Exhibit H: Preliminary Stormwater Report

Collina at Springbrook
Newberg, Oregon

Preliminary Stormwater Report

Date: October 2022

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AKS Job Number: 4487-01

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Preliminary Stormwater Report

COLLINA AT SPRINGBROOK

NEWBERG, OREGON

1.0 Purpose of Report

The purpose of this report is to analyze the effects the proposed development will have on the existing stormwater conveyance system; document the criteria, methodology, and informational sources used to design the proposed stormwater system; and present the results of the preliminary hydraulic analysis.

2.0 Project Location/Description

The proposed residential subdivision will be located northeast of the intersection of E Mountainview Drive and N Center Street in Newberg Oregon, encompassing approximately 98.12 acres (Tax Lots 4900, 5000, 5100, 5200, 5300, 5400, 6200, and 6300 Yamhill County Assessor's Map 3 2 08).

The proposed development is a 405-lot residential subdivision with single-family detached homes. The site improvements will include the construction of public streets, underground utilities, stormwater facilities, and open space improvements.

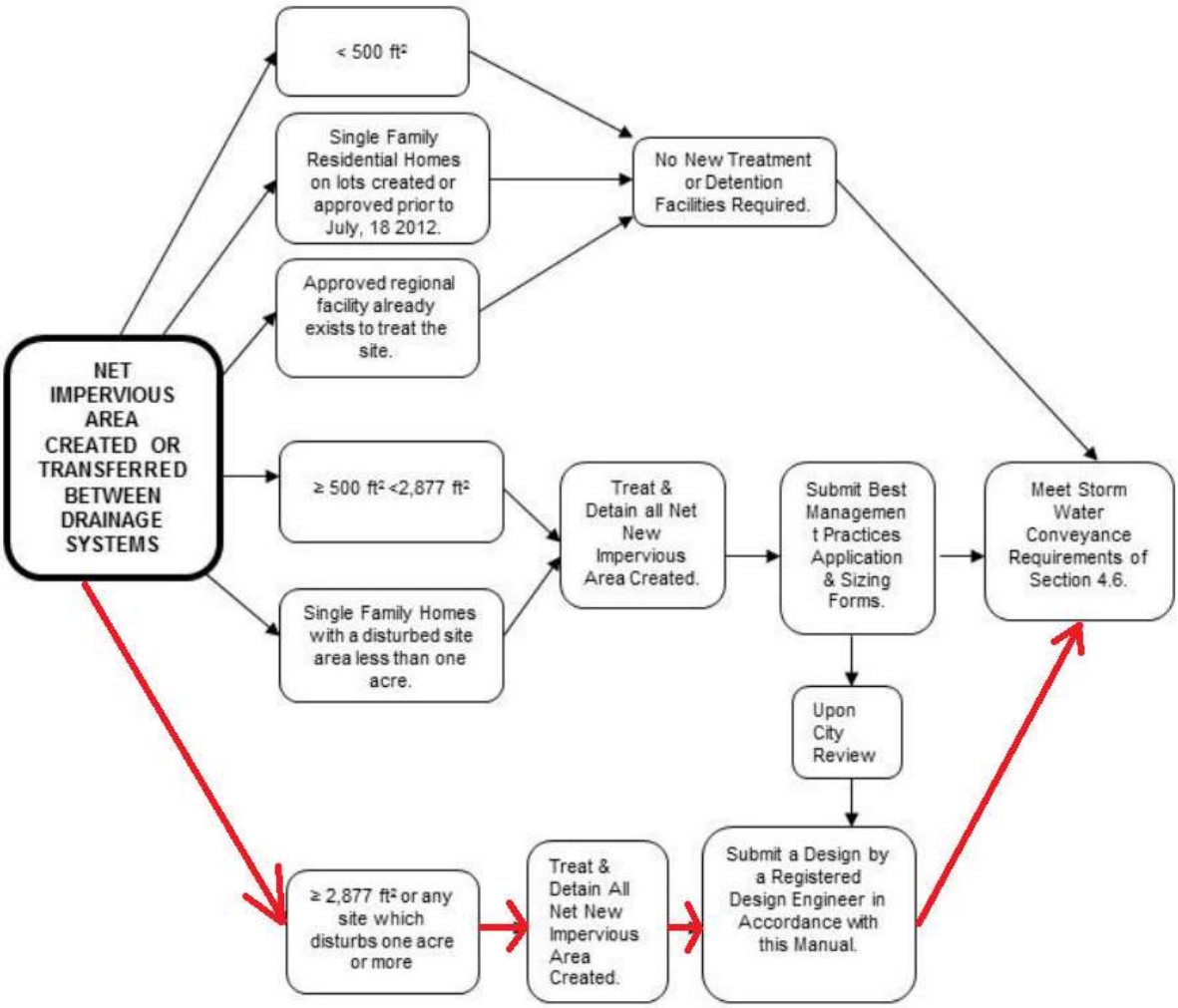
Stormwater management is provided through two regional stormwater facilities. Runoff from the west portion of the site is treated and detained by an extended dry basin. Runoff from the north and east portion of the site will be treated and detained by a vegetated swale and a detention pond.

3.0 Regulatory Design Criteria

Stormwater design criteria is dictated by the City of Newberg August 2015 *Public Works Design and Construction Standards* (CoN PWDCS). Per Figure 4.4, the proposed development will create more than 2,877 square feet of impervious area and will therefore be required to provide treatment and detention for all net new impervious area.

4.6 Water Quantity and Quality Facilities

Figure 4.4 Storm water Quality & Quantity Design Flow Chart



3.1. Stormwater Quantity

The CoN PWDCS requires that the post-development runoff rates from the site do not exceed the pre-development runoff rates. This requirement will be met with detention through two stormwater management facilities.

Section 4.7.1.III Water Quantity Facility Design & Control Standards (CoN PWDCS)

Stormwater quantity on-site detention facilities shall be designed to capture runoff so the post-development runoff rates from the site do not exceed the pre-development runoff rates from the site, based on 24-hour storm events ranging from ½ of the 2-year return storm to the 25-year return storm. Specifically, the ½ of the 2, 2, 10, and 25-year post-development runoff rates will not exceed their respective ½ of the 2, 2, 10, and 25-year pre-development runoff rates…

3.2. Stormwater Quality

The CoN PWDCS, requires that stormwater quality facilities be designed based on the following:

> *Section 4.8.5 Water Quality Storm (CoN PWDCS)*
>
> *The storm defines both volume and rate of runoff. The stormwater quality only facilities shall be designed for a dry weather storm event totaling 1.0 inches of precipitation falling in 24 hours with an average storm return period of 96 hours using Figure 4-3, rainfall distribution.*

Stormwater quality management for this project will be met using a vegetated swale and an extended dry basin. All facilities will be designed in accordance with City of Newberg Standards during final engineering.

4.0 Design Methodology

The Santa Barbara Urban Hydrograph (SBUH) Method was used to analyze stormwater runoff from the site. This method utilizes the Natural Resource Conservation Service (NRCS) Type 1A 24-hour design storm. HydroCAD 10.0 computer software aided in the analysis. Runoff Curve Numbers (CN), which are representative of existing and developed cover conditions and time of concentration (Tc) values were developed in accordance with the U.S. Department of Agriculture (USDA) – Natural Resource Conservation Service's (NRCS) Technical Release 55 and are included in the Appendix.

5.0 Design Parameters

5.1. Design Storms

Per City of Newberg requirements, the following rainfall intensities and durations were utilized in the analysis of the existing and proposed stormwater facilities:

Table 5-1: Rainfall Intensities

Recurrence Interval (Years)	Rainfall Event (Hours)	Total Precipitation Depth (Inches)
Water Quality	24.0	1.00
½ of 2	24.0	1.25
2	24.0	2.50
10	24.0	3.50
25	24.0	4.00

5.2. Pre-Developed Site Conditions

5.2.1. Site Topography

The existing topography divides the subject site into six separate subbasins, as shown on the Pre-Developed Basin Delineation (Figure 2A-2D). The general topography of each basin is as follows:

- Subbasin #1 (Node 1P)
  Subbasin grades generally vary from ±2% to ±5% towards the Southwest with a high point of ±271 feet near the southern stub of N Aldersgate Drive and a low point of ±230 feet near the southern property line. The subbasin drains Southwest to an existing storm system in E Mountainview Drive, then South within S Center Street.

- Subbasin #2 (Node 2P)
  Subbasin grades generally vary from ±3% to ±8% towards the East and South to Hess Creek. Subbasin #2 has a high point of ±303 feet near the Northwest property corner and a low point of ±184 feet near the Southeast property corner.

- Subbasin #3 (Node 3P)
  Subbasin grades generally vary from ±1% to ±3%, with the subbasin draining west along E Mountainview Drive. Subbasin runoff enters an existing storm system that discharges to Tax Lot 900 of Tax Map 3.2.18, South of E Mountainvew Drive and West of N Center Street.

- Subbasin #4 (Node 4P)
  Subbasin grades generally vary from ±3% to ±5%, with the subbasin draining north along N Center Street. Subbasin #4 outfalls into curb inlets of an existing storm system further north along N Center Street. The existing storm system generally conveys flows toward N College Street.

- Subbasin #5 (Node 5P)
  Subbasin grades generally vary from ±2% to ±5%, with the subbasin draining South along N Aldersgate Drive then West along E Edgewood Drive. Subbasin #5 outfalls into curb inlets of an existing storm system further west along E Edgewood Drive. The existing storm system generally conveys flows toward N College Street.

- Subbasin #6 (Node 6P)
  Subbasin grades generally vary from ±3% to ±5%, with the subbasin draining South along N Aldersgate Drive. Curb inlets along N Aldersgate Drive convey stormwater west along E Vintage Street outfalling to a stormwater facility within Tax lot 11900 of Tax map 3.2.08CB. Outfalls from the existing stormwater facility generally flows toward N College Street.

Table 5-2: Existing Impervious Area

Subbasin	Basin Area (sf)	Impervious Area (ac)
#1	±29.49	±0.60
#2	±71.76	±0.91
#3	±0.58	±0.35
#4	±0.12	±0.10
#5	±0.21	±0.18
#6	±0.06	±0.06
Total	**±102.22**	**±2.20**

5.2.2. Land Use

The existing site consists of a house, hazelwood orchard, farmed fields, and brush/wooded areas.

5.3. Soil Type

The soil beneath the project site and associated drainage basins are listed below, according to the USDA Natural Resources Conservation Service (NRCS) Soil Survey for Yamhill County. The following table outlines the Hydrologic Soil Group rating for the soil type:

Table 5-3: Hydrologic Soil Groupings

NRCS Map Unit Identification	NRCS Soil Classification	Hydrologic Soil Group Rating
2013A	Wapato silty clay loam	C/D
2216C	Chehalem silty clay	C/D
2300A	Aloha silt loam	C/D
2301A	Amity silt loam	C/D
2310C	Woodburn silt loam	C
2310D	Woodburn silt loam	C
2310F	Woodburn silt loam	C
2311C	Helvetia silt loam	C
2775F	Saum-Ritner complex	C
2784C	Witzel-Ritner complex	D
2798D	Witham silty clay loam	D

Further information on this soil type is included in the NRCS Soil Resource Report located in the Appendix of this report.

5.4. Post-Developed Site Conditions

5.4.1. Site Topography

The on-site slopes will be modified with cuts and fills to accommodate the construction of public streets, stormwater facilities, and open space areas. Additionally, sloped residential building pads will be constructed adjacent to the public right-of-way.

General descriptions for subbasins are as follows:

- Subbasin #1 (Node 1S1 and 1S2)
  Runoff within this subbasin is directed to Regional Stormwater Facility #1 located at the northeast corner of N Center Street and E Mountainview Drive and discharges into the existing 24" stormwater main flowing south within S Center Street. Post-developed Subbasin #1 was expanded to encompass a portion of Pre-Developed Subbasin #3 along E Mountainview Drive and a portion of Pre-Developed Subbasin #4 along N Center Street.

- Subbasin #2 (Node 2S1)
  Runoff within this subbasin is directed to Regional Stormwater Facility #2 located at the northeast corner of N Villa Road and E Mountainview Drive and discharges directly to Hess Creek. Post-developed Subbasin #2 was expanded to encompass a portion of Pre-Developed Subbasin #5 along E Aldersgate Drive and the entirety of Pre-Developed Subbasin #6.

- Subbasin #3 (Node 3S1)
  Runoff within this subbasin enters an existing storm system that discharges to Tax Lot 900 of Tax Map 3.2.18, as with the Pre-Developed Site Condition. This subbasin includes a proposed widening of E Mountainview Drive.

- Subbasin #4 (Nodes 4S1)
  Runoff within this subbasin discharge to the same curb inlets along N Center Street as with the Pre-Development condition. This subbasin includes a portion of a proposed traffic circle at the intersection of N Center Street and E Henry Road.

- Subbasin #5 (Node 5S1)
  Runoff within this subbasin discharge to the same curb inlets along E Edgewood Drive as with the Pre-Development condition. This subbasin includes reconstruction of the intersection of N Aldersgate Drive and E Edgewood Drive.

- Subbasin #6
  This subbasin includes a reconstruction of East side of E Vintage Street from a three-quarter street into a full street. With this reconstruction, the East side of E Vintage Street is incorporated into Subbasin #2.

5.4.2. Land Use

The post-developed site land use will consist of a 405-lot, single-family residential subdivision, with associated streets, sidewalks, and underground utilities.

5.4.3. Post-Developed Site Parameters

Appendices A, B, and C provide the HydroCAD reports that were generated for the analyzed storm events. These reports include all the parameters (e.g. impervious/pervious areas, time of concentration, etc.) used to model the site hydrology.

5.4.4. Description of Off-Site Contributing Basins

There are no major off-site contributory basins draining onto the subject site.

6.0 Stormwater Analyses

City of Newberg requires that all net new impervious area be treated and detained. With the proposed stormwater quality control facilities, this site will be able to treat the majority of the new impervious area. A portion of the new impervious area cannot be conveyed to the proposed stormwater facilities due to topographic constraints and conflicts with existing storm systems. These new untreated impervious areas are offset by treating existing untreated impervious area that can be routed to the stormwater facilities. Tabulation and mapping of these areas can be found on Figures 4A-4D, Impervious Area Maps.

6.1. Proposed Stormwater Quality Control Facilities

6.1.1. Regional Stormwater Facility #1

At the Southwest corner of the development, an Extended Dry Basin is proposed, to provide water quality treatment for impervious areas. The following contains calculations for the water quality treatment through the basin.

WATER QUALITY CALCULATIONS

Regional Stormwater Facility #1 - Extended Dry Basin (Node P1)

Client: Pahlisch Homes Inc.
Project: Colina at Springbrook
AKS Job No.: 4487-01
Date: 10/7/2022
Done By: GPS
Checked By: TS

Total Subbasin Area (Node 1S1):	25.27	acres
Total Subbasin Area (Node 1S1):	1,100,942	square feet (sf)

IMPERVIOUS AREA

Impervious Lots Area (> 2,877 sf)*	345,240	sf	sf (249 Lots)
Impervious Lots Area (< 2,877 sf)**	57,717	sf	sf (20 Cluster Lots)
Total Impervious Lot Area	402,957	sf	
Proposed Impervious ROW/Open Space Area	323,102	sf	
Existing Untreated Impervious Area	8,305	sf	
Total Impervious Area:	**734,364**	**sf**	

*Lots over 2,877 sf in total area are assumed to contain 2,877 sf of impervious area
**Lots under 2,877 sf in total area are assumed to contain 90% of its total area as impervious area

WATER QUALITY VOLUME (WQV)

(Per CON 4.8.5)

$$\text{WQV (Subdivision)} = \begin{matrix}\text{1.0 inch storm} \\ \text{over 24 hrs}\end{matrix} = \textbf{61,197 cubic feet}$$

WATER QUALITY FLOW (WQF)

(Per CON Detail 461)

$$\text{WQF} = \frac{\text{WQV (cf)}}{48*60*60} = \textbf{0.35 cfs}$$

EXTENDED DRY BASIN DESIGN & CALCULATIONS

Hydraulic Design Criteria (Per CON Design Standards Section 4.8 & Detail 461)

Permanent Pool Depth: 0.4 ft
Permanent Pool covers bottom of basin
Water Quality Drawdown Time: 48 hours
Maximum Depth of WQ Pool: 4 ft
Avoid direct flow across WQ pond to avoid short circuiting

Extended Dry Basin Sizing Design:

Bottom Slope (ft/ft)	Minimum Bottom Width (ft)	Side Slopes H:V	Top of Pond Elev. (ft)	Perm. Pool Depth (ft)	Pool Bottom Area (sf)	Bottom of Pool Elev. (ft)
0.0	75	3.0	230.5	0.4	13,412	224.50

Water Quality Flow Hydraulic Calculations:

Q (cfs)	Pool Elev. at WQV (ft)	Orifice CL Height (ft)	Calculated Orifice Diameter (in)	Max. Pool Elev., 25-yr Event (ft)	Calculated WQV Pool Depth (ft)	Calculated WQV (cf)
0.35	228.30	223.5	2.7	229.3	3.80	62,314

Check Against Design Criteria:

	Calculated		Meet CON Criteria?			
Minimum Freeboard:	1.3	feet	**Yes**	more than	1	foot
Minimum Bottom Width:	75.0	feet	**Yes**	greater than	4	feet
Maximum Pool Depth at WQV:	3.8	feet	**Yes**	less than	4	feet
Design Pond WQV:	62,314	cu. ft	**Yes**	greater than	61,197	cu. ft

6.1.2. Regional Stormwater Facility #2

At the Southeast corner of the proposed site, a vegetated swale is proposed to treat the runoff from impervious surfaces. The following contains calculations and sizing for the vegetated swale.

WATER QUALITY CALCULATIONS

Regional Stormwater Facility #2 - Vegetated Swale (Node S1)

Client: Pahlisch Homes Inc.
Project: Collina at Springbrook
AKS Job No.: 4487-01
Date: October 7, 2022
Done By: GPS
Checked By: TS

Total Subbasin Area (Node 2S2):	51.91	acres
Total Subbasin Area (Node 2S2):	2,261,386	square feet (sf)

IMPERVIOUS AREA

Impervious Area of Lots (> 2,877 sf)*	716,373	sf (249 Lots)
Impervious Area of Lots (< 2,877 sf)**	47,186	sf (20 Cluster Lots)
Total Impervious Lot Area	763,559	sf
Prop. Imp. ROW/Open Space Area	653,436	sf
Ex. Untreated Impervious Area	37,317	sf
Total Impervious Area:	**1,454,312**	**sf**

*Lots over 2,877 sf in total area are assumed to contain 2,877 sf of impervious area
**Lots under 2,877 sf in total area are assumed to contain 90% of its total area as impervious area

WATER QUALITY VOLUME (WQV)

(Per CoN 4.7.2 & 4.8.4-5)

$$\text{WQV (Subdivision)} = \frac{\text{1" X Area (ft)}}{\text{12" per ft}} = \textbf{121,193 cubic feet}$$

WATER QUALITY FLOW (WQF)

(Per CoN 4.7.2 & 4.8.4-5)

$$\text{WQF} = \frac{\text{WQV (sf)}}{\text{86,400 seconds}} = \textbf{1.40 cfs}$$

VEGETATED SWALE, WATER QUALITY FLOW DESIGN & CALCULATIONS

Hydraulic Design Criteria (Per CoN Standard Drawing 460)

Design Flow: Water Quality Flow
Minimum Hydraulic Residence Time: 9 minutes
Maximum Water Design Depth: 0.5-ft
Minimum Freeboard: 1.0 foot (for facilities not protected from high flows)
Manning's "n" Value: 0.24
Maximum Velocity: 2.0 fps based on the 25-YR flow

Swale Sizing Assumptions:

Slope	Bottom Width	Manning's #	Side Slope	Depth of Swale	Length
(ft/ft)	(ft)	"n"	H:V	(ft)	(ft)
0.005	10	0.24	4:1	1	132

Water Quality Flow Hydraulic Calculations (See Hydraflow Printouts):

Q	Flow Depth	Flow Area	Wp	R	Velocity
(cfs)	(ft)	(sf)	(ft)	(ft)	(fps)
1.40	0.48	5.77	13.99	0.41	0.24

25-Year Flow Hydraulic Calculations (See HydroCAD Printouts):

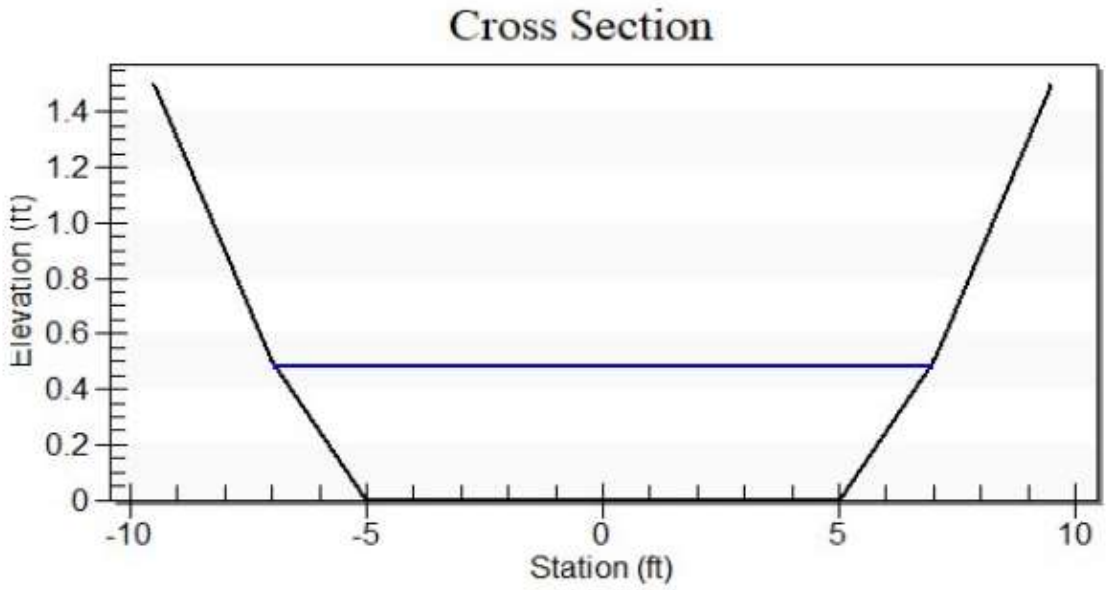
Q	Flow Depth	Velocity
(cfs)	(ft)	(fps)
2.47	0.7	0.30

Check Against Design Criteria: **Meet CoN Criteria?**

	Calculated		CoN Criteria			
Minimum Hydraulic Residence Time:	**9.1**	**minutes**	>	9	minutes	Yes
Maximum Water Quality Design Depth:	**0.48**	**feet**	<	0.5	feet	Yes
Minimum Length:	**132**	**feet**	≥	100	feet	Yes
Maximum Velocity (25 yr):	**0.3**	**fps**	<	2	fps	Yes

SWALE HYDRAULICS ANALYSIS REPORT

Result Parameters		
Flow	1.40	cfs
Depth	0.484	ft
Area of Flow	5.77	sq ft
Wetted Perimeter	13.987	ft
Hydraulic Radius	0.413	ft
Average Velocity	0.243	fps
Top Width (T)	13.868	ft
Froude Number	0.066	
Critical Depth	0.084	ft
Critical Velocity	1.617	fps
Critical Slope	1.94496	ft/ft
Critical Top Width	10.67	ft
Max Shear Stress	0.151	lb/ft^2
Avg Shear Stress	0.129	lb/ft^2
Composite Manning's n Equation	Lotter method	
Manning's Roughness	0.24	



6.2. Proposed Stormwater Quantity Control Facilities

Stormwater quantity for this project will be met separately within each basins. The detention ponds within subbasins #1 and #2 will be designed to release the post-developed peak flow at or below the pre-development rate as required by City of Newberg standards.

Calculations and contributing basins for all stormwater quantity control facilities can be referenced in the Appendix. The table below outlines the pre- and post-development flow rate comparisons for each subbasin:

Table 6-1: Subbasin #1 Peak Pre- and Post-Development Flow Comparisons

Recurrence Interval (Years)	Peak Pre-Development Flow (cfs) (Node 1P)	Peak Post-Development Flow (cfs) (Node CS)	Peak Flow Increase or (Decrease) – (cfs)
½ of 2	0.69	0.37	(0.32)
2	5.09	2.64	(2.45)
10	9.75	7.86	(1.89)
25	12.24	11.35	(0.89)

Table 6-2: Subbasin #2 Peak Pre- and Post-Development Flow Comparisons

Recurrence Interval (Years)	Peak Pre-Development Flow (cfs) (Node 2P)	Peak Post-Development Flow (cfs) (Node HC)	Peak Flow Increase or (Decrease) – (cfs)
½ of 2	0.88	0.54	(0.34)
2	8.78	7.74	(1.04)
10	19.16	15.72	(3.44)
25	24.92	24.60	(0.32)

Table 6-3: Subbasin #3 Peak Pre- and Post-Development Flow Comparisons

Recurrence Interval (Years)	Peak Pre-Development Flow (cfs) (Node 3P)	Peak Post-Development Flow (cfs) (Node 3S1)	Peak Flow Increase or (Decrease) – (cfs)
½ of 2	0.10	0.08	(0.02)
2	0.26	0.18	(0.08)
10	0.39	0.27	(0.12)
25	0.49	0.31	(0.18)

Table 6-4: Subbasin #4 Peak Pre- and Post-Development Flow Comparisons

Recurrence Interval (Years)	Peak Pre-Development Flow (cfs) (Node 4P)	Peak Post-Development Flow (cfs) (Node 4S1)	Peak Flow Increase or (Decrease) – (cfs)
½ of 2	0.03	0.02	(0.01)
2	0.06	0.06	0.00
10	0.09	0.08	(0.01)
25	0.11	0.10	(0.01)

Table 6-5: Subbasin #5 Peak Pre- and Post-Development Flow Comparisons

Recurrence Interval (Years)	Peak Pre-Development Flow (cfs) (Node 5P)	Peak Post-Development Flow (cfs) (Node 5S1)	Peak Flow Increase or (Decrease) – (cfs)
½ of 2	0.05	0.01	(0.04)
2	0.11	0.02	(0.09)
10	0.16	0.04	(0.12)
25	0.18	0.05	(0.13)

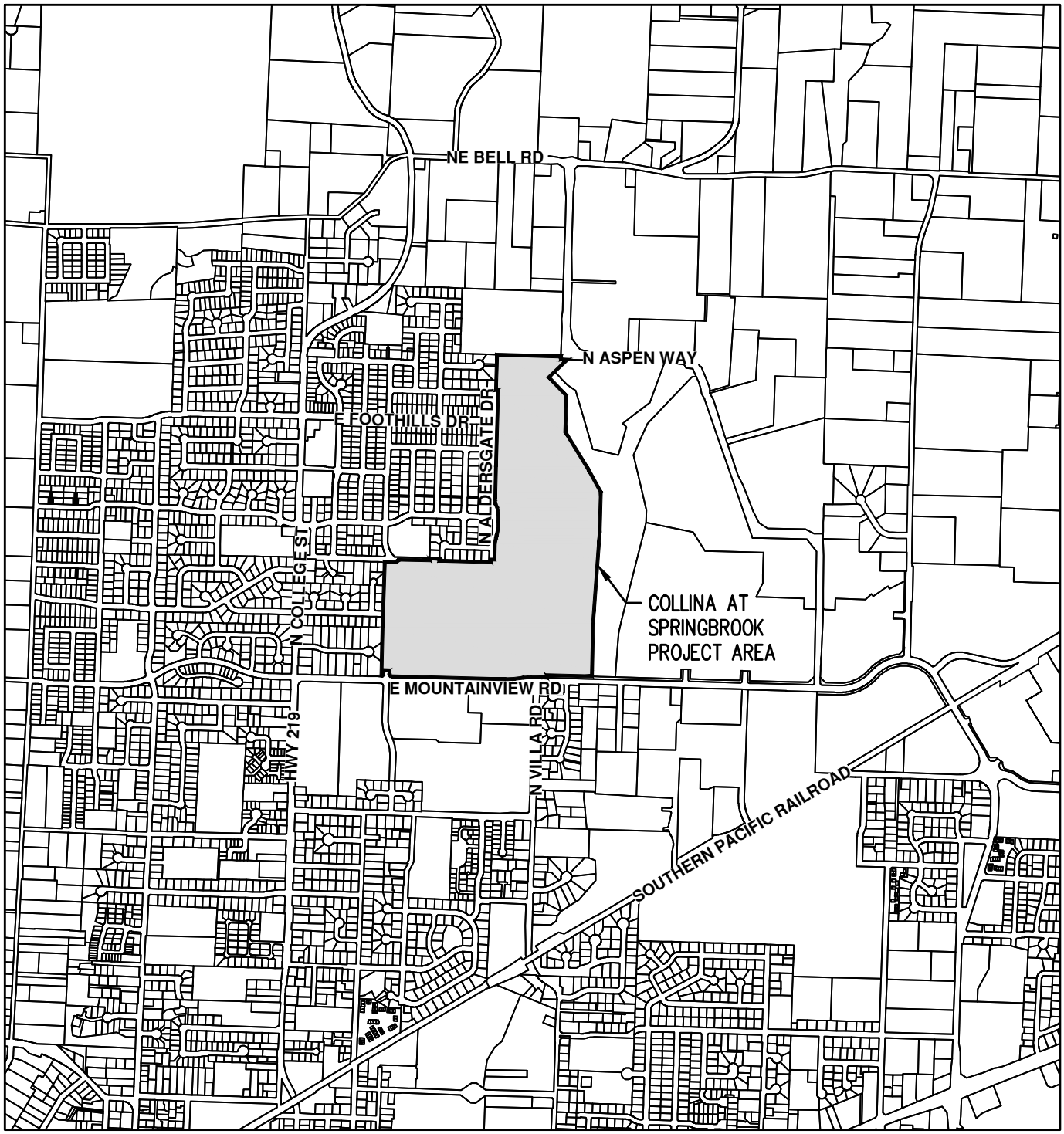
Table 6-6: Subbasin #6 Peak Pre- and Post-Development Flow Comparisons

Recurrence Interval (Years)	Peak Pre-Development Flow (cfs) (Node 6P)	Peak Post-Development Flow (cfs) (N/A)	Peak Flow Increase or (Decrease) – (cfs)
½ of 2	0.02	0.00	(0.02)
2	0.04	0.00	(0.04)
10	0.05	0.00	(0.05)
25	0.06	0.00	(0.06)

6.3. Downstream Analysis

A visual investigation was performed of the downstream system for each subbasin outfall. The visual investigation did not identify any downstream impacts to the conveyance system.

Figure 1: VICINITY MAP



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DATE: 10/03/2022

VICINITY MAP

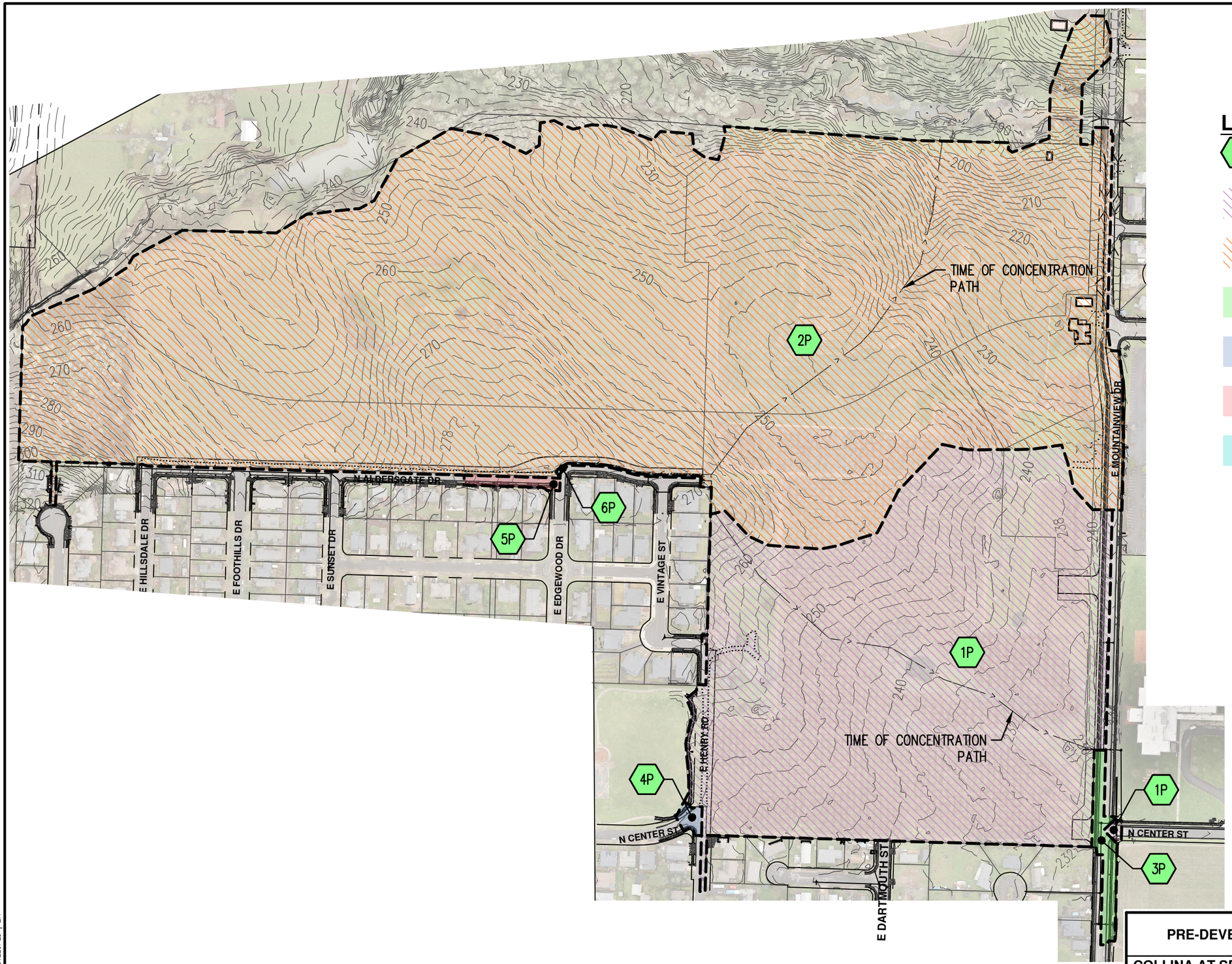
FIGURE 1

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
P: 503.563.6151 F: 503.563.6152 aks-eng.com

DRWN: GPS
CHKD: TS
AKS JOB: 4487-01

DWG: 4487-01 VICINITY MAP | VC

Figure 2A-2D: PRE-DEVELOPED BASIN DELINEATION



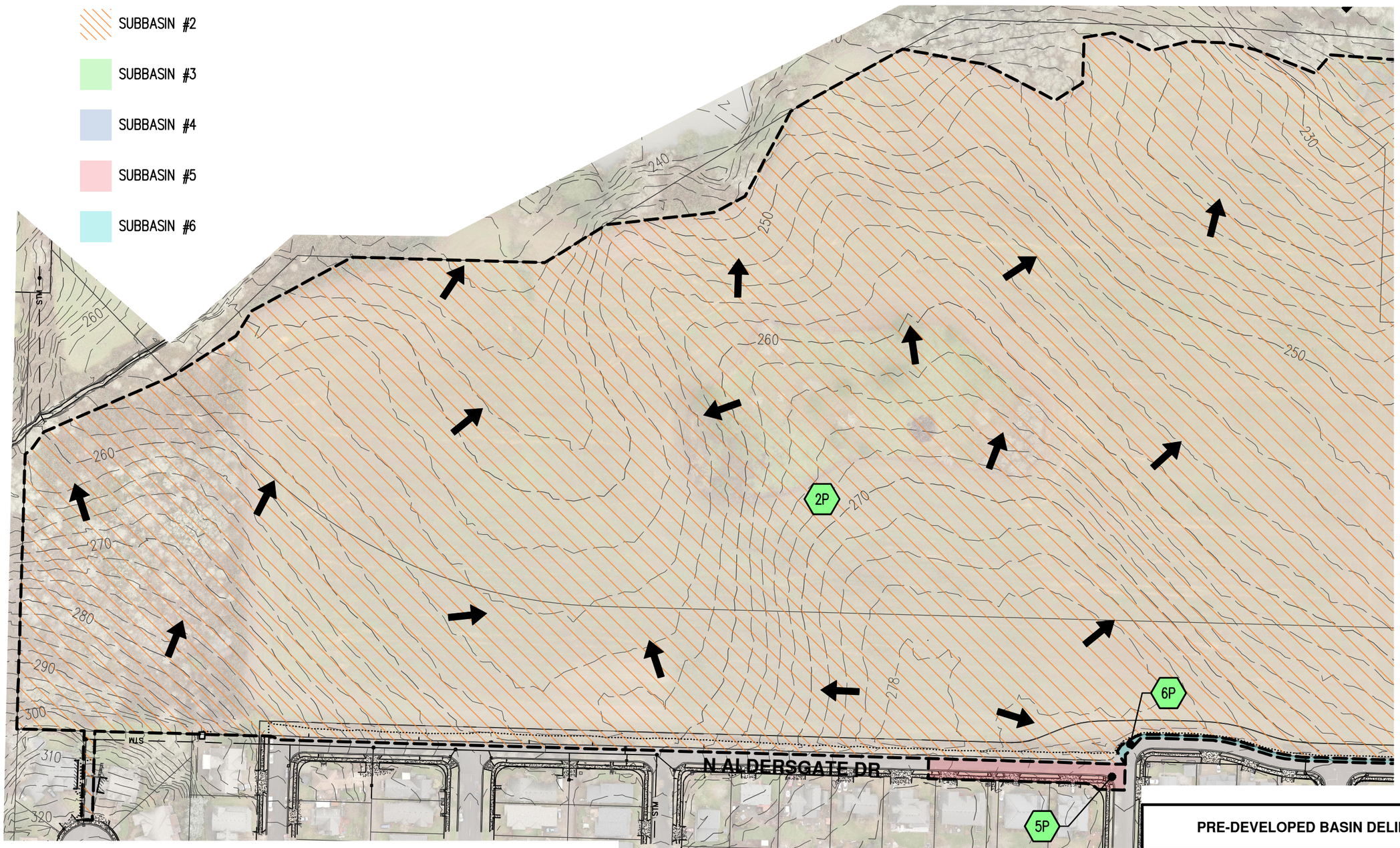
DATE: 10/07/2022

PRE-DEVELOPED BASIN DELINEATION OVERVIEW	FIGURE **2A**
COLLINA AT SPRINGBROOK	
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 503.563.6151 WWW.AKS-ENG.COM	DRWN: GPS CHKD: TS AKS JOB: 4487-01

DWG: 4487-01 PRE DEVELOPED | 2A

LEGEND

- #P SUBCATCHMENT
- SUBBASIN #1
- SUBBASIN #2
- SUBBASIN #3
- SUBBASIN #4
- SUBBASIN #5
- SUBBASIN #6



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SCALE: 1"=150 FEET

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DATE: 10/07/2022

PRE-DEVELOPED BASIN DELINEATION NORTH

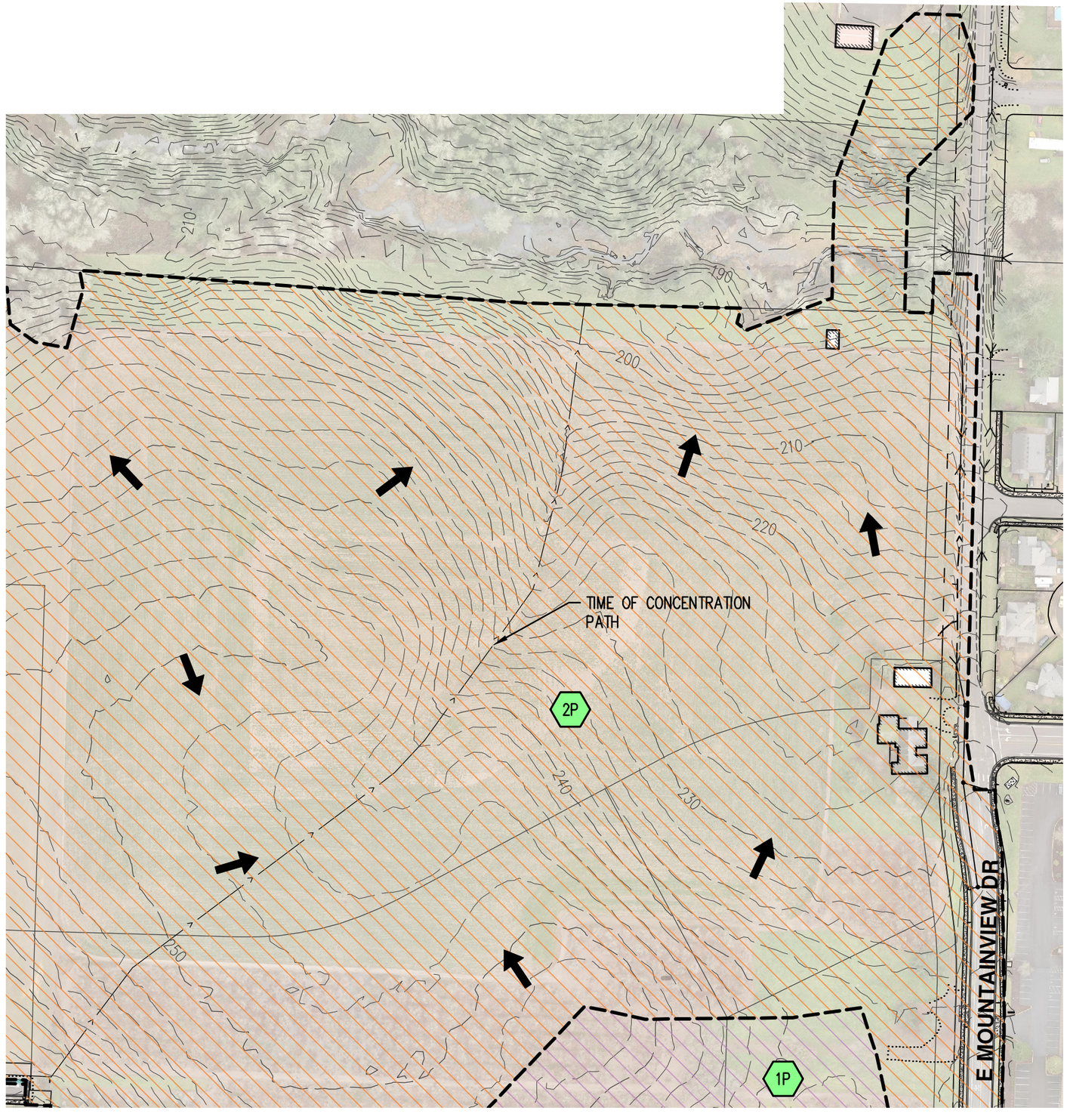
FIGURE **2B**

COLLINA AT SPRINGBROOK

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
503.563.6151 WWW.AKS-ENG.COM

DRWN: GPS
CHKD: TS
AKS JOB: 4487-01

DWG: 4487-01 PRE DEVELOPED | 2B



LEGEND

- #P SUBCATCHMENT
- SUBBASIN #1
- SUBBASIN #2
- SUBBASIN #3
- SUBBASIN #4
- SUBBASIN #5
- SUBBASIN #6

N

SCALE: 1"=150 FEET

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DATE: 10/07/2022

PRE-DEVELOPED BASIN DELINEATION EAST

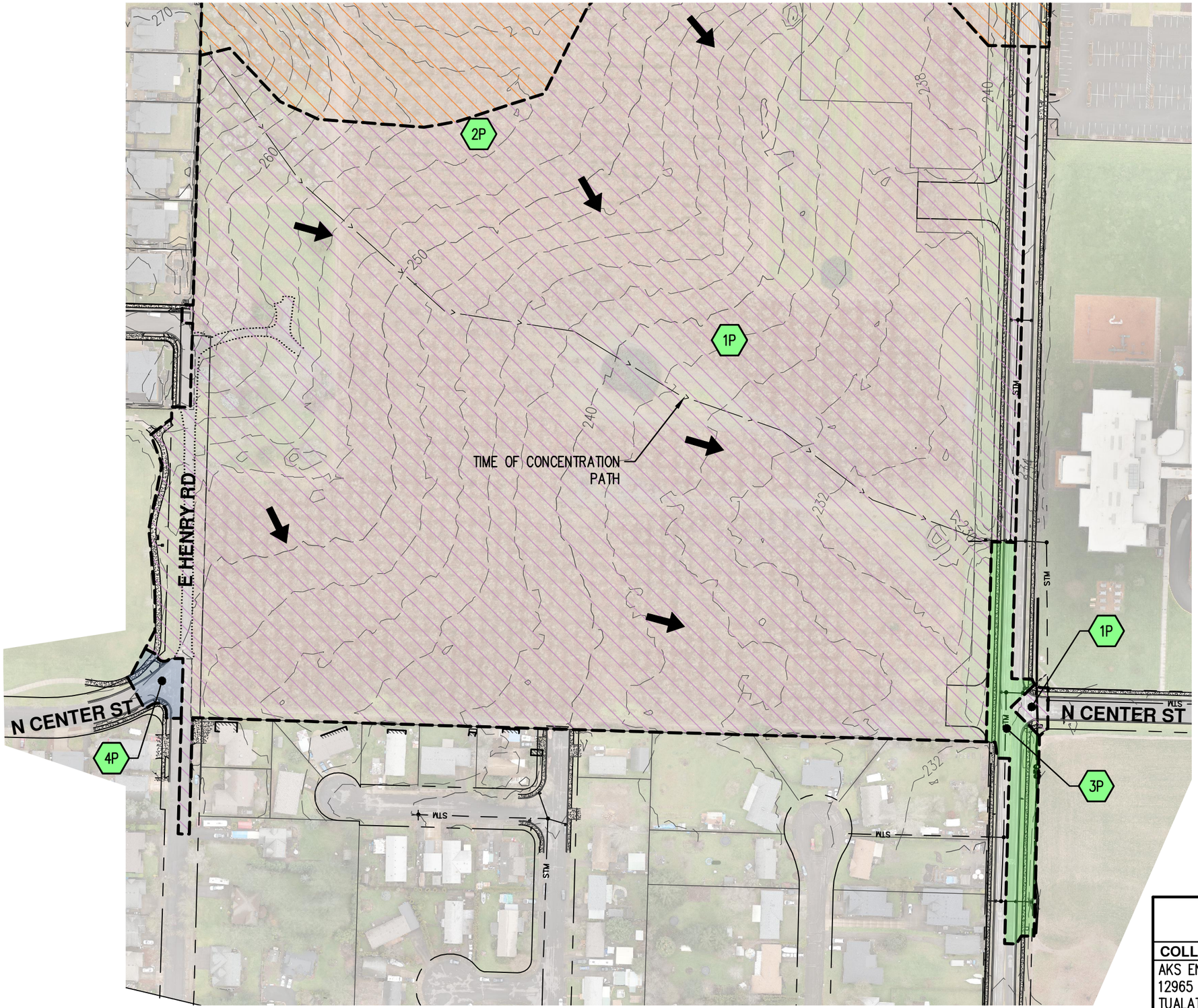
FIGURE 2C

COLLINA AT SPRINGBROOK

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
503.563.6151 WWW.AKS-ENG.COM

DRWN: GPS
CHKD: TS
AKS JOB: 4487-01

DWG: 4487-01 PRE DEVELOPED | 2C



LEGEND

- #P SUBCATCHMENT
- SUBBASIN #1
- SUBBASIN #2
- SUBBASIN #3
- SUBBASIN #4
- SUBBASIN #5
- SUBBASIN #6

N

SCALE: 1"=150 FEET

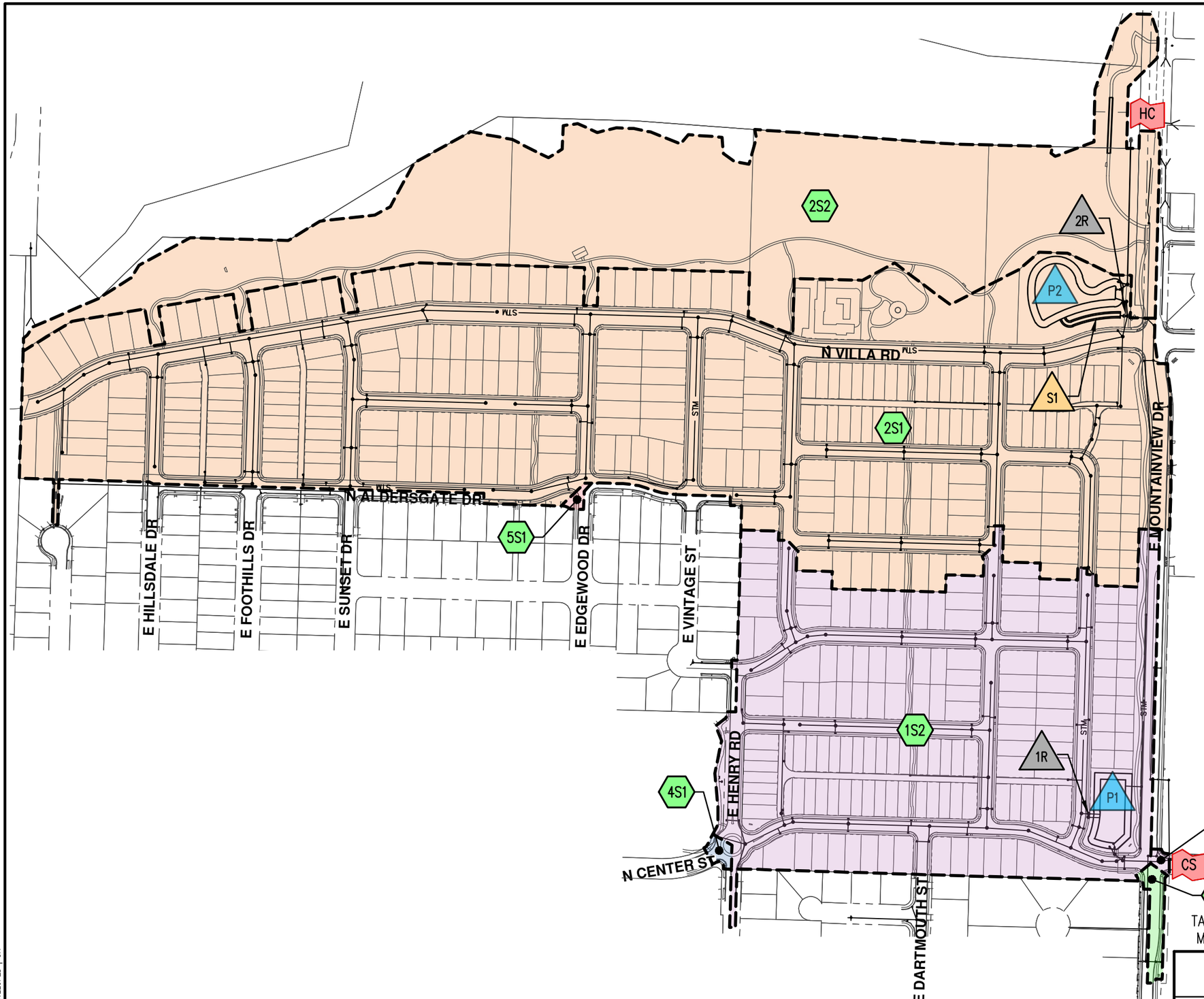
150 0 30 75 150

DATE: 10/07/2022

PRE-DEVELOPED BASIN DELINEATION WEST	FIGURE **2D**
COLLINA AT SPRINGBROOK	
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 503.563.6151 WWW.AKS-ENG.COM	DRWN: GPS CHKD: TS AKS JOB: 4487-01

DWG: 4487-01 PRE DEVELOPED | 2D

Figure 3A-3D: POST-DEVELOPED BASIN DELINEATION



LEGEND

- #S SUBCATCHMENT
- P# STORMWATER POND
- #R HIGHFLOW BYPASS/WATER QUALITY MANHOLE
- S# VEGETATED SWALE
- XX OUTFALL
- SUBBASIN #1
- SUBBASIN #2
- SUBBASIN #3
- SUBBASIN #4
- SUBBASIN #5

N

SCALE: 1"= 300 FEET

300 0 60 150 300

DATE: 10/07/2022

POST-DEVELOPED BASIN DELINEATION OVERVIEW

FIGURE 3A

COLLINA AT SPRINGBROOK

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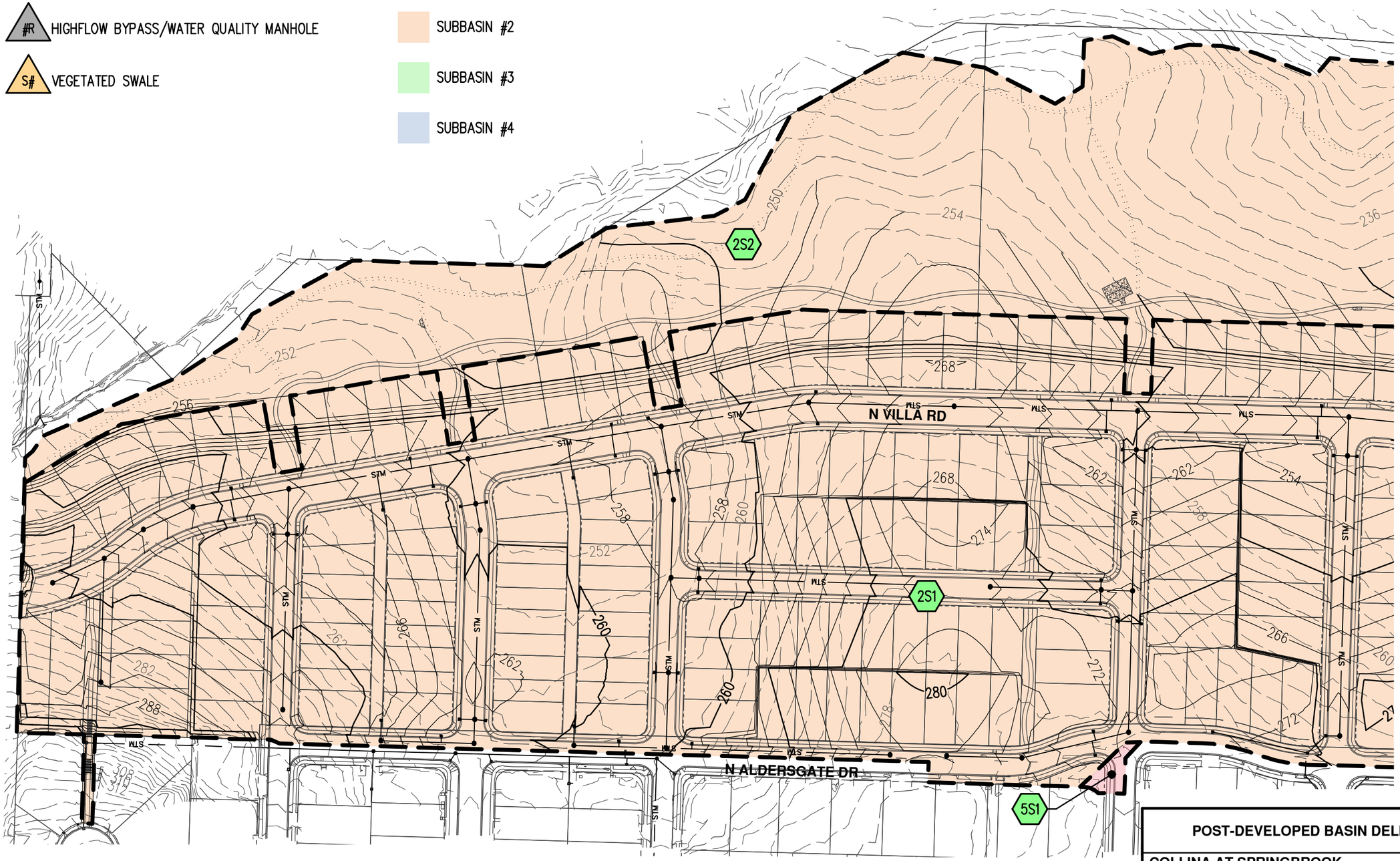
DRWN: GPS
CHKD: TS
AKS JOB: 4487-01

DWG: 4487-01 POST DEVELOPED | 3A

LEGEND

- #S SUBCATCHMENT
- P# STORMWATER POND
- #R HIGHFLOW BYPASS/WATER QUALITY MANHOLE
- S# VEGETATED SWALE
- XX OUTFALL
- SUBBASIN #1
- SUBBASIN #2
- SUBBASIN #3
- SUBBASIN #4



N

SCALE: 1"= 150 FEET

150 0 30 75 150

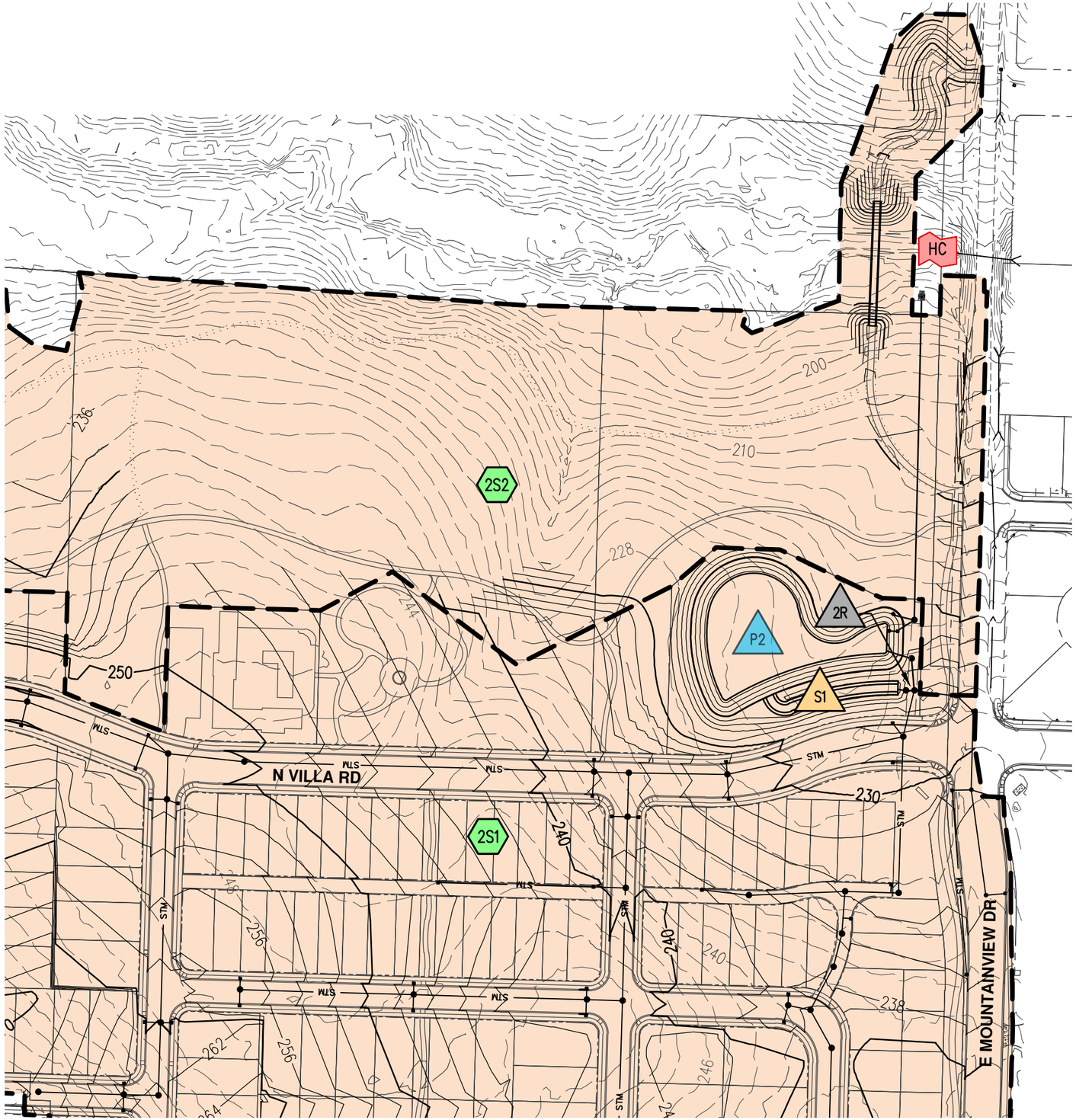
DATE: 10/07/2022

POST-DEVELOPED BASIN DELINEATION NORTH	FIGURE **3B**
COLLINA AT SPRINGBROOK	

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
503.563.6151 WWW.AKS-ENG.COM

DRWN: GPS
CHKD: TS
AKS JOB: 4487-01

DWG: 4487-01 POST DEVELOPED | 3B



LEGEND

- #S SUBCATCHMENT
- P# STORMWATER POND
- #R HIGHFLOW BYPASS/WATER QUALITY MANHOLE
- S# VEGETATED SWALE
- XX OUTFALL
- SUBBASIN #1
- SUBBASIN #2
- SUBBASIN #3
- SUBBASIN #4

N

SCALE: 1"=150 FEET

150 0 30 75 150

DATE: 10/07/2022

POST-DEVELOPED BASIN DELINEATION EAST

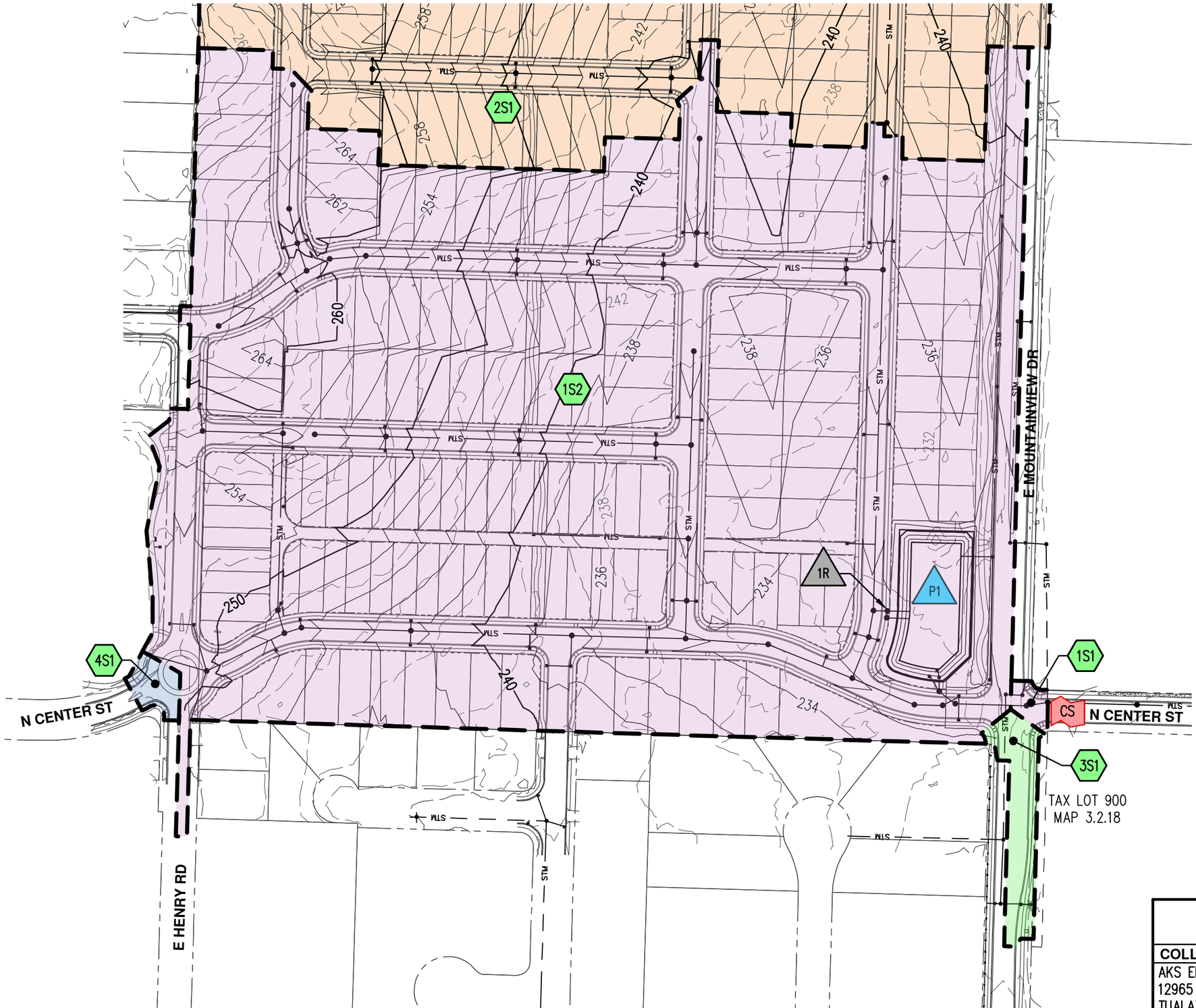
FIGURE 3C

COLLINA AT SPRINGBROOK

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
503.563.6151 WWW.AKS-ENG.COM

DRWN: GPS
CHKD: TS
AKS JOB: 4487-01

DWG: 4487-01 POST DEVELOPED | 3C



LEGEND

- #S — SUBCATCHMENT
- P# — STORMWATER POND
- #R — HIGHFLOW BYPASS/WATER QUALITY MANHOLE
- S# — VEGETATED SWALE
- XX — OUTFALL
- SUBBASIN #1
- SUBBASIN #2
- SUBBASIN #3
- SUBBASIN #4

N

SCALE: 1"=150 FEET

150 0 30 75 150

DATE: 10/07/2022

POST-DEVELOPED BASIN DELINEATION WEST

COLLINA AT SPRINGBROOK

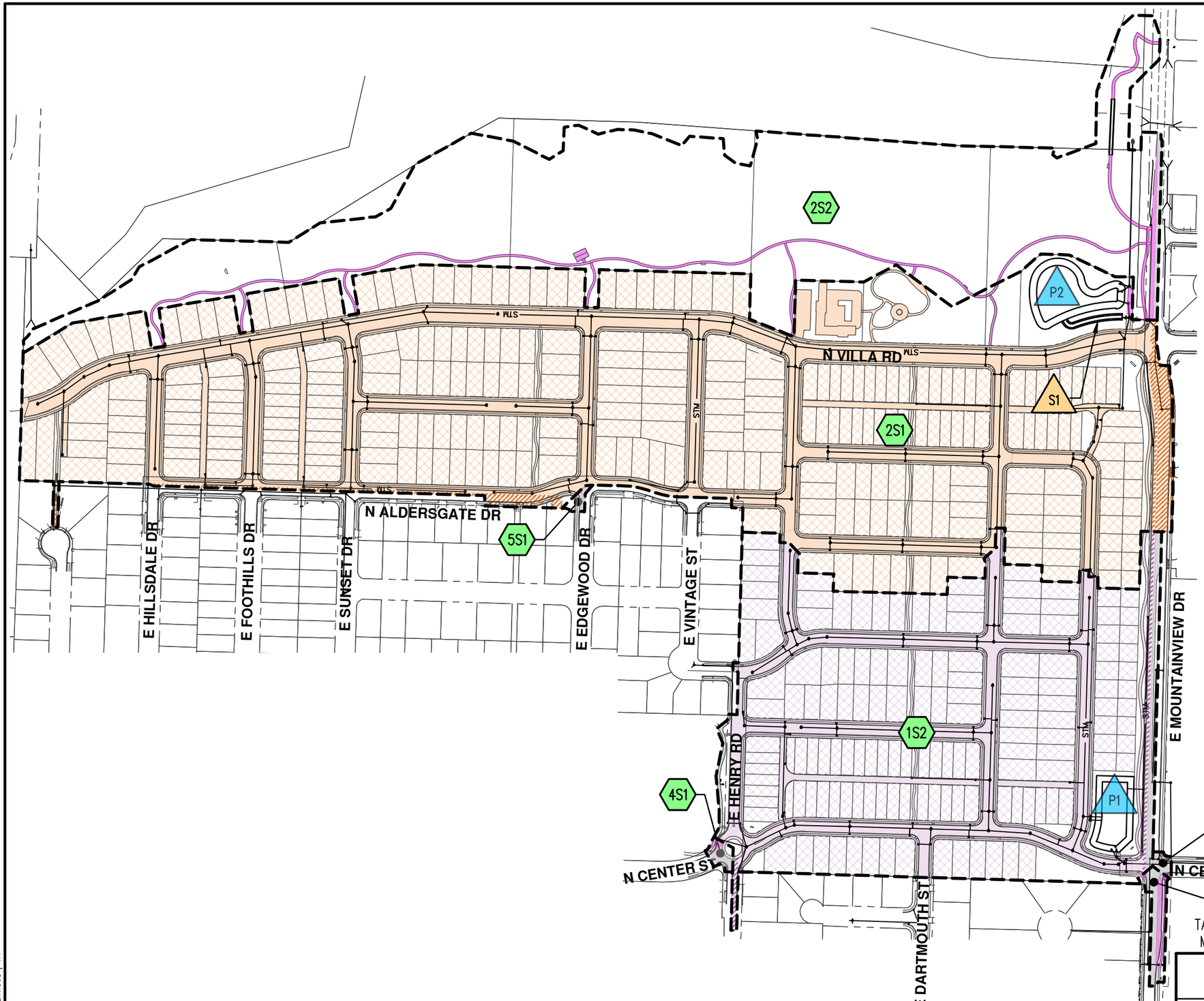
AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
503.563.6151 WWW.AKS-ENG.COM

FIGURE 3D

DRWN: GPS
CHKD: TS
AKS JOB: 4487-01

DWG: 4487-01 POST DEVELOPED | 3D

Figure 4A-4D: IMPERVIOUS AREA MAPS



LEGEND

- #S SUBCATCHMENT
- P# STORMWATER POND
- S# VEGETATED SWALE

SUBBASIN #1 (NODE 1S02) AREA TO BE TREATED	
PROPOSED IMPERVIOUS LOT AREA	±402,957 SF
PROPOSED IMPERVIOUS ROW/OPEN SPACE AREA	±323,102 SF
EXISTING UNTREATED IMPERVIOUS AREA	±8,305 SF
TOTAL AREA TO BE TREATED BY P1	±734,364 SF

SUBBASIN #2 (NODE 2S01) AREA TO BE TREATED	
PROPOSED IMPERVIOUS LOT AREA	±763,559 SF
PROPOSED IMPERVIOUS ROW/OPEN SPACE AREA	±653,436 SF
EXISTING UNTREATED IMPERVIOUS AREA	±37,317 SF
TOTAL AREA TO BE TREATED BY S1	±1,454,312 SF

PROPOSED UNTREATED IMPERVIOUS AREA	±42,754 SF
EXISTING UNTREATED IMPERVIOUS AREA TO REMAIN	

N

SCALE: 1"= 300 FEET

300 0 60 150 300

TAX LOT 900
MAP 3.2.18

DATE: 10/07/2022

IMPERVIOUS AREA MAP OVERVIEW

FIGURE 4A

COLLINA AT SPRINGBROOK

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
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DRWN: GPS
CHKD: TS
AKS JOB: 4487-01

DWG: 4487-01 NET IMPERVIOUS | 4A

LEGEND

#S SUBCATCHMENT

P# STORMWATER POND

S# VEGETATED SWALE

PROPOSED UNTREATED IMPERVIOUS AREA ±42,754 SF

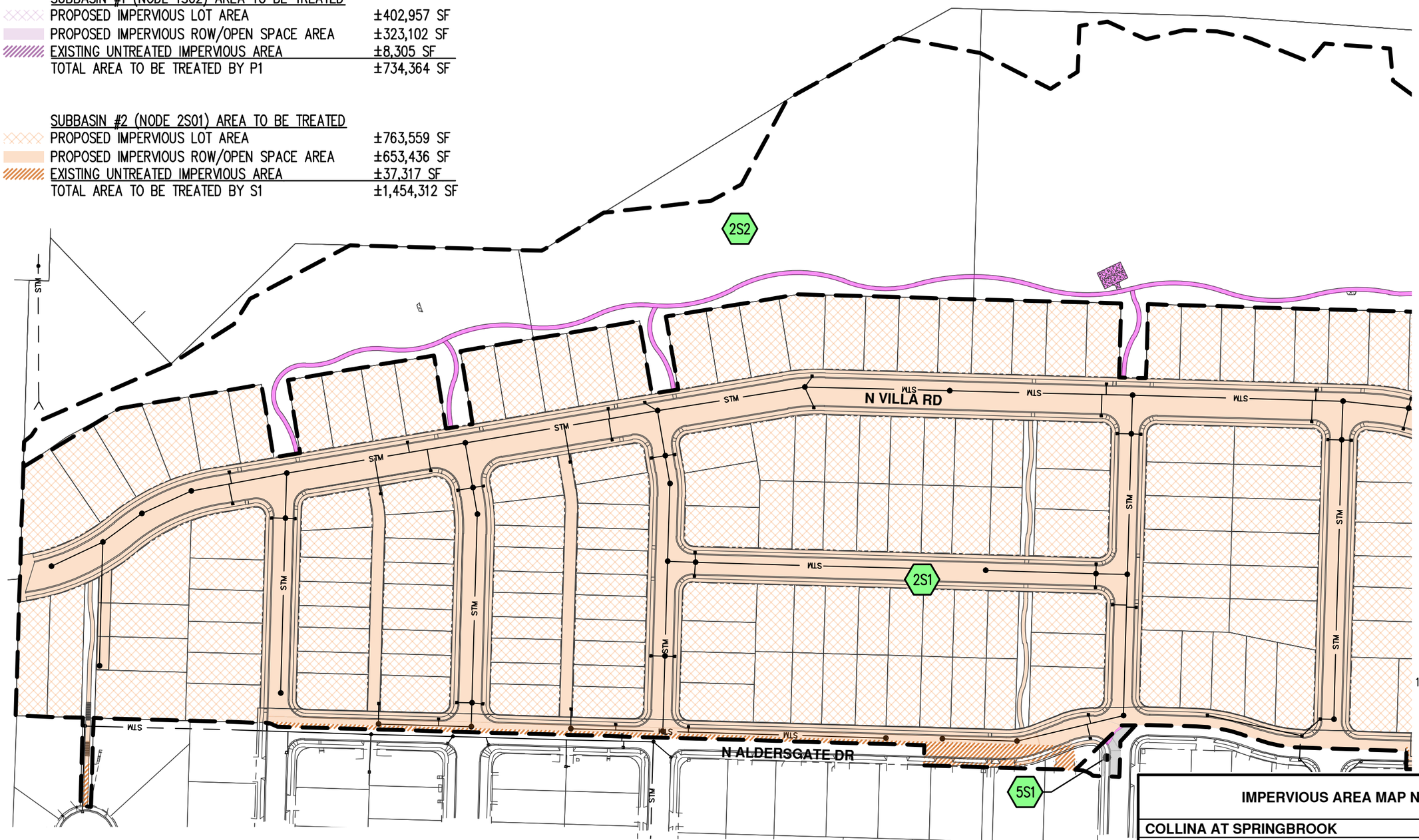
EXISTING UNTREATED IMPERVIOUS AREA TO REMAIN

SUBBASIN #1 (NODE 1S02) AREA TO BE TREATED

PROPOSED IMPERVIOUS LOT AREA	±402,957 SF
PROPOSED IMPERVIOUS ROW/OPEN SPACE AREA	±323,102 SF
EXISTING UNTREATED IMPERVIOUS AREA	±8,305 SF
TOTAL AREA TO BE TREATED BY P1	±734,364 SF

SUBBASIN #2 (NODE 2S01) AREA TO BE TREATED

PROPOSED IMPERVIOUS LOT AREA	±763,559 SF
PROPOSED IMPERVIOUS ROW/OPEN SPACE AREA	±653,436 SF
EXISTING UNTREATED IMPERVIOUS AREA	±37,317 SF
TOTAL AREA TO BE TREATED BY S1	±1,454,312 SF



SCALE: 1"=150 FEET

150 0 30 75 150

DATE: 10/07/2022

IMPERVIOUS AREA MAP NORTH

COLLINA AT SPRINGBROOK

FIGURE **4B**

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
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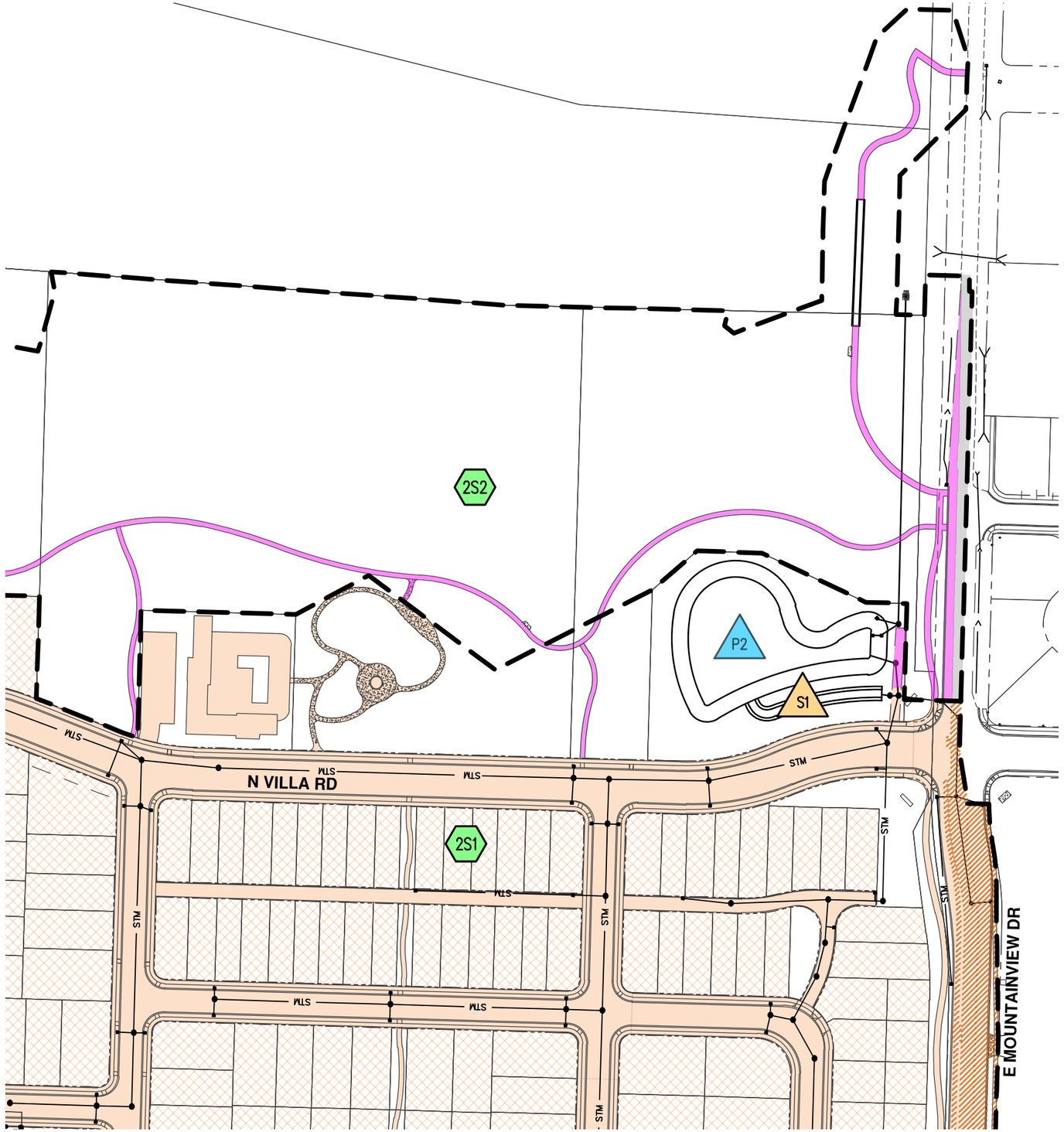
DRWN: GPS
CHKD: TS
AKS JOB: 4487-01

DWG: 4487-01 NET IMPERVIOUS | 4B



LEGEND

#S SUBCATCHMENT

P# STORMWATER POND

S# VEGETATED SWALE

SUBBASIN #1 (NODE 1S02) AREA TO BE TREATED	
PROPOSED IMPERVIOUS LOT AREA	±402,957 SF
PROPOSED IMPERVIOUS ROW/OPEN SPACE AREA	±323,102 SF
EXISTING UNTREATED IMPERVIOUS AREA	±8,305 SF
TOTAL AREA TO BE TREATED BY P1	±734,364 SF

SUBBASIN #2 (NODE 2S01) AREA TO BE TREATED	
PROPOSED IMPERVIOUS LOT AREA	±763,559 SF
PROPOSED IMPERVIOUS ROW/OPEN SPACE AREA	±653,436 SF
EXISTING UNTREATED IMPERVIOUS AREA	±37,317 SF
TOTAL AREA TO BE TREATED BY S1	±1,454,312 SF

PROPOSED UNTREATED IMPERVIOUS AREA	±42,754 SF
EXISTING UNTREATED IMPERVIOUS AREA TO REMAIN	

N

SCALE: 1"=150 FEET

150 0 30 75 150

DATE: 10/07/2022

IMPERVIOUS AREA MAP EAST

FIGURE 4C

COLLINA AT SPRINGBROOK

AKS ENGINEERING & FORESTRY, LLC
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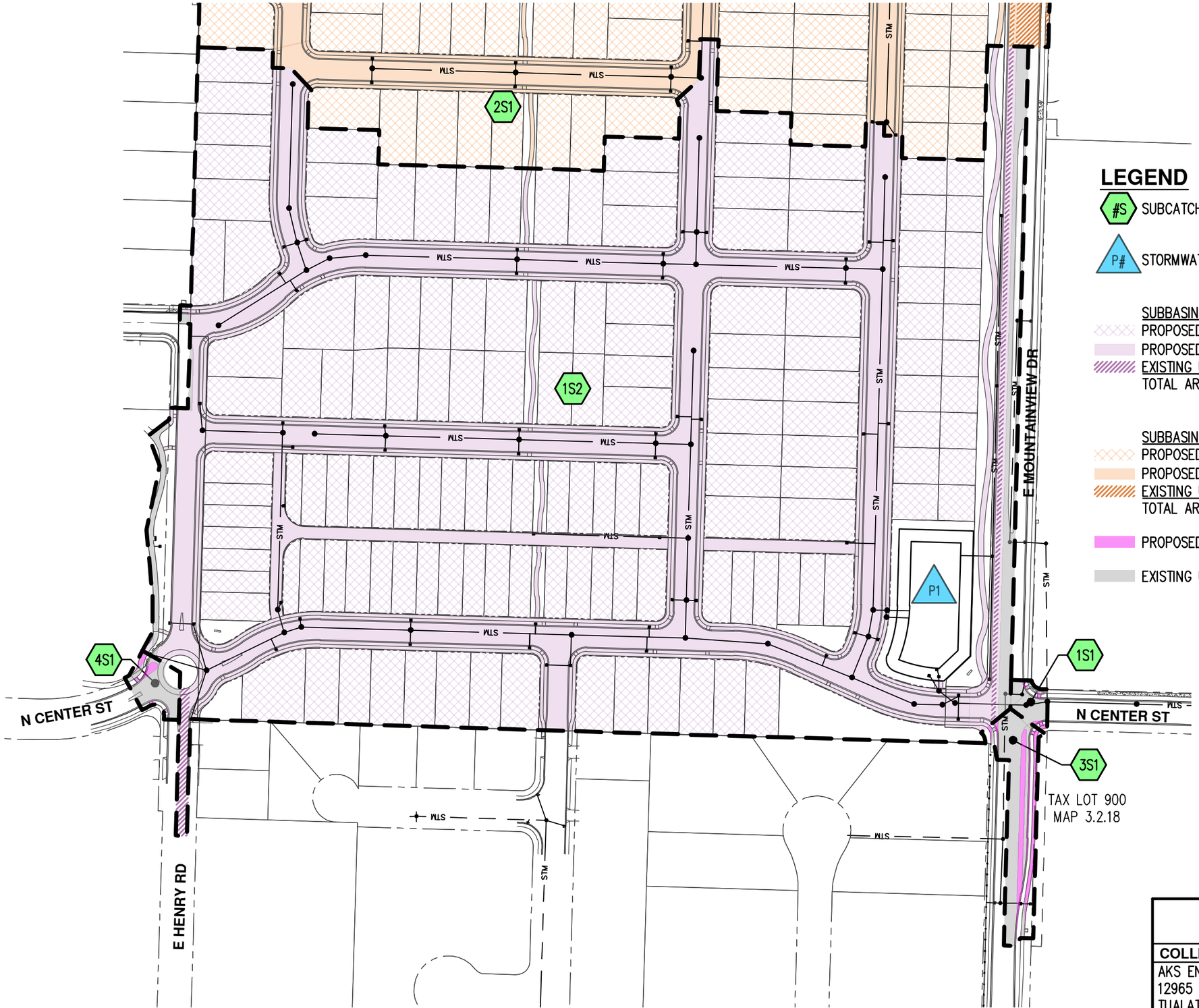
TUALATIN, OR 97062
503.563.6151 WWW.AKS-ENG.COM

DRWN: GPS
CHKD: TS
AKS JOB: 4487-01

DWG: 4487-01 NET IMPERVIOUS | 4C



LEGEND

#S SUBCATCHMENT

P# STORMWATER POND

S# VEGETATED SWALE

SUBBASIN #1 (NODE 1S02) AREA TO BE TREATED	
PROPOSED IMPERVIOUS LOT AREA	±402,957 SF
PROPOSED IMPERVIOUS ROW/OPEN SPACE AREA	±323,102 SF
EXISTING UNTREATED IMPERVIOUS AREA	±8,305 SF
TOTAL AREA TO BE TREATED BY P1	±734,364 SF

SUBBASIN #2 (NODE 2S01) AREA TO BE TREATED	
PROPOSED IMPERVIOUS LOT AREA	±763,559 SF
PROPOSED IMPERVIOUS ROW/OPEN SPACE AREA	±653,436 SF
EXISTING UNTREATED IMPERVIOUS AREA	±37,317 SF
TOTAL AREA TO BE TREATED BY S1	±1,454,312 SF
PROPOSED UNTREATED IMPERVIOUS AREA	±42,754 SF
EXISTING UNTREATED IMPERVIOUS AREA TO REMAIN	

N

SCALE: 1"=150 FEET

150 0 30 75 150

DATE: 10/07/2022

IMPERVIOUS AREA MAP WEST

COLLINA AT SPRINGBROOK

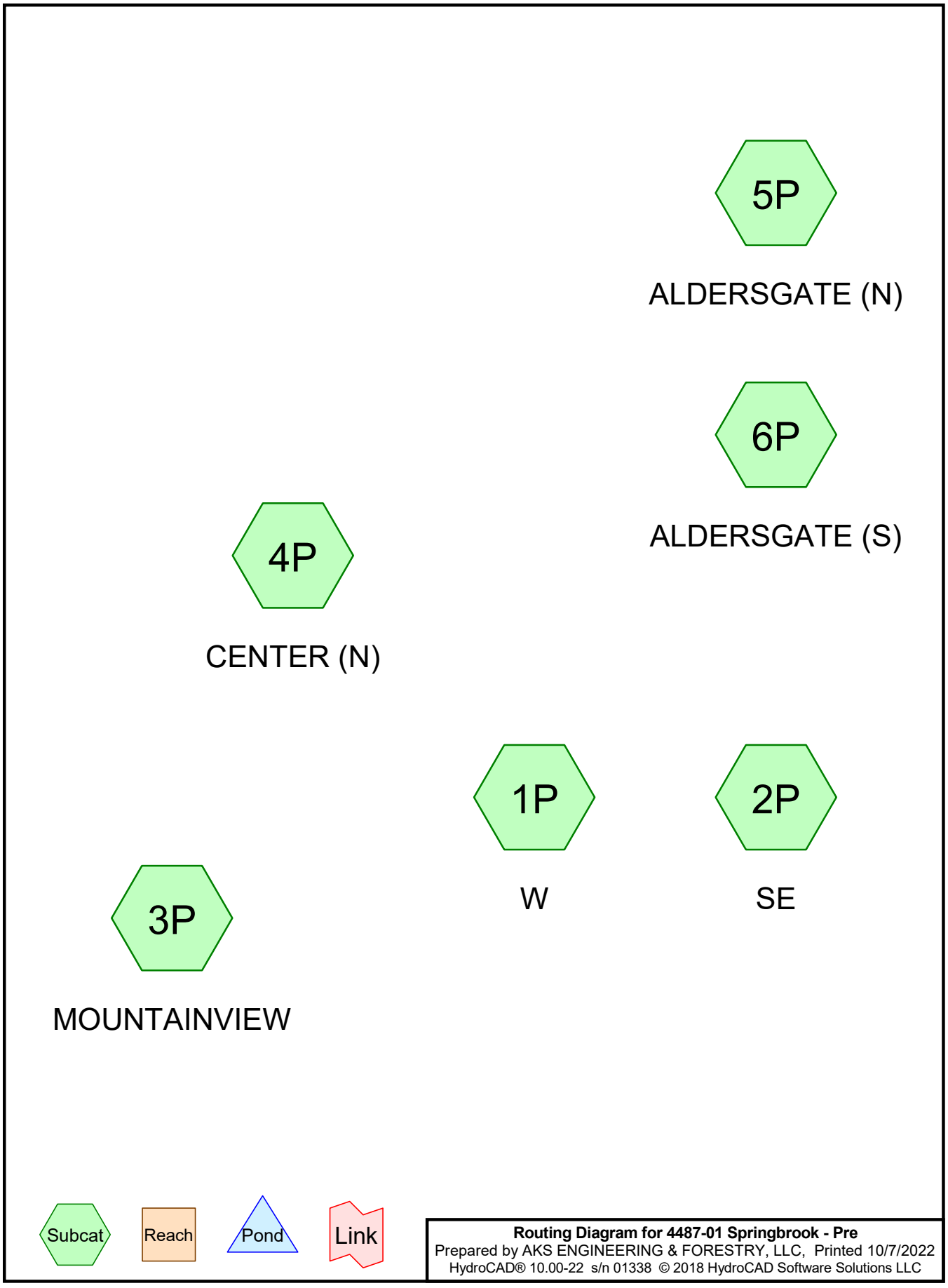
FIGURE **4D**

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
503.563.6151 WWW.AKS-ENG.COM

DRWN: GPS
CHKD: TS
AKS JOB: 4487-01

DWG: 4487-01 NET IMPERVIOUS | 4D

Appendix A: HYDROCAD REPORTS FOR PRE-DEVELOPED CONDITION STORM EVENTS



Routing Diagram for 4487-01 Springbrook - Pre
Prepared by AKS ENGINEERING & FORESTRY, LLC, Printed 10/7/2022
HydroCAD® 10.00-22 s/n 01338 © 2018 HydroCAD Software Solutions LLC

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1P: W Runoff Area=1,284,759 sf 2.03% Impervious Runoff Depth=0.29"
Flow Length=1,389' Tc=29.8 min CN=84/98 Runoff=0.69 cfs 0.707 af

Subcatchment 2P: SE Runoff Area=3,125,647 sf 1.30% Impervious Runoff Depth=0.18"
Flow Length=2,065' Tc=27.1 min CN=80/98 Runoff=0.88 cfs 1.102 af

Subcatchment 3P: MOUNTAINVIEW Runoff Area=25,396 sf 60.03% Impervious Runoff Depth=0.73"
Tc=5.0 min CN=84/98 Runoff=0.10 cfs 0.035 af

Subcatchment 4P: CENTER (N) Runoff Area=5,401 sf 80.65% Impervious Runoff Depth=0.87"
Tc=5.0 min CN=80/98 Runoff=0.03 cfs 0.009 af

Subcatchment 5P: ALDERSGATE (N) Runoff Area=9,103 sf 85.65% Impervious Runoff Depth=0.90"
Tc=5.0 min CN=77/98 Runoff=0.05 cfs 0.016 af

Subcatchment 6P: ALDERSGATE (S) Runoff Area=0.062 ac 100.00% Impervious Runoff Depth=1.03"
Tc=5.0 min CN=0/98 Runoff=0.02 cfs 0.005 af

Total Runoff Area = 102.227 ac Runoff Volume = 1.875 af Average Runoff Depth = 0.22"
97.83% Pervious = 100.004 ac 2.17% Impervious = 2.223 ac

Summary for Subcatchment 1P: W

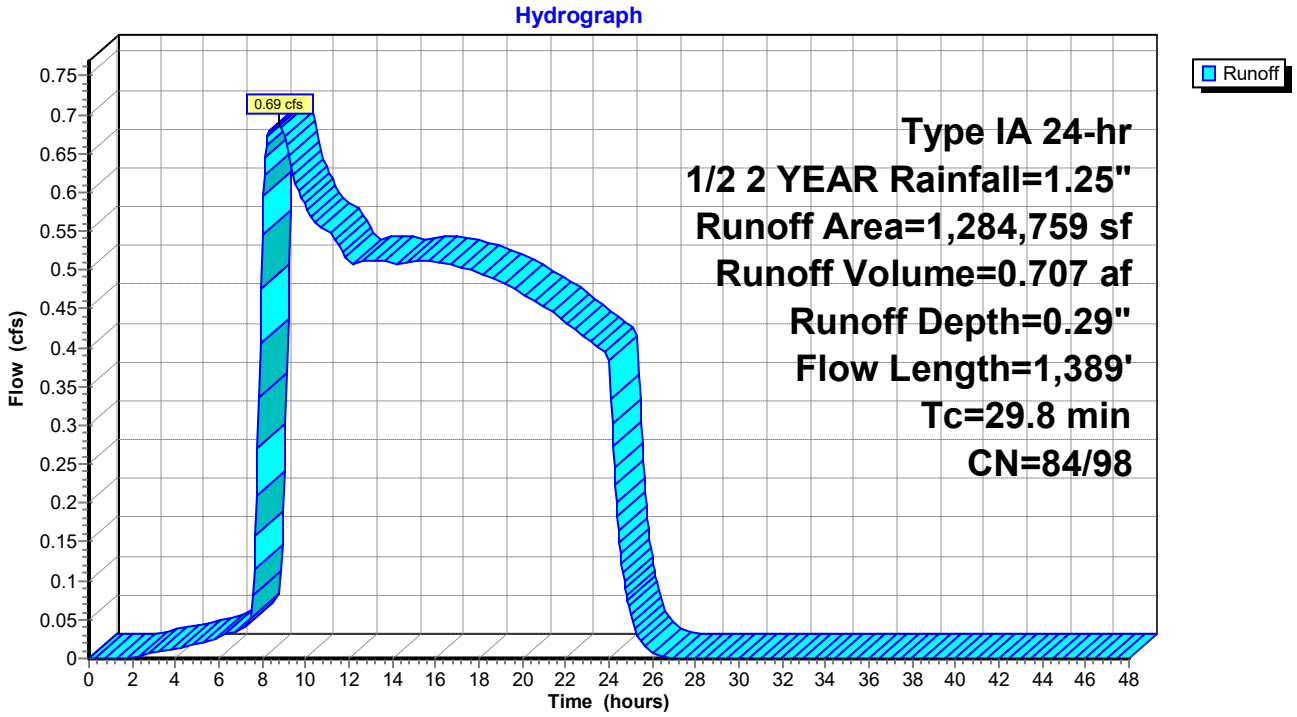
Runoff = 0.69 cfs @ 8.75 hrs, Volume= 0.707 af, Depth= 0.29"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

Area (sf)	CN	Description
696,873	82	Woods/grass comb., Poor, HSG C
536,093	86	Woods/grass comb., Poor, HSG D
26,049	98	Paved roads w/curbs & sewers, HSG C
9,932	96	Gravel surface, HSG C
11,238	74	>75% Grass cover, Good, HSG C
4,574	80	>75% Grass cover, Good, HSG D
1,284,759	84	Weighted Average
1,258,710	84	97.97% Pervious Area
26,049	98	2.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0480	0.08		**Sheet Flow, Sheet-Orchard** Woods: Light underbrush n= 0.400 P2= 2.50"
7.9	658	0.0392	1.39		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
12.1	681	0.0181	0.94		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
29.8	1,389	Total			

Subcatchment 1P: W



Summary for Subcatchment 2P: SE

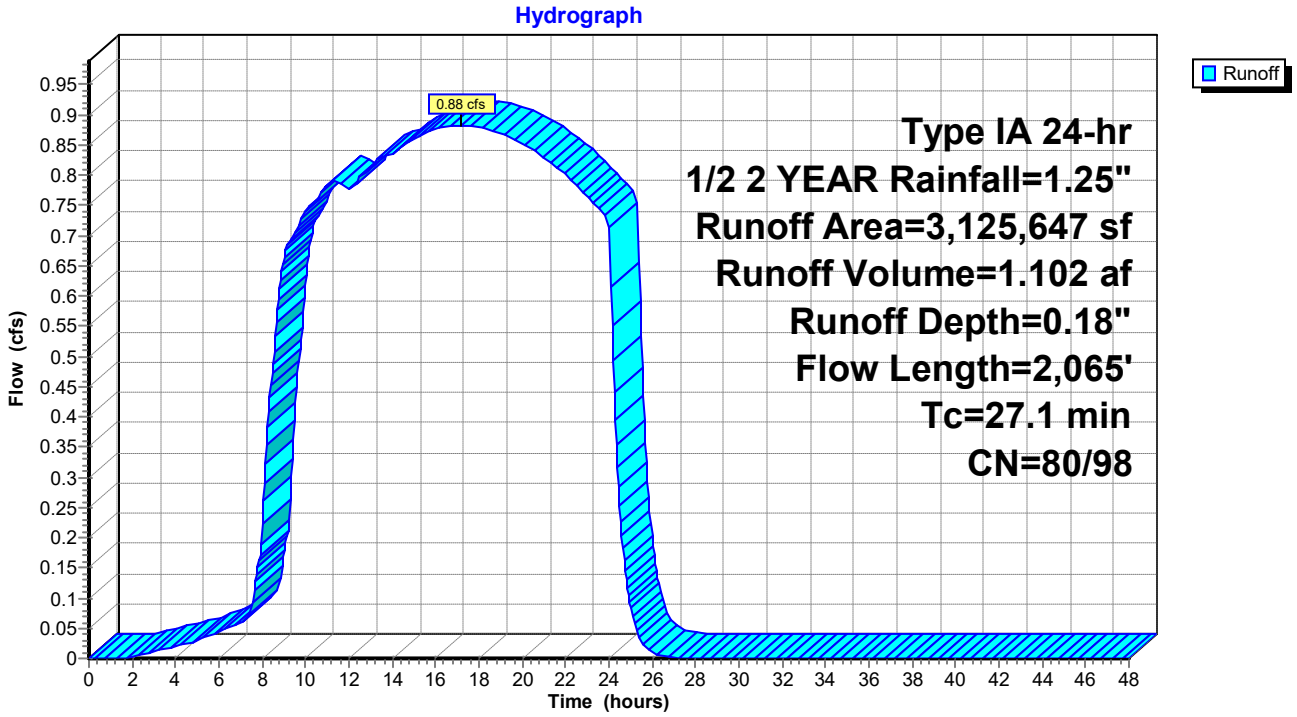
Runoff = 0.88 cfs @ 17.20 hrs, Volume= 1.102 af, Depth= 0.18"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

	Area (sf)	CN	Description
	38,333	82	Farmsteads, HSG C
	2,022,883	79	Pasture/grassland/range, Fair, HSG C
	495,843	84	Pasture/grassland/range, Fair, HSG D
	315,113	82	Woods/grass comb., Poor, HSG C
	39,683	98	Paved roads w/curbs & sewers, HSG C
	15,812	96	Gravel surface, HSG C
	3,615	79	50-75% Grass cover, Fair, HSG C
	171,757	73	Brush, Good, HSG D
	21,606	74	>75% Grass cover, Good, HSG C
*	1,002	100	Stream
	3,125,647	80	Weighted Average
	3,084,962	80	98.70% Pervious Area
	40,685	98	1.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	16	0.1182	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.50"
3.1	268	0.0208	1.44		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
7.4	493	0.0124	1.11		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
1.5	178	0.0822	2.01		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.2	486	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.6	624	0.0709	1.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
27.1	2,065	Total			

Subcatchment 2P: SE



Summary for Subcatchment 3P: MOUNTAINVIEW

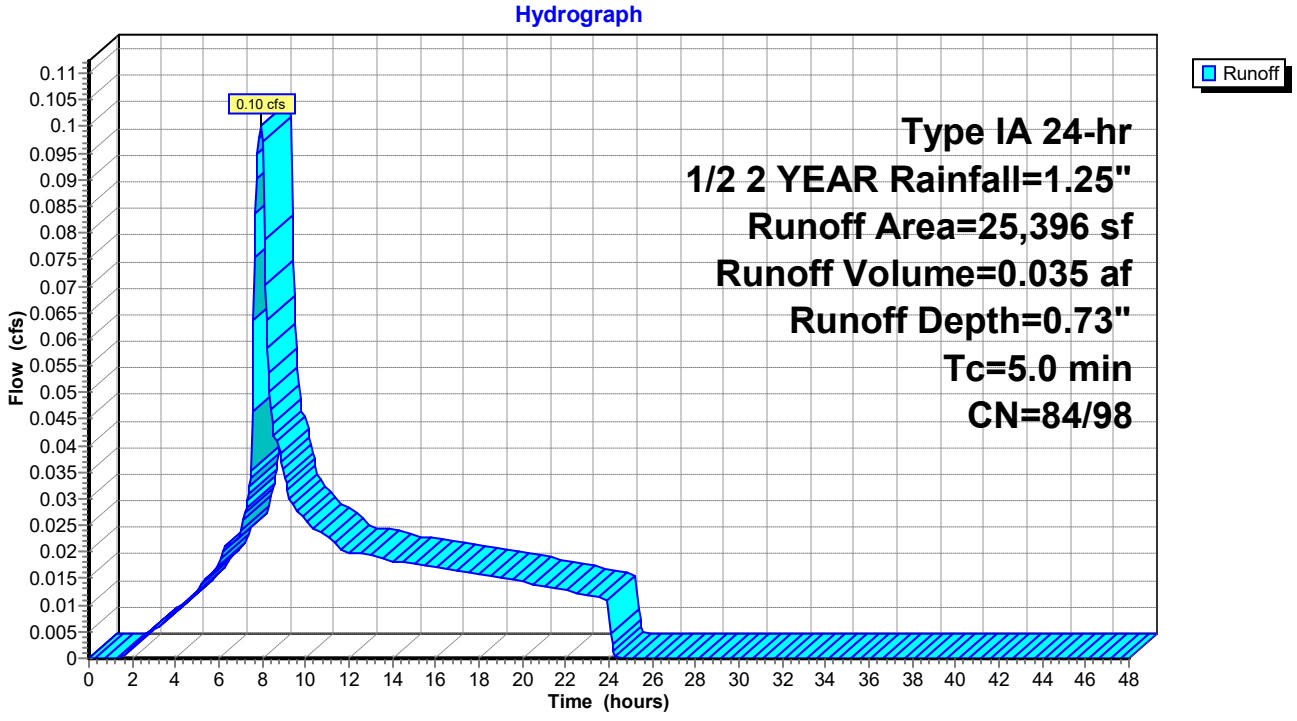
Runoff = 0.10 cfs @ 7.95 hrs, Volume= 0.035 af, Depth= 0.73"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

Area (sf)	CN	Description
6,447	86	Woods/grass comb., Poor, HSG D
15,246	98	Paved roads w/curbs & sewers, HSG C
3,703	80	>75% Grass cover, Good, HSG D
25,396	92	Weighted Average
10,150	84	39.97% Pervious Area
15,246	98	60.03% Impervious Area

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

Subcatchment 3P: MOUNTAINVIEW



Summary for Subcatchment 4P: CENTER (N)

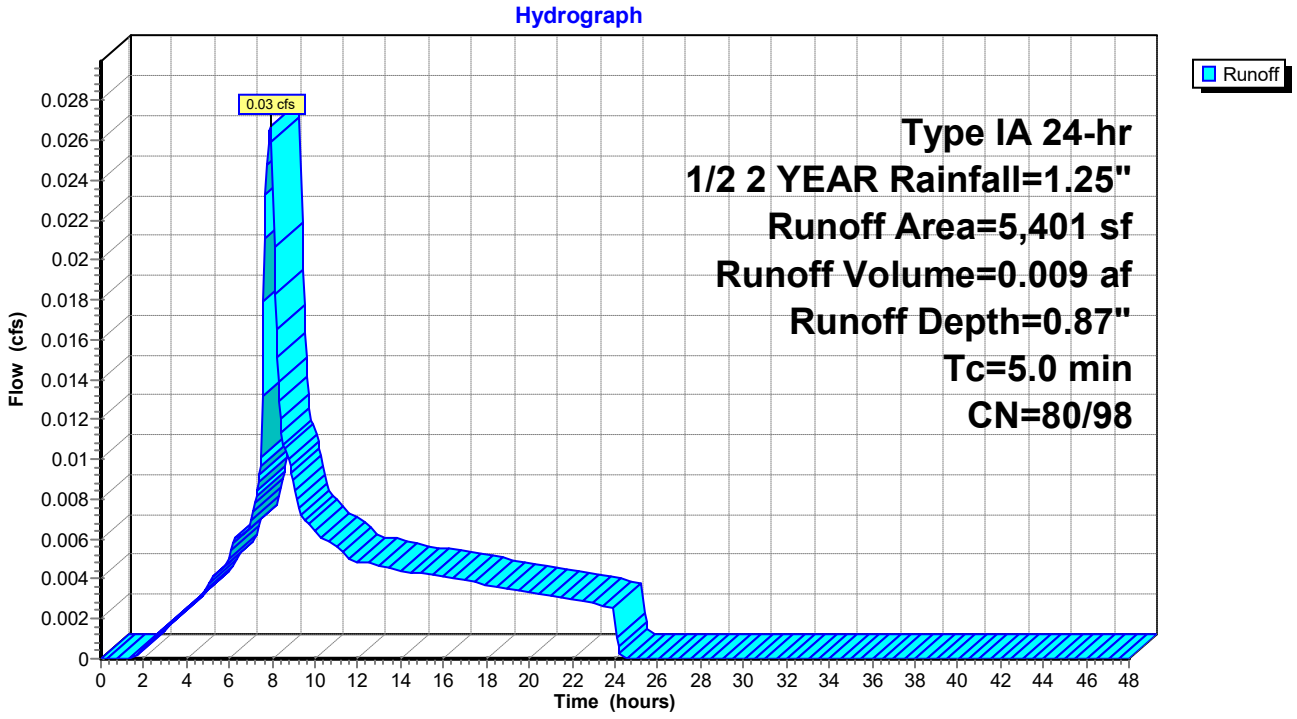
Runoff = 0.03 cfs @ 7.91 hrs, Volume= 0.009 af, Depth= 0.87"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

Area (sf)	CN	Description
4,356	98	Paved roads w/curbs & sewers, HSG C
1,045	80	>75% Grass cover, Good, HSG D
5,401	95	Weighted Average
1,045	80	19.35% Pervious Area
4,356	98	80.65% Impervious Area

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

Subcatchment 4P: CENTER (N)



Summary for Subcatchment 5P: ALDERSGATE (N)

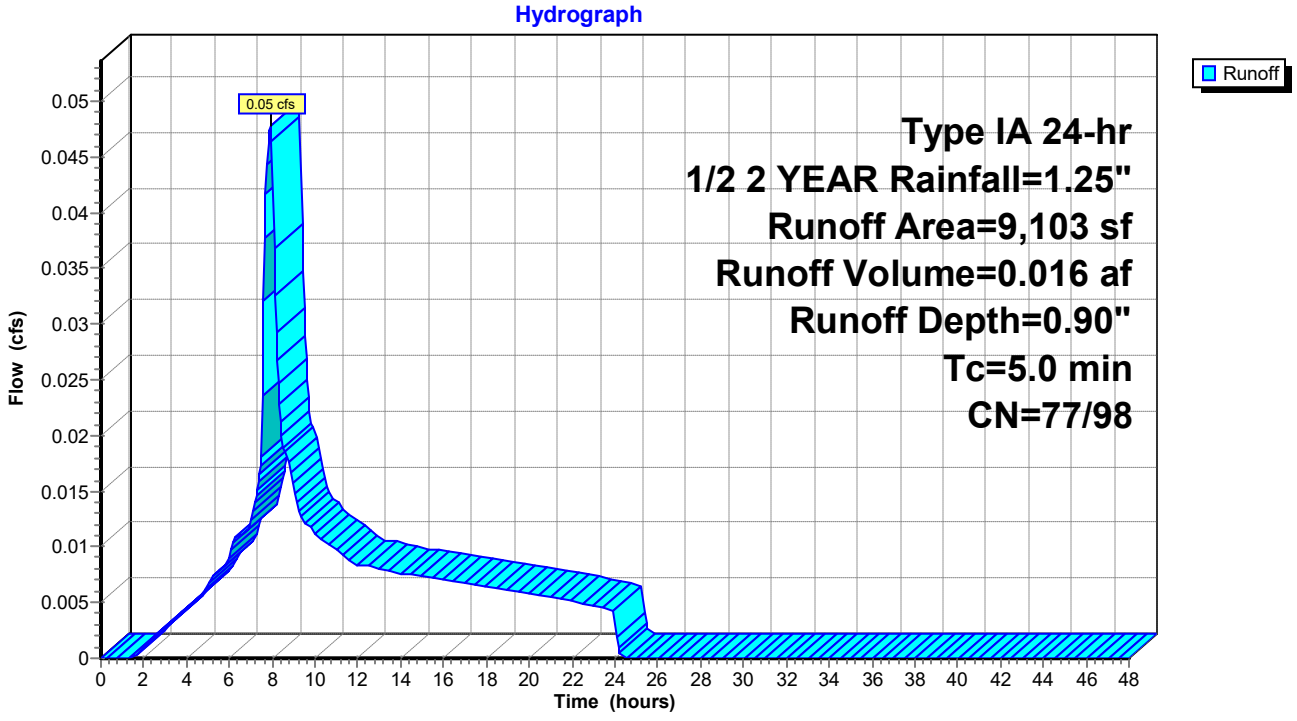
Runoff = 0.05 cfs @ 7.91 hrs, Volume= 0.016 af, Depth= 0.90"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

Area (sf)	CN	Description
7,797	98	Paved roads w/curbs & sewers, HSG C
653	80	>75% Grass cover, Good, HSG D
653	74	>75% Grass cover, Good, HSG C
9,103	95	Weighted Average
1,306	77	14.35% Pervious Area
7,797	98	85.65% Impervious Area

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

Subcatchment 5P: ALDERSGATE (N)



Summary for Subcatchment 6P: ALDERSGATE (S)

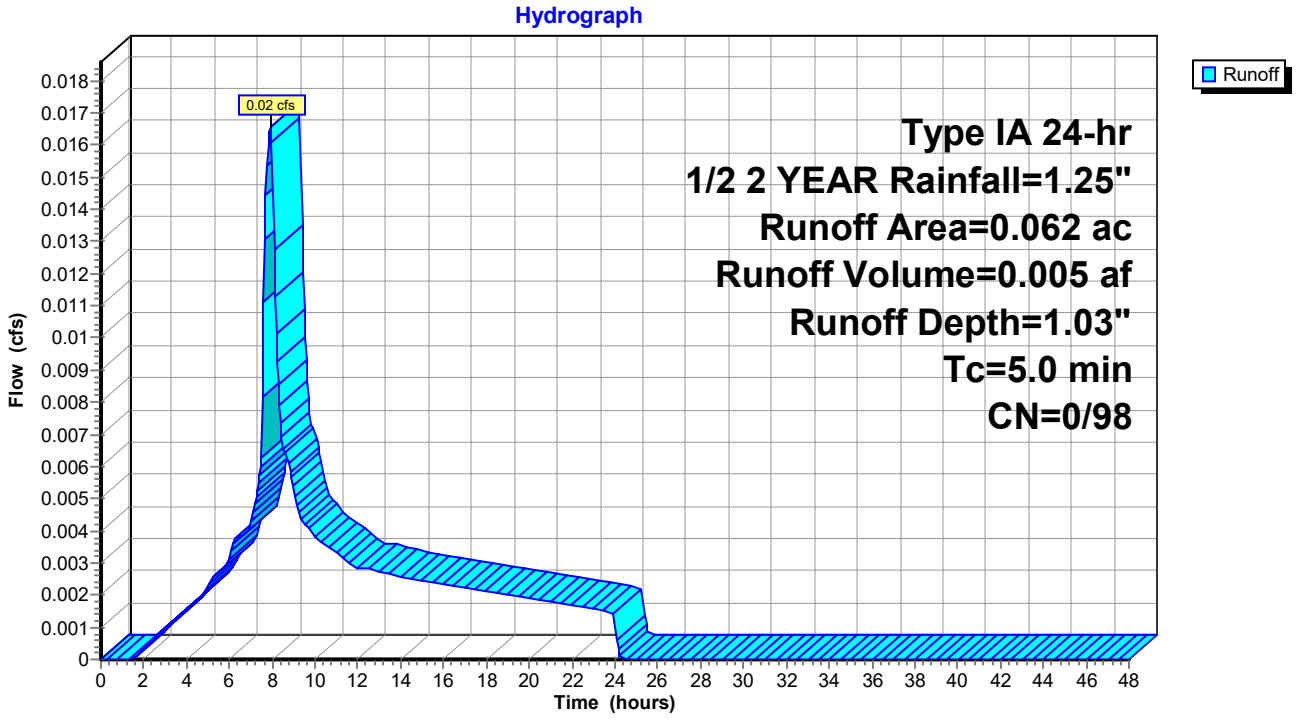
Runoff = 0.02 cfs @ 7.91 hrs, Volume= 0.005 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

Area (ac)	CN	Description
0.062	98	Paved roads w/curbs & sewers, HSG C
0.062	98	100.00% Impervious Area

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

Subcatchment 6P: ALDERSGATE (S)



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1P: W Runoff Area=1,284,759 sf 2.03% Impervious Runoff Depth=1.14"
Flow Length=1,389' Tc=29.8 min CN=84/98 Runoff=5.09 cfs 2.800 af

Subcatchment 2P: SE Runoff Area=3,125,647 sf 1.30% Impervious Runoff Depth=0.91"
Flow Length=2,065' Tc=27.1 min CN=80/98 Runoff=8.78 cfs 5.423 af

Subcatchment 3P: MOUNTAINVIEW Runoff Area=25,396 sf 60.03% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=84/98 Runoff=0.26 cfs 0.088 af

Subcatchment 4P: CENTER (N) Runoff Area=5,401 sf 80.65% Impervious Runoff Depth=2.00"
Tc=5.0 min CN=80/98 Runoff=0.06 cfs 0.021 af

Subcatchment 5P: ALDERSGATE (N) Runoff Area=9,103 sf 85.65% Impervious Runoff Depth=2.05"
Tc=5.0 min CN=77/98 Runoff=0.11 cfs 0.036 af

Subcatchment 6P: ALDERSGATE (S) Runoff Area=0.062 ac 100.00% Impervious Runoff Depth=2.27"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.012 af

Total Runoff Area = 102.227 ac Runoff Volume = 8.379 af Average Runoff Depth = 0.98"
97.83% Pervious = 100.004 ac 2.17% Impervious = 2.223 ac

Summary for Subcatchment 1P: W

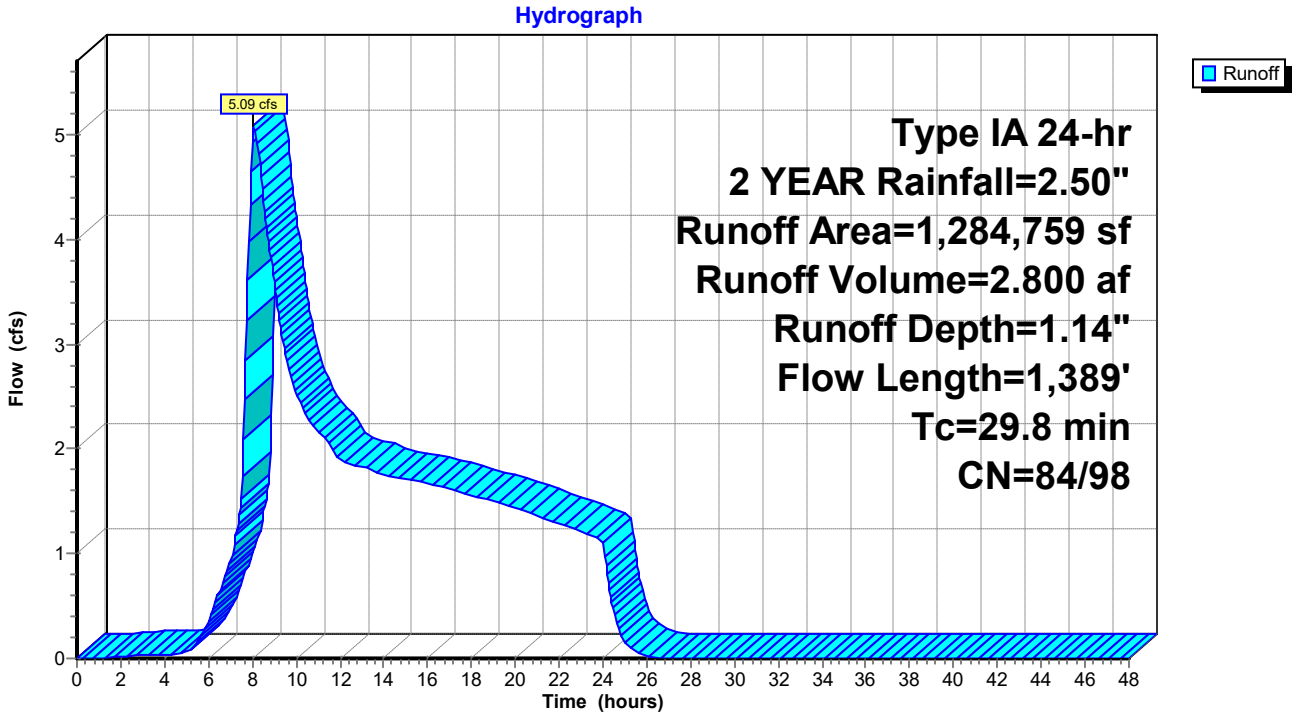
Runoff = 5.09 cfs @ 8.07 hrs, Volume= 2.800 af, Depth= 1.14"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

Area (sf)	CN	Description
696,873	82	Woods/grass comb., Poor, HSG C
536,093	86	Woods/grass comb., Poor, HSG D
26,049	98	Paved roads w/curbs & sewers, HSG C
9,932	96	Gravel surface, HSG C
11,238	74	>75% Grass cover, Good, HSG C
4,574	80	>75% Grass cover, Good, HSG D
1,284,759	84	Weighted Average
1,258,710	84	97.97% Pervious Area
26,049	98	2.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0480	0.08		**Sheet Flow, Sheet-Orchard** Woods: Light underbrush n= 0.400 P2= 2.50"
7.9	658	0.0392	1.39		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
12.1	681	0.0181	0.94		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
29.8	1,389	Total			

Subcatchment 1P: W



Summary for Subcatchment 2P: SE

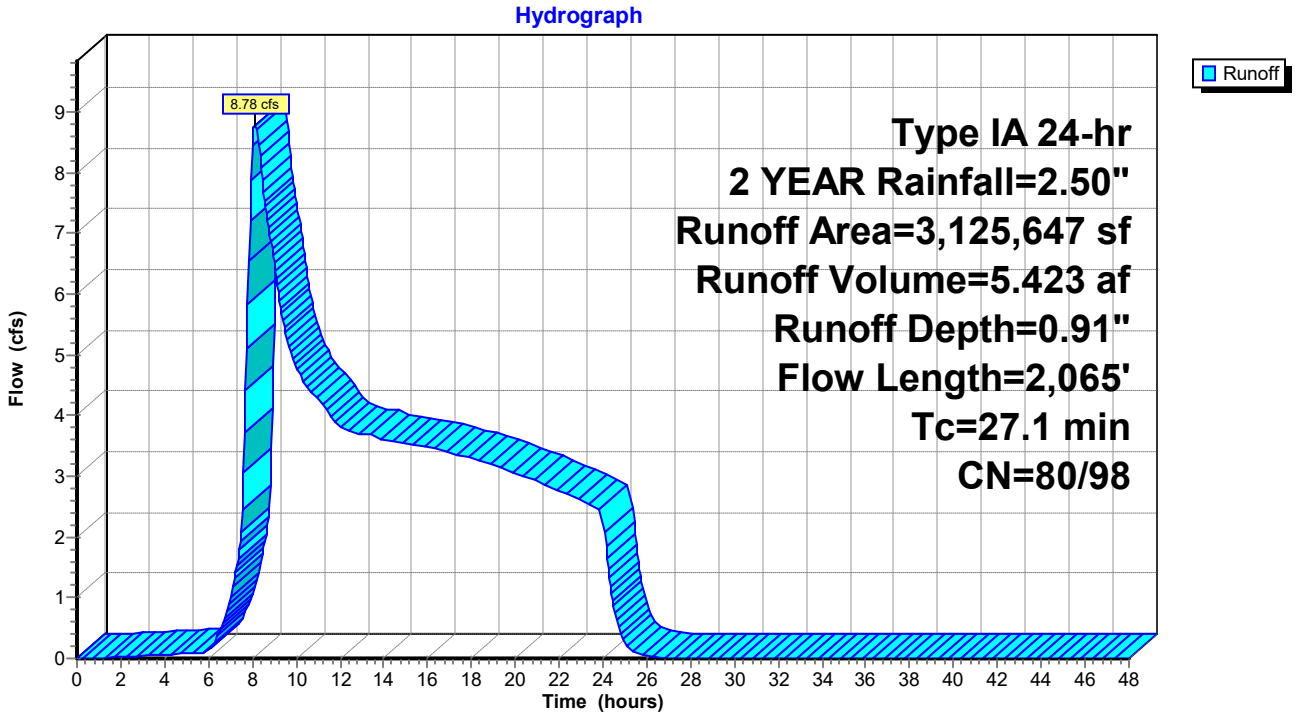
Runoff = 8.78 cfs @ 8.11 hrs, Volume= 5.423 af, Depth= 0.91"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

	Area (sf)	CN	Description
	38,333	82	Farmsteads, HSG C
	2,022,883	79	Pasture/grassland/range, Fair, HSG C
	495,843	84	Pasture/grassland/range, Fair, HSG D
	315,113	82	Woods/grass comb., Poor, HSG C
	39,683	98	Paved roads w/curbs & sewers, HSG C
	15,812	96	Gravel surface, HSG C
	3,615	79	50-75% Grass cover, Fair, HSG C
	171,757	73	Brush, Good, HSG D
	21,606	74	>75% Grass cover, Good, HSG C
*	1,002	100	Stream
	3,125,647	80	Weighted Average
	3,084,962	80	98.70% Pervious Area
	40,685	98	1.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	16	0.1182	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.50"
3.1	268	0.0208	1.44		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
7.4	493	0.0124	1.11		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
1.5	178	0.0822	2.01		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.2	486	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.6	624	0.0709	1.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
27.1	2,065	Total			

Subcatchment 2P: SE



Summary for Subcatchment 3P: MOUNTAINVIEW

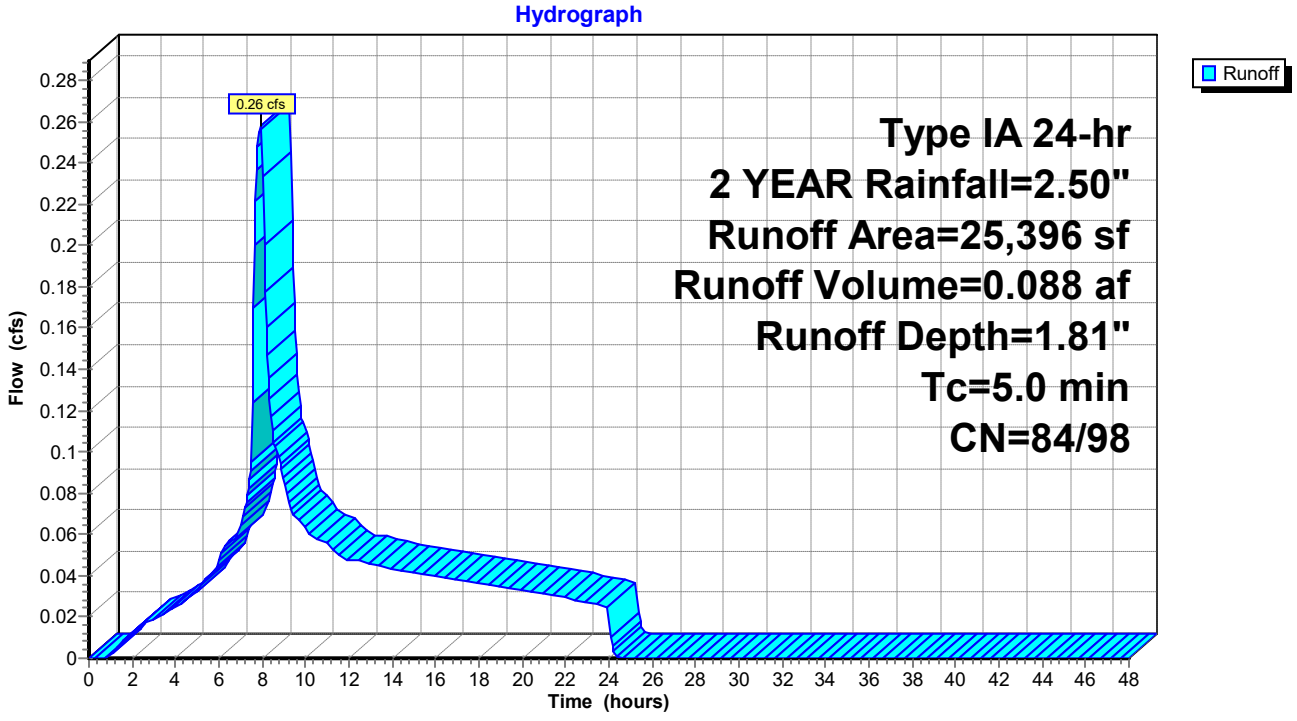
Runoff = 0.26 cfs @ 7.93 hrs, Volume= 0.088 af, Depth= 1.81"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

Area (sf)	CN	Description
6,447	86	Woods/grass comb., Poor, HSG D
15,246	98	Paved roads w/curbs & sewers, HSG C
3,703	80	>75% Grass cover, Good, HSG D
25,396	92	Weighted Average
10,150	84	39.97% Pervious Area
15,246	98	60.03% Impervious Area

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

Subcatchment 3P: MOUNTAINVIEW



Summary for Subcatchment 4P: CENTER (N)

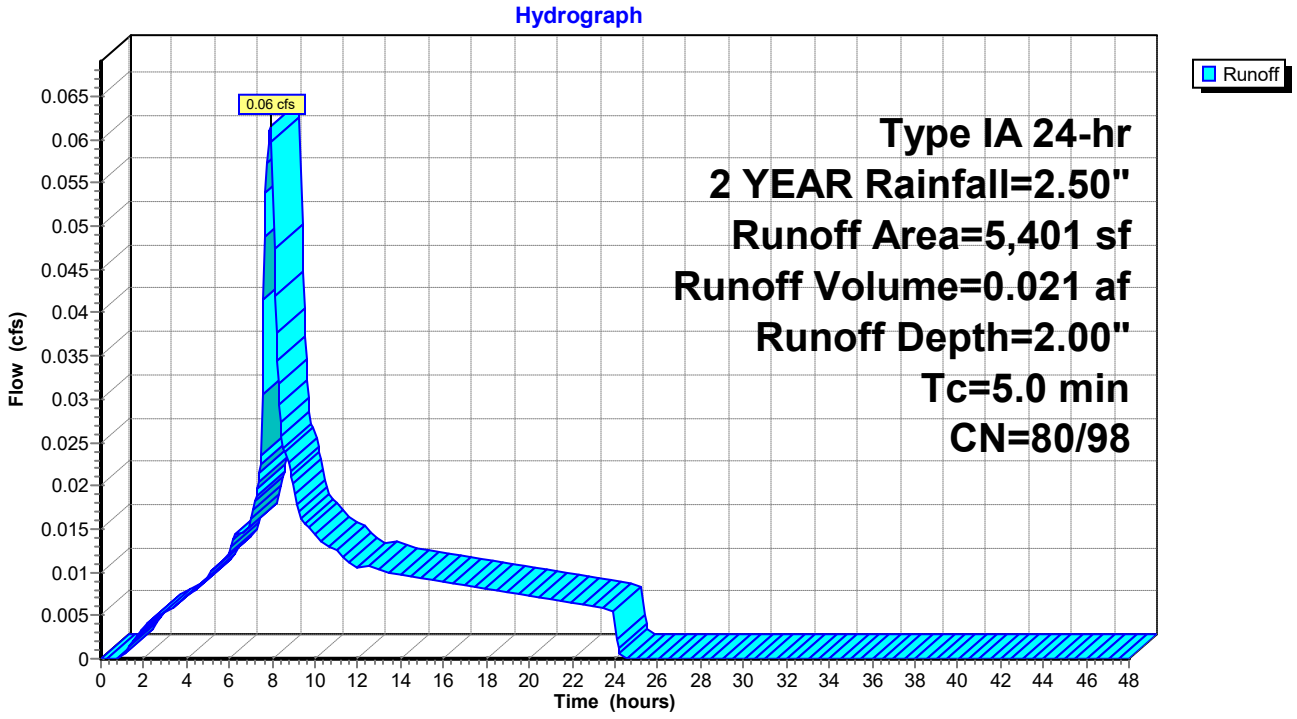
Runoff = 0.06 cfs @ 7.91 hrs, Volume= 0.021 af, Depth= 2.00"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

Area (sf)	CN	Description
4,356	98	Paved roads w/curbs & sewers, HSG C
1,045	80	>75% Grass cover, Good, HSG D
5,401	95	Weighted Average
1,045	80	19.35% Pervious Area
4,356	98	80.65% Impervious Area

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

Subcatchment 4P: CENTER (N)



Summary for Subcatchment 5P: ALDERSGATE (N)

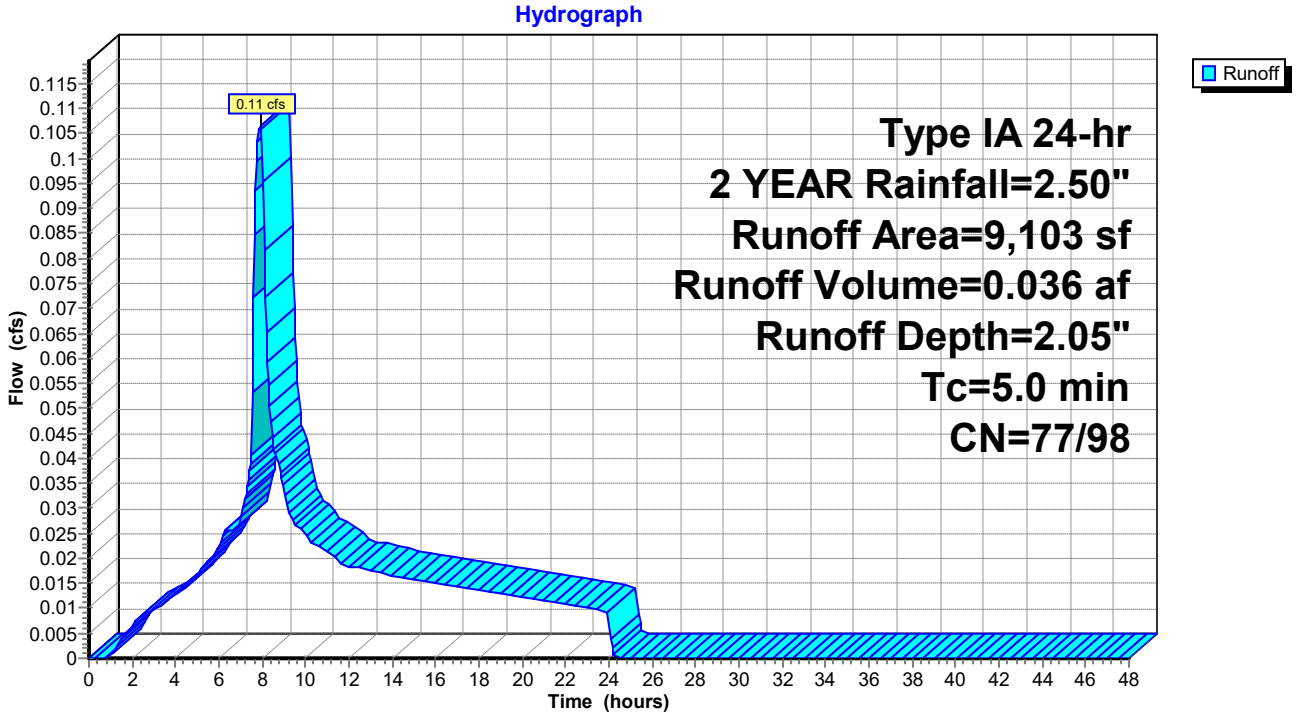
Runoff = 0.11 cfs @ 7.91 hrs, Volume= 0.036 af, Depth= 2.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

Area (sf)	CN	Description
7,797	98	Paved roads w/curbs & sewers, HSG C
653	80	>75% Grass cover, Good, HSG D
653	74	>75% Grass cover, Good, HSG C
9,103	95	Weighted Average
1,306	77	14.35% Pervious Area
7,797	98	85.65% Impervious Area

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

Subcatchment 5P: ALDERSGATE (N)



Summary for Subcatchment 6P: ALDERSGATE (S)

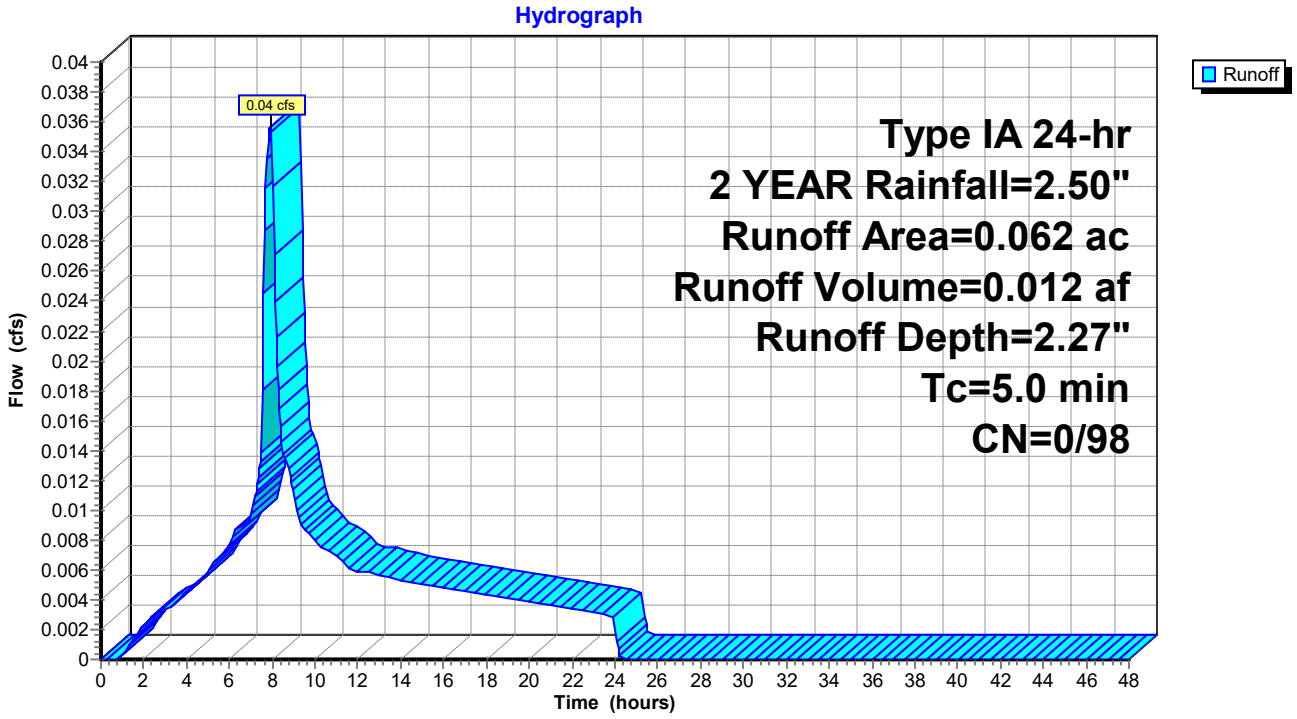
Runoff = 0.04 cfs @ 7.90 hrs, Volume= 0.012 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

Area (ac)	CN	Description
0.062	98	Paved roads w/curbs & sewers, HSG C
0.062	98	100.00% Impervious Area

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

Subcatchment 6P: ALDERSGATE (S)



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1P: W Runoff Area=1,284,759 sf 2.03% Impervious Runoff Depth=1.96"
Flow Length=1,389' Tc=29.8 min CN=84/98 Runoff=9.75 cfs 4.826 af

Subcatchment 2P: SE Runoff Area=3,125,647 sf 1.30% Impervious Runoff Depth=1.66"
Flow Length=2,065' Tc=27.1 min CN=80/98 Runoff=19.16 cfs 9.912 af

Subcatchment 3P: MOUNTAINVIEW Runoff Area=25,396 sf 60.03% Impervious Runoff Depth=2.73"
Tc=5.0 min CN=84/98 Runoff=0.39 cfs 0.133 af

Subcatchment 4P: CENTER (N) Runoff Area=5,401 sf 80.65% Impervious Runoff Depth=2.95"
Tc=5.0 min CN=80/98 Runoff=0.09 cfs 0.030 af

Subcatchment 5P: ALDERSGATE (N) Runoff Area=9,103 sf 85.65% Impervious Runoff Depth=3.00"
Tc=5.0 min CN=77/98 Runoff=0.16 cfs 0.052 af

Subcatchment 6P: ALDERSGATE (S) Runoff Area=0.062 ac 100.00% Impervious Runoff Depth=3.27"
Tc=5.0 min CN=0/98 Runoff=0.05 cfs 0.017 af

Total Runoff Area = 102.227 ac Runoff Volume = 14.970 af Average Runoff Depth = 1.76"
97.83% Pervious = 100.004 ac 2.17% Impervious = 2.223 ac

Summary for Subcatchment 1P: W

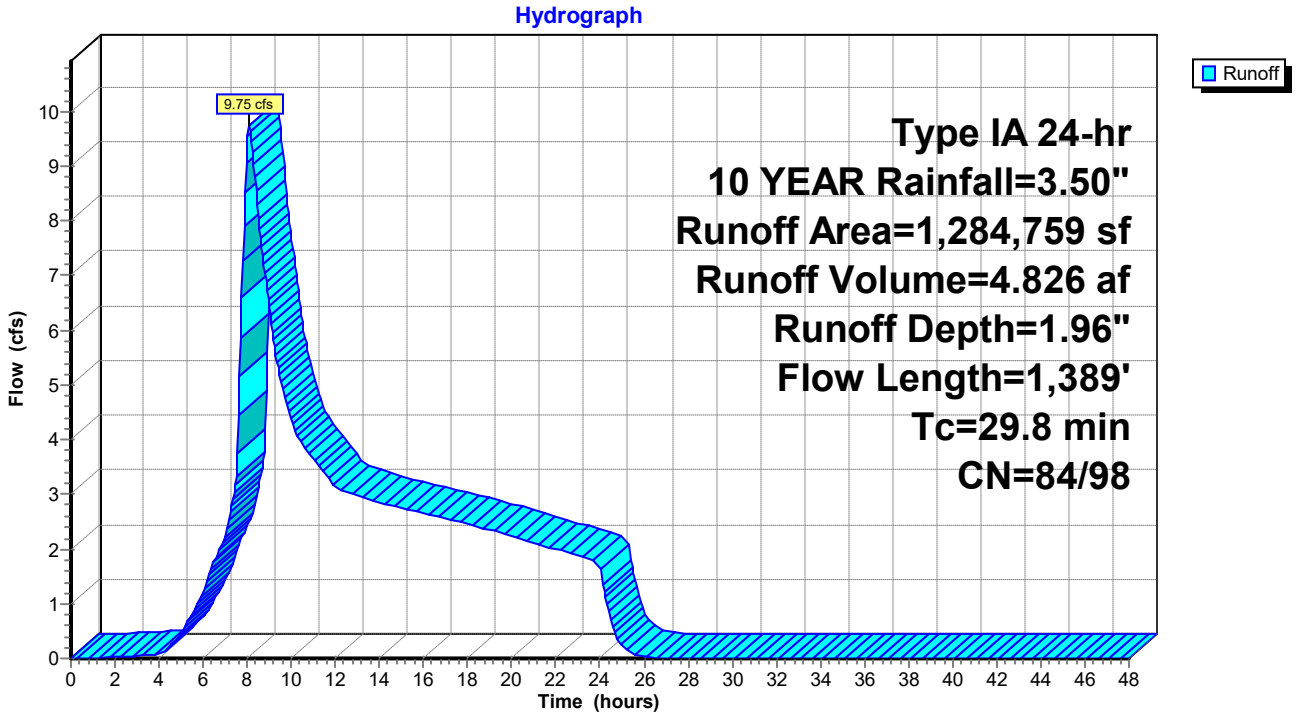
Runoff = 9.75 cfs @ 8.06 hrs, Volume= 4.826 af, Depth= 1.96"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

Area (sf)	CN	Description
696,873	82	Woods/grass comb., Poor, HSG C
536,093	86	Woods/grass comb., Poor, HSG D
26,049	98	Paved roads w/curbs & sewers, HSG C
9,932	96	Gravel surface, HSG C
11,238	74	>75% Grass cover, Good, HSG C
4,574	80	>75% Grass cover, Good, HSG D
1,284,759	84	Weighted Average
1,258,710	84	97.97% Pervious Area
26,049	98	2.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0480	0.08		**Sheet Flow, Sheet-Orchard** Woods: Light underbrush n= 0.400 P2= 2.50"
7.9	658	0.0392	1.39		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
12.1	681	0.0181	0.94		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
29.8	1,389	Total			

Subcatchment 1P: W



Summary for Subcatchment 2P: SE

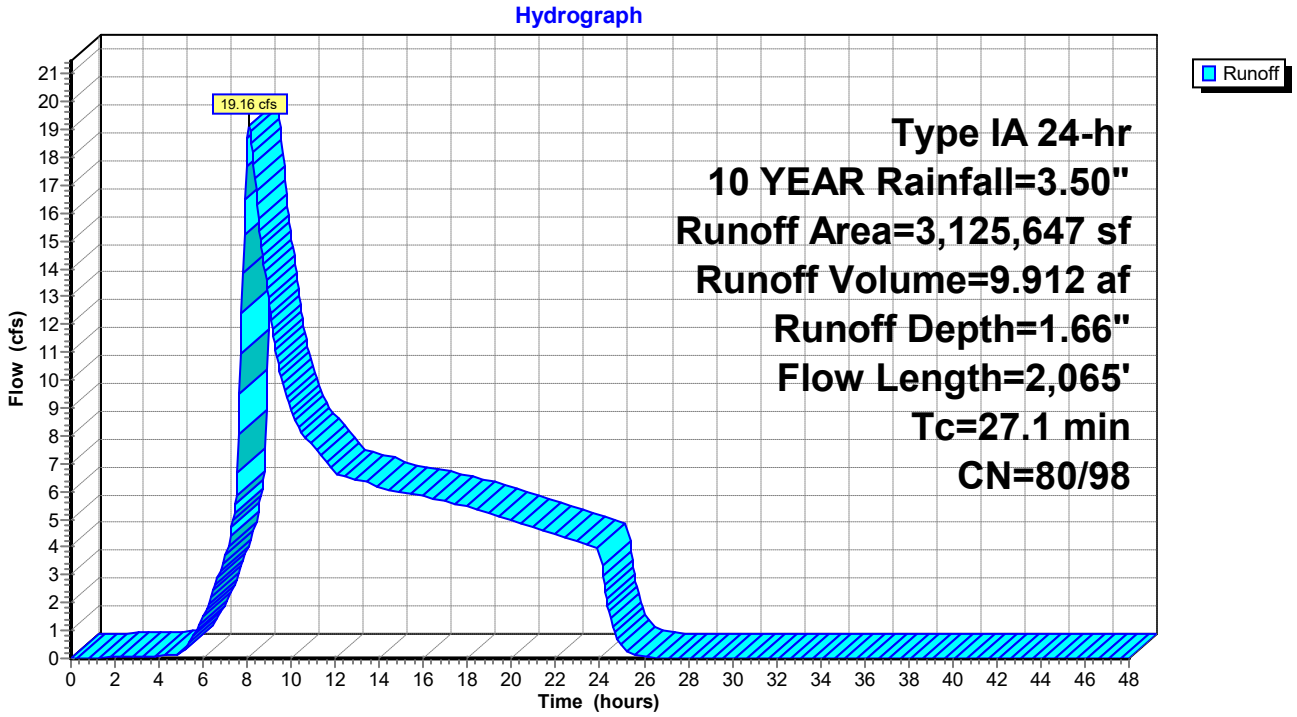
Runoff = 19.16 cfs @ 8.07 hrs, Volume= 9.912 af, Depth= 1.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

	Area (sf)	CN	Description
	38,333	82	Farmsteads, HSG C
	2,022,883	79	Pasture/grassland/range, Fair, HSG C
	495,843	84	Pasture/grassland/range, Fair, HSG D
	315,113	82	Woods/grass comb., Poor, HSG C
	39,683	98	Paved roads w/curbs & sewers, HSG C
	15,812	96	Gravel surface, HSG C
	3,615	79	50-75% Grass cover, Fair, HSG C
	171,757	73	Brush, Good, HSG D
	21,606	74	>75% Grass cover, Good, HSG C
*	1,002	100	Stream
	3,125,647	80	Weighted Average
	3,084,962	80	98.70% Pervious Area
	40,685	98	1.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	16	0.1182	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.50"
3.1	268	0.0208	1.44		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
7.4	493	0.0124	1.11		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
1.5	178	0.0822	2.01		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.2	486	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.6	624	0.0709	1.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
27.1	2,065	Total			

Subcatchment 2P: SE



Summary for Subcatchment 3P: MOUNTAINVIEW

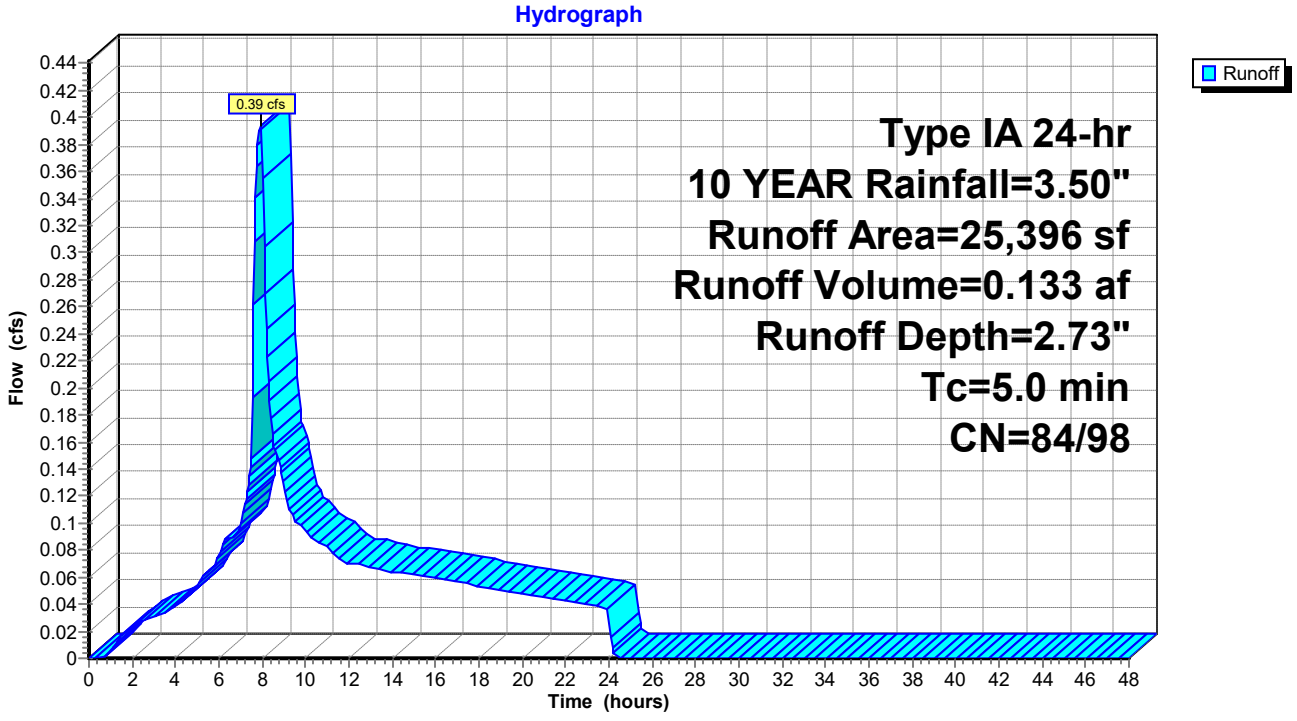
Runoff = 0.39 cfs @ 7.92 hrs, Volume= 0.133 af, Depth= 2.73"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

Area (sf)	CN	Description
6,447	86	Woods/grass comb., Poor, HSG D
15,246	98	Paved roads w/curbs & sewers, HSG C
3,703	80	>75% Grass cover, Good, HSG D
25,396	92	Weighted Average
10,150	84	39.97% Pervious Area
15,246	98	60.03% Impervious Area

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

Subcatchment 3P: MOUNTAINVIEW



Summary for Subcatchment 4P: CENTER (N)

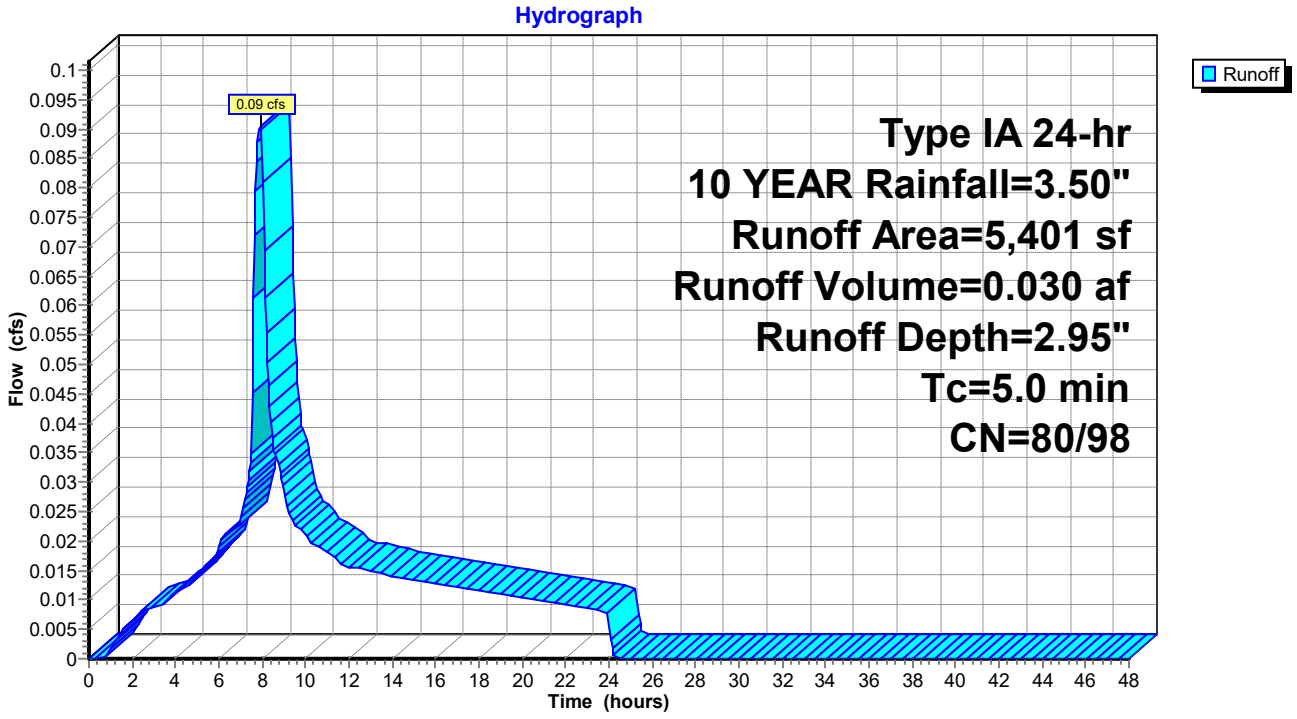
Runoff = 0.09 cfs @ 7.91 hrs, Volume= 0.030 af, Depth= 2.95"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

Area (sf)	CN	Description
4,356	98	Paved roads w/curbs & sewers, HSG C
1,045	80	>75% Grass cover, Good, HSG D
5,401	95	Weighted Average
1,045	80	19.35% Pervious Area
4,356	98	80.65% Impervious Area

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

Subcatchment 4P: CENTER (N)



Summary for Subcatchment 5P: ALDERSGATE (N)

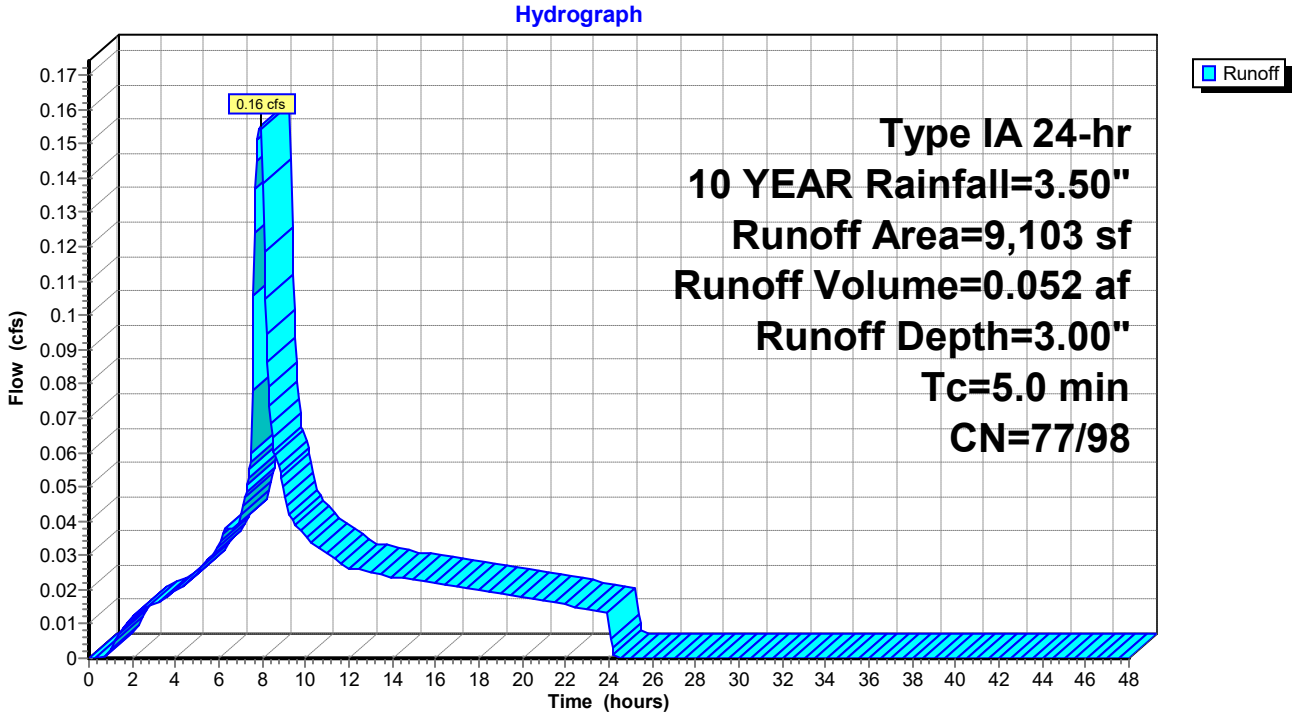
Runoff = 0.16 cfs @ 7.91 hrs, Volume= 0.052 af, Depth= 3.00"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

Area (sf)	CN	Description
7,797	98	Paved roads w/curbs & sewers, HSG C
653	80	>75% Grass cover, Good, HSG D
653	74	>75% Grass cover, Good, HSG C
9,103	95	Weighted Average
1,306	77	14.35% Pervious Area
7,797	98	85.65% Impervious Area

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

Subcatchment 5P: ALDERSGATE (N)



Summary for Subcatchment 6P: ALDERSGATE (S)

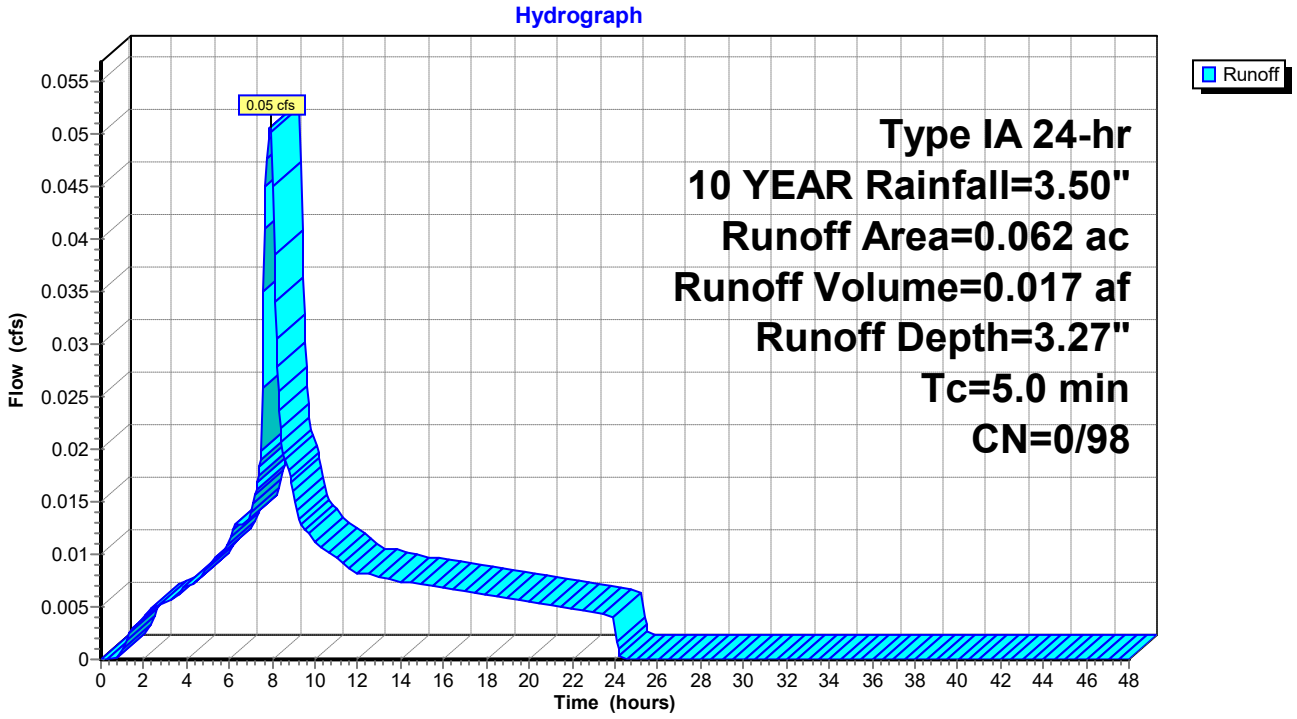
Runoff = 0.05 cfs @ 7.90 hrs, Volume= 0.017 af, Depth= 3.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

Area (ac)	CN	Description
0.062	98	Paved roads w/curbs & sewers, HSG C
0.062	98	100.00% Impervious Area

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

Subcatchment 6P: ALDERSGATE (S)



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1P: W Runoff Area=1,284,759 sf 2.03% Impervious Runoff Depth=2.40"
Flow Length=1,389' Tc=29.8 min CN=84/98 Runoff=12.24 cfs 5.897 af

Subcatchment 2P: SE Runoff Area=3,125,647 sf 1.30% Impervious Runoff Depth=2.06"
Flow Length=2,065' Tc=27.1 min CN=80/98 Runoff=24.92 cfs 12.342 af

Subcatchment 3P: MOUNTAINVIEW Runoff Area=25,396 sf 60.03% Impervious Runoff Depth=3.21"
Tc=5.0 min CN=84/98 Runoff=0.46 cfs 0.156 af

Subcatchment 4P: CENTER (N) Runoff Area=5,401 sf 80.65% Impervious Runoff Depth=3.43"
Tc=5.0 min CN=80/98 Runoff=0.11 cfs 0.035 af

Subcatchment 5P: ALDERSGATE (N) Runoff Area=9,103 sf 85.65% Impervious Runoff Depth=3.48"
Tc=5.0 min CN=77/98 Runoff=0.18 cfs 0.061 af

Subcatchment 6P: ALDERSGATE (S) Runoff Area=0.062 ac 100.00% Impervious Runoff Depth=3.77"
Tc=5.0 min CN=0/98 Runoff=0.06 cfs 0.019 af

Total Runoff Area = 102.227 ac Runoff Volume = 18.511 af Average Runoff Depth = 2.17"
97.83% Pervious = 100.004 ac 2.17% Impervious = 2.223 ac

Summary for Subcatchment 1P: W

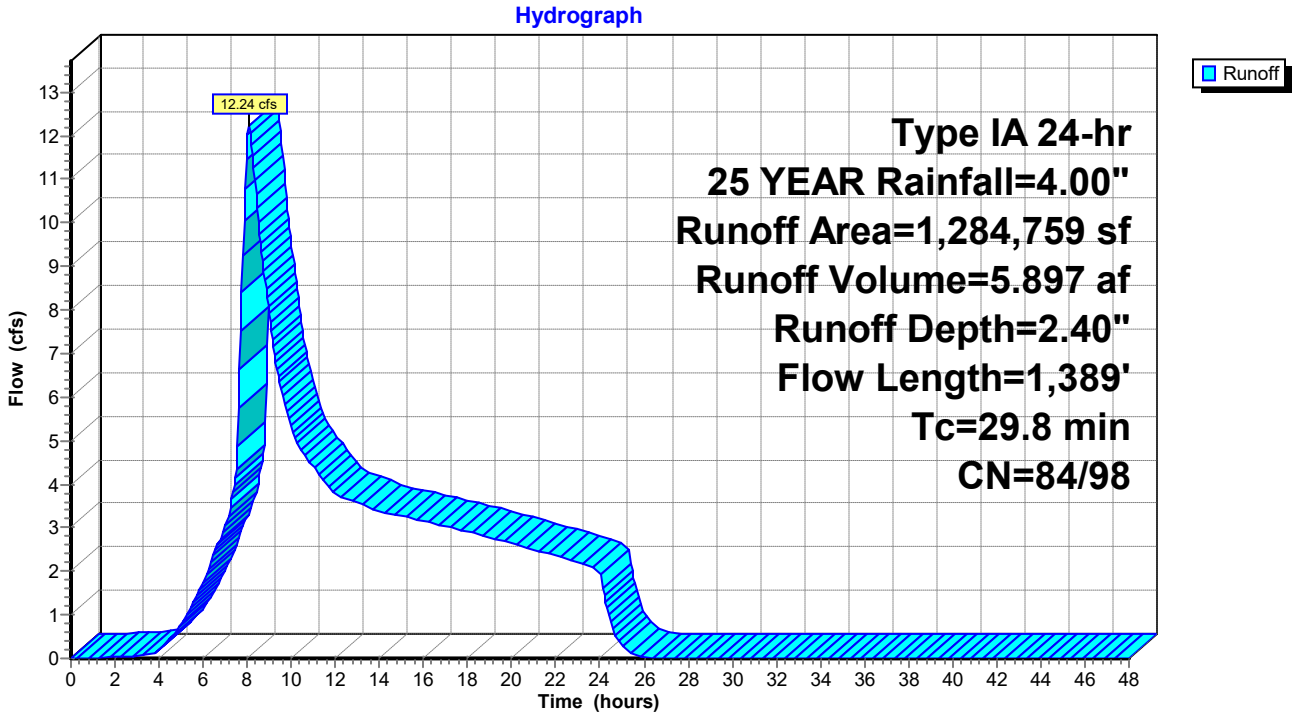
Runoff = 12.24 cfs @ 8.06 hrs, Volume= 5.897 af, Depth= 2.40"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

Area (sf)	CN	Description
696,873	82	Woods/grass comb., Poor, HSG C
536,093	86	Woods/grass comb., Poor, HSG D
26,049	98	Paved roads w/curbs & sewers, HSG C
9,932	96	Gravel surface, HSG C
11,238	74	>75% Grass cover, Good, HSG C
4,574	80	>75% Grass cover, Good, HSG D
1,284,759	84	Weighted Average
1,258,710	84	97.97% Pervious Area
26,049	98	2.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0480	0.08		**Sheet Flow, Sheet-Orchard** Woods: Light underbrush n= 0.400 P2= 2.50"
7.9	658	0.0392	1.39		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
12.1	681	0.0181	0.94		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
29.8	1,389	Total			

Subcatchment 1P: W



Summary for Subcatchment 2P: SE

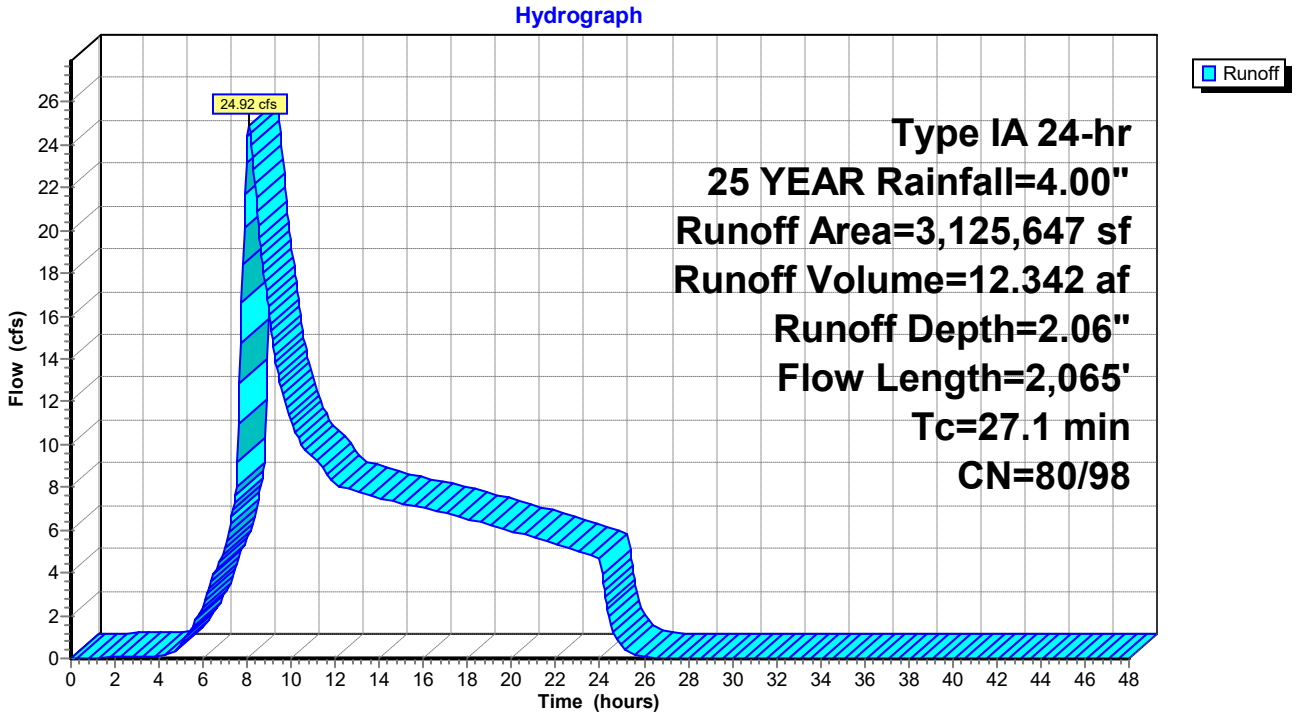
Runoff = 24.92 cfs @ 8.06 hrs, Volume= 12.342 af, Depth= 2.06"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

	Area (sf)	CN	Description
	38,333	82	Farmsteads, HSG C
	2,022,883	79	Pasture/grassland/range, Fair, HSG C
	495,843	84	Pasture/grassland/range, Fair, HSG D
	315,113	82	Woods/grass comb., Poor, HSG C
	39,683	98	Paved roads w/curbs & sewers, HSG C
	15,812	96	Gravel surface, HSG C
	3,615	79	50-75% Grass cover, Fair, HSG C
	171,757	73	Brush, Good, HSG D
	21,606	74	>75% Grass cover, Good, HSG C
*	1,002	100	Stream
	3,125,647	80	Weighted Average
	3,084,962	80	98.70% Pervious Area
	40,685	98	1.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	16	0.1182	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.50"
3.1	268	0.0208	1.44		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
7.4	493	0.0124	1.11		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
1.5	178	0.0822	2.01		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.2	486	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.6	624	0.0709	1.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
27.1	2,065	Total			

Subcatchment 2P: SE



Summary for Subcatchment 3P: MOUNTAINVIEW

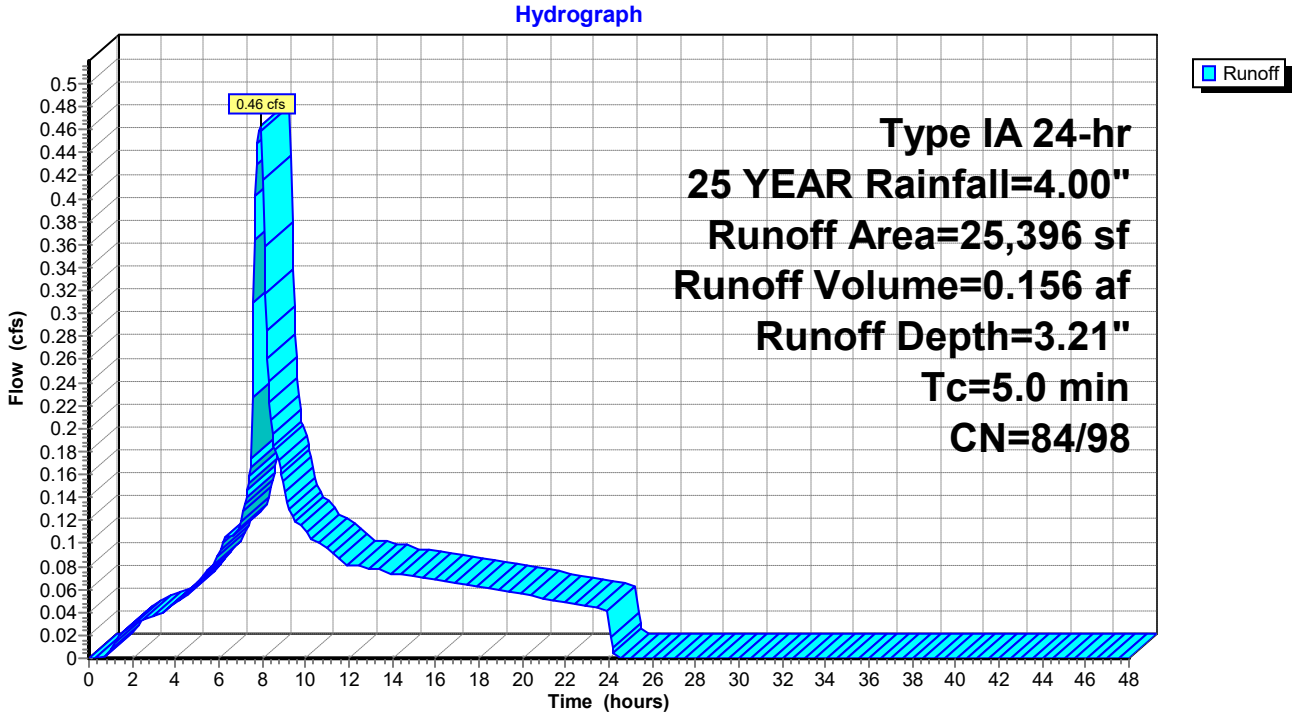
Runoff = 0.46 cfs @ 7.92 hrs, Volume= 0.156 af, Depth= 3.21"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

Area (sf)	CN	Description
6,447	86	Woods/grass comb., Poor, HSG D
15,246	98	Paved roads w/curbs & sewers, HSG C
3,703	80	>75% Grass cover, Good, HSG D
25,396	92	Weighted Average
10,150	84	39.97% Pervious Area
15,246	98	60.03% Impervious Area

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

Subcatchment 3P: MOUNTAINVIEW



Summary for Subcatchment 4P: CENTER (N)

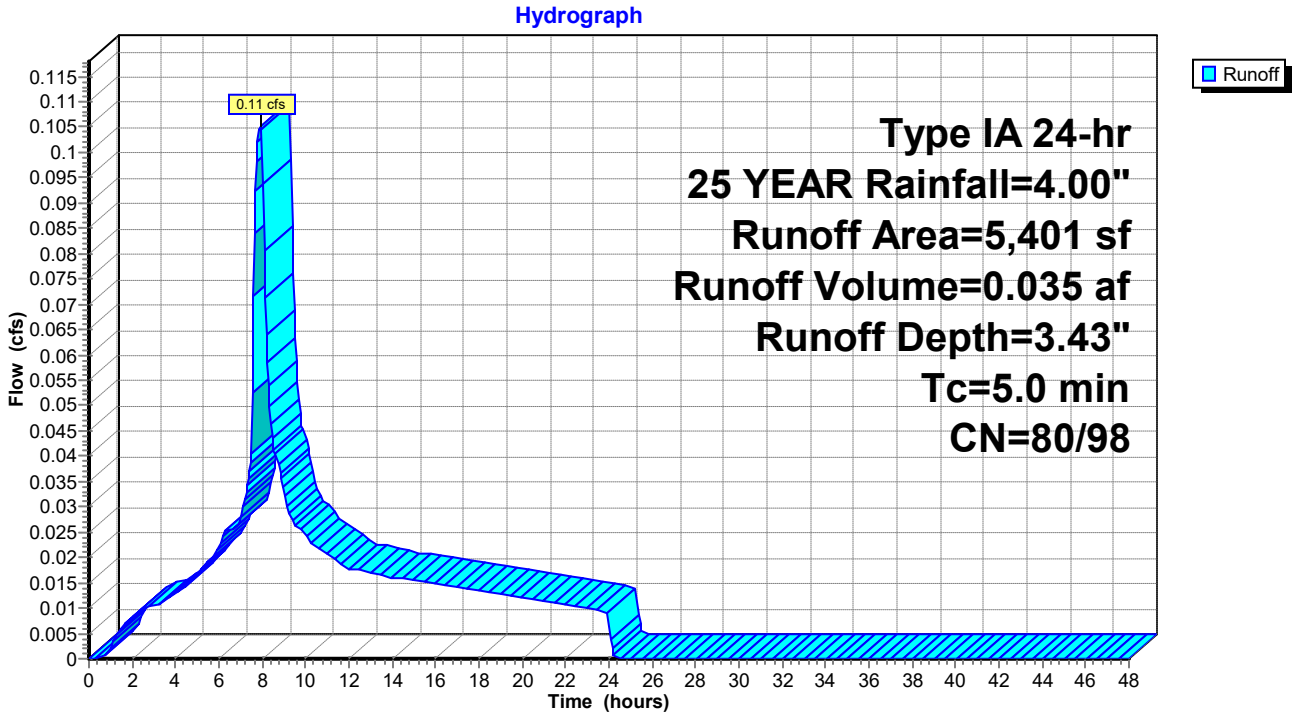
Runoff = 0.11 cfs @ 7.91 hrs, Volume= 0.035 af, Depth= 3.43"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

Area (sf)	CN	Description
4,356	98	Paved roads w/curbs & sewers, HSG C
1,045	80	>75% Grass cover, Good, HSG D
5,401	95	Weighted Average
1,045	80	19.35% Pervious Area
4,356	98	80.65% Impervious Area

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

Subcatchment 4P: CENTER (N)



Summary for Subcatchment 5P: ALDERSGATE (N)

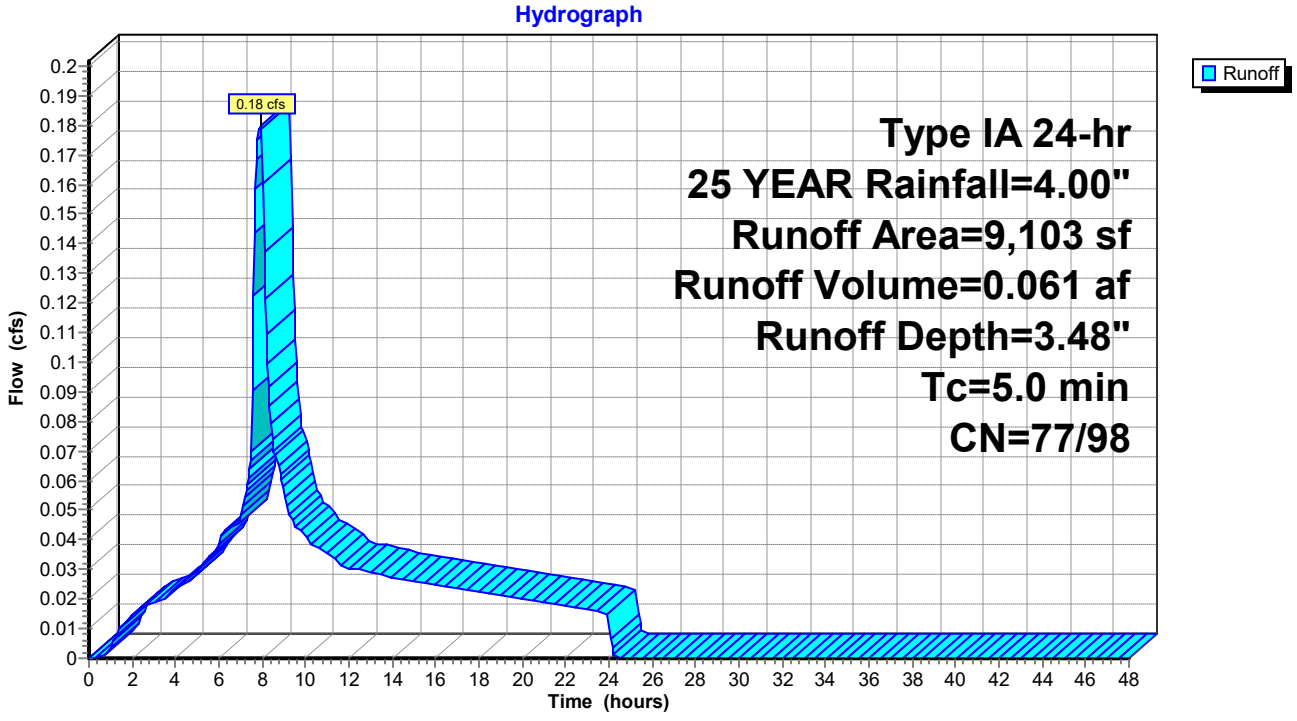
Runoff = 0.18 cfs @ 7.90 hrs, Volume= 0.061 af, Depth= 3.48"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

Area (sf)	CN	Description
7,797	98	Paved roads w/curbs & sewers, HSG C
653	80	>75% Grass cover, Good, HSG D
653	74	>75% Grass cover, Good, HSG C
9,103	95	Weighted Average
1,306	77	14.35% Pervious Area
7,797	98	85.65% Impervious Area

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

Subcatchment 5P: ALDERSGATE (N)



Summary for Subcatchment 6P: ALDERSGATE (S)

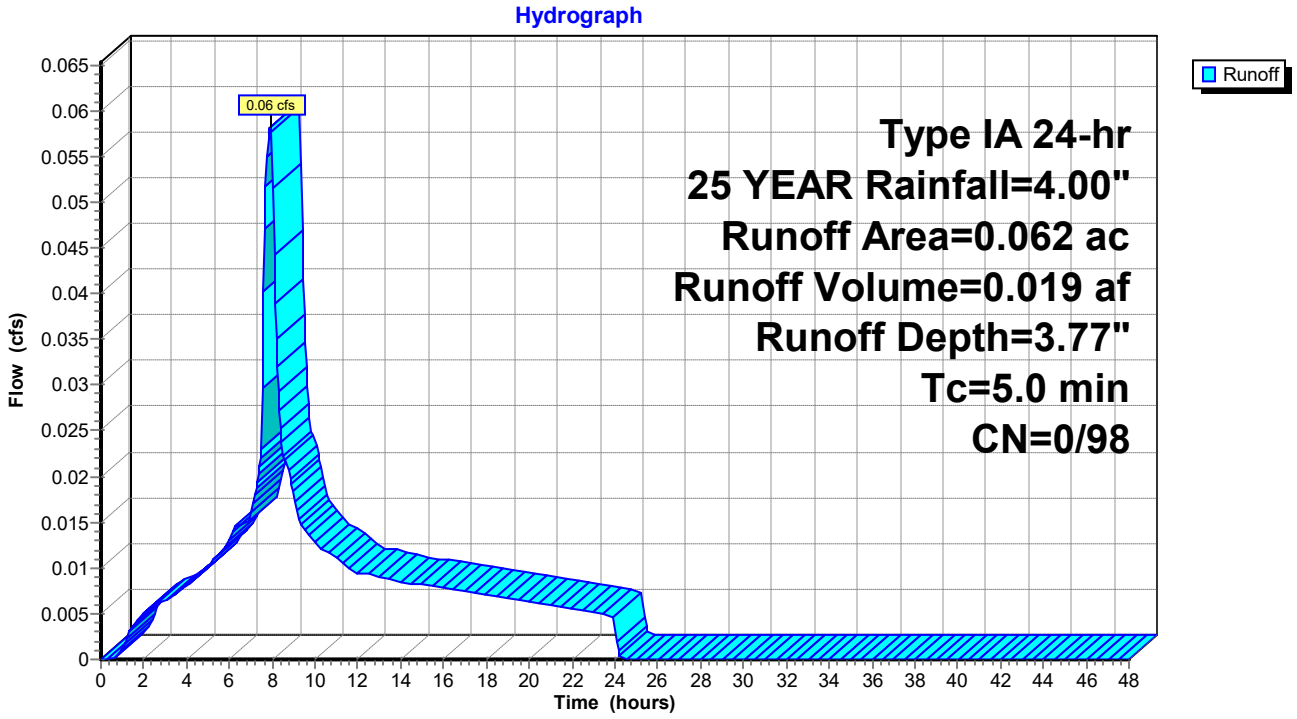
Runoff = 0.06 cfs @ 7.90 hrs, Volume= 0.019 af, Depth= 3.77"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

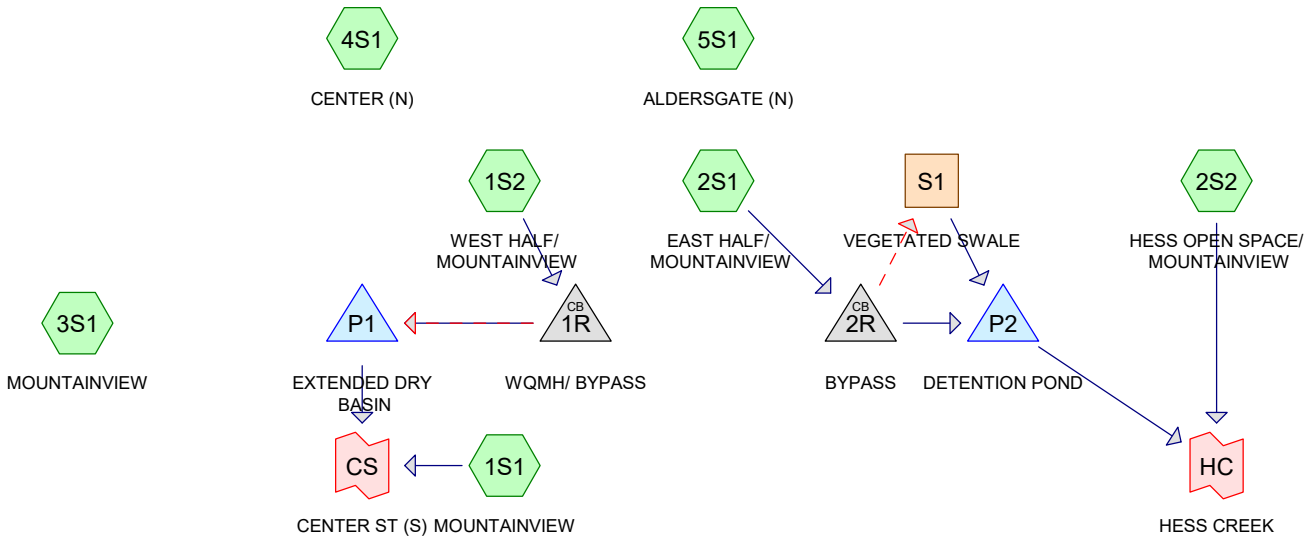
Area (ac)	CN	Description
0.062	98	Paved roads w/curbs & sewers, HSG C
0.062	98	100.00% Impervious Area

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

Subcatchment 6P: ALDERSGATE (S)



Appendix B: HYDROCAD REPORTS FOR POST-DEVELOPED CONDITION STORM EVENTS



Subcat Reach Pond Link

Routing Diagram for 4487-01 Springbrook - Post
Prepared by AKS ENGINEERING & FORESTRY, LLC, Printed 10/7/2022
HydroCAD® 10.00-22 s/n 01338 © 2018 HydroCAD Software Solutions LLC

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S1: MOUNTAINVIEW Runoff Area=3,037 sf 88.90% Impervious Runoff Depth=0.94"
Tc=5.0 min CN=80/98 Runoff=0.02 cfs 238 cf

Subcatchment 1S2: WEST HALF/ Runoff Area=1,100,942 sf 68.23% Impervious Runoff Depth=0.74"
Tc=8.0 min CN=77/98 Runoff=4.48 cfs 68,170 cf

Subcatchment 2S1: EAST HALF/ Runoff Area=2,261,386 sf 64.41% Impervious Runoff Depth=0.70"
Tc=10.0 min CN=75/98 Runoff=8.52 cfs 131,412 cf

Subcatchment 2S2: HESS OPEN SPACE/ Runoff Area=1,063,815 sf 4.10% Impervious Runoff Depth=0.09"
Flow Length=455' Tc=8.9 min CN=72/98 Runoff=0.26 cfs 8,108 cf

Subcatchment 3S1: MOUNTAINVIEW Runoff Area=15,878 sf 81.07% Impervious Runoff Depth=0.87"
Tc=5.0 min CN=80/98 Runoff=0.08 cfs 1,153 cf

Subcatchment 4S1: CENTER (N) Runoff Area=5,141 sf 75.43% Impervious Runoff Depth=0.82"
Tc=5.0 min CN=80/98 Runoff=0.02 cfs 353 cf

Subcatchment 5S1: ALDERSGATE (N) Runoff Area=2,874 sf 58.91% Impervious Runoff Depth=0.64"
Tc=5.0 min CN=74/98 Runoff=0.01 cfs 153 cf

Reach S1: VEGETATED SWALE Avg. Flow Depth=0.53' Max Vel=0.26 fps Inflow=1.68 cfs 83,214 cf
n=0.240 L=132.0' S=0.0050 '/' Capacity=10.83 cfs Outflow=1.66 cfs 83,214 cf

Pond 1R: WQMH/ BYPASS Peak Elev=227.44' Inflow=4.48 cfs 68,170 cf
Primary=0.55 cfs 926 cf Secondary=3.93 cfs 67,244 cf Outflow=4.48 cfs 68,170 cf

Pond 2R: BYPASS Peak Elev=223.05' Inflow=8.52 cfs 131,412 cf
Primary=6.84 cfs 48,198 cf Secondary=1.68 cfs 83,214 cf Outflow=8.52 cfs 131,412 cf

Pond P1: EXTENDED DRY BASIN Peak Elev=227.32' Storage=43,885 cf Inflow=4.48 cfs 68,170 cf
Outflow=0.37 cfs 68,185 cf

Pond P2: DETENTION POND Peak Elev=216.87' Storage=106,032 cf Inflow=8.49 cfs 131,412 cf
Outflow=0.39 cfs 84,811 cf

Link CS: CENTER ST (S) Inflow=0.37 cfs 68,423 cf
Primary=0.37 cfs 68,423 cf

Link HC: HESS CREEK Inflow=0.54 cfs 92,918 cf
Primary=0.54 cfs 92,918 cf

Total Runoff Area = 4,453,073 sf Runoff Volume = 209,586 cf Average Runoff Depth = 0.56"
48.97% Pervious = 2,180,498 sf 51.03% Impervious = 2,272,575 sf

Summary for Subcatchment 1S1: MOUNTAINVIEW

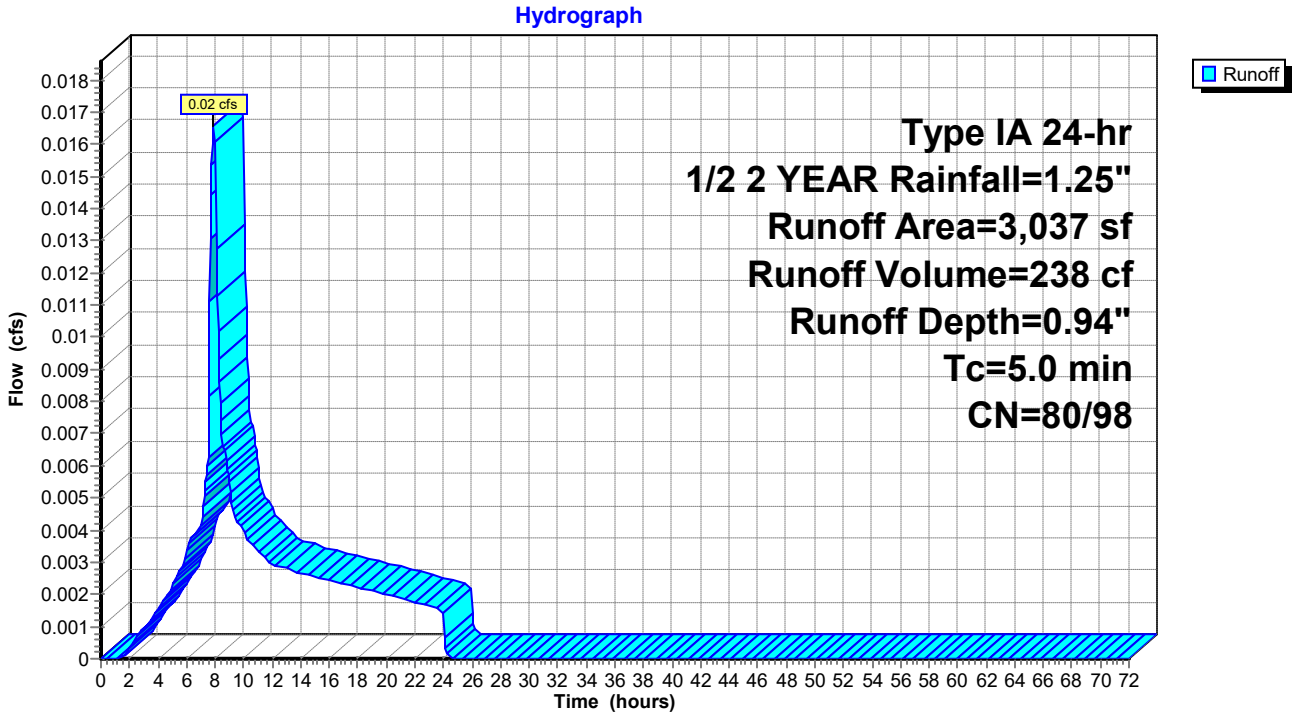
Runoff = 0.02 cfs @ 7.91 hrs, Volume= 238 cf, Depth= 0.94"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

Area (sf)	CN	Description
2,700	98	Paved roads w/curbs & sewers
337	80	>75% Grass cover, Good, HSG D
3,037	96	Weighted Average
337	80	11.10% Pervious Area
2,700	98	88.90% Impervious Area

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

Subcatchment 1S1: MOUNTAINVIEW



Summary for Subcatchment 1S2: WEST HALF/ MOUNTAINVIEW

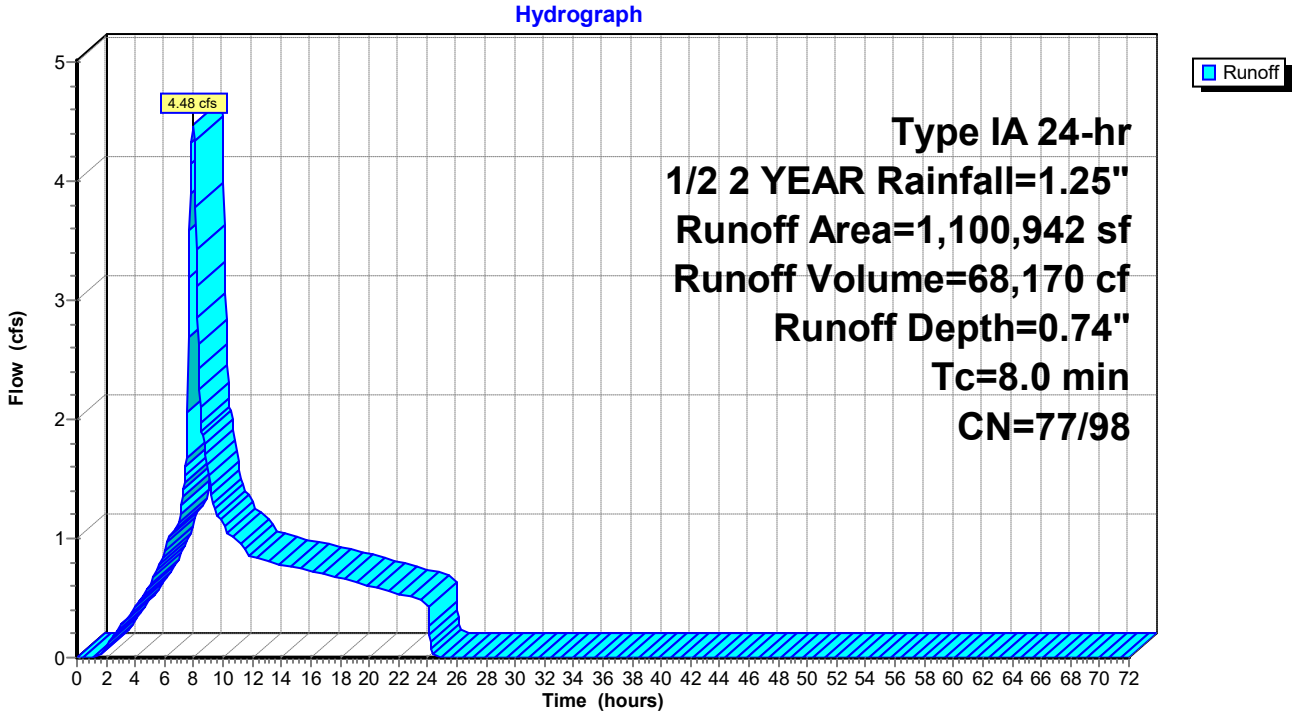
Runoff = 4.48 cfs @ 7.97 hrs, Volume= 68,170 cf, Depth= 0.74"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

	Area (sf)	CN	Description
*	336,878	98	Right-of-Way Impervious area
*	345,240	98	120 Lots >2877 sf (2877sf/Lot)
*	57,717	98	Cluster Lots (90% of total area)
*	11,309	98	Open Space Impervious
	170,116	74	>75% Grass cover, Good, HSG C
	179,682	80	>75% Grass cover, Good, HSG D
	1,100,942	91	Weighted Average
	349,798	77	31.77% Pervious Area
	751,144	98	68.23% Impervious Area

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

Subcatchment 1S2: WEST HALF/ MOUNTAINVIEW



Summary for Subcatchment 2S1: EAST HALF/ MOUNTAINVIEW

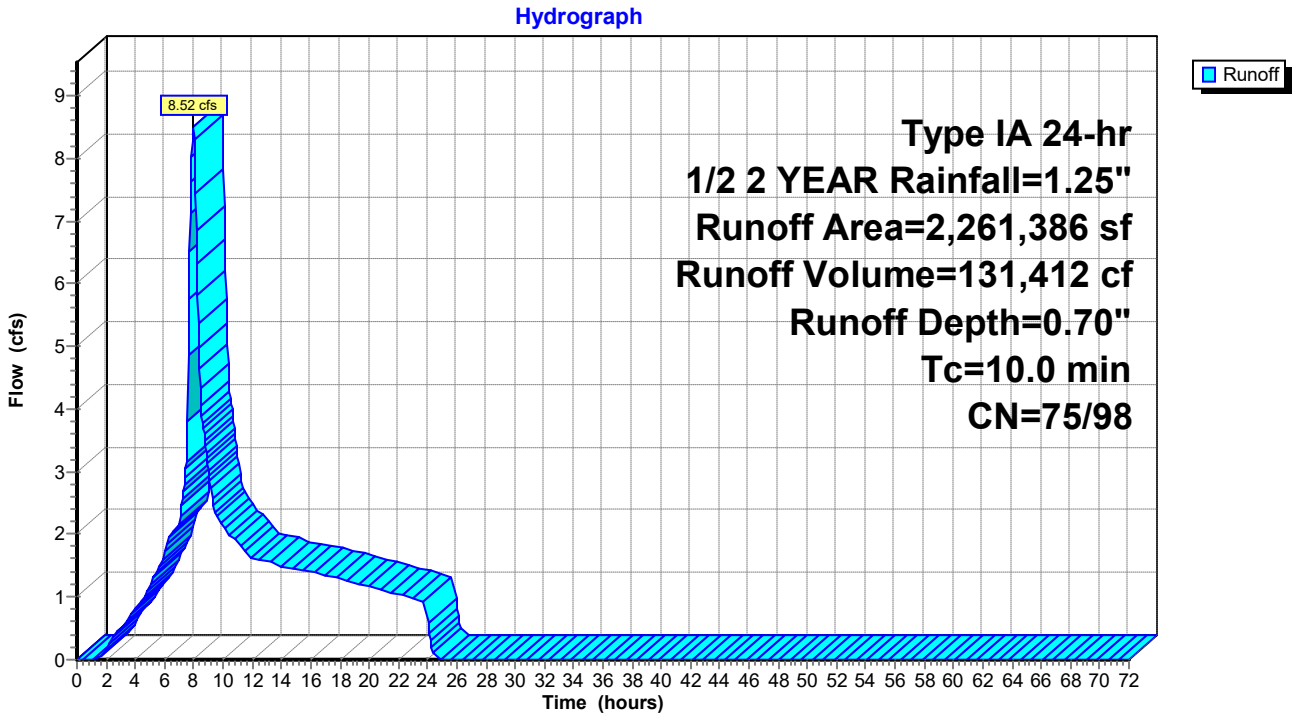
Runoff = 8.52 cfs @ 7.98 hrs, Volume= 131,412 cf, Depth= 0.70"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

	Area (sf)	CN	Description
*	650,436	98	Right-of-Way Impervious area
*	716,373	98	249 Lots >2877 sf (2877sf/Lot)
*	47,186	98	Cluster Lots (90% of total area)
*	42,676	98	Open Space Impervious
	547,140	74	>75% Grass cover, Good, HSG C
	195,956	80	>75% Grass cover, Good, HSG D
*	14,344	86	Playground surfacing
	47,275	71	Meadow, non-grazed, HSG C
	2,261,386	90	Weighted Average
	804,715	75	35.59% Pervious Area
	1,456,671	98	64.41% Impervious Area

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

Subcatchment 2S1: EAST HALF/ MOUNTAINVIEW



Summary for Subcatchment 2S2: HESS OPEN SPACE/ MOUNTAINVIEW

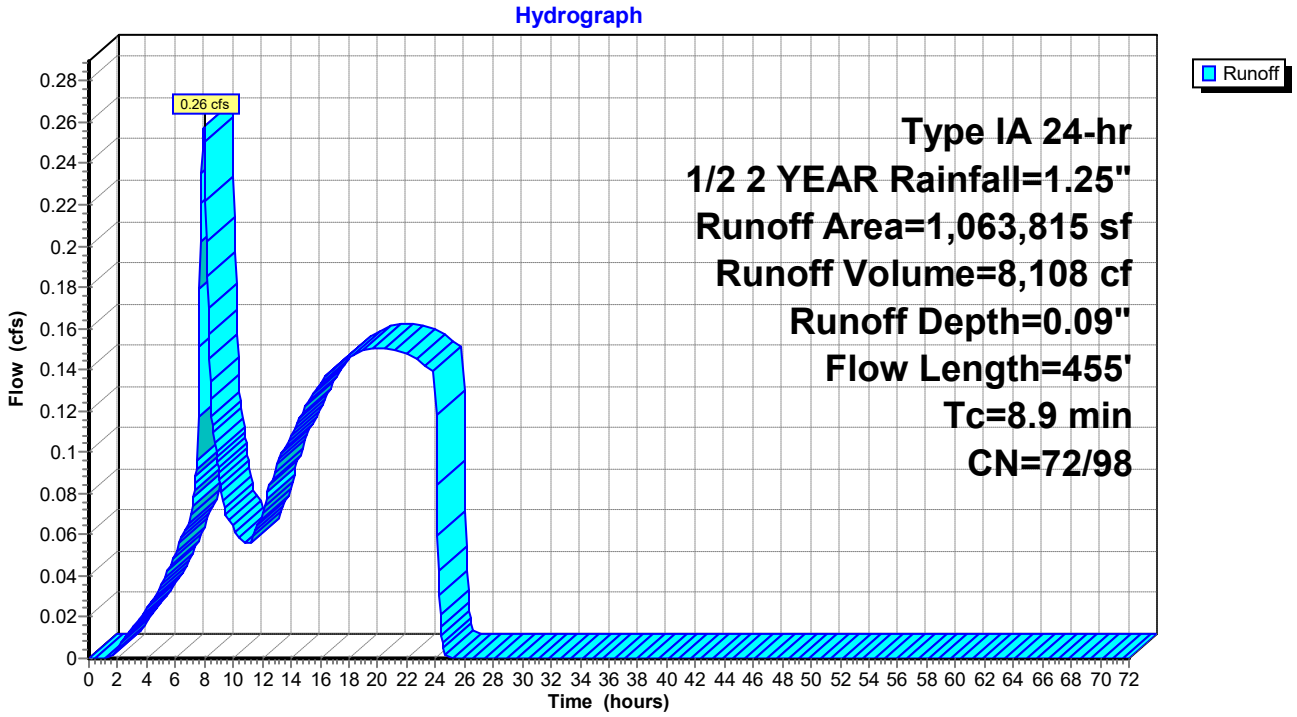
Runoff = 0.26 cfs @ 7.98 hrs, Volume= 8,108 cf, Depth= 0.09"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

	Area (sf)	CN	Description
	11,944	98	Paved roads w/curbs & sewers
	815,065	71	Meadow, non-grazed, HSG C
	80,425	78	Meadow, non-grazed, HSG D
*	30,659	98	Paved Paths
	19,458	96	Gravel surface, HSG C
	92,519	74	>75% Grass cover, Good, HSG C
	7,358	80	>75% Grass cover, Good, HSG D
	5,373	82	Woods/grass comb., Poor, HSG C
*	1,014	100	Stream
	1,063,815	73	Weighted Average
	1,020,198	72	95.90% Pervious Area
	43,617	98	4.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.0740	0.28		**Sheet Flow,** Range n= 0.130 P2= 2.50"
2.5	260	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	95	0.2200	3.28		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.9	455	Total			

Subcatchment 2S2: HESS OPEN SPACE/ MOUNTAINVIEW



Summary for Subcatchment 3S1: MOUNTAINVIEW

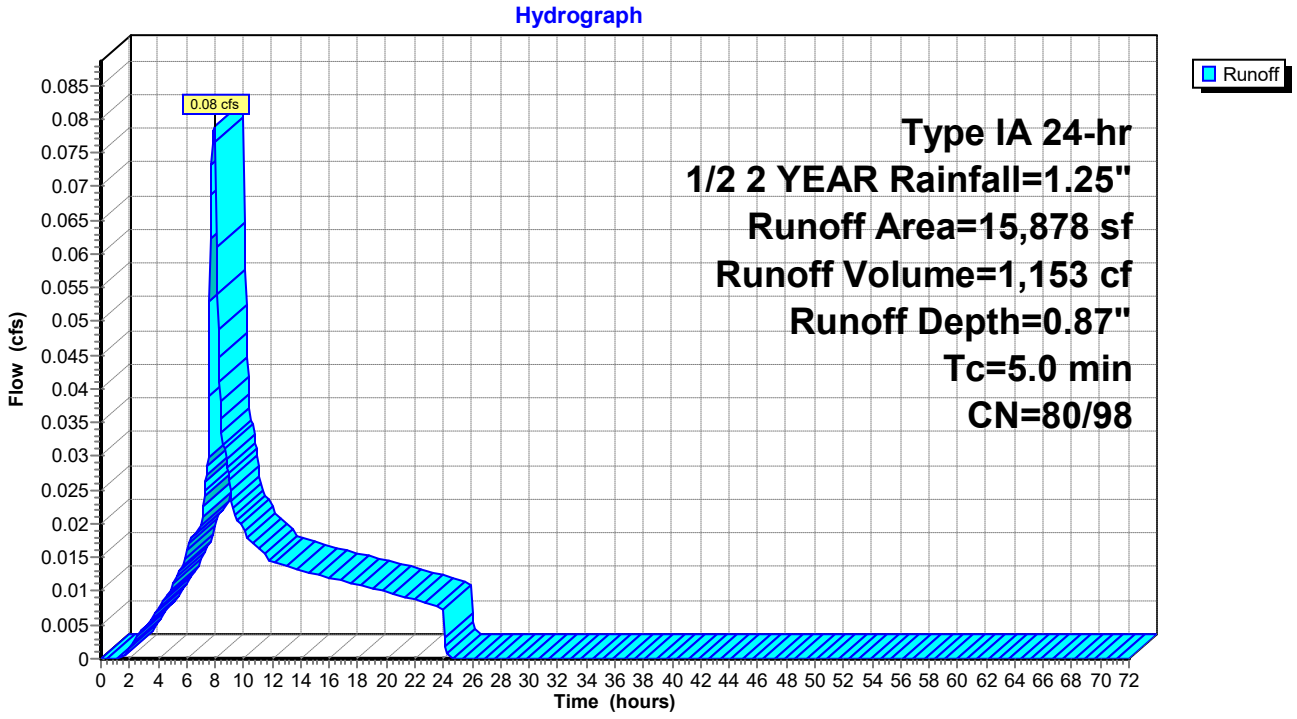
Runoff = 0.08 cfs @ 7.91 hrs, Volume= 1,153 cf, Depth= 0.87"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

Area (sf)	CN	Description
12,872	98	Paved roads w/curbs & sewers
3,006	80	>75% Grass cover, Good, HSG D
15,878	95	Weighted Average
3,006	80	18.93% Pervious Area
12,872	98	81.07% Impervious Area

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

Subcatchment 3S1: MOUNTAINVIEW



Summary for Subcatchment 4S1: CENTER (N)

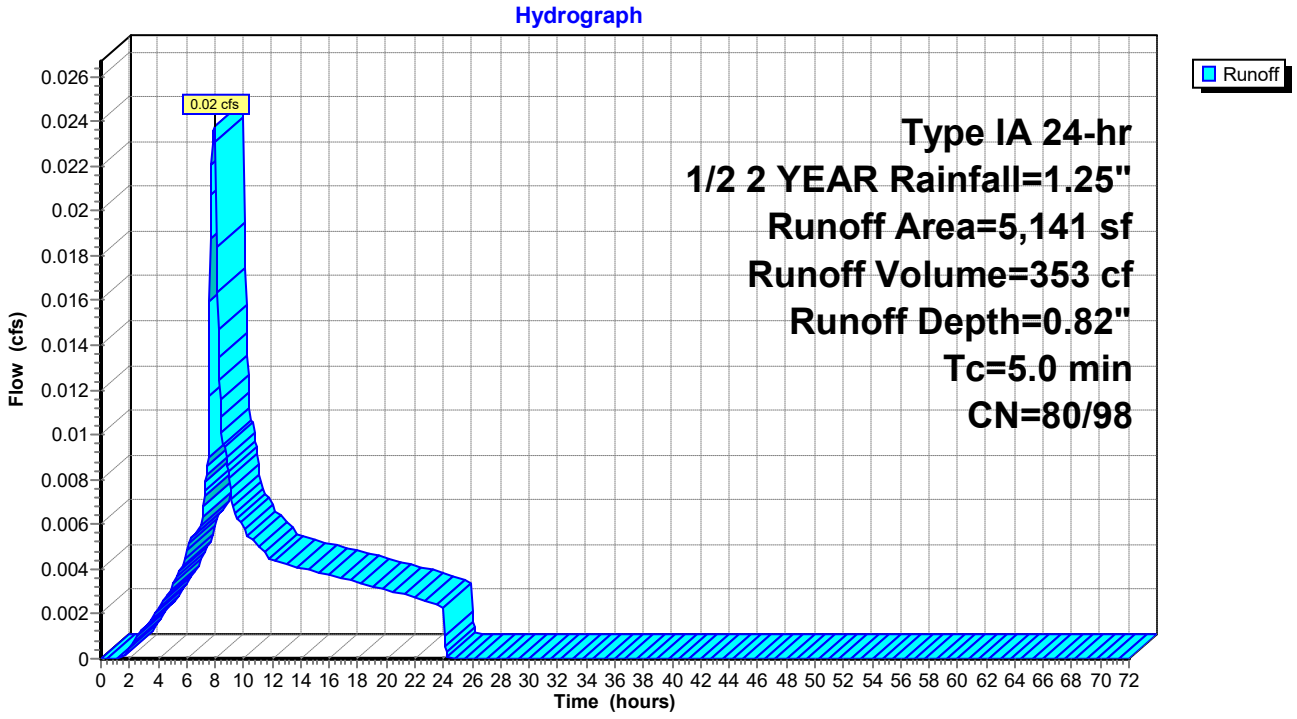
Runoff = 0.02 cfs @ 7.92 hrs, Volume= 353 cf, Depth= 0.82"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

Area (sf)	CN	Description
3,878	98	Paved roads w/curbs & sewers
1,263	80	>75% Grass cover, Good, HSG D
5,141	94	Weighted Average
1,263	80	24.57% Pervious Area
3,878	98	75.43% Impervious Area

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

Subcatchment 4S1: CENTER (N)



Summary for Subcatchment 5S1: ALDERSGATE (N)

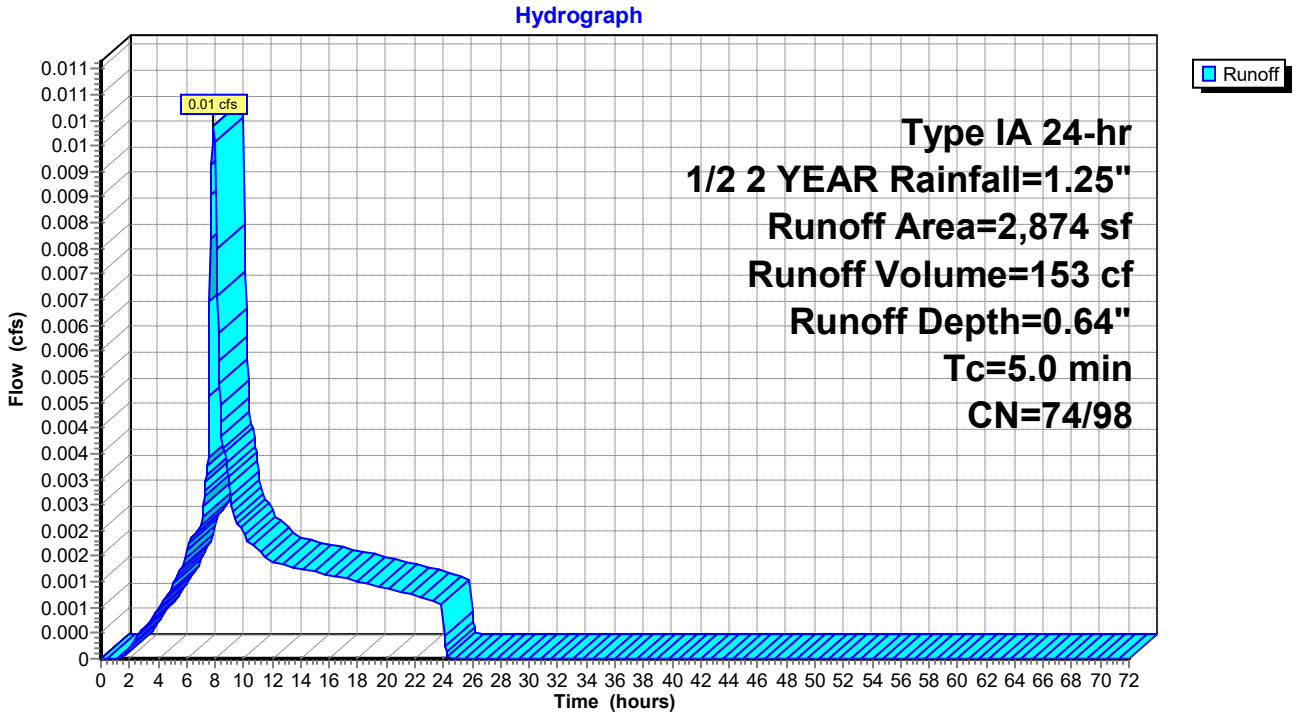
Runoff = 0.01 cfs @ 7.91 hrs, Volume= 153 cf, Depth= 0.64"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

Area (sf)	CN	Description
1,693	98	Paved roads w/curbs & sewers
1,181	74	>75% Grass cover, Good, HSG C
2,874	88	Weighted Average
1,181	74	41.09% Pervious Area
1,693	98	58.91% Impervious Area

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

Subcatchment 5S1: ALDERSGATE (N)



Summary for Reach S1: VEGETATED SWALE

Inflow = 1.68 cfs @ 7.98 hrs, Volume= 83,214 cf
Outflow = 1.66 cfs @ 8.04 hrs, Volume= 83,214 cf, Atten= 1%, Lag= 3.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.26 fps, Min. Travel Time= 8.5 min
Avg. Velocity = 0.15 fps, Avg. Travel Time= 14.7 min

Peak Storage= 852 cf @ 8.04 hrs
Average Depth at Peak Storage= 0.53'
Bank-Full Depth= 1.50' Flow Area= 22.5 sf, Capacity= 10.83 cfs

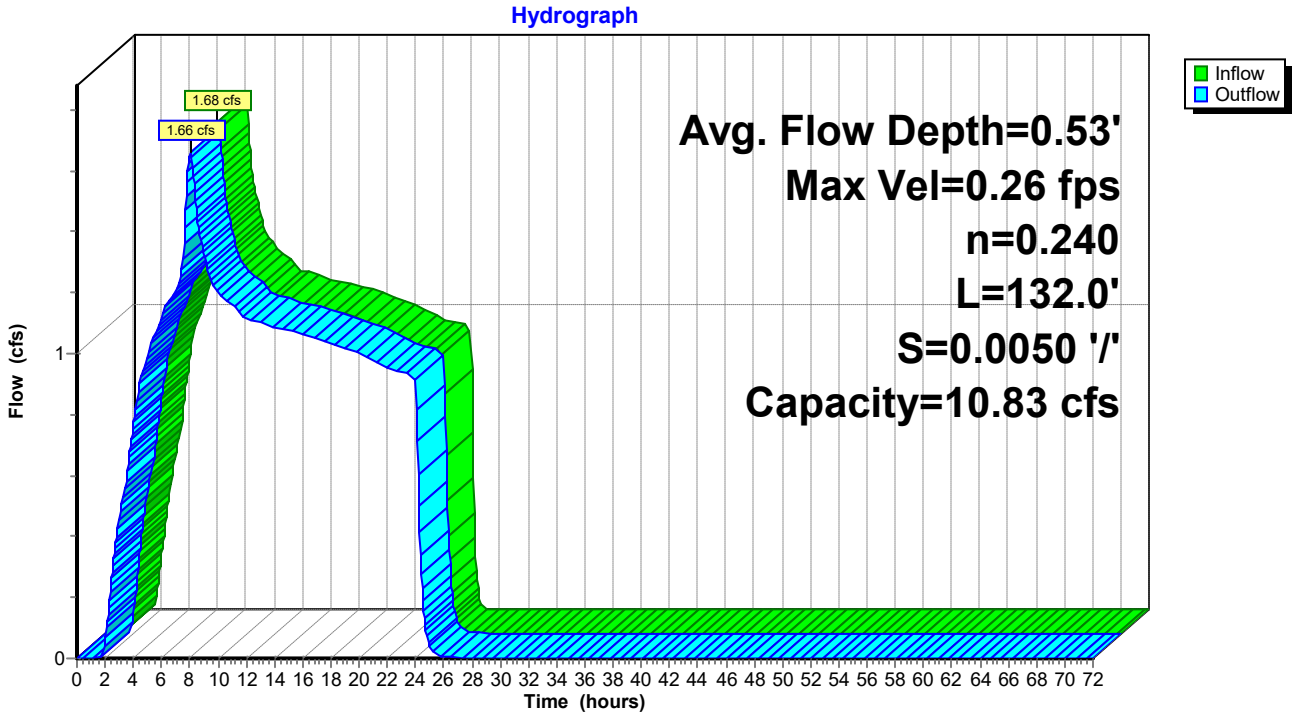
Custom cross-section, Length= 132.0' Slope= 0.0050 '/'
Constant n= 0.240
Inlet Invert= 221.00', Outlet Invert= 220.34'

‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-9.50	1.50	0.00
-7.00	0.50	1.00
-5.00	0.00	1.50
5.00	0.00	1.50
7.00	0.50	1.00
9.50	1.50	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
0.50	6.0	14.1	792	1.49
1.50	22.5	19.5	2,970	10.83

Reach S1: VEGETATED SWALE



Summary for Pond 1R: WQMH/ BYPASS

Inflow Area = 1,100,942 sf, 68.23% Impervious, Inflow Depth = 0.74" for 1/2 2 YEAR event
Inflow = 4.48 cfs @ 7.97 hrs, Volume= 68,170 cf
Outflow = 4.48 cfs @ 7.97 hrs, Volume= 68,170 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.55 cfs @ 7.97 hrs, Volume= 926 cf
Secondary = 3.93 cfs @ 7.97 hrs, Volume= 67,244 cf

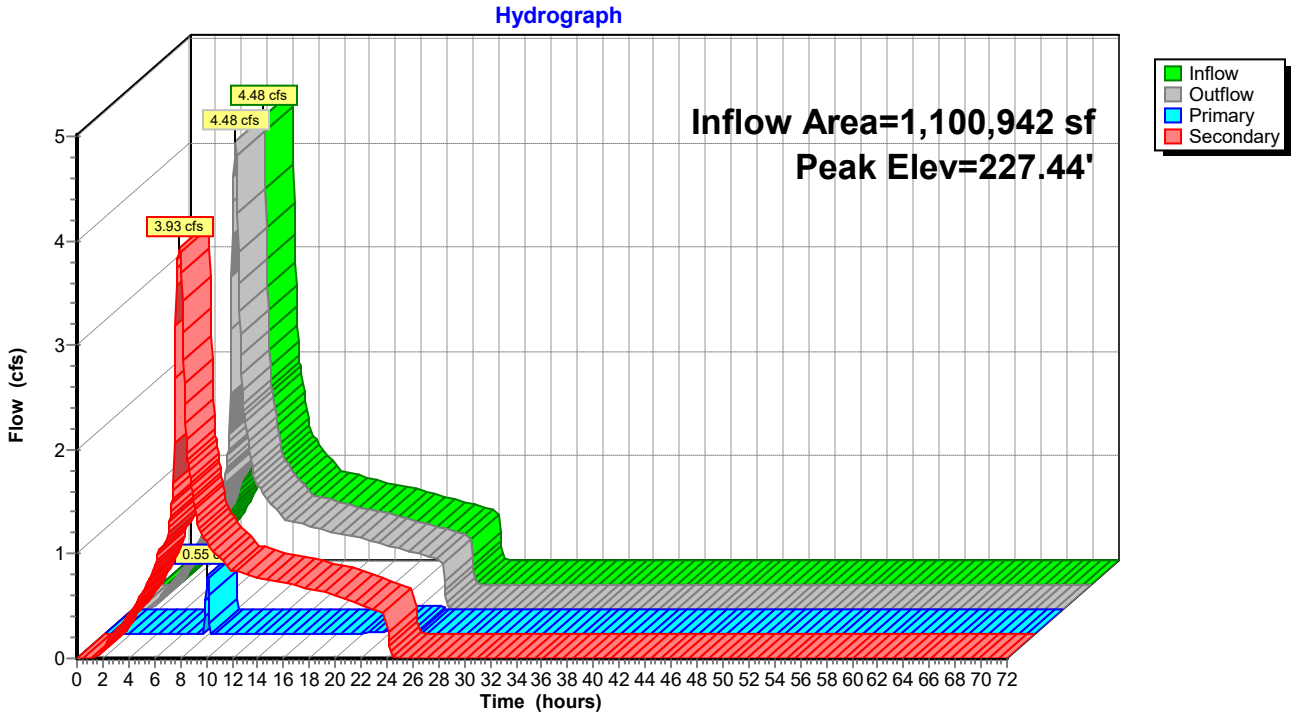
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 227.44' @ 7.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	227.15'	**36.0" Round High Flow Bypass** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 227.15' / 224.50' S= 0.0530 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Secondary	225.55'	**12.0" Round WQ Flow** L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 225.55' / 225.35' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	225.15'	**12.0" Round WQ Flow** L= 32.5' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 225.15' / 224.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.55 cfs @ 7.97 hrs HW=227.43' TW=225.51' (Dynamic Tailwater)
↑—**1=High Flow Bypass** (Inlet Controls 0.55 cfs @ 1.60 fps)

Secondary OutFlow Max=3.93 cfs @ 7.97 hrs HW=227.43' TW=225.51' (Dynamic Tailwater)
↑—**2=WQ Flow** (Inlet Controls 3.93 cfs @ 5.00 fps)
↑—**3=WQ Flow** (Passes 3.93 cfs of 4.46 cfs potential flow)

Pond 1R: WQMH/ BYPASS



Summary for Pond 2R: BYPASS

Inflow Area = 2,261,386 sf, 64.41% Impervious, Inflow Depth = 0.70" for 1/2 2 YEAR event
Inflow = 8.52 cfs @ 7.98 hrs, Volume= 131,412 cf
Outflow = 8.52 cfs @ 7.98 hrs, Volume= 131,412 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.84 cfs @ 7.98 hrs, Volume= 48,198 cf
Secondary = 1.68 cfs @ 7.98 hrs, Volume= 83,214 cf

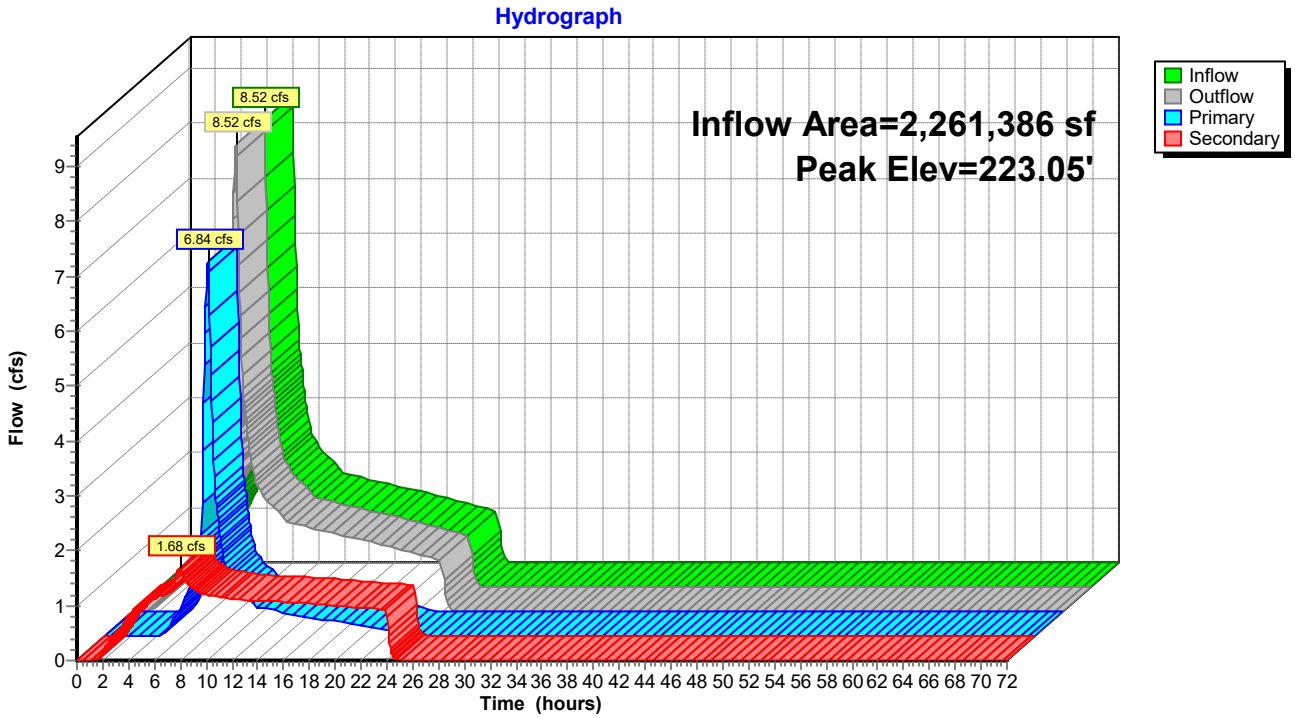
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 223.05' @ 7.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Secondary	221.20'	**8.0" Round WQ Flow** L= 40.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 221.20' / 221.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	222.00'	**36.0" Round High Flow Bypass** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 222.00' / 221.20' S= 0.0160 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=6.79 cfs @ 7.98 hrs HW=223.05' TW=213.66' (Dynamic Tailwater)
└**2=High Flow Bypass** (Inlet Controls 6.79 cfs @ 3.08 fps)

Secondary OutFlow Max=1.68 cfs @ 7.98 hrs HW=223.05' TW=221.53' (Dynamic Tailwater)
└**1=WQ Flow** (Barrel Controls 1.68 cfs @ 4.81 fps)

Pond 2R: BYPASS



Summary for Pond P1: EXTENDED DRY BASIN

Inflow Area = 1,100,942 sf, 68.23% Impervious, Inflow Depth = 0.74" for 1/2 2 YEAR event
Inflow = 4.48 cfs @ 7.97 hrs, Volume= 68,170 cf
Outflow = 0.37 cfs @ 24.06 hrs, Volume= 68,185 cf, Atten= 92%, Lag= 965.4 min
Primary = 0.37 cfs @ 24.06 hrs, Volume= 68,185 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 227.32' @ 24.06 hrs Surf.Area= 17,869 sf Storage= 43,885 cf

Plug-Flow detention time= 1,269.3 min calculated for 68,138 cf (100% of inflow)
Center-of-Mass det. time= 1,270.4 min (1,991.7 - 721.3)

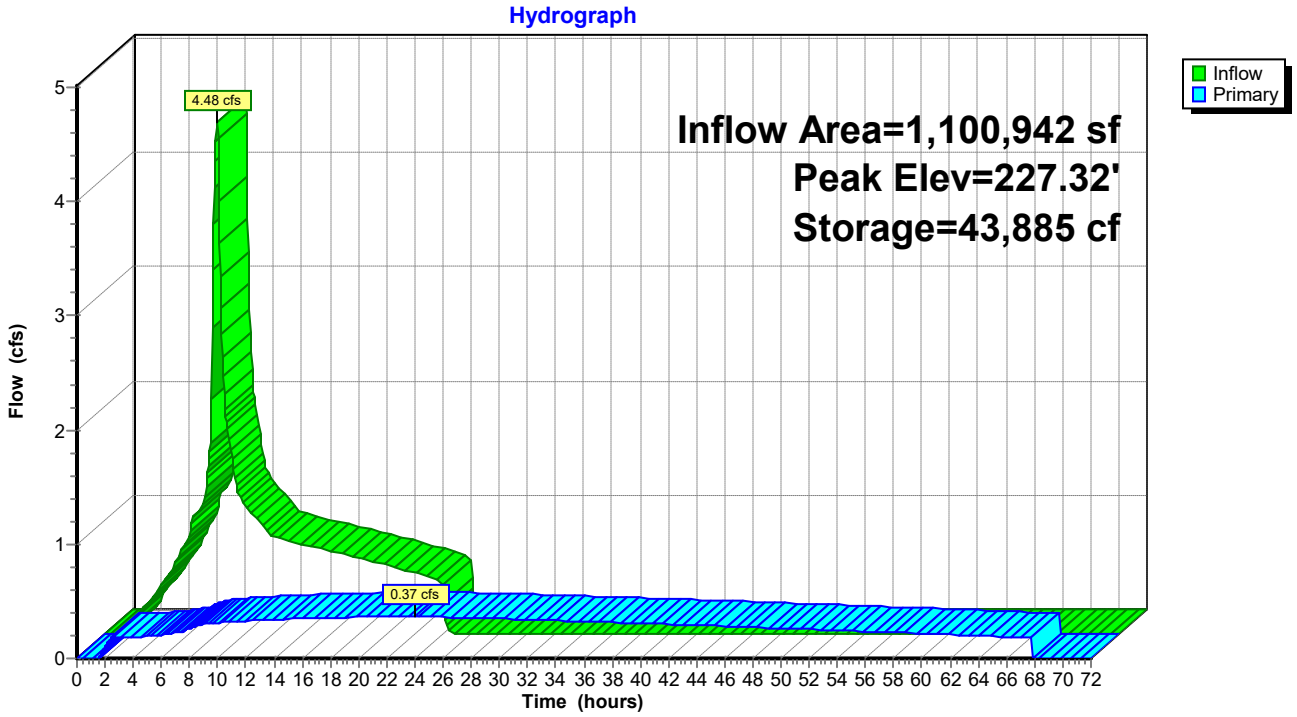
Volume	Invert	Avail.Storage	Storage Description
#1	224.50'	109,826 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
224.50	13,412	505.4	0	0	13,412
230.50	23,680	635.5	109,826	109,826	25,710

Device	Routing	Invert	Outlet Devices
#1	Primary	223.40'	**12.0" Round Outfall Pipe** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 223.40' / 223.15' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	223.50'	**2.7" Vert. WQ Orifice** C= 0.600
#3	Device 1	228.30'	**30.0" x 16.0" Horiz. Upper Ditch Inlet** C= 0.600 Limited to weir flow at low heads
#4	Primary	225.50'	**12.0" Round Outfall Pipe** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 225.50' / 224.25' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#5	Device 4	229.00'	**30.0" x 16.0" Horiz. Upper Ditch Inlet** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.37 cfs @ 24.06 hrs HW=227.32' TW=0.00' (Dynamic Tailwater)
- **1=Outfall Pipe** (Passes 0.37 cfs of 6.40 cfs potential flow)
  - **2=WQ Orifice** (Orifice Controls 0.37 cfs @ 9.27 fps)
  - **3=Upper Ditch Inlet** (Controls 0.00 cfs)
- **4=Outfall Pipe** (Passes 0.00 cfs of 4.34 cfs potential flow)
  - **5=Upper Ditch Inlet** (Controls 0.00 cfs)

Pond P1: EXTENDED DRY BASIN



Summary for Pond P2: DETENTION POND

Inflow Area = 2,261,386 sf, 64.41% Impervious, Inflow Depth = 0.70" for 1/2 2 YEAR event
Inflow = 8.49 cfs @ 7.98 hrs, Volume= 131,412 cf
Outflow = 0.39 cfs @ 24.31 hrs, Volume= 84,811 cf, Atten= 95%, Lag= 979.9 min
Primary = 0.39 cfs @ 24.31 hrs, Volume= 84,811 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 216.87' @ 24.31 hrs Surf.Area= 26,985 sf Storage= 106,032 cf
Flood Elev= 219.00' Surf.Area= 32,084 sf Storage= 168,924 cf

Plug-Flow detention time= 1,736.9 min calculated for 84,811 cf (65% of inflow)
Center-of-Mass det. time= 1,524.1 min (2,253.6 - 729.5)

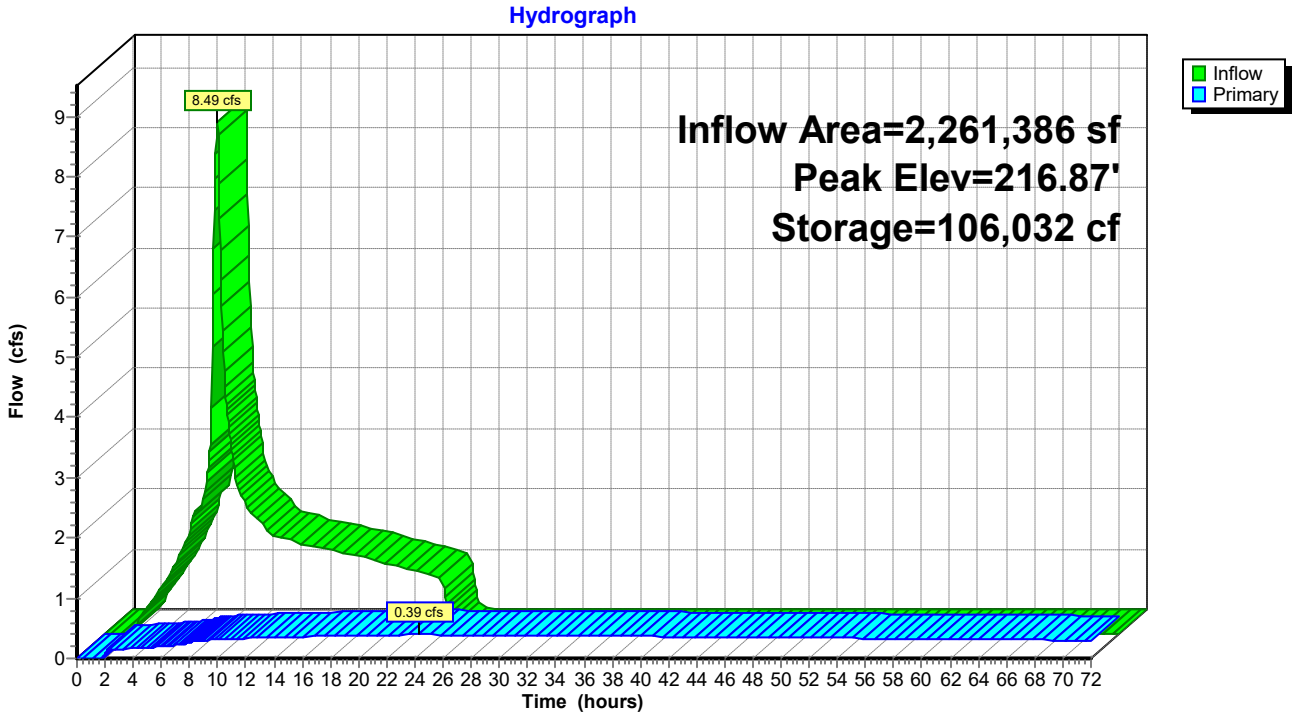
Volume	Invert	Avail.Storage	Storage Description
#1	212.00'	202,272 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.00	16,833	666.0	0	0	16,833
213.00	18,860	684.8	17,837	17,837	18,964
220.00	34,628	816.8	184,435	202,272	35,589

Device	Routing	Invert	Outlet Devices
#1	Primary	210.50'	**18.0" Round Outfall** L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 210.50' / 191.00' S= 0.3900 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	211.00'	**12.0" Round Detention Pipe 1** L= 10.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 211.00' / 210.95' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	211.00'	**2.5" Vert. Detention Orifice 1** C= 0.600
#4	Device 2	216.90'	**30.0" x 16.0" Horiz. Upper Ditch Inlet 1** C= 0.600 Limited to weir flow at low heads
#5	Device 1	213.00'	**12.0" Round Detention Pipe 2** L= 30.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 213.00' / 212.25' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#6	Device 5	218.20'	**30.0" x 16.0" Horiz. Upper Ditch Inlet 2** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.39 cfs @ 24.31 hrs HW=216.87' TW=0.00' (Dynamic Tailwater)
- **1=Outfall** (Passes 0.39 cfs of 20.17 cfs potential flow)
  - **2=Detention Pipe 1** (Passes 0.39 cfs of 8.76 cfs potential flow)
    - **3=Detention Orifice 1** (Orifice Controls 0.39 cfs @ 11.56 fps)
    - **4=Upper Ditch Inlet 1** (Controls 0.00 cfs)
  - **5=Detention Pipe 2** (Passes 0.00 cfs of 6.94 cfs potential flow)
    - **6=Upper Ditch Inlet 2** (Controls 0.00 cfs)

Pond P2: DETENTION POND

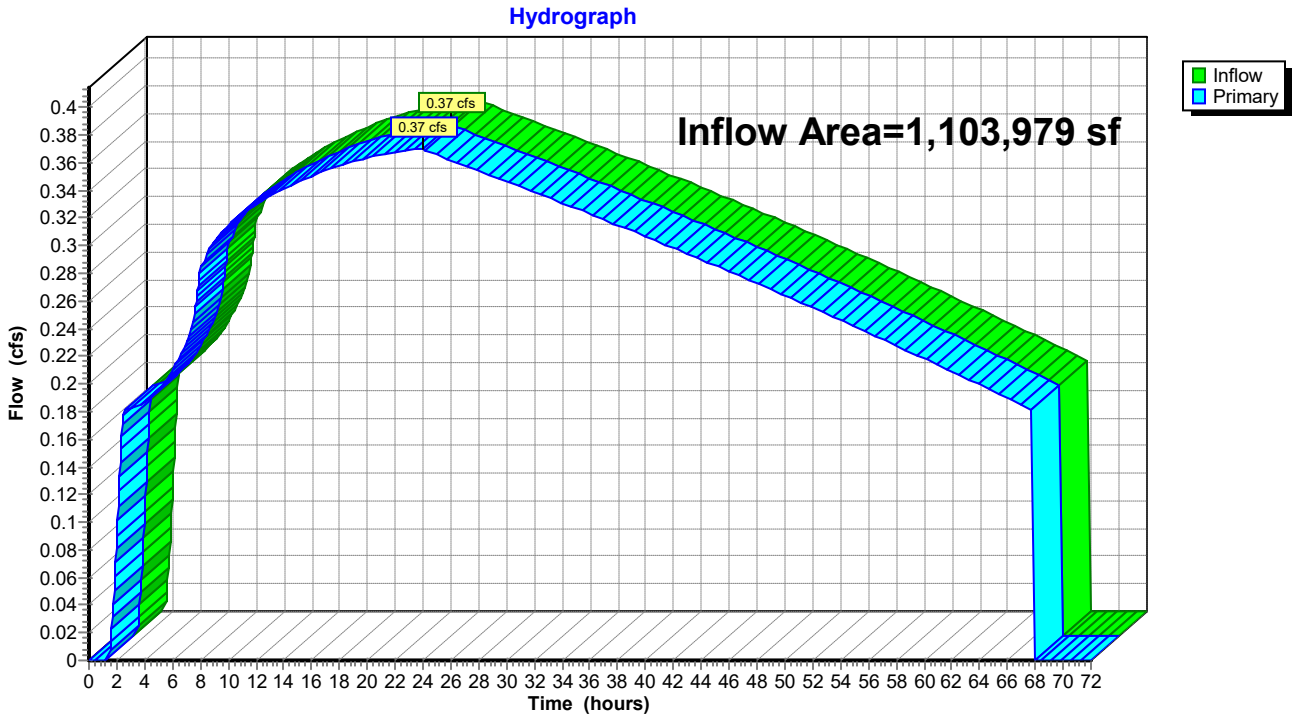


Summary for Link CS: CENTER ST (S)

Inflow Area = 1,103,979 sf, 68.28% Impervious, Inflow Depth = 0.74" for 1/2 2 YEAR event
Inflow = 0.37 cfs @ 23.98 hrs, Volume= 68,423 cf
Primary = 0.37 cfs @ 23.98 hrs, Volume= 68,423 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link CS: CENTER ST (S)

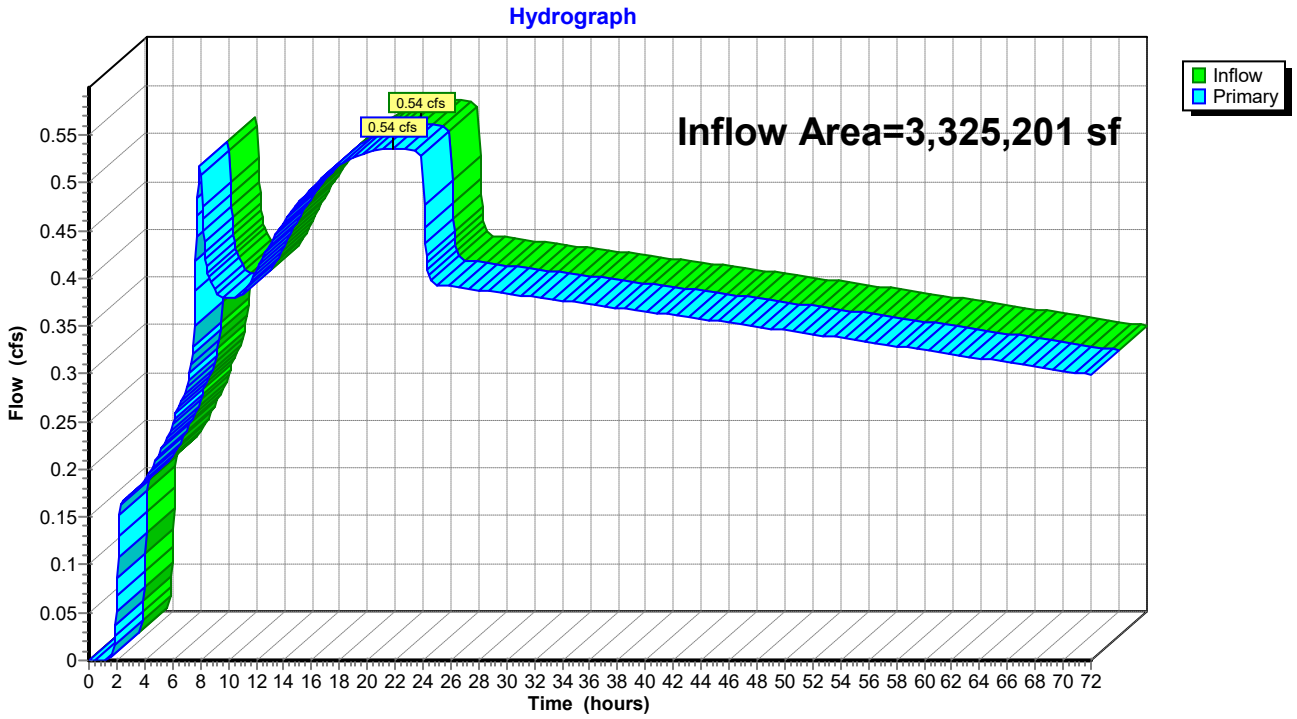


Summary for Link HC: HESS CREEK

Inflow Area = 3,325,201 sf, 45.12% Impervious, Inflow Depth > 0.34" for 1/2 2 YEAR event
Inflow = 0.54 cfs @ 21.90 hrs, Volume= 92,918 cf
Primary = 0.54 cfs @ 21.90 hrs, Volume= 92,918 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link HC: HESS CREEK



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S1: MOUNTAINVIEW Runoff Area=3,037 sf 88.90% Impervious Runoff Depth=2.12"
Tc=5.0 min CN=80/98 Runoff=0.04 cfs 536 cf

Subcatchment 1S2: WEST HALF/ Runoff Area=1,100,942 sf 68.23% Impervious Runoff Depth=1.78"
Tc=8.0 min CN=77/98 Runoff=10.58 cfs 163,718 cf

Subcatchment 2S1: EAST HALF/ Runoff Area=2,261,386 sf 64.41% Impervious Runoff Depth=1.69"
Tc=10.0 min CN=75/98 Runoff=19.93 cfs 319,268 cf

Subcatchment 2S2: HESS OPEN SPACE/ Runoff Area=1,063,815 sf 4.10% Impervious Runoff Depth=0.60"
Flow Length=455' Tc=8.9 min CN=72/98 Runoff=1.80 cfs 53,194 cf

Subcatchment 3S1: MOUNTAINVIEW Runoff Area=15,878 sf 81.07% Impervious Runoff Depth=2.01"
Tc=5.0 min CN=80/98 Runoff=0.18 cfs 2,658 cf

Subcatchment 4S1: CENTER (N) Runoff Area=5,141 sf 75.43% Impervious Runoff Depth=1.93"
Tc=5.0 min CN=80/98 Runoff=0.06 cfs 827 cf

Subcatchment 5S1: ALDERSGATE (N) Runoff Area=2,874 sf 58.91% Impervious Runoff Depth=1.59"
Tc=5.0 min CN=74/98 Runoff=0.02 cfs 380 cf

Reach S1: VEGETATED SWALE Avg. Flow Depth=0.60' Max Vel=0.28 fps Inflow=2.08 cfs 111,260 cf
n=0.240 L=132.0' S=0.0050 '/' Capacity=10.83 cfs Outflow=2.06 cfs 111,260 cf

Pond 1R: WQMH/ BYPASS Peak Elev=228.53' Inflow=10.58 cfs 163,718 cf
Primary=7.14 cfs 94,305 cf Secondary=3.94 cfs 69,413 cf Outflow=10.58 cfs 163,718 cf

Pond 2R: BYPASS Peak Elev=223.80' Inflow=19.93 cfs 319,268 cf
Primary=17.84 cfs 208,008 cf Secondary=2.08 cfs 111,260 cf Outflow=19.93 cfs 319,268 cf

Pond P1: EXTENDED DRY BASIN Peak Elev=228.50' Storage=66,227 cf Inflow=10.58 cfs 163,718 cf
Outflow=2.63 cfs 156,600 cf

Pond P2: DETENTION POND Peak Elev=217.30' Storage=117,812 cf Inflow=19.90 cfs 319,268 cf
Outflow=6.67 cfs 270,611 cf

Link CS: CENTER ST (S) Inflow=2.64 cfs 157,136 cf
Primary=2.64 cfs 157,136 cf

Link HC: HESS CREEK Inflow=7.74 cfs 323,805 cf
Primary=7.74 cfs 323,805 cf

Total Runoff Area = 4,453,073 sf Runoff Volume = 540,582 cf Average Runoff Depth = 1.46"
48.97% Pervious = 2,180,498 sf 51.03% Impervious = 2,272,575 sf

Summary for Subcatchment 1S1: MOUNTAINVIEW

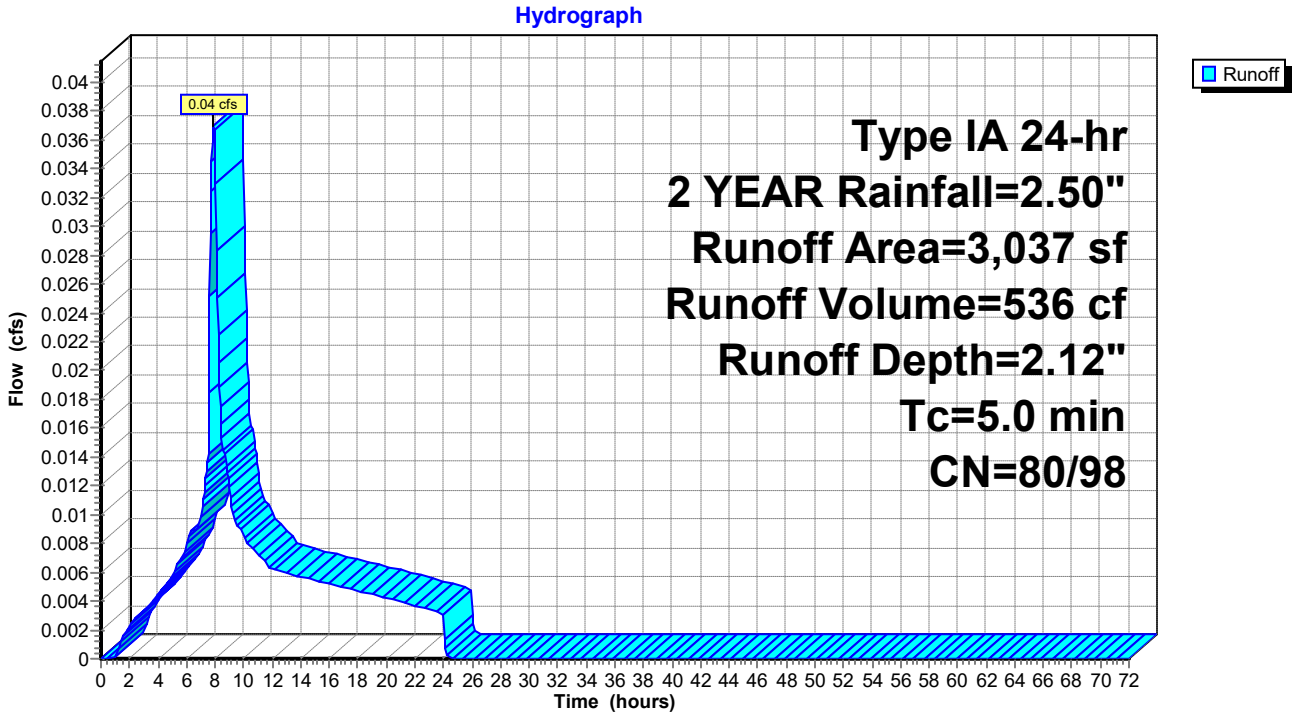
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 536 cf, Depth= 2.12"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

Area (sf)	CN	Description
2,700	98	Paved roads w/curbs & sewers
337	80	>75% Grass cover, Good, HSG D
3,037	96	Weighted Average
337	80	11.10% Pervious Area
2,700	98	88.90% Impervious Area

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

Subcatchment 1S1: MOUNTAINVIEW



Summary for Subcatchment 1S2: WEST HALF/ MOUNTAINVIEW

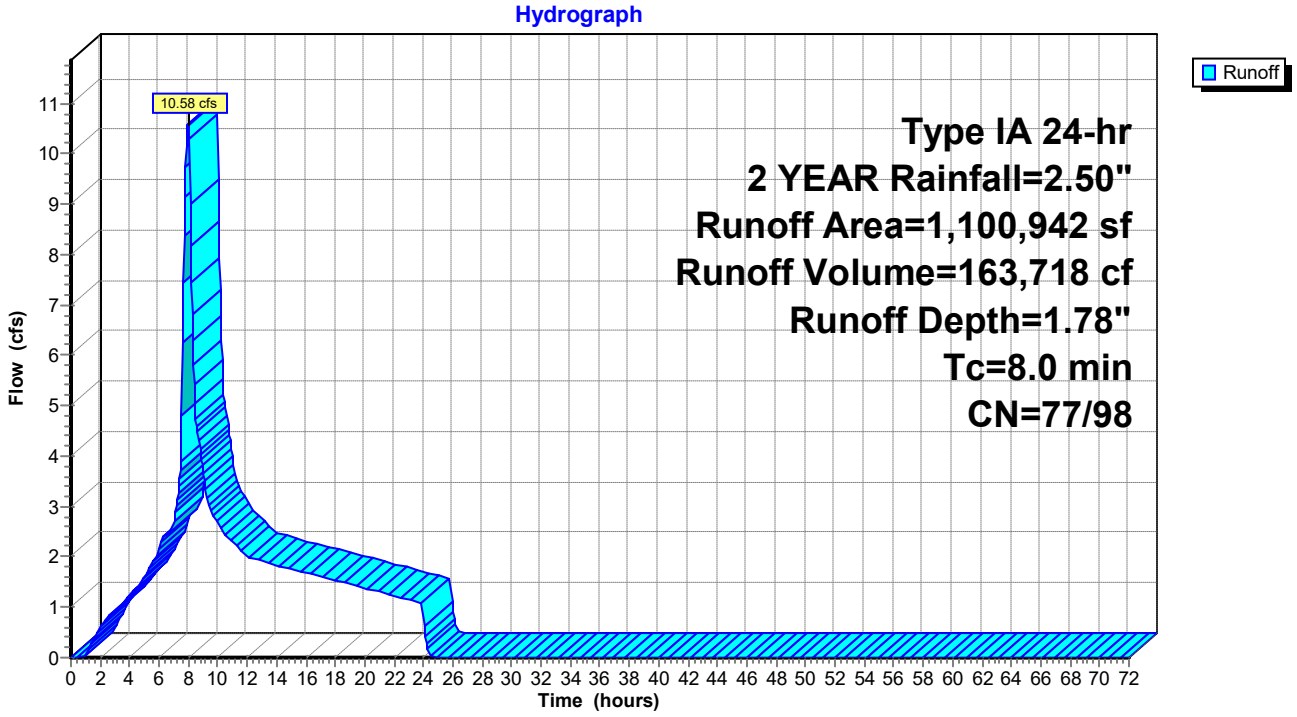
Runoff = 10.58 cfs @ 7.97 hrs, Volume= 163,718 cf, Depth= 1.78"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

	Area (sf)	CN	Description
*	336,878	98	Right-of-Way Impervious area
*	345,240	98	120 Lots >2877 sf (2877sf/Lot)
*	57,717	98	Cluster Lots (90% of total area)
*	11,309	98	Open Space Impervious
	170,116	74	>75% Grass cover, Good, HSG C
	179,682	80	>75% Grass cover, Good, HSG D
	1,100,942	91	Weighted Average
	349,798	77	31.77% Pervious Area
	751,144	98	68.23% Impervious Area

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

Subcatchment 1S2: WEST HALF/ MOUNTAINVIEW



Summary for Subcatchment 2S1: EAST HALF/ MOUNTAINVIEW

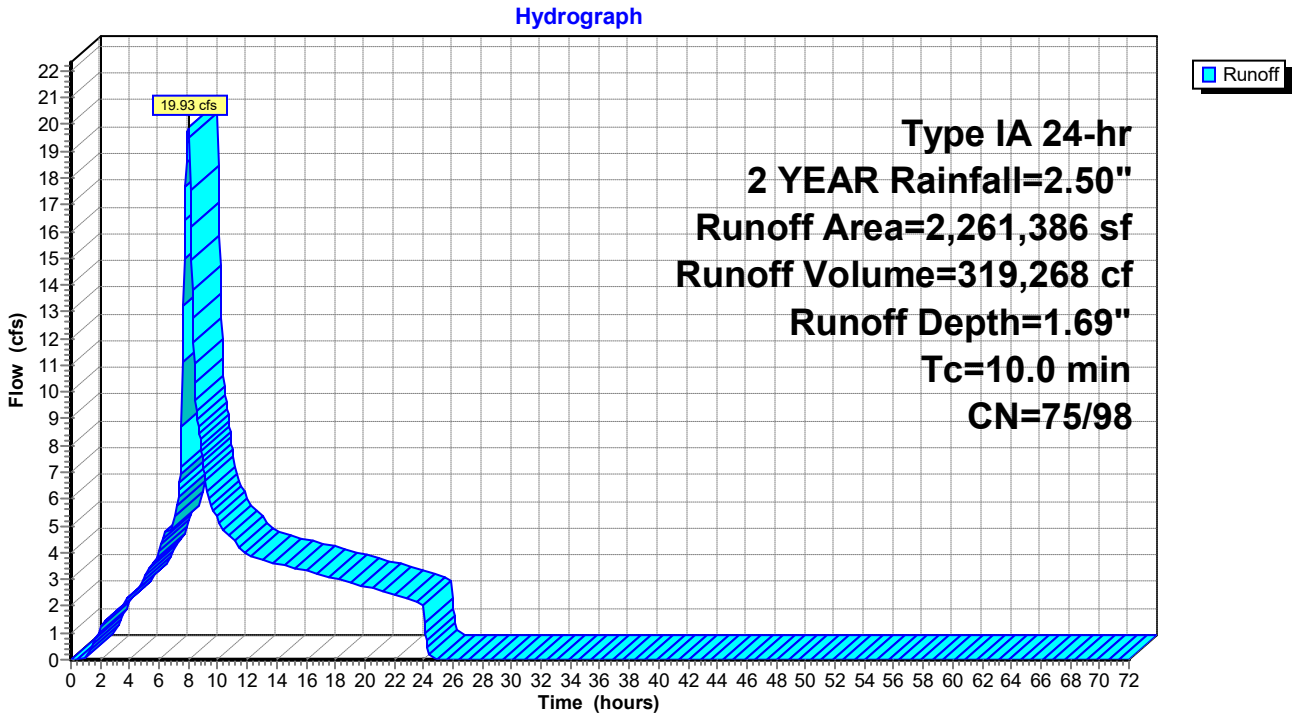
Runoff = 19.93 cfs @ 7.98 hrs, Volume= 319,268 cf, Depth= 1.69"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

	Area (sf)	CN	Description
*	650,436	98	Right-of-Way Impervious area
*	716,373	98	249 Lots >2877 sf (2877sf/Lot)
*	47,186	98	Cluster Lots (90% of total area)
*	42,676	98	Open Space Impervious
	547,140	74	>75% Grass cover, Good, HSG C
	195,956	80	>75% Grass cover, Good, HSG D
*	14,344	86	Playground surfacing
	47,275	71	Meadow, non-grazed, HSG C
	2,261,386	90	Weighted Average
	804,715	75	35.59% Pervious Area
	1,456,671	98	64.41% Impervious Area

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

Subcatchment 2S1: EAST HALF/ MOUNTAINVIEW



Summary for Subcatchment 2S2: HESS OPEN SPACE/ MOUNTAINVIEW

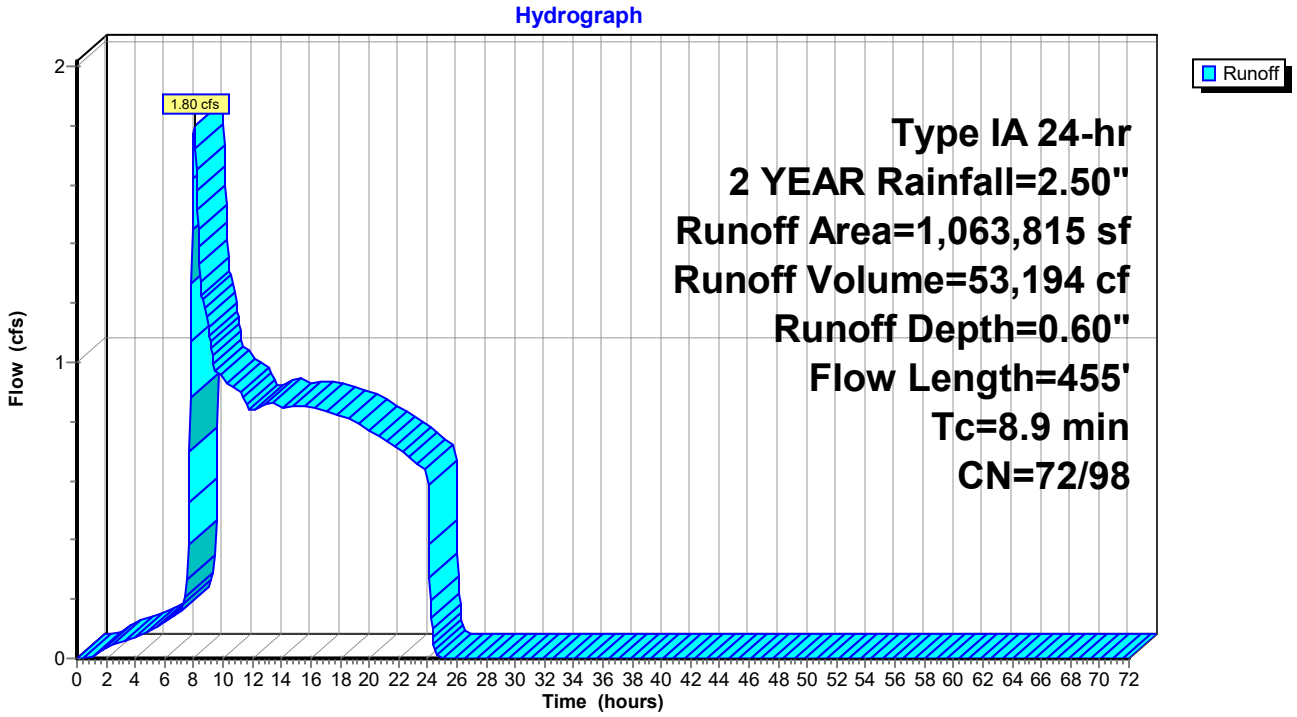
Runoff = 1.80 cfs @ 8.04 hrs, Volume= 53,194 cf, Depth= 0.60"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

	Area (sf)	CN	Description
	11,944	98	Paved roads w/curbs & sewers
	815,065	71	Meadow, non-grazed, HSG C
	80,425	78	Meadow, non-grazed, HSG D
*	30,659	98	Paved Paths
	19,458	96	Gravel surface, HSG C
	92,519	74	>75% Grass cover, Good, HSG C
	7,358	80	>75% Grass cover, Good, HSG D
	5,373	82	Woods/grass comb., Poor, HSG C
*	1,014	100	Stream
	1,063,815	73	Weighted Average
	1,020,198	72	95.90% Pervious Area
	43,617	98	4.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.0740	0.28		**Sheet Flow,** Range n= 0.130 P2= 2.50"
2.5	260	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	95	0.2200	3.28		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.9	455	Total			

Subcatchment 2S2: HESS OPEN SPACE/ MOUNTAINVIEW



Summary for Subcatchment 3S1: MOUNTAINVIEW

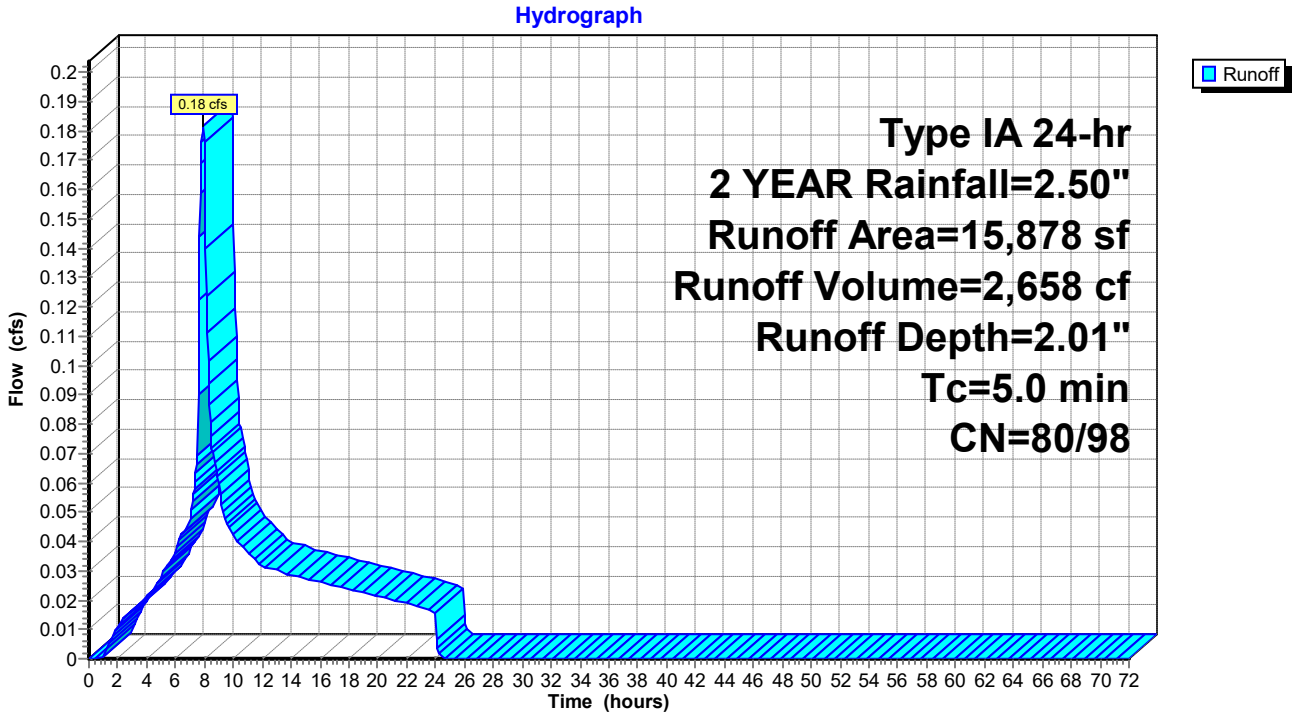
Runoff = 0.18 cfs @ 7.91 hrs, Volume= 2,658 cf, Depth= 2.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

Area (sf)	CN	Description
12,872	98	Paved roads w/curbs & sewers
3,006	80	>75% Grass cover, Good, HSG D
15,878	95	Weighted Average
3,006	80	18.93% Pervious Area
12,872	98	81.07% Impervious Area

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

Subcatchment 3S1: MOUNTAINVIEW



Summary for Subcatchment 4S1: CENTER (N)

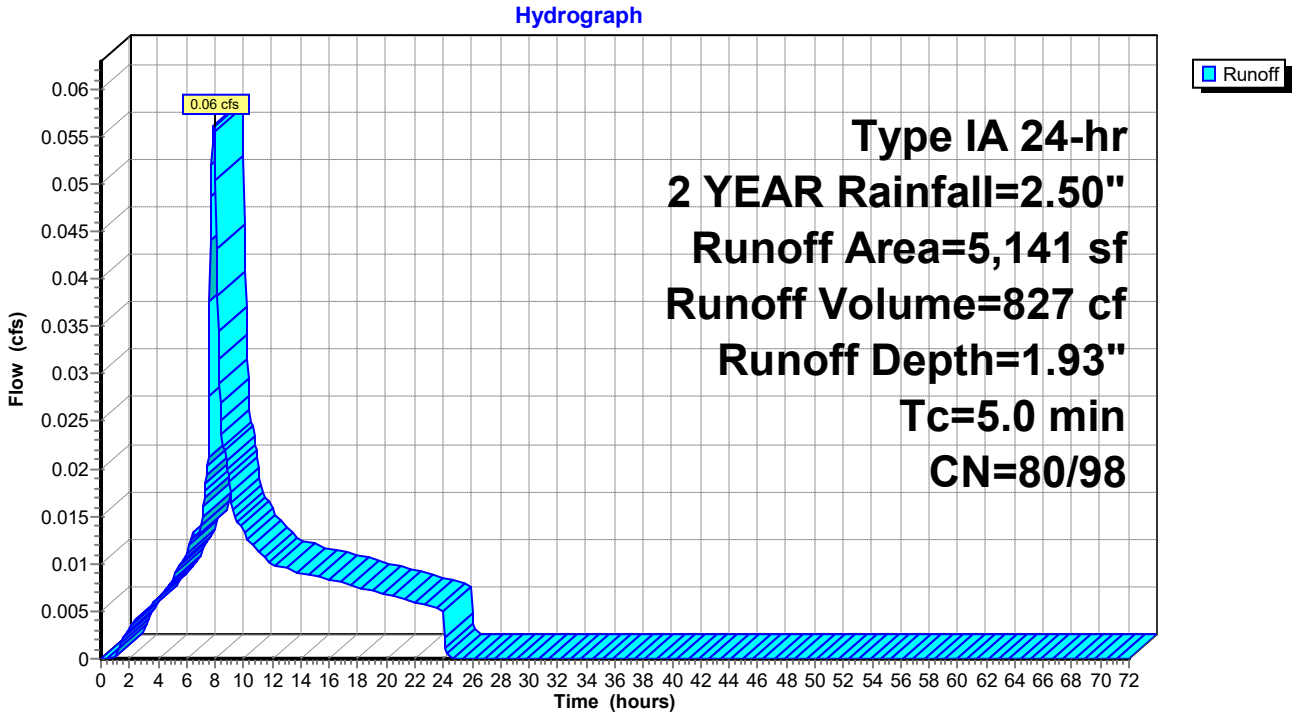
Runoff = 0.06 cfs @ 7.92 hrs, Volume= 827 cf, Depth= 1.93"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

Area (sf)	CN	Description
3,878	98	Paved roads w/curbs & sewers
1,263	80	>75% Grass cover, Good, HSG D
5,141	94	Weighted Average
1,263	80	24.57% Pervious Area
3,878	98	75.43% Impervious Area

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

Subcatchment 4S1: CENTER (N)



Summary for Subcatchment 5S1: ALDERSGATE (N)

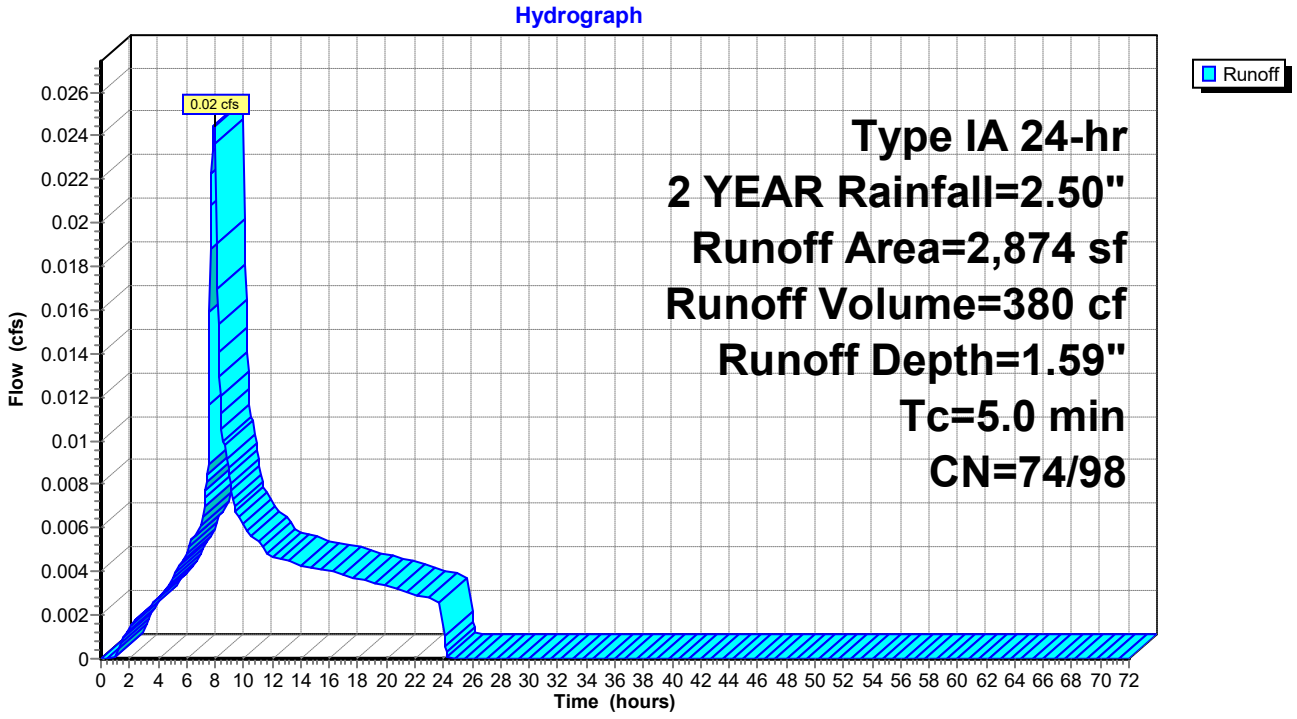
Runoff = 0.02 cfs @ 7.93 hrs, Volume= 380 cf, Depth= 1.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

Area (sf)	CN	Description
1,693	98	Paved roads w/curbs & sewers
1,181	74	>75% Grass cover, Good, HSG C
2,874	88	Weighted Average
1,181	74	41.09% Pervious Area
1,693	98	58.91% Impervious Area

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

Subcatchment 5S1: ALDERSGATE (N)



Summary for Reach S1: VEGETATED SWALE

Inflow = 2.08 cfs @ 7.98 hrs, Volume= 111,260 cf
Outflow = 2.06 cfs @ 8.04 hrs, Volume= 111,260 cf, Atten= 1%, Lag= 3.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.28 fps, Min. Travel Time= 7.9 min
Avg. Velocity = 0.17 fps, Avg. Travel Time= 13.3 min

Peak Storage= 979 cf @ 8.04 hrs
Average Depth at Peak Storage= 0.60'
Bank-Full Depth= 1.50' Flow Area= 22.5 sf, Capacity= 10.83 cfs

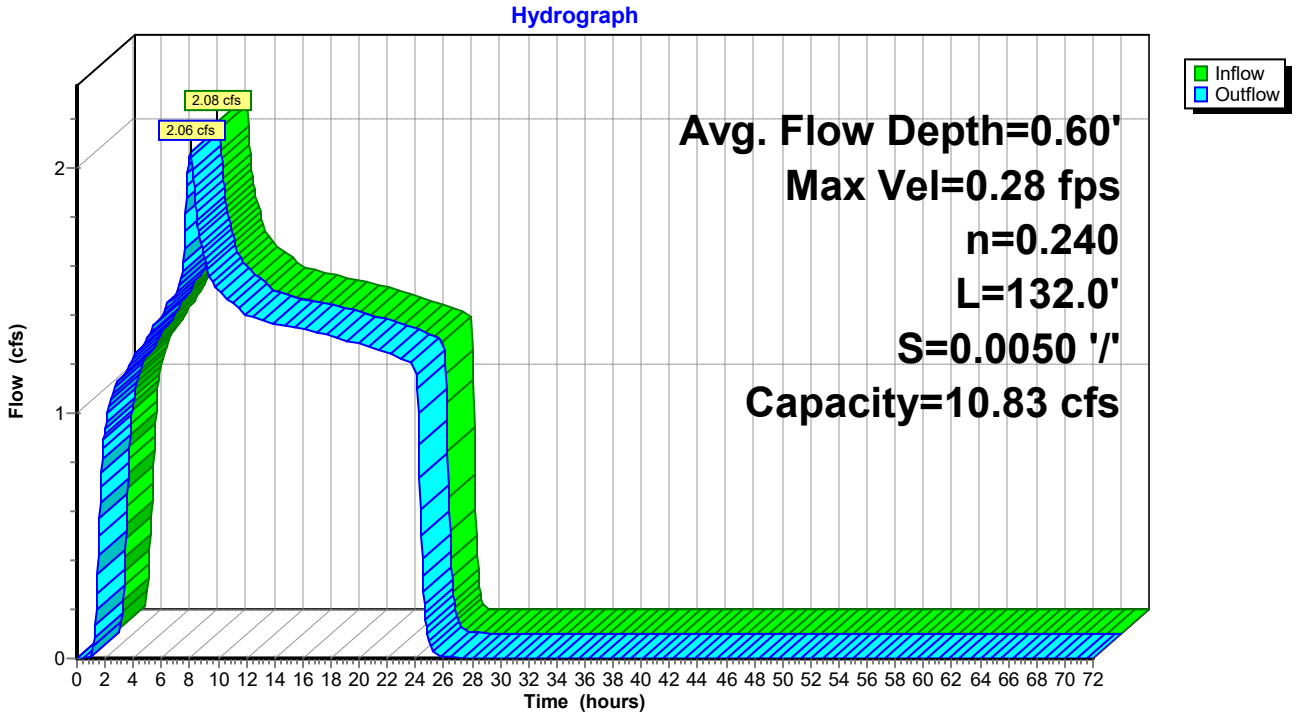
Custom cross-section, Length= 132.0' Slope= 0.0050 '/'
Constant n= 0.240
Inlet Invert= 221.00', Outlet Invert= 220.34'

‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-9.50	1.50	0.00
-7.00	0.50	1.00
-5.00	0.00	1.50
5.00	0.00	1.50
7.00	0.50	1.00
9.50	1.50	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
0.50	6.0	14.1	792	1.49
1.50	22.5	19.5	2,970	10.83

Reach S1: VEGETATED SWALE



Summary for Pond 1R: WQMH/ BYPASS

Inflow Area = 1,100,942 sf, 68.23% Impervious, Inflow Depth = 1.78" for 2 YEAR event
Inflow = 10.58 cfs @ 7.97 hrs, Volume= 163,718 cf
Outflow = 10.58 cfs @ 7.97 hrs, Volume= 163,718 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.14 cfs @ 7.99 hrs, Volume= 94,305 cf
Secondary = 3.94 cfs @ 7.71 hrs, Volume= 69,413 cf

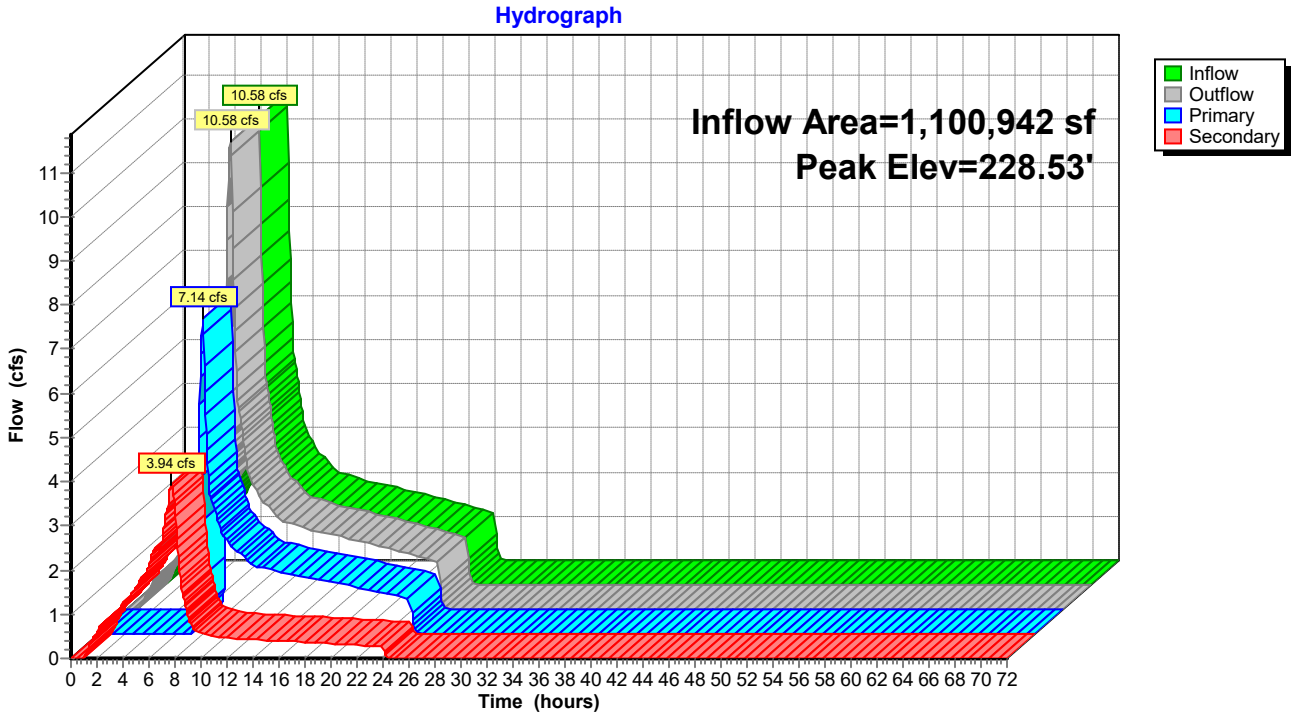
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 228.53' @ 10.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	227.15'	**36.0" Round High Flow Bypass** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 227.15' / 224.50' S= 0.0530 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Secondary	225.55'	**12.0" Round WQ Flow** L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 225.55' / 225.35' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	225.15'	**12.0" Round WQ Flow** L= 32.5' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 225.15' / 224.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=7.10 cfs @ 7.99 hrs HW=228.23' TW=227.25' (Dynamic Tailwater)
└**1=High Flow Bypass** (Inlet Controls 7.10 cfs @ 3.12 fps)

Secondary OutFlow Max=3.81 cfs @ 7.71 hrs HW=228.01' TW=226.70' (Dynamic Tailwater)
└**2=WQ Flow** (Controls 3.81 cfs)
└**3=WQ Flow** (Inlet Controls 3.81 cfs @ 4.86 fps)

Pond 1R: WQMH/ BYPASS



Summary for Pond 2R: BYPASS

Inflow Area = 2,261,386 sf, 64.41% Impervious, Inflow Depth = 1.69" for 2 YEAR event
Inflow = 19.93 cfs @ 7.98 hrs, Volume= 319,268 cf
Outflow = 19.93 cfs @ 7.98 hrs, Volume= 319,268 cf, Atten= 0%, Lag= 0.0 min
Primary = 17.84 cfs @ 7.98 hrs, Volume= 208,008 cf
Secondary = 2.08 cfs @ 7.98 hrs, Volume= 111,260 cf

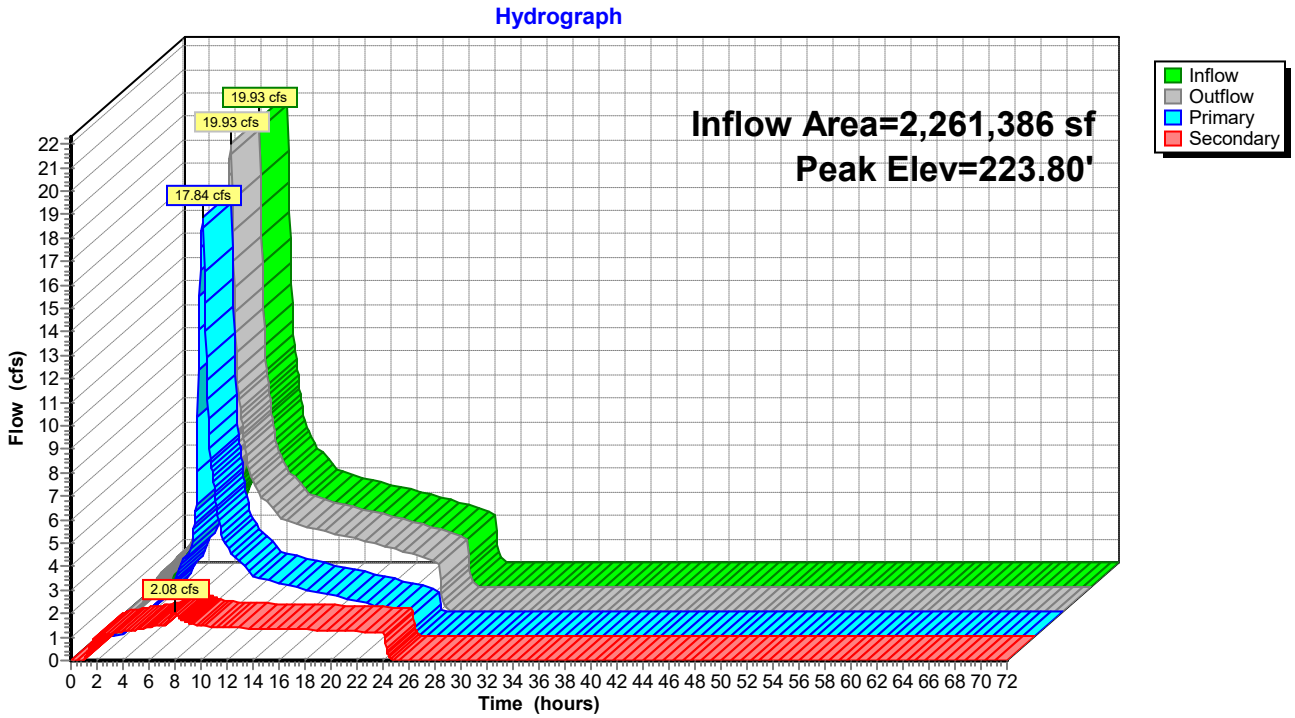
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 223.80' @ 7.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Secondary	221.20'	**8.0" Round WQ Flow** L= 40.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 221.20' / 221.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	222.00'	**36.0" Round High Flow Bypass** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 222.00' / 221.20' S= 0.0160 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=17.74 cfs @ 7.98 hrs HW=223.79' TW=216.05' (Dynamic Tailwater)
└**2=High Flow Bypass** (Inlet Controls 17.74 cfs @ 4.02 fps)

Secondary OutFlow Max=2.08 cfs @ 7.98 hrs HW=223.79' TW=221.60' (Dynamic Tailwater)
└**1=WQ Flow** (Barrel Controls 2.08 cfs @ 5.96 fps)

Pond 2R: BYPASS



Summary for Pond P1: EXTENDED DRY BASIN

Inflow Area = 1,100,942 sf, 68.23% Impervious, Inflow Depth = 1.78" for 2 YEAR event
Inflow = 10.58 cfs @ 7.97 hrs, Volume= 163,718 cf
Outflow = 2.63 cfs @ 10.06 hrs, Volume= 156,600 cf, Atten= 75%, Lag= 125.1 min
Primary = 2.63 cfs @ 10.06 hrs, Volume= 156,600 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 228.50' @ 10.06 hrs Surf.Area= 19,932 sf Storage= 66,227 cf

Plug-Flow detention time= 892.2 min calculated for 156,600 cf (96% of inflow)
Center-of-Mass det. time= 860.7 min (1,564.2 - 703.5)

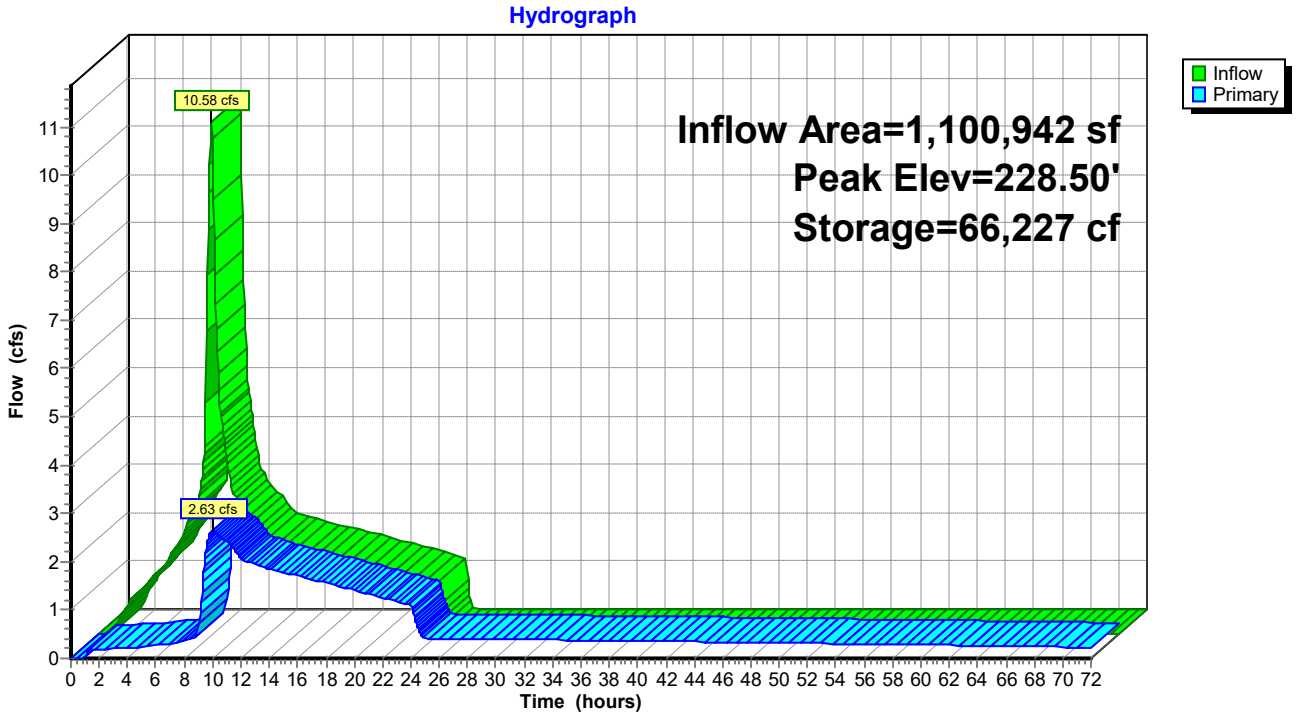
Volume	Invert	Avail.Storage	Storage Description
#1	224.50'	109,826 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
224.50	13,412	505.4	0	0	13,412
230.50	23,680	635.5	109,826	109,826	25,710

Device	Routing	Invert	Outlet Devices
#1	Primary	223.40'	**12.0" Round Outfall Pipe** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 223.40' / 223.15' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	223.50'	**2.7" Vert. WQ Orifice** C= 0.600
#3	Device 1	228.30'	**30.0" x 16.0" Horiz. Upper Ditch Inlet** C= 0.600 Limited to weir flow at low heads
#4	Primary	225.50'	**12.0" Round Outfall Pipe** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 225.50' / 224.25' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#5	Device 4	229.00'	**30.0" x 16.0" Horiz. Upper Ditch Inlet** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.63 cfs @ 10.06 hrs HW=228.50' TW=0.00' (Dynamic Tailwater)
- **1=Outfall Pipe** (Passes 2.63 cfs of 7.50 cfs potential flow)
  - **2=WQ Orifice** (Orifice Controls 0.42 cfs @ 10.64 fps)
  - **3=Upper Ditch Inlet** (Weir Controls 2.21 cfs @ 1.46 fps)
- **4=Outfall Pipe** (Passes 0.00 cfs of 5.98 cfs potential flow)
  - **5=Upper Ditch Inlet** (Controls 0.00 cfs)

Pond P1: EXTENDED DRY BASIN



Summary for Pond P2: DETENTION POND

Inflow Area = 2,261,386 sf, 64.41% Impervious, Inflow Depth = 1.69" for 2 YEAR event
Inflow = 19.90 cfs @ 7.98 hrs, Volume= 319,268 cf
Outflow = 6.67 cfs @ 9.18 hrs, Volume= 270,611 cf, Atten= 66%, Lag= 71.5 min
Primary = 6.67 cfs @ 9.18 hrs, Volume= 270,611 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 217.30' @ 9.18 hrs Surf.Area= 27,975 sf Storage= 117,812 cf
Flood Elev= 219.00' Surf.Area= 32,084 sf Storage= 168,924 cf

Plug-Flow detention time= 718.0 min calculated for 270,423 cf (85% of inflow)
Center-of-Mass det. time= 616.4 min (1,328.5 - 712.1)

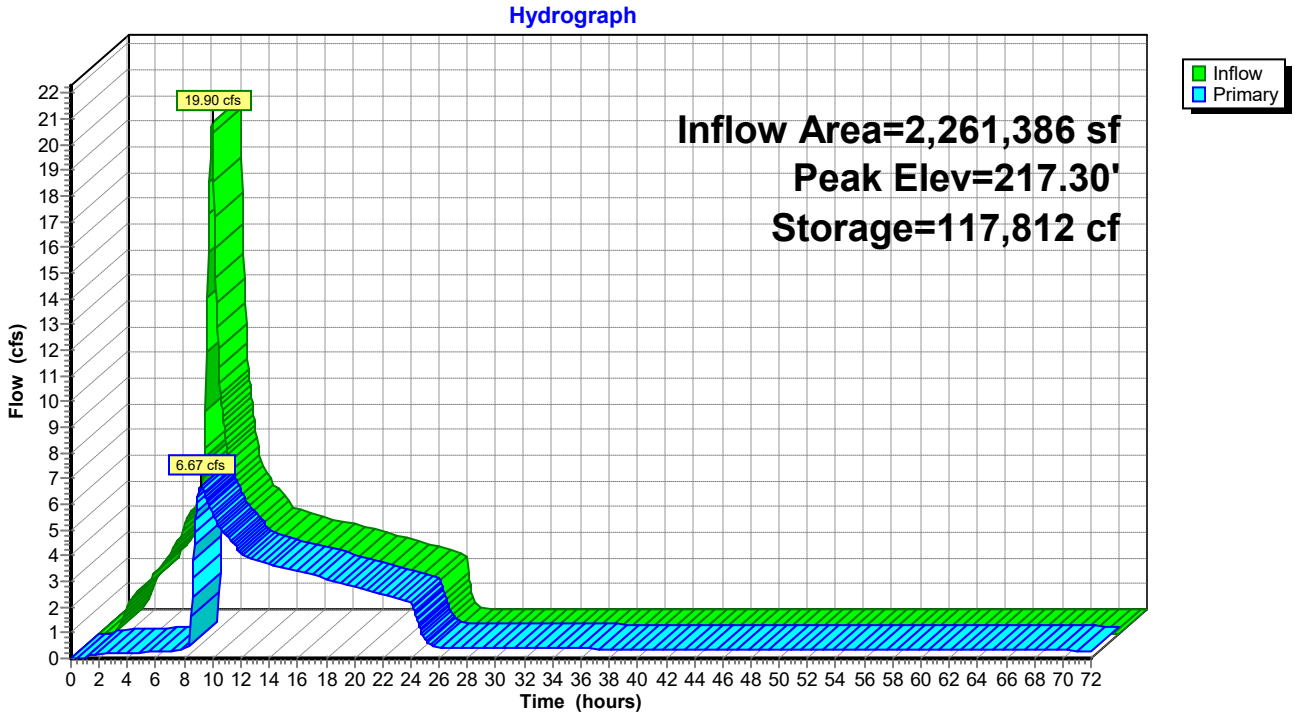
Volume	Invert	Avail.Storage	Storage Description
#1	212.00'	202,272 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.00	16,833	666.0	0	0	16,833
213.00	18,860	684.8	17,837	17,837	18,964
220.00	34,628	816.8	184,435	202,272	35,589

Device	Routing	Invert	Outlet Devices
#1	Primary	210.50'	**18.0" Round Outfall** L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 210.50' / 191.00' S= 0.3900 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	211.00'	**12.0" Round Detention Pipe 1** L= 10.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 211.00' / 210.95' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	211.00'	**2.5" Vert. Detention Orifice 1** C= 0.600
#4	Device 2	216.90'	**30.0" x 16.0" Horiz. Upper Ditch Inlet 1** C= 0.600 Limited to weir flow at low heads
#5	Device 1	213.00'	**12.0" Round Detention Pipe 2** L= 30.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 213.00' / 212.25' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#6	Device 5	218.20'	**30.0" x 16.0" Horiz. Upper Ditch Inlet 2** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.67 cfs @ 9.18 hrs HW=217.30' TW=0.00' (Dynamic Tailwater)
- **1=Outfall** (Passes 6.67 cfs of 20.92 cfs potential flow)
  - **2=Detention Pipe 1** (Passes 6.67 cfs of 9.10 cfs potential flow)
    - **3=Detention Orifice 1** (Orifice Controls 0.41 cfs @ 11.98 fps)
    - **4=Upper Ditch Inlet 1** (Weir Controls 6.26 cfs @ 2.06 fps)
  - **5=Detention Pipe 2** (Passes 0.00 cfs of 7.37 cfs potential flow)
    - **6=Upper Ditch Inlet 2** (Controls 0.00 cfs)

Pond P2: DETENTION POND

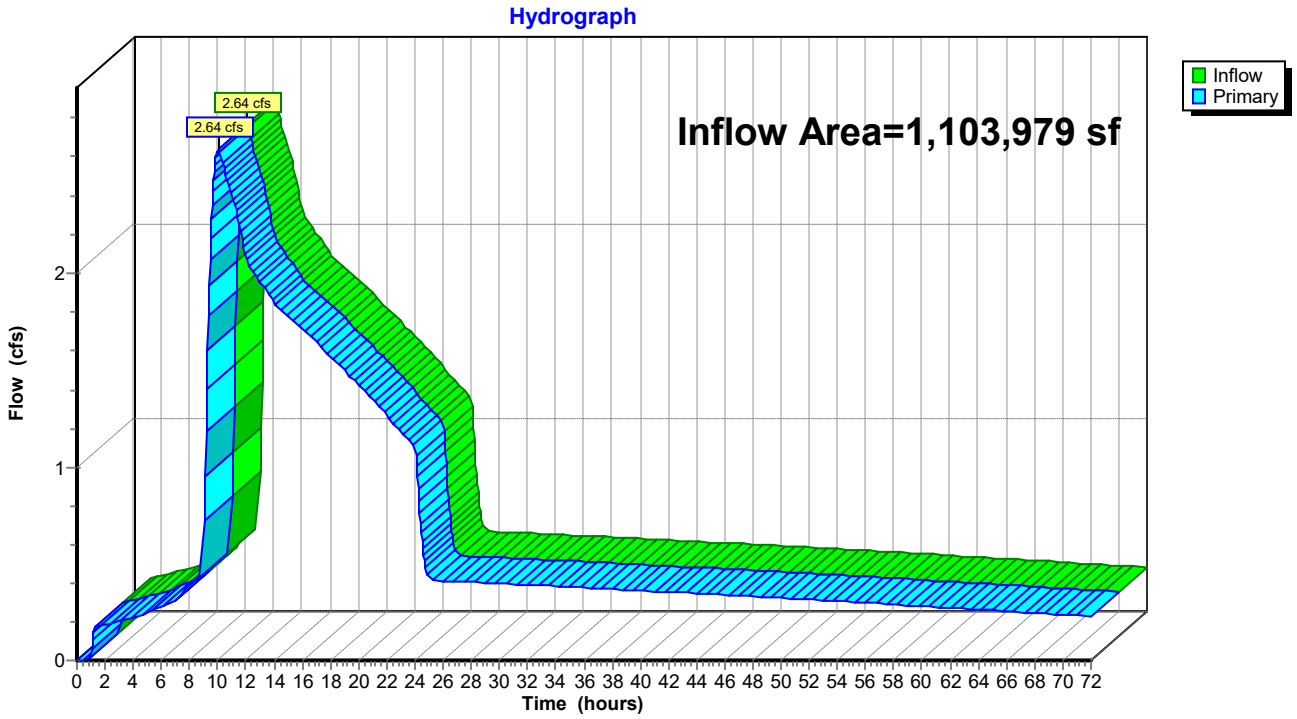


Summary for Link CS: CENTER ST (S)

Inflow Area = 1,103,979 sf, 68.28% Impervious, Inflow Depth > 1.71" for 2 YEAR event
Inflow = 2.64 cfs @ 10.06 hrs, Volume= 157,136 cf
Primary = 2.64 cfs @ 10.06 hrs, Volume= 157,136 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link CS: CENTER ST (S)

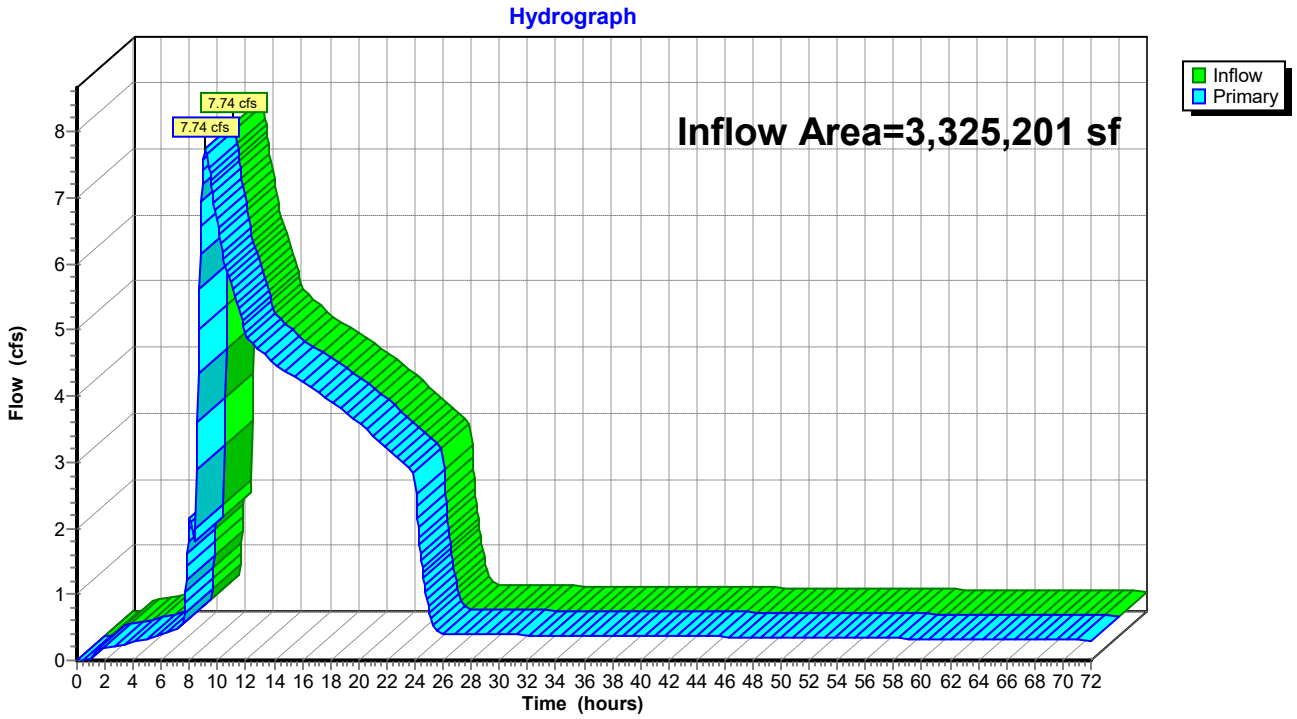


Summary for Link HC: HESS CREEK

Inflow Area = 3,325,201 sf, 45.12% Impervious, Inflow Depth > 1.17" for 2 YEAR event
Inflow = 7.74 cfs @ 9.15 hrs, Volume= 323,805 cf
Primary = 7.74 cfs @ 9.15 hrs, Volume= 323,805 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link HC: HESS CREEK



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S1: MOUNTAINVIEW Runoff Area=3,037 sf 88.90% Impervious Runoff Depth=3.09"
Tc=5.0 min CN=80/98 Runoff=0.05 cfs 781 cf

Subcatchment 1S2: WEST HALF/ Runoff Area=1,100,942 sf 68.23% Impervious Runoff Depth=2.68"
Tc=8.0 min CN=77/98 Runoff=16.03 cfs 246,165 cf

Subcatchment 2S1: EAST HALF/ Runoff Area=2,261,386 sf 64.41% Impervious Runoff Depth=2.57"
Tc=10.0 min CN=75/98 Runoff=30.55 cfs 483,813 cf

Subcatchment 2S2: HESS OPEN SPACE/ Runoff Area=1,063,815 sf 4.10% Impervious Runoff Depth=1.21"
Flow Length=455' Tc=8.9 min CN=72/98 Runoff=5.31 cfs 107,169 cf

Subcatchment 3S1: MOUNTAINVIEW Runoff Area=15,878 sf 81.07% Impervious Runoff Depth=2.96"
Tc=5.0 min CN=80/98 Runoff=0.27 cfs 3,914 cf

Subcatchment 4S1: CENTER (N) Runoff Area=5,141 sf 75.43% Impervious Runoff Depth=2.87"
Tc=5.0 min CN=80/98 Runoff=0.08 cfs 1,228 cf

Subcatchment 5S1: ALDERSGATE (N) Runoff Area=2,874 sf 58.91% Impervious Runoff Depth=2.43"
Tc=5.0 min CN=74/98 Runoff=0.04 cfs 583 cf

Reach S1: VEGETATED SWALE Avg. Flow Depth=0.64' Max Vel=0.29 fps Inflow=2.36 cfs 124,582 cf
n=0.240 L=132.0' S=0.0050 '/' Capacity=10.83 cfs Outflow=2.33 cfs 124,582 cf

Pond 1R: WQMH/ BYPASS Peak Elev=229.07' Inflow=16.03 cfs 246,165 cf
Primary=13.58 cfs 159,311 cf Secondary=3.25 cfs 86,853 cf Outflow=16.03 cfs 246,165 cf

Pond 2R: BYPASS Peak Elev=224.40' Inflow=30.55 cfs 483,813 cf
Primary=28.19 cfs 359,231 cf Secondary=2.36 cfs 124,582 cf Outflow=30.55 cfs 483,813 cf

Pond P1: EXTENDED DRY BASIN Peak Elev=228.90' Storage=74,398 cf Inflow=16.03 cfs 246,165 cf
Outflow=7.84 cfs 238,907 cf

Pond P2: DETENTION POND Peak Elev=218.44' Storage=151,284 cf Inflow=30.51 cfs 483,813 cf
Outflow=12.87 cfs 434,979 cf

Link CS: CENTER ST (S) Inflow=7.86 cfs 239,688 cf
Primary=7.86 cfs 239,688 cf

Link HC: HESS CREEK Inflow=15.72 cfs 542,148 cf
Primary=15.72 cfs 542,148 cf

Total Runoff Area = 4,453,073 sf Runoff Volume = 843,652 cf Average Runoff Depth = 2.27"
48.97% Pervious = 2,180,498 sf 51.03% Impervious = 2,272,575 sf

Summary for Subcatchment 1S1: MOUNTAINVIEW

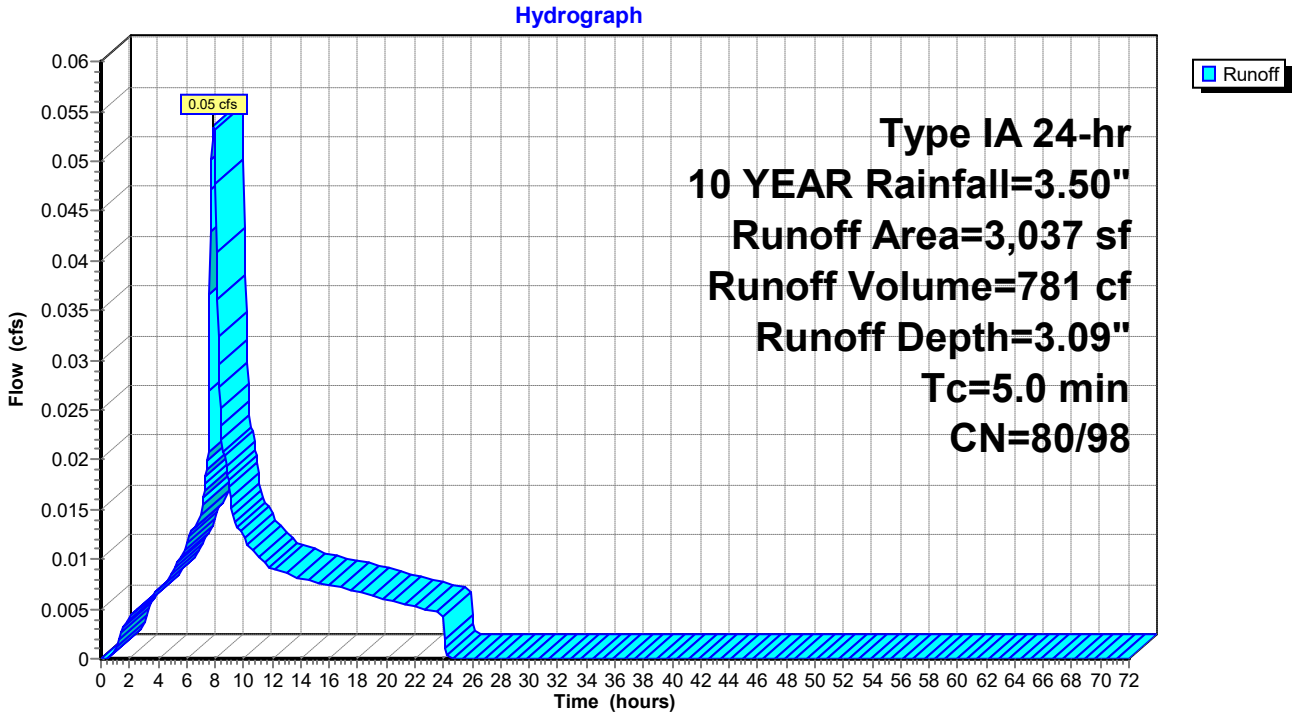
Runoff = 0.05 cfs @ 7.90 hrs, Volume= 781 cf, Depth= 3.09"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

Area (sf)	CN	Description
2,700	98	Paved roads w/curbs & sewers
337	80	>75% Grass cover, Good, HSG D
3,037	96	Weighted Average
337	80	11.10% Pervious Area
2,700	98	88.90% Impervious Area

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

Subcatchment 1S1: MOUNTAINVIEW



Summary for Subcatchment 1S2: WEST HALF/ MOUNTAINVIEW

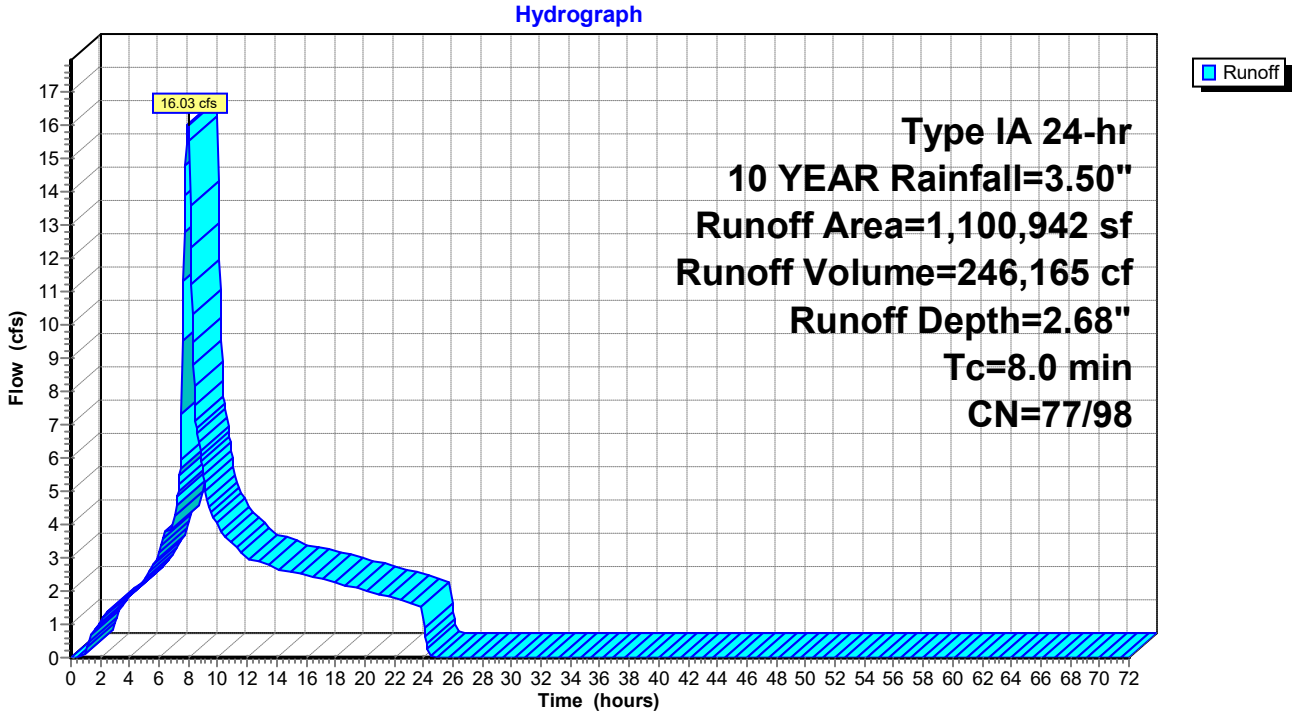
Runoff = 16.03 cfs @ 7.97 hrs, Volume= 246,165 cf, Depth= 2.68"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

	Area (sf)	CN	Description
*	336,878	98	Right-of-Way Impervious area
*	345,240	98	120 Lots >2877 sf (2877sf/Lot)
*	57,717	98	Cluster Lots (90% of total area)
*	11,309	98	Open Space Impervious
	170,116	74	>75% Grass cover, Good, HSG C
	179,682	80	>75% Grass cover, Good, HSG D
	1,100,942	91	Weighted Average
	349,798	77	31.77% Pervious Area
	751,144	98	68.23% Impervious Area

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

Subcatchment 1S2: WEST HALF/ MOUNTAINVIEW



Summary for Subcatchment 2S1: EAST HALF/ MOUNTAINVIEW

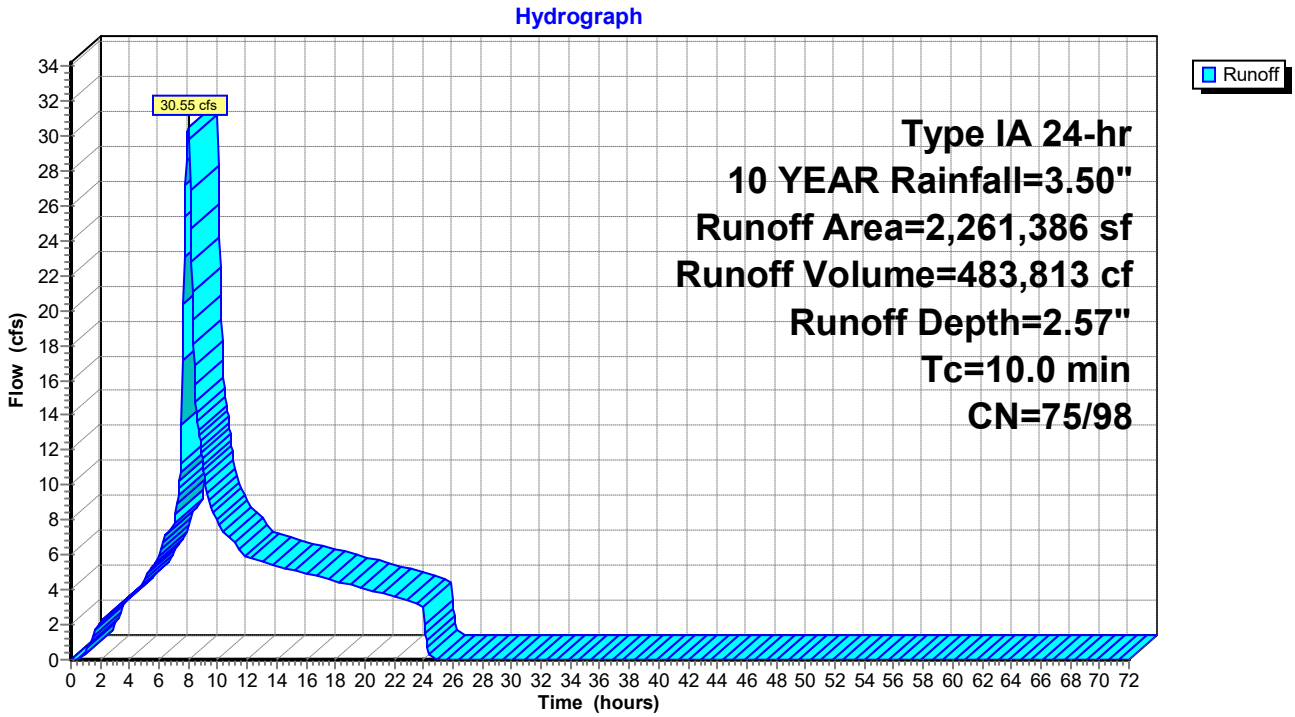
Runoff = 30.55 cfs @ 7.98 hrs, Volume= 483,813 cf, Depth= 2.57"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

	Area (sf)	CN	Description
*	650,436	98	Right-of-Way Impervious area
*	716,373	98	249 Lots >2877 sf (2877sf/Lot)
*	47,186	98	Cluster Lots (90% of total area)
*	42,676	98	Open Space Impervious
	547,140	74	>75% Grass cover, Good, HSG C
	195,956	80	>75% Grass cover, Good, HSG D
*	14,344	86	Playground surfacing
	47,275	71	Meadow, non-grazed, HSG C
	2,261,386	90	Weighted Average
	804,715	75	35.59% Pervious Area
	1,456,671	98	64.41% Impervious Area

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

Subcatchment 2S1: EAST HALF/ MOUNTAINVIEW



Summary for Subcatchment 2S2: HESS OPEN SPACE/ MOUNTAINVIEW

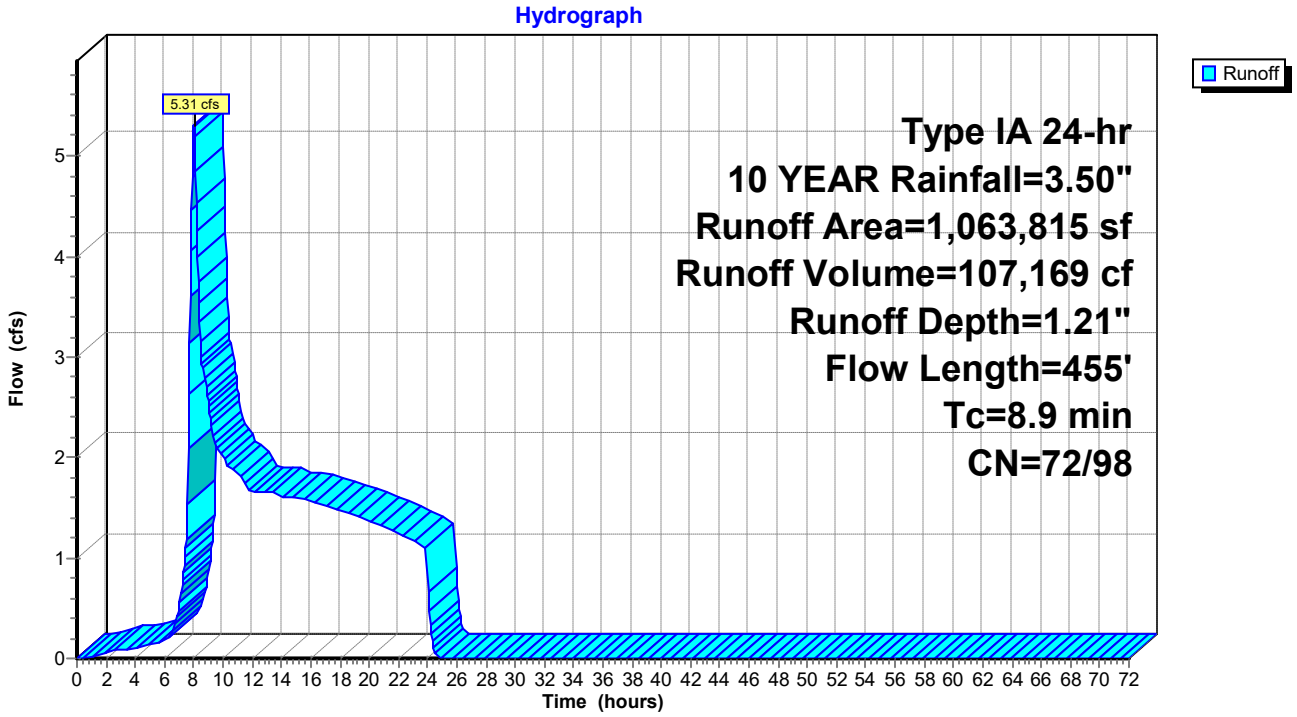
Runoff = 5.31 cfs @ 8.01 hrs, Volume= 107,169 cf, Depth= 1.21"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

	Area (sf)	CN	Description
	11,944	98	Paved roads w/curbs & sewers
	815,065	71	Meadow, non-grazed, HSG C
	80,425	78	Meadow, non-grazed, HSG D
*	30,659	98	Paved Paths
	19,458	96	Gravel surface, HSG C
	92,519	74	>75% Grass cover, Good, HSG C
	7,358	80	>75% Grass cover, Good, HSG D
	5,373	82	Woods/grass comb., Poor, HSG C
*	1,014	100	Stream
	1,063,815	73	Weighted Average
	1,020,198	72	95.90% Pervious Area
	43,617	98	4.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.0740	0.28		**Sheet Flow,** Range n= 0.130 P2= 2.50"
2.5	260	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	95	0.2200	3.28		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.9	455	Total			

Subcatchment 2S2: HESS OPEN SPACE/ MOUNTAINVIEW



Summary for Subcatchment 3S1: MOUNTAINVIEW

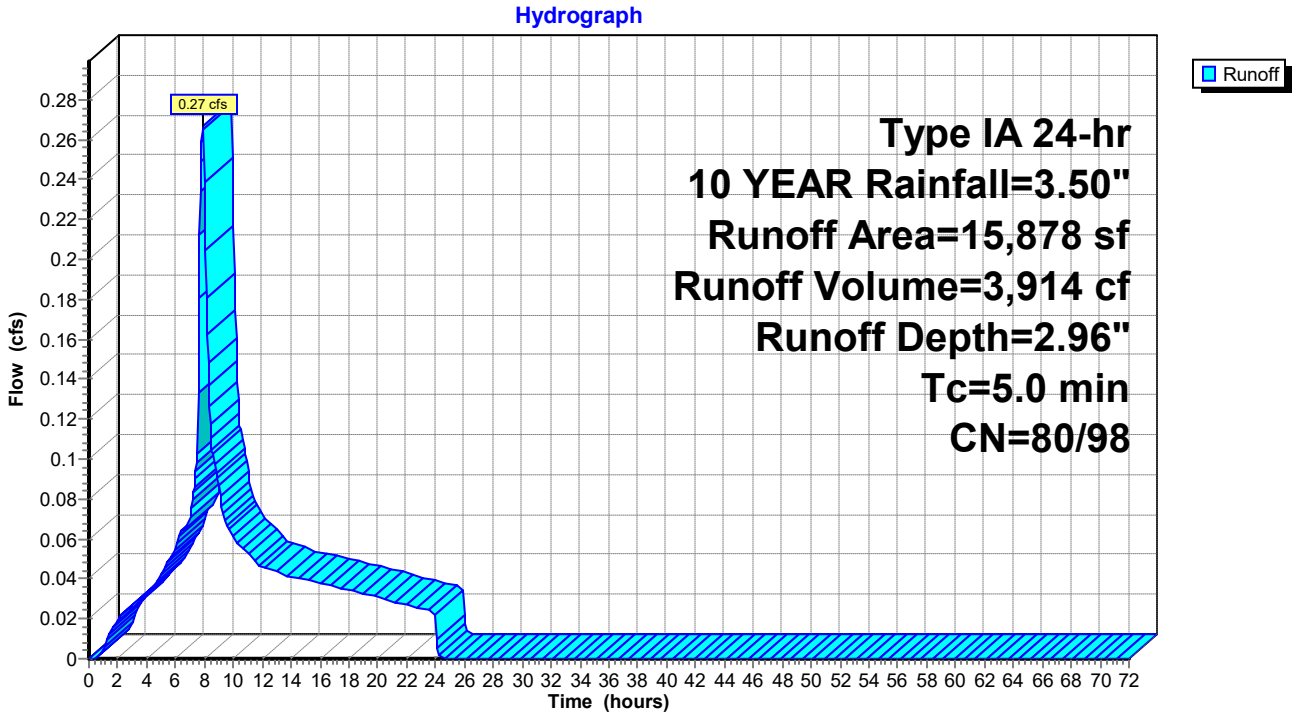
Runoff = 0.27 cfs @ 7.91 hrs, Volume= 3,914 cf, Depth= 2.96"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

Area (sf)	CN	Description
12,872	98	Paved roads w/curbs & sewers
3,006	80	>75% Grass cover, Good, HSG D
15,878	95	Weighted Average
3,006	80	18.93% Pervious Area
12,872	98	81.07% Impervious Area

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

Subcatchment 3S1: MOUNTAINVIEW



Summary for Subcatchment 4S1: CENTER (N)

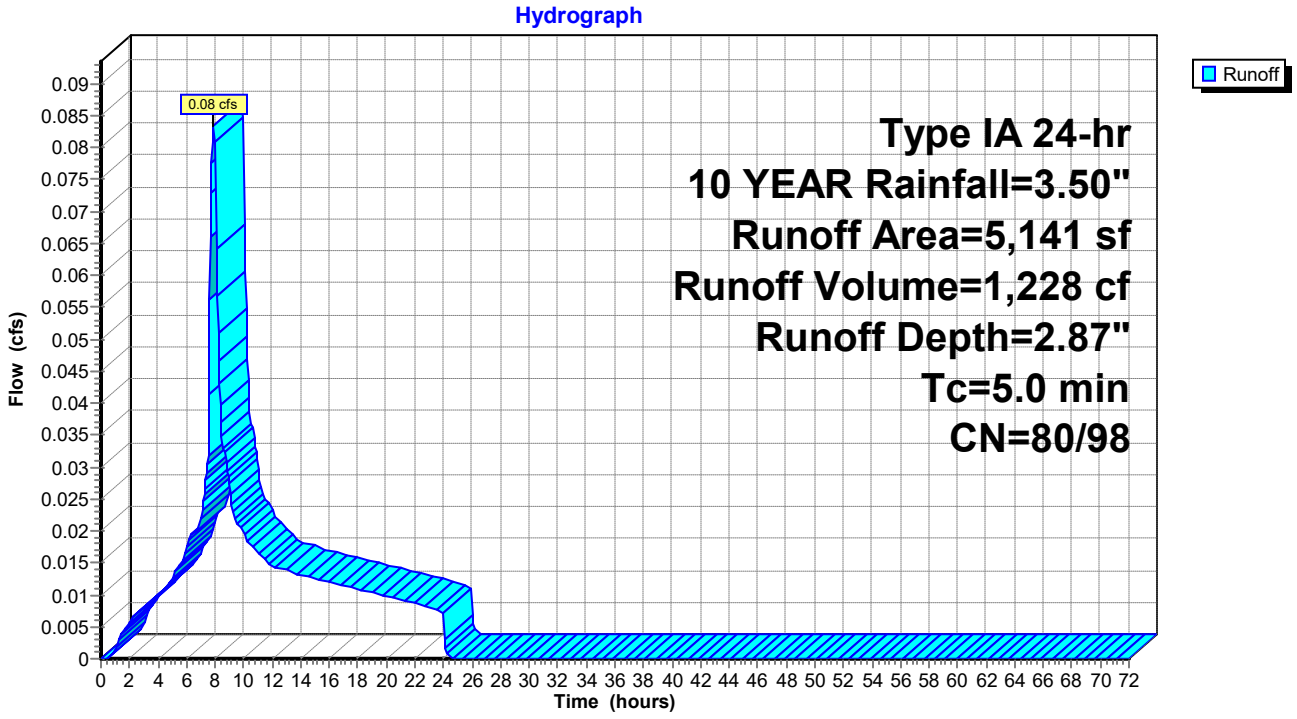
Runoff = 0.08 cfs @ 7.91 hrs, Volume= 1,228 cf, Depth= 2.87"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

Area (sf)	CN	Description
3,878	98	Paved roads w/curbs & sewers
1,263	80	>75% Grass cover, Good, HSG D
5,141	94	Weighted Average
1,263	80	24.57% Pervious Area
3,878	98	75.43% Impervious Area

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

Subcatchment 4S1: CENTER (N)



Summary for Subcatchment 5S1: ALDERSGATE (N)

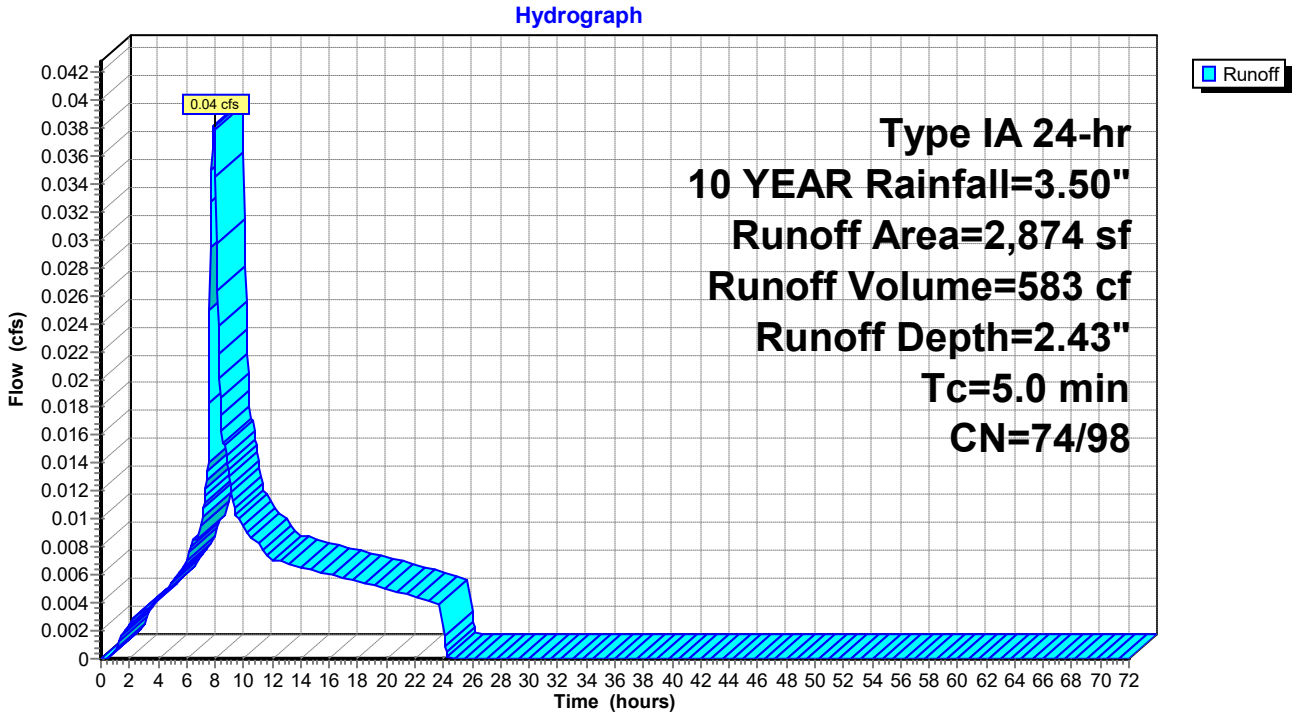
Runoff = 0.04 cfs @ 7.93 hrs, Volume= 583 cf, Depth= 2.43"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

Area (sf)	CN	Description
1,693	98	Paved roads w/curbs & sewers
1,181	74	>75% Grass cover, Good, HSG C
2,874	88	Weighted Average
1,181	74	41.09% Pervious Area
1,693	98	58.91% Impervious Area

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

Subcatchment 5S1: ALDERSGATE (N)



Summary for Reach S1: VEGETATED SWALE

Inflow = 2.36 cfs @ 7.98 hrs, Volume= 124,582 cf
Outflow = 2.33 cfs @ 8.04 hrs, Volume= 124,582 cf, Atten= 1%, Lag= 3.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.29 fps, Min. Travel Time= 7.6 min
Avg. Velocity = 0.17 fps, Avg. Travel Time= 12.8 min

Peak Storage= 1,061 cf @ 8.04 hrs
Average Depth at Peak Storage= 0.64'
Bank-Full Depth= 1.50' Flow Area= 22.5 sf, Capacity= 10.83 cfs

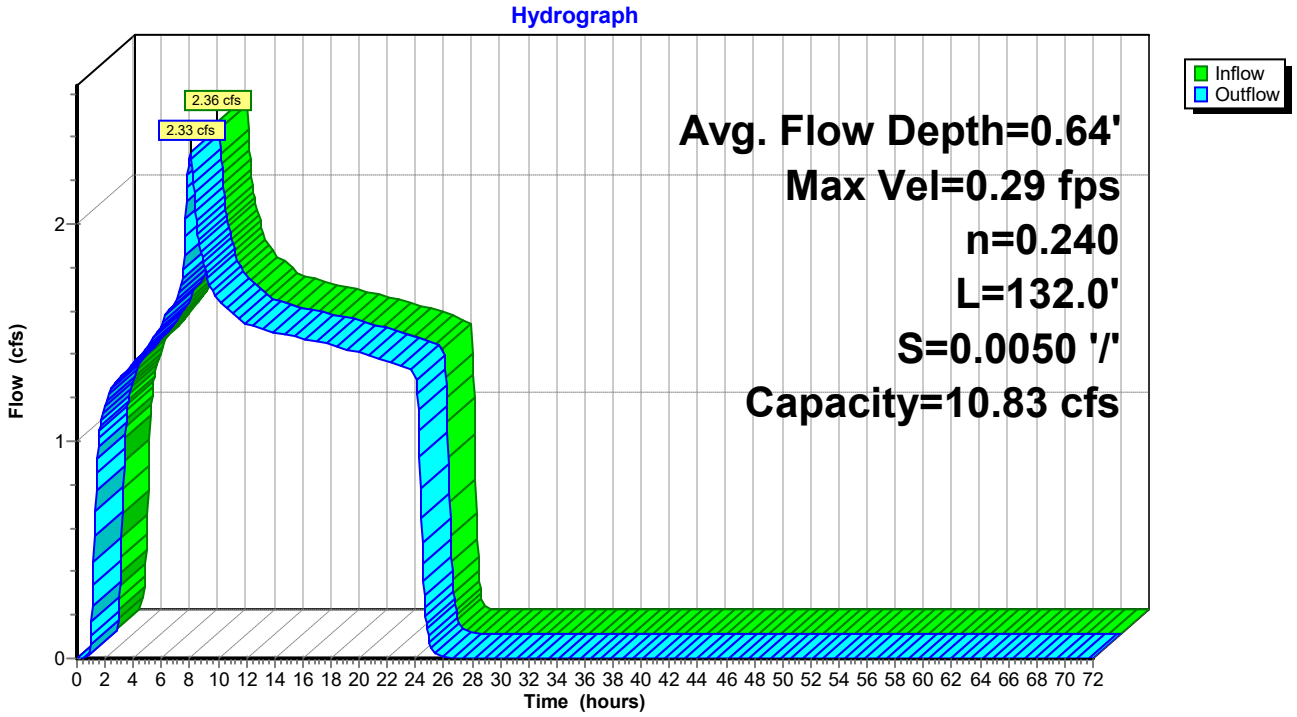
Custom cross-section, Length= 132.0' Slope= 0.0050 '/'
Constant n= 0.240
Inlet Invert= 221.00', Outlet Invert= 220.34'

‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-9.50	1.50	0.00
-7.00	0.50	1.00
-5.00	0.00	1.50
5.00	0.00	1.50
7.00	0.50	1.00
9.50	1.50	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
0.50	6.0	14.1	792	1.49
1.50	22.5	19.5	2,970	10.83

Reach S1: VEGETATED SWALE



Summary for Pond 1R: WQMH/ BYPASS

Inflow Area = 1,100,942 sf, 68.23% Impervious, Inflow Depth = 2.68" for 10 YEAR event
Inflow = 16.03 cfs @ 7.97 hrs, Volume= 246,165 cf
Outflow = 16.03 cfs @ 7.97 hrs, Volume= 246,165 cf, Atten= 0%, Lag= 0.0 min
Primary = 13.58 cfs @ 7.98 hrs, Volume= 159,311 cf
Secondary = 3.25 cfs @ 6.17 hrs, Volume= 86,853 cf

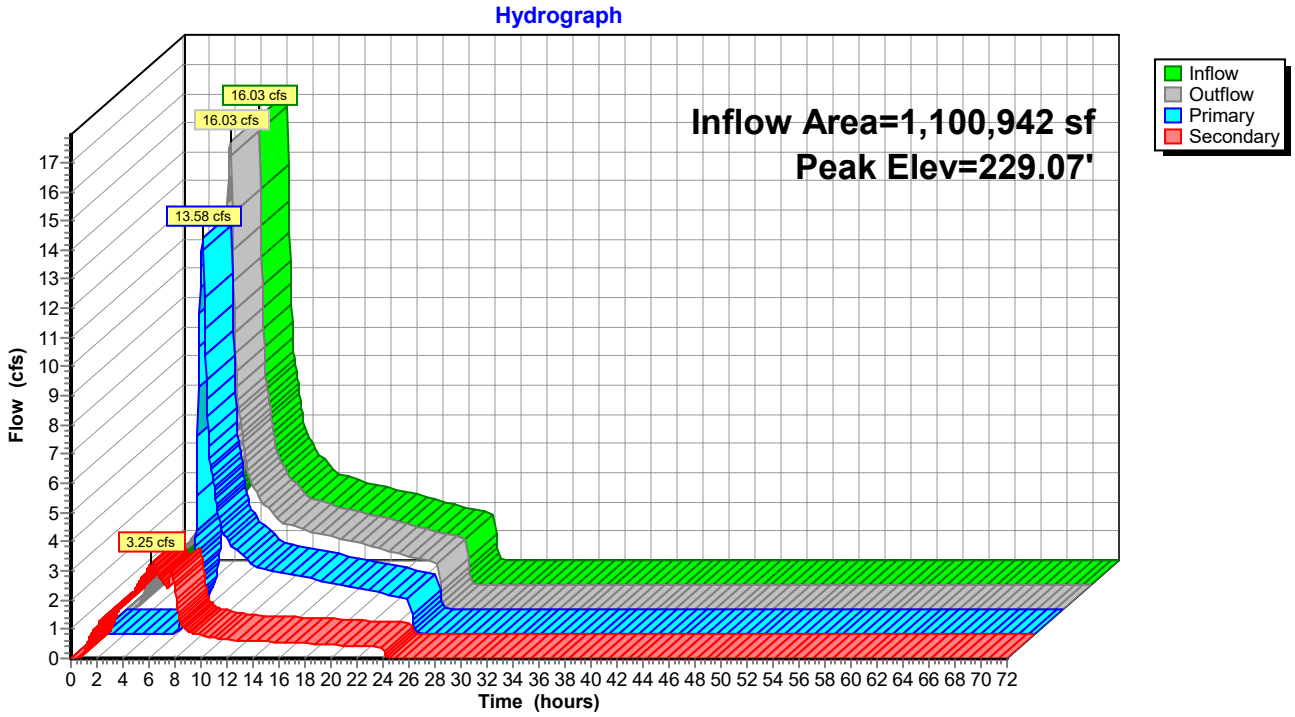
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 229.07' @ 8.05 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	227.15'	**36.0" Round High Flow Bypass** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 227.15' / 224.50' S= 0.0530 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Secondary	225.55'	**12.0" Round WQ Flow** L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 225.55' / 225.35' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	225.15'	**12.0" Round WQ Flow** L= 32.5' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 225.15' / 224.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=12.02 cfs @ 7.98 hrs HW=229.01' TW=228.57' (Dynamic Tailwater)
↑—**1=High Flow Bypass** (Outlet Controls 12.02 cfs @ 3.72 fps)

Secondary OutFlow Max=3.19 cfs @ 6.17 hrs HW=227.33' TW=226.42' (Dynamic Tailwater)
↑—**2=WQ Flow** (Controls 3.19 cfs)
↑—**3=WQ Flow** (Inlet Controls 3.19 cfs @ 4.06 fps)

Pond 1R: WQMH/ BYPASS



Summary for Pond 2R: BYPASS

Inflow Area = 2,261,386 sf, 64.41% Impervious, Inflow Depth = 2.57" for 10 YEAR event
Inflow = 30.55 cfs @ 7.98 hrs, Volume= 483,813 cf
Outflow = 30.55 cfs @ 7.98 hrs, Volume= 483,813 cf, Atten= 0%, Lag= 0.0 min
Primary = 28.19 cfs @ 7.98 hrs, Volume= 359,231 cf
Secondary = 2.36 cfs @ 7.98 hrs, Volume= 124,582 cf

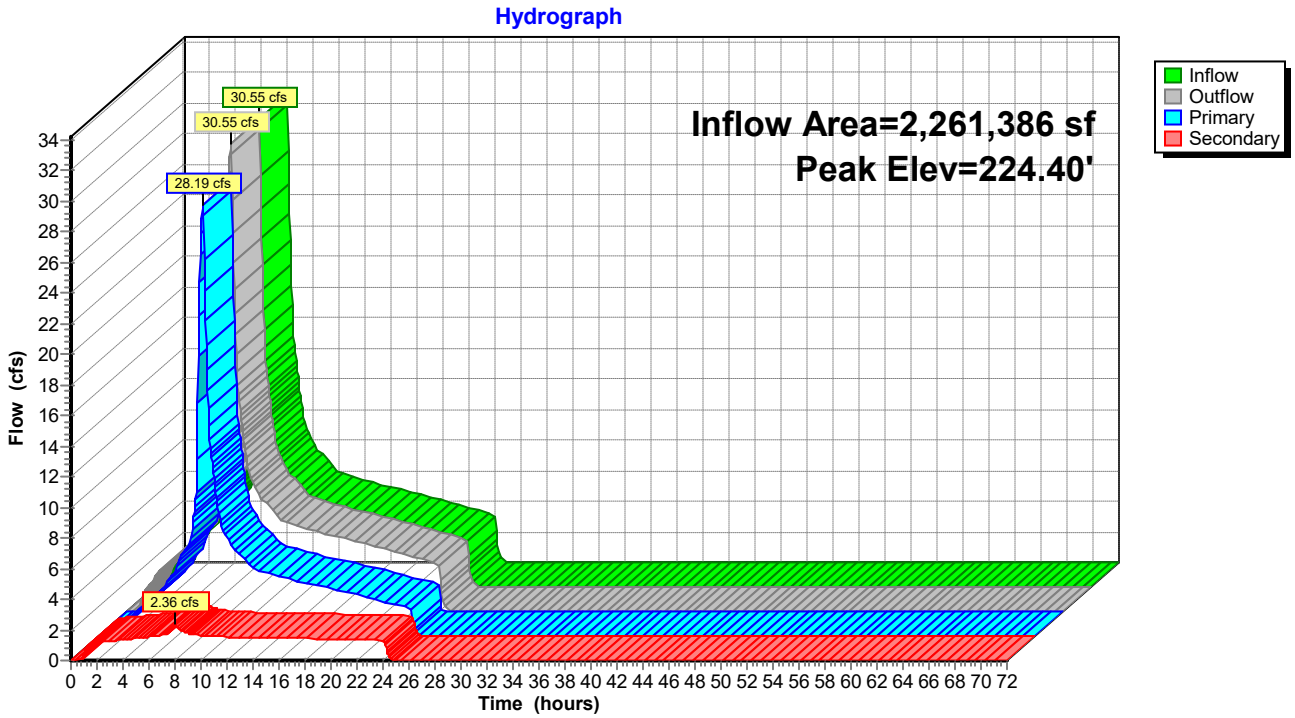
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 224.40' @ 7.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Secondary	221.20'	**8.0" Round WQ Flow** L= 40.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 221.20' / 221.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	222.00'	**36.0" Round High Flow Bypass** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 222.00' / 221.20' S= 0.0160 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=28.03 cfs @ 7.98 hrs HW=224.39' TW=217.67' (Dynamic Tailwater)
└**2=High Flow Bypass** (Inlet Controls 28.03 cfs @ 4.64 fps)

Secondary OutFlow Max=2.35 cfs @ 7.98 hrs HW=224.39' TW=221.64' (Dynamic Tailwater)
└**1=WQ Flow** (Barrel Controls 2.35 cfs @ 6.74 fps)

Pond 2R: BYPASS



Summary for Pond P1: EXTENDED DRY BASIN

Inflow Area = 1,100,942 sf, 68.23% Impervious, Inflow Depth = 2.68" for 10 YEAR event
Inflow = 16.03 cfs @ 7.97 hrs, Volume= 246,165 cf
Outflow = 7.84 cfs @ 8.43 hrs, Volume= 238,907 cf, Atten= 51%, Lag= 27.4 min
Primary = 7.84 cfs @ 8.43 hrs, Volume= 238,907 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 228.90' @ 8.43 hrs Surf.Area= 20,660 sf Storage= 74,398 cf

Plug-Flow detention time= 607.6 min calculated for 238,741 cf (97% of inflow)
Center-of-Mass det. time= 587.5 min (1,283.0 - 695.5)

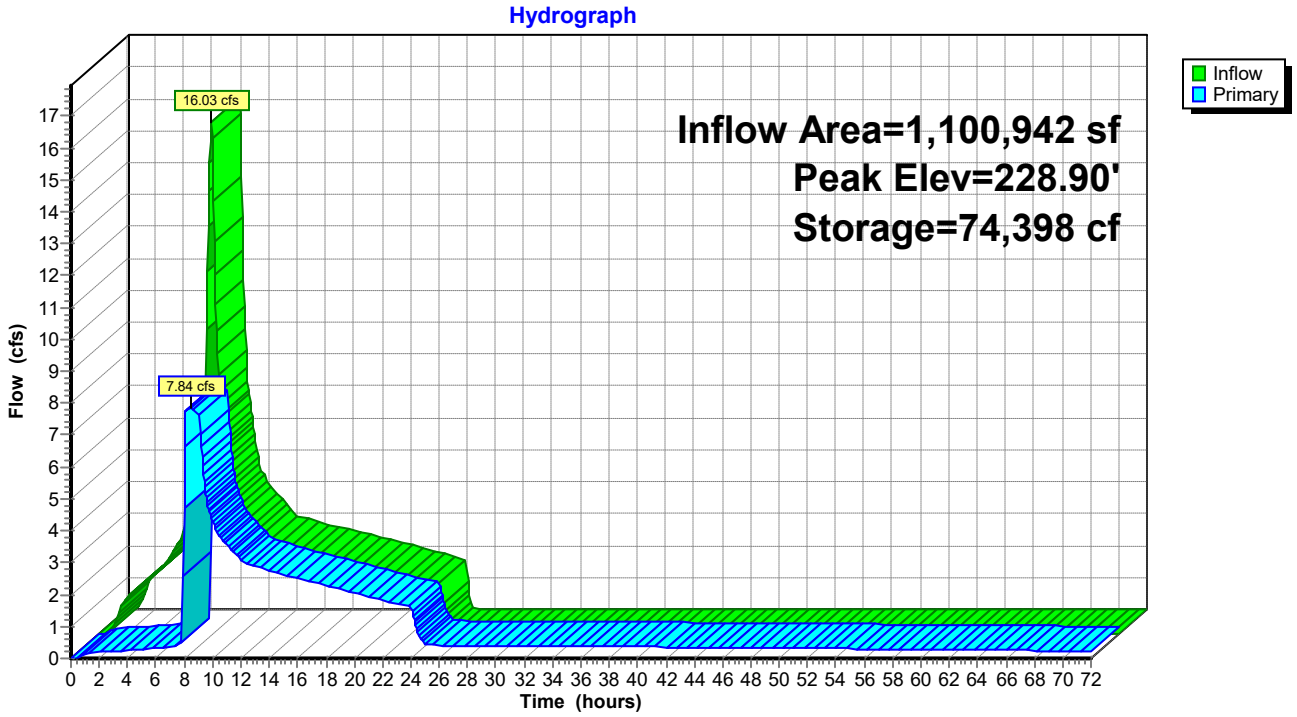
Volume	Invert	Avail.Storage	Storage Description
#1	224.50'	109,826 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
224.50	13,412	505.4	0	0	13,412
230.50	23,680	635.5	109,826	109,826	25,710

Device	Routing	Invert	Outlet Devices
#1	Primary	223.40'	**12.0" Round Outfall Pipe** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 223.40' / 223.15' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	223.50'	**2.7" Vert. WQ Orifice** C= 0.600
#3	Device 1	228.30'	**30.0" x 16.0" Horiz. Upper Ditch Inlet** C= 0.600 Limited to weir flow at low heads
#4	Primary	225.50'	**12.0" Round Outfall Pipe** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 225.50' / 224.25' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#5	Device 4	229.00'	**30.0" x 16.0" Horiz. Upper Ditch Inlet** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.84 cfs @ 8.43 hrs HW=228.90' TW=0.00' (Dynamic Tailwater)
- **1=Outfall Pipe** (Barrel Controls 7.84 cfs @ 9.98 fps)
  - **2=WQ Orifice** (Passes < 0.44 cfs potential flow)
  - **3=Upper Ditch Inlet** (Passes < 11.66 cfs potential flow)
- **4=Outfall Pipe** (Passes 0.00 cfs of 6.44 cfs potential flow)
  - **5=Upper Ditch Inlet** (Controls 0.00 cfs)

Pond P1: EXTENDED DRY BASIN



Summary for Pond P2: DETENTION POND

Inflow Area = 2,261,386 sf, 64.41% Impervious, Inflow Depth = 2.57" for 10 YEAR event
Inflow = 30.51 cfs @ 7.98 hrs, Volume= 483,813 cf
Outflow = 12.87 cfs @ 8.75 hrs, Volume= 434,979 cf, Atten= 58%, Lag= 46.0 min
Primary = 12.87 cfs @ 8.75 hrs, Volume= 434,979 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 218.44' @ 8.75 hrs Surf.Area= 30,698 sf Storage= 151,284 cf
Flood Elev= 219.00' Surf.Area= 32,084 sf Storage= 168,924 cf

Plug-Flow detention time= 485.3 min calculated for 434,677 cf (90% of inflow)
Center-of-Mass det. time= 416.2 min (1,120.2 - 704.1)

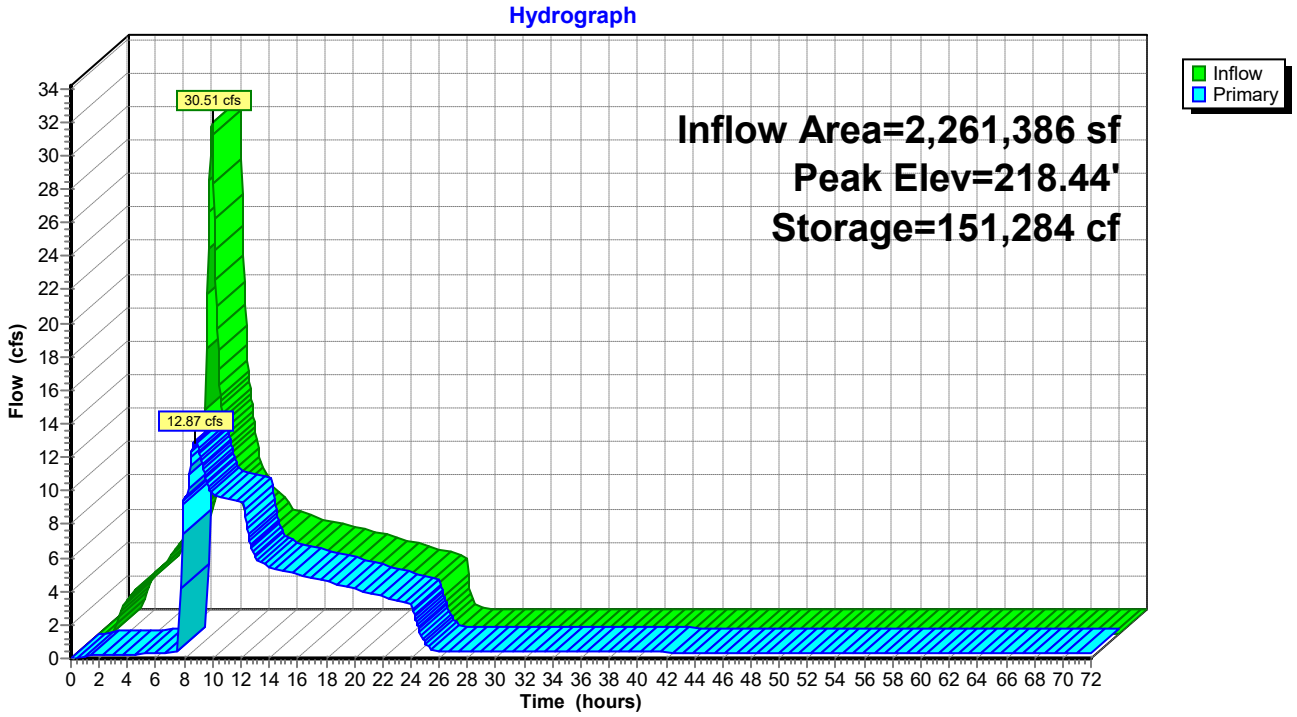
Volume	Invert	Avail.Storage	Storage Description
#1	212.00'	202,272 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.00	16,833	666.0	0	0	16,833
213.00	18,860	684.8	17,837	17,837	18,964
220.00	34,628	816.8	184,435	202,272	35,589

Device	Routing	Invert	Outlet Devices
#1	Primary	210.50'	**18.0" Round Outfall** L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 210.50' / 191.00' S= 0.3900 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	211.00'	**12.0" Round Detention Pipe 1** L= 10.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 211.00' / 210.95' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	211.00'	**2.5" Vert. Detention Orifice 1** C= 0.600
#4	Device 2	216.90'	**30.0" x 16.0" Horiz. Upper Ditch Inlet 1** C= 0.600 Limited to weir flow at low heads
#5	Device 1	213.00'	**12.0" Round Detention Pipe 2** L= 30.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 213.00' / 212.25' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#6	Device 5	218.20'	**30.0" x 16.0" Horiz. Upper Ditch Inlet 2** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=12.87 cfs @ 8.75 hrs HW=218.44' TW=0.00' (Dynamic Tailwater)
- **1=Outfall** (Passes 12.87 cfs of 22.81 cfs potential flow)
  - **2=Detention Pipe 1** (Inlet Controls 9.96 cfs @ 12.68 fps)
    - **3=Detention Orifice 1** (Passes < 0.44 cfs potential flow)
    - **4=Upper Ditch Inlet 1** (Passes < 19.90 cfs potential flow)
  - **5=Detention Pipe 2** (Passes 2.91 cfs of 8.40 cfs potential flow)
    - **6=Upper Ditch Inlet 2** (Weir Controls 2.91 cfs @ 1.60 fps)

Pond P2: DETENTION POND

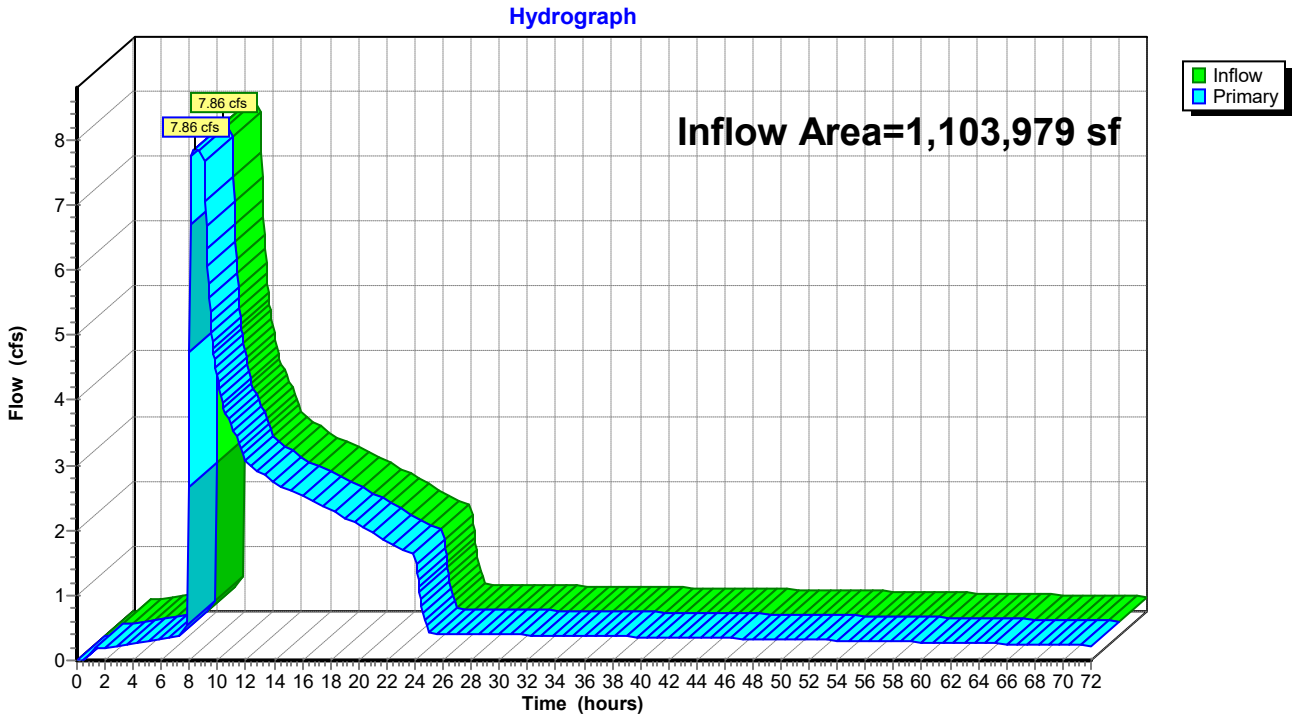


Summary for Link CS: CENTER ST (S)

Inflow Area = 1,103,979 sf, 68.28% Impervious, Inflow Depth > 2.61" for 10 YEAR event
Inflow = 7.86 cfs @ 8.41 hrs, Volume= 239,688 cf
Primary = 7.86 cfs @ 8.41 hrs, Volume= 239,688 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link CS: CENTER ST (S)

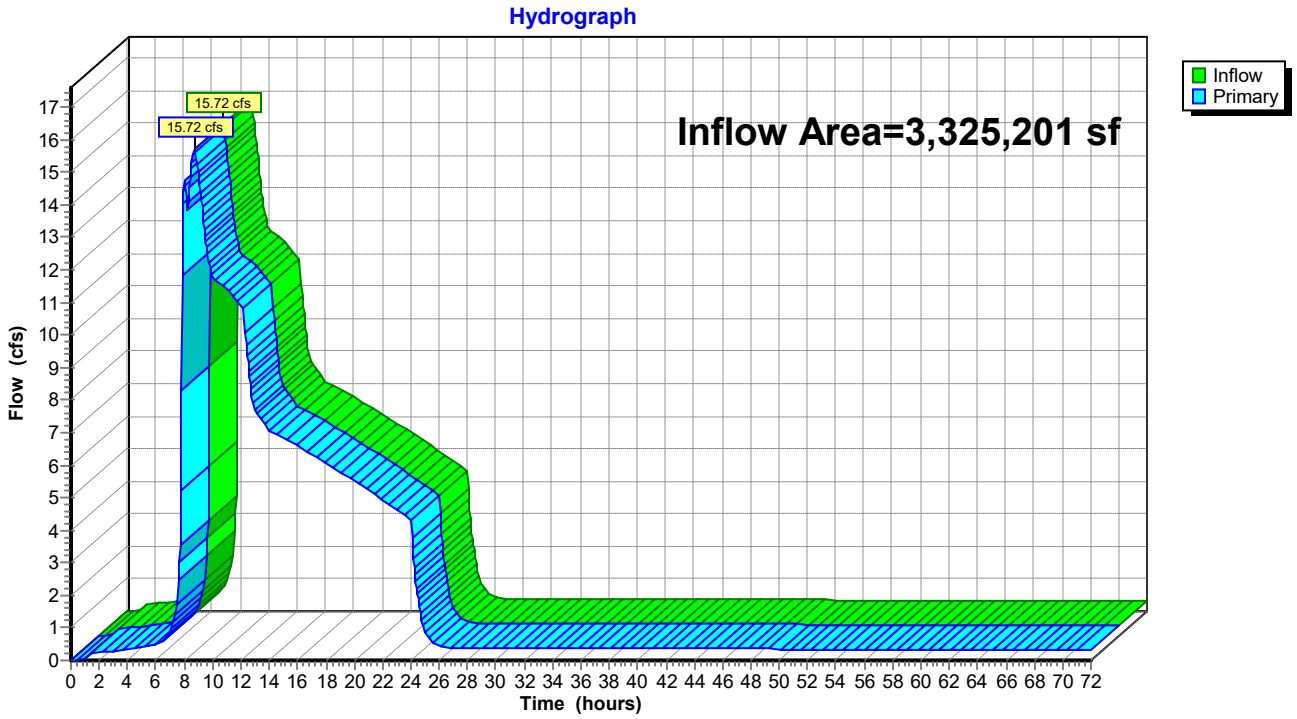


Summary for Link HC: HESS CREEK

Inflow Area = 3,325,201 sf, 45.12% Impervious, Inflow Depth > 1.96" for 10 YEAR event
Inflow = 15.72 cfs @ 8.70 hrs, Volume= 542,148 cf
Primary = 15.72 cfs @ 8.70 hrs, Volume= 542,148 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link HC: HESS CREEK



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S1: MOUNTAINVIEW Runoff Area=3,037 sf 88.90% Impervious Runoff Depth=3.57"
Tc=5.0 min CN=80/98 Runoff=0.06 cfs 904 cf

Subcatchment 1S2: WEST HALF/ Runoff Area=1,100,942 sf 68.23% Impervious Runoff Depth=3.14"
Tc=8.0 min CN=77/98 Runoff=18.83 cfs 288,496 cf

Subcatchment 2S1: EAST HALF/ Runoff Area=2,261,386 sf 64.41% Impervious Runoff Depth=3.02"
Tc=10.0 min CN=75/98 Runoff=36.07 cfs 568,809 cf

Subcatchment 2S2: HESS OPEN SPACE/ Runoff Area=1,063,815 sf 4.10% Impervious Runoff Depth=1.55"
Flow Length=455' Tc=8.9 min CN=72/98 Runoff=7.39 cfs 137,815 cf

Subcatchment 3S1: MOUNTAINVIEW Runoff Area=15,878 sf 81.07% Impervious Runoff Depth=3.44"
Tc=5.0 min CN=80/98 Runoff=0.31 cfs 4,550 cf

Subcatchment 4S1: CENTER (N) Runoff Area=5,141 sf 75.43% Impervious Runoff Depth=3.34"
Tc=5.0 min CN=80/98 Runoff=0.10 cfs 1,432 cf

Subcatchment 5S1: ALDERSGATE (N) Runoff Area=2,874 sf 58.91% Impervious Runoff Depth=2.87"
Tc=5.0 min CN=74/98 Runoff=0.05 cfs 688 cf

Reach S1: VEGETATED SWALE Avg. Flow Depth=0.66' Max Vel=0.30 fps Inflow=2.50 cfs 130,073 cf
n=0.240 L=132.0' S=0.0050 '/' Capacity=10.83 cfs Outflow=2.47 cfs 130,073 cf

Pond 1R: WQMH/ BYPASS Peak Elev=229.45' Inflow=18.83 cfs 288,496 cf
Primary=16.53 cfs 195,335 cf Secondary=3.25 cfs 93,159 cf Outflow=18.83 cfs 288,494 cf

Pond 2R: BYPASS Peak Elev=224.73' Inflow=36.07 cfs 568,809 cf
Primary=33.57 cfs 438,736 cf Secondary=2.50 cfs 130,073 cf Outflow=36.07 cfs 568,809 cf

Pond P1: EXTENDED DRY BASIN Peak Elev=229.25' Storage=81,794 cf Inflow=18.83 cfs 288,494 cf
Outflow=11.32 cfs 281,188 cf

Pond P2: DETENTION POND Peak Elev=218.81' Storage=162,868 cf Inflow=36.02 cfs 568,809 cf
Outflow=18.94 cfs 519,912 cf

Link CS: CENTER ST (S) Inflow=11.35 cfs 282,093 cf
Primary=11.35 cfs 282,093 cf

Link HC: HESS CREEK Inflow=24.60 cfs 657,727 cf
Primary=24.60 cfs 657,727 cf

Total Runoff Area = 4,453,073 sf Runoff Volume = 1,002,695 cf Average Runoff Depth = 2.70"
48.97% Pervious = 2,180,498 sf 51.03% Impervious = 2,272,575 sf

Summary for Subcatchment 1S1: MOUNTAINVIEW

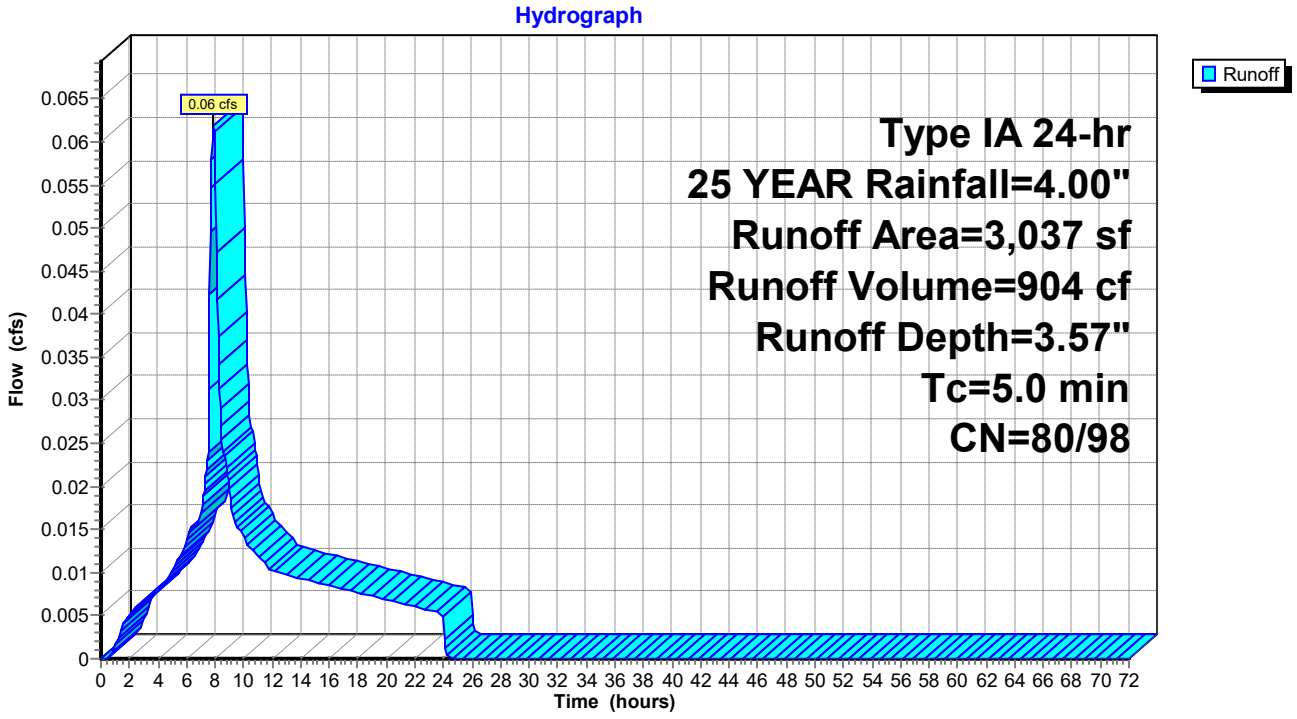
Runoff = 0.06 cfs @ 7.90 hrs, Volume= 904 cf, Depth= 3.57"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

Area (sf)	CN	Description
2,700	98	Paved roads w/curbs & sewers
337	80	>75% Grass cover, Good, HSG D
3,037	96	Weighted Average
337	80	11.10% Pervious Area
2,700	98	88.90% Impervious Area

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

Subcatchment 1S1: MOUNTAINVIEW



Summary for Subcatchment 1S2: WEST HALF/ MOUNTAINVIEW

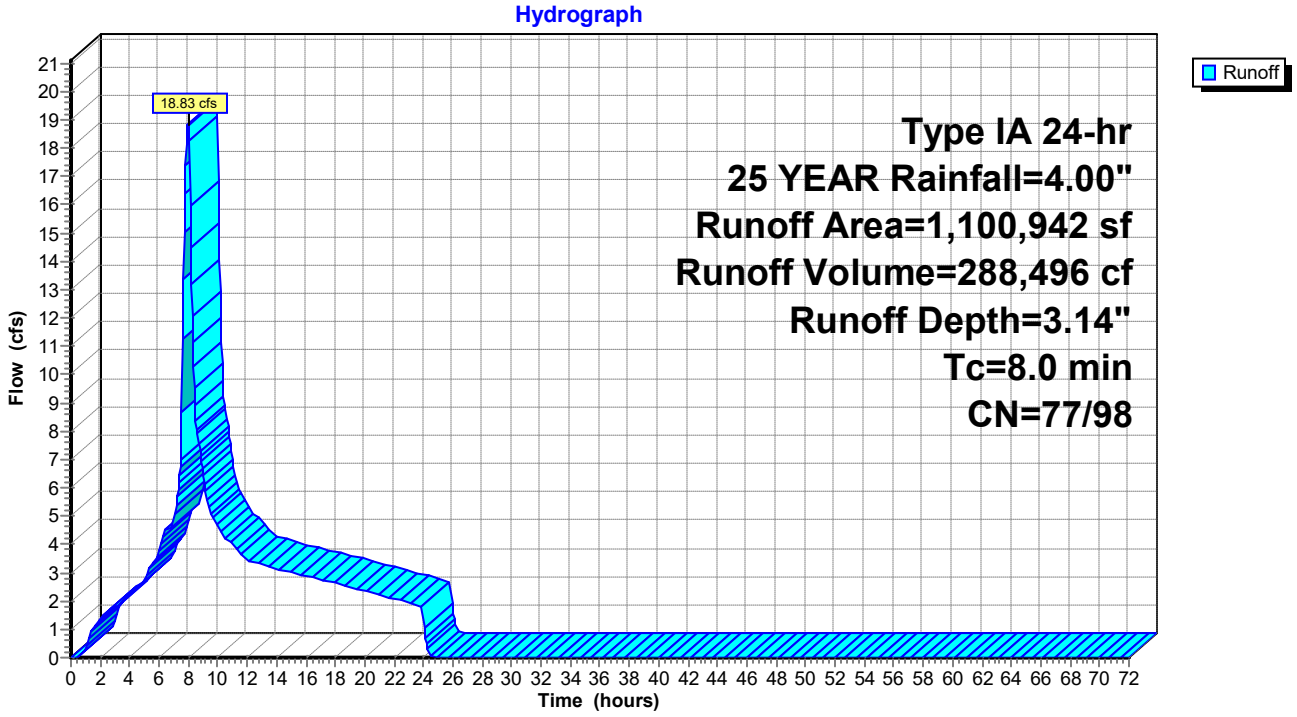
Runoff = 18.83 cfs @ 7.97 hrs, Volume= 288,496 cf, Depth= 3.14"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

	Area (sf)	CN	Description
*	336,878	98	Right-of-Way Impervious area
*	345,240	98	120 Lots >2877 sf (2877sf/Lot)
*	57,717	98	Cluster Lots (90% of total area)
*	11,309	98	Open Space Impervious
	170,116	74	>75% Grass cover, Good, HSG C
	179,682	80	>75% Grass cover, Good, HSG D
	1,100,942	91	Weighted Average
	349,798	77	31.77% Pervious Area
	751,144	98	68.23% Impervious Area

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

Subcatchment 1S2: WEST HALF/ MOUNTAINVIEW



Summary for Subcatchment 2S1: EAST HALF/ MOUNTAINVIEW

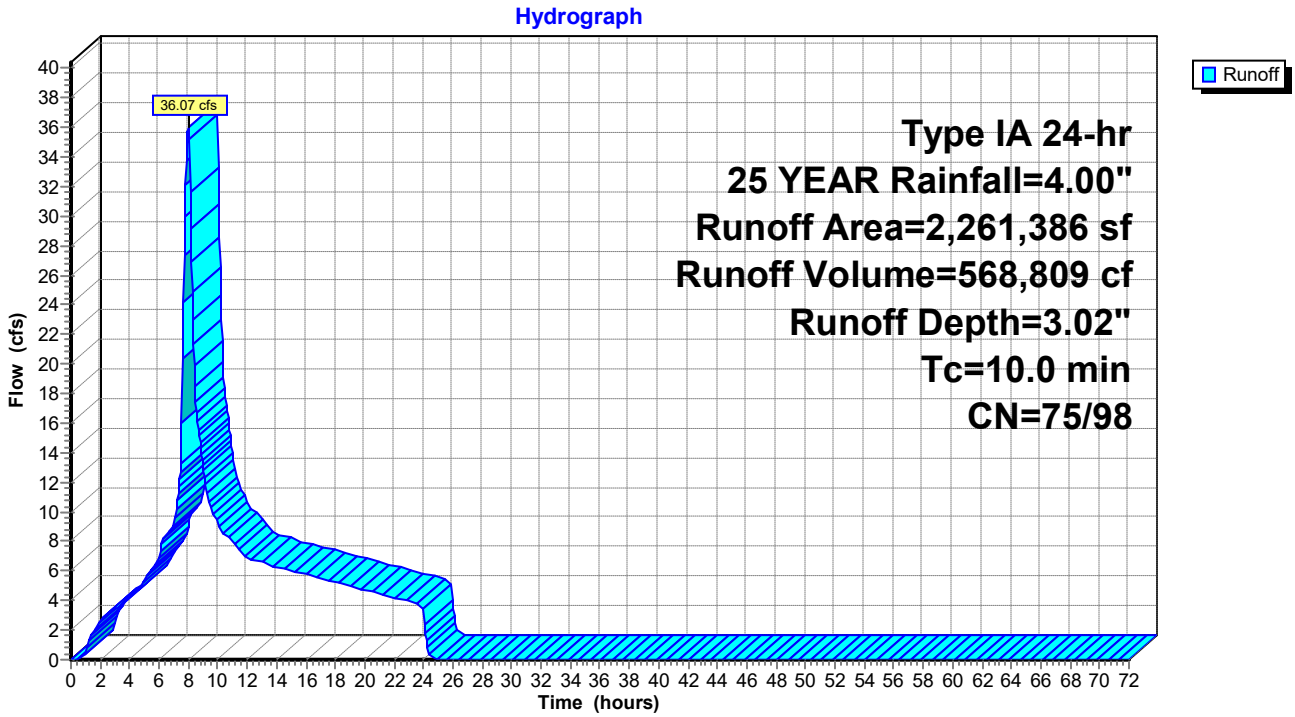
Runoff = 36.07 cfs @ 7.98 hrs, Volume= 568,809 cf, Depth= 3.02"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

	Area (sf)	CN	Description
*	650,436	98	Right-of-Way Impervious area
*	716,373	98	249 Lots >2877 sf (2877sf/Lot)
*	47,186	98	Cluster Lots (90% of total area)
*	42,676	98	Open Space Impervious
	547,140	74	>75% Grass cover, Good, HSG C
	195,956	80	>75% Grass cover, Good, HSG D
*	14,344	86	Playground surfacing
	47,275	71	Meadow, non-grazed, HSG C
	2,261,386	90	Weighted Average
	804,715	75	35.59% Pervious Area
	1,456,671	98	64.41% Impervious Area

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

Subcatchment 2S1: EAST HALF/ MOUNTAINVIEW



Summary for Subcatchment 2S2: HESS OPEN SPACE/ MOUNTAINVIEW

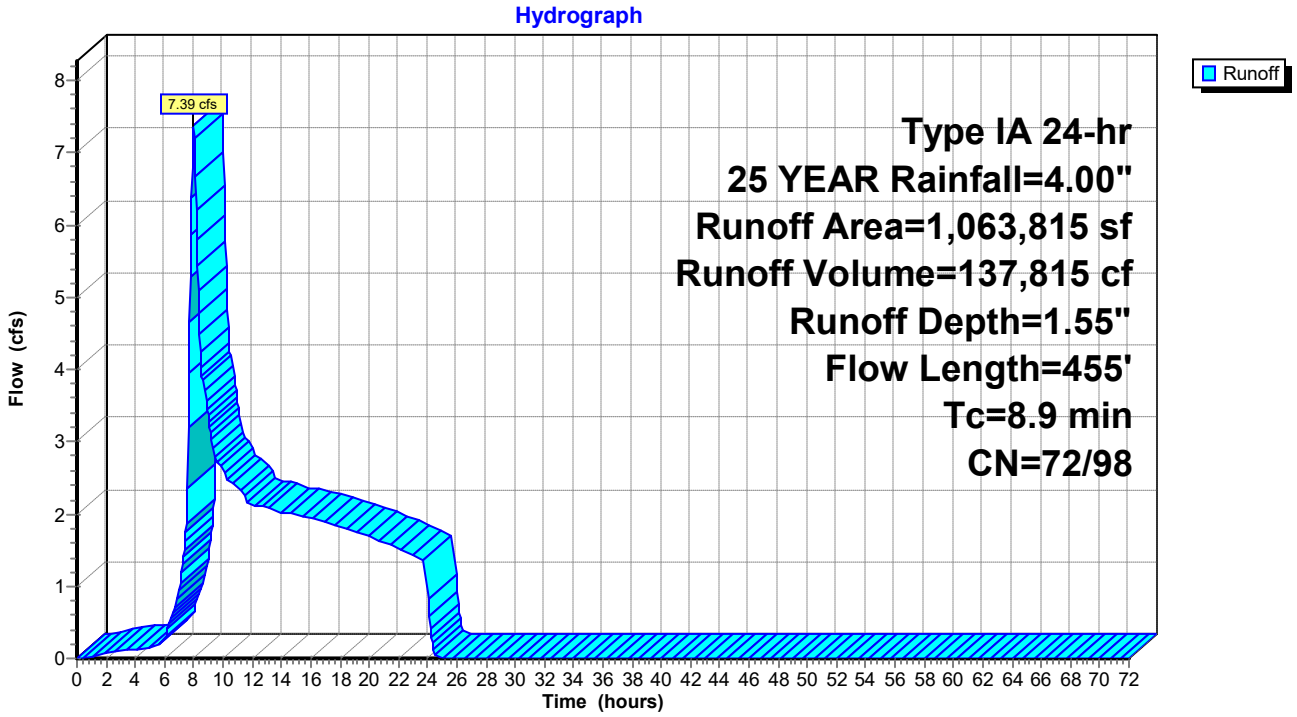
Runoff = 7.39 cfs @ 8.00 hrs, Volume= 137,815 cf, Depth= 1.55"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

	Area (sf)	CN	Description
	11,944	98	Paved roads w/curbs & sewers
	815,065	71	Meadow, non-grazed, HSG C
	80,425	78	Meadow, non-grazed, HSG D
*	30,659	98	Paved Paths
	19,458	96	Gravel surface, HSG C
	92,519	74	>75% Grass cover, Good, HSG C
	7,358	80	>75% Grass cover, Good, HSG D
	5,373	82	Woods/grass comb., Poor, HSG C
*	1,014	100	Stream
	1,063,815	73	Weighted Average
	1,020,198	72	95.90% Pervious Area
	43,617	98	4.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.0740	0.28		**Sheet Flow,** Range n= 0.130 P2= 2.50"
2.5	260	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	95	0.2200	3.28		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.9	455	Total			

Subcatchment 2S2: HESS OPEN SPACE/ MOUNTAINVIEW



Summary for Subcatchment 3S1: MOUNTAINVIEW

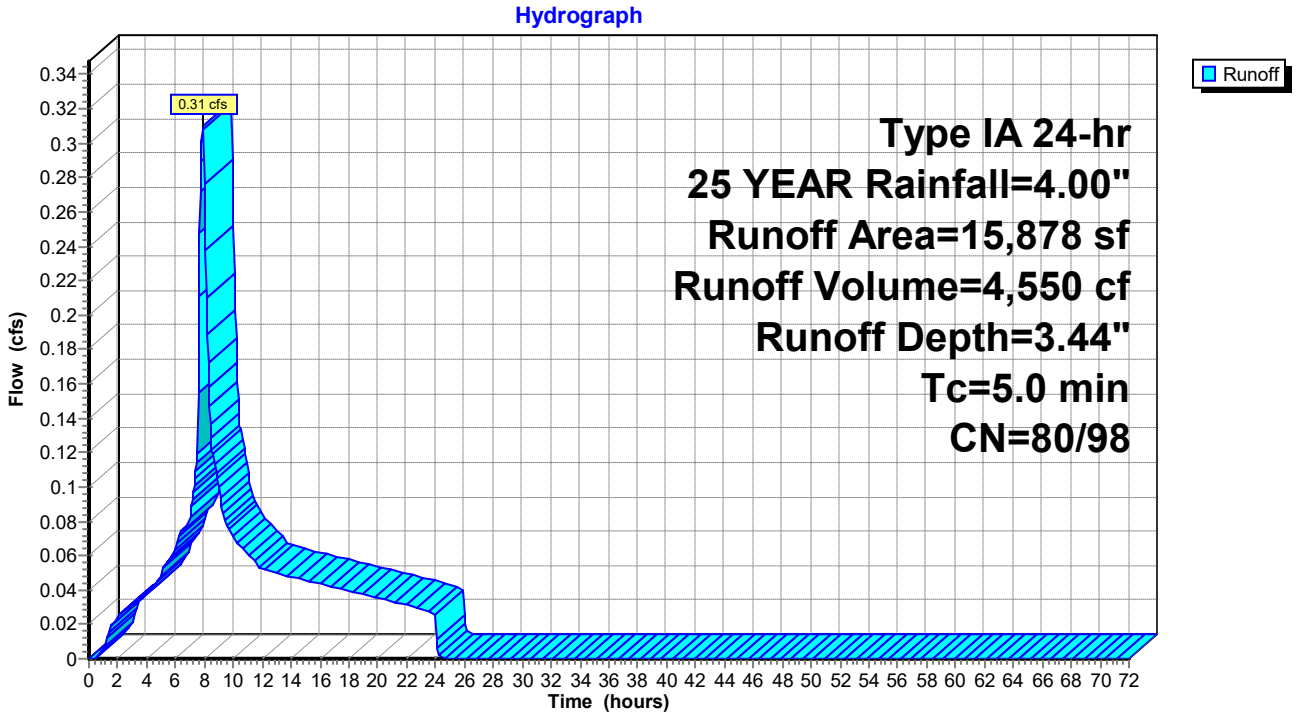
Runoff = 0.31 cfs @ 7.91 hrs, Volume= 4,550 cf, Depth= 3.44"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

Area (sf)	CN	Description
12,872	98	Paved roads w/curbs & sewers
3,006	80	>75% Grass cover, Good, HSG D
15,878	95	Weighted Average
3,006	80	18.93% Pervious Area
12,872	98	81.07% Impervious Area

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

Subcatchment 3S1: MOUNTAINVIEW



Summary for Subcatchment 4S1: CENTER (N)

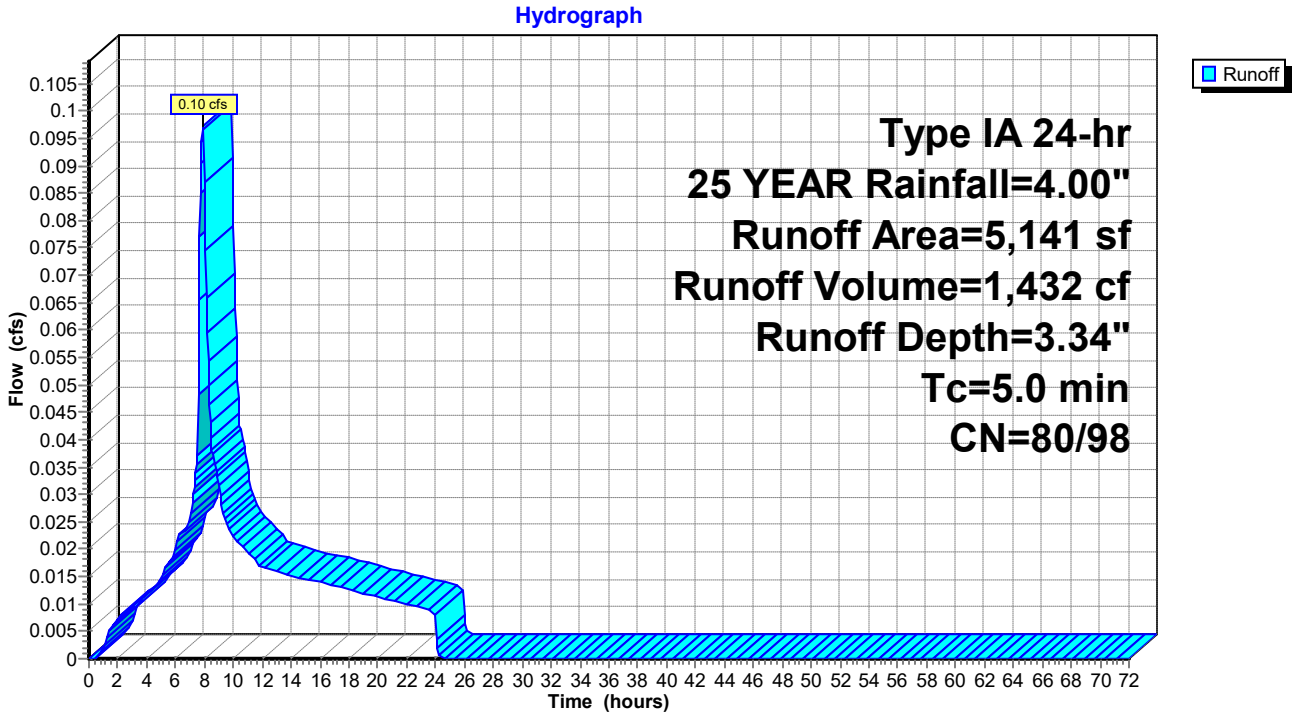
Runoff = 0.10 cfs @ 7.91 hrs, Volume= 1,432 cf, Depth= 3.34"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

Area (sf)	CN	Description
3,878	98	Paved roads w/curbs & sewers
1,263	80	>75% Grass cover, Good, HSG D
5,141	94	Weighted Average
1,263	80	24.57% Pervious Area
3,878	98	75.43% Impervious Area

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

Subcatchment 4S1: CENTER (N)



Summary for Subcatchment 5S1: ALDERSGATE (N)

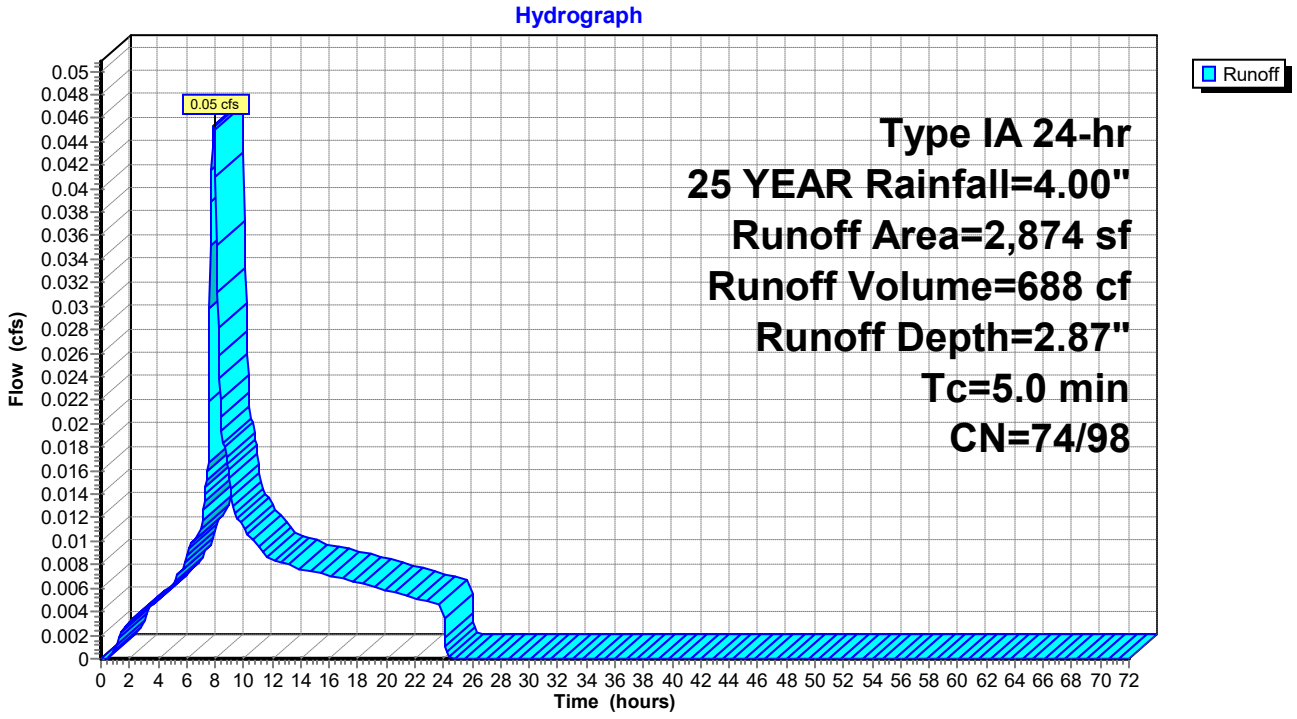
Runoff = 0.05 cfs @ 7.93 hrs, Volume= 688 cf, Depth= 2.87"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

Area (sf)	CN	Description
1,693	98	Paved roads w/curbs & sewers
1,181	74	>75% Grass cover, Good, HSG C
2,874	88	Weighted Average
1,181	74	41.09% Pervious Area
1,693	98	58.91% Impervious Area

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

Subcatchment 5S1: ALDERSGATE (N)



Summary for Reach S1: VEGETATED SWALE

Inflow = 2.50 cfs @ 7.98 hrs, Volume= 130,073 cf
Outflow = 2.47 cfs @ 8.04 hrs, Volume= 130,073 cf, Atten= 1%, Lag= 3.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.30 fps, Min. Travel Time= 7.4 min
Avg. Velocity = 0.17 fps, Avg. Travel Time= 12.6 min

Peak Storage= 1,101 cf @ 8.04 hrs
Average Depth at Peak Storage= 0.66'
Bank-Full Depth= 1.50' Flow Area= 22.5 sf, Capacity= 10.83 cfs

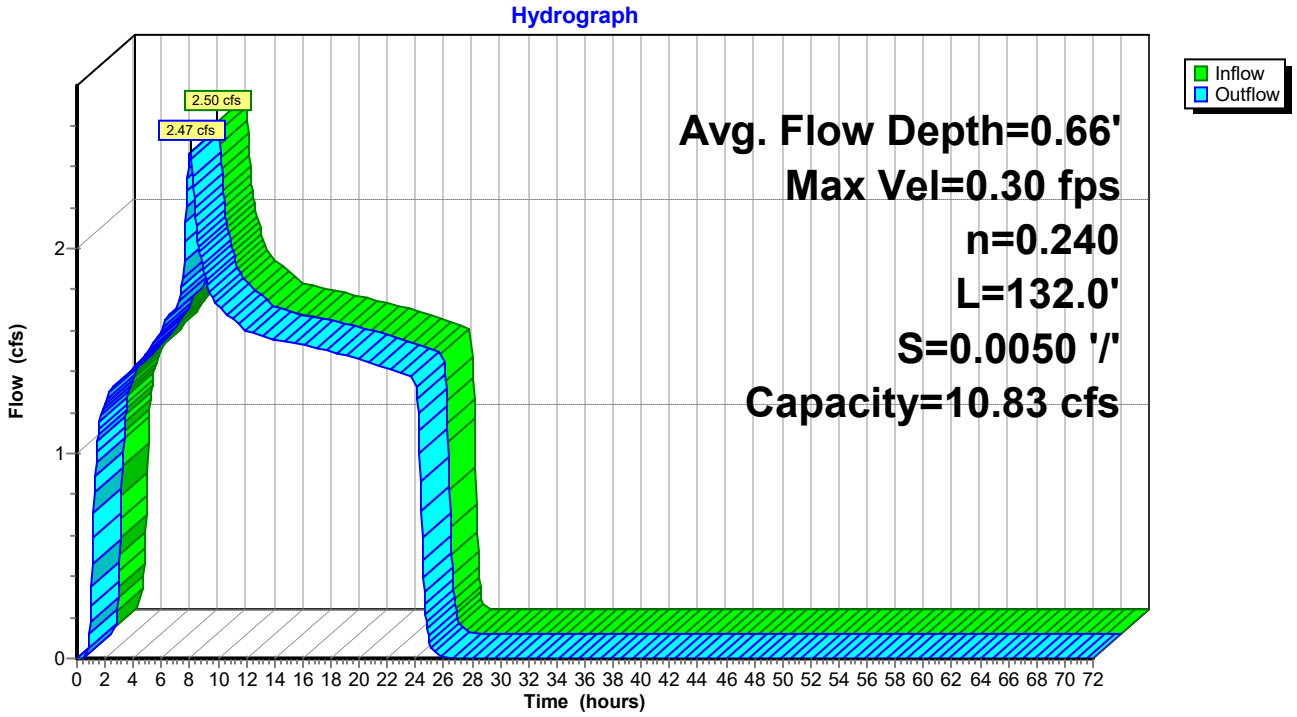
Custom cross-section, Length= 132.0' Slope= 0.0050 '/'
Constant n= 0.240
Inlet Invert= 221.00', Outlet Invert= 220.34'

‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-9.50	1.50	0.00
-7.00	0.50	1.00
-5.00	0.00	1.50
5.00	0.00	1.50
7.00	0.50	1.00
9.50	1.50	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
0.50	6.0	14.1	792	1.49
1.50	22.5	19.5	2,970	10.83

Reach S1: VEGETATED SWALE



Summary for Pond 1R: WQMH/ BYPASS

Inflow Area = 1,100,942 sf, 68.23% Impervious, Inflow Depth = 3.14" for 25 YEAR event
Inflow = 18.83 cfs @ 7.97 hrs, Volume= 288,496 cf
Outflow = 18.83 cfs @ 7.97 hrs, Volume= 288,494 cf, Atten= 0%, Lag= 0.0 min
Primary = 16.53 cfs @ 7.98 hrs, Volume= 195,335 cf
Secondary = 3.25 cfs @ 5.50 hrs, Volume= 93,159 cf

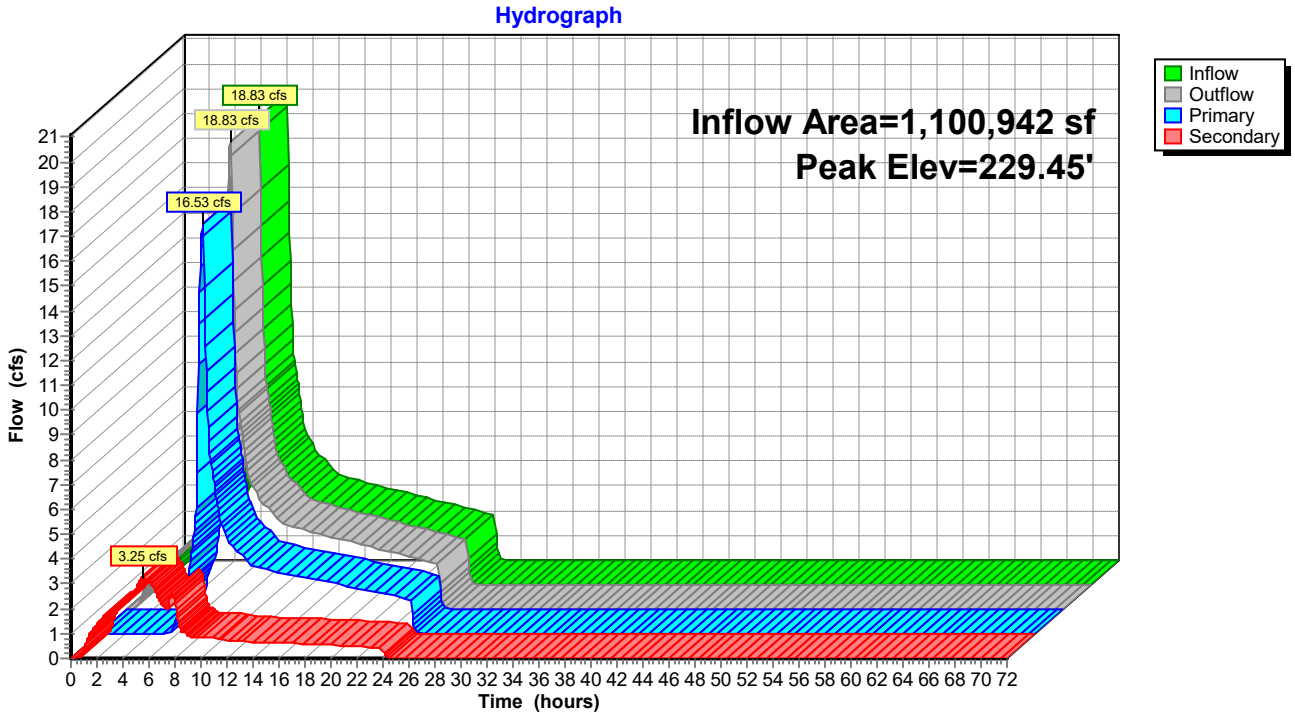
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 229.45' @ 8.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	227.15'	**36.0" Round High Flow Bypass** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 227.15' / 224.50' S= 0.0530 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Secondary	225.55'	**12.0" Round WQ Flow** L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 225.55' / 225.35' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	225.15'	**12.0" Round WQ Flow** L= 32.5' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 225.15' / 224.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=14.83 cfs @ 7.98 hrs HW=229.39' TW=228.98' (Dynamic Tailwater)
↑—**1=High Flow Bypass** (Outlet Controls 14.83 cfs @ 3.63 fps)

Secondary OutFlow Max=3.19 cfs @ 5.50 hrs HW=227.24' TW=226.32' (Dynamic Tailwater)
↑—**2=WQ Flow** (Controls 3.19 cfs)
↑—**3=WQ Flow** (Inlet Controls 3.19 cfs @ 4.07 fps)

Pond 1R: WQMH/ BYPASS



Summary for Pond 2R: BYPASS

Inflow Area = 2,261,386 sf, 64.41% Impervious, Inflow Depth = 3.02" for 25 YEAR event
Inflow = 36.07 cfs @ 7.98 hrs, Volume= 568,809 cf
Outflow = 36.07 cfs @ 7.98 hrs, Volume= 568,809 cf, Atten= 0%, Lag= 0.0 min
Primary = 33.57 cfs @ 7.98 hrs, Volume= 438,736 cf
Secondary = 2.50 cfs @ 7.98 hrs, Volume= 130,073 cf

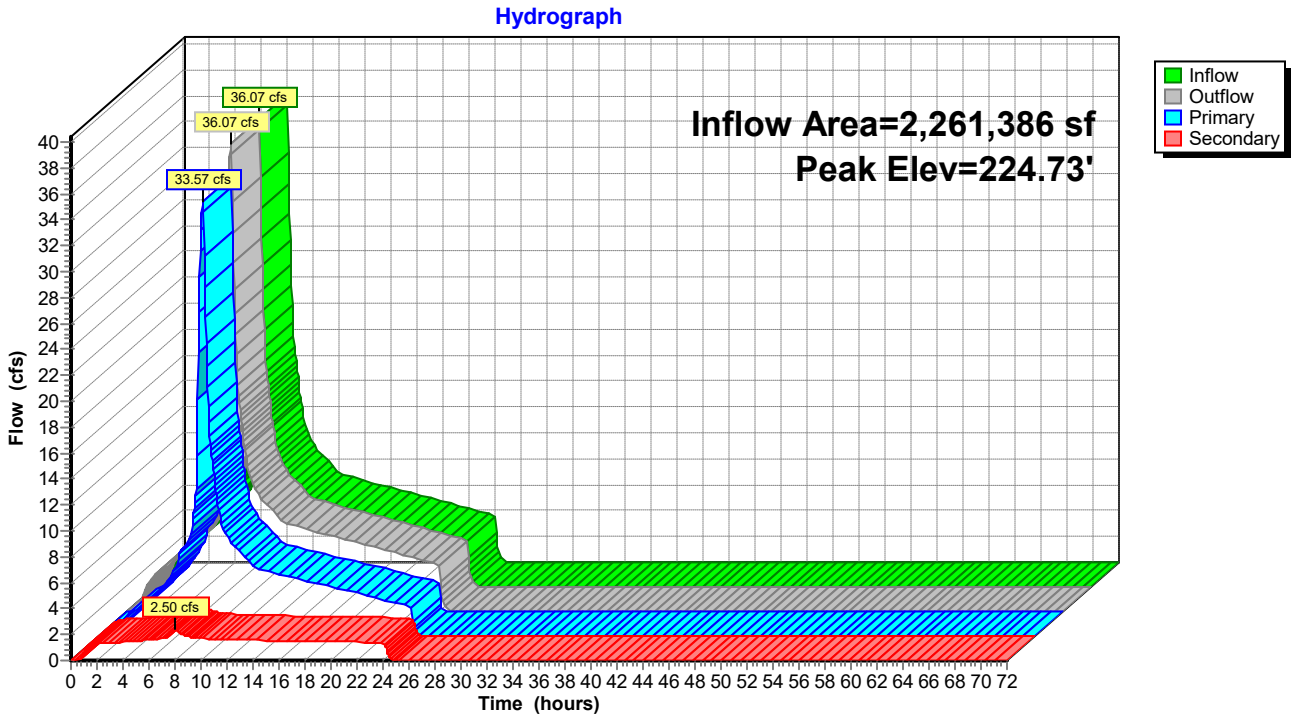
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 224.73' @ 7.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Secondary	221.20'	**8.0" Round WQ Flow** L= 40.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 221.20' / 221.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	222.00'	**36.0" Round High Flow Bypass** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 222.00' / 221.20' S= 0.0160 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=33.38 cfs @ 7.98 hrs HW=224.72' TW=218.28' (Dynamic Tailwater)
└**2=High Flow Bypass** (Inlet Controls 33.38 cfs @ 4.95 fps)

Secondary OutFlow Max=2.49 cfs @ 7.98 hrs HW=224.72' TW=221.66' (Dynamic Tailwater)
└**1=WQ Flow** (Barrel Controls 2.49 cfs @ 7.14 fps)

Pond 2R: BYPASS



Summary for Pond P1: EXTENDED DRY BASIN

Inflow Area = 1,100,942 sf, 68.23% Impervious, Inflow Depth = 3.14" for 25 YEAR event
Inflow = 18.83 cfs @ 7.97 hrs, Volume= 288,494 cf
Outflow = 11.32 cfs @ 8.29 hrs, Volume= 281,188 cf, Atten= 40%, Lag= 19.4 min
Primary = 11.32 cfs @ 8.29 hrs, Volume= 281,188 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 229.25' @ 8.29 hrs Surf.Area= 21,308 sf Storage= 81,794 cf

Plug-Flow detention time= 528.0 min calculated for 281,188 cf (97% of inflow)
Center-of-Mass det. time= 509.2 min (1,201.5 - 692.3)

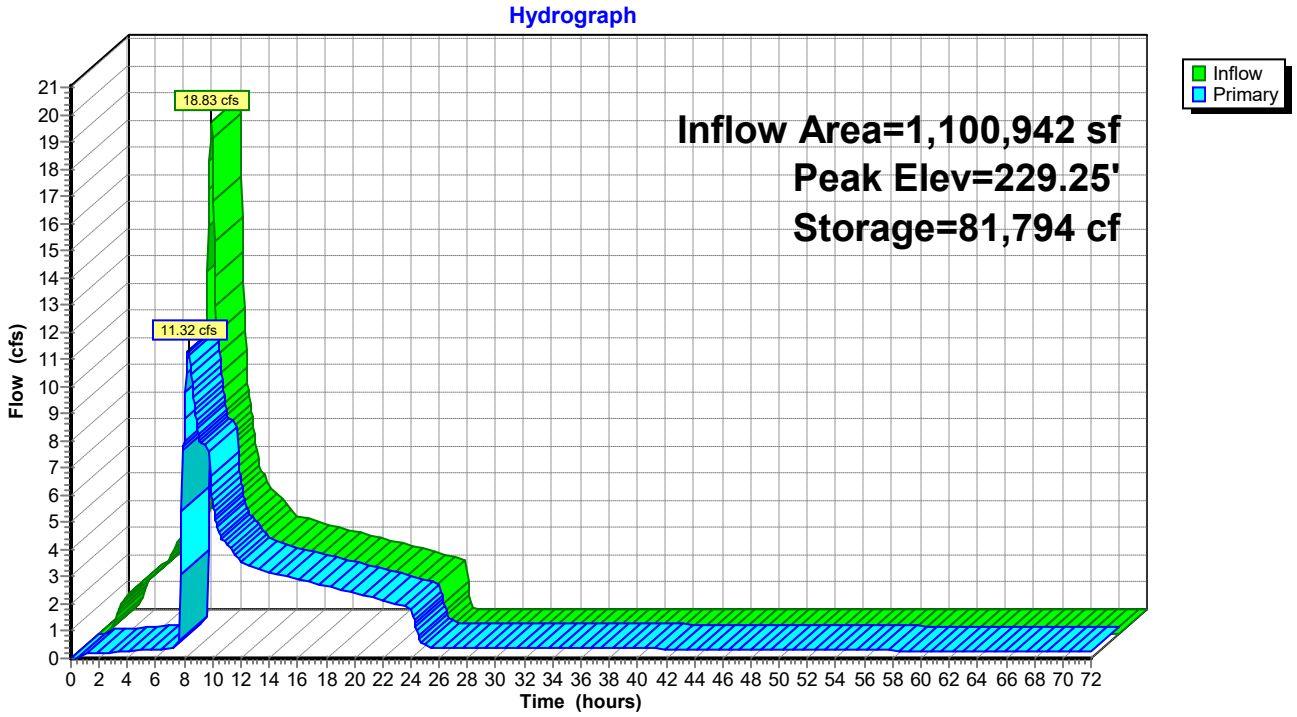
Volume	Invert	Avail.Storage	Storage Description
#1	224.50'	109,826 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
224.50	13,412	505.4	0	0	13,412
230.50	23,680	635.5	109,826	109,826	25,710

Device	Routing	Invert	Outlet Devices
#1	Primary	223.40'	**12.0" Round Outfall Pipe** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 223.40' / 223.15' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	223.50'	**2.7" Vert. WQ Orifice** C= 0.600
#3	Device 1	228.30'	**30.0" x 16.0" Horiz. Upper Ditch Inlet** C= 0.600 Limited to weir flow at low heads
#4	Primary	225.50'	**12.0" Round Outfall Pipe** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 225.50' / 224.25' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#5	Device 4	229.00'	**30.0" x 16.0" Horiz. Upper Ditch Inlet** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=11.31 cfs @ 8.29 hrs HW=229.25' TW=0.00' (Dynamic Tailwater)
- **1=Outfall Pipe** (Barrel Controls 8.13 cfs @ 10.35 fps)
  - **2=WQ Orifice** (Passes < 0.45 cfs potential flow)
  - **3=Upper Ditch Inlet** (Passes < 15.67 cfs potential flow)
- **4=Outfall Pipe** (Passes 3.18 cfs of 6.82 cfs potential flow)
  - **5=Upper Ditch Inlet** (Weir Controls 3.18 cfs @ 1.64 fps)

Pond P1: EXTENDED DRY BASIN



Summary for Pond P2: DETENTION POND

Inflow Area = 2,261,386 sf, 64.41% Impervious, Inflow Depth = 3.02" for 25 YEAR event
Inflow = 36.02 cfs @ 7.98 hrs, Volume= 568,809 cf
Outflow = 18.94 cfs @ 8.44 hrs, Volume= 519,912 cf, Atten= 47%, Lag= 27.3 min
Primary = 18.94 cfs @ 8.44 hrs, Volume= 519,912 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 218.81' @ 8.44 hrs Surf.Area= 31,612 sf Storage= 162,868 cf
Flood Elev= 219.00' Surf.Area= 32,084 sf Storage= 168,924 cf

Plug-Flow detention time= 421.5 min calculated for 519,912 cf (91% of inflow)
Center-of-Mass det. time= 360.3 min (1,061.2 - 700.9)

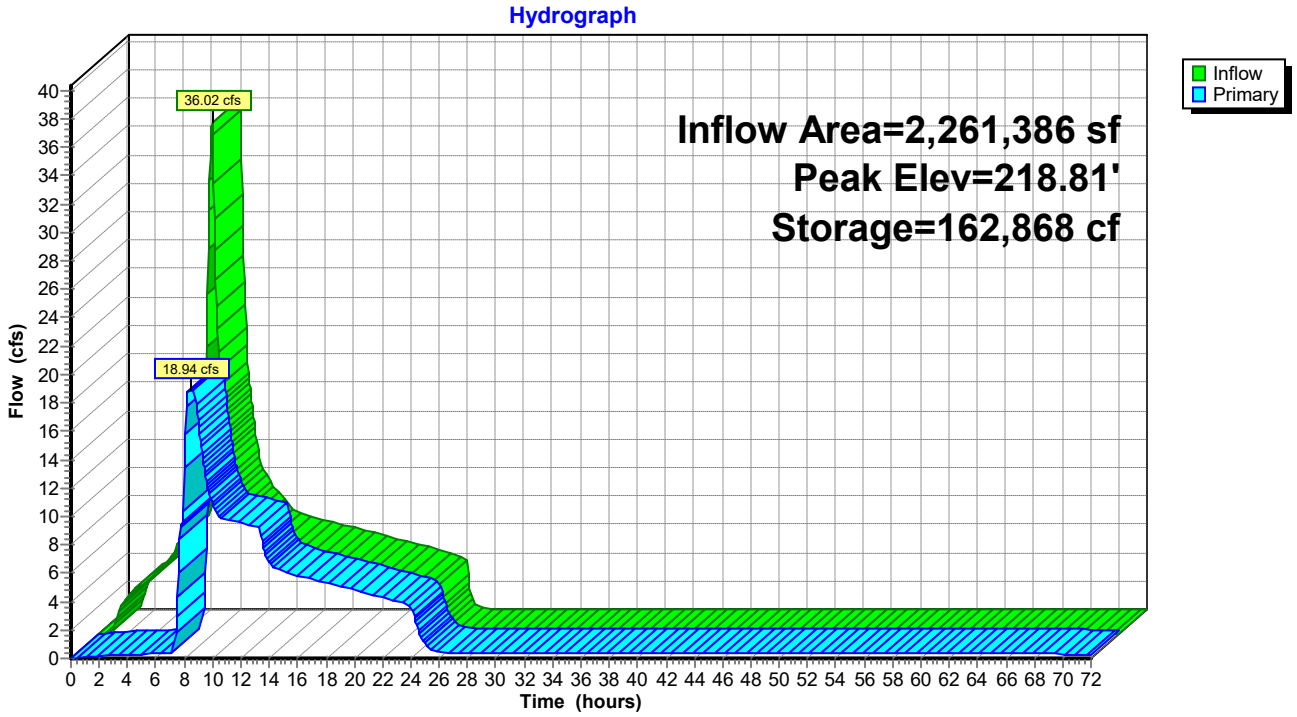
Volume	Invert	Avail.Storage	Storage Description
#1	212.00'	202,272 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.00	16,833	666.0	0	0	16,833
213.00	18,860	684.8	17,837	17,837	18,964
220.00	34,628	816.8	184,435	202,272	35,589

Device	Routing	Invert	Outlet Devices
#1	Primary	210.50'	**18.0" Round Outfall** L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 210.50' / 191.00' S= 0.3900 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	211.00'	**12.0" Round Detention Pipe 1** L= 10.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 211.00' / 210.95' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	211.00'	**2.5" Vert. Detention Orifice 1** C= 0.600
#4	Device 2	216.90'	**30.0" x 16.0" Horiz. Upper Ditch Inlet 1** C= 0.600 Limited to weir flow at low heads
#5	Device 1	213.00'	**12.0" Round Detention Pipe 2** L= 30.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 213.00' / 212.25' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#6	Device 5	218.20'	**30.0" x 16.0" Horiz. Upper Ditch Inlet 2** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=18.94 cfs @ 8.44 hrs HW=218.81' TW=0.00' (Dynamic Tailwater)
- **1=Outfall** (Passes 18.94 cfs of 23.39 cfs potential flow)
  - **2=Detention Pipe 1** (Inlet Controls 10.22 cfs @ 13.02 fps)
    - **3=Detention Orifice 1** (Passes < 0.46 cfs potential flow)
    - **4=Upper Ditch Inlet 1** (Passes < 22.18 cfs potential flow)
  - **5=Detention Pipe 2** (Inlet Controls 8.71 cfs @ 11.09 fps)
    - **6=Upper Ditch Inlet 2** (Passes 8.71 cfs of 11.92 cfs potential flow)

Pond P2: DETENTION POND

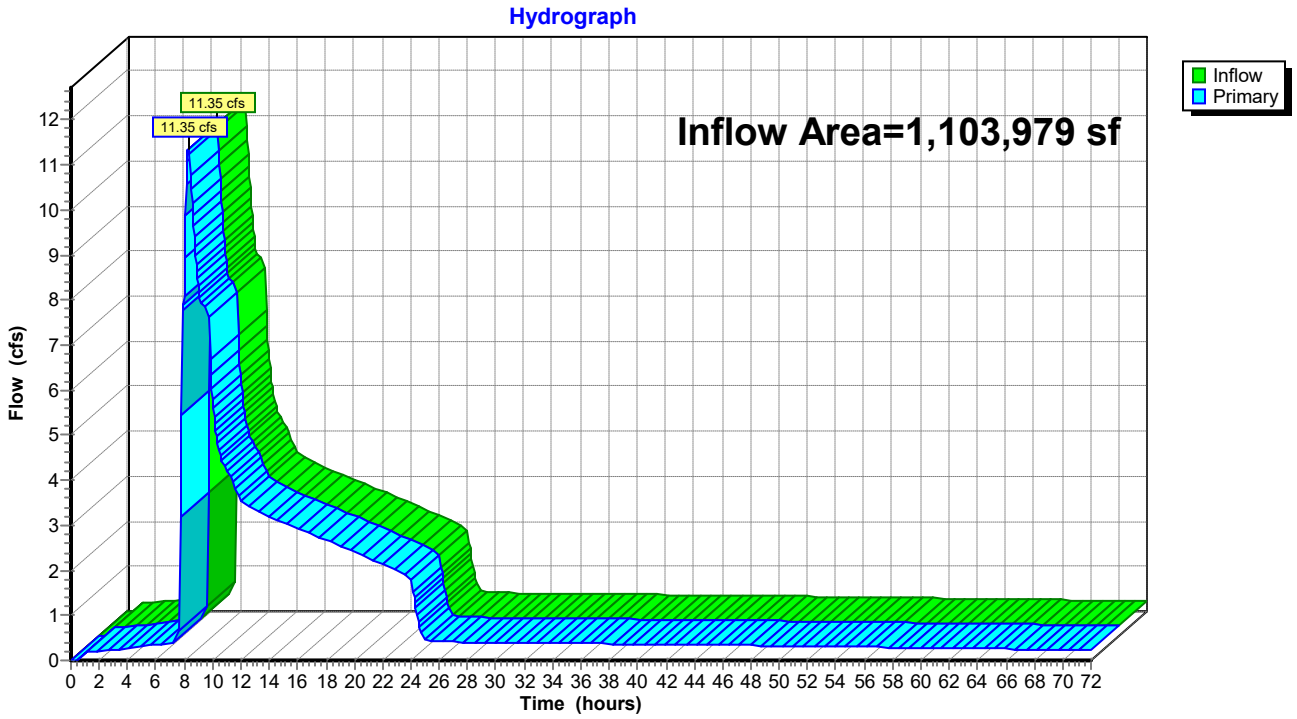


Summary for Link CS: CENTER ST (S)

Inflow Area = 1,103,979 sf, 68.28% Impervious, Inflow Depth > 3.07" for 25 YEAR event
Inflow = 11.35 cfs @ 8.29 hrs, Volume= 282,093 cf
Primary = 11.35 cfs @ 8.29 hrs, Volume= 282,093 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link CS: CENTER ST (S)

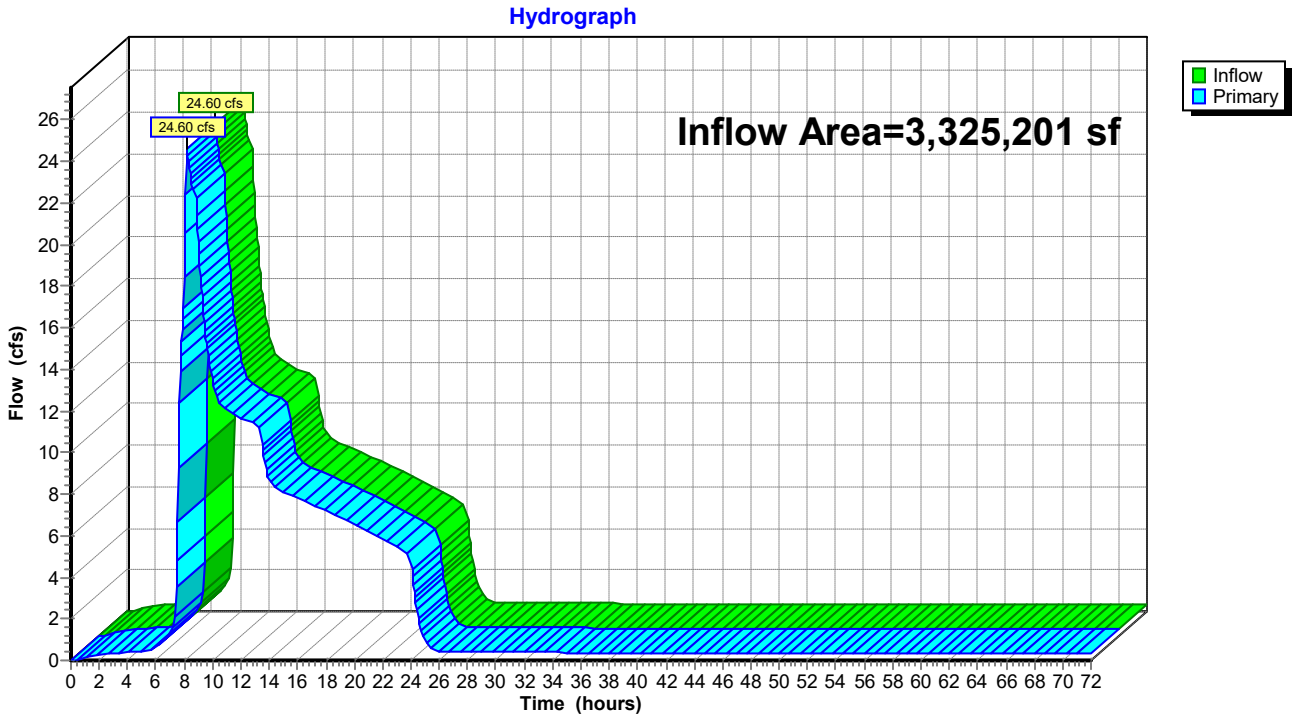


Summary for Link HC: HESS CREEK

Inflow Area = 3,325,201 sf, 45.12% Impervious, Inflow Depth > 2.37" for 25 YEAR event
Inflow = 24.60 cfs @ 8.21 hrs, Volume= 657,727 cf
Primary = 24.60 cfs @ 8.21 hrs, Volume= 657,727 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link HC: HESS CREEK



Appendix C: TR-55 RUNOFF CURVE NUMBERS

Table 2-2a Runoff curve numbers for urban areas [1/]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2/]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3/]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4/]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5/]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands [1/]

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment [2/]	Hydrologic condition [3/]	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T+ CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T+ CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

[1] Average runoff condition, and I_a=0.2S

[2] Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

[3] Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2/]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3/]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4/]	48	65	73
Woods—grass combination (orchard or tree farm). [5/]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6/]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4/]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.

2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

3 *Poor*: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

4 Actual curve number is less than 30; use CN = 30 for runoff computations.

5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Appendix D: USDA-NRCS SOIL RESOURCE REPORT

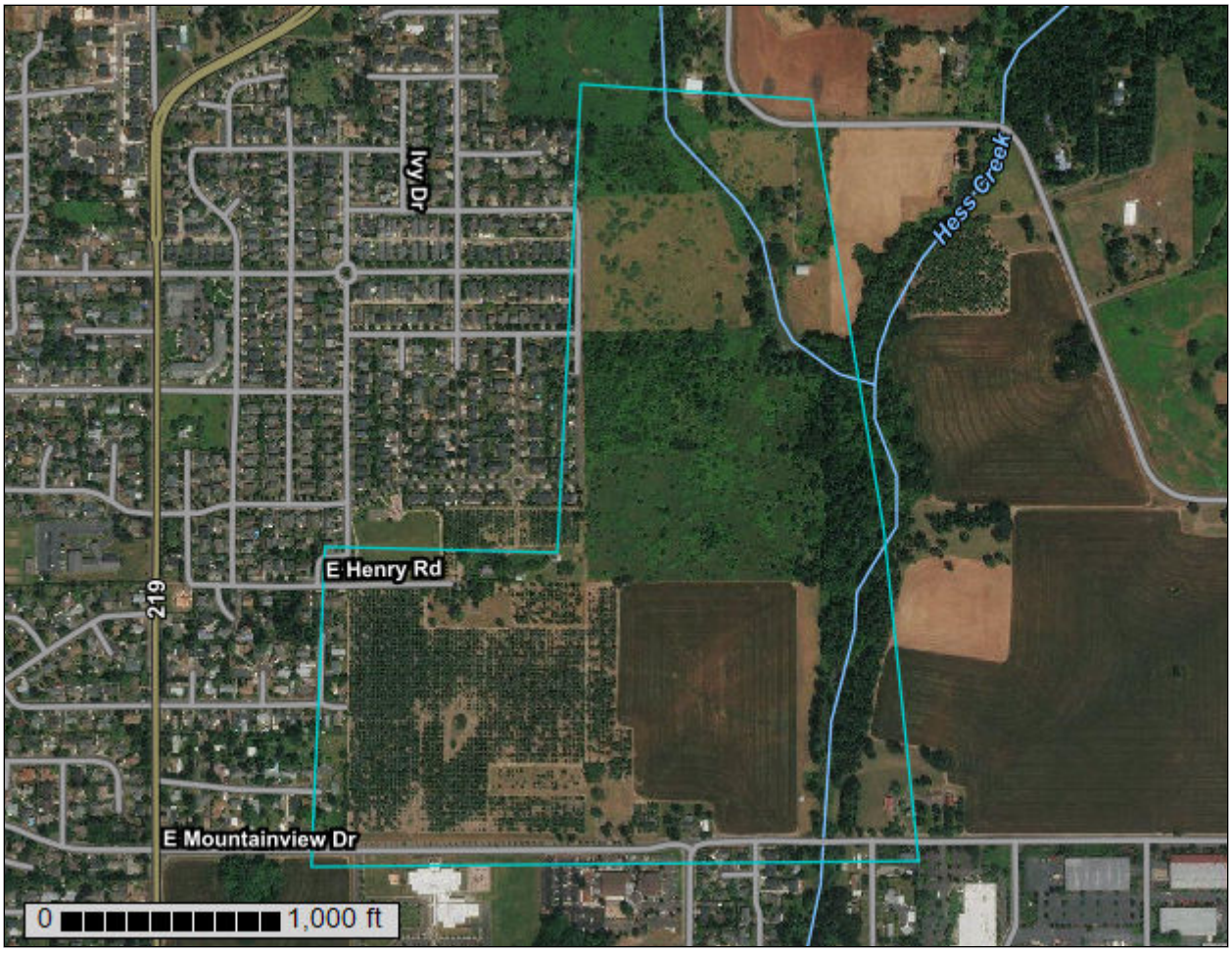
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Yamhill County, Oregon



September 28, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

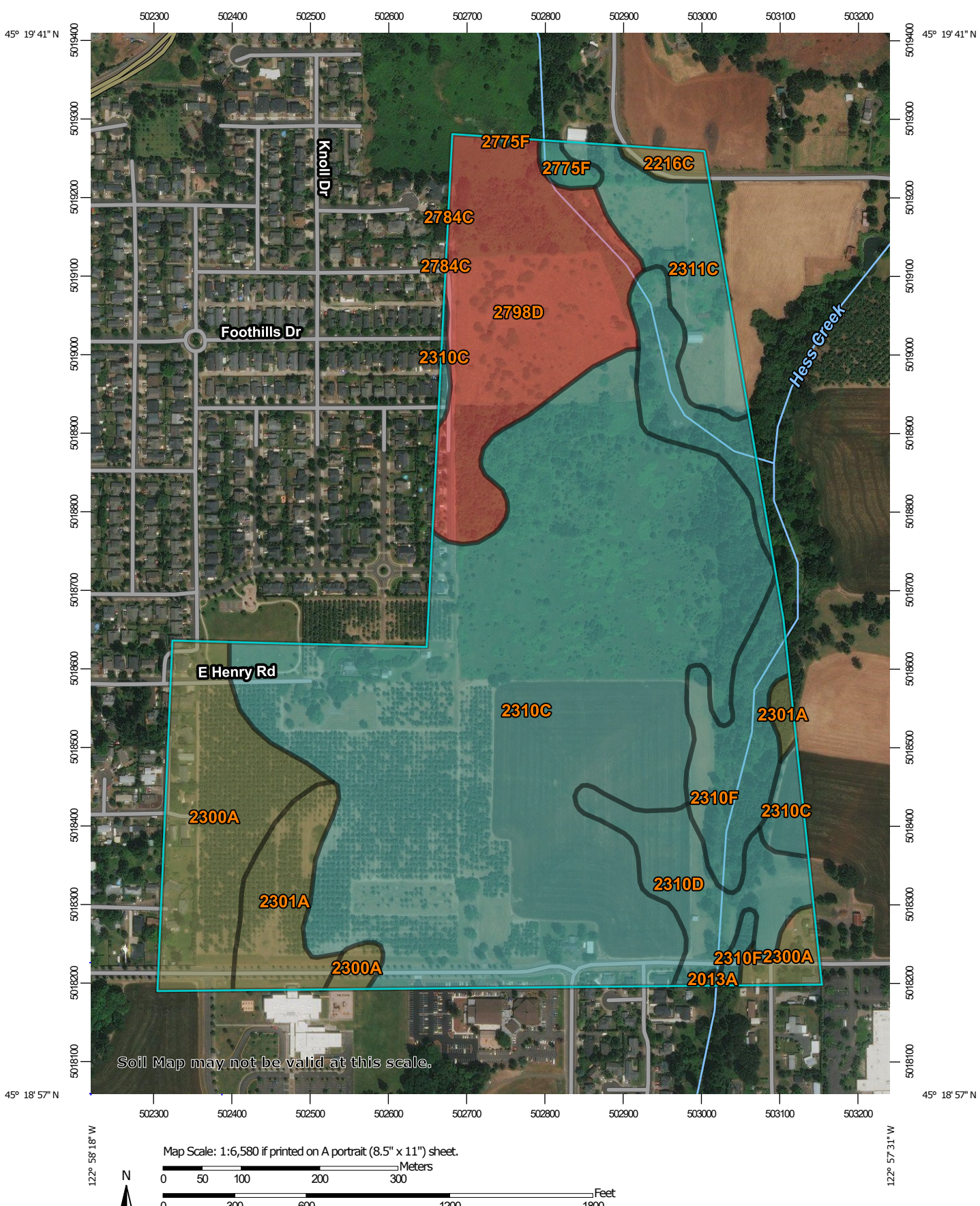
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:6,580 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Yamhill County, Oregon
Survey Area Data: Version 10, Oct 27, 2021

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

Date(s) aerial images were photographed: Aug 19, 2015—Sep 13, 2016

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

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2013A	Wapato silty clay loam, 0 to 3 percent slopes	C/D	0.1	0.0%
2216C	Chehalem silty clay loam, volcanic, 3 to 12 percent slopes	C/D	0.9	0.6%
2300A	Aloha silt loam, 0 to 3 percent slopes	C/D	15.1	10.0%
2301A	Amity silt loam, 0 to 3 percent slopes	C/D	6.1	4.1%
2310C	Woodburn silt loam, 3 to 12 percent slopes	C	80.5	53.4%
2310D	Woodburn silt loam, 12 to 20 percent slopes	C	7.2	4.8%
2310F	Woodburn silt loam, 20 to 55 percent slopes	C	12.3	8.1%
2311C	Helvetia silt loam, 2 to 12 percent slopes	C	7.7	5.1%
2775F	Saum-Ritner complex, 30 to 75 percent slopes	C	0.8	0.5%
2784C	Witzel-Ritner complex, 2 to 12 percent slopes, stony	D	0.0	0.0%
2798D	Witham silty clay loam, hummocky, 2 to 25 percent slopes	D	19.9	13.2%
Totals for Area of Interest			**150.6**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf