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20081973

OARS JACKSON PIKE WWTP SITE (CIP 650704-100001)

City of Columbus SWDM Type II Variance Application

City of Columbus

June 15, 2018

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TABLE OF CONTENTS

1.0 INTRODUCTION

The following report provides information pertaining to a requested variance from the City of Columbus Stormwater Drainage Manual (the Manual) for the Olentangy Scioto Interceptor Sewer (OSIS) Augmentation and Relief Sewer (OARS) Jackson Pike Wastewater Treatment Plant (JPWWTP) Site CIP 650704-100001 (CC-15684).

The OARS project was constructed to intercept and convey combined sewer overflows from downtown Columbus and relieve the OSIS during wet weather conditions. The tunnel extends four and half miles from just north of the Arena District to the JPWWTP. The project parcel, located just north of JPWWTP at 2020 Jackson Pike, Columbus, Ohio 43223 (Figure 1), is at the southern terminus of the OARS project. The site is located in the Zone AE 100-year floodplain of the Scioto River, as mapped by the Federal Emergency Management Agency (FEMA).

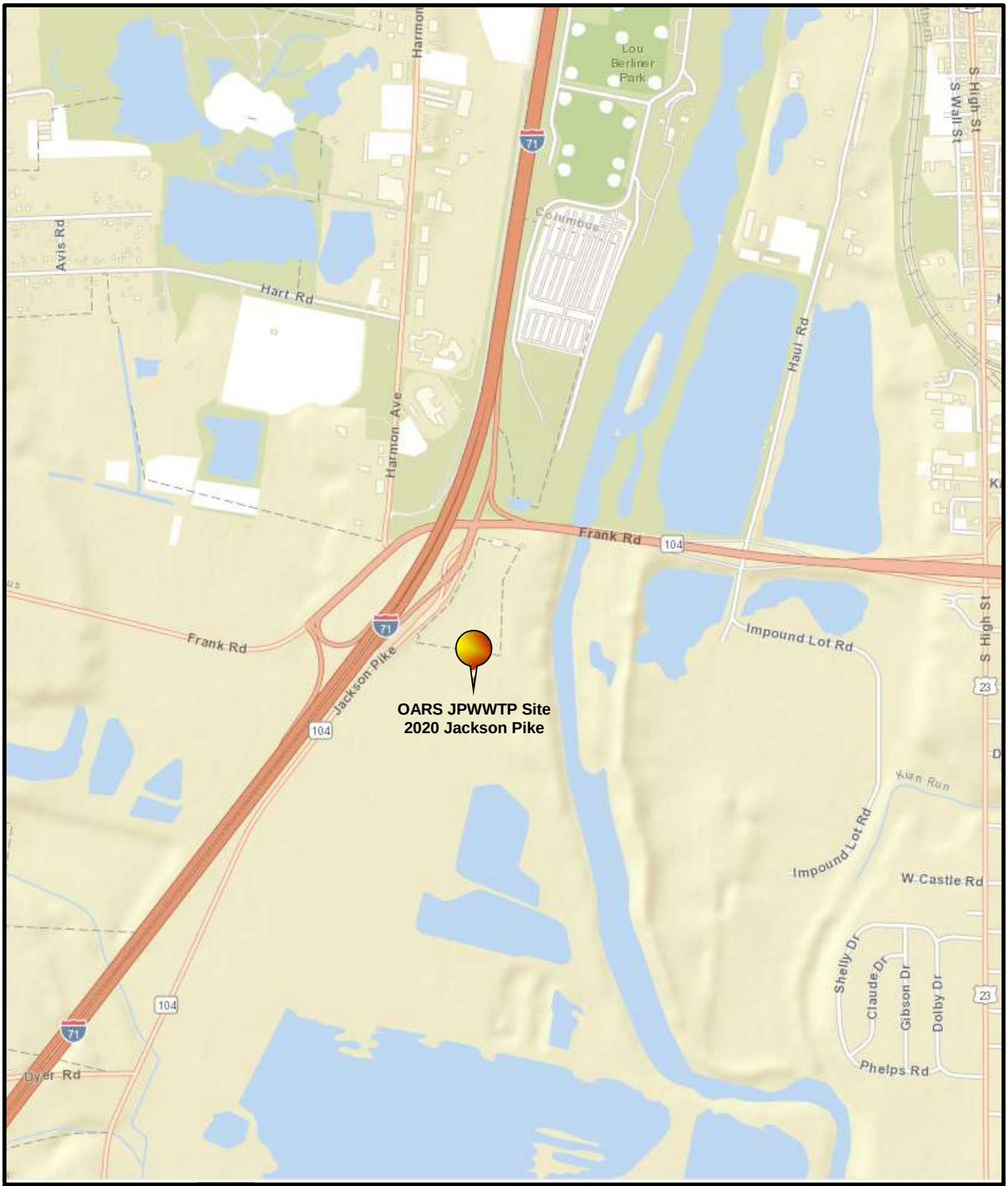
The City purchased the project parcel (OARS JPWWTP Site) in 2009 to accommodate construction of the OARS facilities. Prior to the City purchasing the parcel, the previous owner had allowed placement of construction and demolition debris (C&DD) on the site over many years, even though the site was in the floodplain. This fill effectively raised a portion of the site above the floodplain elevation.

The permanent OARS facilities located within the JPWWTP site, including the OSIS diversion structure extension, gate chamber, OARS diversion structure, pump electrical building, and screen structure, were constructed in 2010-2017. These features were constructed within a portion of the OARS JPWWTP Site located outside of the 100-year floodplain. One dry extended detention basin was installed to provide post-construction detention and water quality stormwater management for the permanent site facilities. The remainder of the site was utilized for contractor's laydown, construction trailers and associated parking during the OARS construction. These temporary features were located within the 100-year floodplain. No additional fill was placed onsite as part of the OARS project, but the existing fill was spread over the site, increasing the fill footprint.

Since completion of the OARS JPWWTP site construction in 2017, the City has decided to restore the project parcel to establish permanent contractor laydown areas and trailers for the JPWWTP Cogeneration Facility Project. The final development will involve the addition of a paved parking lot, trailer buildings, gravel access drives, and a maintenance building that will serve the OARS facility and projects at JPWWTP. As such, stormwater BMPs must be provided for the developed site in accordance with the Manual. However, compliance with this requirement will require placement of stormwater BMPs in the FEMA-mapped floodplain, which is prohibited by Section 3.1 of the Manual.

Moreover, the City has determined that compensatory floodplain storage shall be required for floodplain fills placed on the site since the City's acquisition in 2009. The City has agreed to provide a compensatory volume of 21,265 cubic yards as part of CIP 650250-100007 Jackson Pike Cogeneration Facility. The full details of the mitigation will be defined as part of that project. This activity will not be constructed under the OARS contract. A separate variance will be submitted for this activity.

Accordingly, the City of Columbus is seeking a Type II variance for the project for the placement of stormwater management BMPs within the FEMA floodplain boundary (SWDM Section 3.1).



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CITY OF COLUMBUS, FRANKLIN COUNTY, OHIO

Project Location Map
Figure 1

N

2.0 TYPE II VARIANCE REQUEST

The City of Columbus is requesting a variance from certain aspects of the Manual for the OARS JPWWTP Site. Specifically, the City seeks approval to place stormwater management BMPs within the FEMA floodplain boundary (Manual Section 3.1). Additional details regarding this request for a variance are provided in the following sections.

2.1 Site Conditions

The site is located immediately north of the JPWWTP between Jackson Pike and the Scioto River (Exhibit 1). The site is currently composed of three construction trailers, a paved parking area, open laydown areas (compacted gravel and C&DD) and open space. Access to the site is provided via a paved access drive from Jackson Pike. The permanent OARS facilities are located immediately east of the parcel on the western bank of the Scioto River. These facilities are located outside of the 100-year floodplain. West of the permanent OARS facilities, the parcel is located in the mapped 100-year floodplain, but is outside of the regulatory floodway (Exhibit 2).

Due to the prior use of the property as a C&DD landfill, much of the site was actually situated above the 100-year floodplain elevation (709.00 feet amsl) when the City acquired it in 2009. The area excluded from the floodplain per the 2009 topographic survey is shown on Exhibit 2. Following the City's acquisition of the property, no additional fill was placed on the site, but existing fill was graded, expanding the fill footprint, as shown on Exhibits 3 and 4.

Much of the site is now located above the 100-year floodplain elevation (Exhibit 5). However, due to the uncertainty associated with the historical fills on the site, it is not possible to certify the fill compaction. This is a requirement of the LOMR-F process, and as such, the City cannot pursue a LOMR-F to revise the FEMA map and remove the property from the floodplain. Thus, the entire site will remain in the mapped 100-year floodplain, regardless of its actual topography.

Per Section 3.1 of the Manual, "stormwater runoff generated from onsite areas shall be controlled before it is released from the development site" and "stormwater control facilities shall not be located within designated FEMA floodplain boundaries." For the project site, meeting both of these requirements is not possible. The entire site is located within the mapped floodplain, thus any post-construction stormwater BMPs required for the permanent development must be positioned within the floodplain boundary.

In addition to the requirements of the Manual, previous decisions made by the City require that the City place stormwater BMPs on the project site. Specifically, the September 15, 2017 approval of the City's Stormwater Drainage Manual Type II Variance Request for the J220 Biosolids Land Application Improvements (Appendix A) required that "the deficiency in addressing the SWDM-mandated post-construction stormwater quantity BMP volume for this project must be addressed by oversizing future post-construction stormwater quantity BMPs to be designed and constructed under the OARS Shaft 1/2 site restoration project just north of the JPWWTP."

2.2 Proposed Stormwater BMPs

The City proposes to construct three extended dry detention basins on the site to provide post-construction stormwater detention and water quality treatment in order to meet the requirements of the Manual (Exhibit 5). These basins will manage the runoff from the proposed OARS JPWWTP

Site final site development prior to discharging to an existing ditch to the west and south of the project area, which discharges to the Scioto River east of the site. These basins will also address the stormwater quantity BMP volume for the J220 Biosolids Land Application Improvements, in accordance with the City's September 15, 2017 variance approval.

All of the site improvements, including the stormwater management basins, are located within the FEMA-mapped 100-year floodplain. However, the basin elevations will be above the floodplain elevation of 709 feet amsl. Additional details regarding the proposed stormwater basins are provided in the Stormwater Management Plan for the site (Appendix B), and the basin engineering plan sheets provided within Appendix C.

2.3 Impacts to Stormwater Detention and Water Quality

Under existing conditions, the majority of the site drains to the existing ditch, which flows west to east between the project site and the JPWWTP. The ditch discharges to the Scioto River through a 36-inch pipe located near the southeast corner of the project site. Much of the site is currently hardscape, i.e., compacted gravel and compacted C&DD, which generates approximately 1.823 acre-feet of runoff for a one-year storm event. This volume of runoff currently discharges to the Scioto River without any detention or water quality treatment. The proposed basins will provide detention and water quality treatment for the runoff from the existing hardscape, as well as new impervious area, resulting in a significant improvement in water quality/quantity as compared to existing conditions.

2.4 Statement of Hardship

As detailed in Section 3, it is not possible to evaluate a minimal or no impact alternative for the placement of stormwater BMPs on the OARS JPWWTP Site. The entire site is located within the mapped 100-year floodplain. Thus, it is not possible for the City to comply with the post-construction stormwater control requirements of the Manual without placing stormwater BMPs within the floodplain boundaries. Further, although much of site is situated above the 100-year floodplain elevation, it is not possible to remove the site from the floodplain via a LOMR-F due to the unknown characteristics of the historical C&DD fills that occurred on the site.

The City has invested resources into this property as part of the OARS project construction, and desires to further improve the site in order to use it on a permanent basis in conjunction with the OARS facilities and other projects at the JPWWTP. Thus, the City respectfully requests approval of the requested variance from Section 3.1 of the Manual to allow for placement of the proposed stormwater BMPs within the mapped floodplain, but above the floodplain elevation.

3.0 SITE DEVELOPMENT ALTERNATIVES

In accordance with the requirements of the Manual and the City's Variance Guidance Policy, a Type II variance application must include three site development plans: full compliance, minimal impact and preferred alternative. In this case, the City is unable to provide a full compliance or minimal impact alternative for the requested Type II variance.

As previously described, much of the site has been previously developed in association with historical activities and the construction of the OARS project. At the time the OARS project was designed and bid, there were no permanent development plans for the project area outside of

the permanent OARs facilities. The activities proposed over the project area were intended to be temporary in nature (construction trailers, contractor laydown areas, etc.), and did not require post-construction stormwater controls. Now that the OARS construction is complete, the City is proposing to improve and restore the site in order to be able to use it on a permanent basis for OARS and JPWWTP projects, necessitating installation of post-construction stormwater BMPs.

Although the previously described floodplain fills have effectively raised the majority of the site above the 100-year floodplain elevation, it is not possible to pursue a LOMR-F to remove the site from the mapped floodplain due to the unknown characteristics of the historic fills. Thus, the entire site will remain within the mapped floodplain and any stormwater BMPs must be placed in the floodplain in order to provide the required post-construction detention and water quality treatment. As such, there are no minimal or no impact alternatives under which the City can comply fully with the Manual, aside from abandoning the City's use of the property.

The proposed stormwater BMPs, although located within the mapped floodplain, will be situated above the 100-year flood elevation, and will full comply with all requirements for detention and water quality as set forth by the City and the Ohio EPA. The proposed basins will manage the runoff from the site prior to discharging into the Scioto River, and will provide a benefit to water quality/quantity as compared to current conditions. Accordingly, the City is requesting approval for a Type II variance from Section 3.1 of the Manual.

4.0 CONCLUSIONS

The City of Columbus seeks approval of the Type II variances for the Preferred Development Plan for the OARS JPWWTP site in order to place required stormwater BMPs in the mapped 100-year floodplain of the Scioto River (Section 3.1 of the Manual).

The need for this variance is driven by the historical activities that have occurred at the site, some of which occurred prior to the City's ownership. Full compliance with the Manual would result in substantial hardship to the City, would deprive the City of continued use of the property, and would prevent the City from complying with requirements previously set forth in association with the J220 Biosolids Land Application Improvements Project.

EXHIBITS

S.R. 71

Jackson Pike

WORK LIMITS

CONSTRUCTION TRAILERS

TEMPORARY PARKING LOT

CONTRACTOR LAYDOWN/STAGING AREA

WORK LIMITS

OHE

OHE

WORK LIMITS

OHE

SCPZ
(50'+15% Slopes)

WORK LIMITS

EX FLOODPLAIN

EX DETENTION BASIN

FLOODWAY

Scioto River

WORK LIMITS

EX FLOODPLAIN

S-2/OSS

S-1/ODS

ST ST ST ST

LEGEND

Floodway

100 yr FEMA Floodplain

Stream Corridor Protection Zone (SCPZ)

GRAPHIC SCALE

0 30 60 120

1 inch = 60 feet

CITY OF COLUMBUS, OHIO
STORMWATER MANAGEMENT PLAN
FOR
OARS PHASE 1 - JACKSON PIKE SITE
FINAL RESTORATION PLAN
EXISTING SITE CONDITIONS

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Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

DATE: February 6, 2018

SCALE: 1" = 60'

JOB NO.: 2008-1973

SHEET: 1 of 5

S.R. 71

Jackson Pike

WORK LIMITS

REVISED FLOODPLAIN

WORK LIMITS

SCPZ
(50'+15% Slopes)

Scioto River

FLOODWAY

EX FLOODPLAIN

EX FLOODPLAIN

WORK LIMITS

CONTRACTOR LAYDOWN AREA

OHE

OHE

WORK LIMITS

ST ST ST ST

Φ1433 ft+mag

Φ8000 ip

Φ38 ipc

Φ88 ipc

Φ18 ipc

Φ19 ipc

LEGEND

Floodway

100 yr FEMA Floodplain

Stream Corridor Protection Zone (SCPZ)

709 Contour

Area Excluded from Floodplain Per 2009 Topo

GRAPHIC SCALE

0 30 60 120

1 inch = 60 feet

CITY OF COLUMBUS, OHIO
STORMWATER MANAGEMENT PLAN
FOR
OARS PHASE 1 - JACKSON PIKE SITE
FINAL RESTORATION PLAN
2009 FILL CONDITIONS

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SCALE: 1" = 60'

JOB NO.: 2008-1973

SHEET: 2 of 5

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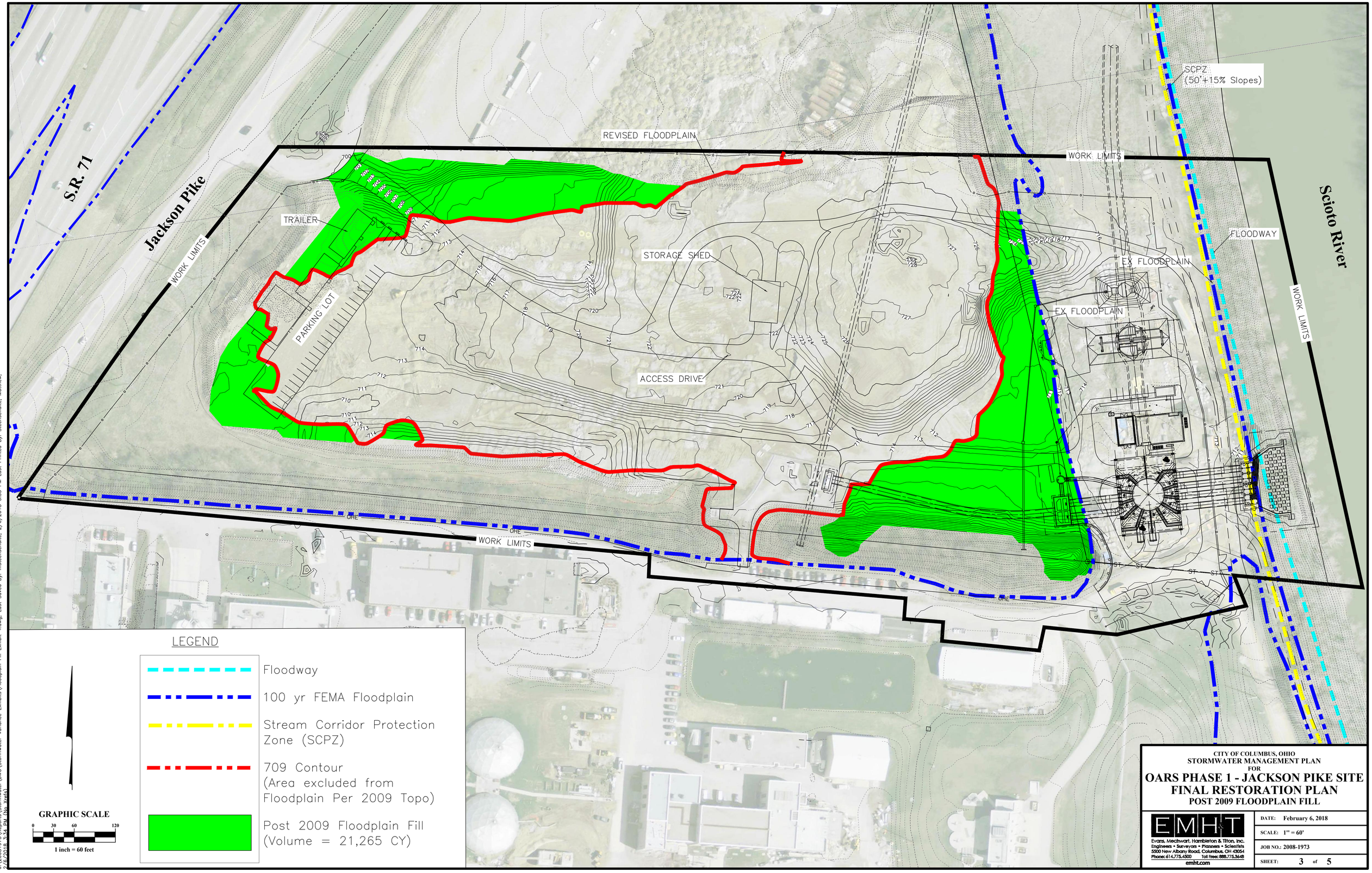

CITY OF COLUMBUS, OHIO
STORMWATER MANAGEMENT PLAN
FOR
OARS PHASE 1 - JACKSON PIKE SITE
FINAL RESTORATION PLAN
POST 2009 FLOODPLAIN FILL

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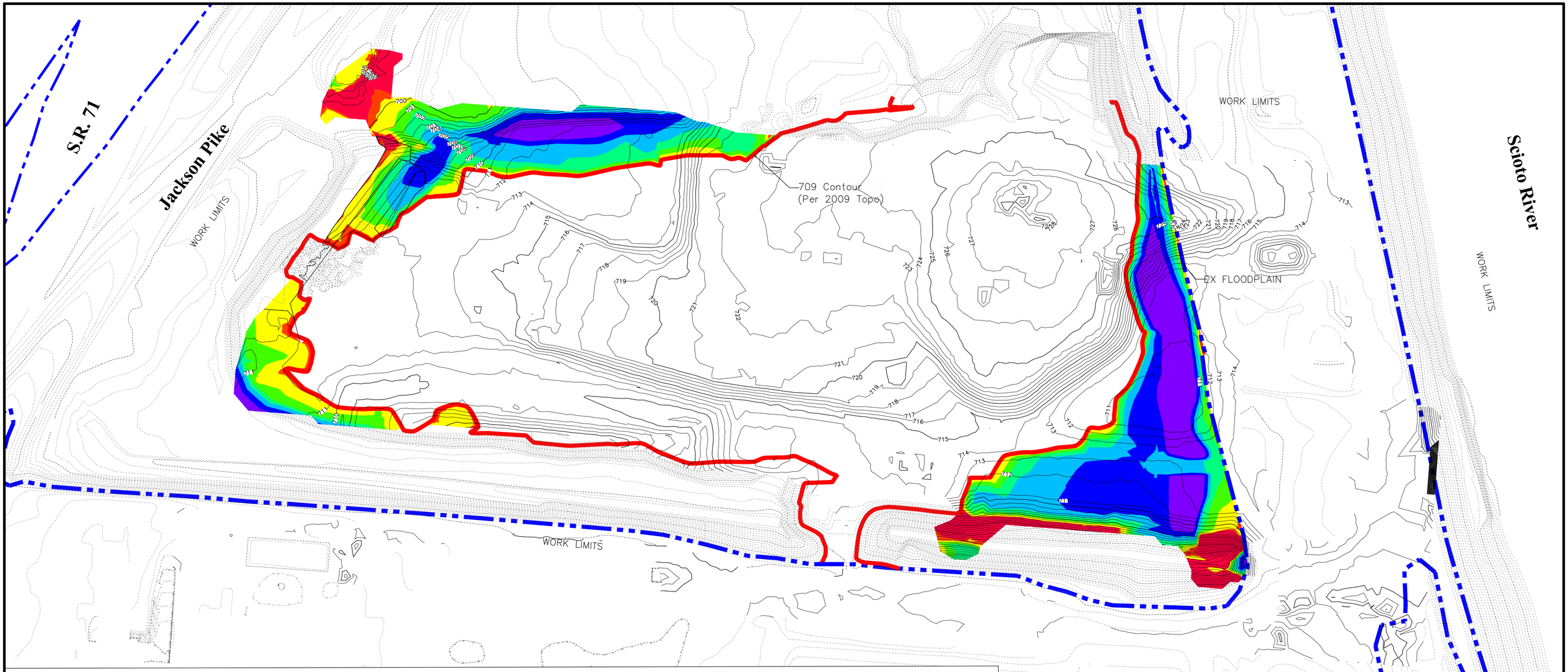
SCALE: 1" = 60'
JOB NO.: 2008-1973
SHEET: 3 of 5



Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	−9.500	0.000	
2	0.000	1.000	
3	1.000	2.000	
4	2.000	3.000	
5	3.000	4.000	
6	4.000	6.000	
7	6.000	8.000	
8	8.000	14.000	

GRAPHIC SCALE

0 30 60 120

1 inch = 60 feet

Normal River Elevation = 685.40

FEMA 100−yr Floodplain Elevation = 709.00

Total Fill added to the site since 2009 = 21,264.46 CY = 13.18 Ac−Ft

CITY OF COLUMBUS, OHIO
STORMWATER MANAGEMENT PLAN
FOR
OARS PHASE 1 - JACKSON PIKE SITE FINAL RESTORATION PLAN
POST 2009 FLOODPLAIN FILL ELEVATIONS

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SHEET: 4 of 5

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S.R. 71

Jackson Pike

WORK LIMITS

TRAILER

PARKING LOT

REVISED FLOODPLAIN

PROPOSED BMP

STORAGE SHED

ACCESS DRIVE

PROPOSED BMP

OHE

OHE

WORK LIMITS

WORK LIMITS

SCPZ
(50'+15% Slopes)

FLOODWAY

EX FLOODPLAIN

EX FLOODPLAIN

PROPOSED BMP

ST ST ST ST

Scioto River

LEGEND

- Floodway
- 100 yr FEMA Floodplain
- Stream Corridor Protection Zone (SCPZ)
- Revised 100 yr FEMA Floodplain (11.69 Acres)

GRAPHIC SCALE

0 30 60 120

1 inch = 60 feet

CITY OF COLUMBUS, OHIO
STORMWATER MANAGEMENT PLAN
FOR
OARS PHASE 1 - JACKSON PIKE SITE
FINAL RESTORATION PLAN
PROPOSED SITE CONDITIONS

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DATE: February 6, 2018

SCALE: 1" = 60'

JOB NO.: 2008-1973

SHEET: 5 of 5

APPENDIX A

TRACIE DAVIES
Director

THE CITY OF
COLUMBUS
ANDREW J. GINTHER, MAYOR

DEPARTMENT OF
PUBLIC UTILITIES

September 15, 2017

Troy K. Branson, P.E., Project Engineer
City of Columbus
Division of Sewerage & Drainage
Treatment Engineering

RE: Stormwater Drainage Manual (SWDM) Type II Variance Request – J220 Biosolids Land Application Improvements

Mr. Branson:

This letter is in response to the subject variance request to SWDM Section 3.2 Stormwater Quantity Controls. More specifically, utilizing post-construction stormwater quantity BMPs providing control below the level required by the SWDM was sought to be approved due to site limitations. The Request was submitted to the City on July 17, 2017.

As part of the Variance review process, the subject Variance request was posted on the City website on August 3, 2017 to solicit public comments. No public comments were received by the due date of August 17, 2017.

The submitted Variance Request was found to be in compliance with the SWDM Non-Stream Protection Type II Variance Application requirements. Three alternatives were considered within the application – Full Compliance (no impact), Minimal Impact and the Preferred Alternative.

Upon reviewing and discussing the application and other supportive documentation submitted by J220 Biosolids Land Application Improvements, the Variance Review Committee accepts the argument that the existing site conditions would make full compliance with the SWDM unfeasible. However, the Committee also concluded that the applicant's Minimal Impact Alternative is reasonably achievable within the proposed project

In light of the above, the subject Variance Request (Minimal Impact Alternative) is conditionally approved contingent upon the following stipulations:

- The deficiency in addressing the SWDM-mandated post-construction stormwater quantity BMP volume for this project must be addressed by oversizing future post-construction stormwater quantity BMPs to be designed and constructed under the OARS Shaft ½ site restoration project just north of the JPWWTP.
- Storm CC-Plans and Stormwater Management Report to be submitted and approved by the City

No approval contained herein relieves or absolves the applicant of any provisions of applicable state or federal laws. Please contact Private Development Section Manager Greg Fedner, P.E. at 614-645-8072 with any questions.

Sincerely,

John G. Newsome, P.E., Administrator
Division of Sewerage and Drainage

pc: Variance Review Committee
File

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Division of Power | 3500 Indianola Avenue | Columbus OH 43214 | T (614) 645.7360 | F (614) 645.8177 | columbus.gov
Sewerage and Drainage | 1250 Fairwood Avenue | Columbus OH 43206 | T (614) 645.7175 | F (614) 645.3801 | columbus.gov
Division of Water | 910 Dublin Road | Columbus OH 43215 | T (614) 645.7020 | F (614) 645.8177 | columbus.gov

APPENDIX B

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OARS PHASE 1 - JACKSON PIKE SITE FINAL RESTORATION PLAN (CC-15684)

Stormwater Management Plan (SWMP)

Prepared for: City of Columbus

May 3, 2018

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PROJECT SUMMARY

Project Name:	OARS Phase 1 - Jackson Pike Site Final Restoration Plan
Location:	City of Columbus, Ohio
Type:	Stormwater Management Plan
Reviewing Agency:	City of Columbus, Ohio EPA

HYDROLOGIC SUMMARY

Rainfall Data: NOAA Atlas 14, Volume 2, Version 3, 2004

1-yr	2.20”
2-yr	2.63”
5-yr	3.24”
10-yr	3.74”
25-yr	4.44”
50-yr	5.02”
100-yr	5.63”

Rainfall Distribution:	NRCS Type II 24 hour
Detention Policy:	City of Columbus
Water Quality:	City of Columbus, Ohio EPA
Hydrology Modeling Program:	HydroCAD 10.0

DESIGN SUMMARY

Detention:	Dry Basins
Water Quality:	Dry Basins
Receiving Water Body:	Existing drainage ditch located adjacently west and south to project area, which discharges to the Scioto River

REVISIONS

TABLE OF CONTENTS

TABLES

APPENDICES

1.0 INTRODUCTION

The following report provides a detailed analysis and design of the Stormwater Management Plan for the OARS Phase 1 – Jackson Pike Site Final Restoration Plan (CC-15684) in the City of Columbus, Ohio. The site is located east of Jackson Pike, south of Frank road, north of the Jackson Pike Waste Water Treatment Plant (WWTP) and west of the Scioto River. The pre-developed conditions of the site consist of compacted gravel, compacted construction and demolition debris and open space. The proposed conditions involve the addition of proposed pavement, trailer and maintenance buildings and concrete pads that will serve the OARS (Olentangy Augmentation Relief Sewer) deep tunnels & shafts. The proposed stormwater management improvements will be constructed with the proposed JPWWTP Cogeneration Facility project (CIP 650250-100007). The Stormwater Management Plan was prepared in accordance with the requirements of both the City of Columbus and the Ohio EPA.

The runoff from this site will be routed to three proposed dry basins for water quantity and quality control. The stormwater management features discharge to an existing ditch located along the west and south of the project area, as can be seen on Exhibit 1 and 2, which discharges to the Scioto River to the east of the site. The proposed stormwater features will additionally provide detention for the offsite J220 Biosolids Land Application Project per the City's approved Stormwater Variance (September 15, 2017).

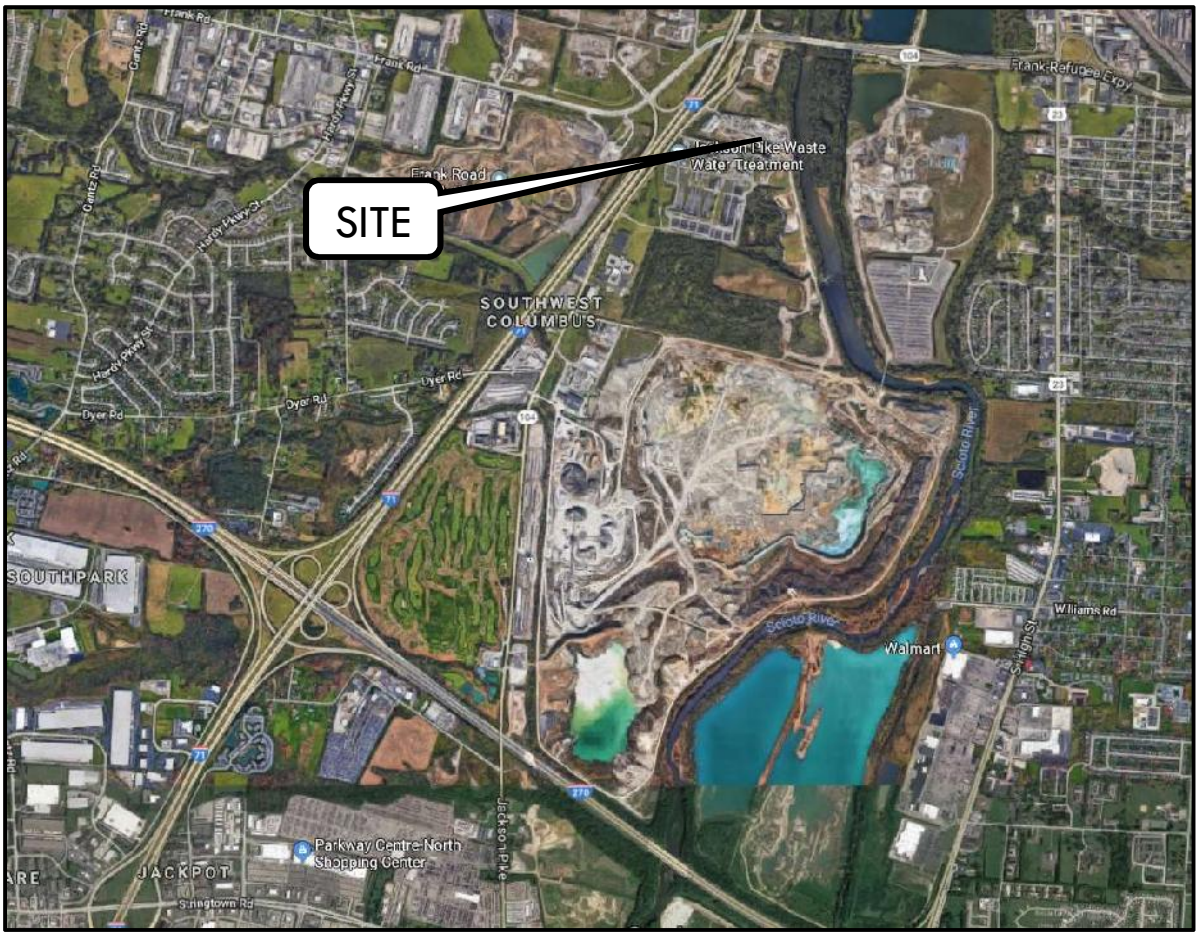

Figure 1 – Site Location Map

2.0 HYDROLOGIC ANALYSIS

Hydrologic parameters such as Runoff Curve Number (RCN) and Time of Concentration were determined using standard Natural Resources Conservation Service (NRCS) methodology. The 1-, 2-, 5-, 10-, 25-, 50-, and 100-year storm event discharge amounts were calculated using the NRCS TR-55 method. This analysis reflects the NRCS Type II distribution, 24-hr storm duration. Rainfall depths were obtained from NOAA Atlas 14, Volume 2, Version 3, 2004. The peak flow rates were computed using the HydroCAD 10.0 computer program.

3.0 PRE-DEVELOPED ANALYSIS

The pre-developed condition (shown on Exhibit 1 in Appendix E) consists of one subarea: Pre-Developed 01. As seen on Exhibit 1 the proposed project is located within the FEMA 100-year mapped floodplain. The majority of the site generally drains to an existing ditch located east of Jackson Pike, between the OARS Site and the Jackson Pike WWTP. The ditch flows west to east and discharges to the Scioto River through a 36-inch pipe located near the southeast corner of the site. A small portion along the eastern boundary of the site bypasses the aforementioned 36-inch pipe and discharges directly to the Scioto River. Given that the Scioto River is the ultimate outfall peak flow rates and critical storm calculations will be based on the entire project area.

The pre-developed land use on the site consists of compacted gravel, compacted construction and demolition debris and open space in Type "C" (Genesee-Urban Land and Udorthents) soils. As can be seen on the aerial image (2006) in Exhibit 1, the site was used as a dump site, therefore the compacted gravel and compacted construction material areas were assumed to be hardscape for the analysis. Compacted gravel and construction material was assigned a RCN (Runoff Curve Number of 96) Pre-developed subarea characteristics are detailed in Table 1. Composite Runoff Curve Number and Time of Concentration calculations were computed using HydroCAD and included in the HydroCAD output in Appendix D. The Time of Concentration flow path can be found on Exhibit 1. Table 2 shows the pre-developed peak flow rates for Pre-Developed 01.

Table 1 -Pre-developed Subarea Characteristics

Subarea Identifier	Tributary Area (acres)	Land Usage	Runoff Curve Number	% Impervious (%)	Time of Concentration (min)	1-year Runoff Volume (ac-ft)
Subarea 01	14.64	Compacted gravel, compacted construction and demolition debris and open space	94	89%	10.80	1.933

Table 2 -Pre-developed Peak Flow Rates

Storm Event (year)	Pre-developed 01 Peak Flow Rates (cfs)
1	33.53
2	41.68
5	53.18
10	62.56
25	75.61
50	86.37
100	97.63

4.0 POST-DEVELOPED ANALYSIS

The post-developed condition, as shown in Exhibit 2 in Appendix E, consists of five subareas: Subareas 01, Subarea 02, Subarea 03, Undetained 01, and Undetained 02. The improvements consist of addition of pavement, trailers, maintenance building and concrete areas associated with the OARS deep tunnels & shafts. For the analysis the compacted gravel areas were assumed a RCN of 96 and was considered to be hardscape. Time of concentration for all post-developed condition subareas was assumed to be 5 minutes based on land use and size. Table 3 below shows the post-developed subarea characteristics.

As can be seen on Exhibit 2, Subareas 01, 02 and 03 are tributary to three proposed dry basins for water quality and quantity control. The three dry basins discharge to the existing ditch along the west and south sides of the site, which eventually discharges to the Scioto River. Undetained 01, and 02 correspond to areas that were not able to be routed to the proposed basins and will discharge directly to the existing ditch or the Scioto River. The undetained areas will be counted towards the critical storm calculation and total proposed release rates of the site.

Table 3 -Post-developed Subarea Characteristics

Subarea Identifier	Tributary Area (acres)	Land Usage	Runoff Curve Number	% Impervious (%)	Time of Concentration (min)	1-year Runoff Volume (ac-ft)
Subarea 01	1.68	Compacted Gravel, Impervious Cover	96	100%	5.0	0.248
Subarea 02	3.06	Compacted Gravel, Impervious Cover	96	100%	5.0	0.451
Subarea 03	4.31	Compacted Gravel, Impervious Cover	97	100%	5.0	0.671
Undetained 01	4.31	Compacted Gravel, Impervious Cover	96	100%	5.0	0.635
Undetained 02	1.28	Compacted Gravel, Impervious Cover	97	100%	5.0	0.199
Total	**14.64**	**-**	**96**	**100%**	**-**	**1.956**

The 1-year runoff volume for the post-developed site increases to 1.956 acre-feet, an increase of 1.19% from the pre-developed condition, which results in 1-year critical storm event. Table 4 shows the allowable release rates.

$$\% \text{ Increase} = [(1.956 - 1.933)/1.933] \times 100 = 1.19\%$$

1-Year Critical Storm

Table 4 -Allowable Release Rates

Storm Event (yr.)	Total Pre-Developed Peak Flow Rates* (cfs.)	Total Allowable Release Rates (cfs.)
1	33.56	33.56
2	41.71	41.71
5	53.22	53.22
10	62.60	62.60
25	75.66	62.60
50	86.42	62.60
100	97.70	62.60

*From Table 2.

In the post-developed condition, proposed outlet structures will be added to the three proposed dry basins. Dry Basin 01 will discharge to the existing ditch to the west of the site and Dry Basins 02 and 03 will discharge to the existing ditch to the south of the site. The three dry basins were designed so that the first stage outlet of the basins is at an elevation of 709.00 ft which is the 100-yr floodplain elevation of the existing ditch and Scioto River they are discharging to. Given that most of the runoff from the site will sheet flow into the basins the forebay and micropool features were combined and the basins will provide 20% of the required WQv below the outlet elevation of 709.00 ft. Table 5 shows the allowable and total proposed release rates from the site. Table 6 shows a performance summary for the proposed dry basins.

Table 5 -Proposed Release Rates

Storm Event (yr.)	Total Post-Developed Peak Flow Rates* (cfs.)	Total Allowable Release Rates** (cfs.)	Proposed Release Rates*** (cfs.)
1	44.29	33.56	17.14
2	53.92	41.71	21.47
5	67.48	53.22	27.25
10	78.54	62.60	35.15
25	93.95	62.60	42.21
50	106.67	62.60	48.19
100	120.02	62.60	55.09

*Corresponds to the combined hydrograph of the peak flow rates for Subarea 01, 02, 03, 04 and Undetained 01, 02, 03.
**From Table 4.
***Proposed release rates corresponds to the combined hydrograph of discharges from Dry Basin 01, 02, 03 and Ex. Dry Basin and the Undetained areas 01, 02, and 03. "Total Out" node in HydroCAD output.

Table 6 -Dry Basin 01 Performance Summary

Storm Event (yr.)	Peak Inflow Rates (cfs.)	Dry Basin 01 Proposed Release Rates (cfs.)	Maximum W.S.E., T.O.B. = 712.00 (feet)	Storage Volume Utilized (ac-ft)
1	5.04	0.07	709.53	0.187
2	6.15	0.08	709.66	0.234
5	7.71	0.09	709.85	0.303
10	8.98	0.10	710.00	0.361
25	10.75	0.11	710.21	0.442
50	12.22	0.12	710.39	0.511
100	13.75	0.13	710.57	0.584

Storage Utilized (100-yr event): 0.584 ac-ft
Storage Provided (Top of Bank = 712.00 ft.): 1.225 ac-ft

Table 7 -Dry Basin 02 Performance Summary

Storm Event (yr.)	Peak Inflow Rates (cfs.)	Dry Basin 02 Proposed Release Rates (cfs.)	Maximum W.S.E., T.O.B. = 712.00 (feet)	Storage Volume Utilized (ac-ft)
1	9.19	0.09	709.83	0.356
2	11.21	0.10	709.97	0.450
5	14.05	0.37	710.04	0.508
10	16.36	0.87	710.09	0.542
25	19.59	2.17	710.17	0.606
50	22.25	3.88	710.25	0.672
100	25.05	5.99	710.34	0.741

Storage Utilized (100-yr event): 0.741 ac-ft
Storage Provided (Top of Bank = 712.00 ft.): 2.230 ac-ft

Table 8 -Dry Basin 03 Performance Summary

Storm Event (yr.)	Peak Inflow Rates (cfs.)	Dry Basin 03 Proposed Release Rates (cfs.)	Maximum W.S.E., T.O.B. = 712.00 (feet)	Storage Volume Utilized (ac-ft)
1	13.34	1.03	710.49	0.405
2	16.16	1.51	710.73	0.488
5	20.12	5.44	710.95	0.572
10	23.35	6.16	711.15	0.652
25	27.87	6.48	711.43	0.774
50	31.60	6.71	711.65	0.873
100	35.51	6.92	711.84	0.973

Storage Utilized (100-yr event): 0.973 ac-ft
Storage Provided (Top of Bank = 712.00 ft.): 1.055 ac-ft

5.0 OUTLET DESIGN

The proposed outlet structure for Dry Basin 01 is located on the west side of the basin, at proposed Structure 1. The proposed outlet structure for Dry Basins 02 and 03 is located on the south side of the basins, at proposed Structures 2 and 3. The outlet configuration is described below. Refer to the Construction Plans for the proposed outlet structure detail.

Dry Basin 01-Proposed Outlet Structure– Structure 1

- Bottom of Basin – 706.50 feet
- Top of Micropool/Forebay – 709.00 feet
- Top of Bank – 712.00 feet
- 1st stage outlet – 2-inch orifice cut into submerged riser pipe, invert at 709.00 feet
- 2nd stage outlet – Neenah R-4871 grate, top of casting at 711.00 feet
- 3rd stage outlet – 10-ft Earthen Weir, crest elevation at 711.50 feet
- Tailwater control: 12-inch outlet pipe with 2.61% slope, invert at 702.50 feet, controls 1st and 2nd stage outlets

Basin 02 Proposed Outlet Structure– Structure 2

- Bottom of Basin – 706.50 feet
- Top of Micropool/Forebay – 709.00 feet
- Top of Bank – 712.00 feet
- 1st stage outlet – 2.0-inch orifice cut into submerged riser pipe, invert at 709.00 feet
- 2nd stage outlet – Neenah R-4871 grate, top of casting at 710.00 feet
- 3rd stage outlet – 10-ft Earthen Weir, crest elevation at 711.00 feet
- Tailwater control: 15-inch outlet pipe with 4.45% slope, invert at 707.00 feet, controls 1st and 2nd stage outlets

Basin 03 Proposed Outlet Structure– Structure 3

- Bottom of Basin – 706.50 feet
- Top of Micropool/Forebay – 709.00 feet
- Top of Bank – 713.00 feet
- 1st stage outlet – 2-inch orifice cut into submerged riser pipe, invert at 709.00 feet
- 2nd stage outlet – 8-inch orifice, open top of riser, invert at 710.20 feet
- 3rd stage outlet – Neenah R-4871 grate, top of casting at 710.70 feet
- Tailwater control: 12-inch outlet pipe with 3.01% slope, invert at 708.00 feet, controls 1st through 3rd stage outlets

Table 9 -Elevation-Area-Storage Tables

Dry Basin 01		
Contour Elevation	Area	Cumulative Storage Volume
(feet)	(acres)	(acre-feet)
709.00	0.340	0.000
710.00	0.380	0.360
711.00	0.430	0.765
712.00	0.490	1.225

Dry Basin 02		
Contour Elevation	Area	Cumulative Storage Volume
(feet)	(acres)	(acre-feet)
709.00	0.180	0.000
710.00	0.770	0.475
711.00	0.880	1.300
712.00	0.980	2.230

Dry Basin 03		
Contour Elevation	Area	Cumulative Storage Volume
(feet)	(acres)	(acre-feet)
709.00	0.23	0.000
710.00	0.28	0.255
711.00	0.39	0.590
712.00	0.54	1.055

Per the J220 Biosolids Land Application Improvements project a variance was approved based on the minimal impact alternative. This minimal impact alternative provided a bioretention basin on the Biosolids site to provide water quality however it was unable to meet the required detention requirements. The City of Columbus approved the variance contingent upon OARS Phase 1 – Jackson Pike Site Final Restoration Plan providing 4,600 cubic feet (0.106 ac-ft) of additional detention to account for their site improvements. The OARs Phase 1 project will provide 2.212 ac-ft (4.110-1.898 = 2.212 ac-ft) of excess volume above the 100-year detention requirement exceeding the 0.106 ac-ft of volume required to overdetain for the Biosolids project.

6.0 WATER QUALITY

The Ohio EPA requires that the water quality volume for dry basins be detained for a period of 48 hours while releasing less than half of that volume in the first 16 hours. Water quality calculations for the proposed Dry Basins are provided in Appendix B and summarized in Table 8 below. As explained in section 3.0, in pre-developed conditions the land use of the site was mostly hardscape, therefore the site is considered a re-development for water quality calculations. Re-development requirements include treating 20% of the existing impervious area and 100% of the new impervious cover. Of the total 14.64 acres of site area, 13.03 acres were assumed to be hardscape and 1.61 acres open space. The proposed conditions of the site was assumed to be all hardscape. Therefore, the site must treat a total of 4.22 acres of impervious area (13.03 acres * 20% + 1.61 acres = 4.22 Ac).

The micropool and forebay of the dry basins are each required to have a volume of at least 10% of the water quality volume. Given that most of the runoff from the site will discharge to the basins via surface flow, the micropool and forebay for the basins were combined and provide a volume equal to or greater than 20% of the water quality volume below the 1st stage outlet elevation of 709.00 ft each.

Table 10 -Water Quality Calculations

Basin Identifier	Tributary area* (acres)	Water Quality Volume (ac-ft)	Water Quality Volume Elevation (ft)	Drawdown Orifice Size (in)	Required Permanent Pool Volume (Cu-ft)	Provided Permanent Pool Volume (Cu-ft)
Dry Basin 01	1.68	0.120	709.35	2.0	521	17,642
Dry Basin 02	3.06	0.218	709.61	2.0	950	12,850
Dry Basin 03	4.31	0.307	710.18	2.0	1338	13,068

*Total treatment area = 7.97 acres

7.0 STORMWATER DRAINAGE MANUAL VARIANCE

Detention within the 100-year floodplain

The OARS Phase 1 – Jackson Pike Site Final Restoration Plan project will require a variance due to the proposed project utilizing basins located within the FEMA 100-year floodplain.

Floodplain Fill Compensatory Storage

As mentioned previously the proposed project is located within the FEMA 100-year mapped floodplain. Since the City of Columbus purchased the project in 2009 it was calculated that 13.18 ac-ft of fill was placed within the floodplain. The City of Columbus Stormwater regulations state that an equal amount of compensatory cut shall be provided for an equal volume of fill placed within the FEMA floodplain (13.18 ac-ft). It was found that providing this amount of compensatory cut onsite was impractical and thus the compensatory storage will be provided offsite. Exhibits 1 & 2 within Appendix E show the locations and amount of fill placed on the site since 2009. The City has agreed to provide the compensatory volume at an offsite location. The location is currently under investigation.

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APPENDIX A:

USDA Soils Report

Map Scale: 1:3,370 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

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 1:15,800.

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: Franklin County, Ohio
Survey Area Data: Version 15, Oct 5, 2017

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

Date(s) aerial images were photographed: Aug 4, 2014—Aug 27, 2014

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
Up	Udorthents, loamy, rolling	4.2	16.9%
Ur	Udorthents, loamy, sloping	6.3	25.5%
Uw	Urban land-Genesee complex, occasionally flooded	14.3	57.6%
Totals for Area of Interest		**24.8**	**100.0%**

APPENDIX B:

Storm Sewer Calculations

EMH&T
Engineers, Surveyors, Planners, Scientists

STORM SEWER COMPUTATION SHEET

SHT 1

Project: OARS
Job No.: 2008-1973
Intensity Reference: Columbus

Date: 3/19/18
By: MRS
Checked:

Revised:
Revised:

2 Yr Design Storm n= 0.013

Struc.	Struc. Index	Sta.	Drainage Area Trib	Cumul.	C	Cumul CA	Time Delta t Min.	Sum t Min.	Intensity in/hr	Des Q CFS	Length ft.	Dia. In	Slope%	Vel	Cap. Flowing Full	Status	In	Out	TC	Remarks	100 YEAR HYDRAULIC GRADE LINE: 100 Yr Rainfall Intensity	Discharge Q	Slope %	Minor Losses	100 Yr HGL w/o minor losses
1		0+57.41	0.00	0.00	0.80		10.00	10.00	3.91	0.13							702.50		711.00						
			0.00		0.80	0.00					57.41	12	2.61%	7.3	5.8	OK				7.33 ft. cover	7.07	0.00	0.0000	-	#VALUE!
																				8.50 ft. depth					#VALUE!
EW1		0+00.00	0.00	0.00	0.80		0.13	10.13	3.88	0.00							701.00	701.00		0.10 DROP					
			0.00		0.80	0.00					0.01	12	0.00%	0.0	0.0	OK				ft. cover	7.03	0.00	0.0000	-	#VALUE!
																				ft. depth					#VALUE!
2		0+67.45	0.00	0.00	0.80		10.00	10.00	3.91	6.06							707.00		710.00	0.10 DROP					
			0.00		0.80	0.00					67.45	15	4.45%	11.1	13.7	OK				1.56 ft. cover	7.07	0.00	0.0000	-	#VALUE!
																				3.00 ft. depth					#VALUE!
EW2		0+00.00	0.00	0.00	0.80		0.10	10.10	3.89								704.00	704.00		0.10 DROP					
			0.00		0.80	0.00					0.01	15	0.00%	0.0	0.0	OK				ft. cover	7.04	0.00	0.0000	-	#VALUE!
																				ft. depth					#VALUE!
3		0+18.60	0.00	0.00	0.80		10.00	10.00	3.91	6.17							708.00		710.70	0.10 DROP					
			0.00		0.80	0.00					18.60	12	3.00%	7.9	6.2	OK				1.53 ft. cover	7.07	0.00	0.0000	-	#VALUE!
																				2.70 ft. depth					#VALUE!
EW3		0+00.00	0.00	0.00	0.80		0.04	10.04	3.90								707.82	707.44		0.10 DROP					
			0.00		0.80	0.00					0.01	12	0.00%	0.0	0.0	OK				ft. cover	7.06	0.00	0.0000	-	#VALUE!
																				ft. depth					#VALUE!

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APPENDIX C:

Water Quality Calculations

OARS Phase 1 - Jackson Pike Site Final Restoration Plan

WATER QUALITY VOLUME CALCULATIONS

BMP	Subarea Identifier	Area (acres)	Percent Impervious (%)	Rv	Water Quality Volume (ac-ft)	Water Quality Volume Elevation (feet)	Required Micropool/ Forebay Volume (cu-ft)	Provided Micropool/ Forebay Volume (cu-ft)
Basin 01	Subarea 01	1.68	100%	0.95	0.120	709.35	521	17642
Basin 02	Subarea 02	3.06	100%	0.95	0.218	709.61	950	12850
Basin 02	Subarea 03	4.31	100%	0.95	0.307	710.18	1338	13068

Water Quality Volume calculated using the Ohio EPA formula:

$$WQ_v = \frac{R_v \times P \times A}{12}$$

where:
A = area draining into the BMP (acres)
P = 0.90" precipitation depth
Rv = the volumetric runoff coefficient
Rv = 0.05+0.9i
Where i = fraction of post-construction impervious surface

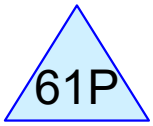
SEDIMENT BASIN CALCULATIONS

BMP	Tributary Area (acres)	Disturbed Area (acres)	Required Dewatering Volume (67 CY/Tributary Acre) (ac-ft)	Dewatering Volume Elevation (feet)	Required Sediment Storage Volume (37 CY/Disturbed Acre) (ac-ft)
Basin 01	1.68	1.68	0.07	709.21	0.04
Basin 01	3.06	3.06	0.13	709.43	0.07
Basin 01	4.31	4.31	0.18	709.73	0.10

Dry Basin 01 WQ

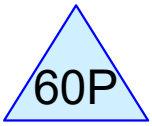
Dry Basin 02 WQ

Dry Basin 03 WQ



Dry Basin 01 Sed

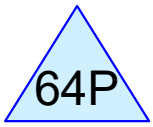
Dry Basin 02 Sed



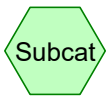
Dry Basin 03 Sed

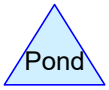
Dry Basin 01 Below NP

Dry Basin 02 Below NP



Dry Basin 03 Below NP





Routing Diagram for 2008-1973
Prepared by Symanetc, Printed 3/19/2018

Summary for Pond 56P: Dry Basin 02 WQ

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.08 cfs @	0.00 hrs,	Volume=	0.208 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.08 cfs @	0.00 hrs,	Volume=	0.208 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 709.61' Surf.Area= 0.540 ac Storage= 0.220 af
Peak Elev= 709.61' @ 0.00 hrs Surf.Area= 0.540 ac Storage= 0.220 af

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

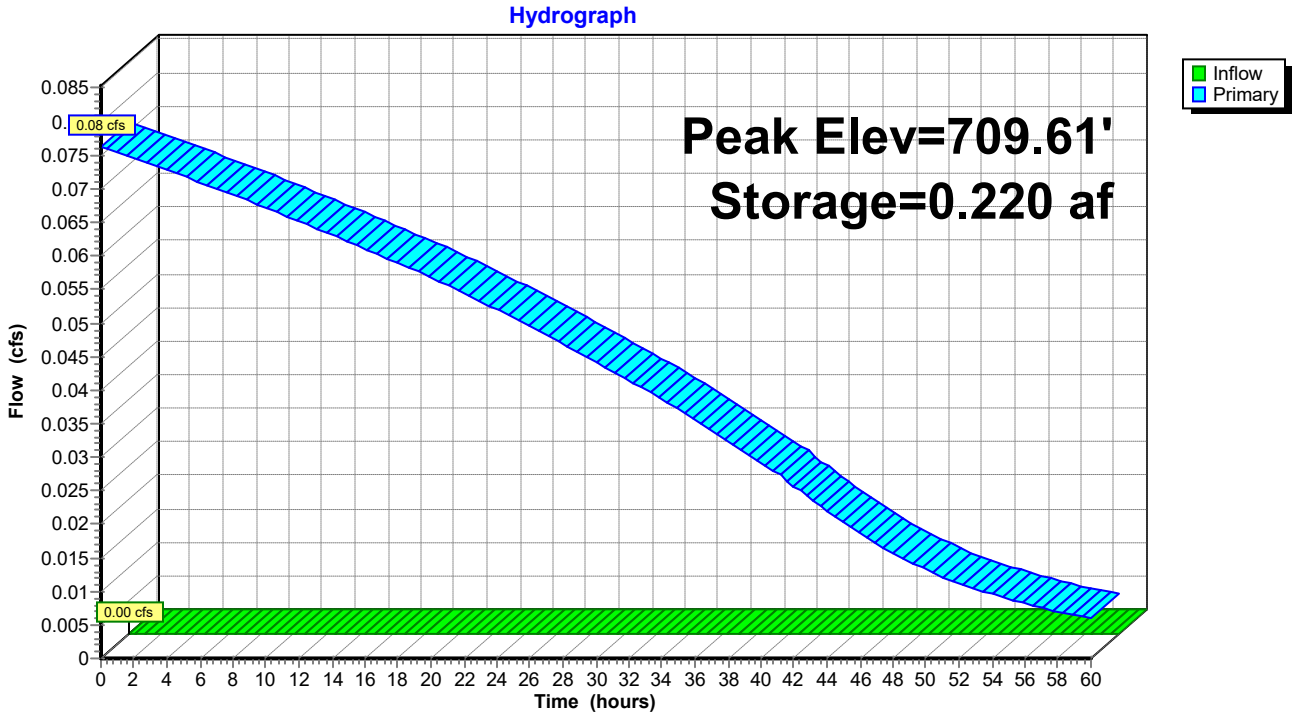
Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	2.230 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.180	0.000	0.000
710.00	0.770	0.475	0.475
711.00	0.880	0.825	1.300
712.00	0.980	0.930	2.230

Device	Routing	Invert	Outlet Devices
#1	Primary	707.00'	**15.0" Round Culvert** L= 67.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 707.00' / 704.00' S= 0.0445 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.08 cfs @ 0.00 hrs HW=709.61' (Free Discharge)
↑—**1=Culvert** (Passes 0.08 cfs of 8.33 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 3.49 fps)

Pond 56P: Dry Basin 02 WQ



Hydrograph for Pond 56P: Dry Basin 02 WQ

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.220**	**709.61**	**0.08**
2.00	0.00	0.207	709.59	0.07
4.00	0.00	0.195	709.56	0.07
6.00	0.00	0.183	709.54	0.07
8.00	0.00	0.171	709.52	0.07
10.00	0.00	0.160	709.49	0.07
12.00	0.00	0.149	709.47	0.07
14.00	0.00	0.139	709.45	0.06
16.00	0.00	0.128	709.42	0.06
18.00	0.00	0.118	709.40	0.06
20.00	0.00	0.109	709.37	0.06
22.00	0.00	0.100	709.35	0.05
24.00	0.00	0.091	709.33	0.05
26.00	0.00	0.083	709.31	0.05
28.00	0.00	0.075	709.28	0.05
30.00	0.00	0.067	709.26	0.04
32.00	0.00	0.060	709.24	0.04
34.00	0.00	0.053	709.22	0.04
36.00	0.00	0.047	709.20	0.04
38.00	0.00	0.042	709.18	0.03
40.00	0.00	0.037	709.16	0.03
42.00	0.00	0.032	709.14	0.03
44.00	0.00	0.028	709.13	0.02
46.00	0.00	0.025	709.12	0.02
48.00	0.00	0.022	709.10	0.02
50.00	0.00	0.019	709.09	0.01
52.00	0.00	0.017	709.09	0.01
54.00	0.00	0.016	709.08	0.01
56.00	0.00	0.014	709.07	0.01
58.00	0.00	0.013	709.07	0.01
60.00	0.00	0.012	709.06	0.01

Summary for Pond 57P: Dry Basin 03 WQ

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.11 cfs @	0.00 hrs,	Volume=	0.290 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.11 cfs @	0.00 hrs,	Volume=	0.290 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 710.18' Surf.Area= 0.300 ac Storage= 0.307 af
Peak Elev= 710.18' @ 0.00 hrs Surf.Area= 0.300 ac Storage= 0.307 af

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

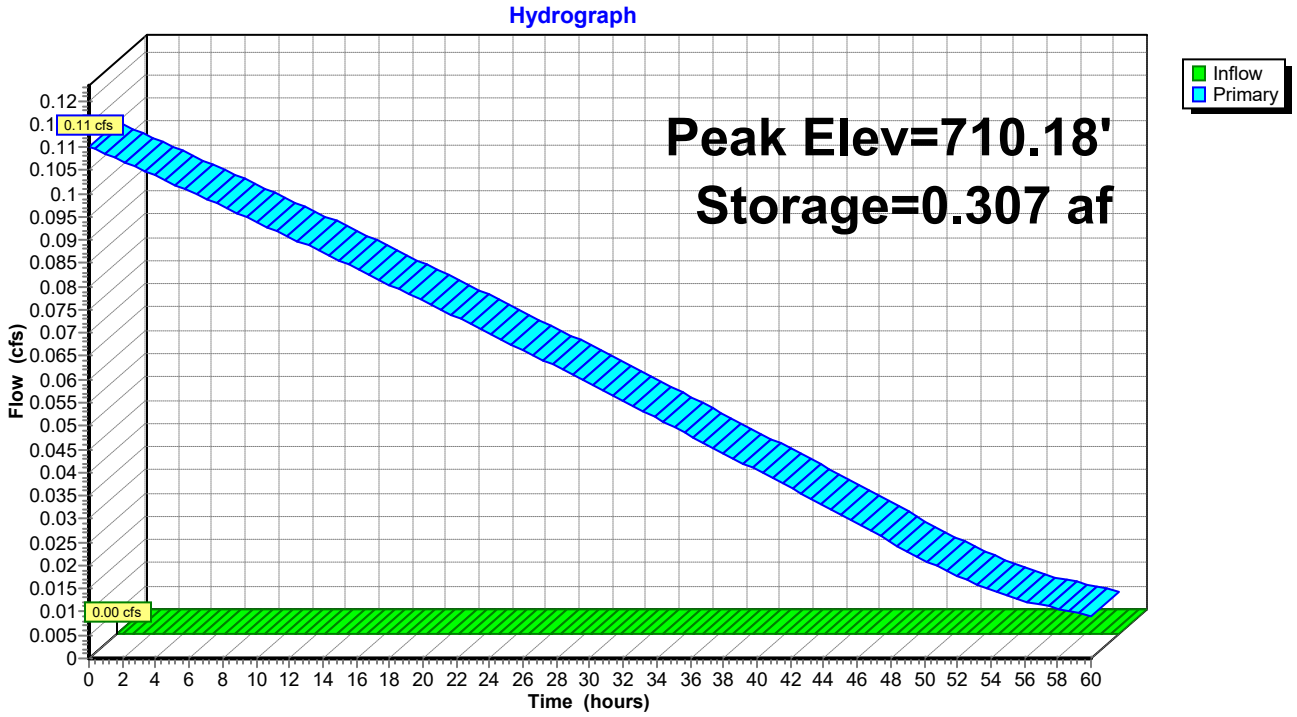
Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.055 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.230	0.000	0.000
710.00	0.280	0.255	0.255
711.00	0.390	0.335	0.590
712.00	0.540	0.465	1.055

Device	Routing	Invert	Outlet Devices
#1	Primary	708.00'	**12.0" Round RCP_Round 12"** L= 18.6' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 708.00' / 707.44' S= 0.0301 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.11 cfs @ 0.00 hrs HW=710.18' (Free Discharge)
↑—**1=RCP_Round 12"** (Passes 0.11 cfs of 4.90 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.04 fps)

Pond 57P: Dry Basin 03 WQ



Hydrograph for Pond 57P: Dry Basin 03 WQ

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.307**	**710.18**	**0.11**
2.00	0.00	0.289	710.12	0.11
4.00	0.00	0.272	710.06	0.10
6.00	0.00	0.255	710.00	0.10
8.00	0.00	0.239	709.94	0.10
10.00	0.00	0.223	709.88	0.09
12.00	0.00	0.208	709.83	0.09
14.00	0.00	0.193	709.77	0.09
16.00	0.00	0.179	709.72	0.08
18.00	0.00	0.165	709.67	0.08
20.00	0.00	0.152	709.62	0.08
22.00	0.00	0.140	709.57	0.07
24.00	0.00	0.128	709.53	0.07
26.00	0.00	0.117	709.48	0.07
28.00	0.00	0.106	709.44	0.06
30.00	0.00	0.096	709.40	0.06
32.00	0.00	0.086	709.36	0.06
34.00	0.00	0.078	709.33	0.05
36.00	0.00	0.069	709.29	0.05
38.00	0.00	0.062	709.26	0.04
40.00	0.00	0.055	709.23	0.04
42.00	0.00	0.048	709.21	0.04
44.00	0.00	0.043	709.18	0.03
46.00	0.00	0.037	709.16	0.03
48.00	0.00	0.033	709.14	0.03
50.00	0.00	0.029	709.13	0.02
52.00	0.00	0.026	709.11	0.02
54.00	0.00	0.023	709.10	0.01
56.00	0.00	0.021	709.09	0.01
58.00	0.00	0.019	709.08	0.01
60.00	0.00	0.017	709.08	0.01

Summary for Pond 58P: Dry Basin 01 WQ

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.05 cfs @	0.00 hrs,	Volume=	0.106 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.05 cfs @	0.00 hrs,	Volume=	0.106 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 709.35' Surf.Area= 0.354 ac Storage= 0.121 af
Peak Elev= 709.35' @ 0.00 hrs Surf.Area= 0.354 ac Storage= 0.121 af

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

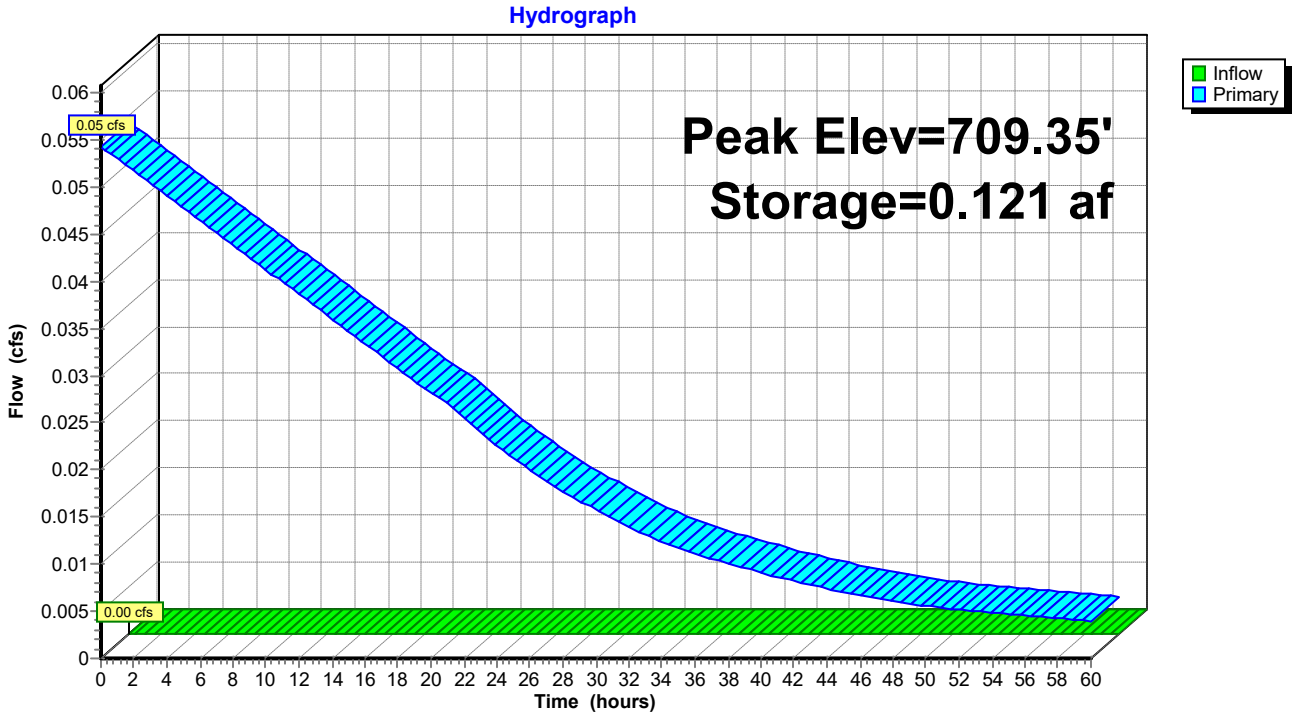
Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.225 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.340	0.000	0.000
710.00	0.380	0.360	0.360
711.00	0.430	0.405	0.765
712.00	0.490	0.460	1.225

Device	Routing	Invert	Outlet Devices
#1	Primary	702.50'	**12.0" Round Culvert** L= 57.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 702.50' / 701.00' S= 0.0261 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.05 cfs @ 0.00 hrs HW=709.35' (Free Discharge)
↑—**1=Culvert** (Passes 0.05 cfs of 9.40 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 2.49 fps)

Pond 58P: Dry Basin 01 WQ



Hydrograph for Pond 58P: Dry Basin 01 WQ

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.121**	**709.35**	**0.05**
2.00	0.00	0.113	709.33	0.05
4.00	0.00	0.104	709.30	0.05
6.00	0.00	0.096	709.28	0.05
8.00	0.00	0.089	709.26	0.04
10.00	0.00	0.082	709.24	0.04
12.00	0.00	0.075	709.22	0.04
14.00	0.00	0.069	709.20	0.04
16.00	0.00	0.063	709.18	0.03
18.00	0.00	0.058	709.17	0.03
20.00	0.00	0.053	709.16	0.03
22.00	0.00	0.049	709.14	0.03
24.00	0.00	0.045	709.13	0.02
26.00	0.00	0.041	709.12	0.02
28.00	0.00	0.038	709.11	0.02
30.00	0.00	0.035	709.10	0.02
32.00	0.00	0.033	709.10	0.01
34.00	0.00	0.031	709.09	0.01
36.00	0.00	0.029	709.08	0.01
38.00	0.00	0.027	709.08	0.01
40.00	0.00	0.026	709.07	0.01
42.00	0.00	0.024	709.07	0.01
44.00	0.00	0.023	709.07	0.01
46.00	0.00	0.022	709.06	0.01
48.00	0.00	0.021	709.06	0.01
50.00	0.00	0.020	709.06	0.01
52.00	0.00	0.019	709.06	0.01
54.00	0.00	0.018	709.05	0.00
56.00	0.00	0.017	709.05	0.00
58.00	0.00	0.017	709.05	0.00
60.00	0.00	0.016	709.05	0.00

Summary for Pond 59P: Dry Basin 02 Sed

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.06 cfs @	0.00 hrs,	Volume=	0.125 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.06 cfs @	0.00 hrs,	Volume=	0.125 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 709.43' Surf.Area= 0.434 ac Storage= 0.132 af
Peak Elev= 709.43' @ 0.00 hrs Surf.Area= 0.434 ac Storage= 0.132 af

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

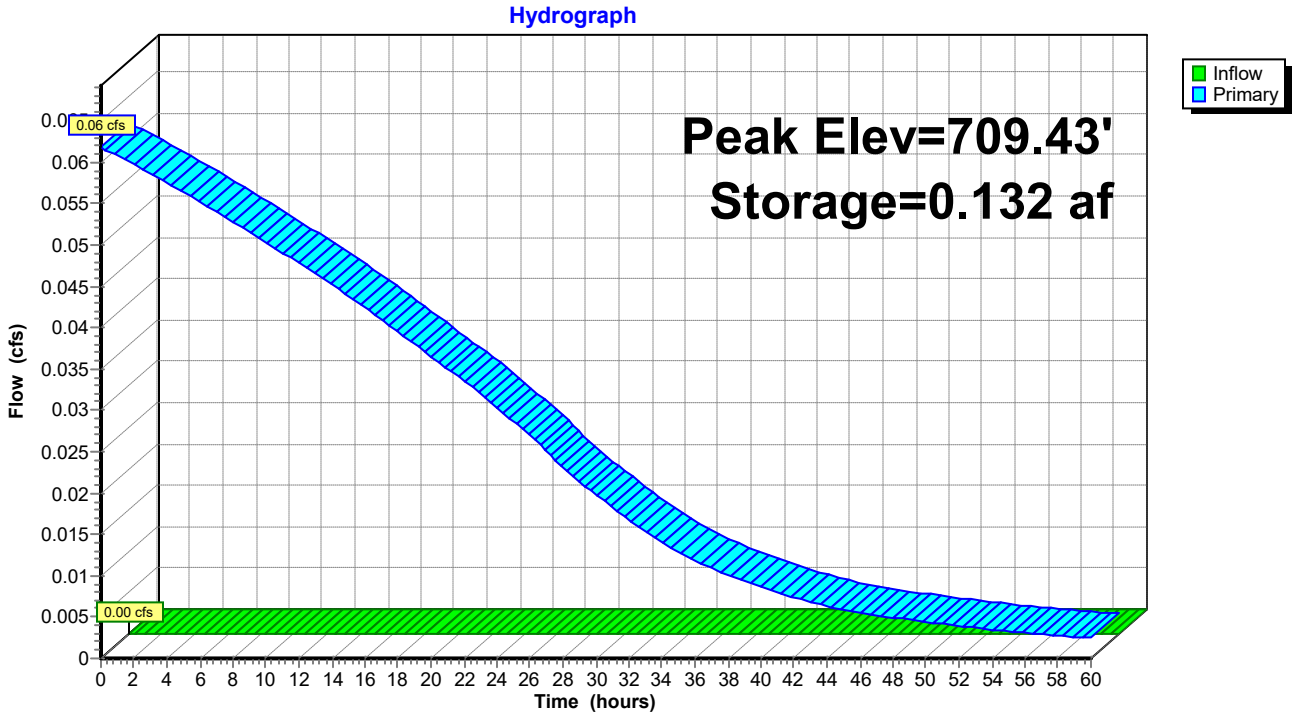
Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	2.230 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.180	0.000	0.000
710.00	0.770	0.475	0.475
711.00	0.880	0.825	1.300
712.00	0.980	0.930	2.230

Device	Routing	Invert	Outlet Devices
#1	Primary	707.00'	**15.0" Round Culvert** L= 67.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 707.00' / 704.00' S= 0.0445 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.06 cfs @ 0.00 hrs HW=709.43' (Free Discharge)
↑—**1=Culvert** (Passes 0.06 cfs of 7.94 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 2.83 fps)

Pond 59P: Dry Basin 02 Sed



Hydrograph for Pond 59P: Dry Basin 02 Sed

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.132**	**709.43**	**0.06**
2.00	0.00	0.122	709.41	0.06
4.00	0.00	0.112	709.38	0.06
6.00	0.00	0.103	709.36	0.06
8.00	0.00	0.094	709.34	0.05
10.00	0.00	0.085	709.31	0.05
12.00	0.00	0.077	709.29	0.05
14.00	0.00	0.070	709.27	0.05
16.00	0.00	0.062	709.25	0.04
18.00	0.00	0.056	709.23	0.04
20.00	0.00	0.049	709.20	0.04
22.00	0.00	0.044	709.19	0.03
24.00	0.00	0.038	709.17	0.03
26.00	0.00	0.034	709.15	0.03
28.00	0.00	0.029	709.13	0.02
30.00	0.00	0.026	709.12	0.02
32.00	0.00	0.023	709.11	0.02
34.00	0.00	0.020	709.10	0.01
36.00	0.00	0.018	709.09	0.01
38.00	0.00	0.016	709.08	0.01
40.00	0.00	0.015	709.07	0.01
42.00	0.00	0.013	709.07	0.01
44.00	0.00	0.012	709.06	0.01
46.00	0.00	0.011	709.06	0.01
48.00	0.00	0.010	709.05	0.00
50.00	0.00	0.010	709.05	0.00
52.00	0.00	0.009	709.05	0.00
54.00	0.00	0.008	709.04	0.00
56.00	0.00	0.008	709.04	0.00
58.00	0.00	0.007	709.04	0.00
60.00	0.00	0.007	709.04	0.00

Summary for Pond 60P: Dry Basin 03 Sed

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.08 cfs @	0.00 hrs,	Volume=	0.171 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.08 cfs @	0.00 hrs,	Volume=	0.171 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 709.73' Surf.Area= 0.267 ac Storage= 0.181 af
Peak Elev= 709.73' @ 0.00 hrs Surf.Area= 0.267 ac Storage= 0.181 af

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

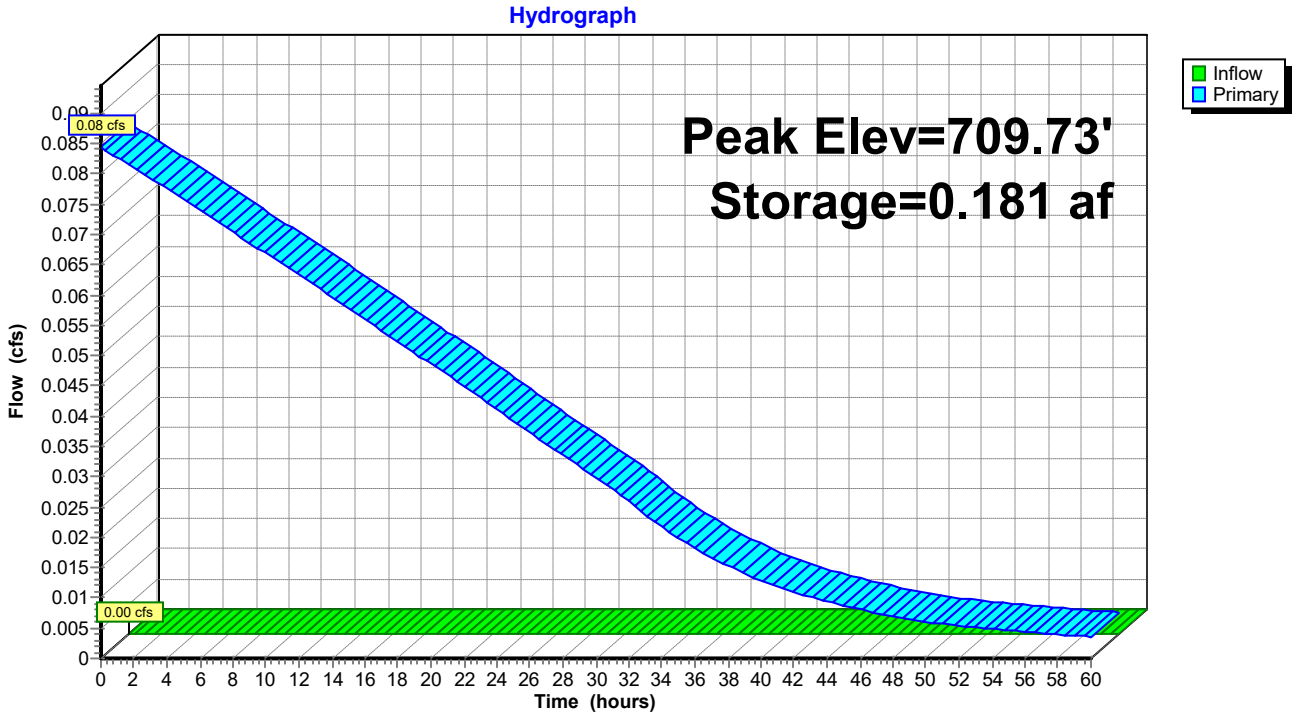
Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.055 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.230	0.000	0.000
710.00	0.280	0.255	0.255
711.00	0.390	0.335	0.590
712.00	0.540	0.465	1.055

Device	Routing	Invert	Outlet Devices
#1	Primary	708.00'	**12.0" Round RCP_Round 12"** L= 18.6' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 708.00' / 707.44' S= 0.0301 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.08 cfs @ 0.00 hrs HW=709.73' (Free Discharge)
↑—**1=RCP_Round 12"** (Passes 0.08 cfs of 4.19 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 3.87 fps)

Pond 60P: Dry Basin 03 Sed



Hydrograph for Pond 60P: Dry Basin 03 Sed

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.181**	**709.73**	**0.08**
2.00	0.00	0.168	709.68	0.08
4.00	0.00	0.154	709.63	0.08
6.00	0.00	0.142	709.58	0.07
8.00	0.00	0.130	709.53	0.07
10.00	0.00	0.119	709.49	0.07
12.00	0.00	0.108	709.45	0.06
14.00	0.00	0.098	709.41	0.06
16.00	0.00	0.088	709.37	0.06
18.00	0.00	0.079	709.33	0.05
20.00	0.00	0.071	709.30	0.05
22.00	0.00	0.063	709.27	0.04
24.00	0.00	0.056	709.24	0.04
26.00	0.00	0.049	709.21	0.04
28.00	0.00	0.044	709.19	0.03
30.00	0.00	0.038	709.16	0.03
32.00	0.00	0.034	709.14	0.03
34.00	0.00	0.030	709.13	0.02
36.00	0.00	0.027	709.11	0.02
38.00	0.00	0.024	709.10	0.02
40.00	0.00	0.021	709.09	0.01
42.00	0.00	0.019	709.08	0.01
44.00	0.00	0.018	709.08	0.01
46.00	0.00	0.016	709.07	0.01
48.00	0.00	0.015	709.07	0.01
50.00	0.00	0.014	709.06	0.01
52.00	0.00	0.013	709.06	0.01
54.00	0.00	0.012	709.05	0.00
56.00	0.00	0.011	709.05	0.00
58.00	0.00	0.011	709.05	0.00
60.00	0.00	0.010	709.04	0.00

Summary for Pond 61P: Dry Basin 01 Sed

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.04 cfs @	0.00 hrs,	Volume=	0.060 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.04 cfs @	0.00 hrs,	Volume=	0.060 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 709.21' Surf.Area= 0.348 ac Storage= 0.072 af
Peak Elev= 709.21' @ 0.00 hrs Surf.Area= 0.348 ac Storage= 0.072 af

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

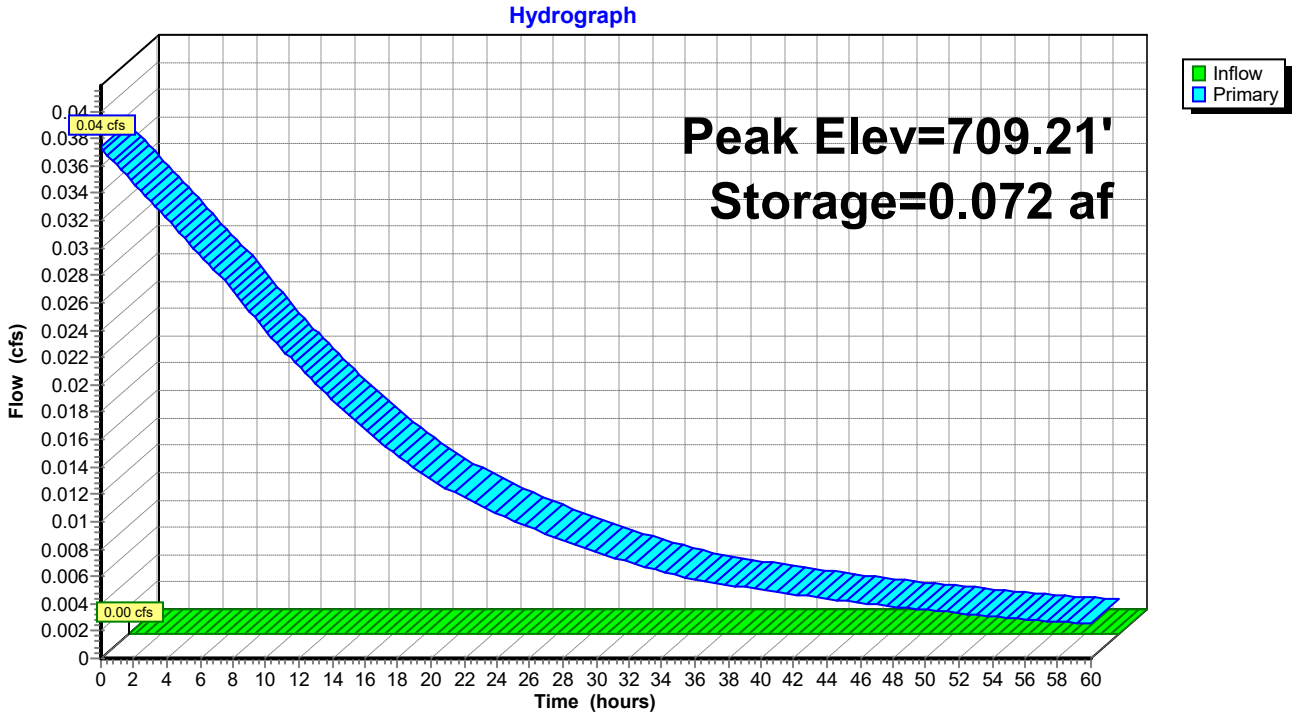
Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.225 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.340	0.000	0.000
710.00	0.380	0.360	0.360
711.00	0.430	0.405	0.765
712.00	0.490	0.460	1.225

Device	Routing	Invert	Outlet Devices
#1	Primary	702.50'	**12.0" Round Culvert** L= 57.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 702.50' / 701.00' S= 0.0261 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.04 cfs @ 0.00 hrs HW=709.21' (Free Discharge)
↑—**1=Culvert** (Passes 0.04 cfs of 9.31 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 1.71 fps)

Pond 61P: Dry Basin 01 Sed



Hydrograph for Pond 61P: Dry Basin 01 Sed

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.072**	**709.21**	**0.04**
2.00	0.00	0.066	709.19	0.03
4.00	0.00	0.061	709.18	0.03
6.00	0.00	0.056	709.16	0.03
8.00	0.00	0.051	709.15	0.03
10.00	0.00	0.047	709.14	0.02
12.00	0.00	0.043	709.13	0.02
14.00	0.00	0.040	709.12	0.02
16.00	0.00	0.037	709.11	0.02
18.00	0.00	0.034	709.10	0.01
20.00	0.00	0.032	709.09	0.01
22.00	0.00	0.030	709.09	0.01
24.00	0.00	0.028	709.08	0.01
26.00	0.00	0.026	709.08	0.01
28.00	0.00	0.025	709.07	0.01
30.00	0.00	0.024	709.07	0.01
32.00	0.00	0.022	709.07	0.01
34.00	0.00	0.021	709.06	0.01
36.00	0.00	0.020	709.06	0.01
38.00	0.00	0.019	709.06	0.01
40.00	0.00	0.018	709.05	0.01
42.00	0.00	0.018	709.05	0.00
44.00	0.00	0.017	709.05	0.00
46.00	0.00	0.016	709.05	0.00
48.00	0.00	0.016	709.05	0.00
50.00	0.00	0.015	709.04	0.00
52.00	0.00	0.014	709.04	0.00
54.00	0.00	0.014	709.04	0.00
56.00	0.00	0.013	709.04	0.00
58.00	0.00	0.013	709.04	0.00
60.00	0.00	0.012	709.04	0.00

Summary for Pond 62P: Dry Basin 01 Below NP

Volume	Invert	Avail.Storage	Storage Description
#1	706.50'	0.405 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
706.50	0.010	0.000	0.000
707.00	0.070	0.020	0.020
708.00	0.180	0.125	0.145
709.00	0.340	0.260	0.405

Summary for Pond 63P: Dry Basin 02 Below NP

Volume	Invert	Avail.Storage	Storage Description
#1	706.50'	0.295 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
706.50	0.030	0.000	0.000
707.00	0.090	0.030	0.030
708.00	0.130	0.110	0.140
709.00	0.180	0.155	0.295

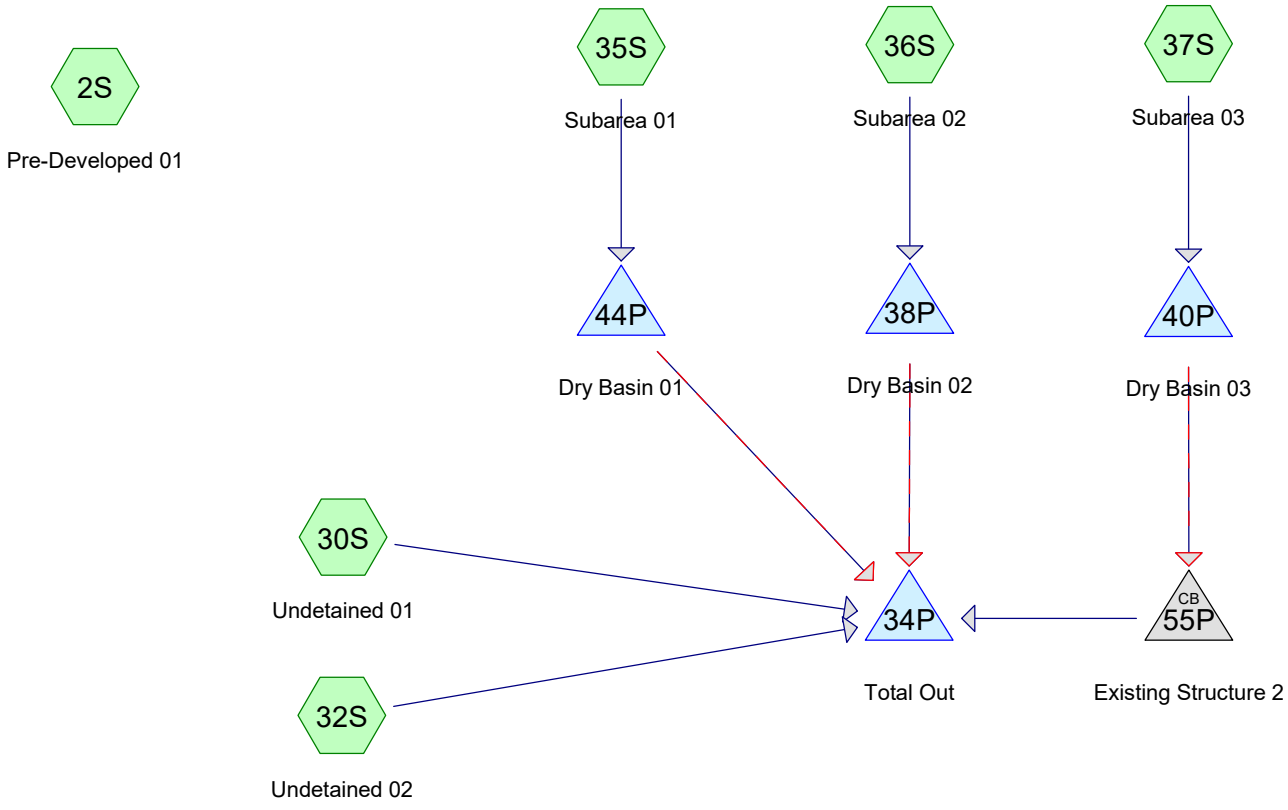
Summary for Pond 64P: Dry Basin 03 Below NP

Volume	Invert	Avail.Storage	Storage Description
#1	706.50'	0.300 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
706.50	0.040	0.000	0.000
707.00	0.060	0.025	0.025
708.00	0.130	0.095	0.120
709.00	0.230	0.180	0.300

APPENDIX D:

HydroCAD Output



Subcat Reach Pond Link

Routing Diagram for 2008-1973
Prepared by Symanetc, Printed 3/19/2018

Summary for Subcatchment 2S: Pre-Developed 01

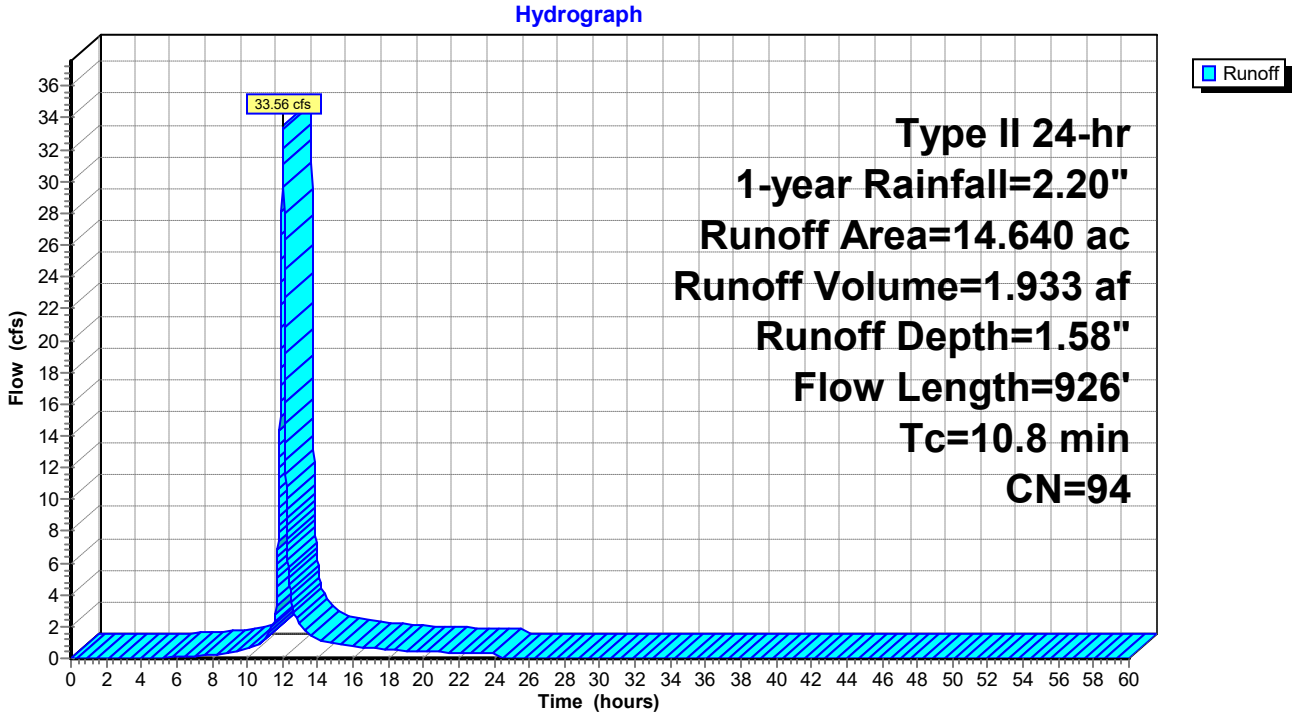
Runoff = 33.56 cfs @ 12.02 hrs, Volume= 1.933 af, Depth= 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-year Rainfall=2.20"

Area (ac)	CN	Description
13.040	96	Gravel surface, HSG C
1.600	74	>75% Grass cover, Good, HSG C
14.640	94	Weighted Average
14.640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0234	0.76		**Sheet Flow,** n= 0.022 P2= 2.63"
8.6	826	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
10.8	926	Total			

Subcatchment 2S: Pre-Developed 01



Summary for Subcatchment 30S: Undetained 01

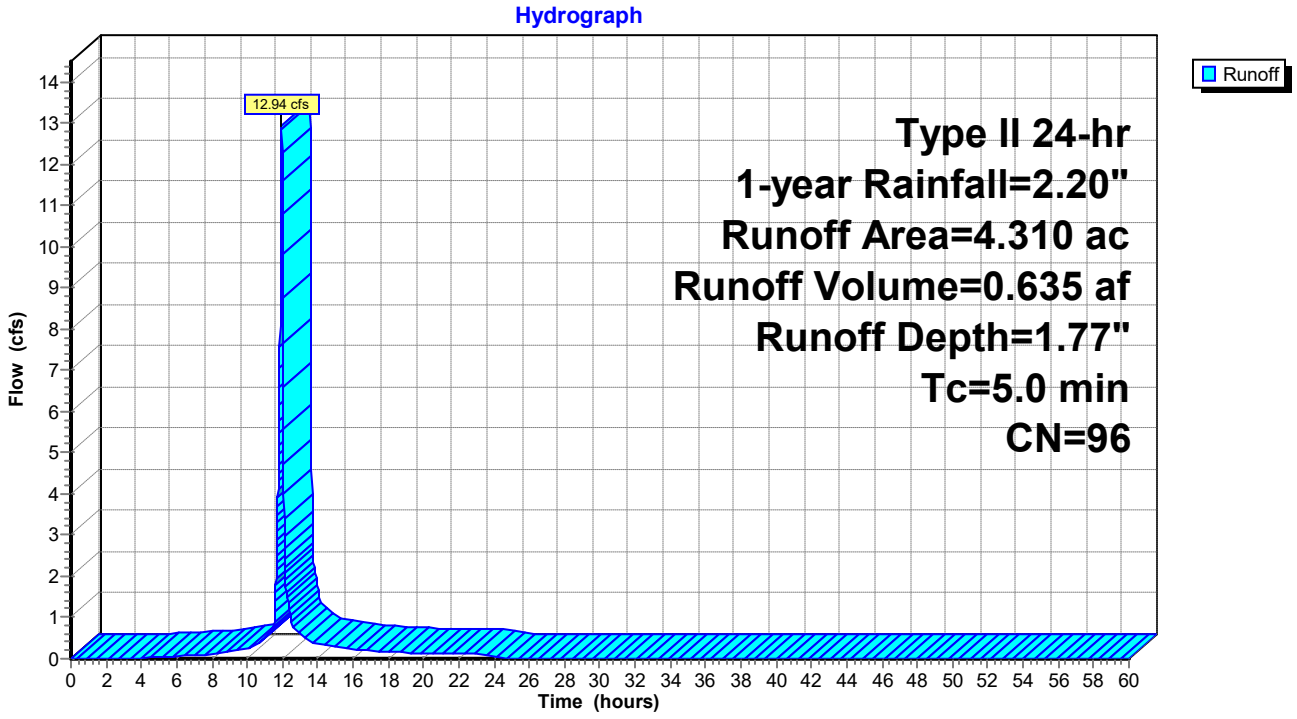
Runoff = 12.94 cfs @ 11.96 hrs, Volume= 0.635 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-year Rainfall=2.20"

Area (ac)	CN	Description
3.330	96	Gravel surface, HSG C
0.980	98	Paved parking, HSG C
4.310	96	Weighted Average
3.330		77.26% Pervious Area
0.980		22.74% Impervious Area

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

Subcatchment 30S: Undetained 01



Summary for Subcatchment 32S: Undetained 02

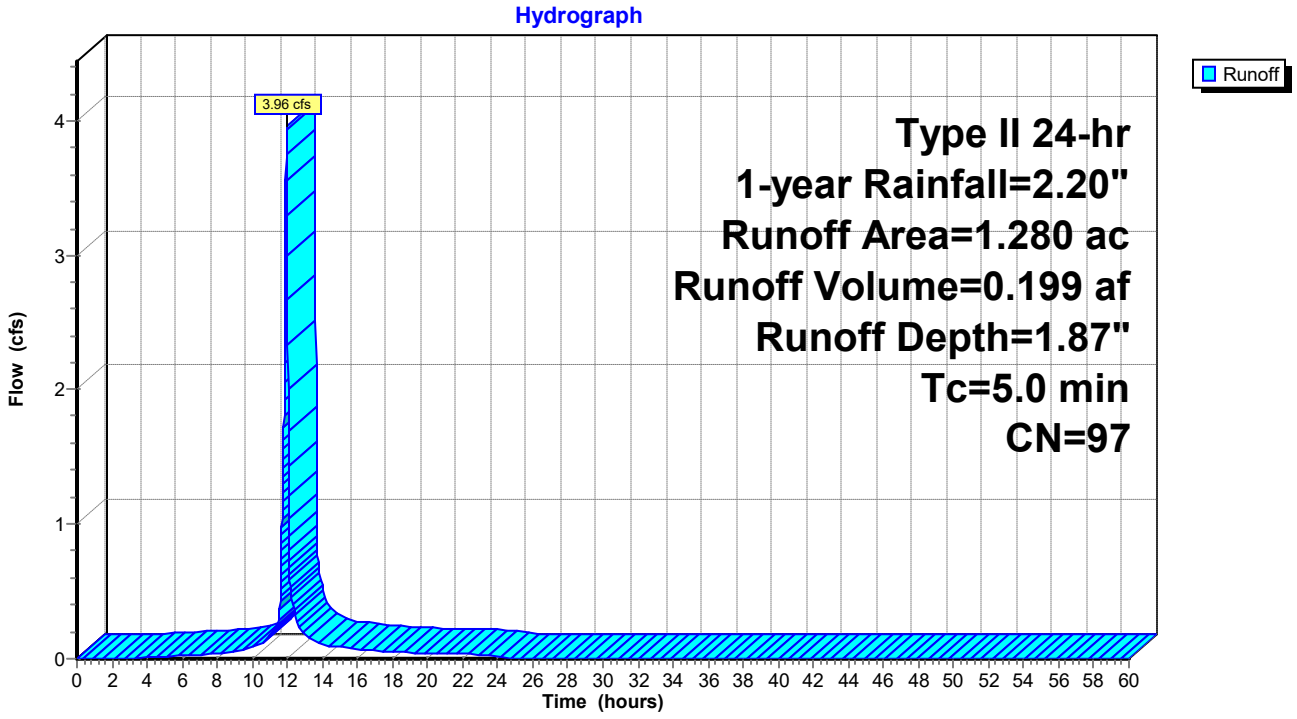
Runoff = 3.96 cfs @ 11.96 hrs, Volume= 0.199 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-year Rainfall=2.20"

Area (ac)	CN	Description
0.560	96	Gravel surface, HSG C
0.720	98	Paved parking, HSG C
1.280	97	Weighted Average
0.560		43.75% Pervious Area
0.720		56.25% Impervious Area

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

Subcatchment 32S: Undetained 02



Summary for Subcatchment 35S: Subarea 01

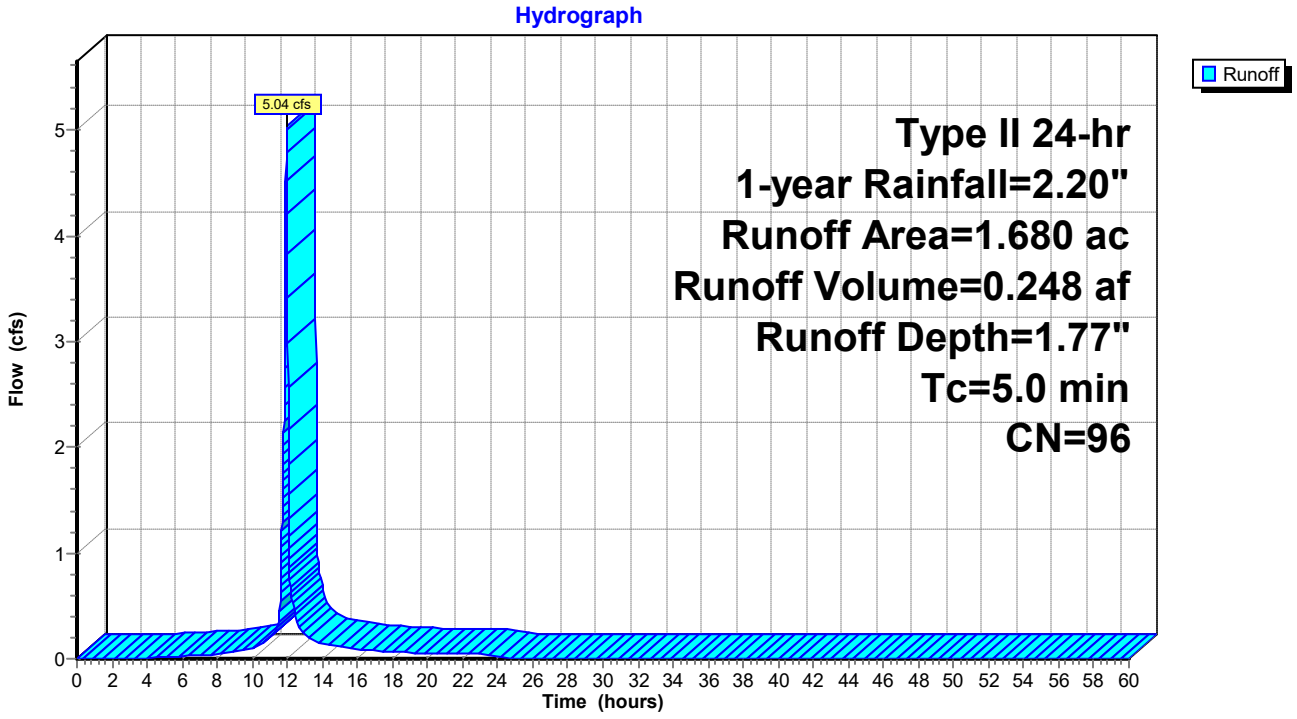
Runoff = 5.04 cfs @ 11.96 hrs, Volume= 0.248 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-year Rainfall=2.20"

Area (ac)	CN	Description
0.150	98	Paved parking, HSG C
1.530	96	Gravel surface, HSG C
1.680	96	Weighted Average
1.530		91.07% Pervious Area
0.150		8.93% Impervious Area

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

Subcatchment 35S: Subarea 01



Summary for Subcatchment 36S: Subarea 02

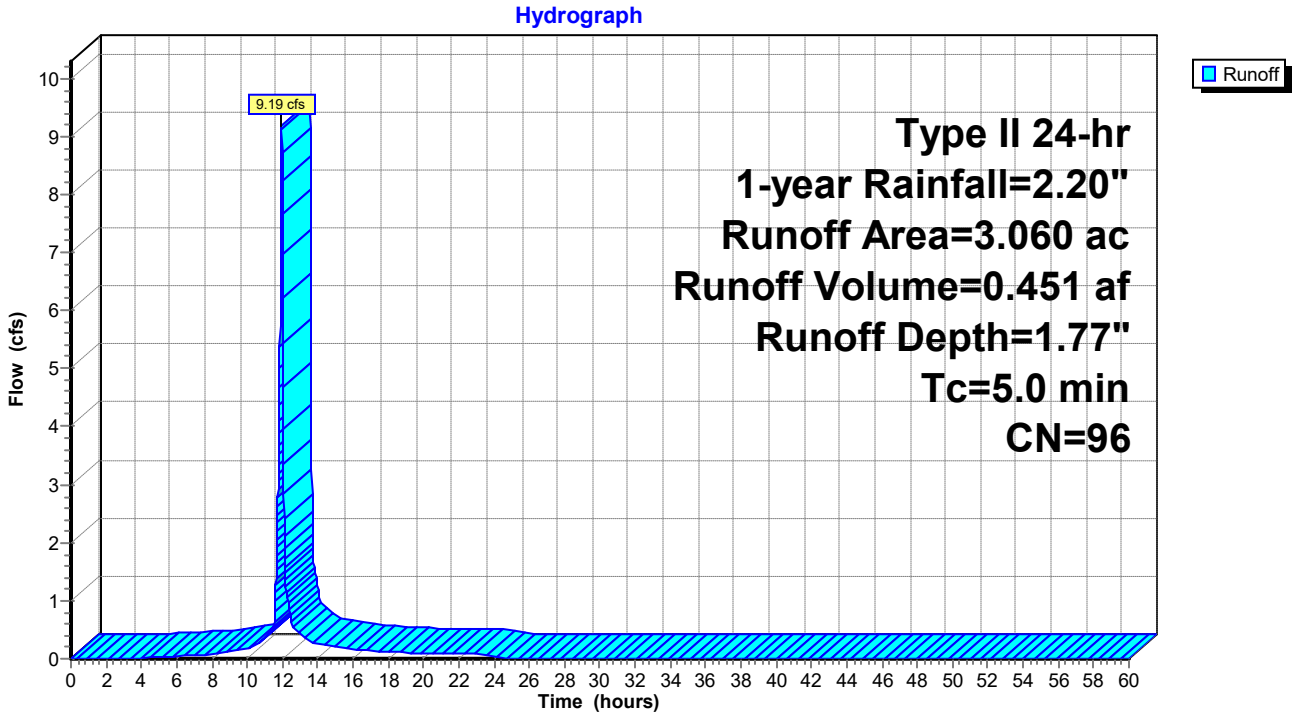
Runoff = 9.19 cfs @ 11.96 hrs, Volume= 0.451 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-year Rainfall=2.20"

Area (ac)	CN	Description
0.680	98	Paved parking, HSG C
2.380	96	Gravel surface, HSG C
3.060	96	Weighted Average
2.380		77.78% Pervious Area
0.680		22.22% Impervious Area

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

Subcatchment 36S: Subarea 02



Summary for Subcatchment 37S: Subarea 03

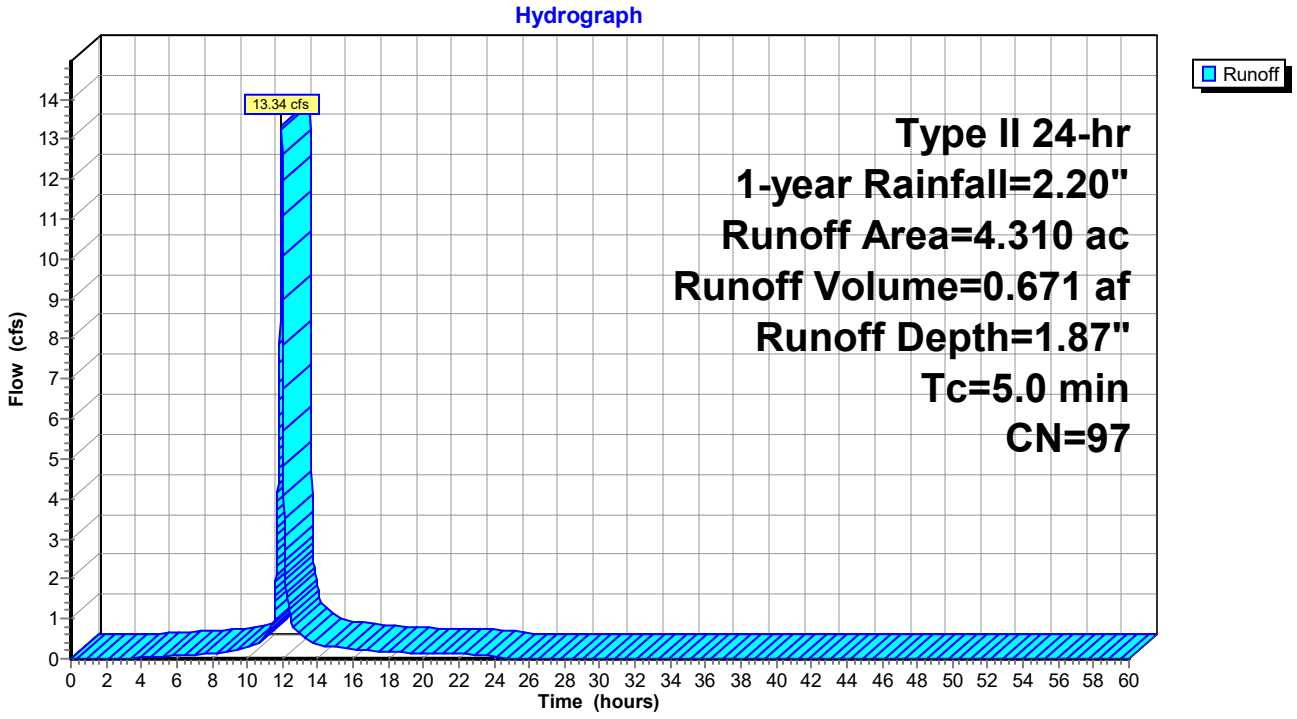
Runoff = 13.34 cfs @ 11.96 hrs, Volume= 0.671 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-year Rainfall=2.20"

Area (ac)	CN	Description
1.110	98	Paved parking, HSG C
3.200	96	Gravel surface, HSG C
4.310	97	Weighted Average
3.200		74.25% Pervious Area
1.110		25.75% Impervious Area

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

Subcatchment 37S: Subarea 03

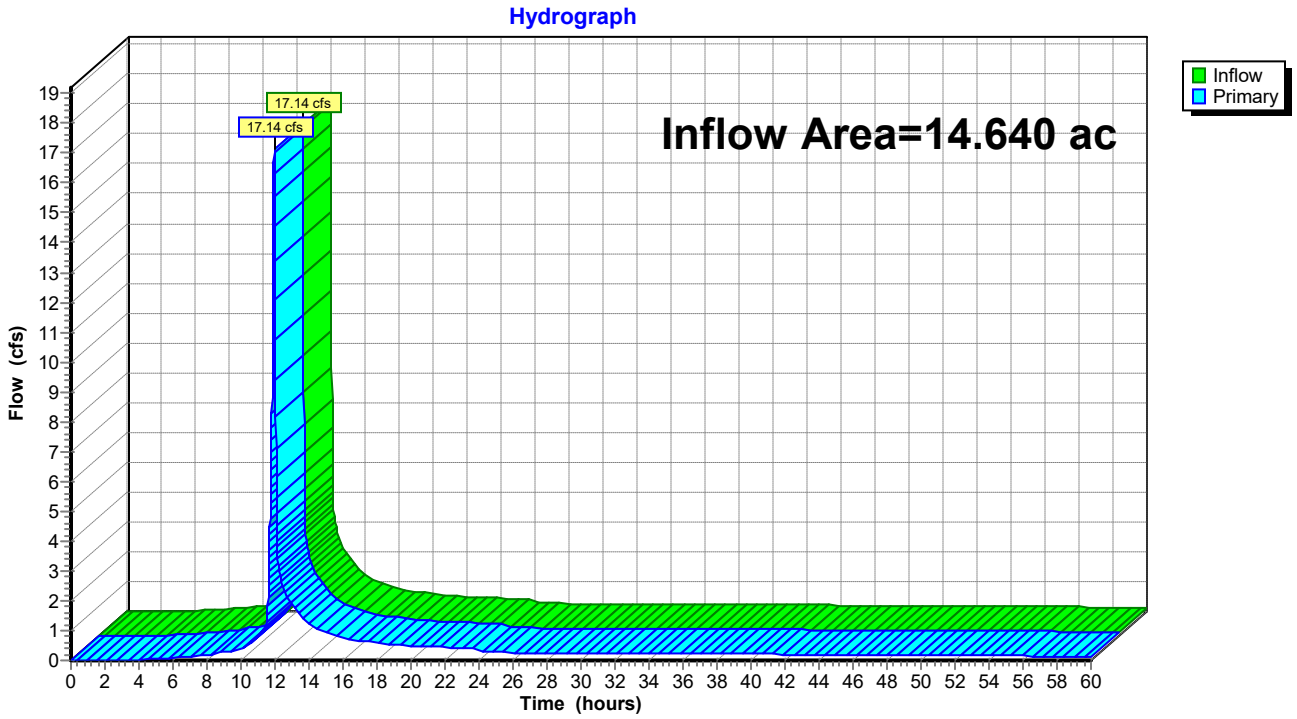


Summary for Pond 34P: Total Out

Inflow Area = 14.640 ac, 24.86% Impervious, Inflow Depth > 1.61" for 1-year event
Inflow = 17.14 cfs @ 11.96 hrs, Volume= 1.963 af
Primary = 17.14 cfs @ 11.96 hrs, Volume= 1.963 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Pond 34P: Total Out



Summary for Pond 38P: Dry Basin 02

Inflow Area = 3.060 ac, 22.22% Impervious, Inflow Depth = 1.77" for 1-year event
Inflow = 9.19 cfs @ 11.96 hrs, Volume= 0.451 af
Outflow = 0.09 cfs @ 19.75 hrs, Volume= 0.327 af, Atten= 99%, Lag= 467.4 min
Primary = 0.09 cfs @ 19.75 hrs, Volume= 0.327 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 709.83' @ 19.75 hrs Surf.Area= 0.673 ac Storage= 0.356 af

Plug-Flow detention time= 1,335.0 min calculated for 0.327 af (72% of inflow)
Center-of-Mass det. time= 1,242.7 min (2,023.9 - 781.2)

Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	2.230 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

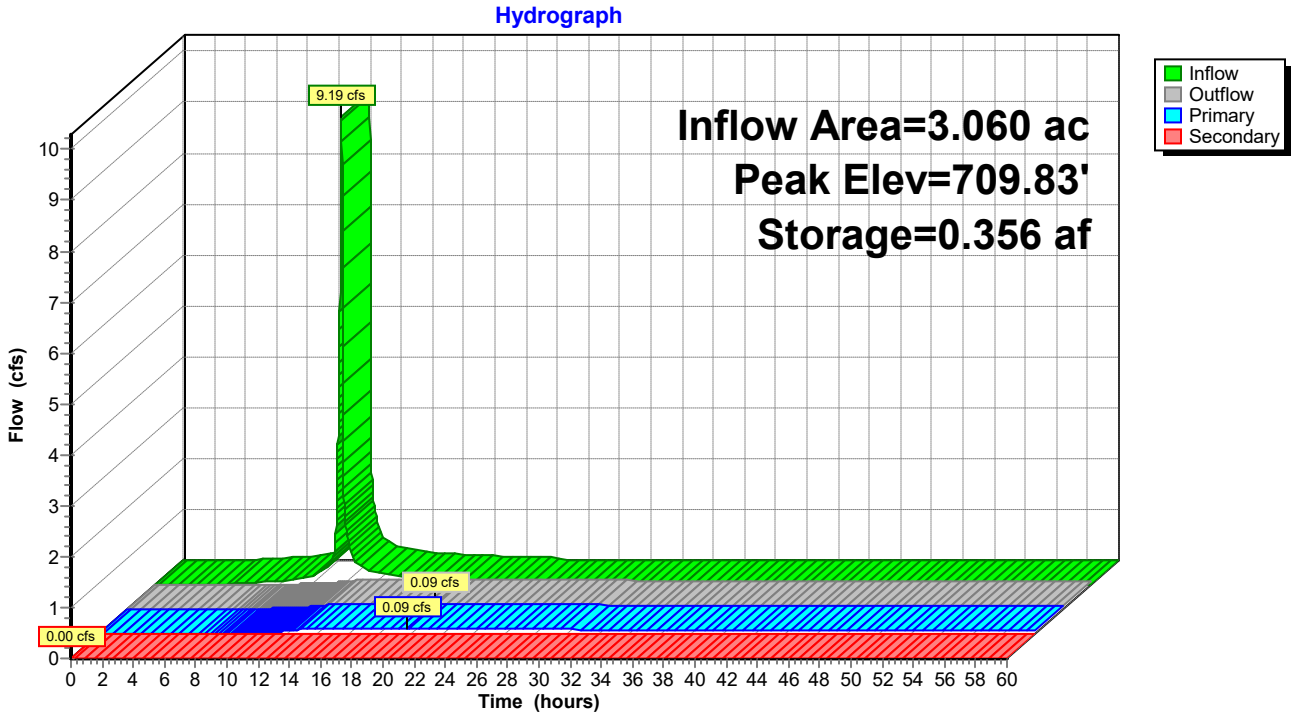
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.180	0.000	0.000
710.00	0.770	0.475	0.475
711.00	0.880	0.825	1.300
712.00	0.980	0.930	2.230

Device	Routing	Invert	Outlet Devices
#1	Primary	707.00'	**15.0" Round Culvert** L= 67.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 707.00' / 704.00' S= 0.0445 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	710.00'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#4	Secondary	711.00'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.09 cfs @ 19.75 hrs HW=709.83' (Free Discharge)
└**1=Culvert** (Passes 0.09 cfs of 8.78 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.09 cfs @ 4.17 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=709.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 38P: Dry Basin 02



Summary for Pond 40P: Dry Basin 03

Inflow Area = 4.310 ac, 25.75% Impervious, Inflow Depth = 1.87" for 1-year event
Inflow = 13.34 cfs @ 11.96 hrs, Volume= 0.671 af
Outflow = 1.03 cfs @ 12.47 hrs, Volume= 0.597 af, Atten= 92%, Lag= 31.1 min
Primary = 1.03 cfs @ 12.47 hrs, Volume= 0.597 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 710.49' @ 12.47 hrs Surf.Area= 0.334 ac Storage= 0.405 af

Plug-Flow detention time= 800.9 min calculated for 0.597 af (89% of inflow)
Center-of-Mass det. time= 745.8 min (1,517.7 - 771.9)

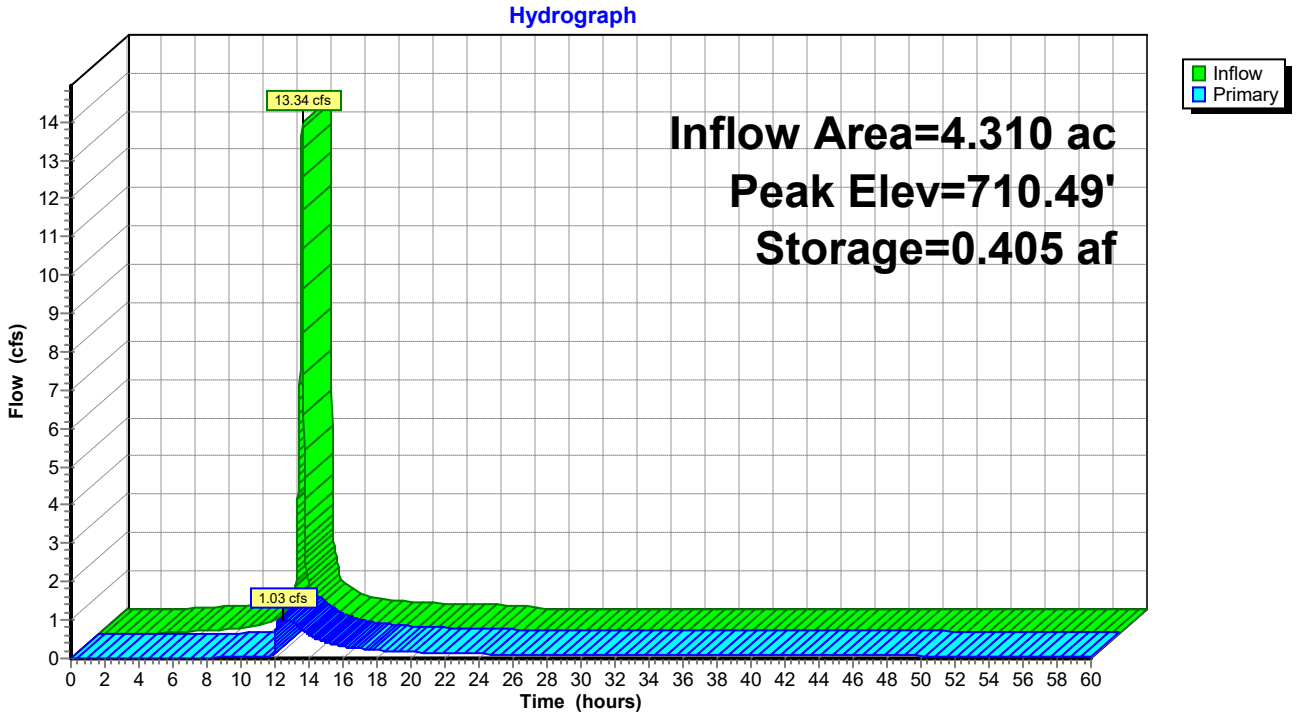
Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.055 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.230	0.000	0.000
710.00	0.280	0.255	0.255
711.00	0.390	0.335	0.590
712.00	0.540	0.465	1.055

Device	Routing	Invert	Outlet Devices
#1	Primary	708.00'	**12.0" Round RCP_Round 12"** L= 18.6' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 708.00' / 707.44' S= 0.0301 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	710.20'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	710.70'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

Primary OutFlow Max=1.03 cfs @ 12.47 hrs HW=710.49' (Free Discharge)
└**1=RCP_Round 12"** (Passes 1.03 cfs of 5.33 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.71 fps)
  ├**3=Orifice/Grate** (Orifice Controls 0.90 cfs @ 2.58 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 40P: Dry Basin 03



Summary for Pond 44P: Dry Basin 01

Inflow Area = 1.680 ac, 8.93% Impervious, Inflow Depth = 1.77" for 1-year event
Inflow = 5.04 cfs @ 11.96 hrs, Volume= 0.248 af
Outflow = 0.07 cfs @ 17.48 hrs, Volume= 0.205 af, Atten= 99%, Lag= 331.1 min
Primary = 0.07 cfs @ 17.48 hrs, Volume= 0.205 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 709.53' @ 17.48 hrs Surf.Area= 0.361 ac Storage= 0.187 af

Plug-Flow detention time= 1,182.2 min calculated for 0.205 af (83% of inflow)
Center-of-Mass det. time= 1,108.4 min (1,889.6 - 781.2)

Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.225 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

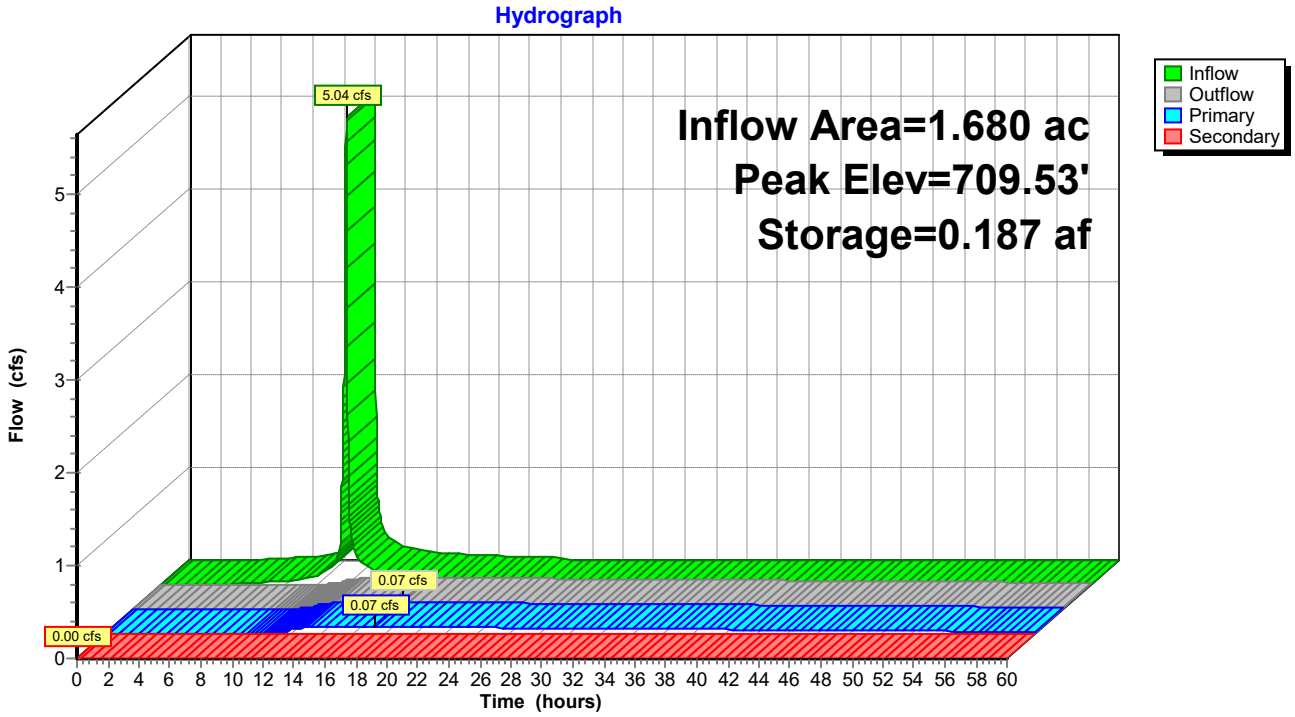
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.340	0.000	0.000
710.00	0.380	0.360	0.360
711.00	0.430	0.405	0.765
712.00	0.490	0.460	1.225

Device	Routing	Invert	Outlet Devices
#1	Primary	702.50'	**12.0" Round Culvert** L= 57.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 702.50' / 701.00' S= 0.0261 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	711.00'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#4	Secondary	711.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.07 cfs @ 17.48 hrs HW=709.53' (Free Discharge)
└**1=Culvert** (Passes 0.07 cfs of 9.52 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 3.23 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=709.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 44P: Dry Basin 01



Summary for Pond 55P: Existing Structure 2

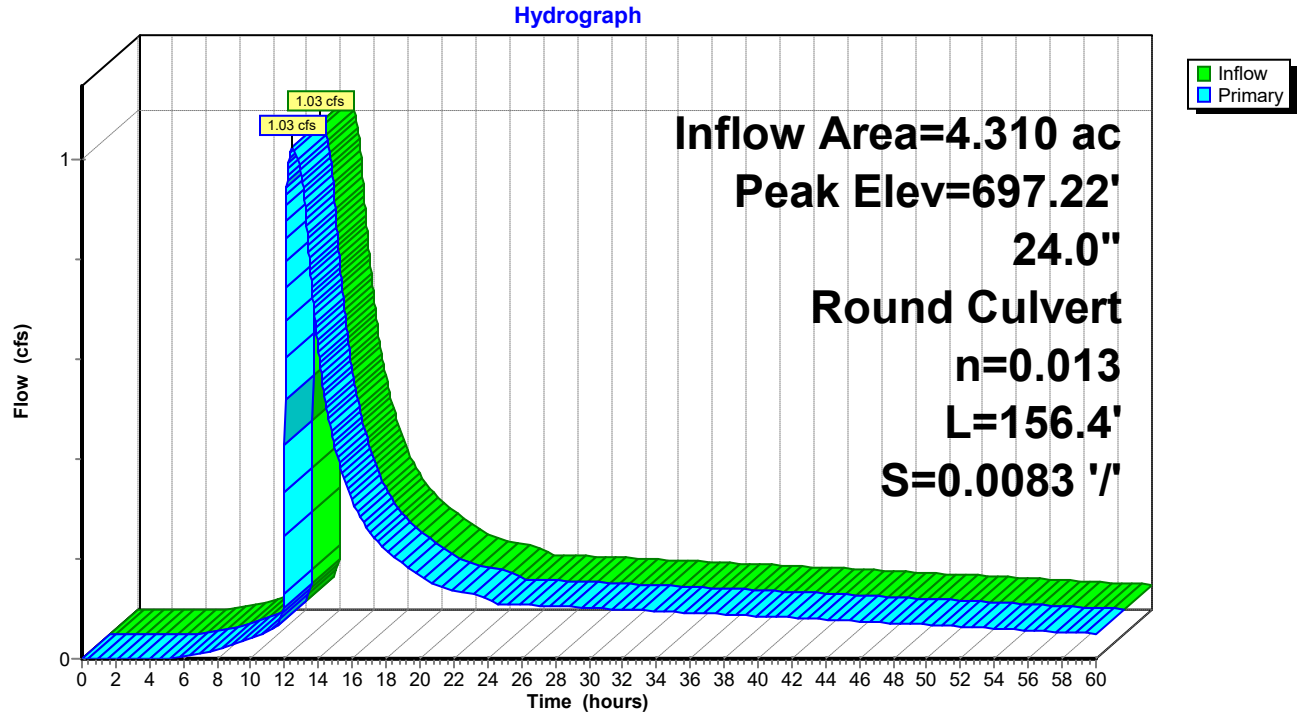
Inflow Area = 4.310 ac, 25.75% Impervious, Inflow Depth > 1.66" for 1-year event
Inflow = 1.03 cfs @ 12.47 hrs, Volume= 0.597 af
Outflow = 1.03 cfs @ 12.47 hrs, Volume= 0.597 af, Atten= 0%, Lag= 0.0 min
Primary = 1.03 cfs @ 12.47 hrs, Volume= 0.597 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 697.22' @ 12.47 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	696.80'	**24.0" Round RCP_Round 24"** L= 156.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 696.80' / 695.50' S= 0.0083 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf

Primary OutFlow Max=1.03 cfs @ 12.47 hrs HW=697.22' (Free Discharge)
1=RCP_Round 24" (Barrel Controls 1.03 cfs @ 3.27 fps)

Pond 55P: Existing Structure 2



Summary for Subcatchment 2S: Pre-Developed 01

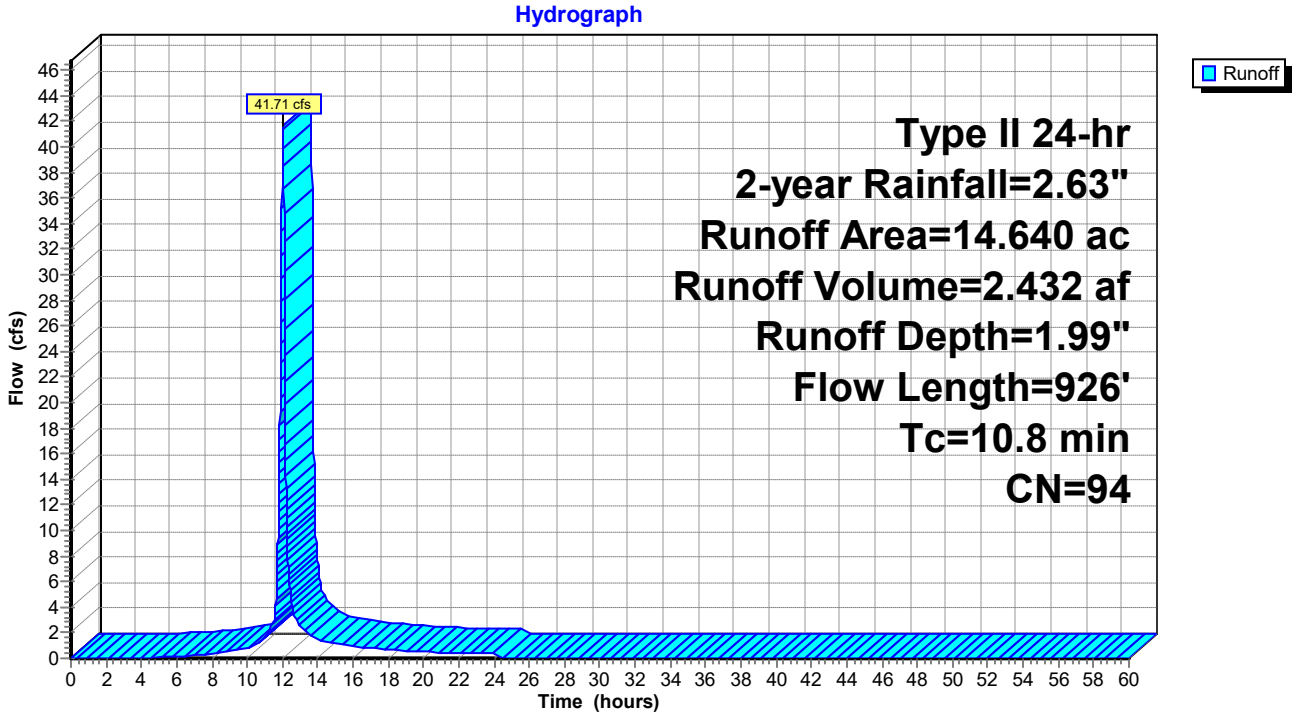
Runoff = 41.71 cfs @ 12.02 hrs, Volume= 2.432 af, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-year Rainfall=2.63"

Area (ac)	CN	Description
13.040	96	Gravel surface, HSG C
1.600	74	>75% Grass cover, Good, HSG C
14.640	94	Weighted Average
14.640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0234	0.76		**Sheet Flow,** n= 0.022 P2= 2.63"
8.6	826	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
10.8	926	Total			

Subcatchment 2S: Pre-Developed 01



Summary for Subcatchment 30S: Undetained 01

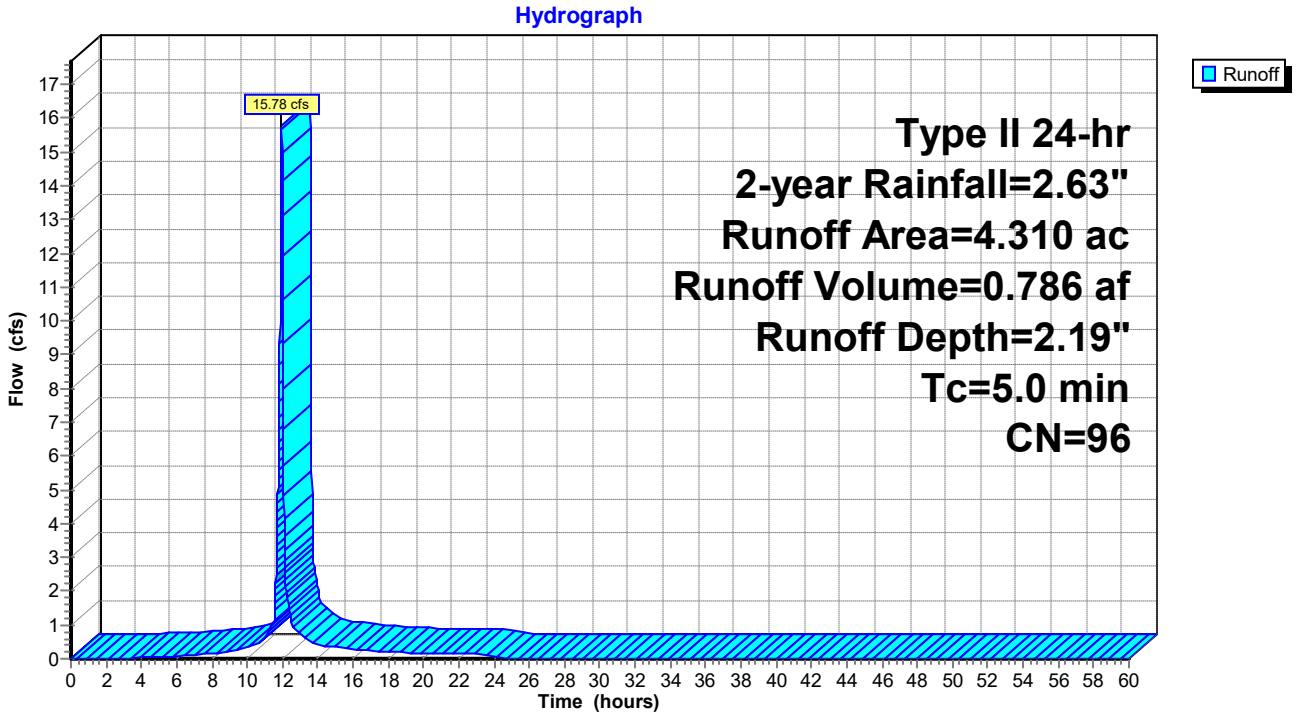
Runoff = 15.78 cfs @ 11.96 hrs, Volume= 0.786 af, Depth= 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-year Rainfall=2.63"

Area (ac)	CN	Description
3.330	96	Gravel surface, HSG C
0.980	98	Paved parking, HSG C
4.310	96	Weighted Average
3.330		77.26% Pervious Area
0.980		22.74% Impervious Area

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

Subcatchment 30S: Undetained 01



Summary for Subcatchment 32S: Undetained 02

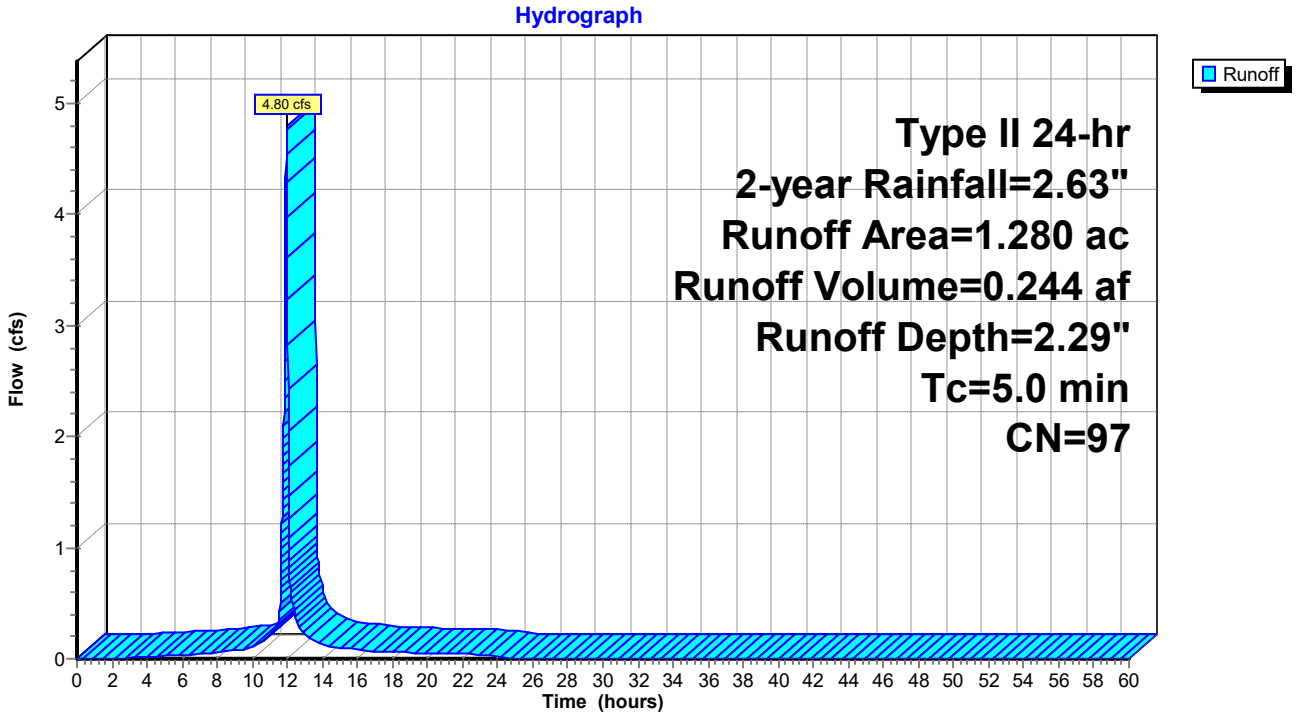
Runoff = 4.80 cfs @ 11.96 hrs, Volume= 0.244 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-year Rainfall=2.63"

Area (ac)	CN	Description
0.560	96	Gravel surface, HSG C
0.720	98	Paved parking, HSG C
1.280	97	Weighted Average
0.560		43.75% Pervious Area
0.720		56.25% Impervious Area

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

Subcatchment 32S: Undetained 02



Summary for Subcatchment 35S: Subarea 01

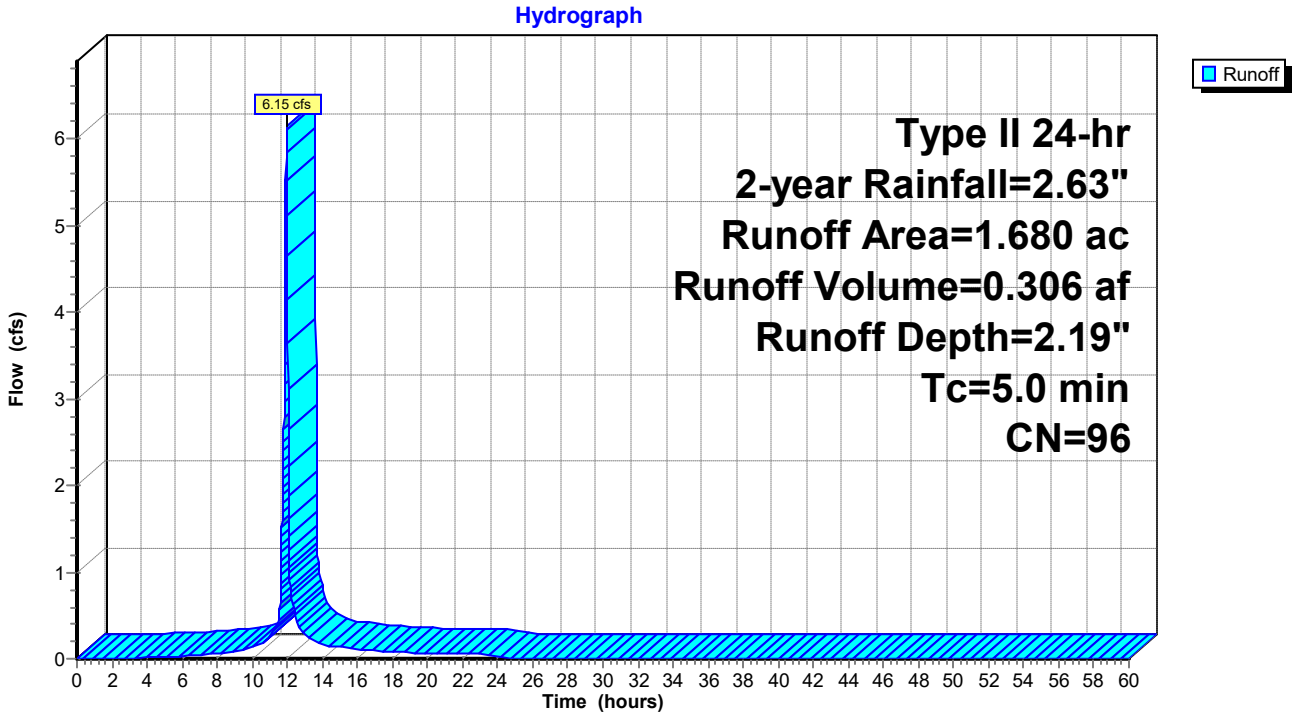
Runoff = 6.15 cfs @ 11.96 hrs, Volume= 0.306 af, Depth= 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-year Rainfall=2.63"

Area (ac)	CN	Description
0.150	98	Paved parking, HSG C
1.530	96	Gravel surface, HSG C
1.680	96	Weighted Average
1.530		91.07% Pervious Area
0.150		8.93% Impervious Area

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

Subcatchment 35S: Subarea 01



Summary for Subcatchment 36S: Subarea 02

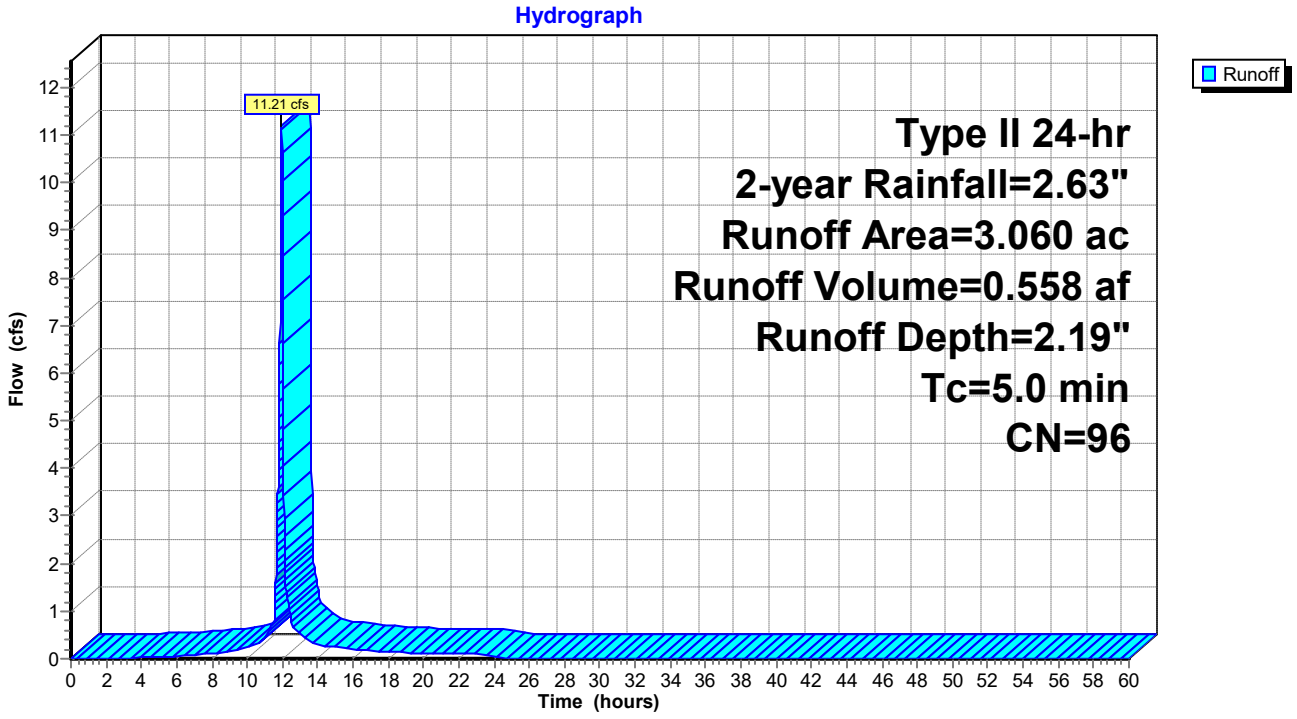
Runoff = 11.21 cfs @ 11.96 hrs, Volume= 0.558 af, Depth= 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-year Rainfall=2.63"

Area (ac)	CN	Description
0.680	98	Paved parking, HSG C
2.380	96	Gravel surface, HSG C
3.060	96	Weighted Average
2.380		77.78% Pervious Area
0.680		22.22% Impervious Area

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

Subcatchment 36S: Subarea 02



Summary for Subcatchment 37S: Subarea 03

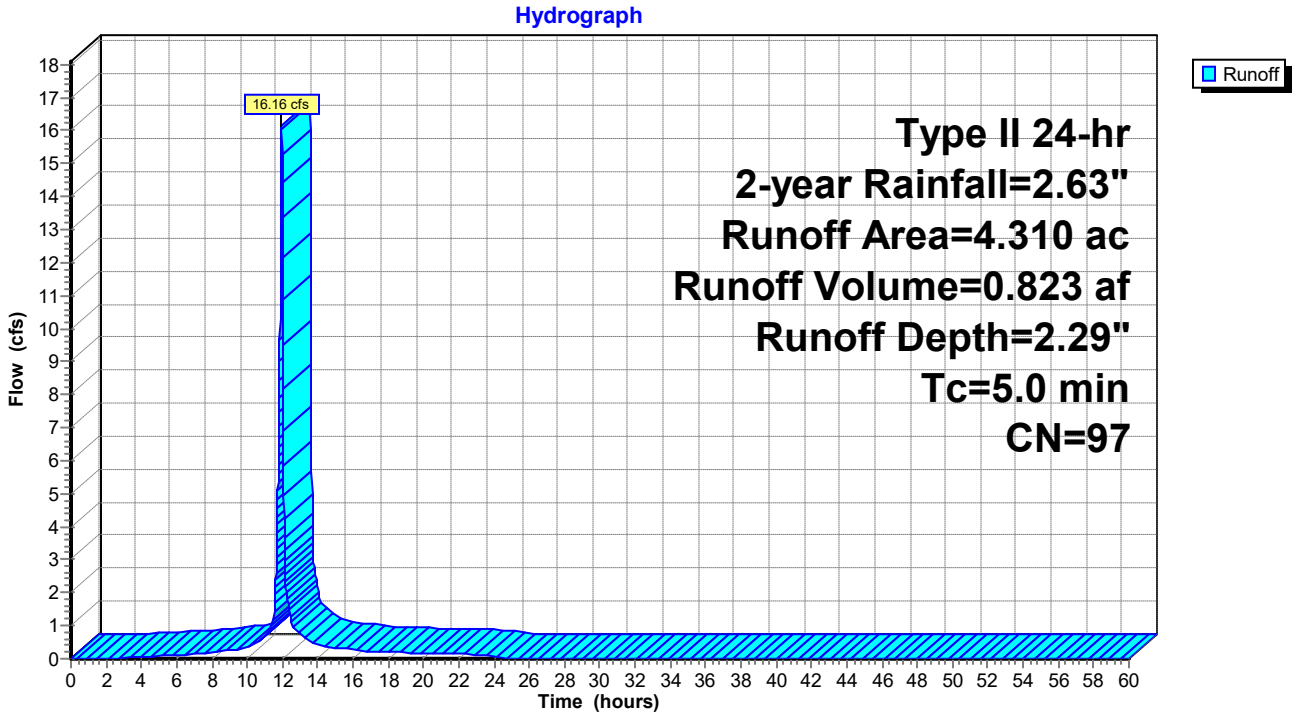
Runoff = 16.16 cfs @ 11.96 hrs, Volume= 0.823 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-year Rainfall=2.63"

Area (ac)	CN	Description
1.110	98	Paved parking, HSG C
3.200	96	Gravel surface, HSG C
4.310	97	Weighted Average
3.200		74.25% Pervious Area
1.110		25.75% Impervious Area

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

Subcatchment 37S: Subarea 03

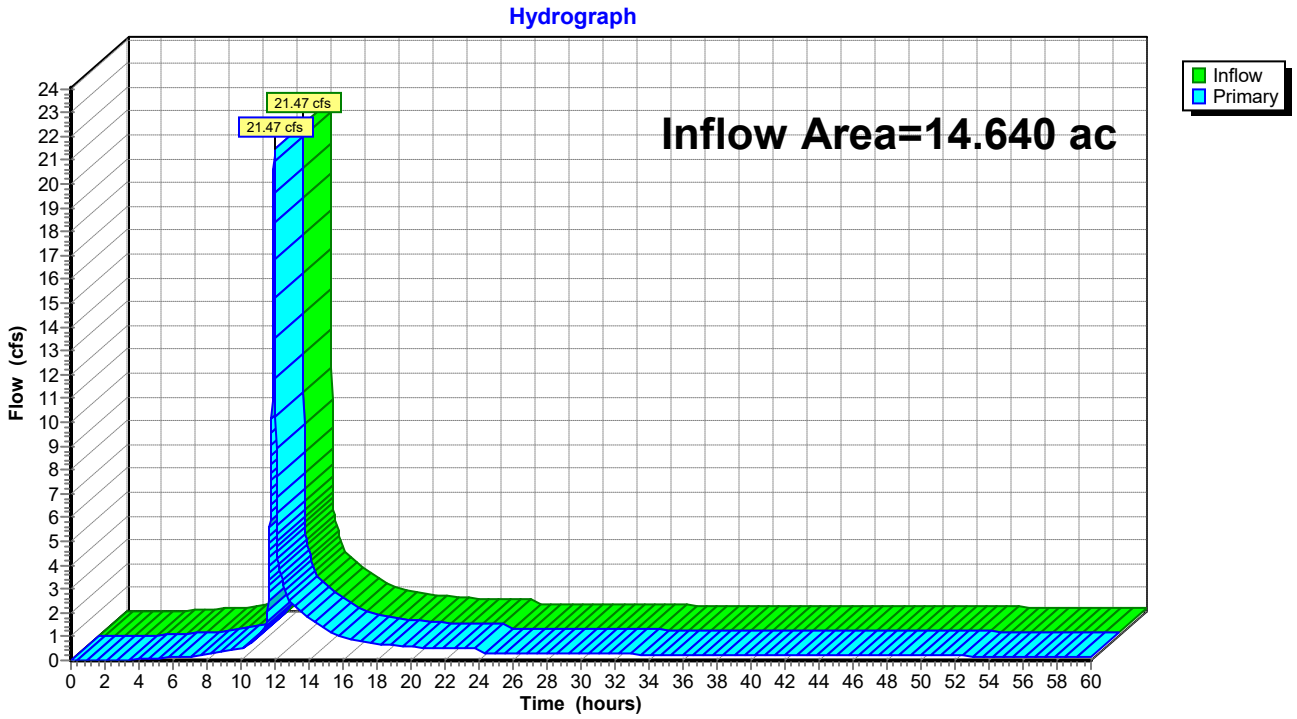


Summary for Pond 34P: Total Out

Inflow Area = 14.640 ac, 24.86% Impervious, Inflow Depth > 1.96" for 2-year event
Inflow = 21.47 cfs @ 11.96 hrs, Volume= 2.391 af
Primary = 21.47 cfs @ 11.96 hrs, Volume= 2.391 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Pond 34P: Total Out



Summary for Pond 38P: Dry Basin 02

Inflow Area = 3.060 ac, 22.22% Impervious, Inflow Depth = 2.19" for 2-year event
Inflow = 11.21 cfs @ 11.96 hrs, Volume= 0.558 af
Outflow = 0.10 cfs @ 21.23 hrs, Volume= 0.366 af, Atten= 99%, Lag= 556.2 min
Primary = 0.10 cfs @ 21.23 hrs, Volume= 0.366 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 709.97' @ 21.23 hrs Surf.Area= 0.750 ac Storage= 0.450 af

Plug-Flow detention time= 1,360.9 min calculated for 0.366 af (66% of inflow)
Center-of-Mass det. time= 1,261.2 min (2,036.7 - 775.5)

Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	2.230 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

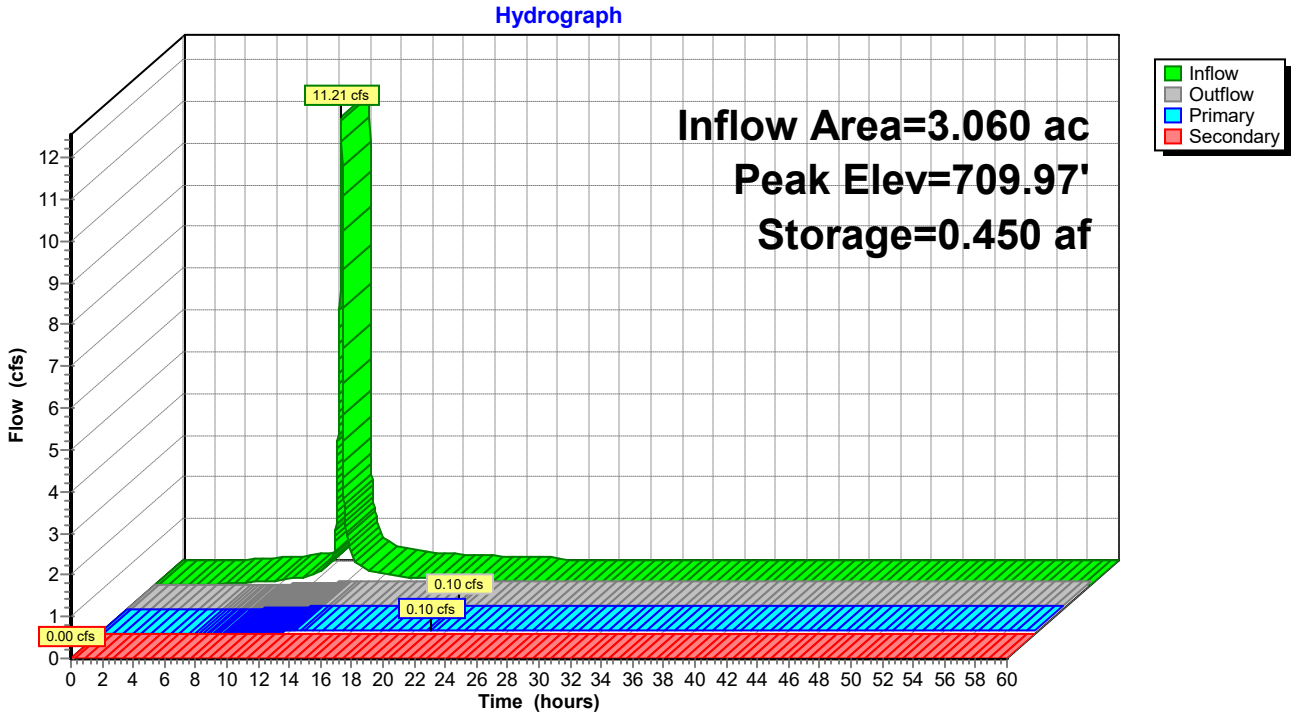
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.180	0.000	0.000
710.00	0.770	0.475	0.475
711.00	0.880	0.825	1.300
712.00	0.980	0.930	2.230

Device	Routing	Invert	Outlet Devices
#1	Primary	707.00'	**15.0" Round Culvert** L= 67.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 707.00' / 704.00' S= 0.0445 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	710.00'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#4	Secondary	711.00'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.10 cfs @ 21.23 hrs HW=709.97' (Free Discharge)
└**1=Culvert** (Passes 0.10 cfs of 9.04 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.10 cfs @ 4.52 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=709.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 38P: Dry Basin 02



Summary for Pond 40P: Dry Basin 03

Inflow Area = 4.310 ac, 25.75% Impervious, Inflow Depth = 2.29" for 2-year event
Inflow = 16.16 cfs @ 11.96 hrs, Volume= 0.823 af
Outflow = 1.51 cfs @ 12.37 hrs, Volume= 0.748 af, Atten= 91%, Lag= 24.7 min
Primary = 1.51 cfs @ 12.37 hrs, Volume= 0.748 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 710.73' @ 12.37 hrs Surf.Area= 0.360 ac Storage= 0.488 af

Plug-Flow detention time= 672.7 min calculated for 0.748 af (91% of inflow)
Center-of-Mass det. time= 624.4 min (1,391.1 - 766.7)

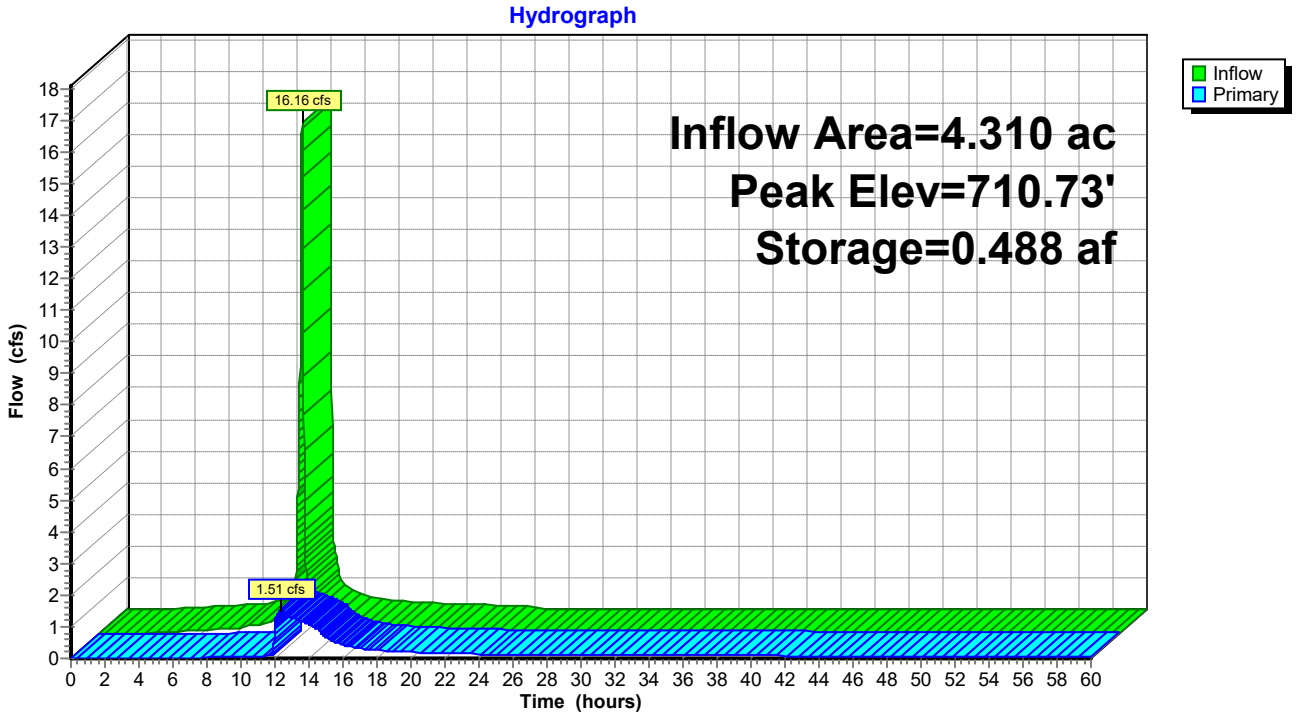
Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.055 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.230	0.000	0.000
710.00	0.280	0.255	0.255
711.00	0.390	0.335	0.590
712.00	0.540	0.465	1.055

Device	Routing	Invert	Outlet Devices
#1	Primary	708.00'	**12.0" Round RCP_Round 12"** L= 18.6' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 708.00' / 707.44' S= 0.0301 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	710.20'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	710.70'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

Primary OutFlow Max=1.49 cfs @ 12.37 hrs HW=710.73' (Free Discharge)
└**1=RCP_Round 12"** (Passes 1.49 cfs of 5.64 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.13 cfs @ 6.17 fps)
  ├**3=Orifice/Grate** (Orifice Controls 1.22 cfs @ 3.50 fps)
  └**4=Orifice/Grate** (Weir Controls 0.14 cfs @ 0.54 fps)

Pond 40P: Dry Basin 03



Summary for Pond 44P: Dry Basin 01

Inflow Area = 1.680 ac, 8.93% Impervious, Inflow Depth = 2.19" for 2-year event
Inflow = 6.15 cfs @ 11.96 hrs, Volume= 0.306 af
Outflow = 0.08 cfs @ 17.93 hrs, Volume= 0.246 af, Atten= 99%, Lag= 358.3 min
Primary = 0.08 cfs @ 17.93 hrs, Volume= 0.246 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 709.66' @ 17.93 hrs Surf.Area= 0.367 ac Storage= 0.234 af

Plug-Flow detention time= 1,233.5 min calculated for 0.246 af (80% of inflow)
Center-of-Mass det. time= 1,154.4 min (1,929.9 - 775.5)

Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.225 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

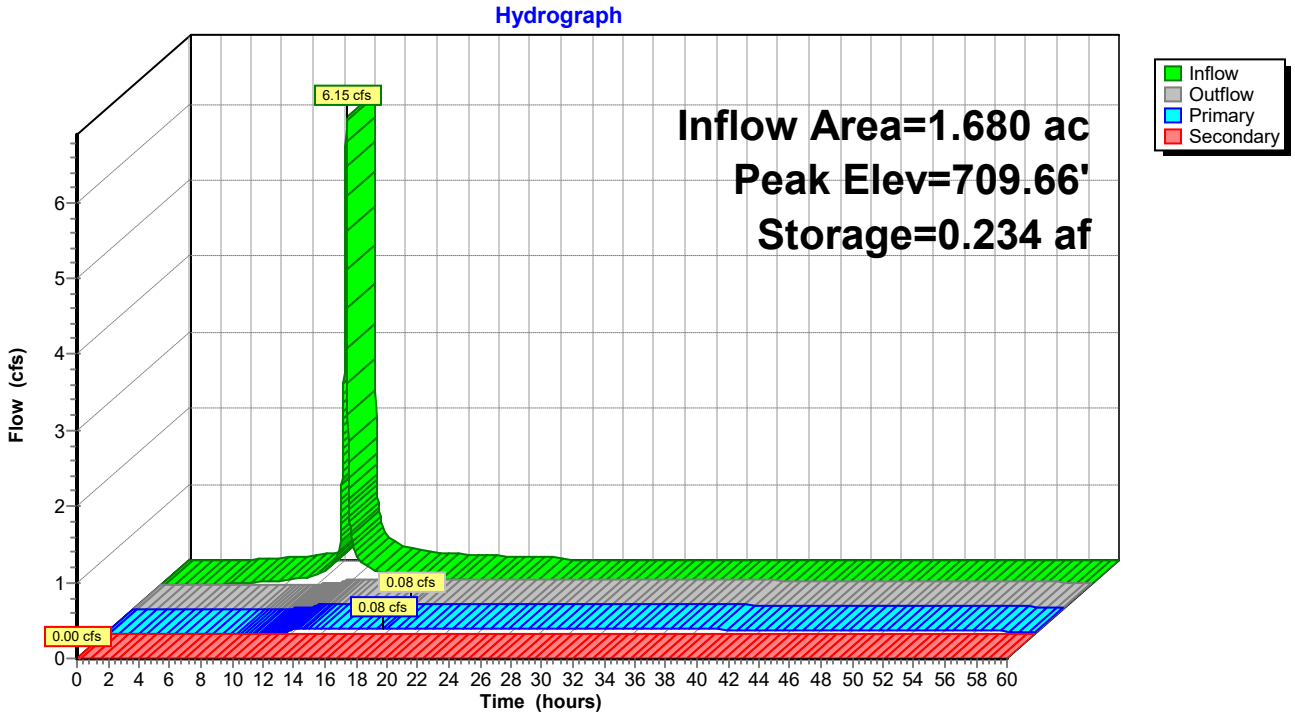
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.340	0.000	0.000
710.00	0.380	0.360	0.360
711.00	0.430	0.405	0.765
712.00	0.490	0.460	1.225

Device	Routing	Invert	Outlet Devices
#1	Primary	702.50'	**12.0" Round Culvert** L= 57.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 702.50' / 701.00' S= 0.0261 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	711.00'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#4	Secondary	711.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.08 cfs @ 17.93 hrs HW=709.66' (Free Discharge)
└**1=Culvert** (Passes 0.08 cfs of 9.60 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 3.67 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=709.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 44P: Dry Basin 01



Summary for Pond 55P: Existing Structure 2

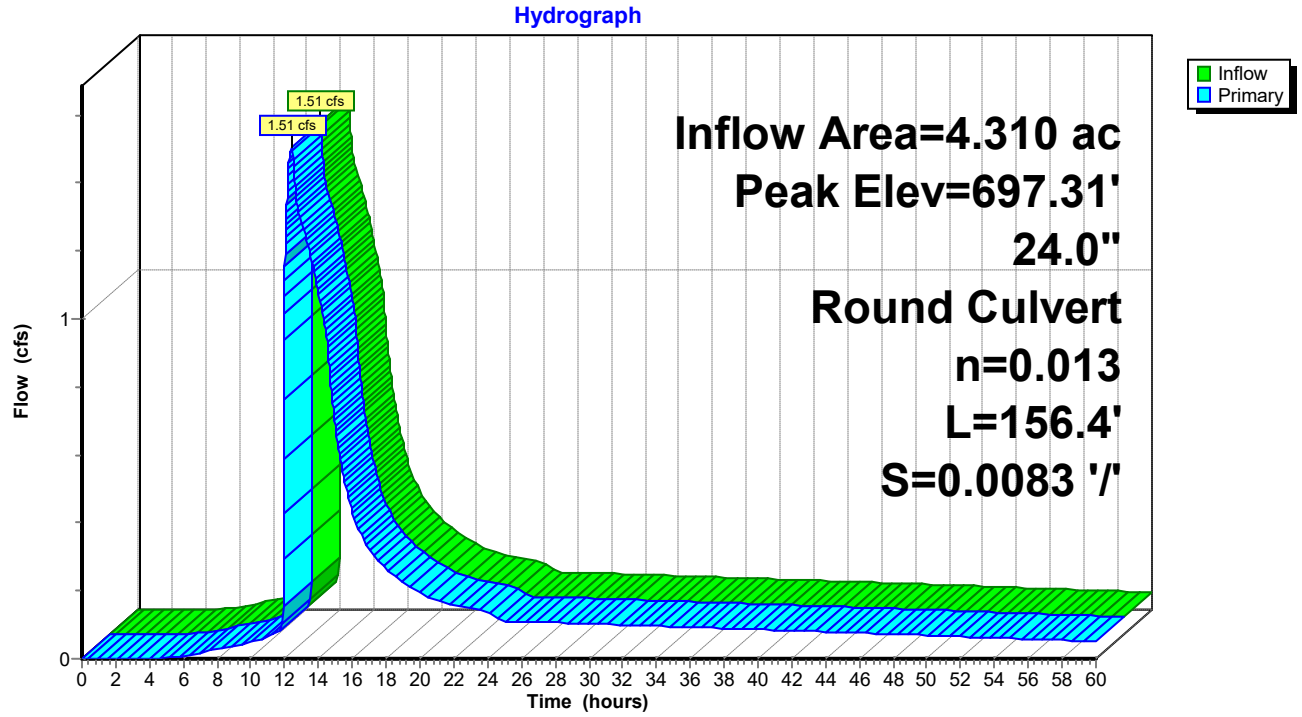
Inflow Area = 4.310 ac, 25.75% Impervious, Inflow Depth > 2.08" for 2-year event
Inflow = 1.51 cfs @ 12.37 hrs, Volume= 0.748 af
Outflow = 1.51 cfs @ 12.37 hrs, Volume= 0.748 af, Atten= 0%, Lag= 0.0 min
Primary = 1.51 cfs @ 12.37 hrs, Volume= 0.748 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 697.31' @ 12.37 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	696.80'	**24.0" Round RCP_Round 24"** L= 156.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 696.80' / 695.50' S= 0.0083 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf

Primary OutFlow Max=1.51 cfs @ 12.37 hrs HW=697.31' (Free Discharge)
1=RCP_Round 24" (Barrel Controls 1.51 cfs @ 3.63 fps)

Pond 55P: Existing Structure 2



Summary for Subcatchment 2S: Pre-Developed 01

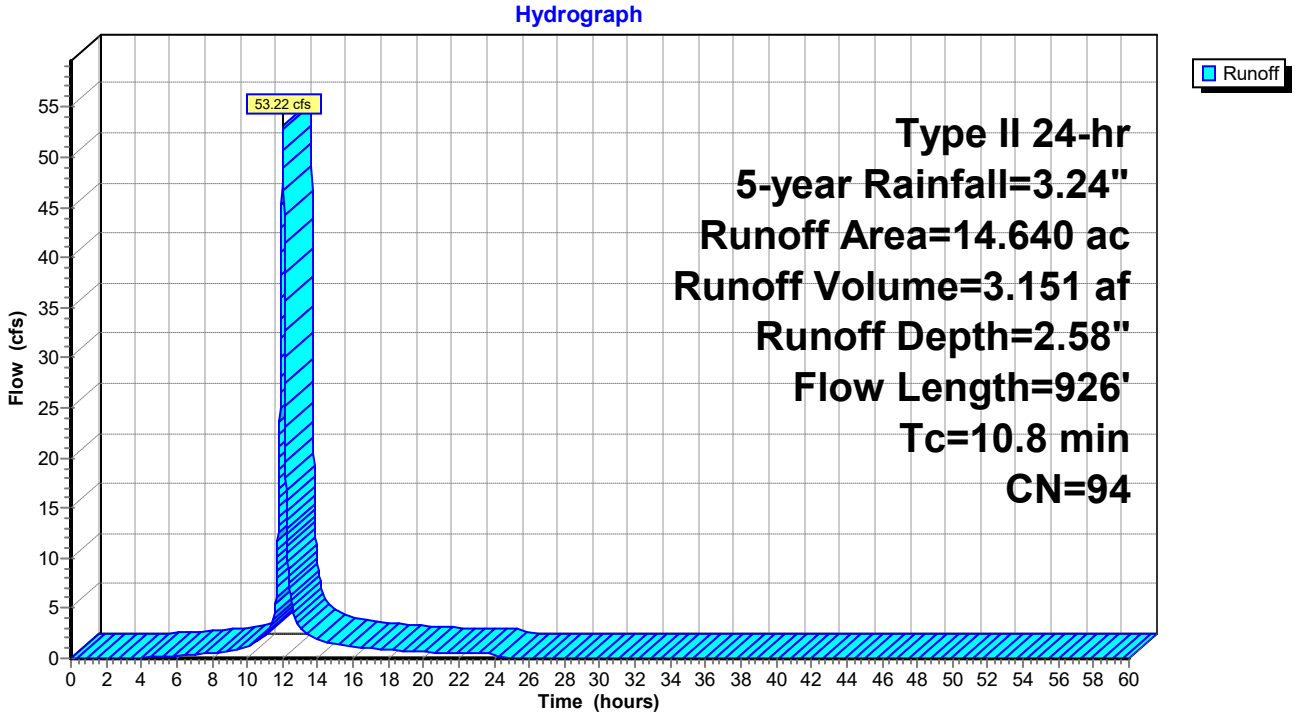
Runoff = 53.22 cfs @ 12.02 hrs, Volume= 3.151 af, Depth= 2.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-year Rainfall=3.24"

Area (ac)	CN	Description
13.040	96	Gravel surface, HSG C
1.600	74	>75% Grass cover, Good, HSG C
14.640	94	Weighted Average
14.640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0234	0.76		**Sheet Flow,** n= 0.022 P2= 2.63"
8.6	826	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
10.8	926	Total			

Subcatchment 2S: Pre-Developed 01



Summary for Subcatchment 30S: Undetained 01

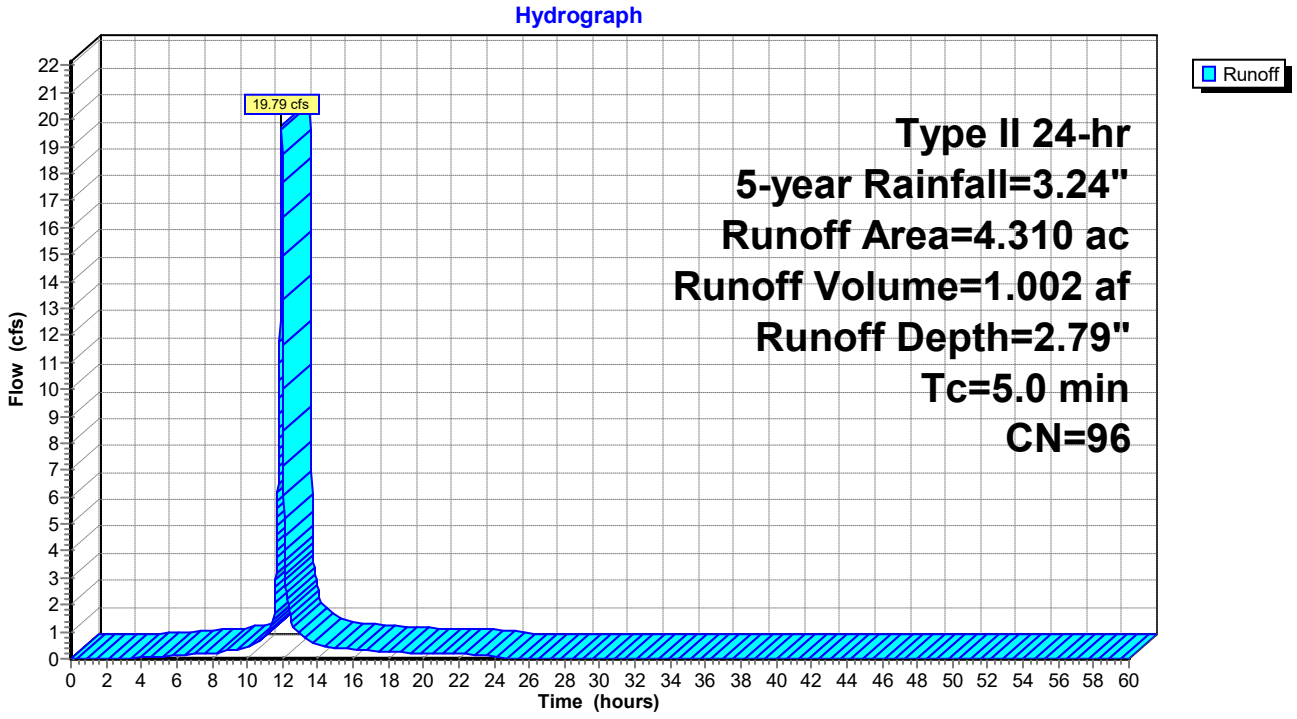
Runoff = 19.79 cfs @ 11.96 hrs, Volume= 1.002 af, Depth= 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-year Rainfall=3.24"

Area (ac)	CN	Description
3.330	96	Gravel surface, HSG C
0.980	98	Paved parking, HSG C
4.310	96	Weighted Average
3.330		77.26% Pervious Area
0.980		22.74% Impervious Area

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

Subcatchment 30S: Undetained 01



Summary for Subcatchment 32S: Undetained 02

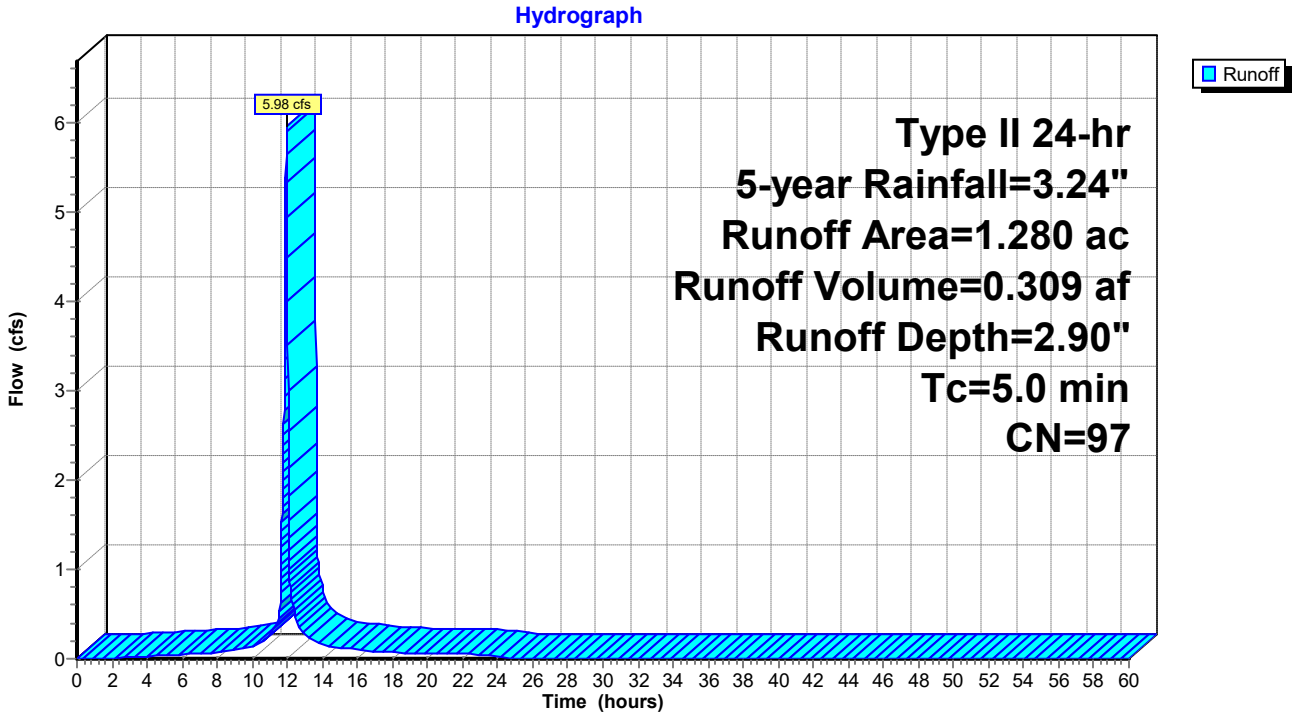
Runoff = 5.98 cfs @ 11.96 hrs, Volume= 0.309 af, Depth= 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-year Rainfall=3.24"

Area (ac)	CN	Description
0.560	96	Gravel surface, HSG C
0.720	98	Paved parking, HSG C
1.280	97	Weighted Average
0.560		43.75% Pervious Area
0.720		56.25% Impervious Area

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

Subcatchment 32S: Undetained 02



Summary for Subcatchment 35S: Subarea 01

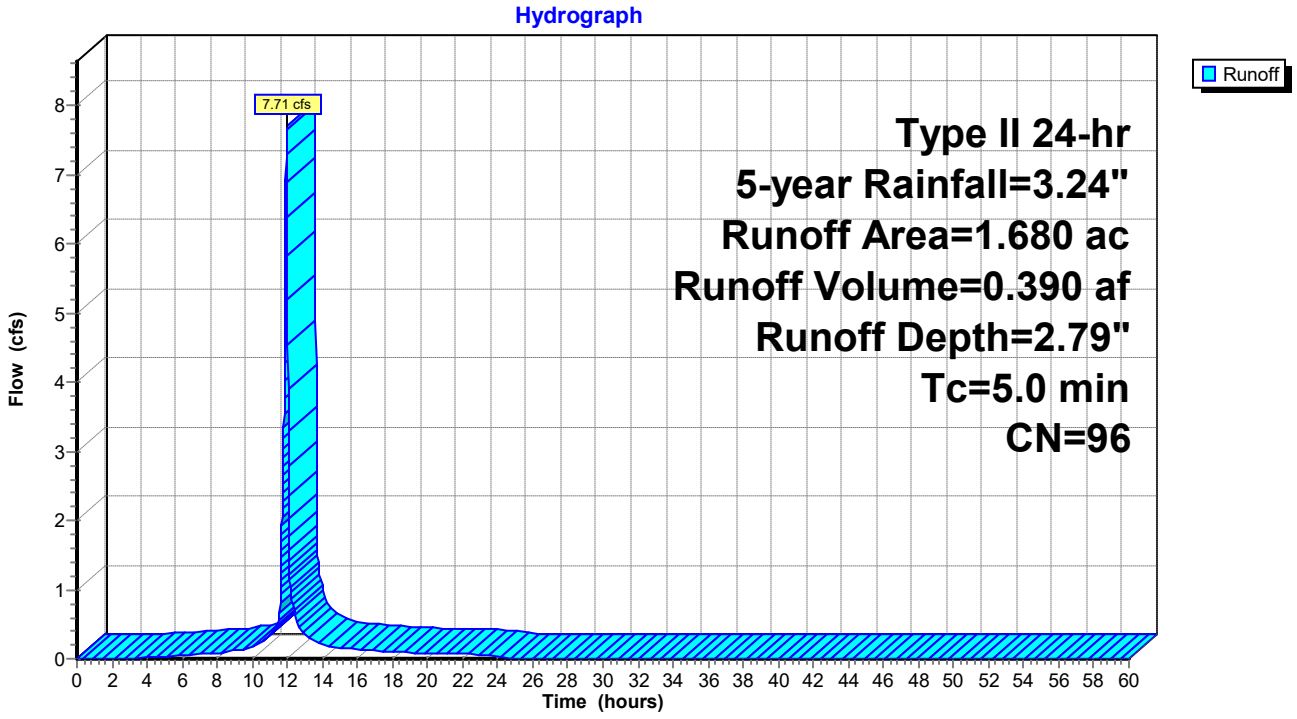
Runoff = 7.71 cfs @ 11.96 hrs, Volume= 0.390 af, Depth= 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-year Rainfall=3.24"

Area (ac)	CN	Description
0.150	98	Paved parking, HSG C
1.530	96	Gravel surface, HSG C
1.680	96	Weighted Average
1.530		91.07% Pervious Area
0.150		8.93% Impervious Area

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

Subcatchment 35S: Subarea 01



Summary for Subcatchment 36S: Subarea 02

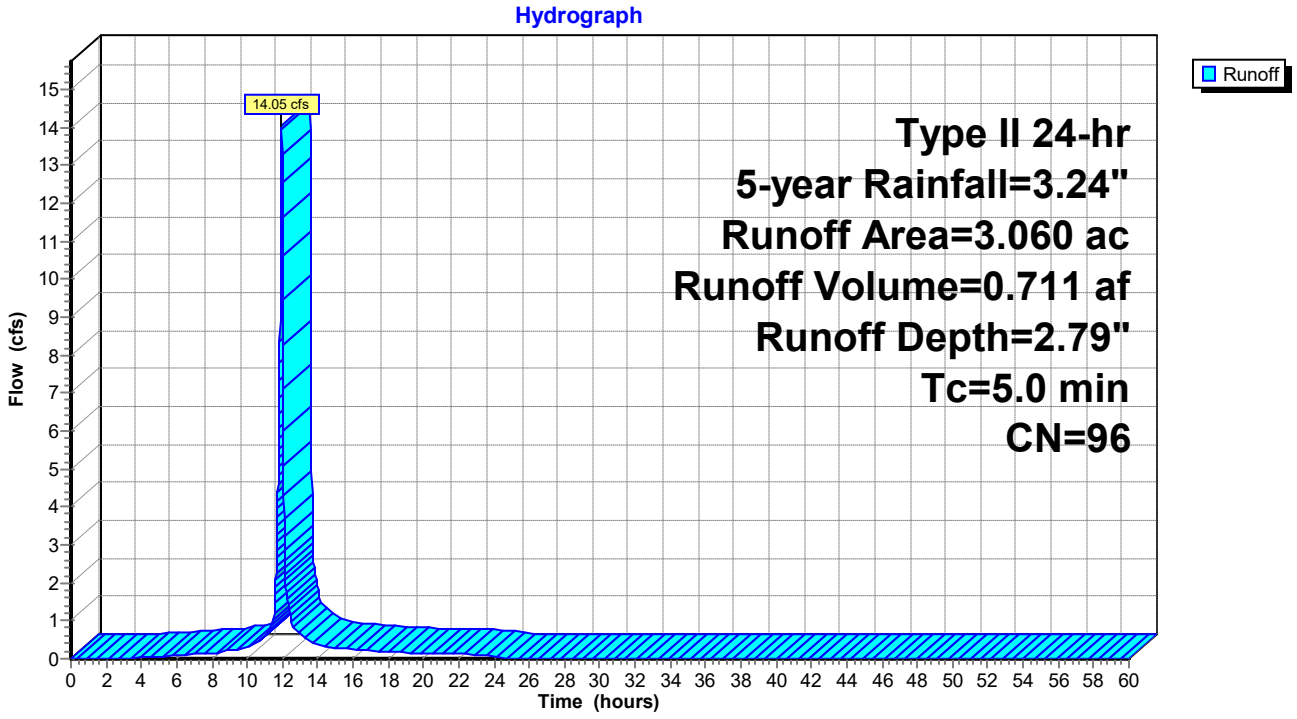
Runoff = 14.05 cfs @ 11.96 hrs, Volume= 0.711 af, Depth= 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-year Rainfall=3.24"

Area (ac)	CN	Description
0.680	98	Paved parking, HSG C
2.380	96	Gravel surface, HSG C
3.060	96	Weighted Average
2.380		77.78% Pervious Area
0.680		22.22% Impervious Area

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

Subcatchment 36S: Subarea 02



Summary for Subcatchment 37S: Subarea 03

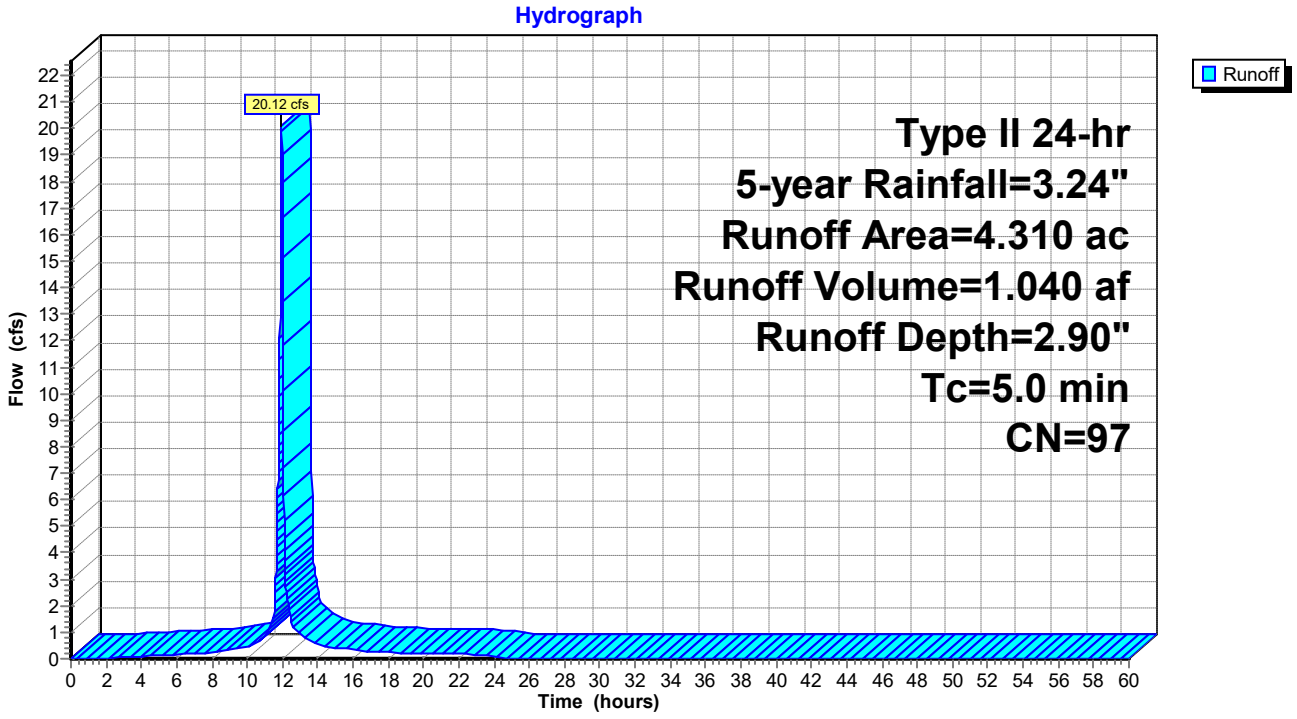
Runoff = 20.12 cfs @ 11.96 hrs, Volume= 1.040 af, Depth= 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-year Rainfall=3.24"

Area (ac)	CN	Description
1.110	98	Paved parking, HSG C
3.200	96	Gravel surface, HSG C
4.310	97	Weighted Average
3.200		74.25% Pervious Area
1.110		25.75% Impervious Area

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

Subcatchment 37S: Subarea 03

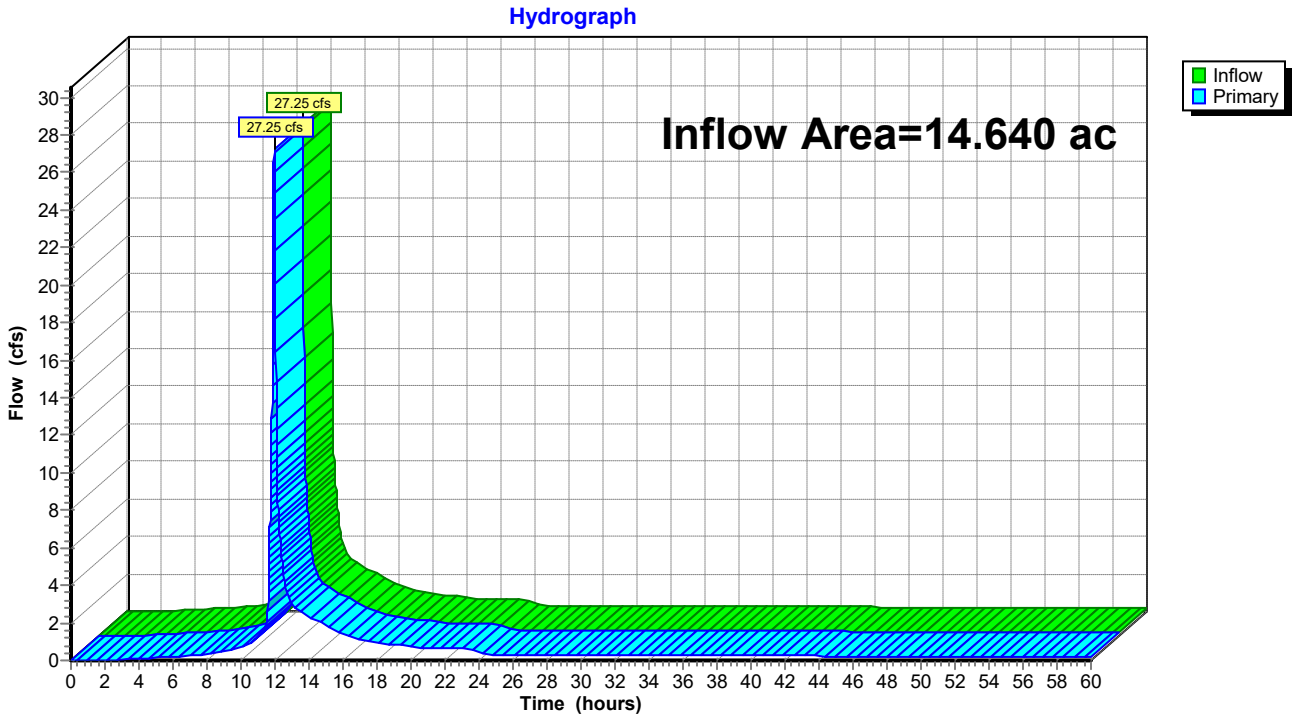


Summary for Pond 34P: Total Out

Inflow Area = 14.640 ac, 24.86% Impervious, Inflow Depth > 2.52" for 5-year event
Inflow = 27.25 cfs @ 11.96 hrs, Volume= 3.069 af
Primary = 27.25 cfs @ 11.96 hrs, Volume= 3.069 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Pond 34P: Total Out



Summary for Pond 38P: Dry Basin 02

Inflow Area = 3.060 ac, 22.22% Impervious, Inflow Depth = 2.79" for 5-year event
Inflow = 14.05 cfs @ 11.96 hrs, Volume= 0.711 af
Outflow = 0.37 cfs @ 14.03 hrs, Volume= 0.497 af, Atten= 97%, Lag= 124.1 min
Primary = 0.37 cfs @ 14.03 hrs, Volume= 0.497 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 710.04' @ 14.03 hrs Surf.Area= 0.775 ac Storage= 0.508 af

Plug-Flow detention time= 1,108.8 min calculated for 0.497 af (70% of inflow)
Center-of-Mass det. time= 1,013.3 min (1,782.6 - 769.3)

Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	2.230 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

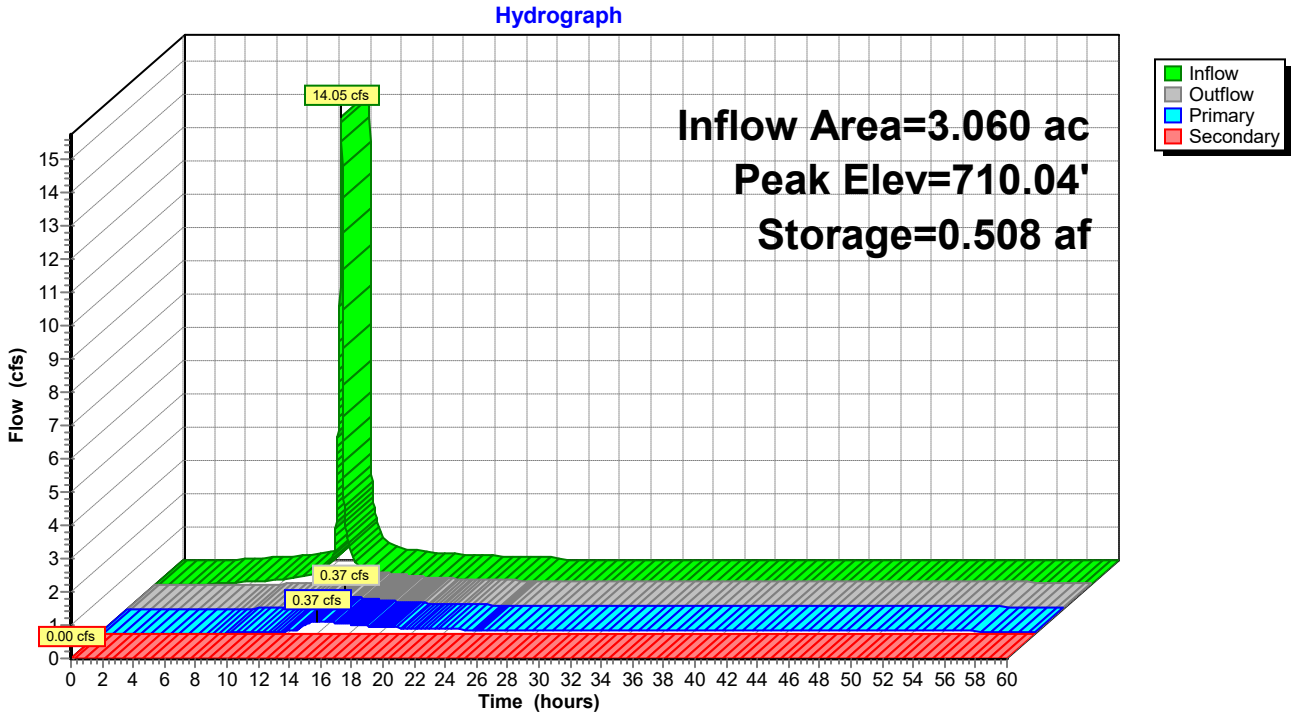
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.180	0.000	0.000
710.00	0.770	0.475	0.475
711.00	0.880	0.825	1.300
712.00	0.980	0.930	2.230

Device	Routing	Invert	Outlet Devices
#1	Primary	707.00'	**15.0" Round Culvert** L= 67.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 707.00' / 704.00' S= 0.0445 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	710.00'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#4	Secondary	711.00'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.36 cfs @ 14.03 hrs HW=710.04' (Free Discharge)
└**1=Culvert** (Passes 0.36 cfs of 9.19 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.10 cfs @ 4.71 fps)
  └**3=Orifice/Grate** (Weir Controls 0.26 cfs @ 0.67 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=709.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 38P: Dry Basin 02



Summary for Pond 40P: Dry Basin 03

Inflow Area = 4.310 ac, 25.75% Impervious, Inflow Depth = 2.90" for 5-year event
Inflow = 20.12 cfs @ 11.96 hrs, Volume= 1.040 af
Outflow = 5.44 cfs @ 12.08 hrs, Volume= 0.964 af, Atten= 73%, Lag= 7.3 min
Primary = 5.44 cfs @ 12.08 hrs, Volume= 0.964 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 710.95' @ 12.08 hrs Surf.Area= 0.385 ac Storage= 0.572 af

Plug-Flow detention time= 545.9 min calculated for 0.963 af (93% of inflow)
Center-of-Mass det. time= 505.1 min (1,266.2 - 761.1)

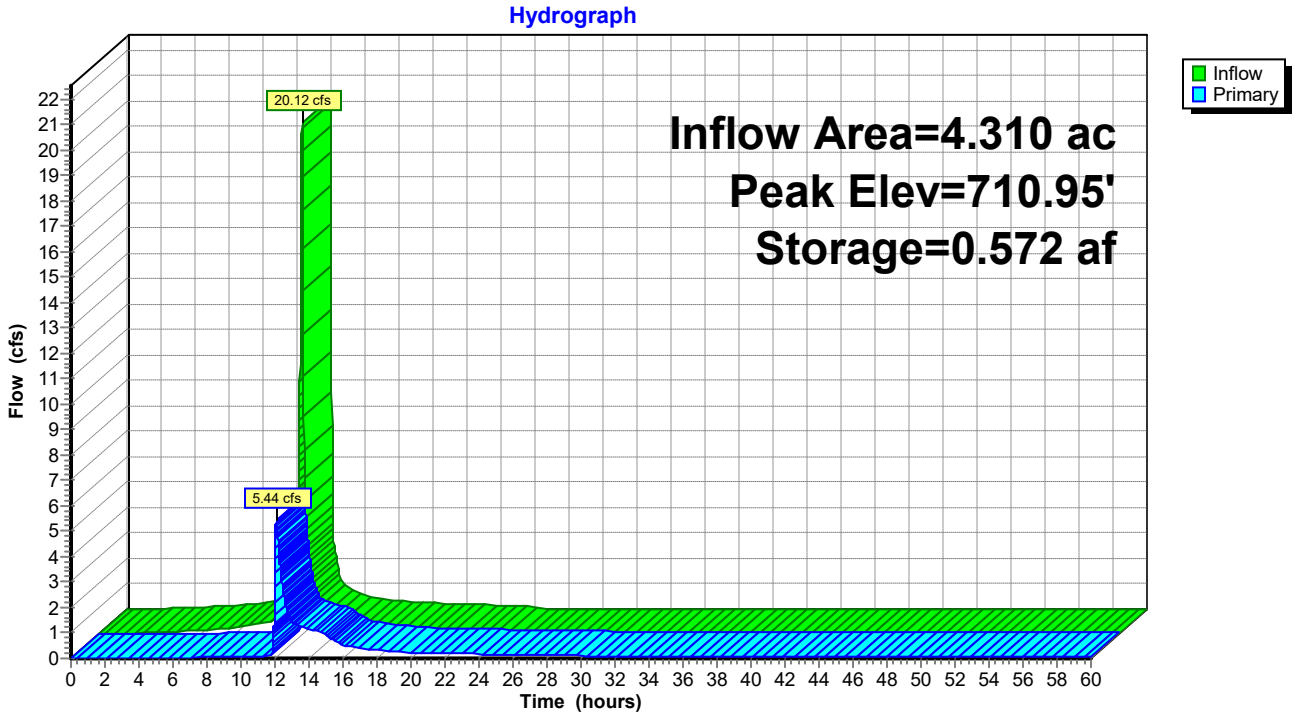
Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.055 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.230	0.000	0.000
710.00	0.280	0.255	0.255
711.00	0.390	0.335	0.590
712.00	0.540	0.465	1.055

Device	Routing	Invert	Outlet Devices
#1	Primary	708.00'	**12.0" Round RCP_Round 12"** L= 18.6' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 708.00' / 707.44' S= 0.0301 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	710.20'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	710.70'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

Primary OutFlow Max=5.45 cfs @ 12.08 hrs HW=710.95' (Free Discharge)
└─**1=RCP_Round 12"** (Passes 5.45 cfs of 5.92 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.59 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.46 cfs @ 4.18 fps)
  └─**4=Orifice/Grate** (Weir Controls 3.85 cfs @ 1.65 fps)

Pond 40P: Dry Basin 03



Summary for Pond 44P: Dry Basin 01

Inflow Area = 1.680 ac, 8.93% Impervious, Inflow Depth = 2.79" for 5-year event
Inflow = 7.71 cfs @ 11.96 hrs, Volume= 0.390 af
Outflow = 0.09 cfs @ 18.47 hrs, Volume= 0.299 af, Atten= 99%, Lag= 390.9 min
Primary = 0.09 cfs @ 18.47 hrs, Volume= 0.299 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 709.85' @ 18.47 hrs Surf.Area= 0.374 ac Storage= 0.303 af

Plug-Flow detention time= 1,279.0 min calculated for 0.299 af (76% of inflow)
Center-of-Mass det. time= 1,192.9 min (1,962.2 - 769.3)

Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.225 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

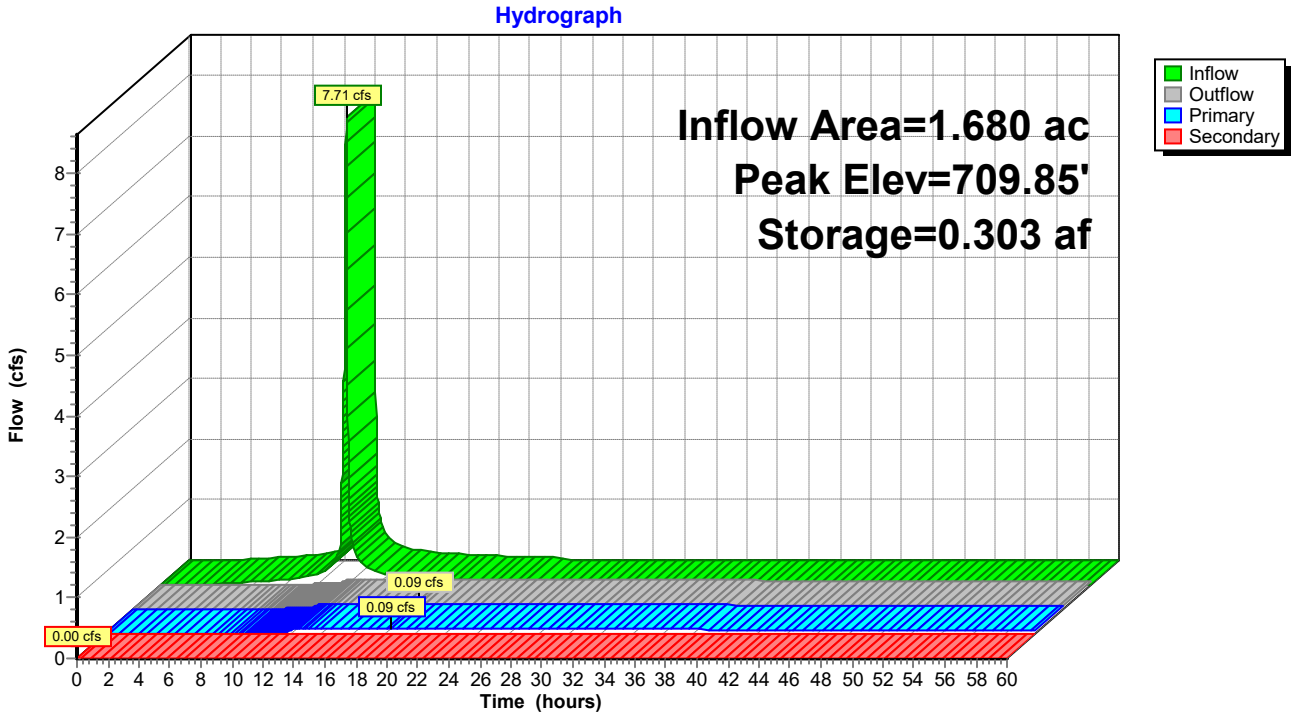
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.340	0.000	0.000
710.00	0.380	0.360	0.360
711.00	0.430	0.405	0.765
712.00	0.490	0.460	1.225

Device	Routing	Invert	Outlet Devices
#1	Primary	702.50'	**12.0" Round Culvert** L= 57.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 702.50' / 701.00' S= 0.0261 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	711.00'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#4	Secondary	711.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.09 cfs @ 18.47 hrs HW=709.85' (Free Discharge)
└**1=Culvert** (Passes 0.09 cfs of 9.72 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.09 cfs @ 4.21 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=709.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 44P: Dry Basin 01



Summary for Pond 55P: Existing Structure 2

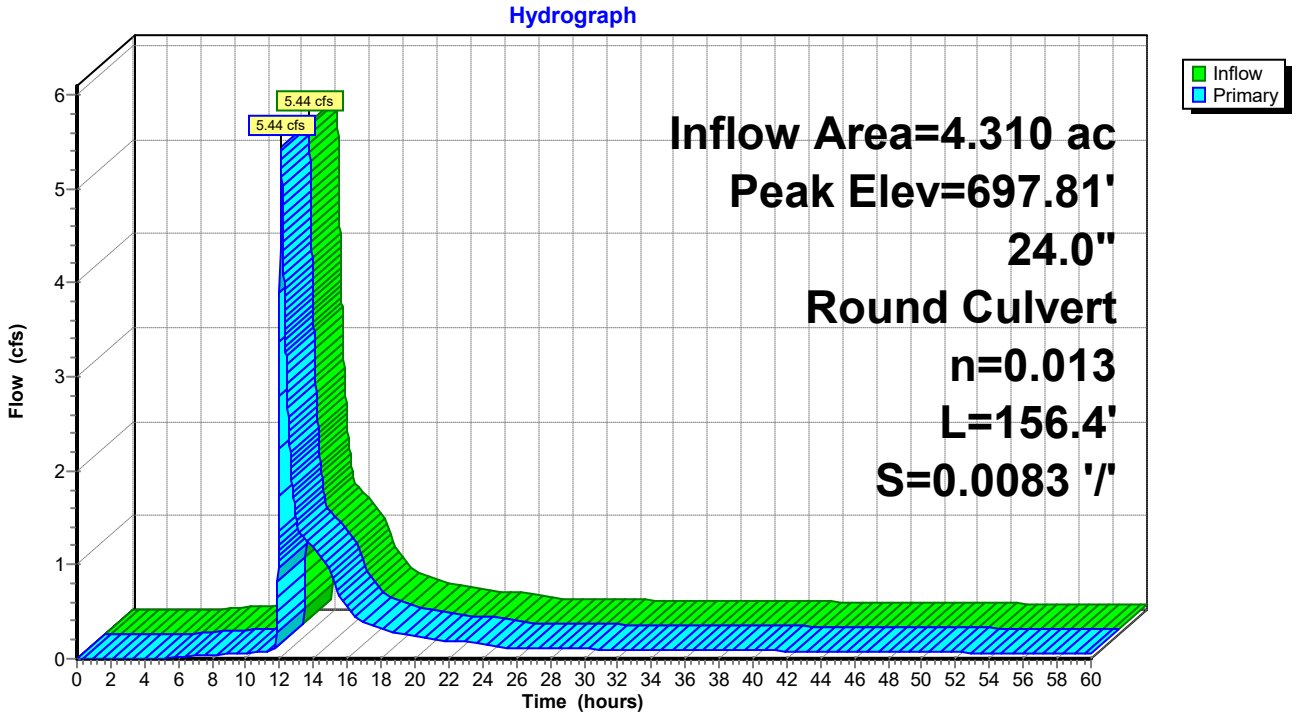
Inflow Area = 4.310 ac, 25.75% Impervious, Inflow Depth > 2.68" for 5-year event
Inflow = 5.44 cfs @ 12.08 hrs, Volume= 0.964 af
Outflow = 5.44 cfs @ 12.08 hrs, Volume= 0.964 af, Atten= 0%, Lag= 0.0 min
Primary = 5.44 cfs @ 12.08 hrs, Volume= 0.964 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 697.81' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	696.80'	**24.0" Round RCP_Round 24"** L= 156.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 696.80' / 695.50' S= 0.0083 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf

Primary OutFlow Max=5.44 cfs @ 12.08 hrs HW=697.81' (Free Discharge)
1=RCP_Round 24" (Barrel Controls 5.44 cfs @ 4.98 fps)

Pond 55P: Existing Structure 2



Summary for Subcatchment 2S: Pre-Developed 01

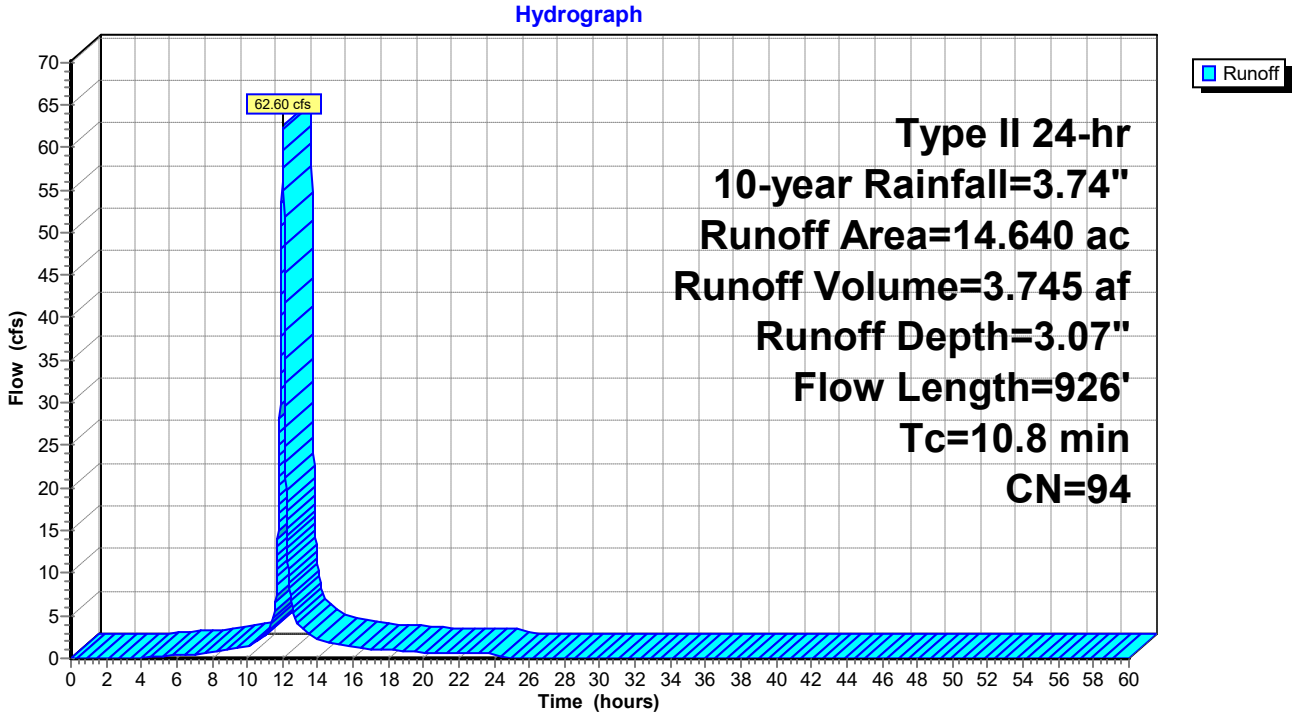
Runoff = 62.60 cfs @ 12.02 hrs, Volume= 3.745 af, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=3.74"

Area (ac)	CN	Description
13.040	96	Gravel surface, HSG C
1.600	74	>75% Grass cover, Good, HSG C
14.640	94	Weighted Average
14.640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0234	0.76		**Sheet Flow,** n= 0.022 P2= 2.63"
8.6	826	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
10.8	926	Total			

Subcatchment 2S: Pre-Developed 01



Summary for Subcatchment 30S: Undetained 01

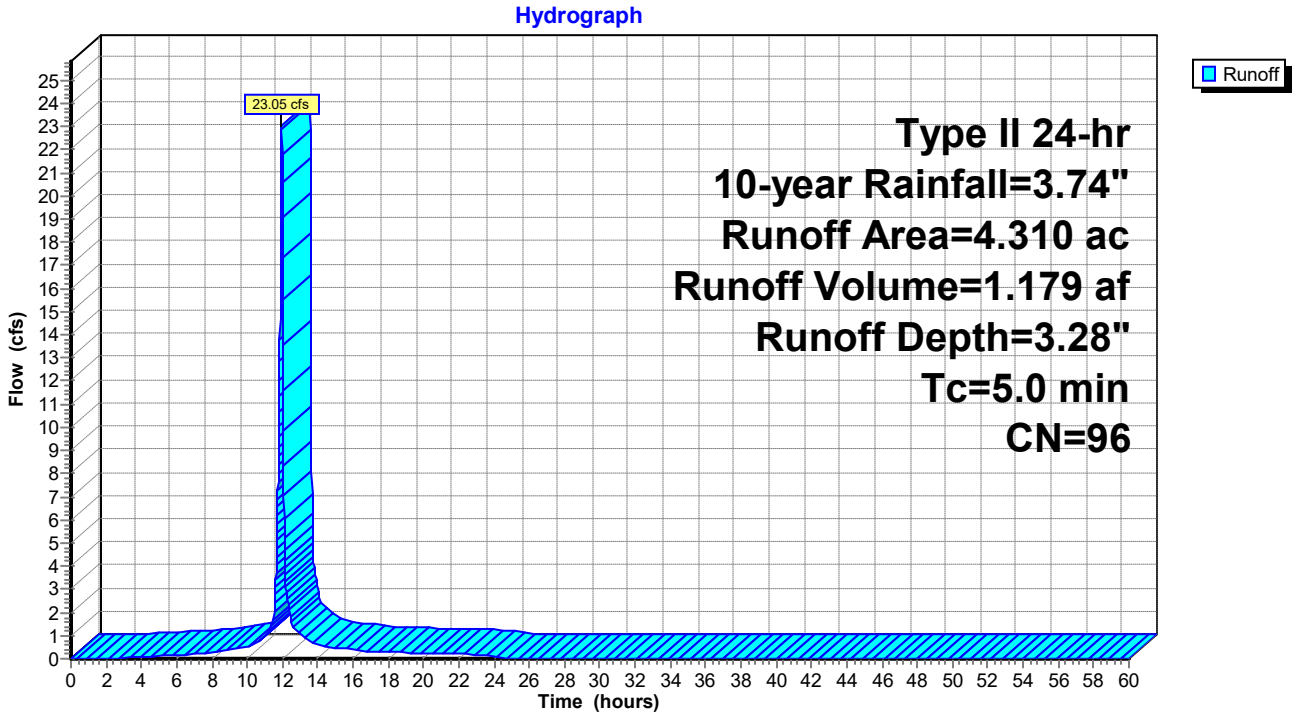
Runoff = 23.05 cfs @ 11.96 hrs, Volume= 1.179 af, Depth= 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=3.74"

Area (ac)	CN	Description
3.330	96	Gravel surface, HSG C
0.980	98	Paved parking, HSG C
4.310	96	Weighted Average
3.330		77.26% Pervious Area
0.980		22.74% Impervious Area

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

Subcatchment 30S: Undetained 01



Summary for Subcatchment 32S: Undetained 02

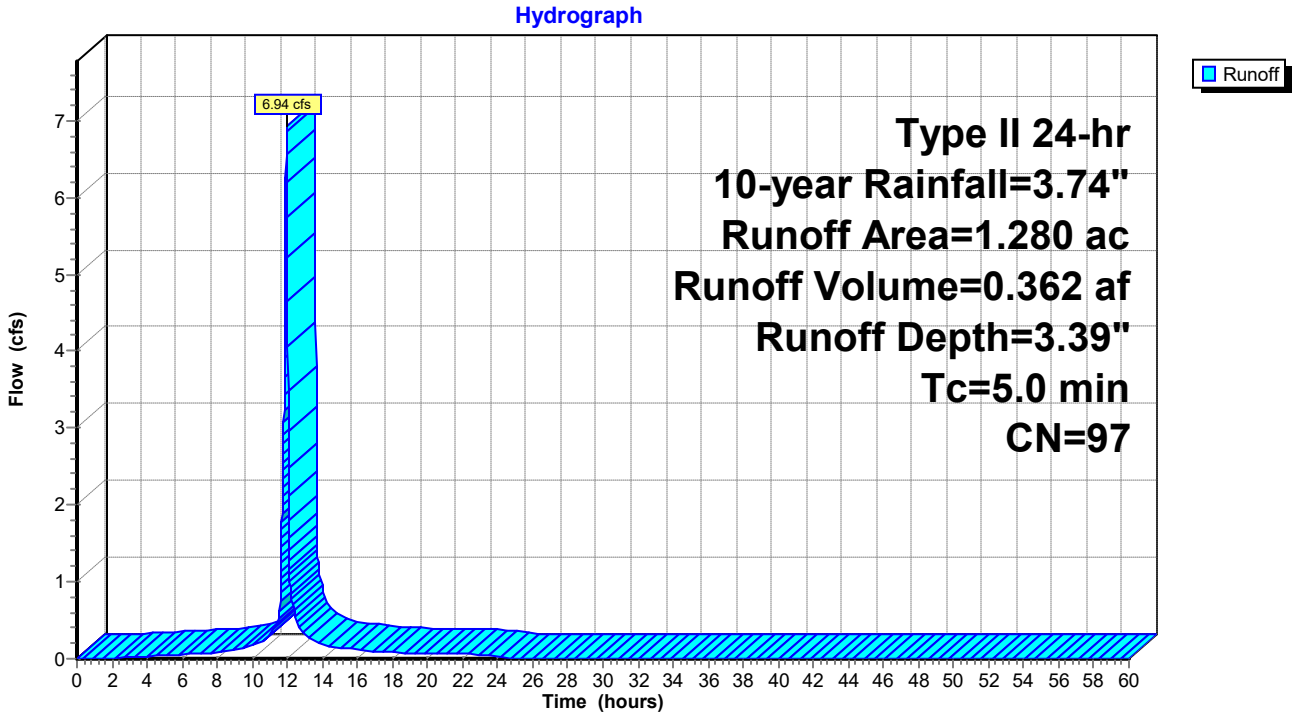
Runoff = 6.94 cfs @ 11.96 hrs, Volume= 0.362 af, Depth= 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=3.74"

Area (ac)	CN	Description
0.560	96	Gravel surface, HSG C
0.720	98	Paved parking, HSG C
1.280	97	Weighted Average
0.560		43.75% Pervious Area
0.720		56.25% Impervious Area

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

Subcatchment 32S: Undetained 02



Summary for Subcatchment 35S: Subarea 01

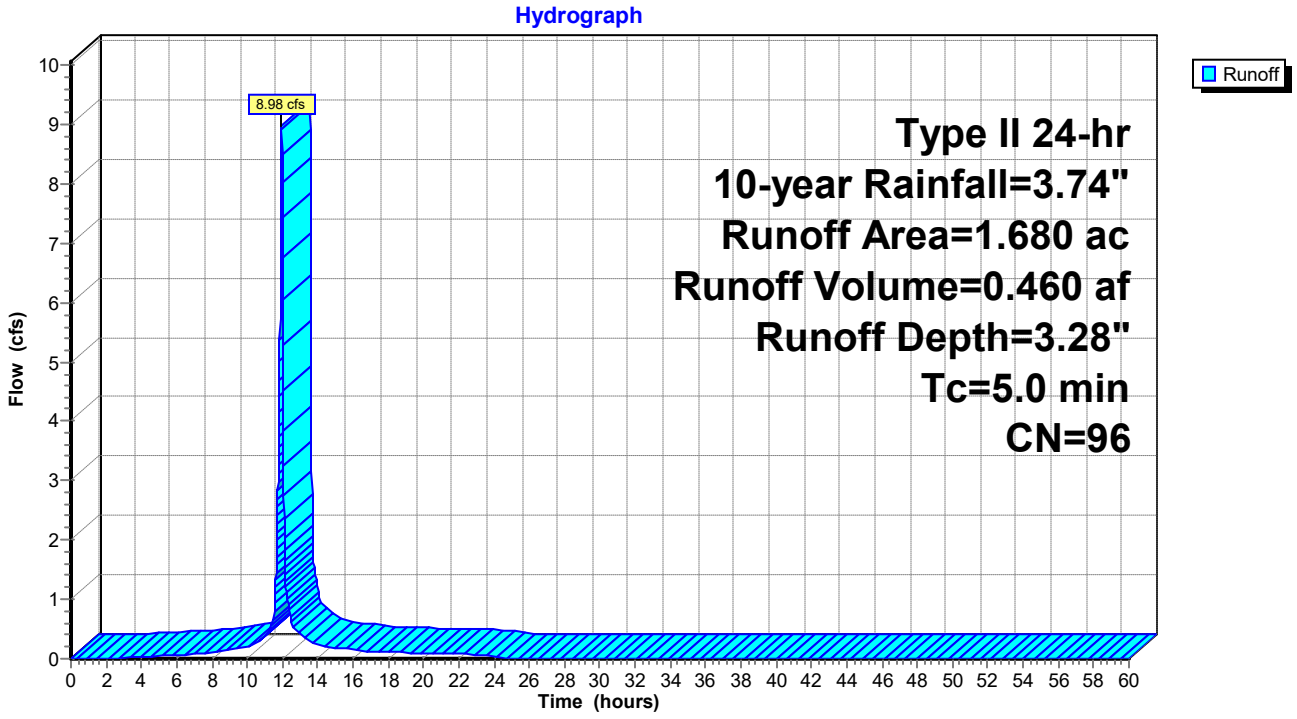
Runoff = 8.98 cfs @ 11.96 hrs, Volume= 0.460 af, Depth= 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=3.74"

Area (ac)	CN	Description
0.150	98	Paved parking, HSG C
1.530	96	Gravel surface, HSG C
1.680	96	Weighted Average
1.530		91.07% Pervious Area
0.150		8.93% Impervious Area

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

Subcatchment 35S: Subarea 01



Summary for Subcatchment 36S: Subarea 02

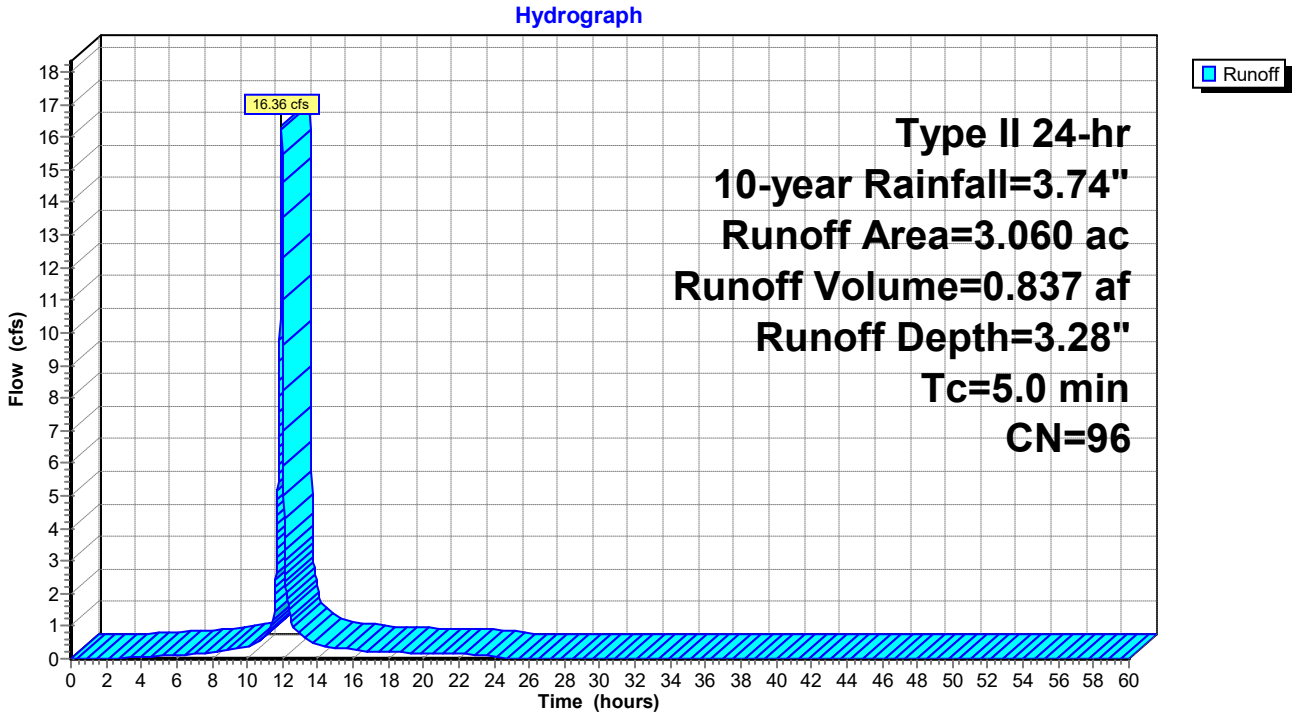
Runoff = 16.36 cfs @ 11.96 hrs, Volume= 0.837 af, Depth= 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=3.74"

Area (ac)	CN	Description
0.680	98	Paved parking, HSG C
2.380	96	Gravel surface, HSG C
3.060	96	Weighted Average
2.380		77.78% Pervious Area
0.680		22.22% Impervious Area

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

Subcatchment 36S: Subarea 02



Summary for Subcatchment 37S: Subarea 03

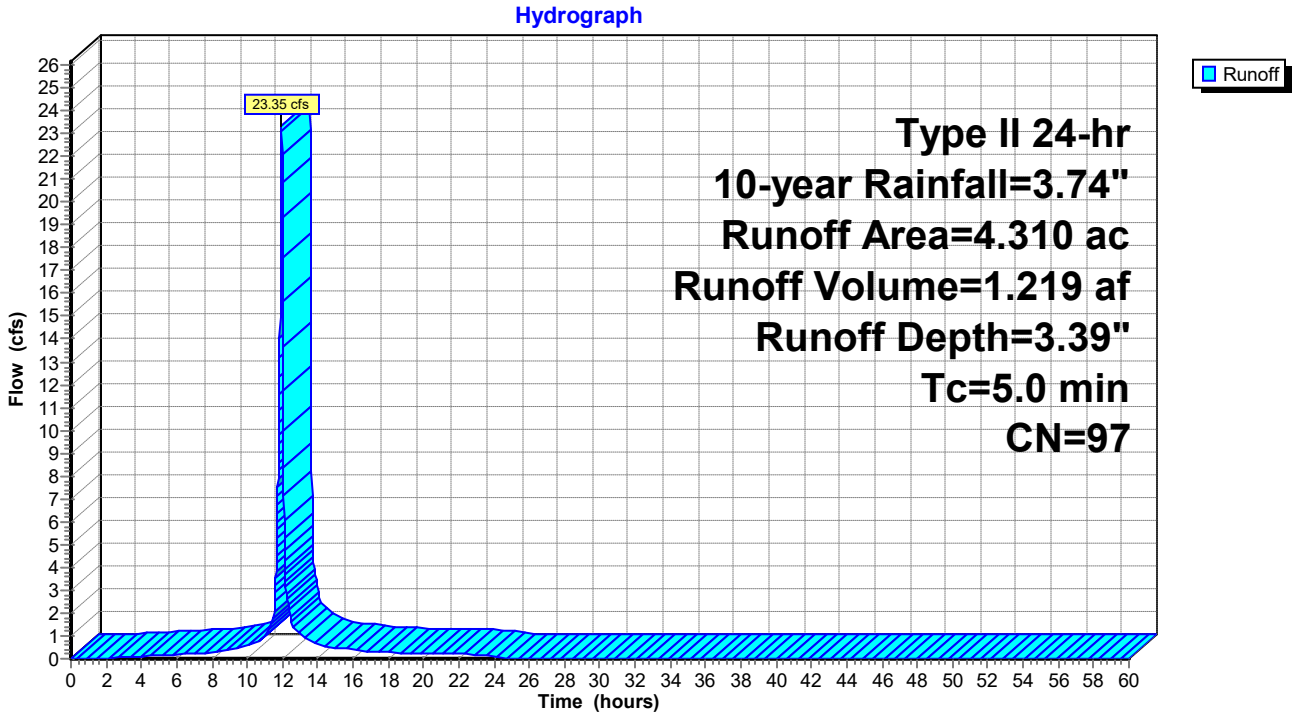
Runoff = 23.35 cfs @ 11.96 hrs, Volume= 1.219 af, Depth= 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=3.74"

Area (ac)	CN	Description
1.110	98	Paved parking, HSG C
3.200	96	Gravel surface, HSG C
4.310	97	Weighted Average
3.200		74.25% Pervious Area
1.110		25.75% Impervious Area

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

Subcatchment 37S: Subarea 03

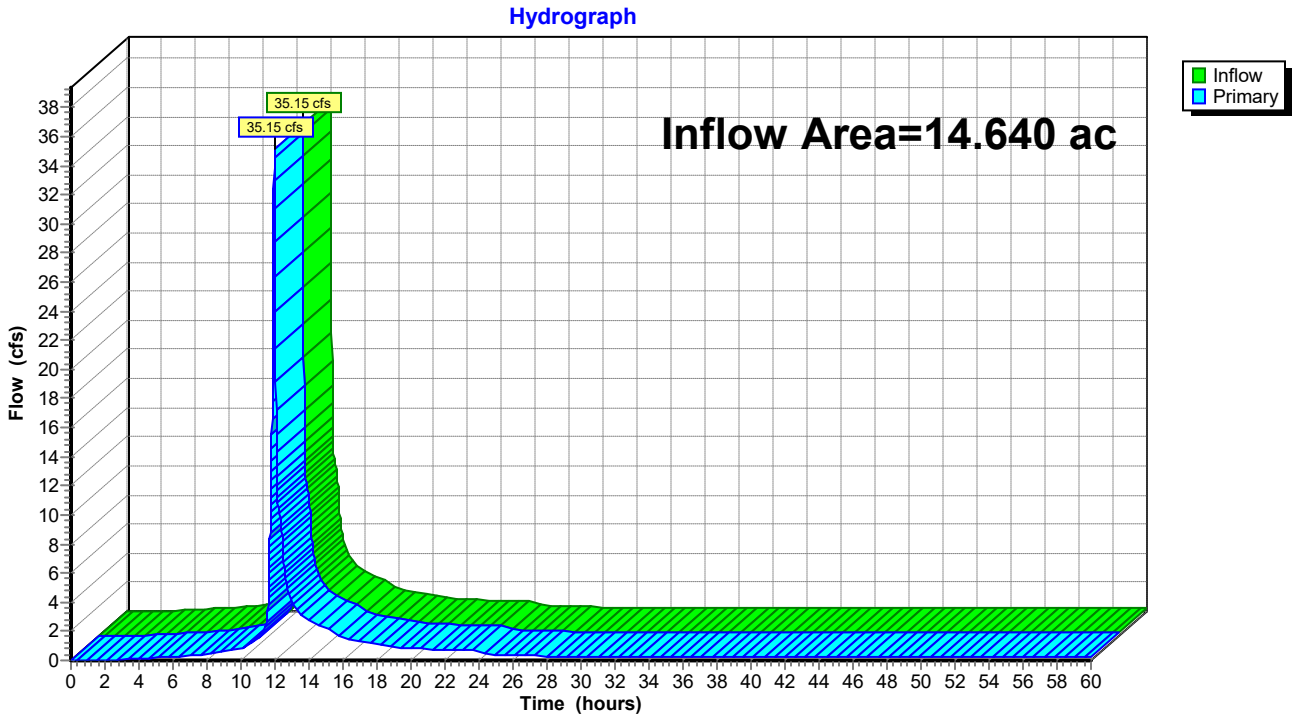


Summary for Pond 34P: Total Out

Inflow Area = 14.640 ac, 24.86% Impervious, Inflow Depth > 2.98" for 10-year event
Inflow = 35.15 cfs @ 11.97 hrs, Volume= 3.640 af
Primary = 35.15 cfs @ 11.97 hrs, Volume= 3.640 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Pond 34P: Total Out



Summary for Pond 38P: Dry Basin 02

Inflow Area = 3.060 ac, 22.22% Impervious, Inflow Depth = 3.28" for 10-year event
Inflow = 16.36 cfs @ 11.96 hrs, Volume= 0.837 af
Outflow = 0.87 cfs @ 12.78 hrs, Volume= 0.621 af, Atten= 95%, Lag= 49.6 min
Primary = 0.87 cfs @ 12.78 hrs, Volume= 0.621 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 710.09' @ 12.78 hrs Surf.Area= 0.779 ac Storage= 0.542 af

Plug-Flow detention time= 921.5 min calculated for 0.621 af (74% of inflow)
Center-of-Mass det. time= 831.9 min (1,597.1 - 765.2)

Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	2.230 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

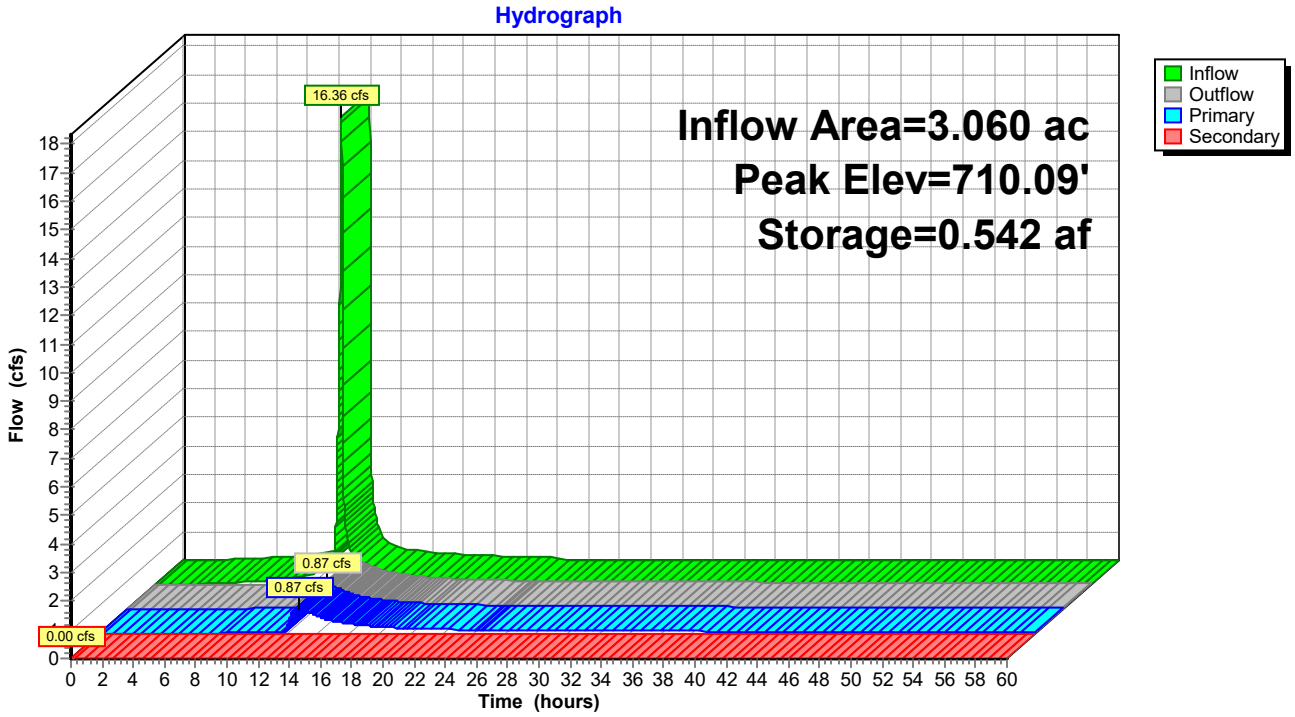
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.180	0.000	0.000
710.00	0.770	0.475	0.475
711.00	0.880	0.825	1.300
712.00	0.980	0.930	2.230

Device	Routing	Invert	Outlet Devices
#1	Primary	707.00'	**15.0" Round Culvert** L= 67.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 707.00' / 704.00' S= 0.0445 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	710.00'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#4	Secondary	711.00'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.86 cfs @ 12.78 hrs HW=710.09' (Free Discharge)
└**1=Culvert** (Passes 0.86 cfs of 9.27 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.11 cfs @ 4.82 fps)
  └**3=Orifice/Grate** (Weir Controls 0.75 cfs @ 0.96 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=709.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 38P: Dry Basin 02



Summary for Pond 40P: Dry Basin 03

Inflow Area = 4.310 ac, 25.75% Impervious, Inflow Depth = 3.39" for 10-year event
Inflow = 23.35 cfs @ 11.96 hrs, Volume= 1.219 af
Outflow = 6.16 cfs @ 12.08 hrs, Volume= 1.141 af, Atten= 74%, Lag= 7.4 min
Primary = 6.16 cfs @ 12.08 hrs, Volume= 1.141 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 711.15' @ 12.08 hrs Surf.Area= 0.413 ac Storage= 0.652 af

Plug-Flow detention time= 476.7 min calculated for 1.141 af (94% of inflow)
Center-of-Mass det. time= 440.3 min (1,197.9 - 757.5)

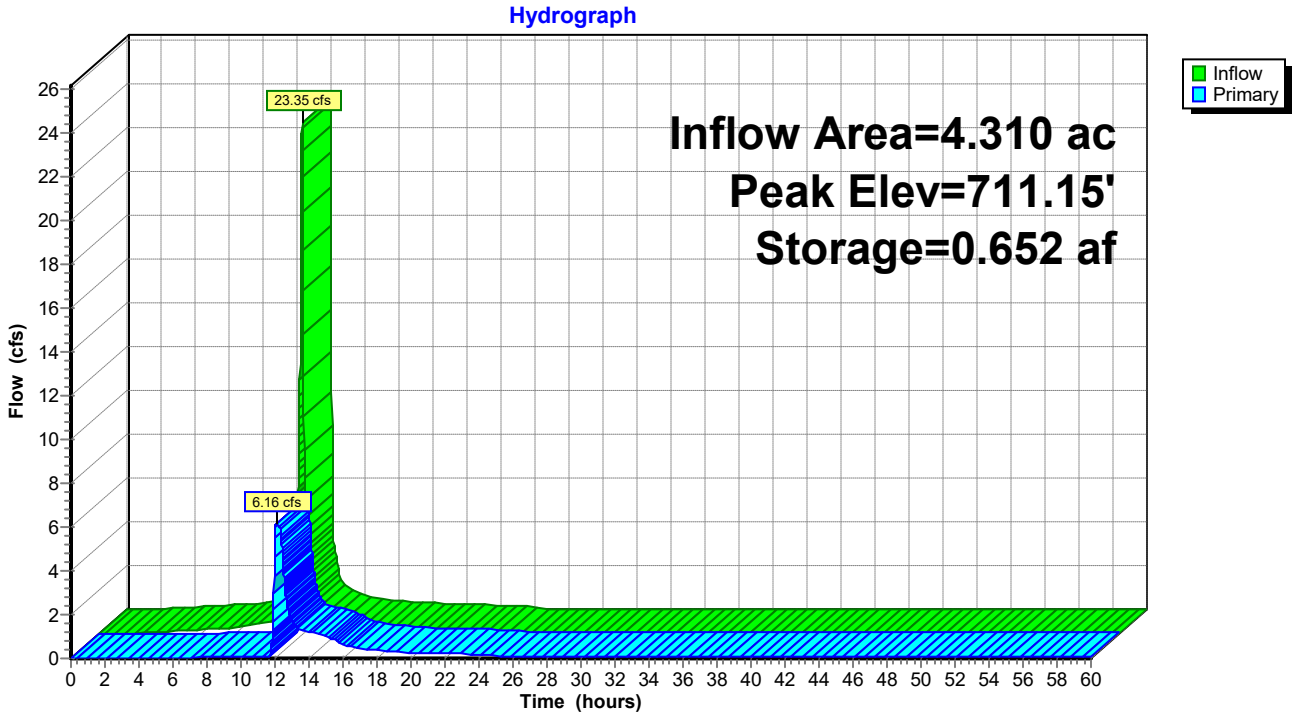
Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.055 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.230	0.000	0.000
710.00	0.280	0.255	0.255
711.00	0.390	0.335	0.590
712.00	0.540	0.465	1.055

Device	Routing	Invert	Outlet Devices
#1	Primary	708.00'	**12.0" Round RCP_Round 12"** L= 18.6' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 708.00' / 707.44' S= 0.0301 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	710.20'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	710.70'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

Primary OutFlow Max=6.16 cfs @ 12.08 hrs HW=711.15' (Free Discharge)
└─**1=RCP_Round 12"** (Inlet Controls 6.16 cfs @ 7.84 fps)
  ├─**2=Orifice/Grate** (Passes < 0.15 cfs potential flow)
  ├─**3=Orifice/Grate** (Passes < 1.64 cfs potential flow)
  └─**4=Orifice/Grate** (Passes < 8.65 cfs potential flow)

Pond 40P: Dry Basin 03



Summary for Pond 44P: Dry Basin 01

Inflow Area = 1.680 ac, 8.93% Impervious, Inflow Depth = 3.28" for 10-year event
Inflow = 8.98 cfs @ 11.96 hrs, Volume= 0.460 af
Outflow = 0.10 cfs @ 18.85 hrs, Volume= 0.337 af, Atten= 99%, Lag= 413.4 min
Primary = 0.10 cfs @ 18.85 hrs, Volume= 0.337 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 710.00' @ 18.85 hrs Surf.Area= 0.380 ac Storage= 0.361 af

Plug-Flow detention time= 1,303.8 min calculated for 0.337 af (73% of inflow)
Center-of-Mass det. time= 1,213.0 min (1,978.2 - 765.2)

Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.225 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

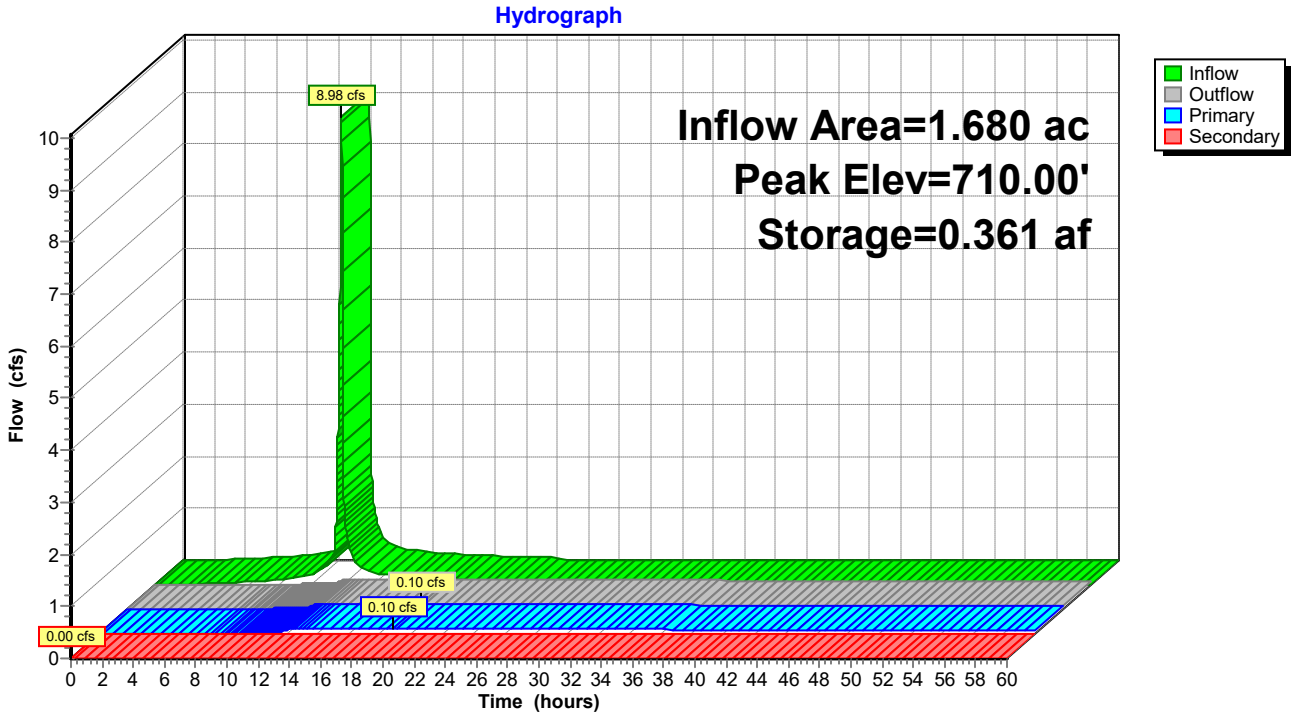
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.340	0.000	0.000
710.00	0.380	0.360	0.360
711.00	0.430	0.405	0.765
712.00	0.490	0.460	1.225

Device	Routing	Invert	Outlet Devices
#1	Primary	702.50'	**12.0" Round Culvert** L= 57.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 702.50' / 701.00' S= 0.0261 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	711.00'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#4	Secondary	711.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.10 cfs @ 18.85 hrs HW=710.00' (Free Discharge)
└**1=Culvert** (Passes 0.10 cfs of 9.81 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.10 cfs @ 4.61 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=709.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 44P: Dry Basin 01



Summary for Pond 55P: Existing Structure 2

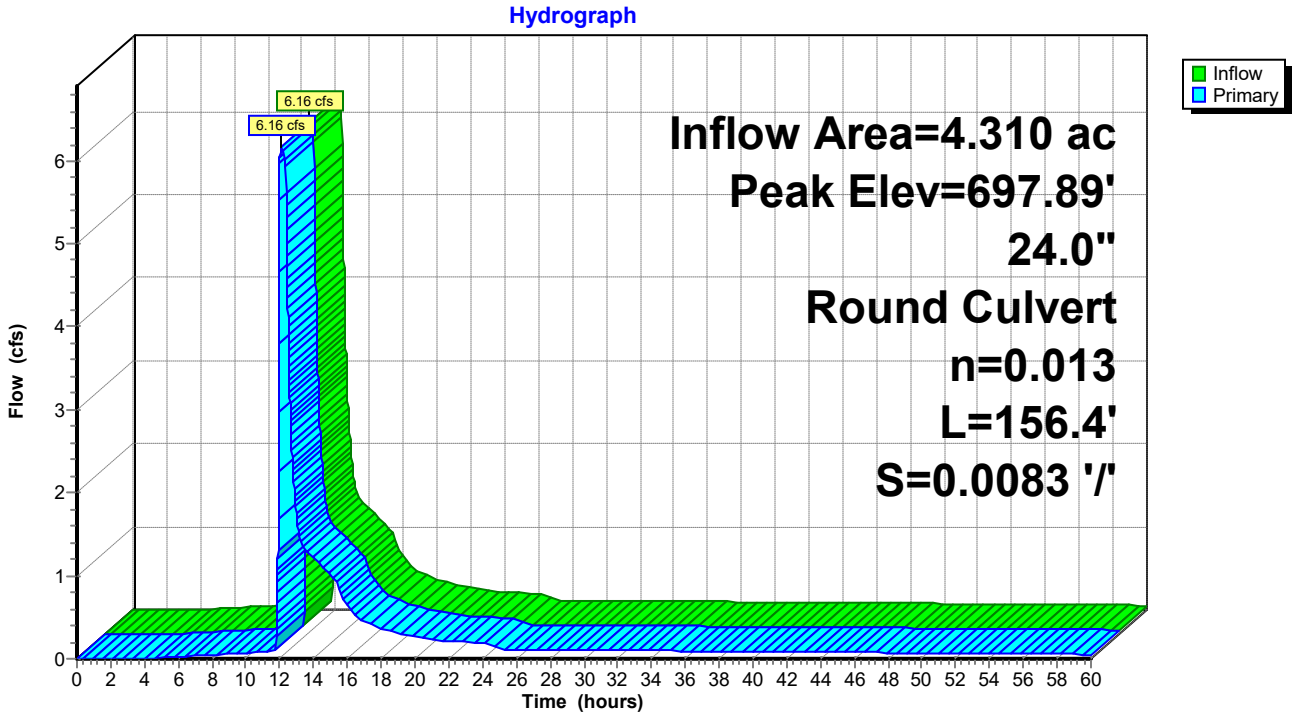
Inflow Area = 4.310 ac, 25.75% Impervious, Inflow Depth > 3.18" for 10-year event
Inflow = 6.16 cfs @ 12.08 hrs, Volume= 1.141 af
Outflow = 6.16 cfs @ 12.08 hrs, Volume= 1.141 af, Atten= 0%, Lag= 0.0 min
Primary = 6.16 cfs @ 12.08 hrs, Volume= 1.141 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 697.89' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	696.80'	**24.0" Round RCP_Round 24"** L= 156.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 696.80' / 695.50' S= 0.0083 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf

Primary OutFlow Max=6.16 cfs @ 12.08 hrs HW=697.89' (Free Discharge)
1=RCP_Round 24" (Barrel Controls 6.16 cfs @ 5.13 fps)

Pond 55P: Existing Structure 2



Summary for Subcatchment 2S: Pre-Developed 01

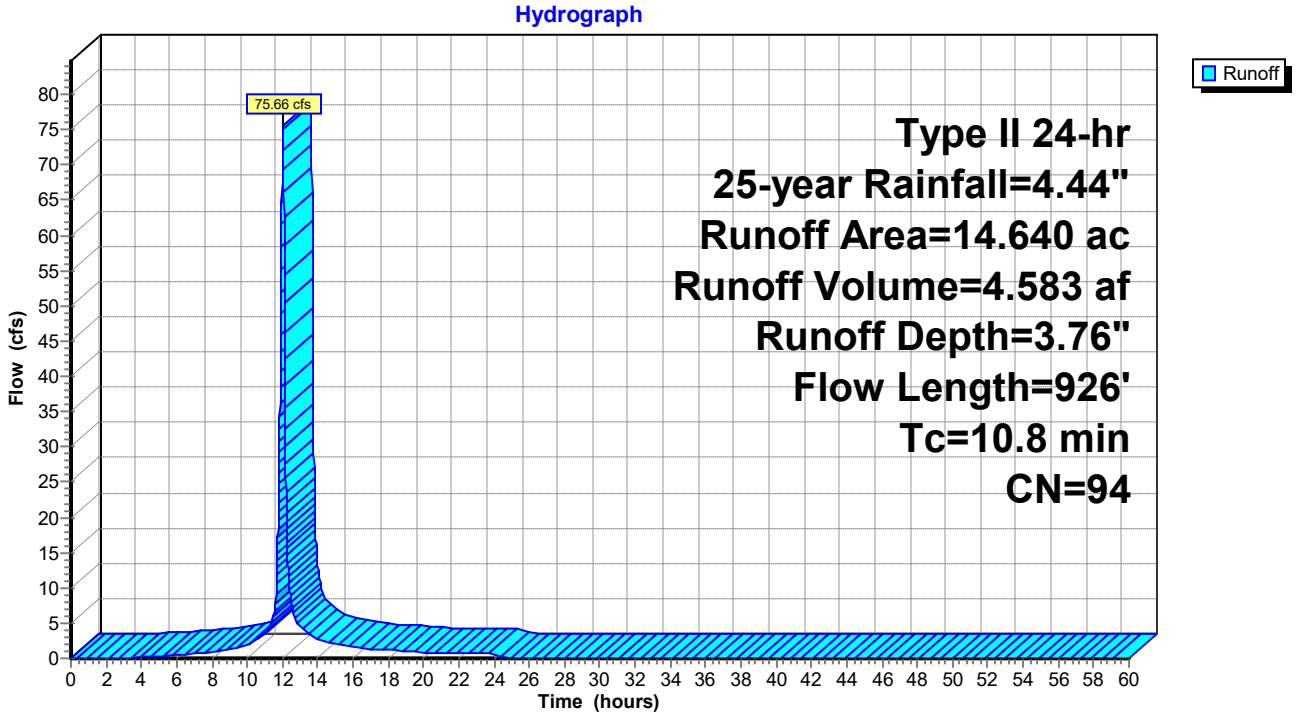
Runoff = 75.66 cfs @ 12.02 hrs, Volume= 4.583 af, Depth= 3.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year Rainfall=4.44"

Area (ac)	CN	Description
13.040	96	Gravel surface, HSG C
1.600	74	>75% Grass cover, Good, HSG C
14.640	94	Weighted Average
14.640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0234	0.76		**Sheet Flow,** n= 0.022 P2= 2.63"
8.6	826	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
10.8	926	Total			

Subcatchment 2S: Pre-Developed 01



Summary for Subcatchment 30S: Undetained 01

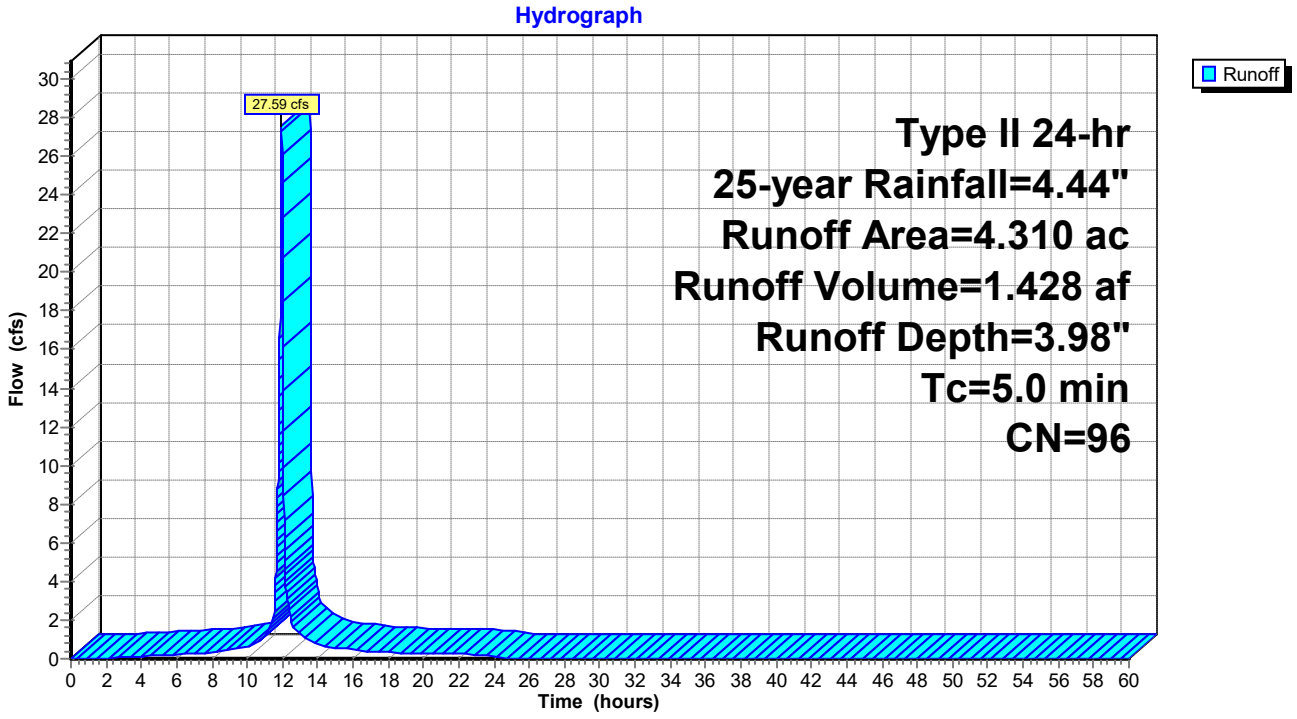
Runoff = 27.59 cfs @ 11.96 hrs, Volume= 1.428 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year Rainfall=4.44"

Area (ac)	CN	Description
3.330	96	Gravel surface, HSG C
0.980	98	Paved parking, HSG C
4.310	96	Weighted Average
3.330		77.26% Pervious Area
0.980		22.74% Impervious Area

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

Subcatchment 30S: Undetained 01



Summary for Subcatchment 32S: Undetained 02

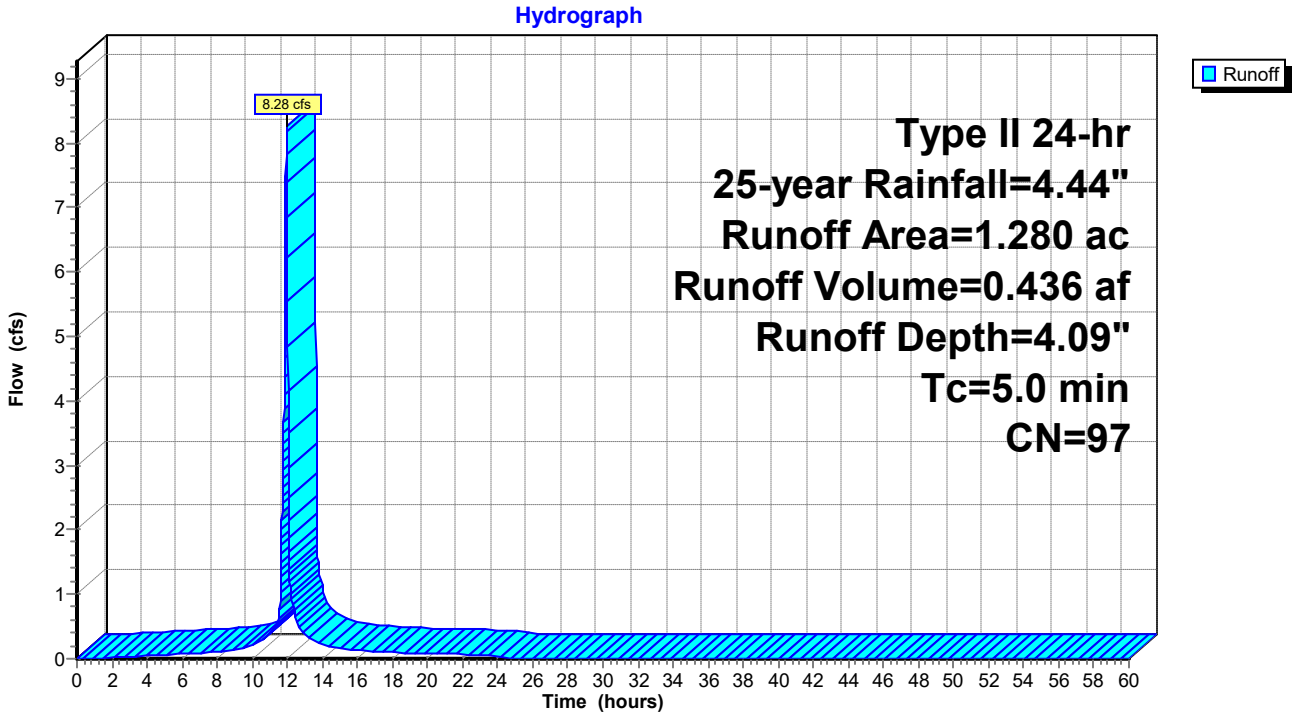
Runoff = 8.28 cfs @ 11.96 hrs, Volume= 0.436 af, Depth= 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year Rainfall=4.44"

Area (ac)	CN	Description
0.560	96	Gravel surface, HSG C
0.720	98	Paved parking, HSG C
1.280	97	Weighted Average
0.560		43.75% Pervious Area
0.720		56.25% Impervious Area

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

Subcatchment 32S: Undetained 02



Summary for Subcatchment 35S: Subarea 01

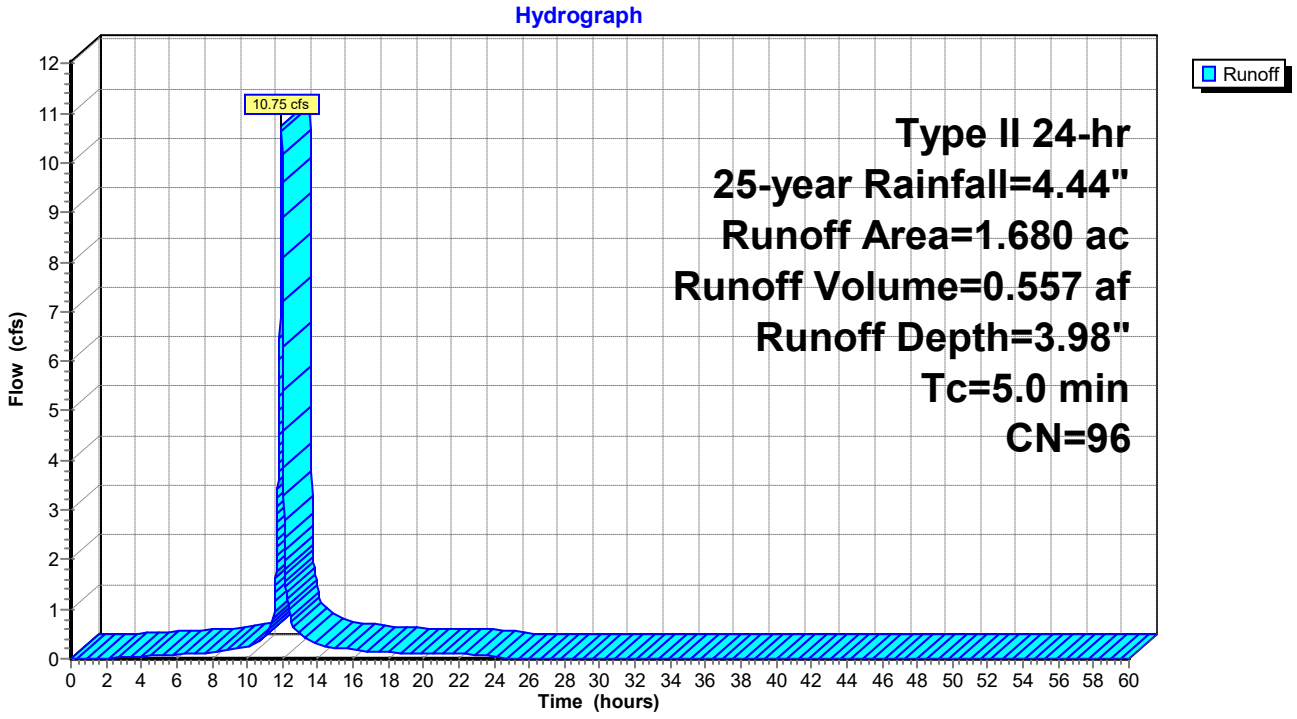
Runoff = 10.75 cfs @ 11.96 hrs, Volume= 0.557 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year Rainfall=4.44"

Area (ac)	CN	Description
0.150	98	Paved parking, HSG C
1.530	96	Gravel surface, HSG C
1.680	96	Weighted Average
1.530		91.07% Pervious Area
0.150		8.93% Impervious Area

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

Subcatchment 35S: Subarea 01



Summary for Subcatchment 36S: Subarea 02

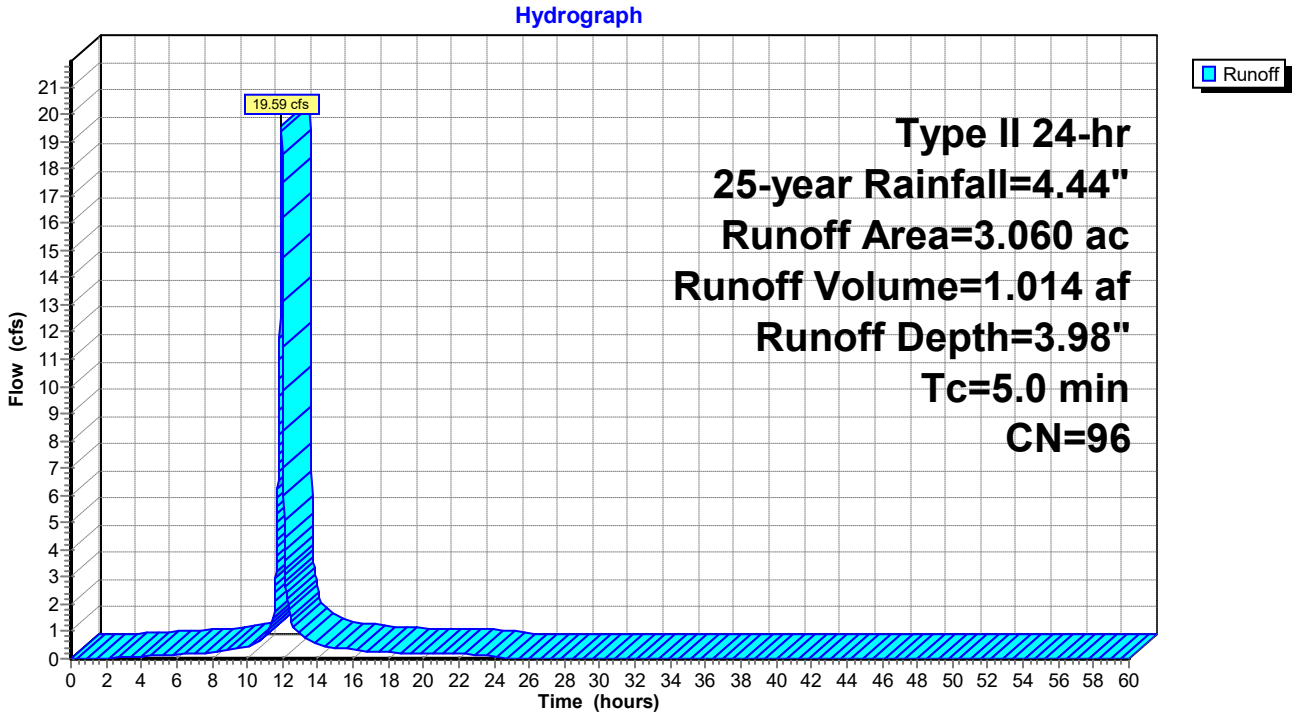
Runoff = 19.59 cfs @ 11.96 hrs, Volume= 1.014 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year Rainfall=4.44"

Area (ac)	CN	Description
0.680	98	Paved parking, HSG C
2.380	96	Gravel surface, HSG C
3.060	96	Weighted Average
2.380		77.78% Pervious Area
0.680		22.22% Impervious Area

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

Subcatchment 36S: Subarea 02



Summary for Subcatchment 37S: Subarea 03

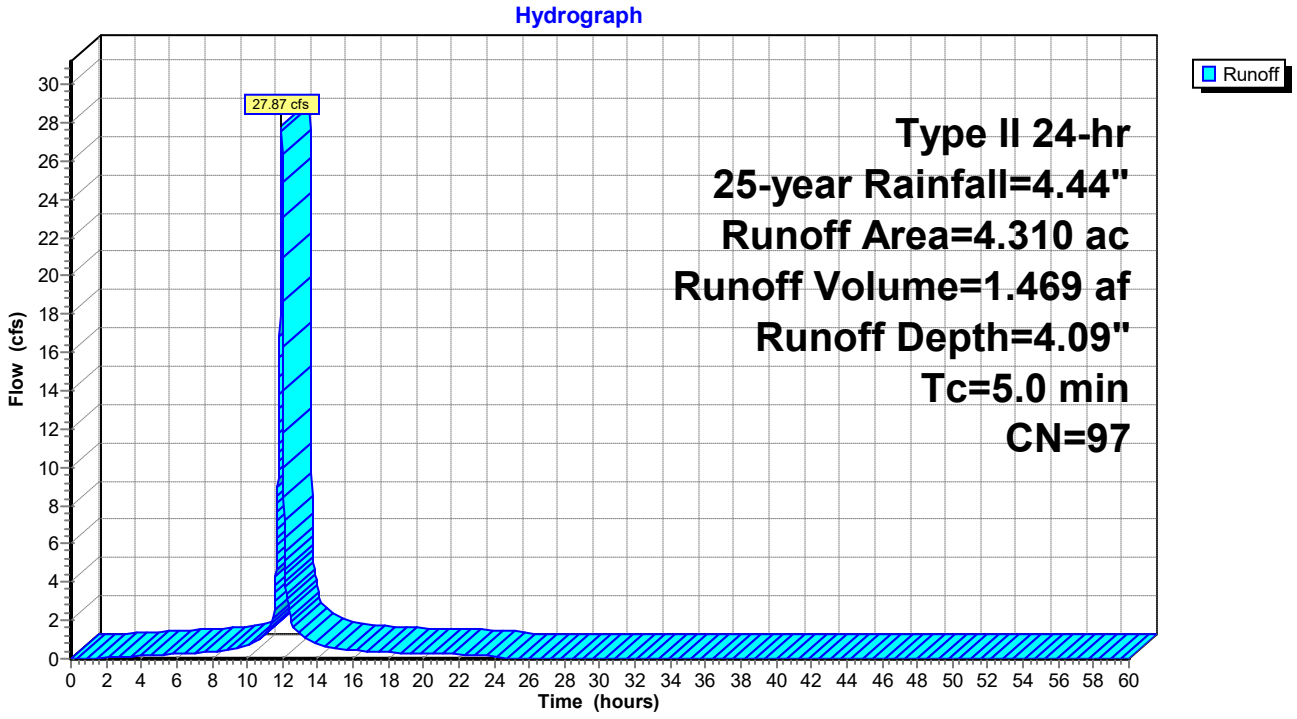
Runoff = 27.87 cfs @ 11.96 hrs, Volume= 1.469 af, Depth= 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year Rainfall=4.44"

Area (ac)	CN	Description
1.110	98	Paved parking, HSG C
3.200	96	Gravel surface, HSG C
4.310	97	Weighted Average
3.200		74.25% Pervious Area
1.110		25.75% Impervious Area

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

Subcatchment 37S: Subarea 03

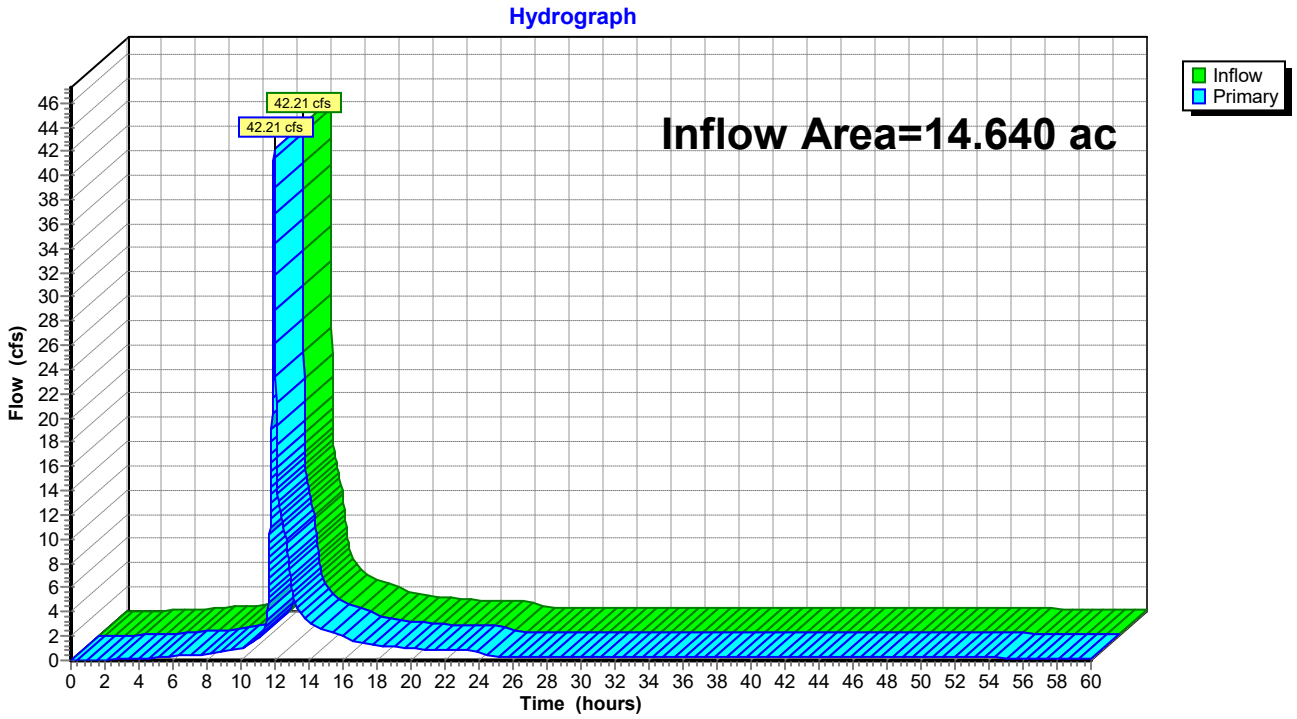


Summary for Pond 34P: Total Out

Inflow Area = 14.640 ac, 24.86% Impervious, Inflow Depth > 3.64" for 25-year event
Inflow = 42.21 cfs @ 11.96 hrs, Volume= 4.436 af
Primary = 42.21 cfs @ 11.96 hrs, Volume= 4.436 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Pond 34P: Total Out



Summary for Pond 38P: Dry Basin 02

Inflow Area = 3.060 ac, 22.22% Impervious, Inflow Depth = 3.98" for 25-year event
Inflow = 19.59 cfs @ 11.96 hrs, Volume= 1.014 af
Outflow = 2.17 cfs @ 12.25 hrs, Volume= 0.795 af, Atten= 89%, Lag= 17.9 min
Primary = 2.17 cfs @ 12.25 hrs, Volume= 0.795 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 710.17' @ 12.25 hrs Surf.Area= 0.788 ac Storage= 0.606 af

Plug-Flow detention time= 750.6 min calculated for 0.795 af (78% of inflow)
Center-of-Mass det. time= 667.9 min (1,428.6 - 760.7)

Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	2.230 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

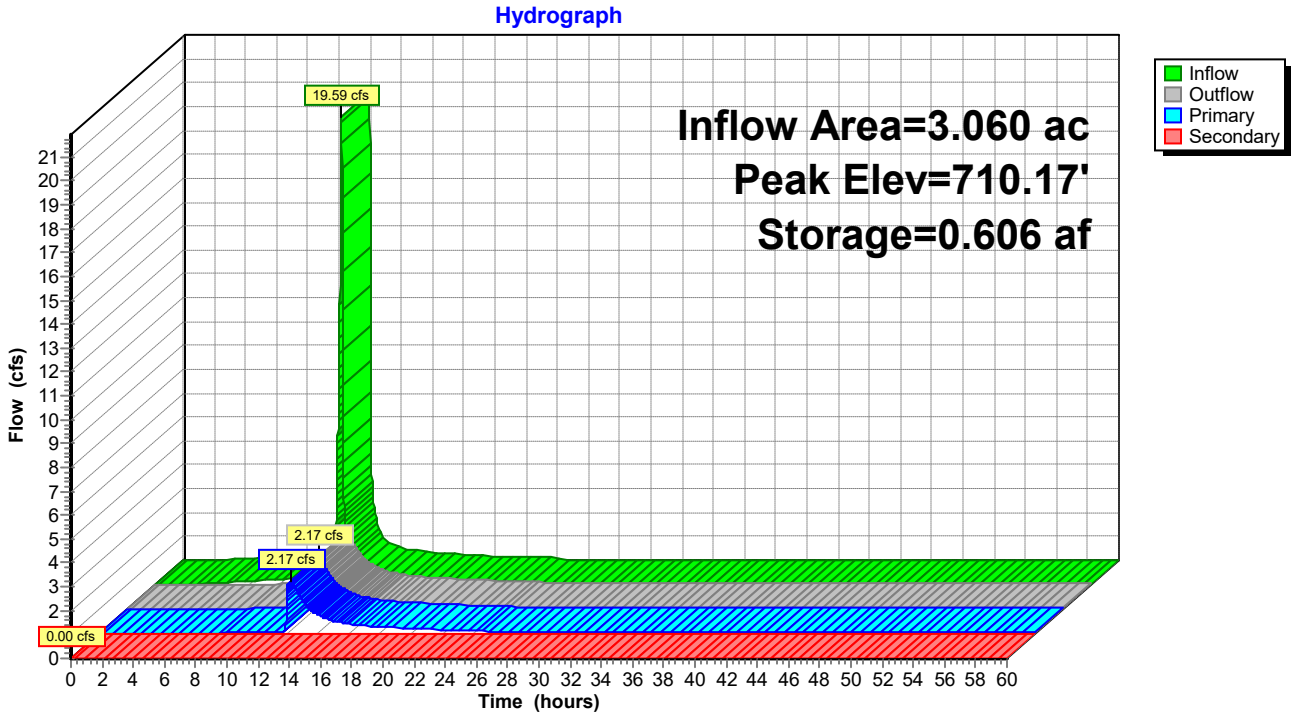
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.180	0.000	0.000
710.00	0.770	0.475	0.475
711.00	0.880	0.825	1.300
712.00	0.980	0.930	2.230

Device	Routing	Invert	Outlet Devices
#1	Primary	707.00'	**15.0" Round Culvert** L= 67.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 707.00' / 704.00' S= 0.0445 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	710.00'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#4	Secondary	711.00'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=2.17 cfs @ 12.25 hrs HW=710.17' (Free Discharge)
└**1=Culvert** (Passes 2.17 cfs of 9.42 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.01 fps)
  └**3=Orifice/Grate** (Weir Controls 2.06 cfs @ 1.34 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=709.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 38P: Dry Basin 02



Summary for Pond 40P: Dry Basin 03

Inflow Area = 4.310 ac, 25.75% Impervious, Inflow Depth = 4.09" for 25-year event
Inflow = 27.87 cfs @ 11.96 hrs, Volume= 1.469 af
Outflow = 6.48 cfs @ 12.09 hrs, Volume= 1.390 af, Atten= 77%, Lag= 8.0 min
Primary = 6.48 cfs @ 12.09 hrs, Volume= 1.390 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 711.43' @ 12.09 hrs Surf.Area= 0.455 ac Storage= 0.774 af

Plug-Flow detention time= 411.2 min calculated for 1.390 af (95% of inflow)
Center-of-Mass det. time= 379.3 min (1,132.8 - 753.5)

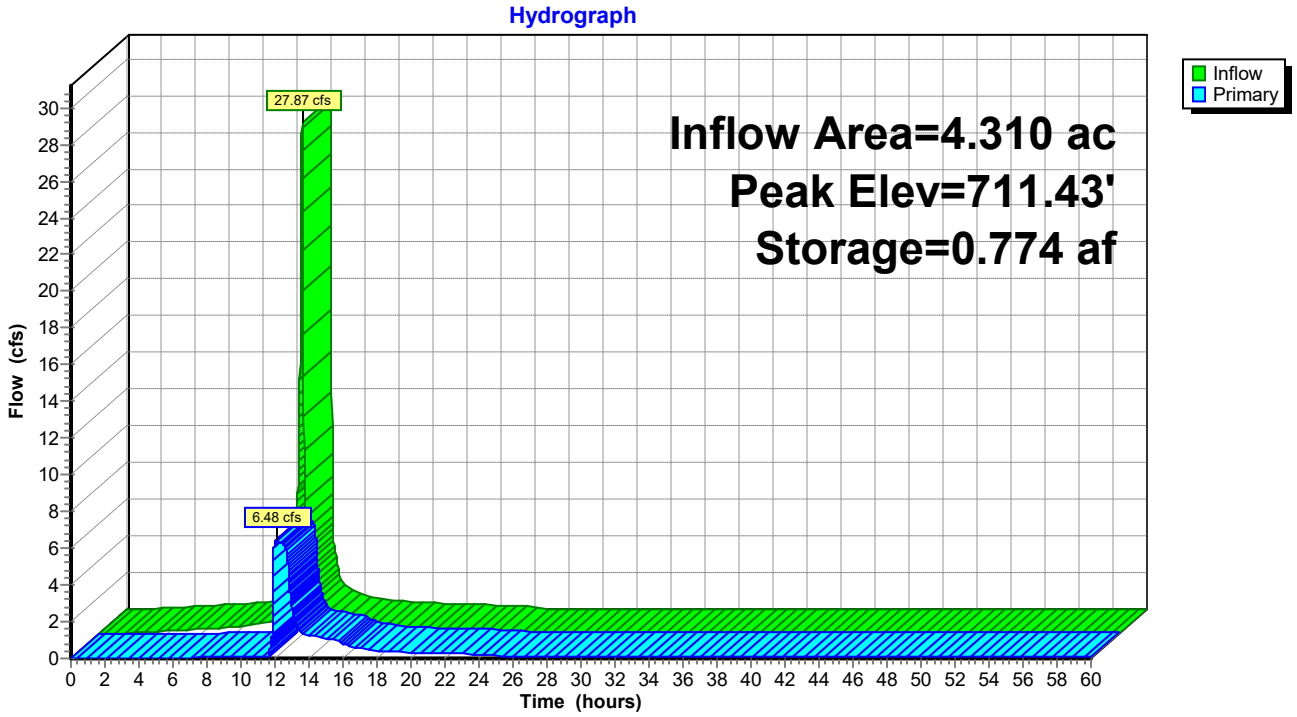
Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.055 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.230	0.000	0.000
710.00	0.280	0.255	0.255
711.00	0.390	0.335	0.590
712.00	0.540	0.465	1.055

Device	Routing	Invert	Outlet Devices
#1	Primary	708.00'	**12.0" Round RCP_Round 12"** L= 18.6' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 708.00' / 707.44' S= 0.0301 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	710.20'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	710.70'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

Primary OutFlow Max=6.48 cfs @ 12.09 hrs HW=711.43' (Free Discharge)
└─**1=RCP_Round 12"** (Inlet Controls 6.48 cfs @ 8.25 fps)
  ├─**2=Orifice/Grate** (Passes < 0.16 cfs potential flow)
  ├─**3=Orifice/Grate** (Passes < 1.87 cfs potential flow)
  └─**4=Orifice/Grate** (Passes < 11.00 cfs potential flow)

Pond 40P: Dry Basin 03



Summary for Pond 44P: Dry Basin 01

Inflow Area = 1.680 ac, 8.93% Impervious, Inflow Depth = 3.98" for 25-year event
Inflow = 10.75 cfs @ 11.96 hrs, Volume= 0.557 af
Outflow = 0.11 cfs @ 19.29 hrs, Volume= 0.386 af, Atten= 99%, Lag= 439.8 min
Primary = 0.11 cfs @ 19.29 hrs, Volume= 0.386 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 710.21' @ 19.29 hrs Surf.Area= 0.391 ac Storage= 0.442 af

Plug-Flow detention time= 1,328.4 min calculated for 0.386 af (69% of inflow)
Center-of-Mass det. time= 1,232.2 min (1,992.9 - 760.7)

Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.225 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

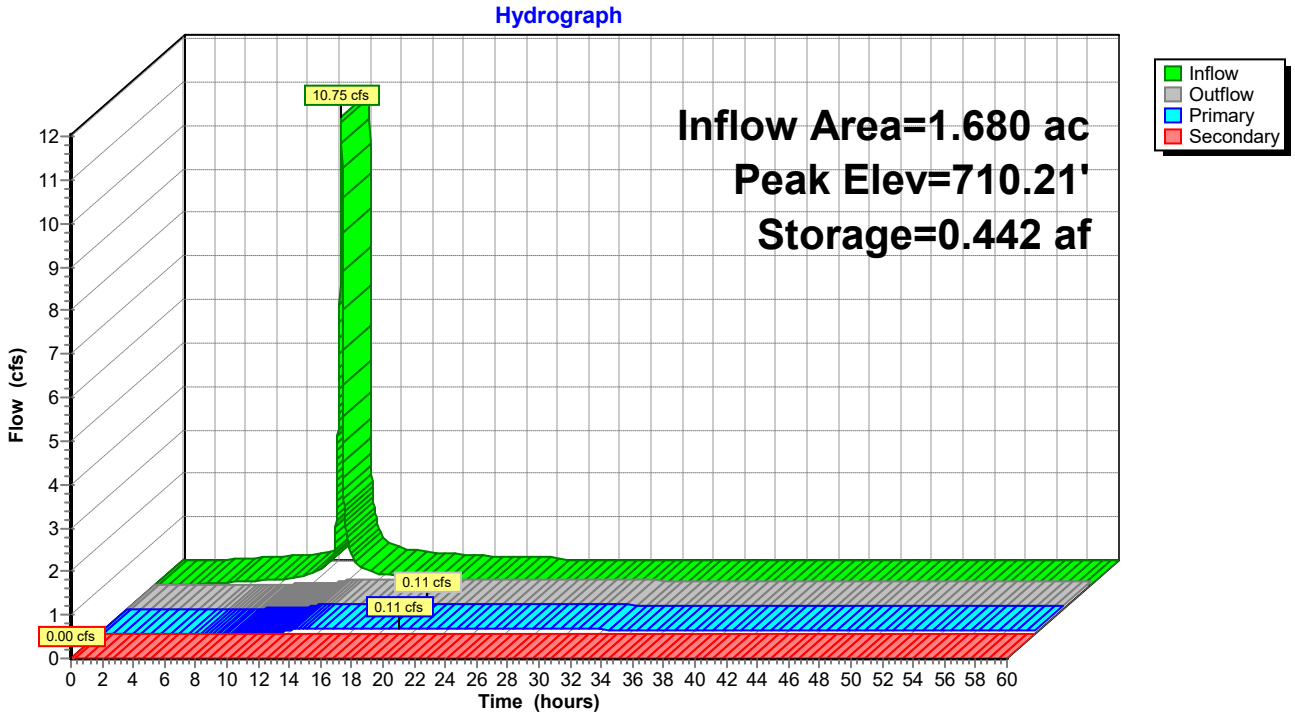
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.340	0.000	0.000
710.00	0.380	0.360	0.360
711.00	0.430	0.405	0.765
712.00	0.490	0.460	1.225

Device	Routing	Invert	Outlet Devices
#1	Primary	702.50'	**12.0" Round Culvert** L= 57.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 702.50' / 701.00' S= 0.0261 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	711.00'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#4	Secondary	711.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.11 cfs @ 19.29 hrs HW=710.21' (Free Discharge)
└**1=Culvert** (Passes 0.11 cfs of 9.94 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.12 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=709.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 44P: Dry Basin 01



Summary for Pond 55P: Existing Structure 2

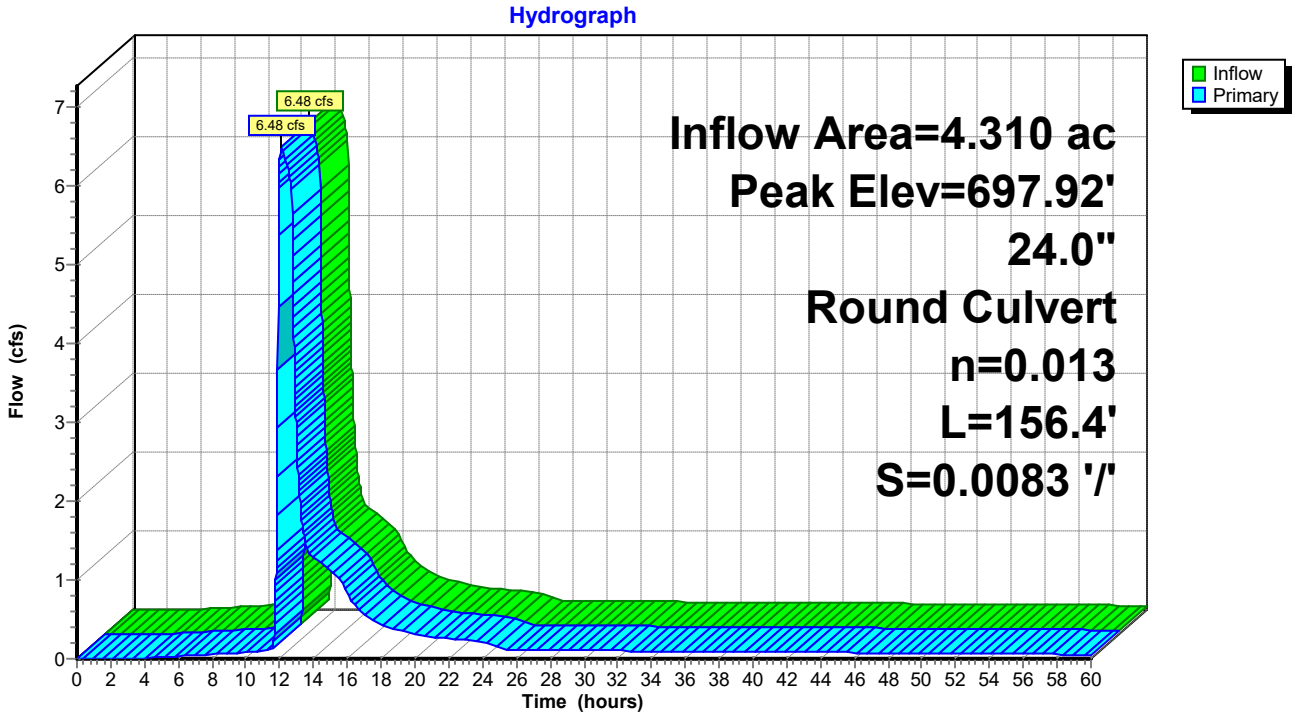
Inflow Area = 4.310 ac, 25.75% Impervious, Inflow Depth > 3.87" for 25-year event
Inflow = 6.48 cfs @ 12.09 hrs, Volume= 1.390 af
Outflow = 6.48 cfs @ 12.09 hrs, Volume= 1.390 af, Atten= 0%, Lag= 0.0 min
Primary = 6.48 cfs @ 12.09 hrs, Volume= 1.390 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 697.92' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	696.80'	**24.0" Round RCP_Round 24"** L= 156.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 696.80' / 695.50' S= 0.0083 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf

Primary OutFlow Max=6.48 cfs @ 12.09 hrs HW=697.92' (Free Discharge)
1=RCP_Round 24" (Barrel Controls 6.48 cfs @ 5.18 fps)

Pond 55P: Existing Structure 2



Summary for Subcatchment 2S: Pre-Developed 01

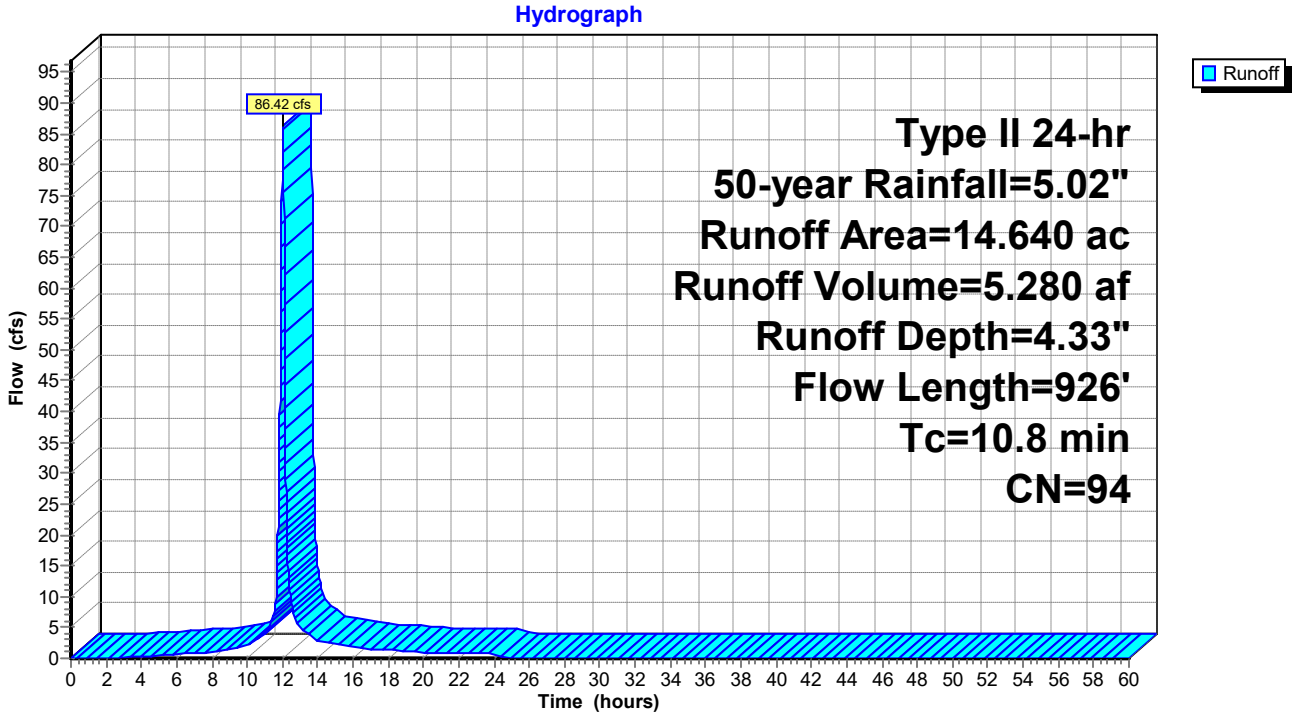
Runoff = 86.42 cfs @ 12.02 hrs, Volume= 5.280 af, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-year Rainfall=5.02"

Area (ac)	CN	Description
13.040	96	Gravel surface, HSG C
1.600	74	>75% Grass cover, Good, HSG C
14.640	94	Weighted Average
14.640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0234	0.76		**Sheet Flow,** n= 0.022 P2= 2.63"
8.6	826	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
10.8	926	Total			

Subcatchment 2S: Pre-Developed 01



Summary for Subcatchment 30S: Undetained 01

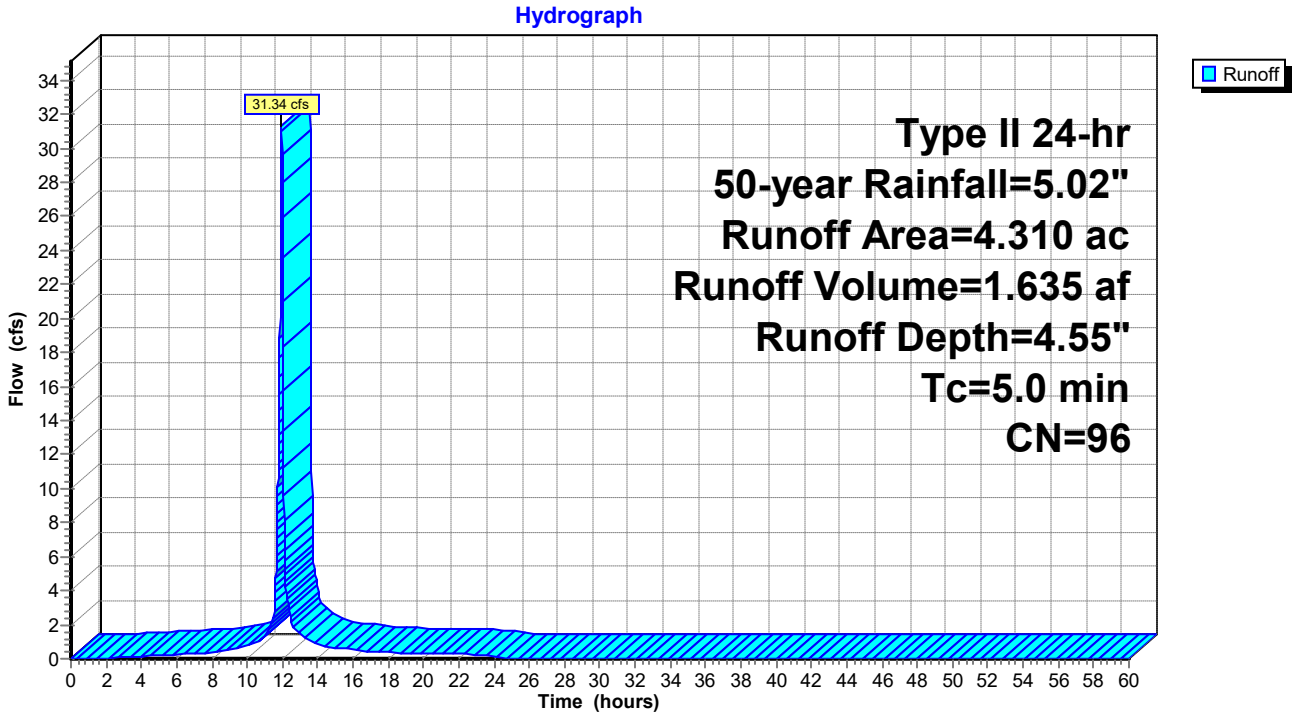
Runoff = 31.34 cfs @ 11.96 hrs, Volume= 1.635 af, Depth= 4.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-year Rainfall=5.02"

Area (ac)	CN	Description
3.330	96	Gravel surface, HSG C
0.980	98	Paved parking, HSG C
4.310	96	Weighted Average
3.330		77.26% Pervious Area
0.980		22.74% Impervious Area

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

Subcatchment 30S: Undetained 01



Summary for Subcatchment 32S: Undetained 02

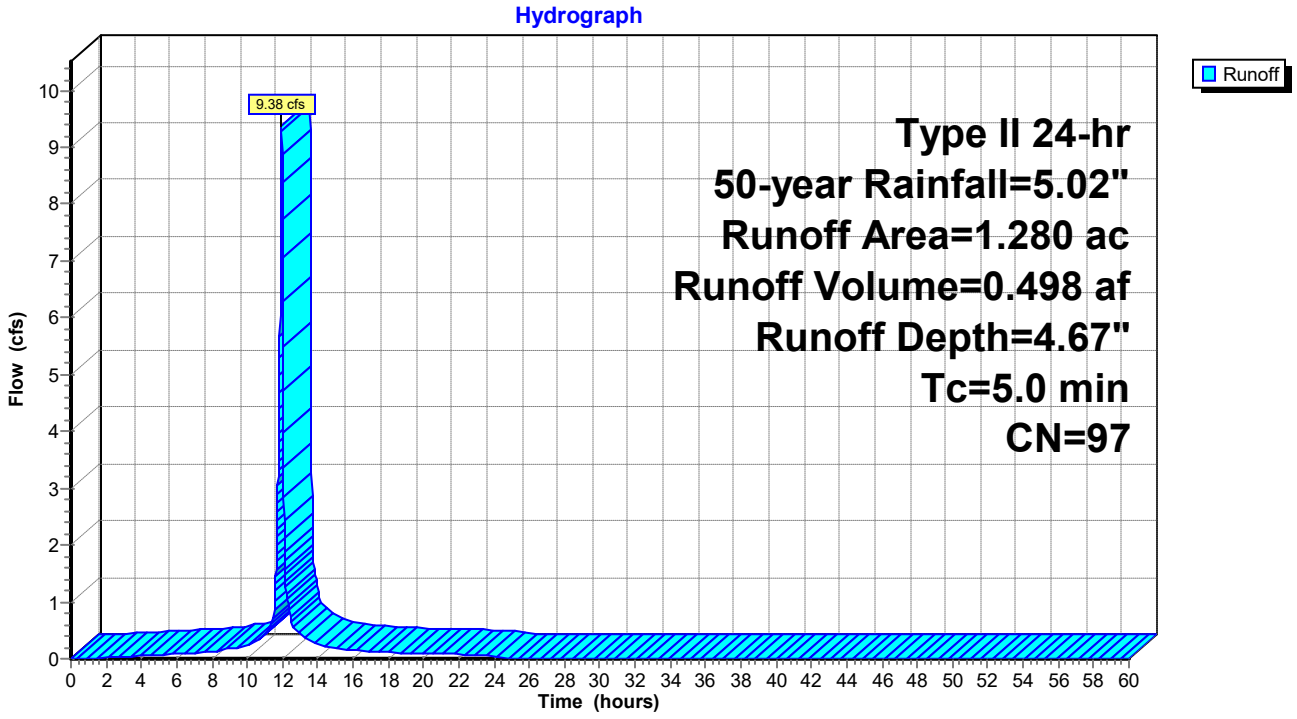
Runoff = 9.38 cfs @ 11.96 hrs, Volume= 0.498 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-year Rainfall=5.02"

Area (ac)	CN	Description
0.560	96	Gravel surface, HSG C
0.720	98	Paved parking, HSG C
1.280	97	Weighted Average
0.560		43.75% Pervious Area
0.720		56.25% Impervious Area

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

Subcatchment 32S: Undetained 02



Summary for Subcatchment 35S: Subarea 01

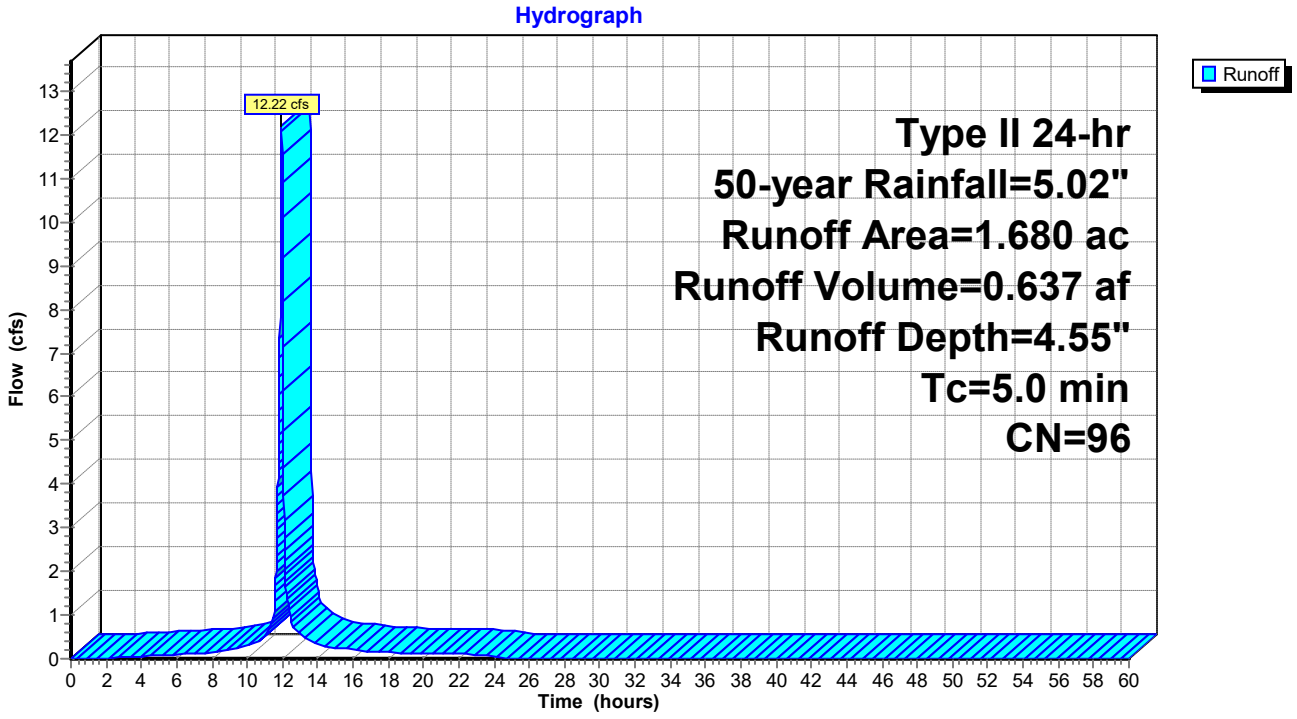
Runoff = 12.22 cfs @ 11.96 hrs, Volume= 0.637 af, Depth= 4.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-year Rainfall=5.02"

Area (ac)	CN	Description
0.150	98	Paved parking, HSG C
1.530	96	Gravel surface, HSG C
1.680	96	Weighted Average
1.530		91.07% Pervious Area
0.150		8.93% Impervious Area

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

Subcatchment 35S: Subarea 01



Summary for Subcatchment 36S: Subarea 02

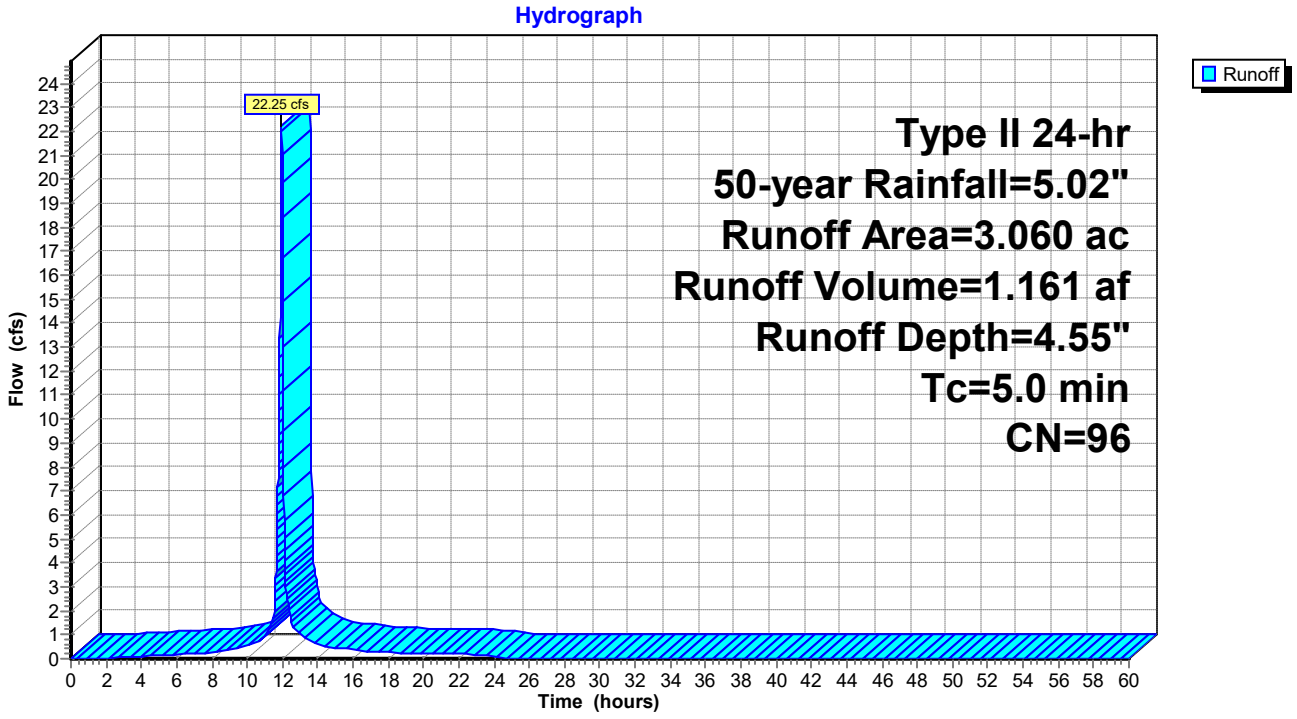
Runoff = 22.25 cfs @ 11.96 hrs, Volume= 1.161 af, Depth= 4.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-year Rainfall=5.02"

Area (ac)	CN	Description
0.680	98	Paved parking, HSG C
2.380	96	Gravel surface, HSG C
3.060	96	Weighted Average
2.380		77.78% Pervious Area
0.680		22.22% Impervious Area

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

Subcatchment 36S: Subarea 02



Summary for Subcatchment 37S: Subarea 03

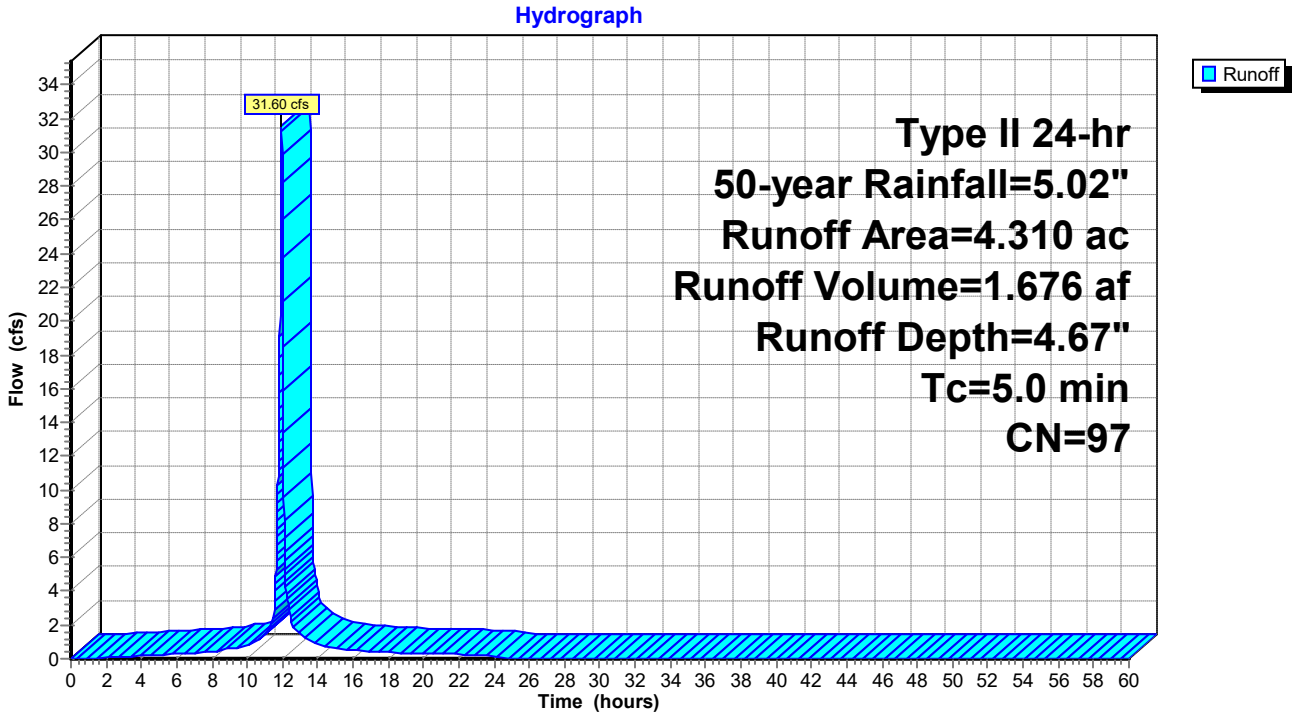
Runoff = 31.60 cfs @ 11.96 hrs, Volume= 1.676 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-year Rainfall=5.02"

Area (ac)	CN	Description
1.110	98	Paved parking, HSG C
3.200	96	Gravel surface, HSG C
4.310	97	Weighted Average
3.200		74.25% Pervious Area
1.110		25.75% Impervious Area

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

Subcatchment 37S: Subarea 03

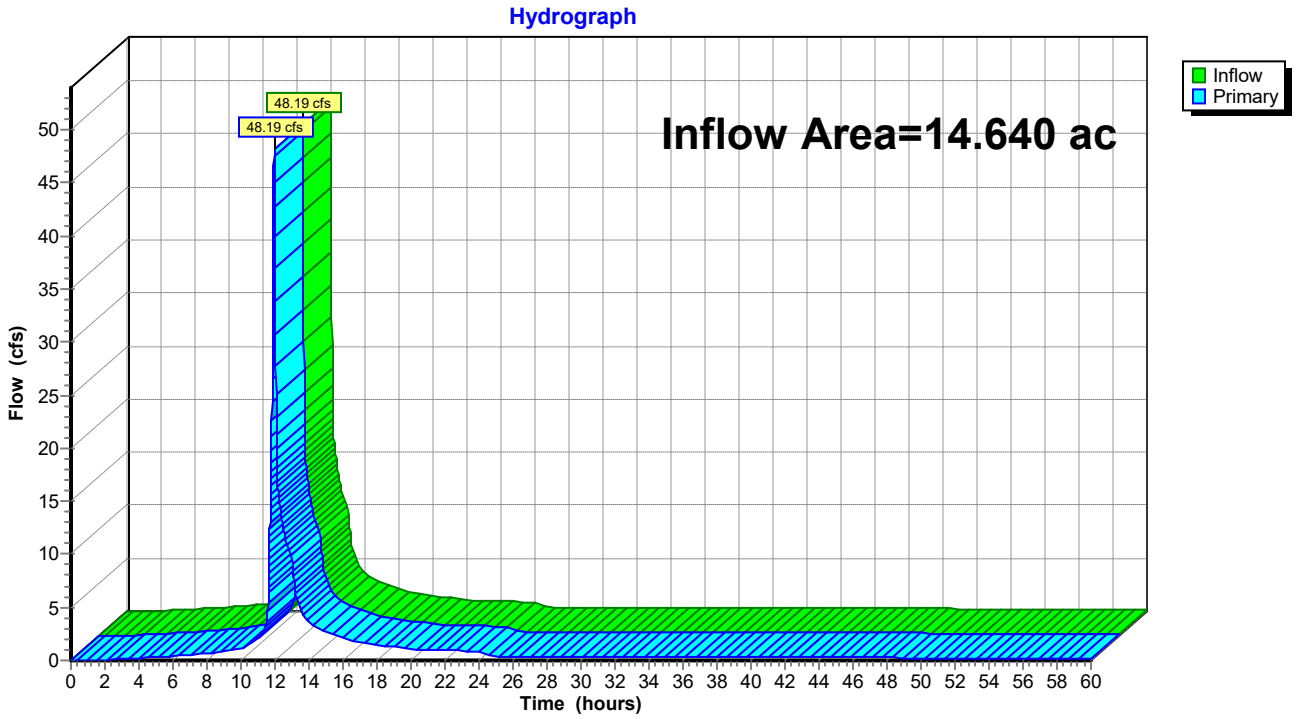


Summary for Pond 34P: Total Out

Inflow Area = 14.640 ac, 24.86% Impervious, Inflow Depth > 4.18" for 50-year event
Inflow = 48.19 cfs @ 11.96 hrs, Volume= 5.094 af
Primary = 48.19 cfs @ 11.96 hrs, Volume= 5.094 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Pond 34P: Total Out



Summary for Pond 38P: Dry Basin 02

Inflow Area = 3.060 ac, 22.22% Impervious, Inflow Depth = 4.55" for 50-year event
Inflow = 22.25 cfs @ 11.96 hrs, Volume= 1.161 af
Outflow = 3.88 cfs @ 12.12 hrs, Volume= 0.941 af, Atten= 83%, Lag= 9.6 min
Primary = 3.88 cfs @ 12.12 hrs, Volume= 0.941 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 710.25' @ 12.12 hrs Surf.Area= 0.798 ac Storage= 0.672 af

Plug-Flow detention time= 654.7 min calculated for 0.941 af (81% of inflow)
Center-of-Mass det. time= 577.1 min (1,334.7 - 757.6)

Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	2.230 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

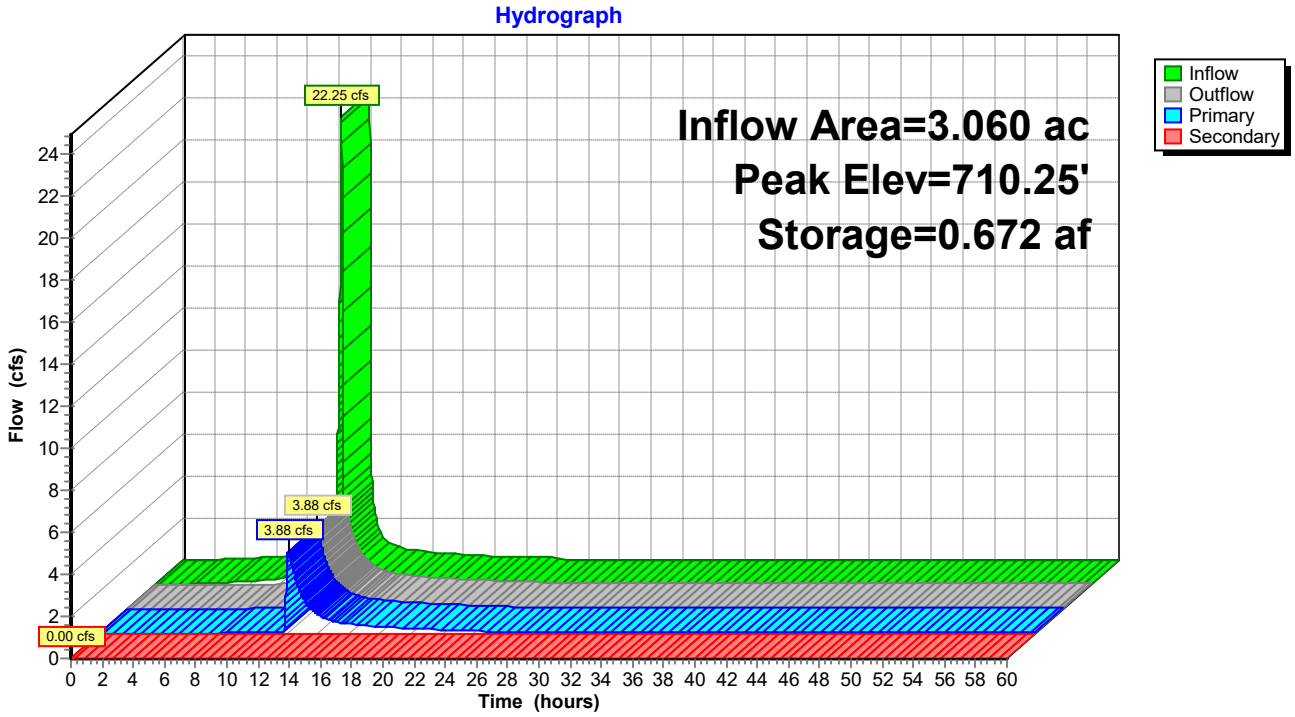
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.180	0.000	0.000
710.00	0.770	0.475	0.475
711.00	0.880	0.825	1.300
712.00	0.980	0.930	2.230

Device	Routing	Invert	Outlet Devices
#1	Primary	707.00'	**15.0" Round Culvert** L= 67.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 707.00' / 704.00' S= 0.0445 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	710.00'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#4	Secondary	711.00'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=3.88 cfs @ 12.12 hrs HW=710.25' (Free Discharge)
└**1=Culvert** (Passes 3.88 cfs of 9.57 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.20 fps)
  └**3=Orifice/Grate** (Weir Controls 3.77 cfs @ 1.64 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=709.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 38P: Dry Basin 02



Summary for Pond 40P: Dry Basin 03

Inflow Area = 4.310 ac, 25.75% Impervious, Inflow Depth = 4.67" for 50-year event
Inflow = 31.60 cfs @ 11.96 hrs, Volume= 1.676 af
Outflow = 6.71 cfs @ 12.10 hrs, Volume= 1.597 af, Atten= 79%, Lag= 8.4 min
Primary = 6.71 cfs @ 12.10 hrs, Volume= 1.597 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 711.65' @ 12.10 hrs Surf.Area= 0.487 ac Storage= 0.873 af

Plug-Flow detention time= 373.0 min calculated for 1.597 af (95% of inflow)
Center-of-Mass det. time= 344.1 min (1,095.0 - 750.8)

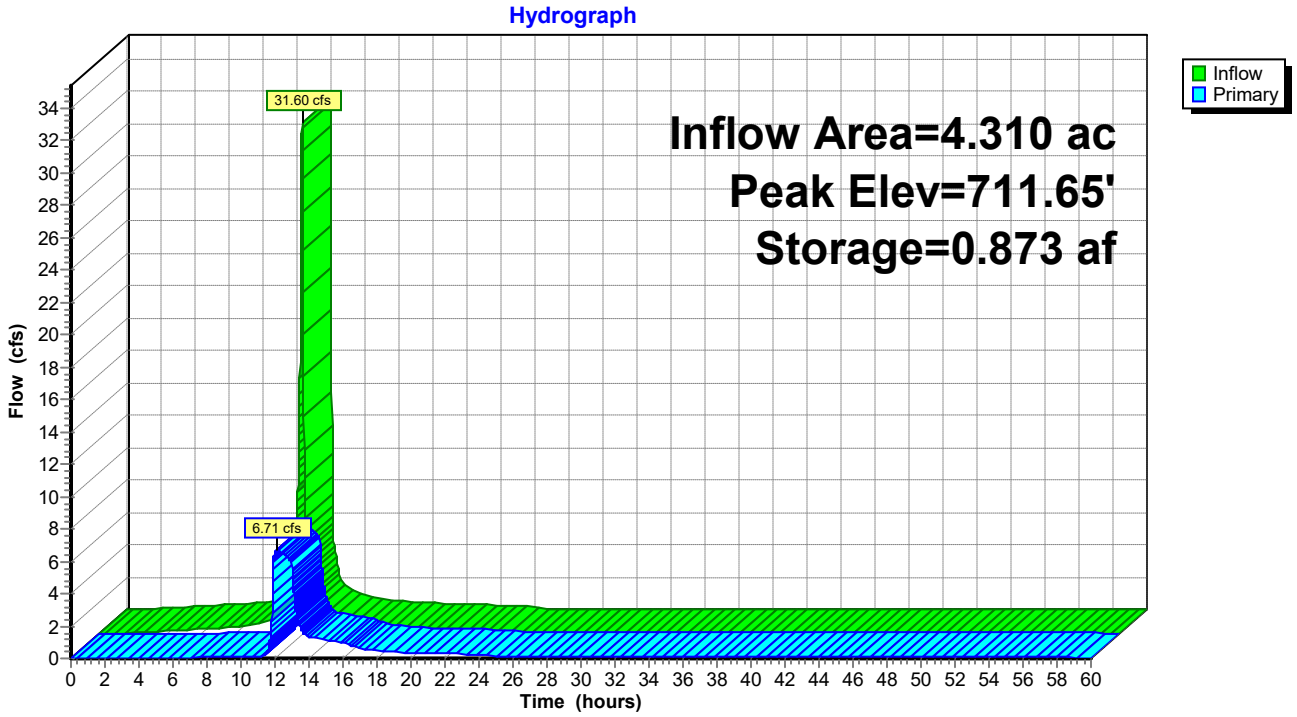
Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.055 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.230	0.000	0.000
710.00	0.280	0.255	0.255
711.00	0.390	0.335	0.590
712.00	0.540	0.465	1.055

Device	Routing	Invert	Outlet Devices
#1	Primary	708.00'	**12.0" Round RCP_Round 12"** L= 18.6' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 708.00' / 707.44' S= 0.0301 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	710.20'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	710.70'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

Primary OutFlow Max=6.71 cfs @ 12.10 hrs HW=711.65' (Free Discharge)
└─**1=RCP_Round 12"** (Inlet Controls 6.71 cfs @ 8.54 fps)
  ├─**2=Orifice/Grate** (Passes < 0.17 cfs potential flow)
  ├─**3=Orifice/Grate** (Passes < 2.02 cfs potential flow)
  └─**4=Orifice/Grate** (Passes < 12.49 cfs potential flow)

Pond 40P: Dry Basin 03



Summary for Pond 44P: Dry Basin 01

Inflow Area = 1.680 ac, 8.93% Impervious, Inflow Depth = 4.55" for 50-year event
Inflow = 12.22 cfs @ 11.96 hrs, Volume= 0.637 af
Outflow = 0.12 cfs @ 19.60 hrs, Volume= 0.423 af, Atten= 99%, Lag= 458.4 min
Primary = 0.12 cfs @ 19.60 hrs, Volume= 0.423 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 710.39' @ 19.60 hrs Surf.Area= 0.399 ac Storage= 0.511 af

Plug-Flow detention time= 1,343.7 min calculated for 0.423 af (66% of inflow)
Center-of-Mass det. time= 1,243.5 min (2,001.1 - 757.6)

Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.225 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

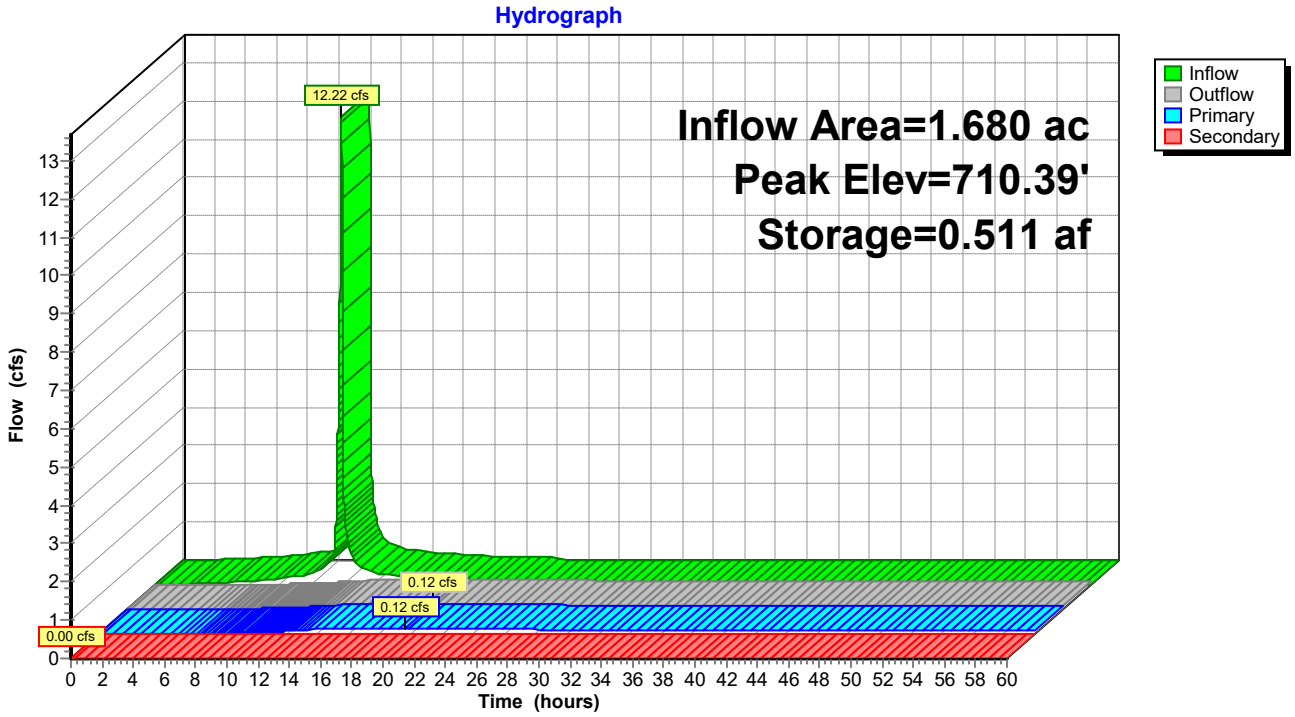
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.340	0.000	0.000
710.00	0.380	0.360	0.360
711.00	0.430	0.405	0.765
712.00	0.490	0.460	1.225

Device	Routing	Invert	Outlet Devices
#1	Primary	702.50'	**12.0" Round Culvert** L= 57.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 702.50' / 701.00' S= 0.0261 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	711.00'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#4	Secondary	711.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.12 cfs @ 19.60 hrs HW=710.39' (Free Discharge)
└**1=Culvert** (Passes 0.12 cfs of 10.04 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.50 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=709.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 44P: Dry Basin 01



Summary for Pond 55P: Existing Structure 2

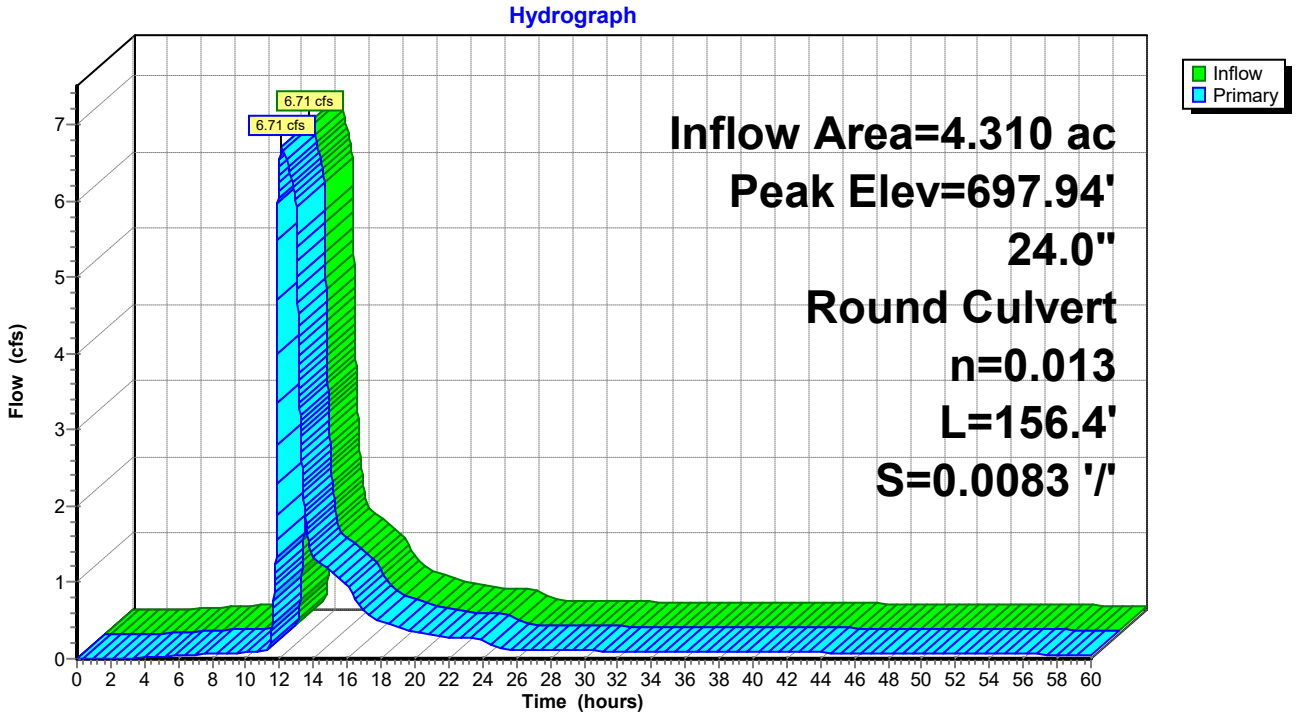
Inflow Area = 4.310 ac, 25.75% Impervious, Inflow Depth > 4.45" for 50-year event
Inflow = 6.71 cfs @ 12.10 hrs, Volume= 1.597 af
Outflow = 6.71 cfs @ 12.10 hrs, Volume= 1.597 af, Atten= 0%, Lag= 0.0 min
Primary = 6.71 cfs @ 12.10 hrs, Volume= 1.597 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 697.94' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	696.80'	**24.0" Round RCP_Round 24"** L= 156.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 696.80' / 695.50' S= 0.0083 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf

Primary OutFlow Max=6.71 cfs @ 12.10 hrs HW=697.94' (Free Discharge)
1=RCP_Round 24" (Barrel Controls 6.71 cfs @ 5.22 fps)

Pond 55P: Existing Structure 2



Summary for Subcatchment 2S: Pre-Developed 01

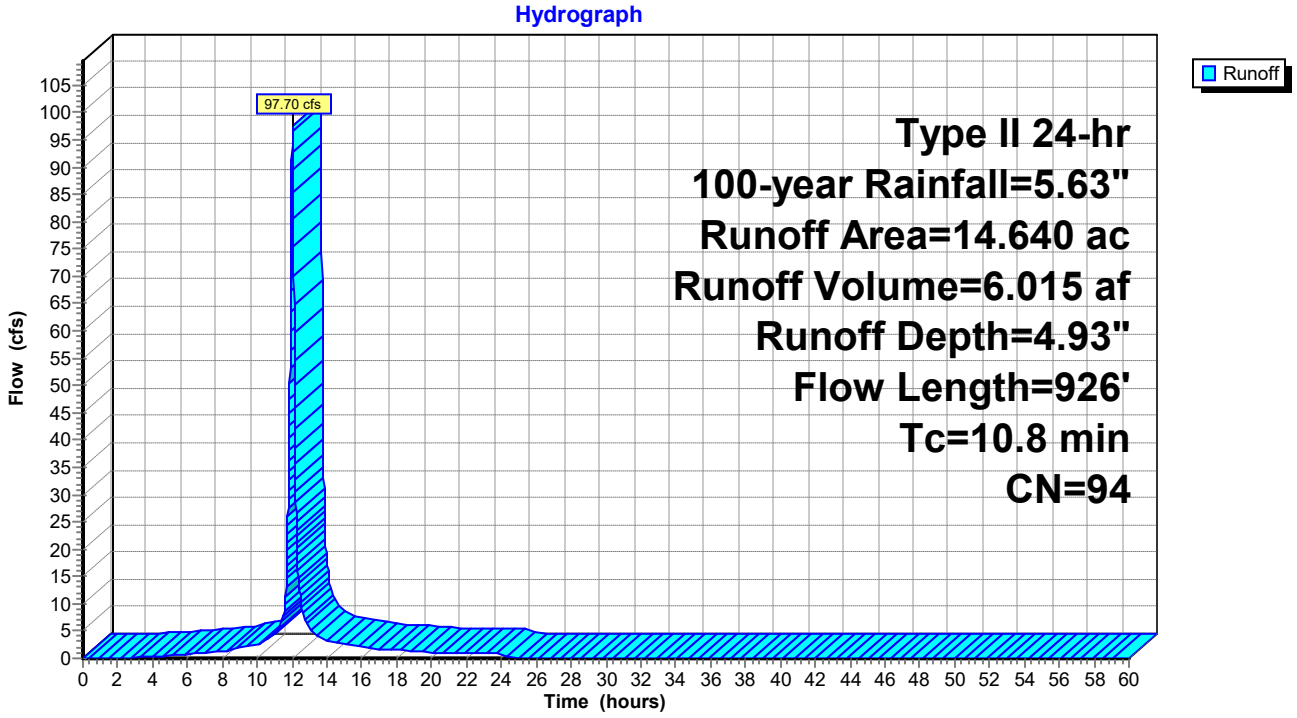
Runoff = 97.70 cfs @ 12.02 hrs, Volume= 6.015 af, Depth= 4.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-year Rainfall=5.63"

Area (ac)	CN	Description
13.040	96	Gravel surface, HSG C
1.600	74	>75% Grass cover, Good, HSG C
14.640	94	Weighted Average
14.640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0234	0.76		**Sheet Flow,** n= 0.022 P2= 2.63"
8.6	826	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
10.8	926	Total			

Subcatchment 2S: Pre-Developed 01



Summary for Subcatchment 30S: Undetained 01

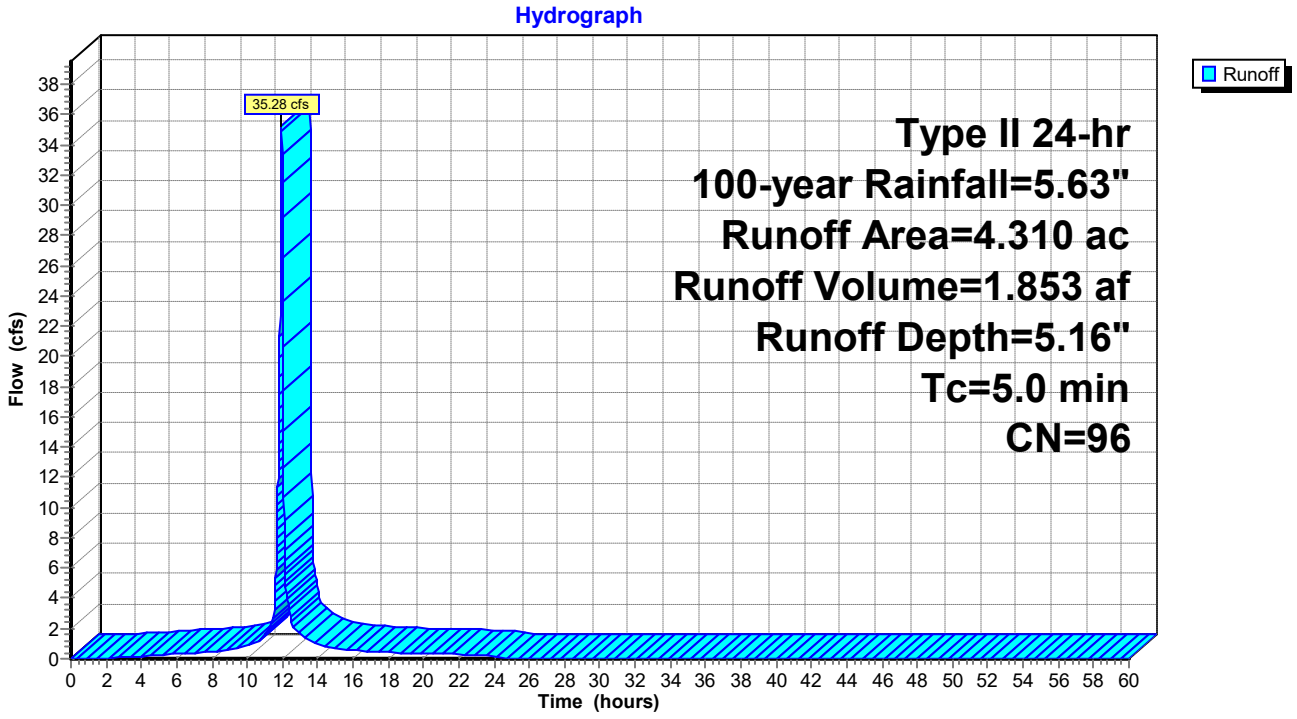
Runoff = 35.28 cfs @ 11.96 hrs, Volume= 1.853 af, Depth= 5.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-year Rainfall=5.63"

Area (ac)	CN	Description
3.330	96	Gravel surface, HSG C
0.980	98	Paved parking, HSG C
4.310	96	Weighted Average
3.330		77.26% Pervious Area
0.980		22.74% Impervious Area

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

Subcatchment 30S: Undetained 01



Summary for Subcatchment 32S: Undetained 02

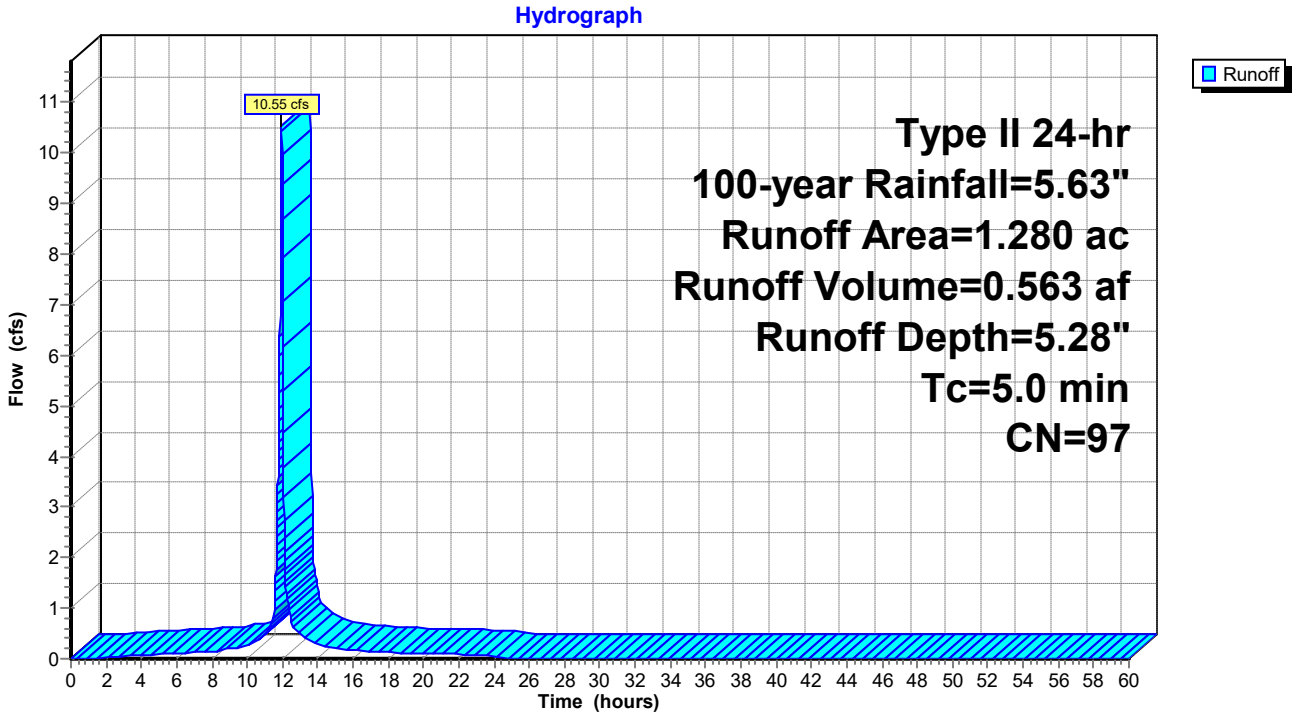
Runoff = 10.55 cfs @ 11.96 hrs, Volume= 0.563 af, Depth= 5.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-year Rainfall=5.63"

Area (ac)	CN	Description
0.560	96	Gravel surface, HSG C
0.720	98	Paved parking, HSG C
1.280	97	Weighted Average
0.560		43.75% Pervious Area
0.720		56.25% Impervious Area

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

Subcatchment 32S: Undetained 02



Summary for Subcatchment 35S: Subarea 01

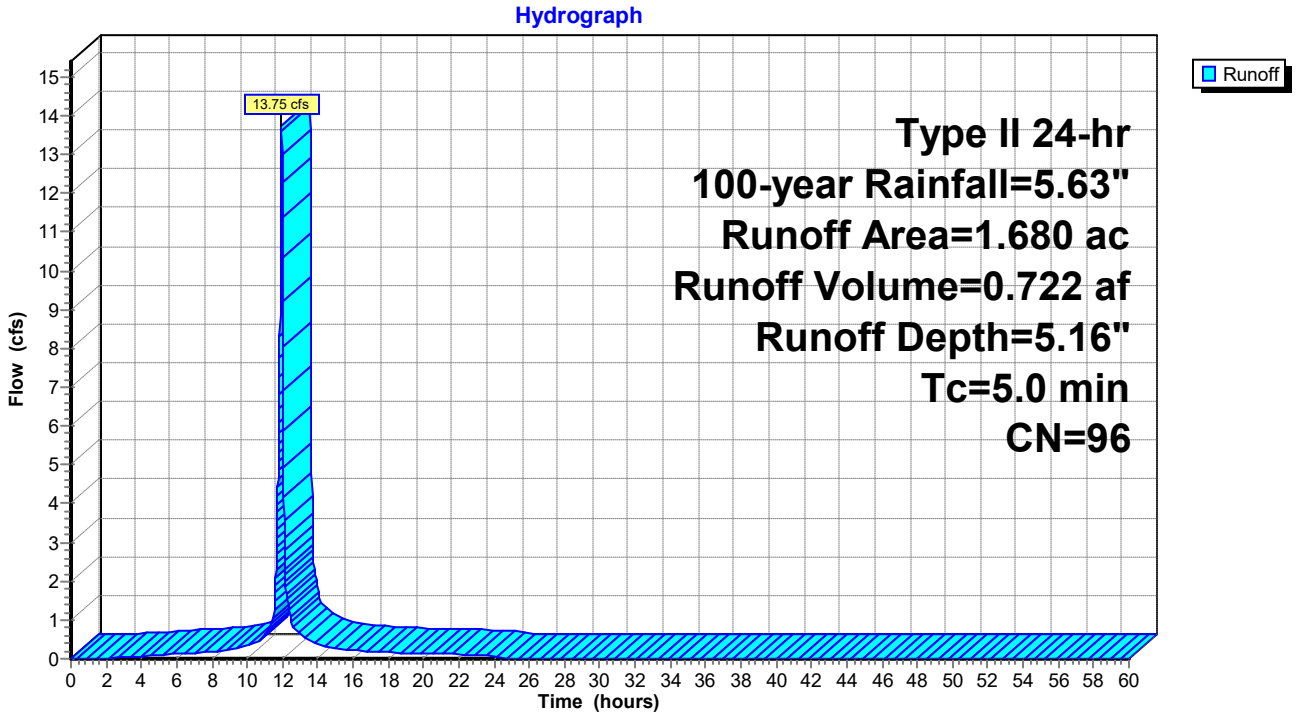
Runoff = 13.75 cfs @ 11.96 hrs, Volume= 0.722 af, Depth= 5.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-year Rainfall=5.63"

Area (ac)	CN	Description
0.150	98	Paved parking, HSG C
1.530	96	Gravel surface, HSG C
1.680	96	Weighted Average
1.530		91.07% Pervious Area
0.150		8.93% Impervious Area

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

Subcatchment 35S: Subarea 01



Summary for Subcatchment 36S: Subarea 02

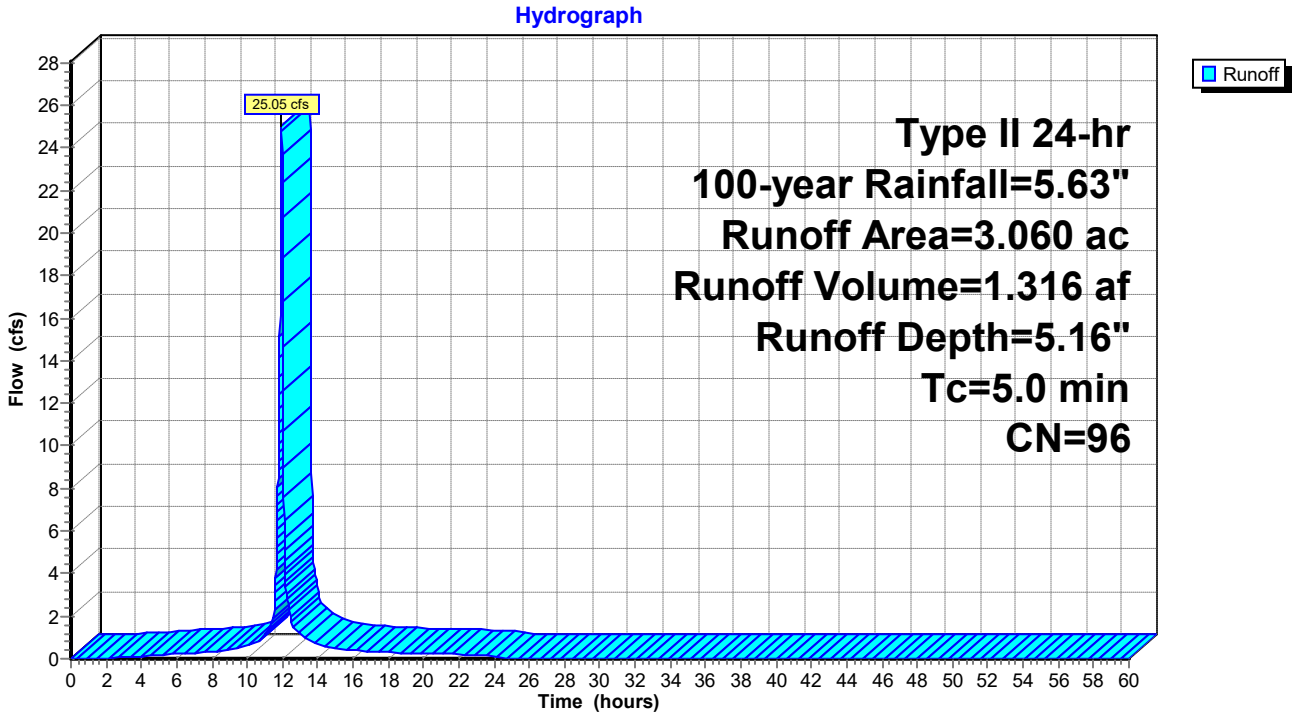
Runoff = 25.05 cfs @ 11.96 hrs, Volume= 1.316 af, Depth= 5.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-year Rainfall=5.63"

Area (ac)	CN	Description
0.680	98	Paved parking, HSG C
2.380	96	Gravel surface, HSG C
3.060	96	Weighted Average
2.380		77.78% Pervious Area
0.680		22.22% Impervious Area

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

Subcatchment 36S: Subarea 02



Summary for Subcatchment 37S: Subarea 03

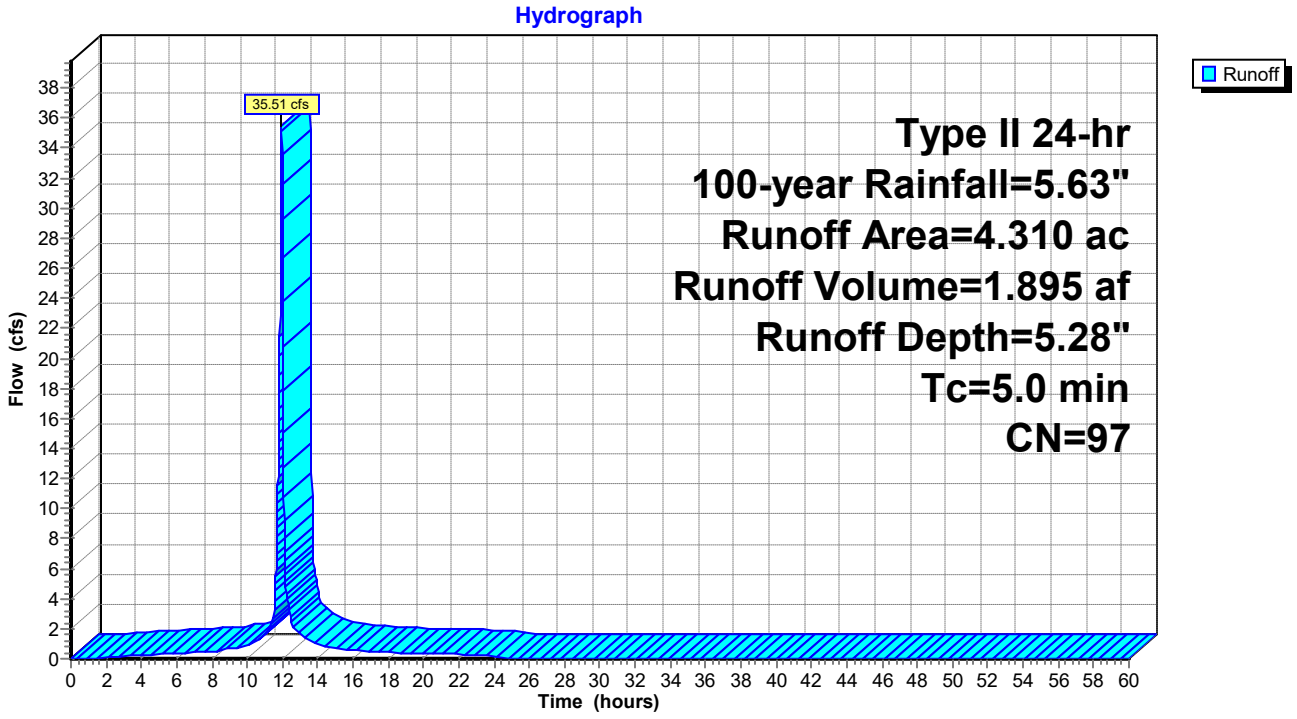
Runoff = 35.51 cfs @ 11.96 hrs, Volume= 1.895 af, Depth= 5.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-year Rainfall=5.63"

Area (ac)	CN	Description
1.110	98	Paved parking, HSG C
3.200	96	Gravel surface, HSG C
4.310	97	Weighted Average
3.200		74.25% Pervious Area
1.110		25.75% Impervious Area

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

Subcatchment 37S: Subarea 03

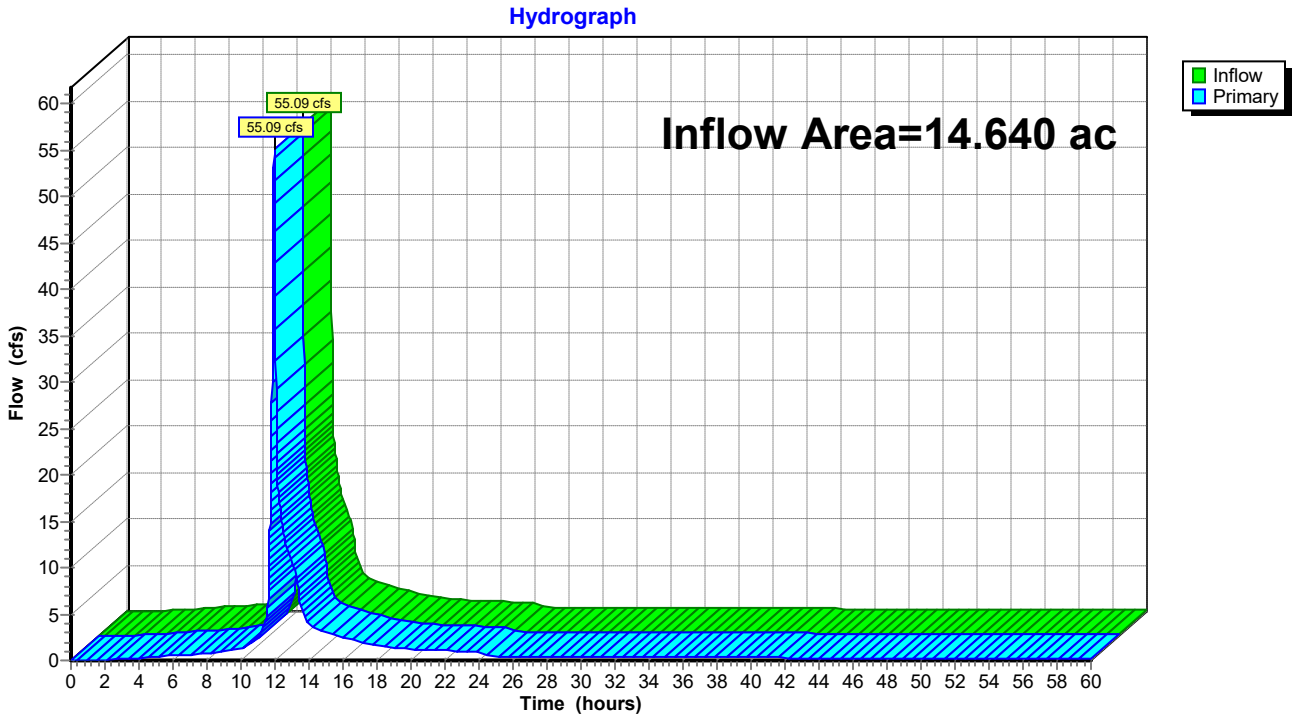


Summary for Pond 34P: Total Out

Inflow Area = 14.640 ac, 24.86% Impervious, Inflow Depth > 4.74" for 100-year event
Inflow = 55.09 cfs @ 11.96 hrs, Volume= 5.785 af
Primary = 55.09 cfs @ 11.96 hrs, Volume= 5.785 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Pond 34P: Total Out



Summary for Pond 38P: Dry Basin 02

Inflow Area = 3.060 ac, 22.22% Impervious, Inflow Depth = 5.16" for 100-year event
Inflow = 25.05 cfs @ 11.96 hrs, Volume= 1.316 af
Outflow = 5.99 cfs @ 12.09 hrs, Volume= 1.095 af, Atten= 76%, Lag= 7.8 min
Primary = 5.99 cfs @ 12.09 hrs, Volume= 1.095 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 710.34' @ 12.09 hrs Surf.Area= 0.807 ac Storage= 0.741 af

Plug-Flow detention time= 579.8 min calculated for 1.095 af (83% of inflow)
Center-of-Mass det. time= 507.2 min (1,262.0 - 754.9)

Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	2.230 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

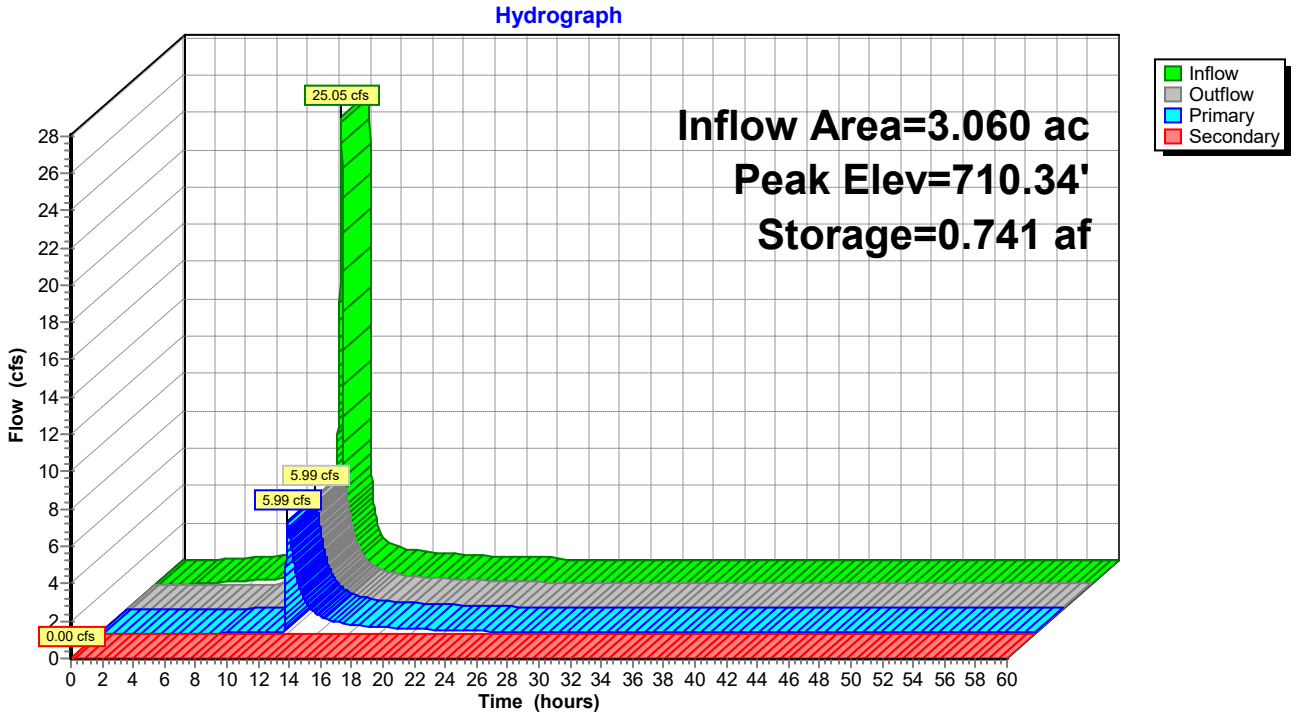
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.180	0.000	0.000
710.00	0.770	0.475	0.475
711.00	0.880	0.825	1.300
712.00	0.980	0.930	2.230

Device	Routing	Invert	Outlet Devices
#1	Primary	707.00'	**15.0" Round Culvert** L= 67.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 707.00' / 704.00' S= 0.0445 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	710.00'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#4	Secondary	711.00'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=5.98 cfs @ 12.09 hrs HW=710.34' (Free Discharge)
└**1=Culvert** (Passes 5.98 cfs of 9.73 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.39 fps)
  └**3=Orifice/Grate** (Weir Controls 5.86 cfs @ 1.90 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=709.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 38P: Dry Basin 02



Summary for Pond 40P: Dry Basin 03

Inflow Area = 4.310 ac, 25.75% Impervious, Inflow Depth = 5.28" for 100-year event
Inflow = 35.51 cfs @ 11.96 hrs, Volume= 1.895 af
Outflow = 6.92 cfs @ 12.10 hrs, Volume= 1.815 af, Atten= 81%, Lag= 8.9 min
Primary = 6.92 cfs @ 12.10 hrs, Volume= 1.815 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 711.84' @ 12.10 hrs Surf.Area= 0.517 ac Storage= 0.973 af

Plug-Flow detention time= 342.5 min calculated for 1.815 af (96% of inflow)
Center-of-Mass det. time= 316.4 min (1,064.8 - 748.5)

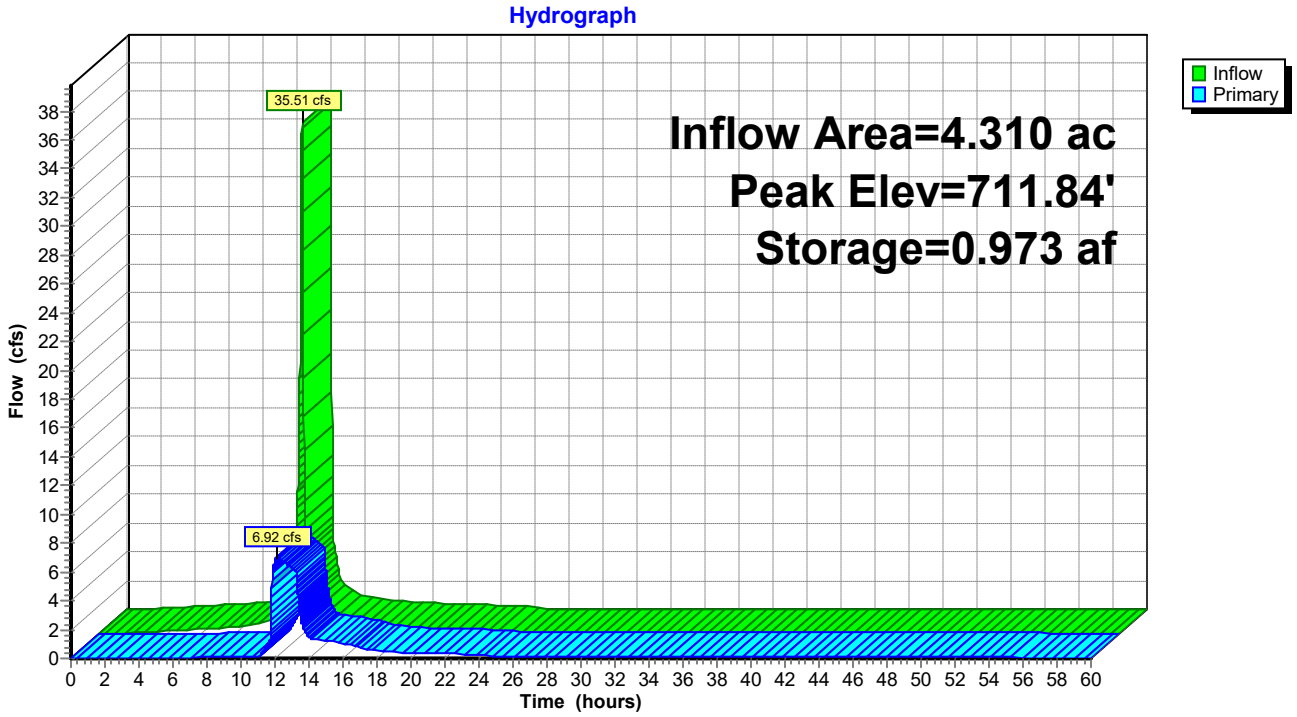
Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.055 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.230	0.000	0.000
710.00	0.280	0.255	0.255
711.00	0.390	0.335	0.590
712.00	0.540	0.465	1.055

Device	Routing	Invert	Outlet Devices
#1	Primary	708.00'	**12.0" Round RCP_Round 12"** L= 18.6' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 708.00' / 707.44' S= 0.0301 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	710.20'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	710.70'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

Primary OutFlow Max=6.92 cfs @ 12.10 hrs HW=711.84' (Free Discharge)
└─**1=RCP_Round 12"** (Inlet Controls 6.92 cfs @ 8.81 fps)
  ├─**2=Orifice/Grate** (Passes < 0.17 cfs potential flow)
  ├─**3=Orifice/Grate** (Passes < 2.16 cfs potential flow)
  └─**4=Orifice/Grate** (Passes < 13.74 cfs potential flow)

Pond 40P: Dry Basin 03



Summary for Pond 44P: Dry Basin 01

Inflow Area = 1.680 ac, 8.93% Impervious, Inflow Depth = 5.16" for 100-year event
Inflow = 13.75 cfs @ 11.96 hrs, Volume= 0.722 af
Outflow = 0.13 cfs @ 19.88 hrs, Volume= 0.460 af, Atten= 99%, Lag= 475.4 min
Primary = 0.13 cfs @ 19.88 hrs, Volume= 0.460 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 710.57' @ 19.88 hrs Surf.Area= 0.408 ac Storage= 0.584 af

Plug-Flow detention time= 1,356.5 min calculated for 0.460 af (64% of inflow)
Center-of-Mass det. time= 1,252.7 min (2,007.5 - 754.9)

Volume	Invert	Avail.Storage	Storage Description
#1	709.00'	1.225 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

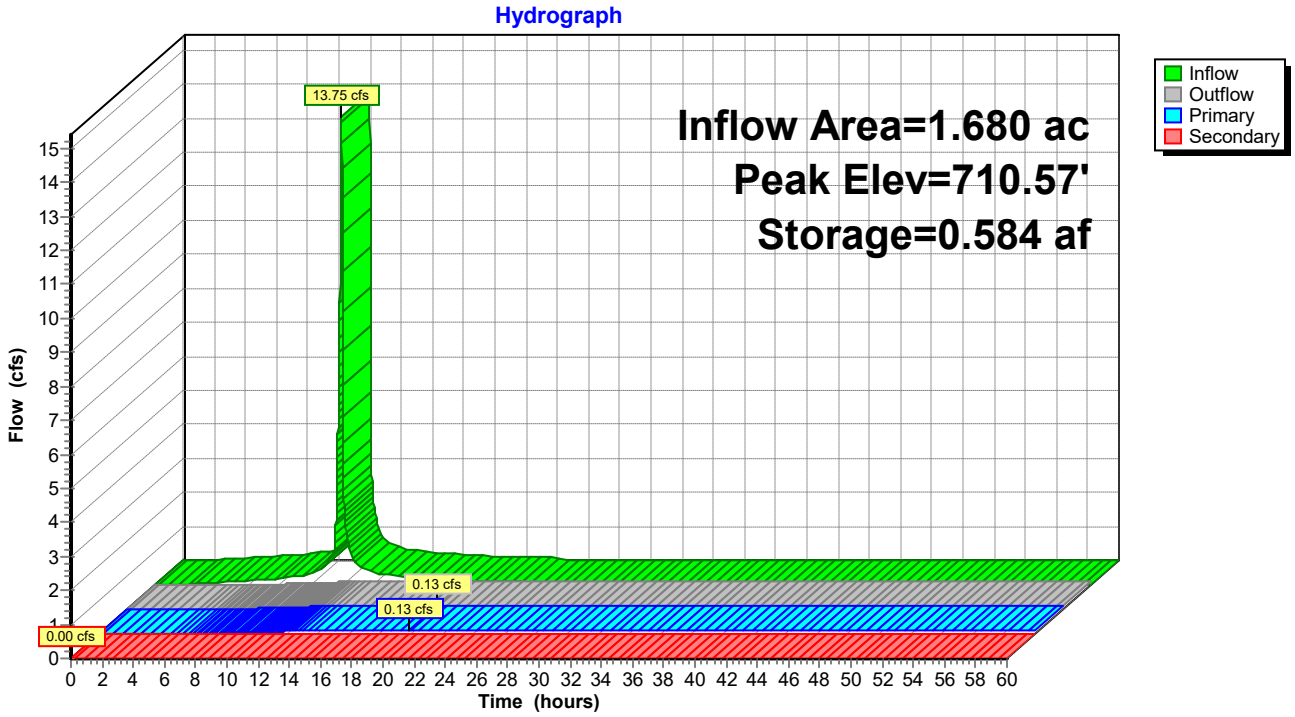
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
709.00	0.340	0.000	0.000
710.00	0.380	0.360	0.360
711.00	0.430	0.405	0.765
712.00	0.490	0.460	1.225

Device	Routing	Invert	Outlet Devices
#1	Primary	702.50'	**12.0" Round Culvert** L= 57.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 702.50' / 701.00' S= 0.0261 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	709.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	711.00'	**2.0" x 24.0" Horiz. Orifice/Grate X 8.00** C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads
#4	Secondary	711.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.13 cfs @ 19.88 hrs HW=710.57' (Free Discharge)
└**1=Culvert** (Passes 0.13 cfs of 10.15 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.13 cfs @ 5.87 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=709.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 44P: Dry Basin 01



Summary for Pond 55P: Existing Structure 2

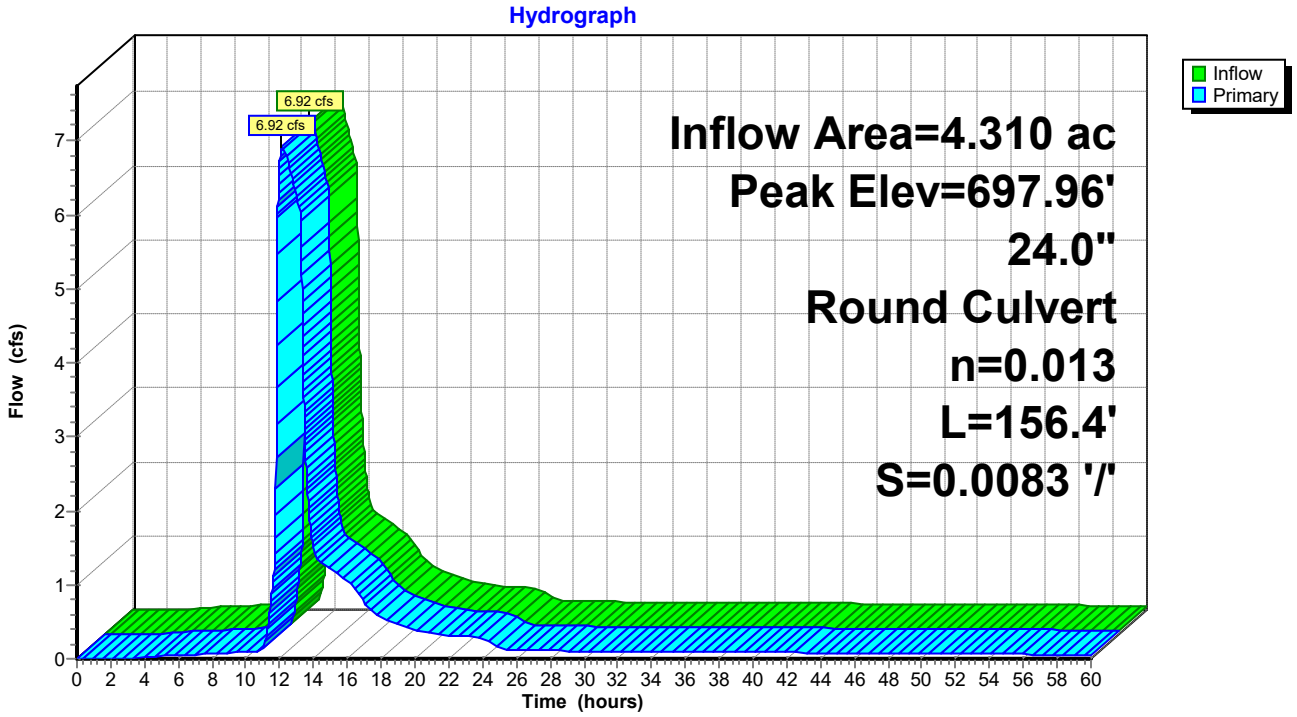
Inflow Area = 4.310 ac, 25.75% Impervious, Inflow Depth > 5.05" for 100-year event
Inflow = 6.92 cfs @ 12.10 hrs, Volume= 1.815 af
Outflow = 6.92 cfs @ 12.10 hrs, Volume= 1.815 af, Atten= 0%, Lag= 0.0 min
Primary = 6.92 cfs @ 12.10 hrs, Volume= 1.815 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 697.96' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	696.80'	**24.0" Round RCP_Round 24"** L= 156.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 696.80' / 695.50' S= 0.0083 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf

Primary OutFlow Max=6.92 cfs @ 12.10 hrs HW=697.96' (Free Discharge)
1=RCP_Round 24" (Barrel Controls 6.92 cfs @ 5.26 fps)

Pond 55P: Existing Structure 2



APPENDIX E:

Exhibits

LEGEND

Tributary Area

100 Yr Floodplain

Pre-Developed 01
Tributary Area= 14.64 acres
RCN= 94
TC= 10.80 minutes

GRAPHIC SCALE

0 30 60 120

1 inch = 60 feet

SR 71

Jackson Pike

WORK LIMITS

Pre-Developed 01

PARKING

TANKS

TANKS

WE
712.9

Scioto River

699.8 700.2 699.5 698.8 701.7 710.5 707.4 718.2 718.4 713.5 711.2 713.1 709.8 711.0 712.7 714.2 717.0 710.9 714.1 713.4

CITY OF COLUMBUS, FRANKLIN COUNTY, OHIO
STORMWATER MANAGEMENT PLAN
FOR
OARS PHASE 1 - JACKSON PIKE SITE
FINAL RESTORATION PLAN
PRE-DEVELOPED CONDITIONS EXHIBIT

EMH&T
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

Date: January 23, 2018
Scale: 1" = 60'
Job No: 2008-1973
Sheet: 1 of 2

Subarea 01
Area=1.68 Ac
RCN=96
TC=5.0 min

Subarea 02
Area=3.06 Ac
RCN=96
TC=5.0 min

Subarea 03
Area=4.31 Ac
RCN=97
TC=5.0 min

Undetained 01
Area=4.31 Ac
RCN=96
TC=5.0 min

Undetained 02
Area=1.28 Ac
RCN=97
TC=5.0 min

LEGEND

- Site Access, Parking, & Buildings
- Tributary Area
- Floodway
- 100-Year Floodplain = 709.00 feet
- Stream Corridor Protection Zone (SCPZ)

GRAPHIC SCALE

0 30 60 120

1 inch = 60 feet

S.R.71

Jackson Pike

WORK LIMITS

Dry Basin 01

Subarea 01

Undetained 01

Subarea 02

Subarea 03

Ex. Dry Basin (TBR)

Dry Basin 02

Dry Basin 03

Undetained 02

SCPZ

FLOODWAY

FLOODPLAIN

FLOODPLAIN

FLOODPLAIN

WORK LIMITS

Scioto River

Ex. 36" Stm

CITY OF COLUMBUS, FRANKLIN COUNTY, OHIO
STORMWATER MANAGEMENT PLAN
FOR
OARS PHASE 1 - JACKSON PIKE SITE
FINAL RESTORATION PLAN
POST-DEVELOPED CONDITIONS EXHIBIT

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Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

Date:	February, 2017
Scale:	1" = 60'
Job No:	2008-1973
Sheet:	2 of 2

J:\20081973\Reports\Stormwater\DWG\POST.dwg

S.R. 71

Jackson Pike

WORK LIMITS

REVISED FLOODPLAIN

WORK LIMITS

SCPZ
(50'+15% Slopes)

Scioto River

WORK LIMITS

FLOODWAY

EX FLOODPLAIN

EX FLOODPLAIN

TRAILER

PROPOSED BMP

STORAGE SHED

PARKING LOT

ACCESS DRIVE

PROPOSED BMP

PROPOSED BMP

OHE

OHE

WORK LIMITS

ST

ST

ST

ST

LEGEND

Floodway

100 yr FEMA Floodplain

Stream Corridor Protection Zone (SCPZ)

709 Contour (Area excluded from Floodplain Per 2009 Topo)

Post 2009 Floodplain Fill (Volume = 21,265 CY)

GRAPHIC SCALE

0 30 60 120

1 inch = 60 feet

CITY OF COLUMBUS, OHIO
STORMWATER MANAGEMENT PLAN
FOR
OARS PHASE 1 - JACKSON PIKE SITE FINAL RESTORATION PLAN
FLOODPLAIN FILL

EMHT
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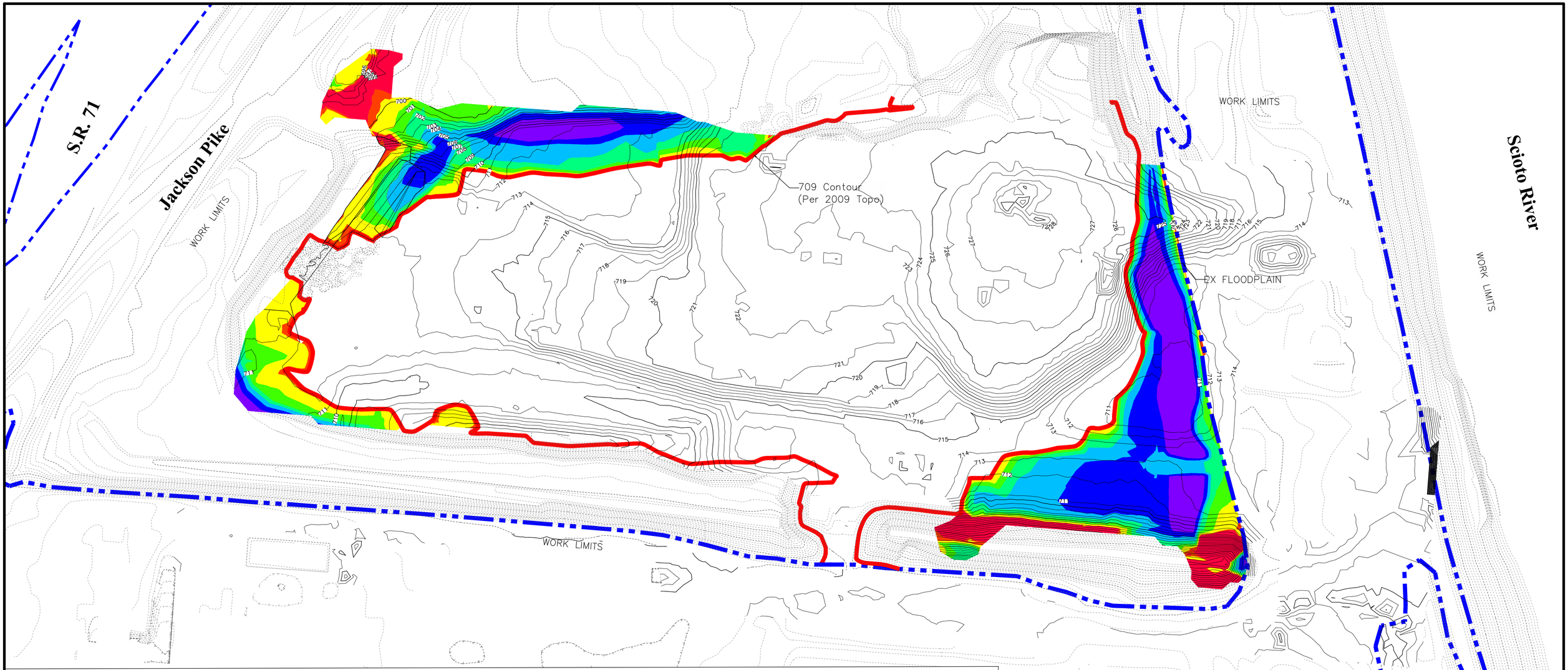
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

DATE: November 6, 2017

SCALE: 1" = 60'

JOB NO.: 2008-1973

SHEET: Exhibit 1



Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	−9.500	0.000	
2	0.000	1.000	
3	1.000	2.000	
4	2.000	3.000	
5	3.000	4.000	
6	4.000	6.000	
7	6.000	8.000	
8	8.000	14.000	

GRAPHIC SCALE

0 30 60 120

1 inch = 60 feet

Normal River Elevation = 685.40

FEMA 100−yr Floodplain Elevation = 709.00

Total Fill added to the site since 2009 = 21,264.46 CY = 13.18 Ac−Ft

CITY OF COLUMBUS, OHIO
STORMWATER MANAGEMENT PLAN
FOR
OARS PHASE 1 - JACKSON PIKE SITE
FINAL RESTORATION PLAN
FLOODPLAIN FILL

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emht.com

DATE: November 6, 2017
SCALE: 1" = 60'
JOB NO.: 2008-1973
SHEET: Exhibit 2

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APPENDIX C

See Attached Plan Sheets

N

W4800 W4400 W4000 W3600 W3200 W2800 W2400

N4600 N4200 N3800 N3400 N3000

INLAND PRODUCTS INCORPORATED

LIMIT OF SURVEYED GRADING (SEPT. 6, 2017)

STOCK PILE

DIRT PILE

STORAGE SHED

SR 104 JACKSON PIKE

R/W

SCIOTO RIVER

FDS

BYPASS CHAMBER

S-2 OSS

S-1 ODS

EWGC

CF1

MAN

PS1

M-1

M-2

M-3

ADM

SCD

SDB

DT1

DT2

GWP

ESB

JACKSON PIKE WASTEWATER TREATMENT FACILITY

IN1

IN2

PHT

WHT

SS1

SS2

SS3

SS4

D01 D02 D03 D04 D05 D06 D07 D08 D09 D10

DC1 DC2 DC3

GEN

PS2

SCN

PMP

CLD

BURIED IMHOFF TANKS (ABANDONED)

PRB

PR3

PR4

PIB

CODED NOTES:

1. PERMANENT SITE FENCING.
2. 30' AUTOMATIC SLIDING GATE.
3. 30' MANUAL SLIDING GATE.
4. 22' CHAIN LINK DOUBLE LEAF SWING GATE.
5. ASPHALT PAVEMENT.
6. GRAVEL PAVEMENT.
7. TRANSFORMER.
8. HIGH MAST LIGHT.
9. ABANDONED POLE.
10. LIGHTING PULL BOX.
11. BURIED DEBRIS – BROKEN CHUNKS OF CONCRETE

DLZ

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No.	BY Int.	DATE Mo./Dy./Yr.	REVISIONS Remarks

PROJ. PERSONNEL Initials	DATE Mo./Dy./Yr.
DES. –	–/–/–
DWN. –	–/–/–
CKD. –	–/–/–

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC UTILITIES
DIVISION OF SEWERAGE AND DRAINAGE

JPWWWTP COGENERATION FACILITY
CIP 650250–100007

SCALE
0 40 100
FEET

JACKSON PIKE–OARS
EXISTING SITE PLAN

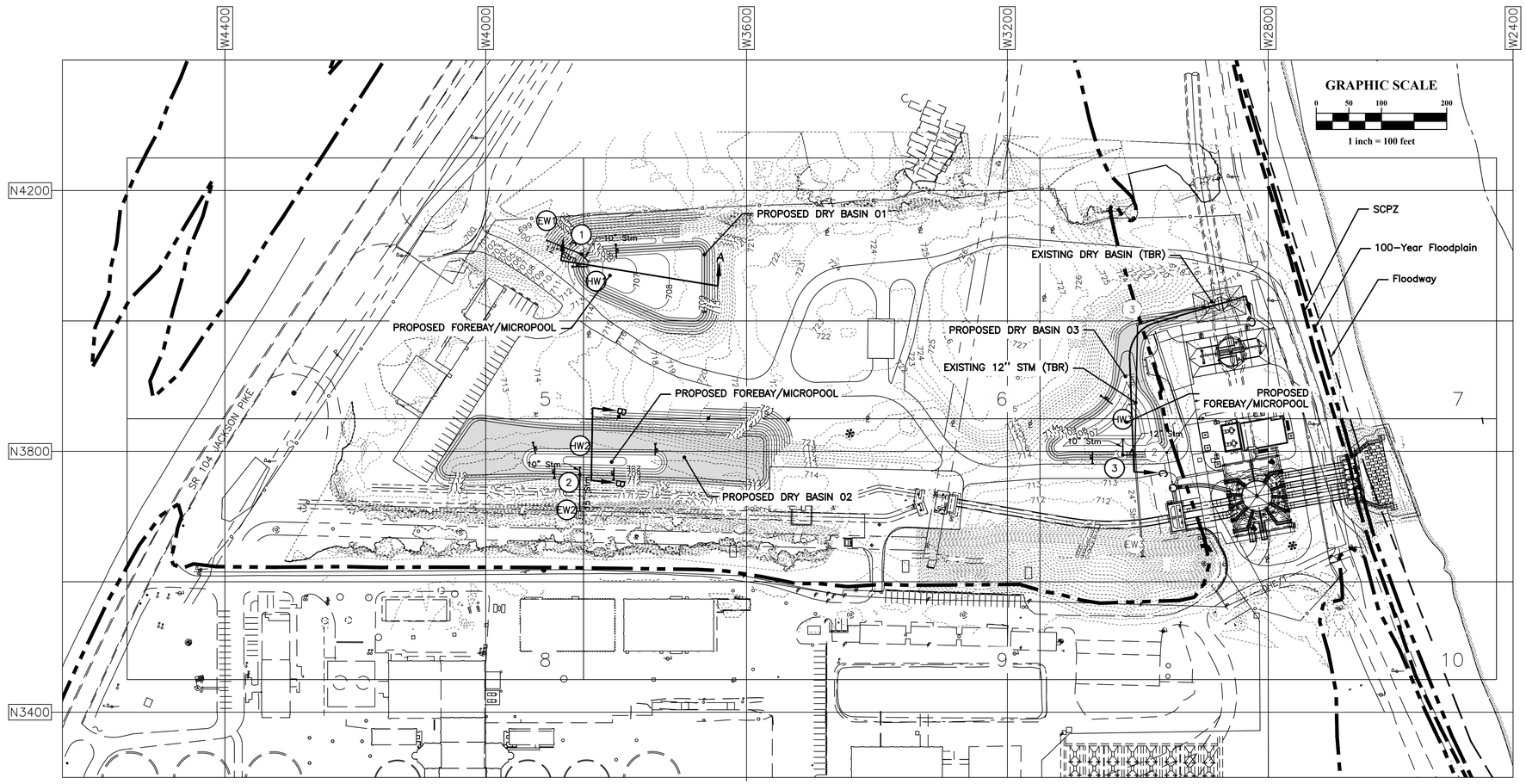
ISSUED STATUS: –

SHEET

DATE ISSUED: –/–/–
Mo./Dy./Yr.

PLOTTED: 4/6/2018 11:19:08 AM

J:\2008197 3\Dwg\04Sheets\Plan\01 Existing Site Plan.dwg 4/5/2018 4:59:36 PM Stechschulte, Matthew



PROPOSED DRY BASIN 01 DATA
Micropool/Forebay Elev. = 706.50 Ft
Normal Pool Elev. = 709.00 Ft
Water Quality Elev. = 709.35 Ft
Water Quality Volume Required = 0.120 A-Ft
Water Quality Volume Provided = 0.120 A-Ft
(Not including forebay and micropool)
Forebay/Micropool Volume Required = 0.012 Ac-Ft
Forebay/Micropool Volume Provided = 0.405 Ac-Ft
100-Yr Elev. = 710.57
Top of Embankment = 712.00 Ft

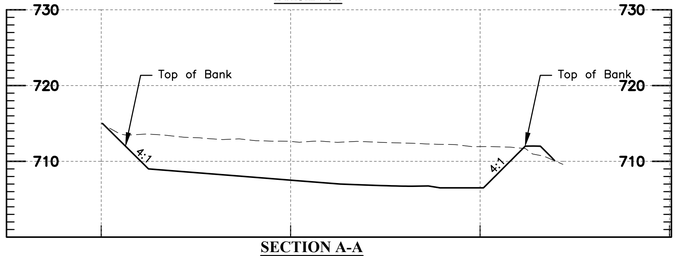
PROPOSED DRY BASIN 02 DATA
Micropool/Forebay Elev. = 706.50 Ft
Normal Pool Elev. = 709.00 Ft
Water Quality Elev. = 709.61 Ft
Water Quality Volume Required = 0.218 A-Ft
Water Quality Volume Provided = 0.218 A-Ft
(Not including forebay and micropool)
Forebay/Micropool Volume Required = 0.022 Ac-Ft
Forebay/Micropool Volume Provided = 0.295 Ac-Ft
100-Yr Elev. = 710.34
Top of Embankment = 712.00 Ft

PROPOSED DRY BASIN 03 DATA
Micropool/Forebay Elev. = 706.50 Ft
Normal Pool Elev. = 709.00 Ft
Water Quality Elev. = 710.18 Ft
Water Quality Volume Required = 0.307 A-Ft
Water Quality Volume Provided = 0.307 A-Ft
(Not including forebay and micropool)
Forebay/Micropool Volume Required = 0.031 Ac-Ft
Forebay/Micropool Volume Provided = 0.300 Ac-Ft
100-Yr Elev. = 711.84
Top of Embankment = 712.00 Ft

STRUCTURE COORDINATES PROPOSED

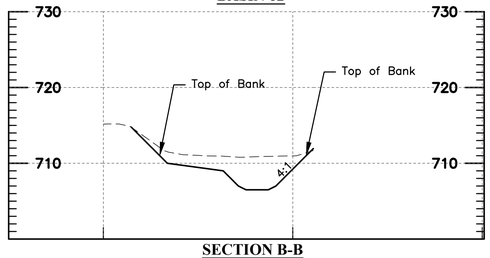
STRUCTURE #	NORTHING	EASTING
EW1	697515.9553	1824064.7076
EW2	697099.6232	1824020.7342
HW3	697020.2528	1824857.2056
HW2	697165.7097	1824036.1232
HW1	697469.4488	1824119.9750
1	697483.1885	1824111.8442
2	697153.9831	1824033.5763
3	696996.1036	1824851.6303

BASIN 01



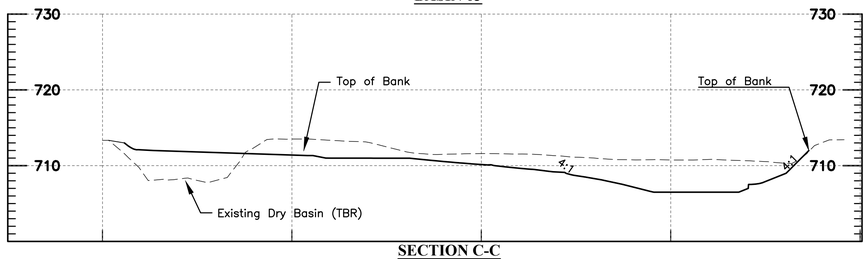
SECTION A-A
Scale: 1"=40' Horizontal
1"=10' Vertical

BASIN 02



SECTION B-B
Scale: 1"=40' Horizontal
1"=10' Vertical

BASIN 03



SECTION C-C
Scale: 1"=40' Horizontal
1"=10' Vertical

STABILIZE BASIN WITH 6 INCHES OF #2 STONE

4:1 SURFACE SLOPE

LEGEND:

1
SHEET LIMITS
SHEET NUMBERS

ELEVATION-AREA-STORAGE TABLE

BASIN 01	AREA	CUM. STORAGE VOL.
ELEV (FT)	(AC)	(AC-FT)
709.00	0.340	0.000
710.00	0.380	0.360
711.00	0.430	0.765
712.00	0.490	1.225

ELEVATION-AREA-STORAGE TABLE

BASIN 02	AREA	CUM. STORAGE VOL.
ELEV (FT)	(AC)	(AC-FT)
709.00	0.180	0.000
710.00	0.770	0.475
711.00	0.800	1.275
711.00	0.800	1.275

ELEVATION-AREA-STORAGE TABLE

BASIN 03	AREA	CUM. STORAGE VOL.
ELEV (FT)	(AC)	(AC-FT)
709.00	0.250	0.000
710.00	0.300	0.275
711.00	0.350	0.600
712.00	0.410	0.980
713.00	0.470	1.420

100 YEAR DETENTION TABLE

LOCATION	VOLUME REQUIRED AC/FT	VOLUME PROVIDED AC/FT	ELEVATION	REMARKS
Dry Basin 01	0.584	1.225	710.57	*
Dry Basin 02	0.740	1.275	710.34	*
Dry Basin 03	0.711	1.420	711.31	*

*See Storm Water Management Plan/Report for Details

POST-CONSTRUCTION STORMWATER CONTROL FACILITIES

CONTROL/ OUTLET STRUCTURE NO.	CONTROL FUNCTION	DRAINAGE AREA TO CONTROL FACILITY (ACRES)	FACILITY TYPE
1	Water Quality & Flood Control	1.68	Dry Basin
2	Water Quality & Flood Control	3.06	Dry Basin
3	Water Quality & Flood Control	3.23	Dry Basin

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				DES.	
				DWN.	
				CKD.	

CITY OF COLUMBUS, OHIO
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DIVISION OF SEWERAGE AND DRAINAGE

JPWWWTP COGENERATION FACILITY
CIP 650250-100007

SCALE
AS NOTED

JACKSON PIKE-OARS
PROPOSED SITE PLAN

ISSUED STATUS: -

SHEET

DATE ISSUED: -/-/- (Mo./Dy./Yr.)

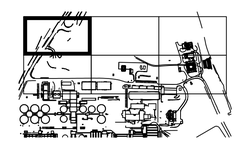
STABILIZE BASIN WITH 6 INCHES OF #2 STONE

4:1 SURFACE SLOPE

GRAPHIC SCALE

0 15 30 60

1 inch = 30 feet



KEY PLAN

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				DES.	
				DWN.	
				CKD.	

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DEPARTMENT OF PUBLIC UTILITIES

DIVISION OF SEWERAGE AND DRAINAGE

JPWWWTP COGENERATION FACILITY

CIP 650250-100007

SCALE

0 10 20 30

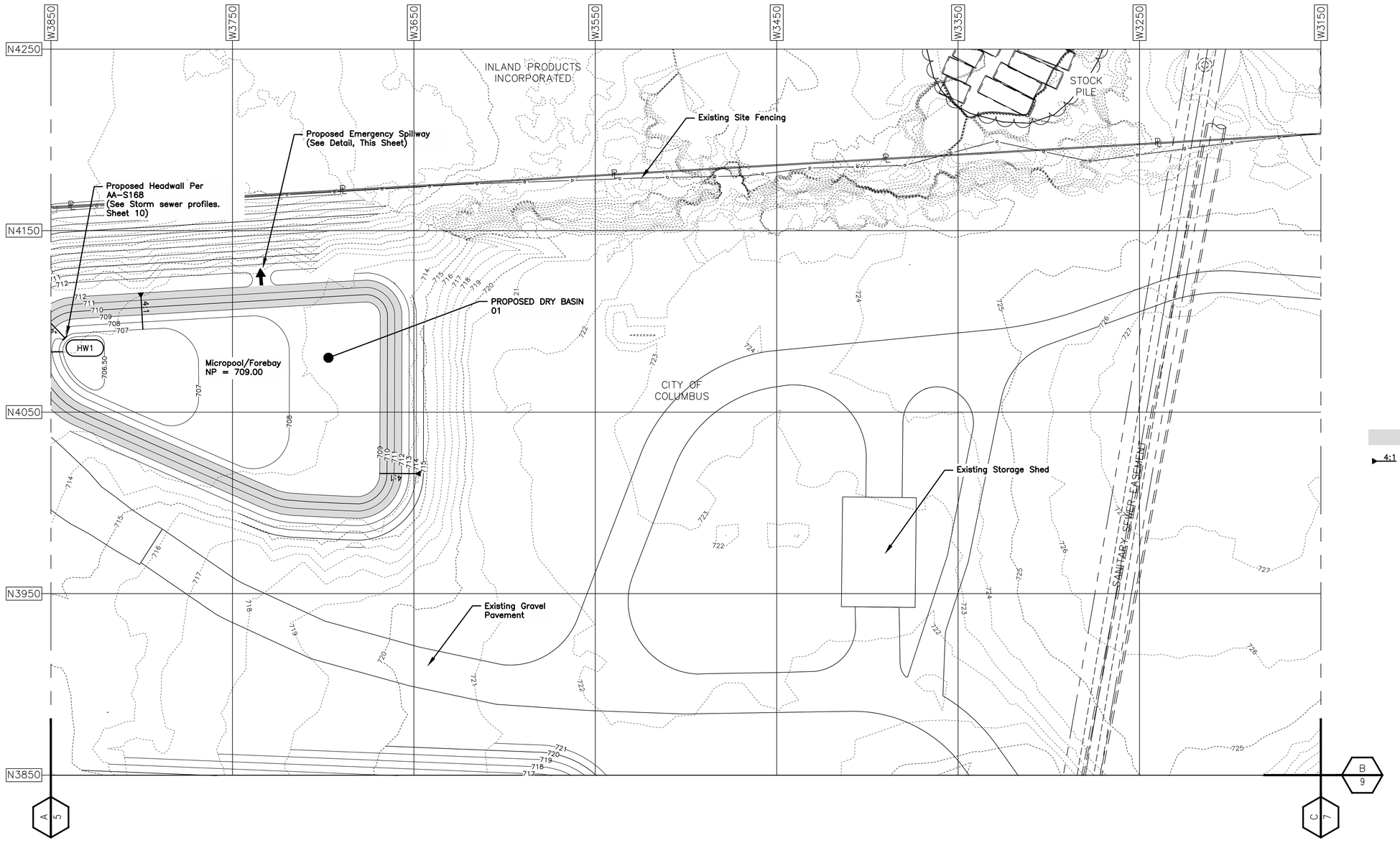
FEET

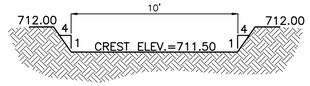
JACKSON PIKE-OARS GRADING PLAN

ISSUED STATUS: -

SHEET

DATE ISSUED: -/-/-
Mo./Dy./Yr.

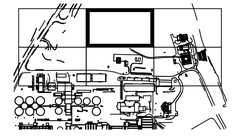




BASIN 01 OVERFLOW SPILLWAY DETAIL (PROFILE VIEW)
NO SCALE

STABILIZE BASIN WITH 6 INCHES OF #2 STONE

4:1 SURFACE SLOPE



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				DES.	
				DWN.	
				CKD.	

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DIVISION OF SEWERAGE AND DRAINAGE

JPWWWTP COGENERATION FACILITY
CIP 650250–100007

SCALE
0 10 20 30
FEET

JACKSON PIKE–OARS GRADING PLAN

ISSUED STATUS: –

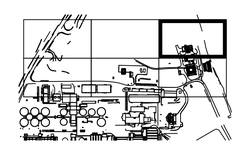
SHEET

DATE ISSUED: –/–/–
Mo./Dy./Yr.

STABILIZE BASIN WITH 6 INCHES OF #2 STONE

4:1 SURFACE SLOPE

(TBR) TO BE REMOVED



KEY PLAN

No.	BY Int.	DATE Mo./Dy./Yr.	REVISIONS Remarks	PROJ. PERSONNEL Initials	DATE Mo./Dy./Yr.
				DES.	
				DWN.	
				CKD.	

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JPWWWTP COGENERATION FACILITY
CIP 650250-100007

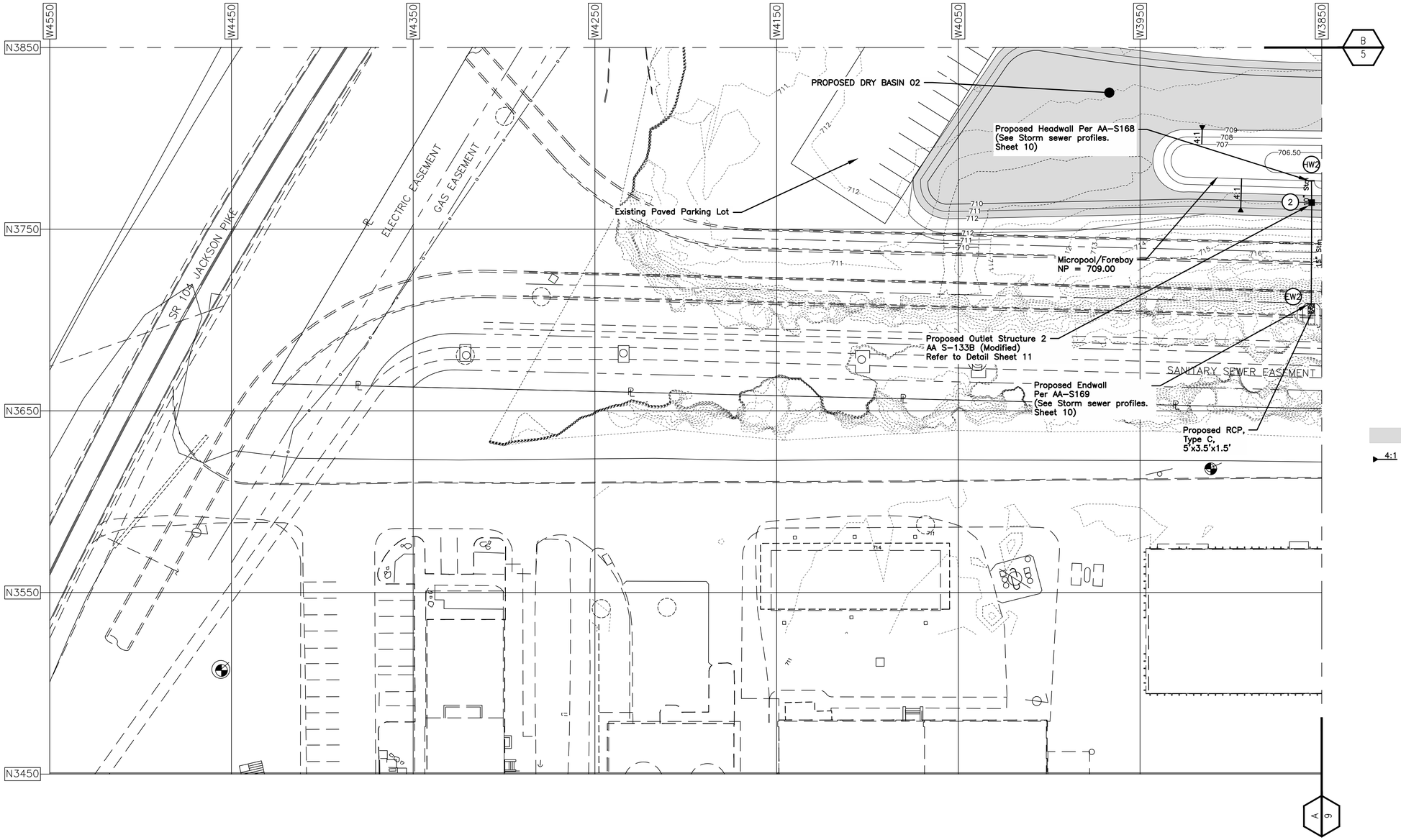
SCALE
0 10 20 30
FEET

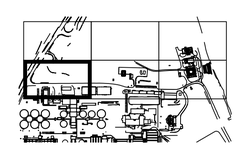
JACKSON PIKE-OARS
GRADING PLAN

ISSUED STATUS: -

SHEET

DATE ISSUED: -/-/-
Mo./Dy./Yr.





KEY PLAN

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				DES.	
				DWN.	
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DEPARTMENT OF PUBLIC UTILITIES
DIVISION OF SEWERAGE AND DRAINAGE

JPWWWTP COGENERATION FACILITY
CIP 650250-100007

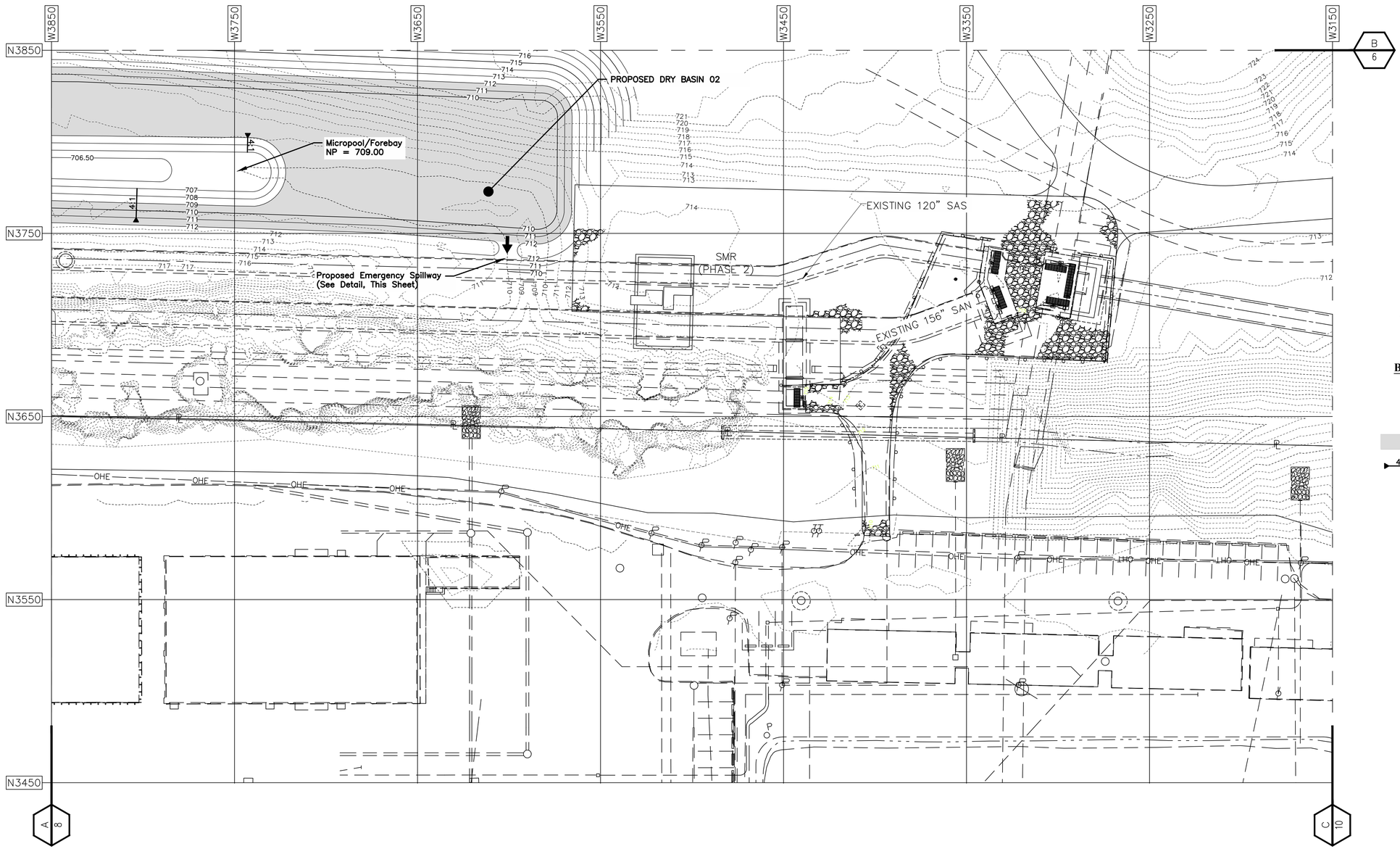
SCALE
0 10 20 30
FEET

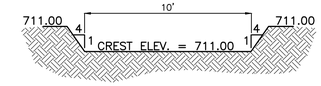
JACKSON PIKE-OARS GRADING PLAN

ISSUED STATUS: -

SHEET

DATE ISSUED: -/-/-
Mo./Dy./Yr.

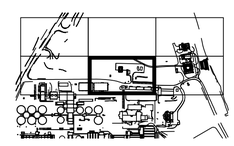




BASIN 02 OVERFLOW SPILLWAY DETAIL (PROFILE VIEW)
NO SCALE

STABILIZE BASIN WITH 6 INCHES OF #2 STONE

4:1 SURFACE SLOPE



KEY PLAN

DLZ
EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Fax: 614.775.4800
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				DES.	
				DWN.	
				CKD.	

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC UTILITIES
DIVISION OF SEWERAGE AND DRAINAGE

JPWWWTP COGENERATION FACILITY
CIP 650250-100007

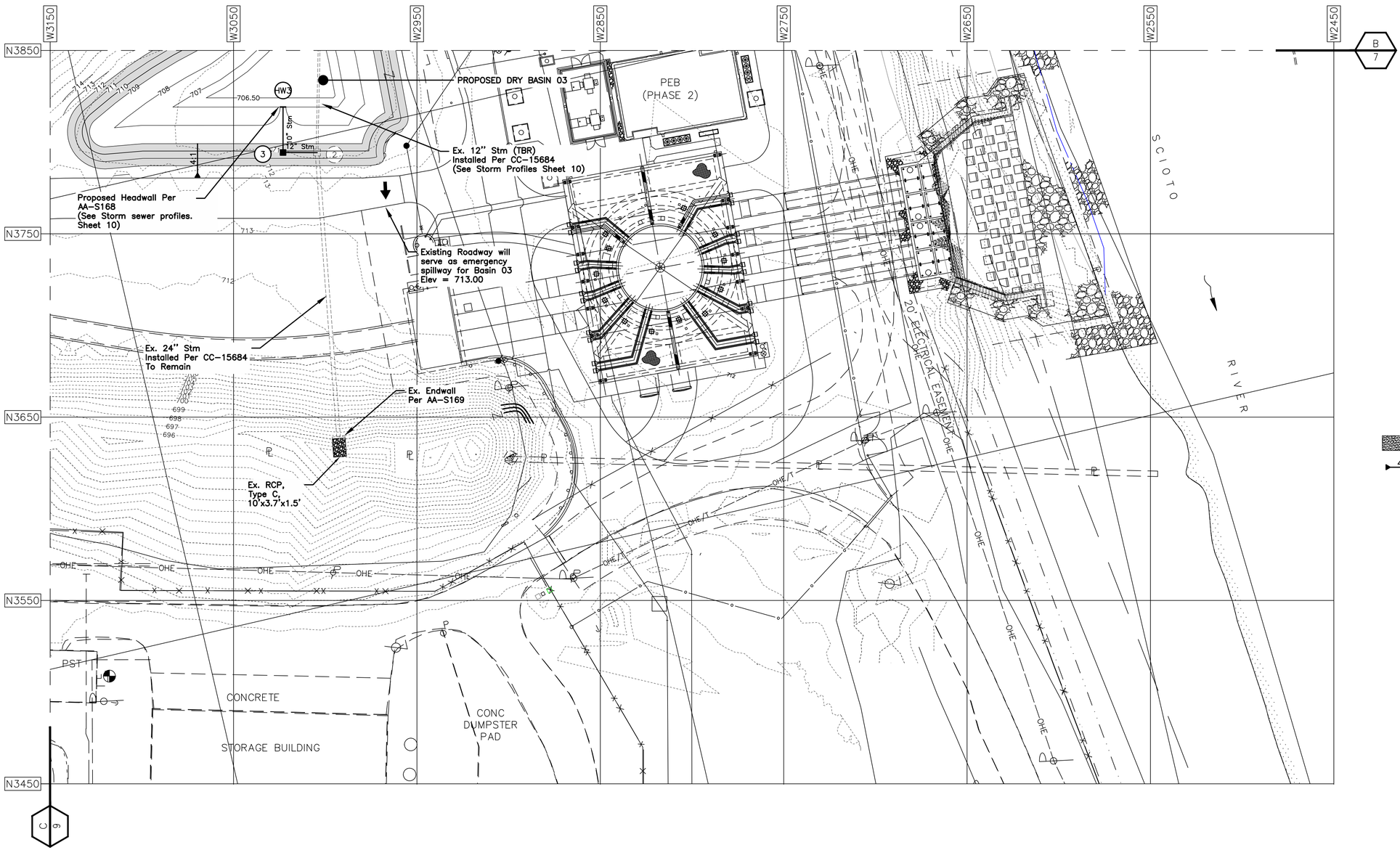
SCALE
0 10 20 30
FEET

JACKSON PIKE-OARS
GRADING PLAN

ISSUED STATUS: -

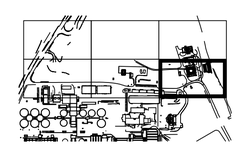
SHEET

DATE ISSUED: -/-/-
Mo./Dy./Yr.



STABILIZE BASIN WITH 6 INCHES OF #2 STONE

4:1 SURFACE SLOPE



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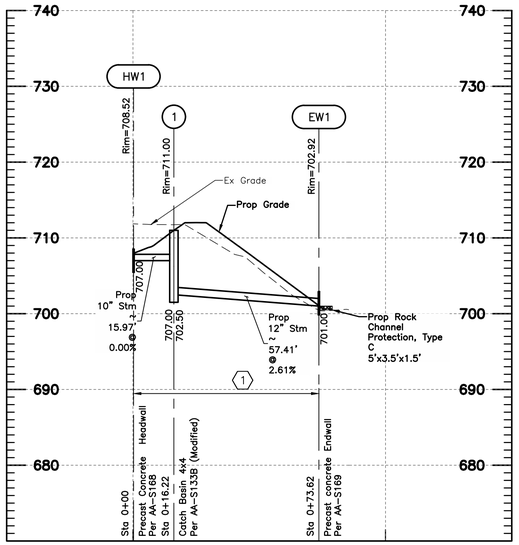
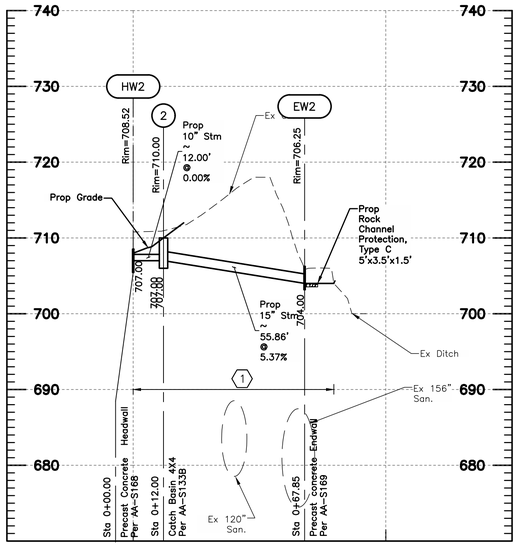
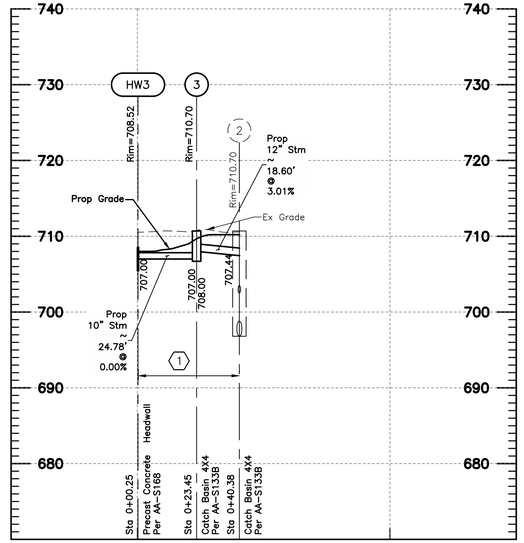


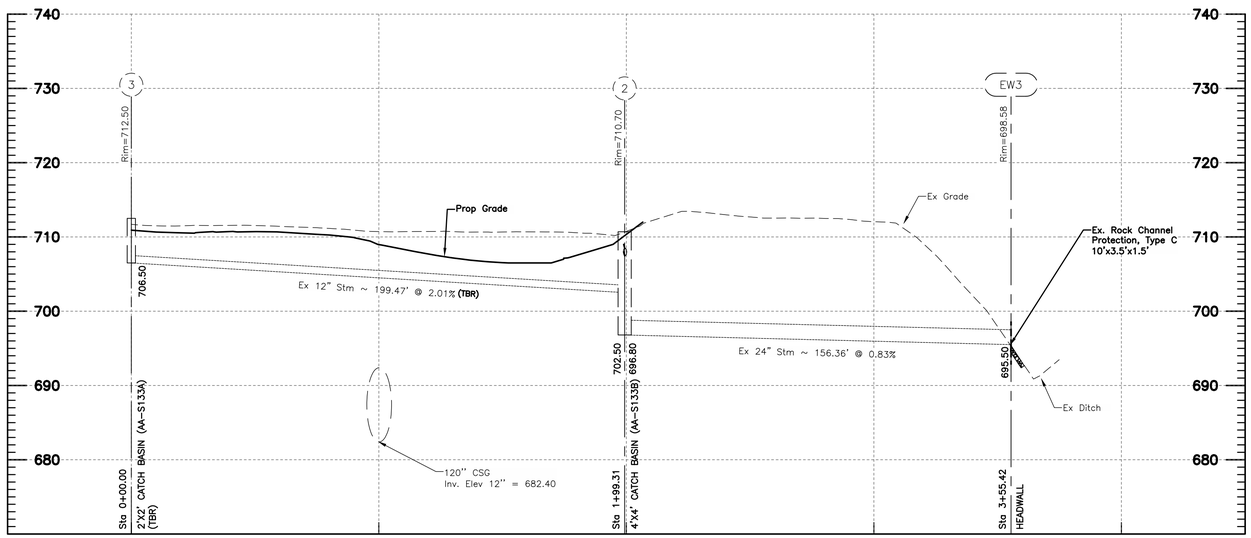




PROPOSED STORM SEWER PROFILES
Scale: 1"=30' Horizontal
1"=10' Vertical

CODED NOTES

(1) COMPACTED BACKFILL PER CMSC ITEM 911.



EXISTING STORM SEWER PROFILES
Scale: 1"=30' Horizontal
1"=5' Vertical

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SCALE
AS NOTED

JACKSON PIKE-OARS
STORM SEWER PROFILES

ISSUED STATUS: -

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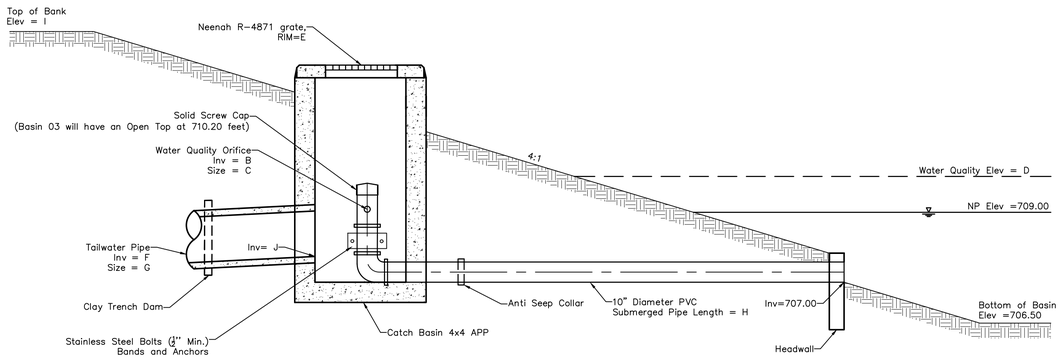

Notes
1. Remove all sediment and flush entire outlet when site is stabilized.

DETENTION AND WATER QUALITY BASINS OUTLET DETAIL

Not to Scale

BASIN DATA TABLE										
BASIN	A	B	C	D	E	F	G	H	I	J
	STRUCTURE #	WQ ORIFICE INVERT	WQ ORIFICE SIZE	WATER QUALITY ELEVATION	TOP OF CASTING ELEVATION	TAILWATER PIPE INVERT	TAILWATER PIPE SIZE	10" SUBMERGED PIPE LENGTH	TOP OF BANK ELEVATION	OUTLET PIPE INVERT
		(FT)	(IN)	(FT)	(FT)	(FT)	(IN)	(FT)	(FT)	(FT)
01	1	709.00	2	709.35	711.00	702.50	12.00	15.97	712.00	702.50
02	2	709.00	2	709.61	710.00	707.00	15.00	12.00	711.00	707.00
03	3	709.00	2	710.18	710.70	708.00	12.00	20.00	713.00	708.00

Inspection Item	Inspection and Maintenance Procedures	Frequency of Inspection
Outlet Structures	• Inspect the basin outlet structure and ensure that the submerged 10" diameter outlet pipe located at the bottom of the micropool is not blocked with sediment or debris. Inspect the 10" diameter riser pipe, including the water quality orifice, located within the outlet structure and remove any blockages. Inspect the outlet structure window and overflow grate and remove debris as necessary. • Inspect for cracking or other damage to the outlet structure.	Monthly
Forebay/ Micropool	• Monitor sediment accumulation and remove when the elevation reaches 707 ft. • Use a portable pump to drain the retained runoff. Remove the accumulated sediment and properly dispose of offsite.	Annually
Stormwater Basin	• Remove accumulated debris and trash from the basin bottom. • Inspect for erosion and ensure that a uniform stone cover is provided. Backfill eroded areas with stone.	Annually

Stormwater Basins treat incoming stormwater runoff by physical, biological, and chemical processes. The primary removal mechanism is the gravitational settling of particulates, organic matter, metals, bacteria and organics as stormwater runoff resides in the forebay and micropool. Another mechanism for pollutant removal is uptake by algae and wetland plants in the micropool, particularly removing nutrients. Other contaminants such as hydrocarbons are broken down and eliminated by volatilization and chemical activity. Stormwater Basins are utilized to remove 80% of the total suspended solids load in typical urban post-development runoff when designed and maintained properly.

Stormwater basins naturally collect sediment, including gravel, sand, and mud, as well as other debris like litter. To maintain its capacity and function, a basin should be kept free of excessive debris, litter, and sediment. The forebay and micropool basin features have been designed at a depth of approximately 2.5 feet. This design depth should be verified annually to ensure that the basin will continue to function properly. Property owners or contracted personnel shall position themselves in the middle of the forebay and micropool and several measurements around the features shall be taken using a Stadia Rod to determine the top of the accumulated sediment elevation. Once the available depth of the forebay and micropool reaches 2.00 feet or less, the accumulated sediment should be excavated to restore the micropool/forebay depth to the respective design depths per the grading plan. The forebay and micropool are to be temporarily pumped down so that the accumulated sediment can be removed. It is recommended that sediment excavated from stormwater basins be tested prior to sediment disposal. Sediment removed from the stormwater basin should be stored properly until disposal to ensure no exposure to stormwater runoff.

STORMWATER BASIN INSPECTION AND MAINTENANCE

DLZ

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CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC UTILITIES
DIVISION OF SEWERAGE AND DRAINAGE

JPWWWTP COGENERATION FACILITY
CIP 650250-100007

SCALE

JACKSON PIKE-OARS
BASIN DETAILS & NOTES

ISSUED STATUS: -

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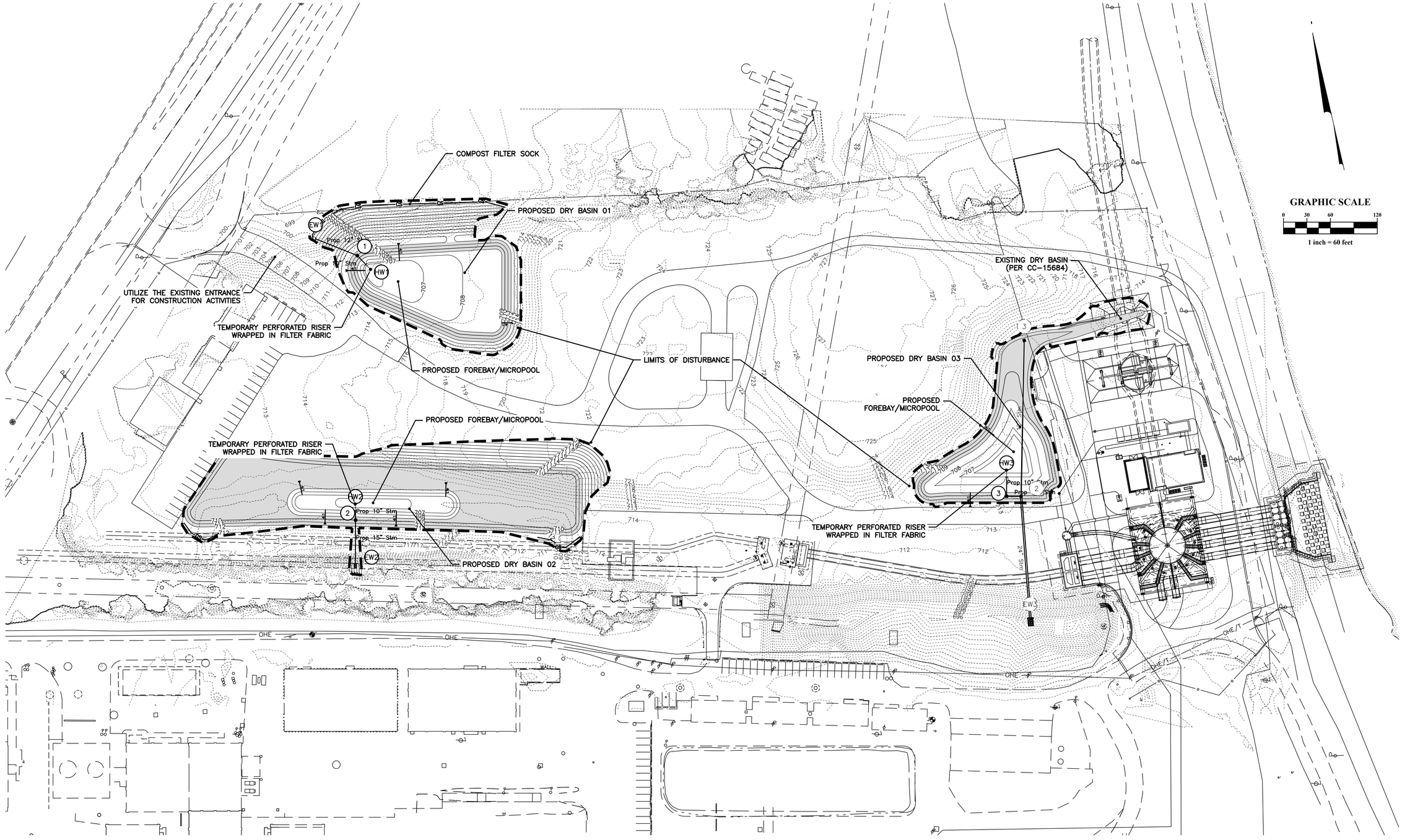

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					DES.		JPWWWTP COGENERATION FACILITY CIP 650250-100007
					DWN.		SCALE AS NOTED
					CKD.		JACKSON PIKE-OARS STORMWATER POLLUTION PREVENTION PLAN
							ISSUED STATUS: – SHEET DATE ISSUED: -/-/- Mo./Dy./Yr.

Erosion & Sediment Control Narrative

Plan Engineer:
Evans, Mechwart, Hambleton & Tilton, Inc.
5500 New Albany Road
Columbus, OH 43054
Phone: (614) 775-4500
Fax: (614) 775-4800

Property Owner:
City of Columbus, Department of Public Utilities
910 Dublin Road
Columbus, OH 43215

Existing Site Description:
The existing site condition consists of compacted gravel, compacted construction and demolition debris as a result of previous fill activities located onsite. The site has been developed into with trailers and maintenance buildings to serve the OARS deep tunnels and shafts.

Site Disturbance:
Approximately 2.76 acres will be disturbed with the proposed project.

Proposed Improvements:
The proposed project involves the grading of the proposed stormwater basins which will provide water quality and detention for the proposed site.

Existing Site Drainage Condition:
The existing site currently drains to a ditch located along the south end of the site just north of the Jackson Pike Waste Water Treatment Plant which discharges to the Scioto River to the east.

Watershed
The project is located within the Scioto River watershed.

Adjacent Areas:
The proposed project is located just east of Interstate 71, north of Jackson Pike Water Water Treatment Plant, South of Frank Road and west of the Scioto River.

Soils:
The soils onsite consist of Bennington Silt Loam (BeA), Cardington Silt Loam (CaB), Condit Silt Loam (Cn) and Pewamo Silty Clay Loam (Pm) according to the NRCS Web Soil Survey.

Critical Areas:
Inspection and maintenance of the regional stormwater management basins that will be used as a sediment traps during construction activities.

Erosion & Sediment Control:
The proposed stormwater management basins will be used as sediment traps and will be the primary Best Management Practice (BMP) used to manage the stormwater runoff during construction activities. Additional BMP's to be installed to assist with managing the runoff consist of perimeter controls such as compost filter socks. Muddy water required to be pumped from excavated areas will be pumped into a geotextile filter bag. Disturbed areas will be stabilized per the temporary and permanent seeding requirements.

Construction Sequence
1. Use the existing construction entrance to access the site.
2. Construct the proposed stormwater management basins and outlet structures complete with temporary perforated riser pipes wrapped in filter fabric.
3. Install riprap at the proposed storm sewer outfalls.
4. Stabilize the disturbed areas throughout construction activities per the temporary and permanent soil stabilization timeframe requirements.
5. Upon permanent stabilization of the the site, contact the City of Columbus Erosion Control inspector to coordinate an inspection to obtain approval to remove the temporary riser pipes from the basin outlet structures. Prior to removal of the riser pipes, drain the basins and by pumping retained water into geotextile filter bags remove the accumulated sediment.

Prior to Construction Operations in a particular area, all sedimentation and erosion control features shall be in place. Field adjustments with respect to locations and dimensions may be made by the Engineer.

The Contractor shall place inlet protection for the erosion control immediately after construction of the catch basins or inlets.

It may become necessary to remove portions of the barrier during construction to facilitate the grading operations in certain areas. However, the barrier shall be in place in the evening or during any inclement weather.

The use of compost filter socks and compost blankets are gaining wider acceptance nationwide. They are now approved for use on all Columbus SWP3 plans and construction sites.

The limits of disturbance line on the plan delineate the limits of seeding and mulching. All areas not designated to be seeded shall remain under natural ground cover. Those areas disturbed outside the seeding limits shall be seeded and mulched at the Contractor's expense. "Temporary seeding" No area for which grading has been completed shall be left unseeded or unmulched for longer than 14 days. If permanent seed is not applied at this time, temporary seeding shall be done at the following rates:

March 1 to August 15
Seed: Oats — 2 lbs./1,000 Sq.Ft.
Fertilizer: (12:12:12) — 12 1/2 lbs./1,000 Sq.Ft.
Mulch:(Straw or Hay) — 2 tons/acre

August 15 to November
Seed: Annual Rye — 2 lbs./1,000 Sq.Ft.
Fertilizer: (12:12:12) — 12 1/2 lbs./1,000 Sq.Ft.
Mulch:(Straw or Hay) — 2 tons/acre

November 1 to March 1
Mulch (ONLY):(Straw or Hay) — 2 tons/acre

"Permanent seeding" shall be done between March 15 and September 15. If seeding is done between September 15 and March 15, it shall be classified as "Temporary Seeding." Permanent seed shall be 40% Kentucky Bluegrass, 40% Creeping Red Fescue, 20% Annual Ryegrass. Permanent seeding shall consist of fertilizing, watering and seeding rates indicated under Item 659. Seeding shall be applied within two(2) days after final grading or following seed bed preparation.

Rates of application of Item 659:
Seed: — 2 lbs./1,000 Sq.Ft.
Fertilizer: (12:12:12) — 25 lbs./1,000 Sq.Ft.
Mulch:(Straw or Hay) — 2 tons/acre

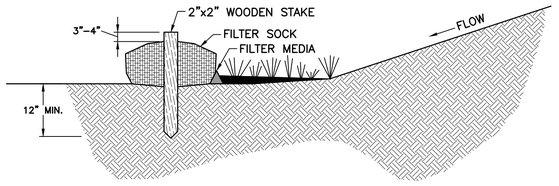
The cost for temporary channels, sediment dams, sediment basins, and other appurtenant earthmoving operations shall be included in the price bid for erosion and sedimentation control quantities.

MAINTENANCE:

It is the Contractor's responsibility to maintain the sediment control features used on this project. The site shall be inspected periodically and within 24 hours of a significant rainfall. Records of these inspections shall be kept and made available to jurisdictional agencies if requested. Any sediment or debris which has reduced the efficiency of a structure shall be removed immediately. Should a structure or feature become damaged, the Contractor shall repair or replace at no additional cost to the Owner. Not all details shown on this sheet may be required for this project,

SCHEDULE:

The Contractor shall provide a schedule of operations to the owner. Sedimentation and erosion control features shall be placed in accordance with this schedule.



1. MATERIALS – COMPOST USED FOR FILTER SOCKS SHALL BE WEED, PATHOGEN AND INSECT FREE AND FREE OF ANY REFUSE, CONTAMINANTS OR OTHER MATERIALS TOXIC TO PLANT GROWTH. THEY SHALL BE DERIVED FROM A WELL-DECOMPOSED SOURCE OF ORGANIC MATTER AND CONSIST OF A PARTICLES RANGING FROM 3/8" TO 2".
2. FILTER SOCKS SHALL BE 3 OR 5 MIL CONTINUOUS, TUBULAR, HDPE 3/8" KNITTED MESH NETTING MATERIAL, FILLED WITH COMPOST PASSING THE ABOVE SPECIFICATIONS FOR COMPOST PRODUCTS.

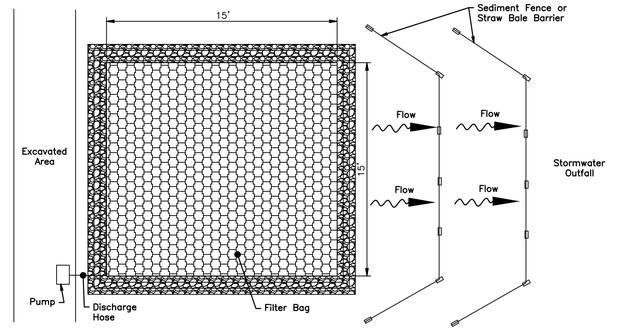
INSTALLATION:

3. FILTER SOCKS WILL BE PLACED ON A LEVEL LINE ACROSS SLOPES, GENERALLY PARALLEL TO THE BASE OF THE SLOPE OR OTHER AFFECTED AREA. ON SLOPES APPROACHING 2:1, ADDITIONAL SOCKS SHALL BE PROVIDED AT THE TOP AND AS NEEDED MIDSLOPE.
4. UPON INSTALLATION OF THE FILTER SOCK, ADDITIONAL FILTER MEDIA (MATCHING THE MEDIA INSIDE OF THE SOCK) SHALL BE PLACED ON THE UPLAND SIDE OF THE FILTER SOCK. FILTER MEDIA SHALL EXTEND HALFWAY UP THE SOCK AND SLOPE AT A MAXIMUM OF 45 DEGREES TO EXISTING GROUND ELEVATION.
5. FILTER SOCKS INTENDED TO BE LEFT AS A PERMANENT FILTER OR PART OF THE NATURAL LANDSCAPE, SHALL BE SEEDED AT THE TIME OF INSTALLATION FOR ESTABLISHMENT OF PERMANENT VEGETATION.
6. FILTER SOCKS ARE NOT TO BE USED IN CONCENTRATED FLOW SITUATIONS OR IN RUNOFF CHANNELS.

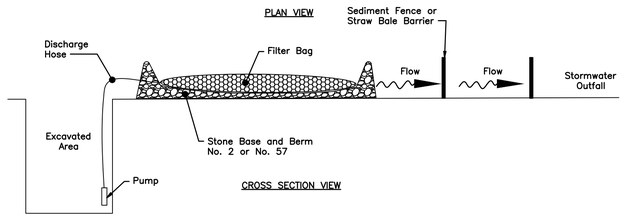
MAINTENANCE:

7. ROUTINELY INSPECT FILTER SOCKS AFTER EACH SIGNIFICANT RAIN, MAINTAINING FILTER SOCKS IN A FUNCTIONAL CONDITION AT ALL TIMES.
8. REMOVE SEDIMENTS COLLECTED AT THE BASE OF THE FILTER SOCKS WHEN THEY REACH 1/3 OF THE EXPOSED HEIGHT OF THE PRACTICE.
9. WHERE THE FILTER SOCK DETERIORATES OR FAILS, IT WILL BE REPAIRED OR REPLACED WITH A MORE EFFECTIVE ALTERNATIVE.
10. REMOVAL – FILTER SOCKS WILL BE DISPERSED ON SITE WHEN NO LONGER REQUIRED IN SUCH AS WAY AS TO FACILITATE AND NOT OBSTRUCT SEEDINGS.

FILTER SOCK
NOT TO SCALE



PLAN VIEW

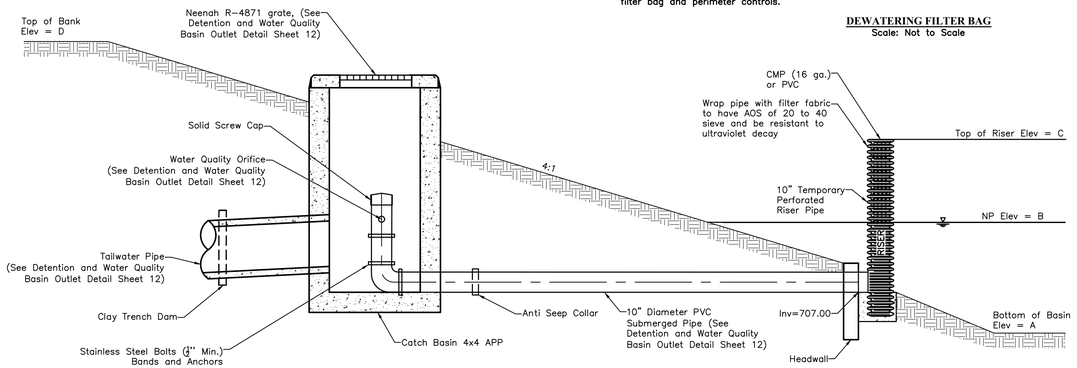


CROSS SECTION VIEW

Installation:
1. The Contractor shall pump muddy water encountered within the excavated areas into a filter fabric bag. The bag shall be placed within a level undisturbed area as far away from the stormwater outfall as possible. The bag shall be placed on top of a aggregate pad. Additionally, a perimeter aggregate berm shall be constructed around the bag. Perimeter controls such as straw bale barriers or sediment fence shall be utilized along the downstream side of the bag. The perimeter controls shall be installed to ensure that the water flowing out of the bag does not flow around the ends of the controls. Upon completion, the bag shall be removed to an area away from the stormwater outfall and opened. The accumulated sediment shall be spread out to allow to dry and stabilized with vegetation. Filterbag shall be JMD Enviro-Protection Filter Bag, size is 15'x15' or equal.

Maintenance:
1. The filter bag shall be replaced when the bag is half filled with sediment.
2. The Contractor shall contact the project inspector/engineer for consultative services if dewatering activities overwhelm the filter bag and perimeter controls.

DEWATERING FILTER BAG
Scale: Not to Scale



Notes
1. Remove all sediment and flush entire outlet when site is stabilized.
2. Remove temporary riser pipe once the project has been stabilized.

STORMWATER BASIN PERMANENT OUTLET STRUCTURE WITH A TEMPORARY RISER DETAIL

Not to Scale

TEMPORARY SEDIMENT CONTROL STRUCTURE SCHEDULE

BASIN	A	B	C	D	TRIBUTARY ACREAGE	DISTURBED ACREAGE	REQUIRED BASIN DEWATERING VOLUME (67 CY/TRIBUTARY AC)	PROVIDED BASIN DEWATERING VOLUME	REQUIRED SEDIMENT STORAGE VOLUME (37 CY/DISTURBED A.C.)	PROVIDED SEDIMENT STORAGE VOLUME
01	706.50	709.00	710.50	712.00	1.68	1.68	0.07 Ac-Ft	0.56 Ac-Ft	0.04 Ac-Ft	0.41 Ac-Ft
02	706.50	709.00	710.50	712.00	3.06	3.06	0.13 Ac-Ft	0.87 Ac-Ft	0.07 Ac-Ft	0.30 Ac-Ft
03	706.50	709.00	710.50	712.00	4.31	4.31	0.18 Ac-Ft	0.41 Ac-Ft	0.10 Ac-Ft	0.30 Ac-Ft

Sediment Basin Required Dewatering Volume Drawdown = 48 Hrs.
Sediment Basin Provided Dewatering Volume Drawdown > 48 Hrs.

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JPWWWTP COGENERATION FACILITY
CIP 650250-100007

SCALE

JACKSON PIKE-OARS
STORMWATER POLLUTION PREVENTION
NOTES & DETAILS

ISSUED STATUS: –

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