydrograph



Summary for Pond BF3: Bioretention Cell 3

Inflow Area = 0.419 ac, 52.03% Impervious, Inflow Depth = 2.09" for 2-Yr Storm event
 Inflow = 1.02 cfs @ 12.09 hrs, Volume= 0.073 af
 Outflow = 0.32 cfs @ 12.42 hrs, Volume= 0.070 af, Atten= 69%, Lag= 19.8 min
 Primary = 0.32 cfs @ 12.42 hrs, Volume= 0.070 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 67.60' @ 12.42 hrs Surf.Area= 1,159 sf Storage= 1,457 cf

Plug-Flow detention time= 318.1 min calculated for 0.070 af (96% of inflow)
 Center-of-Mass det. time= 296.1 min (1,109.9 - 813.8)

Volume	Invert	Avail.Storage	Storage Description
#1	64.50'	1,951 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
64.50	928	0.0	0	0
65.50	928	40.0	371	371
67.00	928	33.0	459	831
68.00	1,313	100.0	1,121	1,951

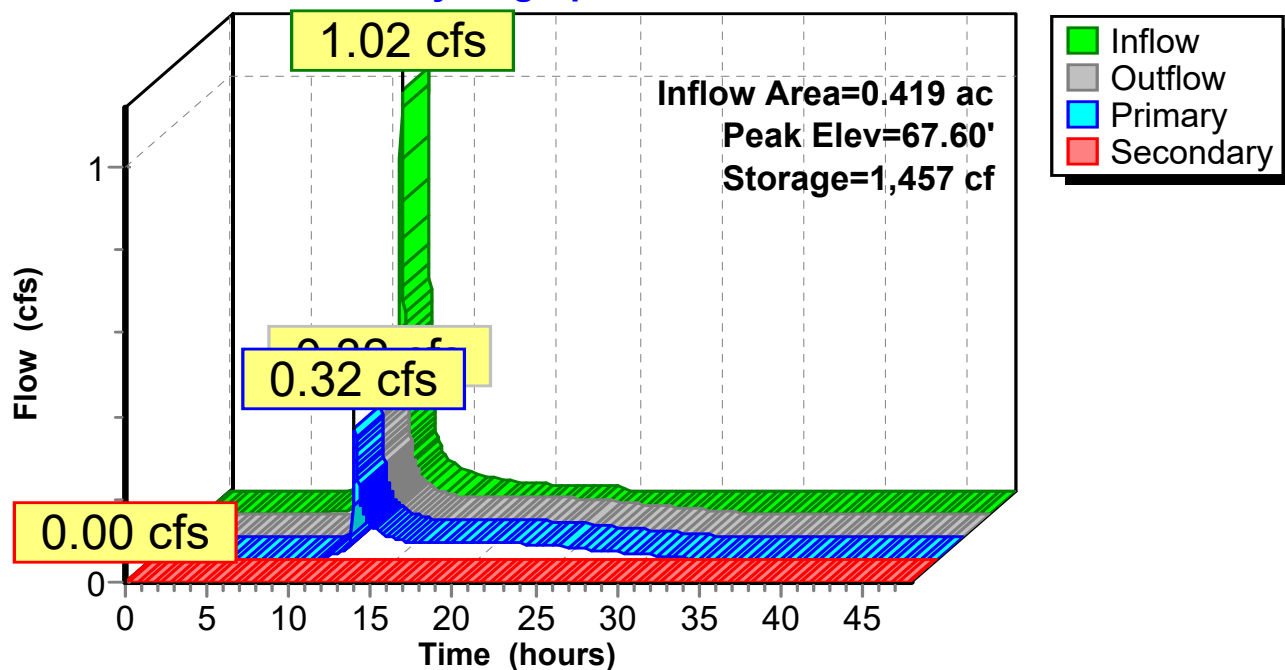
Device	Routing	Invert	Outlet Devices
#1	Primary	64.83'	12.0" Round Culvert L= 34.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 64.83' / 64.66' S= 0.0050 ' S= 0.0050 ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	64.83'	1.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	67.50'	10.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	67.83'	4.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.31 cfs @ 12.42 hrs HW=67.60' (Free Discharge)

↑ **1=Culvert** (Passes 0.31 cfs of 4.50 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.95 fps)
 ↑ **3=Orifice/Grate** (Weir Controls 0.27 cfs @ 1.03 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=64.50' (Free Discharge)

↑ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)



Summary for Pond C: GOOSE ROCKS ROAD

Inflow Area = 99.429 ac, 2.77% Impervious, Inflow Depth > 1.12" for 2-Yr Storm event
 Inflow = 33.57 cfs @ 13.45 hrs, Volume= 9.267 af
 Outflow = 29.13 cfs @ 13.87 hrs, Volume= 7.674 af, Atten= 13%, Lag= 25.4 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 29.13 cfs @ 13.87 hrs, Volume= 7.674 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 60.94' @ 13.87 hrs Surf.Area= 73,184 sf Storage= 92,257 cf

Plug-Flow detention time= 134.7 min calculated for 7.674 af (83% of inflow)
 Center-of-Mass det. time= 52.4 min (1,014.5 - 962.1)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	96,625 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.00	7,230	0	0
59.00	16,340	11,785	11,785
60.00	39,010	27,675	39,460
61.00	75,320	57,165	96,625

Device	Routing	Invert	Outlet Devices
#1	Primary	258.00'	30.0" Round Culvert w/ 6.0" inside fill L= 50.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 257.50' / 256.50' S= 0.0200 ' S Cc= 0.900 n= 0.021 Corrugated metal, Flow Area= 4.21 sf
#2	Secondary	60.60'	50.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=58.00' (Free Discharge)

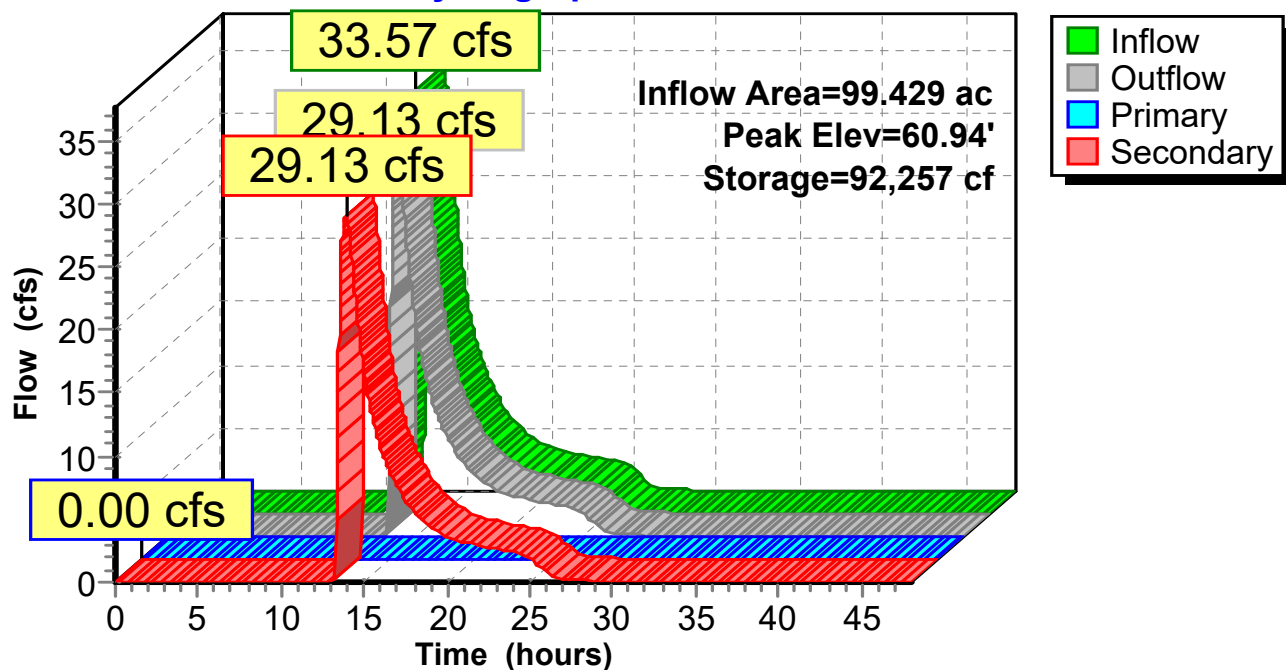
↑**1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=26.84 cfs @ 13.87 hrs HW=60.94' (Free Discharge)

↑**2=Broad-Crested Rectangular Weir** (Weir Controls 26.84 cfs @ 1.57 fps)

Pond C: GOOSE ROCKS ROAD

Hydrograph



Summary for Pond GW1: Gravel Wetland 1

Inflow Area = 0.202 ac, 56.09% Impervious, Inflow Depth = 2.17" for 2-Yr Storm event
 Inflow = 0.51 cfs @ 12.09 hrs, Volume= 0.037 af
 Outflow = 0.03 cfs @ 13.89 hrs, Volume= 0.029 af, Atten= 94%, Lag= 108.1 min
 Primary = 0.03 cfs @ 13.89 hrs, Volume= 0.029 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Starting Elev= 21.17' Surf.Area= 0 sf Storage= 0 cf

Peak Elev= 70.16' @ 13.89 hrs Surf.Area= 728 sf Storage= 945 cf

Plug-Flow detention time= 342.7 min calculated for 0.029 af (79% of inflow)

Center-of-Mass det. time= 264.5 min (1,074.4 - 809.9)

Volume	Invert	Avail.Storage	Storage Description	
#1	65.83'	1,739 cf	Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.83	325	0.0	0	0
67.83	325	40.0	260	260
68.33	325	35.0	57	317
69.00	325	15.0	33	350
70.00	651	100.0	488	838
70.50	900	100.0	388	1,225
71.00	1,155	100.0	514	1,739

Device	Routing	Invert	Outlet Devices
#1	Primary	68.67'	12.0" Round Culvert L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.67' / 68.56' S= 0.0050 ' / ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	65.83'	1.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	70.50'	10.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	71.00'	130.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.03 cfs @ 13.89 hrs HW=70.16' (Free Discharge)

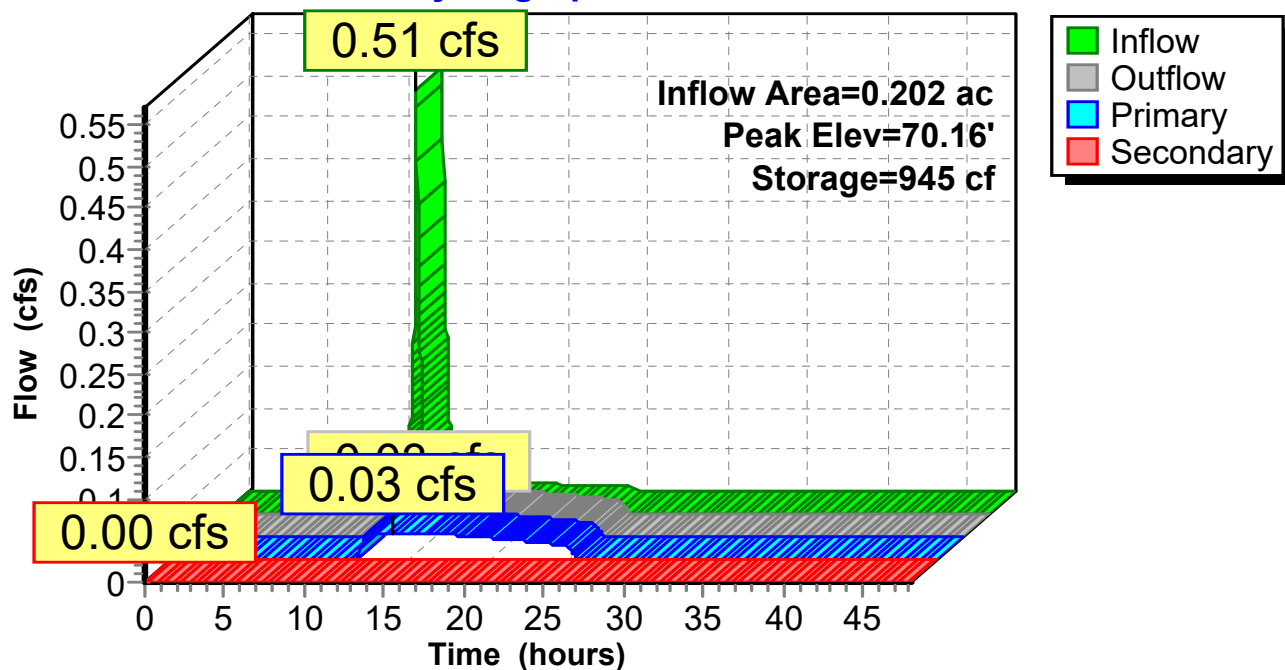
1=Culvert (Passes 0.03 cfs of 2.96 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.03 cfs @ 5.87 fps)
 3=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=65.83' (Free Discharge)

4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond GW1: Gravel Wetland 1

Hydrograph

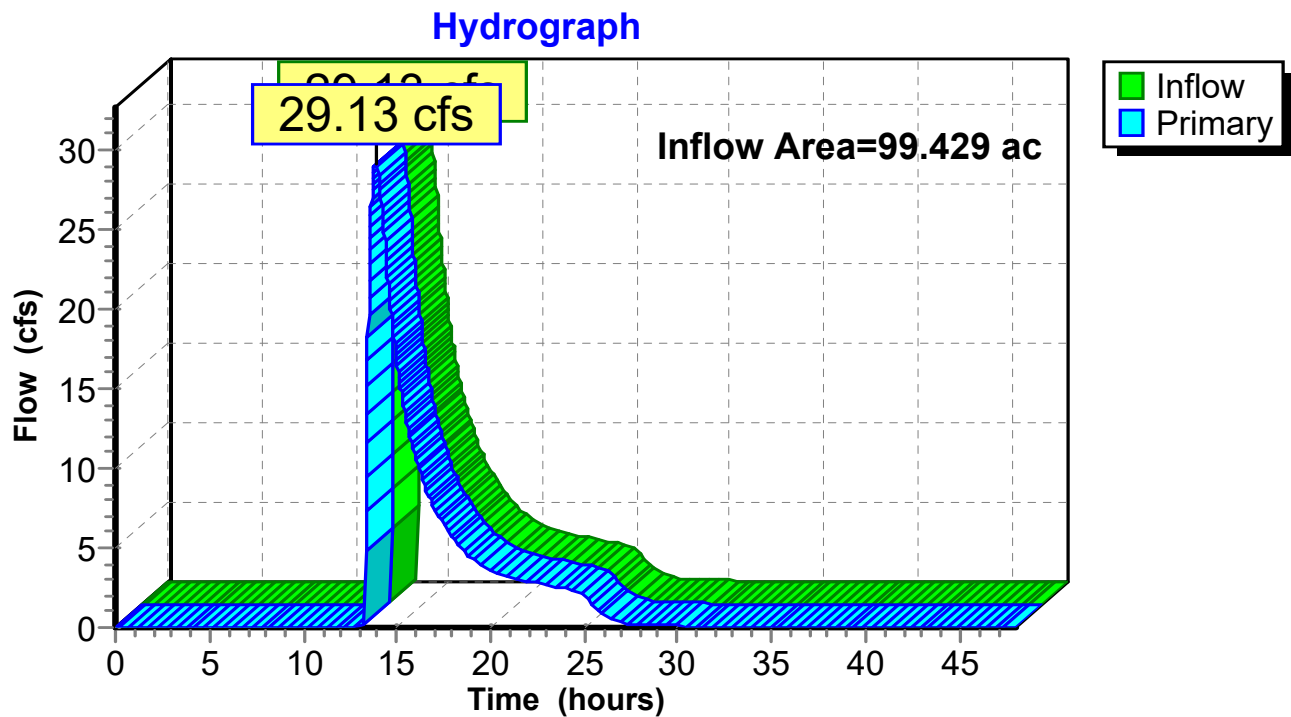


Summary for Link POA1:

Inflow Area = 99.429 ac, 2.77% Impervious, Inflow Depth > 0.93" for 2-Yr Storm event
 Inflow = 29.13 cfs @ 13.87 hrs, Volume= 7.674 af
 Primary = 29.13 cfs @ 13.87 hrs, Volume= 7.674 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

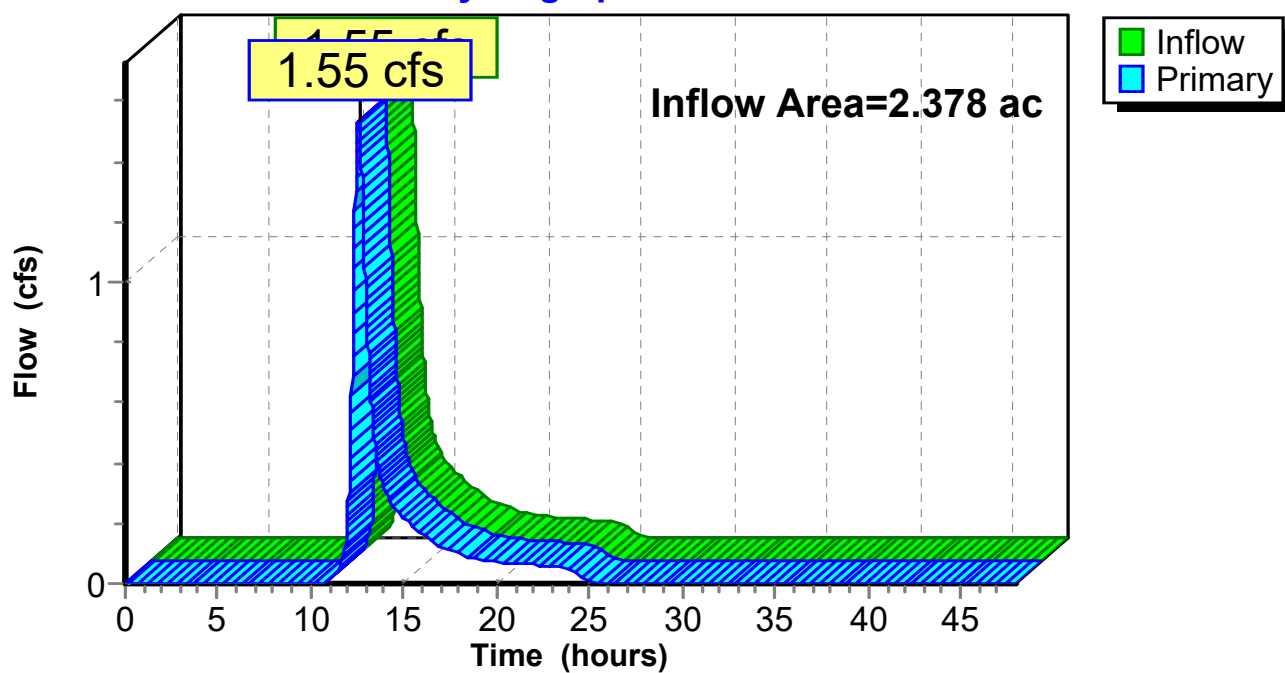
Link POA1:



Summary for Link POA2:

Inflow Area = 2.378 ac, 2.41% Impervious, Inflow Depth = 1.16" for 2-Yr Storm event
Inflow = 1.55 cfs @ 12.58 hrs, Volume= 0.230 af
Primary = 1.55 cfs @ 12.58 hrs, Volume= 0.230 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Link POA2:**Hydrograph**

21-059 Post - Revised 4-11-23

Type III 24-hr 10-Yr Storm Rainfall=4.90"

Prepared by Atlantic Resource Consultants

Printed 4/11/2023

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Page 1

Summary for Subcatchment 10S:

Runoff = 72.29 cfs @ 13.43 hrs, Volume= 18.584 af, Depth= 2.28"

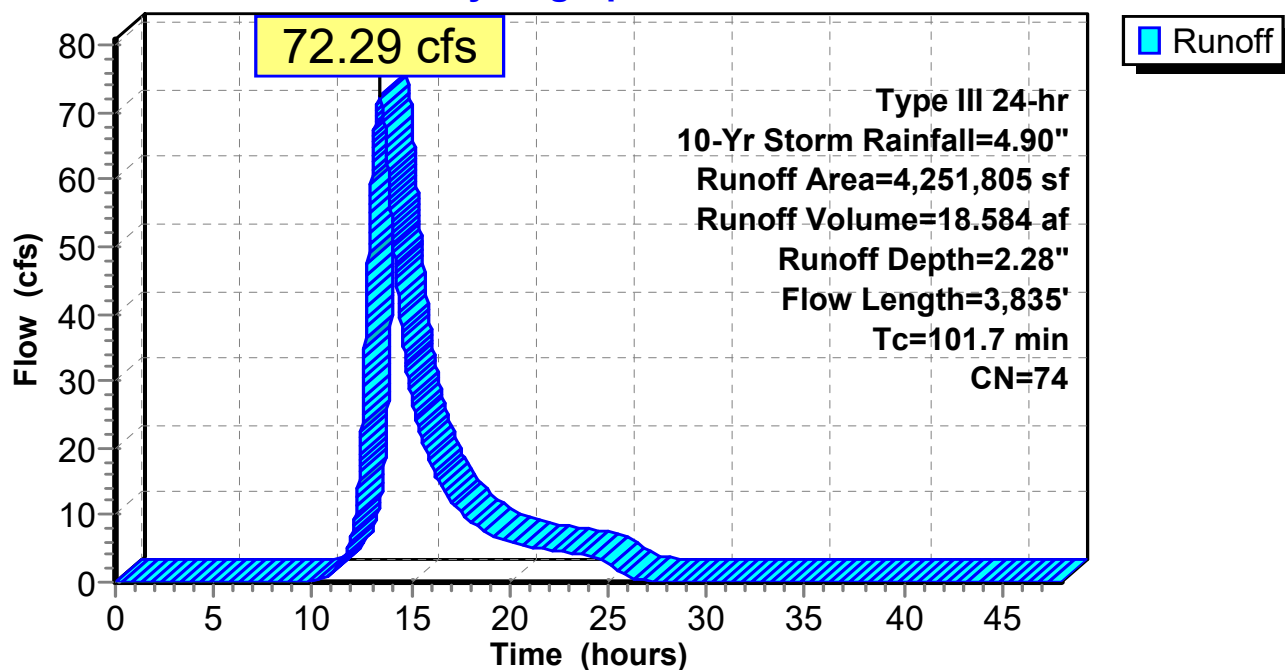
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.90"

Area (sf)	CN	Description
438,403	70	Woods, Good, HSG C
* 960,471	77	Woods, Good, HSG D
* 679,545	79	Woods, Fair, HSG D (O/S)
* 1,929,660	70	Woods, Good, HSG C (O/S)
* 77,660	77	Woods, Good, HSG D (O/S)
* 6,978	74	>75% Grass cover, Good, HSG C (Road)
* 6,978	80	>75% Grass cover, Good, HSG D (Road)
* 36,500	74	>75% Grass cover, Good, HSG C (Lawn)
* 36,500	80	>75% Grass cover, Good, HSG D (Lawn)
* 33,000	98	Unconnected roofs, HSG C and driveway
* 33,000	98	Unconnected roofs, HSG D and driveway
* 13,110	98	Road HSG D
4,251,805	74	Weighted Average
4,172,695		98.14% Pervious Area
79,110		1.86% Impervious Area
66,000		83.43% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.8	100	0.0050	0.05		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.30"
29.4	1,675	0.0360	0.95		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
21.2	450	0.0050	0.35		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
14.3	1,610	0.0070	1.88	75.31	Channel Flow, D-E STREAM CHANNEL Area= 40.0 sf Perim= 30.0' r= 1.33' n= 0.080 Earth, long dense weeds
101.7	3,835	Total			

Subcatchment 10S:

Hydrograph



Summary for Subcatchment 11S:

Runoff = 3.60 cfs @ 12.09 hrs, Volume= 0.260 af, Depth= 3.47"

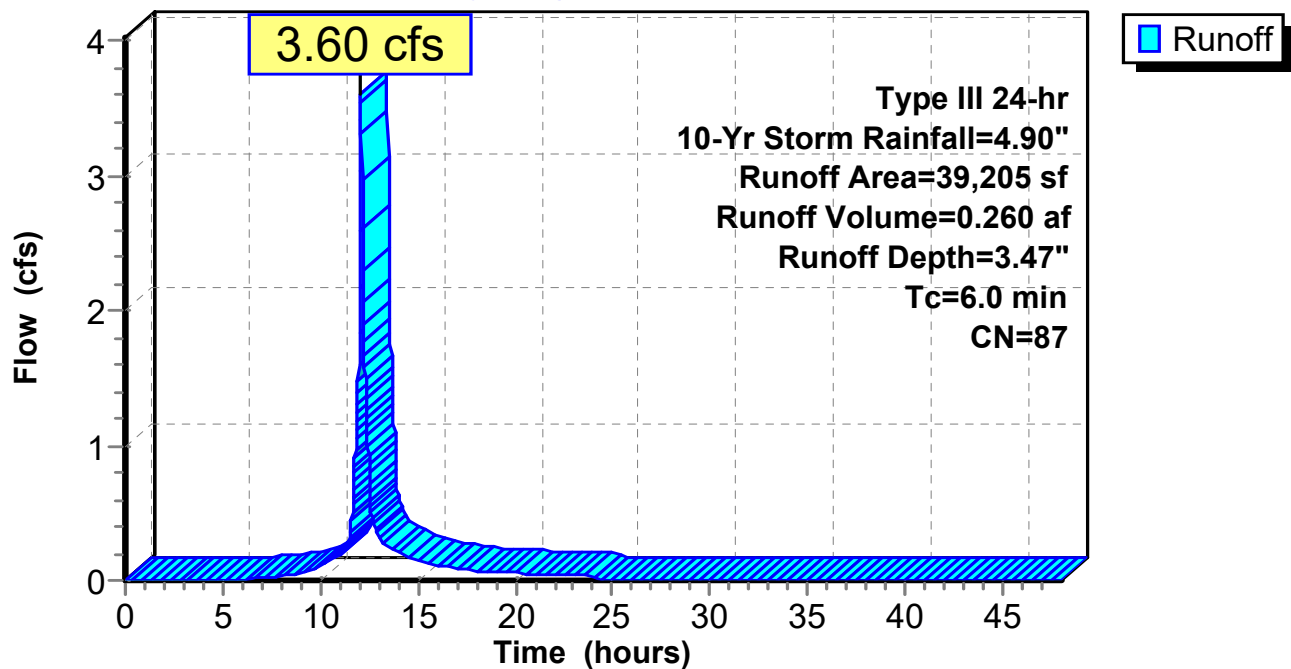
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.90"

	Area (sf)	CN	Description
*	19,305	98	New Road
	9,950	74	>75% Grass cover, Good, HSG C
	9,950	80	>75% Grass cover, Good, HSG D
	39,205	87	Weighted Average
	19,900		50.76% Pervious Area
	19,305		49.24% Impervious Area

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

Subcatchment 11S:

Hydrograph



Summary for Subcatchment 12S:

Runoff = 1.20 cfs @ 12.09 hrs, Volume= 0.087 af, Depth= 3.47"

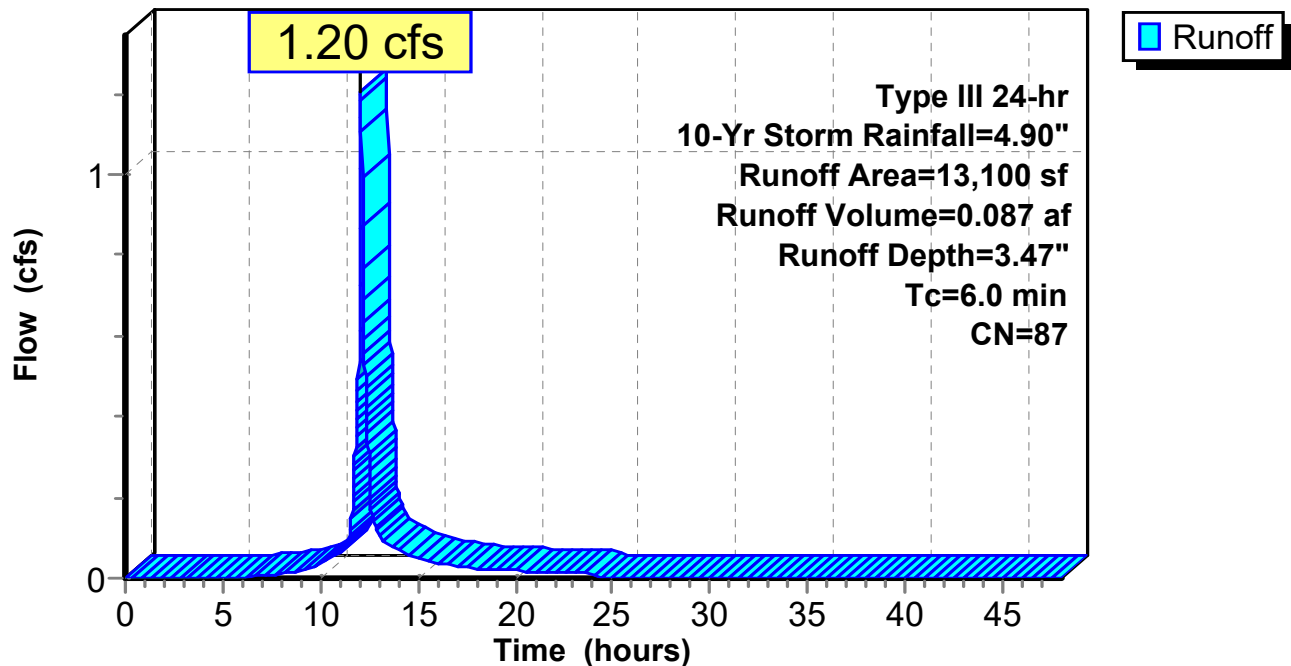
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.90"

Area (sf)	CN	Description
6,145	74	>75% Grass cover, Good, HSG C
* 6,955	98	New Road
13,100	87	Weighted Average
6,145		46.91% Pervious Area
6,955		53.09% Impervious Area

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

Subcatchment 12S:

Hydrograph



Summary for Subcatchment 13S:

Runoff = 1.71 cfs @ 12.09 hrs, Volume= 0.125 af, Depth= 3.57"

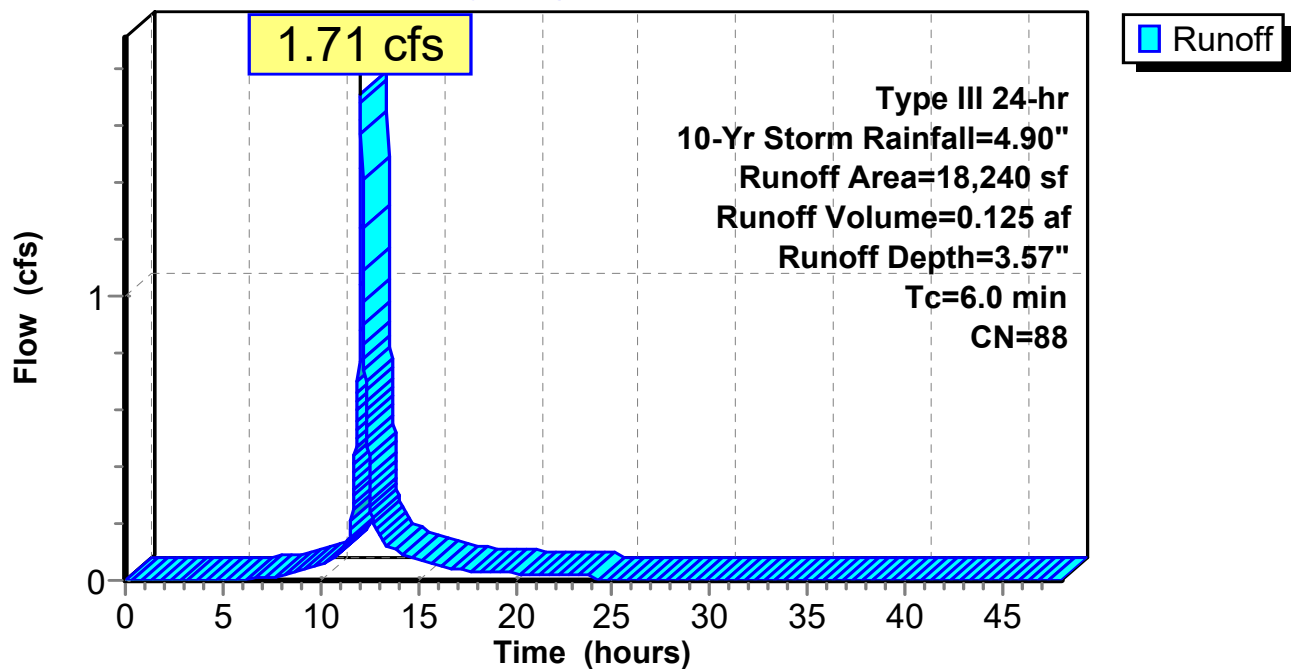
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.90"

Area (sf)	CN	Description
4,375	74	>75% Grass cover, Good, HSG C
4,375	80	>75% Grass cover, Good, HSG D
* 9,490	98	New Road
18,240	88	Weighted Average
8,750		47.97% Pervious Area
9,490		52.03% Impervious Area

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

Subcatchment 13S:

Hydrograph



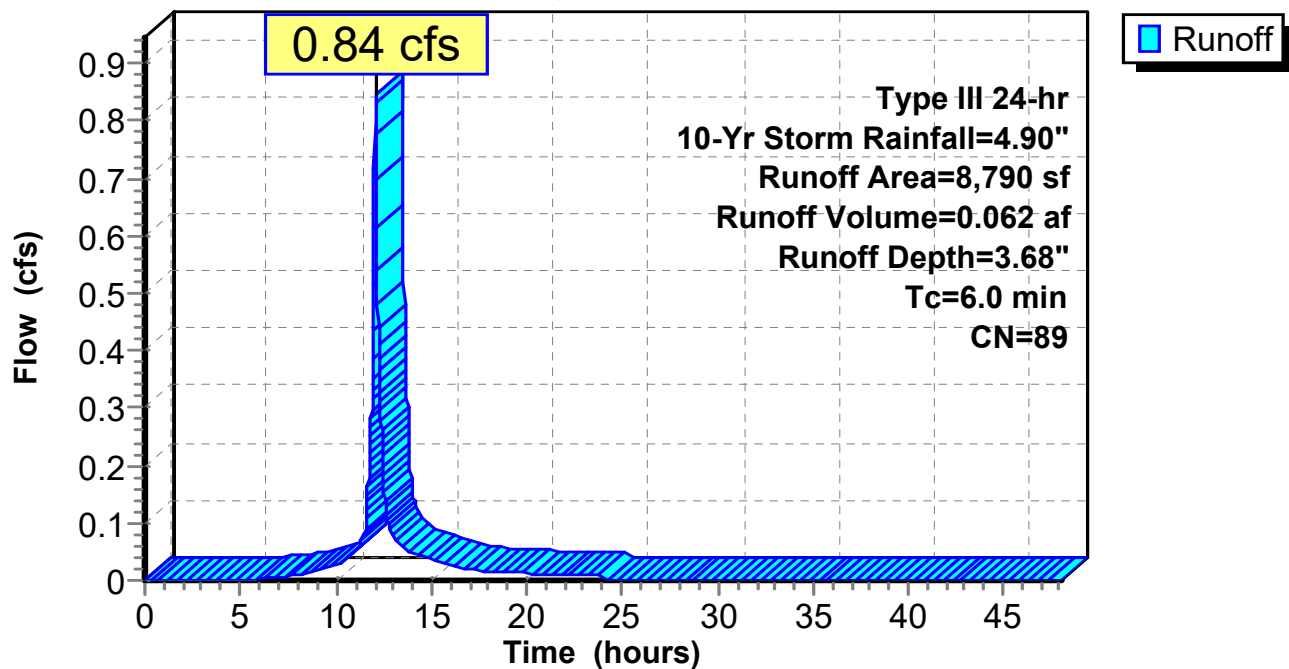
Summary for Subcatchment 14S:

Runoff = 0.84 cfs @ 12.09 hrs, Volume= 0.062 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.90"

Area (sf)	CN	Description
1,930	74	>75% Grass cover, Good, HSG C
1,930	80	>75% Grass cover, Good, HSG D
* 4,930	98	New Road
8,790	89	Weighted Average
3,860		43.91% Pervious Area
4,930		56.09% Impervious Area

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

Subcatchment 14S:**Hydrograph**

Summary for Subcatchment 20S:

Runoff = 3.26 cfs @ 12.56 hrs, Volume= 0.469 af, Depth= 2.37"

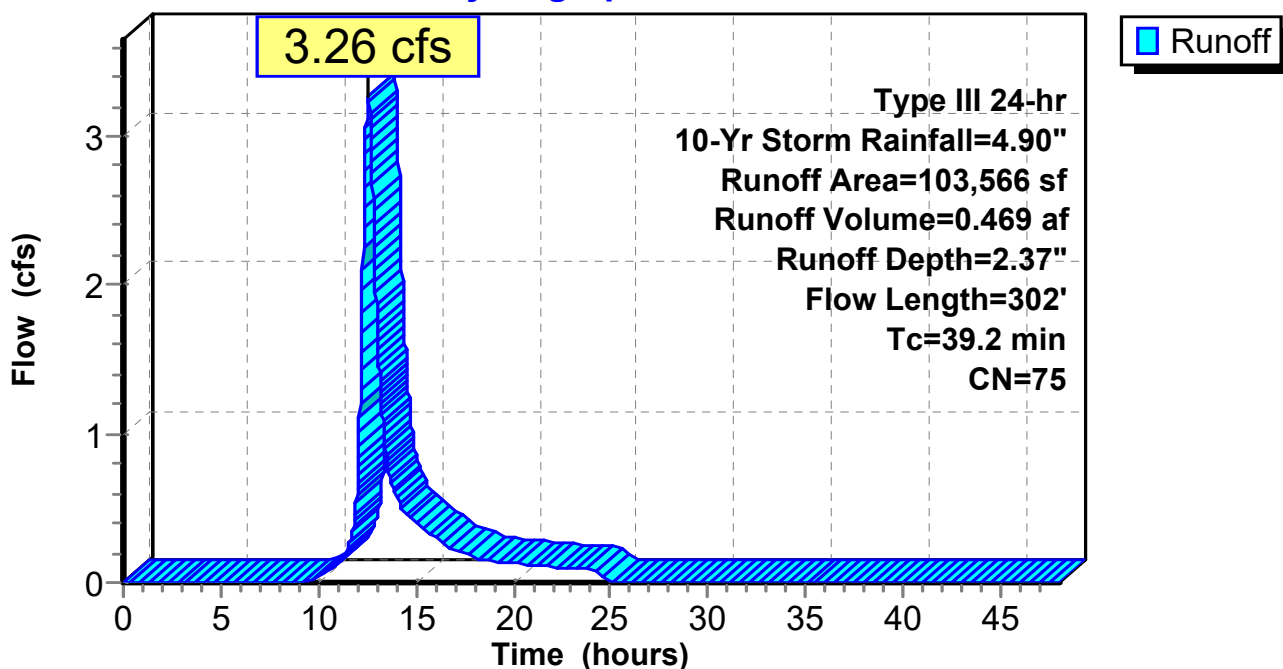
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Yr Storm Rainfall=4.90"

	Area (sf)	CN	Description
*	30,010	77	Woods, Good, HSG D (Wetlands)
	36,778	77	Woods, Good, HSG D
	29,278	70	Woods, Good, HSG C
*	2,500	98	Lot
	5,000	74	>75% Grass cover, Good, HSG C
	103,566	75	Weighted Average
	101,066		97.59% Pervious Area
	2,500		2.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.5	60	0.0050	0.04		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.30"
14.7	242	0.0030	0.27		Shallow Concentrated Flow, B-POA2 Woodland Kv= 5.0 fps
39.2	302	Total			

Subcatchment 20S:

Hydrograph



Summary for Reach 1R:

Inflow Area = 0.900 ac, 49.24% Impervious, Inflow Depth > 3.35" for 10-Yr Storm event
 Inflow = 2.25 cfs @ 12.19 hrs, Volume= 0.251 af
 Outflow = 1.67 cfs @ 12.58 hrs, Volume= 0.250 af, Atten= 26%, Lag= 23.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 0.62 fps, Min. Travel Time= 12.0 min
 Avg. Velocity = 0.17 fps, Avg. Travel Time= 43.7 min

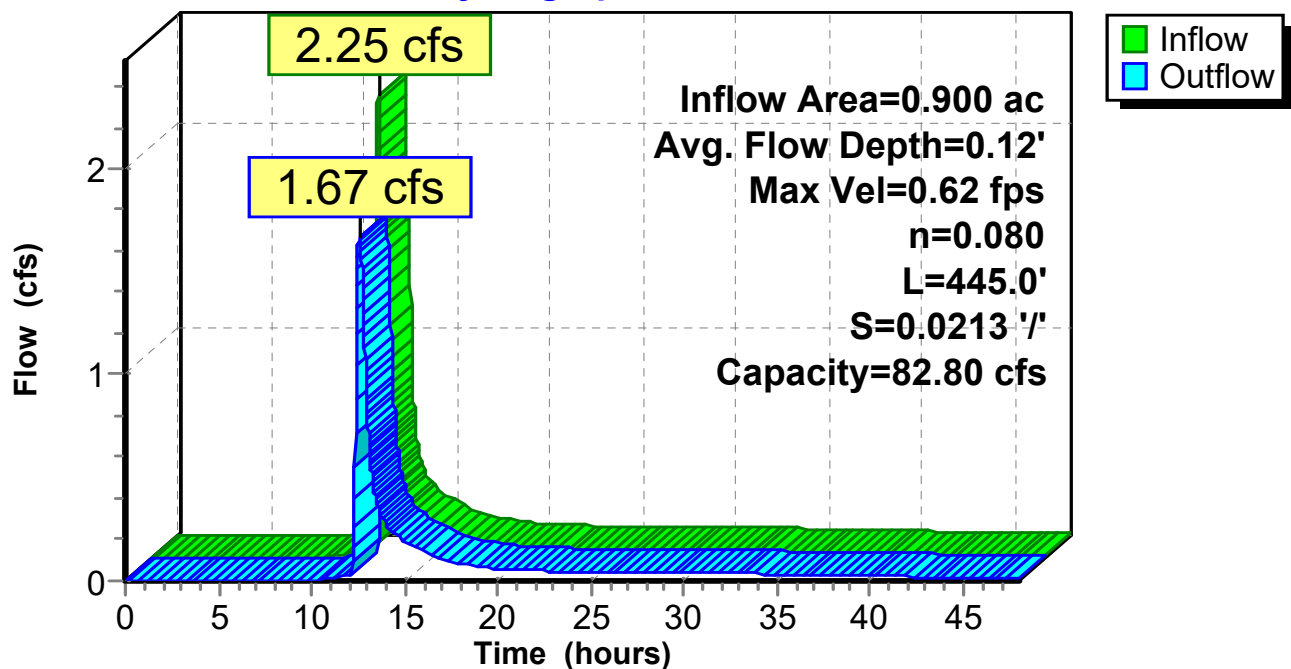
Peak Storage= 1,201 cf @ 12.38 hrs
 Average Depth at Peak Storage= 0.12'
 Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 82.80 cfs

20.00' x 1.00' deep channel, n= 0.080 Earth, long dense weeds
 Side Slope Z-value= 20.0 '/' Top Width= 60.00'
 Length= 445.0' Slope= 0.0213 '/'
 Inlet Invert= 67.50', Outlet Invert= 58.00'



Reach 1R:

Hydrograph



Summary for Reach 2&3R:

Inflow Area = 0.719 ac, 52.47% Impervious, Inflow Depth = 3.45" for 10-Yr Storm event
 Inflow = 1.34 cfs @ 12.22 hrs, Volume= 0.207 af
 Outflow = 0.44 cfs @ 13.39 hrs, Volume= 0.207 af, Atten= 67%, Lag= 70.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 0.28 fps, Min. Travel Time= 46.8 min
 Avg. Velocity = 0.12 fps, Avg. Travel Time= 108.6 min

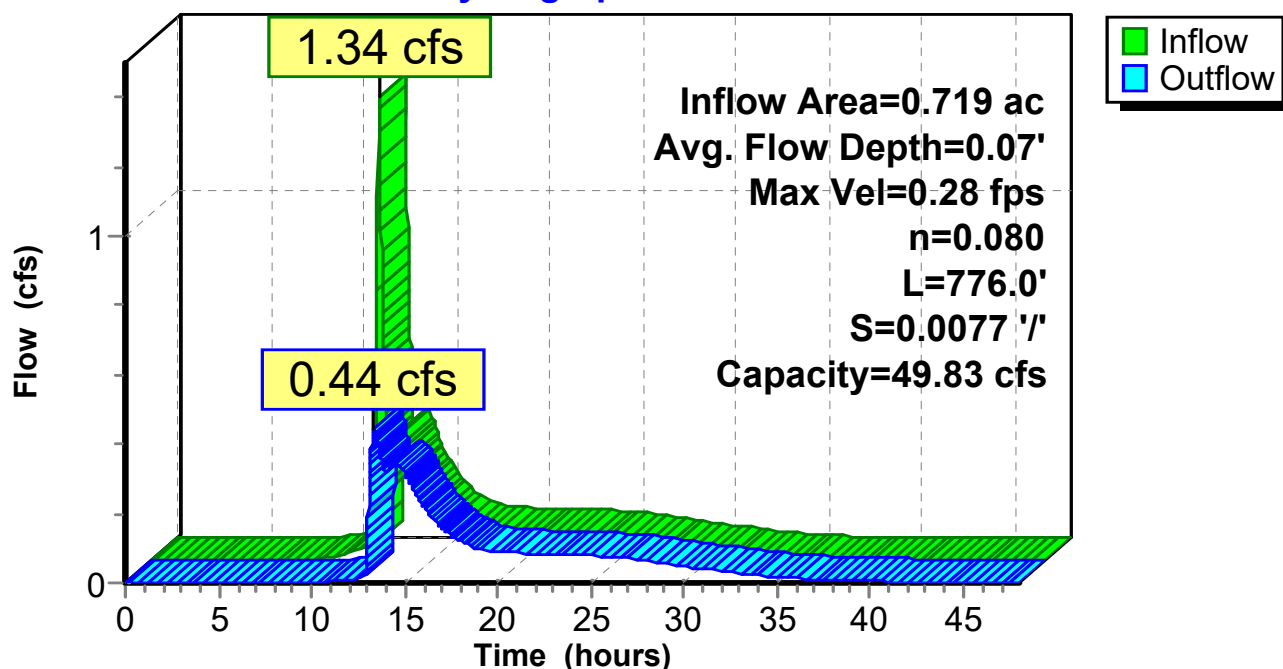
Peak Storage= 1,238 cf @ 12.61 hrs
 Average Depth at Peak Storage= 0.07'
 Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 49.83 cfs

20.00' x 1.00' deep channel, n= 0.080 Earth, long dense weeds
 Side Slope Z-value= 20.0 '/' Top Width= 60.00'
 Length= 776.0' Slope= 0.0077 '/'
 Inlet Invert= 64.00', Outlet Invert= 58.00'



Reach 2&3R:

Hydrograph



Summary for Reach 2R:

Inflow Area = 0.301 ac, 53.09% Impervious, Inflow Depth = 3.38" for 10-Yr Storm event
 Inflow = 0.86 cfs @ 12.17 hrs, Volume= 0.085 af
 Outflow = 0.25 cfs @ 13.48 hrs, Volume= 0.085 af, Atten= 71%, Lag= 79.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 0.23 fps, Min. Travel Time= 54.1 min
 Avg. Velocity = 0.10 fps, Avg. Travel Time= 127.2 min

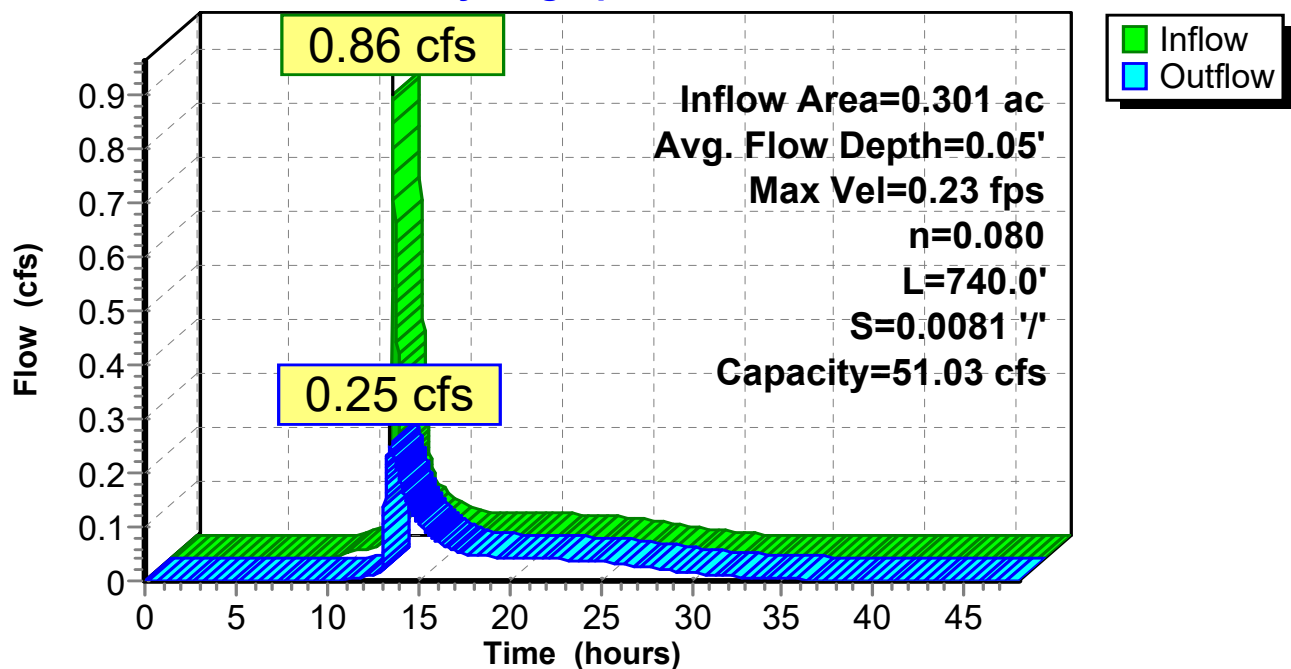
Peak Storage= 818 cf @ 12.58 hrs
 Average Depth at Peak Storage= 0.05'
 Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 51.03 cfs

20.00' x 1.00' deep channel, n= 0.080 Earth, long dense weeds
 Side Slope Z-value= 20.0 '/' Top Width= 60.00'
 Length= 740.0' Slope= 0.0081 '/'
 Inlet Invert= 70.00', Outlet Invert= 64.00'



Reach 2R:

Hydrograph



Summary for Reach 3R:

Inflow Area = 0.419 ac, 52.03% Impervious, Inflow Depth = 3.49" for 10-Yr Storm event
 Inflow = 1.40 cfs @ 12.14 hrs, Volume= 0.122 af
 Outflow = 1.34 cfs @ 12.21 hrs, Volume= 0.122 af, Atten= 4%, Lag= 3.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 0.69 fps, Min. Travel Time= 2.2 min
 Avg. Velocity = 0.19 fps, Avg. Travel Time= 8.0 min

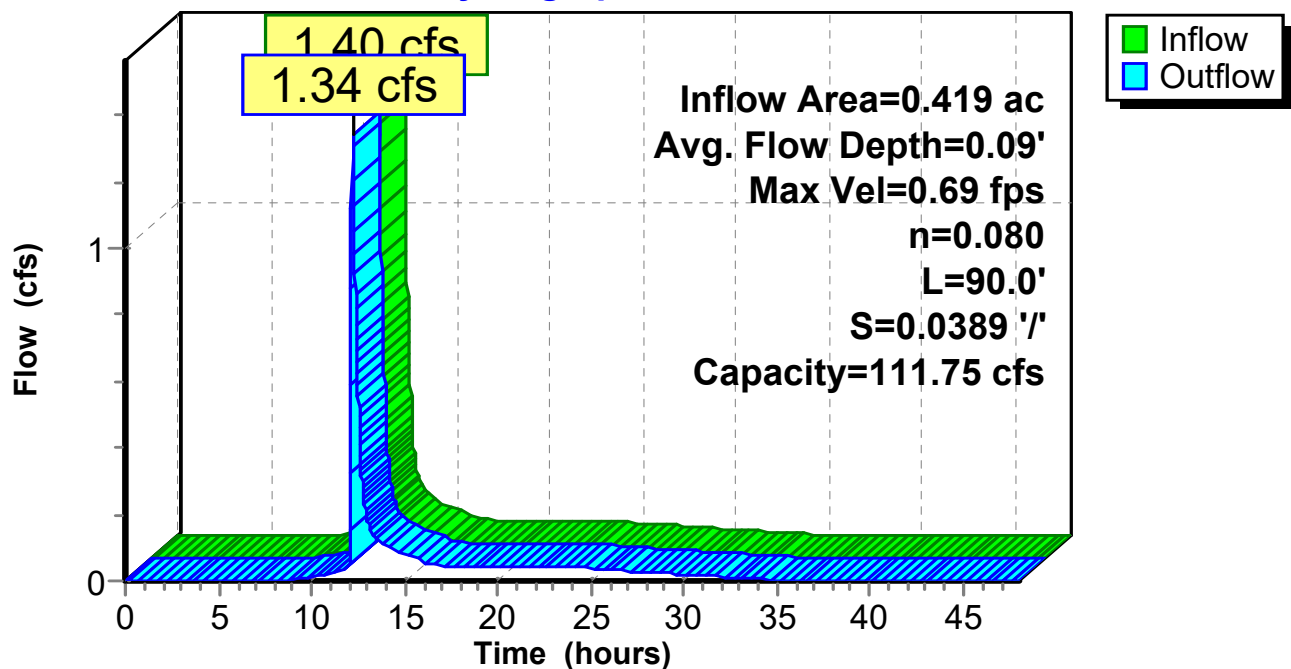
Peak Storage= 175 cf @ 12.17 hrs
 Average Depth at Peak Storage= 0.09'
 Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 111.75 cfs

20.00' x 1.00' deep channel, n= 0.080 Earth, long dense weeds
 Side Slope Z-value= 20.0 '/' Top Width= 60.00'
 Length= 90.0' Slope= 0.0389 '/'
 Inlet Invert= 68.50', Outlet Invert= 65.00'



Reach 3R:

Hydrograph



Summary for Reach 4R:

Inflow Area = 0.202 ac, 56.09% Impervious, Inflow Depth = 3.22" for 10-Yr Storm event
 Inflow = 0.30 cfs @ 12.36 hrs, Volume= 0.054 af
 Outflow = 0.09 cfs @ 13.97 hrs, Volume= 0.054 af, Atten= 68%, Lag= 96.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 0.16 fps, Min. Travel Time= 65.1 min
 Avg. Velocity = 0.10 fps, Avg. Travel Time= 108.4 min

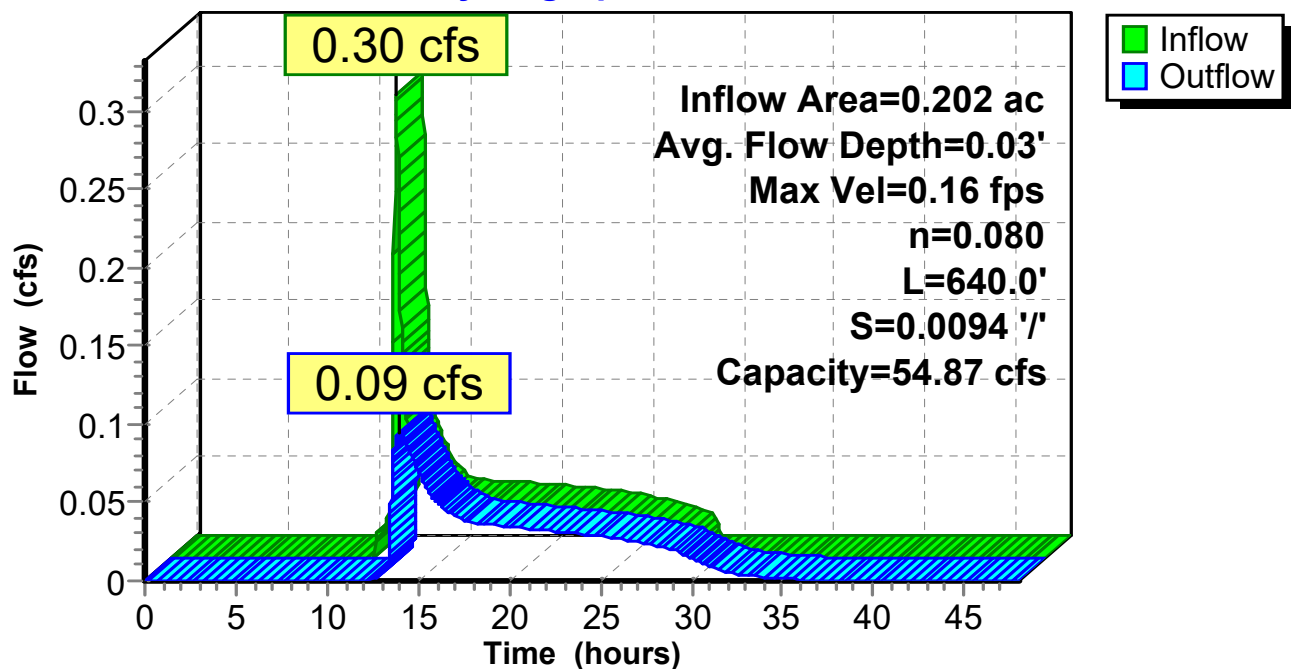
Peak Storage= 365 cf @ 12.89 hrs
 Average Depth at Peak Storage= 0.03'
 Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 54.87 cfs

20.00' x 1.00' deep channel, n= 0.080 Earth, long dense weeds
 Side Slope Z-value= 20.0 '/' Top Width= 60.00'
 Length= 640.0' Slope= 0.0094 '/'
 Inlet Invert= 64.00', Outlet Invert= 58.00'



Reach 4R:

Hydrograph



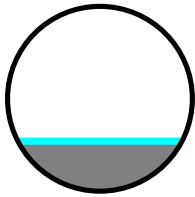
Summary for Reach PIPE: CULVERT

Inflow Area = 0.719 ac, 52.47% Impervious, Inflow Depth = 3.45" for 10-Yr Storm event
 Inflow = 1.35 cfs @ 12.21 hrs, Volume= 0.207 af
 Outflow = 1.34 cfs @ 12.22 hrs, Volume= 0.207 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 2.45 fps, Min. Travel Time= 0.2 min
 Avg. Velocity= 1.06 fps, Avg. Travel Time= 0.5 min

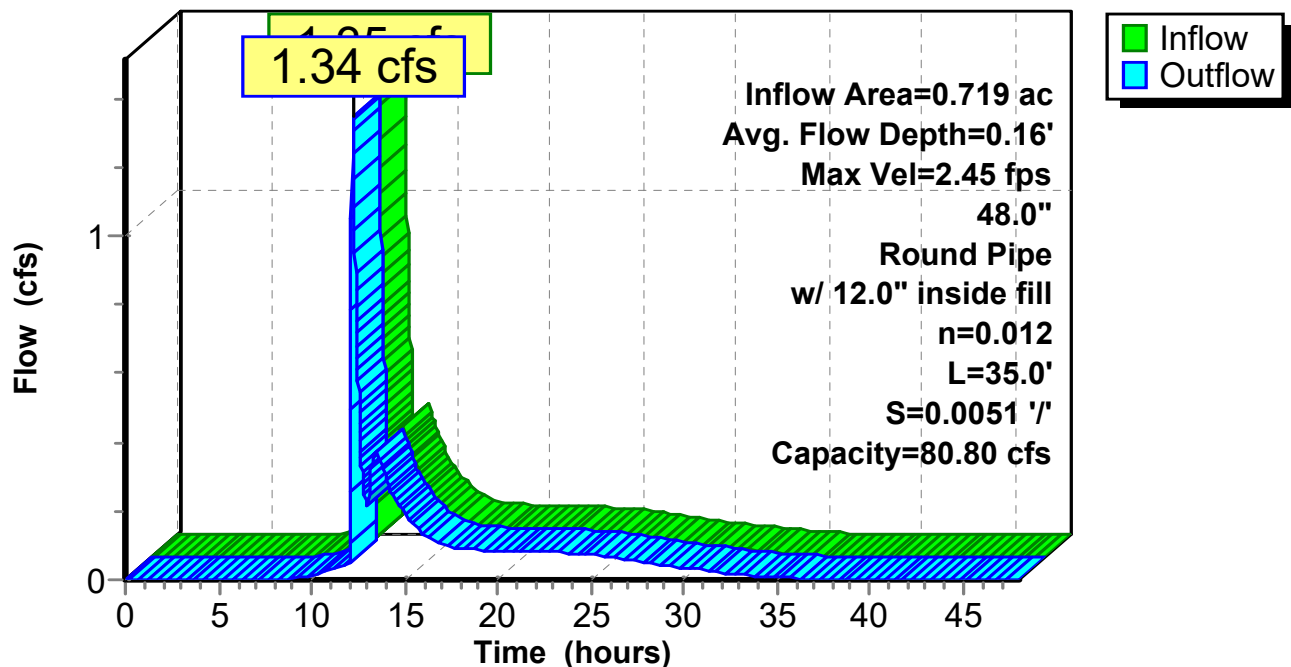
Peak Storage= 19 cf @ 12.21 hrs
 Average Depth at Peak Storage= 1.16' above invert (0.16' above fill)
 Bank-Full Depth= 4.00' above invert (3.00' above fill) Flow Area= 10.1 sf, Capacity= 80.80 cfs

48.0" Round Pipe w/ 12.0" inside fill
 n= 0.012 Corrugated PP, smooth interior
 Length= 35.0' Slope= 0.0051 '/
 Inlet Invert= 69.00', Outlet Invert= 68.82'



Reach PIPE: CULVERT

Hydrograph



Summary for Pond BF1: Bioretention Cell 1

Inflow Area = 0.900 ac, 49.24% Impervious, Inflow Depth = 3.47" for 10-Yr Storm event
 Inflow = 3.60 cfs @ 12.09 hrs, Volume= 0.260 af
 Outflow = 2.25 cfs @ 12.19 hrs, Volume= 0.251 af, Atten= 37%, Lag= 6.0 min
 Primary = 1.85 cfs @ 12.19 hrs, Volume= 0.246 af
 Secondary = 0.40 cfs @ 12.19 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 66.97' @ 12.19 hrs Surf.Area= 2,568 sf Storage= 4,005 cf

Plug-Flow detention time= 335.9 min calculated for 0.251 af (96% of inflow)
 Center-of-Mass det. time= 316.1 min (1,118.0 - 802.0)

Volume	Invert	Avail.Storage	Storage Description
#1	63.50'	4,080 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
63.50	1,998	0.0	0	0
64.50	1,998	40.0	799	799
66.00	1,998	33.0	989	1,788
67.00	2,585	100.0	2,292	4,080

Device	Routing	Invert	Outlet Devices
#1	Primary	63.83'	12.0" Round Culvert L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.83' / 63.33' S= 0.0250 ' S= 0.0250 ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	63.83'	1.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	66.50'	10.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	66.85'	4.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=1.85 cfs @ 12.19 hrs HW=66.97' (Free Discharge)

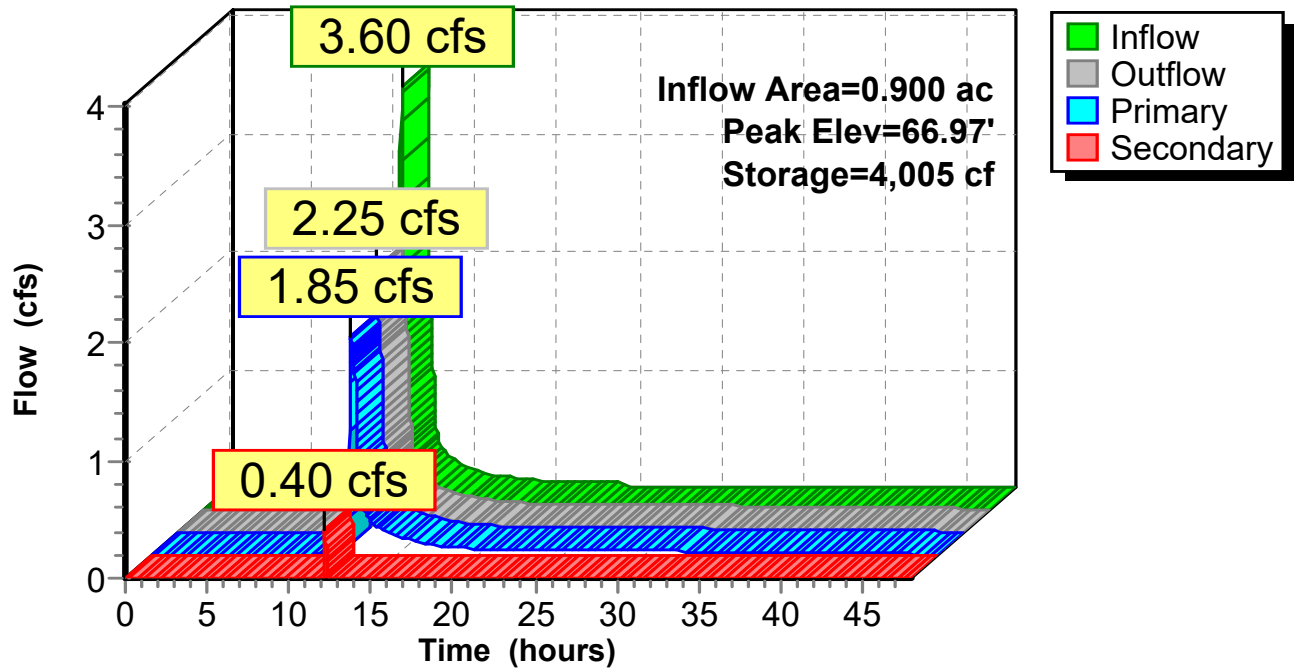
↑ **1=Culvert** (Passes 1.85 cfs of 4.85 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 8.48 fps)
 ↑ **3=Orifice/Grate** (Orifice Controls 1.80 cfs @ 3.30 fps)

Secondary OutFlow Max=0.40 cfs @ 12.19 hrs HW=66.97' (Free Discharge)

↑ **4=Broad-Crested Rectangular Weir** (Weir Controls 0.40 cfs @ 0.83 fps)

Pond BF1: Bioretention Cell 1

Hydrograph



Summary for Pond BF2: Bioretention Cell 2

Inflow Area = 0.301 ac, 53.09% Impervious, Inflow Depth = 3.47" for 10-Yr Storm event
 Inflow = 1.20 cfs @ 12.09 hrs, Volume= 0.087 af
 Outflow = 0.86 cfs @ 12.17 hrs, Volume= 0.085 af, Atten= 28%, Lag= 4.8 min
 Primary = 0.86 cfs @ 12.17 hrs, Volume= 0.085 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 73.21' @ 12.17 hrs Surf.Area= 1,002 sf Storage= 1,269 cf

Plug-Flow detention time= 207.1 min calculated for 0.085 af (97% of inflow)
 Center-of-Mass det. time= 192.2 min (994.2 - 802.0)

Volume	Invert	Avail.Storage	Storage Description	
#1	70.00'	2,190 cf	Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
70.00	733	0.0	0	0
71.00	733	40.0	293	293
72.50	733	33.0	363	656
73.00	917	100.0	413	1,069
74.00	1,326	100.0	1,122	2,190

Device	Routing	Invert	Outlet Devices
#1	Primary	70.33'	12.0" Round Culvert L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 70.33' / 70.29' S= 0.0057 ' S= 0.0057 ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	70.33'	1.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	73.00'	10.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	73.50'	4.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.85 cfs @ 12.17 hrs HW=73.21' (Free Discharge)

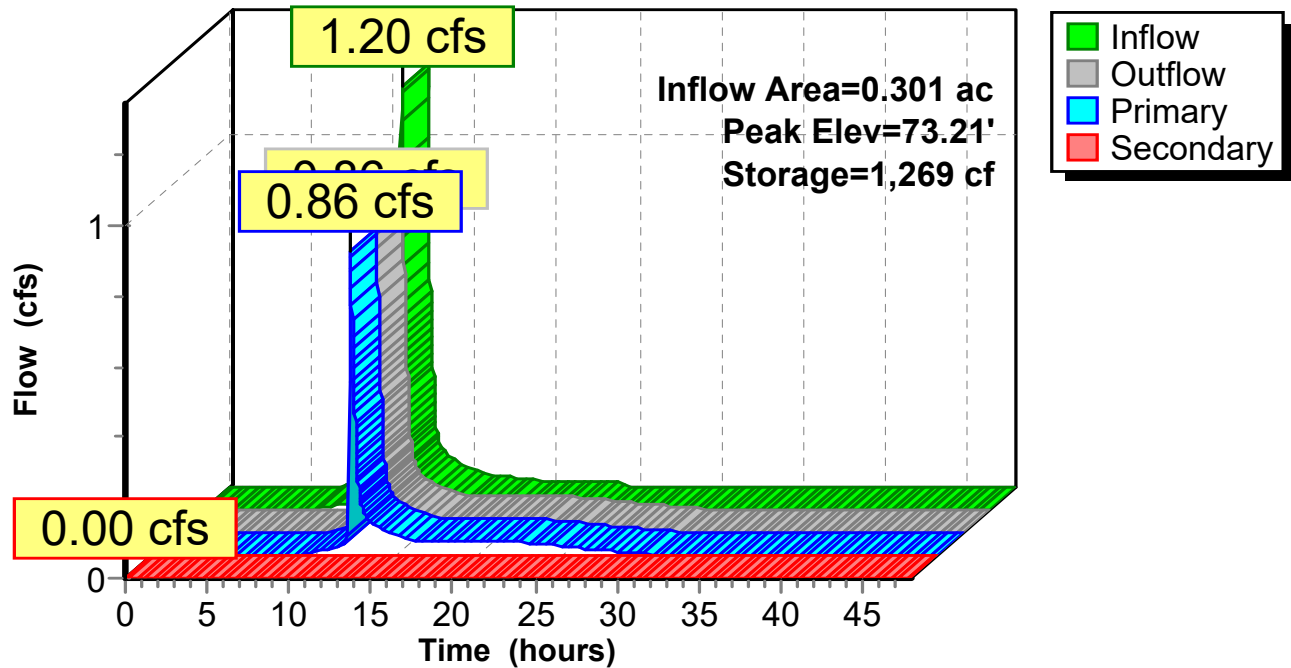
1=Culvert (Passes 0.85 cfs of 4.60 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.04 cfs @ 8.11 fps)
 3=Orifice/Grate (Weir Controls 0.81 cfs @ 1.49 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=70.00' (Free Discharge)

4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond BF2: Bioretention Cell 2

Hydrograph



Summary for Pond BF3: Bioretention Cell 3

Inflow Area = 0.419 ac, 52.03% Impervious, Inflow Depth = 3.57" for 10-Yr Storm event
 Inflow = 1.71 cfs @ 12.09 hrs, Volume= 0.125 af
 Outflow = 1.40 cfs @ 12.14 hrs, Volume= 0.122 af, Atten= 18%, Lag= 3.5 min
 Primary = 1.40 cfs @ 12.14 hrs, Volume= 0.122 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 67.79' @ 12.14 hrs Surf.Area= 1,233 sf Storage= 1,688 cf

Plug-Flow detention time= 224.1 min calculated for 0.122 af (98% of inflow)
 Center-of-Mass det. time= 210.4 min (1,009.0 - 798.6)

Volume	Invert	Avail.Storage	Storage Description
#1	64.50'	1,951 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
64.50	928	0.0	0	0
65.50	928	40.0	371	371
67.00	928	33.0	459	831
68.00	1,313	100.0	1,121	1,951

Device	Routing	Invert	Outlet Devices
#1	Primary	64.83'	12.0" Round Culvert L= 34.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 64.83' / 64.66' S= 0.0050 ' S= 0.0050 ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	64.83'	1.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	67.50'	10.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	67.83'	4.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=1.40 cfs @ 12.14 hrs HW=67.79' (Free Discharge)

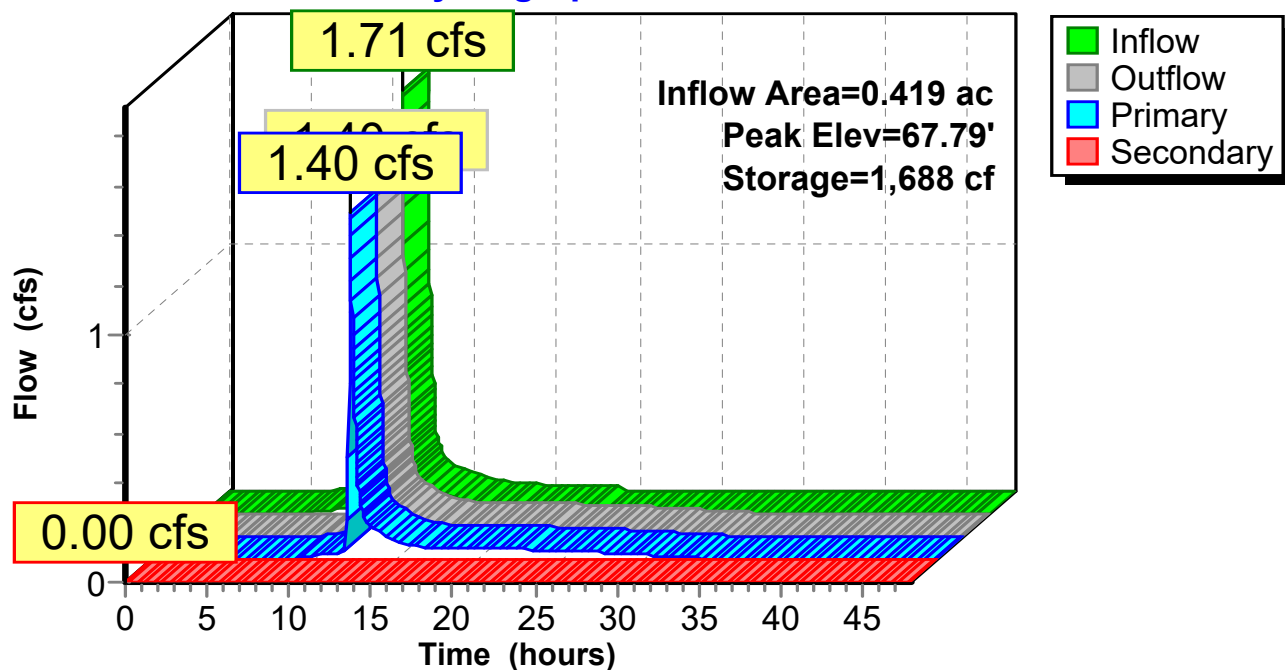
↑ **1=Culvert** (Passes 1.40 cfs of 4.69 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 8.23 fps)
 ↑ **3=Orifice/Grate** (Weir Controls 1.35 cfs @ 1.77 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=64.50' (Free Discharge)

↑ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond BF3: Bioretention Cell 3

Hydrograph



Summary for Pond C: GOOSE ROCKS ROAD

Inflow Area = 99.429 ac, 2.77% Impervious, Inflow Depth > 2.30" for 10-Yr Storm event
 Inflow = 73.17 cfs @ 13.43 hrs, Volume= 19.095 af
 Outflow = 76.82 cfs @ 13.44 hrs, Volume= 17.502 af, Atten= 0%, Lag= 0.4 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 76.82 cfs @ 13.44 hrs, Volume= 17.502 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 61.23' @ 13.44 hrs Surf.Area= 75,320 sf Storage= 96,625 cf

Plug-Flow detention time= 74.3 min calculated for 17.494 af (92% of inflow)
 Center-of-Mass det. time= 28.8 min (962.8 - 934.0)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	96,625 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.00	7,230	0	0
59.00	16,340	11,785	11,785
60.00	39,010	27,675	39,460
61.00	75,320	57,165	96,625

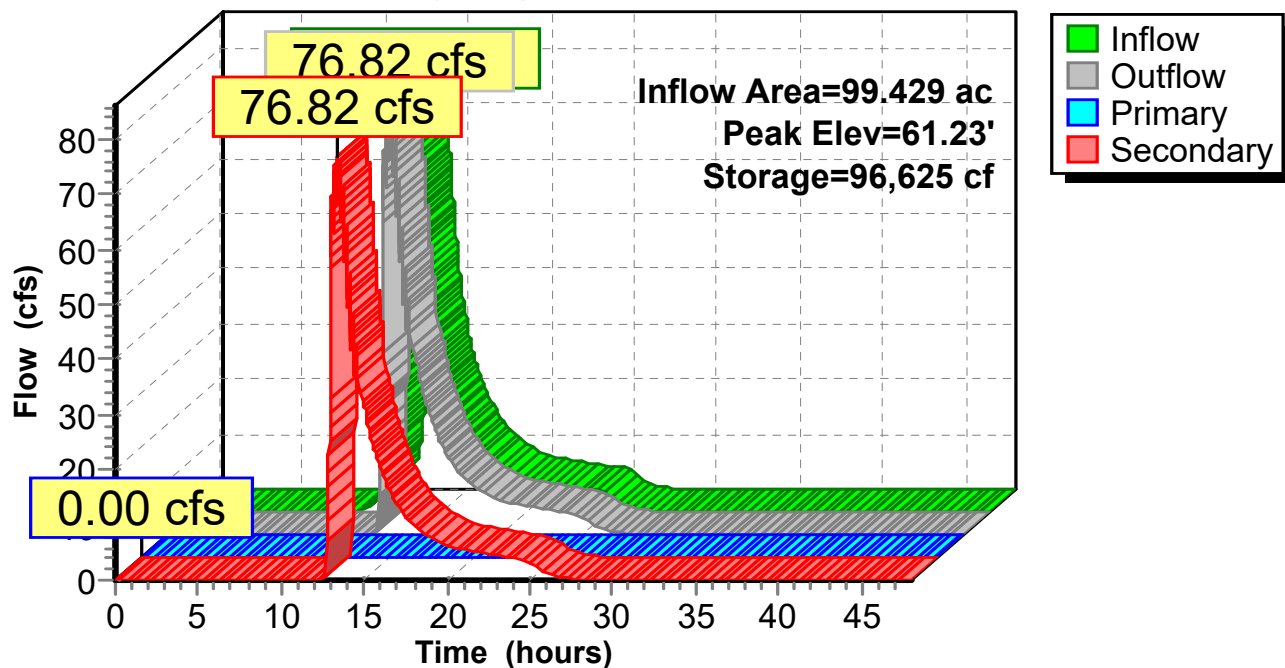
Device	Routing	Invert	Outlet Devices
#1	Primary	258.00'	30.0" Round Culvert w/ 6.0" inside fill L= 50.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 257.50' / 256.50' S= 0.0200 ' S Cc= 0.900 n= 0.021 Corrugated metal, Flow Area= 4.21 sf
#2	Secondary	60.60'	50.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=58.00' (Free Discharge)

↑1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=67.02 cfs @ 13.44 hrs HW=61.23' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Weir Controls 67.02 cfs @ 2.13 fps)

Pond C: GOOSE ROCKS ROAD**Hydrograph**

Summary for Pond GW1: Gravel Wetland 1

Inflow Area = 0.202 ac, 56.09% Impervious, Inflow Depth = 3.68" for 10-Yr Storm event
 Inflow = 0.84 cfs @ 12.09 hrs, Volume= 0.062 af
 Outflow = 0.30 cfs @ 12.36 hrs, Volume= 0.054 af, Atten= 65%, Lag= 16.5 min
 Primary = 0.30 cfs @ 12.36 hrs, Volume= 0.054 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Starting Elev= 21.17' Surf.Area= 0 sf Storage= 0 cf

Peak Elev= 70.60' @ 12.36 hrs Surf.Area= 949 sf Storage= 1,314 cf

Plug-Flow detention time= 326.9 min calculated for 0.054 af (88% of inflow)

Center-of-Mass det. time= 270.4 min (1,065.5 - 795.1)

Volume	Invert	Avail.Storage	Storage Description
#1	65.83'	1,739 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.83	325	0.0	0	0
67.83	325	40.0	260	260
68.33	325	35.0	57	317
69.00	325	15.0	33	350
70.00	651	100.0	488	838
70.50	900	100.0	388	1,225
71.00	1,155	100.0	514	1,739

Device	Routing	Invert	Outlet Devices
#1	Primary	68.67'	12.0" Round Culvert L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.67' / 68.56' S= 0.0050 ' / ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	65.83'	1.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	70.50'	10.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	71.00'	130.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.29 cfs @ 12.36 hrs HW=70.60' (Free Discharge)

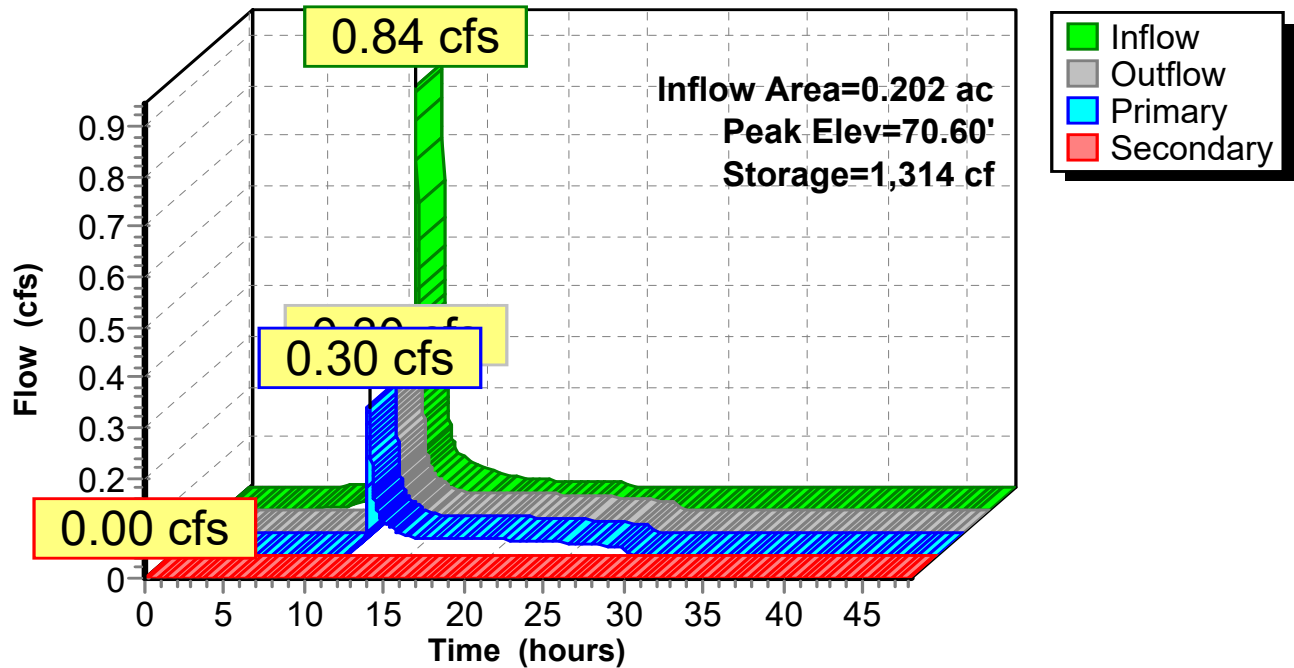
1=Culvert (Passes 0.29 cfs of 3.57 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.04 cfs @ 6.68 fps)
 3=Orifice/Grate (Weir Controls 0.26 cfs @ 1.01 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=65.83' (Free Discharge)

4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond GW1: Gravel Wetland 1

Hydrograph



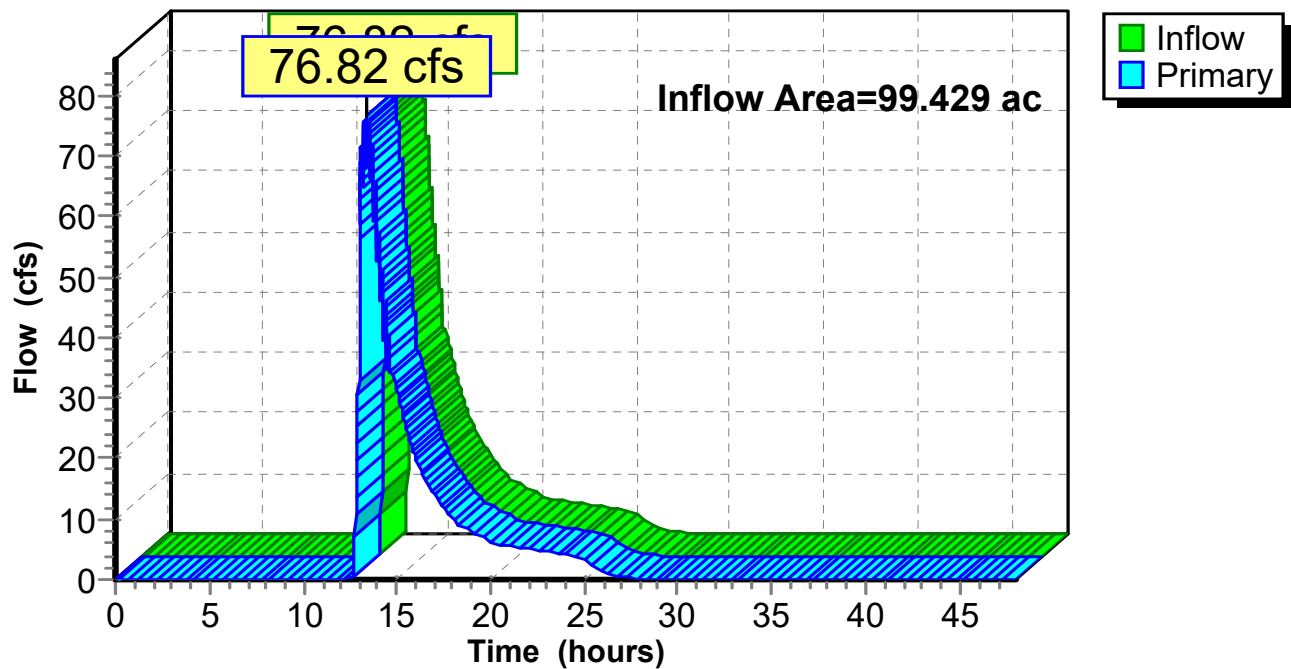
Summary for Link POA1:

Inflow Area = 99.429 ac, 2.77% Impervious, Inflow Depth > 2.11" for 10-Yr Storm event
 Inflow = 76.82 cfs @ 13.44 hrs, Volume= 17.502 af
 Primary = 76.82 cfs @ 13.44 hrs, Volume= 17.502 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Link POA1:

Hydrograph

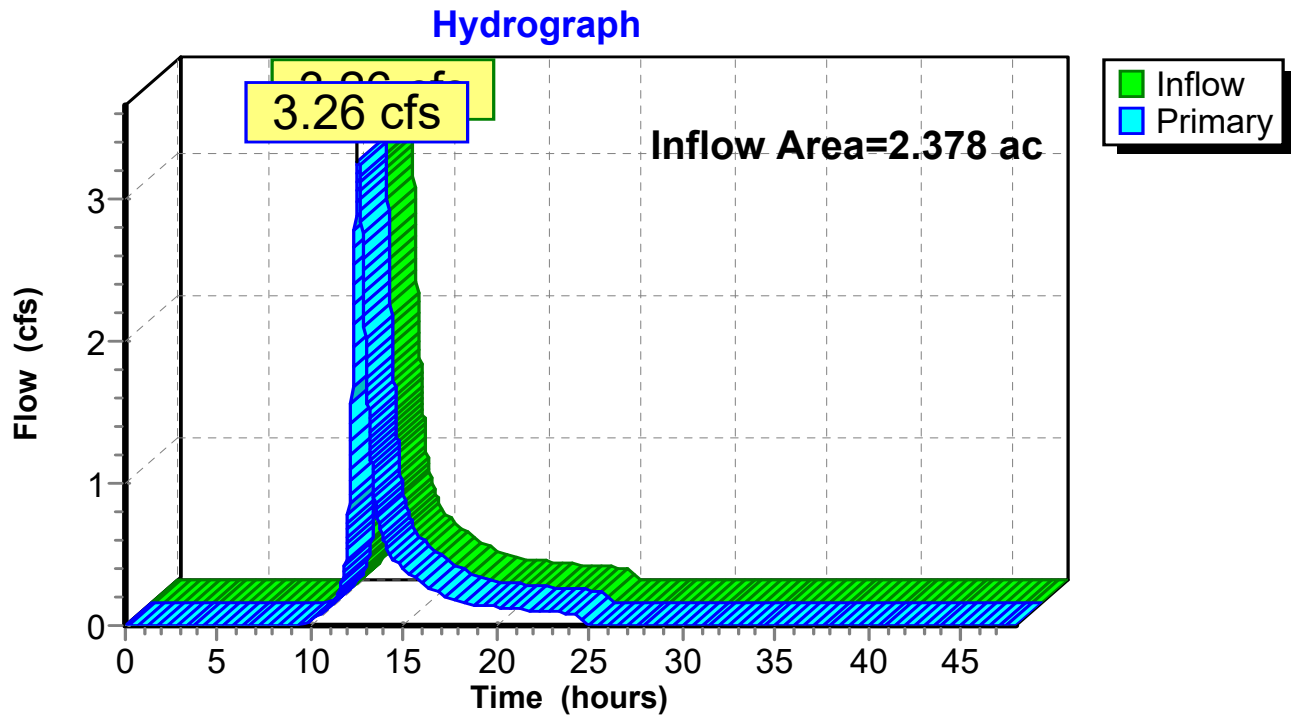


Summary for Link POA2:

Inflow Area = 2.378 ac, 2.41% Impervious, Inflow Depth = 2.37" for 10-Yr Storm event
 Inflow = 3.26 cfs @ 12.56 hrs, Volume= 0.469 af
 Primary = 3.26 cfs @ 12.56 hrs, Volume= 0.469 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Link POA2:



Summary for Subcatchment 10S:

Runoff = 107.08 cfs @ 13.34 hrs, Volume= 27.280 af, Depth= 3.35"

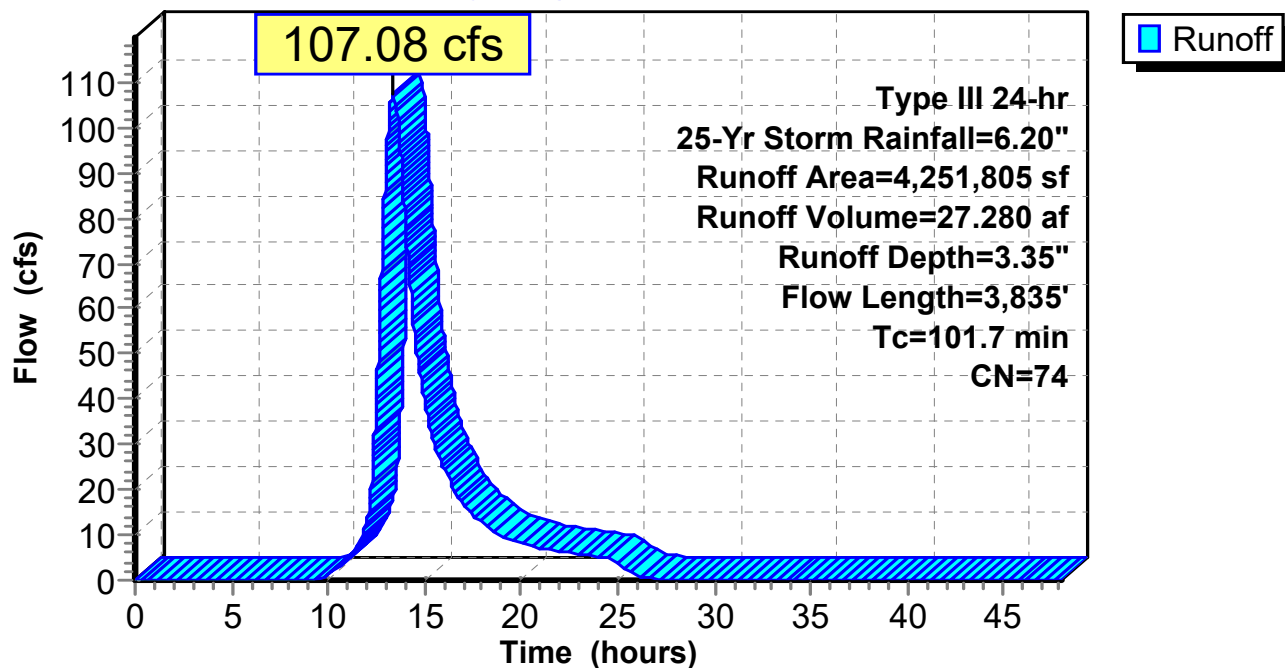
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Yr Storm Rainfall=6.20"

Area (sf)	CN	Description
438,403	70	Woods, Good, HSG C
* 960,471	77	Woods, Good, HSG D
* 679,545	79	Woods, Fair, HSG D (O/S)
* 1,929,660	70	Woods, Good, HSG C (O/S)
* 77,660	77	Woods, Good, HSG D (O/S)
* 6,978	74	>75% Grass cover, Good, HSG C (Road)
* 6,978	80	>75% Grass cover, Good, HSG D (Road)
* 36,500	74	>75% Grass cover, Good, HSG C (Lawn)
* 36,500	80	>75% Grass cover, Good, HSG D (Lawn)
* 33,000	98	Unconnected roofs, HSG C and driveway
* 33,000	98	Unconnected roofs, HSG D and driveway
* 13,110	98	Road HSG D
4,251,805	74	Weighted Average
4,172,695		98.14% Pervious Area
79,110		1.86% Impervious Area
66,000		83.43% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.8	100	0.0050	0.05		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.30"
29.4	1,675	0.0360	0.95		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
21.2	450	0.0050	0.35		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
14.3	1,610	0.0070	1.88	75.31	Channel Flow, D-E STREAM CHANNEL Area= 40.0 sf Perim= 30.0' r= 1.33' n= 0.080 Earth, long dense weeds
101.7	3,835	Total			

Subcatchment 10S:

Hydrograph



Summary for Subcatchment 11S:

Runoff = 4.81 cfs @ 12.09 hrs, Volume= 0.353 af, Depth= 4.71"

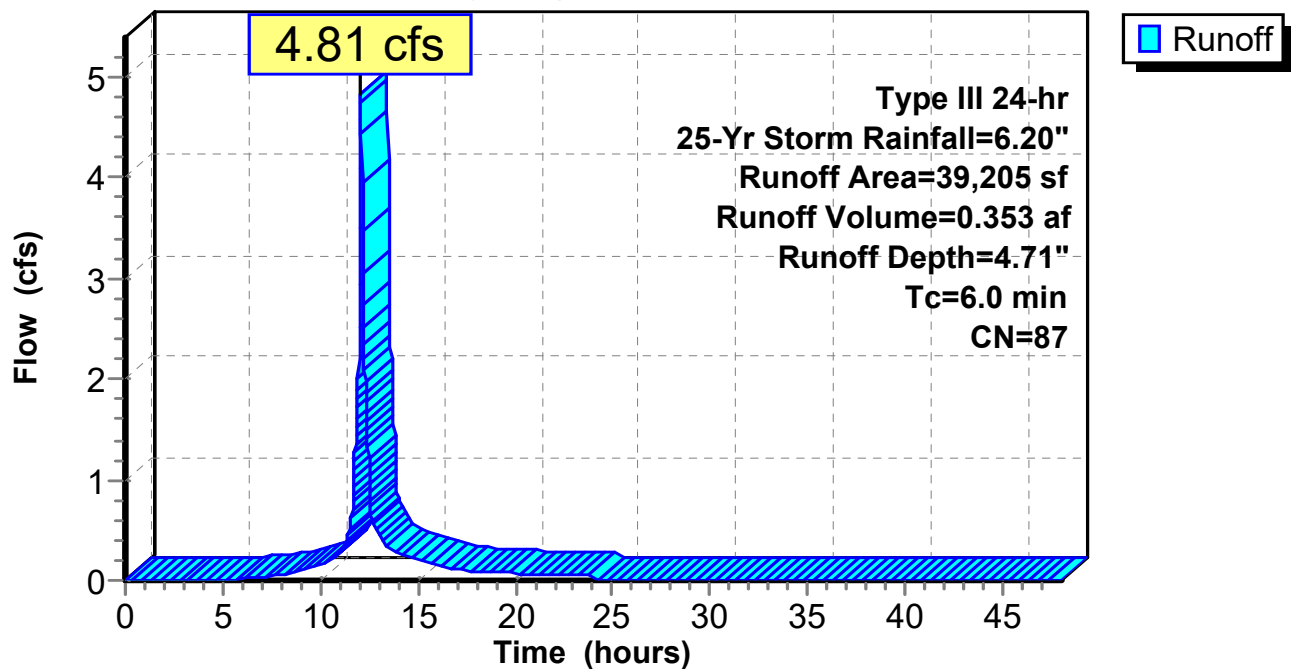
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Yr Storm Rainfall=6.20"

	Area (sf)	CN	Description
*	19,305	98	New Road
	9,950	74	>75% Grass cover, Good, HSG C
	9,950	80	>75% Grass cover, Good, HSG D
	39,205	87	Weighted Average
	19,900		50.76% Pervious Area
	19,305		49.24% Impervious Area

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

Subcatchment 11S:

Hydrograph



Summary for Subcatchment 12S:

Runoff = 1.61 cfs @ 12.09 hrs, Volume= 0.118 af, Depth= 4.71"

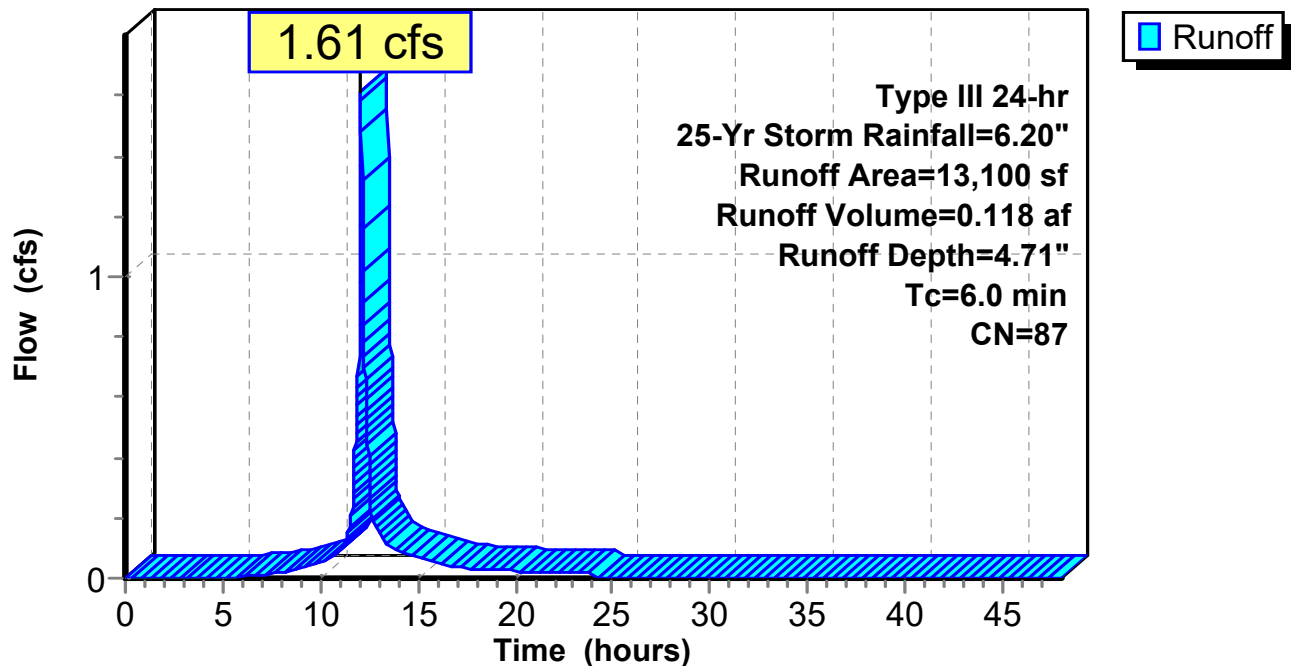
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Yr Storm Rainfall=6.20"

Area (sf)	CN	Description
6,145	74	>75% Grass cover, Good, HSG C
* 6,955	98	New Road
13,100	87	Weighted Average
6,145		46.91% Pervious Area
6,955		53.09% Impervious Area

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

Subcatchment 12S:

Hydrograph



Summary for Subcatchment 13S:

Runoff = 2.28 cfs @ 12.09 hrs, Volume= 0.168 af, Depth= 4.82"

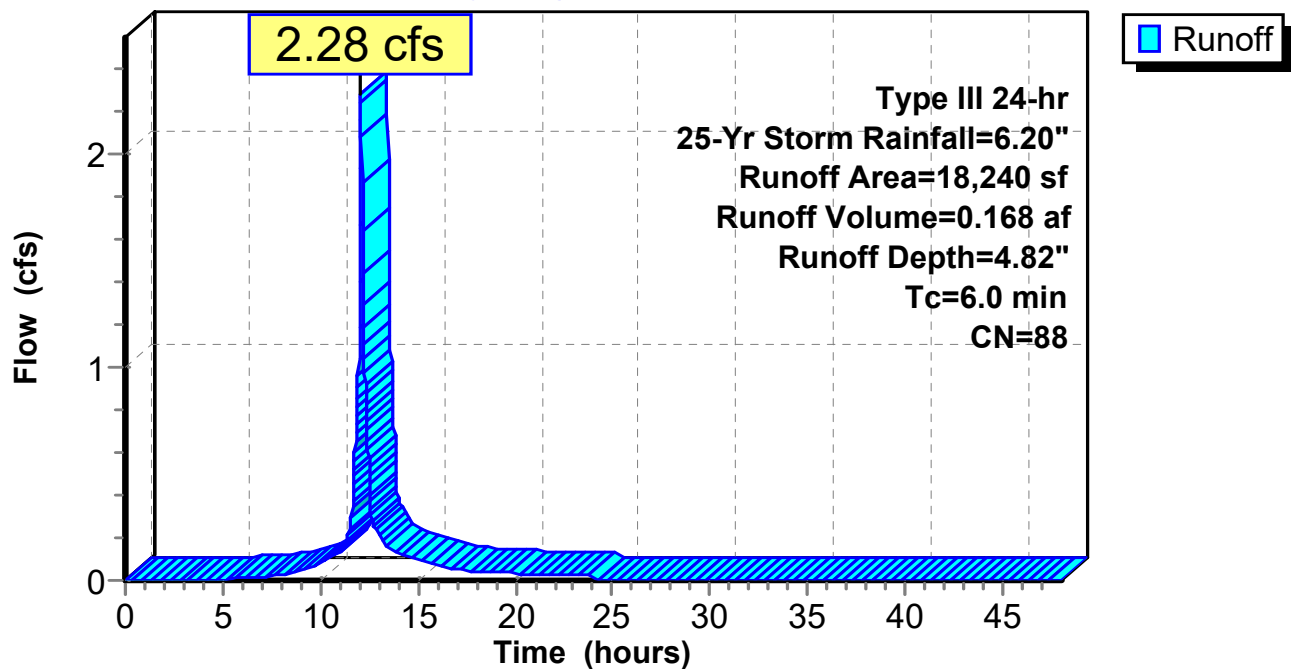
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Yr Storm Rainfall=6.20"

Area (sf)	CN	Description
4,375	74	>75% Grass cover, Good, HSG C
4,375	80	>75% Grass cover, Good, HSG D
* 9,490	98	New Road
18,240	88	Weighted Average
8,750		47.97% Pervious Area
9,490		52.03% Impervious Area

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

Subcatchment 13S:

Hydrograph



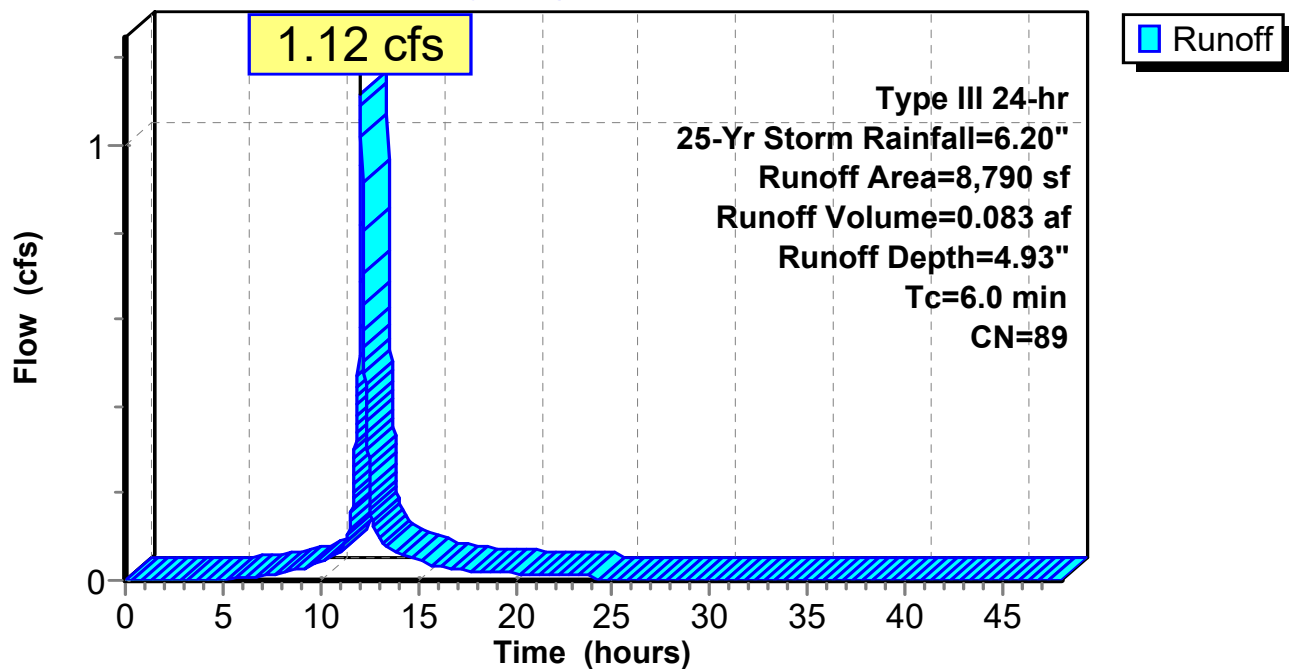
Summary for Subcatchment 14S:

Runoff = 1.12 cfs @ 12.08 hrs, Volume= 0.083 af, Depth= 4.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Yr Storm Rainfall=6.20"

Area (sf)	CN	Description
1,930	74	>75% Grass cover, Good, HSG C
1,930	80	>75% Grass cover, Good, HSG D
* 4,930	98	New Road
8,790	89	Weighted Average
3,860		43.91% Pervious Area
4,930		56.09% Impervious Area

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

Subcatchment 14S:**Hydrograph**

Summary for Subcatchment 20S:

Runoff = 4.78 cfs @ 12.54 hrs, Volume= 0.684 af, Depth= 3.45"

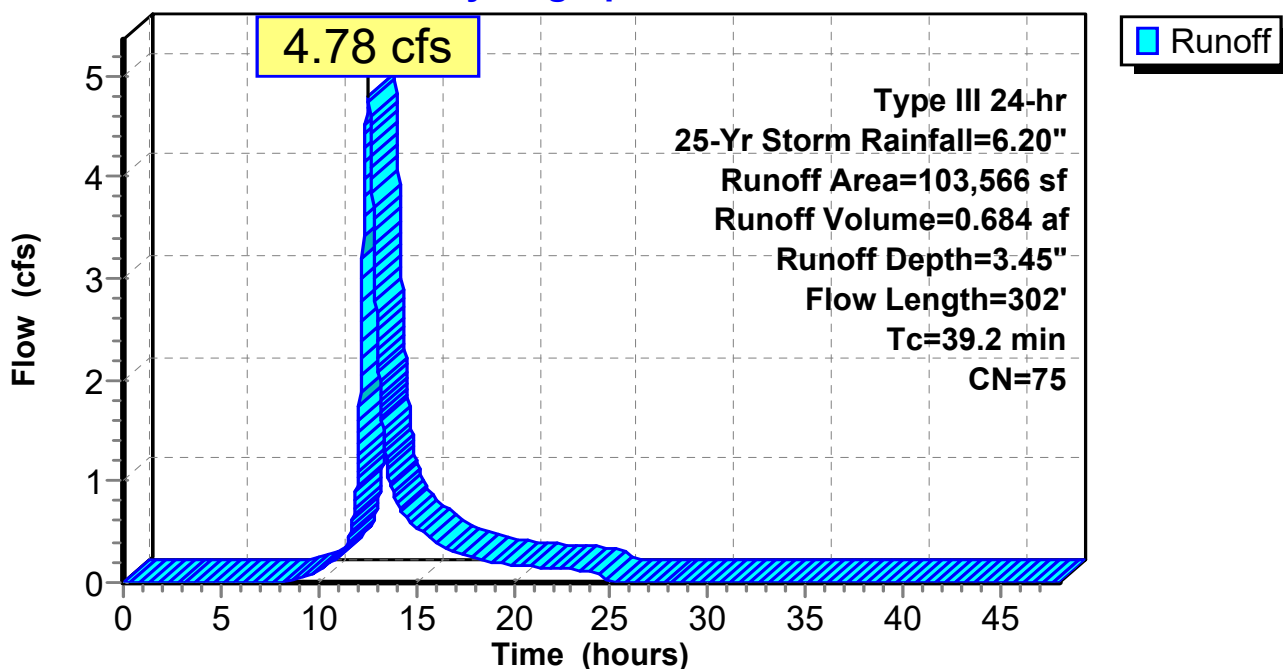
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Yr Storm Rainfall=6.20"

	Area (sf)	CN	Description
*	30,010	77	Woods, Good, HSG D (Wetlands)
	36,778	77	Woods, Good, HSG D
	29,278	70	Woods, Good, HSG C
*	2,500	98	Lot
	5,000	74	>75% Grass cover, Good, HSG C
	103,566	75	Weighted Average
	101,066		97.59% Pervious Area
	2,500		2.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.5	60	0.0050	0.04		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.30"
14.7	242	0.0030	0.27		Shallow Concentrated Flow, B-POA2 Woodland Kv= 5.0 fps
39.2	302	Total			

Subcatchment 20S:

Hydrograph



Summary for Reach 1R:

Inflow Area = 0.900 ac, 49.24% Impervious, Inflow Depth > 4.58" for 25-Yr Storm event
 Inflow = 6.70 cfs @ 12.08 hrs, Volume= 0.344 af
 Outflow = 2.94 cfs @ 12.35 hrs, Volume= 0.343 af, Atten= 56%, Lag= 16.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 0.75 fps, Min. Travel Time= 9.8 min
 Avg. Velocity = 0.18 fps, Avg. Travel Time= 41.6 min

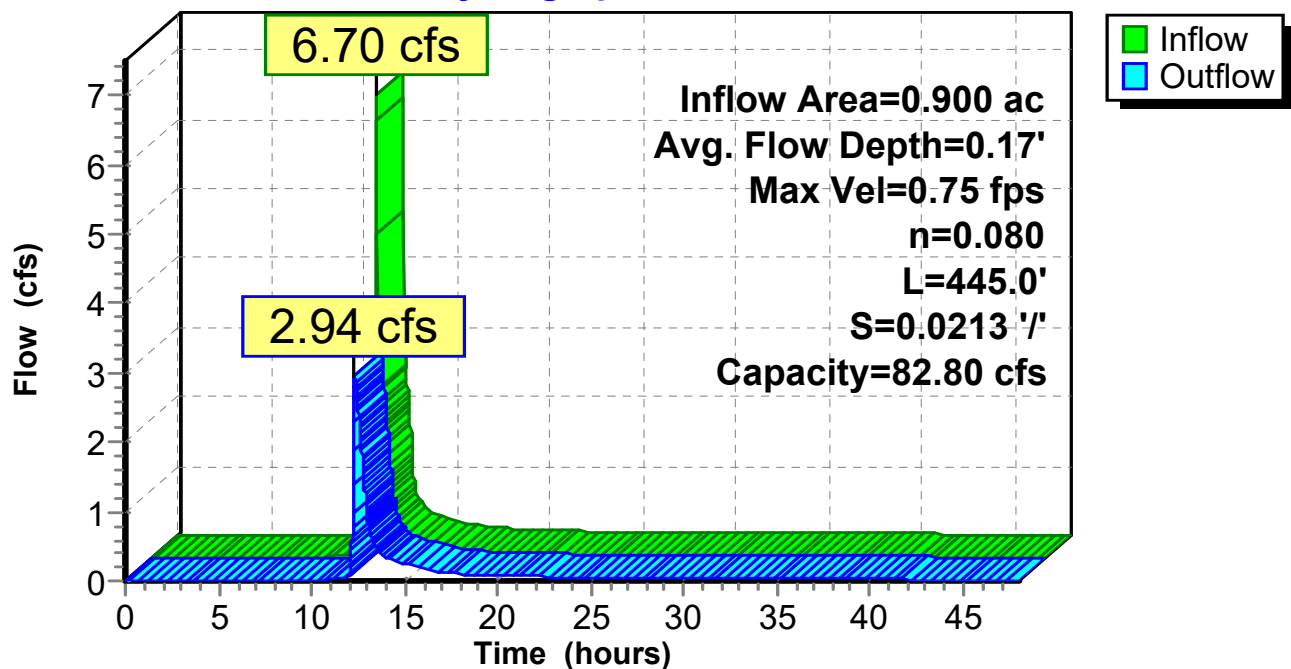
Peak Storage= 1,742 cf @ 12.18 hrs
 Average Depth at Peak Storage= 0.17'
 Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 82.80 cfs

20.00' x 1.00' deep channel, n= 0.080 Earth, long dense weeds
 Side Slope Z-value= 20.0 '/' Top Width= 60.00'
 Length= 445.0' Slope= 0.0213 '/'
 Inlet Invert= 67.50', Outlet Invert= 58.00'



Reach 1R:

Hydrograph



Summary for Reach 2&3R:

Inflow Area = 0.719 ac, 52.47% Impervious, Inflow Depth = 4.69" for 25-Yr Storm event
 Inflow = 1.90 cfs @ 12.20 hrs, Volume= 0.281 af
 Outflow = 0.81 cfs @ 13.11 hrs, Volume= 0.281 af, Atten= 57%, Lag= 55.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 0.34 fps, Min. Travel Time= 37.5 min
 Avg. Velocity = 0.13 fps, Avg. Travel Time= 103.0 min

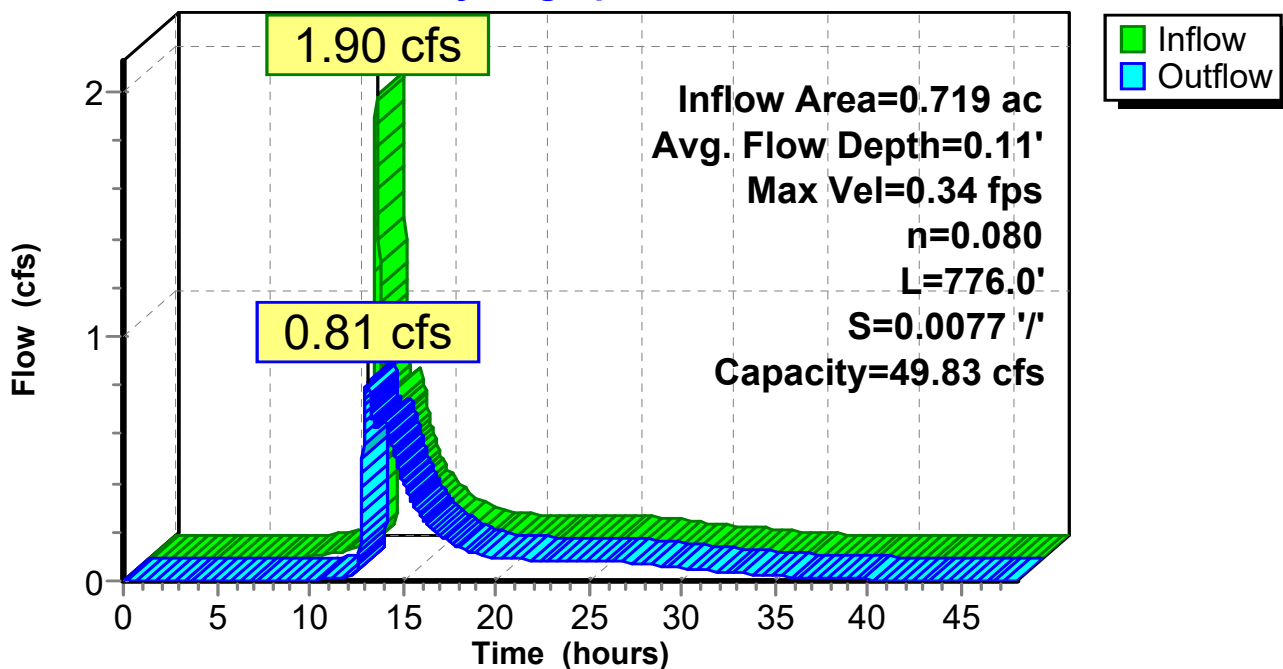
Peak Storage= 1,824 cf @ 12.49 hrs
 Average Depth at Peak Storage= 0.11'
 Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 49.83 cfs

20.00' x 1.00' deep channel, n= 0.080 Earth, long dense weeds
 Side Slope Z-value= 20.0 '/' Top Width= 60.00'
 Length= 776.0' Slope= 0.0077 '/'
 Inlet Invert= 64.00', Outlet Invert= 58.00'



Reach 2&3R:

Hydrograph



Summary for Reach 2R:

Inflow Area = 0.301 ac, 53.09% Impervious, Inflow Depth = 4.62" for 25-Yr Storm event
 Inflow = 1.43 cfs @ 12.13 hrs, Volume= 0.116 af
 Outflow = 0.49 cfs @ 13.16 hrs, Volume= 0.116 af, Atten= 66%, Lag= 62.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 0.29 fps, Min. Travel Time= 42.2 min
 Avg. Velocity = 0.10 fps, Avg. Travel Time= 122.0 min

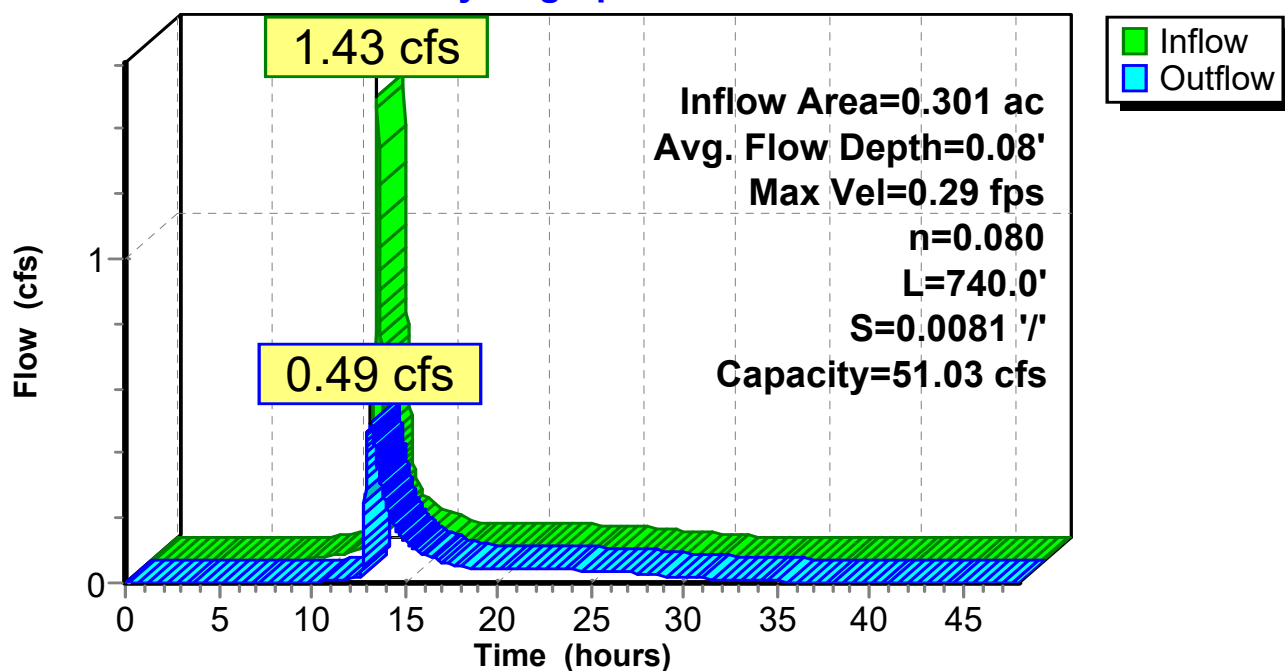
Peak Storage= 1,248 cf @ 12.46 hrs
 Average Depth at Peak Storage= 0.08'
 Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 51.03 cfs

20.00' x 1.00' deep channel, n= 0.080 Earth, long dense weeds
 Side Slope Z-value= 20.0 '/' Top Width= 60.00'
 Length= 740.0' Slope= 0.0081 '/'
 Inlet Invert= 70.00', Outlet Invert= 64.00'



Reach 2R:

Hydrograph



Summary for Reach 3R:

Inflow Area = 0.419 ac, 52.03% Impervious, Inflow Depth = 4.74" for 25-Yr Storm event
 Inflow = 1.94 cfs @ 12.14 hrs, Volume= 0.165 af
 Outflow = 1.89 cfs @ 12.19 hrs, Volume= 0.165 af, Atten= 2%, Lag= 3.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 0.79 fps, Min. Travel Time= 1.9 min
 Avg. Velocity = 0.19 fps, Avg. Travel Time= 7.7 min

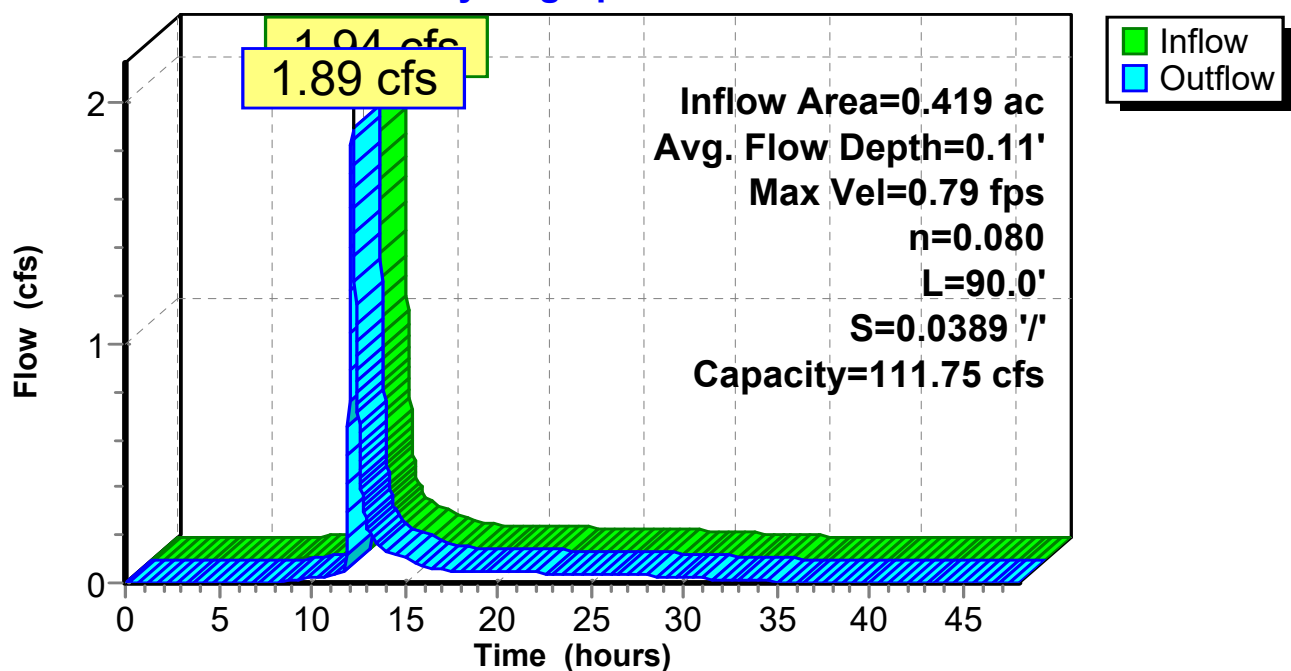
Peak Storage= 218 cf @ 12.16 hrs
 Average Depth at Peak Storage= 0.11'
 Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 111.75 cfs

20.00' x 1.00' deep channel, n= 0.080 Earth, long dense weeds
 Side Slope Z-value= 20.0 '/' Top Width= 60.00'
 Length= 90.0' Slope= 0.0389 '/'
 Inlet Invert= 68.50', Outlet Invert= 65.00'



Reach 3R:

Hydrograph



Summary for Reach 4R:

Inflow Area = 0.202 ac, 56.09% Impervious, Inflow Depth = 4.47" for 25-Yr Storm event
 Inflow = 0.77 cfs @ 12.17 hrs, Volume= 0.075 af
 Outflow = 0.25 cfs @ 13.30 hrs, Volume= 0.075 af, Atten= 67%, Lag= 68.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 0.24 fps, Min. Travel Time= 45.0 min
 Avg. Velocity = 0.10 fps, Avg. Travel Time= 104.2 min

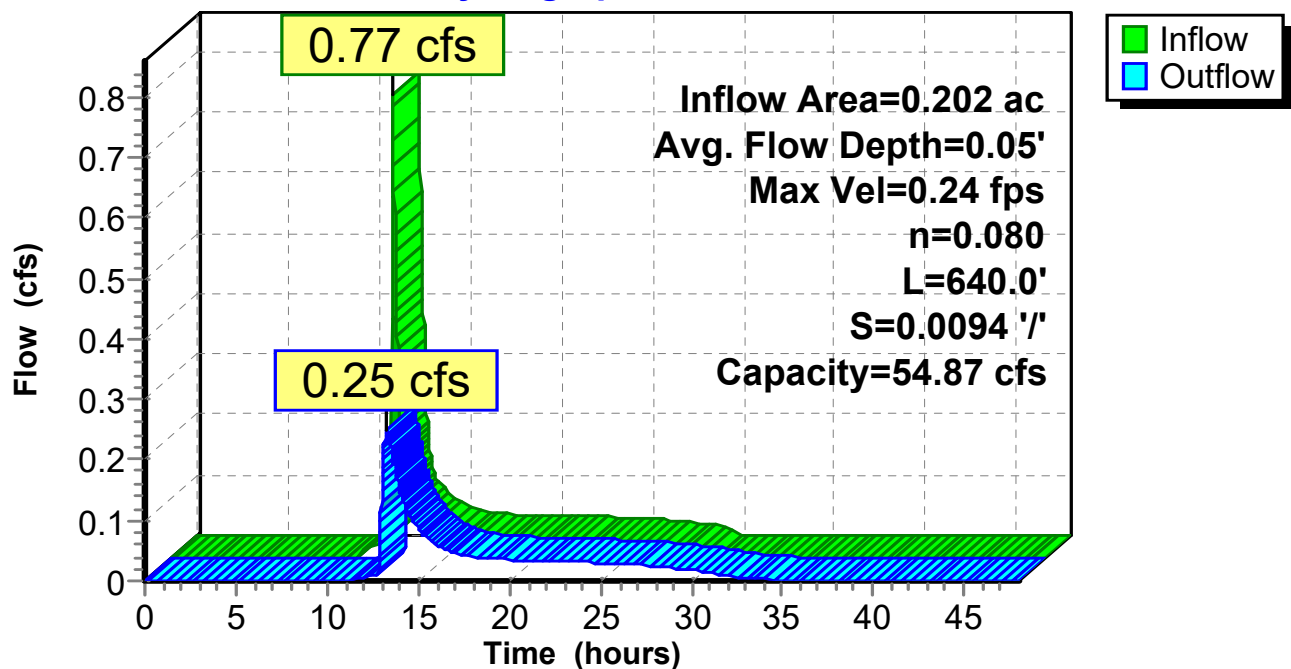
Peak Storage= 675 cf @ 12.55 hrs
 Average Depth at Peak Storage= 0.05'
 Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 54.87 cfs

20.00' x 1.00' deep channel, n= 0.080 Earth, long dense weeds
 Side Slope Z-value= 20.0 '/' Top Width= 60.00'
 Length= 640.0' Slope= 0.0094 '/'
 Inlet Invert= 64.00', Outlet Invert= 58.00'



Reach 4R:

Hydrograph



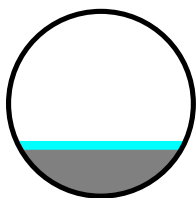
Summary for Reach PIPE: CULVERT

Inflow Area = 0.719 ac, 52.47% Impervious, Inflow Depth = 4.69" for 25-Yr Storm event
 Inflow = 1.91 cfs @ 12.19 hrs, Volume= 0.281 af
 Outflow = 1.90 cfs @ 12.20 hrs, Volume= 0.281 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Max. Velocity= 2.79 fps, Min. Travel Time= 0.2 min
 Avg. Velocity= 1.08 fps, Avg. Travel Time= 0.5 min

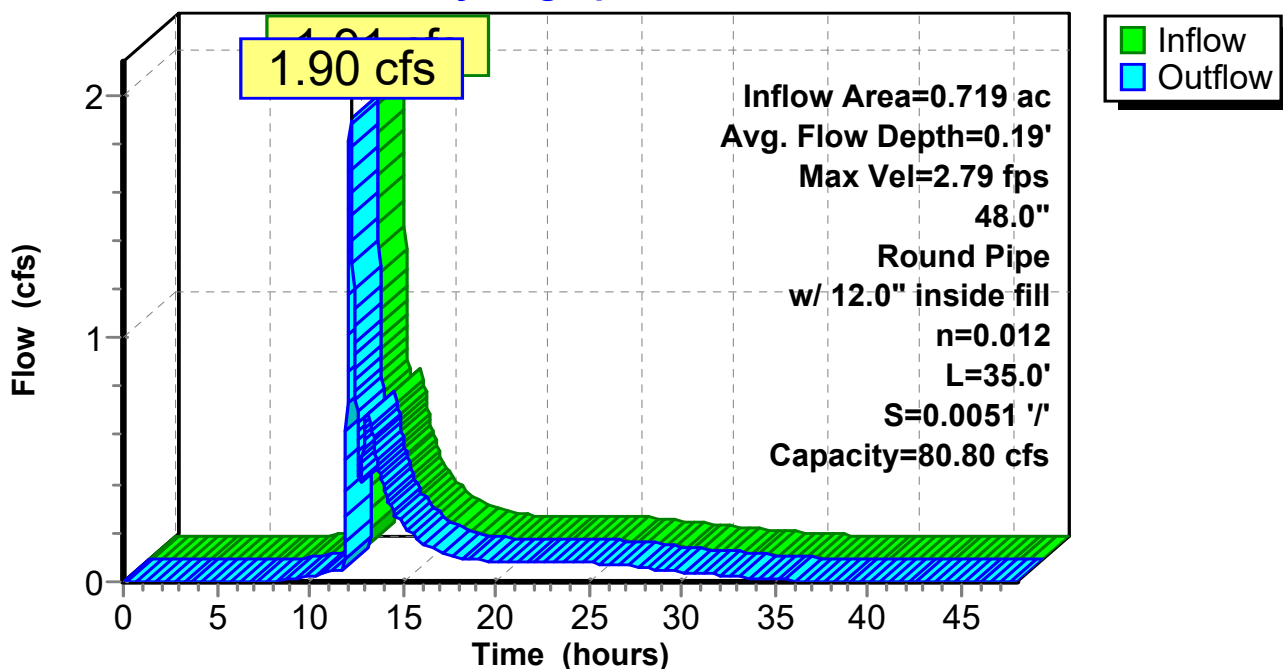
Peak Storage= 24 cf @ 12.19 hrs
 Average Depth at Peak Storage= 1.19' above invert (0.19' above fill)
 Bank-Full Depth= 4.00' above invert (3.00' above fill) Flow Area= 10.1 sf, Capacity= 80.80 cfs

48.0" Round Pipe w/ 12.0" inside fill
 n= 0.012 Corrugated PP, smooth interior
 Length= 35.0' Slope= 0.0051 '/
 Inlet Invert= 69.00', Outlet Invert= 68.82'



Reach PIPE: CULVERT

Hydrograph



Summary for Pond BF1: Bioretention Cell 1

Inflow Area = 0.900 ac, 49.24% Impervious, Inflow Depth = 4.71" for 25-Yr Storm event
 Inflow = 4.81 cfs @ 12.09 hrs, Volume= 0.353 af
 Outflow = 6.70 cfs @ 12.08 hrs, Volume= 0.344 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.52 cfs @ 12.08 hrs, Volume= 0.313 af
 Secondary = 4.18 cfs @ 12.08 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 67.39' @ 12.08 hrs Surf.Area= 2,585 sf Storage= 4,080 cf

Plug-Flow detention time= 257.1 min calculated for 0.344 af (97% of inflow)
 Center-of-Mass det. time= 241.3 min (1,034.8 - 793.5)

Volume	Invert	Avail.Storage	Storage Description
#1	63.50'	4,080 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
63.50	1,998	0.0	0	0
64.50	1,998	40.0	799	799
66.00	1,998	33.0	989	1,788
67.00	2,585	100.0	2,292	4,080

Device	Routing	Invert	Outlet Devices
#1	Primary	63.83'	12.0" Round Culvert L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.83' / 63.33' S= 0.0250 ' S= 0.0250 ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	63.83'	1.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	66.50'	10.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	66.85'	4.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=2.52 cfs @ 12.08 hrs HW=67.38' (Free Discharge)

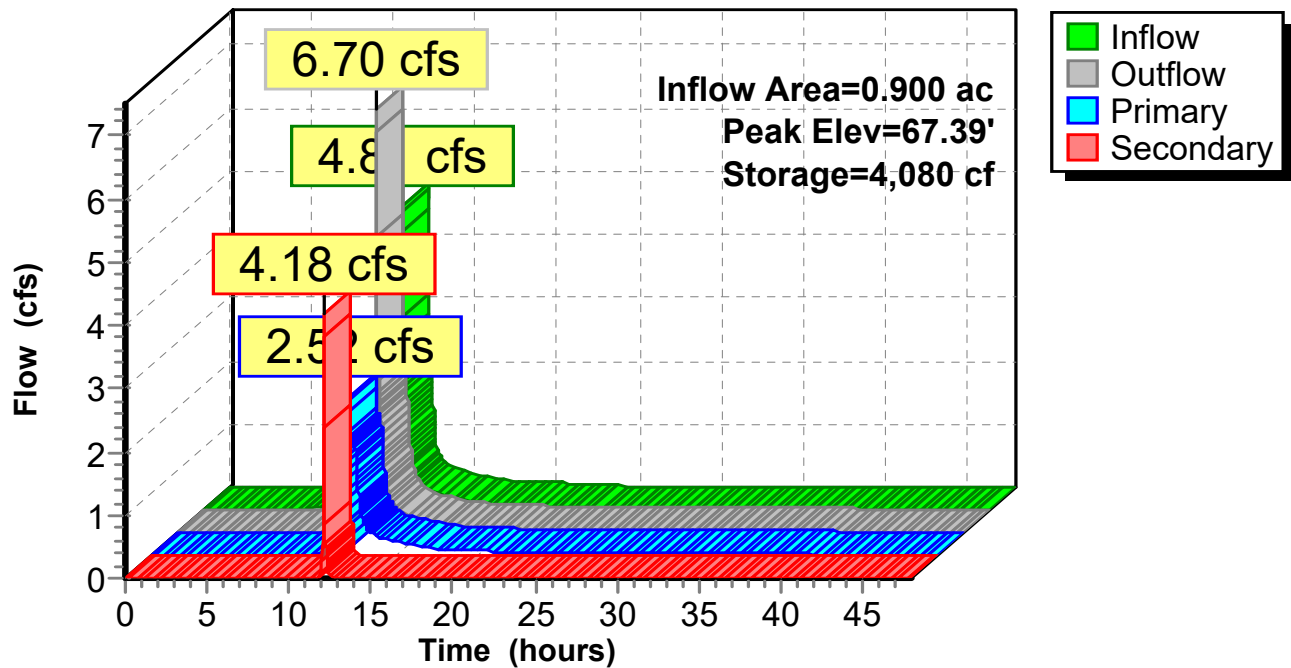
1=Culvert (Passes 2.52 cfs of 5.22 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.05 cfs @ 9.02 fps)
 3=Orifice/Grate (Orifice Controls 2.47 cfs @ 4.52 fps)

Secondary OutFlow Max=4.14 cfs @ 12.08 hrs HW=67.39' (Free Discharge)

4=Broad-Crested Rectangular Weir (Weir Controls 4.14 cfs @ 1.93 fps)

Pond BF1: Bioretention Cell 1

Hydrograph



Summary for Pond BF2: Bioretention Cell 2

Inflow Area = 0.301 ac, 53.09% Impervious, Inflow Depth = 4.71" for 25-Yr Storm event
 Inflow = 1.61 cfs @ 12.09 hrs, Volume= 0.118 af
 Outflow = 1.43 cfs @ 12.13 hrs, Volume= 0.116 af, Atten= 11%, Lag= 2.5 min
 Primary = 1.43 cfs @ 12.13 hrs, Volume= 0.116 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 73.30' @ 12.13 hrs Surf.Area= 1,040 sf Storage= 1,363 cf

Plug-Flow detention time= 173.3 min calculated for 0.116 af (98% of inflow)
 Center-of-Mass det. time= 162.0 min (955.6 - 793.5)

Volume	Invert	Avail.Storage	Storage Description
#1	70.00'	2,190 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet) Cum.Store (cubic-feet)
70.00	733	0.0	0 0
71.00	733	40.0	293 293
72.50	733	33.0	363 656
73.00	917	100.0	413 1,069
74.00	1,326	100.0	1,122 2,190

Device	Routing	Invert	Outlet Devices
#1	Primary	70.33'	12.0" Round Culvert L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 70.33' / 70.29' S= 0.0057 ' S= 0.0057 ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	70.33'	1.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	73.00'	10.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	73.50'	4.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=1.45 cfs @ 12.13 hrs HW=73.30' (Free Discharge)

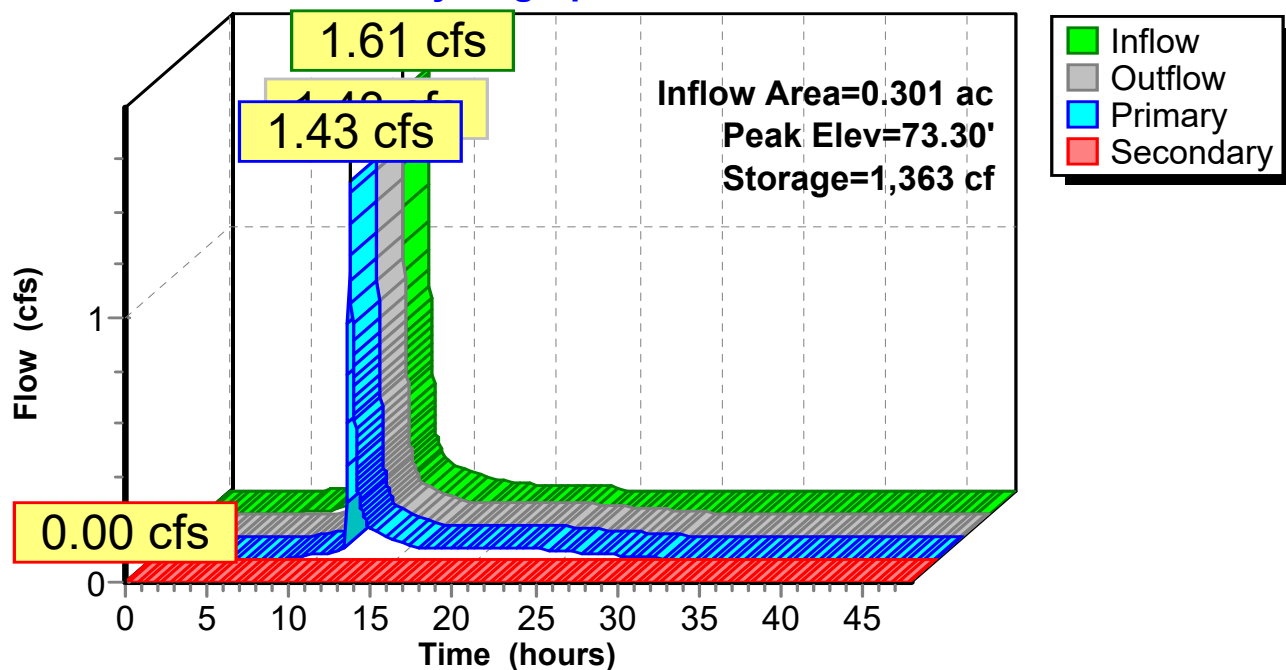
↑ **1=Culvert** (Passes 1.45 cfs of 4.69 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 8.24 fps)
 ↑ **3=Orifice/Grate** (Weir Controls 1.41 cfs @ 1.79 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=70.00' (Free Discharge)

↑ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond BF2: Bioretention Cell 2

Hydrograph



Summary for Pond BF3: Bioretention Cell 3

Inflow Area = 0.419 ac, 52.03% Impervious, Inflow Depth = 4.82" for 25-Yr Storm event
 Inflow = 2.28 cfs @ 12.09 hrs, Volume= 0.168 af
 Outflow = 1.94 cfs @ 12.14 hrs, Volume= 0.165 af, Atten= 15%, Lag= 3.0 min
 Primary = 1.72 cfs @ 12.14 hrs, Volume= 0.164 af
 Secondary = 0.21 cfs @ 12.14 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 67.91' @ 12.14 hrs Surf.Area= 1,278 sf Storage= 1,833 cf

Plug-Flow detention time= 186.1 min calculated for 0.165 af (98% of inflow)
 Center-of-Mass det. time= 175.7 min (966.1 - 790.4)

Volume	Invert	Avail.Storage	Storage Description
#1	64.50'	1,951 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
64.50	928	0.0	0	0
65.50	928	40.0	371	371
67.00	928	33.0	459	831
68.00	1,313	100.0	1,121	1,951

Device	Routing	Invert	Outlet Devices
#1	Primary	64.83'	12.0" Round Culvert L= 34.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 64.83' / 64.66' S= 0.0050 ' S= 0.0050 ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	64.83'	1.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	67.50'	10.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	67.83'	4.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=1.72 cfs @ 12.14 hrs HW=67.91' (Free Discharge)

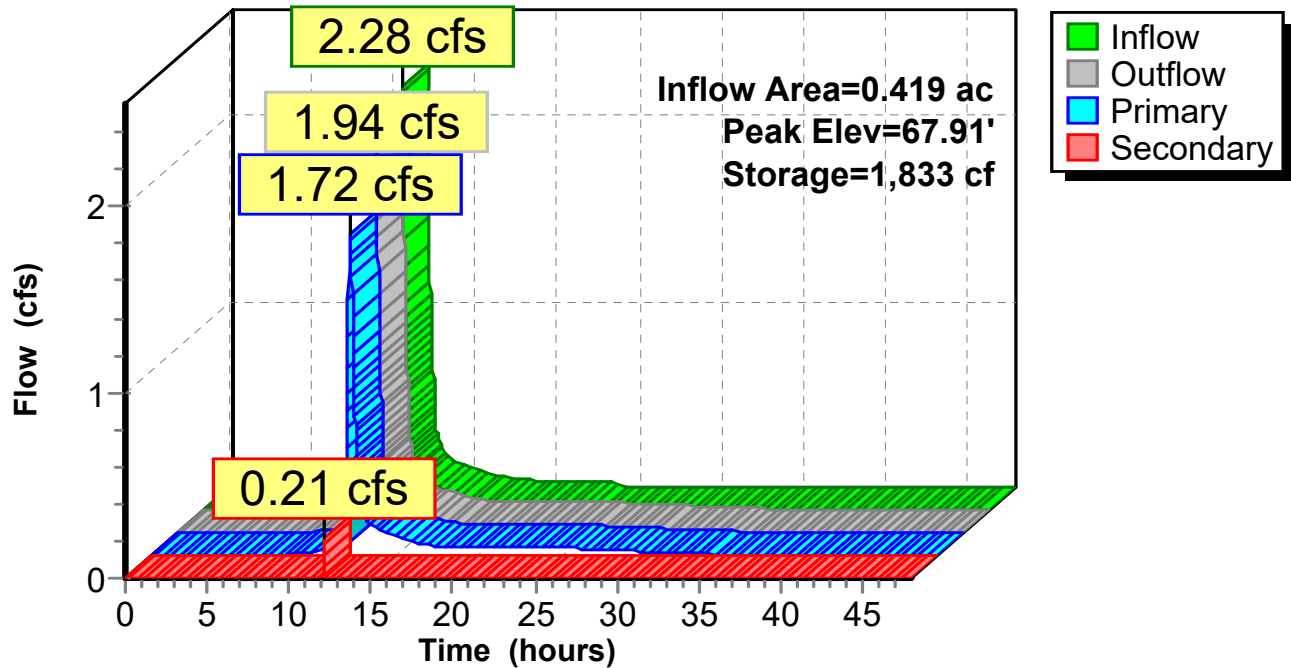
↑ **1=Culvert** (Passes 1.72 cfs of 4.79 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 8.39 fps)
 ↑ **3=Orifice/Grate** (Orifice Controls 1.68 cfs @ 3.07 fps)

Secondary OutFlow Max=0.21 cfs @ 12.14 hrs HW=67.91' (Free Discharge)

↑ **4=Broad-Crested Rectangular Weir** (Weir Controls 0.21 cfs @ 0.66 fps)

Pond BF3: Bioretention Cell 3

Hydrograph



Summary for Pond C: GOOSE ROCKS ROAD

Inflow Area = 99.429 ac, 2.77% Impervious, Inflow Depth > 3.38" for 25-Yr Storm event
 Inflow = 108.60 cfs @ 13.35 hrs, Volume= 27.979 af
 Outflow = 112.68 cfs @ 13.34 hrs, Volume= 26.385 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 112.68 cfs @ 13.34 hrs, Volume= 26.385 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 61.42' @ 13.34 hrs Surf.Area= 75,320 sf Storage= 96,625 cf

Plug-Flow detention time= 55.2 min calculated for 26.374 af (94% of inflow)
 Center-of-Mass det. time= 22.4 min (943.0 - 920.7)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	96,625 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.00	7,230	0	0
59.00	16,340	11,785	11,785
60.00	39,010	27,675	39,460
61.00	75,320	57,165	96,625

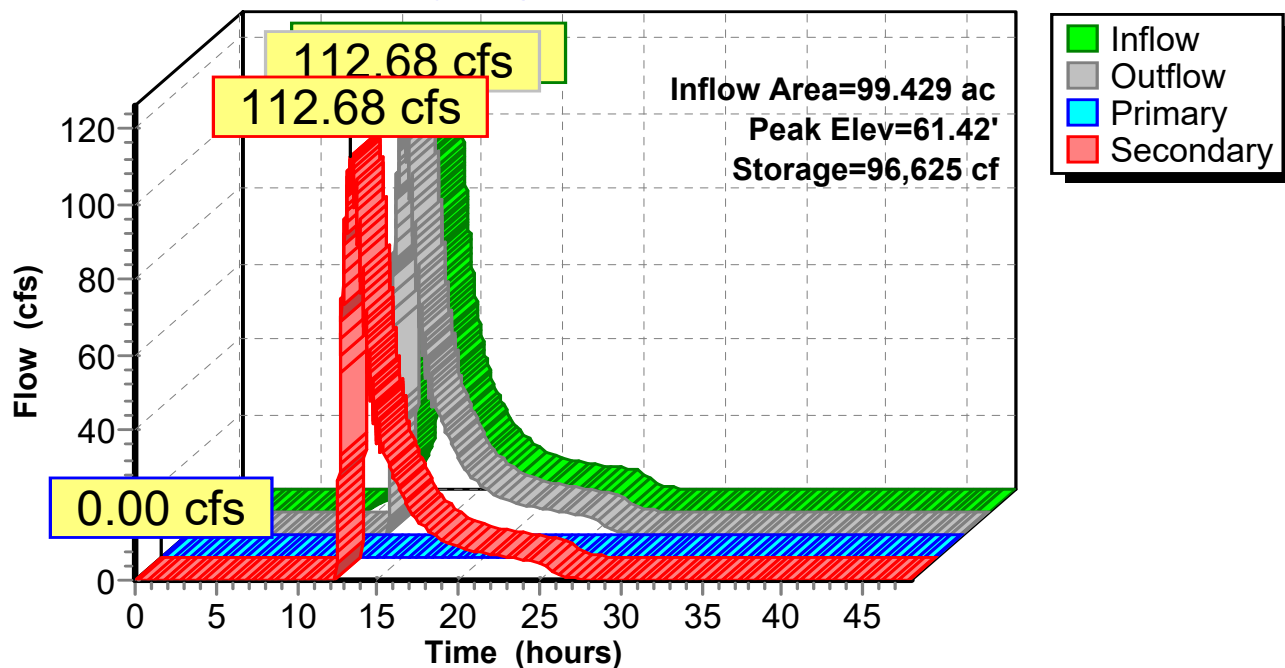
Device	Routing	Invert	Outlet Devices
#1	Primary	258.00'	30.0" Round Culvert w/ 6.0" inside fill L= 50.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 257.50' / 256.50' S= 0.0200 ' S Cc= 0.900 n= 0.021 Corrugated metal, Flow Area= 4.21 sf
#2	Secondary	60.60'	50.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=58.00' (Free Discharge)

↑1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=98.02 cfs @ 13.34 hrs HW=61.42' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Weir Controls 98.02 cfs @ 2.39 fps)

Pond C: GOOSE ROCKS ROAD**Hydrograph**

Summary for Pond GW1: Gravel Wetland 1

Inflow Area = 0.202 ac, 56.09% Impervious, Inflow Depth = 4.93" for 25-Yr Storm event
 Inflow = 1.12 cfs @ 12.08 hrs, Volume= 0.083 af
 Outflow = 0.77 cfs @ 12.17 hrs, Volume= 0.075 af, Atten= 31%, Lag= 5.0 min
 Primary = 0.77 cfs @ 12.17 hrs, Volume= 0.075 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Starting Elev= 21.17' Surf.Area= 0 sf Storage= 0 cf

Peak Elev= 70.69' @ 12.17 hrs Surf.Area= 999 sf Storage= 1,409 cf

Plug-Flow detention time= 268.1 min calculated for 0.075 af (91% of inflow)

Center-of-Mass det. time= 222.4 min (1,009.5 - 787.1)

Volume	Invert	Avail.Storage	Storage Description	
#1	65.83'	1,739 cf	Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.83	325	0.0	0	0
67.83	325	40.0	260	260
68.33	325	35.0	57	317
69.00	325	15.0	33	350
70.00	651	100.0	488	838
70.50	900	100.0	388	1,225
71.00	1,155	100.0	514	1,739

Device	Routing	Invert	Outlet Devices
#1	Primary	68.67'	12.0" Round Culvert L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.67' / 68.56' S= 0.0050 ' / Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	65.83'	1.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	70.50'	10.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	71.00'	130.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.76 cfs @ 12.17 hrs HW=70.69' (Free Discharge)

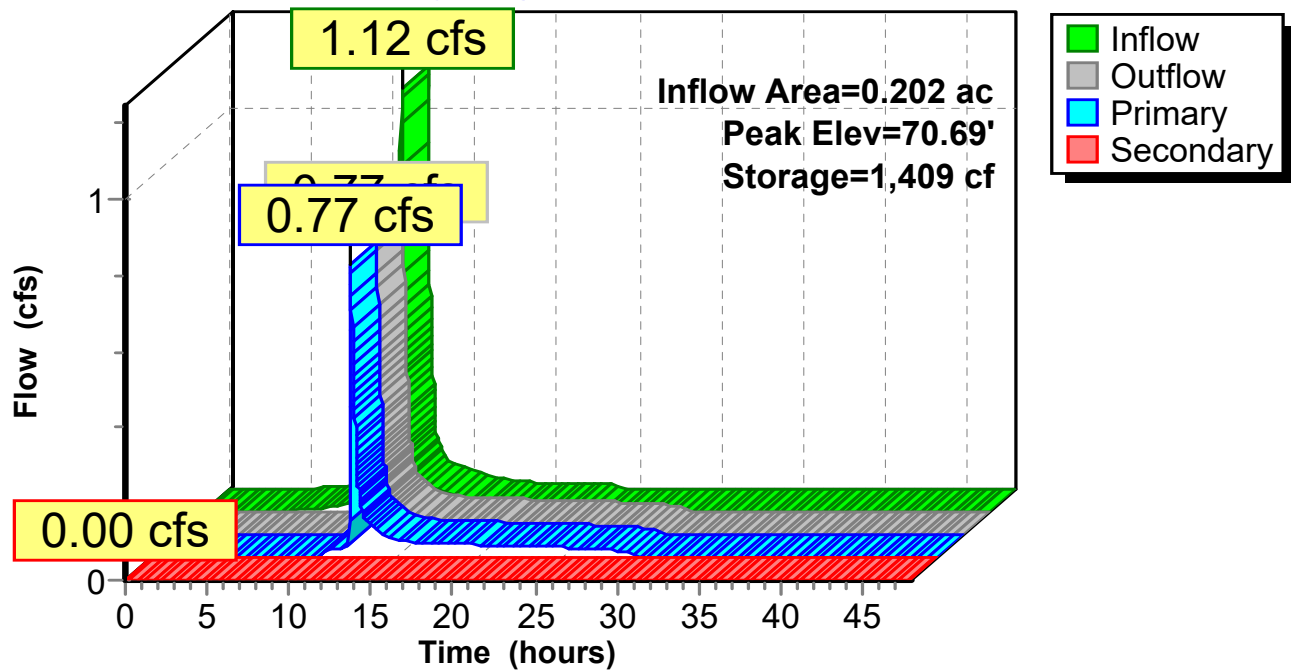
1=Culvert (Passes 0.76 cfs of 3.68 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.04 cfs @ 6.85 fps)
 3=Orifice/Grate (Weir Controls 0.72 cfs @ 1.43 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=65.83' (Free Discharge)

4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond GW1: Gravel Wetland 1

Hydrograph

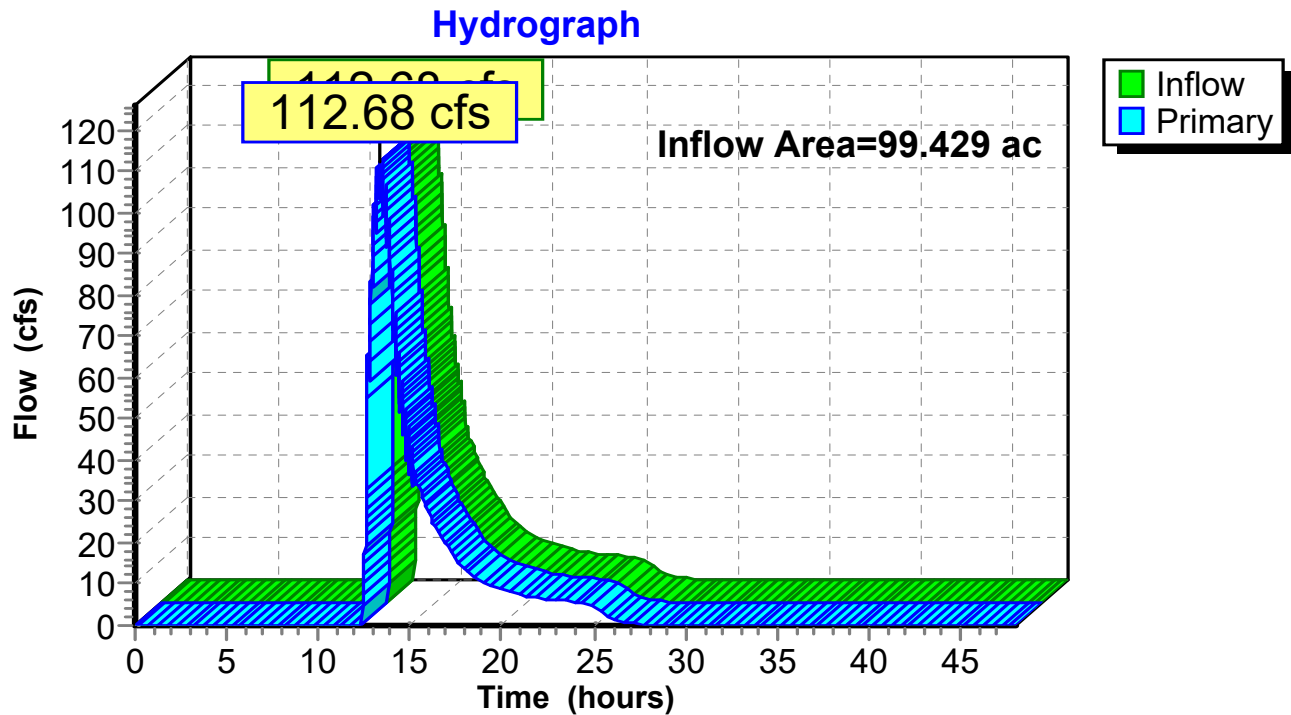


Summary for Link POA1:

Inflow Area = 99.429 ac, 2.77% Impervious, Inflow Depth > 3.18" for 25-Yr Storm event
 Inflow = 112.68 cfs @ 13.34 hrs, Volume= 26.385 af
 Primary = 112.68 cfs @ 13.34 hrs, Volume= 26.385 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

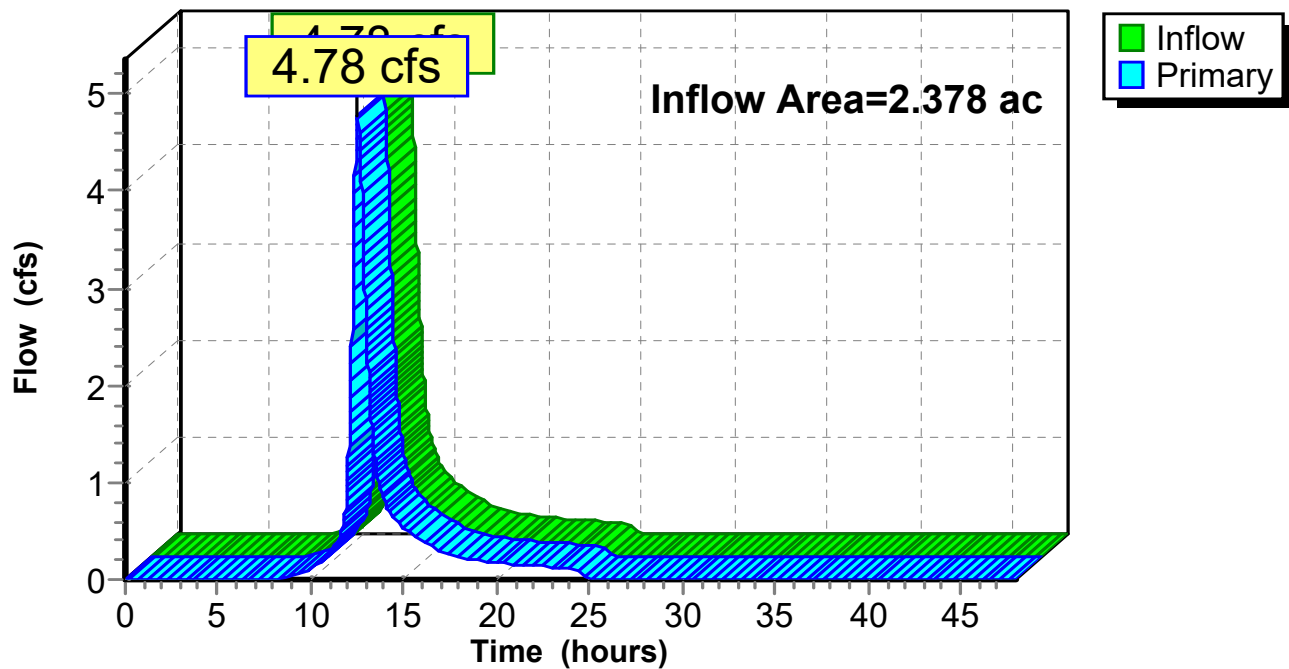
Link POA1:



Summary for Link POA2:

Inflow Area = 2.378 ac, 2.41% Impervious, Inflow Depth = 3.45" for 25-Yr Storm event
Inflow = 4.78 cfs @ 12.54 hrs, Volume= 0.684 af
Primary = 4.78 cfs @ 12.54 hrs, Volume= 0.684 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Link POA2:**Hydrograph**

ATTACHMENT D – STORMWATER OPERATIONS AND MAINTENANCE MANUAL

THE GLEN AT GOOSE ROCKS

KENNEBUNKPORT, MAINE

STORMWATER MAINTENANCE PLAN

Maintenance Responsibilities

During construction activities, the maintenance of all stormwater measures will be the direct responsibility of the Contractor. After acceptance by the Owner, the maintenance of all stormwater management facilities, the establishment of any contract services required to implement the program, and the keeping of records and maintenance log book will be the responsibility of the Owner.

Regular inspection and maintenance of stormwater management BMPs shall be undertaken as follows:

Ditches, Swales, and Riprap Aprons

Open swales and ditches shall be inspected on a monthly basis or after a major rainfall event to assure that debris and/or sediments do not reduce the effectiveness of the system. Debris shall be removed at that time. Any sign of erosion or blockage shall be immediately repaired to assure a vigorous growth of vegetation for the stability of the structure and proper function. Maintenance shall include, but not be limited to, mowing, trimming and removal vegetation in the ditches as required to prevent vegetation from blocking or diverting storm flows, replacement of riprap channel lining to prevent scour of the channel invert, removing vegetation and debris from the culverts.

Vegetated ditches should be mowed at least three times during the growing season. Larger brush or trees must not be allowed to become established in the channel. Any areas where the vegetation fails will be subject to erosion and should be reseeded and mulched immediately.

Riprap ditches and aprons where stone is displaced should be replaced and chinked to assure stability. With time, additional riprap may be added. Vegetation growing through riprap and accumulated sediments and debris should be removed on a bi-annual basis.

Drainage Pipes and Culverts

Culverts and piped drainage systems shall be inspected on an annual basis to remove any obstructions to flow; remove accumulated sediments and debris at the inlet, at the outlet, and within the conduit; and to repair any erosion damage at the pipe inlet and outlet. Sediment should be removed when its level exceeds 20% of the pipe diameter. This may be accomplished by hydraulic flushing or any mechanical means; however, care should be taken to contain the sediment at the pipe outlet, and not flush the sediments into the detention/infiltration pond areas as this will reduce the ponds capacity and ability to infiltrate runoff and will hasten the time when the pond must be cleaned/rehabilitated.

Roadways, Driveways, Walkways and Parking Lots

Accumulations of winter sand along paved surfaces shall be cleared at least once a year, preferably in the spring, to minimize transportation of sediment during rainfall events. Accumulations on pavement may be removed by pavement sweeping. Accumulations of sand along road shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader. Grading of gravel roads or grading of the gravel shoulders of gravel or paved roads, must be routinely performed to ensure that stormwater drains immediately off the road surface to adjacent buffer areas or stable ditches, and is not impeded by accumulations of graded material on the road shoulder or by excavation of false ditches in the shoulder.

Gravel Wetlands

Inspections of the gravel wetlands shall be conducted on a semi-annual basis and following significant rainfall events. Delayed or poor maintenance practices can result in loss of treatment capacity. Records should be kept of all maintenance operations to help plan future work and identify problem areas.

The basin embankments should be maintained to preserve their integrity including, but not limited to, vegetation maintenance (mowing, control of woody vegetation), rodent control, erosion control and repair, and outlet control structure maintenance and repair. The embankment should be inspected annually for erosion or destabilization of side slopes, embankment settling and other signs of overtrop structural failure.

Basin plantings, and vegetation should be maintained on a quarterly basis. Regular maintenance activities should include cutting back shrub plantings where necessary to prevent excessive woody growth, removal of dead vegetation and re-planting to maintain good cover and root spread. Shrub or grass clippings should be removed to minimize the amount of organic material accumulation in the basin. Sediment and debris should be removed from the sediment forebay at least annually, where applicable. Bioretention cells and underdrained filters shall not be used for snow storage area. Snow storage should be sited so that snow melt flows to a pretreatment BMP before reaching the infiltration area. Vehicular equipment used to maintain or rehabilitate the basins should work from the cell perimeter and not enter the basin floor area, as this would compact the soil surface and reduce infiltration. The surface of the basins may clog with fine sediments over time. Maintenance of good plant or grass cover should minimize this; however, if ponded runoff does not infiltrate within 48 hours, rototilling the top of the soil bed may be required to reestablish the soils infiltration capacity.

Stormwater Inspection and Maintenance Log

Site Name **Goose Rocks** Location **Kennbunkport** Date of Inspection

BMP	Inspection tasks	Completed	Notes	Maintenance Required	Maintenance Complete
Ditches, swales and open channels	Inspect for debris and channel blockages Check vegetation for overgrowth Inspect for evidence of erosion				
Stormwater Structures	Check sediment level in sumps Inspect grates, frames and structures				
Pipe Inlet and Outlet	Inspect riprap aprons Look for evidence of erosion				
Bioretention Cells & Gravel Wetland	Check plantings/grass cover Inspect soil bed Inspect underdrain outlets Evidence of high water level Verify structure is draining Inspect inlet grate and outlet structure Look for evidence of sedimentation Check stability of side slopes				
Paved areas, walkways	Check for sand and salt accumulation Check integrity of surfaces and edges				
Culverts	Inspect structural integrity Look for joint displacement Inspect inlet and outlet structures Check for sediment accumulation				

ATTACHMENT E – CLASS-A HIGH INTENSITY SOIL SURVEY



Soil Narrative Report

Prepared for
Creative Coast Construction
(Atlantic Resource Consultants)
Goose Rocks Road

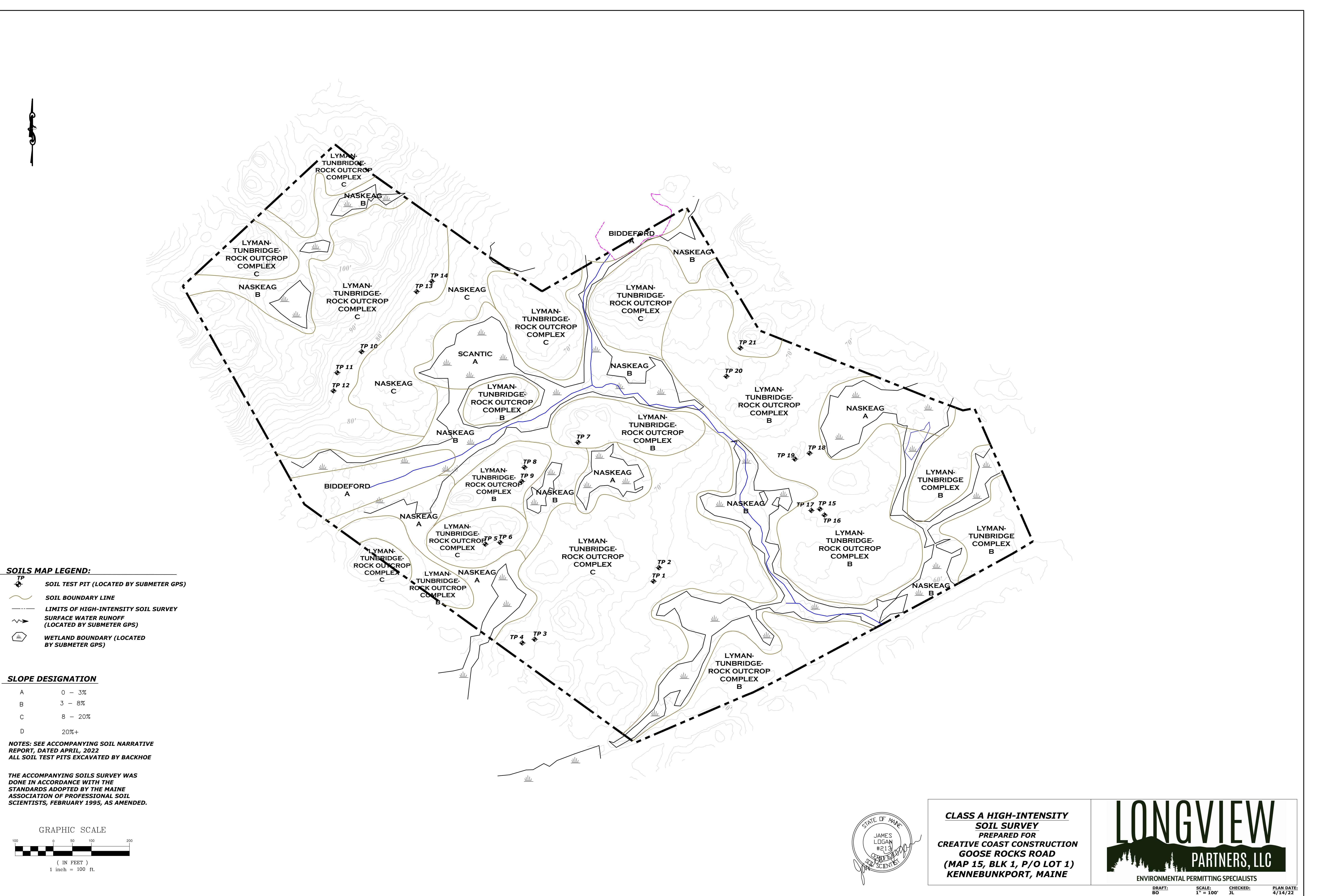
Kennebunkport, Maine

April, 2022

Map prepared for a proposed residential subdivision

Maps scaled 1" = 100', base map provided by Atlantic resource Consultants

Mapping meets Maine Association of Professional Soil Scientists Class A High-Intensity mapping standards with minimum mapping units of 1/8 acre



SOILS MAP LEGEND:

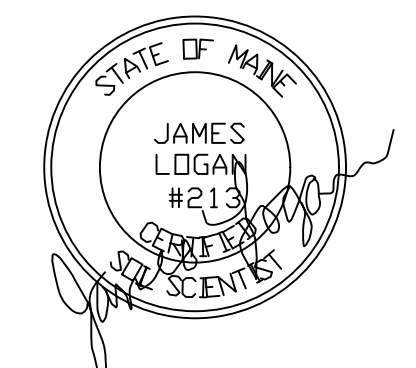
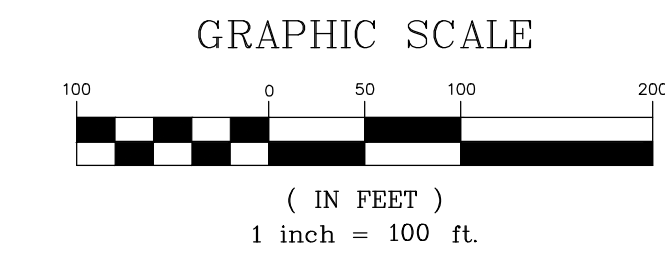
- SOIL TEST PIT (LOCATED BY SUBMETER GPS)
- SOIL BOUNDARY LINE
- LIMITS OF HIGH-INTENSITY SOIL SURVEY
- SURFACE WATER RUNOFF (LOCATED BY SUBMETER GPS)
- WETLAND BOUNDARY (LOCATED BY SUBMETER GPS)

SLOPE DESIGNATION

A	0 - 3%
B	3 - 8%
C	8 - 20%
D	20%+

NOTES: SEE ACCOMPANYING SOIL NARRATIVE REPORT, DATED APRIL, 2022
ALL SOIL TEST PITS EXCAVATED BY BACKHOE

THE ACCOMPANYING SOILS SURVEY WAS DONE IN ACCORDANCE WITH THE STANDARDS ADOPTED BY THE MAINE ASSOCIATION OF PROFESSIONAL SOIL SCIENTISTS, FEBRUARY 1995, AS AMENDED.



CLASS A HIGH-INTENSITY SOIL SURVEY
PREPARED FOR
CREATIVE COAST CONSTRUCTION
GOOSE ROCKS ROAD
(MAP 15, BLK 1, P/O LOT 1)
KENNEBUNKPORT, MAINE

LONGVIEW
PARTNERS, LLC

ENVIRONMENTAL PERMITTING SPECIALISTS

DRAFT: BO SCALE: 1" = 100' CHECKED: JL PLAN DATE: 4/14/22

BIDDEFORD (Histic Humaquept)

SETTING

Parent Material:	Derived from marine & lacustrine sediments.
Landform:	Nearly level lowlands.
Position in Landscape:	Usually occupies the lowest position within the landscape.
Slope Gradient Ranges:	(A) 0-3%

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Biddeford soil is very poorly drained with a perched water table within 0.5 feet of the soil surface, and may be ponded at the surface for some portion of the year.
Typical Profile Description:	Surface layer: Very dark brown mucky peat, 0-12" Subsurface layer: Gray silt loam, 12-16" Subsoil layer: Olive gray/dark gray silty clay, 16-35" Substratum: Gray silty clay & silty clay loam, 35-65"
Hydrologic Group:	Group D
Surface Run Off:	Very slow
Permeability:	Moderate or moderately slow in upper horizons, slow or very slow in substratum.
Depth to Bedrock:	Deep, more than 40 inches.
Hazard to Flooding:	This soil is intermittently ponded, and may rarely flood in areas adjacent to streams and rivers during periods of prolonged wetness.

INCLUSIONS (Within Mapping Unit)

Similar:	Scantic, Whately, Roundabout, Bucksport
Dissimilar:	Sebago, Chocorua, Wonsqueak

USE AND MANAGEMENT

Development with subsurface wastewater disposal: The limiting factor for building site development is wetness due to a high water table throughout the year. Biddeford soil has very low potential for dwellings with foundations and road construction due to ponding and low strength. Biddeford soil is unsuitable for subsurface wastewater disposal as defined by the State of Maine Subsurface Wastewater Disposal Rules. Biddeford soil is usually classified a wetland, based on the combined consideration of hydric conditions, hydrology, and vegetation.

LYMAN-TUNBRIDGE COMPLEX

SETTING

Parent Material:	Loamy glacial till.
Landform:	Glaciated uplands.
Position in Landscape:	Upper positions on landform.
Slope Gradient Ranges:	(B) 3-8%

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Somewhat excessively to well drained, with no evidence of a water table, or only inches from the bedrock surface during spring and periods of heavy precipitation.		
Typical Profile Description:	Surface layer:	Black & reddish brown loam & fine sandy loam, 0-4"	
	Subsurface layer:	Very dusky red loam, 4-6"	
	Subsoil layer:	Dark red loam, 6-10"	
	Substratum layer:	Dark brown to brown loam, 10-20"	
Hydrologic Group:	Group C/D		
Surface Run Off:	Rapid		
Permeability:	Moderate or moderately rapid.		
Depth to Bedrock:	Shallow (Lyman, 10-20") to moderately deep (Tunbridge, 20-40").		
Hazard to Flooding:	None		
Erosion Factors:	K: .20 - .32		

INCLUSIONS (Within Mapping Unit)

Similar:	Dixfield, Skerry (deeper than 40" to bedrock)
Dissimilar:	Naskeag (in depressional areas), Colonel, Brayton

USE AND MANAGEMENT

Development with subsurface wastewater disposal: The limiting factors for building site development is shallow to bedrock. Blasting or ripping of the more fractured and weathered bedrock is required for deep excavation. Portions of these map units are suitable for subsurface wastewater disposal, where the depth to limiting factor is greater than 15" from the mineral soil surface within Shoreland Zoned areas, and 9"-15" in non-Shoreland Zoned areas. This soil requires a 24-inch separation distance between the bottom of any disposal area and the bedrock surface, and 3.3 sq.ft/gpd and 1.7 sq.ft/gpd for bed disposal area and chamber area, respectively.

For stormwater design: Limiting factor for stormwater design is bedrock, which is generally less than 20". These soils are generally well drained, with no seasonal water table except for short durations on the bedrock surface. Permeabilities are 2-6 inches per hour in all horizons.

LYMAN-TUNBRIDGE-ROCK OUTCROP COMPLEX

SETTING

Parent Material:	Loamy glacial till.
Landform:	Glaciated uplands.
Position in Landscape:	Uppermost locations on landform; sideslopes, shoulders, and crests of ridges.
Slope Gradient Ranges:	(B) 3-8% (C) 8-20%

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Somewhat excessively drained (Lyman) to well drained (Tunbridge) with no apparent water table other than run off across the bedrock surface occasionally, during spring and periods of heavy precipitation. These soils occur in a non-repeating pattern with exposed bedrock outcrop, and cannot be separated in mapping.		
Typical Profile Description:	Surface layer:	Black & reddish brown loam & fine sandy loam, 0-4"	
	Subsurface layer:	Very dusky red loam, 4-6"	
	Subsoil layer:	Dark red loam, 6-10"	
	Substratum layer:	Dark brown to brown loam, 10-20"	
Hydrologic Group:	Group C/D		
Surface Run Off:	Slow to rapid depending on slope and bedrock exposure.		
Permeability:	Moderately rapid.		
Depth to Bedrock:	Shallow (Lyman 10-20") to moderately deep (Tunbridge 20-40").		
Hazard to Flooding:	None		

INCLUSIONS (Within Mapping Unit)

Similar:	Dixfield, Skerry (deeper than 40" to bedrock)
Dissimilar:	Colonel (greater than 40" to bedrock), Naskeag (in microdepressions)

USE AND MANAGEMENT

Development with subsurface wastewater disposal: The limiting factor for building site development is depth to bedrock, which ranges from 0" to 40" within this complex. Blasting or ripping of the more fractured bedrock is necessary for deep excavation. Tunbridge and Lyman (9"-15" deep to bedrock outside shoreland zone areas) soils are suitable for subsurface wastewater disposal in accordance with State of Maine Subsurface Wastewater Disposal Rules. These soils require a 24-inch separation distance between the bedrock surface and the bottom of any disposal system. These soils also require 3.3 and 1.7 sq.ft/gpd for disposal beds and chamber area, respectively.

Development with public sewer and water: The limiting factor for building site development is depth to bedrock, which is 0-40" within this complex. Blasting or ripping of the more fractured bedrock is necessary for deep excavation. Proper foundation drainage or other site modification is recommended for construction.

NASKEAG (Aeric Haplaquods)

SETTING

Parent Material:	Loamy and sandy glacial till.
Landform:	Depressions of glaciated bedrock ridges.
Position in Landscape:	Lowest positions in depressions or concavities in landform.
Slope Gradient Ranges:	(A) 0-3% (B) 3-8%

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Somewhat poorly to poorly drained, with a perched water table 0-1.5 feet beneath the soil surface.								
Typical Profile Description:	<table><tr><td>Surface layer:</td><td>Very dusky red muck, 0-5"</td></tr><tr><td>Subsurface layer:</td><td>Light brownish gray and brown sandy loam or loamy sand, 5-16"</td></tr><tr><td>Subsoil layer:</td><td>Dusky red loamy sand, 10-26"</td></tr><tr><td>Substratum:</td><td>Light yellowish brown gravelly sandy loam to loamy sand, 26-38"</td></tr></table>	Surface layer:	Very dusky red muck, 0-5"	Subsurface layer:	Light brownish gray and brown sandy loam or loamy sand, 5-16"	Subsoil layer:	Dusky red loamy sand, 10-26"	Substratum:	Light yellowish brown gravelly sandy loam to loamy sand, 26-38"
Surface layer:	Very dusky red muck, 0-5"								
Subsurface layer:	Light brownish gray and brown sandy loam or loamy sand, 5-16"								
Subsoil layer:	Dusky red loamy sand, 10-26"								
Substratum:	Light yellowish brown gravelly sandy loam to loamy sand, 26-38"								
Hydrologic Group:	Group C								
Surface Run Off:	Moderate or moderately rapid (across bedrock surface)								
Permeability:	Rapid								
Depth to Bedrock:	Moderately deep, 20-40" to bedrock surface.								
Hazard to Flooding:	None, but may be ponded for short duration in spring and during periods of excessive rainfall.								
Erosion Factors:	.10								

INCLUSIONS (Within Mapping Unit)

Similar:	Lyman, Tunbridge, Colonel, Brayton, Swanton, Pillsbury
Dissimilar:	Rock Outcrop, Peacham, Naskeag (Variant-V.P.D.)

USE AND MANAGEMENT

Development with subsurface wastewater disposal: The limiting factor of this soil for building site development are depth to bedrock less than 40" in Naskeag and wetness due to a water table perched above the bedrock surface or hardpan. Proper foundation drainage is recommended for construction. Naskeag does not meet the minimum requirements for subsurface wastewater disposal as defined by the State of Maine Subsurface Wastewater Disposal Rules. This soil (poorly drained) may be classified as wetlands, based on the combined consideration of hydric conditions, hydrology, and vegetation.

SCANTIC (Typic Haplaquepts)

SETTING

Parent Material:	Marine or lacustrine sediments.
Landform:	Level or gently sloping marine or lake plains.
Position in Landscape:	Lower to intermediate positions.
Slope Gradient Ranges:	(A) 0-3%

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Poorly drained, with a perched water table 0.5 to 1.0 feet beneath the soil surface.	
Typical Profile Description:	Surface layer:	Dark grayish brown silt loam, 0-9"
	Subsurface layer:	Olive gray silt loam, 9-11"
	Subsoil layer:	Olive gray, silty clay loam, 11-16"
	Substratum:	Olive gray clay, 16-65"
Hydrologic Group:	Group D	
Surface Run Off:	Slow	
Permeability:	Moderate or moderately slow in upper profile, slow to very slow in dense substratum.	
Depth to Bedrock:	Very deep, greater than 60".	
Hazard to Flooding:	May flood occasionally on lowest fringes during spring and periods of excessive precipitation.	

INCLUSIONS (Within Mapping Unit)

Similar:	Lamoine, Enosburg (Swanton)
Dissimilar:	Naskeag, Biddeford, Whately

USE AND MANAGEMENT

Development with subsurface wastewater disposal: The limiting factor for building site development is wetness due to the presence of a shallow water table throughout most of the year. Proper foundation drainage or site modification is recommended for construction. Scantic soil does not meet the minimum requirements for subsurface wastewater disposal, as defined by State of Maine Rules for Subsurface Wastewater Disposal. Scantic soil may be classified as wetlands, based on the combined consideration of hydrology, hydric conditions, and vegetation.

Development for stormwater: Scantic soils are poorly drained with a high perched water table 0.5 to 1.0 feet beneath the soil surface and exhibit permeabilities of 0.2 to 2.0 inches/hr. in the upper 10 inches, and less than 0.2 inches/hr. below 10 inches.

SOIL TEST PIT PROFILE DESCRIPTIONS

LONGVIEW PARTNERS, LLC
6 SECOND STREET BUXTON, MAINE

Town, City, Plantation

Street, Road, Subdivision

Owner's Name

KENNEBUNKPORT

GOOSE ROCKS ROAD (MAP 15, BLK 1, LOT 1)

CREATIVE COAST CONSTRUCTION

SOIL DESCRIPTION AND CLASSIFICATION (PER STATE OF MAINE SUBSURFACE WASTEWATER DISPOSAL RULES)

Observation Hole TP 1 ☒ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
GRAVELLY FINE SANDY LOAM	FRIABLE	DARK BROWN	
		DARK YELLOWISH BROWN	
GRAVELLY LOAMY SAND	FIRM	OLIVE BROWN	FEW FAINT SATURATED
BEDROCK			

Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
3 AIII/C	%	15 "	<input type="checkbox"/> Restrictive Layer
Profile Condition			<input type="checkbox"/> Bedrock
TUNBRIDGE			<input type="checkbox"/> Pit Depth

Observation Hole TP 2 ☒ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
		DARK BROWN	
FINE SANDY LOAM		DARK YELLOWISH BROWN	
	FRIABLE	MIXED DARK YELLOWISH BROWN	FEW FAINT
STONY LOAMY SAND & SAND	FIRM	OLIVE BROWN	COMMON DISTINCT & SATURATED
BEDROCK			

Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
3 AIII/C	%	15 "	<input type="checkbox"/> Restrictive Layer
Profile Condition			<input type="checkbox"/> Bedrock
TUNBRIDGE			<input type="checkbox"/> Pit Depth

SOIL DESCRIPTION AND CLASSIFICATION (PER STATE OF MAINE SUBSURFACE WASTEWATER DISPOSAL RULES)

Observation Hole TP 3 ☒ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
FINE SANDY LOAM	FRIABLE	DARK BROWN	
		YELLOWISH BROWN	
LOAMY SAND	SOMEWHAT FIRM	OLIVE BROWN	FEW FAINT FREE WATER
BEDROCK			

Soil Classification	Slope	Limiting Factor	<input type="checkbox"/> Ground Water
3 AIII/D	%	17-27 "	<input type="checkbox"/> Restrictive Layer
Profile Condition			<input checked="" type="checkbox"/> Bedrock
LYMAN-TUNBRIDGE (SWP VARIANT)			<input type="checkbox"/> Pit Depth

Observation Hole TP 4 ☒ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
		DARK BROWN	
FINE SANDY LOAM	FRIABLE	OLIVE BROWN	
SANDY LOAM & LOAMY SAND	FIRM		COMMON FAINT
BEDROCK			

Soil Classification	Slope	Limiting Factor	<input type="checkbox"/> Ground Water
3 AIII/D	%	21 "	<input type="checkbox"/> Restrictive Layer
Profile Condition			<input checked="" type="checkbox"/> Bedrock
LYMAN (VARIANT)			<input type="checkbox"/> Pit Depth

James Logan
SIGNATURE

237/213

LSE/CSS #

2/23/22

DATE

SOIL TEST PIT PROFILE DESCRIPTIONS

LONGVIEW PARTNERS, LLC
6 SECOND STREET BUXTON, MAINE

Town, City, Plantation

Street, Road, Subdivision

Owner's Name

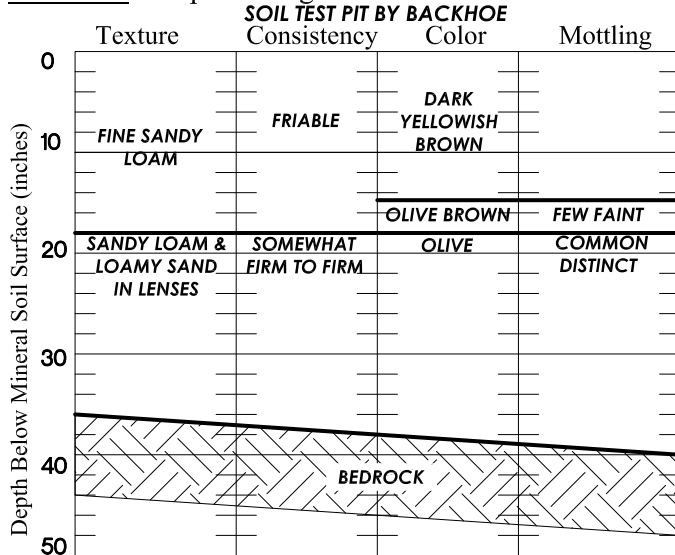
KENNEBUNKPORT

GOOSE ROCKS ROAD (MAP 15, BLK 1, LOT 1)

CREATIVE COAST CONSTRUCTION

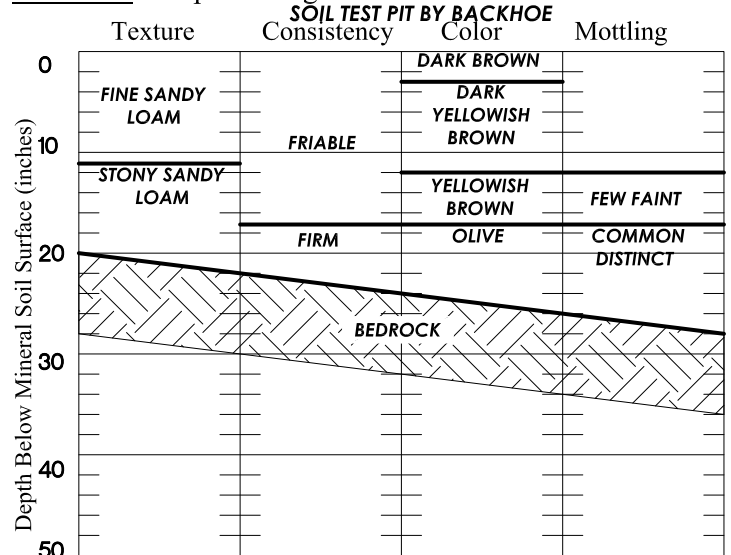
SOIL DESCRIPTION AND CLASSIFICATION (PER STATE OF MAINE SUBSURFACE WASTEWATER DISPOSAL RULES)

Observation Hole TP 5 ☒ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil



Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
3 AIII/C Profile Condition	%	15 "	
TUNBRIDGE (VARIANT)			

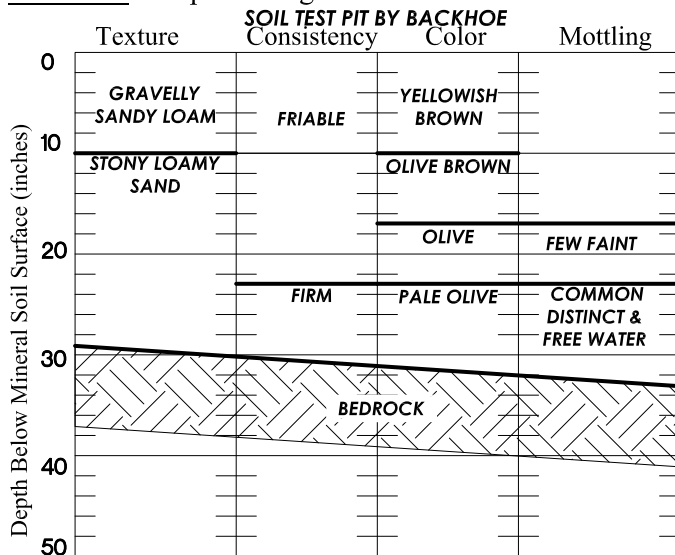
Observation Hole TP 6 ☒ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil



Soil Classification	Slope	Limiting Factor	<input type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input checked="" type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
3 AIII/D Profile Condition	%	20-28 "	
TUNBRIDGE (VARIANT)			

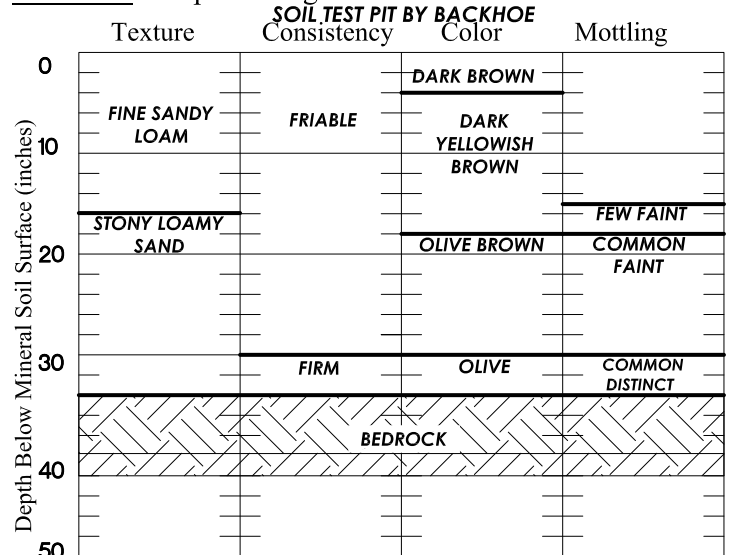
SOIL DESCRIPTION AND CLASSIFICATION (PER STATE OF MAINE SUBSURFACE WASTEWATER DISPOSAL RULES)

Observation Hole TP 7 ☒ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil



Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
3 AIII/C Profile Condition	%	17 "	
TUNBRIDGE			

Observation Hole TP 8 ☒ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil



Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
3 AIII/C Profile Condition	%	15 "	
TUNBRIDGE			

James Logan
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237/213
LSE/CSS #

2/23/22
DATE

SOIL TEST PIT PROFILE DESCRIPTIONS

LONGVIEW PARTNERS, LLC
6 SECOND STREET BUXTON, MAINE

Town, City, Plantation

Street, Road, Subdivision

Owner's Name

KENNEBUNKPORT

GOOSE ROCKS ROAD (MAP 15, BLK 1, LOT 1)

CREATIVE COAST CONSTRUCTION

SOIL DESCRIPTION AND CLASSIFICATION (PER STATE OF MAINE SUBSURFACE WASTEWATER DISPOSAL RULES)

Observation Hole TP 9 ☒ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0		DARK BROWN	
FINE SANDY LOAM	FRIABLE	YELLOWISH BROWN	
10			
STONY LOAMY SAND	FIRM	OLIVE BROWN	FEW FAINT
20			COMMON DISTINCT
30			
40			
50			

LIMIT OF EXCAVATION @ 40"

Soil Classification
3 C
Profile Condition
SKERRY

Slope _____ %

Limiting Factor **18** "

☒ Ground Water
☐ Restrictive Layer
☐ Bedrock
☐ Pit Depth

Observation Hole TP 10 ☒ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0		DARK YELLOWISH BROWN	NONE EVIDENT
FINE SANDY LOAM	FRIABLE		
10			
BEDROCK			
20			
30			
40			
50			

Soil Classification
2 AI
Profile Condition
ABRAM/LYMAN

Slope _____ %

Limiting Factor **4-12** "

☐ Ground Water
☐ Restrictive Layer
☒ Bedrock
☐ Pit Depth

SOIL DESCRIPTION AND CLASSIFICATION (PER STATE OF MAINE SUBSURFACE WASTEWATER DISPOSAL RULES)

Observation Hole TP 11 ☒ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0		DARK BROWN	
FINE SANDY LOAM	FRIABLE	YELLOWISH BROWN	
10			
STONY LOAMY SAND	FIRM	OLIVE BROWN	COMMON DISTINCT
20			FEW FAINT
30			
BEDROCK			
40			
50			

Soil Classification
3 C
Profile Condition
TUNBRIDGE

Slope _____ %

Limiting Factor **31** "

☐ Ground Water
☐ Restrictive Layer
☒ Bedrock
☐ Pit Depth

Observation Hole TP 12 ☒ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0		DARK BROWN	
FINE SANDY LOAM	FRIABLE	YELLOWISH BROWN	
10			
GRAVELLY LOAMY COARSE SAND	FIRM	MIXED DARK YELLOWISH BROWN	FEW FAINT
20		OLIVE BROWN	COMMON FAINT
30			
BEDROCK			
40			
50			

Soil Classification
3 AIII/C
Profile Condition
TUNBRIDGE

Slope _____ %

Limiting Factor **17** "

☒ Ground Water
☐ Restrictive Layer
☐ Bedrock
☐ Pit Depth

James Logan
SIGNATURE

237/213
LSE/CSS #

2/23/22
DATE

SOIL TEST PIT PROFILE DESCRIPTIONS

LONGVIEW PARTNERS, LLC
6 SECOND STREET BUXTON, MAINE

Town, City, Plantation

Street, Road, Subdivision

Owner's Name

KENNEBUNKPORT

GOOSE ROCKS ROAD (MAP 15, BLK 1, LOT 1)

CREATIVE COAST CONSTRUCTION

SOIL DESCRIPTION AND CLASSIFICATION (PER STATE OF MAINE SUBSURFACE WASTEWATER DISPOSAL RULES)

Observation Hole TP 13 ☒ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil

SOIL TEST PIT BY BACKHOE

Texture	Consistency	Color	Mottling
0		DARK YELLOWISH BROWN	
FINE SANDY LOAM			
10	FRIABLE	YELLOWISH BROWN	
20		OLIVE BROWN	FEW FAINT
GRAVELLY SANDY LOAM & LOAMY SAND	FIRM	OLIVE	COMMON DISTINCT
30			
40			
50			
LIMIT OF EXCAVATION @ 45"			

Soil Classification 3 C
Profile Condition
SKERRY/DIXFIELD

Slope _____ %

Limiting Factor 19 "

☒ Ground Water
☐ Restrictive Layer
☐ Bedrock
☐ Pit Depth

Observation Hole TP 14 ☒ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil

SOIL TEST PIT BY BACKHOE

Texture	Consistency	Color	Mottling
0		DARK BROWN	
SANDY LOAM	FRIABLE	YELLOWISH BROWN	
10		OLIVE BROWN	FEW FAINT
20	SOMEWHAT FIRM	OLIVE GRAY	COMMON DISTINCT
SILT LOAM	FIRM		
30			
40			
50			
LIMIT OF EXCAVATION @ 40"			

Soil Classification 8 C
Profile Condition
DIXFIELD (VARIANT)

Slope _____ %

Limiting Factor 16 "

☒ Ground Water
☐ Restrictive Layer
☐ Bedrock
☐ Pit Depth

SOIL DESCRIPTION AND CLASSIFICATION (PER STATE OF MAINE SUBSURFACE WASTEWATER DISPOSAL RULES)

Observation Hole TP 15 ☒ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil

SOIL TEST PIT BY BACKHOE

Texture	Consistency	Color	Mottling
0	FINE SANDY LOAM	FRIABLE	BLACK
			NONE EVIDENT
10			BEDROCK
20			
30			
40			
50			

Soil Classification 2 AI
Profile Condition
ABRAM

Slope _____ %

Limiting Factor 2-4 "

☐ Ground Water
☐ Restrictive Layer
☒ Bedrock
☐ Pit Depth

Observation Hole TP 16 ☒ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil

SOIL TEST PIT BY BACKHOE

Texture	Consistency	Color	Mottling
0		DARK BROWN	
FINE SANDY LOAM	FRIABLE	DARK YELLOWISH BROWN	
10		YELLOWISH BROWN	
20		OLIVE BROWN	FEW FAINT
SILT LOAM	FIRM	OLIVE GRAY	COMMON DISTINCT
30			
40			
50			
FRACTURED BEDROCK			

Soil Classification 8 AIII/C
Profile Condition
TUNBRIDGE (ATYPICAL)

Slope _____ %

Limiting Factor 15 "

☒ Ground Water
☐ Restrictive Layer
☐ Bedrock
☐ Pit Depth

James Logan
SIGNATURE

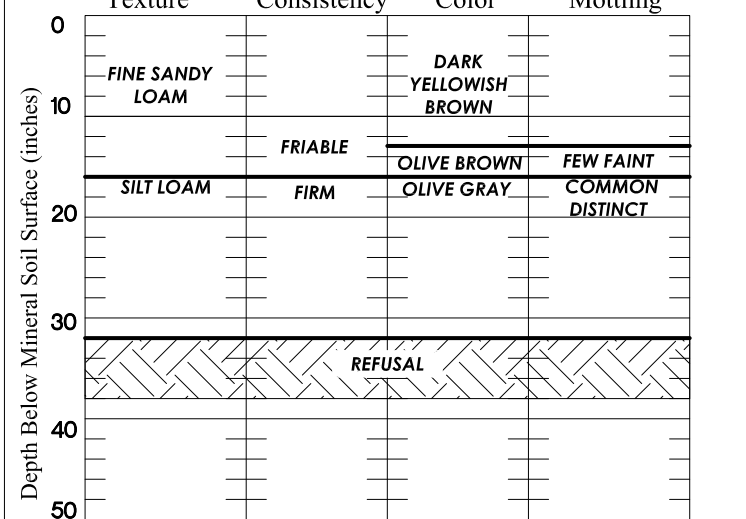
237/213
LSE/CSS #

2/23/22
DATE

<p><i>SOIL TEST PIT PROFILE DESCRIPTIONS</i></p>	<p><i>LONGVIEW PARTNERS, LLC</i> <i>6 SECOND STREET BUXTON, MAINE</i></p>
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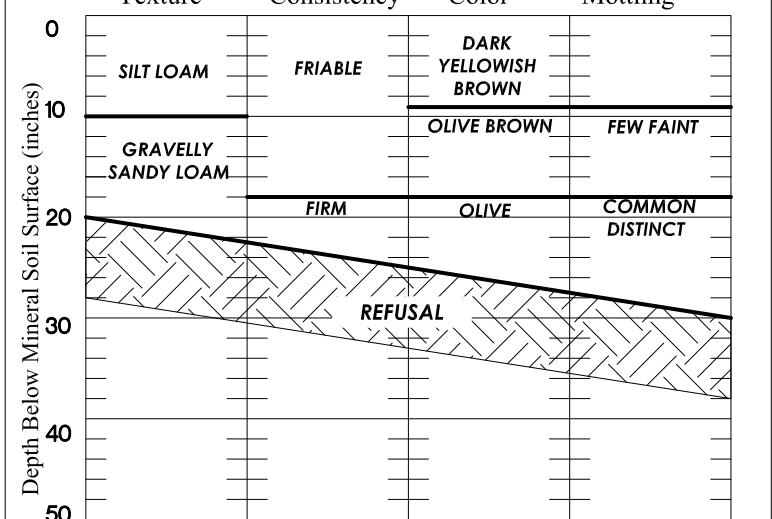
Town, City, Plantation	Street, Road, Subdivision	Owner's Name
KENNEBUNKPORT	GOOSE ROCKS ROAD (MAP 15, BLK 1, LOT 1)	CREATIVE COAST CONSTRUCTION

Observation Hole TP 17 ☒ Test Pit ☐ Boring
 _____ " Depth of Organic Horizon Above Mineral Soil

[illegible]

Observation Hole TP 18 ☒ Test Pit ☐ Boring
 _____" Depth of Organic Horizon Above Mineral Soil

SOIL TEST PIT BY BACKHOE					
Texture	Consistency	Color	Mottling		



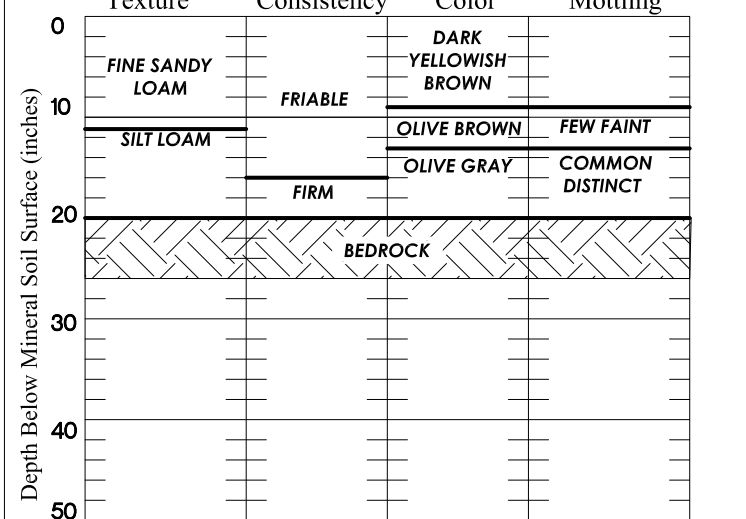
Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
<u>8</u> <u>AIII/D</u> Profile Condition TUNBRIDGE (ATYPICAL)	_____ %	<u>13</u> "	

Soil Classification <u>8</u> <u>AIII/D</u> Profile Condition TUNBRIDGE (VARIANT)	Slope _____ %	Limiting Factor <u>9</u> "	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
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SOIL DESCRIPTION AND CLASSIFICATION (PER STATE OF MAINE SUBSURFACE WASTEWATER DISPOSAL RULES)	
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Observation Hole TP 19 ☒ Test Pit ☐ Boring
 _____" Depth of Organic Horizon Above Mineral Soil

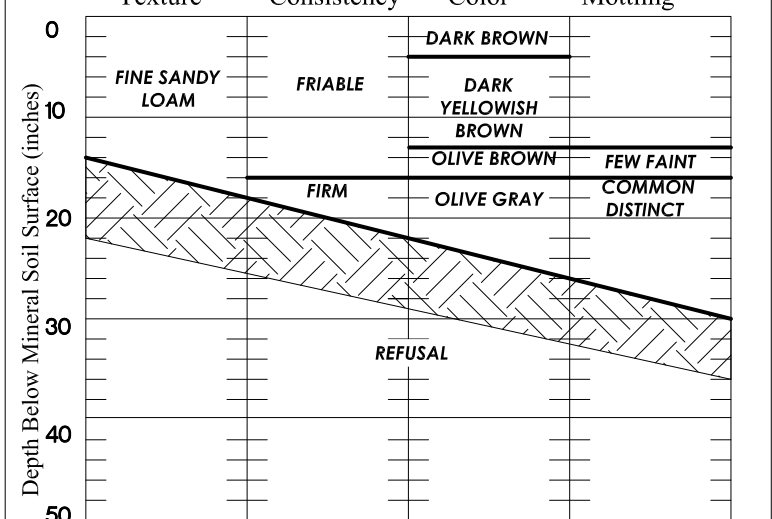
	Texture	SOIL TEST PIT BY BACKHOE Consistency Color Mottling		
Topsoil				
Subsoil				
Bedrock				



Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
<u>8</u> <i>AIII/D</i> Profile Condition <i>TUNBRIDGE (VARIANT)</i>	_____ %	<u>9</u> " "	

Observation Hole TP 20 ☒ Test Pit ☐ Boring
 _____ " Depth of Organic Horizon Above Mineral Soil

	SOIL TEST PIT BY BACKHOE	
Texture	Consistency Color Mottling	



Soil Classification <u>8</u> <u>AIII/D</u> Profile Condition TUNBRIDGE (VARIANT)	Slope _____ %	Limiting Factor <u>14-30 "</u>	<input type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input checked="" type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
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<i>SOIL TEST PIT PROFILE DESCRIPTIONS</i>	<i>LONGVIEW PARTNERS, LLC</i> <i>6 SECOND STREET BUXTON, MAINE</i>
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Town, City, Plantation	Street, Road, Subdivision	Owner's Name
KENNEBUNKPORT	GOOSE ROCKS ROAD (MAP 15, BLK 1, LOT 1)	CREATIVE COAST CONSTRUCTION

Depth Below Mineral Soil Surface (inches)	SOIL TEST PIT BY BACKHOE			
	Texture	Consistency	Color	Mottling
0			DARK BROWN	
10	GRAVELLY FINE SANDY LOAM	FRIABLE	DARK YELLOWISH BROWN	FEW FAINT
20	GRAVELLY FINE SANDY LOAM W/ SILT IN LENSES	FIRM	OLIVE GRAY	COMMON FAINT & FREE WATER
30				
40	REFUSAL (LARGE STONES/BEDROCK)			
50				

	Texture	Consistency	Color	Mottling
0				
10				
20				
30				
40				
50				

Soil Classification		Slope	Limiting Factor	<input type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
Profile	Condition	_____ %	_____ "	

	Texture	Consistency	Color	Mottling
0				
10				
20				
30				
40				
50				

	Texture	Consistency	Color	Mottling
0				
10				
20				
30				
40				
50				

Soil Classification		Slope	Limiting Factor	<input type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
_____ Profile	_____ Condition	_____%	_____"	

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