Arlington 211th Place NE

City of Arlington
Arlington, Washington

Prepared For:
City of Arlington

Prepared By:
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January 2024

SCJ ALLIANCE
CONSULTING SERVICES

Project Information

Project:	**211th Place NE**
Prepared for:	City of Arlington 238 North Olympic Avenue Arlington, WA 98223 Phone: 360-403-3421

Reviewing Agency

Jurisdiction:	**City of Arlington**

Project Representative

Prepared by:	**SCJ Alliance** 25 N Wenatchee Ave, Suite 238 Wenatchee, WA 98801 509.886.3265 scjalliance.com
Contact:	Dan Ireland, PE
Project Reference:	SCJ # 22-000884

N:\Projects\0698 City of Arlington\22-000884 Arlington 211th NE-67th Ave\Design\Storm\Drainage Report

PROJECT ENGINEER'S CERTIFICATION

I hereby certify that this Stormwater Report for the City of Arlington 211th Place NE project has been prepared by me or under my supervision and meets the minimum standards of the City of Arlington and normal standards of engineering practice. I hereby acknowledge and agree that the jurisdiction does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities designed by me.

Prepared by David Hall, PE

Approved by Dan Ireland, PE

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Project Overview

Project Description

The City of Arlington is designing improvements for 211 Place NE between 67th Avenue State Road and SR-530. These improvements will include a resurfaced roadway, improved drainage, utility improvements, multiuse trail, street/pedestrian lights, and street amenities.

The new roadway alignment will be shifted 2-feet to the south to allow for a 2-foot shoulder along the northern edge of the roadway. An extruded curb will be installed on the northern edge of the roadway in areas in which the roadway cross slope sheet flows water to the north. New catch basins will be installed at the low points along the northern extruded curb to bring water south to proposed infiltration facilities.

The southern portion of the roadway will have a new 2-foot shoulder, extruded curb & gutter, 5-foot landscaped buffer strip, and a 12-foot shared used path. This project will require stormwater collection and conveyance that keeps runoff away from the critical slopes on the north side of the roadway. The road also has many varying super-elevated slopes that result in larger concentrations of stormwater and ponding. A new stormwater conveyance main will be installed along the southern curb & gutter with new catch basins. Three proposed infiltration facilities will be installed along the southern edge of the roadway to detain and infiltrate stormwater runoff.

Private land acquisition will be necessary from some parcels along the southern edge of the roadway to increase the ROW to accommodate the new shared use path and channelization.

This stormwater design is designed to meet the standards of the 2019 Ecology Stormwater Management Manual for Western Washington (SWMMWW) and the City of Arlington standards.

Project Location

The proposed project is located along the entirety of 211th Place NE between State Road 530 on the west end and 67th Avenue NE on the east end of the project. The project is approximately 1.4 miles to the southwest of downtown Arlington Washington.

Vicinity Map

Existing Conditions

Runoff from the project site generally is either conveyed to existing underground infiltration systems or sheet flows off the roadway and is comprised of two Tributary Discharge Areas (TDA) as described below.

TDA 1

This TDA consists of 211th Pl NE, between the west end of the project and STA 28+70, and portions of running Road and 67th Dr NE. 211th Place NE is a narrow curving roadway with no shoulder on either side. An extruded curb and asphalt path existing on the southern edge of the roadway from 67th Avenue NE to Ronning Road. Except for several private parcels along the northeast portion of the site, the entire northern edge of the roadway has steep slopes almost immediately off the shoulder. The slope is heavily vegetated with dense grasses and large diameter trees. A marshy floodplain with an unnamed small creek exists at the base of the slope from the roadway.

The south side of 211th Place NE has houses in which driveways directly access the roadway. Two residential roads intersect 211th Place NE at the south which provide access to subdivisions. The existing grade on the south side of 211th Place NE slopes from the south to north but is not considered steep.

Stormwater from TDA 1 generally flows to the west, sheet flows off the side of the roadway into grass lined ditches or down the grass lined slopes and flows to the base of the hill. Portions of Ronning Road and 211th are collected by two existing catch basins and discharged off the edge of the slope to the immediate north and flows to the base of the hill.

TDA 2

Stormwater from this basin includes the eastern portion of 211th Place NE from STA 28+70 to the eastern end of the project and is collected by existing catch basins. Per City of Arlington as-builts for

67th Ave NE stormwater from this TDA is conveyed to a treatment structure on the east side of 67th Ave NE and discharged into underground infiltration facilities.

Critical Areas

Steep slopes exist almost immediately off the northern shoulder of the roadway for the entirety of the project length.

Proposed Conditions

TDA 1

The proposed conditions include curb and gutter on both the north and south sides of the roadway, along with a shared use path for the entire length of the project on the south side of the roadway. Stormwater runoff is collected by new catch basins and conveyed underground to the west to the base of the hill. At the base of the hill the stormwater enters an Oldcastle Biopod treatment structure prior to discharging into an infiltration pond on the south side of 211th Place NE. The conveyance system is designed to handle the 25-year event per City of Arlington standards. The infiltration pond is designed to convey and infiltrate 100% of the 50-year event. For storms above the 50-year event a primary design overflow structure is provided to convey additional runoff above the 50-year event to the northwest through an underground conveyance system and is discharged into an existing grassy swale which then flows underneath highway 530 to the north, and eventually discharges into March Creek. A secondary emergency overflow weir at the southern end of the pond is designed to overflow the 100-year event.

TDA 2

The proposed conditions include new curb and gutter on both the north and south sides of the roadway and a shared-use path on the south side. Stormwater runoff is collected by new structures and conveyed to the existing storm system, and eventually discharged into the existing underground storm system.

A proposed basin map can be found in Appendix 2

Minimum Requirements

Per the SWMMWW Minimum Requirements are assessed on the project level, then the TDA level.

Project Level:

This project will add a total of 19,242 sf of new sidewalk (new hard surface), 3,300 SF of new roadway (new hard surface), and 69,247 sf of replaced road surface (replaced hard surface). Per Figure I-3.2 of the SWMMWW, assessing the Project Thresholds Minimum Requirements #1 through #5 apply to the new and replaced hard surfaces, and Minimum Requirements #1 through #9 apply to new hard surfaces and converted vegetation areas.

TDA Level:

The project site consists of two TDA's. Per the SWMMWW thresholds for Minimum Requirements #6 Runoff Treatment and Minimum Requirements #7 Flow Control are assessed at the TDA Level considering only new hard surfaces as required by the Project Thresholds.

TDA 1 exceeds the threshold of 10,000 square feet of new hard surface and therefore Minimum Requirement #6 Runoff Treatment and Minimum Requirement #7 Flow Control is required.

TDA 2 does not exceed the 5,000 SF threshold of new hard surface, therefore Minimum Requirement #6 and Runoff Treatment and Minimum Requirement #7 Flow Control is not required.

A TDA map can be found in Appendix A-2.

Below is the summary of the areas:

Table 2.3 Existing TDA Summary

Subbasin	1	2	TOTAL
Existing PGIS Area (AC)	1.65	0.20	1.85
Existing Sidewalk (AC)	0.01	0.04	0.05
Pervious Area (AC)	1.21	0.05	1.26
Total Area (AC)	2.87	0.29	3.16

Table 2.4 Proposed TDA Summary

TDA	1	2	TOTAL
Replaced PGIS (AC)	1.43	0.20	1.63
New PGIS (AC)	0.07	0.00	0.07
New NPGIS (AC)	0.40	0.05	0.45
Replaced NPGIS (AC)	0.10	0.01	0.11
Pervious Area (AC)	0.84	0.02	0.86
Off-site Flow (AC)	0.04	0.00	0.04
Total Area (AC)	2.88	0.28	3.16

MR1-Preparation of Stormwater Site Plans

Stormwater site plans are required and will be prepared as part of this project.

MR2 – Construction Stormwater Pollution Prevention Plan (SWPPP)

The SWPPP is required for this project and will be provided under a separate cover.

MR3 – Source Control of Pollution

There are no known illicit discharges to the storm sewer system on the site. All runoff from the new pollutant generating surfaces within the project site will receive treatment prior to being infiltrated on site.

MR4 – Preservation of Natural Drainage Systems and Outfalls

Natural drainage patterns will be maintained to the maximum extent practicable and discharges from the project site will occur as close to their natural location as possible.

TDA 1

In the existing conditions, runoff from 211th Pl NE sheet flows off the north side of the road or flows to a ditch on the south side of the road, infiltrating on site, or flows to the base of the hill. Stormwater runoff from Ronning Road is collected by catch basins and discharged over the hill north of the road. In the proposed conditions stormwater will continue to flow to the base of the hill and infiltrate on site.

TDA 2

In the existing conditions runoff from the east end of the project on 211th PL NE is collected by catch basins and infiltrated in underground facilities located on 67th Ave NE. In the proposed conditions stormwater runoff will continue to be conveyed to the same existing underground infiltration facilities.

MR5 – On-Site Stormwater Management

This project will employ stormwater management BMPs in accordance with the thresholds, standards, and lists to infiltrate, disperse, and retain stormwater runoff on site that are stated in the Department of SWMMWW to the maximum extent feasible without causing flooding or erosion impacts. This is described in more detail in the Onsite Permanent Stormwater Control Plan section of this report.

MR6 – Runoff Treatment

TDA 1

Water quality treatment is achieved through the use of Oldcastle Precast BioPod's. Per the Department of Ecology General Use Level Designation (GULD), BioPod's are approved to provide basic treatment at a rate of 0.00356 cfs per square foot of treatment media. The BioPod system contains a built-in weir as a bypass allowing for the unit to treat runoff as an off-line system. A BPU-816IB Biopod provides a total treatment surface of 112 SF and will treat 0.398 cfs, sufficient to treat the off-line rate of 0.2927 CFS.

TDA 2

TDA 2 is exempt from flow control requirements for this project, however per City of Arlington As-builts, the existing infiltration facilities provide treatment for stormwater runoff from this basin.

MR7 – Flow Control

For TDA 1, flow control is required for this project. Stormwater runoff from TDA 1 is conveyed to an infiltration pond to infiltrate the 50-year 24hr storm per Department of Ecology standards, meeting the requirements for flow control.

TDA 2 is exempt from flow control requirements for this project, however the existing infiltration facilities will provide flow control.

MR8 – Wetlands Protection

Wetlands are located to the north of the project site. All runoff from the project site and the offsite areas flowing from the project site infiltrate in this basin in the existing conditions and will continue to infiltrate on site in the proposed conditions.

MR9 – Operation and Maintenance

An Operation and Maintenance Manual is required for the construction of this project. An O & M manual will be provided at final submittal under a separate cover.

Offsite Analysis

Offsite flows for the properties listed below have been considered and included in the analysis of this project. Drainage reports for the properties were reviewed in preparation for this report and the discharges from each site as stated in the reports are also listed below.

Stormwater runoff from TDA 2 on 211th PL NE, per City of Arlington provided as-builts, currently flow to the existing underground infiltration infrastructure beneath 211th PL NE. The proposed conditions will continue to convey a similar amount of area to these infiltration systems.

Off-site stormwater runoff from approximately 230 feet of Ronning Road currently flows onto the project site and is collected by catch basins and conveyed to the north and discharged over the hillside. In the proposed conditions the stormwater runoff will be collected and conveyed to treatment and infiltration facilities at the base of the hill.

Offsite Conveyance Sizing

Storm and Sanitary Analysis (2022) was used to size conveyance on this project. All offsite flows to the project site are conveyed to the proposed infiltration facilities.

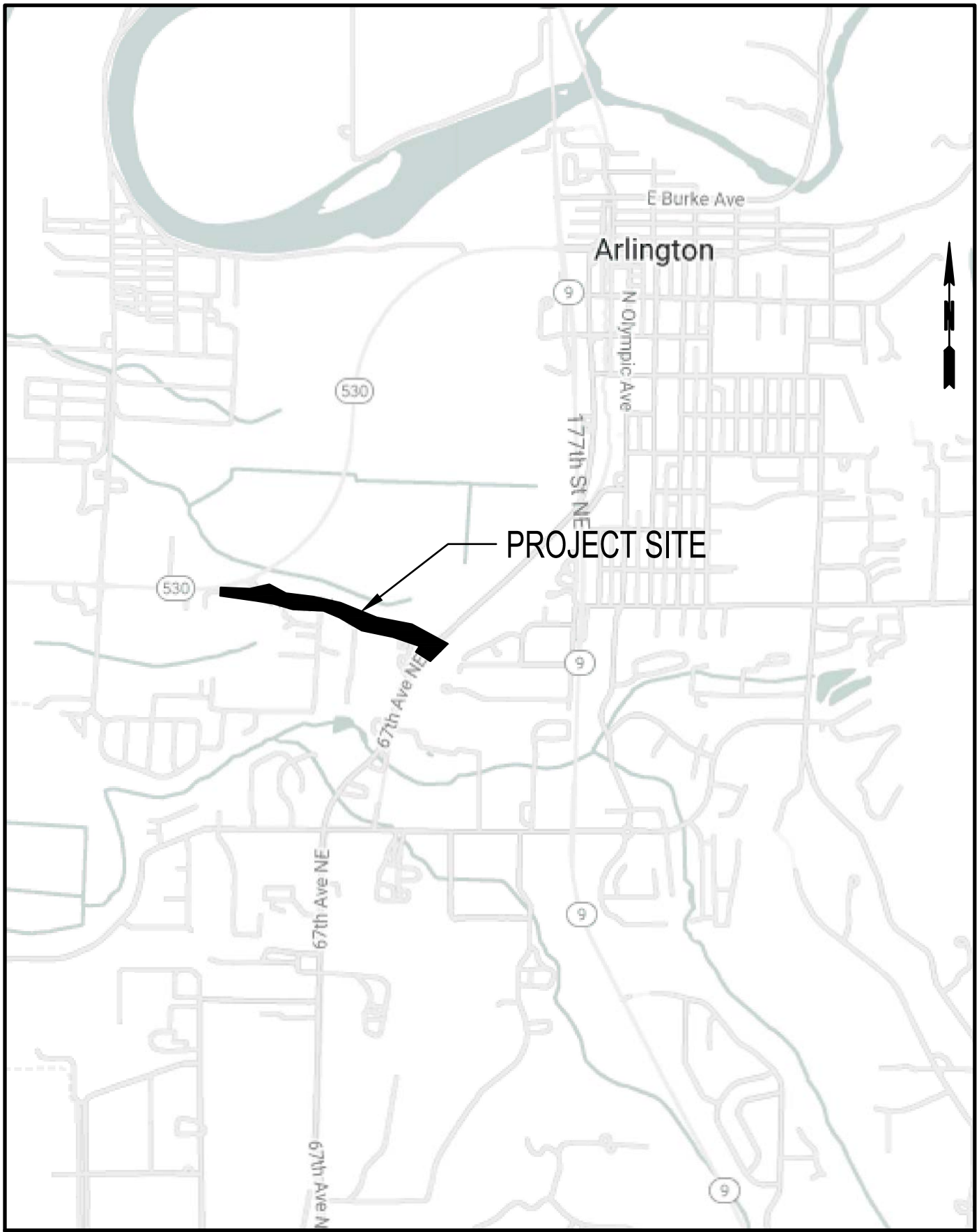
Onsite Permanent Stormwater Control Plan

Catch basins are proposed along the south or north curb line of the new roadway to capture all surface runoff from the proposed improvements. The new roadway, shared-use path are all sloping towards one side of the road gutter depending on the location to capture all stormwater runoff and conveyed to existing or proposed treatment and infiltration facilities. I

Offsite Permanent Stormwater Control Plan

All offsite stormwater entering the project site will be routed to the new conveyance system. Ultimately, the design flows will be infiltrated on site, and any additional flows will be routed to the bottom of the hill and eventually to March Creek through existing stormwater conveyance systems.

APPENDIX 1
SITE VICINITY MAP



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DATE: OCTOBER 2023
JOB No.: 22-000884
DRAWING FILE No.:

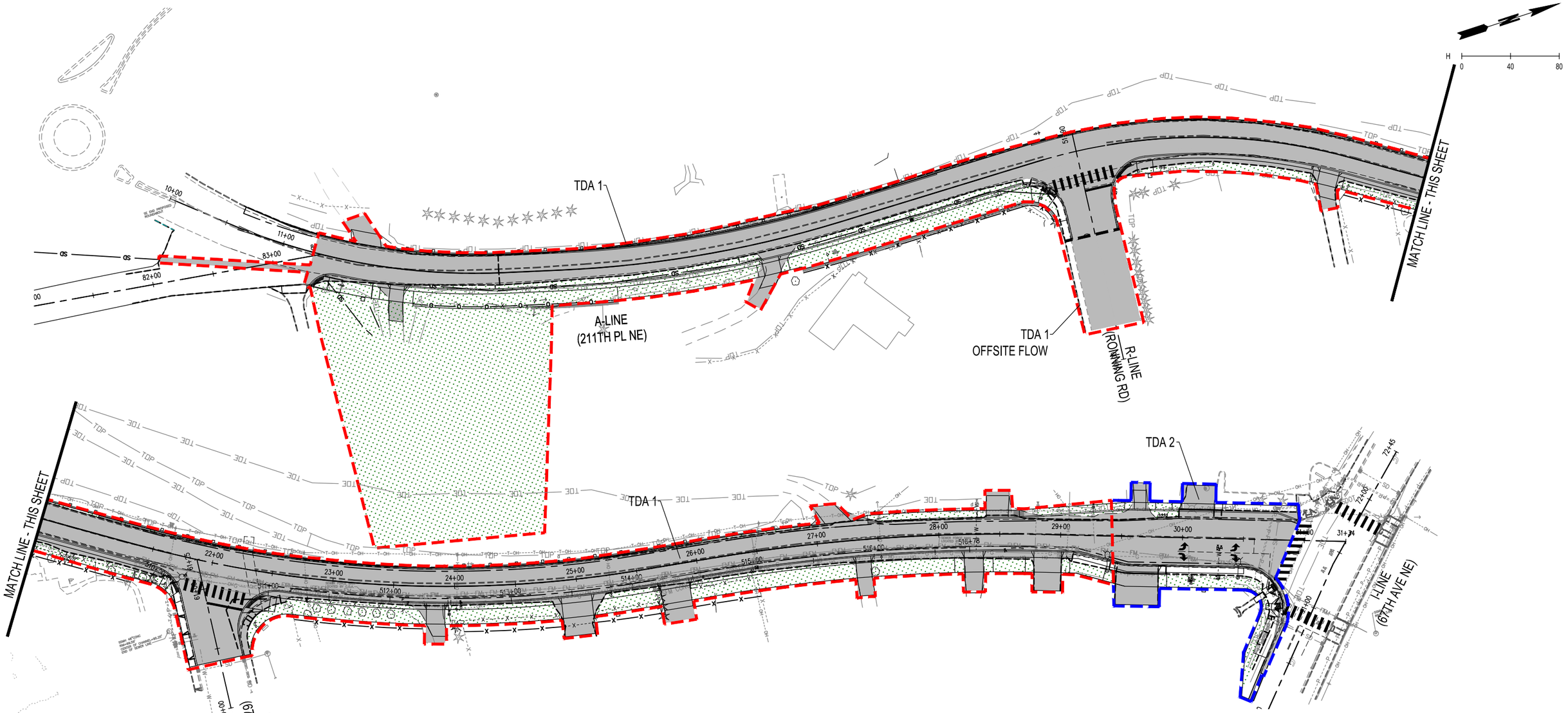
211TH PLACE CORRIDOR IMPROVEMENT PROJECT

VICINITY MAP

EXHIBIT No: EX-01
SHEET No: 1

APPENDIX 2

SUB-BASIN EXHIBITS



LEGEND			
BASIN AREA	TDA 1	TDA 2	TOTAL
PGIS AREA (AC)	1.65	0.20	1.85
SIDEWALK (AC)	0.01	0.04	0.05
PERVIOUS AREA (AC)	1.21	0.05	1.26
TOTAL AREA	2.87	0.29	3.16

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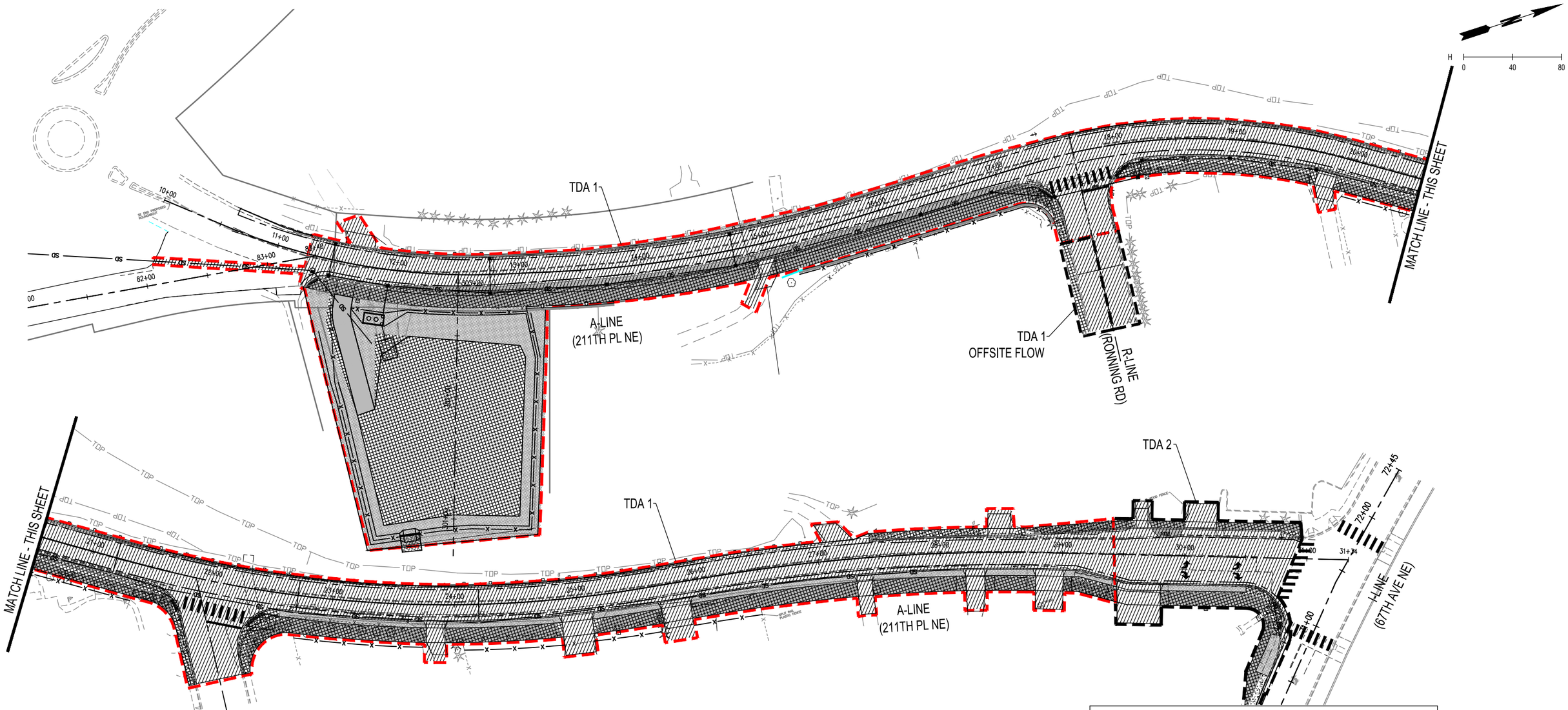
HORIZONTAL SCALE: AS SHOWN
DATE: JANUARY 2024
JOB No.: 22-000884
DRAWING FILE No.:

EXISTING CONDITIONS MAP
211TH PLACE CORRIDOR IMPROVEMENT PROJECT

EXHIBIT No: EX-01
SHEET No: 1 OF 2

Jan 16, 2024 - 4:10:02pm - User: david.hall
N:\PROJECTS\698 CITY OF ARLINGTON\22-000884 ARLINGTON 211TH NE-67TH AVE\CAD\EXHIBITS\2024-0115_90% STORM EXHIBITS_22-000884_EXH_EXISTINGCONDITIONS.DWG



LEGEND			
BASIN AREA	TDA 1	TDA 2	TOTAL
REPLACED PGIS (AC)	1.44	0.20	1.64
NEW PGIS (AC)	0.39	0.00	0.39
REPLACED NPGIS (AC)	0.10	0.01	0.11
NEW NPGIS (AC)	0.40	0.05	0.45
PERVIOUS AREA (AC)	0.51	0.03	0.53
OFFSITE FLOW (AC)	0.04	0.00	0.04
TOTAL AREA (AC)	2.87	0.29	3.16

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HORIZONTAL SCALE: AS SHOWN
DATE: JANUARY 2024
JOB No.: 22-000884
DRAWING FILE No.:

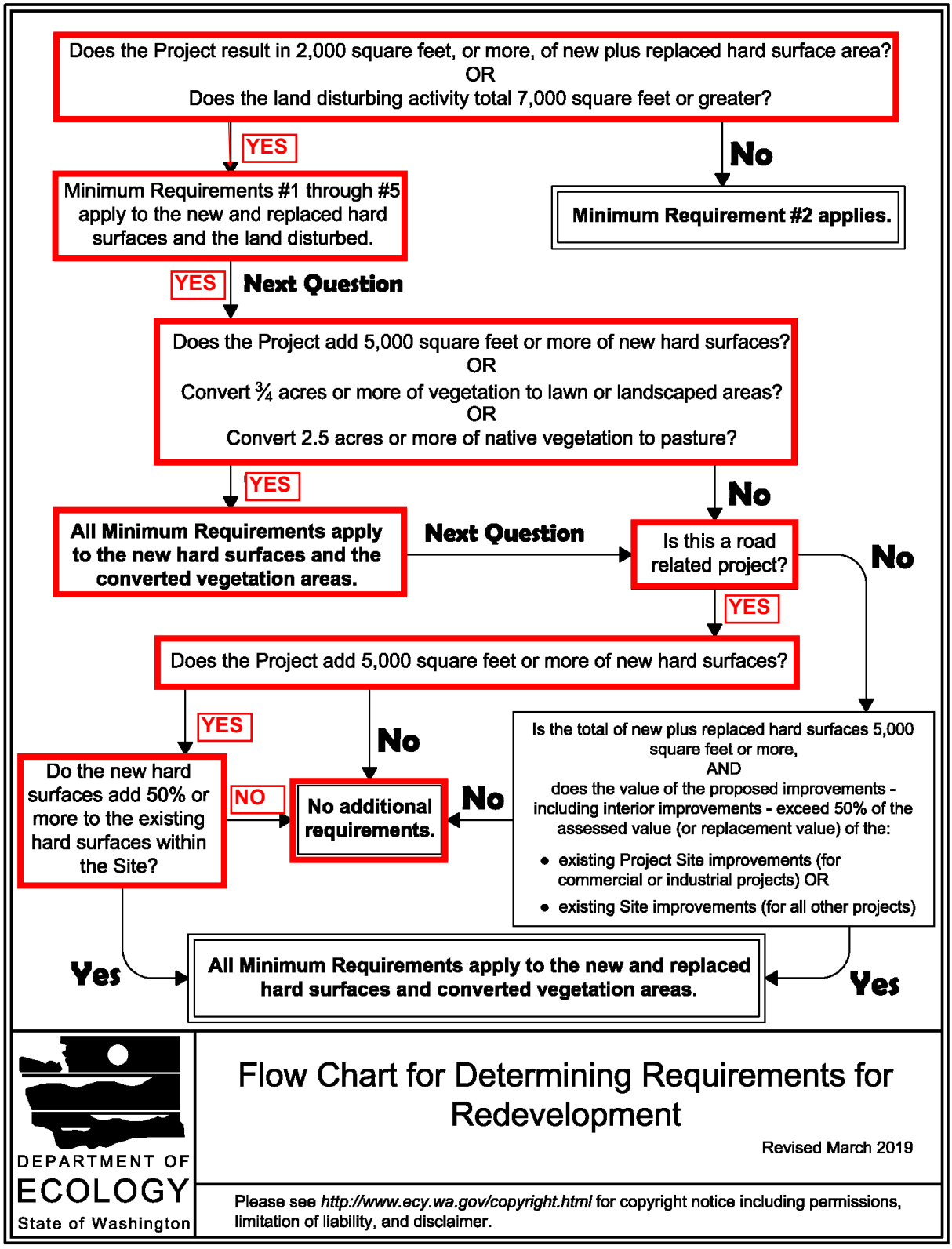
PROPOSED CONDITIONS MAP
211TH PLACE CORRIDOR IMPROVEMENT PROJECT

EXHIBIT No: EX-02
SHEET No: 2 OF 2

APPENDIX 3A

MINIMUM REQUIREMENTS FLOW CHART

Figure I-3.2: Flow Chart for Determining Requirements for Redevelopment



APPENDIX 3B
WWHM MODEL OUTPUT

WWHM2012

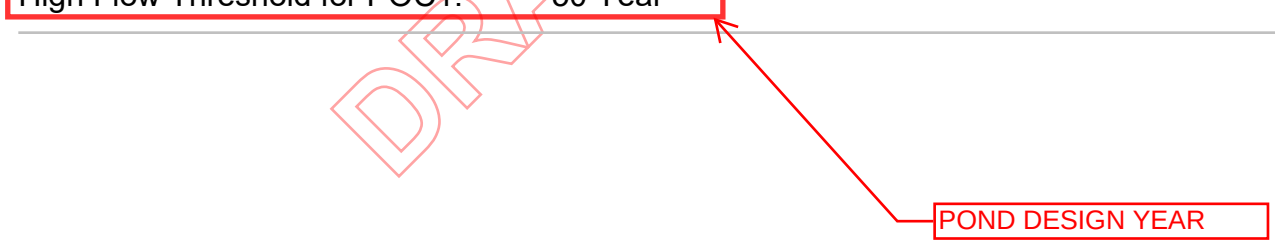
PROJECT REPORT

General Model Information

Project Name:	211th Arlington_Pond
Site Name:	211th Pl NE
Site Address:	
City:	Arlington
Report Date:	1/18/2024
Gage:	Everett
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	1.200
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year



Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Mod	2.88
Pervious Total	2.88

Impervious Land Use	acre
Impervious Total	0
Basin Total	2.88

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Pasture, Mod	0.381
Pervious Total	0.381

Impervious Land Use	acre
ROADS MOD	1.989
SIDEWALKS MOD	0.51
Impervious Total	2.499
Basin Total	2.88

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length:	135.00 ft.	
Bottom Width:	130.00 ft.	
Depth:	3.5 ft.	
Volume at riser head:	1.0981 acre-feet.	
Infiltration On		
Infiltration rate:	0.3	
Infiltration safety factor:	1	
Wetted surface area On		
Total Volume Infiltrated (ac-ft.):		491.933
Total Volume Through Riser (ac-ft.):		0.001
Total Volume Through Facility (ac-ft.):		491.934
Percent Infiltrated:		100
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
Side slope 1:	2 To 1	
Side slope 2:	2 To 1	
Side slope 3:	2 To 1	
Side slope 4:	2 To 1	
Discharge Structure		
Riser Height:	2.5 ft.	
Riser Diameter:	18 in.	
Notch Type:	Rectangular	
Notch Width:	0.010 ft.	
Notch Height:	0.500 ft.	
Element Flows To:		
Outlet 1	Outlet 2	

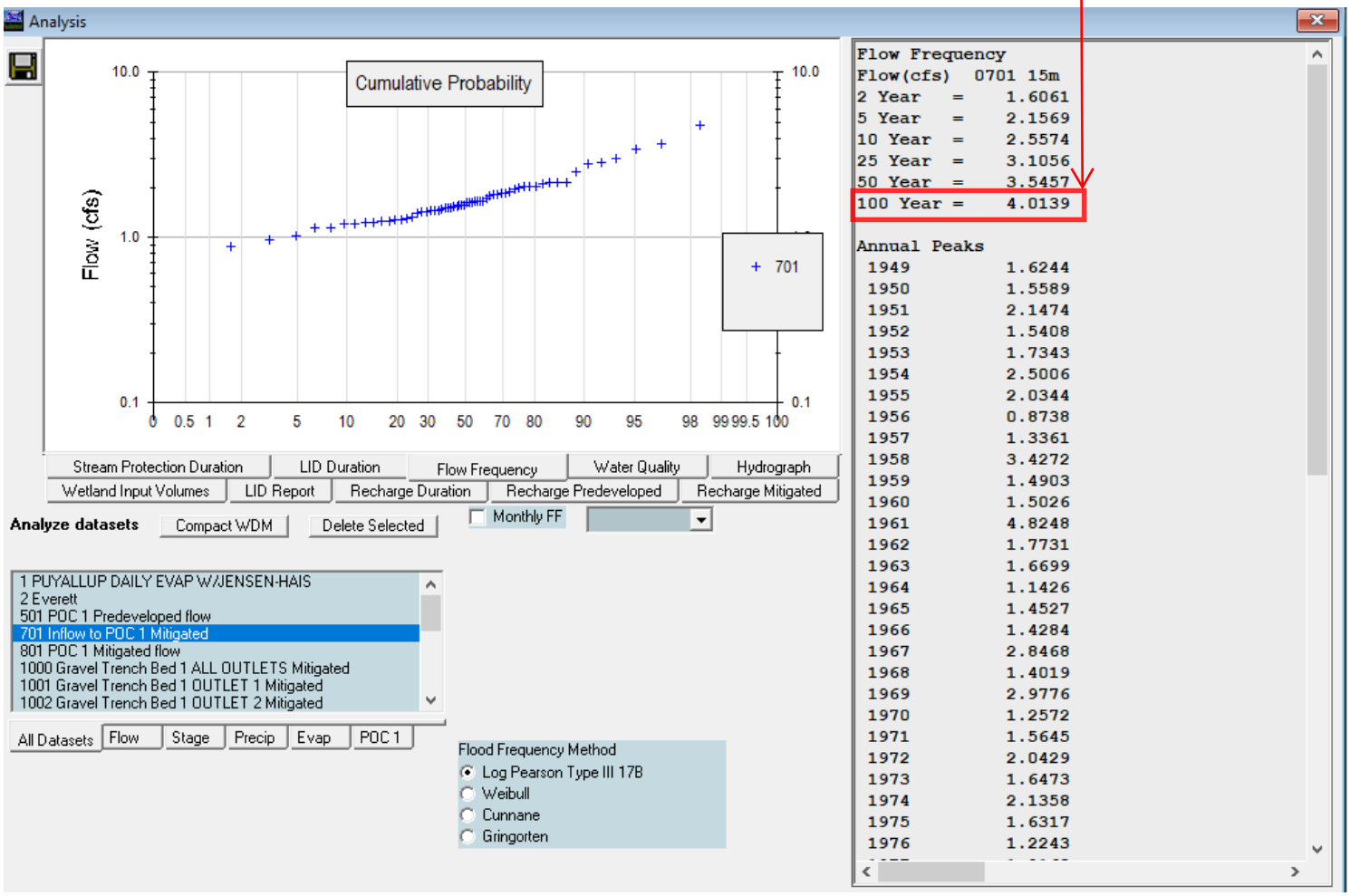
Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.402	0.000	0.000	0.000
0.0389	0.403	0.015	0.000	0.122
0.0778	0.404	0.031	0.000	0.122
0.1167	0.405	0.047	0.000	0.122
0.1556	0.406	0.063	0.000	0.123
0.1944	0.407	0.078	0.000	0.123
0.2333	0.408	0.094	0.000	0.123
0.2722	0.409	0.110	0.000	0.123
0.3111	0.410	0.126	0.000	0.124
0.3500	0.411	0.142	0.000	0.124
0.3889	0.412	0.158	0.000	0.124
0.4278	0.413	0.174	0.000	0.125
0.4667	0.414	0.190	0.000	0.125
0.5056	0.415	0.206	0.000	0.125
0.5444	0.416	0.223	0.000	0.125
0.5833	0.417	0.239	0.000	0.126
0.6222	0.418	0.255	0.000	0.126
0.6611	0.419	0.271	0.000	0.126
0.7000	0.420	0.288	0.000	0.127
0.7389	0.421	0.304	0.000	0.127
0.7778	0.422	0.320	0.000	0.127
0.8167	0.423	0.337	0.000	0.128
0.8556	0.424	0.353	0.000	0.128

0.8944	0.425	0.370	0.000	0.128
0.9333	0.425	0.386	0.000	0.128
0.9722	0.426	0.403	0.000	0.129
1.0111	0.427	0.419	0.000	0.129
1.0500	0.428	0.436	0.000	0.129
1.0889	0.429	0.453	0.000	0.130
1.1278	0.430	0.470	0.000	0.130
1.1667	0.431	0.486	0.000	0.130
1.2056	0.432	0.503	0.000	0.130
1.2444	0.433	0.520	0.000	0.131
1.2833	0.434	0.537	0.000	0.131
1.3222	0.435	0.554	0.000	0.131
1.3611	0.436	0.571	0.000	0.132
1.4000	0.437	0.588	0.000	0.132
1.4389	0.438	0.605	0.000	0.132
1.4778	0.439	0.622	0.000	0.133
1.5167	0.440	0.639	0.000	0.133
1.5556	0.441	0.656	0.000	0.133
1.5944	0.442	0.673	0.000	0.133
1.6333	0.443	0.691	0.000	0.134
1.6722	0.444	0.708	0.000	0.134
1.7111	0.445	0.725	0.000	0.134
1.7500	0.446	0.743	0.000	0.135
1.7889	0.447	0.760	0.000	0.135
1.8278	0.448	0.777	0.000	0.135
1.8667	0.449	0.795	0.000	0.136
1.9056	0.450	0.812	0.000	0.136
1.9444	0.451	0.830	0.000	0.136
1.9833	0.452	0.847	0.000	0.136
2.0222	0.453	0.865	0.000	0.137
2.0611	0.454	0.883	0.000	0.137
2.1000	0.455	0.900	0.001	0.137
2.1389	0.456	0.918	0.001	0.138
2.1778	0.457	0.936	0.002	0.138
2.2167	0.458	0.954	0.003	0.138
2.2556	0.459	0.972	0.004	0.139
2.2944	0.460	0.989	0.005	0.139
2.3333	0.461	1.007	0.006	0.139
2.3722	0.462	1.025	0.007	0.140
2.4111	0.463	1.043	0.008	0.140
2.4500	0.464	1.061	0.009	0.140
2.4889	0.465	1.080	0.010	0.140
2.5278	0.466	1.098	0.084	0.141
2.5667	0.467	1.116	0.284	0.141
2.6056	0.468	1.134	0.555	0.141
2.6444	0.469	1.152	0.879	0.142
2.6833	0.470	1.171	1.246	0.142
2.7222	0.471	1.189	1.647	0.142
2.7611	0.472	1.207	2.072	0.143
2.8000	0.473	1.226	2.511	0.143
2.8389	0.474	1.244	2.956	0.143
2.8778	0.476	1.263	3.396	0.144
2.9167	0.477	1.281	3.823	0.144
2.9556	0.478	1.300	4.226	0.144
2.9944	0.479	1.318	4.599	0.144
3.0333	0.480	1.337	4.934	0.145
3.0722	0.481	1.356	5.228	0.145
3.1111	0.482	1.374	5.478	0.145

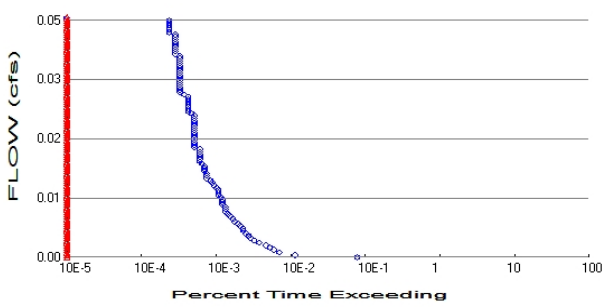
3.1500	0.483	1.393	5.687	0.146
3.1889	0.484	1.412	5.859	0.146
3.2278	0.485	1.431	6.005	0.146
3.2667	0.486	1.450	6.215	0.147
3.3056	0.487	1.469	6.371	0.147
3.3444	0.488	1.488	6.522	0.147
3.3833	0.489	1.507	6.671	0.148
3.4222	0.490	1.526	6.816	0.148
3.4611	0.491	1.545	6.958	0.148
3.5000	0.492	1.564	7.097	0.149
3.5389	0.493	1.583	7.233	0.149

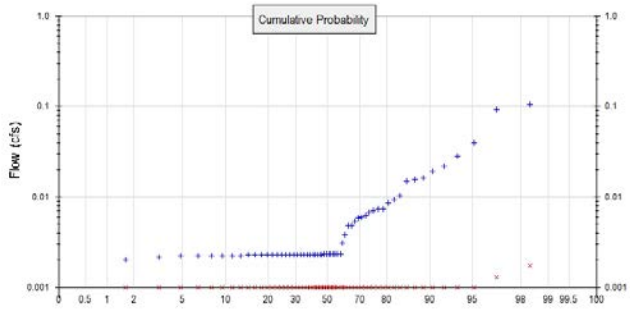
EMERGENCY OVERLFOW RATE



Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 2.88
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.381
Total Impervious Area: 2.499

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.003709
5 year	0.009017
10 year	0.015507
25 year	0.029402
50 year	0.046021
100 year	0.070516

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0
5 year	0
10 year	0
25 year	0
50 year	0
100 year	0

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.002	0.000
1950	0.009	0.000
1951	0.007	0.000
1952	0.002	0.000
1953	0.002	0.000
1954	0.022	0.000
1955	0.016	0.000
1956	0.002	0.000
1957	0.002	0.000
1958	0.002	0.000

1959	0.007	0.000
1960	0.006	0.000
1961	0.015	0.000
1962	0.002	0.000
1963	0.002	0.000
1964	0.010	0.000
1965	0.002	0.000
1966	0.002	0.000
1967	0.006	0.000
1968	0.002	0.000
1969	0.002	0.000
1970	0.002	0.000
1971	0.016	0.000
1972	0.002	0.000
1973	0.002	0.000
1974	0.009	0.000
1975	0.002	0.000
1976	0.007	0.000
1977	0.002	0.000
1978	0.003	0.000
1979	0.007	0.000
1980	0.002	0.000
1981	0.002	0.000
1982	0.005	0.000
1983	0.002	0.000
1984	0.002	0.000
1985	0.005	0.000
1986	0.028	0.000
1987	0.019	0.000
1988	0.002	0.000
1989	0.002	0.000
1990	0.002	0.000
1991	0.002	0.000
1992	0.002	0.000
1993	0.002	0.000
1994	0.002	0.000
1995	0.004	0.000
1996	0.040	0.000
1997	0.092	0.002
1998	0.002	0.000
1999	0.002	0.000
2000	0.006	0.000
2001	0.002	0.000
2002	0.002	0.000
2003	0.002	0.000
2004	0.002	0.000
2005	0.002	0.000
2006	0.106	0.000
2007	0.002	0.000
2008	0.005	0.001
2009	0.002	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.1057	0.0017
2	0.0925	0.0013
3	0.0395	0.0000

4	0.0282	0.0000
5	0.0220	0.0000
6	0.0191	0.0000
7	0.0163	0.0000
8	0.0156	0.0000
9	0.0148	0.0000
10	0.0103	0.0000
11	0.0094	0.0000
12	0.0086	0.0000
13	0.0073	0.0000
14	0.0073	0.0000
15	0.0071	0.0000
16	0.0067	0.0000
17	0.0063	0.0000
18	0.0060	0.0000
19	0.0059	0.0000
20	0.0054	0.0000
21	0.0049	0.0000
22	0.0048	0.0000
23	0.0038	0.0000
24	0.0031	0.0000
25	0.0023	0.0000
26	0.0023	0.0000
27	0.0023	0.0000
28	0.0023	0.0000
29	0.0023	0.0000
30	0.0023	0.0000
31	0.0023	0.0000
32	0.0023	0.0000
33	0.0023	0.0000
34	0.0023	0.0000
35	0.0023	0.0000
36	0.0023	0.0000
37	0.0023	0.0000
38	0.0023	0.0000
39	0.0023	0.0000
40	0.0023	0.0000
41	0.0023	0.0000
42	0.0023	0.0000
43	0.0023	0.0000
44	0.0023	0.0000
45	0.0023	0.0000
46	0.0023	0.0000
47	0.0023	0.0000
48	0.0023	0.0000
49	0.0023	0.0000
50	0.0023	0.0000
51	0.0023	0.0000
52	0.0023	0.0000
53	0.0023	0.0000
54	0.0023	0.0000
55	0.0022	0.0000
56	0.0022	0.0000
57	0.0022	0.0000
58	0.0022	0.0000
59	0.0021	0.0000
60	0.0020	0.0000
61	0.0016	0.0000

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0019	1654	0	0	Pass
0.0023	242	0	0	Pass
0.0027	151	0	0	Pass
0.0032	128	0	0	Pass
0.0036	112	0	0	Pass
0.0041	99	0	0	Pass
0.0045	81	0	0	Pass
0.0050	69	0	0	Pass
0.0054	61	0	0	Pass
0.0059	58	0	0	Pass
0.0063	53	0	0	Pass
0.0068	50	0	0	Pass
0.0072	49	0	0	Pass
0.0077	45	0	0	Pass
0.0081	42	0	0	Pass
0.0085	38	0	0	Pass
0.0090	36	0	0	Pass
0.0094	33	0	0	Pass
0.0099	31	0	0	Pass
0.0103	29	0	0	Pass
0.0108	29	0	0	Pass
0.0112	29	0	0	Pass
0.0117	26	0	0	Pass
0.0121	26	0	0	Pass
0.0126	26	0	0	Pass
0.0130	25	0	0	Pass
0.0135	23	0	0	Pass
0.0139	23	0	0	Pass
0.0143	23	0	0	Pass
0.0148	22	0	0	Pass
0.0152	20	0	0	Pass
0.0157	19	0	0	Pass
0.0161	18	0	0	Pass
0.0166	16	0	0	Pass
0.0170	16	0	0	Pass
0.0175	16	0	0	Pass
0.0179	15	0	0	Pass
0.0184	15	0	0	Pass
0.0188	15	0	0	Pass
0.0193	14	0	0	Pass
0.0197	13	0	0	Pass
0.0201	13	0	0	Pass
0.0206	13	0	0	Pass
0.0210	13	0	0	Pass
0.0215	13	0	0	Pass
0.0219	13	0	0	Pass
0.0224	11	0	0	Pass
0.0228	11	0	0	Pass
0.0233	11	0	0	Pass
0.0237	11	0	0	Pass
0.0242	11	0	0	Pass
0.0246	11	0	0	Pass
0.0251	11	0	0	Pass

0.0255	11	0	0	Pass
0.0259	11	0	0	Pass
0.0264	11	0	0	Pass
0.0268	11	0	0	Pass
0.0273	11	0	0	Pass
0.0277	11	0	0	Pass
0.0282	11	0	0	Pass
0.0286	10	0	0	Pass
0.0291	9	0	0	Pass
0.0295	9	0	0	Pass
0.0300	9	0	0	Pass
0.0304	9	0	0	Pass
0.0309	9	0	0	Pass
0.0313	9	0	0	Pass
0.0317	9	0	0	Pass
0.0322	8	0	0	Pass
0.0326	7	0	0	Pass
0.0331	7	0	0	Pass
0.0335	7	0	0	Pass
0.0340	7	0	0	Pass
0.0344	7	0	0	Pass
0.0349	7	0	0	Pass
0.0353	7	0	0	Pass
0.0358	7	0	0	Pass
0.0362	7	0	0	Pass
0.0367	7	0	0	Pass
0.0371	7	0	0	Pass
0.0375	7	0	0	Pass
0.0380	7	0	0	Pass
0.0384	7	0	0	Pass
0.0389	7	0	0	Pass
0.0393	7	0	0	Pass
0.0398	6	0	0	Pass
0.0402	6	0	0	Pass
0.0407	6	0	0	Pass
0.0411	6	0	0	Pass
0.0416	6	0	0	Pass
0.0420	6	0	0	Pass
0.0425	6	0	0	Pass
0.0429	6	0	0	Pass
0.0433	6	0	0	Pass
0.0438	5	0	0	Pass
0.0442	5	0	0	Pass
0.0447	5	0	0	Pass
0.0451	5	0	0	Pass
0.0456	5	0	0	Pass
0.0460	5	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0.2878 acre-feet
On-line facility target flow:	0.5172 cfs.
Adjusted for 15 min:	0.5172 cfs.
Off-line facility target flow:	0.2927 cfs.
Adjusted for 15 min:	0.2927 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Trapezoidal Pond 1 POC	☐	447.61			☐	100.00			
Total Volume Infiltrated		447.61	0.00	0.00		100.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic

Mitigated Schematic

Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   211th Arlington_Pond.wdm
MESSU       25   Pre211th Arlington_Pond.MES
            27   Pre211th Arlington_Pond.L61
            28   Pre211th Arlington_Pond.L62
            30   POC211th Arlington_Pond1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND       2
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                        in  out           ***
    2     A/B, Forest, Mod        1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
    2         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
    2         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
    2         0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
    2               0         5         2       400       0.1       0.3     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
    2              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
    2          0.2       0.5      0.35         0       0.7       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS      GWVS
    2              0         0         0          0         3          1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name-------> Unit-systems   Printer ***
    # -  #                    User  t-series Engl Metr ***
                                    in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND   2                        2.88     COPY   501     12
PERLND   2                        2.88     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                          in  out                            ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                      ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.2            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2            IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   211th Arlington_Pond.wdm
MESSU       25   Mit211th Arlington_Pond.MES
            27   Mit211th Arlington_Pond.L61
            28   Mit211th Arlington_Pond.L62
            30   POC211th Arlington_Pond1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND       5
      IMPLND       2
      IMPLND       9
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Trapezoidal Pond  1         MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
    5     A/B, Pasture, Mod       1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
    5         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
```

```
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
    5         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
    5         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
    5             0         5       1.5       400       0.1       0.3     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
    5             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
    5          0.15       0.5       0.3         0       0.7       0.4
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS       GWVS
    5             0         0         0         0         3         1          0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                    in  out           ***
    2      ROADS/MOD              1    1    1   27    0
    9      SIDEWALKS/MOD          1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    2         0    0    1    0    0    0
    9         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    2         0    0    4    0    0    0    1    9
    9         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    2         0    0    0    0    0
    9         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
```

```
    2            400      0.05       0.1      0.08
    9            400      0.05       0.1      0.08
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    2              0         0
    9              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    2              0         0
    9              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK    ***
<Name>   #                 <-factor->     <Name>   #   Tbl#    ***
Basin  1***
PERLND   5                      0.381     RCHRES   1      2
PERLND   5                      0.381     RCHRES   1      3
IMPLND   2                      1.989     RCHRES   1      5
IMPLND   9                       0.51     RCHRES   1      5

******Routing******
PERLND   5                      0.381     COPY     1     12
IMPLND   2                      1.989     COPY     1     15
IMPLND   9                       0.51     COPY     1     15
PERLND   5                      0.381     COPY     1     13
RCHRES   1                          1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
    1     Trapezoidal Pond-020    2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
```

```
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
           FG FG FG FG  possible  exit  *** possible  exit      possible  exit
            *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
    1       0  1  0  0    4  5  0  0  0       0  0  0  0  0        2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1              1      0.03       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
         *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)     (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.432736  0.000000  0.000000  0.000000
  0.038889  0.433719  0.016848  0.000000  0.131200
  0.077778  0.434703  0.033734  0.000000  0.131498
  0.116667  0.435688  0.050658  0.000000  0.131795
  0.155556  0.436674  0.067621  0.000000  0.132094
  0.194444  0.437661  0.084621  0.000000  0.132392
  0.233333  0.438649  0.101661  0.000000  0.132691
  0.272222  0.439638  0.118739  0.000000  0.132990
  0.311111  0.440628  0.135855  0.000000  0.133290
  0.350000  0.441620  0.153010  0.000000  0.133590
  0.388889  0.442612  0.170203  0.000000  0.133890
  0.427778  0.443606  0.187435  0.000000  0.134191
  0.466667  0.444601  0.204706  0.000000  0.134492
  0.505556  0.445597  0.222015  0.000000  0.134793
  0.544444  0.446594  0.239363  0.000000  0.135095
  0.583333  0.447592  0.256750  0.000000  0.135397
  0.622222  0.448591  0.274176  0.000000  0.135699
  0.661111  0.449592  0.291641  0.000000  0.136001
  0.700000  0.450593  0.309144  0.000000  0.136304
  0.738889  0.451596  0.326687  0.000000  0.136608
  0.777778  0.452600  0.344269  0.000000  0.136911
  0.816667  0.453604  0.361889  0.000000  0.137215
  0.855556  0.454610  0.379549  0.000000  0.137520
  0.894444  0.455617  0.397248  0.000000  0.137824
  0.933333  0.456625  0.414986  0.000000  0.138129
  0.972222  0.457635  0.432763  0.000000  0.138434
  1.011111  0.458645  0.450580  0.000000  0.138740
  1.050000  0.459657  0.468436  0.000000  0.139046
  1.088889  0.460669  0.486331  0.000000  0.139352
  1.127778  0.461683  0.504265  0.000000  0.139659
  1.166667  0.462698  0.522239  0.000000  0.139966
  1.205556  0.463714  0.540253  0.000000  0.140273
  1.244444  0.464731  0.558306  0.000000  0.140581
  1.283333  0.465749  0.576399  0.000000  0.140889
  1.322222  0.466768  0.594531  0.000000  0.141197
  1.361111  0.467788  0.612703  0.000000  0.141506
  1.400000  0.468810  0.630915  0.000000  0.141815
  1.438889  0.469833  0.649166  0.000000  0.142124
  1.477778  0.470856  0.667457  0.000000  0.142434
  1.516667  0.471881  0.685788  0.000000  0.142744
  1.555556  0.472907  0.704159  0.000000  0.143054
  1.594444  0.473934  0.722570  0.000000  0.143365
```

```
  1.633333  0.474962  0.741021  0.000000  0.143676
  1.672222  0.475991  0.759511  0.000000  0.143987
  1.711111  0.477022  0.778042  0.000000  0.144299
  1.750000  0.478053  0.796613  0.000000  0.144611
  1.788889  0.479086  0.815224  0.000253  0.144923
  1.827778  0.480120  0.833875  0.000711  0.145236
  1.866667  0.481154  0.852567  0.001296  0.145549
  1.905556  0.482190  0.871298  0.001979  0.145863
  1.944444  0.483227  0.890070  0.002744  0.146176
  1.983333  0.484265  0.908883  0.003578  0.146490
  2.022222  0.485305  0.927736  0.004472  0.146805
  2.061111  0.486345  0.946629  0.005419  0.147119
  2.100000  0.487387  0.965562  0.006413  0.147434
  2.138889  0.488429  0.984537  0.007448  0.147750
  2.177778  0.489473  1.003551  0.008520  0.148066
  2.216667  0.490518  1.022607  0.009625  0.148382
  2.255556  0.491564  1.041703  0.017192  0.148698
  2.294444  0.492611  1.060840  0.159666  0.149015
  2.333333  0.493659  1.080017  0.392888  0.149332
  2.372222  0.494708  1.099235  0.688251  0.149649
  2.411111  0.495758  1.118494  1.032337  0.149967
  2.450000  0.496810  1.137794  1.415060  0.150285
  2.488889  0.497863  1.157135  1.827170  0.150603
  2.527778  0.498916  1.176517  2.259433  0.150922
  2.566667  0.499971  1.195940  2.702390  0.151241
  2.605556  0.501027  1.215404  3.146399  0.151561
  2.644444  0.502084  1.234909  3.581840  0.151880
  2.683333  0.503142  1.254455  3.999422  0.152200
  2.722222  0.504201  1.274042  4.390592  0.152521
  2.761111  0.505262  1.293670  4.747988  0.152842
  2.800000  0.506323  1.313340  5.065970  0.153163
  2.838889  0.507386  1.333051  5.341185  0.153484
  2.877778  0.508450  1.352803  5.573186  0.153806
  2.916667  0.509514  1.372597  5.765090  0.154128
  2.955556  0.510580  1.392432  5.924278  0.154451
  2.994444  0.511647  1.412309  6.063120  0.154773
  3.033333  0.512715  1.432227  6.282731  0.155096
  3.072222  0.513785  1.452187  6.436536  0.155420
  3.111111  0.514855  1.472188  6.586745  0.155744
  3.150000  0.515927  1.492231  6.733599  0.156068
  3.188889  0.516999  1.512316  6.877313  0.156392
  3.227778  0.518073  1.532442  7.018080  0.156717
  3.266667  0.519148  1.552610  7.156075  0.157042
  3.305556  0.520224  1.572820  7.291455  0.157368
  3.344444  0.521301  1.593072  7.424363  0.157693
  3.383333  0.522379  1.613366  7.554930  0.158020
  3.422222  0.523458  1.633702  7.683275  0.158346
  3.461111  0.524538  1.654079  7.809509  0.158673
  3.500000  0.525620  1.674499  7.933731  0.159000
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.2           PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2           IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76          PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76          IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO     1 1        1      WDM   1012 FLOW     ENGL      REPL
RCHRES   1 HYDR   O      1 1        1      WDM   1013 FLOW     ENGL      REPL
RCHRES   1 HYDR   O      2 1        1      WDM   1014 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1015 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
```

```
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK         2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK     2

  MASS-LINK         3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK     3

  MASS-LINK         5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK     5

  MASS-LINK        12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK    12

  MASS-LINK        13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK    13

  MASS-LINK        15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK    15

  MASS-LINK        17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK    17


END MASS-LINK

END RUN
```

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APPENDIX 3C
CONVEYANCE CALCULATIONS

Emergency Spillway Design

Source: WSDOT Highway Runoff Manual

$$Q_{100} = C\,(2g)^{1/2}\left[\frac{2}{3}LH^{3/2} + \frac{8}{15}\,(\mathrm{Tan}\,\theta)\,H^{5/2}\right] \qquad \text{(E-31)}$$

where: Q_{100} = peak flow for the 100-year runoff event (cfs)

C = discharge coefficient (0.6)

g = gravity (32.2 ft/sec^2)

L = length of weir (ft)

H = height of water over weir (ft)

θ = angle of side slopes

Assuming C = 0.6 and Tan θ = 3 (for 3H:1V slopes), the equation becomes:

$$Q_{100} = 3.21[LH^{3/2} + 2.4\,H^{5/2}] \qquad \text{(E-32)}$$

To find the width L for the weir section, the equation is rearranged to use the computed Q_{100} and trial values of H (0.2 feet minimum):

$$L = [Q_{100}/(3.21H^{3/2})] - 2.4\,H \text{ or } 6 \text{ feet minimum} \qquad \text{(E-33)}$$

Analyze emergency overflow spillway designs using a Type II manhole fitted with a birdcage, as shown in Figure 5-55, using Figure 5-56 to pass the 100-year postdeveloped undetained peak low.

Equation E-33

C =	0.6	
g =	32.2	ft/s^2
H =	0.25	ft
Q100 =	4.01	cfs

$$L = \frac{4.01}{0.40} - 0.6 = 9.99 - 0.6 = \mathbf{9.394\ FEET}$$

Q100 Per WWHM modeling for 100-year event.

SSA CONVEYANCE ANALYSIS

Project Description

File Name ..... 211th Arlington.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Santa Barbara UH
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	YES

Analysis Options

Start Analysis On	Jan 14, 2024	00:00:00
End Analysis On	Jan 15, 2024	00:00:00
Start Reporting On	Jan 14, 2024	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	16
Nodes	37
Junctions	33
Outfalls	4
Flow Diversions	0
Inlets	0
Storage Nodes	0
Links	33
Channels	0
Pipes	33
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	Rain Gage-01	Time Series	24hr 25-yr	Intensity	inches	Washington	Snohomish	25	2.60	SCS Type IA 24-hr

Subbasin Summary

SN	Subbasin ID	Area (ac)	Impervious Area (%)	Impervious Area Curve Number	Pervious Area Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-01	0.13	100.00	98.00	98.00	2.59	2.36	0.31	0.08	0 00:05:00
2	Sub-02	0.21	100.00	98.00	98.00	2.59	2.36	0.49	0.12	0 00:05:00
3	Sub-03	0.17	100.00	98.00	98.00	2.59	2.36	0.40	0.10	0 00:05:00
4	Sub-04	0.06	100.00	98.00	98.00	2.59	2.36	0.14	0.04	0 00:05:00
5	Sub-05	0.17	100.00	98.00	98.00	2.59	2.36	0.39	0.10	0 00:05:00
6	Sub-06	0.12	100.00	98.00	98.00	2.59	2.36	0.27	0.07	0 00:05:00
7	Sub-07	0.08	100.00	98.00	98.00	2.59	2.36	0.19	0.05	0 00:05:00
8	Sub-11	0.08	100.00	98.00	98.00	2.59	2.36	0.20	0.05	0 00:05:00
9	Sub-13	0.17	100.00	98.00	98.00	2.59	2.36	0.39	0.10	0 00:05:00
10	Sub-14	0.12	100.00	98.00	98.00	2.59	2.36	0.28	0.07	0 00:05:00
11	Sub-15	0.18	100.00	98.00	98.00	2.59	2.36	0.43	0.11	0 00:05:00
12	Sub-16	0.12	100.00	98.00	98.00	2.59	2.36	0.27	0.07	0 00:05:00
13	Sub-17	0.14	100.00	98.00	98.00	2.59	2.36	0.34	0.09	0 00:05:00
14	Sub-18	0.18	100.00	98.00	98.00	2.59	2.36	0.43	0.11	0 00:05:00
15	Sub-19	0.12	100.00	98.00	98.00	2.59	2.36	0.29	0.07	0 00:05:00
16	Sub-20	0.09	100.00	98.00	98.00	2.59	2.36	0.22	0.06	0 00:05:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	CB 01	Junction	67.87	71.87	67.87	71.87	0.00	0.44	68.19	0.00	3.68	0 00:00	0.00	0.00
2	CB 02	Junction	68.12	71.50	68.12	71.50	0.00	0.08	68.30	0.00	3.20	0 00:00	0.00	0.00
3	CB 03	Junction	68.25	71.06	68.25	71.06	0.00	0.08	68.43	0.00	2.62	0 00:00	0.00	0.00
4	CB 04	Junction	89.77	93.96	89.77	93.96	0.00	0.64	90.15	0.00	3.82	0 00:00	0.00	0.00
5	CB 05	Junction	70.79	72.43	70.79	72.43	0.00	0.12	70.97	0.00	1.45	0 00:00	0.00	0.00
6	CB 06	Junction	72.08	76.08	72.08	76.08	0.00	0.24	72.31	0.00	3.77	0 00:00	0.00	0.00
7	CB 07	Junction	76.47	80.47	76.47	80.47	0.00	0.24	76.69	0.00	3.77	0 00:00	0.00	0.00
8	CB 08	Junction	76.06	79.18	76.06	79.18	0.00	0.10	76.70	0.00	2.47	0 00:00	0.00	0.00
9	CB 10	Junction	87.31	91.26	87.31	91.26	0.00	0.81	87.79	0.00	3.47	0 00:00	0.00	0.00
10	CB 11	Junction	94.24	99.14	94.24	99.14	0.00	0.44	94.56	0.00	4.58	0 00:00	0.00	0.00
11	CB 12	Junction	92.38	97.63	92.38	97.63	0.00	0.59	92.75	0.00	4.88	0 00:00	0.00	0.00
12	CB 13	Junction	94.00	98.70	94.00	98.70	0.00	0.49	94.33	0.00	4.36	0 00:00	0.00	0.00
13	CB 14	Junction	96.88	98.37	96.88	98.37	0.00	0.05	97.04	0.00	1.33	0 00:00	0.00	0.00
14	CB 15	Junction	95.26	99.26	95.26	99.26	0.00	0.07	95.44	0.00	3.82	0 00:00	0.00	0.00
15	CB 16	Junction	96.94	101.77	96.94	101.77	0.00	0.39	97.23	0.00	4.54	0 00:00	0.00	0.00
16	CB 17	Junction	97.08	100.72	97.08	100.72	0.00	0.11	97.25	0.00	3.47	0 00:00	0.00	0.00
17	CB 18	Junction	98.22	102.50	98.22	102.50	0.00	0.28	98.47	0.00	4.03	0 00:00	0.00	0.00
18	CB 19	Junction	98.83	102.84	98.83	102.84	0.00	0.19	99.08	0.00	3.76	0 00:00	0.00	0.00
19	CB 20	Junction	100.30	104.30	100.30	104.30	0.00	0.11	100.51	0.00	3.79	0 00:00	0.00	0.00
20	CB 21	Junction	100.07	105.12	100.07	105.12	0.00	0.13	100.30	0.00	4.82	0 00:00	0.00	0.00
21	CB 22	Junction	100.26	104.40	100.26	104.40	0.00	0.13	100.49	0.00	3.91	0 00:00	0.00	0.00
22	CB 23	Junction	102.65	104.22	102.65	104.22	0.00	0.05	102.81	0.00	1.41	0 00:00	0.00	0.00
23	CB 24	Junction	68.43	73.97	68.43	73.97	0.00	0.37	68.71	0.00	5.25	0 00:00	0.00	0.00
24	CB 25	Junction	91.67	97.13	91.67	97.13	0.00	0.64	92.05	0.00	5.08	0 00:00	0.00	0.00
25	CB 26	Junction	66.60	71.56	66.60	71.56	0.00	0.44	66.91	0.00	4.64	0 00:00	0.00	0.00
26	CB 27	Junction	85.86	89.40	85.86	89.40	0.00	0.86	86.11	0.00	3.29	0 00:00	0.00	0.00
27	CB 28	Junction	89.96	95.36	89.96	95.36	0.00	0.64	90.34	0.00	5.02	0 00:00	0.00	0.00
28	CB 29	Junction	95.12	100.87	95.12	100.87	0.00	0.44	95.44	0.00	5.44	0 00:00	0.00	0.00
29	EX CB 103	Junction	82.75	87.38	82.75	87.38	0.00	0.84	83.11	0.00	4.27	0 00:00	0.00	0.00
30	EX CB 115	Junction	99.63	102.71	99.63	102.71	0.00	0.00	99.63	0.00	3.08	0 00:00	0.00	0.00
31	EXCB108	Junction	102.62	103.87	102.62	103.87	0.00	0.06	102.77	0.00	1.10	0 00:00	0.00	0.00
32	EXCB110	Junction	100.05	101.19	100.05	101.19	0.00	0.13	100.28	0.00	0.91	0 00:00	0.00	0.00
33	POND	Junction	67.75	71.80	67.75	71.80	0.00	0.44	68.06	0.00	3.74	0 00:00	0.00	0.00
34	Out-1Pipe - (115)	Outfall	77.79					0.86	77.95					
35	Out-1Pipe - (116)	Outfall	68.02					0.00	68.02					
36	Out-1Pipe - (121)	Outfall	99.76					0.13	99.89					
37	OVERFLOW	Outfall	65.29					0.44	65.56					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	Link-01	Pipe	CB 27	EX CB 103	60.73	85.86	83.01	4.6900	12.000	0.0150	0.81	6.69	0.12	5.54	0.24	0.24	0.00	Calculated
2	Link-02	Pipe	EX CB 103	CB 07	156.96	83.01	76.47	4.1700	12.000	0.0150	0.14	6.30	0.02	1.69	0.16	0.16	0.00	Calculated
3	Pipe - (10)	Pipe	CB 20	CB 19	123.35	100.30	98.83	1.1900	12.000	0.0120	0.11	4.21	0.03	0.80	0.23	0.23	0.00	Calculated
4	Pipe - (10) (1)	Pipe	CB 19	CB 18	121.02	98.83	98.22	0.5000	12.000	0.0120	0.21	2.74	0.08	1.42	0.25	0.25	0.00	Calculated
5	Pipe - (11)	Pipe	CB 18	CB 16	150.01	98.22	97.47	0.5000	12.000	0.0120	0.28	2.73	0.10	2.01	0.23	0.23	0.00	Calculated
6	Pipe - (115)	Pipe	EX CB 103	Out-1Pipe - (115)	44.23	82.75	77.79	11.2100	18.000	0.0120	0.86	38.11	0.02	4.16	0.26	0.17	0.00	Calculated
7	Pipe - (121)	Pipe	EXCB110	Out-1Pipe - (121)	35.03	100.05	99.76	0.8300	12.000	0.0120	0.13	3.51	0.04	1.32	0.18	0.18	0.00	Calculated
8	Pipe - (123)	Pipe	EXCB108	CB 22	47.18	102.62	102.49	0.2800	12.000	0.0120	0.05	2.03	0.03	1.00	0.12	0.12	0.00	Calculated
9	Pipe - (126)	Pipe	CB 26	OVERFLOW	261.91	66.60	65.29	0.5000	12.000	0.0120	0.44	2.73	0.16	2.29	0.29	0.29	0.00	Calculated
10	Pipe - (146) (1)	Pipe	CB 10	CB 27	51.83	87.31	85.86	2.8000	12.000	0.0120	0.86	6.46	0.13	3.57	0.36	0.36	0.00	Calculated
11	Pipe - (146) (2)	Pipe	CB 28	CB 04	14.61	89.96	89.77	1.3000	12.000	0.0120	0.64	4.40	0.15	2.33	0.38	0.38	0.00	Calculated
12	Pipe - (148)	Pipe	CB 13	CB 12	149.70	94.00	92.38	1.0800	12.000	0.0120	0.49	4.02	0.12	2.01	0.35	0.35	0.00	Calculated
13	Pipe - (151)	Pipe	CB 21	EXCB110	5.18	100.07	100.05	0.3900	12.000	0.0120	0.13	2.40	0.05	0.92	0.23	0.23	0.00	Calculated
14	Pipe - (152)	Pipe	CB 23	EXCB108	5.48	102.65	102.62	0.5000	8.000	0.0120	0.06	0.93	0.06	0.94	0.16	0.24	0.00	Calculated
15	Pipe - (153)	Pipe	CB 22	CB 21	37.26	100.26	100.07	0.5000	12.000	0.0120	0.13	2.72	0.05	0.92	0.23	0.23	0.00	Calculated
16	Pipe - (156)	Pipe	CB 15	CB 29	27.76	95.26	95.12	0.5100	8.000	0.0120	0.07	0.93	0.08	0.68	0.25	0.37	0.00	Calculated
17	Pipe - (158)	Pipe	CB 17	CB 16	28.34	97.08	96.94	0.4900	8.000	0.0120	0.11	0.92	0.12	1.11	0.23	0.35	0.00	Calculated
18	Pipe - (161)	Pipe	CB 29	CB 11	109.92	95.12	94.24	0.8000	12.000	0.0120	0.44	3.45	0.13	2.08	0.32	0.32	0.00	Calculated
19	Pipe - (162)	Pipe	CB 11	CB 13	43.64	94.24	94.00	0.5500	12.000	0.0120	0.44	2.86	0.15	2.00	0.32	0.32	0.00	Calculated
20	Pipe - (166)	Pipe	CB 01	POND	24.40	67.87	67.75	0.4900	12.000	0.0120	0.44	2.71	0.16	2.05	0.32	0.32	0.00	Calculated
21	Pipe - (168)	Pipe	CB 03	CB 02	26.16	68.25	68.12	0.5000	12.000	0.0120	0.08	2.73	0.03	0.83	0.18	0.18	0.00	Calculated
22	Pipe - (169)	Pipe	CB 14	CB 13	26.04	96.88	96.75	0.5000	8.000	0.0120	0.05	0.93	0.05	1.04	0.13	0.20	0.00	Calculated
23	Pipe - (170)	Pipe	POND	CB 26	76.95	67.75	66.62	1.4700	12.000	0.0120	0.44	4.69	0.09	2.21	0.31	0.31	0.00	Calculated
24	Pipe - (172)	Pipe	CB 04	CB 10	70.09	89.77	87.31	3.5100	12.000	0.0120	0.64	7.23	0.09	2.08	0.43	0.43	0.00	Calculated
25	Pipe - (19)	Pipe	CB 12	CB 25	71.53	92.38	91.67	0.9900	12.000	0.0120	0.59	3.85	0.15	2.21	0.37	0.37	0.00	Calculated
26	Pipe - (19) (3)	Pipe	CB 25	CB 28	71.88	91.67	89.96	2.3800	12.000	0.0120	0.64	5.95	0.11	2.32	0.38	0.38	0.00	Calculated
27	Pipe - (22)	Pipe	CB 08	CB 07	26.16	76.06	75.93	0.5000	8.000	0.0120	0.10	1.64	0.06	0.42	0.43	0.65	0.00	Calculated
28	Pipe - (23)	Pipe	CB 07	CB 06	106.37	76.47	72.08	4.1300	12.000	0.0120	0.24	7.84	0.03	1.81	0.23	0.23	0.00	Calculated
29	Pipe - (23) (1) (1)	Pipe	CB 06	CB 24	95.70	72.08	69.47	2.7300	12.000	0.0120	0.25	6.37	0.04	2.54	0.18	0.18	0.00	Calculated
30	Pipe - (24)	Pipe	CB 24	CB 01	84.19	68.43	67.87	0.6700	12.000	0.0120	0.36	3.15	0.12	1.85	0.30	0.30	0.00	Calculated
31	Pipe - (24) (2)	Pipe	CB 02	CB 01	49.16	68.12	67.87	0.5000	12.000	0.0120	0.08	2.73	0.03	0.59	0.25	0.25	0.00	Calculated
32	Pipe - (26)	Pipe	CB 05	CB 24	28.34	70.79	70.65	0.4900	8.000	0.0120	0.12	0.92	0.13	1.73	0.17	0.26	0.00	Calculated
33	Pipe - (32)	Pipe	CB 16	CB 29	150.19	96.94	96.19	0.5000	12.000	0.0120	0.37	2.73	0.14	2.19	0.27	0.27	0.00	Calculated

Subbasin Hydrology

Subbasin : Sub-01

Input Data

Area (ac) 0.13
Impervious Area (%) 100.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 98.00
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.13		98

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

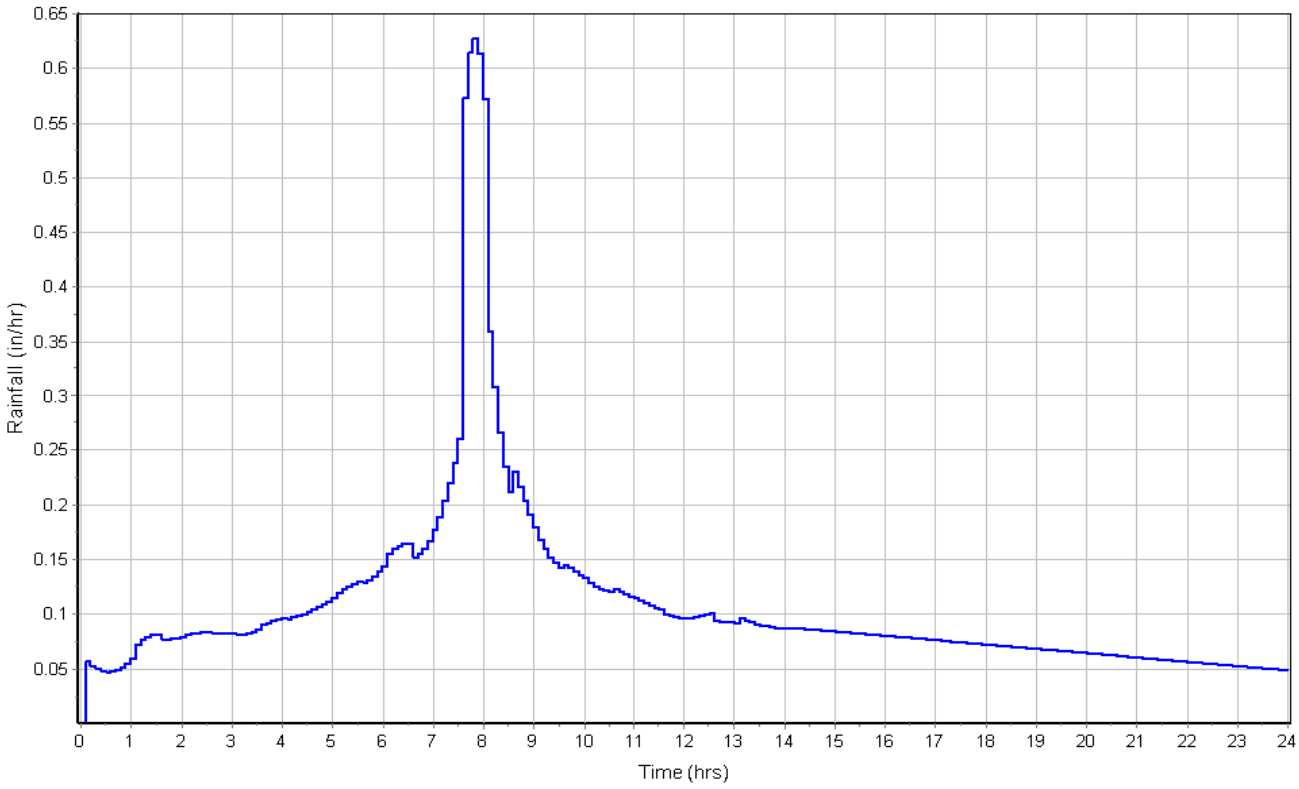
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

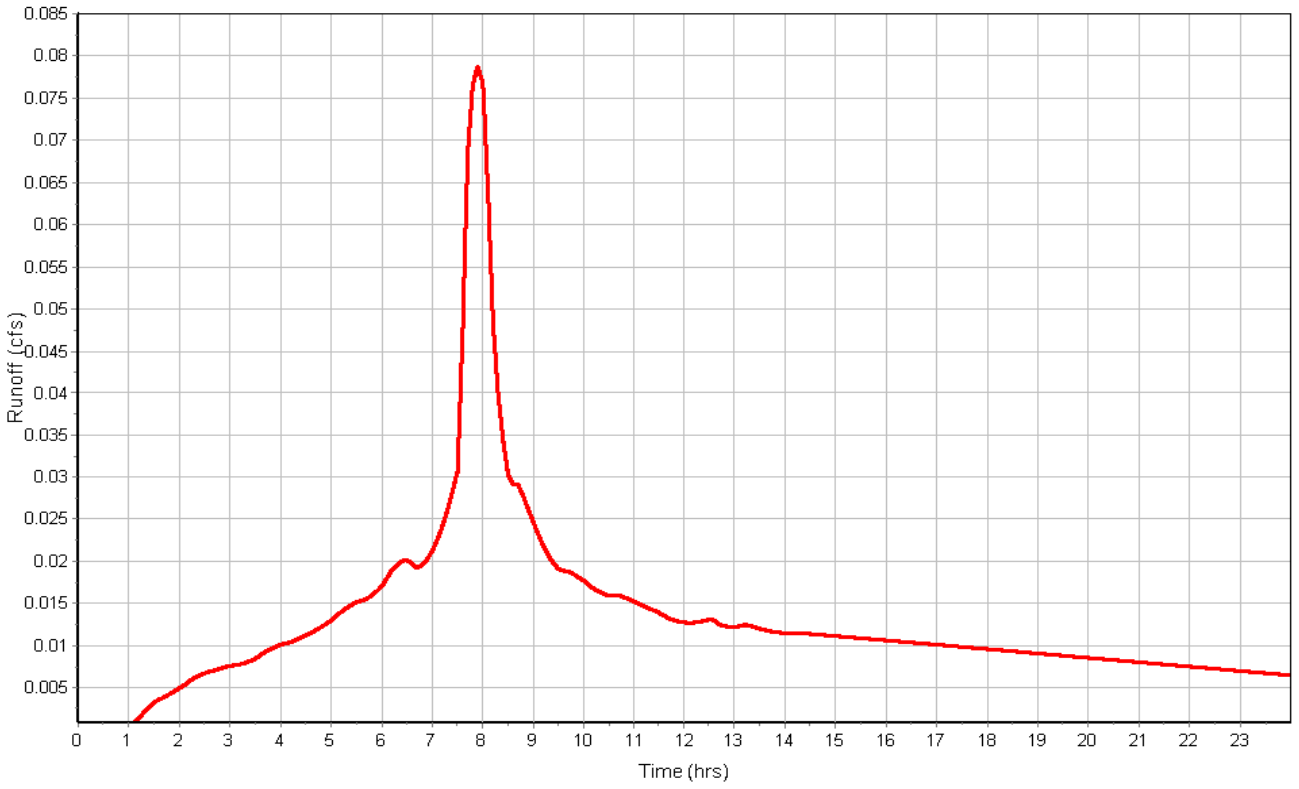
Total Rainfall (in) 2.59
Total Runoff (in) 2.36
Peak Runoff (cfs) 0.08
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Sub-01

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-02

Input Data

Area (ac)	0.21
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	98.00
Rain Gage ID	Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.21		98

Time of Concentration

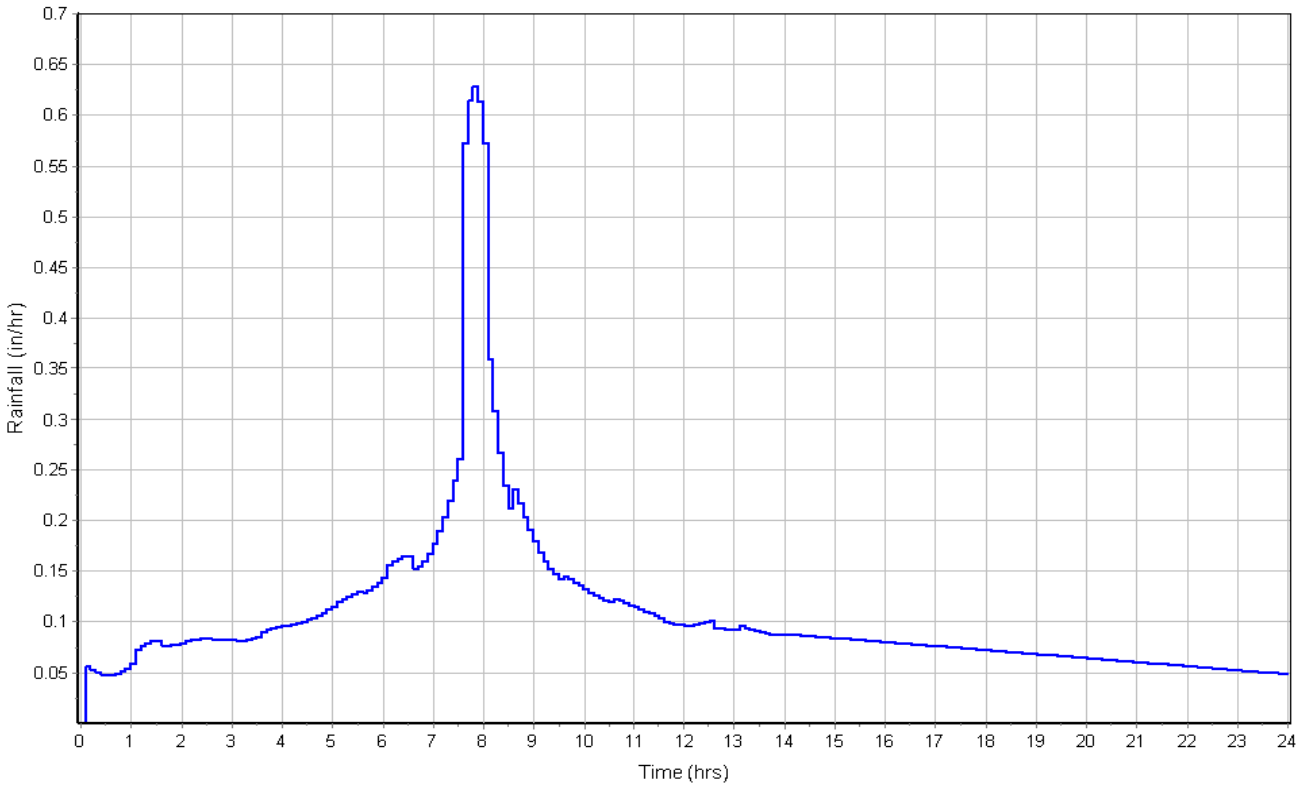
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

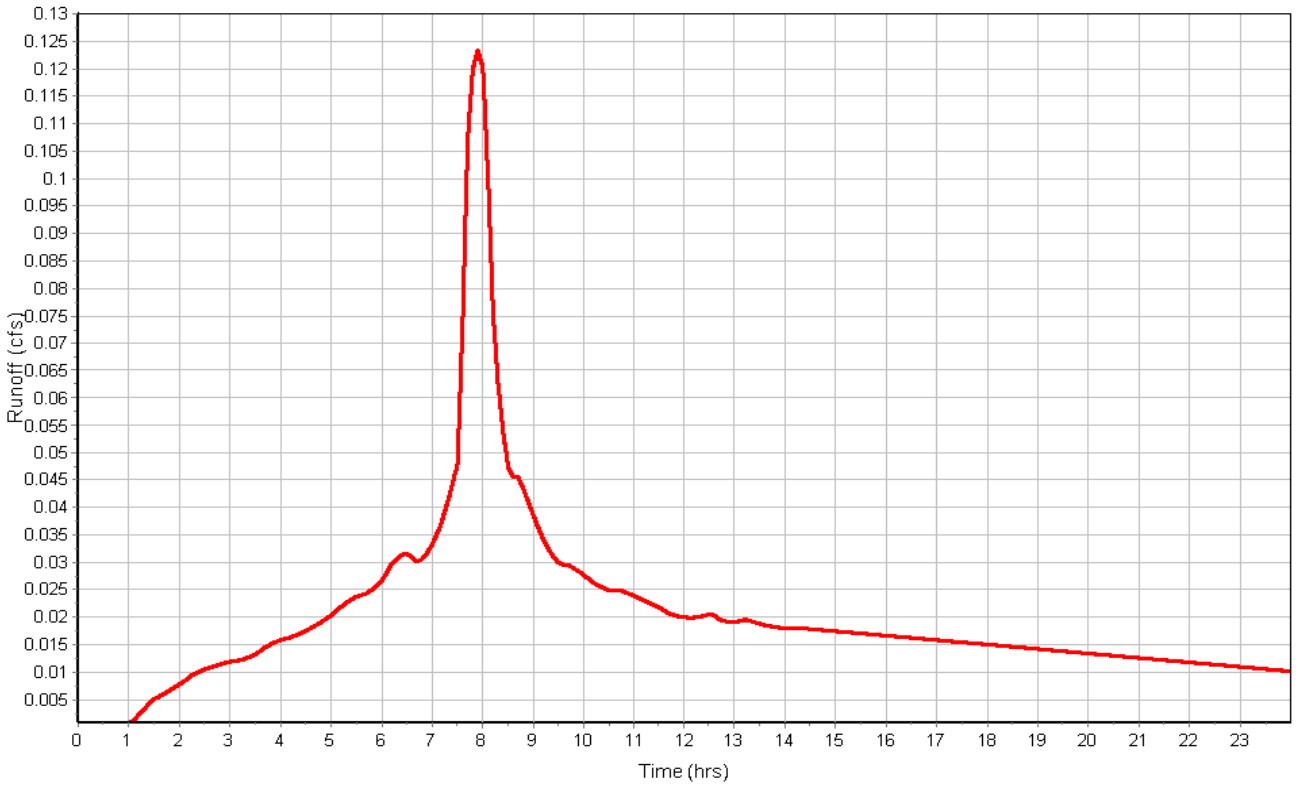
Total Rainfall (in)	2.59
Total Runoff (in)	2.36
Peak Runoff (cfs)	0.12
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : Sub-02

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-03

Input Data

Area (ac)	0.17
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	98.00
Rain Gage ID	Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.17		98

Time of Concentration

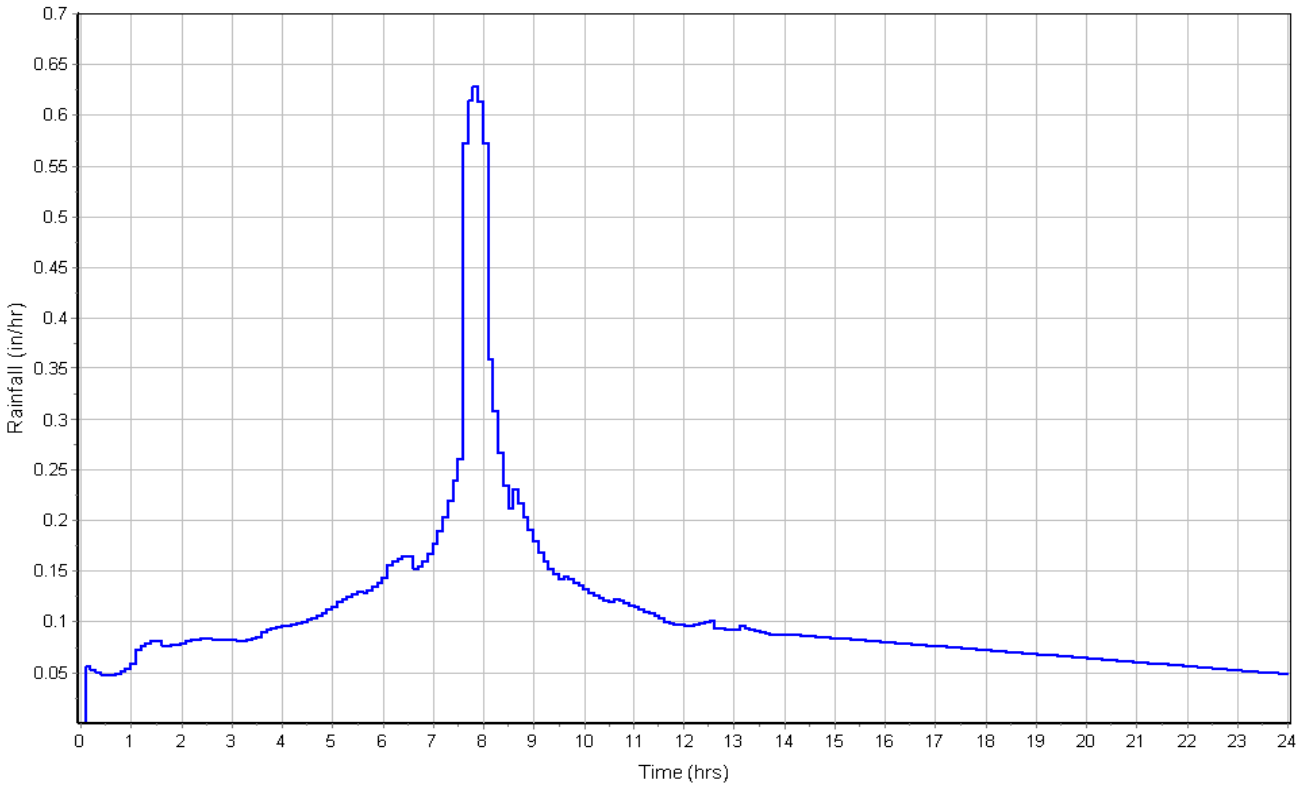
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

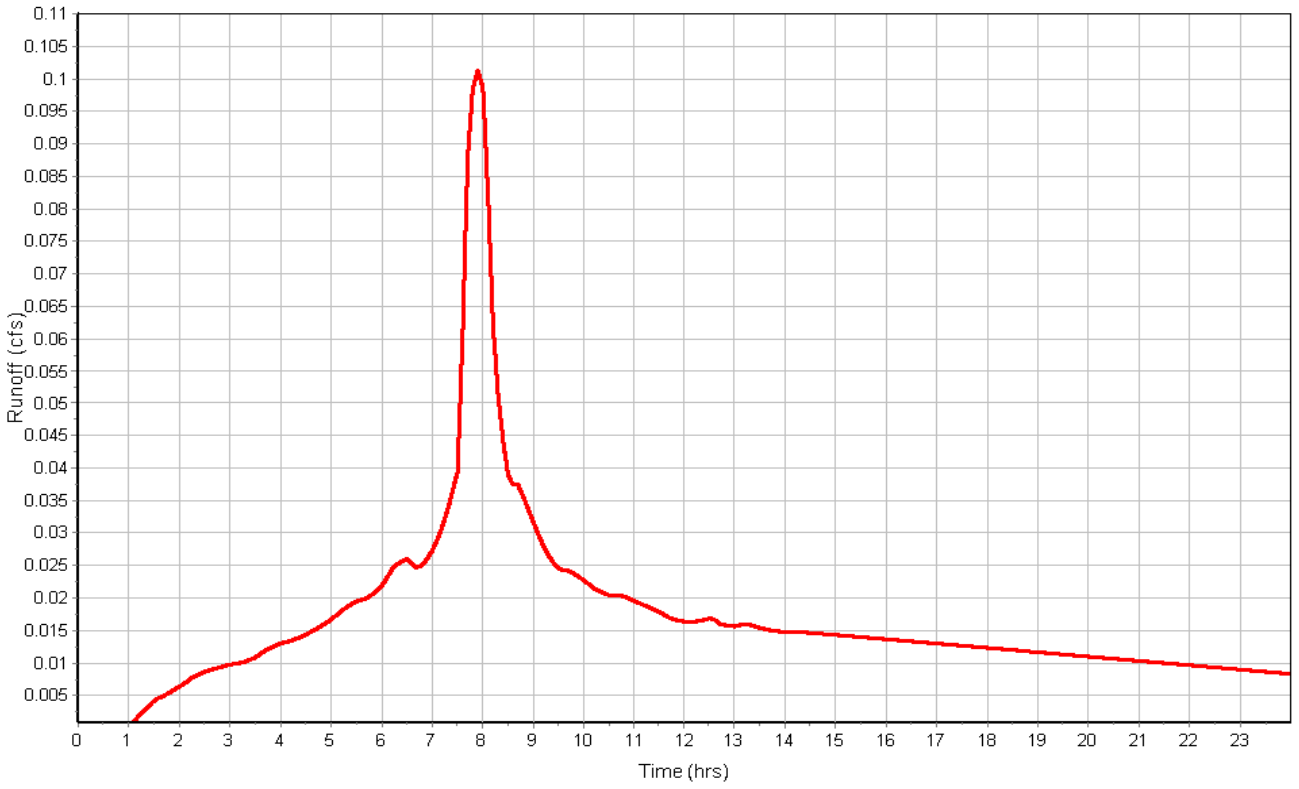
Total Rainfall (in)	2.59
Total Runoff (in)	2.36
Peak Runoff (cfs)	0.10
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : Sub-03

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-04

Input Data

Area (ac)	0.06
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	98.00
Rain Gage ID	Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.06		98

Time of Concentration

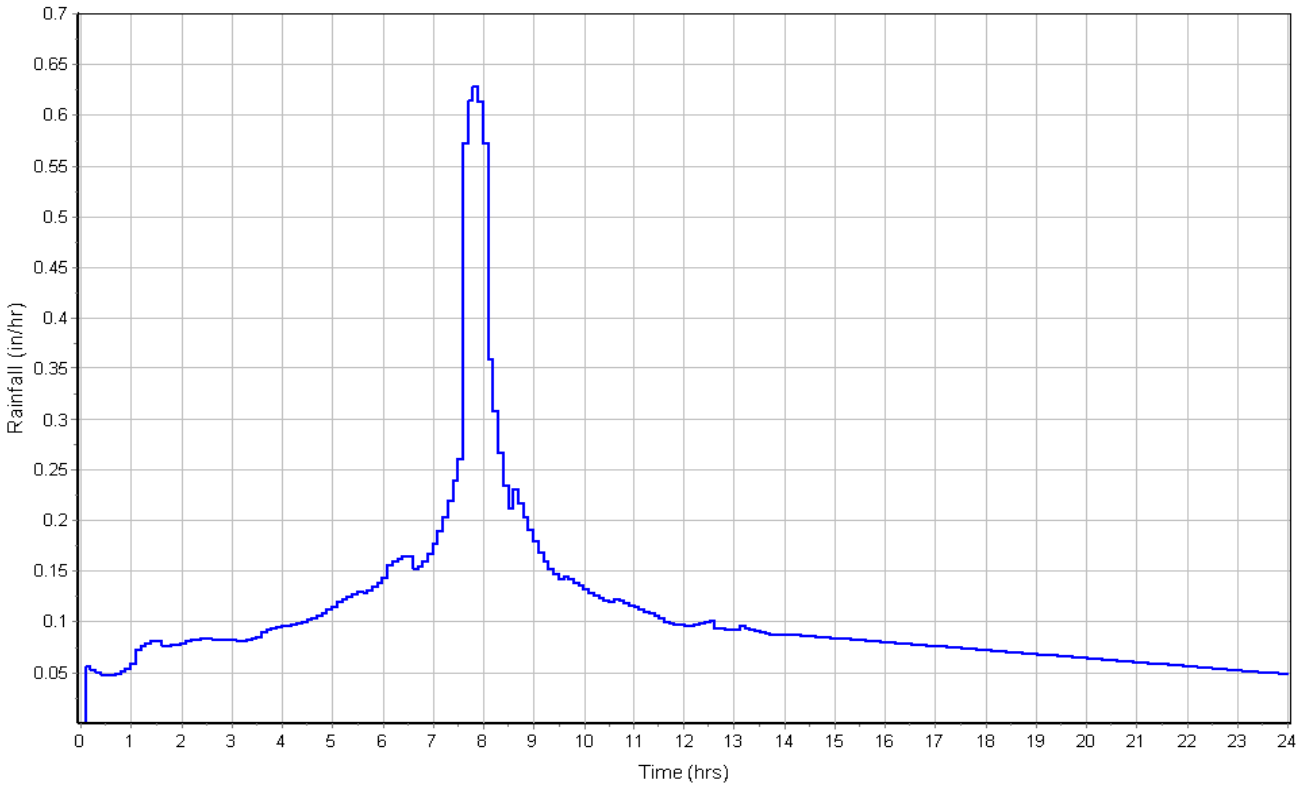
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

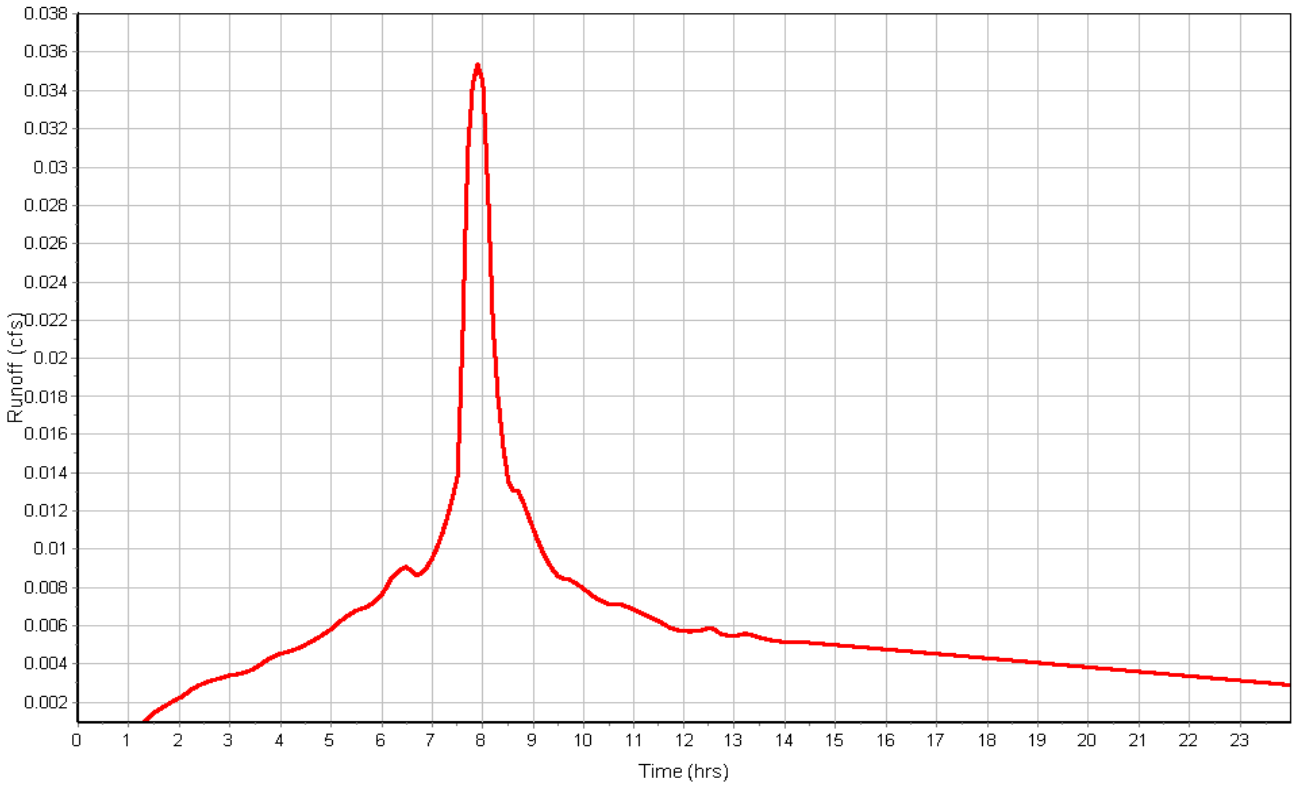
Total Rainfall (in)	2.59
Total Runoff (in)	2.36
Peak Runoff (cfs)	0.04
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : Sub-04

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-05

Input Data

Area (ac)	0.17
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	98.00
Rain Gage ID	Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.17		98

Time of Concentration

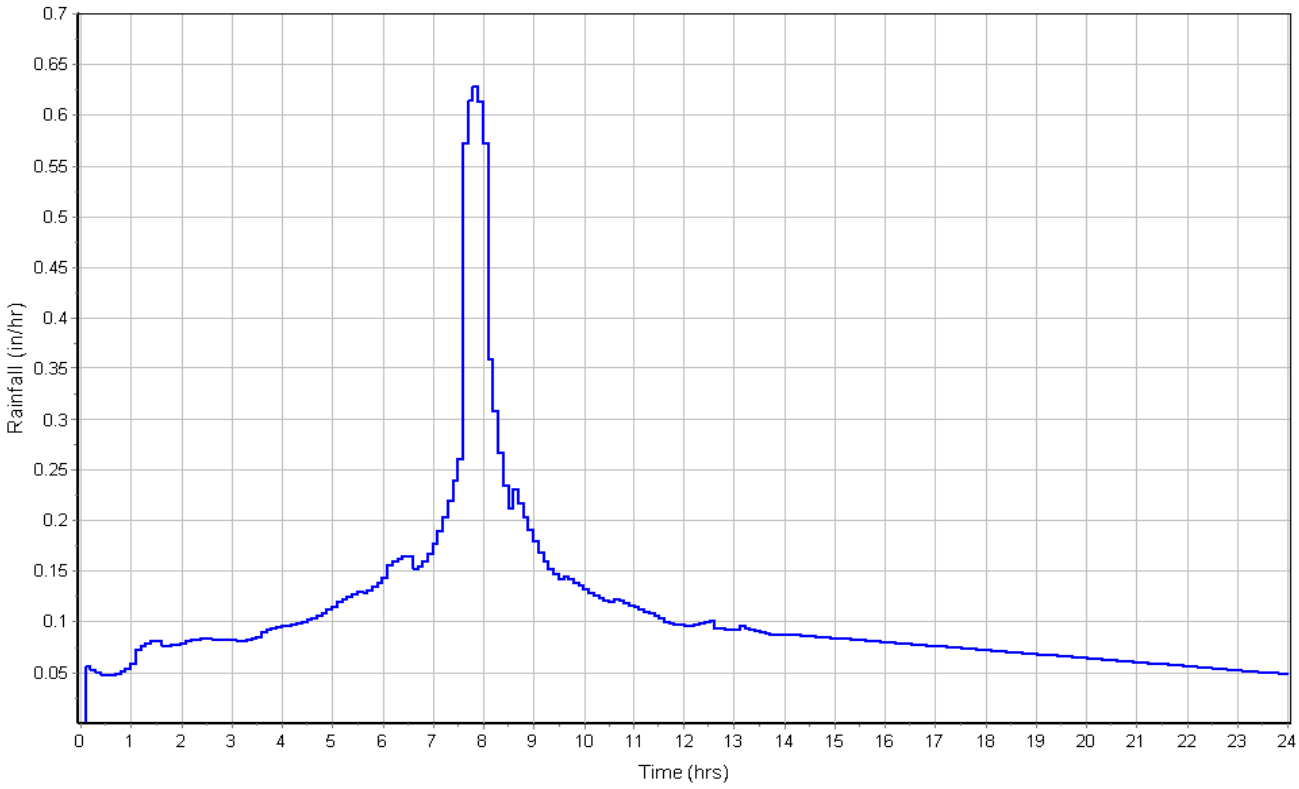
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

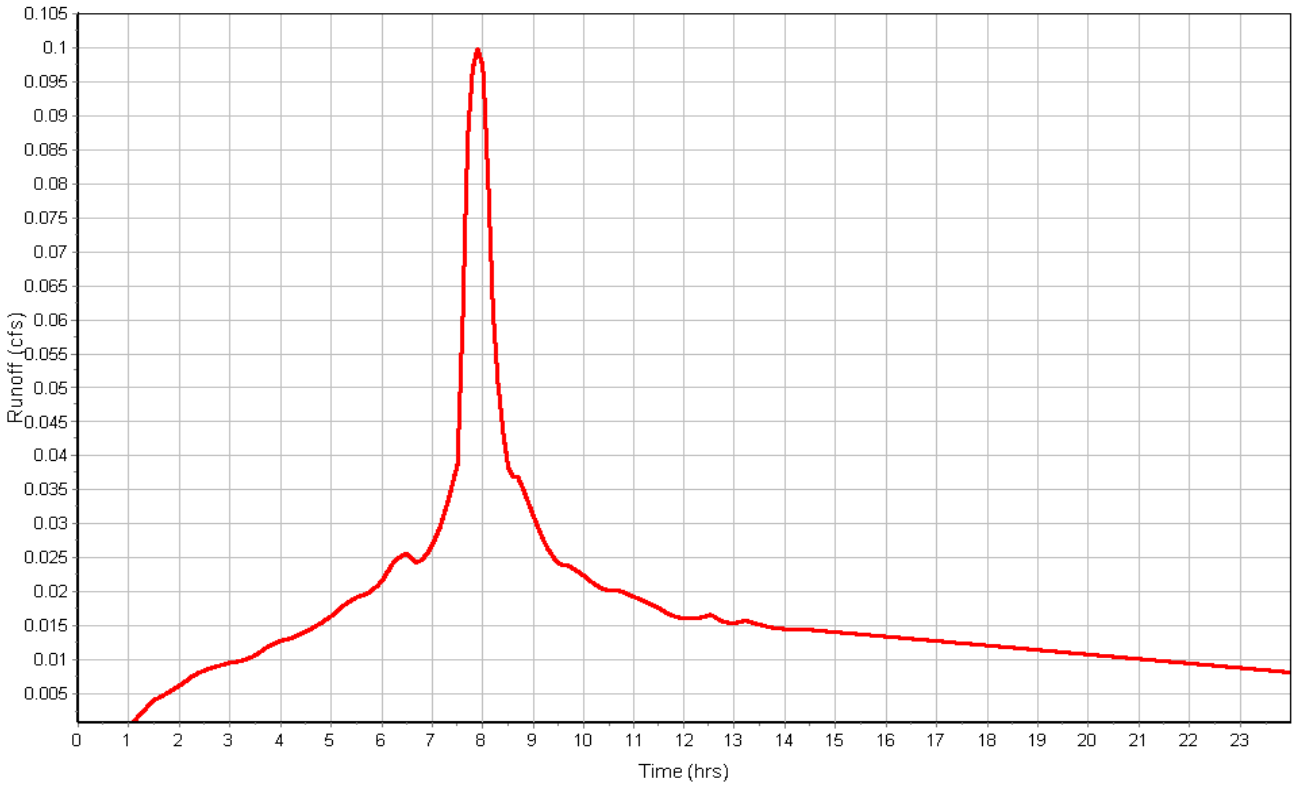
Total Rainfall (in)	2.59
Total Runoff (in)	2.36
Peak Runoff (cfs)	0.10
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : Sub-05

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-06

Input Data

Area (ac)	0.12
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	98.00
Rain Gage ID	Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		98

Time of Concentration

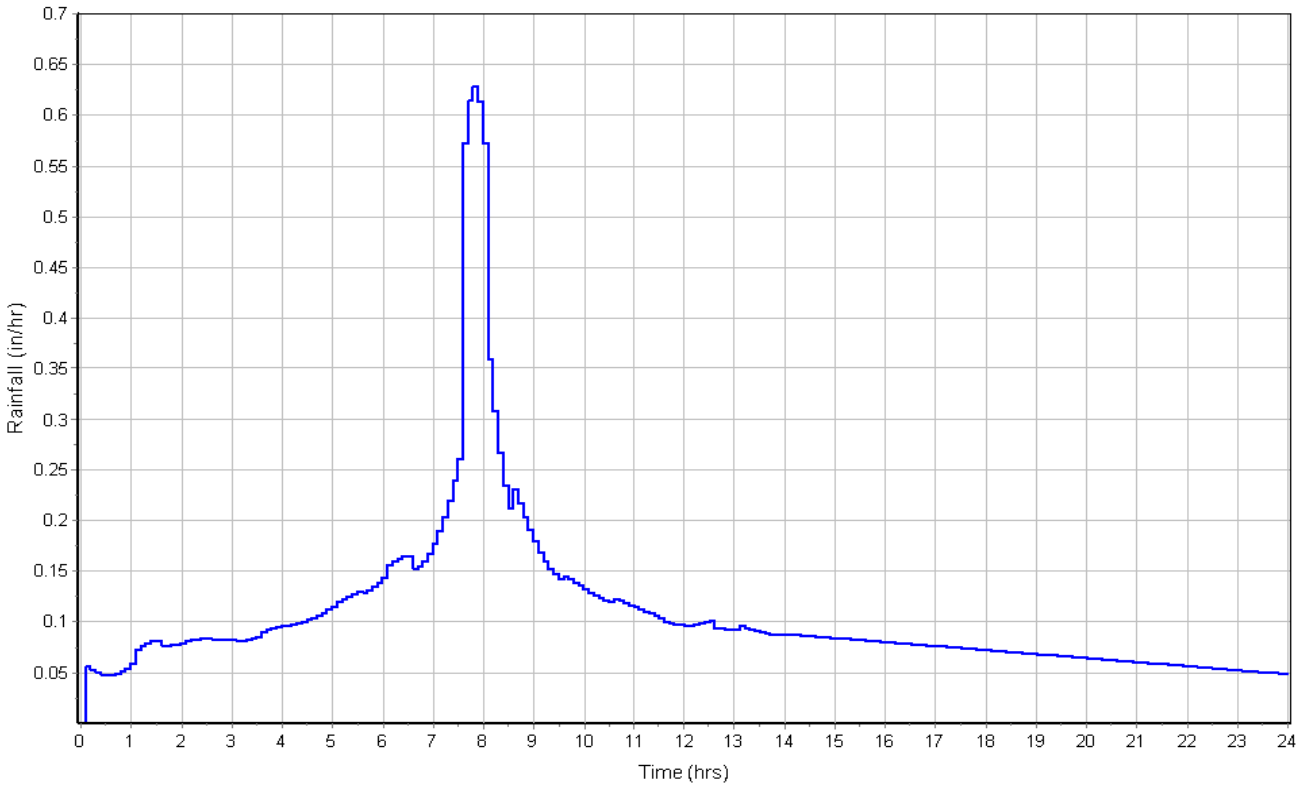
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

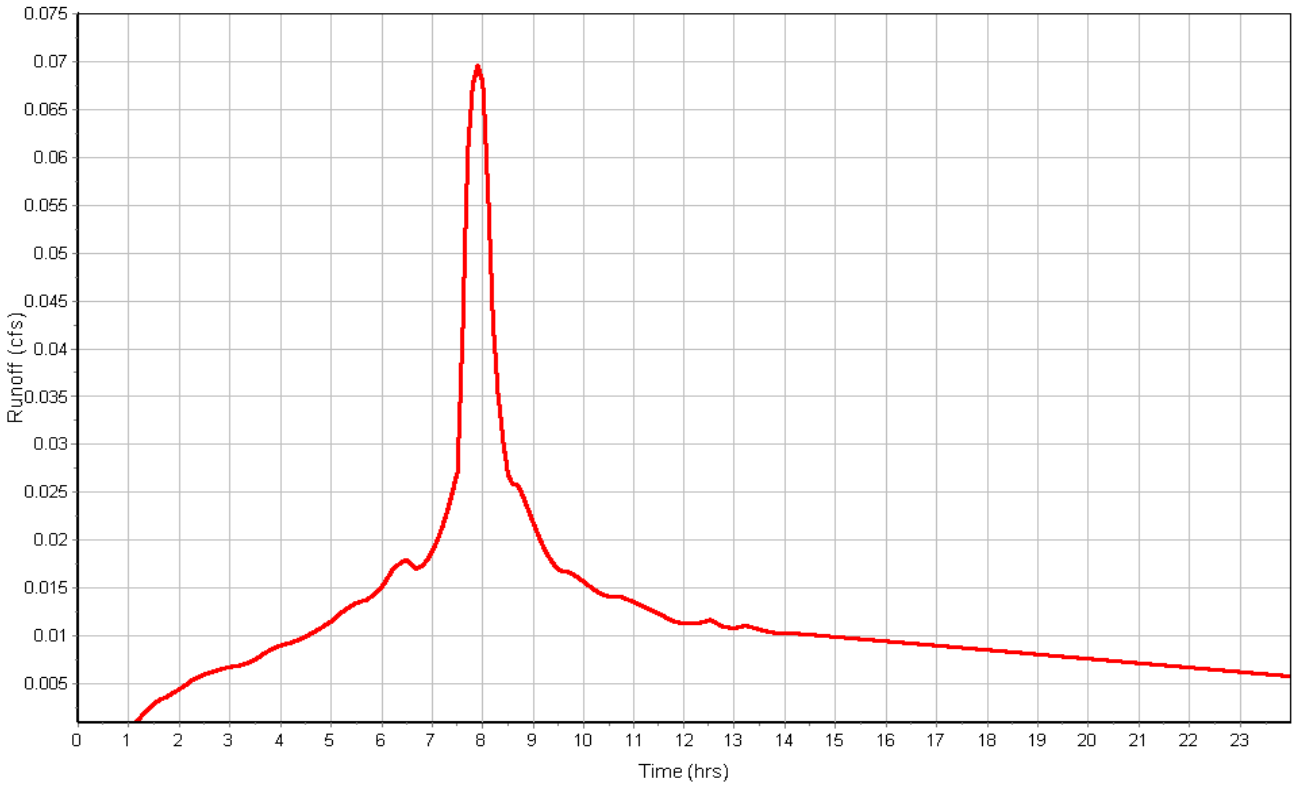
Total Rainfall (in)	2.59
Total Runoff (in)	2.36
Peak Runoff (cfs)	0.07
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : Sub-06

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-07

Input Data

Area (ac)	0.08
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	98.00
Rain Gage ID	Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.08		98

Time of Concentration

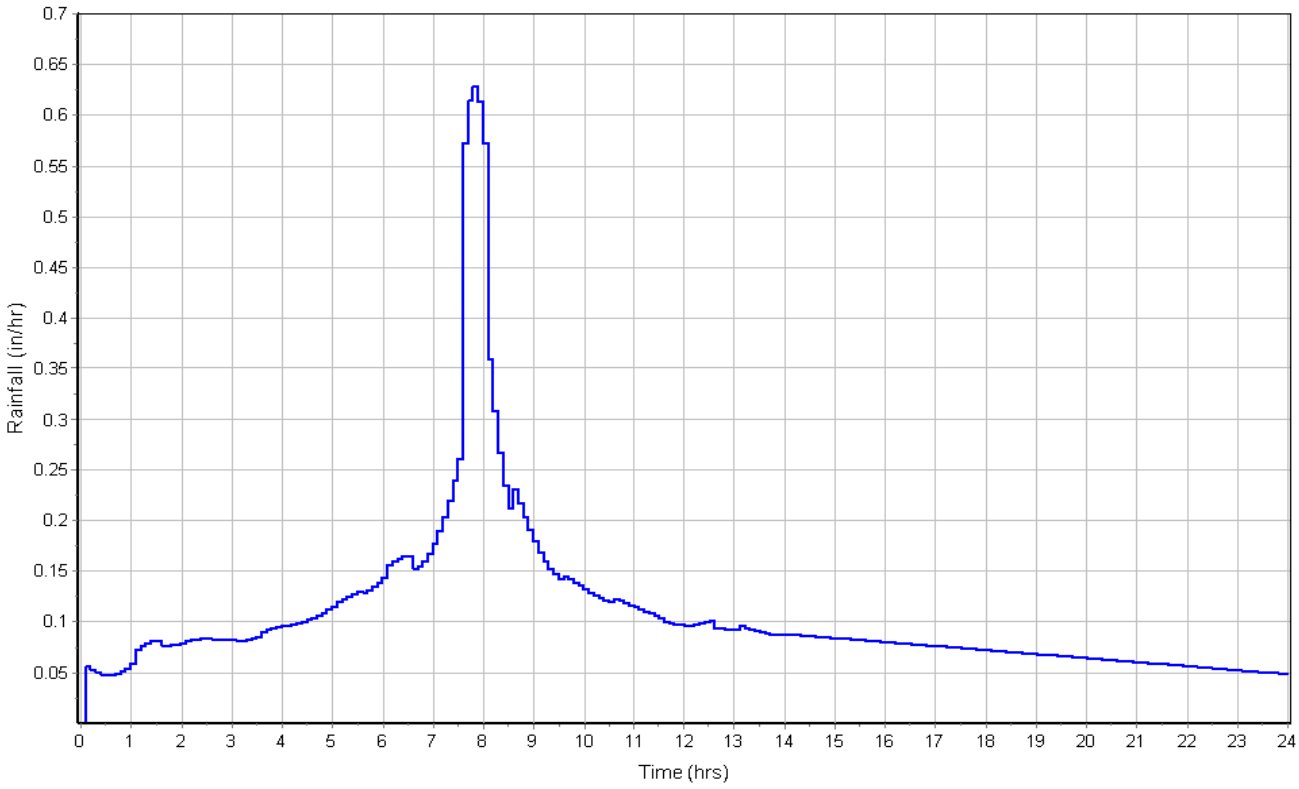
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

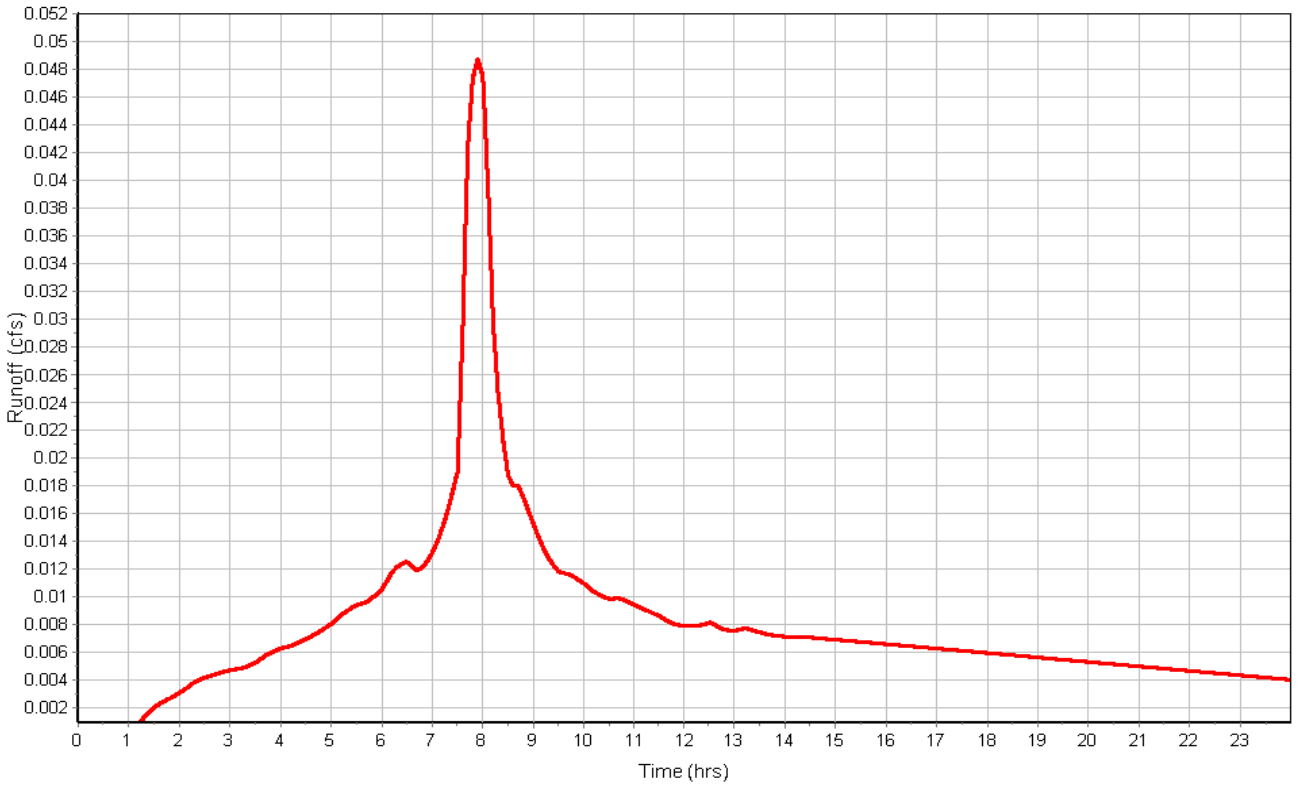
Total Rainfall (in)	2.59
Total Runoff (in)	2.36
Peak Runoff (cfs)	0.05
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : Sub-07

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-11

Input Data

Area (ac)	0.08
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	98.00
Rain Gage ID	Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.08		98

Time of Concentration

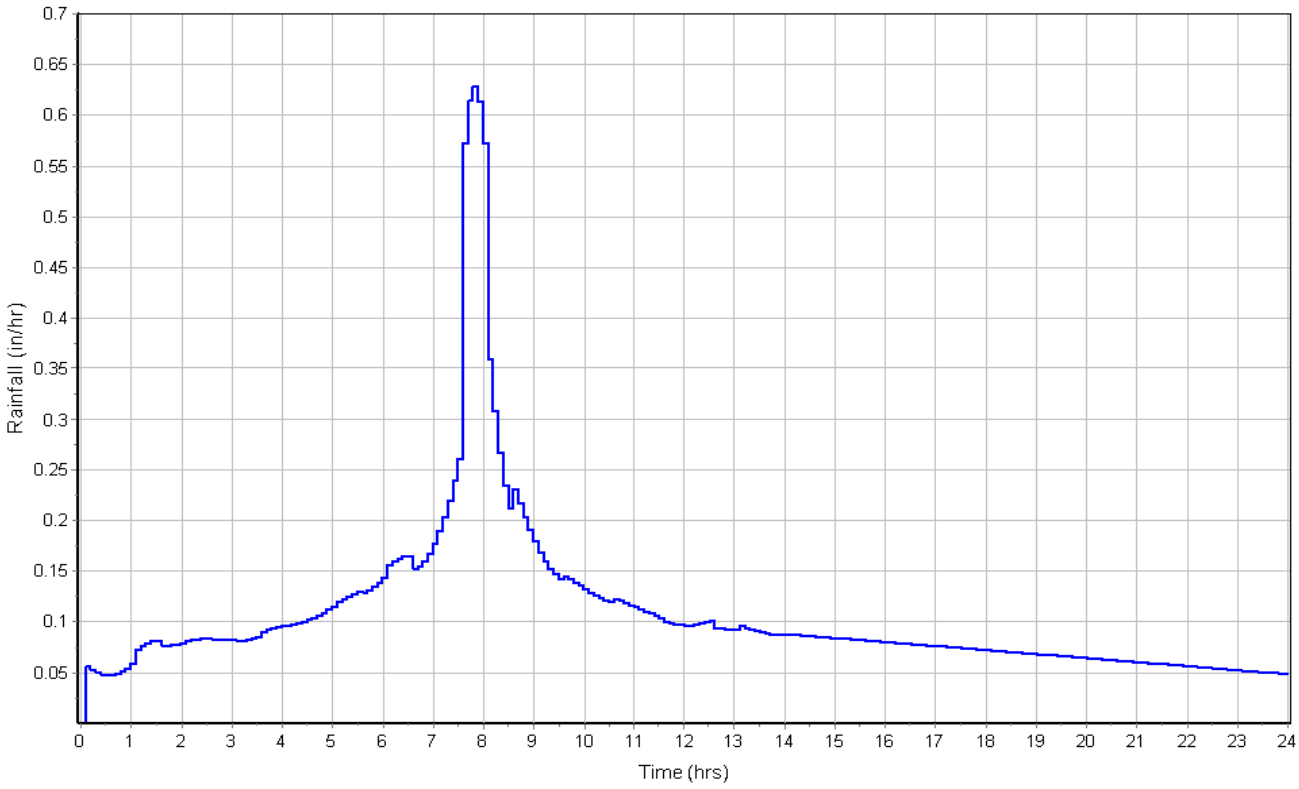
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

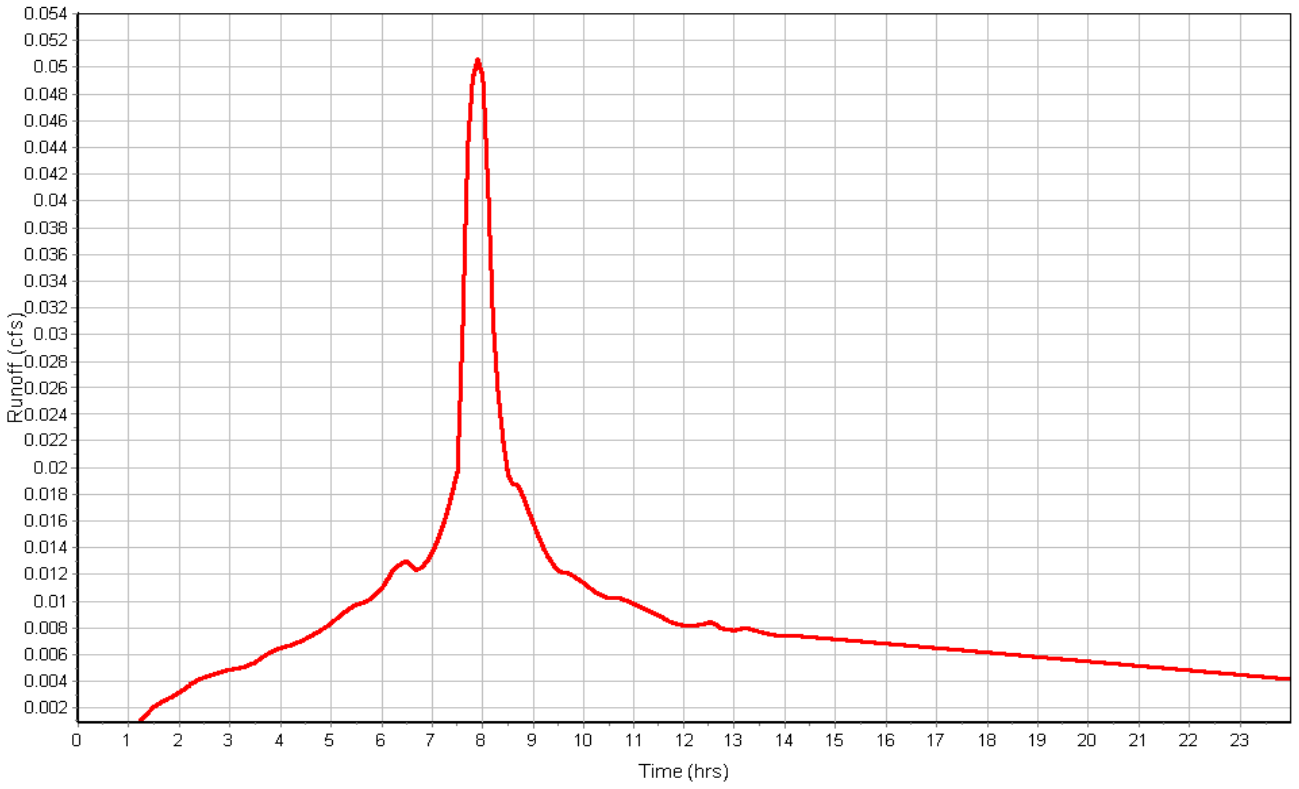
Total Rainfall (in)	2.59
Total Runoff (in)	2.36
Peak Runoff (cfs)	0.05
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : Sub-11

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-13

Input Data

Area (ac)	0.17
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	98.00
Rain Gage ID	Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.17		98

Time of Concentration

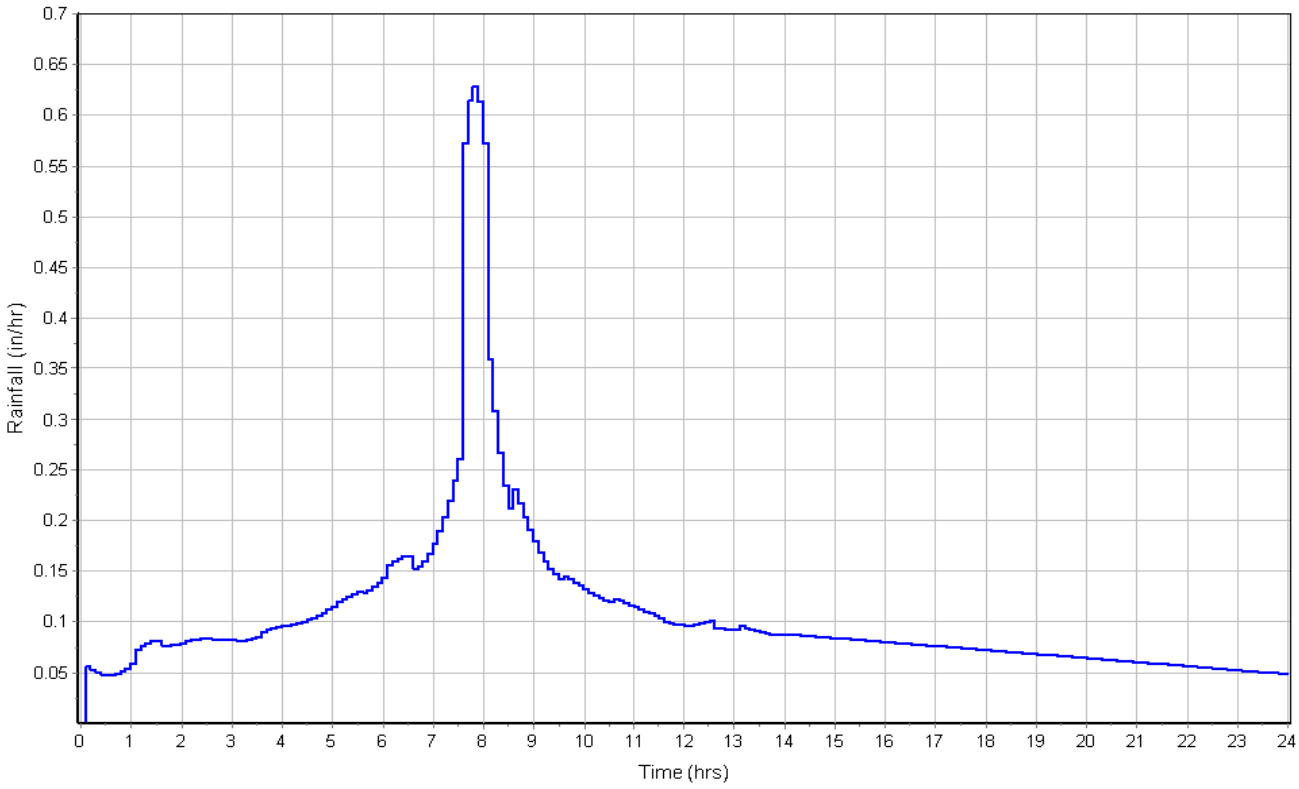
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

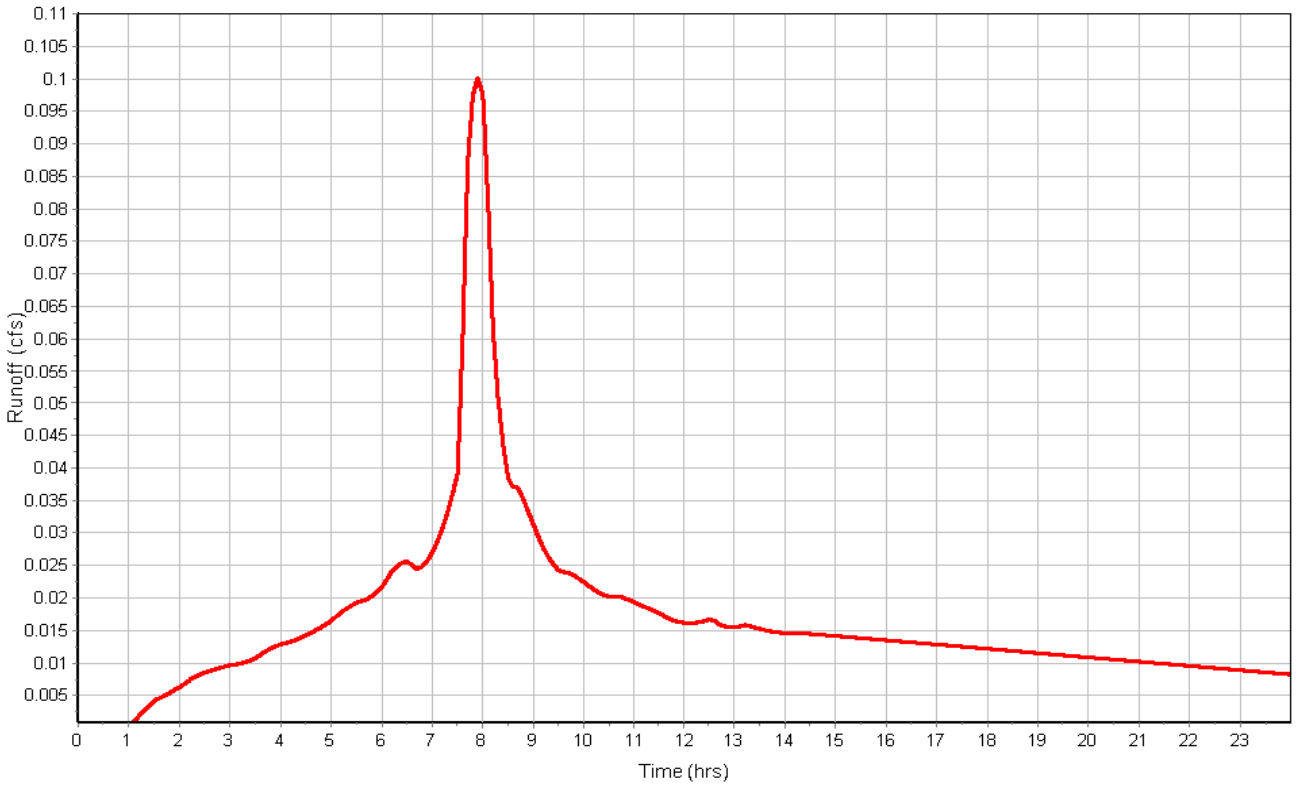
Total Rainfall (in)	2.59
Total Runoff (in)	2.36
Peak Runoff (cfs)	0.10
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : Sub-13

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-14

Input Data

Area (ac)	0.12
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	98.00
Rain Gage ID	Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		98

Time of Concentration

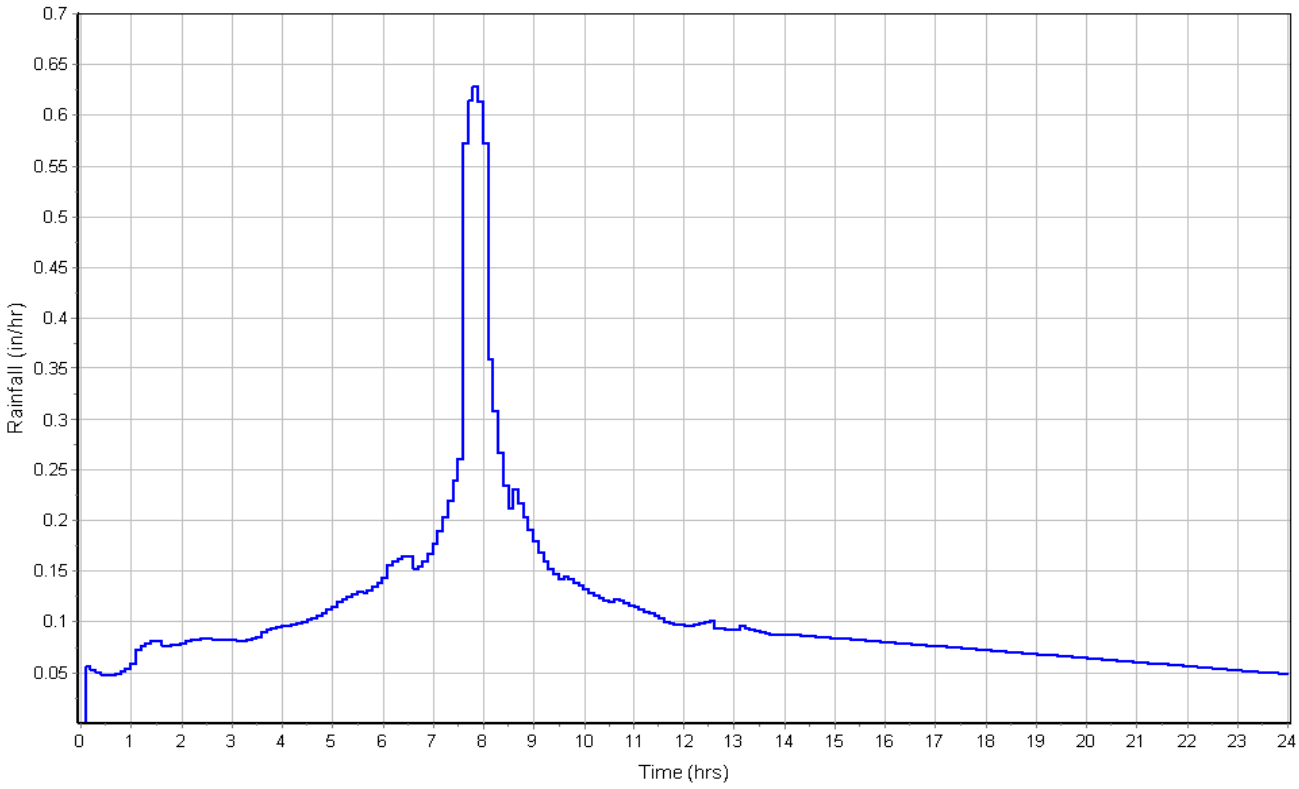
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

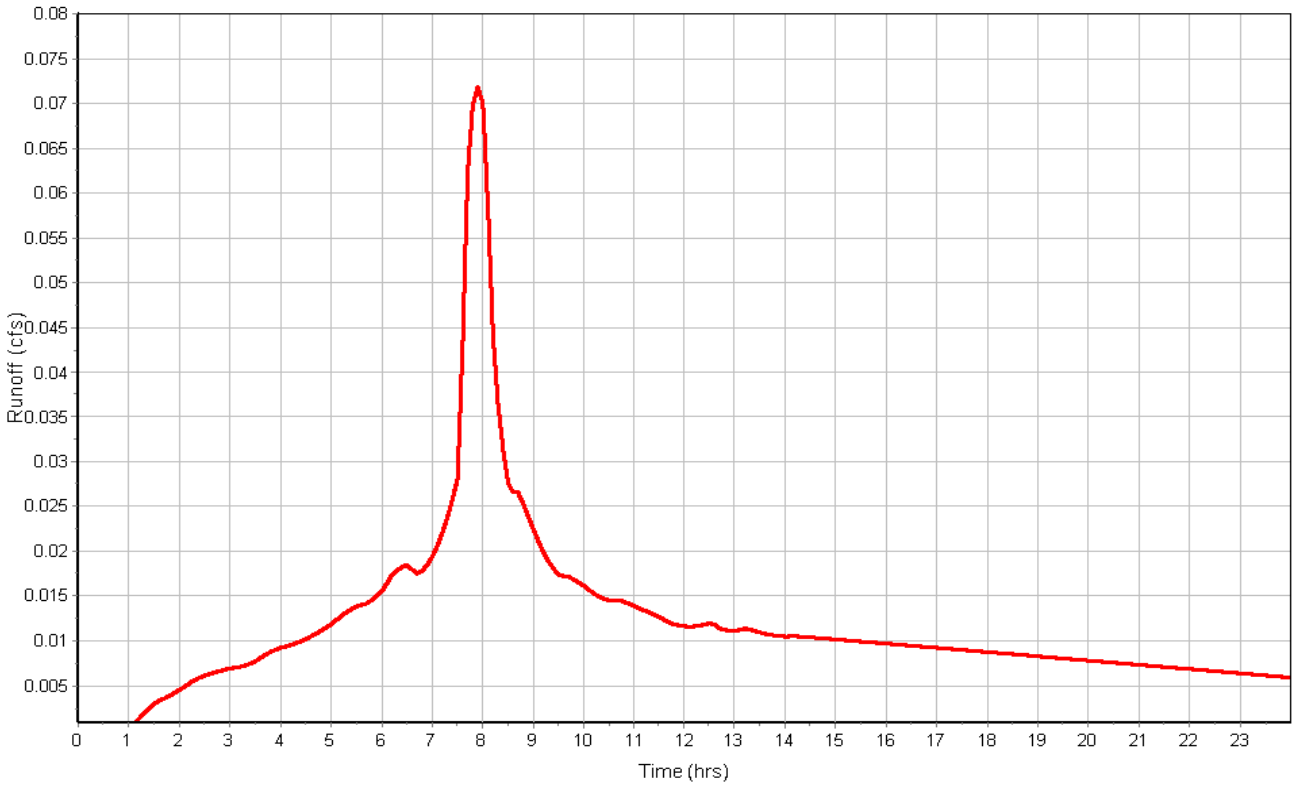
Total Rainfall (in)	2.59
Total Runoff (in)	2.36
Peak Runoff (cfs)	0.07
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : Sub-14

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-15

Input Data

Area (ac)	0.18
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	98.00
Rain Gage ID	Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.18		98

Time of Concentration

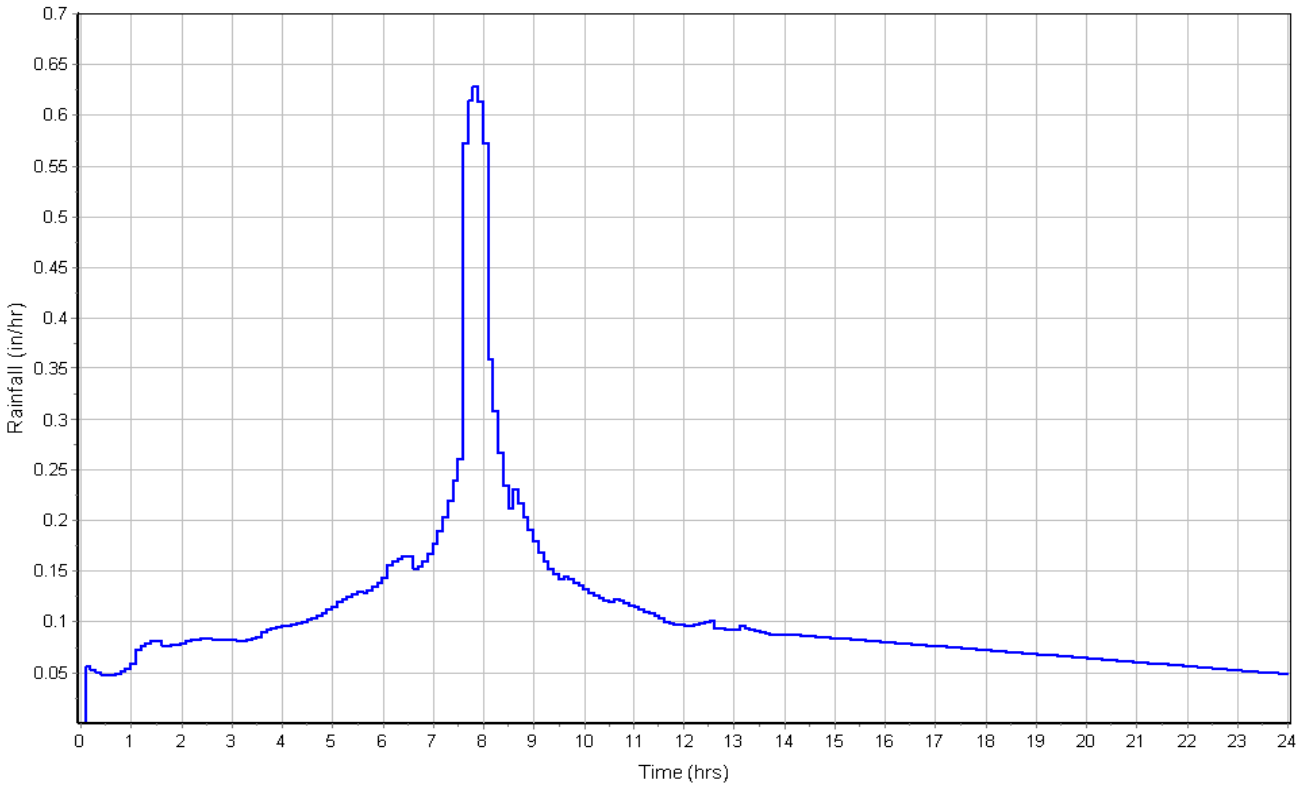
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

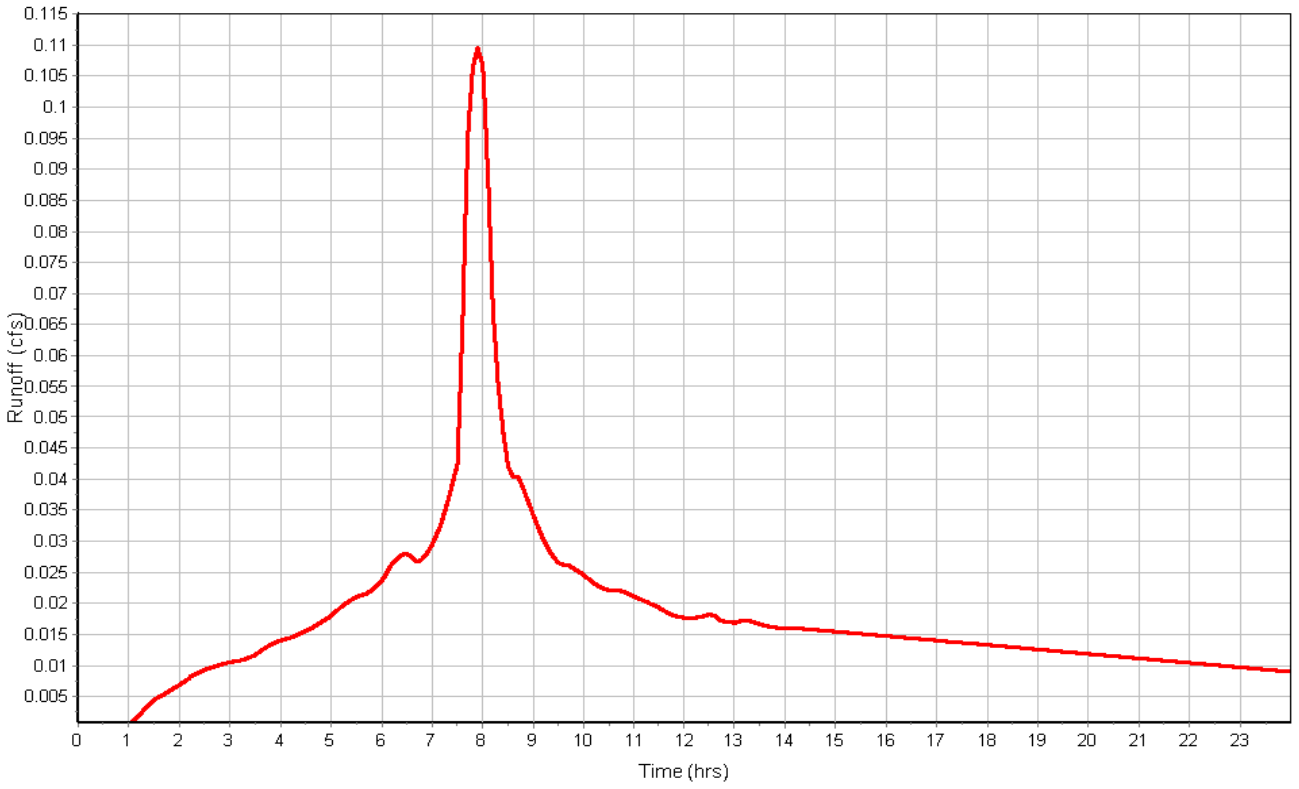
Total Rainfall (in)	2.59
Total Runoff (in)	2.36
Peak Runoff (cfs)	0.11
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : Sub-15

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-16

Input Data

Area (ac)	0.12
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	98.00
Rain Gage ID	Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		98

Time of Concentration

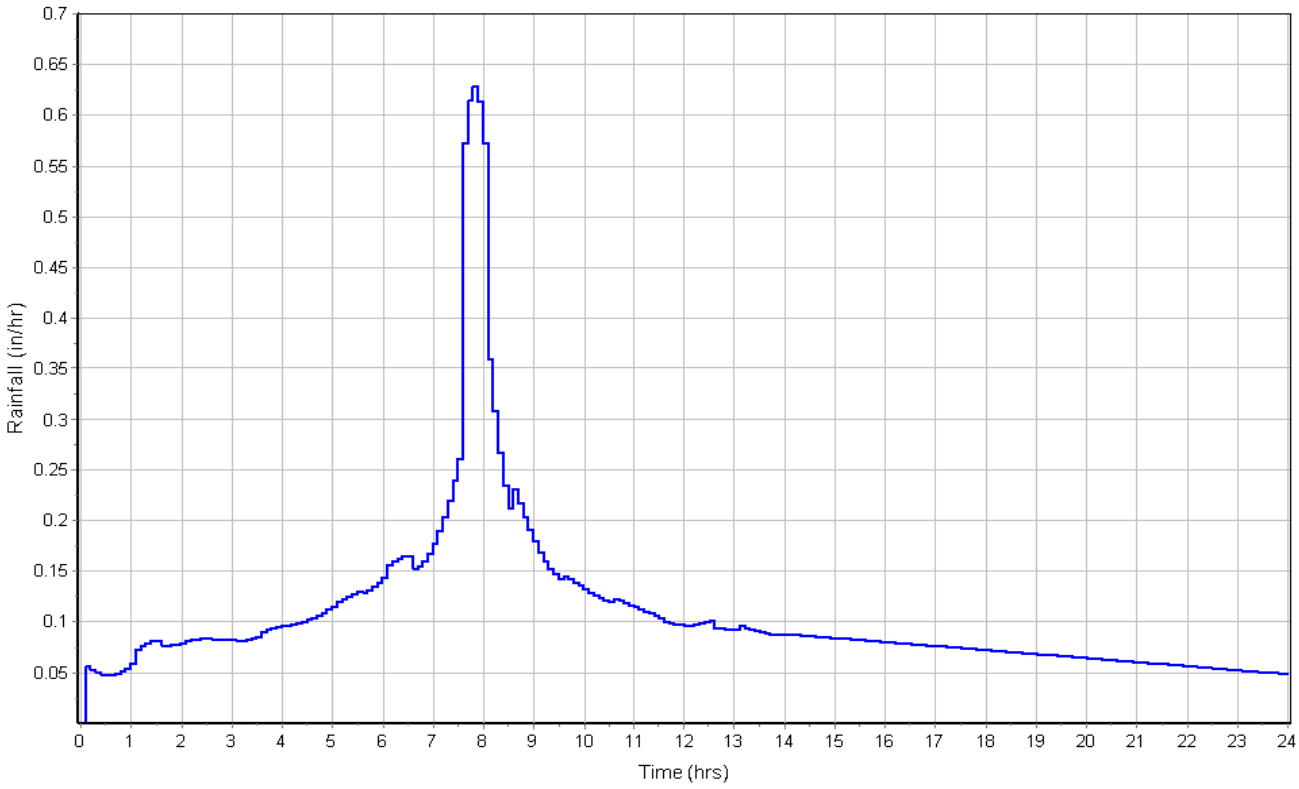
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

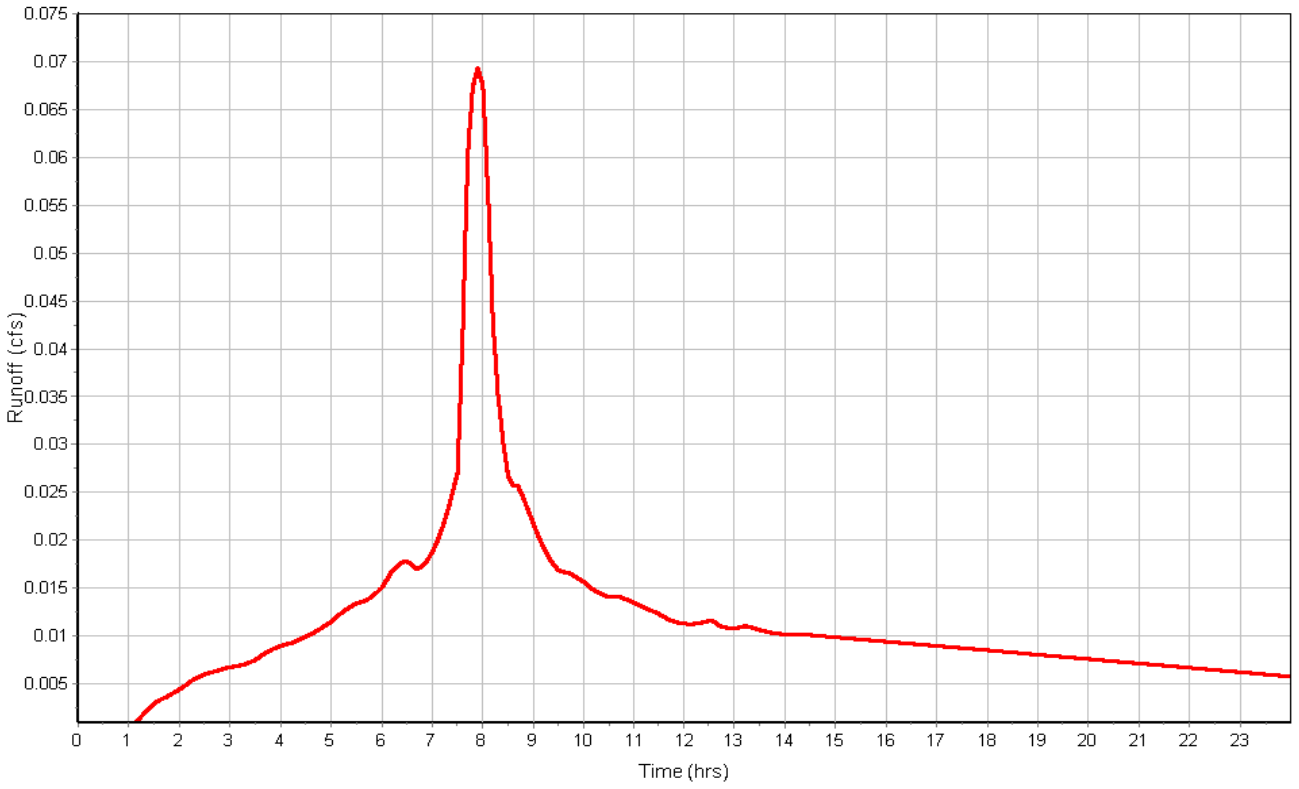
Total Rainfall (in)	2.59
Total Runoff (in)	2.36
Peak Runoff (cfs)	0.07
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : Sub-16

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-17

Input Data

Area (ac)	0.14
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	98.00
Rain Gage ID	Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.14		98

Time of Concentration

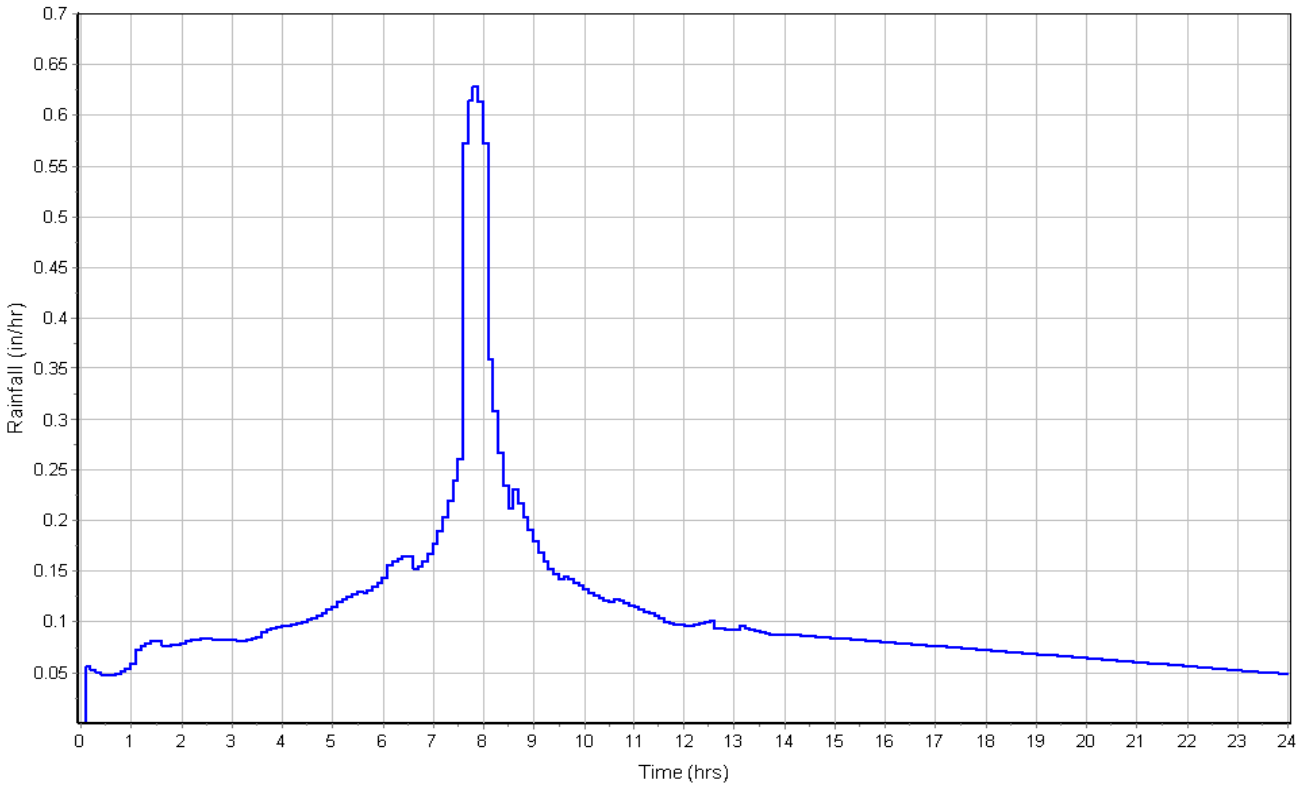
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

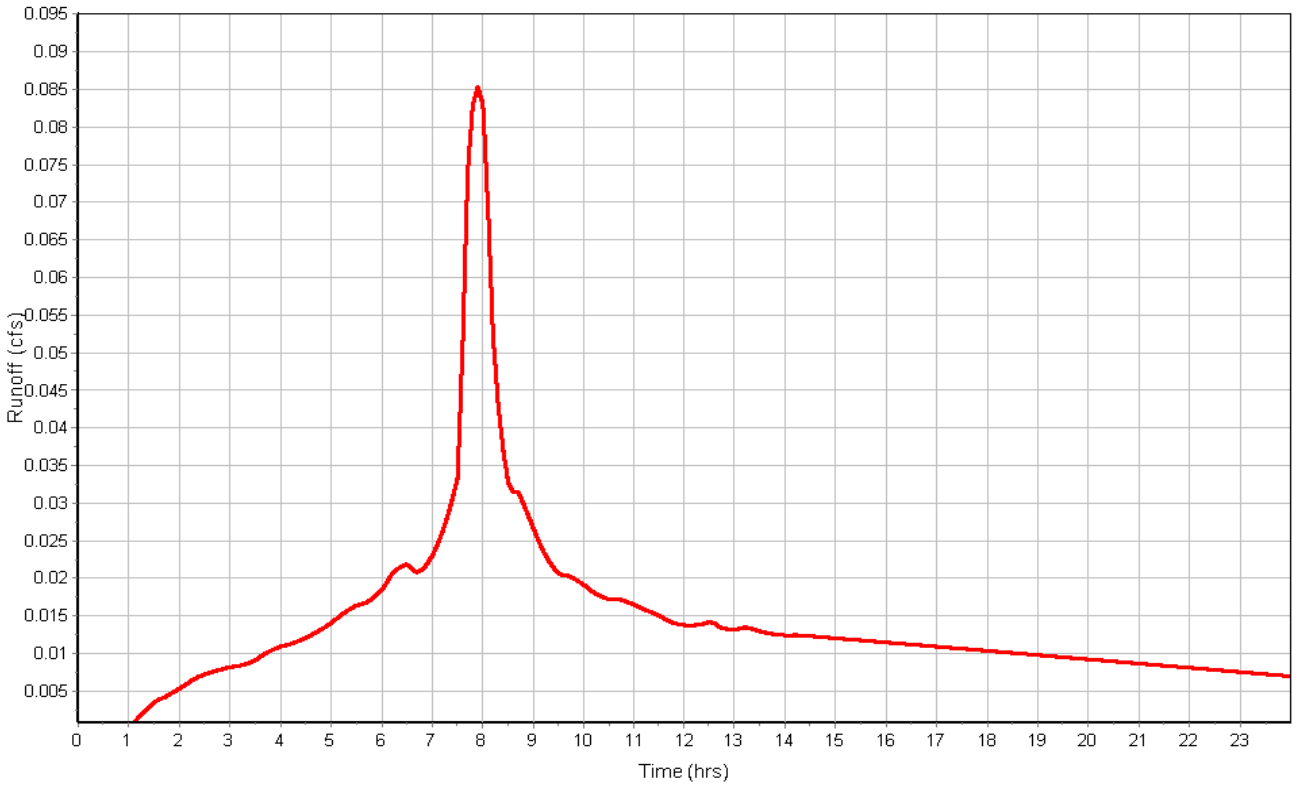
Total Rainfall (in)	2.59
Total Runoff (in)	2.36
Peak Runoff (cfs)	0.09
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : Sub-17

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-18

Input Data

Area (ac)	0.18
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	98.00
Rain Gage ID	Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.18		98

Time of Concentration

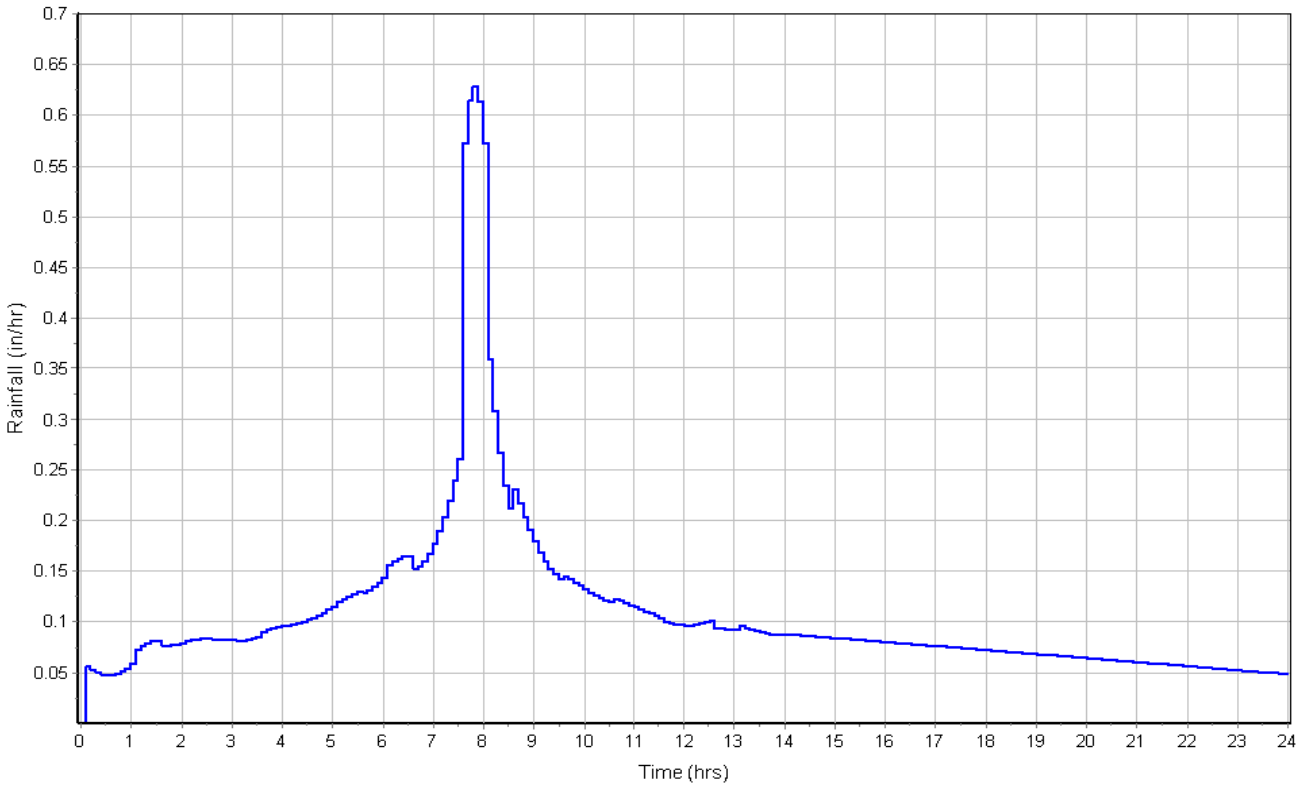
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

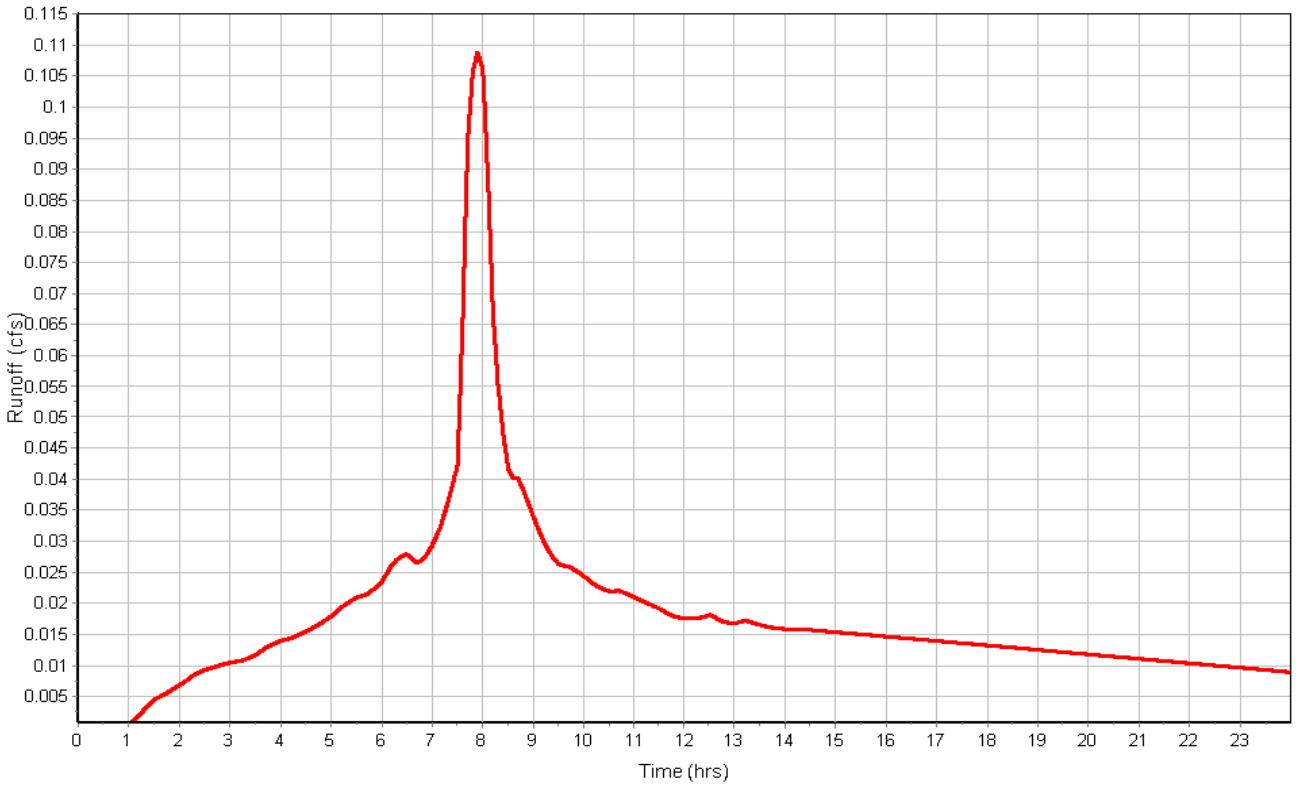
Total Rainfall (in)	2.59
Total Runoff (in)	2.36
Peak Runoff (cfs)	0.11
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : Sub-18

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-19

Input Data

Area (ac)	0.12
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	98.00
Rain Gage ID	Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		98

Time of Concentration

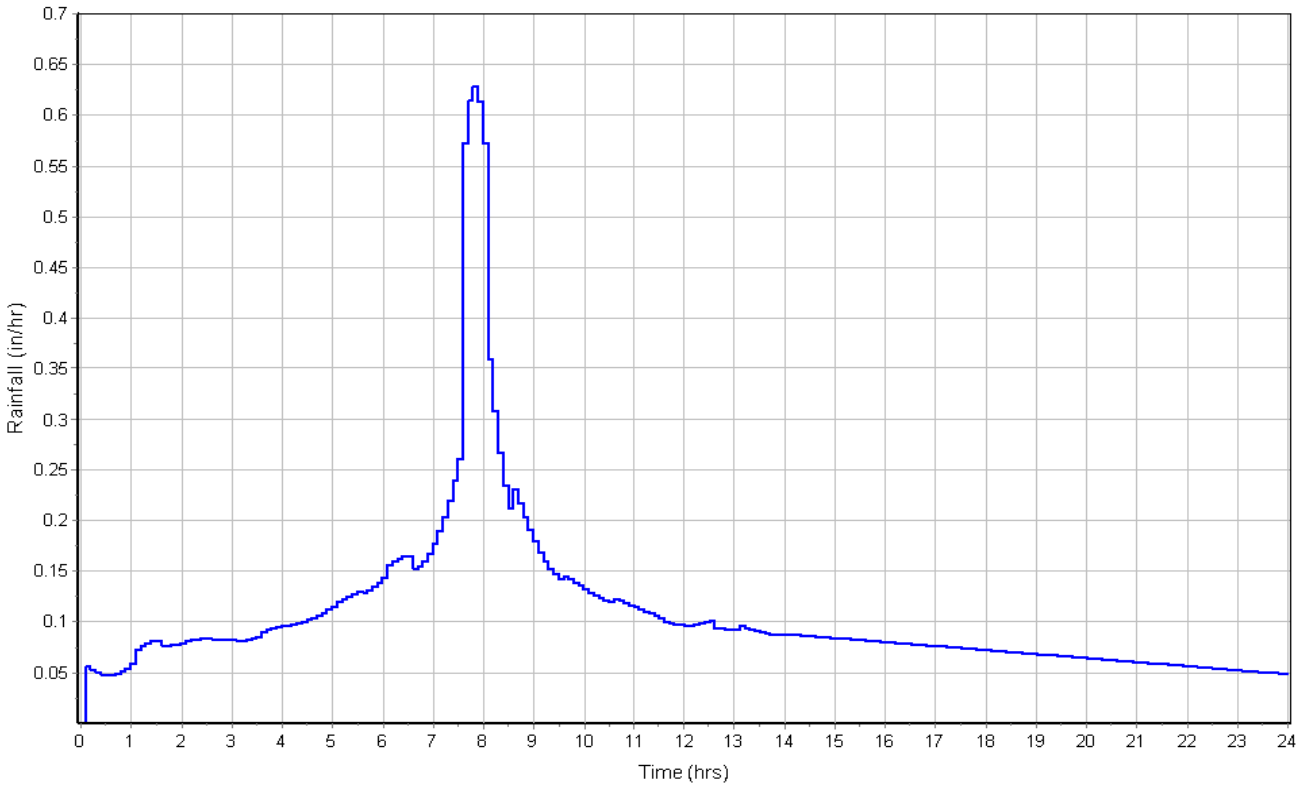
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

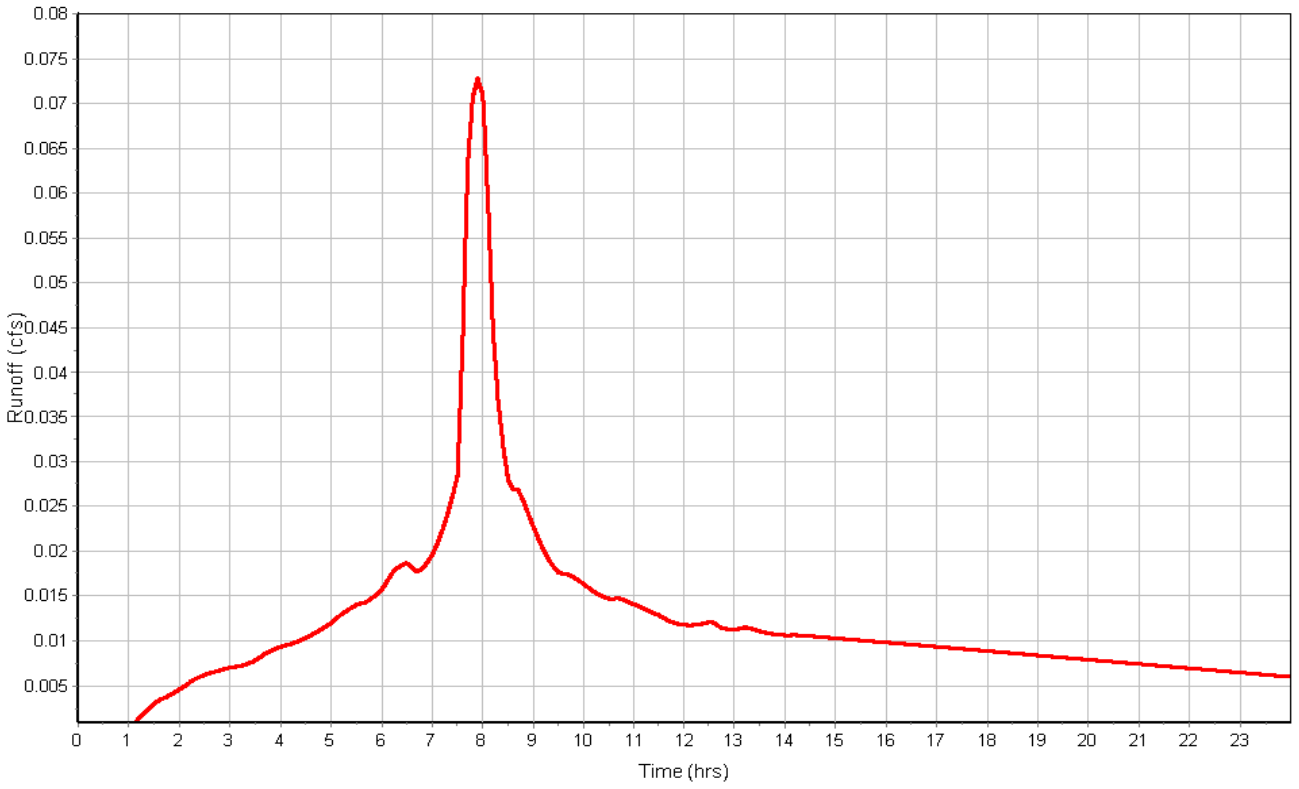
Total Rainfall (in)	2.59
Total Runoff (in)	2.36
Peak Runoff (cfs)	0.07
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : Sub-19

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-20

Input Data

Area (ac)	0.09
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	98.00
Rain Gage ID	Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.09		98

Time of Concentration

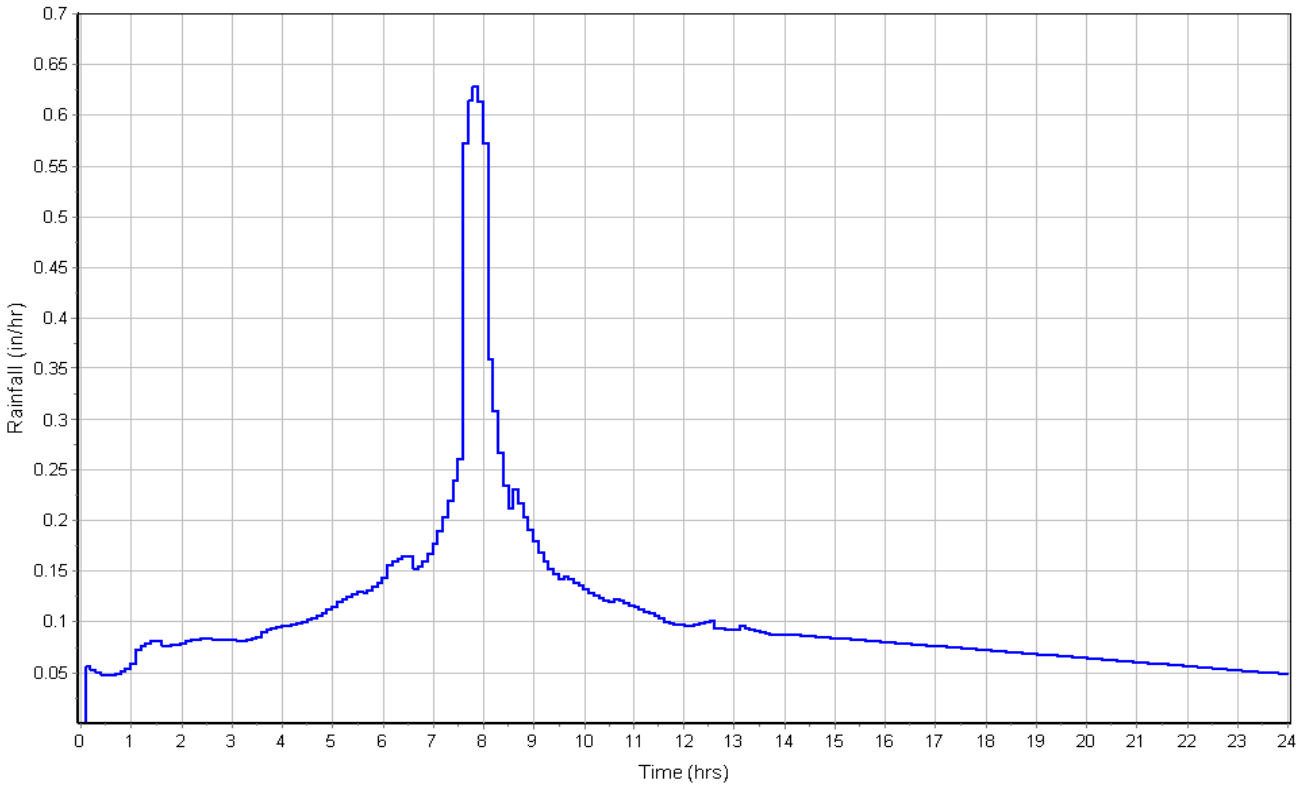
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

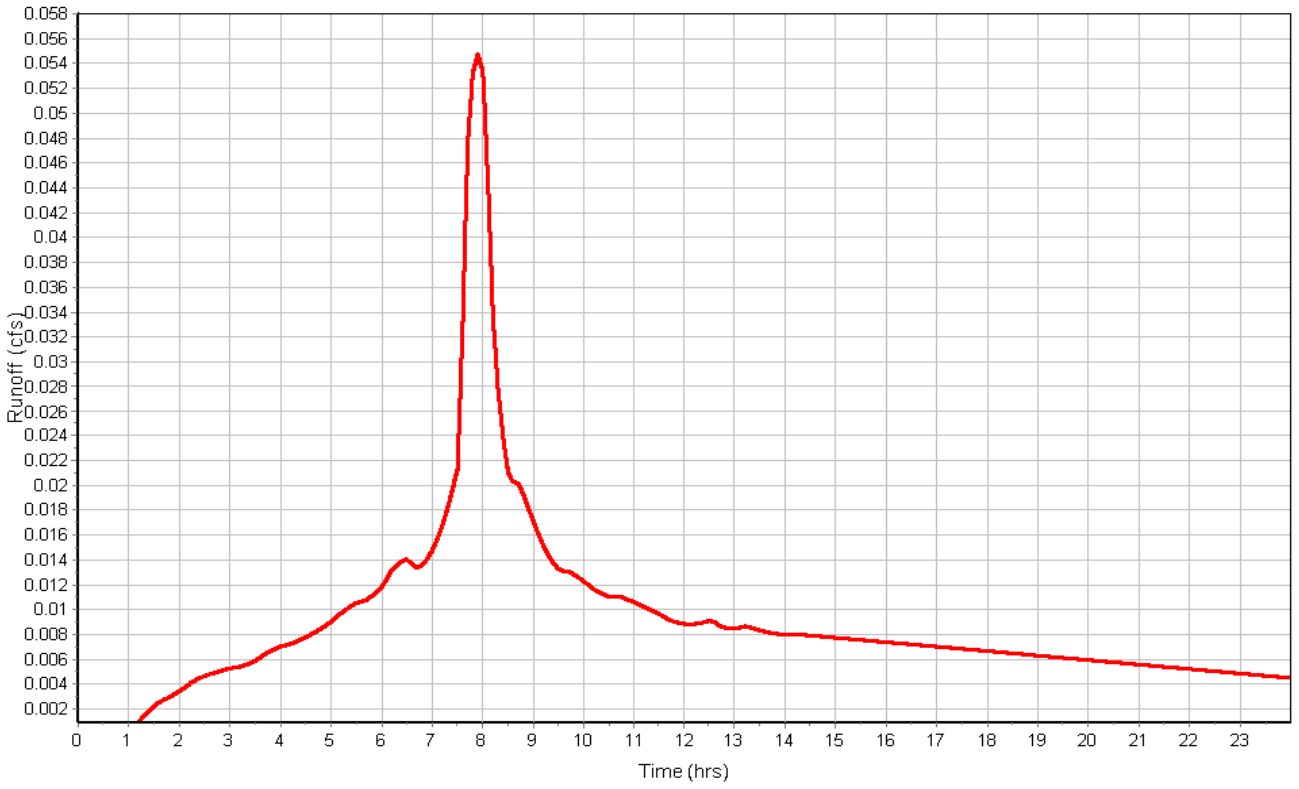
Total Rainfall (in)	2.59
Total Runoff (in)	2.36
Peak Runoff (cfs)	0.06
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : Sub-20

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft²)	Minimum Pipe Cover (in)
1	CB 01	67.87	71.87	4.00	67.87	0.00	71.87	0.00	0.00	0.00
2	CB 02	68.12	71.50	3.39	68.12	0.00	71.50	0.00	0.00	0.00
3	CB 03	68.25	71.06	2.81	68.25	0.00	71.06	0.00	0.00	0.00
4	CB 04	89.77	93.96	4.19	89.77	0.00	93.96	0.00	0.00	0.00
5	CB 05	70.79	72.43	1.64	70.79	0.00	72.43	0.00	0.00	0.00
6	CB 06	72.08	76.08	4.00	72.08	0.00	76.08	0.00	0.00	0.00
7	CB 07	76.47	80.47	4.00	76.47	0.00	80.47	0.00	0.00	0.00
8	CB 08	76.06	79.18	3.12	76.06	0.00	79.18	0.00	0.00	0.00
9	CB 10	87.31	91.26	3.95	87.31	0.00	91.26	0.00	0.00	0.00
10	CB 11	94.24	99.14	4.90	94.24	0.00	99.14	0.00	0.00	0.00
11	CB 12	92.38	97.63	5.25	92.38	0.00	97.63	0.00	0.00	0.00
12	CB 13	94.00	98.70	4.70	94.00	0.00	98.70	0.00	0.00	0.00
13	CB 14	96.88	98.37	1.49	96.88	0.00	98.37	0.00	0.00	0.00
14	CB 15	95.26	99.26	4.00	95.26	0.00	99.26	0.00	0.00	0.00
15	CB 16	96.94	101.77	4.83	96.94	0.00	101.77	0.00	0.00	0.00
16	CB 17	97.08	100.72	3.64	97.08	0.00	100.72	0.00	0.00	0.00
17	CB 18	98.22	102.50	4.28	98.22	0.00	102.50	0.00	0.00	0.00
18	CB 19	98.83	102.84	4.01	98.83	0.00	102.84	0.00	0.00	0.00
19	CB 20	100.30	104.30	4.00	100.30	0.00	104.30	0.00	0.00	0.00
20	CB 21	100.07	105.12	5.05	100.07	0.00	105.12	0.00	0.00	0.00
21	CB 22	100.26	104.40	4.14	100.26	0.00	104.40	0.00	0.00	0.00
22	CB 23	102.65	104.22	1.57	102.65	0.00	104.22	0.00	0.00	0.00
23	CB 24	68.43	73.97	5.54	68.43	0.00	73.97	0.00	0.00	0.00
24	CB 25	91.67	97.13	5.46	91.67	0.00	97.13	0.00	0.00	0.00
25	CB 26	66.60	71.56	4.96	66.60	0.00	71.56	0.00	0.00	0.00
26	CB 27	85.86	89.40	3.54	85.86	0.00	89.40	0.00	0.00	0.00
27	CB 28	89.96	95.36	5.40	89.96	0.00	95.36	0.00	0.00	0.00
28	CB 29	95.12	100.87	5.75	95.12	0.00	100.87	0.00	0.00	0.00
29	EX CB 103	82.75	87.38	4.63	82.75	0.00	87.38	0.00	0.00	0.00
30	EX CB 115	99.63	102.71	3.08	99.63	0.00	102.71	0.00	0.00	0.00
31	EXCB108	102.62	103.87	1.25	102.62	0.00	103.87	0.00	0.00	0.00
32	EXCB110	100.05	101.19	1.14	100.05	0.00	101.19	0.00	0.00	0.00
33	POND	67.75	71.80	4.05	67.75	0.00	71.80	0.00	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	CB 01	0.44	0.00	68.19	0.32	0.00	3.68	68.03	0.16	0 07:54	0 00:00	0.00	0.00
2	CB 02	0.08	0.00	68.30	0.18	0.00	3.20	68.20	0.08	0 07:55	0 00:00	0.00	0.00
3	CB 03	0.08	0.08	68.43	0.18	0.00	2.62	68.33	0.08	0 07:54	0 00:00	0.00	0.00
4	CB 04	0.64	0.00	90.15	0.38	0.00	3.82	89.97	0.20	0 07:57	0 00:00	0.00	0.00
5	CB 05	0.12	0.12	70.97	0.18	0.00	1.45	70.90	0.11	0 07:54	0 00:00	0.00	0.00
6	CB 06	0.24	0.00	72.31	0.23	0.00	3.77	72.17	0.09	0 08:05	0 00:00	0.00	0.00
7	CB 07	0.24	0.00	76.69	0.22	0.00	3.77	76.55	0.08	0 08:05	0 00:00	0.00	0.00
8	CB 08	0.10	0.10	76.70	0.64	0.00	2.47	76.54	0.48	0 07:54	0 00:00	0.00	0.00
9	CB 10	0.81	0.17	87.79	0.48	0.00	3.47	87.54	0.23	0 08:02	0 00:00	0.00	0.00
10	CB 11	0.44	0.00	94.56	0.32	0.00	4.58	94.42	0.18	0 07:56	0 00:00	0.00	0.00
11	CB 12	0.59	0.10	92.75	0.37	0.00	4.88	92.58	0.20	0 07:57	0 00:00	0.00	0.00
12	CB 13	0.49	0.00	94.33	0.33	0.00	4.36	94.19	0.19	0 07:56	0 00:00	0.00	0.00
13	CB 14	0.05	0.05	97.04	0.16	0.00	1.33	96.95	0.07	0 07:54	0 00:00	0.00	0.00
14	CB 15	0.07	0.07	95.44	0.18	0.00	3.82	95.35	0.09	0 07:55	0 00:00	0.00	0.00
15	CB 16	0.39	0.00	97.23	0.29	0.00	4.54	97.11	0.17	0 07:55	0 00:00	0.00	0.00
16	CB 17	0.11	0.11	97.25	0.17	0.00	3.47	97.18	0.10	0 07:55	0 00:00	0.00	0.00
17	CB 18	0.28	0.07	98.47	0.25	0.00	4.03	98.36	0.14	0 07:56	0 00:00	0.00	0.00
18	CB 19	0.19	0.09	99.08	0.25	0.00	3.76	98.96	0.13	0 07:46	0 00:00	0.00	0.00
19	CB 20	0.11	0.11	100.51	0.21	0.00	3.79	100.39	0.09	0 07:55	0 00:00	0.00	0.00
20	CB 21	0.13	0.00	100.30	0.23	0.00	4.82	100.18	0.11	0 07:55	0 00:00	0.00	0.00
21	CB 22	0.13	0.07	100.49	0.24	0.00	3.91	100.36	0.11	0 07:54	0 00:00	0.00	0.00
22	CB 23	0.05	0.05	102.81	0.16	0.00	1.41	102.72	0.07	0 07:54	0 00:00	0.00	0.00
23	CB 24	0.37	0.00	68.71	0.28	0.00	5.25	68.57	0.14	0 07:54	0 00:00	0.00	0.00
24	CB 25	0.64	0.05	92.05	0.38	0.00	5.08	91.88	0.21	0 07:57	0 00:00	0.00	0.00
25	CB 26	0.44	0.00	66.91	0.31	0.00	4.64	66.76	0.16	0 07:57	0 00:00	0.00	0.00
26	CB 27	0.86	0.00	86.11	0.25	0.00	3.29	85.97	0.11	0 07:57	0 00:00	0.00	0.00
27	CB 28	0.64	0.00	90.34	0.38	0.00	5.02	90.17	0.21	0 07:57	0 00:00	0.00	0.00
28	CB 29	0.44	0.00	95.44	0.32	0.00	5.44	95.30	0.18	0 07:55	0 00:00	0.00	0.00
29	EX CB 103	0.84	0.04	83.11	0.36	0.00	4.27	82.91	0.16	0 08:05	0 00:00	0.00	0.00
30	EX CB 115	0.00	0.00	99.63	0.00	0.00	3.08	99.63	0.00	0 00:00	0 00:00	0.00	0.00
31	EXCB108	0.06	0.00	102.77	0.15	0.00	1.10	102.69	0.07	0 07:54	0 00:00	0.00	0.00
32	EXCB110	0.13	0.00	100.28	0.23	0.00	0.91	100.15	0.10	0 07:55	0 00:00	0.00	0.00
33	POND	0.44	0.00	68.06	0.31	0.00	3.74	67.90	0.15	0 07:55	0 00:00	0.00	0.00

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1	Link-01	60.73	85.86	0.00	83.01	0.26	2.85	4.6900	CIRCULAR	12.000	12.000	0.0150	0.5000	0.5000	0.0000	0.00	No
2	Link-02	156.96	83.01	0.26	76.47	0.00	6.54	4.1700	CIRCULAR	12.000	12.000	0.0150	0.5000	0.5000	0.0000	0.00	No
3	Pipe - (10)	123.35	100.30	0.00	98.83	0.00	1.47	1.1900	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
4	Pipe - (10) (1)	121.02	98.83	0.00	98.22	0.00	0.61	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
5	Pipe - (11)	150.01	98.22	0.00	97.47	0.53	0.75	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
6	Pipe - (115)	44.23	82.75	0.00	77.79	0.00	4.96	11.2100	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
7	Pipe - (121)	35.03	100.05	0.00	99.76	0.00	0.29	0.8300	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
8	Pipe - (123)	47.18	102.62	0.00	102.49	2.24	0.13	0.2800	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
9	Pipe - (126)	261.91	66.60	0.00	65.29	0.00	1.31	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
10	Pipe - (146) (1)	51.83	87.31	0.00	85.86	0.00	1.45	2.8000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
11	Pipe - (146) (2)	14.61	89.96	0.00	89.77	0.00	0.19	1.3000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
12	Pipe - (148)	149.70	94.00	0.00	92.38	0.00	1.62	1.0800	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
13	Pipe - (151)	5.18	100.07	0.00	100.05	0.00	0.02	0.3900	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
14	Pipe - (152)	5.48	102.65	0.00	102.62	0.00	0.03	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
15	Pipe - (153)	37.26	100.26	0.00	100.07	0.00	0.19	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
16	Pipe - (156)	27.76	95.26	0.00	95.12	0.00	0.14	0.5100	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
17	Pipe - (158)	28.34	97.08	0.00	96.94	0.00	0.14	0.4900	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
18	Pipe - (161)	109.92	95.12	0.00	94.24	0.00	0.88	0.8000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
19	Pipe - (162)	43.64	94.24	0.00	94.00	0.00	0.24	0.5500	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
20	Pipe - (166)	24.40	67.87	0.00	67.75	0.00	0.12	0.4900	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
21	Pipe - (168)	26.16	68.25	0.00	68.12	0.00	0.13	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
22	Pipe - (169)	26.04	96.88	0.00	96.75	2.75	0.13	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
23	Pipe - (170)	76.95	67.75	0.00	66.62	0.02	1.14	1.4700	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
24	Pipe - (172)	70.09	89.77	0.00	87.31	0.00	2.46	3.5100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
25	Pipe - (19)	71.53	92.38	0.00	91.67	0.00	0.71	0.9900	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
26	Pipe - (19) (3)	71.88	91.67	0.00	89.96	0.00	1.71	2.3800	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
27	Pipe - (22)	26.16	76.06	0.00	75.93	-0.54	0.13	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
28	Pipe - (23)	106.37	76.47	0.00	72.08	0.00	4.39	4.1300	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
29	Pipe - (23) (1) (1)	95.70	72.08	0.00	69.47	1.04	2.61	2.7300	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
30	Pipe - (24)	84.19	68.43	0.00	67.87	0.00	0.56	0.6700	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
31	Pipe - (24) (2)	49.16	68.12	0.00	67.87	0.00	0.25	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
32	Pipe - (26)	28.34	70.79	0.00	70.65	2.22	0.14	0.4900	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
33	Pipe - (32)	150.19	96.94	0.00	96.19	1.07	0.75	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No

No. of Barrels
1
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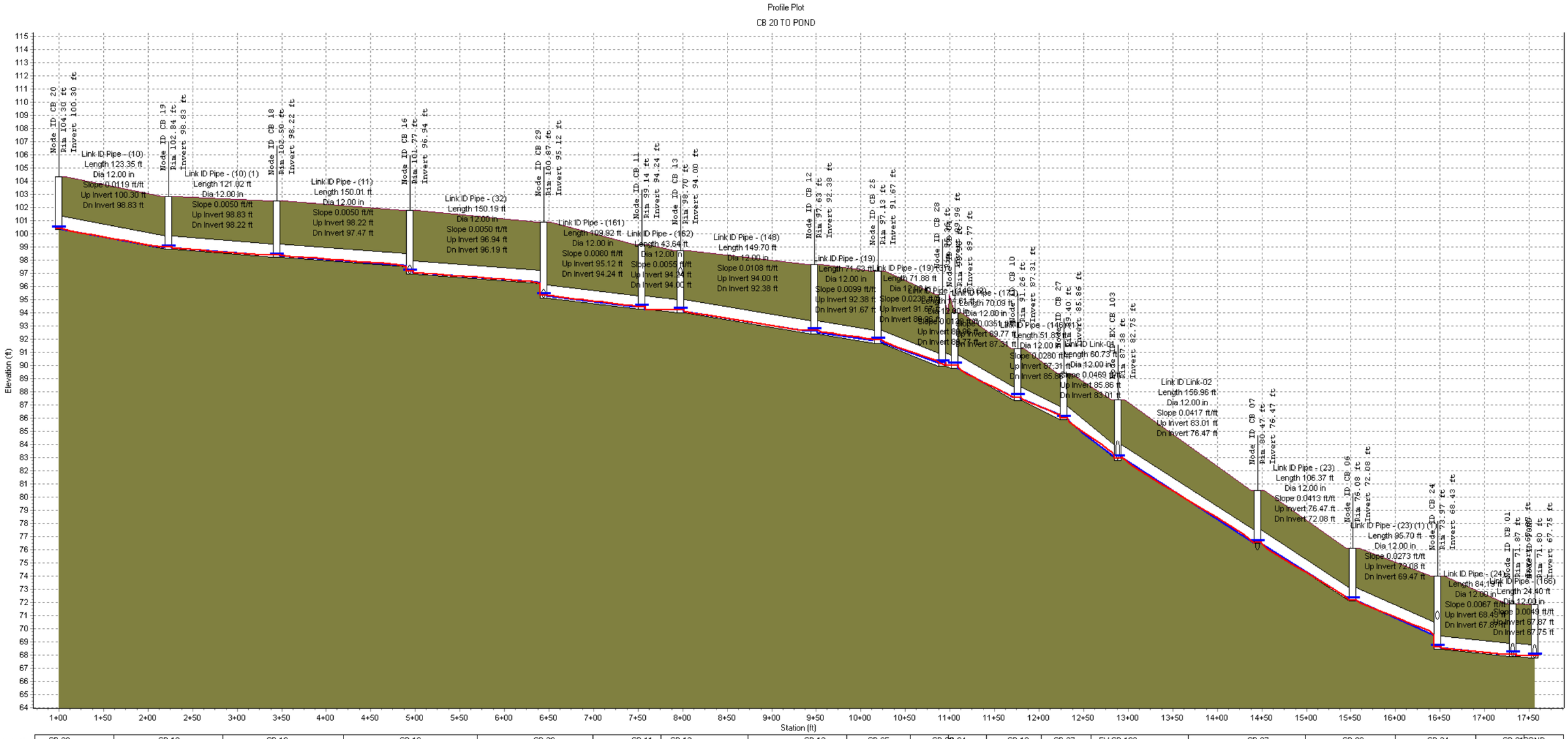
Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Link-01	0.81	0 07:57	6.69	0.12	5.54	0.18	0.24	0.24	0.00		Calculated
2	Link-02	0.14	0 08:05	6.30	0.02	1.69	1.55	0.16	0.16	0.00		Calculated
3	Pipe - (10)	0.11	0 07:55	4.21	0.03	0.80	2.57	0.23	0.23	0.00		Calculated
4	Pipe - (10) (1)	0.21	0 07:52	2.74	0.08	1.42	1.42	0.25	0.25	0.00		Calculated
5	Pipe - (11)	0.28	0 07:56	2.73	0.10	2.01	1.24	0.23	0.23	0.00		Calculated
6	Pipe - (115)	0.86	0 07:58	38.11	0.02	4.16	0.18	0.26	0.17	0.00		Calculated
7	Pipe - (121)	0.13	0 07:55	3.51	0.04	1.32	0.44	0.18	0.18	0.00		Calculated
8	Pipe - (123)	0.05	0 07:54	2.03	0.03	1.00	0.79	0.12	0.12	0.00		Calculated
9	Pipe - (126)	0.44	0 07:57	2.73	0.16	2.29	1.91	0.29	0.29	0.00		Calculated
10	Pipe - (146) (1)	0.86	0 07:58	6.46	0.13	3.57	0.24	0.36	0.36	0.00		Calculated
11	Pipe - (146) (2)	0.64	0 07:57	4.40	0.15	2.33	0.10	0.38	0.38	0.00		Calculated
12	Pipe - (148)	0.49	0 07:56	4.02	0.12	2.01	1.24	0.35	0.35	0.00		Calculated
13	Pipe - (151)	0.13	0 07:55	2.40	0.05	0.92	0.09	0.23	0.23	0.00		Calculated
14	Pipe - (152)	0.06	0 07:52	0.93	0.06	0.94	0.10	0.16	0.24	0.00		Calculated
15	Pipe - (153)	0.13	0 07:54	2.72	0.05	0.92	0.67	0.23	0.23	0.00		Calculated
16	Pipe - (156)	0.07	0 07:57	0.93	0.08	0.68	0.68	0.25	0.37	0.00		Calculated
17	Pipe - (158)	0.11	0 07:54	0.92	0.12	1.11	0.43	0.23	0.35	0.00		Calculated
18	Pipe - (161)	0.44	0 07:55	3.45	0.13	2.08	0.88	0.32	0.32	0.00		Calculated
19	Pipe - (162)	0.44	0 07:56	2.86	0.15	2.00	0.36	0.32	0.32	0.00		Calculated
20	Pipe - (166)	0.44	0 07:54	2.71	0.16	2.05	0.20	0.32	0.32	0.00		Calculated
21	Pipe - (168)	0.08	0 07:54	2.73	0.03	0.83	0.53	0.18	0.18	0.00		Calculated
22	Pipe - (169)	0.05	0 07:54	0.93	0.05	1.04	0.42	0.13	0.20	0.00		Calculated
23	Pipe - (170)	0.44	0 07:55	4.69	0.09	2.21	0.58	0.31	0.31	0.00		Calculated
24	Pipe - (172)	0.64	0 07:57	7.23	0.09	2.08	0.56	0.43	0.43	0.00		Calculated
25	Pipe - (19)	0.59	0 07:57	3.85	0.15	2.21	0.54	0.37	0.37	0.00		Calculated
26	Pipe - (19) (3)	0.64	0 07:57	5.95	0.11	2.32	0.52	0.38	0.38	0.00		Calculated
27	Pipe - (22)	0.10	0 07:54	1.64	0.06	0.42	1.04	0.43	0.65	0.00		Calculated
28	Pipe - (23)	0.24	0 08:05	7.84	0.03	1.81	0.98	0.23	0.23	0.00		Calculated
29	Pipe - (23) (1) (1)	0.25	0 08:05	6.37	0.04	2.54	0.63	0.18	0.18	0.00		Calculated
30	Pipe - (24)	0.36	0 07:54	3.15	0.12	1.85	0.76	0.30	0.30	0.00		Calculated
31	Pipe - (24) (2)	0.08	0 07:55	2.73	0.03	0.59	1.39	0.25	0.25	0.00		Calculated
32	Pipe - (26)	0.12	0 07:54	0.92	0.13	1.73	0.27	0.17	0.26	0.00		Calculated
33	Pipe - (32)	0.37	0 07:55	2.73	0.14	2.19	1.14	0.27	0.27	0.00		Calculated



Node ID:	CB 20	CB 19	CB 18	CB 16	CB 29	CB 11	CB 13	CB 12	CB 25	CB 28	CB 10	CB 27	EX CB 103	CB 07	CB 06	CB 24	CB 01	POND
Rim (ft):	104.30	102.84	102.50	101.77	100.87	99.14	98.70	97.63	97.13	95.96	91.26	89.40	87.38	80.47	76.08	73.97	71.87	71.80
Invert (ft):	100.30	98.83	98.22	96.94	95.12	94.24	94.00	92.38	91.67	89.77	87.31	85.86	82.75	76.47	72.08	68.43	67.87	67.75
Min Pipe Cover (ft):	3.00	3.01	3.28	3.30	3.68	3.90	1.28	4.25	4.46	4.43	2.95	2.54	3.13	3.00	3.00	2.65	3.00	3.05
Max HGL (ft):	100.51	99.08	98.47	97.23	95.44	94.56	94.33	92.75	92.05	90.50	87.79	86.11	83.11	76.69	72.31	68.71	68.19	68.06

Link ID:	Pipe - (10)	Pipe - (10) (1)	Pipe - (11)	Pipe - (32)	Pipe - (161)	Pipe - (162)	Pipe - (148)	Pipe - (19)	Pipe - (19) (1)	Pipe - (146) (2)	Pipe - (172)	Pipe - (146) (1)	Link-01	Link-02	Pipe - (23)	Pipe - (23) (1) (1)	Pipe - (24)	Pipe - (166)
Length (ft):	123.35	121.02	150.01	150.19	109.92	43.64	149.70	71.53	71.88	14.61	70.09	51.83	60.73	156.96	106.37	95.70	84.19	24.40
Dia (in):	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Slope (ft/ft):	0.0119	0.0050	0.0050	0.0050	0.0080	0.0055	0.0108	0.0099	0.0238	0.0130	0.0351	0.0280	0.0469	0.0417	0.0413	0.0273	0.0067	0.0049
Up Invert (ft):	100.30	98.83	98.22	96.94	95.12	94.24	94.00	92.38	91.67	89.96	89.77	87.31	85.86	83.01	76.47	72.08	68.43	67.87
Dn Invert (ft):	98.83	98.22	97.47	96.19	94.24	94.00	92.38	91.67	89.96	89.77	87.31	85.86	83.01	76.47	72.08	69.47	67.87	67.75
Max Q (cfs):	0.11	0.21	0.28	0.37	0.44	0.44	0.49	0.59	0.64	0.64	0.64	0.86	0.81	0.14	0.24	0.25	0.36	0.44
Max Vel (ft/s):	0.80	1.42	2.01	2.19	2.08	2.00	2.01	2.21	2.32	2.33	2.08	3.57	5.54	1.69	1.81	2.54	1.85	2.05
Max Depth (ft):	0.25	0.23	0.27	0.32	0.32	0.35	0.37	0.38	0.38	0.43	0.36	0.24	0.16	0.23	0.18	0.30	0.32	

APPENDIX 4

SOILS MAP & GEOTECHNICAL REPORT

Subbasin A

On Wed, Sep 13, 2023 at 9:27 AM David Hall <david.hall@scjalliance.com> wrote:

Thank you Sean! Just for clarity, are these long-term infiltration rates?

On Wed, Sep 13, 2023 at 9:02 AM Sean Schlitt <SSchlitt@hwageo.com> wrote:

Dan,
To follow up on this, it appears the western location near SR530 (BH-1) showed rates of approximately 0.3 in/hr. However, the Arlington manual states that the rates need to be at least 0.5 in/hr to consider; we could potentially request a deviation if needed. Furthermore, the borings were drilled in the dry summer months and the groundwater table was observed at a height of approximately 12.5 ft below ground surface. Therefore, there is a chance that the groundwater rebounds during the wet weather season and there is not suitable separation at this location. Until we can take the reading in January, we will be unable to definitively determine infiltration feasibility at this location.

On the other hand, the two borings completed to the east (BH-5 and BH-6) showed dry well conditions at the time of drilling and an approximate infiltration rate of 1 in/hr at a depth of 5 ft below ground surface. As a result, we anticipate infiltration to be feasible at these locations.

Subbasins B and C

Please let us know if you have any questions.

Sean Schlitt, P.E.
Geotechnical Engineer

Office: 425.774.0106 ext. 264
Cell: 425.478.3854

From: Sean Schlitt
Sent: Tuesday, September 12, 2023 11:12 AM
To: Dan Ireland <dan.ireland@scjalliance.com>; Donald Huling <dhuling@hwageo.com>
Cc: Melissa Greenheck <melissa.greenheck@scjalliance.com>; David Hall <david.hall@scjalliance.com>
Subject: RE: 211th Infiltration Rates

Dan,
We are running the infiltration rates now and will have something by the end of the week at the latest. Preliminarily, rates look usable for BH-5 and 6 but we may want to discuss further on rates at BH-1. I will chat with Donald and get something back to you as soon as I can.

Sean Schlitt, P.E.
Geotechnical Engineer

APPENDIX 5

FEMA FLOOD INSURANCE RATE MAP

National Flood Hazard Layer FIRMette

FEMA

122°8'45"W 48°11'28"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

122°8'7"W 48°11'4"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) Zone, Zone A, 99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than Zone
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee. See Notes. Zone X
- Area with Flood Risk due to Levee Zone

OTHER AREAS

- No Screen Area of Minimal Flood Hazard Zone X
- Effective LOMRs

OTHER AREAS

- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline

OTHER FEATURES

- Profile Baseline
- Hydrographic Feature

MAP PANELS

- Digital Data Available
- No Digital Data Available
- Unmapped

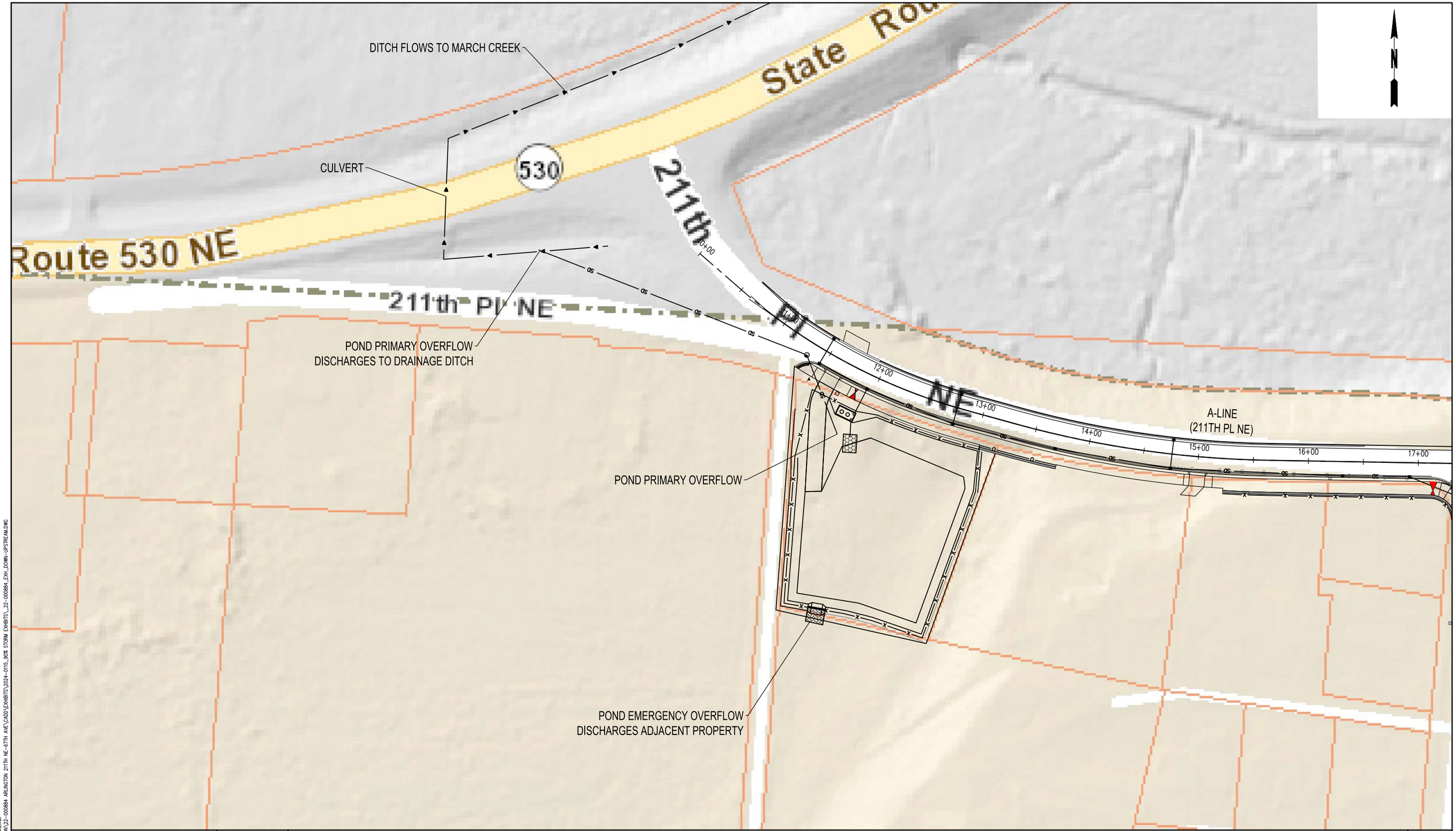
N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not described as preliminary or unofficial. The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/4/2023 at 6:21:26 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX 6
DOWNSTREAM MAP



SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

HORIZONTAL SCALE:	NONE
DATE:	JANUARY 2024
JOB No.:	22-000884
DRAWING FILE No.:	

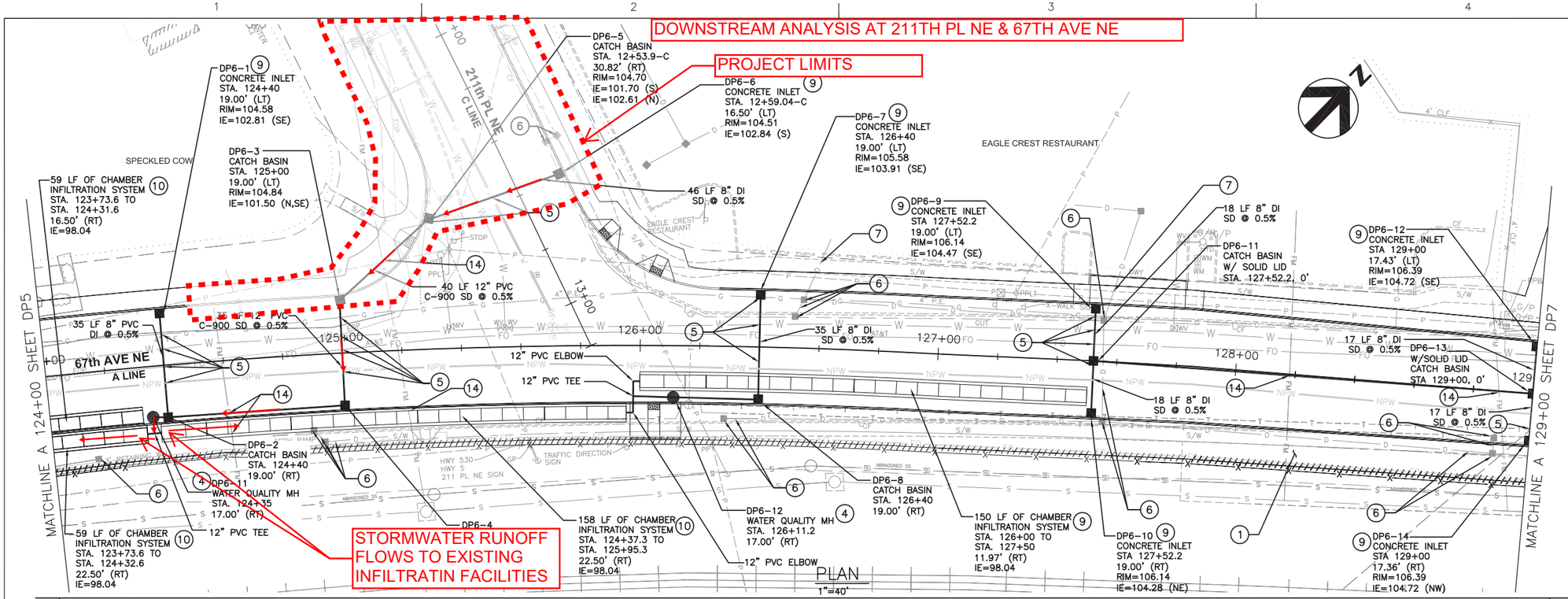
DOWNSTREAM ANALYSIS 211TH PL NE & STATE RT 530
211TH PLACE CORRIDOR IMPROVEMENT PROJECT

EXHIBIT No: EX-01
SHEET No: 1 OF 1

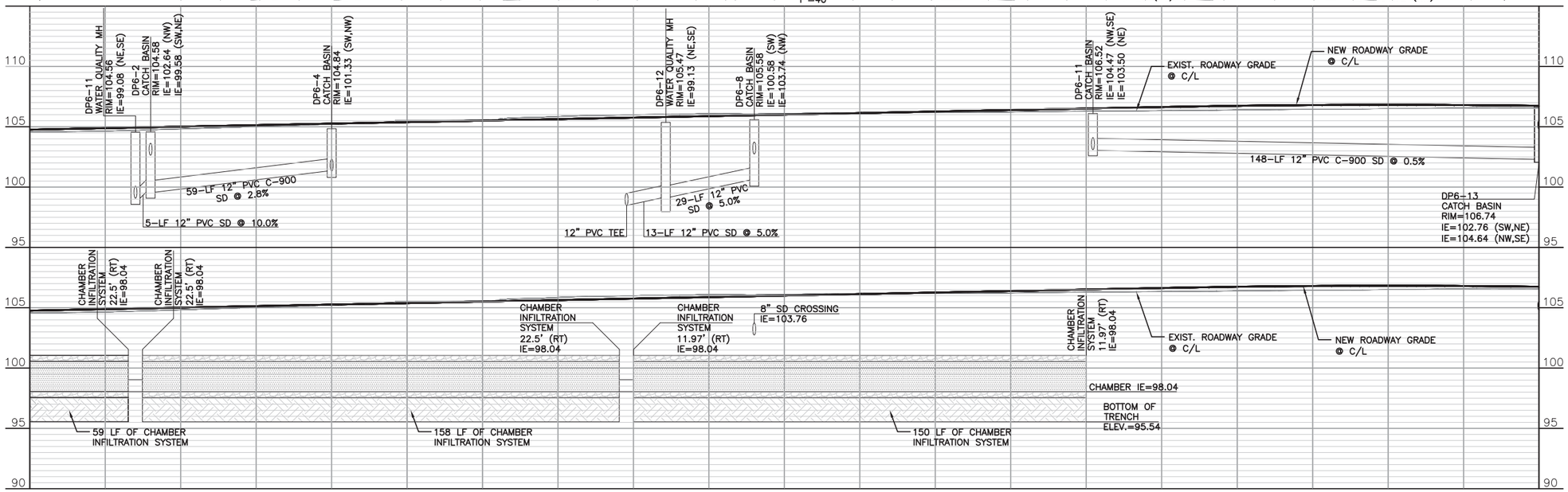
Jan 19, 2024 - 2:50:39pm - User: dm43hall
N:\PROJECTS\000884 ARLINGTON 211TH NE-67TH AVE\CAD\EXHIBITS\2024-0115_90% STORM EXHIBITS_22-000884_EXH_DOWN-UPSTREAM.DWG

DOWNSTREAM ANALYSIS AT 211TH PL NE & 67TH AVE NE

PROJECT LIMITS



PLAN
1"=40'



PROFILE
SCALE: 1:4V, 1:1H

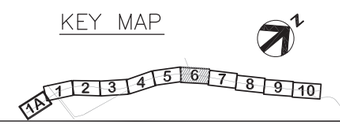
GENERAL NOTES:

1. ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE SPECIFIED.
2. SEE CITY OF ARLINGTON STORM DRAINAGE NOTES ON SHEET SD1.
3. ALL CATCH BASINS ARE TYPE 1 PER CITY OF ARLINGTON STD. DETAIL SD-020 UNLESS OTHERWISE NOTED ON PLANS. FOR CATCH BASINS LOCATED ON THE GUTTER LINE, OFFSETS PROVIDED ON PLANS REFER TO FACE OF CURB. SEE CITY OF ARLINGTON STD. DETAIL SD-060 FOR STANDARD GRATE OR STD. DETAIL SD-080 FOR SOLID COVER, AND STD. DETAIL SD-090 FOR FRAME AND GRATE INSTALLATION TO DETERMINE THE CENTER OF GRATE OFFSET FROM FACE OF CURB.
4. INSTALL CATCH BASIN INLET PROTECTION TO ALL PROPOSED CATCH BASINS DURING CONSTRUCTION. SEE DETAIL ON SHEET SPD1.

(X) DRAINAGE NOTES

1. POROUS ASPHALT TRAIL
2. FISH PASSABLE CULVERT, SEE DETAILS ON SHEETS FP1-FP3
3. INFILTRATION TRENCH, SEE DETAIL ON SHEET SD1
4. HYDRODYNAMIC SEPARATING WATER QUALITY MANHOLE WITH SOLID RING AND COVER PER CITY OF ARLINGTON STD DETAIL SD-110. OFFSETS PROVIDED REFER TO CENTER OF STRUCTURE.
5. COORDINATE AND/OR RESTORE IMPACTED UTILITY LINES. FIELD VERIFY LOCATION AND DEPTH OF EXISTING UTILITIES PRIOR TO CONSTRUCTION. SEE UTILITY PLANS, SHEETS UT1A-UT14
6. REMOVE EXISTING STORM DRAINAGE FEATURES
7. ABANDON EXISTING STORM DRAINAGE FEATURES
8. CATCH BASIN TYPE 2 PER CITY OF ARLINGTON STD. DETAIL SD-040. FOR TYPE 2 CATCH BASINS LOCATED IN THE GUTTER LINE, OFFSETS PROVIDED REFER TO THE FACE OF CURB. SEE CITY OF ARLINGTON STD. DETAIL SD-090 FOR FRAME AND GRATE INSTALLATION TO DETERMINE CENTER OF GRATE OFFSET FROM FACE OF CURB.
9. CONCRETE INLET PER CITY OF ARLINGTON STD. DETAIL SD-010. OFFSETS PROVIDED ON PLANS REFER TO FACE OF CURB. SEE CITY OF ARLINGTON STD. DETAIL SD-060 FOR STANDARD GRATE DETAIL, AND STD. DETAIL SD-090 FOR FRAME AND GRATE INSTALLATION TO DETERMINE CENTER OF GRATE OFFSET FROM FACE OF CURB.
10. SECTIONAL CHAMBER INFILTRATION SYSTEM IN 6.3-FOOT WIDE TRENCH, SEE DETAIL ON SHEET SD2. OFFSETS GIVEN ARE TO CENTERLINE OF EACH SYSTEM. PROVIDE 24-INCH DEEP LAYER OF TREATMENT LINER AMENDED SOIL UNDER TRENCH
11. ADJUST EXISTING CATCH BASIN OR MANHOLE RIM TO FINISHED GRADE
12. OBSERVATION WELL STORM DRAIN CLEANOUT, SEE DETAIL ON SHEET SD1
13. INFILTRATION TRENCH STORM DRAIN CLEANOUT, SEE DETAIL ON SHEET SD1
14. COORDINATE UTILITY WORK WITH EXISTING FORCE MAIN PIPE, FIELD VERIFY LOCATION AND TAKE PRECAUTIONS TO AVOID DISRUPTION OF SERVICE. CONTACT FRED RAPELYEA IN THE PUBLIC WORKS DEPARTMENT IN CASE OF EMERGENCY (360) 913-7058

KEY MAP



HDR Engineering, Inc.

ISSUE	DATE	DESCRIPTION	PROJECT MANAGER	
			PROJECT NUMBER	0000000110731

JEFF T. HAMLIN — STATE OF WASHINGTON — 38025 — REGISTERED PROFESSIONAL ENGINEER

CITY OF ARLINGTON
67th AVENUE PHASE III
RECONSTRUCTION PROJECT

DRAINAGE PLAN AND PROFILE
DP6
(6 OF 10)

FILENAME	DP-00C-06.dwg	SHEET
SCALE	1"=40' (11x17)	067

Appendix 7

Manufacture's Water Quality and Infiltration Chamber Facility Specifications

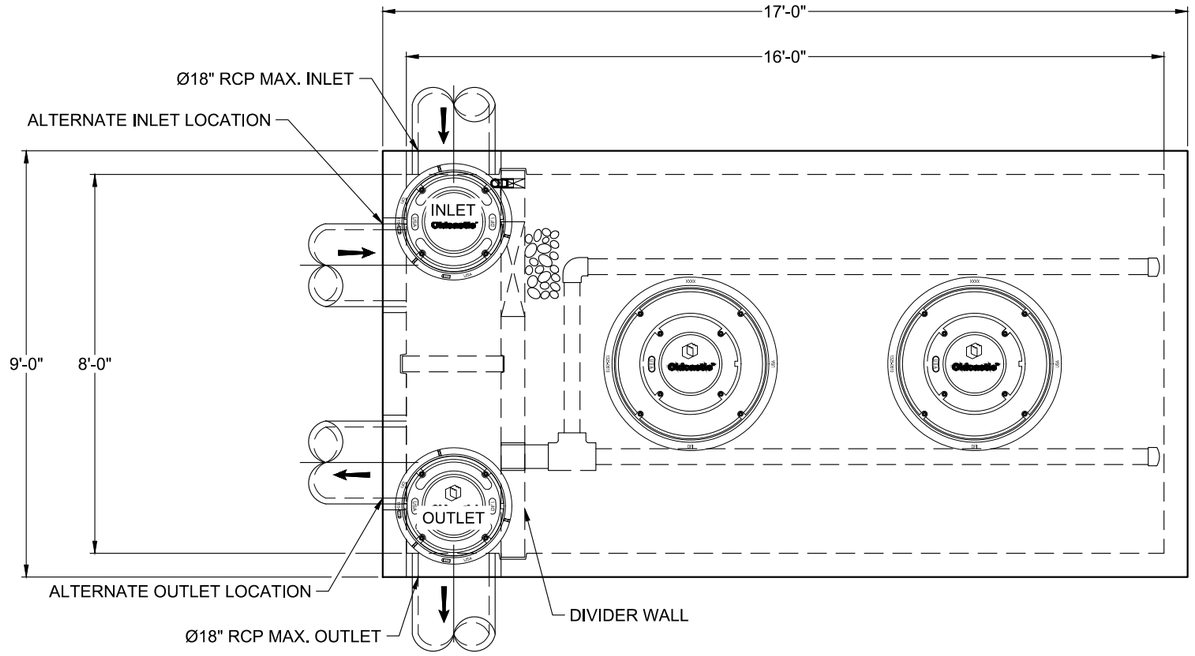
SITE SPECIFIC DATA	
Structure ID	ID
Treatment Flow Rate (cfs)	-
Peak Flow Rate (cfs)	-
Rim Elevation	-
Top of Vault Elevation	-

Pipe Data	Pipe Location	Pipe Size	Pipe Type	Invert Elevation
Inlet	-	-	-	-
Outlet	-	-	-	-

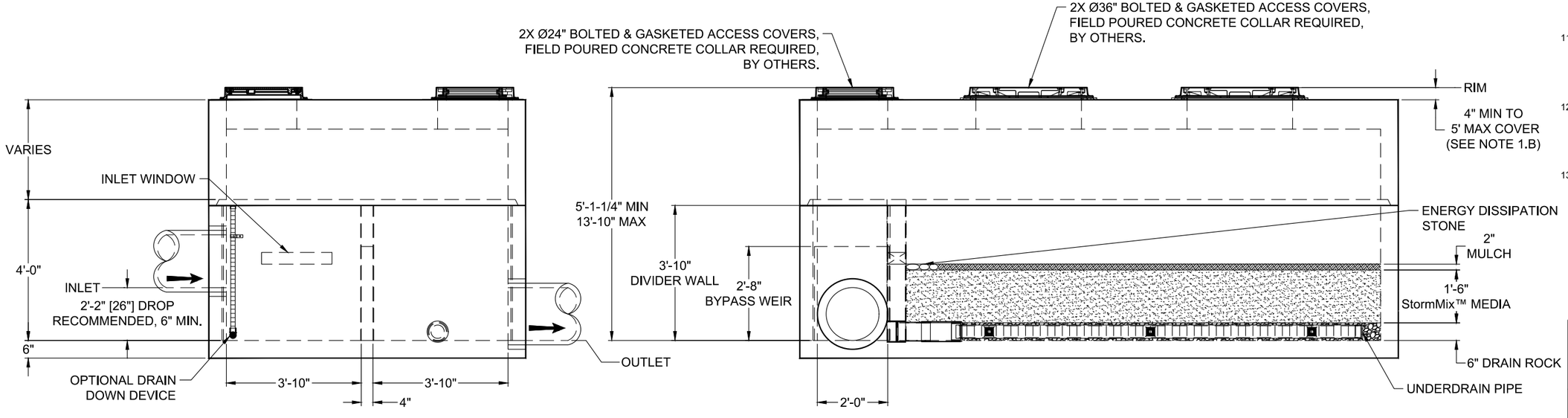
Notes:

PERFORMANCE SPECIFICATIONS	
Treatment Flow Capacities:*	
NJDEP 80% Removal, 75 micron	0.432 cfs
WA Ecology GULD - Basic, Enhanced & Phosphorus	0.384 cfs
Bypass Capacity	6.5 cfs

*Contact Oldcastle for alternative treatment flow capacities.



PLAN VIEW



LEFT END VIEW

ELEVATION VIEW

NOTES:

1. DESIGN LOADINGS:
   A. AASHTO HS-20-44 (WITH IMPACT)
   B. DESIGN SOIL COVER: 5'-0" MAXIMUM
   C. ASSUMED WATER TABLE: BELOW BASE OF PRECAST (ENGINEER-OF-RECORD TO CONFIRM SITE WATER TABLE ELEVATION)
   D. LATERAL EARTH PRESSURE: 45 PCF (DRAINED)
   E. LATERAL LIVE LOAD SURCHARGE: 80 PSF (APPLIED TO 8'-0" BELOW GRADE)
   F. NO LATERAL SURCHARGE FROM ADJACENT BUILDINGS, WALLS, PIERS, OR FOUNDATIONS.
2. CONCRETE 28-DAY MINIMUM COMPRESSIVE STRENGTH: 5,000 PSI MINIMUM.
3. REINFORCING: REBAR, ASTM A615/A706, GRADE 60
4. CEMENT: ASTM C150
5. REQUIRED ALLOWABLE SOIL BEARING CAPACITY: 2,500 PSF
6. REFERENCE STANDARD:
   A. ASTM C890
   B. ASTM C913
   C. ACI 318-14
7. THIS STRUCTURE IS DESIGNED TO THE PARAMETERS NOTED HEREIN. ENGINEER-OF-RECORD SHALL VERIFY FY THAT NOTED PARAMETERS MEET OR EXCEED PROJECT REQUIREMENTS. IF DESIGN PARAMETERS ARE INCORRECT, REVIEWING ENGINEER/AUTHORITY SHALL NOTIFY OLDCASTLE INFRASTRUCTURE UPON REVIEW.
8. INLET AND OUTLET HOLES WILL BE FACTORY CORED/CAST PER PLANS AND CUSTOMER REQUIREMENTS. INLET AND OUTLET LOCATIONS CAN BE MIRRORED.
9. CONTRACTOR RESPONSIBLE TO VERIFY ALL SIZES, LOCATIONS, AND ELEVATIONS OF OPENINGS.
10. CONTRACTOR RESPONSIBLE TO ENSURE ADEQUATE BEARING SURFACE IS PROVIDED (I.E. COMPACTED AND LEVEL PER PROJECT SPECIFICATIONS).
11. SECTION HEIGHTS, SLAB/WALL THICKNESSES, AND KEYWAYS ARE SUBJECT TO CHANGE AS REQUIRED FOR SITE REQUIREMENTS AND/OR DUE TO PRODUCT AVAILABILITY AND PRODUCTION FACILITY CONSTRAINTS.
12. MAXIMUM PICK WEIGHTS":
   A. TOP: XX,XXX LBS
   B. BASE: XX,XXX LBS*
   (* COMBINED WEIGHT OF BASE INCLUDES BYPASS WEIR, DIVIDER WALL, ROCK & MEDIA)
13. INTERNALS SHALL CONSIST OF UNDERDRAIN PIPE, ROCK, STORMMIX™ MEDIA, MULCH, DIVIDER WALL, BYPASS WEIR AND OPTIONAL DRAIN DOWN.

Bioretention/ Biofiltration

Oldcastle Infrastructure™ A CRH COMPANY

Ph: 800.579.8819 | www.oldcastleinfrastructure.com/stormwater

BioPod™ Biofilter System (STANDARD)

Underground Vault with Internal Bypass

CUSTOMER
-

PROJECT NAME
-

SHEET NAME	REVISION	SHEET
Specifier Drawing BPU-816IB	-	1 OF 1
	REV DATE -	