

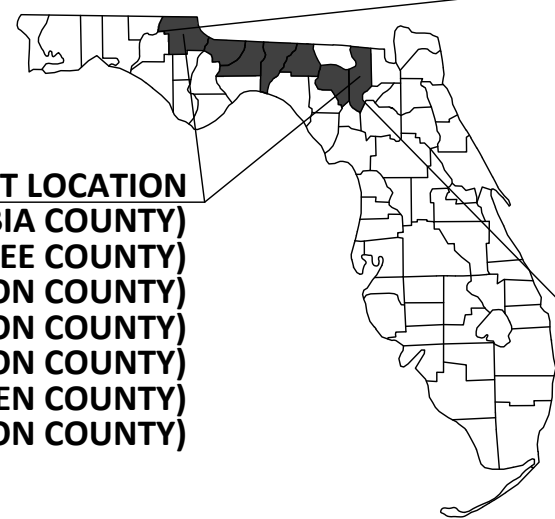
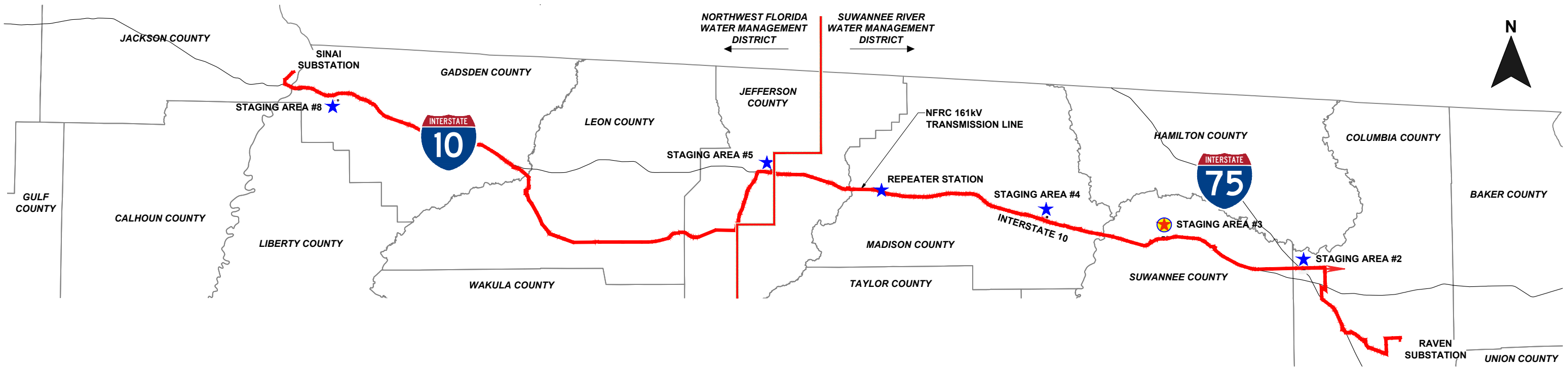
# GULF POWER COMPANY

## NFRC TRANSMISSION LINE PROJECT △

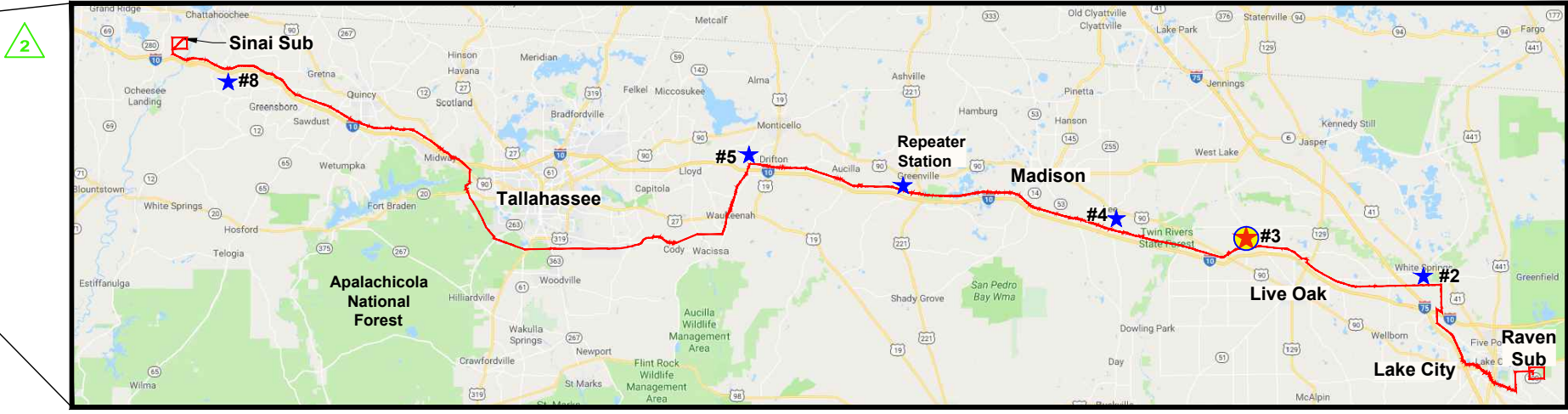
### TEMPORARY STAGING AREA NO. 3

### SITE PLAN EXHIBIT

CAD FILE: S:\Projects\108\_Gulf Power\19-108-1002\_Raven-Sinai\_161kV Line Detailed Engineering\Drawings\Staging Areas Exhibit\NFRC\_Exh\_SA03\_R02.dwg PLOT DATE/TIME: 3/17/2020 - 3:22pm BY: Guido Controni



**PROJECT LOCATION**  
 (COLUMBIA COUNTY)  
 (SUWANNEE COUNTY)  
 (MADISON COUNTY)  
 (JEFFERSON COUNTY)  
 (LEON COUNTY)  
 (GADSDEN COUNTY)  
 (JACKSON COUNTY)



**LEGEND**

★ PROPOSED STAGING AREAS & REPEATER STATION



**Know what's below.  
before you dig.**

C O N T E N T S	
<b>STAGING AREA NO. 3 SITE EXHIBIT</b>	<span style="color: green;">△</span>
GENERAL NOTES AND SITE INFORMATION	SHEET 2
PLAN VIEW AND CROSS SECTIONS	SHEETS 3 - 4
TYPICAL CONSTRUCTION DETAILS	SHEET 5
FENCE AND BMP DETAILS	SHEET 6

**NOTICE:**  
 CONTRACTOR SHALL VERIFY ALL CONDITIONS ON JOB SITE & NOTIFY PROJECT MANAGER AND ENGINEER OF ANY VARIATIONS FROM DIMENSIONS SHOWN ON THESE DRAWINGS BEFORE PROCEEDING WITH ANY CONSTRUCTION.

**PICKETT AND ASSOCIATES, INC**  
 5025 WEST GRACE STREET  
 TAMPA, FLORIDA 33607  
 PHONE: (813) 877-7770  
 CA #31323 LB #364

FLORIDA LICENSED PROFESSIONAL ENGINEER No. 45287  
 PROFESSIONAL SURVEYOR & MAPPER No. 5658

**TRANSMISSION ENGINEERING DEPARTMENT**

SCALE: N.T.S.	ENGINEER: MKL	SECTION: AS SHOWN
DRAFTER: GCC	CHECKED: JJB	COUNTY: SUWANNEE
SHEET: 1 OF 6		FILE NAME: NFRC_EXH_SA02_R02.dwg

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1	11/22/19	REVISIONS, CLARIFICATIONS FOR RAI RESPONSE 11-22-19	GCC JJB MKL
			BY CHK APP

NORTH FLORIDA RESILIENCY CONNECTION (NFRC)  
 STAGING AREA NO. 3 SITE PLAN EXHIBIT  
 FOR TEMPORARY USE AS LAYDOWN YARDS

**STAGING AREA NO. 3  
SITE PLAN EXHIBIT**

# GULF POWER COMPANY

## NFRC TRANSMISSION LINE PROJECT

### TEMPORARY STAGING AREA NO. 3

### SITE PLAN EXHIBIT

**SURVEYOR'S NOTES:**

1. NORTH, THE BEARINGS AND THE COORDINATES SHOWN HEREON ARE REFERENCE TO THE WEST ZONE OF THE FLORIDA STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM OF 1983 (NAD 83/ FLW-83) CORS 2011..
2. ELEVATIONS ARE TO NORTH AMERICAN VERTICAL DATUM OF 1988 AND ARE FOR REFERENCE AND GRAPHICAL DISPLAY PURPOSES ONLY. TEMPORARY BENCHMARKS WILL BE SET AT EACH CROSSING SITE LOCATION AS REQUIRED.
3. SURVEY INFORMATION SHOWN HEREON PERTAINING TO RIGHT-OF-WAY AND EASEMENTS IS BASED ON A SURVEYS PROVIDED BY GULF POWER.
4. NO UNDERGROUND UTILITIES AND/OR IMPROVEMENTS SHOWN HEREON A SUBSURFACE INVESTIGATION WAS NOT PERFORMED AS PART OF THIS SURVEY.
5. THE AERIAL IMAGERY SHOWN HEREIN ARE A COMBINATION OF 2015/2016/2017 ORTHOGRAPHIC IMAGES OBTAINED FROM THE FLORIDA DEPARTMENT OF TRANSPORTATION A+PLUS WEBSITE.
6. PROPERTY THE PROPOSED STAGING AREA IS LOCATED ON IS THERE BY GRANTED EASEMENT TO GULF POWER.

**SITE DATA:**

**STAGING AREA #3 - SUWANNEE COUNTY - SRWMD**  
**153RD ROAD, LIVE OAK, FL**  
**PID 36-01S-12E-0981400.0000**

**PROJECT NARRATIVE:**

TEMPORARY STAGING AREA NO. 3 IS REQUIRED TO STAGE AND STORE CONSTRUCTION MATERIALS (POLES, CONDUCTOR, INSULATORS, ETC.) AND EQUIPMENT (DRILL RIGS, LINE TRUCKS, CRANES, ETC.) FOR THE NORTH FLORIDA RESILIENCY CONNECTION (NFRC) PROJECT. THE NFRC PROJECT IS A 176 MILE LENGTH CORRIDOR THAT IS BROKEN UP INTO APPROXIMATELY 20 MILE SEGMENTS RESULTING IN THE NEED FOR FIVE (5) TOTAL TEMPORARY STAGING AREAS. EACH STAGING AREA IS SIZED TO BE ABLE TO STORE ITS PRO-RATA SHARE OF THE MATERIAL. THE AVERAGE SITE SELECTION CRITERIA IS FOR EACH STAGING AREA TO BE APPROXIMATELY 16.0 ACRES TOTAL WITH APPROXIMATELY 12.6 ACRES OF DEVELOPED AREA. THE DEVELOPED AREA WILL CONSIST OF AN AT GRADE #57 CRUSHED LIMEROCK SURFACE ON UNCOMPACTED SUBBASE TO FACILITATE THE STORAGE OF POLES AND EQUIPMENT ALONG WITH A GEOWEB SEDIMENT CONTAINMENT CELL PERIMETER ROAD OF #57 CRUSHED LIMEROCK FILL TO FACILITATE ACCESS.

TEMPORARY STAGING AREA NO. 3 SITE PLAN STORMWATER DESIGN HAS BEEN REVIEWED TO ENSURE THAT EXISTING SURFACE WATER FLOW WILL FLOW SIMILAR TO IT'S PREDEVELOPED CONDITION. THE DIFFERENCE BETWEEN PRE AND POST-DEVELOPED RUNOFF WILL BE STORED ON SITE WITH DRY RETENTION PONDS AND/OR THE ROCK VOIDS. DISCHARGE WILL NOT EXCEED THE PRE-DEVELOPED CONDITION FOR WATER TREATMENT AND RECOVERY. THIS SITE WILL USE A COMBINATION OF THE VOID SPACE BETWEEN THE #57 CRUSHED LIMEROCK AND A SERIES OF CHECK DAMN SYSTEMS MADE WITH WATER AND ROOT BARRIER SYSTEMS FOR STORAGE FOR THE FIRST 1" OR THE FIRST 1/2" OF RUNOFF, WHICH EVER IS GREATER, AS DIRECTED BY THE GOVERNING SUWANNEE RIVER WATER MANAGEMENT DISTRICT STORMWATER DESIGN MANUAL REQUIREMENTS. GULF POWER HAS DONE EXTENSIVE TESTING ON THIS VOID RATIO AND HAS DETERMINED THAT A 35% VOID RATIO PROVIDES A GOOD CONSERVATIVE VALUE. ANY TREATMENT VOLUMES NOT ABLE TO RECOVER IN THE ROCK VOIDS WILL UTILIZE DRY RETENTION PONDS FOR THE REMAINING VOLUME. THE TREATMENT VOLUMES ARE DESIGNED TO RECOVER WITHIN THE 72 HOUR REQUIREMENT. SOIL BORINGS AND DOUBLE RING INFILTRMETER TESTING WAS PERFORMED AT EACH SITE TO FACILITATE THE DESIGN OF EACH DRY POND AND ROCK VOID STORAGE AREA. REFER TO GEOGRAPHICAL REPORT FOR DETAILS.

TEMPORARY STAGING ARE NO. 3 WILL REMAIN IN PLACE FOR THE DURATION OF THE PROJECT. AT THE CONCLUSION OF THE PROJECT, THIS SITE WILL BE RETURNED TO ITS PRE-CONSTRUCTION STATE BY THE CONTRACTOR. THE ANTICIPATED DURATION IS APPROXIMATELY 12 - 18 MONTHS.

**GENERAL SITE NOTES:**

1. CONSTRUCTION AND MAINTENANCE ACCESS TO TEMPORARY STAGING AREA NO. 3 WILL BE GAINED VIA EXISTING ROAD RIGHT-OF-WAY OF 153RD ROAD. CONNECTOR APRONS WILL BE CONSTRUCTED IN ACCORDANCE WITH COUNTY / STATE REQUIREMENTS.
2. TEMPORARY STAGING AREA NO. 3 EXISTS ON EASEMENTS MADE THRU LAND NEGOTIATIONS WITH CURRENT LANDOWNERS. THIS SITE HAS UNDERGONE A FULL EVALUATION / VETTING RELATIVE TO AVOIDANCE OF ENVIRONMENTAL, CULTURAL, AND WILDLIFE HABITAT IMPACT. NO TREE REMOVAL WILL BE NECESSARY TO FACILITATE CONSTRUCTION OF THIS SITE.
3. TEMPORARY STAGING AREA NO. 3 WILL CONFORM WITH ALL FEDERAL, STATE, AND LOCAL ORDINANCES AND REGULATIONS FOR LONG TERM STORAGE MATERIALS.
4. DELIVERIES AND ACTIVE USE OF THIS SITE WILL BE CONSISTENT WITH CONSTRUCTION HOURS.
5. ALL PROPOSED SEMI-PERVIOUS MATERIAL WILL BE INSTALLED AT THE EXISTING NATURAL GROUND ELEVATION THROUGHOUT THE SITE TO MINIMIZE IMPEDANCE OF THE EXISTING WATERSHED.
6. WHEN THE PROPOSED ACTIVITIES OCCUR ADJACENT TO WETLANDS, APPROPRIATE SEDIMENT CONTROL METHODS WILL BE USED, AS REQUIRED. SEDIMENT CONTROLS INCLUDE THE INSTALLATION OF STAKED SILT FENCES ALONG PROPOSED FILL ADJACENT WETLANDS. NO FILL OR GRADING WORK WILL OCCUR IN WETLAND AREAS.

**CONSTRUCTION NOTES:**

1. CONTRACTOR SHALL INSTALL AND MAINTAIN BMP'S PER THE APPROVED SWPPP (STORM WATER POLLUTION PREVENTION PLAN, I.E. SILT FENCE, TURBIDITY BARRIER) AND WWACCM MANUAL AROUND THE PERIMETER TO THE WORK ZONES DURING CONSTRUCTION. BMP'S SHALL ONLY BE REMOVED AFTER ALL CONSTRUCTION HAS BEEN COMPLETED AND ESTABLISHED.
2. CONTRACTOR SHALL CONSTRUCT PONDS AND/OR SWALES AS SHOWN IN THE DRAWINGS. CONTRACTOR SHALL SOD THE SIDE SLOPES AFTER GRADING TO STABILIZE THE DISTURBED SOIL AND EMBANKMENTS AND TO CONTROL EROSION. SEEDING AND SODDING SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION. THE SIDES OF POND/SWALE AREAS SHALL BE SODDED AND THE BOTTOMS SHALL BE SEEDED AND MULCHED. CONTRACTOR SHALL DISC THE AREAS TO EMBED THE SEED AND MULCH AND SHALL THEN RE-COMPACT THE SURFACE. CONTRACTOR SHALL MAINTAIN THE SOD AND SEED UNTIL FINAL ACCEPTANCE OF THE WORK.
3. CONTRACTOR SHALL INSTALL CHECK DAMS ALONG THE EXISTING (1) ONE FOOT CONTOUR ELEVATIONS AS SHOWN ON THE PLANS AND ALONG THE INTERIOR OF THE ROADWAYS BETWEEN THE ROCK LAYDOWN AREAS AND THE EDGE OF GEOWEB ROAD. SEE DETAIL 3 ON SHEET 5.
4. CONTRACTOR SHALL REMOVE THE TOP LAYER OF VEGETATION ON THE SITE BEFORE BEGINNING ANY GRADING OR SITE WORK. SITE SHALL MAINTAIN EXISTING SLOPES AND GENERAL GRADING CHARACTERISTICS.
5. IF ANY OBSTRUCTIONS OR VARIANCES EXIST, CONTRACTOR MUST NOTIFY THE ENGINEER OF RECORD.

**FLOOD ZONE NOTES:**

1. FLOOD ZONE INFORMATION BASED ON THE COLUMBIA COUNTY, FLORIDA FLOOD INSURANCE RATE MAPS:

MAP NUMBER 12023C0167D (DATED 11-02-18)

2. APPLICABLE FLOOD ZONE DELINEATIONS PER THE ABOVE REFERENCED FLOOD INSURANCE RATE MAP ARE AS FOLLOWS:

**ZONE X AREA OUTSIDE THE 100-YEAR FLOOD PLAIN**

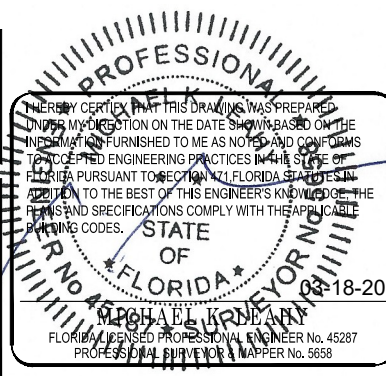
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STATE OF FLORIDA  
 PROFESSIONAL ENGINEER  
 MICHAEL LEAHY  
 LICENSE NO. 45287  
 EXPIRES 03-18-20

**TRANSMISSION ENGINEERING DEPARTMENT**

SCALE: N.T.S.	ENGINEER: MKL
DRAFTER: GCC	CHECKED: JJB
SHEET: 2 OF 6	SECTION: AS SHOWN
	COUNTY: SUWANNEE
	FILE NAME: NFRC_EXH_SA02_R02.dwg

NORTH FLORIDA RESILIENCY CONNECTION (NFRC)  
 STAGING AREA NO. 3 SITE PLAN EXHIBIT  
 FOR TEMPORARY LAYDOWN YARDS



**STAGING AREA NO. 3  
 SITE PLAN EXHIBIT**

CAD FILE: S:\Projects\108\_Gulf Power\19-108-1002\_Raven-Sinal Line Detailed Engineering\Drawings\Staging Areas\Exhibit\NFRC\_Exh\_SA03\_R02.dwg PLOT DATE/TIME: 3/17/2020 - 3:22pm By: Guido Controni

**Staging Area #3 - Suwannee County - SRWMD**

153rd Road, Live Oak, FL  
PID 36-01S-12E-0981400.0000

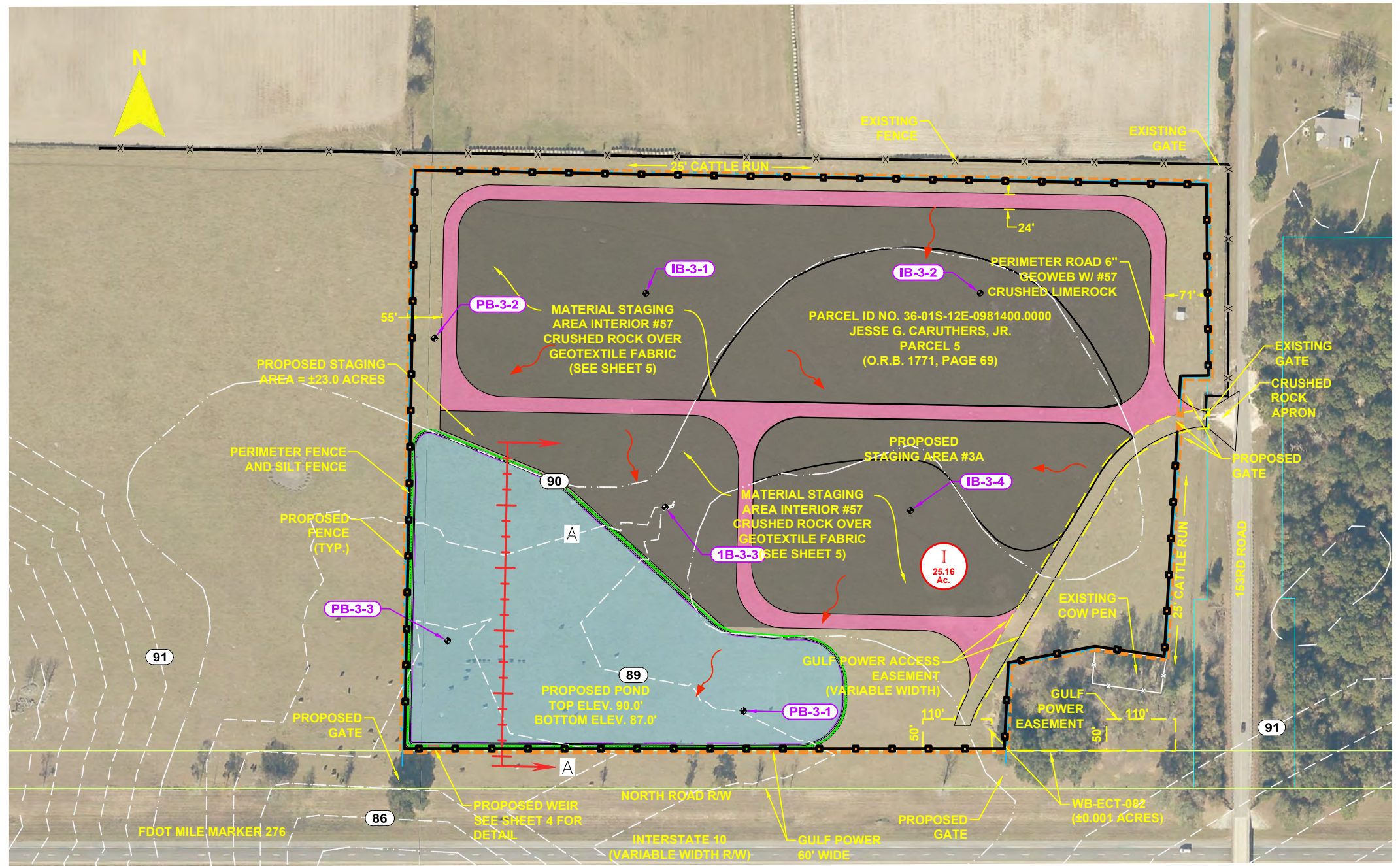
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**Table 3: Pond Storage Data**

Basin No.	Elevation (ft, NAVD 88)	Area (ac)	Provided Volume (acft)	Required Volume (acft)	Provided Discharge at Weir (cfs)
I	Top of Pond	90.0	5.09		
	Peak Water Elev.	88.9		12.13	7.45
	Weir Elev.	88.5			35.14
	Bottom of Pond	87.5	4.85		

**Table 4: Summary of Treatment Volume and Recovery**

Basin No.	Treatment Volume Required (acft)	Treatment Volume Provided (acft)		Recovery Time (hrs)
		Rock Voids	Water Quality Basins	
I	1.17	2.32	Not Required for Treatment	6



**GENERAL NOTES:**

- CHECK DAMS WILL BE INSTALLED ALONG EXISTING (1) ONE FOOT CONTOUR ELEVATIONS AS SHOWN, AND AS A BARRIER BETWEEN THE INTERIOR ROAD EDGE AND GRAVEL LAYDOWN AREA. SEE NOTES ON SHEET 2 AND DETAILS ON SHEET 5.
- INFORMATION OF WATER TABLE DEPTHS FOR SEASONAL HIGH WATER (SHW) ELEVATIONS IS BASED ON GEOTECHNICAL REPORTS PROVIDED BY B.J. ROCK.
- INTERIOR CRUSHED ROCK SHALL NOT BE COMPACTED (TYP.).
- FILL SHALL NOT BE PLACED IN WETLAND AREAS (TYP.).

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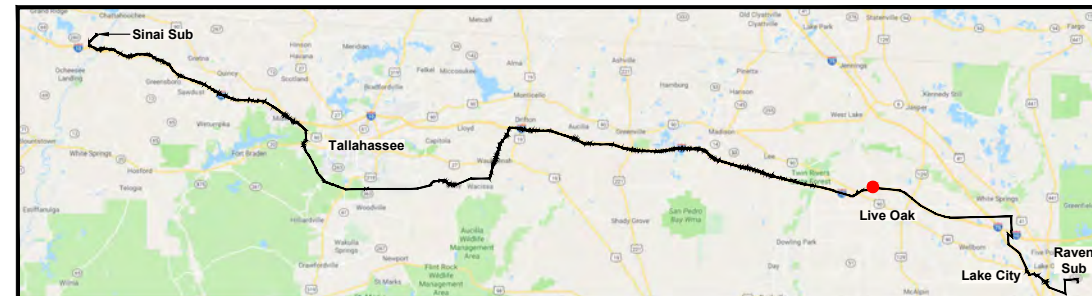
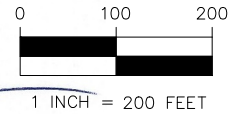
**LEGEND**

PROPOSED TEMPORARY STAGING AREA MATERIALS	WETLAND AREAS	EXISTING BOUNDARIES
L AT-GRADE ROCK LAYDOWN	WETLAND AREA	FEMA 100-YEAR FLOOD PLAIN LINE
R AT-GRADE GEOWEB ROAD	SURFACE WATER AREA	EASEMENT
C CRUSHED ROCK APRON	EXISTING GRADE	PROPERTY LINE
PROPOSED GRADE	DRAINAGE BASIN AREA BOUNDARY	SECTION LINE
PROPOSED PONDS & DITCHES	PROPOSED FENCE & GATES	RIGHT-OF-WAY LINE
TOP OF BANK	PROPOSED GATE	EXISTING FENCE
GRADE BREAK	PROPOSED FENCE	PROPOSED SILT FENCE
TOE OF SLOPE		
P/D PROPOSED POND/DITCH		

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**PROFESSIONAL SURVEYOR**  
MICHAEL K. LEAHY  
FLORIDA LICENSED PROFESSIONAL ENGINEER No. 45287  
PROFESSIONAL SURVEYOR & MAPPER No. 5658



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			BY CHK APP

**TRANSMISSION ENGINEERING DEPARTMENT**

SCALE: 1"=200'  
ENGINEER: MKL  
DRAFTER: GCC  
SHEET: 3 OF 6

SECTION: AS SHOWN  
COUNTY: SUWANNEE  
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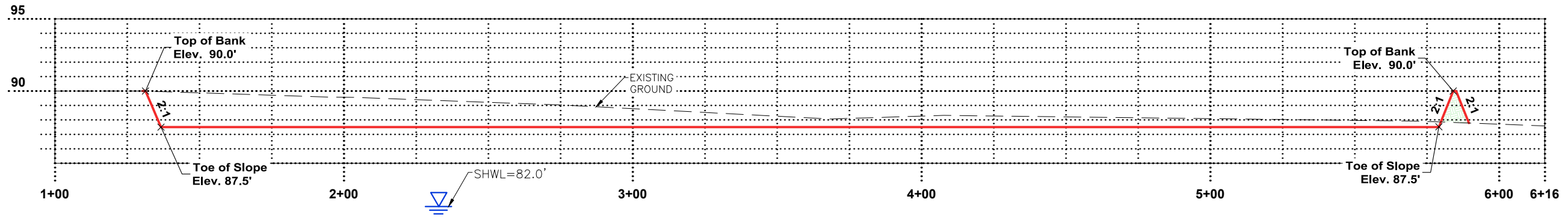
**Gulf Power**

**NFRC STAGING AREA NUMBER 3 SITE PLAN**

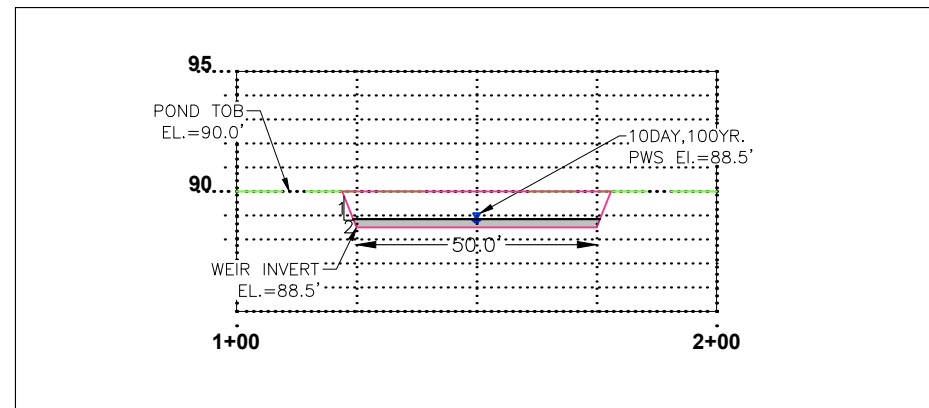
**Staging Area #3 - Suwannee County - SRWMD**

153rd Road, Live Oak, FL  
 PID 36-01S-12E-0981400.0000

SEE SHEET 2 FOR NOTES & SITE DETAILS  
 SEE SHEET 5 FOR TYPICAL CONSTRUCTION DETAILS



**SITE BASIN I**  
**CROSS SECTION VIEW A-A**  
 LOOKING EAST  
 HORZ. SCALE = 1" = 40'  
 VERT. SCALE = 1" = 8'



**SITE BASIN I**  
**WEIR CROSS SECTION**  
 HORZ. SCALE = 1" = 40'  
 VERT. SCALE = 1" = 8'

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**LEGEND**  
 EXISTING GROUND  
 PROPOSED GROUND

**TRANSMISSION ENGINEERING DEPARTMENT**

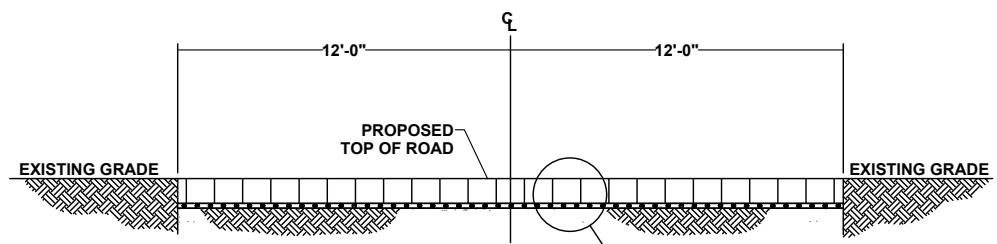
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 SHEET: 4 OF 6 FILE NAME: NFRC\_EXH\_SA02\_R02.dwg

**NORTH FLORIDA RESILIENCY CONNECTION (NFRC)**  
 STAGING AREA NO. 3 SITE PLAN EXHIBIT  
 FOR TEMPORARY LAYDOWN YARDS

**NFRC STAGING AREA NUMBER 3 SITE PLAN**

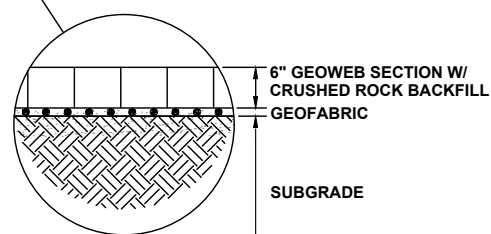
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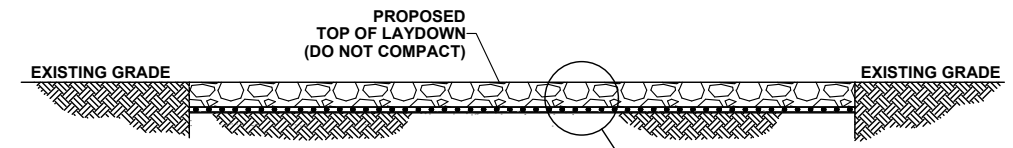
**TEMPORARY ROADWAY IMPROVEMENTS - AT GRADE GEOWEB STABILIZATION**

1. REMOVE THE TOP 6" OF EXISTING VEGETATED SURFACE MATERIAL BEFORE INSTALLING THE TEMPORARY ROADWAY IMPROVEMENTS.
2. SMOOTH SUBGRADE TO LEVEL ELEVATION ACROSS WIDTH OF 24' WIDE TEMPORARY ROAD.
3. PLACE ROAD BEDLINER, MIRAFI RS580i HIGH STRENGTH WOVEN GEOTEXTILE FABRIC, OR APPROVED EQUIVALENT. INSTALL GEOTEXTILE FABRIC PROVIDING MINIMUM LAP AS PER MANUFACTURER INSTALLATION INSTRUCTIONS AT THE LAP JOINT.
4. INSTALL 6" PERFORATED GEOWEB AND FILL WITH 4. NO 57 CRUSHED LIMEROCK.



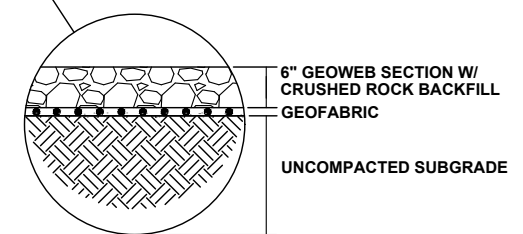
**DETAIL 1**

**TEMPORARY ROADWAY IMPROVEMENT AT-GRADE GEOWEB STABILIZATION WITH CRUSHED ROCK BACKFILL**



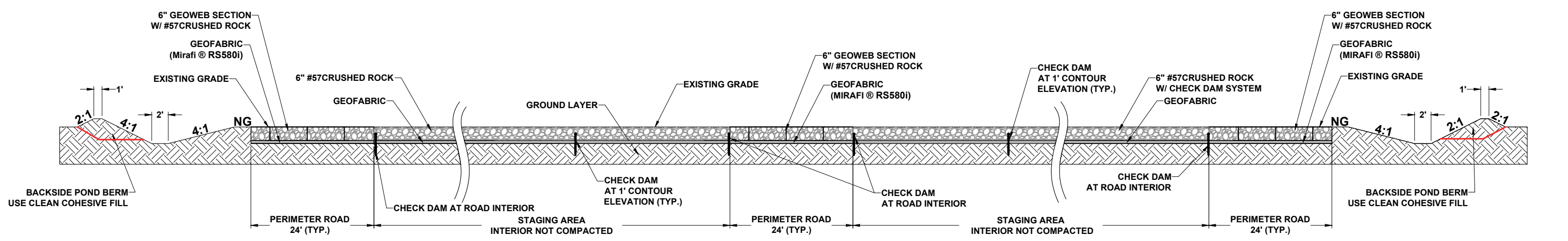
**TEMPORARY - AT GRADE LAYDOWN STABILIZATION**

1. REMOVE THE TOP 6" LAYER OF EXISTING VEGETATED SURFACE MATERIAL BEFORE INSTALLING THE TEMPORARY LAYDOWN STABILIZATION. DO NOT COMPACT SUBGRADE.
2. INSTALL CHECK DAM SYSTEM AT EXISTING 1 FOOT CONTOURS, USING 12" CR-PE MULTI PURPOSE ROOT & WATER BARRIER, OR EQUIVILANT (SEE TYPICAL PROFILE OF CHECK DAM SYSTEM). BURY 6" DEEP AND LEAVE TOP 6" EXPOSED AND PLUM.
3. PLACE ROAD BEDLINER, MIRAFI RS580i HIGH STRENGTH WOVEN GEOTEXTILE FABRIC, OR APPROVED EQUIVALENT. INSTALL GEOTEXTILE FABRIC PROVIDING MINIMUM LAP AS PER MANUFACTURER INSTALLATION INSTRUCTIONS AT THE LAP JOINT.
4. INSTALL 6" WASHED NO 57 CRUSHED ROCK BACKFILL.

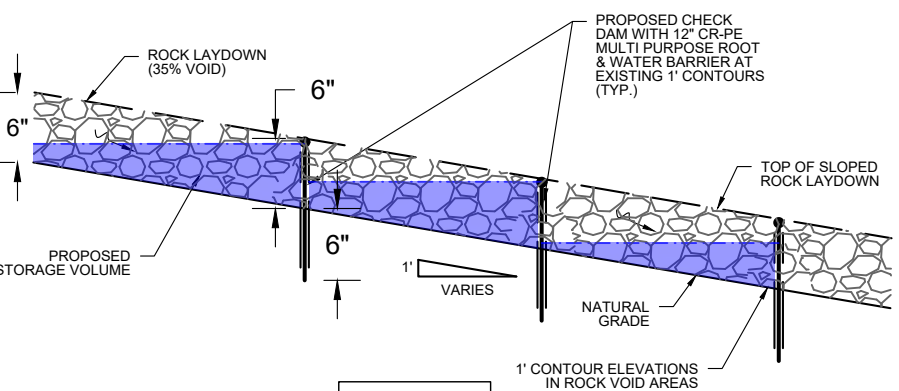


**DETAIL 2**

**TEMPORARY LAYDOWN AREA IMPROVEMENT AT-GRADE WASHED CRUSHED ROCK BACKFILL**

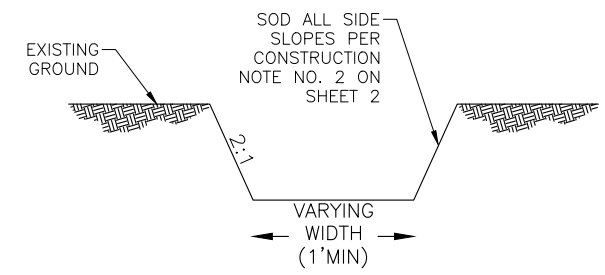


**TYPICAL CROSS SECTION PLAN FOR TEMPORARY ROCK LAYDOWN YARDS**



**DETAIL 3**

**TYPICAL PROFILE OF CHECK DAM SYSTEM FOR TEMPORARY ROCK LAYDOWN YARDS**



**STANDARD SWALE CROSS SECTION N.T.S.**

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			BY CHK APP

**TRANSMISSION ENGINEERING DEPARTMENT**

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 SHEET: 5 OF 6 FILE NAME: NFRC\_EXH\_SA02\_R02.dwg

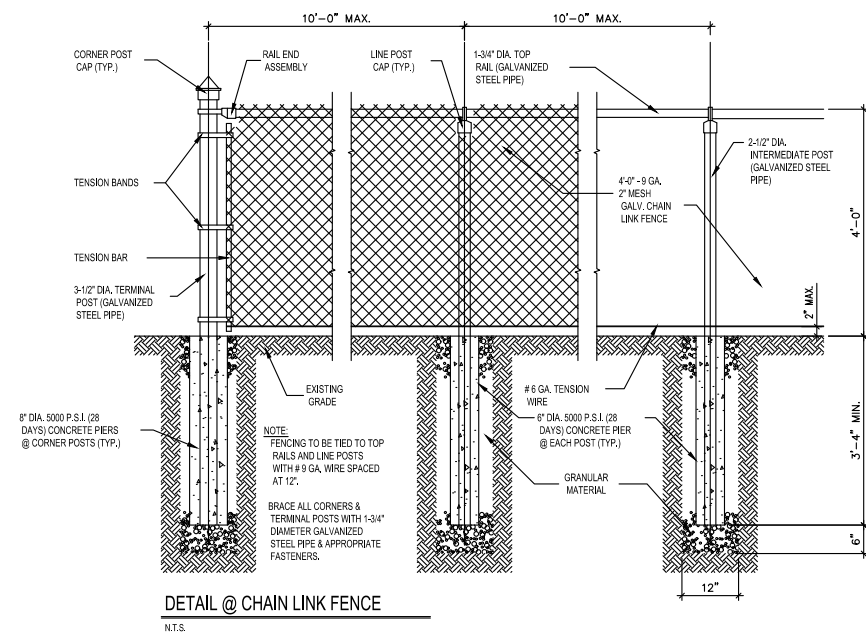
**Gulf Power**

NORTH FLORIDA RESILIENCY CONNECTION (NFRC)  
 STAGING AREA NO. 3 SITE PLAN EXHIBIT  
 FOR TEMPORARY LAYDOWN YARDS

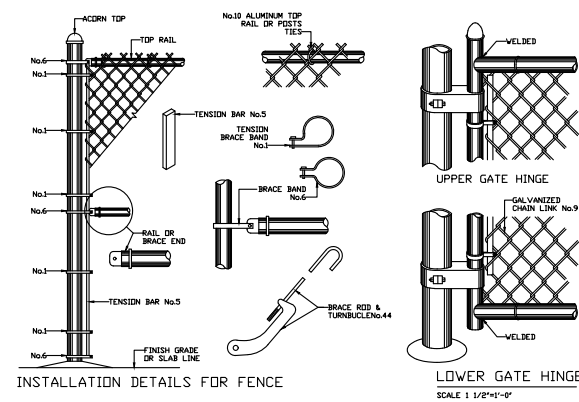
**NFRC STAGING AREA NUMBER 3 SITE PLAN**

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 PLOT DATE/TIME: 3/17/2020 3:24pm By: Guido Controni

# PERIMETER FENCE DETAILS

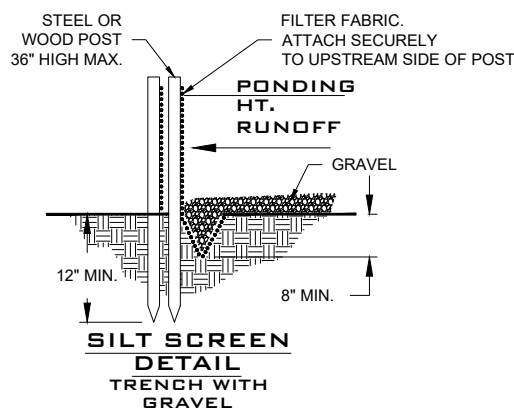


DETAIL @ CHAIN LINK FENCE  
N.T.S.

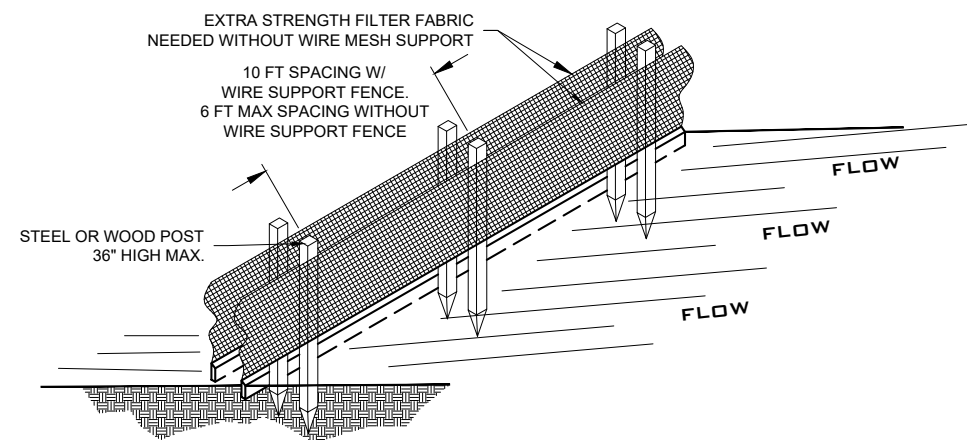


CHAIN LINK FENCE TYPICAL HARDWARE DETAILS

# EROSION CONTROL DETAILS



SILT SCREEN  
DETAIL  
TRENCH WITH GRAVEL



**NOTICE:**  
 CONTRACTOR SHALL VERIFY ALL CONDITIONS ON JOB SITE & NOTIFY PROJECT MANAGER AND ENGINEER OF ANY VARIATIONS FROM DIMENSIONS SHOWN ON THESE DRAWINGS BEFORE PROCEEDING WITH ANY CONSTRUCTION.

**PICKETT AND ASSOCIATES, INC**  
 5025 WEST GRACE STREET  
 TAMPA, FLORIDA 33607  
 PHONE: (813) 877-7770  
 CA #31323 LB #364

I HEREBY CERTIFY THAT THIS DRAWING WAS PREPARED UNDER MY DIRECT SUPERVISION AND CONTROL AND I AM A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF FLORIDA PURSUANT TO SECTION 471, FLORIDA STATUTES. IN ADDITION TO THE BEST OF THIS ENGINEER'S KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE APPLICABLE BUILDING CODES.

03-18-20

- This document has been electronically signed and sealed by Michael Leary, P.E., P.S.M. using a Digital Signature and date.
- Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

2	3/18/20	REVISIONS, CLARIFICATIONS FOR RAI#2 RESPONSE 12-20-19	GCC	JJB	MKL
1	11/22/19	REVISIONS, CLARIFICATIONS FOR RAI RESPONSE 11-22-19	GCC	JJB	MKL
NO	DATE	REVISIONS AND RECORD OF ISSUE	BY	CHK	APP

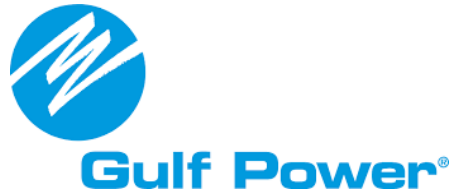
**TRANSMISSION ENGINEERING DEPARTMENT**

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 SHEET: 6 OF 6 FILE NAME: NFRC\_EXH\_SA02\_R02.dwg

**NORTH FLORIDA RESILIENCY CONNECTION (NFRC)**  
 STAGING AREA NO. 3 SITE PLAN EXHIBIT  
 FOR TEMPORARY LAYDOWN YARDS

**NFRC STAGING AREA NUMBER 3 SITE PLAN**

**Temporary Staging Area #3**  
**Stormwater Calculations**  
for the  
**North Florida Resiliency Connection Project**



Gulf Power  
15430 Endeavor Drive  
Jupiter, FL 33478

Prepared by:



Pickett and Associates, Inc.  
5025 W. Grace Street  
Tampa, FL 33607

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## 1.0 Site Data

Columbia County – SRWMD

153<sup>rd</sup> Road, Live Oak, FL

PID 36-01S-12E-0981400.0000

Basin Area = 25.16 acres

Developed Area = 13.62 acres

Flood Zone X per FIRM Map 12121C0130B effective 09-28-07

Design Storm, Non Ag: 100 year, SCS Type II Distribution. 1-, 2-, 4-, 8-, 24-hour and 3-, 7-, and 10-day duration.

Recovery (Attenuation)

1. Provide treatment volumes within 72 hours following the end of the design storm event.

## 2.0 Project Narrative

Temporary Staging Area #3 will stage and store construction materials (poles, conductor, insulators, etc.) and equipment (drill rigs, line trucks, cranes, etc.). The developed area will consist of an at grade #57 crushed limerock surface to facilitate the storage of poles and equipment along with a perimeter road to facilitate access. The site has been reviewed to ensure that existing surface water flow will not be impeded and existing water quality will not be adversely impacted. All proposed semi-pervious material will be installed at the existing natural ground elevation throughout the site to prevent impedance of the existing watershed.

The staging area will use the void space between the #57 crushed limerock for storage for the first 1" of runoff. Gulf Power has done extensive testing on this void ratio and has determined that a 35% void ratio provides a good conservative value. In addition to utilizing the voids for storage, each site will have a swale / berm constructed on the low side(s) of each to ensure no stormwater runoff escapes to adjacent properties. Each site will also have a dry retention pond to account for attenuation. The ponds will be designed to recover within 72 hours. Soil Borings and Double Ring Infiltrometer Testing have been performed at each site to facilitate the design of each dry pond. The site will use the interior uncompacted gravel as additional area for recovery by incorporating the use of a check dam system. Since the site has a slight grade change, an impervious, flexible water barrier (CR-PE12-20) will be installed along each contour line to slow the progression of water over the site to allow recovery within 72 hours. This is detailed in the construction drawings.

The staging area will remain in place for the duration of the project. At the conclusion of the project, each staging area will be returned to its pre-construction state. The anticipated duration is approximately 12 – 18 months.

Construction and maintenance access to each staging area will be gained via existing road right-of-way. Connector aprons will be constructed in accordance with county / state requirements.

Deliveries and active use of staging areas will be consistent with construction hours.

No tree removal will be necessary to facilitate construction of staging area #3.

### 3.0 Stormwater Calculations

The SCS TR-20 method was used to calculate the pre and post-development peak runoff. The time of concentration was generated from the sheet, shallow concentrated flow and Lag/CN method. A complete list of the procedure follows.

#### Assumptions and Methodology

The SRWMD requires that the difference between the 100-year pre-developed and post-developed storm volume be stored on-site with the maximum release rate not exceed the pre-developed flow, Q. Per the SRWMD Handbook, the 100-year storm shall be evaluated for the greatest of the 1, 2, 4, 8, and 24 hour, 3, 7, and 10 days storms.

- Storm Frequency – Type II 100 Year, 1, 2, 4, 8, and 24 hour, 3, 7, and 10 day storms
- Runoff Curve Number – Weighted Curve Numbers were calculated for each area
  - Existing Conditions Curve Number Range: 58
  - Post-Developed Condition Curve Number Range: 58-85
- Calculation of Time of Concentrations
  - Lag/CN Method – Which is used for areas of 2000 acres or less. The formula is provided below:
    - $T_c = 0.00526 \times L^{0.8}(1000/CN-9)^{0.7} \times S^{-0.5}$
- Peak Flow Rate Calculations – HydroCAD Version 10.0
- Pond Recovery Calculations – PONDS Version 3.3

#### Pre-Development Summary

Staging Area 3 has mild slopes of up to 1% and generally consists of grass. Table 1 below includes the results of the pre-development drainage area runoff calculations for the peak flow. These were developed using the topography which can be seen on the plan set and HydroCAD (Appendix B). Table 1 summarizes the peak flows for the various 100-year design storm in the pre-developed condition. The storm with the greatest runoff volume was used in the calculations. In this case, the 100-year, 10-day storm generated the greatest runoff and thus was used as the design storm.

Sub-Basin	Area (Acre)	Weighted CN	Time of Concentration (Min.)	Type II, 100-Year Storm, Q <sub>100</sub> (CFS)							
				1 HR	2 HR	4 HR	8 HR	24 HR	3 DAY	7 DAY	10 DAY
				I	25.16	58	222.3	3.06	5.67	8.97	11.56

#### Post-Development Summary

Upon completion of construction, Staging Area 3 will consist of uncompacted gravel laydown yard with compacted gravel drives. The water quality basin will be located at the low point within the site. Table 2 below includes the results of the post-development calculations for the 100-year, 1, 2, 4, 8, and 24 hour, 3, 7, and 10 day peak flows. These were developed using the topography which can be seen on the plan set and HydroCAD (Appendix B). The difference between the pre-development and post-development storm will be contained within the pond, and anything greater will be conveyed through the outflow weir per the Suwannee River Management District Design Requirement. The storm with the

greatest runoff volume was used in the calculations. Again, in this case, the 100-year, 10-day storm generated the greatest runoff and thus was used as the design storm.

Sub-Basin	Area (Acre)	Weighted CN	Time of Concentration (Min.)	Type II, 100-Year Storm, Q <sub>100</sub> (CFS)							
				1 HR	2 HR	4 HR	8 HR	24 HR	3 DAY	7 DAY	10 DAY
I	25.16	64	193.3	4.09	7.52	12.88	16.18	21.01	30.19	36.12	44.01

Table 3 below summarizes the stormwater quality basin design and key pond elevations with required and provided volumes. It shows that the basin provides the required amount of freeboard (1-foot) and storage required to retain the peak runoff. Peak water surface elevation calculations for detention ponds were developed using HydroCAD (Appendix B).

Basin No.	Elevation (ft, NAVD 88)		Area (ac)	Provided Volume (acft)	Required Volume (acft)	Provided Discharge at Weir (cfs)
I	Top of Pond	90.0	5.09	12.13	7.45	35.14
	Peak Water Elev.	88.9				
	Weir Elev.	88.5				
	Bottom of Pond	87.5	4.85			

### Water Quality/Treatment Methodology

The NFWFMD Handbook requires that all stormwater management systems provide the minimum state water quality treatment requirements. The method utilized for this project consists of one or a combination of percolation in the existing soils within the rock voids of the laydown storage and/or percolation within the stormwater quality basin. To determine the treatment runoff volume, the first 1.0-inch of rainfall was used along with the composite runoff coefficient for each sub-basin. This was compared with the volume from the first 0.5-inch rainfall without the coefficient. The greater volume was used for treatment evaluation and recovery. The calculations can be found starting on Page 6.

Recovery was calculated utilizing the PONDS software, as approved by the district. The rate of recovery was calculated within both the rock voids and if needed, the water quality basins. To model the rock voids, we calculated the available void space within the laydown area using a 35% uncompacted void ratio. An adjusted stage-storage table was input into the PONDS model utilizing a one-half foot increment stage, which corresponds to the height of the check dam. All treatment volumes must recover within 72-hours. See Table 4 for a summary of treatment volumes and recovery times for each sub-basin within the staging area.

<b>Table 4: Summary of Treatment Volume and Recovery</b>				
<b>Basin No.</b>	<b>Treatment Volume Required (acft)</b>	<b>Treatment Volume Provided (acft)</b>		<b>Recovery Time (hrs)</b>
		<b>Rock Voids</b>	<b>Water Quality Basins</b>	
I	1.17	2.32	Not Required for Treatment	6

## Water Quality Recovery Volume Calculations

### Areas:

$$\begin{aligned}
 & (1,096,103 \text{ sq. ft.}) \times \left(\frac{1 \text{ in.}}{43,560 \text{ sq. ft.}}\right) = 25.16 \text{ ac.} \\
 h & = (576,632 \text{ sq. ft.}) \times \left(\frac{1 \text{ in.}}{43,560 \text{ sq. ft.}}\right) = 13.24 \text{ ac.} \\
 h & = (98,135 \text{ sq. ft.}) \times \left(\frac{1 \text{ in.}}{43,560 \text{ sq. ft.}}\right) = 2.25 \text{ ac.} \\
 & = (221,654 \text{ sq. ft.}) \times \left(\frac{1 \text{ in.}}{43,560 \text{ sq. ft.}}\right) = 5.09 \text{ ac.} \\
 & = 25.16 \text{ ac.} - 13.24 \text{ ac.} - 2.25 \text{ ac.} - 5.09 \text{ ac.} = 4.58 \text{ ac.}
 \end{aligned}$$

### Composite Runoff Coefficient:

$$\begin{aligned}
 & = \frac{[(\text{rock laydown area}) + (\text{rock road area}) + (\text{pond area}) + (\text{grass area})]}{25.16} \\
 & = \frac{[(0.5 \times 13.24) + (0.7 \times 2.25) + (1.0 \times 5.09) + (0.17 \times 4.58)]}{25.16} = .56
 \end{aligned}$$

### Total Treatment Volume from 1 inch of Rainfall:

$$\begin{aligned}
 & = (.56) \times (1 \text{ in.}) \times (25.16 \text{ ac.}) \times \left(\frac{1 \text{ ft.}}{12 \text{ in.}}\right) = 1.17 \text{ ac.-ft.}
 \end{aligned}$$

### Total Treatment Volume from ½ inch of Rainfall:

$$\begin{aligned}
 & = (0.5 \text{ in.}) \times (25.16 \text{ ac.}) \times \left(\frac{1 \text{ ft.}}{12 \text{ in.}}\right) = 1.05 \text{ ac.-ft.}
 \end{aligned}$$

The treatment volume for the project is the larger value, **1.17 Ac.-Ft.**

Appendix A – Geotechnical Investigation

# BJ ROCK GEOENGINEERING

## GEOTECHNICAL REPORT



## NFRC STAGING AREA NO. 3



SUWANNEE COUNTY, FLORIDA

MARCH 2020

BJR 19-198B





March 13, 2020

Mike Leahy, P.E.  
**Pickett & Associates**  
5025 W. Grace Street  
Tampa, FL 33607

**Geotechnical Exploration Report  
NFRC Staging Area No. 3  
Suwannee County, Florida  
BJR No. 19-198B**

Dear Mr. Leahy:

**BJ Rock, LLC (BJR)** has completed the geotechnical exploration for the referenced project as authorized by Pickett & Associates for Gulf Power. The purposes of this study were to explore general subsurface conditions for the proposed staging areas and to use the data obtained to develop engineering recommendations to guide the design of the planned ponds/swales. This report describes our exploration procedure, presents the data obtained, and presents our conclusions and recommendations regarding the geotechnical engineering aspects of the design.

BJR appreciates the opportunity to participate in this project and we trust that the information included in this report is sufficient for your design. If you have any questions or comments concerning the contents of this report, please contact us.

Sincerely,

**BJ Rock, LLC**

BJR FL Certificate of Authorization No. 29100



John C. Peak, P.E.  
Sr. Geotechnical Engineer  
FL P.E. License No. 57018



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## ATTACHMENTS

Field Test Location Plan (Figure 1)  
Soil Boring Logs (Figure 2)  
Stormwater Pond Recovery Analysis Results  
NRCS Soil Survey Data  
Field Testing Standards and Procedures



## PROJECT INFORMATION

### Existing Site

Based on the information provided for our review from Pickett & Associates, we understand a staging area is planned off on 153<sup>rd</sup> Road in Live Oak in Suwannee County, Florida (Figure 1).

### Project Approach

The objective of the geotechnical investigation for the proposed project was to obtain information concerning the subsurface conditions in order to make geotechnical engineering estimates and recommendations in each of the following areas:

- Soil stratigraphy at the boring locations and the development of the approximate soil profile.
- General location and description of potentially deleterious materials which may interfere with construction or new structure performance, including buried or surficial existing fills, organics, construction debris, etc.
- Identification of some critical design or construction details, including present groundwater levels, estimated wet season levels, and seasonal fluctuations in the specified areas.

### Scope of Work

In order to address the above objectives, our scope of work for this project included the following:

- Reviewed available published information on the site, including the United States Department of Agriculture (USDA) National Resources Conservation Service (NRCS) soil survey data for Suwannee County.
- Conducted a subsurface exploration program consisting of the advancement of auger borings with DRI / field permeability testing for the pond/swales, subsurface sampling, and field testing.
- Measured the stabilized groundwater levels at the boring locations.
- Reviewed and visually classified the recovered soils in the laboratory using the Unified Soil Classification System (ASTM D 2487). Developed the general soil stratigraphy at the boring locations.
- Performed geotechnical engineering studies and analyses in order to develop geotechnical engineering recommendations for each of the objectives previously discussed for the proposed project.
- Performed stormwater pond recovery analysis per referenced staging area. Analysis performed by our subconsultant, Native GeoSciences, Inc.
- Prepared a geotechnical report that summarizes the course of our study, the field and laboratory data generated, the subsurface conditions encountered, stormwater pond recovery analysis results and our geotechnical engineering recommendations for the proposed project.



## Soil Survey Review

According to the USDA NRCS “Soil Survey of Suwannee County”, the soil types generally present on the site are attached in the appendix and are generalized as follows: *Blanton-Alpin-Bonneau complex and Falmouth-Bonneau-Blanton complex*.

## SUBSURFACE EXPLORATION

### Field Exploration Procedures

The procedures used by BJ Rock, LLC for field sampling and testing are in general accordance with industry standards of care and established geotechnical engineering practice. BJR performed 7 auger borings to approximate depths of up to 10 feet each with 7 field permeability tests at the proposed locations.

Our staff located the staked borings in the field per the plans and field information provided by Pickett & Associates. The approximate testing locations are noted on the provided Field Test Location Plan (Figure 1) in the Appendix. The standards and procedures for the Standard Penetration Test (SPT) Boring and soil sample handling and classification are described in our Field Testing Standards and Procedures in the Appendix.

### Field Exploration Results

#### *Subsurface Conditions*

The auger borings generally encountered fine to slightly silty fine sands, clayey fine sands and sandy clays to an approximate depth of 10 feet below existing grade. The soil testing results are shown on the attached Soil Boring Logs (Figure 2) in the Appendix.

#### *Field Permeability Test*

The field permeability falling head tests were performed at the specified location on the site as shown on Figure 2 in the Appendix. The tests were performed at approximate depths of 1.5 and 3<sup>+/-</sup> feet below existing grade. The tests were performed utilizing slotted casing seated in a uniform soil condition. The results of the tests are as follows:

Recommended Existing Groundwater Parameters for Pond Design				
STAGING AREA 3 - NFRC TRANSMISSION LINE FPL				
PB Test	Test Depth (ft)	Vertical Infiltration (ft/day)	Estimated Horizontal Infiltration (ft/day)*	Recommended SHGWL Depth (ft)
IB-3-1	1.5	0.08	0.16	3
IB-3-2	3	2	4	6
IB-3-3	3	2	4	6
IB-3-4	3	1	2	5
PB 3-1	3	2.6	5.2	6
PB 3-2	2	0.2	0.4	3
PB-3-3	3	1	2	6
*	Estimated horizontal permeability rate is 2x the vertical permeability test result.			
Note:	Horizontal and vertical permeability rates do not include a factor of safety.			



## ***Groundwater***

Groundwater was not encountered to an approximate depth of 10 feet below existing ground surface in the soil test borings performed in November 2019 and February 2020. Based on our past site experience, the results of our investigation, and our review of the NRCS soil survey, it is our opinion that the seasonal high groundwater table will be encountered at an approximate depth of 3 to 6<sup>+/-</sup> feet below existing ground surface in the areas of borings performed. Significant fluctuations in the groundwater levels should be expected due to seasonal variations in rainfall, runoff, and other site-specific factors across the site such as shallow perched conditions due to encountered clayey soils.

## ***Stormwater Pond Recovery Analysis***

Native GeoSciences (NGS) completed the stormwater pond recovery analysis for the staging area(s). NGS utilized the commercially available software PONDS (version 3.3) to perform the stormwater pond recovery analysis. The analysis included recovery of the treatment volume within 30 days. The description of the input parameters and a Copy of the PONDS software outputs are included in the Attachments in the Appendix.

## **SITE PREPARATION RECOMMENDATIONS**

### ***Site Stripping***

Prior to any construction, the site must be properly prepared. To prepare the site for construction, all existing topsoil, muck, debris, vegetation, and large roots down to finger-size should be removed, including a 5-foot margin in a horizontal direction away from the footprints of the structures. The resulting excavations should be backfilled with soils as discussed in the structural fill section of this report.

### ***Proofrolling***

Following site stripping and any related excavation activity, and prior to any fill placement, proofrolling of the on-site soils should be performed. We recommend using a vibratory roller having a static weight of at least ten tons. Placement of fill materials may then proceed. Compaction of the fill materials should continue until the roller has made at least ten passes over all areas of the site and the soils appear to be relatively firm and unyielding. Half of the roller passes should be perpendicular to the direction of travel of the other passes. Proofrolling should be closely monitored by our engineering technician to look for unusual deflection of the soils beneath the compacting equipment. If unusual or excessive deflection is observed, the areas should be undercut to firm soils and backfilled with structural fill placed in maximum one-foot thick lifts. Backfill soils should be of the same composition and should be compacted to the same criteria as structural fill soils.

## **Structural Fill**

### ***Definition***

Soil used for structural fill can be defined as clean fine sand containing less than twelve percent material by weight that is finer than a number 200 sieve (fines) (material conforming to SP to SP-SM in the Unified Soil Classification System) and less than 5 percent organics by weight. However, materials containing up to 25 percent fines (materials conforming to SC or SM in the Unified Soil Classification System) may be utilized as structural fill, if their plasticity index is less than 20 and the working subgrade is at least 2 feet above water or groundwater level.



If fill material with higher fines content is used (< 25 percent fines), the material will require the use of compaction equipment designed for clayey soils. This includes a sheeps foot or vibratory pad foot roller. In addition, a disk could be required to assist with drying the clayey soils in order to place them at or near their optimum moisture content. These materials must be placed in 6-inch thick maximum lifts so that they can be effectively compacted with a vibratory pad foot roller.

### ***Soil Suitability Recommendations***

Based on the results of the auger borings in Figure 3, the soil materials encountered in the borings appear to be acceptable general and/or structural fill from ground surface to 1 to 10+ feet below existing grade excluding any organic material, clays and unsuitable rock/shell/limestone, etc. Stratum 1 (SP/SP-SM) can be utilized as structural fill material. Stratum 2 (SM/SC) can be utilized as general fill material.

### ***Placement***

Fill should be placed in lifts not to exceed one foot thick. The fill material should be compacted to at least 95 percent of its modified Proctor maximum dry density (ASTM D 1557). Confined areas, such as utility trenches, should be compacted with manually operated vibratory compaction equipment.

## **TESTING AND MONITORING**

Construction monitoring and testing are essential to proper site construction and performance. Compliance with the recommended foundation specification must be verified by our engineering technician familiar with the project construction. Observation of site preparation work is an integral part of the engineering recommendations contained in this report.

Safe working conditions are necessary. Temporary excavations should be sloped and/or braced as required by applicable local, state, and federal safety regulations, as well as the current Occupational Safety and Health Organization (OSHA) Excavation and Trench Safety Standards. Generally, the grading contractor is responsible for constructing stable, temporary excavations that are dewatered, shored, sloped and/or benched to maintain stability of the sides and bottom of the trench.

## **LIMITATIONS**

This report has been prepared for the exclusive use of **Pickett & Associates and Gulf Power** for the specific application to the project previously discussed. Our conclusions and recommendations have been rendered using generally accepted standards of geotechnical engineering geology practice in the state of Florida. No other warranty is expressed or implied.

Our conclusions and recommendations are based on the design information furnished to us, the data obtained from the previously described subsurface exploration, and our experience. They do not reflect variations in the subsurface conditions that are likely to exist in the region of our boring and in unexplored areas of the site. These variations are due to the inherent variability of the subsurface conditions in this geologic region. Should variations become apparent during construction, it will be necessary to re-evaluate our conclusions and recommendations based upon our on-site observations of the conditions.

The site is underlain by limestone bedrock that is susceptible to dissolution and the subsequent development of karst features such as voids and sinkholes in the natural soil overburden. Construction in a sinkhole prone area is therefore accompanied by some risk that internal soil

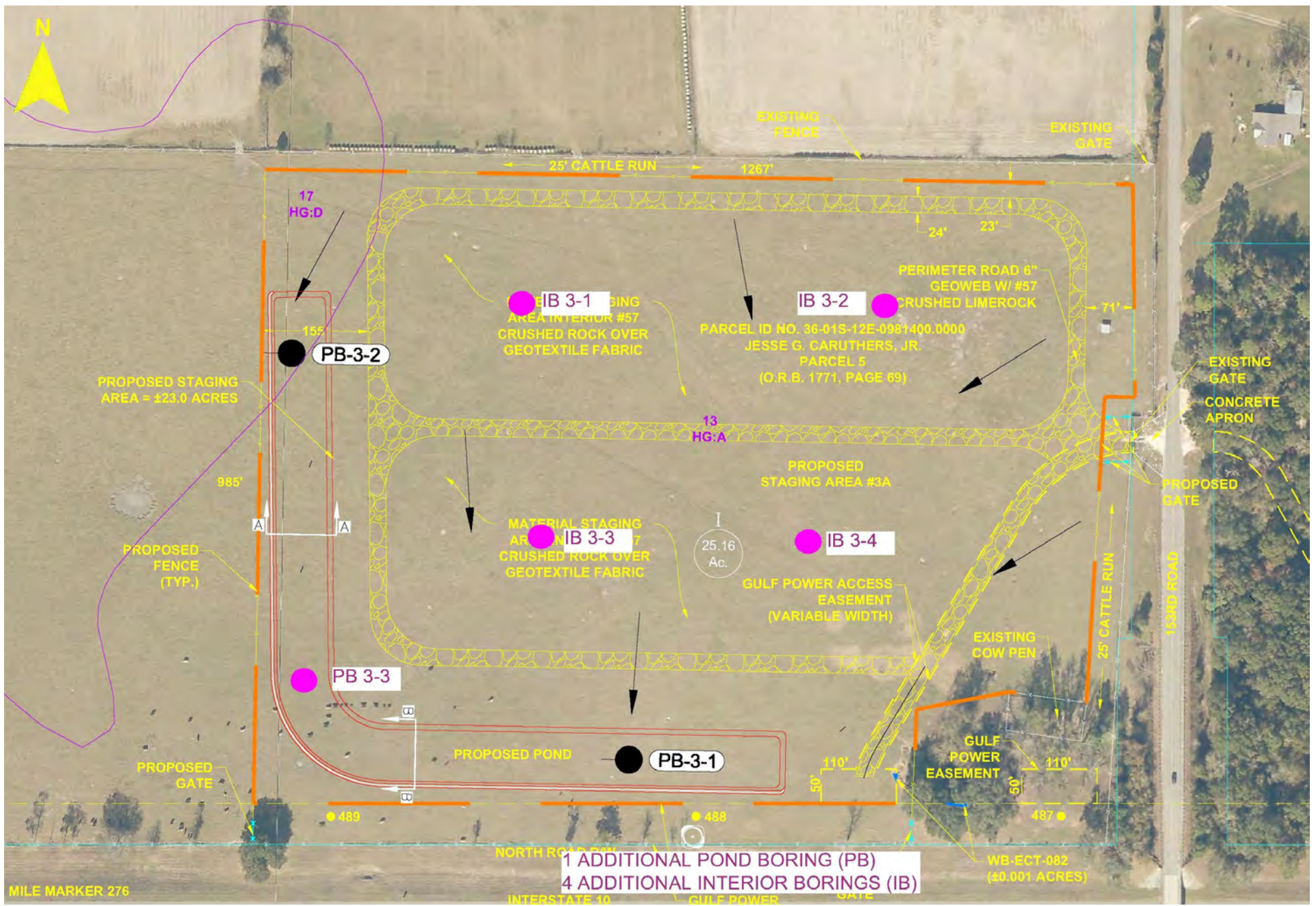


erosion and ground subsidence could affect new structures in the future. It is not possible to investigate or design to completely eliminate the possibility of future sinkhole-related problems. In any event, the Owner must understand and accept this risk.

The scope of our services does not include any environmental assessments or investigations for the possible presence of hazardous or toxic substances in the soil, groundwater, or surface water within or in the general vicinity of the site studied. Any statements made in this report or shown on the test boring log regarding unusual subsurface conditions and/or composition, odor, staining, origin, or other characteristics of the surface and/or subsurface materials are strictly for the information of our client and may or may not be indicative of an environmental problem.

If changes are made in the overall design or the location of the proposed structure(s), the recommendations presented in this report must not be considered valid unless the changes are reviewed by our firm and recommendations modified or verified in writing. We should be given the opportunity to review the foundation plan and the applicable portions of the project specifications when the design is finalized. This review will allow us to check whether these documents are consistent with the intent of our recommendations.

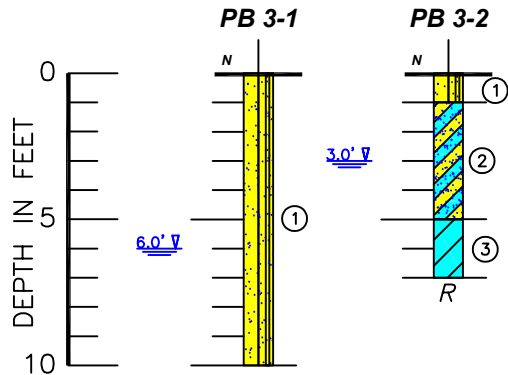
## **APPENDIX**



**NFRC STAGING AREA NO. 3  
FIELD TEST LOCATION PLAN  
SUWANNEE COUNTY, FLORIDA**

DATE: 03/10/20	SCALE: NOT TO SCALE	JOB NO. 19-198B
DRAWN BY: J. PEAK		FIGURE 1
CK'D BY: B. JORY		





**LEGEND**

① = GRAY, TAN, BROWN FINE TO SLIGHTLY SILTY FINE SANDS (SP)/(SP-SM)

② = ORANGE, TAN CLAYEY FINE SAND (SC)

③ = GRAY, BROWN, TAN SANDY CLAY (CL)

(SP) = UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

N = STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT

0.0' V = ESTIMATED SEASONAL HIGH GROUNDWATER LEVEL

R = REFUSAL MATERIAL ENCOUNTERED


NOTES: HAND AUGER BORINGS PERFORMED NOVEMBER 14, 2019.

EXISTING GROUNDWATER LEVEL NOT ENCOUNTERED TO 7 TO 10 FEET.

# LEGEND

 ① = GRAY, TAN, ORANGE, BROWN, DARK BROWN, DARK GRAY FINE TO SLIGHTLY SILTY FINE SANDS (SP)/(SP-SM)

 ② = GRAY, TAN, BROWN, ORANGE SILTY TO CLAYEY FINE SANDS (SM)/(SC)

 ③ = BROWN, ORANGE/BROWN SANDY CLAY (CL)

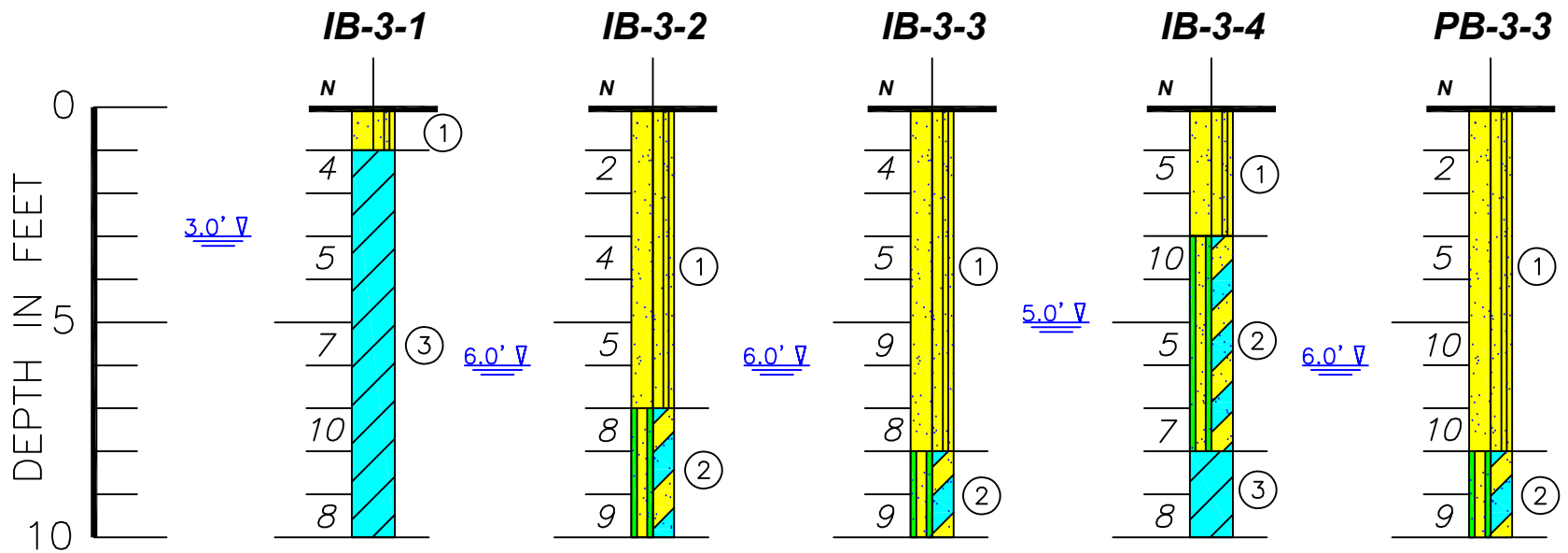
(SP) = UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

N = STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT CORRELATED FROM CPT READINGS

0.0' ▽ = EXISTING GROUNDWATER LEVEL (IF ENCOUNTERED)

0.0' ▽ = ESTIMATED SEASONAL HIGH GROUNDWATER LEVEL

NOTE: TESTING PERFORMED FEBRUARY 13, 2020.



March 13, 2020

**Re: Stormwater Pond Recovery Analysis**  
NFRC Staging Areas  
Staging Area No. 3 – Basin I  
Suwanee County, Florida  
*BJR Job No: 19-198(B)*

As authorized, BJ Rock, LLC (BJR) has completed the stormwater pond recovery analysis for the above-referenced staging area. The project site is located on 153<sup>rd</sup> Road in Live Oak, Suwanee County, Florida.

We understand that two crushed rock material laydown areas will be constructed along with one dry stormwater management pond within the proposed project. The pond will be constructed within the southwest corner of the project. The Staging Area consists of one drainage basin (I).

We used soil and groundwater information collected during the geotechnical exploration on the site and provided in the BJR Geotechnical data provided. In addition, we used site survey data, crushed rock laydown area design, and stormwater pond design information provided by Pickett Surveying and Engineering. We utilized the commercially available software PONDS (version 3.3) to perform the stormwater pond recovery analysis. Copies of the PONDS software outputs are included in the Attachments.

The PONDS software is generally limited to analyzing flat bottom stormwater ponds. Since the rock laydown areas are planned to be constructed at existing grade and will be sloping, it was necessary to analyze each area as flat basins using average soil and groundwater parameters. We understand that you plan to utilize CR-PE Multi-Purpose Root & Water Barrier Molded Rolls by Century Products (or similar) to retain water within the laydown areas for recharge before discharging excess water to the ponds. Based on this plan, it is our opinion that using average soil and groundwater parameters for this analysis is appropriate. Please note that the treatment volume was recovered within the rock laydown basin area within 72 hours. Therefore, discharge and recovery within the stormwater pond was not needed.

Below are Average Soil and Groundwater Calculations and Model Input Parameters for each basin. We assumed a Base of Aquifer depth below the Seasonal High Water Table (SHWT) of 2 feet or less. This depth is generally conservative based on our experience with similar projects in soils with relatively high silt/clay content. The actual Base of Aquifer is likely deeper.

Lastly, we assumed a porosity of 35% for the crushed rock for void space storage.

#### **Stormwater Recovery Analysis – Staging Area No. 3 – Basin I**

##### **Average Soil and Groundwater Calculations**

Below are the average soil and groundwater calculations for the stormwater pond recovery analysis.

Staging Area No. 3		
Basin I		
Rock Laydown Elevation		
Low El. (ft)	High El. (ft)	Average El. (ft.)
90	90	90
Boring	Horizontal Saturated Hydraulic Conductivity (ft/day)*	Depth to SHWT (ft)
PB-3-1	2.6	6
PB-3-2	0.2	3
PB-3-3	1	6
IB-3-1	0.08	3
IB-3-2	2	6
IB-3-3	2	6
IB-3-4	1	5
<b>AVG.</b>	<b>1.27</b>	<b>5</b>
<b>Average SHWT Elev. (ft)</b>		<b>85</b>
* Hydraulic conductivity values include a factor of safety of 2 based on the field test results.		

Model Input Parameters

Below are the input parameters used for the stormwater pond recovery analysis.

**Aquifer and Geometry Data**

Input Parameter	STAGING AREA NO.3 - BASIN I
Base of Aquifer Elevation (feet)	84
Water Table Elevation (feet)	85
Horizontal Saturated Hydraulic Conductivity (ft/day)*	1.27
Fillable Porosity (%)	25
Unsaturated Vertical Infiltration Rate (ft/day)*,**	0.635
Maximum Area for Unsaturated Infiltration (ft <sup>2</sup> )	201821.2
Equivalent Pond Length (ft)	1000
Equivalent Pond Width (ft)	576
* Hydraulic conductivity values include a factor of safety of 2 based on the field test results.	
** Unsaturated vertical Infiltration rate is 1/2 the field tested Horizontal Saturated Hydraulic Conductivity rate.	

**Stage vs Area Data for STAGING AREA 3 – BASIN I**

Stage (ft)	Area (ft <sup>2</sup> )
90	201821.2
90.5	201821.2

**Stormwater Input Data**

<b>STAGING AREA NO. 3 BASIN I</b>	<b>Hydrograph Type</b>	slug load
	<b>Treatment Volume (ft<sup>3</sup>)</b>	50965.2

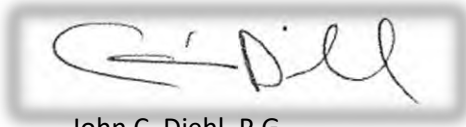
### **Results**

Based on the results of this analysis, the proposed crushed rock laydown area recovers the associated treatment volume within 72 hours.

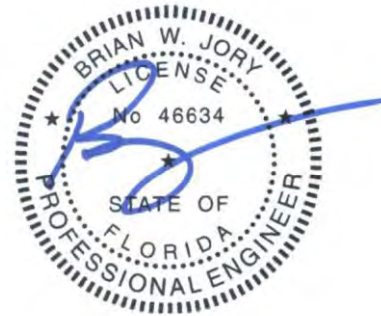
### **Closing**

We appreciate the opportunity to be of service to you on this project and look forward to a continued relationship. Should you have any questions or concerns regarding this report, please feel free to call us at (407) 342-1443.

Sincerely,  
**Native Geoscience, Inc.**  
Certificate of Authorization No. 30474



John C. Diehl, P.G.  
Principal Geologist  
P.G. 2460



Brian W. Jory, P.E.  
Principal Engineer  
P.E. 46634  
3/13/20

### **Attachments:**

- PONDS Output – Staging Area No. 3 – Basin I – Rock Voids (7 pages)

**PONDS Version 3.3.0278**  
**Retention Pond Recovery - Refined Method**  
**Copyright 2012**  
**Devo Seereeram, Ph.D., P.E.**

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**Project Data**

Project Name: NFRC Staging Areas  
Simulation Description: Staging Area No. 3 - Basin I - Rock Voids  
Project Number: BJR19-198A  
Engineer : CW  
Supervising Engineer: JCD  
Date: 03-11-2020

**Aquifer Data**

Base Of Aquifer Elevation, [B] (ft datum): 84.00  
Water Table Elevation, [WT] (ft datum): 85.00  
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day): 1.27  
Fillable Porosity, [n] (%): 25.00  
Unsaturated Vertical Infiltration Rate, [Iv] (ft/day): 0.635  
Maximum Area For Unsaturated Infiltration, [Av] (ft<sup>2</sup>): 201821.2

**Geometry Data**

Equivalent Pond Length, [L] (ft): 1000.0  
Equivalent Pond Width, [W] (ft): 576.0  
Ground water mound is expected to intersect the pond bottom

**Stage vs Area Data**

Stage (ft datum)	Area (ft <sup>2</sup> )
90.00	201821.2
90.50	201821.2

**Ditch Data**

Ditch (or interceptor trench) parallel to length axis is inactive  
Ditch (or interceptor trench) parallel to width axis is inactive

**Discharge Structures**

**Discharge Structure #1 is inactive**  
**Discharge Structure #2 is inactive**

**Discharge Structures (cont'd.)**

Discharge Structure #3 is inactive



**PONDS Version 3.3.0278**  
**Retention Pond Recovery - Refined Method**  
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**Scenario Input Data**

*Scenario 1 :: 50965.2 ft<sup>3</sup> slug load*

Hydrograph Type: Slug Load  
 Modflow Routing: Routed with infiltration

Treatment Volume (ft<sup>3</sup>) 50965.2

Initial ground water level (ft datum) 85.00 (default)

<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>
0.100	3.500	11.000	19.000	27.000
0.250	4.000	12.000	20.000	28.000
0.500	5.000	13.000	21.000	29.000
1.000	6.000	14.000	22.000	30.000
1.500	7.000	15.000	23.000	
2.000	8.000	16.000	24.000	
2.500	9.000	17.000	25.000	
3.000	10.000	18.000	26.000	

**PONDS Version 3.3.0278**  
**Retention Pond Recovery - Refined Method**  
**Copyright 2012**  
**Devo Seereeram, Ph.D., P.E.**

**Detailed Results** :: Scenario 1 :: 50965.2 ft<sup>3</sup> slug load

Elapsed Time (hours)	Instantaneous Inflow Rate (ft <sup>3</sup> /s)	Outside Recharge (ft/day)	Stage Elevation (ft datum)	Infiltration Rate (ft <sup>3</sup> /s)	Combined Instantaneous Discharge Rate (ft <sup>3</sup> /s)	Cumulative Inflow Volume (ft <sup>3</sup> )	Cumulative Infiltration Volume (ft <sup>3</sup> )	Combined Cumulative Discharge (ft <sup>3</sup> )	Flow Type
0.000	8494.2000	0.00000	85.00000	0.00000	0	0.000	0.0	0	N.A.
0.002	8494.2000	0.00000	90.25248	1.48329	0	50965.200	8.9	0	U/P
2.400	0.0000	0.00000	90.18903	1.48329	0	50965.200	12815.7	0	U/P
6.000	0.0000	0.00000	90.09377	0.92706	0	50965.200	32039.1	0	U/P
12.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
24.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
36.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
48.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
60.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
72.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
84.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
96.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
120.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
144.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
168.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
192.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
216.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
240.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
264.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
288.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
312.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
336.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
360.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
384.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
408.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
432.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
456.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
480.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
504.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
528.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
552.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
576.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
600.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
624.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
648.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
672.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
696.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry
720.000	0.0000	0.00000	----	----	----	50965.200	50965.2	0	dry

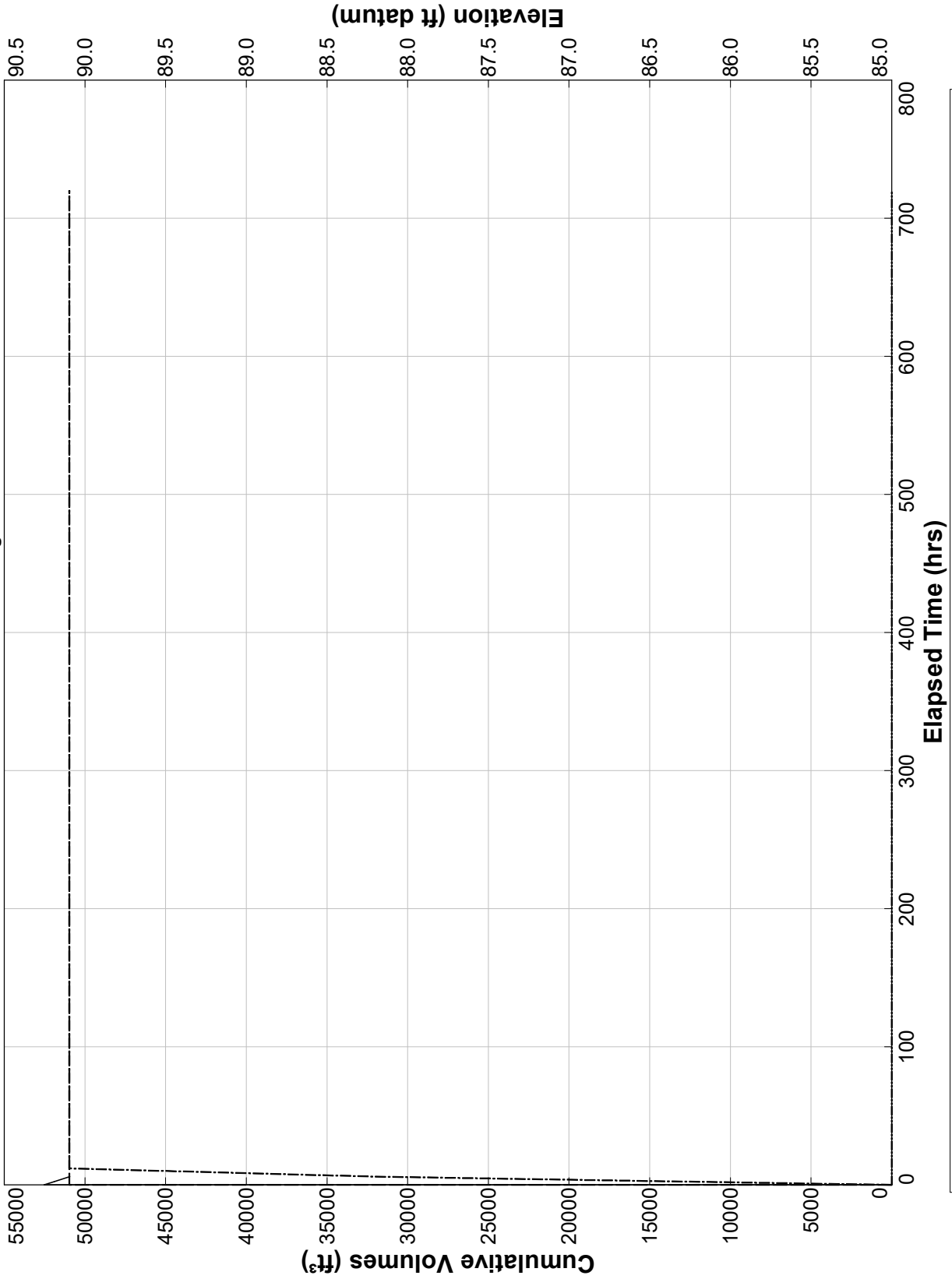
**PONDS Version 3.3.0278**  
**Retention Pond Recovery - Refined Method**  
**Copyright 2012**  
**Devo Seereeram, Ph.D., P.E.**

**Summary of Results** :: Scenario 1 :: 50965.2 ft<sup>3</sup> slug load

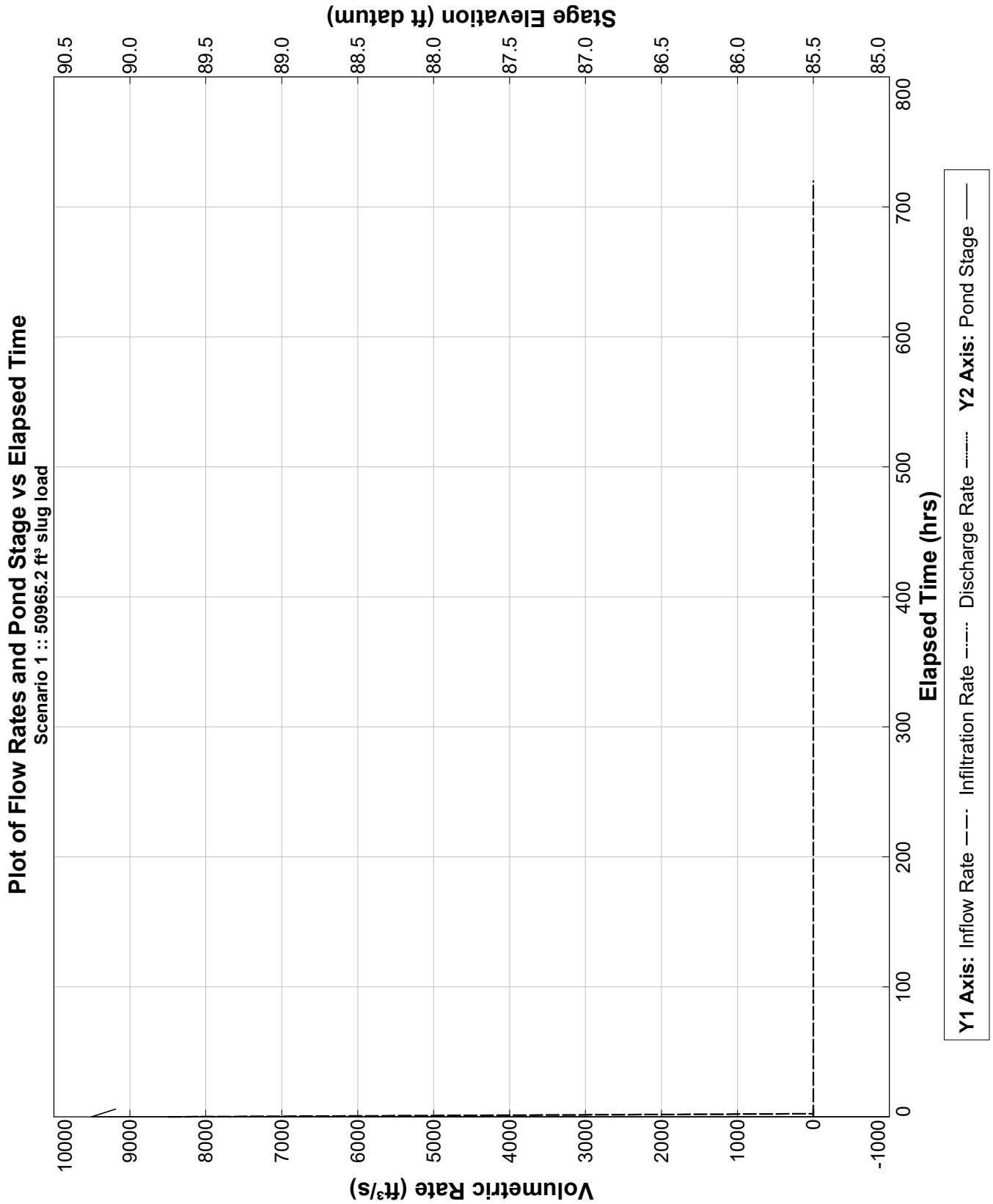
	Time (hours)	Stage (ft datum)	Rate (ft <sup>3</sup> /s)	Volume (ft <sup>3</sup> )
<b>Stage</b>				
Minimum	0.000	85.00		
Maximum	0.002	90.25		
<b>Inflow</b>				
Rate - Maximum - Positive	0.002		8494.2000	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	0.002			50965.2
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	720.000			50965.2
<b>Infiltration</b>				
Rate - Maximum - Positive	0.002		1.4833	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	6.000			32039.1
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	720.000			50965.2
<b>Combined Discharge</b>				
Rate - Maximum - Positive	None		None	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	None			None
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	720.000			0.0
<b>Discharge Structure 1 - inactive</b>				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
<b>Discharge Structure 2 - inactive</b>				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
<b>Discharge Structure 3 - inactive</b>				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
<b>Pollution Abatement:</b>				
36 Hour Stage and Infiltration Volume	36.000	Dry		50965.2
72 Hour Stage and Infiltration Volume	72.000	Dry		50965.2

Plot of Cumulative Volumes and Pond Stage vs Elapsed Time

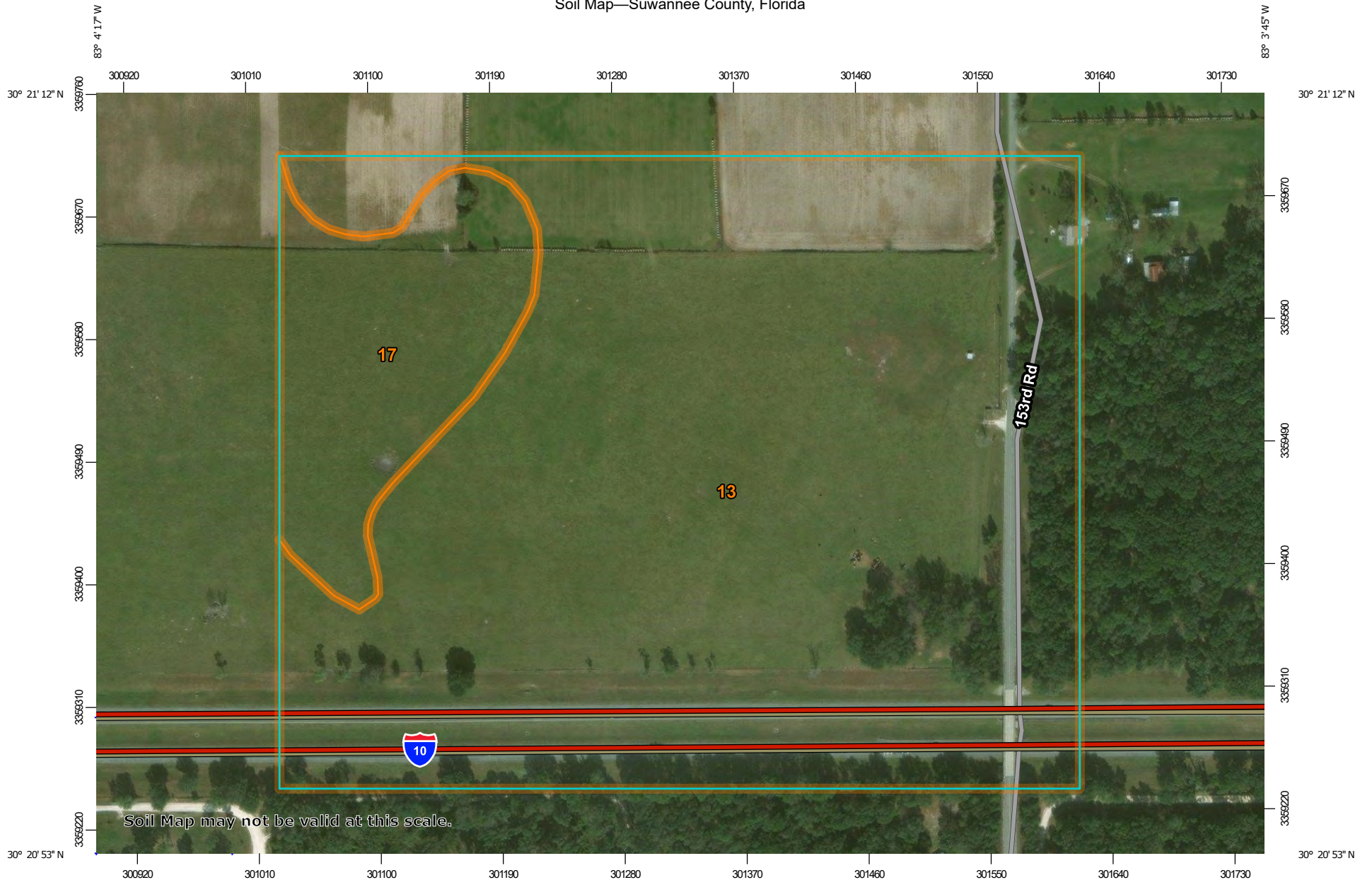
Scenario 1 :: 50965.2 ft<sup>3</sup> slug load



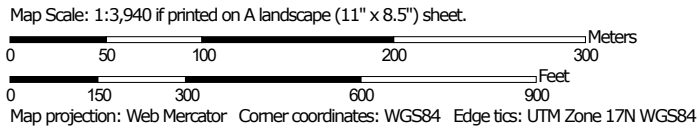
Y1 Axis: Cumulative Inflow --- Cumulative Infiltration - - - - Cumulative Discharge - - - - - Y2 Axis: Pond Stage ---



Soil Map—Suwannee County, Florida



Soil Map may not be valid at this scale.




## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

**Warning:** Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Suwannee County, Florida

Survey Area Data: Version 18, Sep 17, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 5, 2006—Feb 16, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
13	Blanton-Alpin-Bonneau complex, 0 to 5 percent slopes	58.7	86.2%
17	Falmouth-Bonneau-Blanton complex, 0 to 5 percent slopes	9.4	13.8%
<b>Totals for Area of Interest</b>		<b>68.0</b>	<b>100.0%</b>



## Suwannee County, Florida

### 13—Blanton-Alpin-Bonneau complex, 0 to 5 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2w4gj  
*Elevation:* 50 to 350 feet  
*Mean annual precipitation:* 49 to 57 inches  
*Mean annual air temperature:* 66 to 73 degrees F  
*Frost-free period:* 239 to 269 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Blanton and similar soils:* 42 percent  
*Alpin and similar soils:* 33 percent  
*Bonneau and similar soils:* 16 percent  
*Minor components:* 9 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Blanton

##### Setting

*Landform:* Knolls on marine terraces, ridges on marine terraces  
*Landform position (two-dimensional):* Summit  
*Landform position (three-dimensional):* Side slope, interfluvium  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear  
*Parent material:* Sandy and loamy marine deposits

##### Typical profile

*A - 0 to 5 inches:* fine sand  
*E - 5 to 41 inches:* fine sand  
*Bt - 41 to 48 inches:* sandy loam  
*Btg - 48 to 80 inches:* sandy clay loam

##### Properties and qualities

*Slope:* 0 to 5 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Moderately well drained  
*Runoff class:* Negligible  
*Capacity of the most limiting layer to transmit water (Ksat):*  
Moderately high to high (0.20 to 2.00 in/hr)  
*Depth to water table:* About 42 to 72 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Sodium adsorption ratio, maximum in profile:* 4.0  
*Available water storage in profile:* Low (about 4.5 inches)

### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 3s

*Hydrologic Soil Group:* A

*Forage suitability group:* Sandy soils on rises, knolls, and ridges of mesic uplands (G138XA121FL)

*Hydric soil rating:* No

### **Description of Alpin**

#### **Setting**

*Landform:* Knolls on marine terraces, ridges on marine terraces, flats on marine terraces

*Landform position (two-dimensional):* Summit

*Landform position (three-dimensional):* Interfluve, talf

*Down-slope shape:* Convex

*Across-slope shape:* Linear

*Parent material:* Eolian deposits or sandy marine deposits

#### **Typical profile**

*A - 0 to 6 inches:* fine sand

*E - 6 to 65 inches:* fine sand

*E and Bt - 65 to 80 inches:* fine sand

#### **Properties and qualities**

*Slope:* 0 to 5 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Excessively drained

*Runoff class:* Very low

*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (6.00 to 20.00 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Sodium adsorption ratio, maximum in profile:* 4.0

*Available water storage in profile:* Low (about 3.7 inches)

### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4s

*Hydrologic Soil Group:* A

*Forage suitability group:* Sandy soils on ridges and dunes of xeric uplands (G138XA111FL)

*Hydric soil rating:* No

### **Description of Bonneau**

#### **Setting**

*Landform:* Knolls on marine terraces, ridges on marine terraces

*Landform position (two-dimensional):* Summit

*Landform position (three-dimensional):* Interfluve

*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Sandy and loamy marine deposits

#### **Typical profile**

*A - 0 to 7 inches:* fine sand  
*E - 7 to 27 inches:* fine sand  
*Bt - 27 to 58 inches:* fine sandy loam  
*Btg - 58 to 80 inches:* sandy clay loam

#### **Properties and qualities**

*Slope:* 0 to 5 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Well drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):*  
Moderately high to high (0.60 to 2.00 in/hr)  
*Depth to water table:* About 42 to 60 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Sodium adsorption ratio, maximum in profile:* 4.0  
*Available water storage in profile:* Low (about 5.9 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2s  
*Hydrologic Soil Group:* B  
*Forage suitability group:* Sandy over loamy soils on rises, knolls, and ridges of mesic uplands (G138XA221FL)  
*Hydric soil rating:* No

#### **Minor Components**

##### **Albany**

*Percent of map unit:* 5 percent  
*Landform:* Knolls on marine terraces, ridges on marine terraces  
*Landform position (two-dimensional):* Shoulder  
*Landform position (three-dimensional):* Interfluve  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

##### **Chipley**

*Percent of map unit:* 4 percent  
*Landform:* Knolls on marine terraces, rises on marine terraces, flats on marine terraces  
*Landform position (two-dimensional):* Shoulder  
*Landform position (three-dimensional):* Interfluve, talf  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear

*Hydric soil rating:* No

## **Data Source Information**

Soil Survey Area: Suwannee County, Florida  
Survey Area Data: Version 18, Sep 17, 2019

## Suwannee County, Florida

### 17—Falmouth-Bonneau-Blanton complex, 0 to 5 percent slopes

#### Map Unit Setting

*National map unit symbol:* 13bvp  
*Elevation:* 20 to 350 feet  
*Mean annual precipitation:* 49 to 57 inches  
*Mean annual air temperature:* 66 to 73 degrees F  
*Frost-free period:* 239 to 269 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Falmouth and similar soils:* 36 percent  
*Bonneau and similar soils:* 30 percent  
*Blanton and similar soils:* 22 percent  
*Minor components:* 12 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Falmouth

##### Setting

*Landform:* Ridges on marine terraces, hills on marine terraces  
*Landform position (three-dimensional):* Interfluve  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Clayey marine deposits

##### Typical profile

*Ap - 0 to 3 inches:* fine sand  
*E - 3 to 10 inches:* fine sand  
*Bt - 10 to 17 inches:* sandy clay loam  
*B/Cg - 17 to 80 inches:* sandy clay

##### Properties and qualities

*Slope:* 2 to 5 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Somewhat poorly drained  
*Runoff class:* Very high  
*Capacity of the most limiting layer to transmit water (Ksat):*  
Moderately low to moderately high (0.06 to 0.20 in/hr)  
*Depth to water table:* About 18 to 36 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Sodium adsorption ratio, maximum in profile:* 4.0  
*Available water storage in profile:* Moderate (about 8.0 inches)

### **Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4e  
*Hydrologic Soil Group:* D  
*Forage suitability group:* Loamy and clayey soils on flats and rises of mesic lowlands (G138XA331FL)  
*Hydric soil rating:* No

### **Description of Bonneau**

#### **Setting**

*Landform:* Knolls on marine terraces, ridges on marine terraces  
*Landform position (three-dimensional):* Interfluve  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Sandy and loamy marine deposits

#### **Typical profile**

*A - 0 to 7 inches:* fine sand  
*E - 7 to 27 inches:* fine sand  
*Bt - 27 to 36 inches:* fine sandy loam  
*Btg - 36 to 80 inches:* sandy clay loam

#### **Properties and qualities**

*Slope:* 0 to 5 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Well drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):*  
Moderately high to high (0.60 to 2.00 in/hr)  
*Depth to water table:* About 42 to 60 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Sodium adsorption ratio, maximum in profile:* 4.0  
*Available water storage in profile:* Low (about 5.9 inches)

### **Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2s  
*Hydrologic Soil Group:* B  
*Forage suitability group:* Sandy over loamy soils on rises, knolls, and ridges of mesic uplands (G138XA221FL)  
*Hydric soil rating:* No

### **Description of Blanton**

#### **Setting**

*Landform:* Knolls on marine terraces, ridges on marine terraces  
*Landform position (three-dimensional):* Interfluve, side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear

*Parent material:* Sandy and loamy marine deposits

**Typical profile**

*A - 0 to 5 inches:* fine sand

*E - 5 to 41 inches:* fine sand

*Bt - 41 to 48 inches:* sandy loam

*Btg - 48 to 80 inches:* sandy clay loam

**Properties and qualities**

*Slope:* 0 to 5 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Moderately well drained

*Runoff class:* Negligible

*Capacity of the most limiting layer to transmit water (Ksat):*

Moderately high to high (0.20 to 2.00 in/hr)

*Depth to water table:* About 42 to 72 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Sodium adsorption ratio, maximum in profile:* 4.0

*Available water storage in profile:* Low (about 4.5 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 3s

*Hydrologic Soil Group:* A

*Forage suitability group:* Sandy soils on rises, knolls, and ridges of mesic uplands (G138XA121FL)

*Hydric soil rating:* No

**Minor Components**

**Alpin**

*Percent of map unit:* 7 percent

*Landform:* Knolls on marine terraces, ridges on marine terraces, flats on marine terraces

*Landform position (three-dimensional):* Interfluve

*Down-slope shape:* Convex

*Across-slope shape:* Linear

*Hydric soil rating:* No

**Albany**

*Percent of map unit:* 5 percent

*Landform:* Knolls on marine terraces, ridges on marine terraces

*Landform position (three-dimensional):* Interfluve

*Down-slope shape:* Convex

*Across-slope shape:* Linear

*Hydric soil rating:* No

## **Data Source Information**

Soil Survey Area: Suwannee County, Florida  
Survey Area Data: Version 18, Sep 17, 2019





## FIELD TESTING STANDARDS AND PROCEDURES

### **Standard Penetration Test (SPT) Boring**

The SPT borings were advanced by means of a truck or track mounted drill rig employing wet rotary drilling techniques. The SPT testing was performed continuously in the upper ten feet and at five-foot intervals thereafter. The soil samples were obtained at the depths where the SPT testing was performed. The soil samples were then classified in the field, placed in sealed containers, and returned to our laboratory for further evaluation by a geotechnical engineer.

The SPT borings were performed in general compliance with standard field penetration test procedures (ASTM D 1586-99). After drilling to the sampling depth and flushing the borehole, the standard two-inch O.D. split-barrel sampler was seated by driving it six inches into the undisturbed soil at the bottom of the borehole. The sampler was then driven an additional 12 inches by a 140-pound hammer falling 30 inches. The number of blows required to produce the 12 inches of penetration is recorded as the standard penetration test value (N). These values are plotted on the left side of the boring log Figure 3.

In the upper ten feet sampling was performed by driving the split-barrel sampler 24 inches and the blows required to drive the sampler the middle two 6-inch increments were recorded as the “N” value. Through this technique, the upper ten feet of the soil was sampled continuously. Detailed descriptions of the soils encountered during the advancement of the SPT boring are presented in the Boring Logs.

### **Soil Sample Handling and Classification**

The soil samples obtained from the SPT borings were placed in sealed containers to retain moisture and returned to our laboratory. The samples were then reviewed by a geotechnical engineer to confirm classifications, visually estimate the relative percentages of the soil’s constituents (sand, clay, etc.), and identify pertinent structural features. We visually classified the soils according to the Unified Soil Classification System (ASTM D 2487). The stratification lines shown on the boring logs in Figure 3 represent our interpretation of approximate boundaries between soil types. The transition between strata may be gradual. Our classifications are based on a visual estimation of the soil properties and our engineering experience with the soils found in this geologic area.

The SPT “N” values are presented adjacent along the left side of the boring logs. The correlation of the SPT “N” values with relative density, unconfined compressive strength, and consistency are provided in the following table:

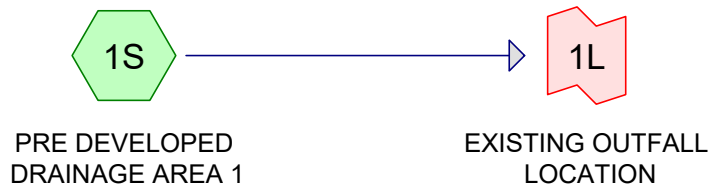
Coarse-Grained Soils		Fine Grained Soils		
Penetration Resistance N (blows/ft)	Relative Density of Sand	Penetration Resistance N (blows/ft)	Unconfined Compressive Strength of Clay (tons/ft <sup>2</sup> )	Consistency of Clay
0-4	Very Loose	<2	<0.25	Very Soft
4-10	Loose	2-4	0.25-0.50	Soft
10-30	Medium-Dense	4-8	0.50-1.00	Medium
30-50	Dense	8-15	1.00-2.00	Stiff
>50	Very Dense	15-30	2.00-4.00	Very Stiff
		>30	>4.00	Hard

### **Hand Auger Borings**

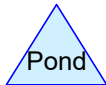
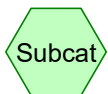
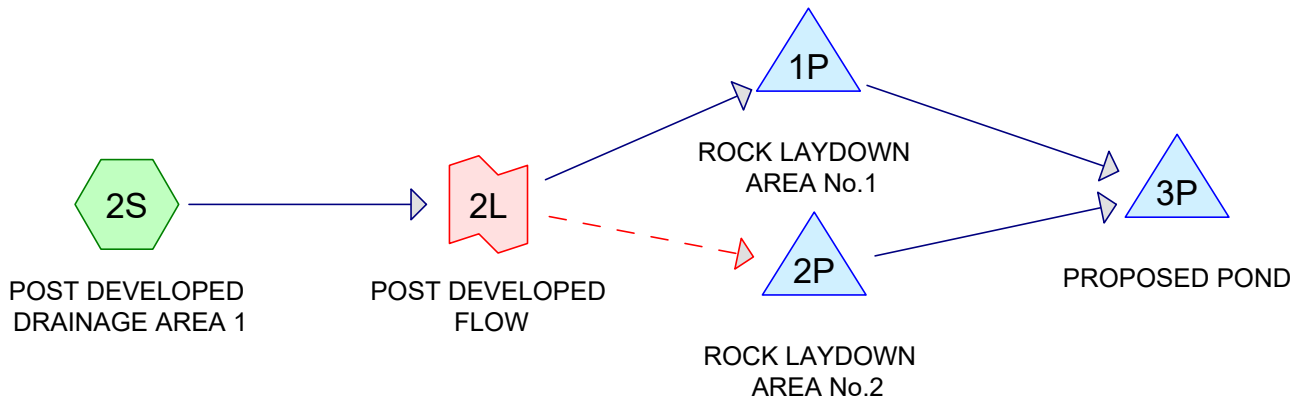
The auger borings were performed with a manually advanced hand auger. The auger was advanced by rotating it into the ground in approximate 6-inch increments. After each incremental penetration, the auger was retracted, and the soils collected in the auger bucket were placed in sealed containers. The samples were then reviewed by a geotechnical engineer and classified as described above. Detailed descriptions of the soils encountered in the auger borings are presented in the Auger Boring Logs.

## Appendix B – HydroCAD Report

### PRE-DEVELOPED SITE



### POST DEVELOPED SITE



**Staging Area 3 HydroCAD Report**

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Time span=5.00-20.00 hrs, dt=0.20 hrs, 76 points  
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: PRE DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>5.06"  
Flow Length=1,711' Slope=0.0016 '/' Tc=222.3 min CN=58 Runoff=23.38 cfs 10.620 af

**Subcatchment2S: POST DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>6.15"  
Flow Length=1,214' Slope=0.0009 '/' Tc=193.3 min CN=64 Runoff=30.19 cfs 12.892 af

**Pond 1P: ROCK LAYDOWN AREA No.1** Peak Elev=90.37' Storage=21,675 cf Inflow=13.28 cfs 5.672 af  
Discarded=1.00 cfs 0.768 af Primary=15.29 cfs 4.417 af Outflow=16.29 cfs 5.185 af

**Pond 2P: ROCK LAYDOWN AREA No.2** Peak Elev=90.46' Storage=13,418 cf Inflow=16.91 cfs 7.220 af  
Discarded=0.62 cfs 0.514 af Primary=20.38 cfs 6.376 af Outflow=21.00 cfs 6.891 af

**Pond 3P: PROPOSED POND** Peak Elev=88.72' Storage=260,592 cf Inflow=29.63 cfs 10.793 af  
Discarded=1.75 cfs 1.035 af Primary=16.42 cfs 4.287 af Outflow=18.18 cfs 5.322 af

**Link 1L: EXISTING OUTFALL LOCATION** Inflow=23.38 cfs 10.620 af  
Primary=23.38 cfs 10.620 af

**Link 2L: POST DEVELOPED FLOW** x 0.44 Inflow=30.19 cfs 12.892 af  
Primary=13.28 cfs 5.672 af Secondary=16.91 cfs 7.220 af

# Staging Area 3 HydroCAD Report

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## Summary for Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Runoff = 23.38 cfs @ 15.06 hrs, Volume= 10.620 af, Depth> 5.06"

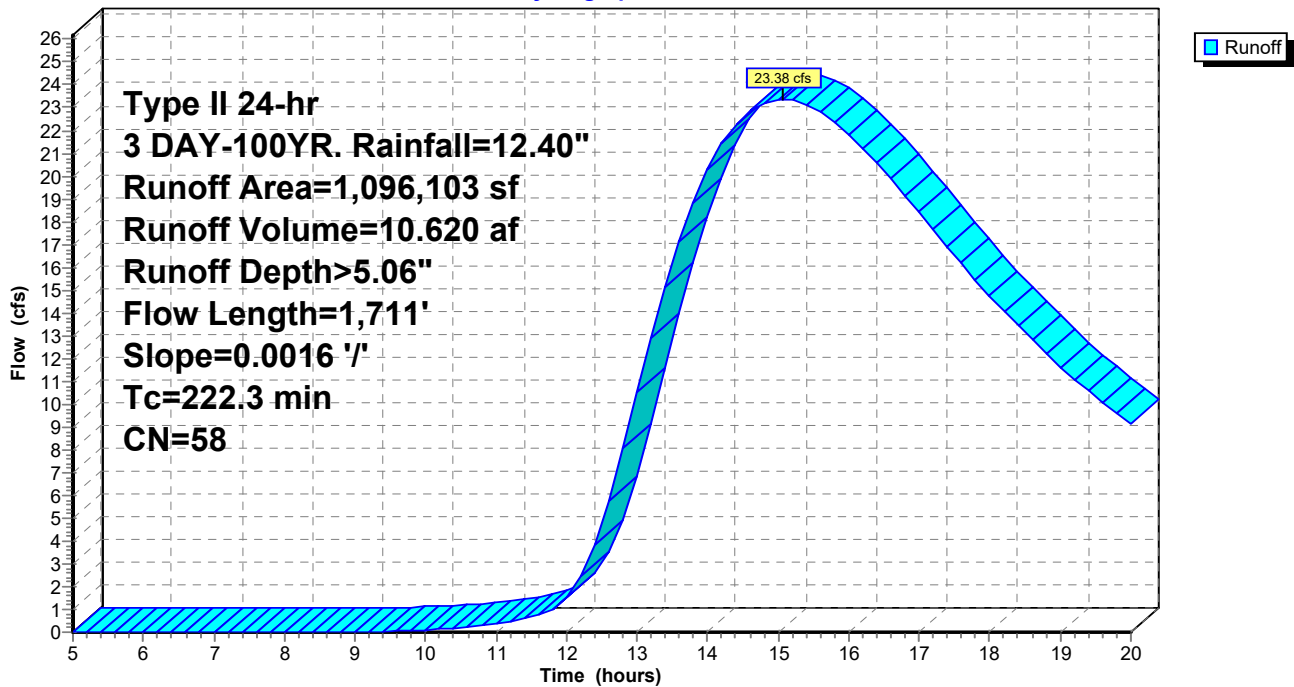
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

Area (sf)	CN	Description
1,096,103	58	Meadow, non-grazed, HSG B
1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
222.3	1,711	0.0016	0.13		Lag/CN Method,

## Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Hydrograph



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## Summary for Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Runoff = 30.19 cfs @ 14.52 hrs, Volume= 12.892 af, Depth> 6.15"

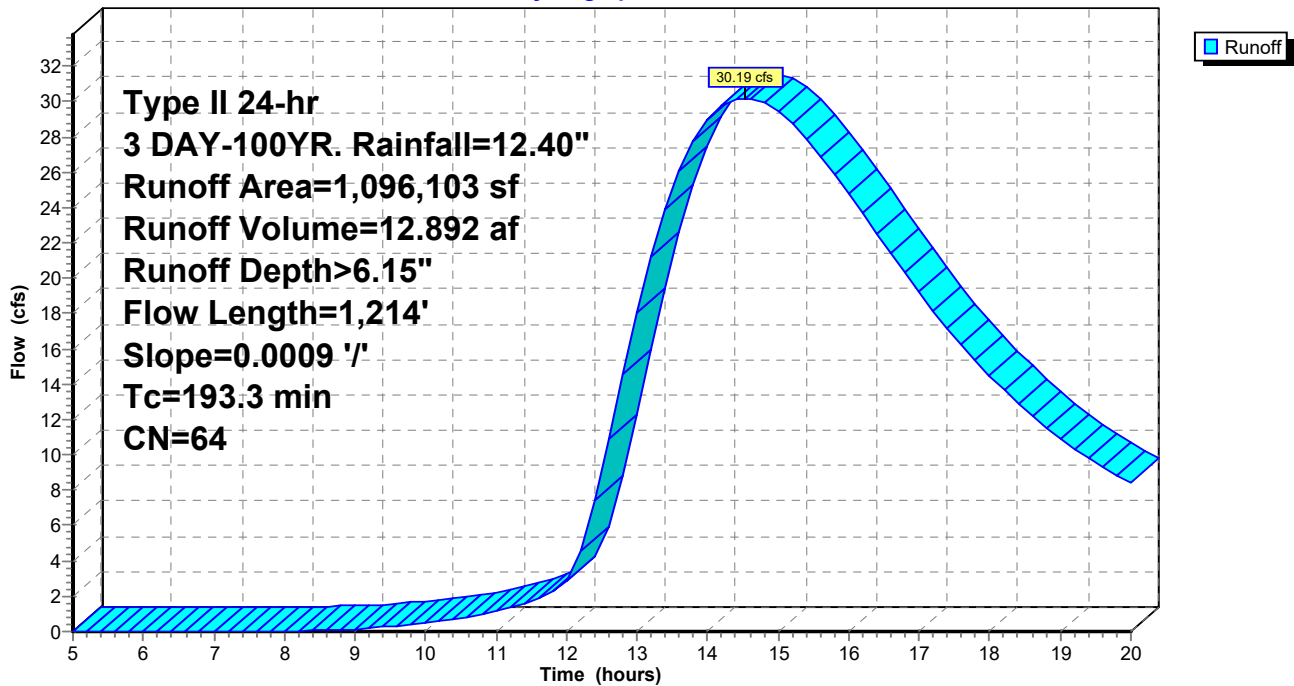
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

	Area (sf)	CN	Description
*	576,632	65	Uncompacted Gravel( 35% Void Ratio)
	421,336	58	Meadow, non-grazed, HSG B
	98,135	85	Gravel roads, HSG B
	1,096,103	64	Weighted Average
	1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
193.3	1,214	0.0009	0.10		Lag/CN Method,

## Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Hydrograph



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## Summary for Pond 1P: ROCK LAYDOWN AREA No.1

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 2.71" for 3 DAY-100YR. event  
 Inflow = 13.28 cfs @ 14.52 hrs, Volume= 5.672 af  
 Outflow = 16.29 cfs @ 14.40 hrs, Volume= 5.185 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 1.00 cfs @ 12.00 hrs, Volume= 0.768 af  
 Primary = 15.29 cfs @ 14.40 hrs, Volume= 4.417 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 90.37' @ 14.40 hrs Surf.Area= 123,855 sf Storage= 21,675 cf

Plug-Flow detention time= 37.0 min calculated for 5.117 af (90% of inflow)  
 Center-of-Mass det. time= 16.3 min ( 952.1 - 935.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	21,675 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 61,928 cf Overall x 35.0% Voids
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	123,855	0	0
90.00	123,855	61,928	61,928

Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=1.00 cfs @ 12.00 hrs HW=89.51' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 1.00 cfs)

**Primary OutFlow** Max=15.24 cfs @ 14.40 hrs HW=90.37' (Free Discharge)  
 ↑**1=Broad-Crested Rectangular Weir**(Weir Controls 15.24 cfs @ 2.03 fps)

# Staging Area 3 HydroCAD Report

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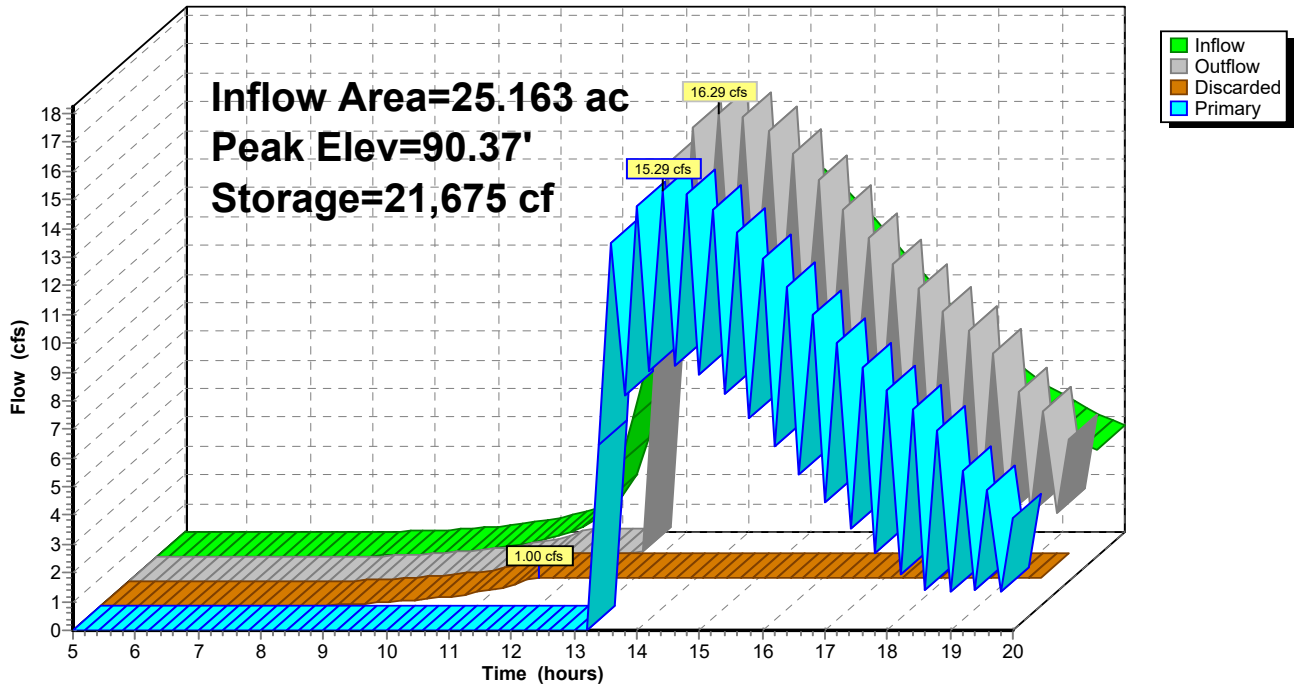
Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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## Pond 1P: ROCK LAYDOWN AREA No.1

Hydrograph





**Staging Area 3 HydroCAD Report**

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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**Summary for Pond 2P: ROCK LAYDOWN AREA No.2**

Inflow = 16.91 cfs @ 14.52 hrs, Volume= 7.220 af  
 Outflow = 21.00 cfs @ 14.60 hrs, Volume= 6.891 af, Atten= 0%, Lag= 4.7 min  
 Discarded = 0.62 cfs @ 11.20 hrs, Volume= 0.514 af  
 Primary = 20.38 cfs @ 14.60 hrs, Volume= 6.376 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 90.46' @ 14.60 hrs Surf.Area= 76,672 sf Storage= 13,418 cf

Plug-Flow detention time= 19.4 min calculated for 6.891 af (95% of inflow)  
 Center-of-Mass det. time= 7.8 min ( 943.6 - 935.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	13,418 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 38,336 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	76,672	0	0
90.00	76,672	38,336	38,336

Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.62 cfs @ 11.20 hrs HW=89.51' (Free Discharge)  
 ↑ **2=Exfiltration** (Exfiltration Controls 0.62 cfs)

**Primary OutFlow** Max=20.35 cfs @ 14.60 hrs HW=90.46' (Free Discharge)  
 ↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 20.35 cfs @ 2.28 fps)

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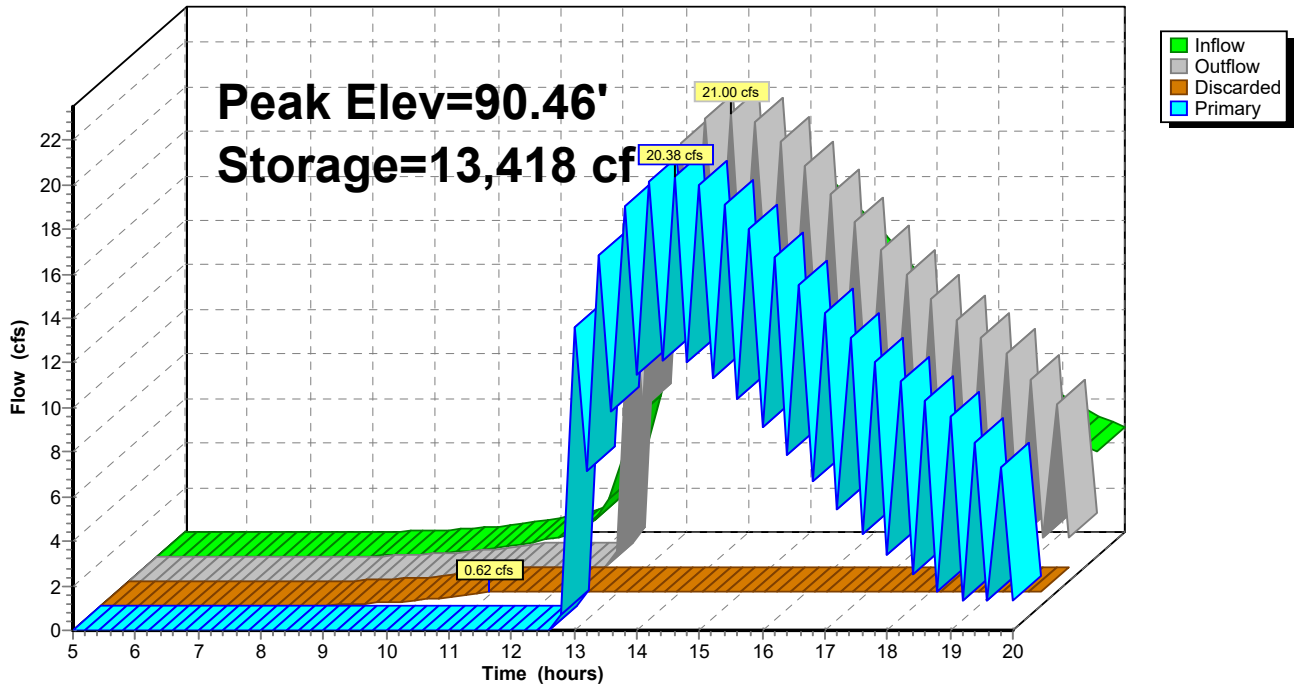
Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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## Pond 2P: ROCK LAYDOWN AREA No.2

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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## Summary for Pond 3P: PROPOSED POND

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 5.15" for 3 DAY-100YR. event  
Inflow = 29.63 cfs @ 14.60 hrs, Volume= 10.793 af  
Outflow = 18.18 cfs @ 16.91 hrs, Volume= 5.322 af, Atten= 39%, Lag= 138.6 min  
Discarded = 1.75 cfs @ 16.91 hrs, Volume= 1.035 af  
Primary = 16.42 cfs @ 16.91 hrs, Volume= 4.287 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Peak Elev= 88.72' @ 16.91 hrs Surf.Area= 216,318 sf Storage= 260,592 cf

Plug-Flow detention time= 187.0 min calculated for 5.252 af (49% of inflow)  
Center-of-Mass det. time= 98.2 min ( 1,049.1 - 950.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	87.50'	541,132 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
87.50	211,274	0	0
88.00	213,338	106,153	106,153
89.00	217,483	215,411	321,564
90.00	221,654	219,569	541,132

Device	Routing	Invert	Outlet Devices
#1	Discarded	87.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	88.50'	<b>43.6 deg x 50.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.56 (C= 3.20)

**Discarded OutFlow** Max=1.75 cfs @ 16.91 hrs HW=88.72' (Free Discharge)  
↑**1=Exfiltration** (Exfiltration Controls 1.75 cfs)

**Primary OutFlow** Max=16.37 cfs @ 16.91 hrs HW=88.72' (Free Discharge)  
↑**2=Sharp-Crested Vee/Trap Weir** (Weir Controls 16.37 cfs @ 1.50 fps)

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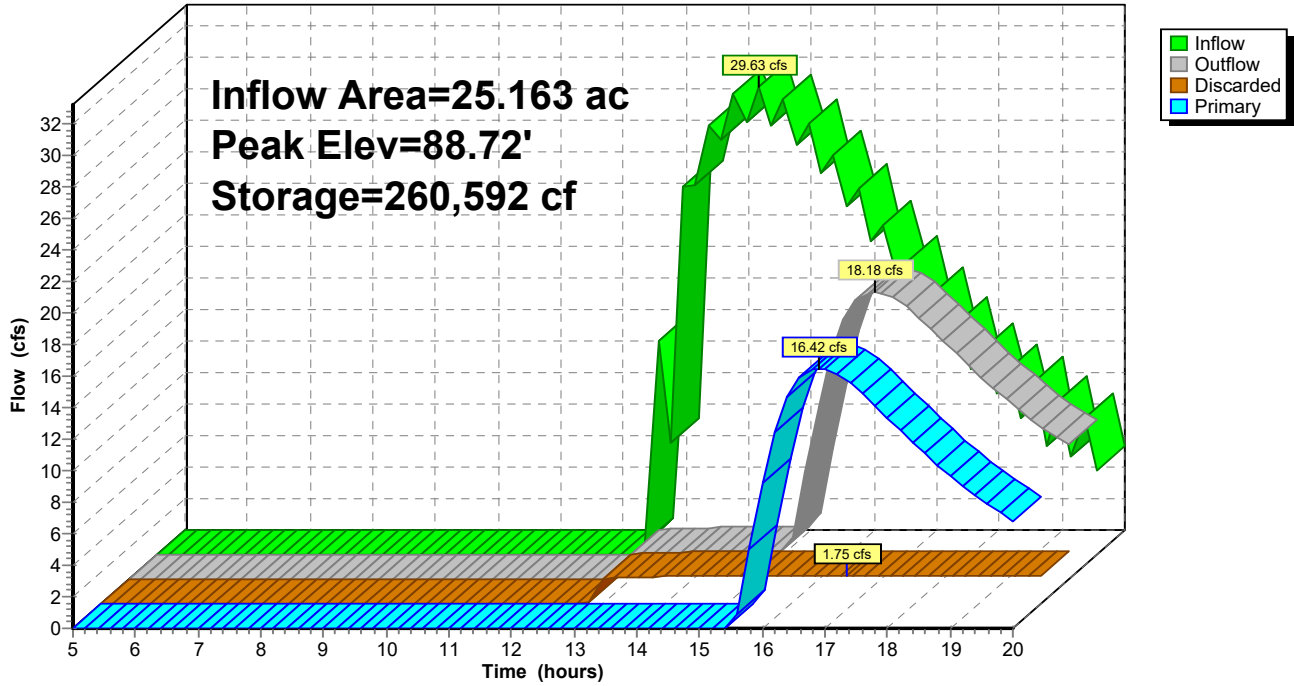
Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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## Pond 3P: PROPOSED POND

Hydrograph



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Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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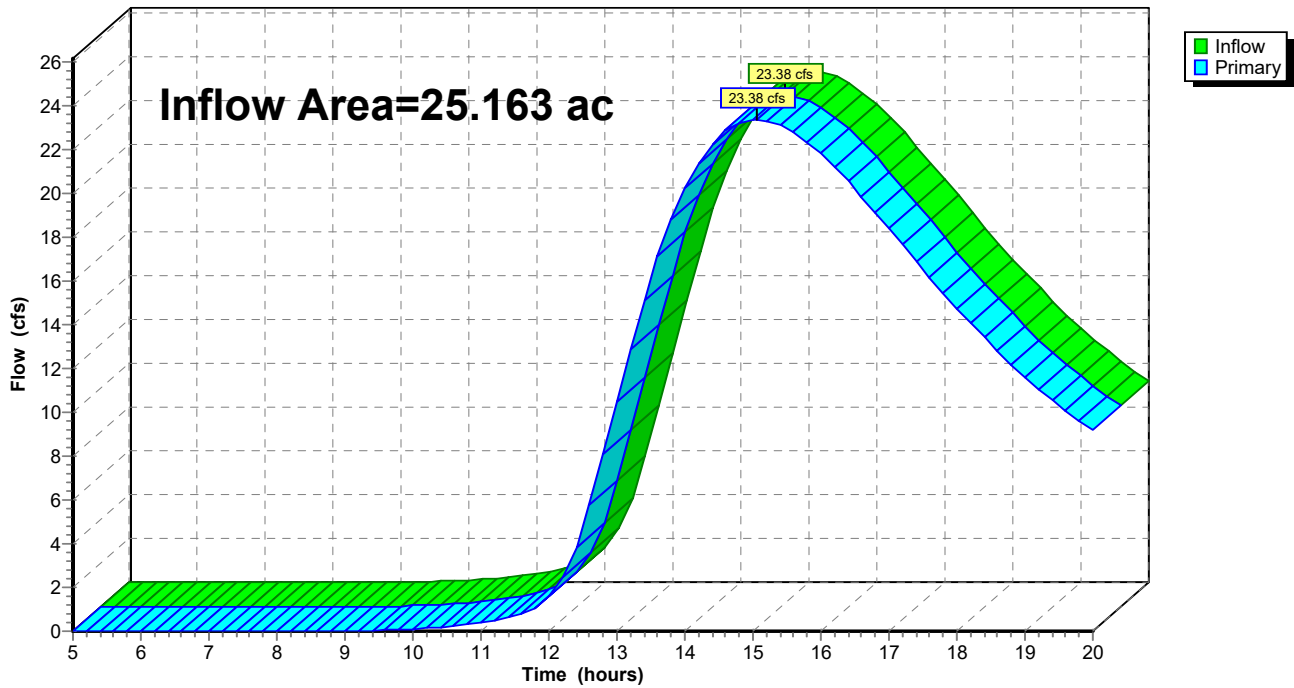
## Summary for Link 1L: EXISTING OUTFALL LOCATION

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 5.06" for 3 DAY-100YR. event  
Inflow = 23.38 cfs @ 15.06 hrs, Volume= 10.620 af  
Primary = 23.38 cfs @ 15.06 hrs, Volume= 10.620 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

### Link 1L: EXISTING OUTFALL LOCATION

Hydrograph



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Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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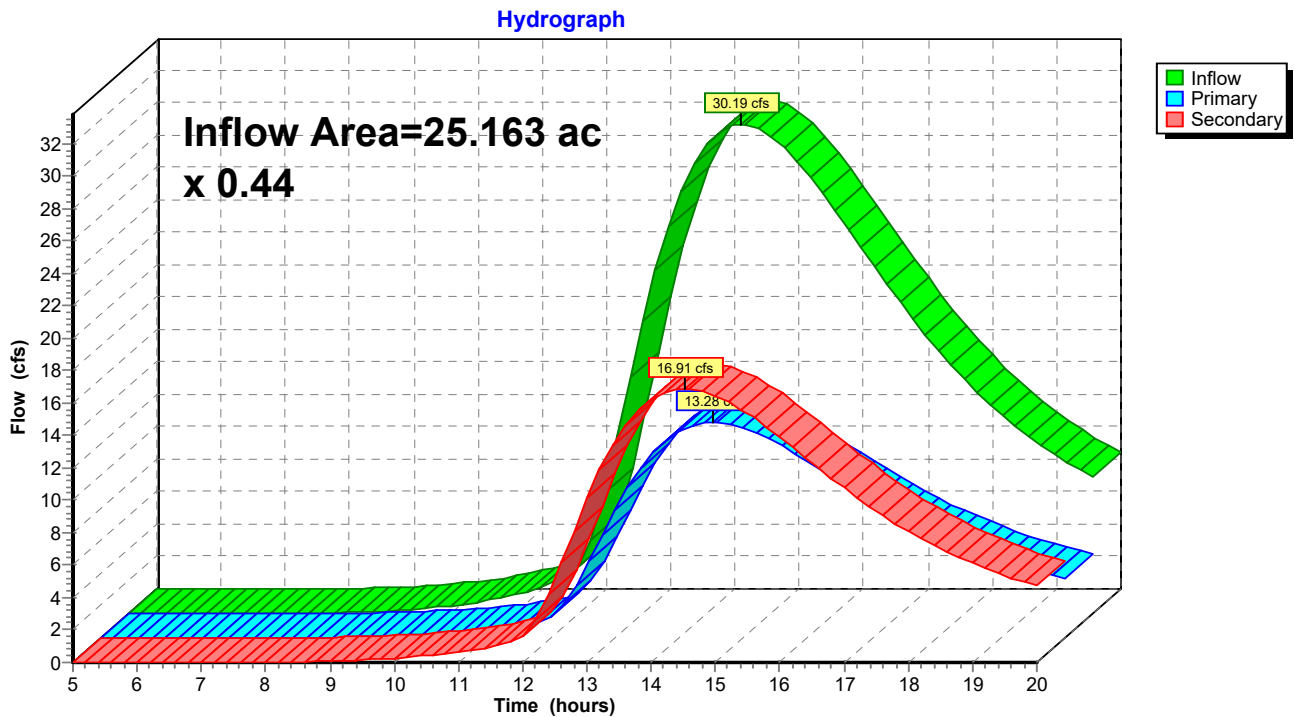
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## Summary for Link 2L: POST DEVELOPED FLOW

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 6.15" for 3 DAY-100YR. event  
Inflow = 30.19 cfs @ 14.52 hrs, Volume= 12.892 af  
Primary = 13.28 cfs @ 14.52 hrs, Volume= 5.672 af, Atten= 56%, Lag= 0.0 min  
Secondary = 16.91 cfs @ 14.52 hrs, Volume= 7.220 af

Primary outflow = Inflow x 0.44, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

## Link 2L: POST DEVELOPED FLOW



# Staging Area 3 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Time span=5.00-20.00 hrs, dt=0.20 hrs, 76 points  
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: PRE DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>6.17"  
Flow Length=1,711' Slope=0.0016 '/' Tc=222.3 min CN=58 Runoff=28.42 cfs 12.932 af

**Subcatchment2S: POST DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>7.37"  
Flow Length=1,214' Slope=0.0009 '/' Tc=193.3 min CN=64 Runoff=36.12 cfs 15.451 af

**Pond 1P: ROCK LAYDOWN AREA No.1** Peak Elev=90.47' Storage=21,675 cf Inflow=15.89 cfs 6.798 af  
Discarded=1.00 cfs 0.812 af Primary=21.09 cfs 5.474 af Outflow=22.09 cfs 6.286 af

**Pond 2P: ROCK LAYDOWN AREA No.2** Peak Elev=90.48' Storage=13,418 cf Inflow=20.23 cfs 8.652 af  
Discarded=0.62 cfs 0.545 af Primary=21.51 cfs 7.816 af Outflow=22.13 cfs 8.360 af

**Pond 3P: PROPOSED POND** Peak Elev=88.78' Storage=273,940 cf Inflow=38.73 cfs 13.290 af  
Discarded=1.75 cfs 1.059 af Primary=23.83 cfs 6.658 af Outflow=25.59 cfs 7.717 af

**Link 1L: EXISTING OUTFALL LOCATION** Inflow=28.42 cfs 12.932 af  
Primary=28.42 cfs 12.932 af

**Link 2L: POST DEVELOPED FLOW** x 0.44 Inflow=36.12 cfs 15.451 af  
Primary=15.89 cfs 6.798 af Secondary=20.23 cfs 8.652 af

# Staging Area 3 HydroCAD Report

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Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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## Summary for Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Runoff = 28.42 cfs @ 15.02 hrs, Volume= 12.932 af, Depth> 6.17"

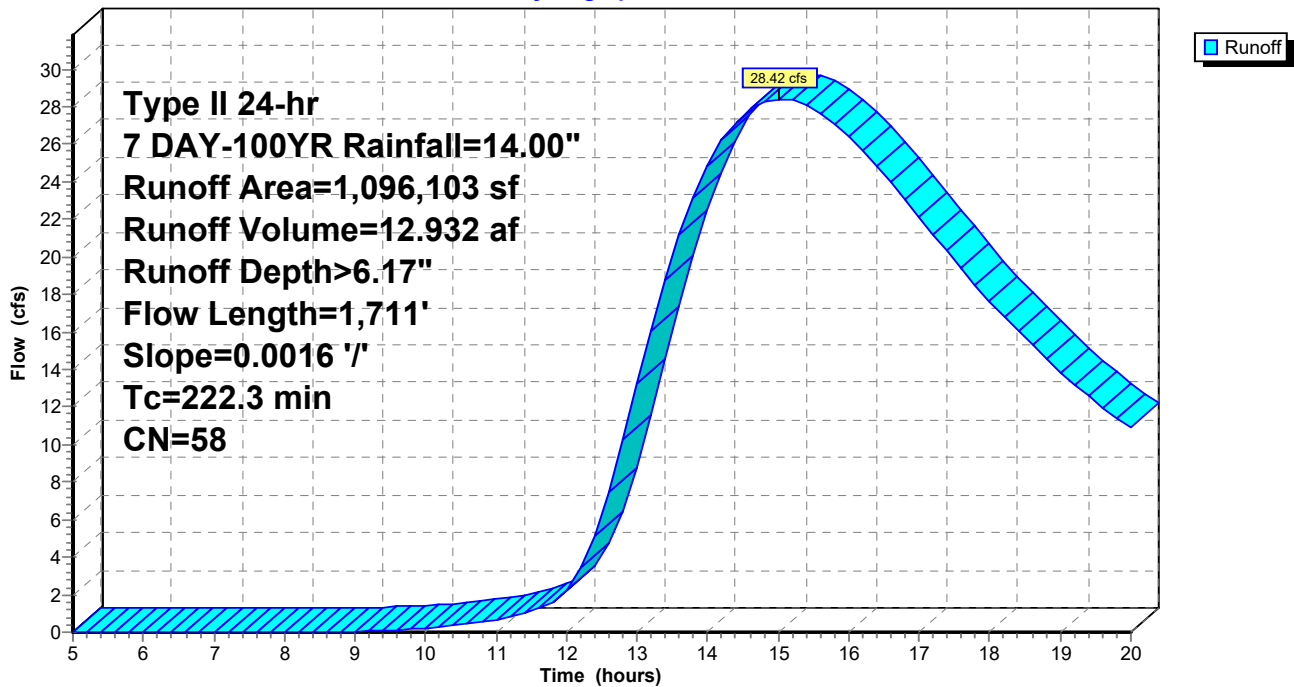
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 7 DAY-100YR Rainfall=14.00"

Area (sf)	CN	Description
1,096,103	58	Meadow, non-grazed, HSG B
1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
222.3	1,711	0.0016	0.13		Lag/CN Method,

## Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Hydrograph





# Staging Area 3 HydroCAD Report

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Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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## Summary for Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Runoff = 36.12 cfs @ 14.50 hrs, Volume= 15.451 af, Depth> 7.37"

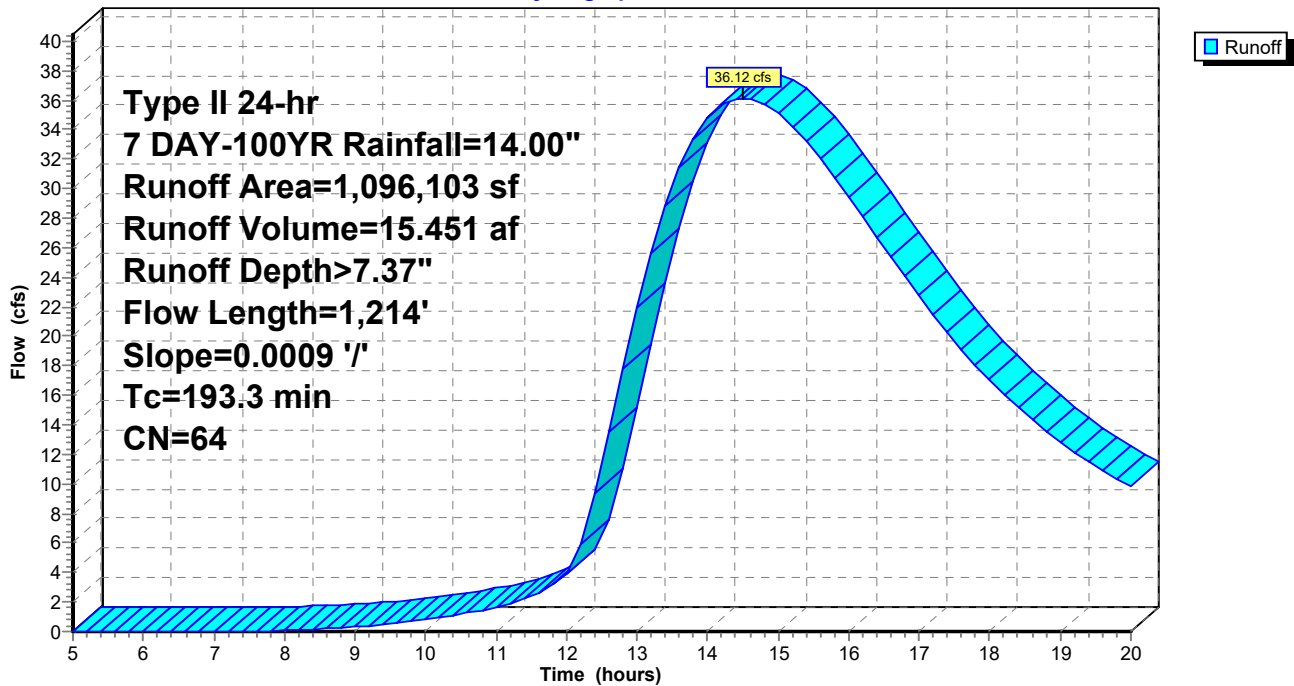
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 7 DAY-100YR Rainfall=14.00"

	Area (sf)	CN	Description
*	576,632	65	Uncompacted Gravel( 35% Void Ratio)
	421,336	58	Meadow, non-grazed, HSG B
	98,135	85	Gravel roads, HSG B
	1,096,103	64	Weighted Average
	1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
193.3	1,214	0.0009	0.10		Lag/CN Method,

## Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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## Summary for Pond 1P: ROCK LAYDOWN AREA No.1

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 3.24" for 7 DAY-100YR event  
 Inflow = 15.89 cfs @ 14.50 hrs, Volume= 6.798 af  
 Outflow = 22.09 cfs @ 14.60 hrs, Volume= 6.286 af, Atten= 0%, Lag= 6.2 min  
 Discarded = 1.00 cfs @ 11.60 hrs, Volume= 0.812 af  
 Primary = 21.09 cfs @ 14.60 hrs, Volume= 5.474 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 90.47' @ 14.60 hrs Surf.Area= 123,855 sf Storage= 21,675 cf

Plug-Flow detention time= 31.9 min calculated for 6.286 af (92% of inflow)  
 Center-of-Mass det. time= 12.9 min ( 945.6 - 932.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	21,675 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 61,928 cf Overall x 35.0% Voids
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	123,855	0	0
90.00	123,855	61,928	61,928

Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=1.00 cfs @ 11.60 hrs HW=89.51' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 1.00 cfs)

**Primary OutFlow** Max=21.04 cfs @ 14.60 hrs HW=90.47' (Free Discharge)  
 ↑**1=Broad-Crested Rectangular Weir**(Weir Controls 21.04 cfs @ 2.31 fps)

# Staging Area 3 HydroCAD Report

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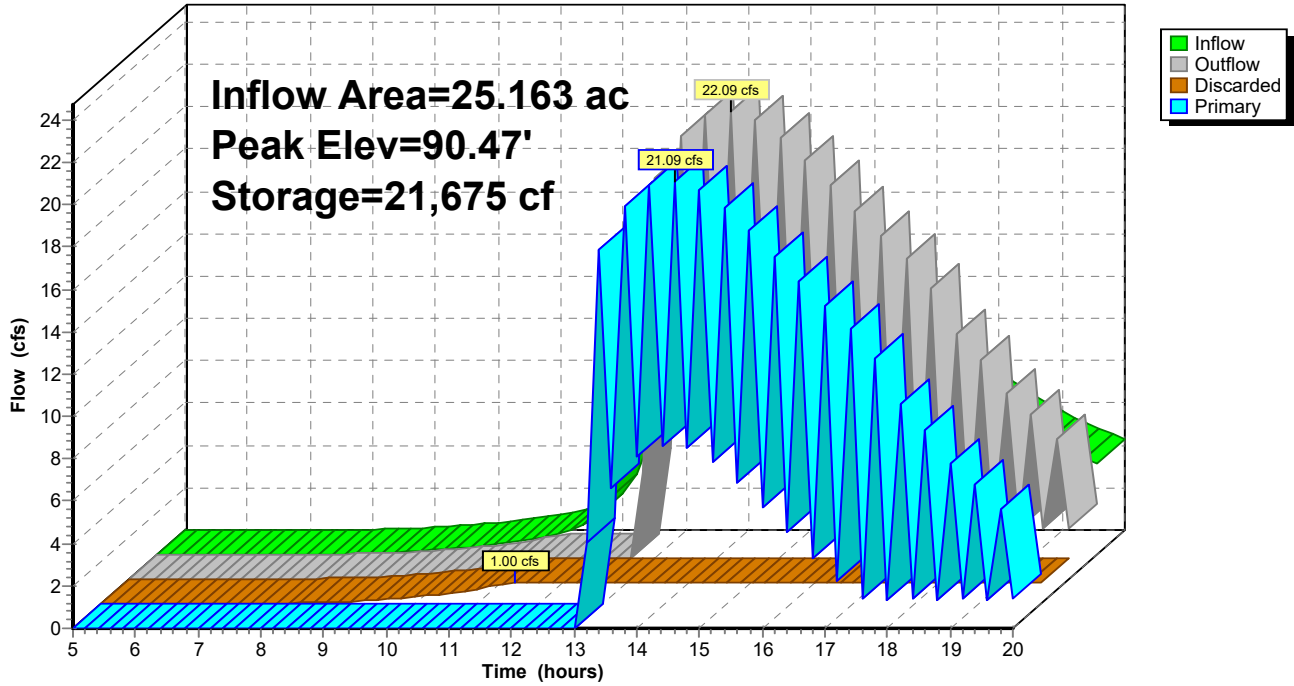
Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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## Pond 1P: ROCK LAYDOWN AREA No.1

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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## Summary for Pond 2P: ROCK LAYDOWN AREA No.2

Inflow = 20.23 cfs @ 14.50 hrs, Volume= 8.652 af  
 Outflow = 22.13 cfs @ 14.40 hrs, Volume= 8.360 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.62 cfs @ 10.60 hrs, Volume= 0.545 af  
 Primary = 21.51 cfs @ 14.40 hrs, Volume= 7.816 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 90.48' @ 14.40 hrs Surf.Area= 76,672 sf Storage= 13,418 cf

Plug-Flow detention time= 16.9 min calculated for 8.360 af (97% of inflow)  
 Center-of-Mass det. time= 8.0 min ( 940.8 - 932.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	13,418 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 38,336 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	76,672	0	0
90.00	76,672	38,336	38,336

Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.62 cfs @ 10.60 hrs HW=89.51' (Free Discharge)

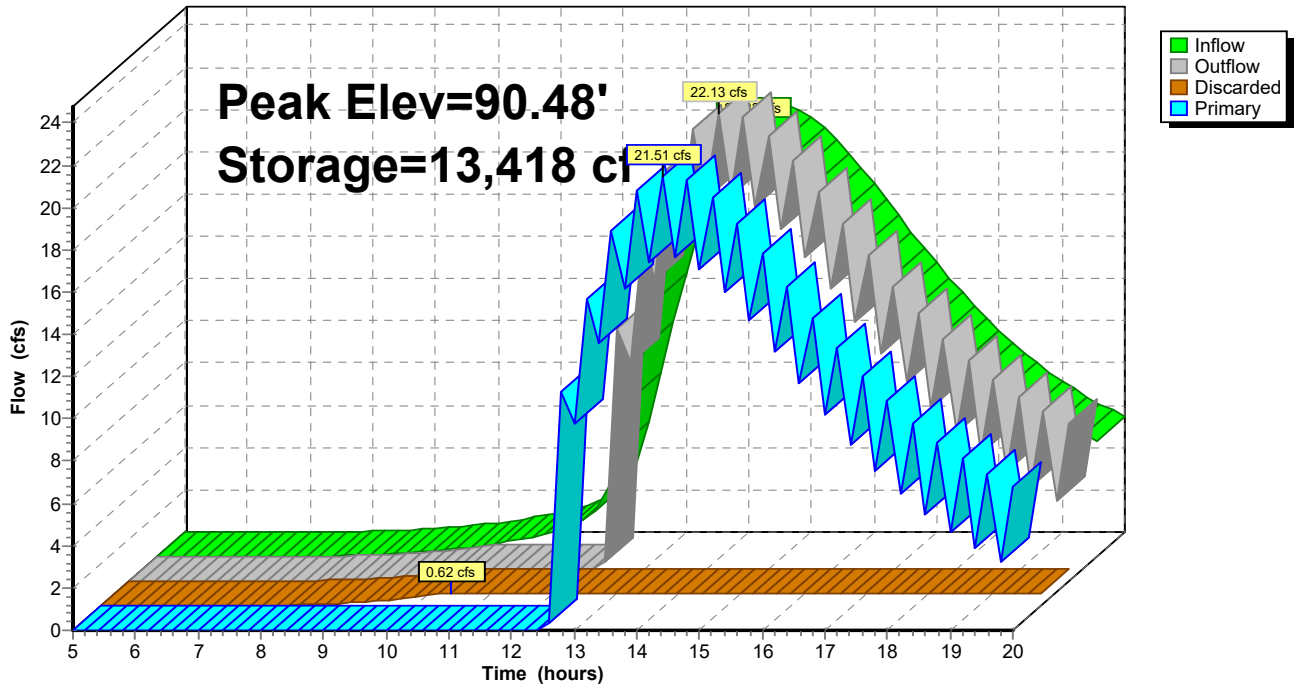
↑ **2=Exfiltration** (Exfiltration Controls 0.62 cfs)

**Primary OutFlow** Max=21.45 cfs @ 14.40 hrs HW=90.48' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 21.45 cfs @ 2.32 fps)

Pond 2P: ROCK LAYDOWN AREA No.2

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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## Summary for Pond 3P: PROPOSED POND

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 6.34" for 7 DAY-100YR event  
 Inflow = 38.73 cfs @ 14.60 hrs, Volume= 13.290 af  
 Outflow = 25.59 cfs @ 16.35 hrs, Volume= 7.717 af, Atten= 34%, Lag= 104.8 min  
 Discarded = 1.75 cfs @ 16.35 hrs, Volume= 1.059 af  
 Primary = 23.83 cfs @ 16.35 hrs, Volume= 6.658 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 88.78' @ 16.35 hrs Surf.Area= 216,573 sf Storage= 273,940 cf

Plug-Flow detention time= 162.7 min calculated for 7.615 af (57% of inflow)  
 Center-of-Mass det. time= 85.6 min ( 1,032.8 - 947.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	87.50'	541,132 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
87.50	211,274	0	0
88.00	213,338	106,153	106,153
89.00	217,483	215,411	321,564
90.00	221,654	219,569	541,132

Device	Routing	Invert	Outlet Devices
#1	Discarded	87.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	88.50'	<b>43.6 deg x 50.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.56 (C= 3.20)

**Discarded OutFlow** Max=1.75 cfs @ 16.35 hrs HW=88.78' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 1.75 cfs)

**Primary OutFlow** Max=23.77 cfs @ 16.35 hrs HW=88.78' (Free Discharge)  
 ↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 23.77 cfs @ 1.69 fps)

# Staging Area 3 HydroCAD Report

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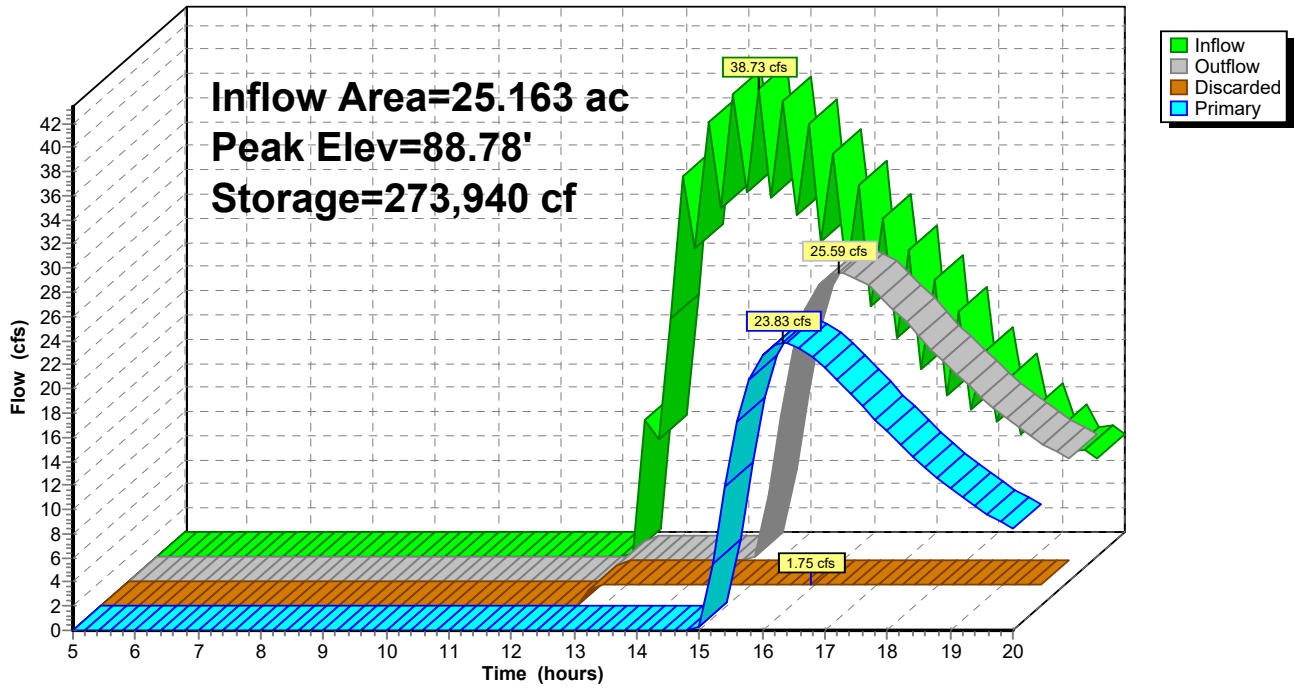
Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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## Pond 3P: PROPOSED POND

Hydrograph



# Staging Area 3 HydroCAD Report

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Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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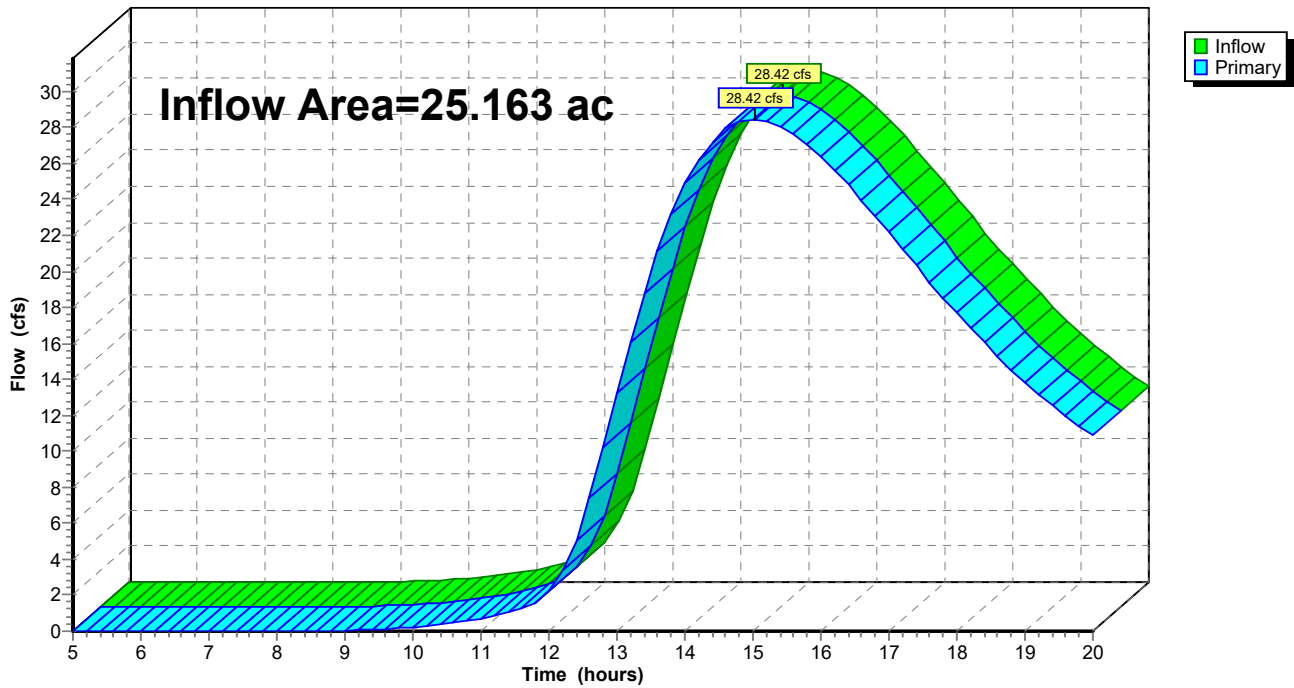
## Summary for Link 1L: EXISTING OUTFALL LOCATION

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 6.17" for 7 DAY-100YR event  
Inflow = 28.42 cfs @ 15.02 hrs, Volume= 12.932 af  
Primary = 28.42 cfs @ 15.02 hrs, Volume= 12.932 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

## Link 1L: EXISTING OUTFALL LOCATION

Hydrograph





# Staging Area 3 HydroCAD Report

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Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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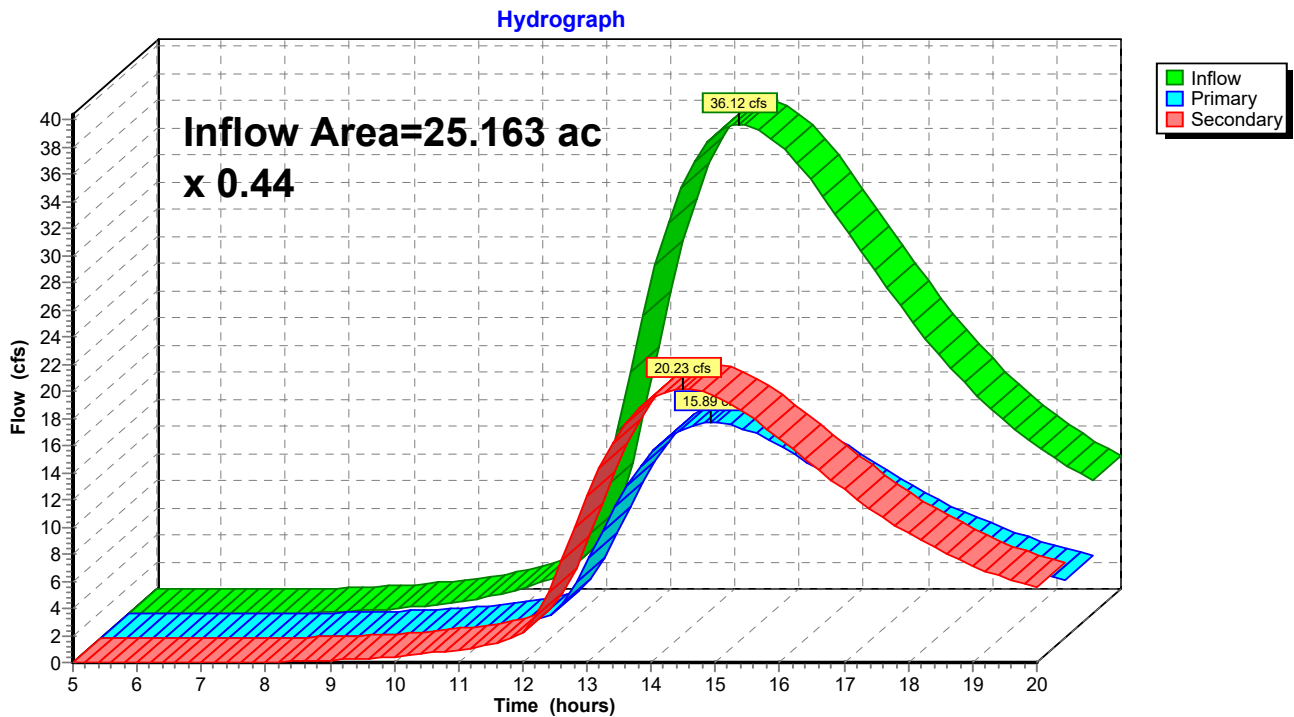
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## Summary for Link 2L: POST DEVELOPED FLOW

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 7.37" for 7 DAY-100YR event  
Inflow = 36.12 cfs @ 14.50 hrs, Volume= 15.451 af  
Primary = 15.89 cfs @ 14.50 hrs, Volume= 6.798 af, Atten= 56%, Lag= 0.0 min  
Secondary = 20.23 cfs @ 14.50 hrs, Volume= 8.652 af

Primary outflow = Inflow x 0.44, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

## Link 2L: POST DEVELOPED FLOW



**Staging Area 3 HydroCAD Report**

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Time span=5.00-20.00 hrs, dt=0.20 hrs, 76 points  
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: PRE DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>7.66"  
Flow Length=1,711' Slope=0.0016 '/' Tc=222.3 min CN=58 Runoff=35.22 cfs 16.072 af

**Subcatchment2S: POST DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>9.01"  
Flow Length=1,214' Slope=0.0009 '/' Tc=193.3 min CN=64 Runoff=44.01 cfs 18.891 af

**Pond 1P: ROCK LAYDOWN AREA No.1** Peak Elev=90.55' Storage=21,675 cf Inflow=19.36 cfs 8.312 af  
Discarded=1.00 cfs 0.866 af Primary=26.10 cfs 6.971 af Outflow=27.11 cfs 7.837 af

**Pond 2P: ROCK LAYDOWN AREA No.2** Peak Elev=90.55' Storage=13,418 cf Inflow=24.64 cfs 10.579 af  
Discarded=0.62 cfs 0.580 af Primary=26.55 cfs 9.669 af Outflow=27.17 cfs 10.249 af

**Pond 3P: PROPOSED POND** Peak Elev=88.85' Storage=289,266 cf Inflow=47.52 cfs 16.640 af  
Discarded=1.76 cfs 1.092 af Primary=33.39 cfs 9.867 af Outflow=35.14 cfs 10.958 af

**Link 1L: EXISTING OUTFALL LOCATION** Inflow=35.22 cfs 16.072 af  
Primary=35.22 cfs 16.072 af

**Link 2L: POST DEVELOPED FLOW** x 0.44 Inflow=44.01 cfs 18.891 af  
Primary=19.36 cfs 8.312 af Secondary=24.64 cfs 10.579 af

# Staging Area 3 HydroCAD Report

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Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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## Summary for Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Runoff = 35.22 cfs @ 14.99 hrs, Volume= 16.072 af, Depth> 7.66"

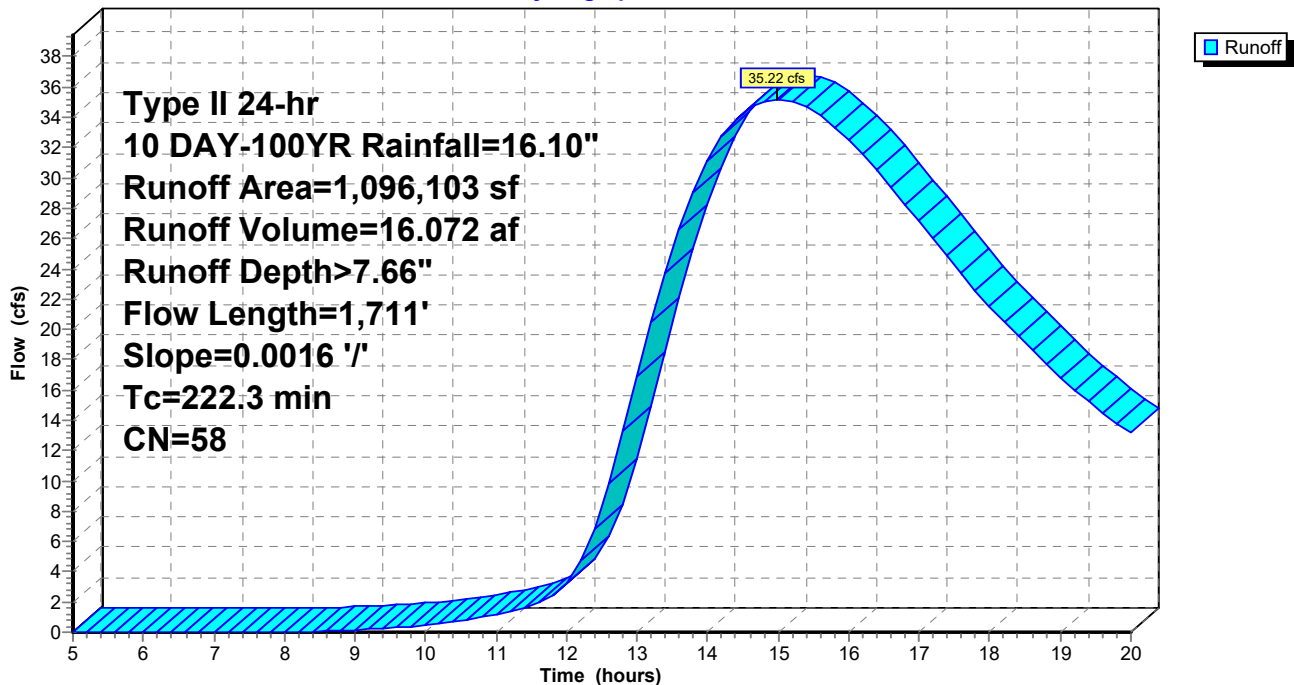
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 10 DAY-100YR Rainfall=16.10"

Area (sf)	CN	Description
1,096,103	58	Meadow, non-grazed, HSG B
1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
222.3	1,711	0.0016	0.13		Lag/CN Method,

## Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Hydrograph



# Staging Area 3 HydroCAD Report

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Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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## Summary for Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Runoff = 44.01 cfs @ 14.47 hrs, Volume= 18.891 af, Depth> 9.01"

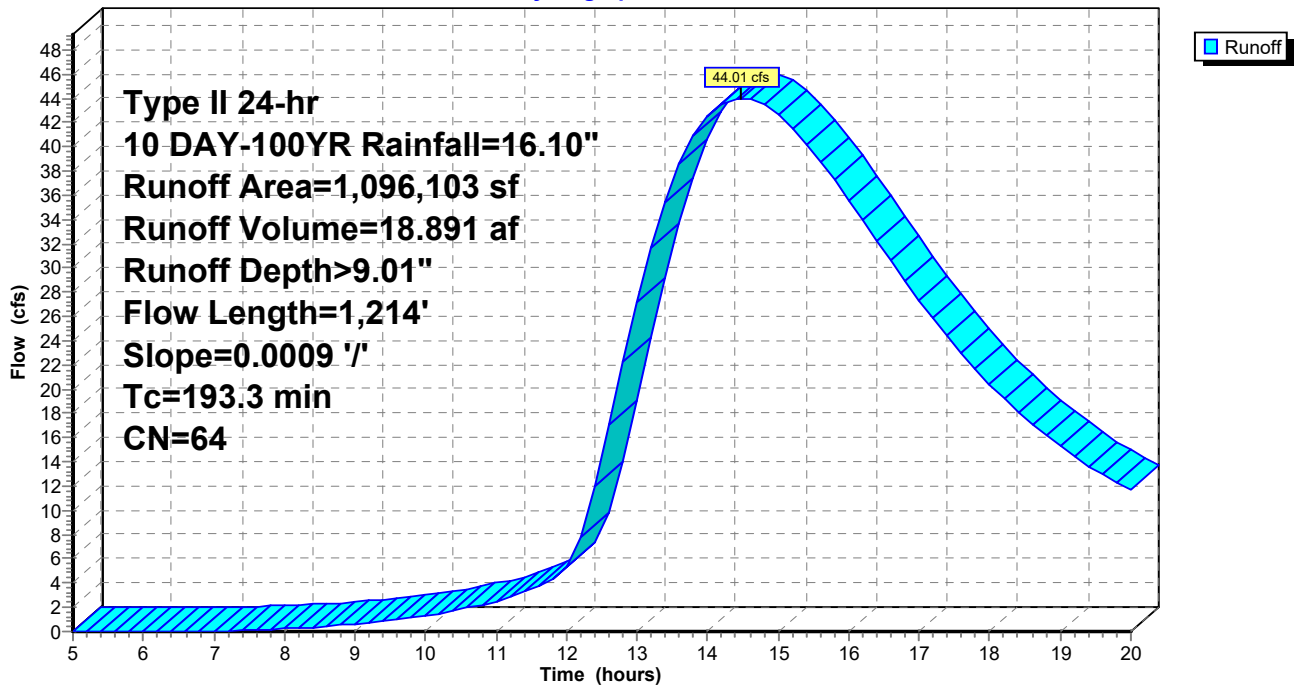
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 10 DAY-100YR Rainfall=16.10"

	Area (sf)	CN	Description
*	576,632	65	Uncompacted Gravel( 35% Void Ratio)
	421,336	58	Meadow, non-grazed, HSG B
	98,135	85	Gravel roads, HSG B
	1,096,103	64	Weighted Average
	1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
193.3	1,214	0.0009	0.10		Lag/CN Method,

## Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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## Summary for Pond 1P: ROCK LAYDOWN AREA No.1

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 3.96" for 10 DAY-100YR event  
 Inflow = 19.36 cfs @ 14.47 hrs, Volume= 8.312 af  
 Outflow = 27.11 cfs @ 14.40 hrs, Volume= 7.837 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 1.00 cfs @ 11.60 hrs, Volume= 0.866 af  
 Primary = 26.10 cfs @ 14.40 hrs, Volume= 6.971 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 90.55' @ 14.40 hrs Surf.Area= 123,855 sf Storage= 21,675 cf

Plug-Flow detention time= 27.2 min calculated for 7.837 af (94% of inflow)  
 Center-of-Mass det. time= 12.3 min ( 941.5 - 929.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	21,675 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 61,928 cf Overall x 35.0% Voids
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	123,855	0	0
90.00	123,855	61,928	61,928

Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=1.00 cfs @ 11.60 hrs HW=89.53' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 1.00 cfs)

**Primary OutFlow** Max=26.05 cfs @ 14.40 hrs HW=90.55' (Free Discharge)  
 ↑**1=Broad-Crested Rectangular Weir**(Weir Controls 26.05 cfs @ 2.52 fps)

# Staging Area 3 HydroCAD Report

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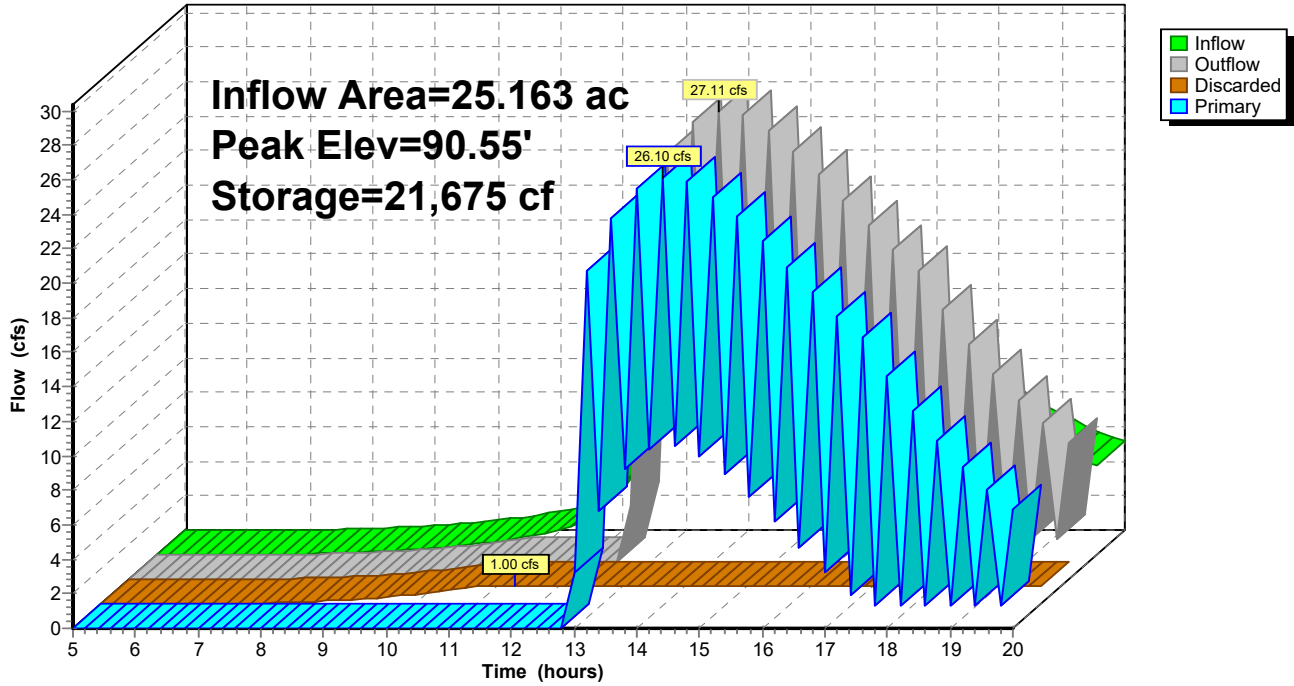
Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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## Pond 1P: ROCK LAYDOWN AREA No.1

Hydrograph



**Staging Area 3 HydroCAD Report**

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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**Summary for Pond 2P: ROCK LAYDOWN AREA No.2**

Inflow = 24.64 cfs @ 14.47 hrs, Volume= 10.579 af  
 Outflow = 27.17 cfs @ 14.60 hrs, Volume= 10.249 af, Atten= 0%, Lag= 7.4 min  
 Discarded = 0.62 cfs @ 10.40 hrs, Volume= 0.580 af  
 Primary = 26.55 cfs @ 14.60 hrs, Volume= 9.669 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 90.55' @ 14.60 hrs Surf.Area= 76,672 sf Storage= 13,418 cf

Plug-Flow detention time= 14.4 min calculated for 10.249 af (97% of inflow)  
 Center-of-Mass det. time= 6.2 min ( 935.4 - 929.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	13,418 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 38,336 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	76,672	0	0
90.00	76,672	38,336	38,336

Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.62 cfs @ 10.40 hrs HW=89.52' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 0.62 cfs)

**Primary OutFlow** Max=26.47 cfs @ 14.60 hrs HW=90.55' (Free Discharge)  
 ↑**1=Broad-Crested Rectangular Weir**(Weir Controls 26.47 cfs @ 2.54 fps)

# Staging Area 3 HydroCAD Report

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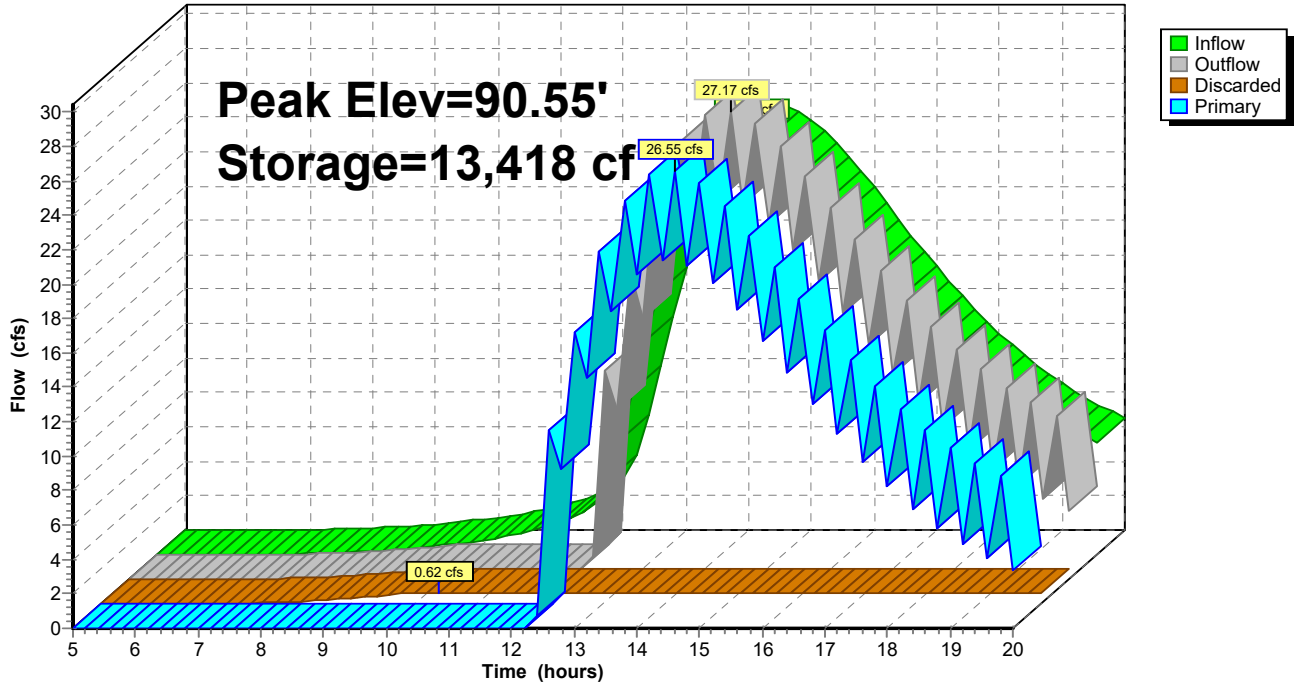
Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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## Pond 2P: ROCK LAYDOWN AREA No.2

Hydrograph





# Staging Area 3 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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## Summary for Pond 3P: PROPOSED POND

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 7.94" for 10 DAY-100YR event  
 Inflow = 47.52 cfs @ 14.40 hrs, Volume= 16.640 af  
 Outflow = 35.14 cfs @ 15.87 hrs, Volume= 10.958 af, Atten= 26%, Lag= 88.3 min  
 Discarded = 1.76 cfs @ 15.87 hrs, Volume= 1.092 af  
 Primary = 33.39 cfs @ 15.87 hrs, Volume= 9.867 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 88.85' @ 15.87 hrs Surf.Area= 216,867 sf Storage= 289,266 cf

Plug-Flow detention time= 140.7 min calculated for 10.958 af (66% of inflow)  
 Center-of-Mass det. time= 73.5 min ( 1,016.6 - 943.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	87.50'	541,132 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
87.50	211,274	0	0
88.00	213,338	106,153	106,153
89.00	217,483	215,411	321,564
90.00	221,654	219,569	541,132

Device	Routing	Invert	Outlet Devices
#1	Discarded	87.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	88.50'	<b>43.6 deg x 50.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.56 (C= 3.20)

**Discarded OutFlow** Max=1.76 cfs @ 15.87 hrs HW=88.85' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 1.76 cfs)

**Primary OutFlow** Max=33.28 cfs @ 15.87 hrs HW=88.85' (Free Discharge)  
 ↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 33.28 cfs @ 1.89 fps)

# Staging Area 3 HydroCAD Report

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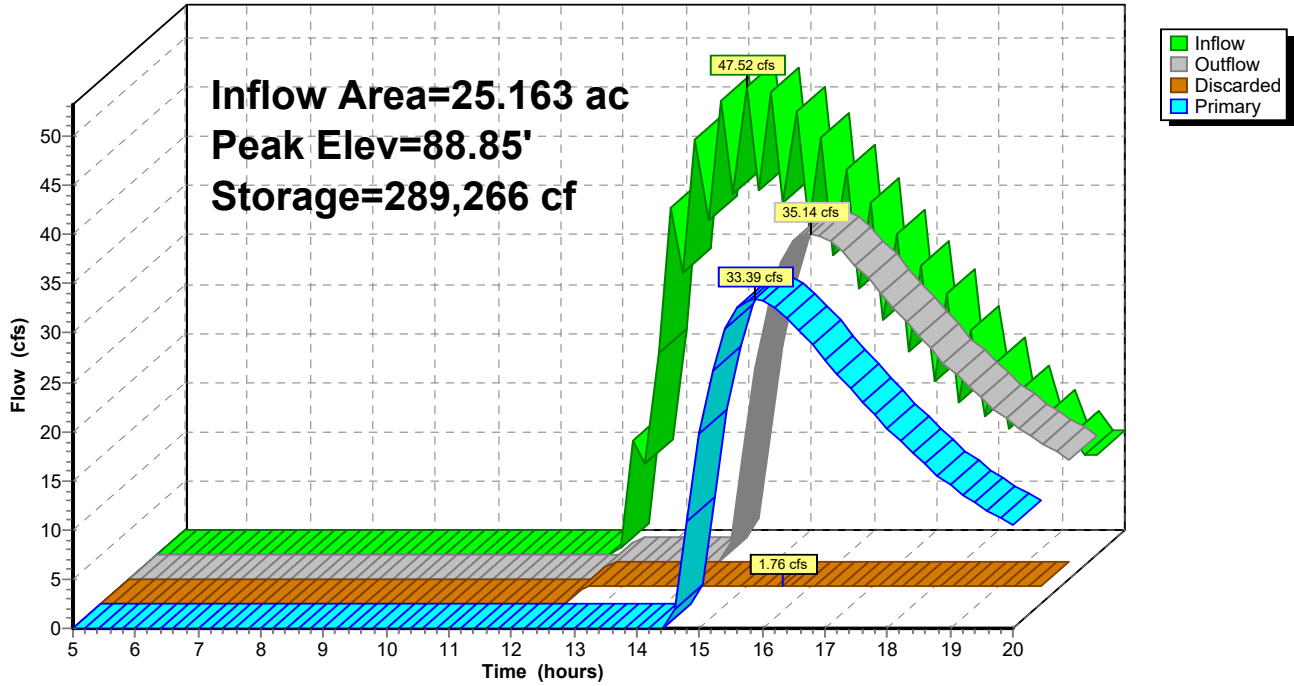
Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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## Pond 3P: PROPOSED POND

Hydrograph



# Staging Area 3 HydroCAD Report

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Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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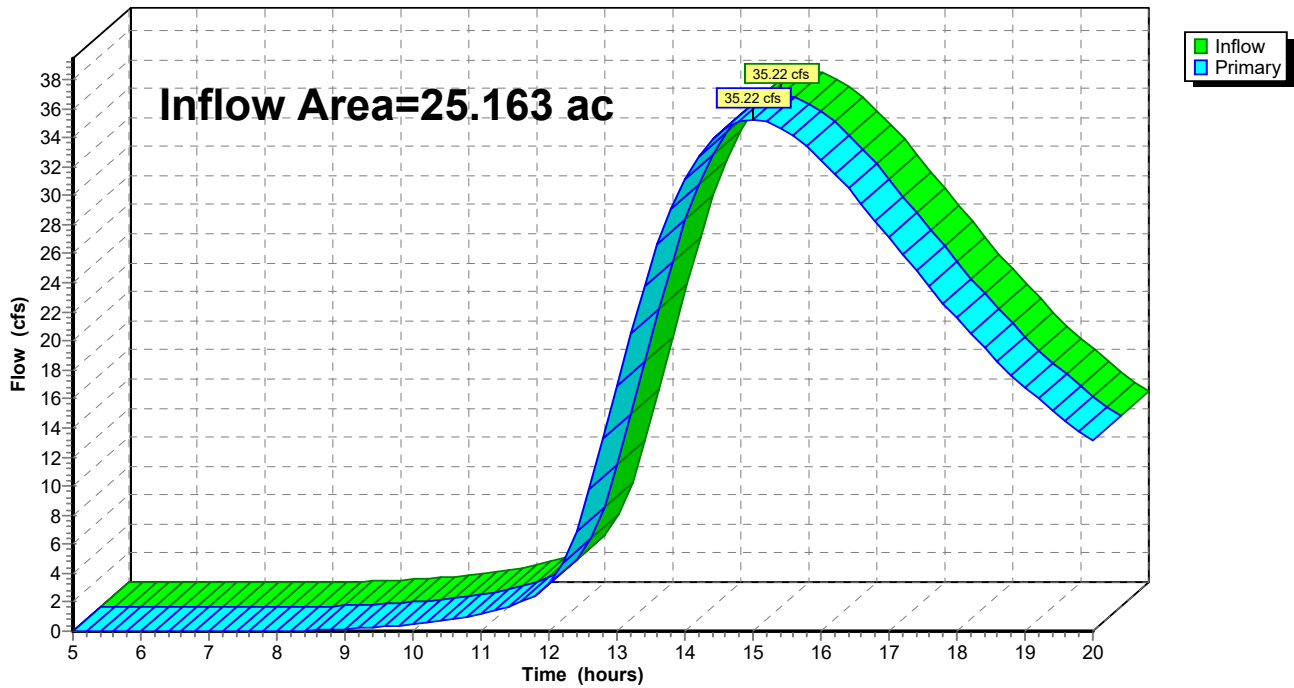
## Summary for Link 1L: EXISTING OUTFALL LOCATION

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 7.66" for 10 DAY-100YR event  
Inflow = 35.22 cfs @ 14.99 hrs, Volume= 16.072 af  
Primary = 35.22 cfs @ 14.99 hrs, Volume= 16.072 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

## Link 1L: EXISTING OUTFALL LOCATION

Hydrograph



# Staging Area 3 HydroCAD Report

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Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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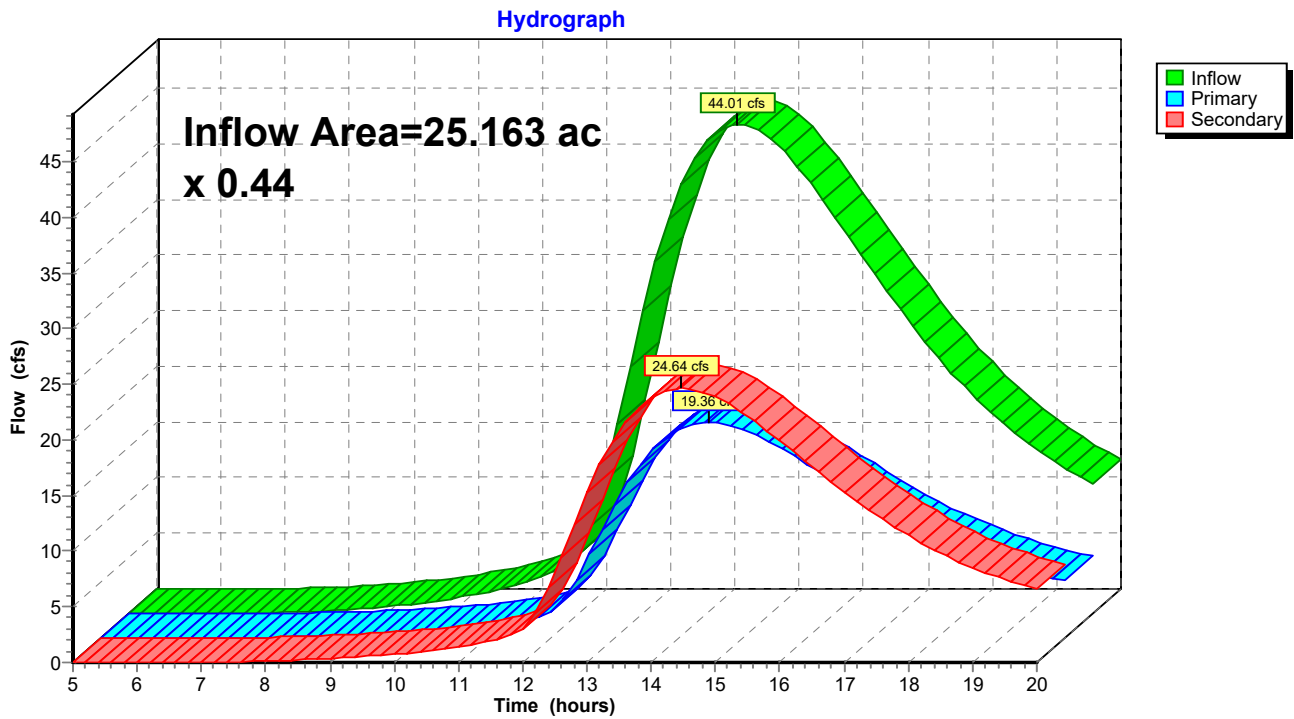
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## Summary for Link 2L: POST DEVELOPED FLOW

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 9.01" for 10 DAY-100YR event  
Inflow = 44.01 cfs @ 14.47 hrs, Volume= 18.891 af  
Primary = 19.36 cfs @ 14.47 hrs, Volume= 8.312 af, Atten= 56%, Lag= 0.0 min  
Secondary = 24.64 cfs @ 14.47 hrs, Volume= 10.579 af

Primary outflow = Inflow x 0.44, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

## Link 2L: POST DEVELOPED FLOW



**Staging Area 3 HydroCAD Report**

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Time span=5.00-20.00 hrs, dt=0.20 hrs, 76 points  
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: PRE DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>1.61"  
Flow Length=1,711' Slope=0.0016 '/' Tc=222.3 min CN=58 Runoff=7.35 cfs 3.370 af

**Subcatchment2S: POST DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>2.19"  
Flow Length=1,214' Slope=0.0009 '/' Tc=193.3 min CN=64 Runoff=10.66 cfs 4.583 af

**Pond 1P: ROCK LAYDOWN AREA No.1** Peak Elev=90.10' Storage=21,675 cf Inflow=4.69 cfs 2.017 af  
Discarded=1.00 cfs 0.648 af Primary=3.94 cfs 0.905 af Outflow=4.94 cfs 1.553 af

**Pond 2P: ROCK LAYDOWN AREA No.2** Peak Elev=90.21' Storage=13,418 cf Inflow=5.97 cfs 2.567 af  
Discarded=0.62 cfs 0.412 af Primary=7.96 cfs 1.848 af Outflow=8.58 cfs 2.260 af

**Pond 3P: PROPOSED POND** Peak Elev=87.88' Storage=81,577 cf Inflow=11.07 cfs 2.753 af  
Discarded=1.72 cfs 0.876 af Primary=0.00 cfs 0.000 af Outflow=1.72 cfs 0.876 af

**Link 1L: EXISTING OUTFALL LOCATION** Inflow=7.35 cfs 3.370 af  
Primary=7.35 cfs 3.370 af

**Link 2L: POST DEVELOPED FLOW** x 0.44 Inflow=10.66 cfs 4.583 af  
Primary=4.69 cfs 2.017 af Secondary=5.97 cfs 2.567 af

# Staging Area 3 HydroCAD Report

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Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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## Summary for Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Runoff = 7.35 cfs @ 15.32 hrs, Volume= 3.370 af, Depth> 1.61"

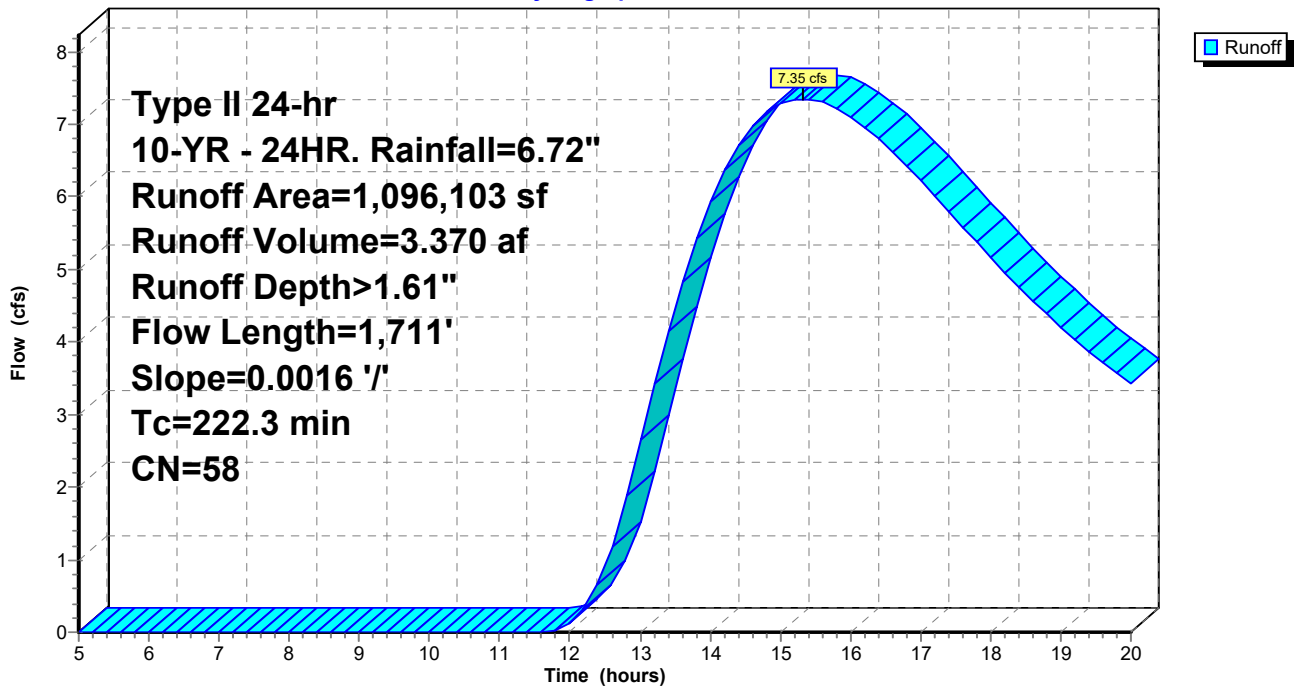
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

Area (sf)	CN	Description
1,096,103	58	Meadow, non-grazed, HSG B
1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
222.3	1,711	0.0016	0.13		Lag/CN Method,

## Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Hydrograph



# Staging Area 3 HydroCAD Report

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Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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## Summary for Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Runoff = 10.66 cfs @ 14.69 hrs, Volume= 4.583 af, Depth> 2.19"

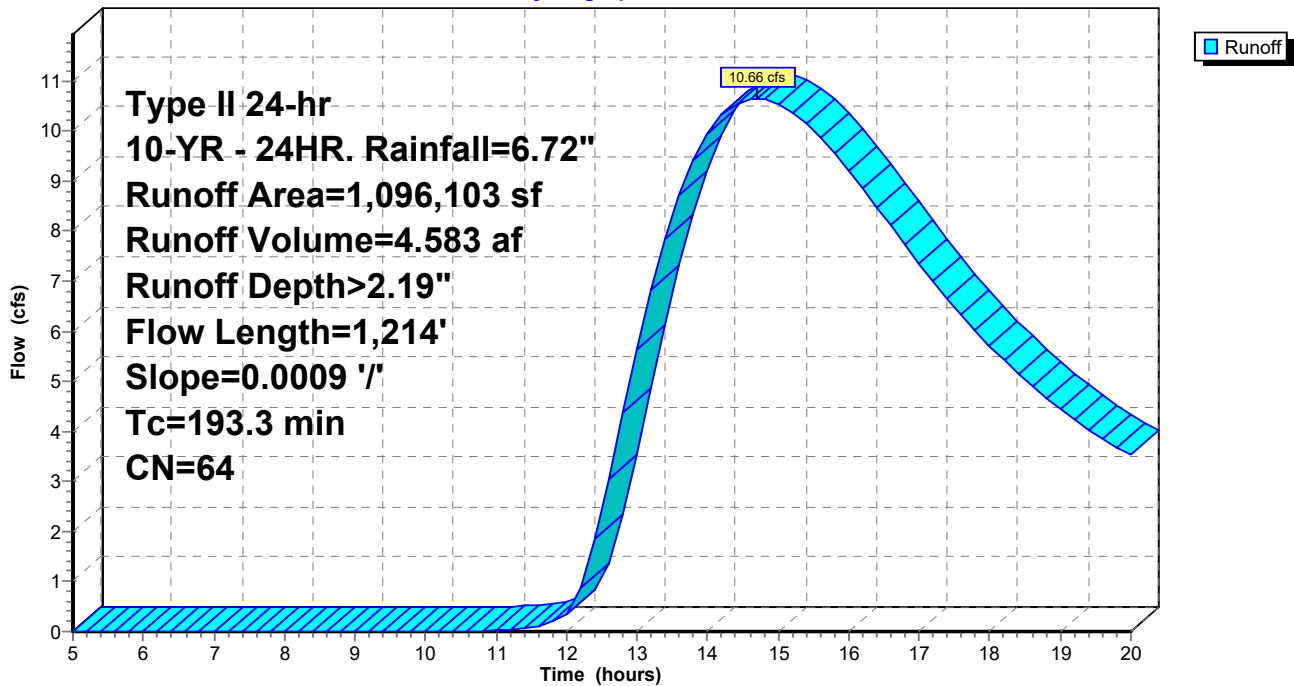
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

	Area (sf)	CN	Description
*	576,632	65	Uncompacted Gravel( 35% Void Ratio)
	421,336	58	Meadow, non-grazed, HSG B
	98,135	85	Gravel roads, HSG B
	1,096,103	64	Weighted Average
	1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
193.3	1,214	0.0009	0.10		Lag/CN Method,

## Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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## Summary for Pond 1P: ROCK LAYDOWN AREA No.1

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 0.96" for 10-YR - 24HR. event  
 Inflow = 4.69 cfs @ 14.69 hrs, Volume= 2.017 af  
 Outflow = 4.94 cfs @ 15.00 hrs, Volume= 1.553 af, Atten= 0%, Lag= 18.5 min  
 Discarded = 1.00 cfs @ 12.60 hrs, Volume= 0.648 af  
 Primary = 3.94 cfs @ 15.00 hrs, Volume= 0.905 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 90.10' @ 15.00 hrs Surf.Area= 123,855 sf Storage= 21,675 cf

Plug-Flow detention time= 91.4 min calculated for 1.553 af (77% of inflow)  
 Center-of-Mass det. time= 41.5 min ( 992.1 - 950.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	21,675 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 61,928 cf Overall x 35.0% Voids
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	123,855	0	0
90.00	123,855	61,928	61,928

Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=1.00 cfs @ 12.60 hrs HW=89.51' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 1.00 cfs)

**Primary OutFlow** Max=3.94 cfs @ 15.00 hrs HW=90.10' (Free Discharge)  
 ↑**1=Broad-Crested Rectangular Weir**(Weir Controls 3.94 cfs @ 1.25 fps)



# Staging Area 3 HydroCAD Report

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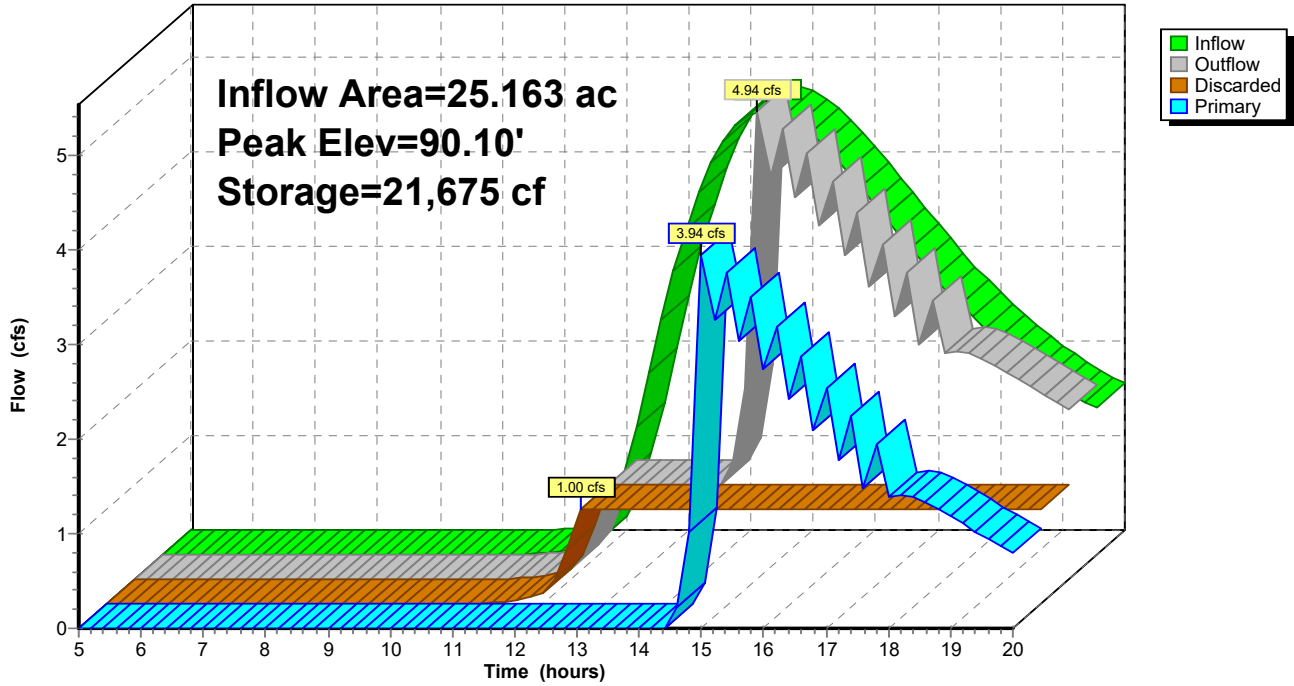
Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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## Pond 1P: ROCK LAYDOWN AREA No.1

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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## Summary for Pond 2P: ROCK LAYDOWN AREA No.2

Inflow = 5.97 cfs @ 14.69 hrs, Volume= 2.567 af  
 Outflow = 8.58 cfs @ 14.80 hrs, Volume= 2.260 af, Atten= 0%, Lag= 6.4 min  
 Discarded = 0.62 cfs @ 12.40 hrs, Volume= 0.412 af  
 Primary = 7.96 cfs @ 14.80 hrs, Volume= 1.848 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 90.21' @ 14.80 hrs Surf.Area= 76,672 sf Storage= 13,418 cf

Plug-Flow detention time= 49.2 min calculated for 2.260 af (88% of inflow)  
 Center-of-Mass det. time= 21.4 min ( 972.1 - 950.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	13,418 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 38,336 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	76,672	0	0
90.00	76,672	38,336	38,336

Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.62 cfs @ 12.40 hrs HW=89.51' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.62 cfs)

**Primary OutFlow** Max=7.94 cfs @ 14.80 hrs HW=90.21' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 7.94 cfs @ 1.60 fps)

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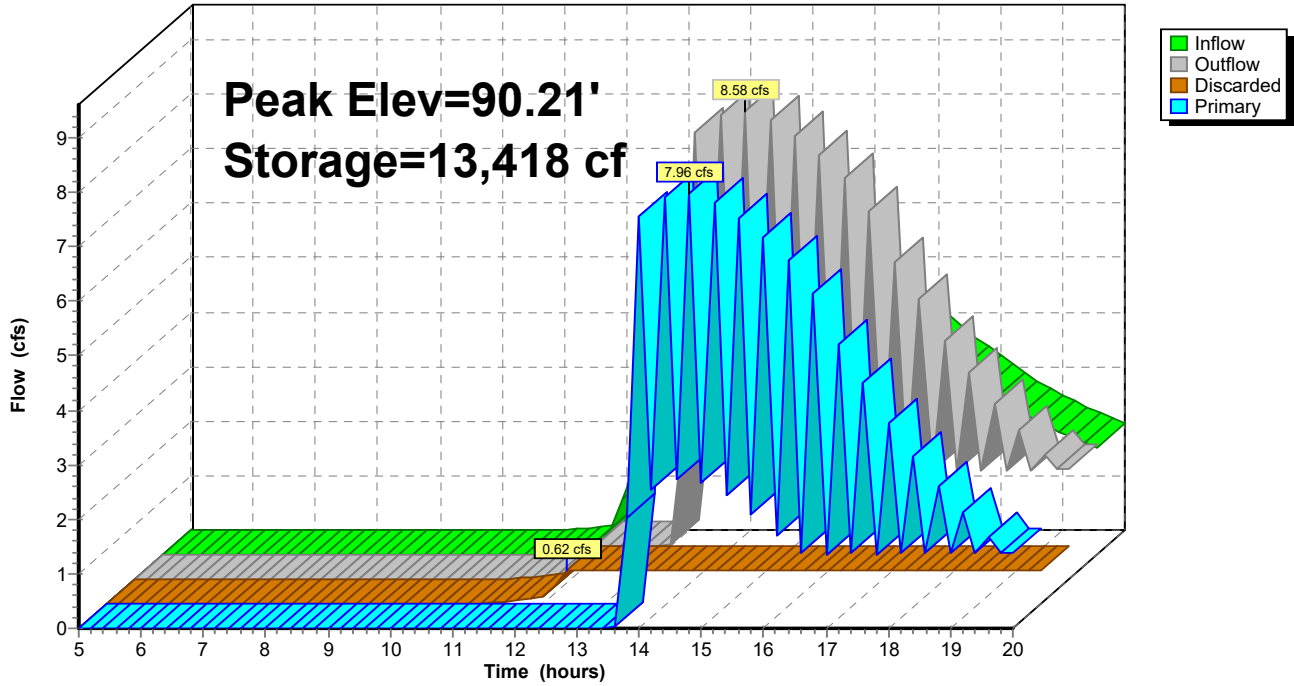
Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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## Pond 2P: ROCK LAYDOWN AREA No.2

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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## Summary for Pond 3P: PROPOSED POND

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 1.31" for 10-YR - 24HR. event  
 Inflow = 11.07 cfs @ 15.20 hrs, Volume= 2.753 af  
 Outflow = 1.72 cfs @ 20.00 hrs, Volume= 0.876 af, Atten= 84%, Lag= 288.3 min  
 Discarded = 1.72 cfs @ 20.00 hrs, Volume= 0.876 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 87.88' @ 20.00 hrs Surf.Area= 212,862 sf Storage= 81,577 cf

Plug-Flow detention time= 137.9 min calculated for 0.865 af (31% of inflow)  
 Center-of-Mass det. time= 36.6 min ( 1,021.3 - 984.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	87.50'	541,132 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
87.50	211,274	0	0
88.00	213,338	106,153	106,153
89.00	217,483	215,411	321,564
90.00	221,654	219,569	541,132

Device	Routing	Invert	Outlet Devices
#1	Discarded	87.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	88.50'	<b>43.6 deg x 50.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.56 (C= 3.20)

**Discarded OutFlow** Max=1.72 cfs @ 20.00 hrs HW=87.88' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 1.72 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=87.50' (Free Discharge)  
 ↑2=Sharp-Crested Vee/Trap Weir ( Controls 0.00 cfs)

# Staging Area 3 HydroCAD Report

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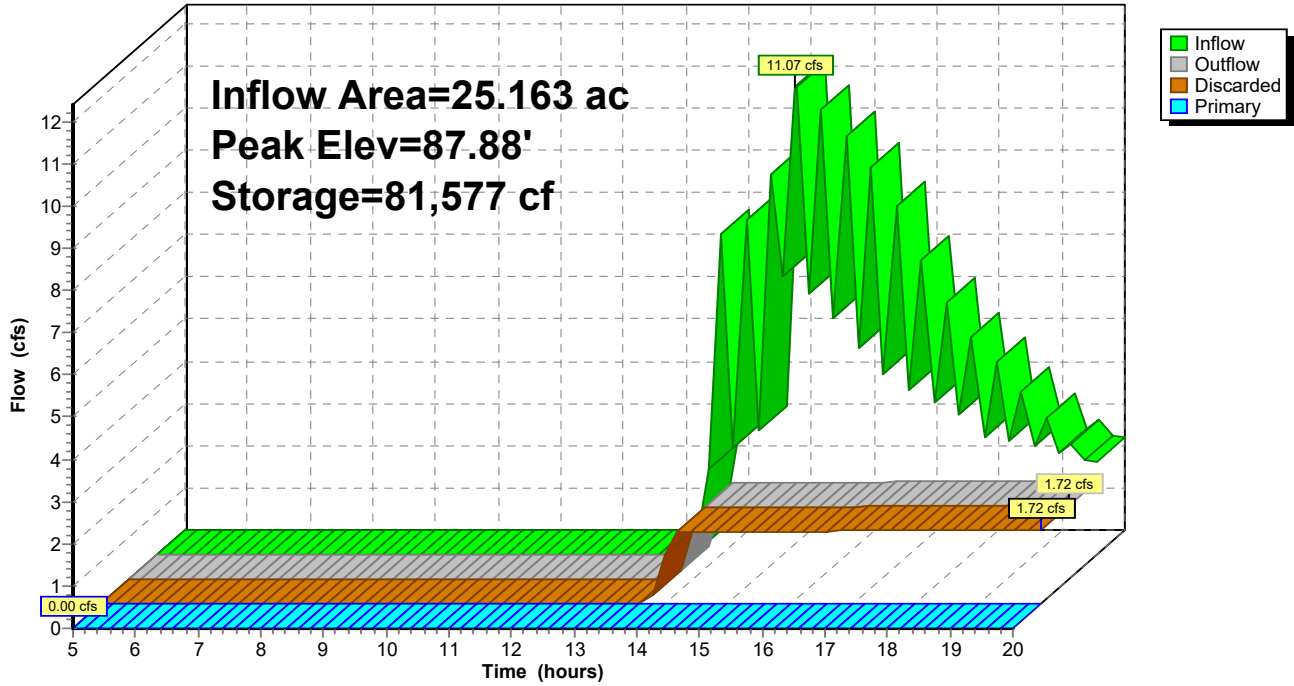
Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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## Pond 3P: PROPOSED POND

Hydrograph



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Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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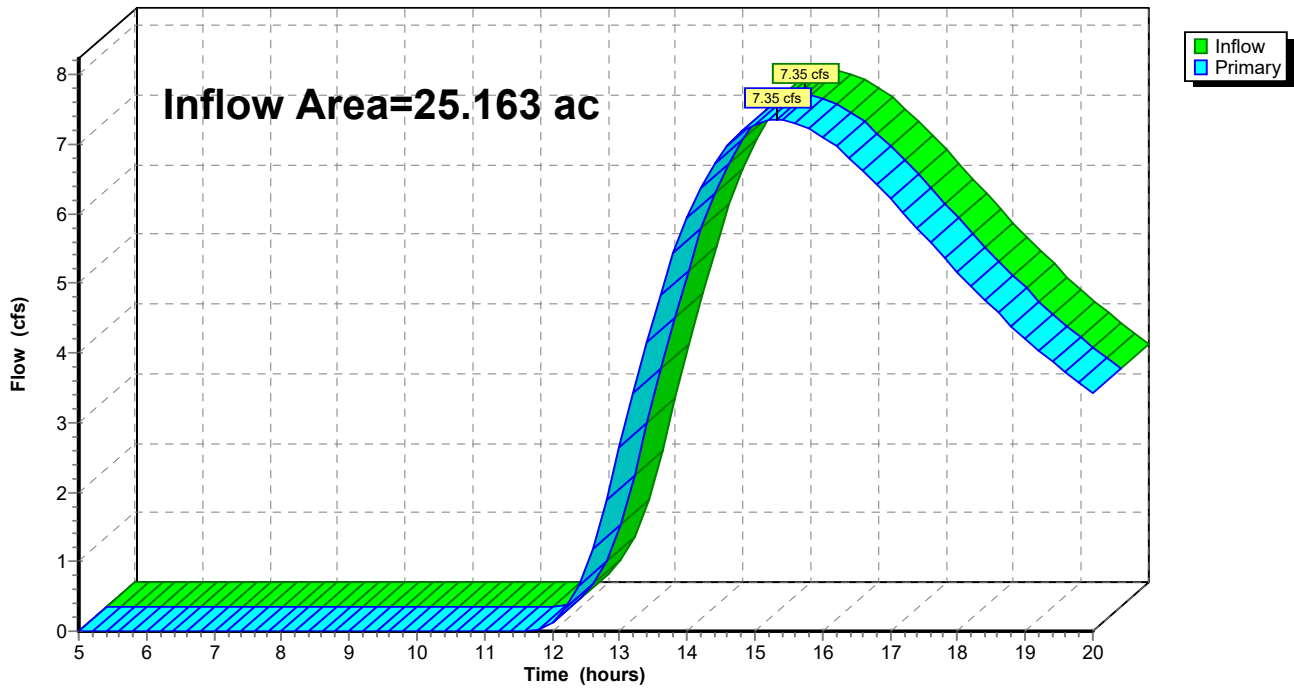
## Summary for Link 1L: EXISTING OUTFALL LOCATION

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 1.61" for 10-YR - 24HR. event  
Inflow = 7.35 cfs @ 15.32 hrs, Volume= 3.370 af  
Primary = 7.35 cfs @ 15.32 hrs, Volume= 3.370 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

## Link 1L: EXISTING OUTFALL LOCATION

Hydrograph



# Staging Area 3 HydroCAD Report

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Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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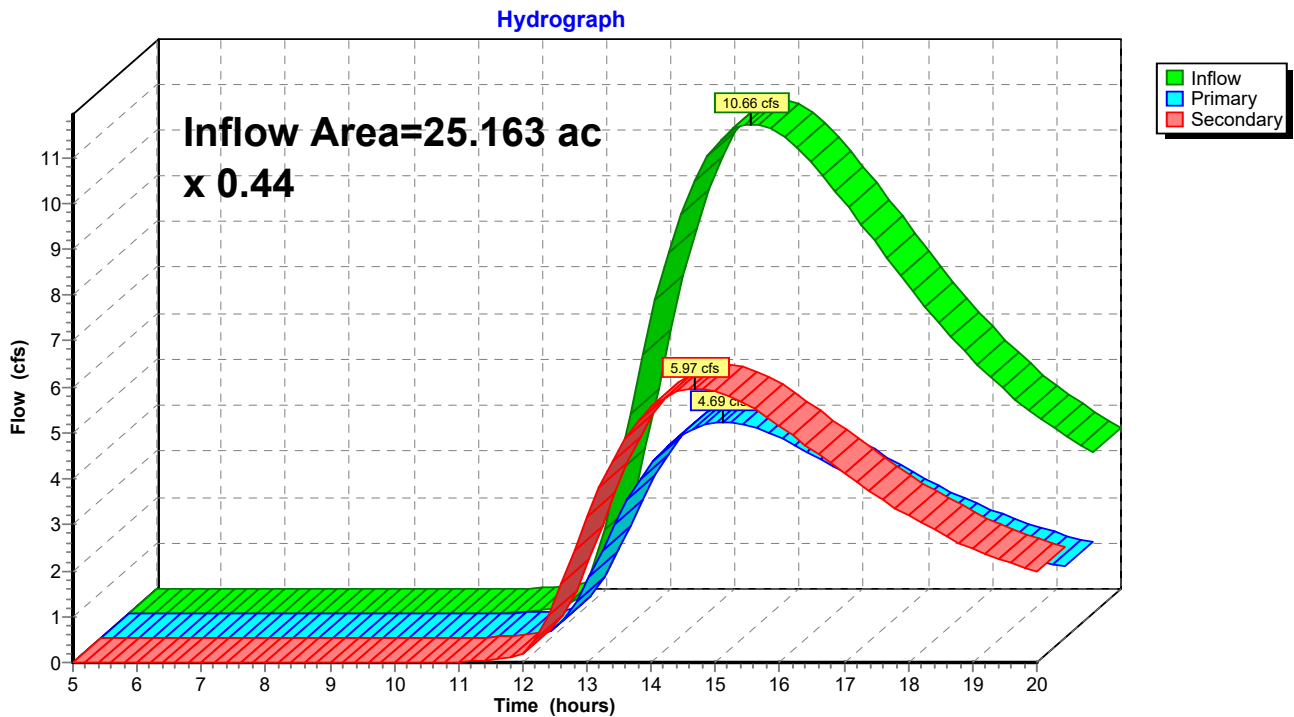
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## Summary for Link 2L: POST DEVELOPED FLOW

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 2.19" for 10-YR - 24HR. event  
Inflow = 10.66 cfs @ 14.69 hrs, Volume= 4.583 af  
Primary = 4.69 cfs @ 14.69 hrs, Volume= 2.017 af, Atten= 56%, Lag= 0.0 min  
Secondary = 5.97 cfs @ 14.69 hrs, Volume= 2.567 af

Primary outflow = Inflow x 0.44, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

## Link 2L: POST DEVELOPED FLOW



**Staging Area 3 HydroCAD Report**

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Time span=5.00-20.00 hrs, dt=0.20 hrs, 76 points  
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: PRE DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>2.25"  
Flow Length=1,711' Slope=0.0016 '/' Tc=222.3 min CN=58 Runoff=10.37 cfs 4.726 af

**Subcatchment2S: POST DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>2.95"  
Flow Length=1,214' Slope=0.0009 '/' Tc=193.3 min CN=64 Runoff=14.48 cfs 6.191 af

**Pond 1P: ROCK LAYDOWN AREA No.1** Peak Elev=90.19' Storage=21,675 cf Inflow=6.37 cfs 2.724 af  
Discarded=1.00 cfs 0.666 af Primary=7.24 cfs 1.572 af Outflow=8.25 cfs 2.238 af

**Pond 2P: ROCK LAYDOWN AREA No.2** Peak Elev=90.24' Storage=13,418 cf Inflow=8.11 cfs 3.467 af  
Discarded=0.62 cfs 0.427 af Primary=9.32 cfs 2.736 af Outflow=9.94 cfs 3.163 af

**Pond 3P: PROPOSED POND** Peak Elev=88.19' Storage=146,463 cf Inflow=16.56 cfs 4.308 af  
Discarded=1.73 cfs 0.930 af Primary=0.00 cfs 0.000 af Outflow=1.73 cfs 0.930 af

**Link 1L: EXISTING OUTFALL LOCATION** Inflow=10.37 cfs 4.726 af  
Primary=10.37 cfs 4.726 af

**Link 2L: POST DEVELOPED FLOW** x 0.44 Inflow=14.48 cfs 6.191 af  
Primary=6.37 cfs 2.724 af Secondary=8.11 cfs 3.467 af



# Staging Area 3 HydroCAD Report

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Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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## Summary for Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Runoff = 10.37 cfs @ 15.23 hrs, Volume= 4.726 af, Depth> 2.25"

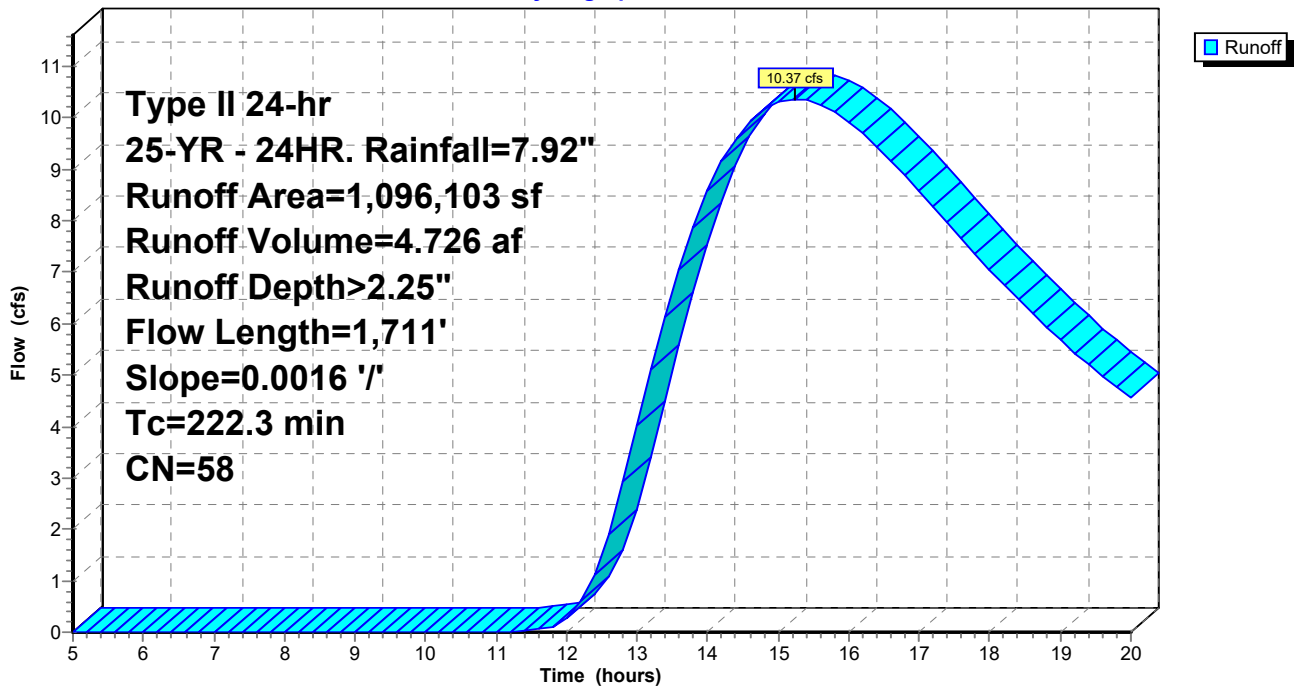
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

Area (sf)	CN	Description
1,096,103	58	Meadow, non-grazed, HSG B
1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
222.3	1,711	0.0016	0.13		Lag/CN Method,

## Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Hydrograph



# Staging Area 3 HydroCAD Report

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Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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## Summary for Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Runoff = 14.48 cfs @ 14.64 hrs, Volume= 6.191 af, Depth> 2.95"

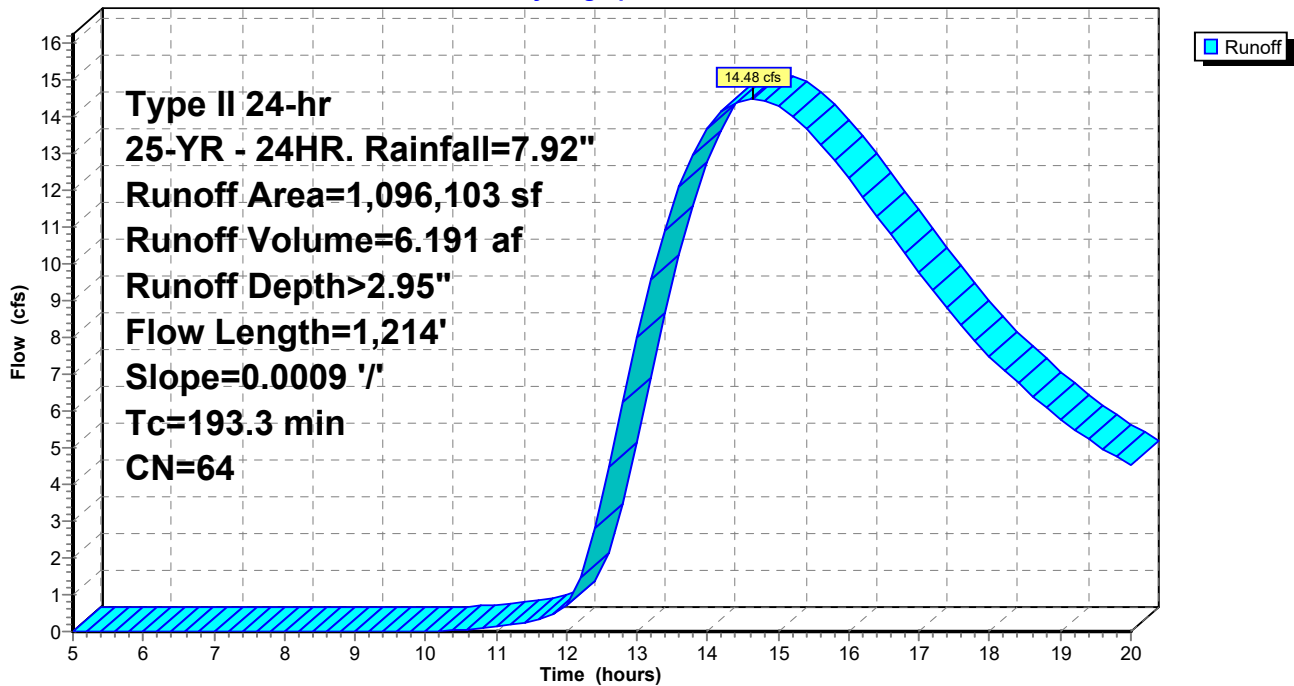
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

	Area (sf)	CN	Description
*	576,632	65	Uncompacted Gravel( 35% Void Ratio)
	421,336	58	Meadow, non-grazed, HSG B
	98,135	85	Gravel roads, HSG B
	1,096,103	64	Weighted Average
	1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
193.3	1,214	0.0009	0.10		Lag/CN Method,

## Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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## Summary for Pond 1P: ROCK LAYDOWN AREA No.1

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 1.30" for 25-YR - 24HR. event  
 Inflow = 6.37 cfs @ 14.64 hrs, Volume= 2.724 af  
 Outflow = 8.25 cfs @ 14.80 hrs, Volume= 2.238 af, Atten= 0%, Lag= 9.6 min  
 Discarded = 1.00 cfs @ 12.60 hrs, Volume= 0.666 af  
 Primary = 7.24 cfs @ 14.80 hrs, Volume= 1.572 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 90.19' @ 14.80 hrs Surf.Area= 123,855 sf Storage= 21,675 cf

Plug-Flow detention time= 71.3 min calculated for 2.238 af (82% of inflow)  
 Center-of-Mass det. time= 31.2 min ( 978.0 - 946.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	21,675 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 61,928 cf Overall x 35.0% Voids
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	123,855	0	0
90.00	123,855	61,928	61,928

Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=1.00 cfs @ 12.60 hrs HW=89.52' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 1.00 cfs)

**Primary OutFlow** Max=7.22 cfs @ 14.80 hrs HW=90.19' (Free Discharge)  
 ↑**1=Broad-Crested Rectangular Weir**(Weir Controls 7.22 cfs @ 1.54 fps)

# Staging Area 3 HydroCAD Report

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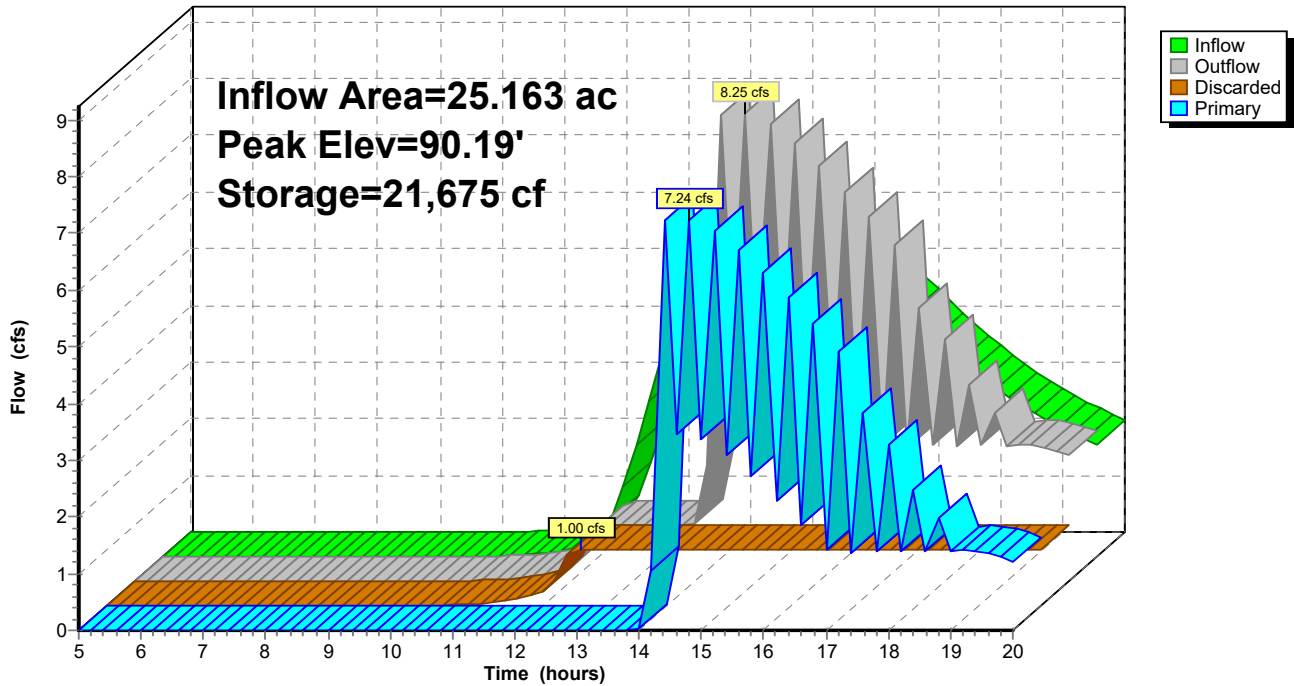
Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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## Pond 1P: ROCK LAYDOWN AREA No.1

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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## Summary for Pond 2P: ROCK LAYDOWN AREA No.2

Inflow = 8.11 cfs @ 14.64 hrs, Volume= 3.467 af  
 Outflow = 9.94 cfs @ 14.80 hrs, Volume= 3.163 af, Atten= 0%, Lag= 9.6 min  
 Discarded = 0.62 cfs @ 12.40 hrs, Volume= 0.427 af  
 Primary = 9.32 cfs @ 14.80 hrs, Volume= 2.736 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 90.24' @ 14.80 hrs Surf.Area= 76,672 sf Storage= 13,418 cf

Plug-Flow detention time= 37.6 min calculated for 3.163 af (91% of inflow)  
 Center-of-Mass det. time= 16.6 min ( 963.3 - 946.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	13,418 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 38,336 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	76,672	0	0
90.00	76,672	38,336	38,336

Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.62 cfs @ 12.40 hrs HW=89.53' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.62 cfs)

**Primary OutFlow** Max=9.28 cfs @ 14.80 hrs HW=90.24' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 9.28 cfs @ 1.69 fps)

# Staging Area 3 HydroCAD Report

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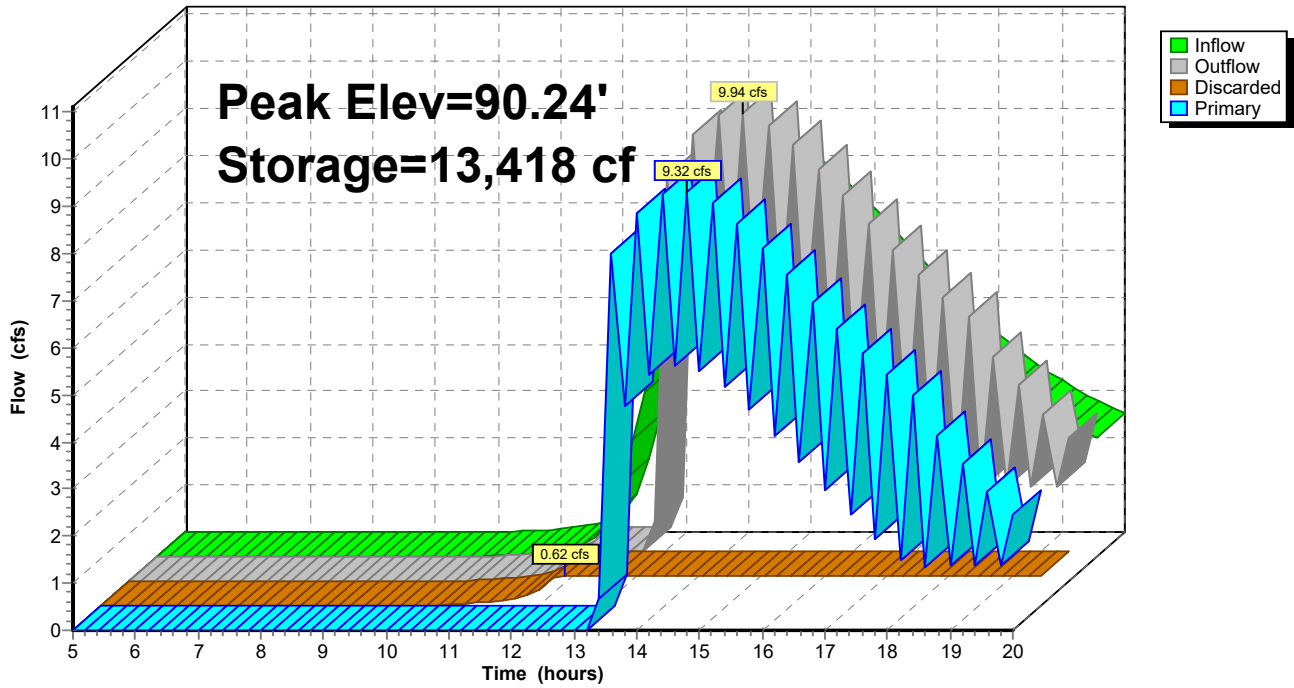
Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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## Pond 2P: ROCK LAYDOWN AREA No.2

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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## Summary for Pond 3P: PROPOSED POND

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 2.05" for 25-YR - 24HR. event  
 Inflow = 16.56 cfs @ 14.80 hrs, Volume= 4.308 af  
 Outflow = 1.73 cfs @ 20.00 hrs, Volume= 0.930 af, Atten= 90%, Lag= 312.1 min  
 Discarded = 1.73 cfs @ 20.00 hrs, Volume= 0.930 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 88.19' @ 20.00 hrs Surf.Area= 214,120 sf Storage= 146,463 cf

Plug-Flow detention time= 157.8 min calculated for 0.918 af (21% of inflow)  
 Center-of-Mass det. time= 39.3 min ( 1,010.8 - 971.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	87.50'	541,132 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
87.50	211,274	0	0
88.00	213,338	106,153	106,153
89.00	217,483	215,411	321,564
90.00	221,654	219,569	541,132

Device	Routing	Invert	Outlet Devices
#1	Discarded	87.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	88.50'	<b>43.6 deg x 50.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.56 (C= 3.20)

**Discarded OutFlow** Max=1.73 cfs @ 20.00 hrs HW=88.19' (Free Discharge)  
 ↑1=**Exfiltration** (Exfiltration Controls 1.73 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=87.50' (Free Discharge)  
 ↑2=**Sharp-Crested Vee/Trap Weir** ( Controls 0.00 cfs)

# Staging Area 3 HydroCAD Report

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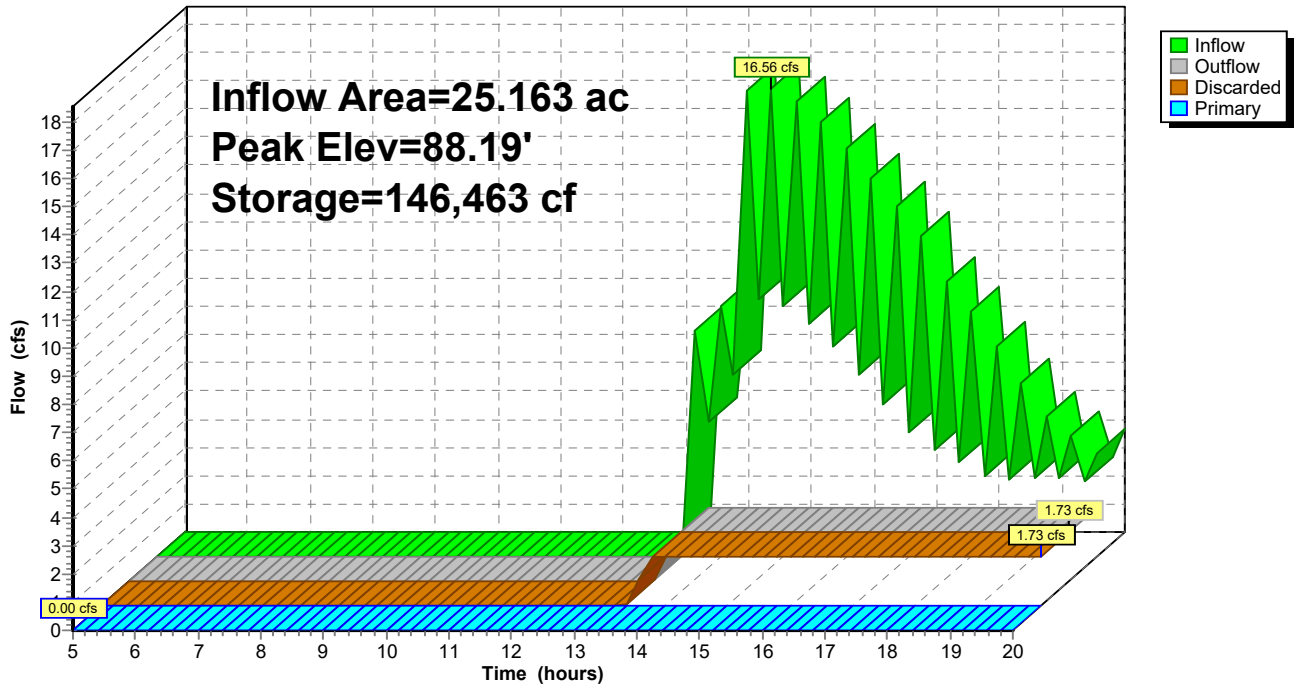
Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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## Pond 3P: PROPOSED POND

Hydrograph





# Staging Area 3 HydroCAD Report

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Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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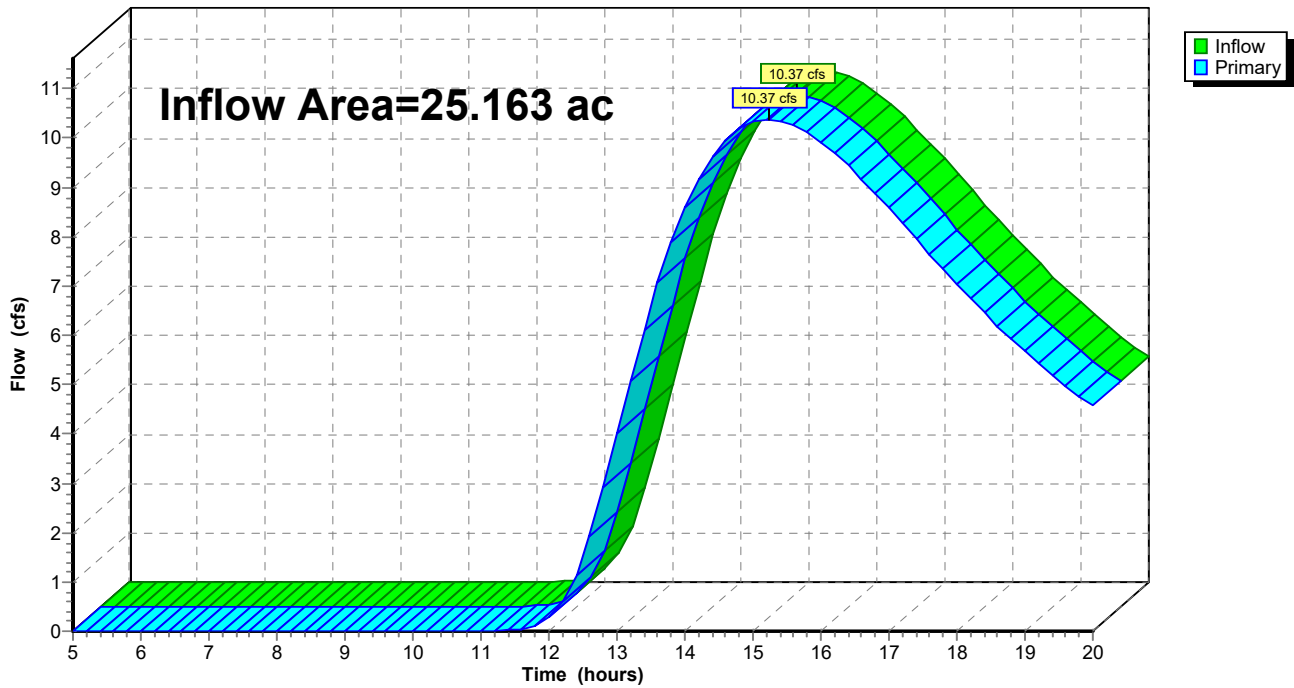
## Summary for Link 1L: EXISTING OUTFALL LOCATION

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 2.25" for 25-YR - 24HR. event  
Inflow = 10.37 cfs @ 15.23 hrs, Volume= 4.726 af  
Primary = 10.37 cfs @ 15.23 hrs, Volume= 4.726 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

## Link 1L: EXISTING OUTFALL LOCATION

Hydrograph



# Staging Area 3 HydroCAD Report

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Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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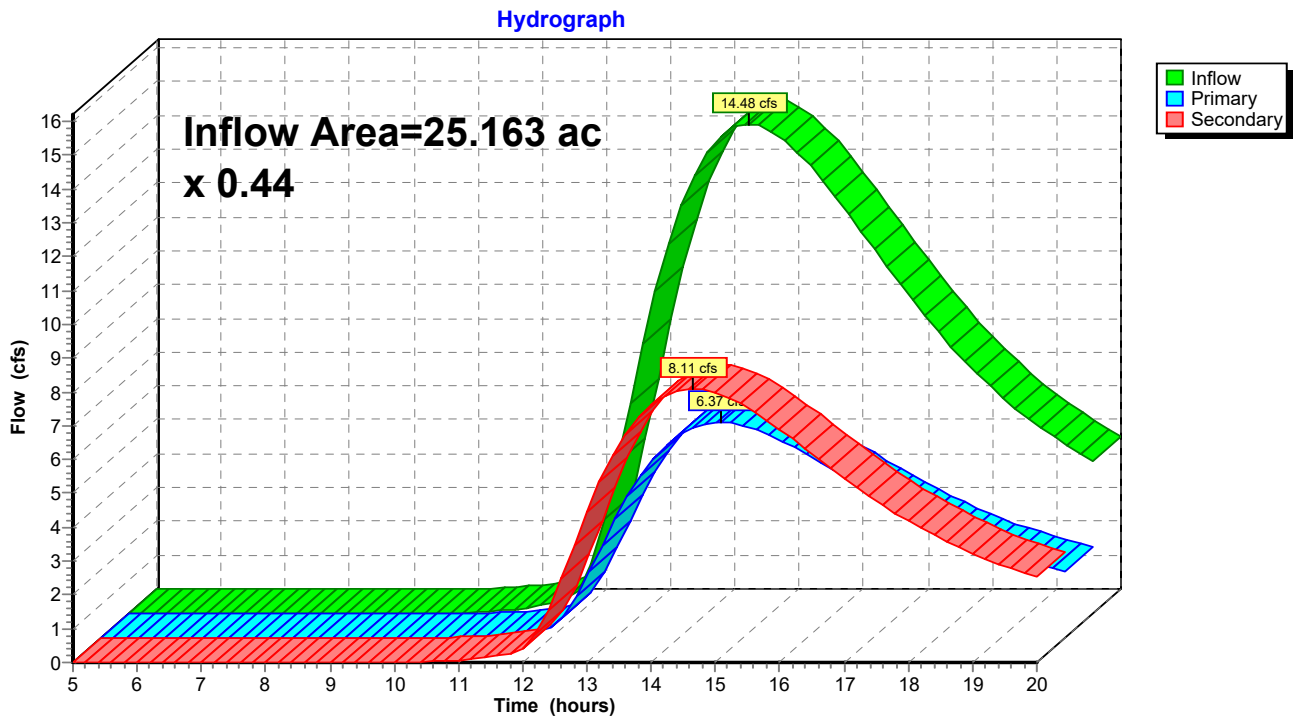
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## Summary for Link 2L: POST DEVELOPED FLOW

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 2.95" for 25-YR - 24HR. event  
Inflow = 14.48 cfs @ 14.64 hrs, Volume= 6.191 af  
Primary = 6.37 cfs @ 14.64 hrs, Volume= 2.724 af, Atten= 56%, Lag= 0.0 min  
Secondary = 8.11 cfs @ 14.64 hrs, Volume= 3.467 af

Primary outflow = Inflow x 0.44, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

## Link 2L: POST DEVELOPED FLOW



**Staging Area 3 HydroCAD Report**

Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

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Time span=5.00-20.00 hrs, dt=0.20 hrs, 76 points  
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: PRE DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>0.31"  
Flow Length=1,711' Slope=0.0016 '/' Tc=222.3 min CN=58 Runoff=3.06 cfs 0.644 af

**Subcatchment2S: POST DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>0.33"  
Flow Length=1,214' Slope=0.0009 '/' Tc=193.3 min CN=64 Runoff=4.09 cfs 0.700 af

**Pond 1P: ROCK LAYDOWN AREA No.1** Peak Elev=89.55' Storage=2,164 cf Inflow=1.80 cfs 0.308 af  
Discarded=1.00 cfs 0.308 af Primary=0.00 cfs 0.000 af Outflow=1.00 cfs 0.308 af

**Pond 2P: ROCK LAYDOWN AREA No.2** Peak Elev=89.77' Storage=7,301 cf Inflow=2.29 cfs 0.392 af  
Discarded=0.62 cfs 0.392 af Primary=0.00 cfs 0.000 af Outflow=0.62 cfs 0.392 af

**Pond 3P: PROPOSED POND** Peak Elev=87.50' Storage=0 cf Inflow=0.00 cfs 0.000 af  
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Link 1L: EXISTING OUTFALL LOCATION** Inflow=3.06 cfs 0.644 af  
Primary=3.06 cfs 0.644 af

**Link 2L: POST DEVELOPED FLOW** x 0.44 Inflow=4.09 cfs 0.700 af  
Primary=1.80 cfs 0.308 af Secondary=2.29 cfs 0.392 af

# Staging Area 3 HydroCAD Report

Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

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## Summary for Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Runoff = 3.06 cfs @ 5.00 hrs, Volume= 0.644 af, Depth> 0.31"

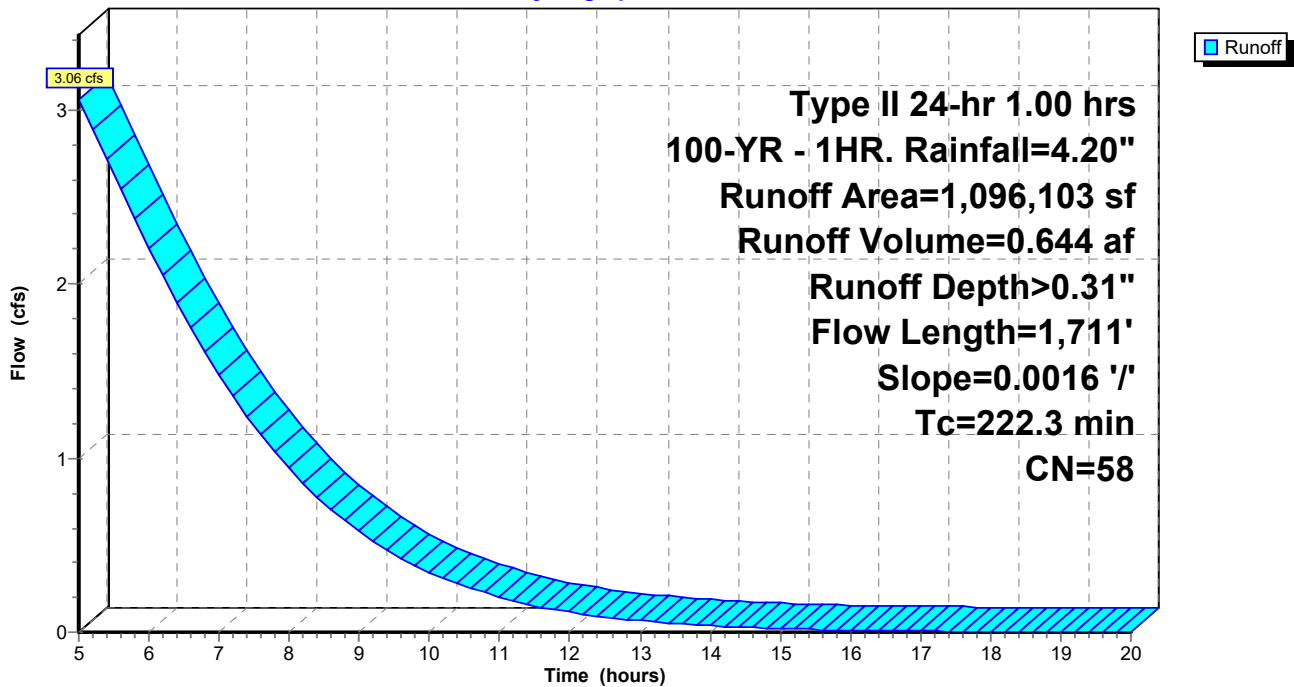
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

Area (sf)	CN	Description
1,096,103	58	Meadow, non-grazed, HSG B
1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
222.3	1,711	0.0016	0.13		Lag/CN Method,

## Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

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## Summary for Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Runoff = 4.09 cfs @ 5.00 hrs, Volume= 0.700 af, Depth> 0.33"

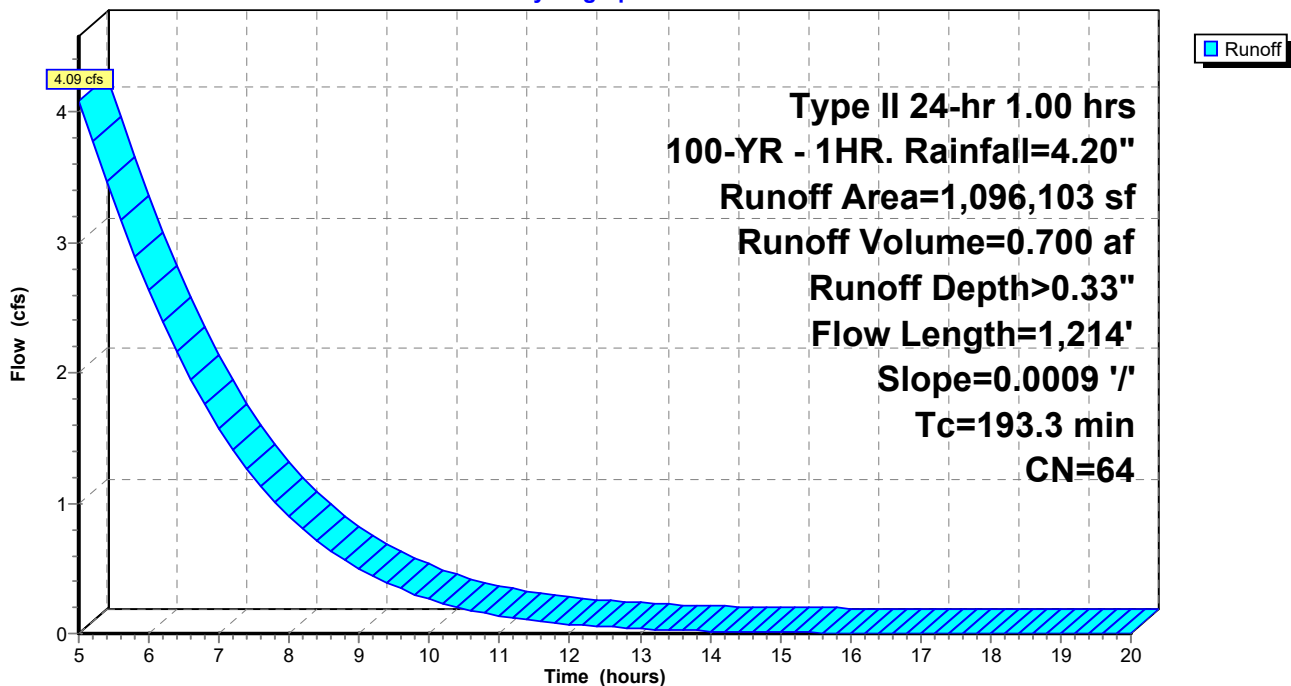
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

Area (sf)	CN	Description
* 576,632	65	Uncompacted Gravel( 35% Void Ratio)
421,336	58	Meadow, non-grazed, HSG B
98,135	85	Gravel roads, HSG B
1,096,103	64	Weighted Average
1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
193.3	1,214	0.0009	0.10		Lag/CN Method,

## Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Hydrograph



**Staging Area 3 HydroCAD Report**

Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

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**Summary for Pond 1P: ROCK LAYDOWN AREA No.1**

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 0.15" for 100-YR - 1HR. event  
 Inflow = 1.80 cfs @ 5.00 hrs, Volume= 0.308 af  
 Outflow = 1.00 cfs @ 5.20 hrs, Volume= 0.308 af, Atten= 44%, Lag= 12.0 min  
 Discarded = 1.00 cfs @ 5.20 hrs, Volume= 0.308 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 89.55' @ 6.29 hrs Surf.Area= 123,855 sf Storage= 2,164 cf

Plug-Flow detention time= 32.3 min calculated for 0.296 af (96% of inflow)  
 Center-of-Mass det. time= 21.6 min ( 421.2 - 399.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	21,675 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 61,928 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	123,855	0	0
90.00	123,855	61,928	61,928

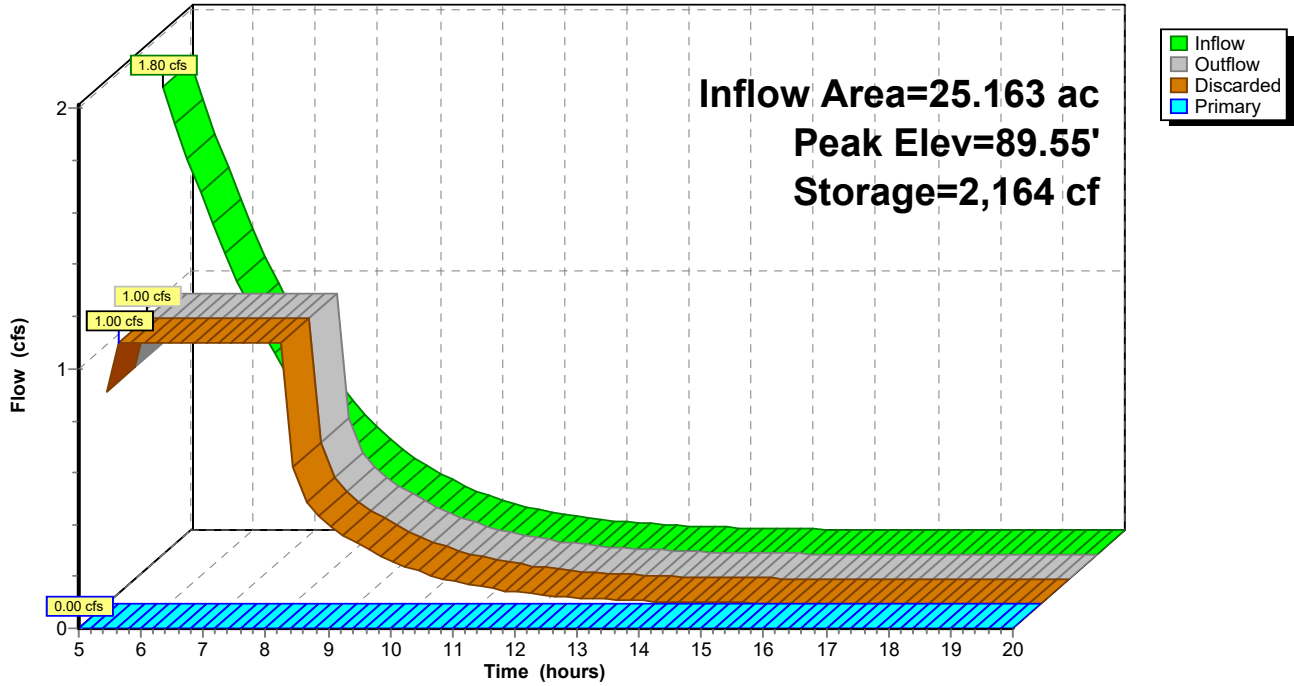
Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=1.00 cfs @ 5.20 hrs HW=89.52' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 1.00 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=89.51' (Free Discharge)  
 ↑**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

Pond 1P: ROCK LAYDOWN AREA No.1

Hydrograph



**Staging Area 3 HydroCAD Report**

Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

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**Summary for Pond 2P: ROCK LAYDOWN AREA No.2**

Inflow = 2.29 cfs @ 5.00 hrs, Volume= 0.392 af  
 Outflow = 0.62 cfs @ 5.00 hrs, Volume= 0.392 af, Atten= 73%, Lag= 0.0 min  
 Discarded = 0.62 cfs @ 5.00 hrs, Volume= 0.392 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 89.77' @ 7.64 hrs Surf.Area= 76,672 sf Storage= 7,301 cf

Plug-Flow detention time= 145.4 min calculated for 0.378 af (96% of inflow)  
 Center-of-Mass det. time= 124.2 min ( 523.8 - 399.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	13,418 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 38,336 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	76,672	0	0
90.00	76,672	38,336	38,336

Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.62 cfs @ 5.00 hrs HW=89.52' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.62 cfs)

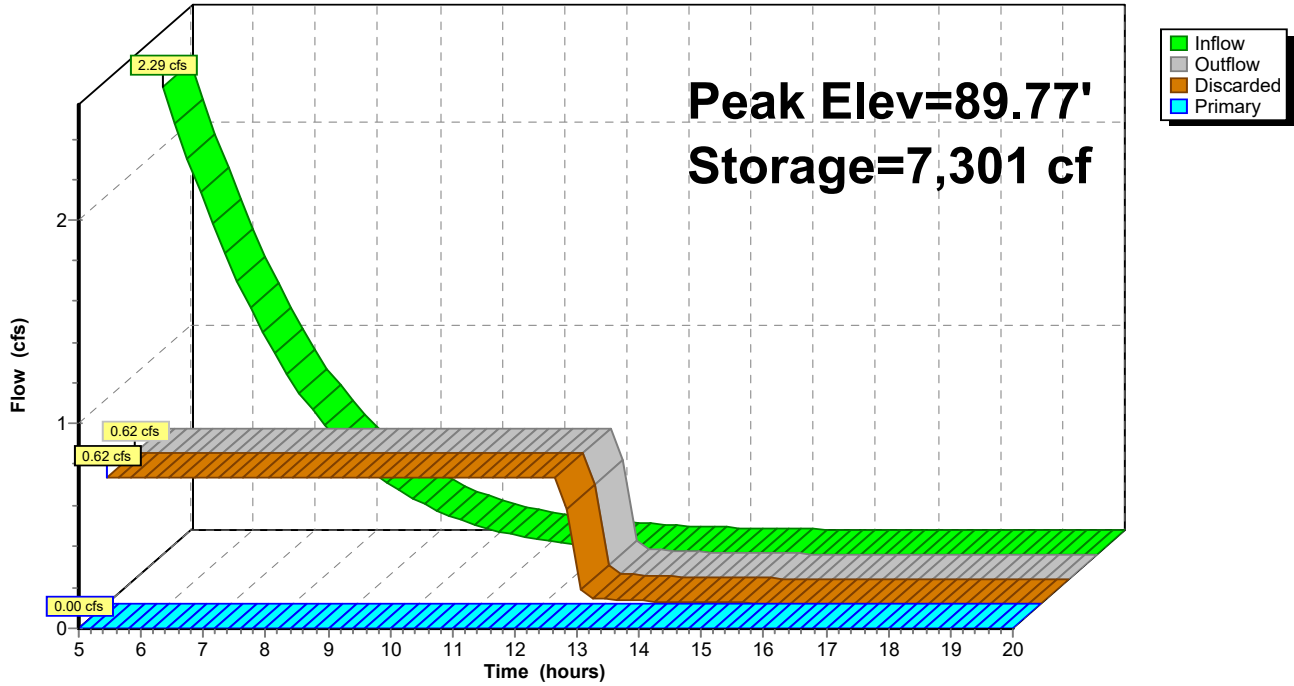
**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=89.52' (Free Discharge)

↑**1=Broad-Crested Rectangular Weir**( Controls 0.00 cfs)



Pond 2P: ROCK LAYDOWN AREA No.2

Hydrograph



**Staging Area 3 HydroCAD Report**

Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

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**Summary for Pond 3P: PROPOSED POND**

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event  
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 87.50' @ 5.00 hrs Surf.Area= 211,274 sf Storage= 0 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	87.50'	541,132 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
87.50	211,274	0	0
88.00	213,338	106,153	106,153
89.00	217,483	215,411	321,564
90.00	221,654	219,569	541,132

Device	Routing	Invert	Outlet Devices
#1	Discarded	87.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	88.50'	<b>43.6 deg x 50.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.56 (C= 3.20)

**Discarded OutFlow** Max=0.00 cfs @ 5.00 hrs HW=87.50' (Free Discharge)  
 ↑1=Exfiltration ( Controls 0.00 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=87.50' (Free Discharge)  
 ↑2=Sharp-Crested Vee/Trap Weir( Controls 0.00 cfs)

# Staging Area 3 HydroCAD Report

Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

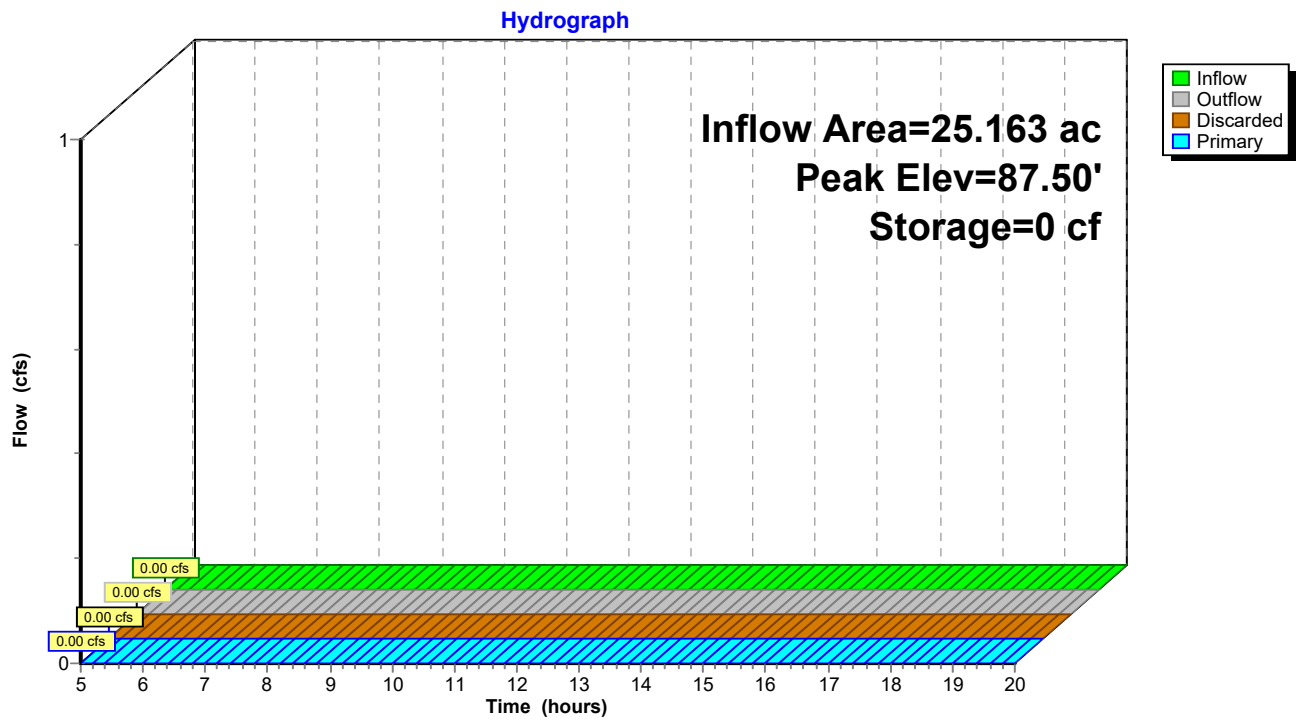
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## Pond 3P: PROPOSED POND



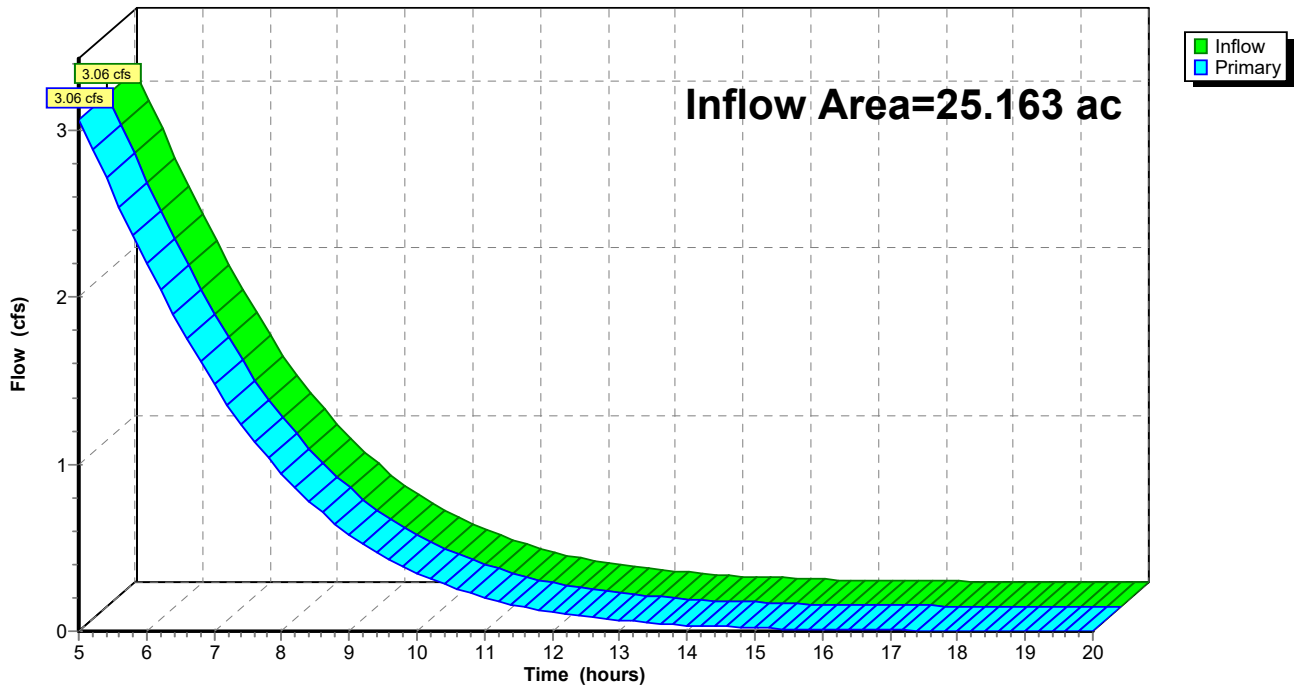
### Summary for Link 1L: EXISTING OUTFALL LOCATION

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 0.31" for 100-YR - 1HR. event  
Inflow = 3.06 cfs @ 5.00 hrs, Volume= 0.644 af  
Primary = 3.06 cfs @ 5.00 hrs, Volume= 0.644 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

### Link 1L: EXISTING OUTFALL LOCATION

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

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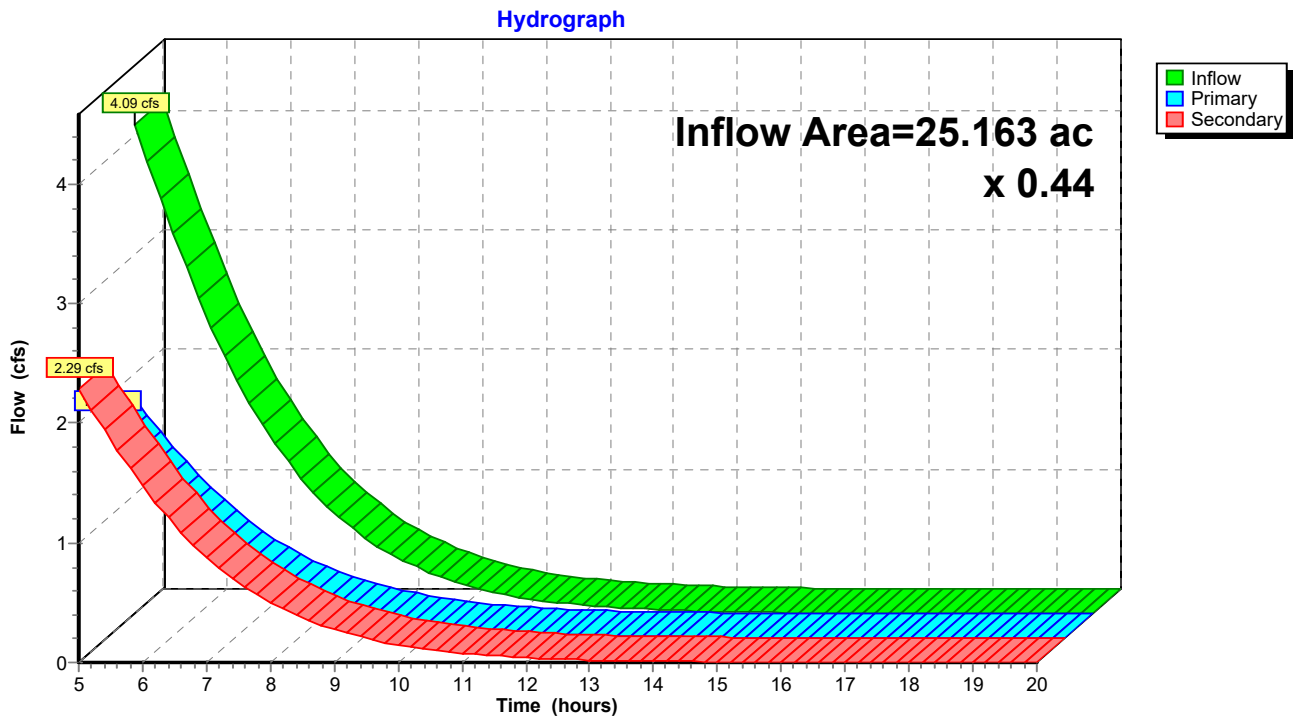
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## Summary for Link 2L: POST DEVELOPED FLOW

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 0.33" for 100-YR - 1HR. event  
Inflow = 4.09 cfs @ 5.00 hrs, Volume= 0.700 af  
Primary = 1.80 cfs @ 5.00 hrs, Volume= 0.308 af, Atten= 56%, Lag= 0.0 min  
Secondary = 2.29 cfs @ 5.00 hrs, Volume= 0.392 af

Primary outflow = Inflow x 0.44, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

## Link 2L: POST DEVELOPED FLOW



**Staging Area 3 HydroCAD Report**

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Time span=5.00-20.00 hrs, dt=0.20 hrs, 76 points  
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: PRE DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>3.40"  
Flow Length=1,711' Slope=0.0016 '/' Tc=222.3 min CN=58 Runoff=15.68 cfs 7.122 af

**Subcatchment2S: POST DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>4.27"  
Flow Length=1,214' Slope=0.0009 '/' Tc=193.3 min CN=64 Runoff=21.01 cfs 8.956 af

**Pond 1P: ROCK LAYDOWN AREA No.1** Peak Elev=90.25' Storage=21,675 cf Inflow=9.24 cfs 3.941 af  
Discarded=1.00 cfs 0.703 af Primary=9.69 cfs 2.742 af Outflow=10.69 cfs 3.445 af

**Pond 2P: ROCK LAYDOWN AREA No.2** Peak Elev=90.33' Storage=13,418 cf Inflow=11.76 cfs 5.015 af  
Discarded=0.62 cfs 0.462 af Primary=13.08 cfs 4.235 af Outflow=13.70 cfs 4.697 af

**Pond 3P: PROPOSED POND** Peak Elev=88.59' Storage=232,905 cf Inflow=19.83 cfs 6.977 af  
Discarded=1.75 cfs 0.985 af Primary=4.41 cfs 0.708 af Outflow=6.15 cfs 1.694 af

**Link 1L: EXISTING OUTFALL LOCATION** Inflow=15.68 cfs 7.122 af  
Primary=15.68 cfs 7.122 af

**Link 2L: POST DEVELOPED FLOW** x 0.44 Inflow=21.01 cfs 8.956 af  
Primary=9.24 cfs 3.941 af Secondary=11.76 cfs 5.015 af

# Staging Area 3 HydroCAD Report

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Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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## Summary for Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Runoff = 15.68 cfs @ 15.14 hrs, Volume= 7.122 af, Depth> 3.40"

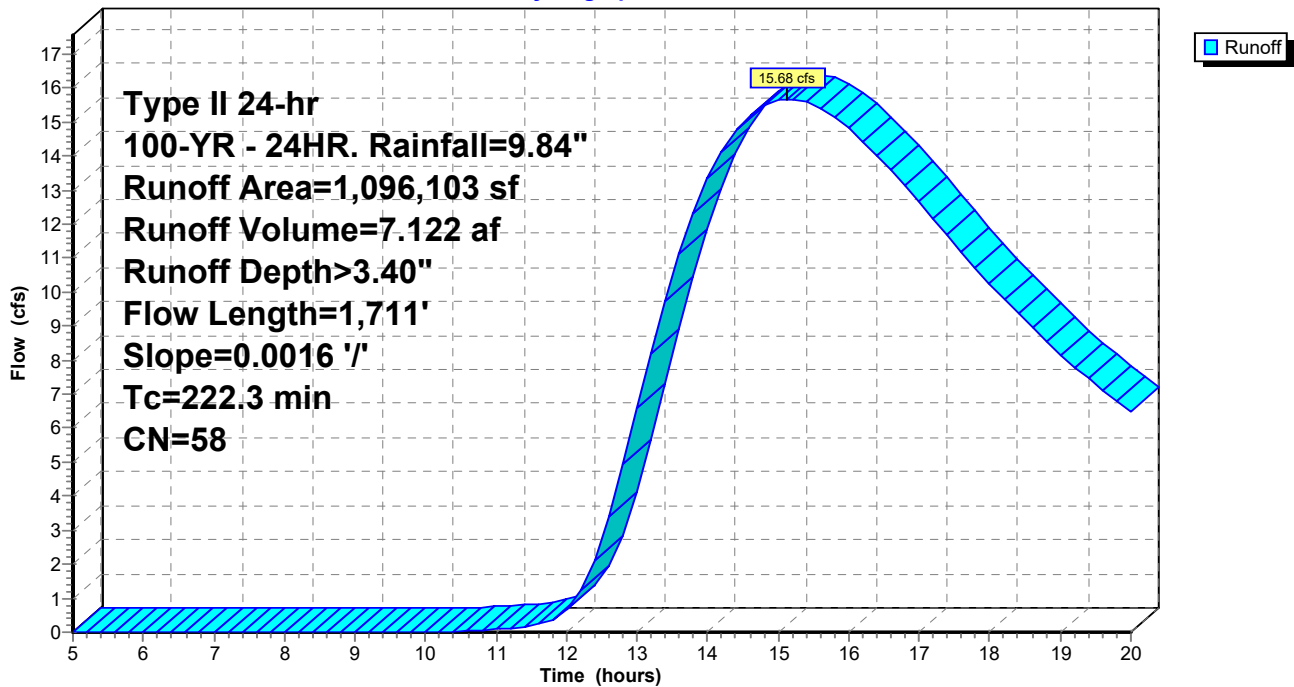
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

Area (sf)	CN	Description
1,096,103	58	Meadow, non-grazed, HSG B
1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
222.3	1,711	0.0016	0.13		Lag/CN Method,

## Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Hydrograph



# Staging Area 3 HydroCAD Report

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Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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## Summary for Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Runoff = 21.01 cfs @ 14.58 hrs, Volume= 8.956 af, Depth> 4.27"

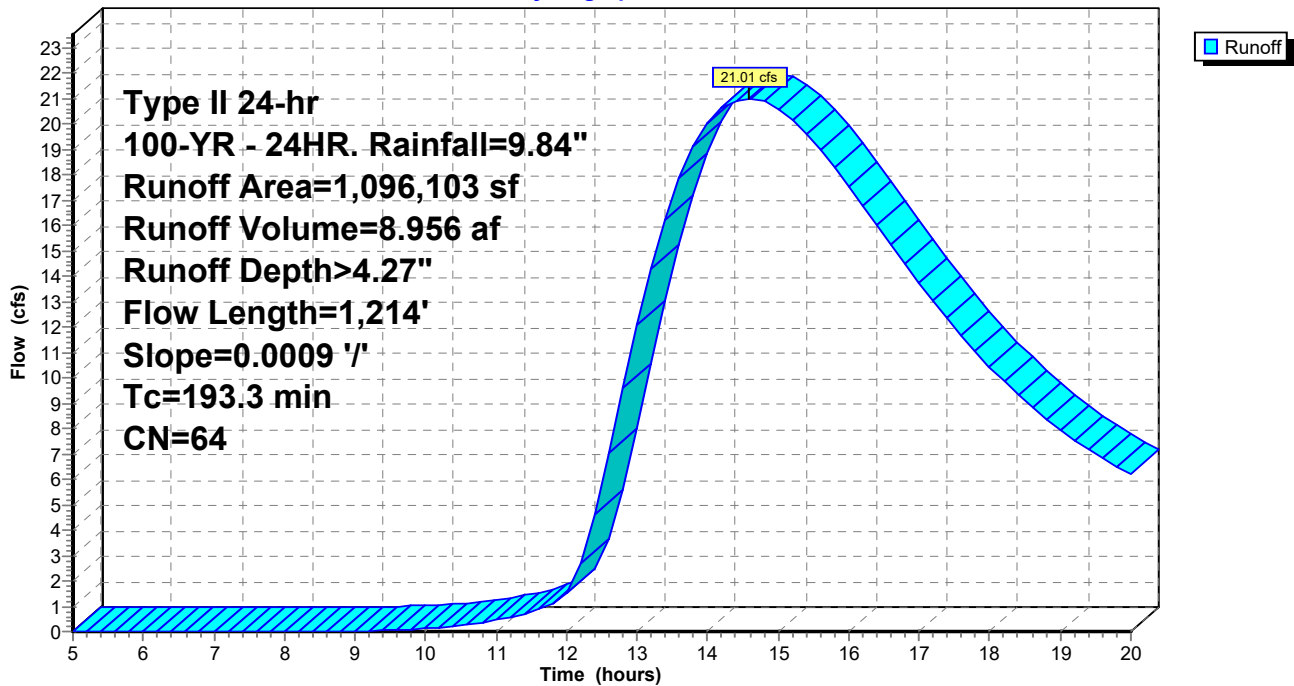
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

	Area (sf)	CN	Description
*	576,632	65	Uncompacted Gravel( 35% Void Ratio)
	421,336	58	Meadow, non-grazed, HSG B
	98,135	85	Gravel roads, HSG B
	1,096,103	64	Weighted Average
	1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
193.3	1,214	0.0009	0.10		Lag/CN Method,

## Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Hydrograph





# Staging Area 3 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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## Summary for Pond 1P: ROCK LAYDOWN AREA No.1

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 1.88" for 100-YR - 24HR. event  
 Inflow = 9.24 cfs @ 14.58 hrs, Volume= 3.941 af  
 Outflow = 10.69 cfs @ 14.40 hrs, Volume= 3.445 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 1.00 cfs @ 12.40 hrs, Volume= 0.703 af  
 Primary = 9.69 cfs @ 14.40 hrs, Volume= 2.742 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 90.25' @ 14.40 hrs Surf.Area= 123,855 sf Storage= 21,675 cf

Plug-Flow detention time= 51.0 min calculated for 3.400 af (86% of inflow)  
 Center-of-Mass det. time= 22.0 min ( 963.5 - 941.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	21,675 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 61,928 cf Overall x 35.0% Voids
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	123,855	0	0
90.00	123,855	61,928	61,928

Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=1.00 cfs @ 12.40 hrs HW=89.52' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 1.00 cfs)

**Primary OutFlow** Max=9.69 cfs @ 14.40 hrs HW=90.25' (Free Discharge)  
 ↑**1=Broad-Crested Rectangular Weir**(Weir Controls 9.69 cfs @ 1.72 fps)

# Staging Area 3 HydroCAD Report

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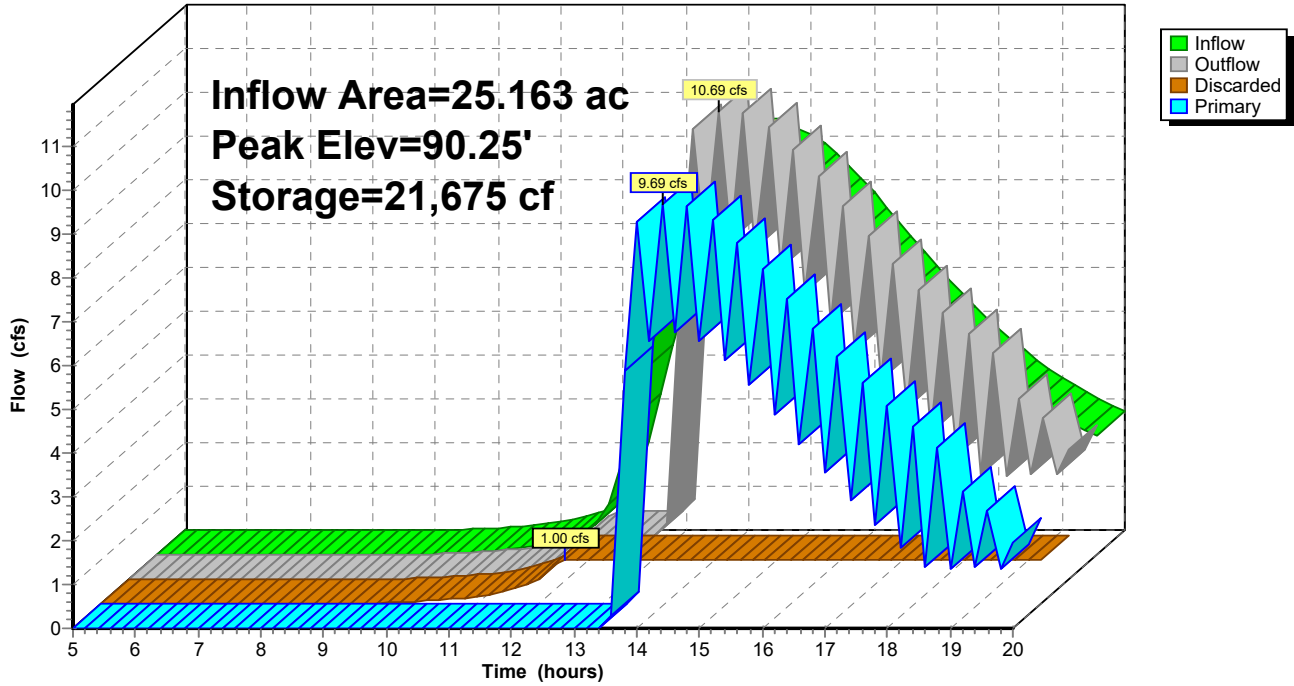
Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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## Pond 1P: ROCK LAYDOWN AREA No.1

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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## Summary for Pond 2P: ROCK LAYDOWN AREA No.2

Inflow = 11.76 cfs @ 14.58 hrs, Volume= 5.015 af  
 Outflow = 13.70 cfs @ 14.60 hrs, Volume= 4.697 af, Atten= 0%, Lag= 1.4 min  
 Discarded = 0.62 cfs @ 12.00 hrs, Volume= 0.462 af  
 Primary = 13.08 cfs @ 14.60 hrs, Volume= 4.235 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 90.33' @ 14.60 hrs Surf.Area= 76,672 sf Storage= 13,418 cf

Plug-Flow detention time= 26.4 min calculated for 4.635 af (92% of inflow)  
 Center-of-Mass det. time= 11.0 min ( 952.6 - 941.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	13,418 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 38,336 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	76,672	0	0
90.00	76,672	38,336	38,336

Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.62 cfs @ 12.00 hrs HW=89.51' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.62 cfs)

**Primary OutFlow** Max=13.07 cfs @ 14.60 hrs HW=90.33' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 13.07 cfs @ 1.92 fps)

# Staging Area 3 HydroCAD Report

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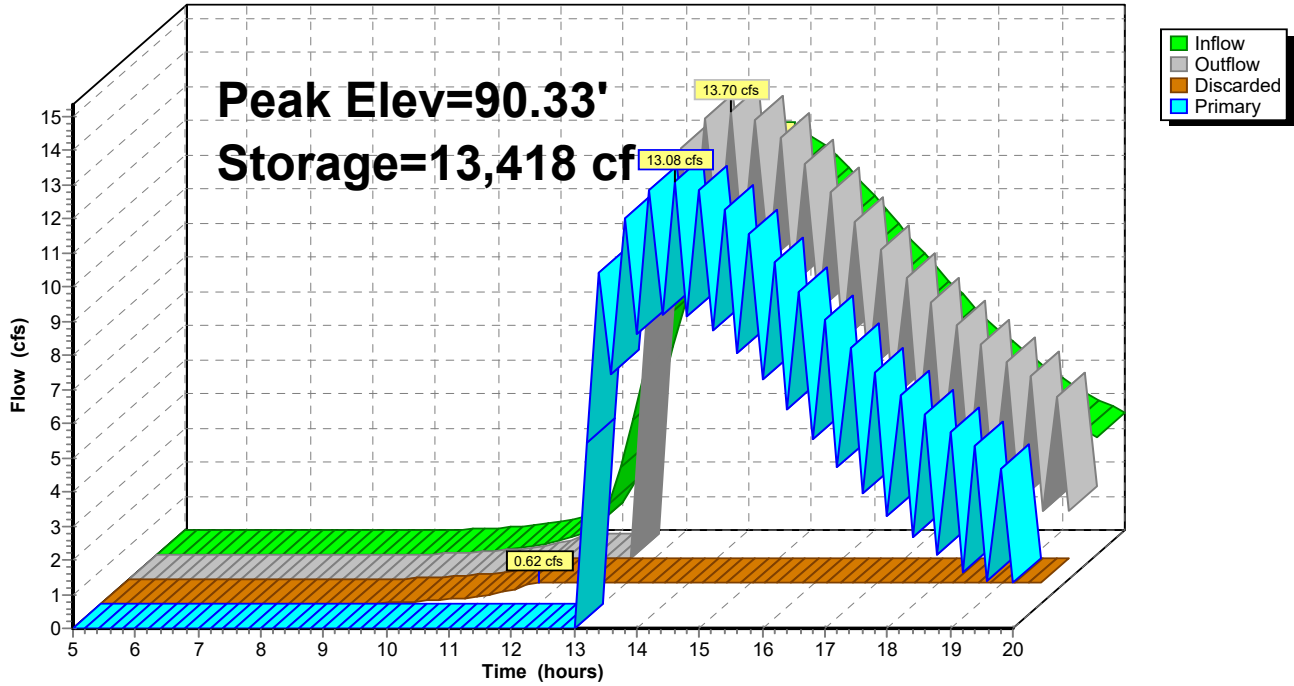
Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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## Pond 2P: ROCK LAYDOWN AREA No.2

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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## Summary for Pond 3P: PROPOSED POND

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 3.33" for 100-YR - 24HR. event  
 Inflow = 19.83 cfs @ 14.60 hrs, Volume= 6.977 af  
 Outflow = 6.15 cfs @ 19.06 hrs, Volume= 1.694 af, Atten= 69%, Lag= 267.5 min  
 Discarded = 1.75 cfs @ 19.06 hrs, Volume= 0.985 af  
 Primary = 4.41 cfs @ 19.06 hrs, Volume= 0.708 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 88.59' @ 19.06 hrs Surf.Area= 215,787 sf Storage= 232,905 cf

Plug-Flow detention time= 220.3 min calculated for 1.671 af (24% of inflow)  
 Center-of-Mass det. time= 100.4 min ( 1,059.9 - 959.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	87.50'	541,132 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
87.50	211,274	0	0
88.00	213,338	106,153	106,153
89.00	217,483	215,411	321,564
90.00	221,654	219,569	541,132

Device	Routing	Invert	Outlet Devices
#1	Discarded	87.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	88.50'	<b>43.6 deg x 50.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.56 (C= 3.20)

**Discarded OutFlow** Max=1.75 cfs @ 19.06 hrs HW=88.59' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 1.75 cfs)

**Primary OutFlow** Max=4.36 cfs @ 19.06 hrs HW=88.59' (Free Discharge)  
 ↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 4.36 cfs @ 0.96 fps)

# Staging Area 3 HydroCAD Report

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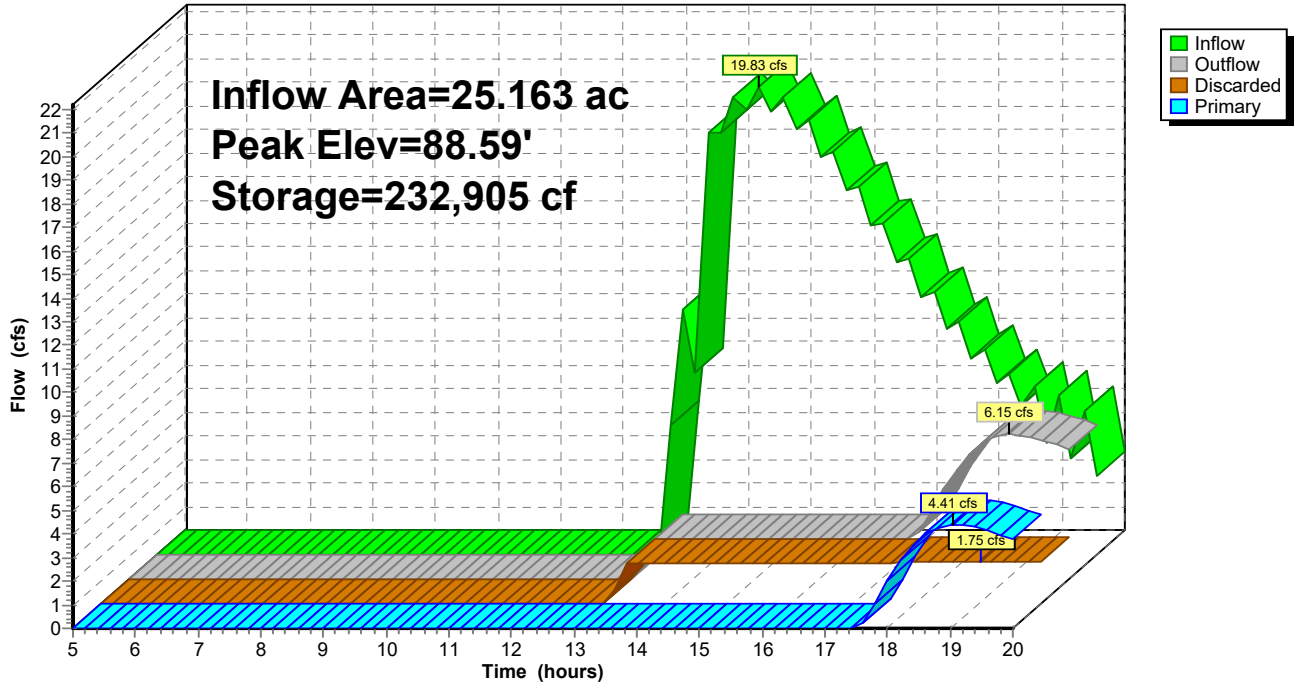
Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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## Pond 3P: PROPOSED POND

Hydrograph



# Staging Area 3 HydroCAD Report

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Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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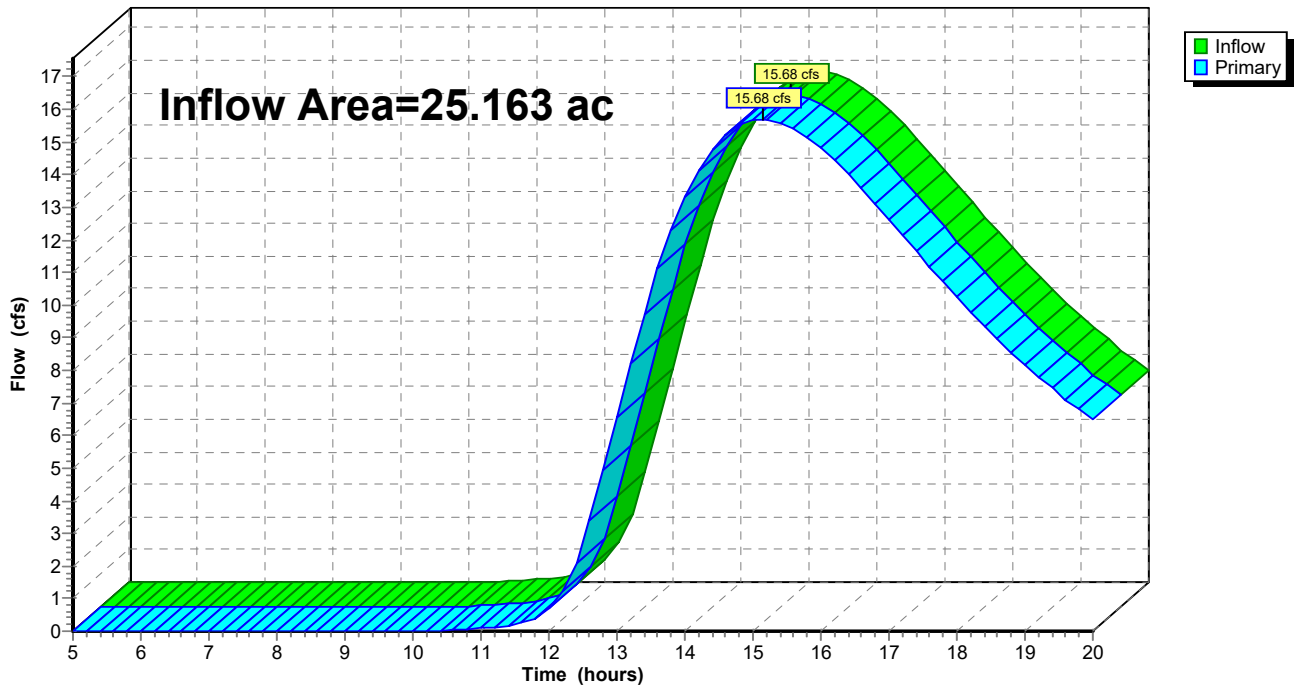
## Summary for Link 1L: EXISTING OUTFALL LOCATION

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 3.40" for 100-YR - 24HR. event  
Inflow = 15.68 cfs @ 15.14 hrs, Volume= 7.122 af  
Primary = 15.68 cfs @ 15.14 hrs, Volume= 7.122 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

## Link 1L: EXISTING OUTFALL LOCATION

Hydrograph



# Staging Area 3 HydroCAD Report

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Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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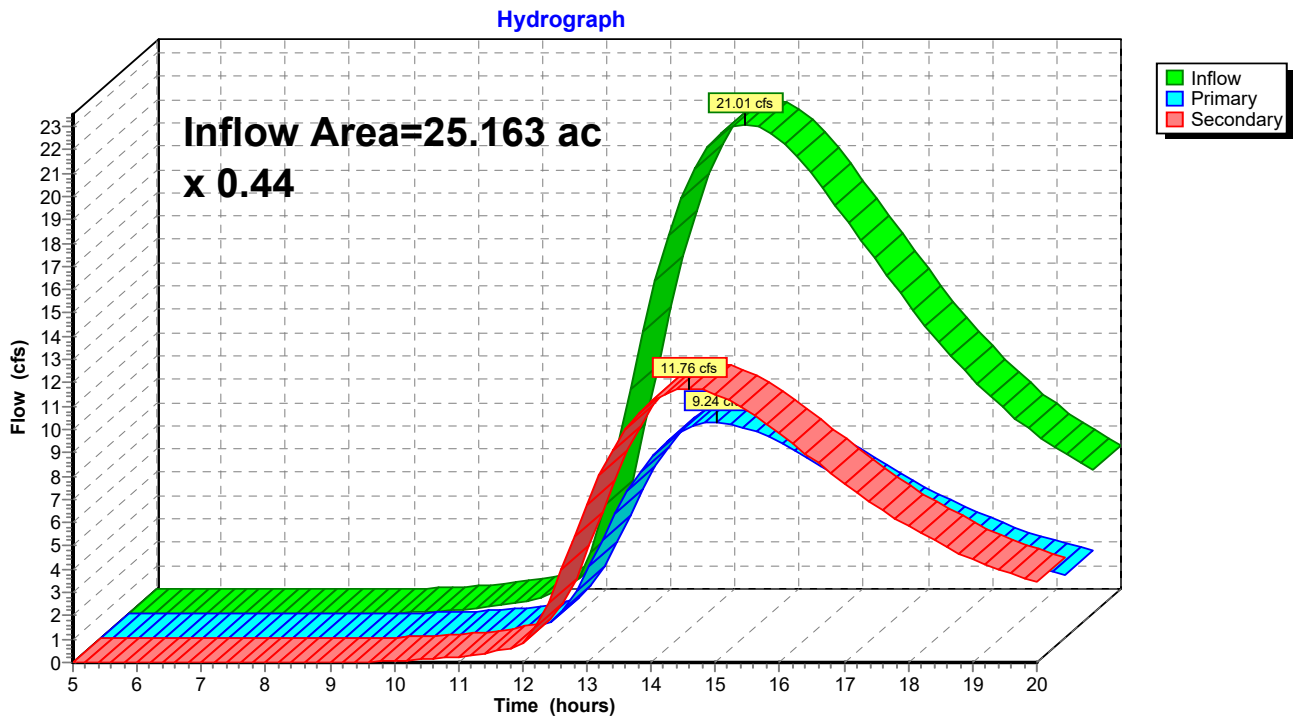
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## Summary for Link 2L: POST DEVELOPED FLOW

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 4.27" for 100-YR - 24HR. event  
Inflow = 21.01 cfs @ 14.58 hrs, Volume= 8.956 af  
Primary = 9.24 cfs @ 14.58 hrs, Volume= 3.941 af, Atten= 56%, Lag= 0.0 min  
Secondary = 11.76 cfs @ 14.58 hrs, Volume= 5.015 af

Primary outflow = Inflow x 0.44, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

## Link 2L: POST DEVELOPED FLOW





**Staging Area 3 HydroCAD Report**

Type II 24-hr 2.00 hrs 100-YR - 2HR. Rainfall=5.10"

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Time span=5.00-20.00 hrs, dt=0.20 hrs, 76 points  
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: PRE DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>0.62"  
Flow Length=1,711' Slope=0.0016 '/' Tc=222.3 min CN=58 Runoff=5.67 cfs 1.297 af

**Subcatchment2S: POST DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>0.66"  
Flow Length=1,214' Slope=0.0009 '/' Tc=193.3 min CN=64 Runoff=7.52 cfs 1.381 af

**Pond 1P: ROCK LAYDOWN AREA No.1** Peak Elev=89.74' Storage=10,516 cf Inflow=3.31 cfs 0.608 af  
Discarded=1.00 cfs 0.608 af Primary=0.00 cfs 0.000 af Outflow=1.00 cfs 0.608 af

**Pond 2P: ROCK LAYDOWN AREA No.2** Peak Elev=90.01' Storage=13,418 cf Inflow=4.21 cfs 0.774 af  
Discarded=0.62 cfs 0.545 af Primary=1.67 cfs 0.229 af Outflow=2.29 cfs 0.774 af

**Pond 3P: PROPOSED POND** Peak Elev=87.51' Storage=3,147 cf Inflow=1.67 cfs 0.229 af  
Discarded=1.02 cfs 0.229 af Primary=0.00 cfs 0.000 af Outflow=1.02 cfs 0.229 af

**Link 1L: EXISTING OUTFALL LOCATION** Inflow=5.67 cfs 1.297 af  
Primary=5.67 cfs 1.297 af

**Link 2L: POST DEVELOPED FLOW** x 0.44 Inflow=7.52 cfs 1.381 af  
Primary=3.31 cfs 0.608 af Secondary=4.21 cfs 0.774 af

# Staging Area 3 HydroCAD Report

Type II 24-hr 2.00 hrs 100-YR - 2HR. Rainfall=5.10"

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## Summary for Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Runoff = 5.67 cfs @ 5.00 hrs, Volume= 1.297 af, Depth> 0.62"

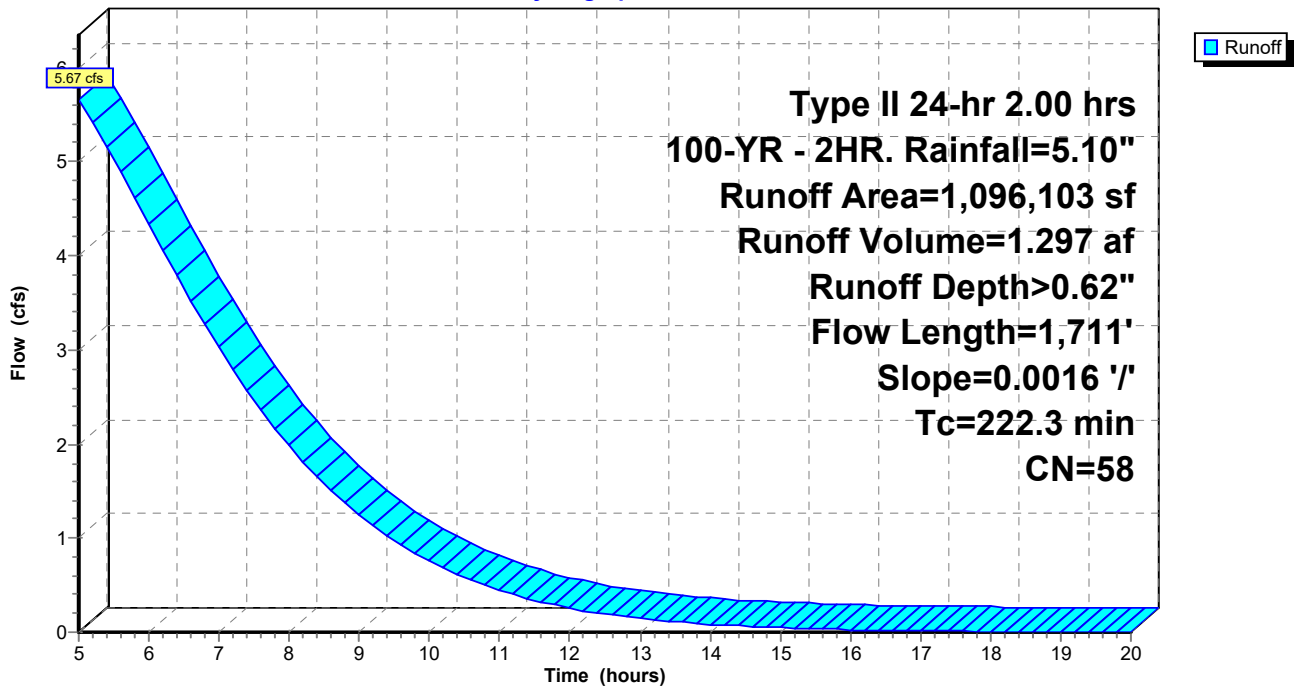
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 2.00 hrs 100-YR - 2HR. Rainfall=5.10"

Area (sf)	CN	Description
1,096,103	58	Meadow, non-grazed, HSG B
1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
222.3	1,711	0.0016	0.13		Lag/CN Method,

## Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 2.00 hrs 100-YR - 2HR. Rainfall=5.10"

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## Summary for Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Runoff = 7.52 cfs @ 5.00 hrs, Volume= 1.381 af, Depth> 0.66"

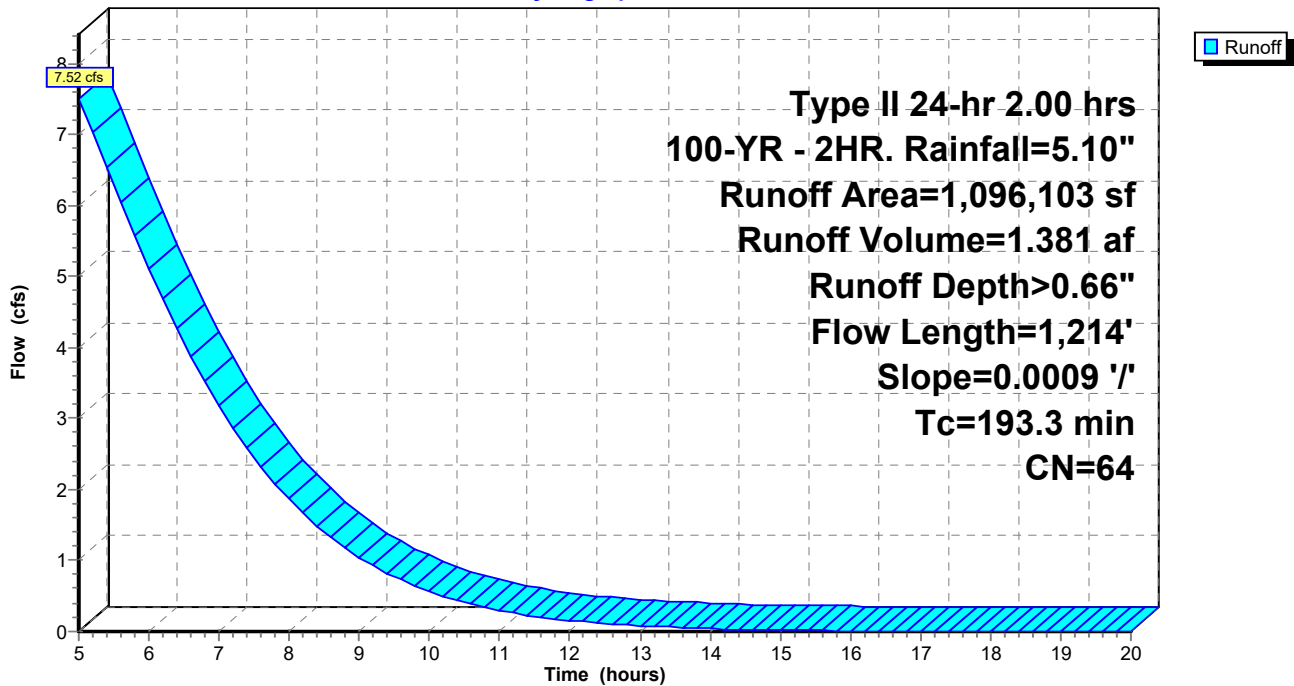
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Type II 24-hr 2.00 hrs 100-YR - 2HR. Rainfall=5.10"

Area (sf)	CN	Description
* 576,632	65	Uncompacted Gravel( 35% Void Ratio)
421,336	58	Meadow, non-grazed, HSG B
98,135	85	Gravel roads, HSG B
1,096,103	64	Weighted Average
1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
193.3	1,214	0.0009	0.10		Lag/CN Method,

## Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Hydrograph



**Staging Area 3 HydroCAD Report**

Type II 24-hr 2.00 hrs 100-YR - 2HR. Rainfall=5.10"

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**Summary for Pond 1P: ROCK LAYDOWN AREA No.1**

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 0.29" for 100-YR - 2HR. event  
 Inflow = 3.31 cfs @ 5.00 hrs, Volume= 0.608 af  
 Outflow = 1.00 cfs @ 5.00 hrs, Volume= 0.608 af, Atten= 70%, Lag= 0.0 min  
 Discarded = 1.00 cfs @ 5.00 hrs, Volume= 0.608 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 89.74' @ 7.64 hrs Surf.Area= 123,855 sf Storage= 10,516 cf

Plug-Flow detention time= 130.2 min calculated for 0.589 af (97% of inflow)  
 Center-of-Mass det. time= 110.8 min ( 515.0 - 404.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	21,675 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 61,928 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	123,855	0	0
90.00	123,855	61,928	61,928

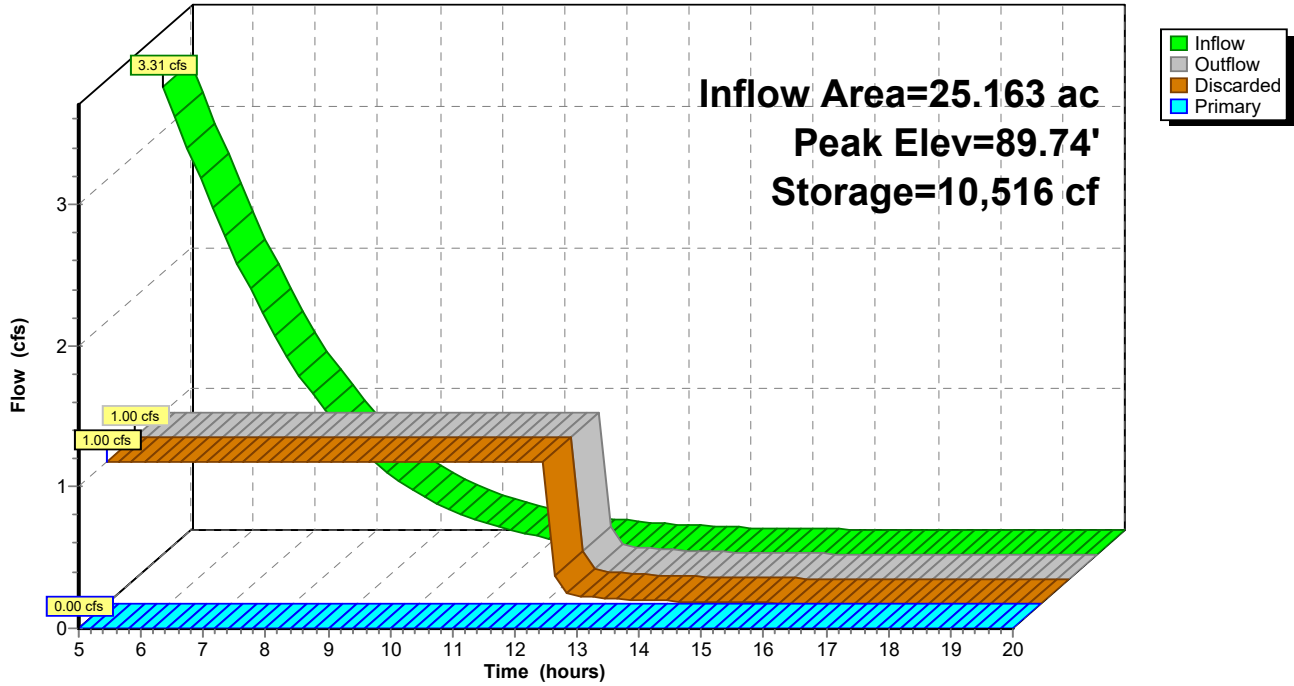
Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=1.00 cfs @ 5.00 hrs HW=89.52' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 1.00 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=89.52' (Free Discharge)  
 ↑**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

Pond 1P: ROCK LAYDOWN AREA No.1

Hydrograph



**Staging Area 3 HydroCAD Report**

Type II 24-hr 2.00 hrs 100-YR - 2HR. Rainfall=5.10"

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**Summary for Pond 2P: ROCK LAYDOWN AREA No.2**

Inflow = 4.21 cfs @ 5.00 hrs, Volume= 0.774 af  
 Outflow = 2.29 cfs @ 6.61 hrs, Volume= 0.774 af, Atten= 46%, Lag= 96.5 min  
 Discarded = 0.62 cfs @ 5.00 hrs, Volume= 0.545 af  
 Primary = 1.67 cfs @ 6.61 hrs, Volume= 0.229 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 90.01' @ 6.61 hrs Surf.Area= 76,672 sf Storage= 13,418 cf

Plug-Flow detention time= 179.5 min calculated for 0.744 af (96% of inflow)  
 Center-of-Mass det. time= 155.6 min ( 559.8 - 404.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	13,418 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 38,336 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	76,672	0	0
90.00	76,672	38,336	38,336

Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.62 cfs @ 5.00 hrs HW=89.55' (Free Discharge)

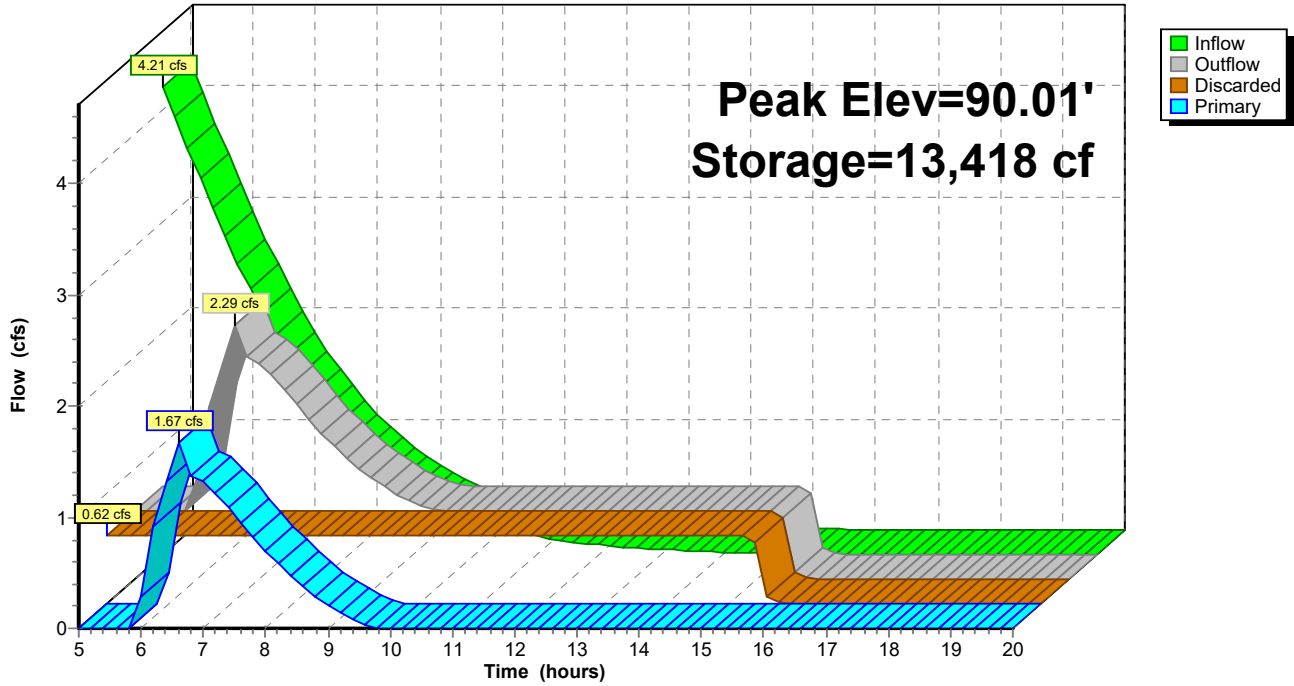
↑**2=Exfiltration** (Exfiltration Controls 0.62 cfs)

**Primary OutFlow** Max=1.65 cfs @ 6.61 hrs HW=90.01' (Free Discharge)

↑**1=Broad-Crested Rectangular Weir**(Weir Controls 1.65 cfs @ 0.93 fps)

Pond 2P: ROCK LAYDOWN AREA No.2

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 2.00 hrs 100-YR - 2HR. Rainfall=5.10"

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## Summary for Pond 3P: PROPOSED POND

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth = 0.11" for 100-YR - 2HR. event  
 Inflow = 1.67 cfs @ 6.61 hrs, Volume= 0.229 af  
 Outflow = 1.02 cfs @ 7.50 hrs, Volume= 0.229 af, Atten= 39%, Lag= 53.7 min  
 Discarded = 1.02 cfs @ 7.50 hrs, Volume= 0.229 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 87.51' @ 7.50 hrs Surf.Area= 211,335 sf Storage= 3,147 cf

Plug-Flow detention time= 54.1 min calculated for 0.229 af (100% of inflow)  
 Center-of-Mass det. time= 51.4 min ( 485.8 - 434.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	87.50'	541,132 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
87.50	211,274	0	0
88.00	213,338	106,153	106,153
89.00	217,483	215,411	321,564
90.00	221,654	219,569	541,132

Device	Routing	Invert	Outlet Devices
#1	Discarded	87.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	88.50'	<b>43.6 deg x 50.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.56 (C= 3.20)

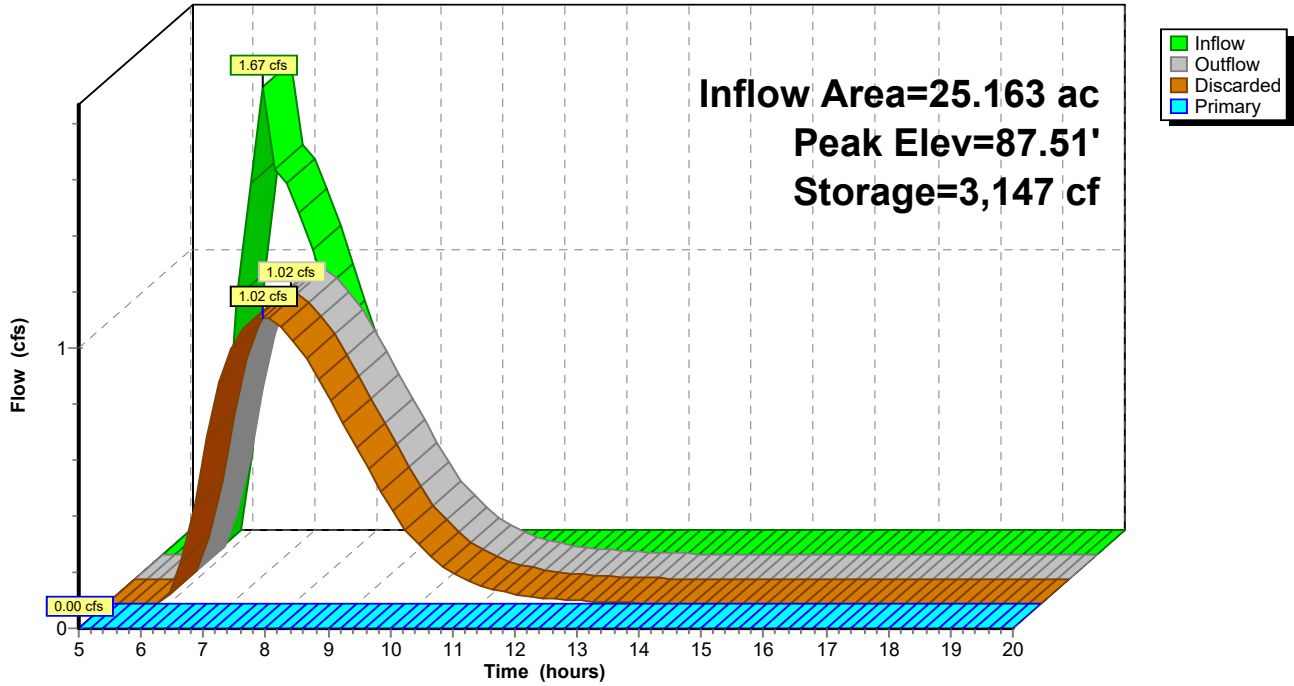
**Discarded OutFlow** Max=1.71 cfs @ 7.50 hrs HW=87.51' (Free Discharge)  
 ↑1=**Exfiltration** (Exfiltration Controls 1.71 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=87.50' (Free Discharge)  
 ↑2=**Sharp-Crested Vee/Trap Weir**( Controls 0.00 cfs)



Pond 3P: PROPOSED POND

Hydrograph



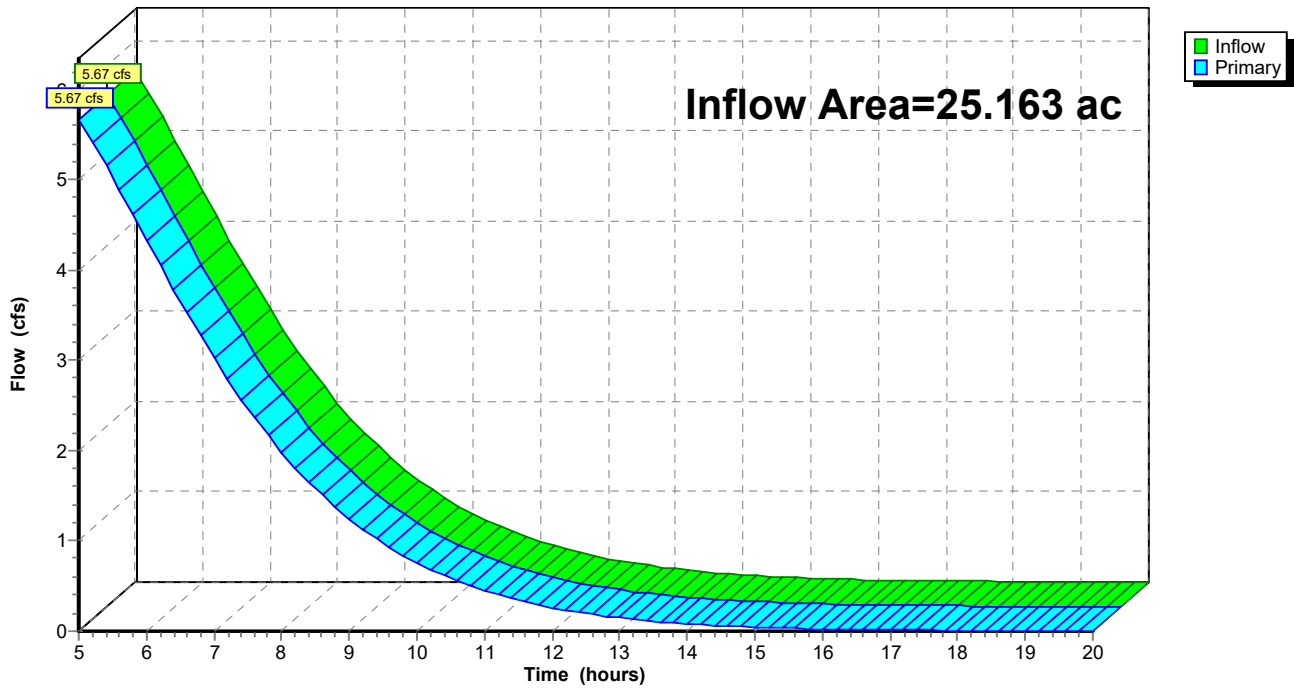
### Summary for Link 1L: EXISTING OUTFALL LOCATION

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 0.62" for 100-YR - 2HR. event  
Inflow = 5.67 cfs @ 5.00 hrs, Volume= 1.297 af  
Primary = 5.67 cfs @ 5.00 hrs, Volume= 1.297 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

### Link 1L: EXISTING OUTFALL LOCATION

Hydrograph

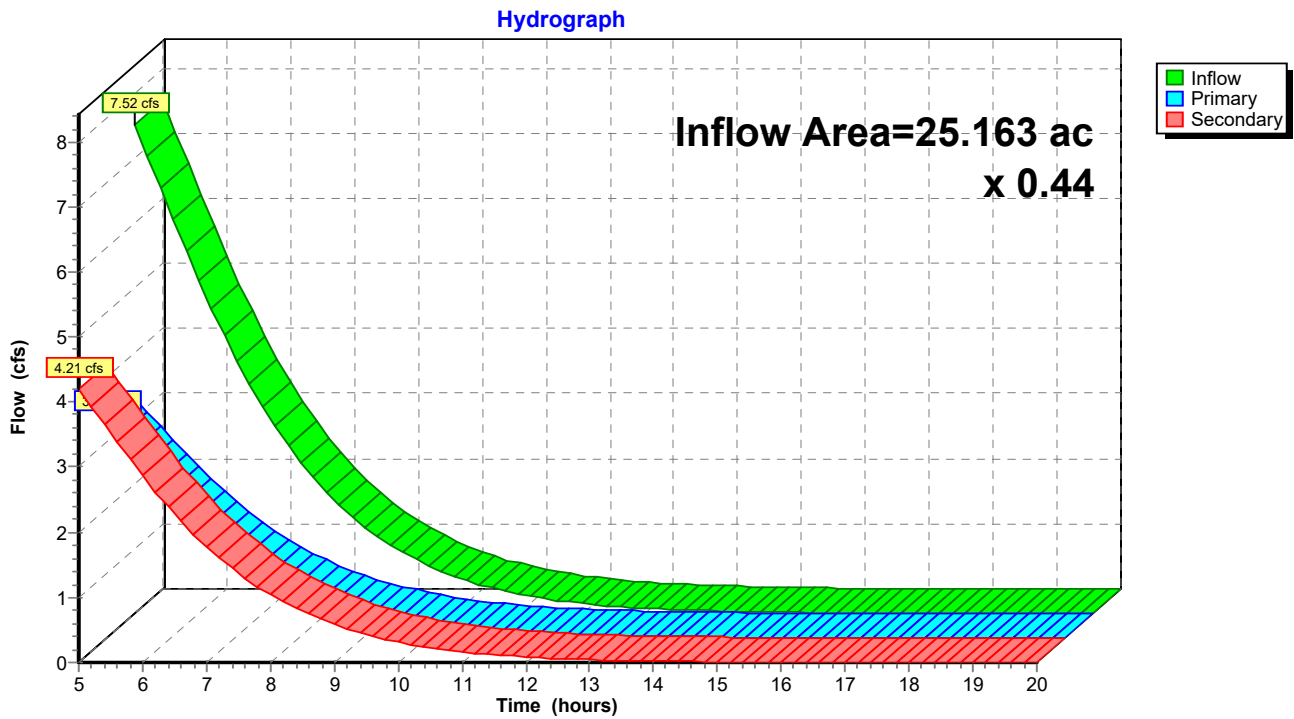


### Summary for Link 2L: POST DEVELOPED FLOW

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 0.66" for 100-YR - 2HR. event  
Inflow = 7.52 cfs @ 5.00 hrs, Volume= 1.381 af  
Primary = 3.31 cfs @ 5.00 hrs, Volume= 0.608 af, Atten= 56%, Lag= 0.0 min  
Secondary = 4.21 cfs @ 5.00 hrs, Volume= 0.774 af

Primary outflow = Inflow x 0.44, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

### Link 2L: POST DEVELOPED FLOW



**Staging Area 3 HydroCAD Report**

Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

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Time span=5.00-20.00 hrs, dt=0.20 hrs, 76 points  
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: PRE DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>1.32"  
Flow Length=1,711' Slope=0.0016 '/' Tc=222.3 min CN=58 Runoff=8.97 cfs 2.763 af

**Subcatchment2S: POST DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>1.47"  
Flow Length=1,214' Slope=0.0009 '/' Tc=193.3 min CN=64 Runoff=12.88 cfs 3.073 af

**Pond 1P: ROCK LAYDOWN AREA No.1** Peak Elev=90.09' Storage=21,675 cf Inflow=5.67 cfs 1.352 af  
Discarded=1.00 cfs 0.938 af Primary=3.64 cfs 0.415 af Outflow=4.64 cfs 1.352 af

**Pond 2P: ROCK LAYDOWN AREA No.2** Peak Elev=90.18' Storage=13,418 cf Inflow=7.21 cfs 1.721 af  
Discarded=0.62 cfs 0.634 af Primary=7.20 cfs 1.087 af Outflow=7.82 cfs 1.721 af

**Pond 3P: PROPOSED POND** Peak Elev=87.68' Storage=38,334 cf Inflow=7.06 cfs 1.502 af  
Discarded=1.72 cfs 1.502 af Primary=0.00 cfs 0.000 af Outflow=1.72 cfs 1.502 af

**Link 1L: EXISTING OUTFALL LOCATION** Inflow=8.97 cfs 2.763 af  
Primary=8.97 cfs 2.763 af

**Link 2L: POST DEVELOPED FLOW** x 0.44 Inflow=12.88 cfs 3.073 af  
Primary=5.67 cfs 1.352 af Secondary=7.21 cfs 1.721 af

# Staging Area 3 HydroCAD Report

Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

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## Summary for Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Runoff = 8.97 cfs @ 5.20 hrs, Volume= 2.763 af, Depth> 1.32"

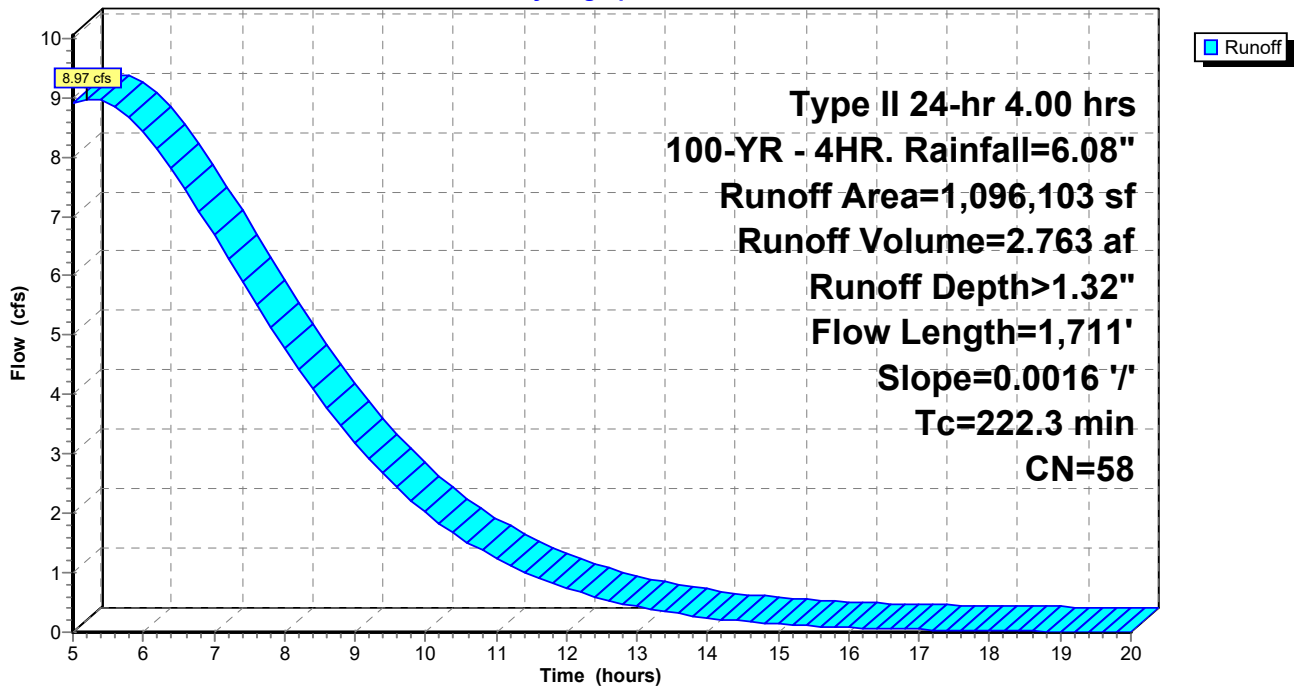
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

Area (sf)	CN	Description
1,096,103	58	Meadow, non-grazed, HSG B
1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
222.3	1,711	0.0016	0.13		Lag/CN Method,

## Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

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## Summary for Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Runoff = 12.88 cfs @ 5.00 hrs, Volume= 3.073 af, Depth> 1.47"

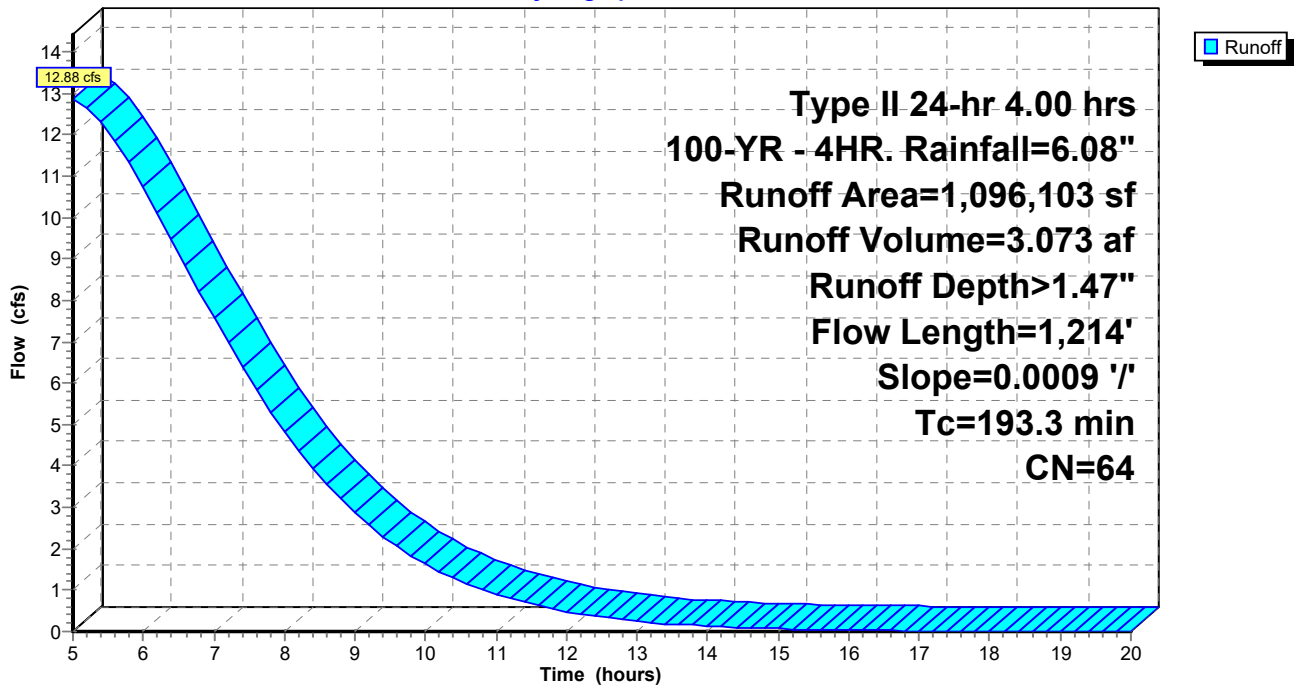
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

Area (sf)	CN	Description
* 576,632	65	Uncompacted Gravel( 35% Void Ratio)
421,336	58	Meadow, non-grazed, HSG B
98,135	85	Gravel roads, HSG B
1,096,103	64	Weighted Average
1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
193.3	1,214	0.0009	0.10		Lag/CN Method,

## Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

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## Summary for Pond 1P: ROCK LAYDOWN AREA No.1

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 0.64" for 100-YR - 4HR. event  
 Inflow = 5.67 cfs @ 5.00 hrs, Volume= 1.352 af  
 Outflow = 4.64 cfs @ 6.62 hrs, Volume= 1.352 af, Atten= 18%, Lag= 96.9 min  
 Discarded = 1.00 cfs @ 5.00 hrs, Volume= 0.938 af  
 Primary = 3.64 cfs @ 6.62 hrs, Volume= 0.415 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 90.09' @ 6.62 hrs Surf.Area= 123,855 sf Storage= 21,675 cf

Plug-Flow detention time= 178.2 min calculated for 1.314 af (97% of inflow)  
 Center-of-Mass det. time= 158.5 min ( 578.5 - 419.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	21,675 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 61,928 cf Overall x 35.0% Voids
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	123,855	0	0
90.00	123,855	61,928	61,928

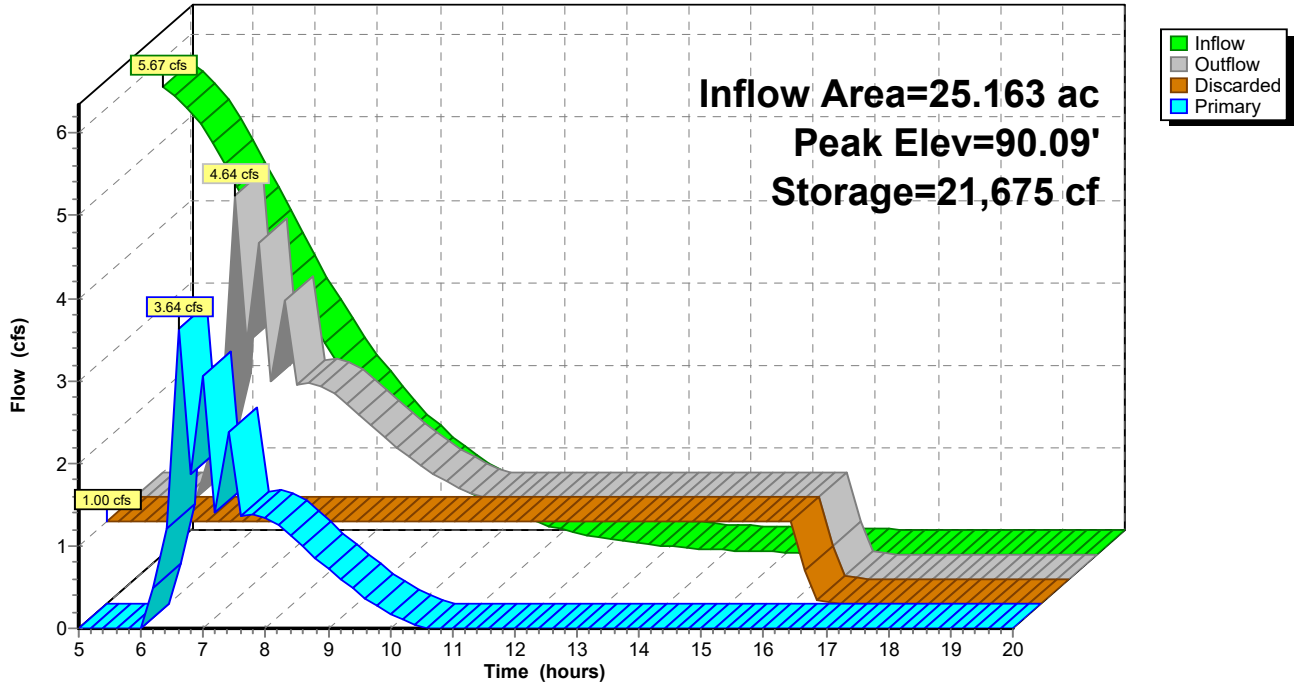
Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=1.00 cfs @ 5.00 hrs HW=89.54' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 1.00 cfs)

**Primary OutFlow** Max=3.47 cfs @ 6.62 hrs HW=90.08' (Free Discharge)  
 ↑**1=Broad-Crested Rectangular Weir**(Weir Controls 3.47 cfs @ 1.19 fps)

Pond 1P: ROCK LAYDOWN AREA No.1

Hydrograph





**Staging Area 3 HydroCAD Report**

Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

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**Summary for Pond 2P: ROCK LAYDOWN AREA No.2**

Inflow = 7.21 cfs @ 5.00 hrs, Volume= 1.721 af  
 Outflow = 7.82 cfs @ 5.65 hrs, Volume= 1.721 af, Atten= 0%, Lag= 39.2 min  
 Discarded = 0.62 cfs @ 5.00 hrs, Volume= 0.634 af  
 Primary = 7.20 cfs @ 5.65 hrs, Volume= 1.087 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 90.18' @ 5.60 hrs Surf.Area= 76,672 sf Storage= 13,418 cf

Plug-Flow detention time= 110.6 min calculated for 1.666 af (97% of inflow)  
 Center-of-Mass det. time= 92.0 min ( 511.9 - 419.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	13,418 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 38,336 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	76,672	0	0
90.00	76,672	38,336	38,336

Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.62 cfs @ 5.00 hrs HW=89.59' (Free Discharge)

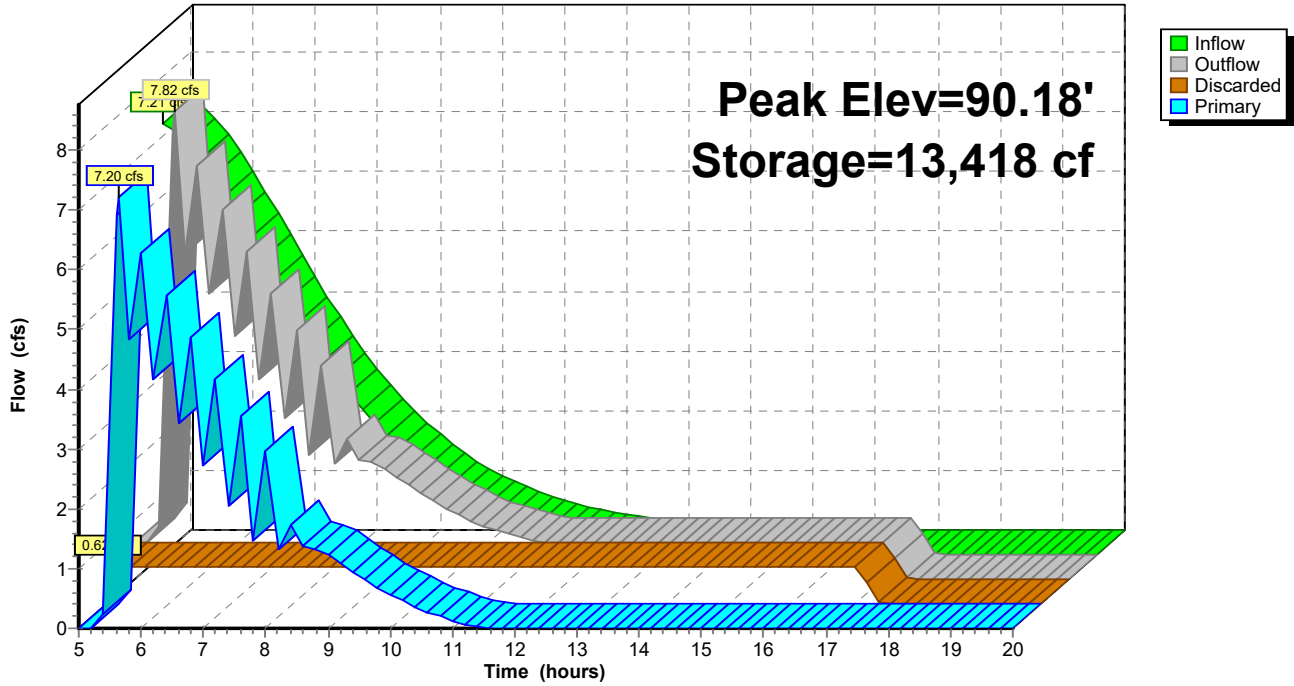
↑**2=Exfiltration** (Exfiltration Controls 0.62 cfs)

**Primary OutFlow** Max=6.33 cfs @ 5.65 hrs HW=90.17' (Free Discharge)

↑**1=Broad-Crested Rectangular Weir**(Weir Controls 6.33 cfs @ 1.47 fps)

Pond 2P: ROCK LAYDOWN AREA No.2

Hydrograph



**Staging Area 3 HydroCAD Report**

Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

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**Summary for Pond 3P: PROPOSED POND**

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 0.72" for 100-YR - 4HR. event  
 Inflow = 7.06 cfs @ 6.59 hrs, Volume= 1.502 af  
 Outflow = 1.72 cfs @ 9.18 hrs, Volume= 1.502 af, Atten= 76%, Lag= 155.1 min  
 Discarded = 1.72 cfs @ 9.18 hrs, Volume= 1.502 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 87.68' @ 9.18 hrs Surf.Area= 212,022 sf Storage= 38,334 cf

Plug-Flow detention time= 224.8 min calculated for 1.502 af (100% of inflow)  
 Center-of-Mass det. time= 224.2 min ( 656.0 - 431.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	87.50'	541,132 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
87.50	211,274	0	0
88.00	213,338	106,153	106,153
89.00	217,483	215,411	321,564
90.00	221,654	219,569	541,132

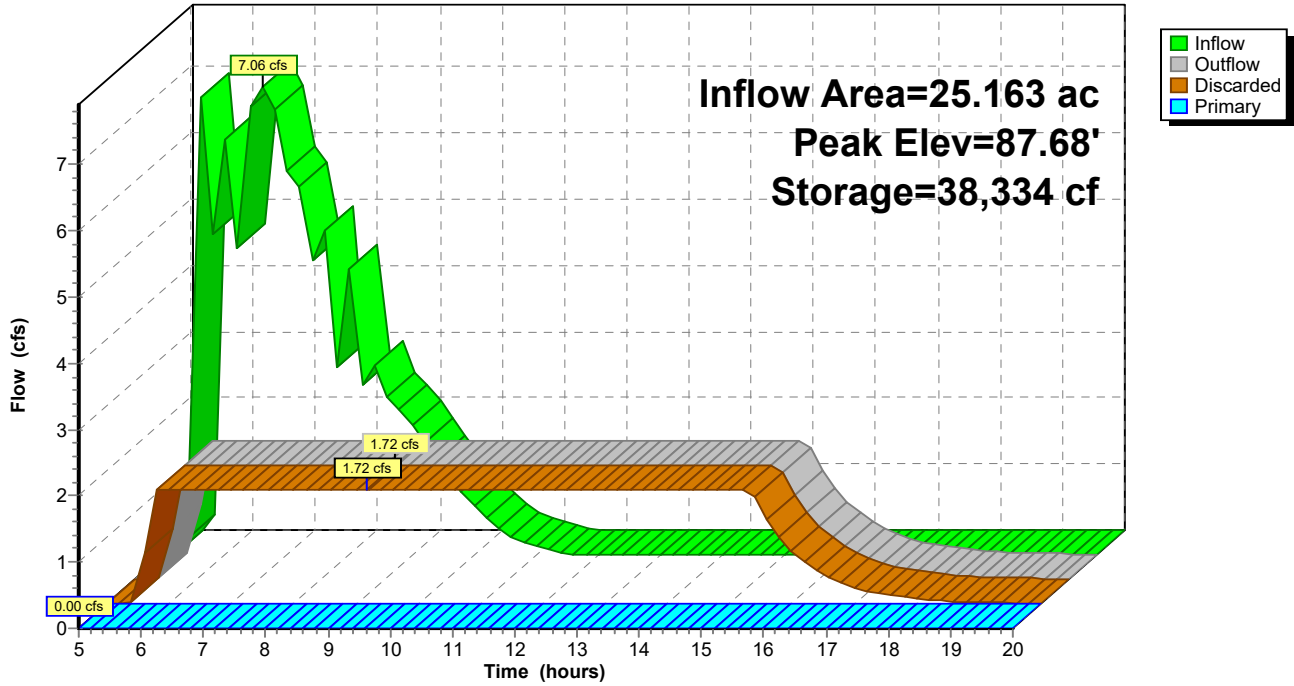
Device	Routing	Invert	Outlet Devices
#1	Discarded	87.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	88.50'	<b>43.6 deg x 50.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.56 (C= 3.20)

**Discarded OutFlow** Max=1.72 cfs @ 9.18 hrs HW=87.68' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 1.72 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=87.50' (Free Discharge)  
 ↑2=Sharp-Crested Vee/Trap Weir ( Controls 0.00 cfs)

### Pond 3P: PROPOSED POND

Hydrograph



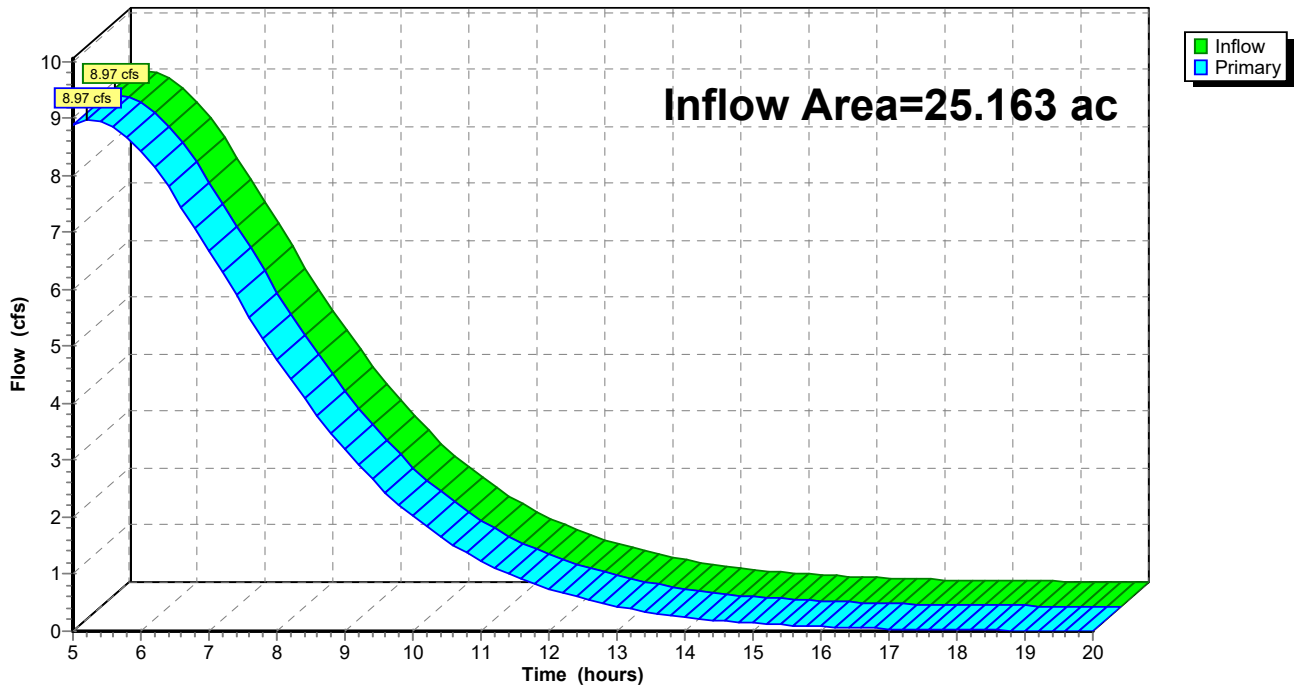
Summary for Link 1L: EXISTING OUTFALL LOCATION

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 1.32" for 100-YR - 4HR. event  
Inflow = 8.97 cfs @ 5.20 hrs, Volume= 2.763 af  
Primary = 8.97 cfs @ 5.20 hrs, Volume= 2.763 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

Link 1L: EXISTING OUTFALL LOCATION

Hydrograph

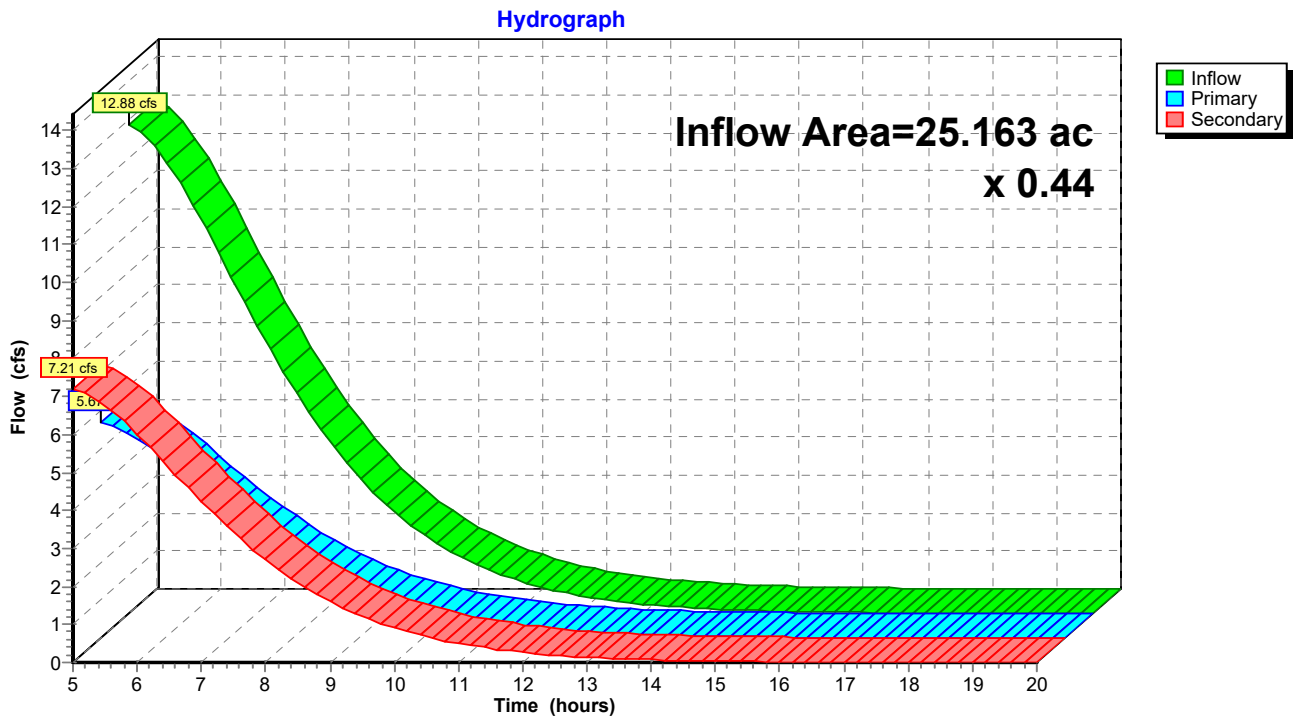


### Summary for Link 2L: POST DEVELOPED FLOW

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 1.47" for 100-YR - 4HR. event  
Inflow = 12.88 cfs @ 5.00 hrs, Volume= 3.073 af  
Primary = 5.67 cfs @ 5.00 hrs, Volume= 1.352 af, Atten= 56%, Lag= 0.0 min  
Secondary = 7.21 cfs @ 5.00 hrs, Volume= 1.721 af

Primary outflow = Inflow x 0.44, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

### Link 2L: POST DEVELOPED FLOW



**Staging Area 3 HydroCAD Report**

Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

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Time span=5.00-20.00 hrs, dt=0.20 hrs, 76 points  
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: PRE DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>2.62"  
Flow Length=1,711' Slope=0.0016 '/' Tc=222.3 min CN=58 Runoff=11.56 cfs 5.495 af

**Subcatchment2S: POST DEVELOPED** Runoff Area=1,096,103 sf 0.00% Impervious Runoff Depth>3.22"  
Flow Length=1,214' Slope=0.0009 '/' Tc=193.3 min CN=64 Runoff=16.18 cfs 6.751 af

**Pond 1P: ROCK LAYDOWN AREA No.1** Peak Elev=90.24' Storage=21,675 cf Inflow=7.12 cfs 2.971 af  
Discarded=1.00 cfs 1.204 af Primary=9.30 cfs 1.767 af Outflow=10.30 cfs 2.971 af

**Pond 2P: ROCK LAYDOWN AREA No.2** Peak Elev=90.28' Storage=13,418 cf Inflow=9.06 cfs 3.781 af  
Discarded=0.62 cfs 0.780 af Primary=10.91 cfs 2.983 af Outflow=11.53 cfs 3.763 af

**Pond 3P: PROPOSED POND** Peak Elev=88.26' Storage=161,133 cf Inflow=15.24 cfs 4.749 af  
Discarded=1.74 cfs 2.039 af Primary=0.00 cfs 0.000 af Outflow=1.74 cfs 2.039 af

**Link 1L: EXISTING OUTFALL LOCATION** Inflow=11.56 cfs 5.495 af  
Primary=11.56 cfs 5.495 af

**Link 2L: POST DEVELOPED FLOW** x 0.44 Inflow=16.18 cfs 6.751 af  
Primary=7.12 cfs 2.971 af Secondary=9.06 cfs 3.781 af

# Staging Area 3 HydroCAD Report

Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

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## Summary for Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Runoff = 11.56 cfs @ 7.46 hrs, Volume= 5.495 af, Depth> 2.62"

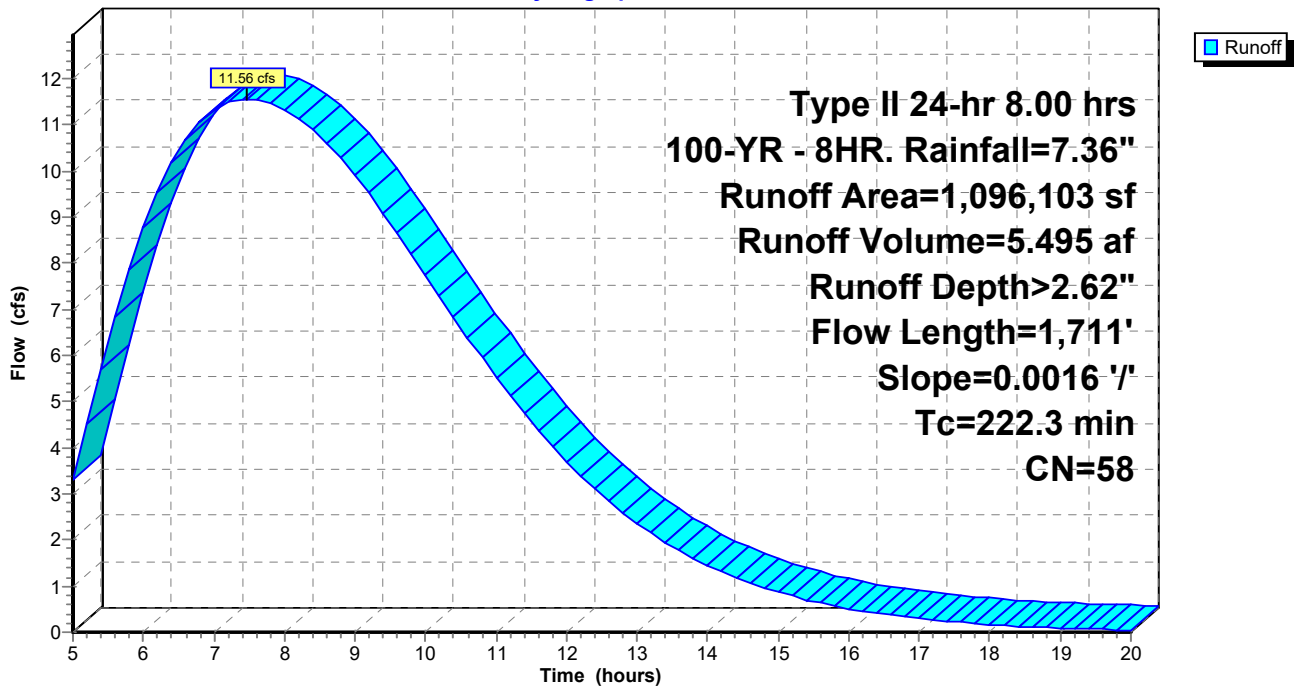
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

Area (sf)	CN	Description
1,096,103	58	Meadow, non-grazed, HSG B
1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
222.3	1,711	0.0016	0.13		Lag/CN Method,

## Subcatchment 1S: PRE DEVELOPED DRAINAGE AREA 1

Hydrograph





# Staging Area 3 HydroCAD Report

Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

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## Summary for Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Runoff = 16.18 cfs @ 6.94 hrs, Volume= 6.751 af, Depth> 3.22"

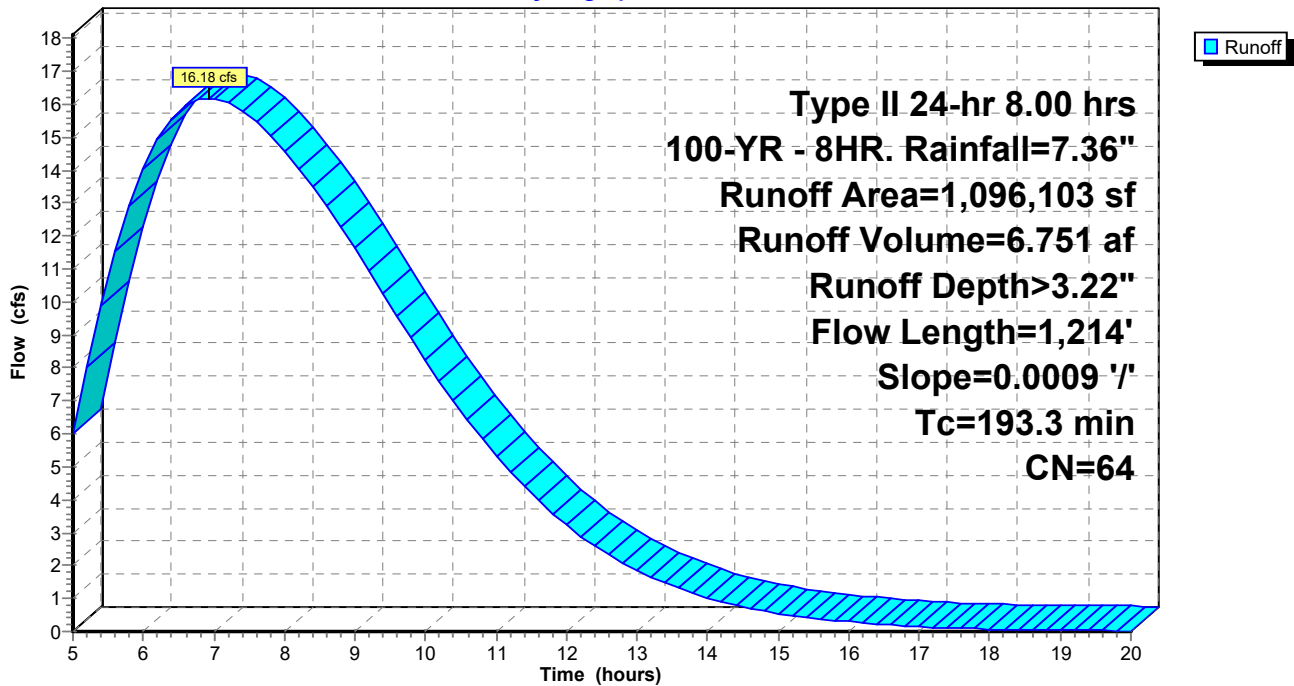
Runoff by SCS TR-20 method, UH=Georgia-323, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

Area (sf)	CN	Description
* 576,632	65	Uncompacted Gravel( 35% Void Ratio)
421,336	58	Meadow, non-grazed, HSG B
98,135	85	Gravel roads, HSG B
1,096,103	64	Weighted Average
1,096,103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
193.3	1,214	0.0009	0.10		Lag/CN Method,

## Subcatchment 2S: POST DEVELOPED DRAINAGE AREA 1

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

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## Summary for Pond 1P: ROCK LAYDOWN AREA No.1

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 1.42" for 100-YR - 8HR. event  
 Inflow = 7.12 cfs @ 6.94 hrs, Volume= 2.971 af  
 Outflow = 10.30 cfs @ 7.00 hrs, Volume= 2.971 af, Atten= 0%, Lag= 3.7 min  
 Discarded = 1.00 cfs @ 5.00 hrs, Volume= 1.204 af  
 Primary = 9.30 cfs @ 7.00 hrs, Volume= 1.767 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 90.24' @ 7.00 hrs Surf.Area= 123,855 sf Storage= 21,675 cf

Plug-Flow detention time= 104.2 min calculated for 2.918 af (98% of inflow)  
 Center-of-Mass det. time= 102.4 min ( 600.1 - 497.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	21,675 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 61,928 cf Overall x 35.0% Voids
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	123,855	0	0
90.00	123,855	61,928	61,928

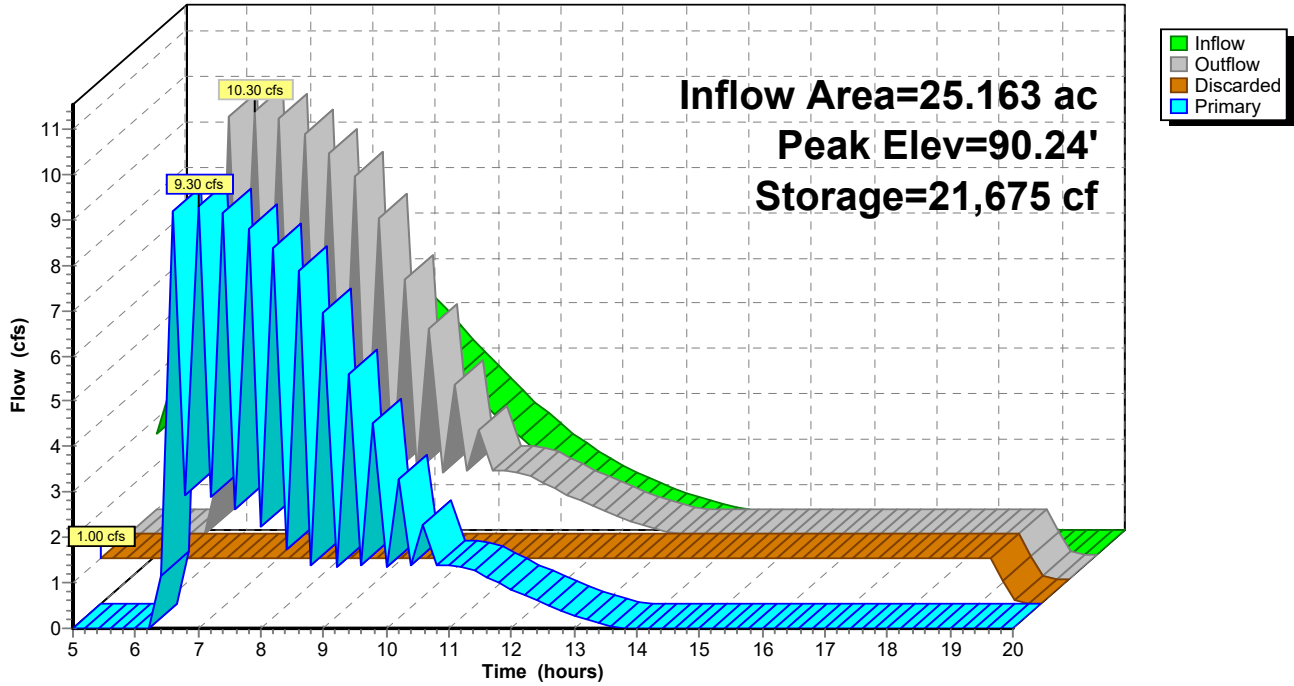
Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=1.00 cfs @ 5.00 hrs HW=89.51' (Free Discharge)  
 ↑**2=Exfiltration** (Exfiltration Controls 1.00 cfs)

**Primary OutFlow** Max=9.29 cfs @ 7.00 hrs HW=90.24' (Free Discharge)  
 ↑**1=Broad-Crested Rectangular Weir**(Weir Controls 9.29 cfs @ 1.69 fps)

Pond 1P: ROCK LAYDOWN AREA No.1

Hydrograph



**Staging Area 3 HydroCAD Report**

Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

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**Summary for Pond 2P: ROCK LAYDOWN AREA No.2**

Inflow = 9.06 cfs @ 6.94 hrs, Volume= 3.781 af  
 Outflow = 11.53 cfs @ 6.80 hrs, Volume= 3.763 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.62 cfs @ 5.00 hrs, Volume= 0.780 af  
 Primary = 10.91 cfs @ 6.80 hrs, Volume= 2.983 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 90.28' @ 6.80 hrs Surf.Area= 76,672 sf Storage= 13,418 cf

Plug-Flow detention time= 56.6 min calculated for 3.691 af (98% of inflow)  
 Center-of-Mass det. time= 53.5 min ( 551.3 - 497.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	13,418 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 38,336 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.50	76,672	0	0
90.00	76,672	38,336	38,336

Device	Routing	Invert	Outlet Devices
#1	Primary	89.90'	<b>16.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	89.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.62 cfs @ 5.00 hrs HW=89.54' (Free Discharge)

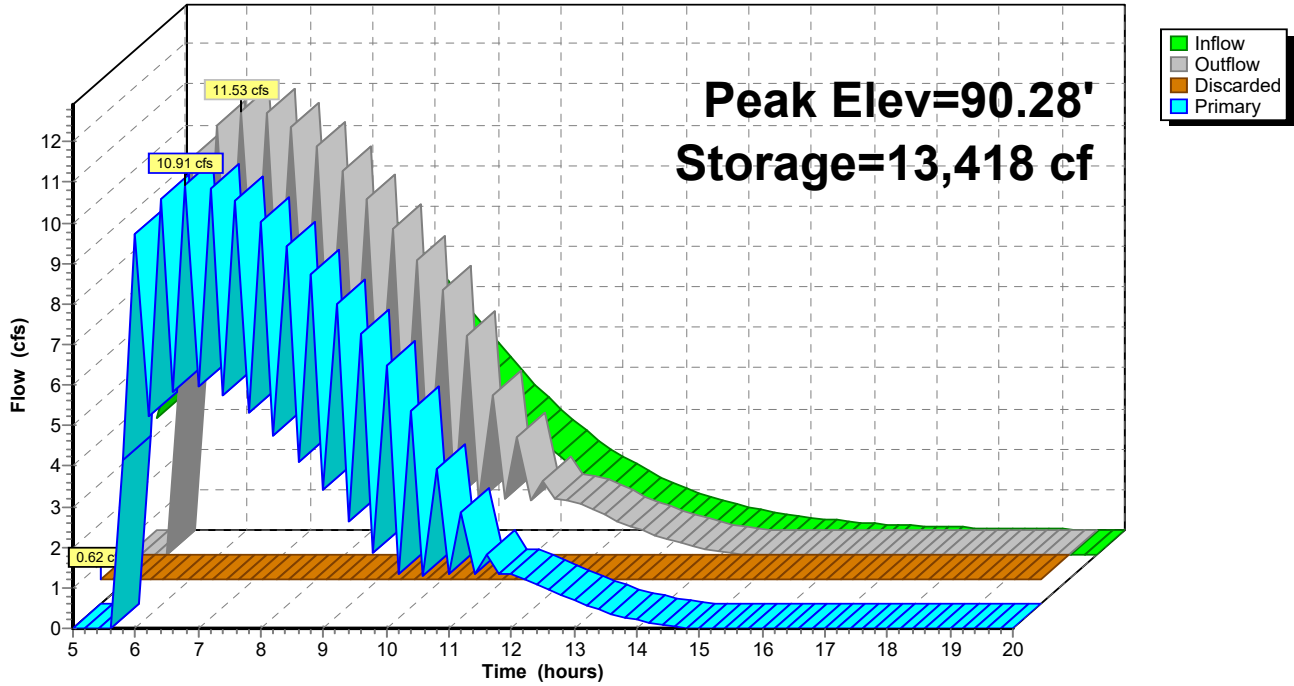
↑**2=Exfiltration** (Exfiltration Controls 0.62 cfs)

**Primary OutFlow** Max=10.88 cfs @ 6.80 hrs HW=90.28' (Free Discharge)

↑**1=Broad-Crested Rectangular Weir**(Weir Controls 10.88 cfs @ 1.79 fps)

Pond 2P: ROCK LAYDOWN AREA No.2

Hydrograph



# Staging Area 3 HydroCAD Report

Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

Prepared by HP Inc.

Printed 3/16/2020

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## Summary for Pond 3P: PROPOSED POND

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth = 2.26" for 100-YR - 8HR. event  
 Inflow = 15.24 cfs @ 7.00 hrs, Volume= 4.749 af  
 Outflow = 1.74 cfs @ 12.37 hrs, Volume= 2.039 af, Atten= 89%, Lag= 322.4 min  
 Discarded = 1.74 cfs @ 12.37 hrs, Volume= 2.039 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs  
 Peak Elev= 88.26' @ 12.37 hrs Surf.Area= 214,404 sf Storage= 161,133 cf

Plug-Flow detention time= 360.4 min calculated for 2.012 af (42% of inflow)  
 Center-of-Mass det. time= 275.0 min ( 779.0 - 504.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	87.50'	541,132 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
87.50	211,274	0	0
88.00	213,338	106,153	106,153
89.00	217,483	215,411	321,564
90.00	221,654	219,569	541,132

Device	Routing	Invert	Outlet Devices
#1	Discarded	87.50'	<b>0.350 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	88.50'	<b>43.6 deg x 50.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.56 (C= 3.20)

**Discarded OutFlow** Max=1.74 cfs @ 12.37 hrs HW=88.26' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 1.74 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=87.50' (Free Discharge)  
 ↑2=Sharp-Crested Vee/Trap Weir ( Controls 0.00 cfs)

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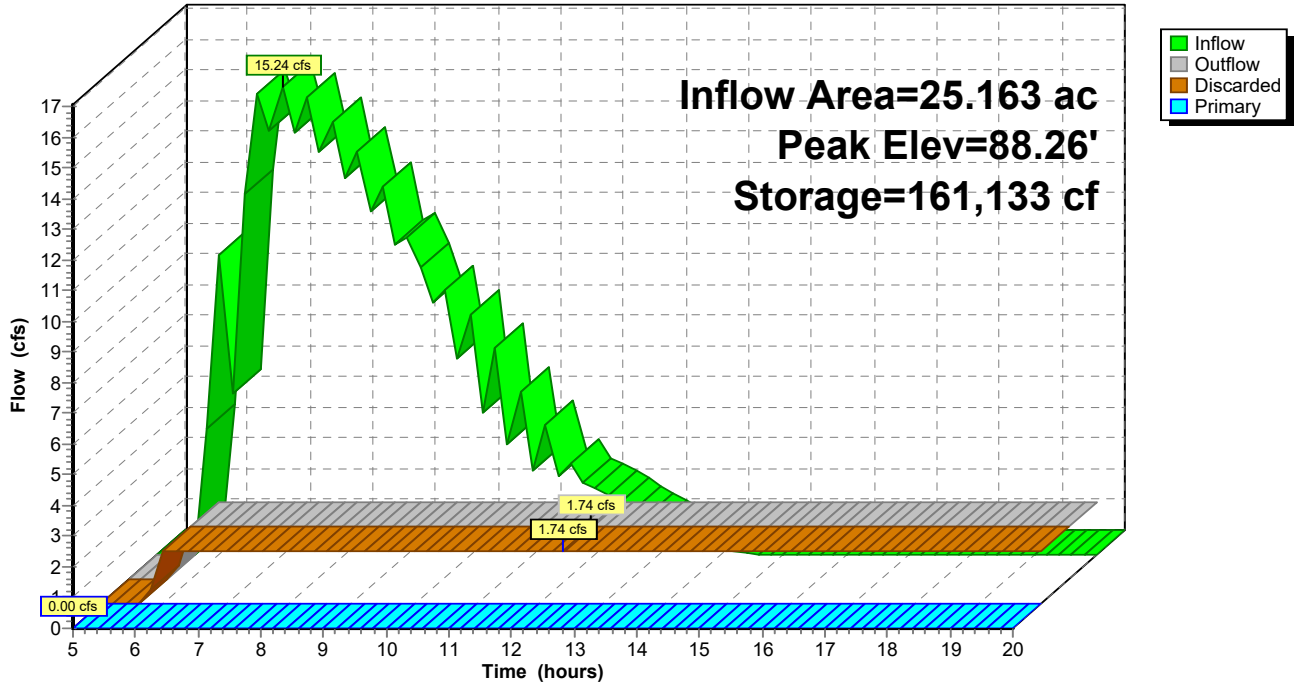
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## Pond 3P: PROPOSED POND

Hydrograph



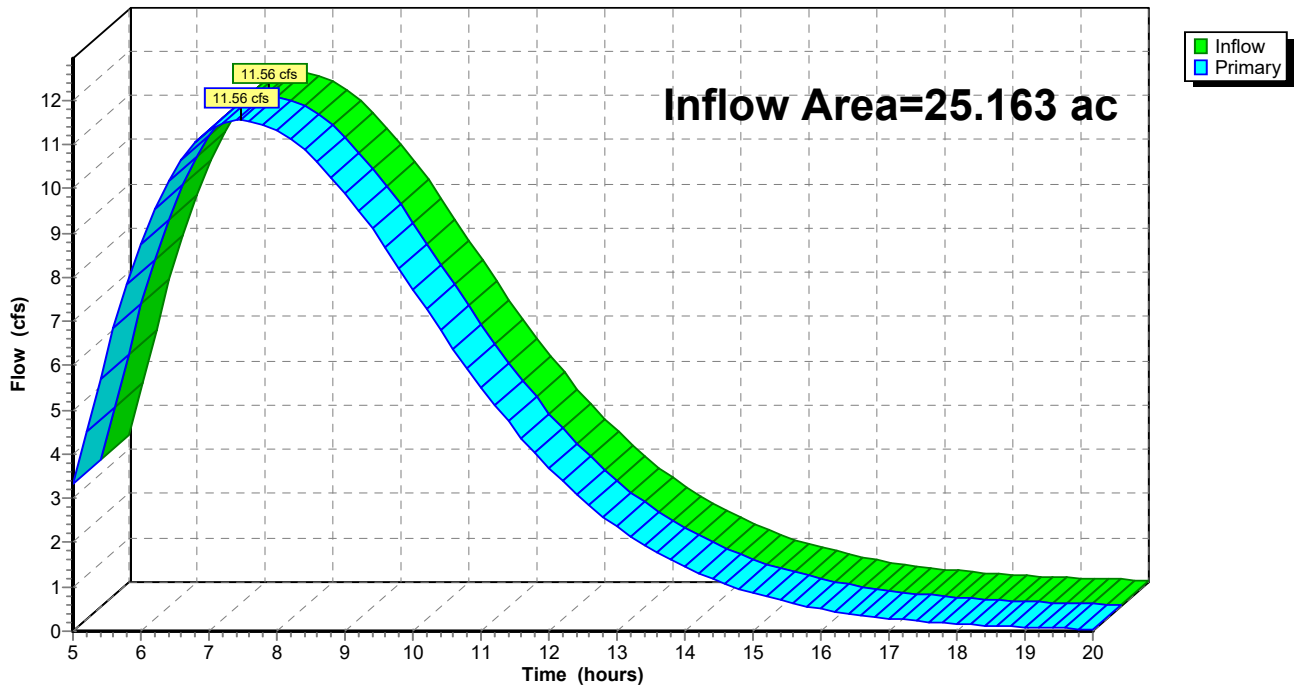
### Summary for Link 1L: EXISTING OUTFALL LOCATION

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 2.62" for 100-YR - 8HR. event  
Inflow = 11.56 cfs @ 7.46 hrs, Volume= 5.495 af  
Primary = 11.56 cfs @ 7.46 hrs, Volume= 5.495 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

### Link 1L: EXISTING OUTFALL LOCATION

Hydrograph





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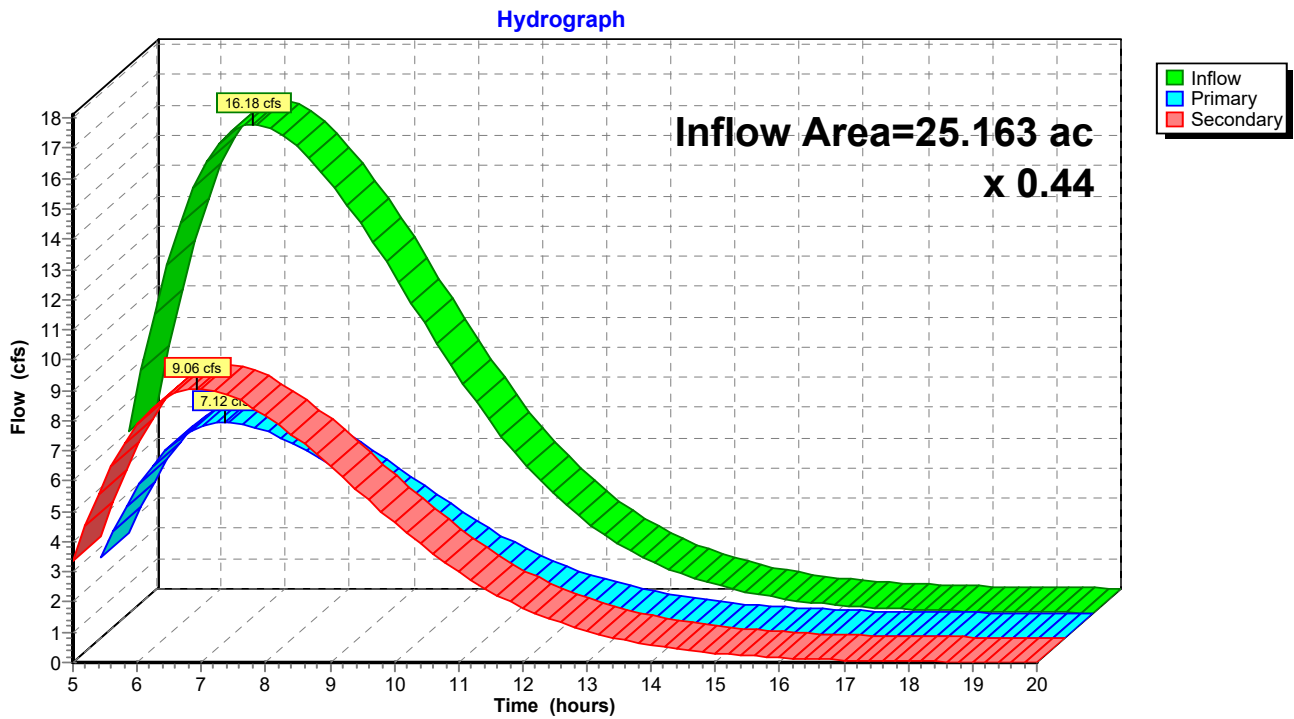
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## Summary for Link 2L: POST DEVELOPED FLOW

Inflow Area = 25.163 ac, 0.00% Impervious, Inflow Depth > 3.22" for 100-YR - 8HR. event  
Inflow = 16.18 cfs @ 6.94 hrs, Volume= 6.751 af  
Primary = 7.12 cfs @ 6.94 hrs, Volume= 2.971 af, Atten= 56%, Lag= 0.0 min  
Secondary = 9.06 cfs @ 6.94 hrs, Volume= 3.781 af

Primary outflow = Inflow x 0.44, Time Span= 5.00-20.00 hrs, dt= 0.20 hrs

## Link 2L: POST DEVELOPED FLOW



## Appendix C – FEMA Firm Map

# National Flood Hazard Layer FIRMette



30°21'18.33"N



## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D

OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall

OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature

MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **10/26/2019 at 1:56:15 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

83°34'0.26"W

## Appendix D – Rainfall Distribution Data

# Appendix D

## District Rainfall Distribution Data

### Values for $P_{total}$ (inches)<sup>1</sup>

For the counties of Madison, Hamilton, Suwannee, Columbia, Baker and Union.

Frequency (years)	Duration (hours)							
	1	2	4	8	24	72	168	240
3	2.50	2.64	3.08	3.52	4.56	5.80	7.30	8.00
10	3.05	3.70	4.40	5.12	6.72	8.30	10.10	11.80
25	3.45	4.30	5.12	6.00	7.92	10.00	12.30	14.00
100	4.20	5.10	6.08	7.36	9.84	12.40	14.00	16.10

For the counties of Taylor, Lafayette, Dixie, Gilchrist, Levy, Alachua and Bradford.

Frequency (years)	Duration (hours)							
	1	2	4	8	24	72	168	240
3	2.60	3.20	3.80	4.48	6.00	7.60	9.50	10.80
10	3.20	4.00	4.80	5.84	7.92	8.90	11.00	12.50
25	3.60	4.40	5.28	6.56	8.64	11.00	13.00	15.00
100	4.40	5.40	6.72	8.00	11.04	13.80	16.00	18.00

### 1-HOUR DURATION

T(hrs)	P/ $P_{total}$	I/ $P_{total}$
0	0	0
.1	.020	.200
.2	.080	.600
.3	.200	1.200
.4	.410	2.100
.5	.625	2.150
.6	.805	1.800
.7	.915	1.100
.8	.985	0.700
.9	.995	0.100
1.0	1.000	0

<sup>1</sup> Values for durations through 24 hours were taken from Florida Department of Transportation intensity curves. Values for durations greater than 24 hours were taken from National Weather Service Technical Paper No. 49, 1964.

Appendix E – Water Management District Boundary

# Appendix E

Part VII APPENDICES  
Appendix

## District Boundary

