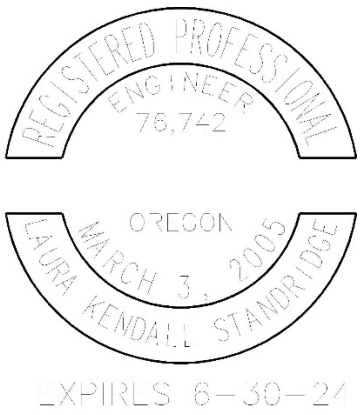
EXHIBIT 3.05

PRELIMINARY HYDROLOGY REPORT
FOR THE
PANZER MIXED USE DEVELOPMENT PROJECT

DATE: April 26, 2023
REVISED: August 31, 2023

PREPARED FOR:
THE NEW HOME COMPANY
15455 NW GREENBRIER PARKWAY, SUITE 240
BEAVERTON, OR 97006

PREPARED BY:
STANDRIDGE INC.
703 BROADWAY STREET, SUITE 610
VANCOUVER, WASHINGTON 98660
SDI PROJECT SSB005



STANDRIDGE
PLANNING | ENGINEERING | SURVEYING

TABLE OF CONTENTS

STANDRIDGE
PLANNING | ENGINEERING | SURVEYING

LIST OF FIGURES

LIST OF TABLES

Technical Appendices

Executive Summary

TNHC Oregon LLC ("Applicant") plans to develop an approximately 26.6-acre property into 533 housing units as well as approximately 17,736 square feet of retail space included within the first floor of four (4) mixed use buildings. Anticipated zoning assigned at annexation is Station Community (SC) – High Density Residential (HDR). The Applicant is requesting with this application that the site be re-zoned to Station Community – Mixed Use (SC – MU). The site is located southeast of the intersection of SW 185th Avenue, SW Stepping Stone Drive and SW Baseline Road Hillsboro, Oregon 97002. The site location is further identified as seven (7) Tax Lots (T.L.) 3700, 3701, 3702 within plat map 1S106BC0, in the Southwest Quarter of Section 06, Township 1 South, Range 1 East of the Willamette Meridian (site).

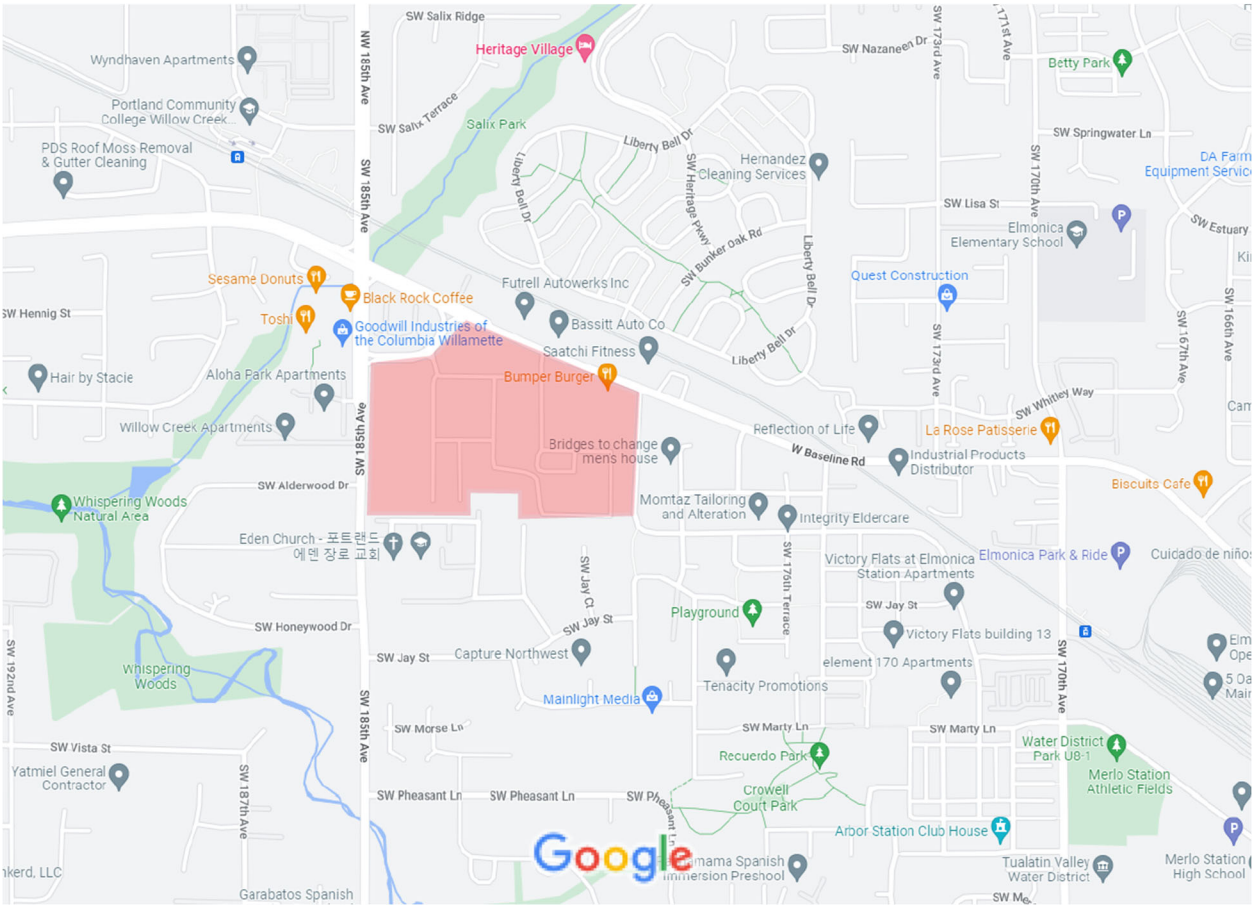
The City of Beaverton utilizes the hydrologic requirements of their own "Engineering Design Manual", 2019 as well as Clean Water Services (CWS) "Design & Construction Standards", December 2019. Water quality and quantity is addressed through the above standards with the City of Beaverton taking precedence. The site is required to treat the water quality storm (0.36 in over 3 hours) for all impervious areas, which is achieved through rain gardens, water quality planters, treatment catch basins, and a water quality pond. Detention of the developed 2-, 5-, 10-, and 25-year storm peak flow rates to the pre-development peak flow rates (and 50% of the 2-year) are also required. This is achieved through three separate underground detention systems that hold stormwater after treatment. Flows are metered out through flow control manholes to an existing public storm system and outfall to Willow Creek on the west side of SW 185th Avenue.

Section 1 – Project Overview

1.0 Vicinity Map

The site is located southeast of the intersection of SW 185th Avenue, SW Stepping Stone Drive and W Baseline Road, Beaverton, Oregon 97002. The site location is further identified as three (3) Tax Lots (T.L.) 3600 and 3700 within plat map 1S106BC0, in the Southwest Quarter of Section 06, Township 1 South, Range 1 East of the Willamette Meridian (site), See Figure 1.1 Vicinity Map.

Figure 1.1 Vicinity Map



Site Location

1.1 Site Plan

The development consists of proposed streets, open space, landscaping, and utilities to serve the 533 dwelling units, see Figure 1.2 Site Plan and Appendix A. Dwellings consist of single-family detached front loaded homes, single-family attached front loaded homes, single-family detached alley loaded homes, and 34- and 36-unit apartment buildings in both residential only and commercial ground floor with residential above buildings.

Figure 1.2 Site Plan

1.2 Existing Conditions

The site was recently annexed into the City of Beaverton and assigned the dual zoning designation of Station Community – High Density Residential (SC – HDR) and Station Community – Multiple Use (SC – MU). This application includes the rezone request to zone the entire site to SC-MU. The existing site is largely covered in gravel, paving, greenhouses, buildings, and landscaping and is the site of the Panzer Nursery. The existing Panzer Nursery has been in operation at this location since 1963.

Publicly available aerial imagery clearly shows that the site has not changed since aerial imagery has been available (1990). The untreated and undetained stormwater runoff from the site infiltrates into the ground around the greenhouses and, when the infiltration areas are inundated, overland flows to the public street storm systems located in SW 185th Avenue, W Baseline Road, and SW Stepping Stone Drive, which outfalls to Willow Creek.

Photo 1. Site Imagery July 1990

Existing Pervious and Impervious Areas

A study of the existing site and associated pervious and impervious areas was performed on June 13, 2023. The greenhouses cover a majority of the site and are constructed of hollow steel tubing with flexible 12 mil plastic sheeting that covers the roof area. Corrugated fiber polymer acts as the walls of the greenhouses (see Photo 2). The plastic "roofing" is in good to fair condition.

Photo 2. Typical Greenhouse

Stormwater runoff flows to a gravel base within and surrounding the greenhouses. Based on similar conditions of areas that infiltrate to gravel areas surrounding the greenhouses (such as the park paths that drain to a gravel edge are considered pervious per the determination by Clean Water Services), in addition to the condition of the plastic "roofing", the greenhouses are determined to be pervious.

Photo 3. Typical Greenhouse

The existing warehouse, office and storage buildings, and existing asphalt and concrete paving is impervious (see Photo 4 and 5). The site area detail is shown in Figure 1.3.

Photos 4 & 5. Typical Buildings and Parking

Figure 1.3. Existing Site Analysis Exhibit

In order to calculate the existing pervious and impervious areas, Clean Water Services Rates and Charges, R&O 18-19, Section II.H.3.g and h is referenced. Per the requirements, 100% of roadways shall be considered impervious, 40% of gravel parking areas shall be deemed impervious, 20% of gravel areas where materials are stored and accessed by motor vehicle shall be considered impervious, and gravel areas not accessed by motor vehicles or not highly compacted shall not be considered impervious. Based on the site analysis, this results in the following areas shown in Table 1.1.

Table 1.1 Existing Pervious and Impervious Area

SURFACE	PERCENT IMPERVIOUS	IMPERVIOUS AREA (SF)	PERVIOUS AREA (SF)	TOTAL (SF)
GREENHOUSE MATERIAL STORAGE	20	170,263	681,052	851,316
BUILDINGS	100	42,564	0	42,564
CONCRETE PAVING	100	31,419	0	31,419
ASPHALT PAVING	100	35,424	0	35,424
GRAVEL FOR MOTOR VEHICLES	100	23,758	0	23,758
GRAVEL FOR SMALL VEHICLE ACCESS	40	3,826	5,740	9,567
GRAVEL MATERIAL STORAGE	20	6,710	26,841	33,552
GRAVEL/DIRT PEDESTRIAN ACCESS	0	0	131,226	131,226
TOTAL		**313,965**	**844,860**	**1,158,826**

The impervious area is considered to be modified as the project proposes to remove all of, and replace most of, the existing impervious areas. Some impervious areas will be converted to open space and landscaping. This triggers CWS 4.08.6.d requiring modified impervious areas to use a pre-development curve number of 75 (woods in fair condition) for all pre-existing conditions when analyzing peak flow rate detention for the 2- and 10-year, 24-hour storms.

Existing surrounding development consists of the single-family residential attached housing within the Stoneway Condominiums to the northwest, the single family residential detached housing within the Aubrey Meadows and Willowford developments to the south and the single-family detached residential housing within Lawton Place to the east. Across from W Baseline Road is industrial zoned property. A mixture of industrial zoned, higher- and lower density housing is located to the west of the site, across SW 185th Avenue, and includes the Willow Creek Apartments, Aloha Park Apartments, and a shopping center. The Existing Conditions Plan can be found in Appendix A.

Upstream Basin

The Panzer site has no upstream basins that flow through or onto the site. To the south and east are single-family homes. The single-family homes have existing storm systems that collect and route the water away from the site. To the south adjacent to the site is a wetland that does not have any discharge/outflow devices and therefore does not affect the site as all water is retained in the wetland.

Downstream Basin

The existing site infiltrates and sheet flows directly to the northeast to SW 185th Ave. and W Baseline Rd. rights-of-way with a small portion of the site sheet flowing to one onsite storm inlet. Both the SW 185th Ave. and W Baseline Rd. rights-of-ways flow to curb inlets which flow to the existing 24-inch main line in SW 185th Ave. The onsite inlet flows directly to the 24-inch main line in SW 185th Ave. The 24-inch main line then routes north and west to discharge into Willow Creek; see the Utility plan found in Appendix A.

1.3 Developed Conditions

The proposed development is for 533 new multi-family, single family attached, and single family detached dwelling units. Open space, landscaping, streets, lighting, and utilities are proposed to serve the new homes. The site consists of seven stormwater drainage basins which treat and detain stormwater runoff to pre-developed rates, see the Basin Map in Appendix B.

1.4 Design Criteria

This project is required to provide stormwater management and disposal in accordance with the 2019 Beaverton Engineering Design Manual Chapter 5: "Surface Water Management and Sanitary Sewer" which refers to Clean Water Services (CWS) December 2019 "Design & Construction Standards". If the City of Beaverton Engineering Design Manual contradicts, then the City of Beaverton standards take precedence. This includes provisions for quantity control (detention), water quality treatment, and disposal of stormwater runoff from all newly constructed or reconstructed impervious areas.

Per City of Beaverton Design Manual Table 530.1 and CWS Table 4-3, contributing basins will utilize second order facilities for treatment and detention. The approach to be used is Vegetated Swales/Storm Filter Vaults for water quality treatment and underground detention for water quantity and hydromodification. Rainfall is modeled as the 24-hour NRCS Type 1A rainfall distribution. Rainfall quantity for the design storms is shown in Table 1.2 and was taken from CWS 4.08.3, which describes the water quality storm (modified by City of Beaverton standards to be rainfall over a 3-hour period) and the 2-, 10- and 25-year, 24-hour storms. The 100-year storm is taken from NOAA Atlas2, Volume 10. The Santa Barbara Unit Hydrograph method and HydroCad 10.2 were used to calculate water quantity runoff peak flow rates.

Impervious Area Used in Design

This site must be designed Per CWS Chapter 4, 4.08.1 "Impervious Area Used In Design" for developments that create or modify 1,000 square feet or greater impervious surface area. Per 4.08.1.c, the Single Family-East and Single Family-South can use the assumed rate of 2,640 square feet per lot. All other areas (Apartments-North, Apartments-West, Town Homes-Central, A Street-South and B Street-Central) will need to use actual impervious area per 4.08.1.d. Single family lots were evaluated and have significantly less impervious surface than the 2,640 standard throughout the subdivision, therefore actual impervious area will be used, see Table 1.2 for average lot areas used.

Table 1.2 Single Family Impervious Lot Area

Lot Description	Lot Area (sf)	Average Impervious Area (sf)
Single Family (PLAN 3004)	3036	1954
Single Family (PLAN 3014)	3036	1975
Single Family (PLAN 2410)	2254	1345
Single Family (PLAN 2650)	2407	1631

Table 1.2 Rainfall Rates

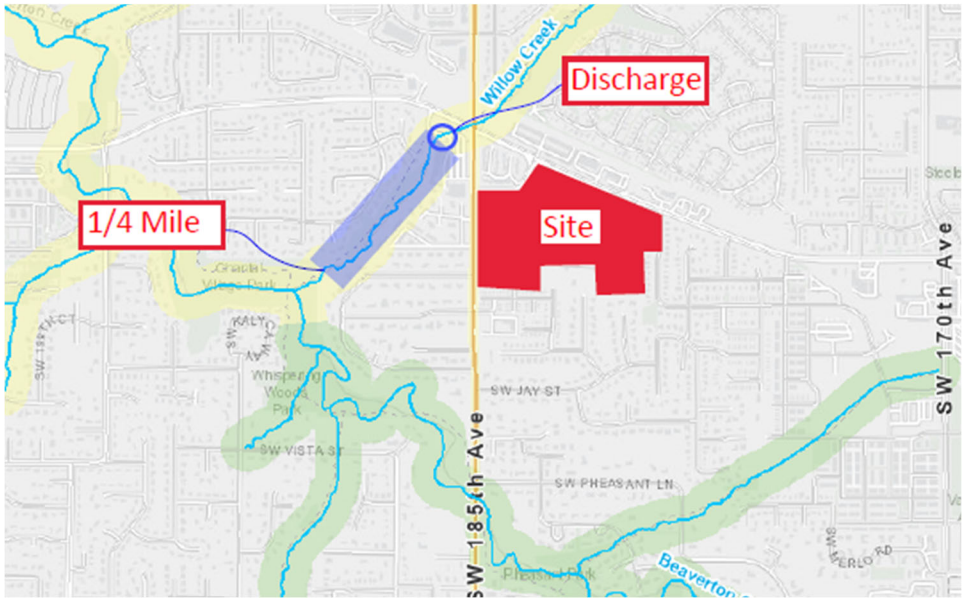
Design Storm	Rainfall (inches)
Water Quality	0.36
2-Year, 24-Hour	2.50
5-Year, 24-Hour	3.10
10-Year, 24-Hour	3.45
25-Year, 24-Hour	3.90
100-Year, 24-Hour	4.50

1.4 Hydromodification Methodology

The Panzer development will use CWS Chapter 4, Section 4.03 to determine the category of Hydromodification for the site and associated design standards. The point of Discharge Per CWS Hydromodification Planning Tool online, Willow Creek, is the discharge point for the existing stormwater system. The risk level Per CWS Hydromodification Planning Tool online, Willow Creek is a Moderate Risk for the ¼ mile section downstream of the discharge point, See Figure 1.3 CWS Hydromodification Map. The development class of the site is "Developed Area" as the area was added to the Urban Growth area prior to 2002. The project is over 80,000 square feet and is classified as large.

Based on the above assessment, the project is a Developed Large Project with Moderate Risk level. Per CWS Table 4-2 the site is Category 2. CWS Chapter 4, Section 4.03.5.b lists acceptable methods of addressing the Hydromodification requirements. No downstream conveyance capacity issues exist thus the Panzer site will utilize option 2 "Peak-Flow Matching Detention, using design criteria described in Section 4.08.6". Since the project impervious area to be replaced is over 12,000 SF, 50% of the 2-year, 24-hour storm for pre-developed is the post-developed 2-year peak flow limit.

Figure 1.3 CWS Hydromodification Map



Section 2 – Soils

2.0 Soil Summary

The underlying soil type on the project and surrounding areas is classified by the United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey (see Appendix B). The site is classified as primarily Aloha Silt Loam with hydrologic soil group C/D and Verboort Silty Clay Loam classified as hydrologic soil group D. Soil groups C and D are used for design purposes as a majority of the site is soil group C/D and/or D. These soils generally exhibit moderate to low infiltration rates and relatively high runoff rates. Per the geotechnical studies that were done on the site, low infiltration was found in the tested areas. See Appendix C for the geotechnical report entitled "REPORT OF GEOTECHNICAL ENGINEERING SERVICES" prepared by NV5 Global Inc. and dated September 08, 2022.

2.1 Curve Numbers

The major factors in determining curve number (CN) values are hydrologic soil group, cover type, treatment, hydrologic condition, and the antecedent moisture condition. The curve numbers represent runoff potential from the soil and is taken from the City of Beaverton "Curve Number Selection Guidance" page 37 of the Engineering Design Manual using a soil group of "D". Since the existing site is comprised of impervious buildings and paved or graveled paths (CN 98), all impervious surfaces were used for pre-developed conditions for the 25- and 100-Year Storms. For the 2-Year and 10-Year Pre-Existing conditions, Woods in Fair condition (CN 75) will be used to satisfy City of Beaverton Standards. The post developed site will incorporate landscaped areas and impervious surfaces. For landscape areas, open space in good condition (CN 90) and Impervious (CN 98) were used.

2.2 Time of Concentration

The time of concentration (TOC) as describe in the National Engineering Handbook, is defined in two ways; the time for runoff to travel from the furthermost point of the watershed to the point in question, and the time from the end of excess rainfall to the point of inflection on the trailing limb of the unit hydrograph. Time of concentration can be estimated from several formulas. The Clean Water Services guidelines, which are based on the SCS method documented in the report, "Technical Release 55: Urban Hydrology for Small Watersheds" were used in this analysis. The minimum time of concentration recommended by Clean Water Services is 5 minutes in highly developed urban areas and the maximum is 100 minutes in rural areas. Three components are considered for determining the Tc: sheet flow, shallow concentrated flow, and channel or pipe flow.

Pre-developed time of concentration for the 2-, 5-, 10-, and 25-year return periods is based off of the current site conditions and equates to 15 minutes. The post-developed time of concentration has been assumed to be 5 minutes, the minimum allowable, as this Time of Concentration will provide a conservative design approach for post developed conditions.

Section 3 – Water Quality Analysis

3.0 Water Quality Summary

The water quality facilities have been designed per Clean Water Services standards to facilitate the treatment of all storm water runoff from the proposed impervious surfaces. The facilities were designed using a rainfall of 0.36 inches over a 3-hour period. Per the CWS design manual, the total of the new impervious areas will be used to calculate water quality volume and flow from the water quality facility. The total impervious surface area is as outlined in Table 4.1.

3.1 Water Quality

Water quality will be achieved through the use of water quality planters, a water quality swale, a water quality and detention pond and storm filter vaults. Each system will have a pre-treatment (sumped and oil separated) structure such as a sumped catch basin or water quality manhole prior to discharge to the treatment facility. Apartment buildings on the west and north side of the site will utilize water quality planters, the single-family homes will use the proposed water quality swale located in the park open space area, and the townhomes will utilize a storm filter vault. For the impervious area treated and basin routing to each structure see Table 4.1.

Structural Flow-Through Planters

Before being conveyed to the underground detention system, runoff will be directed through water quality planters to treat the water quality storm flows. The site has very low infiltration rates and a factor of safety of 2 was used when applying infiltration to the private storm planters.

Private Planters

The private storm planters are located in the two apartment complexes. Street side flow through planters are utilized on the private Streets B1 and B2 and treat runoff from the paved areas that sheet flow to the planters. After treatment, runoff from both the apartment complexes and the private streets flow to the underground detention system.

Public Planters

Structural flow through planters are proposed at the western end of SW Stepping Stone Drive. This planter has the capacity to treat 8074 square feet of impervious area. Only 2265 square feet of new sidewalk is being replaced along the south side of the road. The planters are sized to treat an additional 5809 square feet of impervious area runoff from existing untreated pavement that will remain in place. SW 185th Avenue improvements include a 6-foot wide sidewalk totaling 5269 square feet. The additional pavement treated in SW Stepping Stone Drive will offset the new sidewalk on SW 185th. All of the storm planters are designed to fully treat the water quality storm and safely convey the 100-year storm.

StormFilter Vault

One privately owned and maintained StormFilter Vault will be installed on site to treat the water quality storm for the central townhome basin. The central vault will be 6' x 8' and is designed to treat the runoff from the water quality storm and bypass larger storms.

Extended Dry Basin

The single water quality and detention pond located in the southwest corner of the site will receive runoff from A Street and the southern single family home lots. The pond will have a 0.20-foot permanent pool and a water surface depth of less than 0.5 feet during the water quality storm event. The pond also detains larger storms (see Section 4) and will safely pass the 100-Year storm event without overtopping (see HydroCAD calculations Appendix D).

Vegetated Swale

The single vegetated swale located south of the neighborhood park will receive runoff from the eastern single family home lots and road network. The swale will have a water surface depth of less than 0.33 feet during the water quality storm event and will bypass the larger storm events through a bypass manhole located at the upstream end (see calculations Appendix D).

Table 3.1 Basin Summary

Basin	Impervious Area (AC/SF)	Pervious Area (AC/SF)	Total Area (AC/SF)	Water Quality Structure	Water Quantity Structure
East Single Family	6.10 / 264,845	3.69 / 160,579	9.80 / 425,424	Water Quality Swale	Underground Detention-Primary
South Single Family	0.90 / 37,878	0.80 / 35,024	1.50 / 72,902	Water Quality Pond	Water Quality Pond – South
North Apartments	2.46 / 110,287	0.48 / 21,105	3.00 / 131,392	Water Quality Planter(s)	Underground Detention-North
West Apartments	3.76 / 164,095	0.72 / 31,169	4.50 / 195,264	Water Quality Planter(s)	Underground Detention-West
Town Homes	1.84 / 83,094	0.68 / 29,451	2.54 / 112,545	StormFilter Vault – Center	Underground Detention-Primary
Street A	1.12 / 111,636	0.51 / 22,187	1.22 / 133,823	Water Quality Pond	Water Quality Pond - South
Street B1 & B2	1.58 / 68,209	0.18 / 8,004	1.69 / 76,213	Water Quality Planters	Underground Detention-Primary
TOTAL=	19.28	7.06	26.34		
SW 185th Ave	5269 (added)	Offset by over-treatment on Stepping Stone			N/A
Stepping Stone Dr	2265 (replaced)		Planters that treat 8074 SF		N/A
SW Baseline Road			Existing Treatment in place		

Section 4 – Water Quantity Analysis

4.0 Water Quantity Summary

The water quantity facilities have been designed per Clean Water Services standards to facilitate the detention of all storm water runoff from the proposed improvements. The detention systems consist of 60-inch diameter SaniTite® Polypropylene Drainage Pipe with a minimum 100-year service life. The facilities were designed so proposed conditions match the peak discharge of the pre-existing conditions for 50% of the 2-year, 24-hour storm, and matching the 5-, 10-, and 25-year storm events as well as safely pass the 100-year event.

Any excess runoff from the 100-year or larger storm will sheet flow from the site to the existing right of way on SW Stepping Stone Dr. and SW 185th Ave. Table 4.1 Summarizes the Basins the site is divided into, their contributing areas and the downstream structures. Detention structure elevations are shown in Table 4.2 while Table 4.3 details the flow control structure and pond elevations and orifice locations. The Proposed Utilities map can be found in Appendix A.

Table 4.1 Flow Control Detail

Flow Control Structure	Orifice Size and Elevation			Top of Storage	Peak Elevation	Structure Footprint
	WQ	#1	Overflow			
North Underground Detention	N/A	2.8”@180.00	12”@186.46	187.50	187.22	13.0’ x 62.0’ x 7.5’
Primary Underground Detention	N/A	7”@180.00	18”@186.00	187.50	187.36	13.0’ x 142.0’ x 7.5’
West Underground Detention	N/A	3”@181.00	15”@187.55	188.50	188.42	19.0’ x 102.0’ x 7.5’
Storm Pond – South	1.5” @ 182.20	2.4”@183.15	12”@185.90	189.0	186.55	5456 SF

Based on the above structure and basin information, Table 4.2 below summarizes the pre-construction and post-construction discharge rates. Calculations and routing can be found in Appendix D.

Table 4.2 Water Quantity Discharge Summary

Storm Event	Pre-Developed Flow (cfs)	Post-Developed Flow (with Detention) (cfs)
2-Year	8.93	4.46 (50% of the pre-developed 2-yr)
5-Year	12.41	10.14
10-Year	14.48	13.12
25-Year	17.15	17.27

Final Conveyance Calculations and an Operations and Maintenance Manual will be prepared during final Site Development Permitting review.

Section 5 – Conclusion

5.0 Summary

The purpose of this report is to show that City of Beaverton and Clean Water Services requirements will be met for the project and to present the methodology and calculations used. The stormwater system is designed to treat the water quality storm, detain and discharge runoff to match pre-existing conditions for 50% of the 2-year and 100% of the 5-, 10-, and 25-year storm events, and safely convey the 100-year storm.

References

- City of Beaverton “Engineering Design Manual”, 2019
- Clean Water Services (CWS) “Design & Construction standards”, December 2019.
- NOAA Atlas2, Volume 10
- SCS Technical Release 55: Urban Hydrology for Small Watersheds

Appendix A

Site Plan

Existing Conditions Plan

Existing Impervious Area Exhibit

Utility Plans

STANDRIDGE
PLANNING | ENGINEERING | SURVEYING

ZONING & DENSITY

ZONING — STATION COMMUNITY-MIXED USE

GROSS AREA——26.60 AC
LESS PUBLIC ROW——5.32 AC
LESS PRIVATE STREETS——0.65 AC
LESS ALLEYWAYS——1.47 AC
LESS PARKING DRIVE ISLES——1.75 AC
NET AREA——17.41 AC

MINIMUM DENSITY——17.41 AC @ 24 UNITS/AC——418 UNITS

MAXIMUM DENSITY——NONE

PARKING

SITE LOCATOIN	PARKING TYPE	ON-STREET	STANDARD GUEST	GARAGE	DRIVEWAY	TOTAL	RATIO PER UNIT
	MULTI-FAMILY NORTH (140 UNITS)	4	88	60	60	212	1.51
	MULTI-FAMILY WEST (208 UNITS)	2	136	90	90	318	1.53
	TOWNHOMES (62 UNITS)	21	4	124	0	149	2.40
	SINGLE FAMILY (123 UNITS)	99	5	246	52	402	3.27
	MAINSTREET COMMERCIAL (17,736 SF)	84	N/A	N/A	N/A	84	1/211 SF
	TOTAL	210	233	520	202	1165	2.19

UNIT COUNT

DESCRIPTION	# OF UNITS PER BUILDING	# OF BUILDINGS	TOTAL UNITS
FRONT LOADED SINGLE FAMILY (PLAN 3004)	1	13	13
FRONT LOADED SINGLE FAMILY (PLAN 3014)	1	13	13
ALLEY LOADED SINGLE FAMILY (PLAN 2410)	1	50	50
ALLEY LOADED SINGLE FAMILY (PLAN 2650)	1	47	47
MIXED USE MAIN STREET*	36	4	144
4 STORY APARTMENTS	34	6	204
5-PLEX ALLEY TOWNHOME (F22&E16)	5	5	25
4-PLEX ALLEY TOWNHOME (F22&E16)	4	4	16
3- PLEX ALLEY TOWNHOME (F22&E16)	3	7	21
TOTAL			533

*TOTAL COMMERCIAL RETAIL ALONG MAIN STREET IS 17,736 SF.

LAND USE LEGEND

SYMBOL	DESCRIPTION	AREA (SQUARE FEET)	AREA (ACRES)	% OF SITE
	BUILDING FOOTPRINT	331707	7.61	28.62%
T	TRASH ENCLOSURE	1350	0.03	0.12%
	PUBLIC STREET - ROW	231689	5.32	19.99%
	PRIVATE STREET/ALLEYS/ DRIVE AISLES	168456	3.87	14.54%
	SIDEWALKS / WALKWAYS	41772	0.96	3.60%
	GUEST PARKING	81477	1.87	7.03%
	LANDSCAPE	270597	6.21	23.35%
	PRIVATE DRIVEWAY	20591	0.47	1.78%
	STORM PLANTER/POND	11197	0.26	0.97%
TOTAL		1158836	26.60	100.00%

PREPARED BY:
STANDRIDGE
PLANNING | ENGINEERING | SURVEYING
WWW.STANDRIDGEINC.COM

PREPARED FOR:
NEW HOME CO.
move forward

REGISTERED PROFESSIONAL ENGINEER
76,742
PRELIMINARY
OREGON
MARCH 3, 2005
LAURA KENDALL STANDRIDGE
EXPIRES 6-30-24

DEVELOPEMENT PLAN

PANZER MIXED USE
BEAVERTON, OREGON

PROJECT NO.: SSB005
DESIGN BY: CDB
REVIEWED BY: LKS
DATE: 08/09/2023

SHEET

C010

SCALE: 1" = 80'
SHEET SIZE: 22x34
0 80 160

N

P:\SSB005-Panzer\5 Planning\Drawings\SSB005-Developement.dwg Aug 09, 2023 - 4:30pm

STONEWAY CONDOMINIUMS

SW STEPPING STONE DRIVE (COUNTY)(ASPHALT)

79.00' ROW

EXISTING ROW

5.00' SIDEWALK

8.00' RETAINING WALL EASEMENT

40.00' 1/2 ROW

50.00' 1/2 ROW

100.00' ROW

112.00' ROW

56.00' 1/2 ROW

SW 185TH AVENUE (COUNTY)(ASPHALT)

EXISTING ROW

50.00' 1/2 ROW

100.00' ROW

WATER TANK

PUMP BUILDING (1833 SF)

GRAVEL ENTRANCE

22.00' 1/2 ROW

61.00' ROW

74.00'

2' UTILITY EASEMENT

5.00' UTILITY EASEMENT

92.00' ROW

49.00' 1/2 ROW

6.00' SIDEWALK

EXISTING ROW

W BASELINE ROAD (COUNTY)(ASPHALT)

23.13'

PAVED SITE ENTRANCE

EXISTING BOUNDARY

49.36'

PAVED SITE ENTRANCE

50.00' ROW

25.00' 1/2ROW

EXISTING ROW

SW 179TH AVE (COUNTY)(ASPHALT)

50.00' EX. ROW

GREENHOUSE (TYPICAL)

GREENHOUSE (TYPICAL)

COMM. BUILDING (2800 SF)

OFFICE BUILDING (13,119 SF)

ASPHALT PARKING LOT (35 SPACES)

COMMERCIAL BUILDING (1390 SF)

TAX LOT 3600
574,560 SF

TAX LOT 3700
584,266 SF

16.00' ELECTRIC POWER LINE EASEMENT

GAS METER

SHOP / WAREHOUSE BUILDING (16,447 SF)

COMMERCIAL BUILDING (3443 SF)

EXISTING BOUNDARY

WETLAND BUFFER

WETLAND BOUNDARY

GARAGE

TAX LOT 3702
84,368 SF

HOUSE

GREENHOUSES (TYPICAL)

GREENHOUSE (TYPICAL)

15' SANITARY SEWER EASEMENT

SW 181ST AVENUE (COUNTY)(ASPHALT)

EXISTING GAS SERVICE

SW 184TH AVENUE (COUNTY)(ASPHALT)

SW 182ND AVENUE (COUNTY)(ASPHALT)

44.00' ROW

44.00' ROW

LOT 4 LOT 5 LOT 6 LOT 7 LOT 8 LOT 9 LOT 10 LOT 11

LOT 28 LOT 29 LOT 30 LOT 31 LOT 32 LOT 33 LOT 34 LOT 35

LOT 36

LOT 37

LOT 38

SW LONGACRE STREET (COUNTY)(ASPHALT)

44.00' ROW

50.00' ROW

LOT 6 LOT 1 LOT 16 LOT 17

LOT 9

LOT 10

LOT 11

LOT 12

LOT 13

LOT 14

LOT 15

LOT 16

LOT 17

LEGEND

- 276 EXISTING CONTOUR (MAJOR)
- 276 EXISTING CONTOUR (MINOR)
- BOUNDARY LINE
- SSMH - SANITARY SEWER MANHOLE
- SDMH - STORM DRAINAGE MANHOLE
- CB - CATCH BASIN
- WV - WATER VALVE
- FH - FIRE HYDRANT
- WTR WATER LINE
- SS SANITARY SEWER LINE
- SD STORM SEWER LINE
- GV - GAS VALVE
- GAS NATURAL GAS LINE
- PP - POWER POLE
- LP - LIGHT POLE
- OHL OVERHEAD WIRES
- FENCE LINE

PREPARED BY:
STANDRIDGE
PLANNING | ENGINEERING | SURVEYING
WWW.STANDRIDGEINC.COM

PREPARED FOR:
NEW HOME CO.
move forward

REGISTERED PROFESSIONAL ENGINEER
76,742
OREGON
LAURA KENDALL STANDRIDGE
MARCH 3, 2005
PRELIMINARY
EXPIRES 6-30-24

EXISTING CONDITIONS PLAN

PANZER MIXED USE
BEAVERTON, OREGON

PROJECT NO.:	SSB005
DESIGN BY:	CDB
REVIEWED BY:	LKS
DATE:	08/09/2023

SHEET

C001

SCALE: 1" = 60'
SHEET SIZE: 22x34
0 60 120

N

P:\SSB005-Panzer\5 Planning\Drawings\SSB005-Existing.dwg Aug 09, 2023 - 4:29pm

IMPERVIOUS/PERVIOUS AREA TABLE

DESCRIPTION	PERCENT IMPERVIOUS	TOTAL IMPERVIOUS (SF)	TOTAL PERVIOUS (SF)	TOTAL AREA (SF)
GREENHOUSES	20	170263	681053	851316
BUILDINGS	100	42564	0	42564
CONCRETE PAVING	100	31419	0	31419
ASPHALT PAVING	100	35424	0	35424
GRAVEL FOR MOTOR VEHICLES	100	23758	0	23758
GRAVEL FOR SMALL VEHICLE ACCESS	40	3827	5740	9567
GRAVEL MATERIAL STORAGE	20	6710	26842	33552
GRAVEL/DIRT NOT ACCESSED BY MOTOR VEHICLES	0	0	131226	131226
TOTAL	0	313965	844861	1158826

SD

GARAGE

HOUSE

190.14'

191.06'

N

0 120 240

SCALE: 1" =120'
SHEET SIZE: 11x17

PREPARED BY:
STANDRIDGE
PLANNING|ENGINEERING|SURVEYING
M 703 Broadway St, Suite 610
Vancouver, WA 98660
O 360.597.9240 F 888.750.4981
WWW.STANDRIDGEINC.COM

EXISTING IMPERVIOUS AREAS

PANZER MIXED USE
BEAVERTON, OREGON

PROJECT NO.:	SSB005
DESIGN BY:	CDB
REVIEWED BY:	LKS
DATE:	06/21/2023

SHEET

1

P:\SSB005-Panzer\5 Planning\Reports and Calculations\Hydrology\2023-07-12-Storm Report\2023-06-16-Impervious-Pervious breakdown.dwg Jul 12, 2023 - 4:44pm

NORTHWEST AREA

NORTHEAST AREA

SOUTHWEST AREA

SOUTHEAST AREA

W BASELINE ROAD

SW STEPPING STONE DRIVE

SW 185TH AVENUE

SW 184TH AVENUE

SW LONGACRE STREET

SW 182ND AVENUE

SW 181ST AVENUE

SW 179TH AVENUE

BUILDING 1

BUILDING 2

BUILDING 3

BUILDING 4

BUILDING 5

BUILDING 6

BUILDING 7

BUILDING 8

BUILDING 9

BUILDING 10

GARAGE

HOUSE

STREET A

STREET B1

STREET B2

STREET C

STREET D

STREET E

STREET F

STREET G

STREET H

STREET I

STREET G

PREPARED BY:
STANDRIDGE
PLANNING | ENGINEERING | SURVEYING
WWW.STANDRIDGEINC.COM

PREPARED FOR:
NEW HOME CO.
move forward

REGISTERED PROFESSIONAL ENGINEER
76,742
PRELIMINARY
OREGON
MARCH 3, 2005
LAURA KENDALL STANDRIDGE
EXPIRES 6-30-24

UTILITY PLAN - OVERALL

PANZER MIXED USE
BEAVERTON, OREGON

PROJECT NO.:	SSB005
DESIGN BY:	CDB
REVIEWED BY:	LKS
DATE:	08/09/2023

SHEET

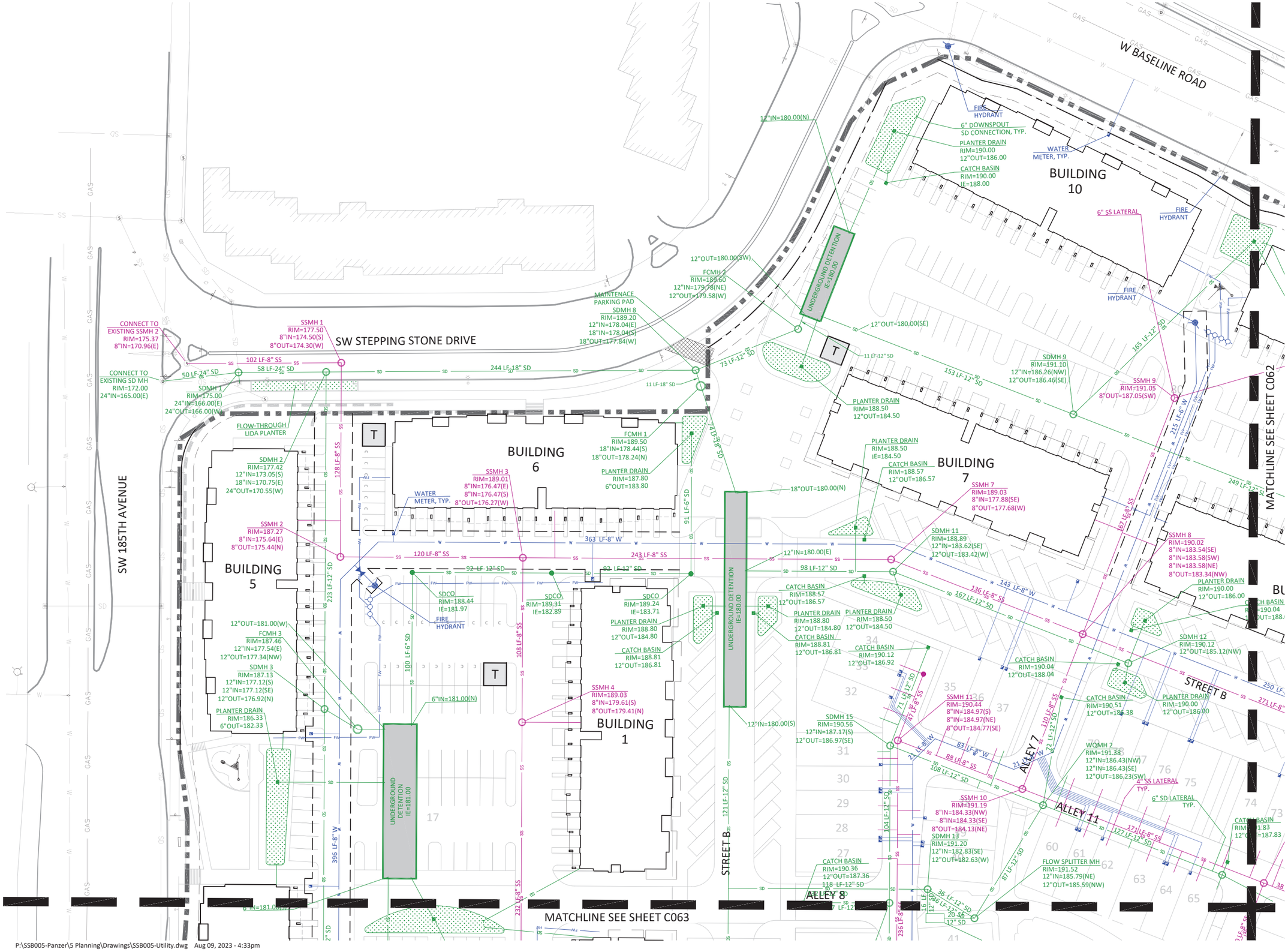
C060

SCALE: 1" = 60'
SHEET SIZE: 22x34

0 60 120

N

P:\SSB005-Panzer\5 Planning\Drawings\SSB005-Utility.dwg Aug 09, 2023 - 4:32pm



P:\SSB005-Panzer\5 Planning\Drawings\SSB005-Utility.dwg Aug 09, 2023 - 4:33pm

PREPARED BY:
STANDRIDGE
PLANNING | ENGINEERING | SURVEYING
WWW.STANDRIDGEINC.COM

PREPARED FOR:
NEW HOME CO.
move forward

REGISTERED PROFESSIONAL ENGINEER
76,742
PRELIMINARY
OREGON
MARCH 3, 2005
LAURA KENDALL STANDRIDGE
EXPIRES 6-30-24

UTILITY PLAN - NORTHWEST AREA

PANZER MIXED USE
BEAVERTON, OREGON

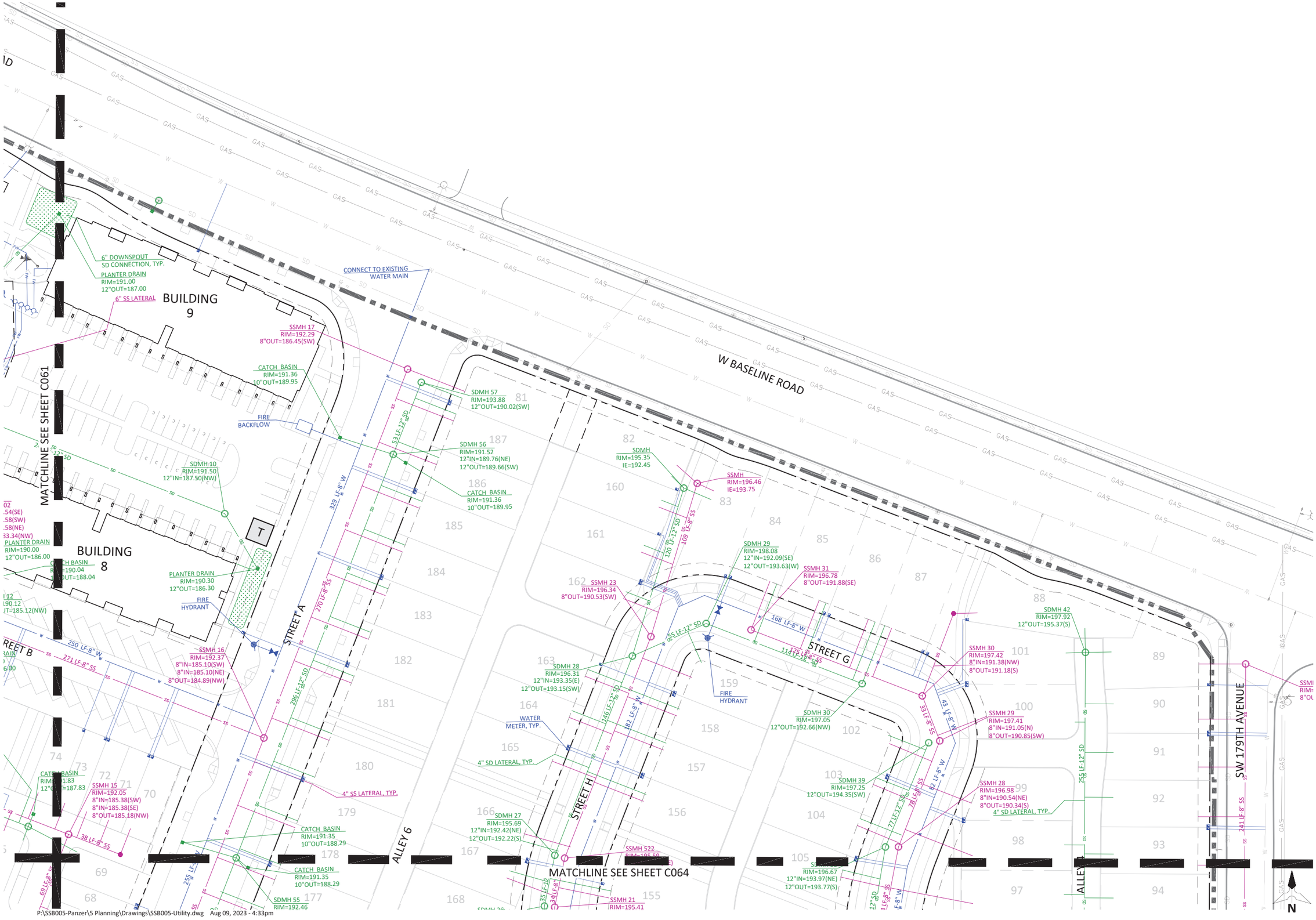
PROJECT NO.:	SSB005
DESIGN BY:	CDB
REVIEWED BY:	LKS
DATE:	08/09/2023

SHEET

C061

SCALE: 1" = 30'
SHEET SIZE: 22x34

0 30 60



P:\SSB005-Panzer\5 Planning\Drawings\SSB005-Utility.dwg Aug 09, 2023 - 4:33pm

PREPARED BY:
STANDRIDGE
PLANNING | ENGINEERING | SURVEYING
WWW.STANDRIDGEINC.COM

PREPARED FOR:
NEW HOME CO.
move forward

REGISTERED PROFESSIONAL ENGINEER
76,742
PRELIMINARY
OREGON
LAURA KENDALL STANDRIDGE
MARCH 3, 2005
EXPIRES 6-30-24

UTILITY PLAN - NORTHEAST AREA

PANZER MIXED USE
BEAVERTON, OREGON

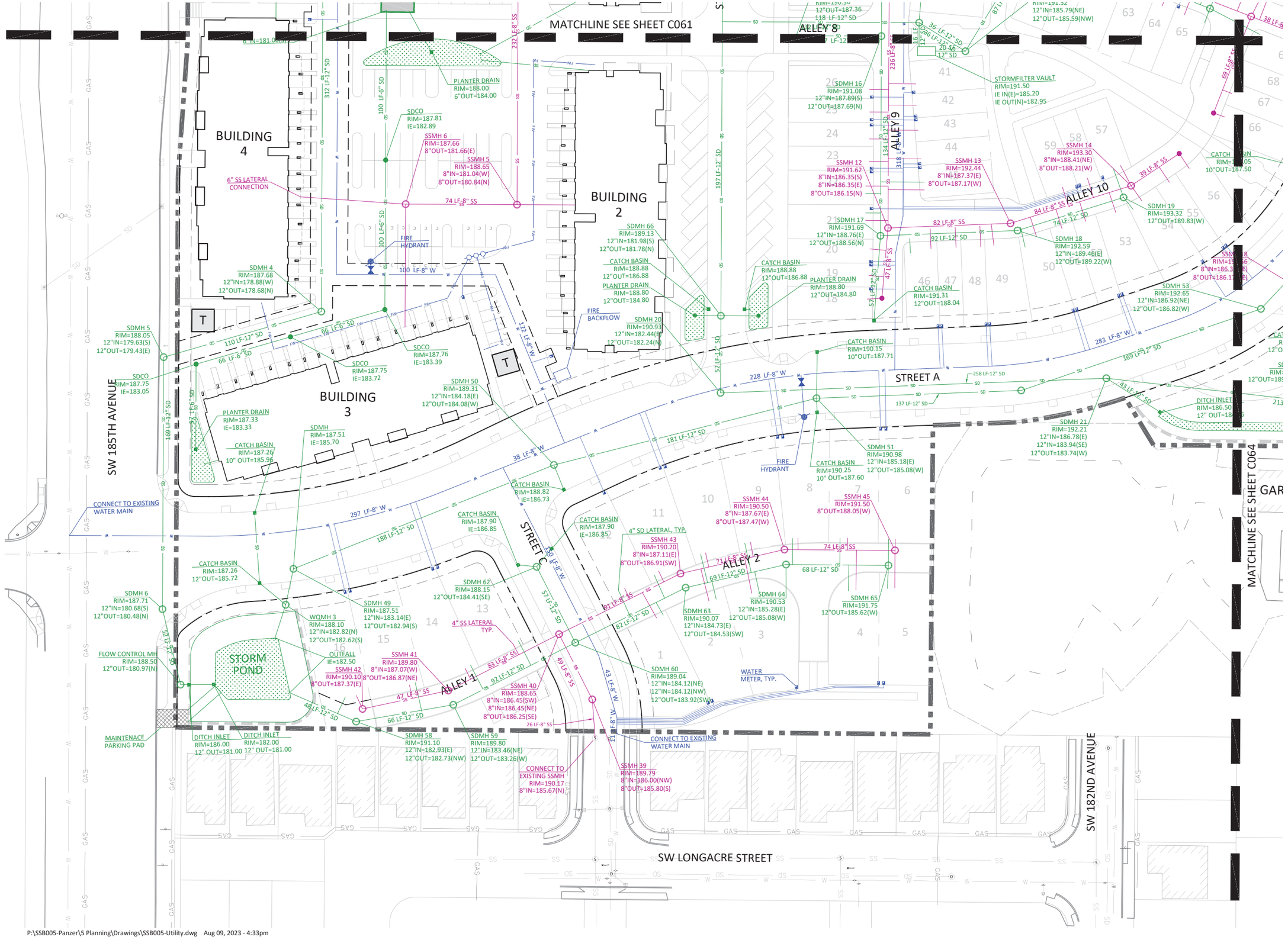
PROJECT NO.:	SSB005
DESIGN BY:	CDB
REVIEWED BY:	LKS
DATE:	08/09/2023

SHEET

C062

SCALE: 1" = 30'
SHEET SIZE: 22x34

0 30 60



P:\SSB005-Panzer\5 Planning\Drawings\SSB005-Utility.dwg Aug 09, 2023 - 4:33pm

PREPARED BY:
STANDRIDGE
PLANNING | ENGINEERING | SURVEYING
WWW.STANDRIDGEINC.COM

PREPARED FOR:
NEW HOME CO.
move forward

REGISTERED PROFESSIONAL ENGINEER
76,742
OREGON
LAURA KENDALL STANDRIDGE
MARCH 3, 2005
PRELIMINARY
EXPIRES 6-30-24

UTILITY PLAN - SOUTHWEST AREA

PANZER MIXED USE
BEAVERTON, OREGON

PROJECT NO.:	SSB005
DESIGN BY:	CDB
REVIEWED BY:	LKS
DATE:	08/09/2023

SHEET

C063

SCALE: 1" = 30'
SHEET SIZE: 22x34

0 30 60

N

MATCHLINE SEE SHEET C062

MATCHLINE SEE SHEET C063

ALLEY 6

ALLEY 5

ALLEY 3

STREET D

STREET E

STREET F

STREET G

STREET I

SW 179TH AVENUE

SW 181ST AVENUE

CATCH BASIN
RIM=191.35
10"OUT=188.29

CATCH BASIN
RIM=191.35
10"OUT=188.29

SDMH 55
RIM=192.46
12"IN=188.18(NE)
12"OUT=188.08(SW)

CATCH BASIN
RIM=187.05
10"OUT=187.50

SDMH 54
RIM=192.46
12"IN=187.49(NE)
12"OUT=187.39(SW)

CATCH BASIN
RIM=192.10
10"OUT=187.50

SSMH 19
RIM=193.18
8"IN=186.95(E)
8"OUT=186.75(NW)

SSMH 18
RIM=193.66
8"IN=186.36(E)
OUT=186.16(W)

CATCH BASIN
RIM=191.93
10"OUT=190.00

SDMH 22
RIM=193.02
12"IN=189.53(NW)
12"IN=189.53(E)
12"OUT=189.33(S)

FLOW SPLITTER MH
RIM=193.67
12"IN=189.15(E)
12"IN=189.15(N)
12"OUT=188.95(W)

CATCH BASIN
RIM=191.93
12"OUT=189.91

SDMH 23
RIM=193.67
12"OUT=189.81(SE)

FSMH 1
RIM=192.57
12"IN=188.91(E)
12"IN=188.91(W)
12"OUT=188.71(S)

CATCH INLET
RIM=186.50
2" OUT=185.

12"IN=188.67(N)

MAINTENACE
PARKING PAD

CATCH BASIN
RIM=192.87
10" OUT=189.61

SDMH 43
RIM=193.95
12"IN=189.50(S)
12"OUT=189.30(W)

CATCH BASIN
RIM=192.87
10" OUT=189.61

RIM=195.69
12"IN=192.42(NE)
12"OUT=192.22(S)

SSMH 52
RIM=195.59
8"OUT=189.52(S)

SDMH 26
RIM=195.26
12"IN=192.05(N)
12"OUT=191.85(S)

SSMH 21
RIM=195.41
8"IN=189.35(N)
8"OUT=189.15(S)

CATCH BASIN
RIM=194.74
10"OUT=191.45

CATCH BASIN
RIM=194.74
10"OUT=191.45

SDMH 25
RIM=194.83
12"IN=191.34(N)
12"OUT=191.14(S)

SSMH 20
RIM=196.24
8"IN=187.98(E)
8"IN=187.98(N)
8"OUT=187.78(W)

FIRE
HYDRANT

SDMH 24
RIM=195.20
12"IN=190.74(N)
12"IN=190.74(E)
12"OUT=190.54(W)

CATCH BASIN
RIM=192.87
10" OUT=189.61

CATCH BASIN
RIM=193.58
10"OUT=191.12

WATER
METER, TYP.

4" SD LATERAL, TYP.

4" SS LATERAL, TYP.

SSMH 35
RIM=194.34
8"IN=189.41(E)
8"OUT=189.21(S)

SDMH 44
RIM=195.17
12"IN=190.57(E)
12"OUT=190.37(N)

CATCH BASIN
RIM=193.00
10"IN=191.03
12"OUT=190.83

SDMH 45
RIM=195.01
12"IN=191.01(E)
12"OUT=190.81(W)

CATCH BASIN
RIM=193.58
10"OUT=191.12

CATCH BASIN
RIM=193.13
10"OUT=191.13

CONNECT TO
EXISTING SSMH 1
RIM=194.43
8"IN=188.79(N)

CONNECT TO EXISTING
WATER MAIN

SDMH 37
RIM=198.01
12"IN=193.41(N)
12"OUT=193.41(S)

SSMH 26
RIM=196.98
8"IN=189.67(N)
8"IN=189.67(E)
8"OUT=189.47(S)

CATCH BASIN
RIM=196.18
10"OUT=191.18

SDMH 36
RIM=196.31
12"IN=193.16(N)
12"IN=193.16(E)
12"OUT=192.96(S)

SDMH 35
RIM=197.39
12"IN=192.79(N)
12"OUT=192.59(S)

CATCH BASIN
RIM=195.98
10"OUT=191.91

SDMH 31
RIM=196.09
12"IN=191.81(E)
12"OUT=191.61(W)

CATCH BASIN
RIM=195.98
10"OUT=191.91

CATCH BASIN
RIM=196.88
10"OUT=192.71

SDMH 33
RIM=197.21
12"IN=192.61(S)
12"OUT=192.41(N)

SDMH 34
RIM=199.15
12"OUT=194.19(N)

SSMH 36
RIM=199.25
8"IN=191.08(SE)
8"OUT=190.88(W)

SSMH 27
RIM=196.61
8"IN=190.04(N)
8"OUT=189.84(S)

CATCH BASIN
RIM=195.19
10"OUT=192.00

SSMH 32
RIM=198.07
8"IN=190.87(N)
8"OUT=190.67(W)

CONNECT
TO EXISTING
WATER MAIN

FIRE
HYDRANT

CATCH BASIN
RIM=196.37
10"OUT=191.37

SDMH 40
RIM=197.86
12"IN=193.40(E)
12"OUT=193.40(W)

CATCH BASIN
RIM=195.19
10"OUT=192.00

SDMH 41
RIM=196.14
12"IN=194.09(N)
12"OUT=193.89(W)

SSMH 24
RIM=196.93
8"IN=189.06(S)
8"IN=189.06(N)
8"OUT=188.86(W)

SDMH 32
RIM=197.46
12"IN=192.24(S)
12"IN=192.24(N)
12"OUT=192.04(W)

CATCH BASIN
RIM=196.88
10"OUT=192.71

SSMH 25
RIM=199.31
8"OUT=191.97(N)

SSMH 37
RIM=193.32
8"IN=192.00(S)
8"OUT=191.80(NW)

SDMH 46
RIM=200.25
12"IN=194.64(SE)
12"OUT=196.25(W)

SDMH 47
RIM=196.70
12"IN=195.04(S)
12"OUT=194.84(NW)

SDMH 48
RIM=197.18
12"OUT=195.32(N)

SSMH 38
RIM=201.10
8"OUT=192.26(N)

38 LF-8" SS
69 LF-8" SS
255 LF-8" SS
269 LF-8" SS
119 LF-12" SD
95 LF-12" SD
50 LF-8" W
96 LF-8" SS
71 LF-8" W
56 LF-12" SD
44 LF-8" W
163 LF-8" W
96 LF-8" SS
201 LF-12" SD
221 LF-8" SS
229 LF-8" W
175 LF-12" SD
46 LF-12" SD
213 LF-12" SD
7 LF-12" SD
8 LF-12" SD
32 LF-12" SD
30 LF-12" SD
217 LF-8" W
175 LF-12" SD
35 LF-12" SD
24 LF-8" SS
104 LF-12" SD
174 LF-8" SS
163 LF-8" W
81 LF-12" SD
102 LF-8" SS
69 LF-12" SD
33 LF-12" SD
72 LF-12" SD
74 LF-8" SS
72 LF-8" W
43 LF-8" SS
50 LF-12" SD
33 LF-12" SD
130 LF-8" W
253 LF-8" W
250 LF-8" SS
97 LF-12" SD
241 LF
194 LF-8" SS
220 LF-8" W
150 LF-12" SD
392 LF-8" W
367 LF-8" SS
353 LF-12" SD
329 LF-12" SD
48 LF-8" SS
39 LF-12" SD
52 LF-8" SS
55 LF-12" SD
47 LF-12" SD
52 LF-8" SS
116 LF-8" W
105 LF-8" SS

PREPARED BY:
STANDRIDGE
PLANNING | ENGINEERING | SURVEYING
WWW.STANDRIDGEINC.COM

PREPARED FOR:
NEW HOME CO.
move forward

REGISTERED PROFESSIONAL ENGINEER
76,742
OREGON
PRELIMINARY
MARCH 3, 2005
LAURA KENDALL STANDRIDGE
EXPIRES 6-30-24

UTILITY PLAN - SOUTHEAST AREA

PANZER MIXED USE
BEAVERTON, OREGON

PROJECT NO.:	SSB005
DESIGN BY:	CDB
REVIEWED BY:	LKS
DATE:	08/09/2023

SHEET

C064

SCALE: 1" = 30'
SHEET SIZE: 22x34

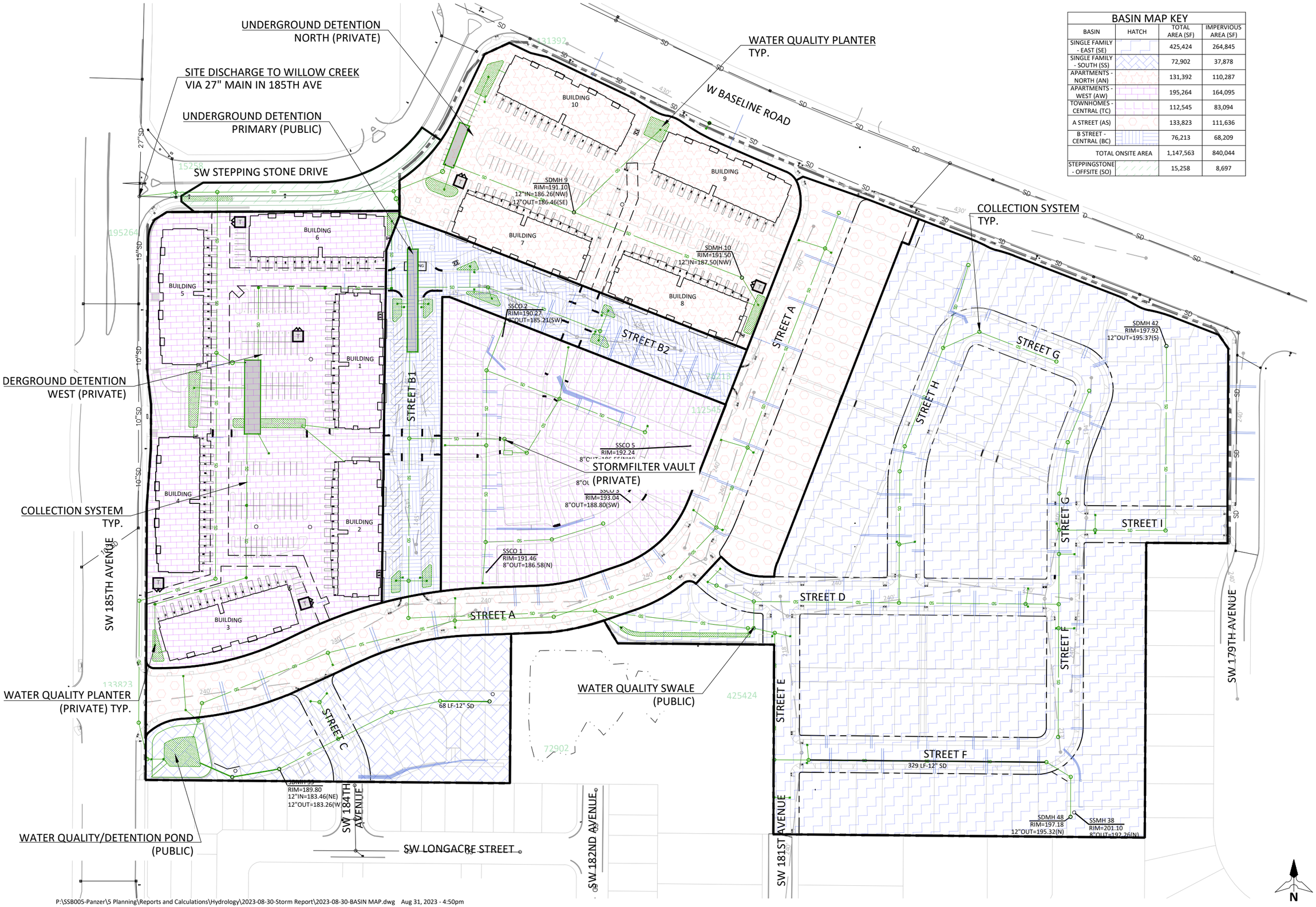
0 30 60

N

P:\SSB005-Panzer\5 Planning\Drawings\SSB005-Utility.dwg Aug 09, 2023 - 4:33pm

Appendix B

Basin Map



BASIN MAP KEY

BASIN	HATCH	TOTAL AREA (SF)	IMPERVIOUS AREA (SF)
SINGLE FAMILY - EAST (SE)		425,424	264,845
SINGLE FAMILY - SOUTH (SS)		72,902	37,878
APARTMENTS - NORTH (AN)		131,392	110,287
APARTMENTS - WEST (AW)		195,264	164,095
TOWNHOMES - CENTRAL (TC)		112,545	83,094
A STREET (AS)		133,823	111,636
B STREET - CENTRAL (BC)		76,213	68,209
TOTAL ONSITE AREA		1,147,563	840,044
STEPPINGSTONE - OFFSITE (SO)		15,258	8,697

PREPARED BY:
STANDRIDGE
PLANNING | ENGINEERING | SURVEYING
WWW.STANDRIDGEINC.COM

PREPARED FOR:
NEW HOME CO.
move forward

REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 3, 2006
LUKAS KENDALL STANDRIDGE
LAND FOR CONSTRUCTION
EXPIRES 6-30-24

HYDROLOGY - BASIN MAP

PANZER MIXED USE

PROJECT NO.:	SSB005
DESIGN BY:	CDB
REVIEWED BY:	LKS
DATE:	08/30/20

EXHIBIT:

A

SCALE: 1" = 60'
SHEET SIZE: 22x34

0 60

N

P:\SSB005-Panzer\5 Planning\Reports and Calculations\Hydrology\2023-08-30-Storm Report\2023-08-30-BASIN MAP.dwg Aug 31, 2023 - 4:50pm

Appendix C

Department of Agriculture

Natural Resources Conservation

Web Soil Survey

STANDRIDGE

PLANNING | ENGINEERING | SURVEYING

Custom Soil Resource Report
Soil Map

Map Scale: 1:3,720 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

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 Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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: Washington County, Oregon
Survey Area Data: Version 22, Sep 14, 2022

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

Date(s) aerial images were photographed: Apr 16, 2021—Apr 18, 2021

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Aloha silt loam	38.6	72.2%
37C	Quatama loam, 7 to 12 percent slopes	2.4	4.4%
37D	Quatama loam, 12 to 20 percent slopes	0.5	1.0%
2027A	Verboort silty clay loam, 0 to 3 percent slopes	8.8	16.5%
2225A	Huberly silt loam, 0 to 3 percent slopes	3.2	5.9%
Totals for Area of Interest		**53.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

Appendix D

Geotechnical Report

(included under separate cover)

STANDRIDGE
PLANNING | ENGINEERING | SURVEYING

Appendix E

Water Quality Calculations

HydroCAD Calculations

STANDRIDGE
PLANNING | ENGINEERING | SURVEYING

STANDRIDGE
PLANNING | ENGINEERING | SURVEYING

Project: Panzer Mixed Use Development
Date: August 31, 2023
Subject: Water Quality Calculations
Prepared By: Standridge Inc.

Swale Calculations

Input Data	Impervious Area	6.08	Acres	
	WQ Volume	**7945**	**ft3**	
	WQ Flow	**0.74**	**cfs**	
Reach 1	Width	5.50	ft	(2 ft min)
	Side Slope Ratio	4.00		(4H:1V max)
	Channel Slope	0.0150	ft/ft	(0.0050 ft/ft min)
	Length	174	ft	(100 ft min)
	Manning "n"	0.24		
Water Quality Swale Design				
Reach #1	ocity	**0.32**	**fps**	
	Flow Depth	**0.33**	**ft**	(0.33 ft max)
	Travel Time for Segment(min)	**9.0**	**min**	
	Total Residence time(min)	**9.0**	**min**	(9.0 minutes min)
Water Quality Manhole Design				
	WQ Manhole Dia	60	inches	(60", 72", or 84")
	25 Year Q	3.58	cfs	
	Sump Volume Required	**72**	**cf**	(20cf per 1 cfs of 25yr flow)
	Manhole Area	**19.6**	**ft2**	
	Sump Depth Required	**3.6**	**ft**	(5ft min) + snout depth

STANDRIDGE
PLANNING | ENGINEERING | SURVEYING

Project: Panzer Mixed Use Development
Date: August 31, 2023
Subject: Water Quality Calculations
Prepared By: Standridge Inc.

Pond Calculations

Water Quality Volume Calculations

Treated Impervious Surface	**6.080**	**Ac**
Water Quality Storm Depth	0.36	in
Volume = Depth * New Imp. Surface =	2.19	Acre-Inch
=	**7945**	**cf**

Water Quality Flow Calculations

Volume =	7945	cf
Duration =	48	hr
Q = Volume / Duration =	165.5	cf/hr
=	**0.0460**	**cfs**

Water Quality Orifice Calculations

Q=	0.0460	cfs	
C = Orifice Coeficient =	0.62		Constant
g = gravitational acceleration =	32.2	ft/sec/sec	Constant
H = temporary Detention height to CL of Orifice =	0.94	ft	From Hydrocad
h = 2/3 H =	0.63	ft	
Orifice Dia. = 24*(Q / (C * (2 * g * h)^ 0.5) / pi)^ 0.5 =	**1.46**	in	

Water Quality Manhole Design

WQ Manhole Dia	60	inches	(60", 72", or 84")
25 Year Q (after flow split)	1.88	cfs	From Hydrocad Flow Split Calcs
Sump Depth Required	**38**	**cf**	(20 x Q-25yr)
Manhole Area	**19.6**	**ft2**	
Sump Required	**1.9**	**ft**	(3ft min, 5ft max)

Summary for Subcatchment E: Existing Site

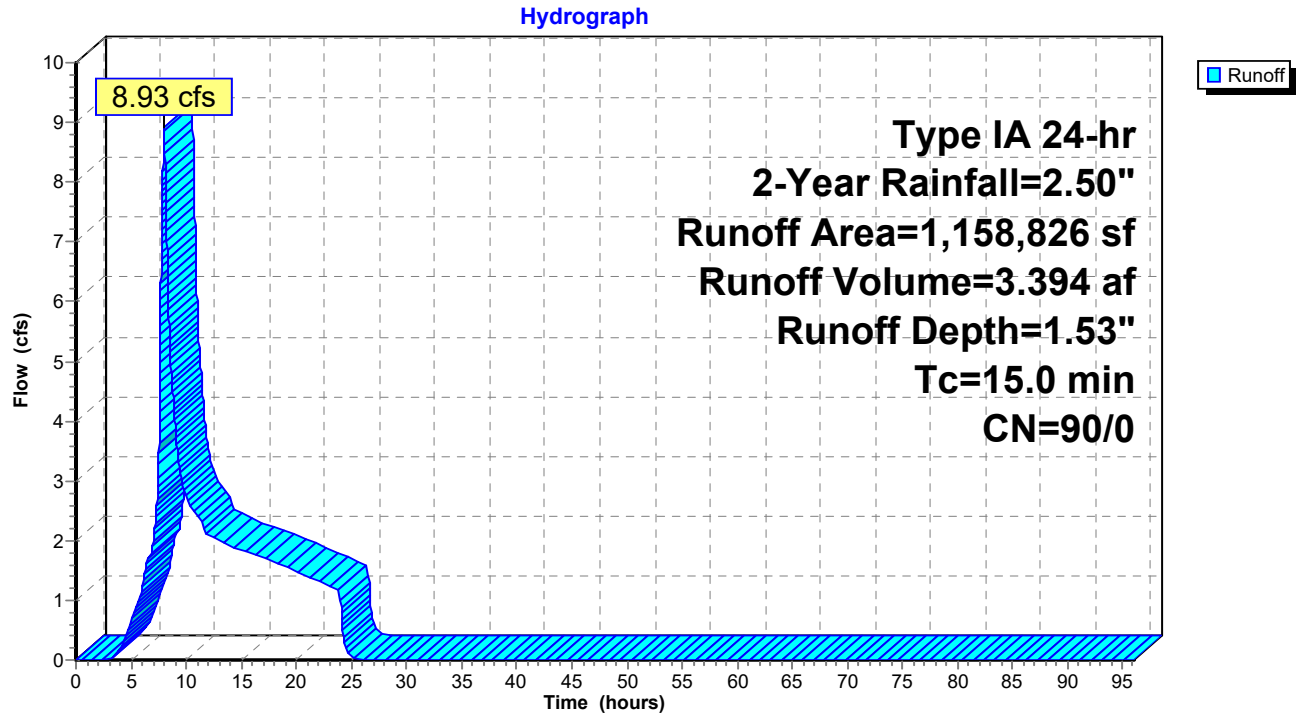
Runoff = 8.93 cfs @ 8.00 hrs, Volume= 3.394 af, Depth= 1.53"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-Year Rainfall=2.50"

	Area (sf)	CN	Description
*	170,263	75	greenhouse storage 20%
*	42,564	75	buildings 100%
*	31,419	75	concrete 100%
*	35,424	75	asphalt 100%
*	23,758	75	Gravel surface, driveable 100%
*	3,827	75	gravel non-driveable 40%
*	5,740	96	gravel non-driveable 60% existing conditions
*	6,710	75	gravel storage 20%
*	26,842	96	gravel storage 80% existing Conditions
*	131,226	96	gravel/dirt, no vehicle access
*	681,053	96	pervious greenhouse storage 80%
	1,158,826	90	Weighted Average
	1,158,826	90	100.00% Pervious Area

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

Subcatchment E: Existing Site



Summary for Subcatchment E: Existing Site

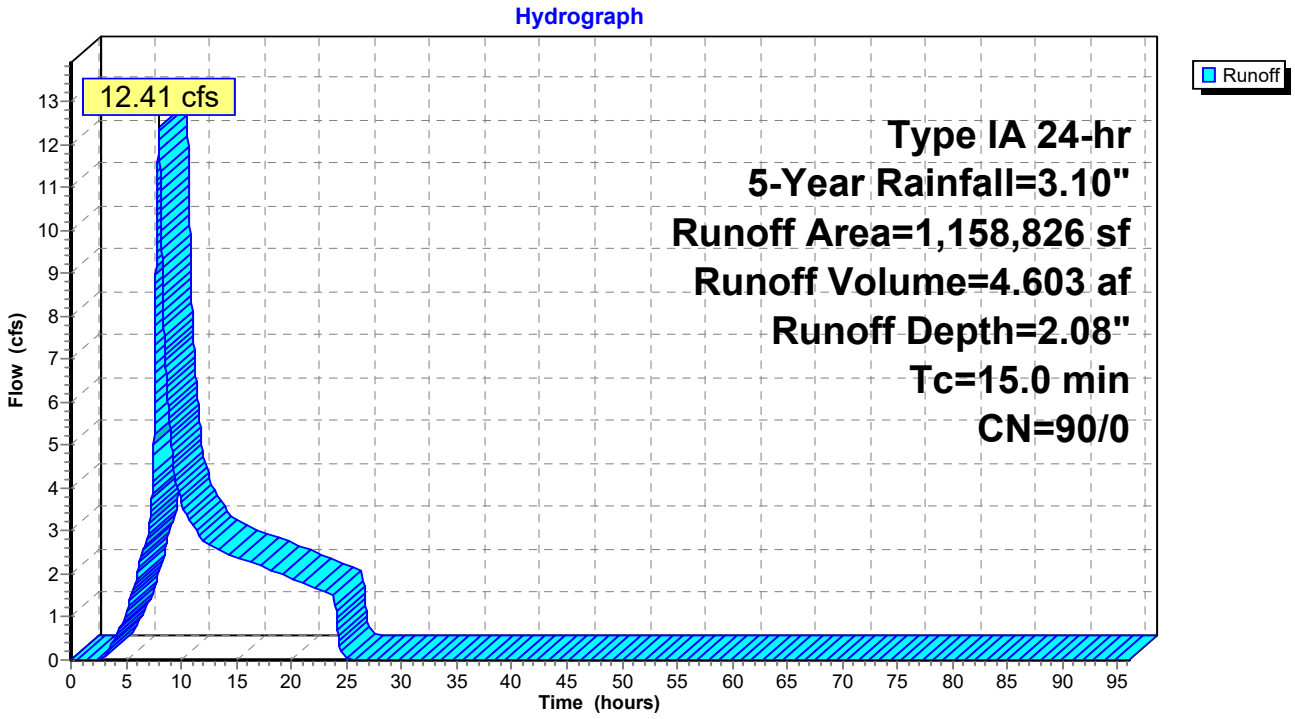
Runoff = 12.41 cfs @ 8.00 hrs, Volume= 4.603 af, Depth= 2.08"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type IA 24-hr 5-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	170,263	75	greenhouse storage 20%
*	42,564	75	buildings 100%
*	31,419	75	concrete 100%
*	35,424	75	asphalt 100%
*	23,758	75	Gravel surface, driveable 100%
*	3,827	75	gravel non-driveable 40%
*	5,740	96	gravel non-driveable 60% existing conditions
*	6,710	75	gravel storage 20%
*	26,842	96	gravel storage 80% existing Conditions
*	131,226	96	gravel/dirt, no vehicle access
*	681,053	96	pervious greenhouse storage 80%
	1,158,826	90	Weighted Average
	1,158,826	90	100.00% Pervious Area

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

Subcatchment E: Existing Site



Summary for Subcatchment E: Existing Site

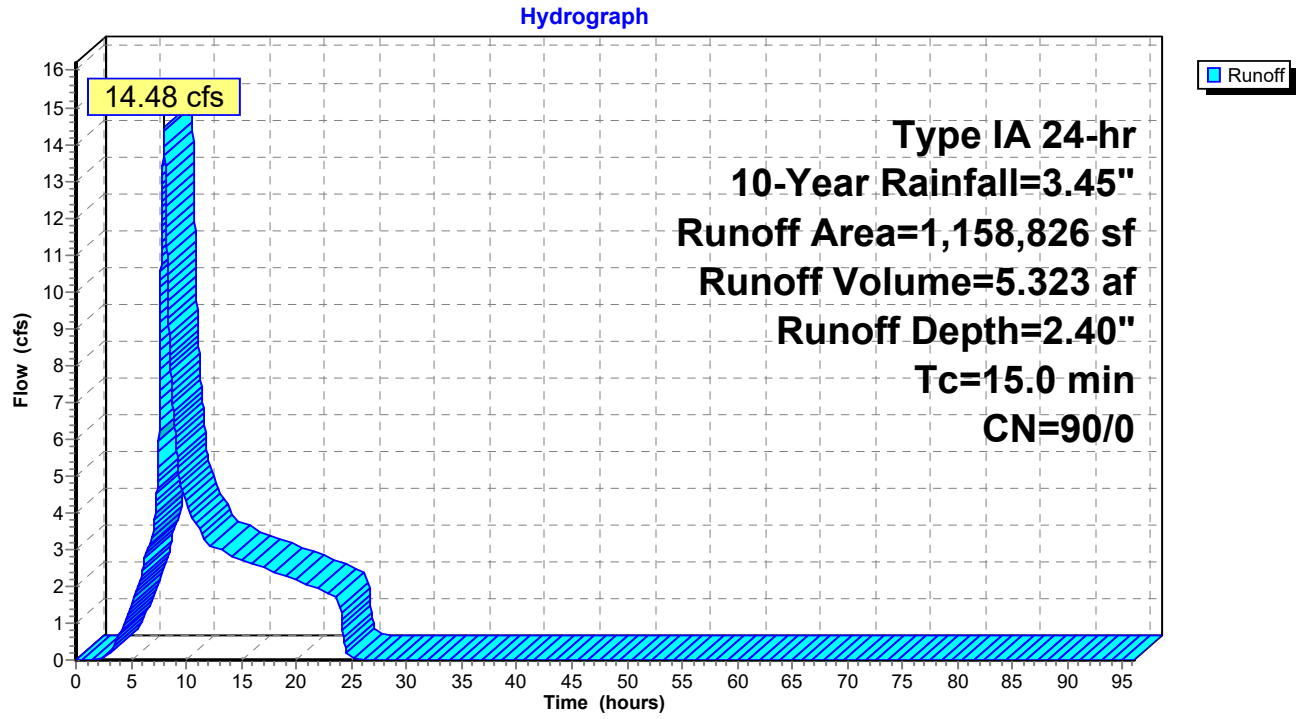
Runoff = 14.48 cfs @ 8.00 hrs, Volume= 5.323 af, Depth= 2.40"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Year Rainfall=3.45"

	Area (sf)	CN	Description
*	170,263	75	greenhouse storage 20%
*	42,564	75	buildings 100%
*	31,419	75	concrete 100%
*	35,424	75	asphalt 100%
*	23,758	75	Gravel surface, driveable 100%
*	3,827	75	gravel non-driveable 40%
*	5,740	96	gravel non-driveable 60% existing conditions
*	6,710	75	gravel storage 20%
*	26,842	96	gravel storage 80% existing Conditions
*	131,226	96	gravel/dirt, no vehicle access
*	681,053	96	pervious greenhouse storage 80%
	1,158,826	90	Weighted Average
	1,158,826	90	100.00% Pervious Area

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

Subcatchment E: Existing Site



Summary for Subcatchment E: Existing Site

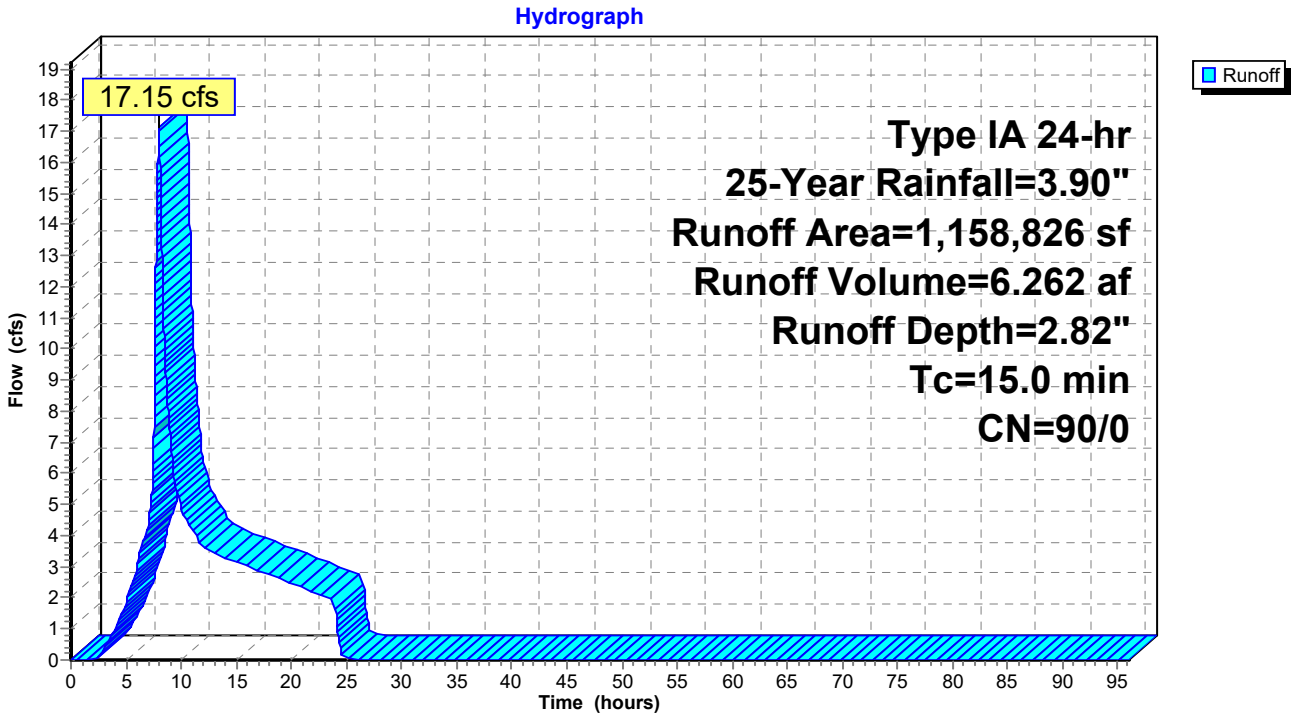
Runoff = 17.15 cfs @ 8.00 hrs, Volume= 6.262 af, Depth= 2.82"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	170,263	75	greenhouse storage 20%
*	42,564	75	buildings 100%
*	31,419	75	concrete 100%
*	35,424	75	asphalt 100%
*	23,758	75	Gravel surface, driveable 100%
*	3,827	75	gravel non-driveable 40%
*	5,740	96	gravel non-driveable 60% existing conditions
*	6,710	75	gravel storage 20%
*	26,842	96	gravel storage 80% existing Conditions
*	131,226	96	gravel/dirt, no vehicle access
*	681,053	96	pervious greenhouse storage 80%
	1,158,826	90	Weighted Average
	1,158,826	90	100.00% Pervious Area

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

Subcatchment E: Existing Site



Summary for Subcatchment AN: Apartments - North

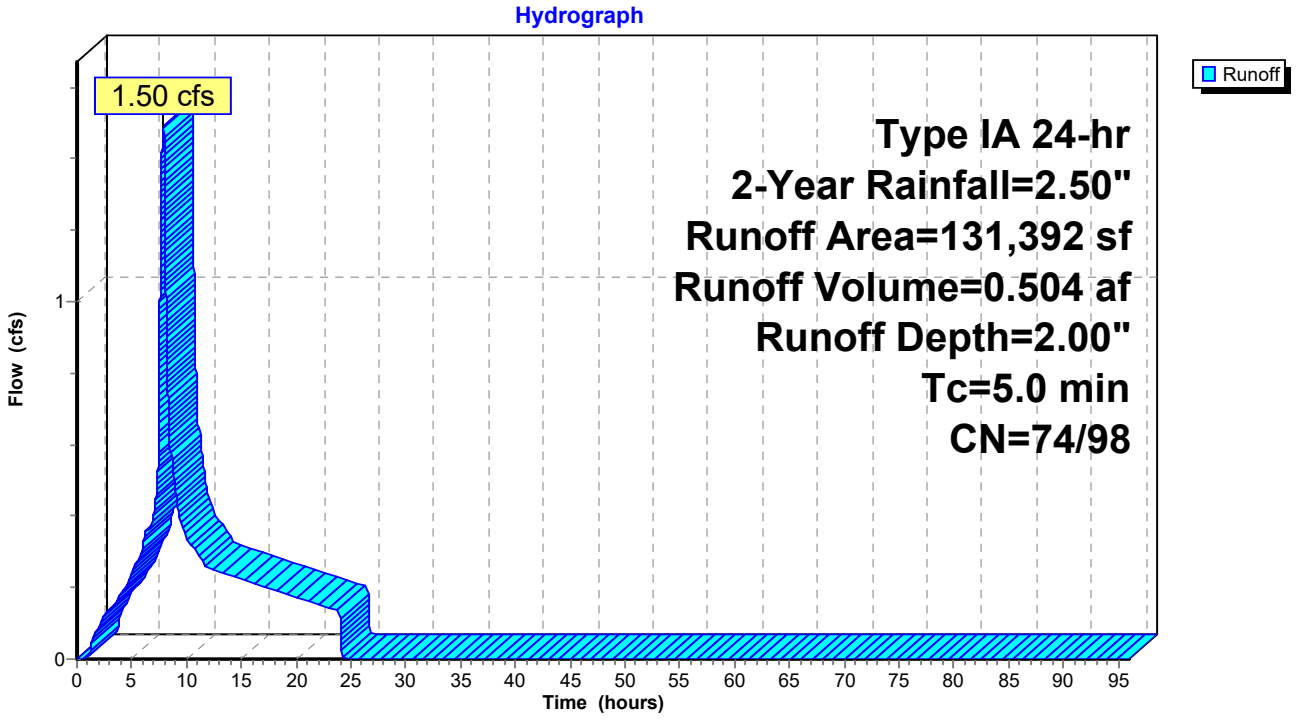
Runoff = 1.50 cfs @ 7.89 hrs, Volume= 0.504 af, Depth= 2.00"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 2-Year Rainfall=2.50"

	Area (sf)	CN	Description
*	110,287	98	
	21,105	74	>75% Grass cover, Good, HSG C
	131,392	94	Weighted Average
	21,105	74	16.06% Pervious Area
	110,287	98	83.94% Impervious Area

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

Subcatchment AN: Apartments - North



Summary for Subcatchment AS: A Street - South

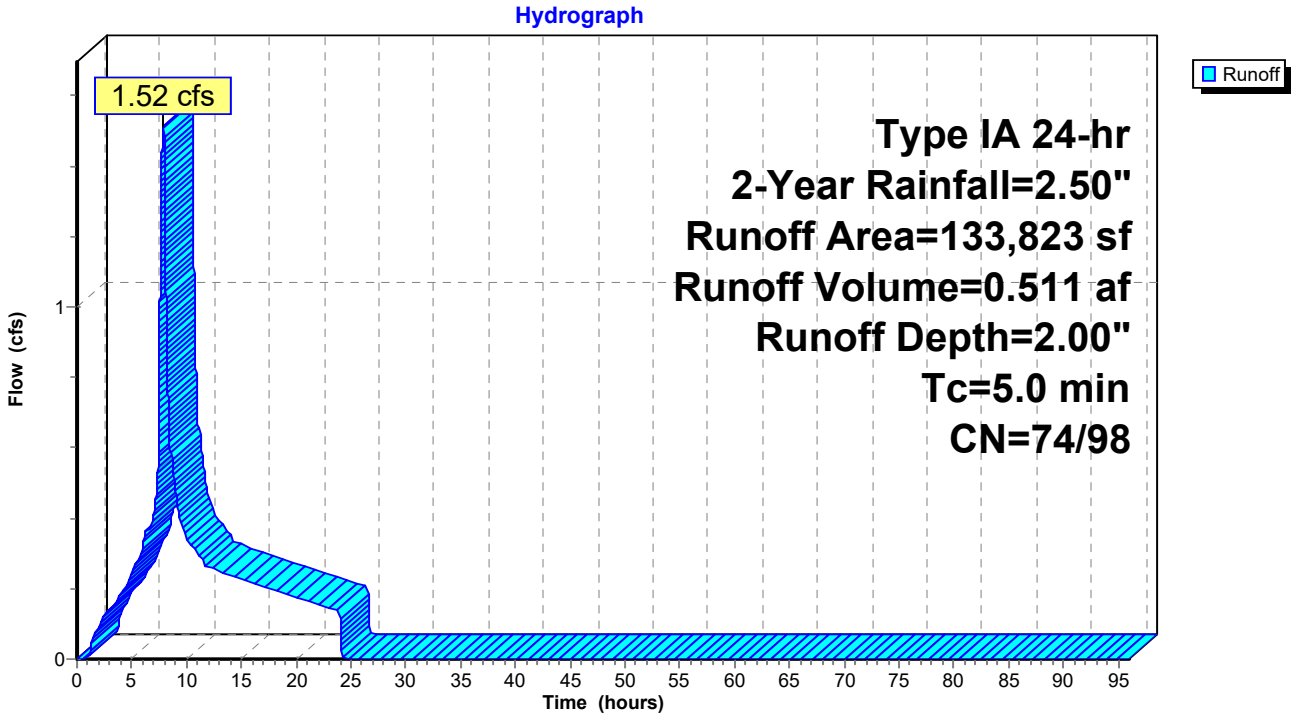
Runoff = 1.52 cfs @ 7.89 hrs, Volume= 0.511 af, Depth= 2.00"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 2-Year Rainfall=2.50"

Area (sf)	CN	Description
111,636	98	
22,187	74	>75% Grass cover, Good, HSG C
133,823	94	Weighted Average
22,187	74	16.58% Pervious Area
111,636	98	83.42% Impervious Area

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

Subcatchment AS: A Street - South



Summary for Subcatchment AW: Apartments - West

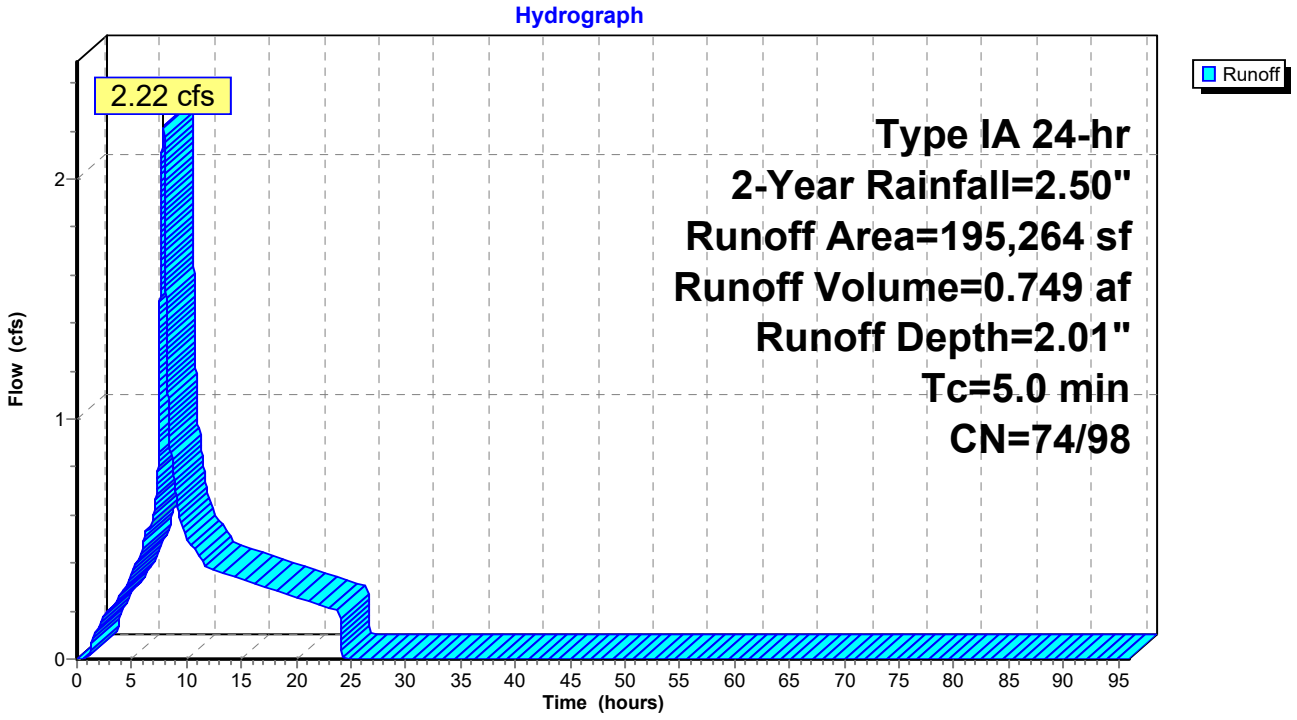
Runoff = 2.22 cfs @ 7.89 hrs, Volume= 0.749 af, Depth= 2.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 2-Year Rainfall=2.50"

	Area (sf)	CN	Description
*	164,095	98	
	31,169	74	>75% Grass cover, Good, HSG C
	195,264	94	Weighted Average
	31,169	74	15.96% Pervious Area
	164,095	98	84.04% Impervious Area

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

Subcatchment AW: Apartments - West



Summary for Subcatchment BC: B Street - Center

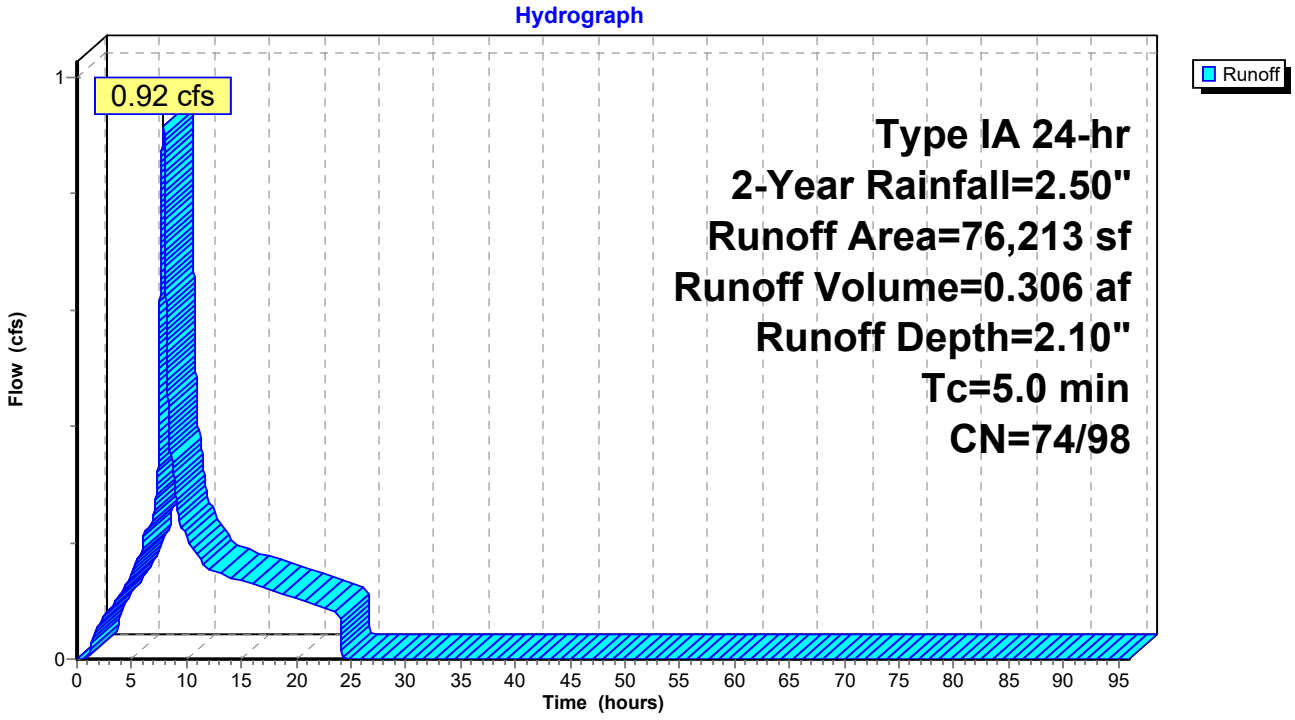
Runoff = 0.92 cfs @ 7.88 hrs, Volume= 0.306 af, Depth= 2.10"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 2-Year Rainfall=2.50"

	Area (sf)	CN	Description
*	68,209	98	
	8,004	74	>75% Grass cover, Good, HSG C
	76,213	95	Weighted Average
	8,004	74	10.50% Pervious Area
	68,209	98	89.50% Impervious Area

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

Subcatchment BC: B Street - Center



Summary for Subcatchment SE: Single Family - East

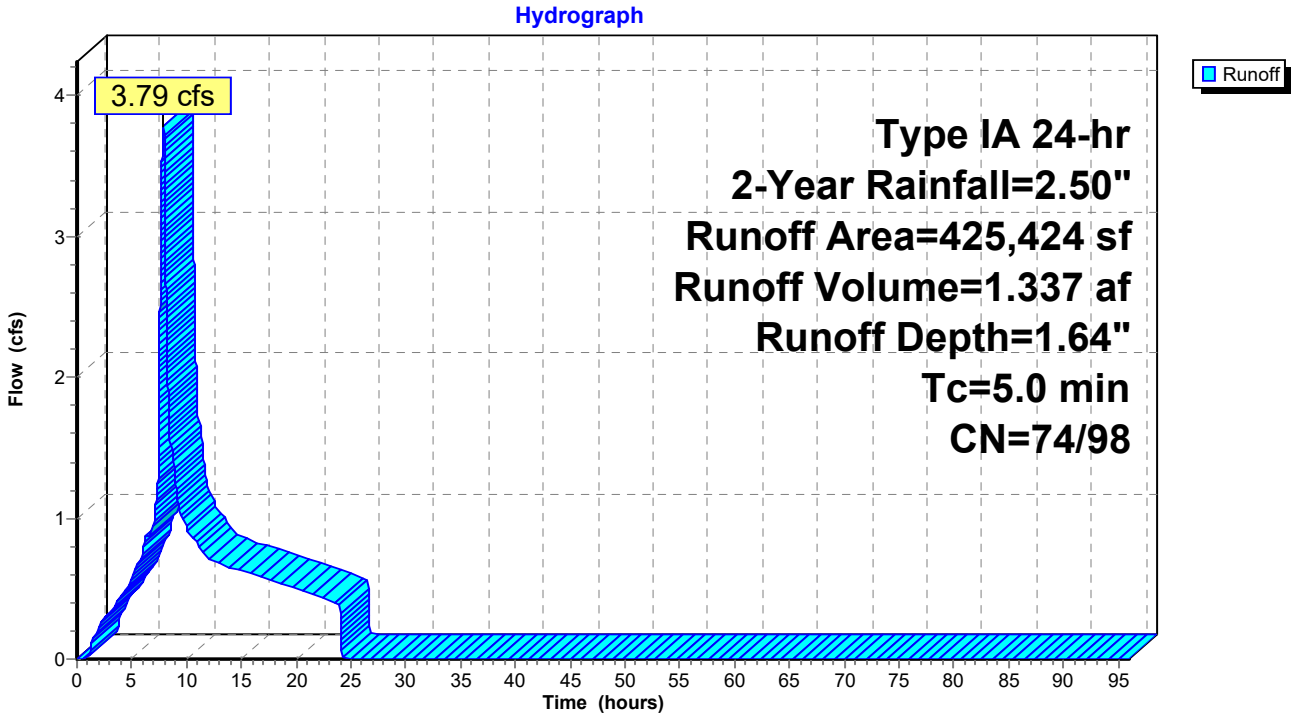
Runoff = 3.79 cfs @ 7.91 hrs, Volume= 1.337 af, Depth= 1.64"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 2-Year Rainfall=2.50"

	Area (sf)	CN	Description
*	264,845	98	
	160,579	74	>75% Grass cover, Good, HSG C
	425,424	89	Weighted Average
	160,579	74	37.75% Pervious Area
	264,845	98	62.25% Impervious Area

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

Subcatchment SE: Single Family - East



Summary for Subcatchment SS: Single Family - South

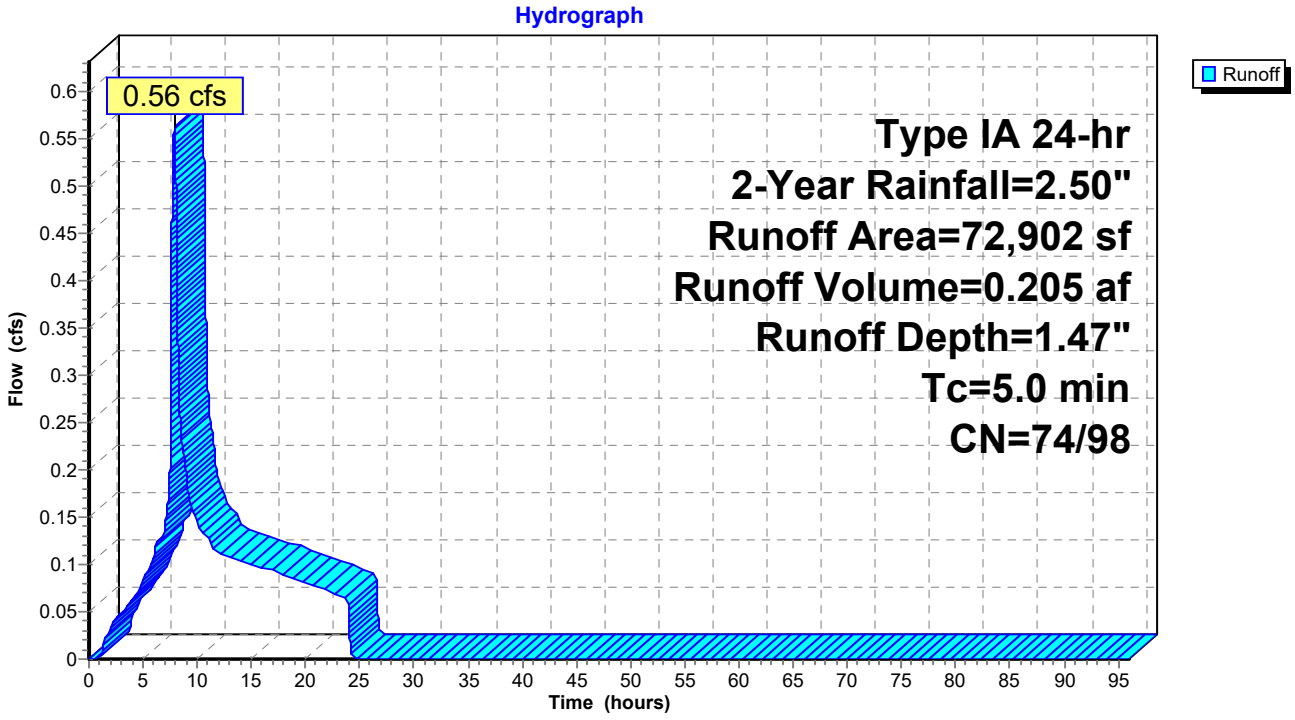
Runoff = 0.56 cfs @ 7.92 hrs, Volume= 0.205 af, Depth= 1.47"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 2-Year Rainfall=2.50"

	Area (sf)	CN	Description
*	37,878	98	
	35,024	74	>75% Grass cover, Good, HSG C
	72,902	86	Weighted Average
	35,024	74	48.04% Pervious Area
	37,878	98	51.96% Impervious Area

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

Subcatchment SS: Single Family - South



Summary for Subcatchment TC: Townhomes - Center

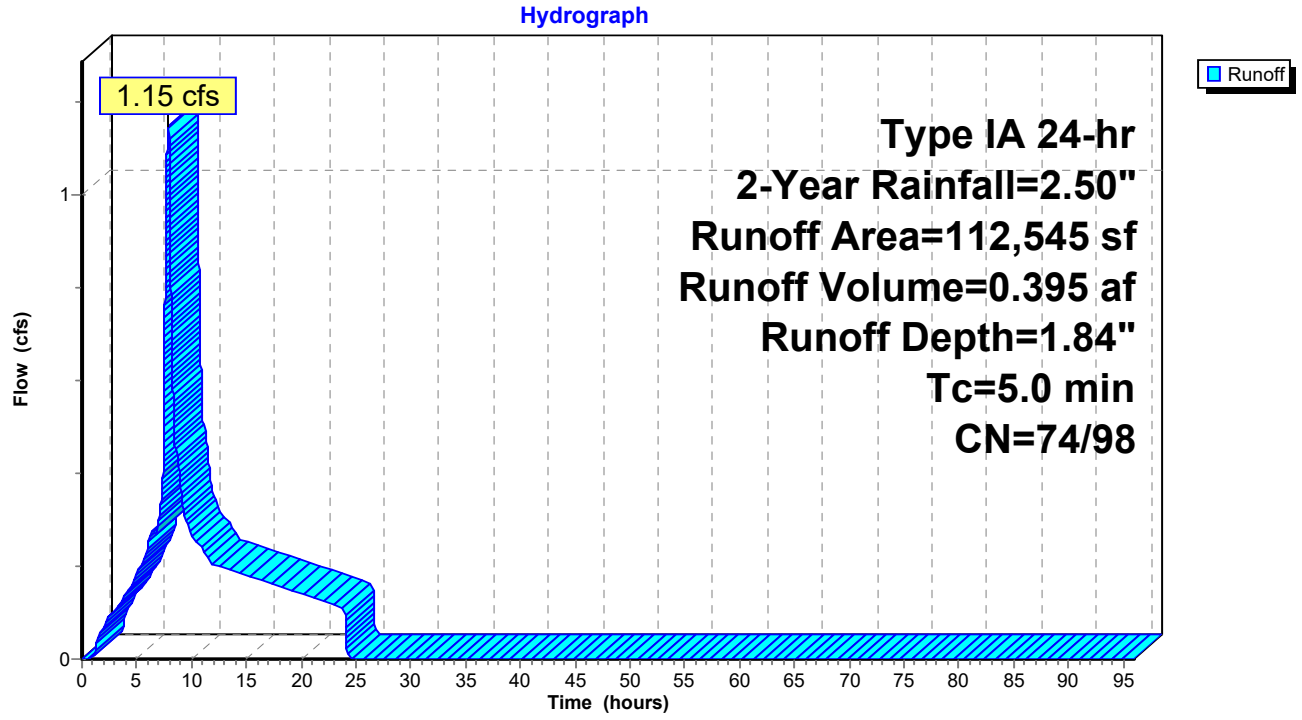
Runoff = 1.15 cfs @ 7.89 hrs, Volume= 0.395 af, Depth= 1.84"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 2-Year Rainfall=2.50"

	Area (sf)	CN	Description
*	83,094	98	
	29,451	74	>75% Grass cover, Good, HSG C
	112,545	92	Weighted Average
	29,451	74	26.17% Pervious Area
	83,094	98	73.83% Impervious Area

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

Subcatchment TC: Townhomes - Center

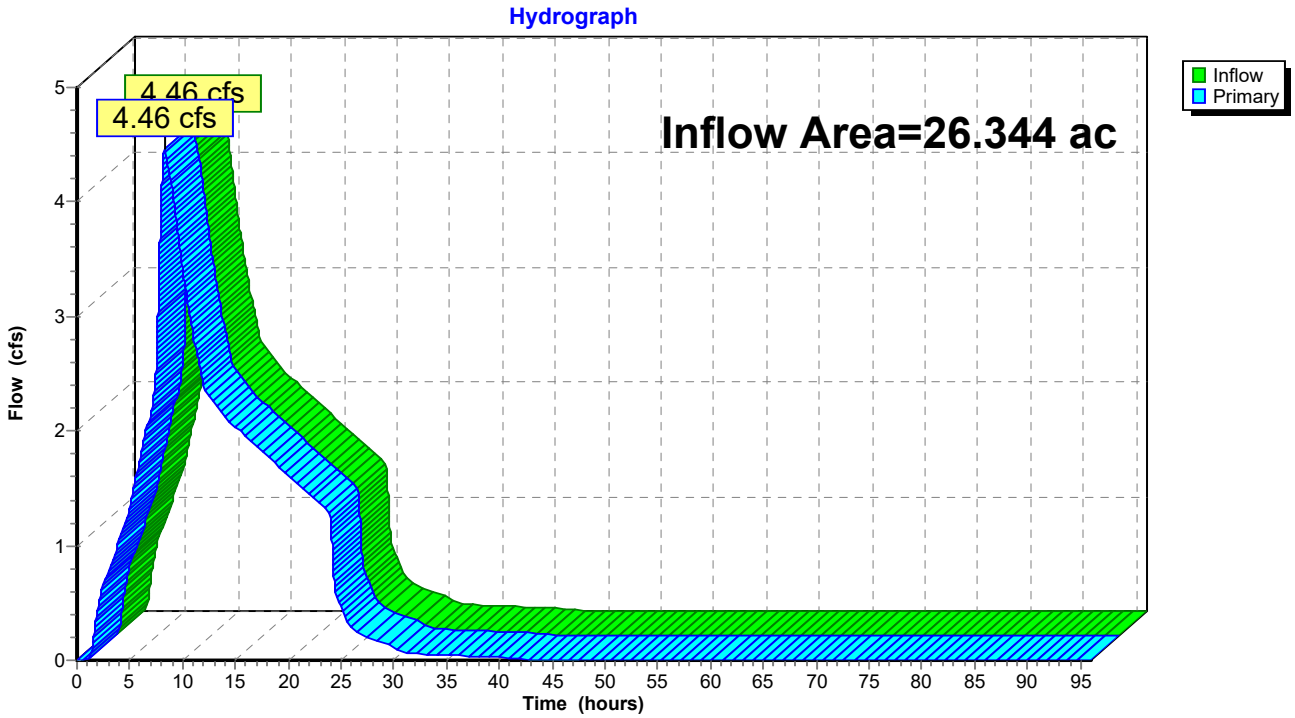


Summary for Pond MAIN OUT: 27" Existing Main

Inflow Area = 26.344 ac, 73.20% Impervious, Inflow Depth = 1.76" for 2-Year event
Inflow = 4.46 cfs @ 8.26 hrs, Volume= 3.873 af
Primary = 4.46 cfs @ 8.26 hrs, Volume= 3.873 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs

Pond MAIN OUT: 27" Existing Main



Summary for Pond SP-S: Storm Pond - South

Inflow Area = 4.746 ac, 72.33% Impervious, Inflow Depth = 1.81" for 2-Year event
Inflow = 2.08 cfs @ 7.90 hrs, Volume= 0.716 af
Outflow = 0.38 cfs @ 11.63 hrs, Volume= 0.716 af, Atten= 82%, Lag= 223.9 min
Discarded = 0.02 cfs @ 11.63 hrs, Volume= 0.063 af
Primary = 0.36 cfs @ 11.63 hrs, Volume= 0.653 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 185.88' @ 11.63 hrs Surf.Area= 4,165 sf Storage= 10,785 cf

Plug-Flow detention time= 406.1 min calculated for 0.716 af (100% of inflow)
Center-of-Mass det. time= 406.1 min (1,099.7 - 693.6)

Volume	Invert	Avail.Storage	Storage Description
#1	182.20'	21,195 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

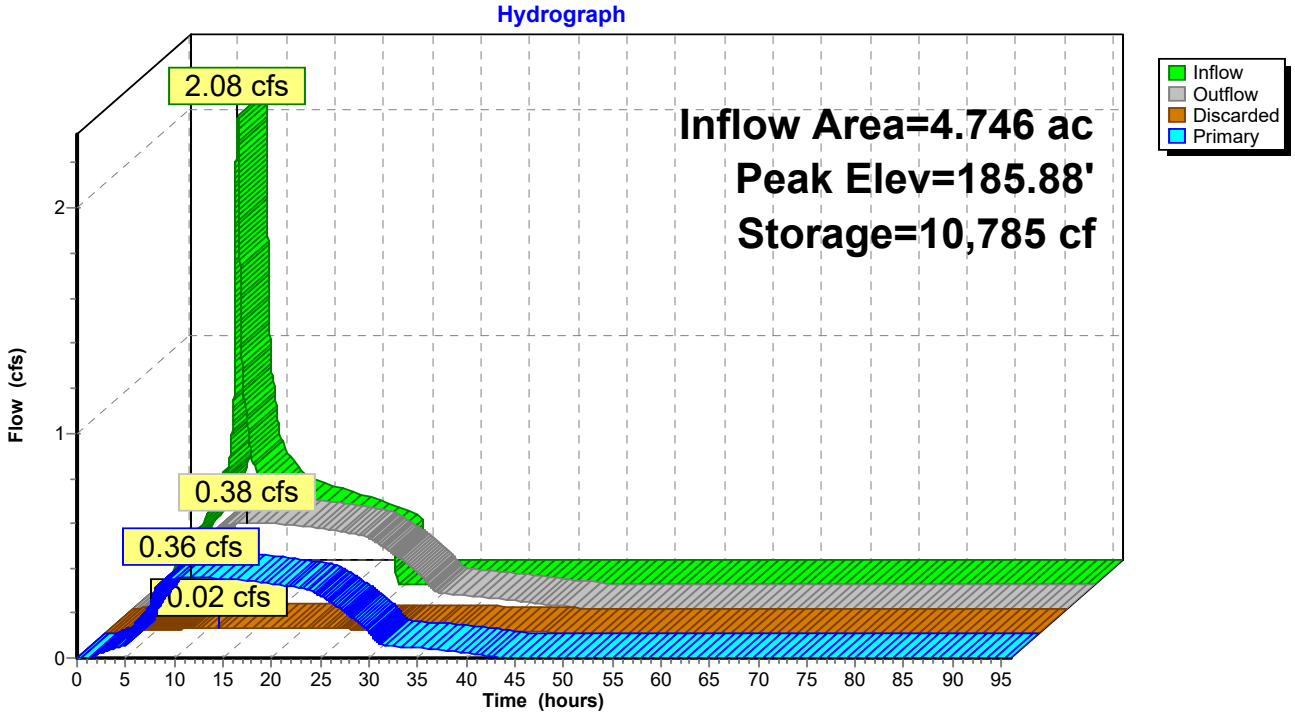
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
182.20	1,760	0	0	1,760
183.00	2,287	1,614	1,614	2,302
184.00	2,880	2,578	4,192	2,922
185.00	3,535	3,202	7,394	3,607
186.00	4,254	3,889	11,283	4,359
187.00	5,064	4,653	15,936	5,204
188.00	5,456	5,259	21,195	5,673

Device	Routing	Invert	Outlet Devices
#1	Primary	182.20'	**1.5" Vert. Orifice/Grate** C= 0.600
#2	Primary	183.15'	**2.4" Vert. Orifice/Grate** C= 0.600
#3	Discarded	182.20'	**0.250 in/hr Exfiltration over Wetted area**
#4	Primary	185.90'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.02 cfs @ 11.63 hrs HW=185.88' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.36 cfs @ 11.63 hrs HW=185.88' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.11 cfs @ 9.16 fps)
├**2=Orifice/Grate** (Orifice Controls 0.25 cfs @ 7.81 fps)
└**4=Orifice/Grate** (Controls 0.00 cfs)

Pond SP-S: Storm Pond - South



Summary for Pond UGD-N: Underground Detention - North

Inflow Area = 3.016 ac, 83.94% Impervious, Inflow Depth = 2.00" for 2-Year event
Inflow = 1.50 cfs @ 7.89 hrs, Volume= 0.504 af
Outflow = 0.53 cfs @ 8.81 hrs, Volume= 0.504 af, Atten= 65%, Lag= 55.5 min
Discarded = 0.01 cfs @ 8.81 hrs, Volume= 0.013 af
Primary = 0.52 cfs @ 8.81 hrs, Volume= 0.491 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 186.45' @ 8.81 hrs Surf.Area= 0.019 ac Storage= 0.080 af

Plug-Flow detention time= 61.4 min calculated for 0.504 af (100% of inflow)
Center-of-Mass det. time= 61.4 min (744.9 - 683.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	180.00'	0.034 af	**13.00'W x 62.00'L x 7.50'H Field A** 0.139 af Overall - 0.054 af Embedded = 0.085 af x 40.0% Voids
#2A	181.00'	0.054 af	**CMP Round 60** x 6 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 2 Rows of 3 Chambers
		0.088 af	Total Available Storage

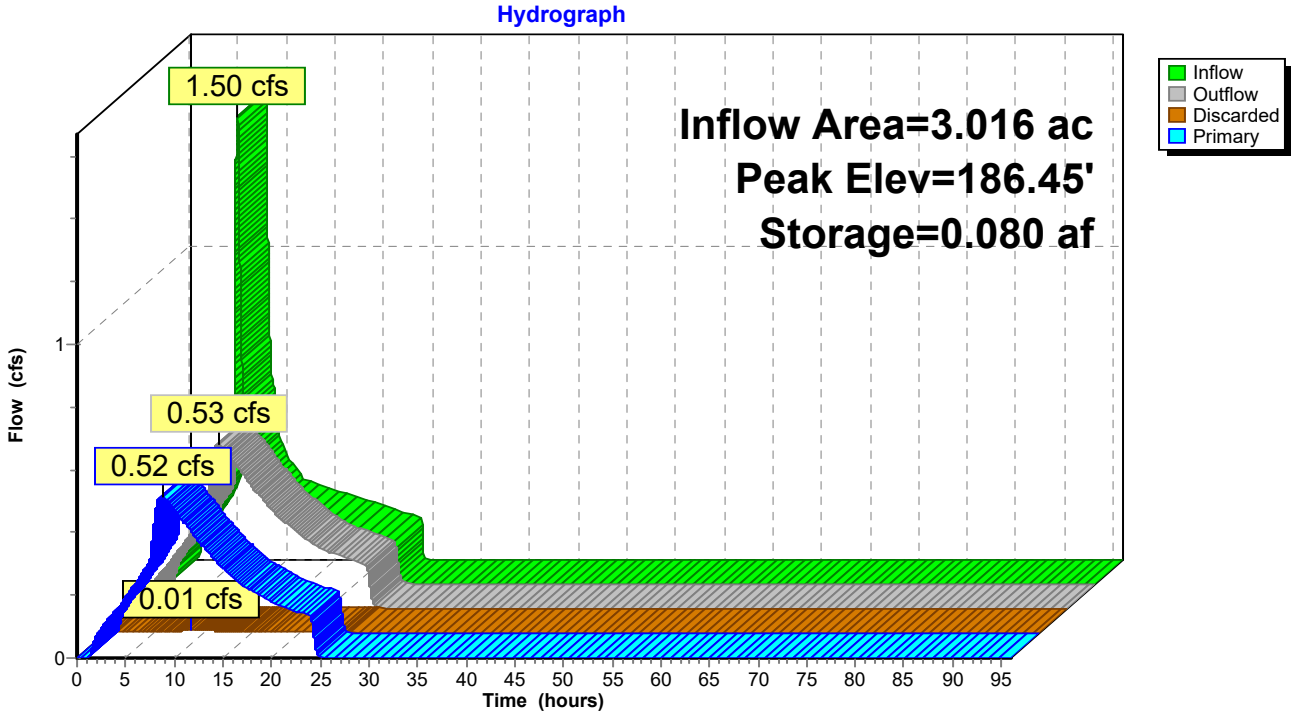
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	180.00'	**2.8" Vert. Orifice/Grate** C= 0.600
#2	Discarded	180.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	186.46'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 8.81 hrs HW=186.45' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.52 cfs @ 8.81 hrs HW=186.45' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.52 cfs @ 12.12 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond UGD-N: Underground Detention - North



Summary for Pond UGD-P: Underground Detention - Primary

Inflow Area = 14.100 ac, 67.76% Impervious, Inflow Depth = 1.73" for 2-Year event
Inflow = 5.85 cfs @ 7.90 hrs, Volume= 2.038 af
Outflow = 3.16 cfs @ 8.25 hrs, Volume= 2.038 af, Atten= 46%, Lag= 21.3 min
Discarded = 0.02 cfs @ 8.25 hrs, Volume= 0.026 af
Primary = 3.14 cfs @ 8.25 hrs, Volume= 2.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 186.09' @ 8.25 hrs Surf.Area= 0.042 ac Storage= 0.179 af

Plug-Flow detention time= 18.4 min calculated for 2.038 af (100% of inflow)
Center-of-Mass det. time= 18.4 min (716.6 - 698.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	180.00'	0.077 af	**13.00'W x 142.00'L x 7.50'H Field A** 0.318 af Overall - 0.126 af Embedded = 0.192 af x 40.0% Voids
#2A	181.00'	0.126 af	**CMP Round 60** x 14 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 2 Rows of 7 Chambers
		0.203 af	Total Available Storage

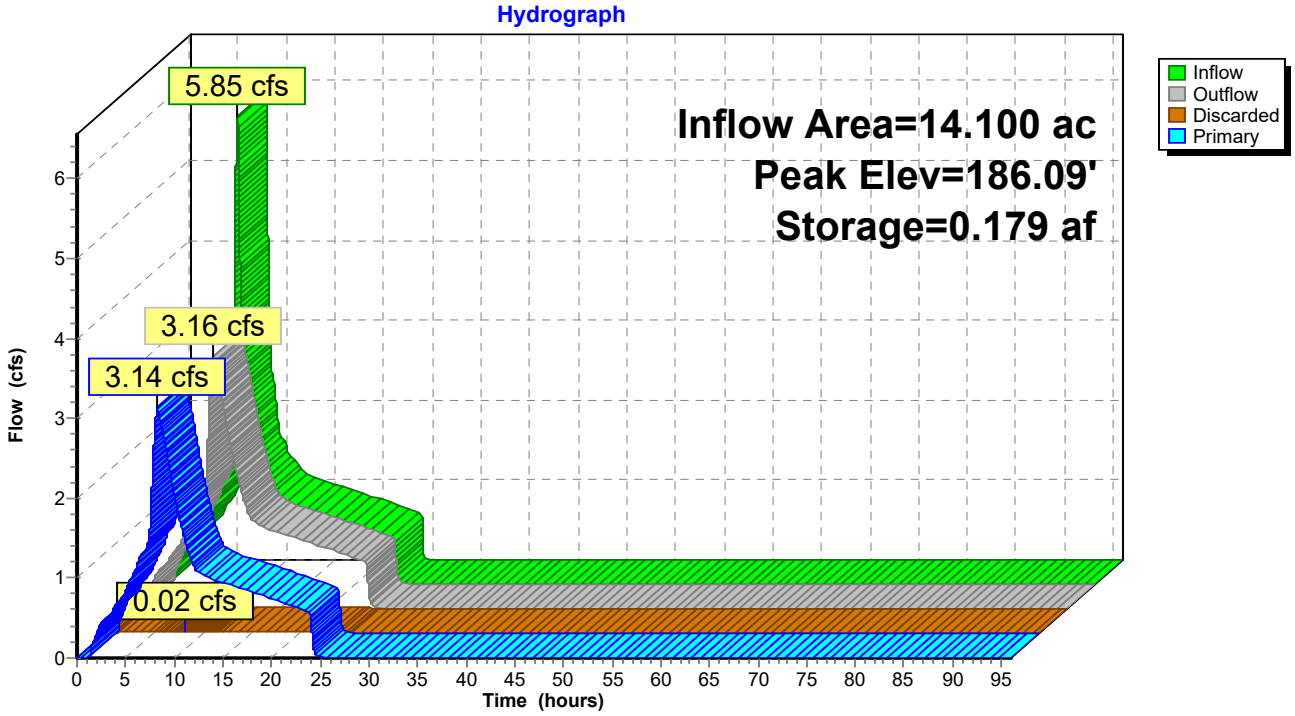
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	180.00'	**7.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	180.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	186.00'	**18.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.02 cfs @ 8.25 hrs HW=186.09' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=3.14 cfs @ 8.25 hrs HW=186.09' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 3.10 cfs @ 11.59 fps)
└**3=Orifice/Grate** (Orifice Controls 0.04 cfs @ 1.01 fps)

Pond UGD-P: Underground Detention - Primary



Summary for Pond UGD-W: Underground Detention - West

Inflow Area = 4.483 ac, 84.04% Impervious, Inflow Depth = 2.01" for 2-Year event
Inflow = 2.22 cfs @ 7.89 hrs, Volume= 0.749 af
Outflow = 0.56 cfs @ 9.45 hrs, Volume= 0.749 af, Atten= 75%, Lag= 94.1 min
Discarded = 0.02 cfs @ 9.45 hrs, Volume= 0.032 af
Primary = 0.54 cfs @ 9.45 hrs, Volume= 0.717 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 186.37' @ 9.45 hrs Surf.Area= 0.044 ac Storage= 0.171 af

Plug-Flow detention time= 151.0 min calculated for 0.749 af (100% of inflow)
Center-of-Mass det. time= 151.1 min (834.5 - 683.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	181.00'	0.079 af	**19.00'W x 102.00'L x 7.50'H Field A** 0.334 af Overall - 0.135 af Embedded = 0.198 af x 40.0% Voids
#2A	182.00'	0.135 af	**CMP Round 60** x 15 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 3 Rows of 5 Chambers
		0.215 af	Total Available Storage

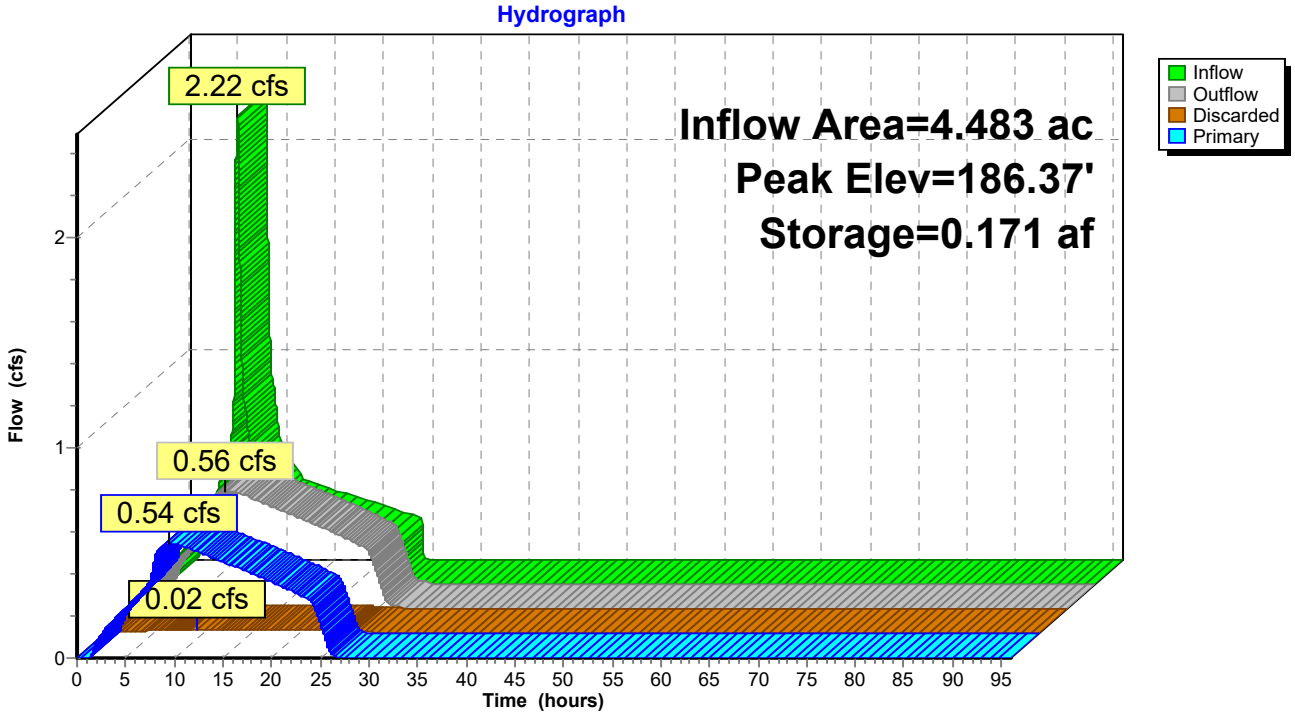
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	181.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	181.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	187.55'	**15.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.02 cfs @ 9.45 hrs HW=186.37' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.54 cfs @ 9.45 hrs HW=186.37' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.54 cfs @ 11.03 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond UGD-W: Underground Detention - West



Summary for Subcatchment AN: Apartments - North

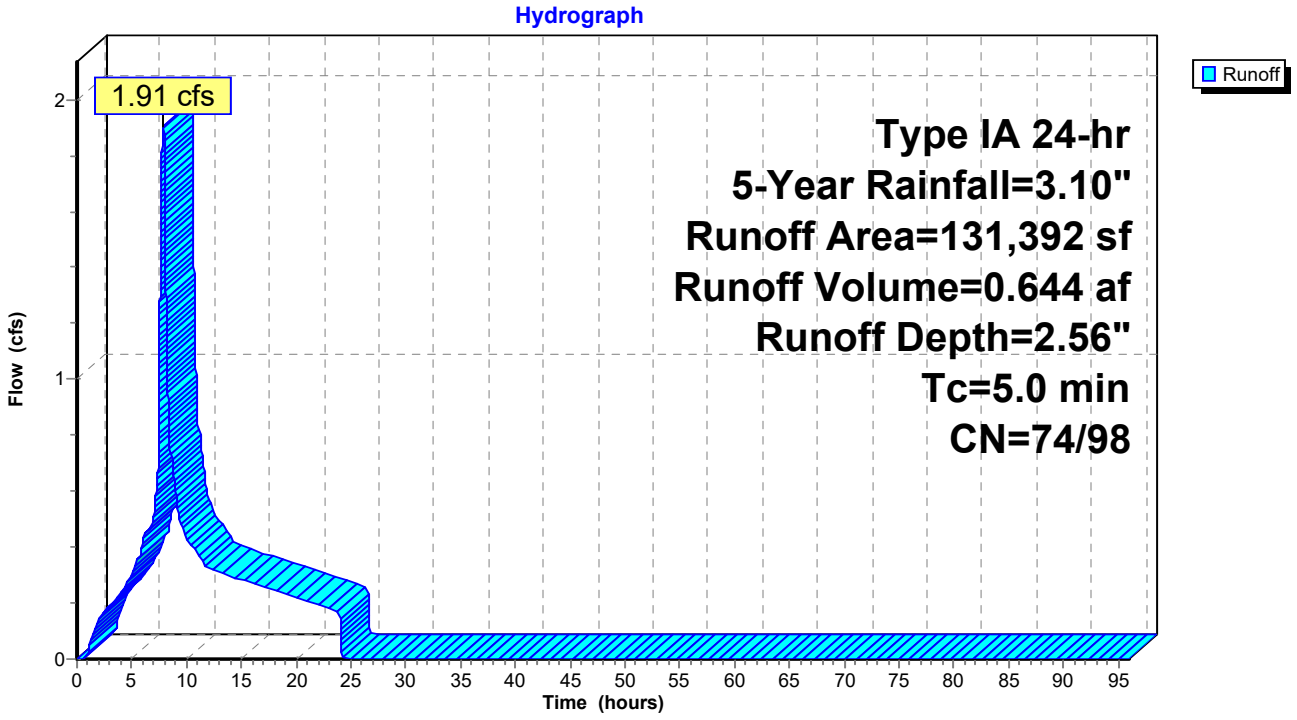
Runoff = 1.91 cfs @ 7.88 hrs, Volume= 0.644 af, Depth= 2.56"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 5-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	110,287	98	
	21,105	74	>75% Grass cover, Good, HSG C
	131,392	94	Weighted Average
	21,105	74	16.06% Pervious Area
	110,287	98	83.94% Impervious Area

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

Subcatchment AN: Apartments - North



Summary for Subcatchment AS: A Street - South

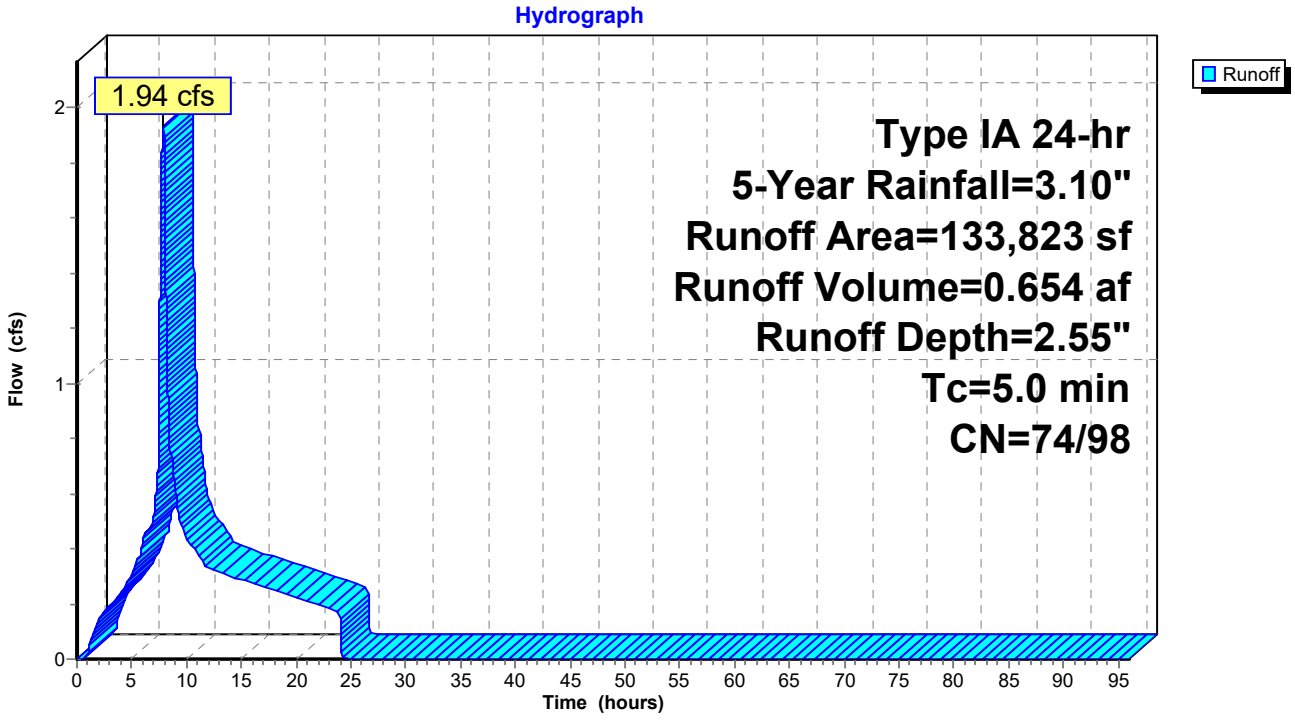
Runoff = 1.94 cfs @ 7.88 hrs, Volume= 0.654 af, Depth= 2.55"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 5-Year Rainfall=3.10"

Area (sf)	CN	Description
111,636	98	
22,187	74	>75% Grass cover, Good, HSG C
133,823	94	Weighted Average
22,187	74	16.58% Pervious Area
111,636	98	83.42% Impervious Area

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

Subcatchment AS: A Street - South



Summary for Subcatchment AW: Apartments - West

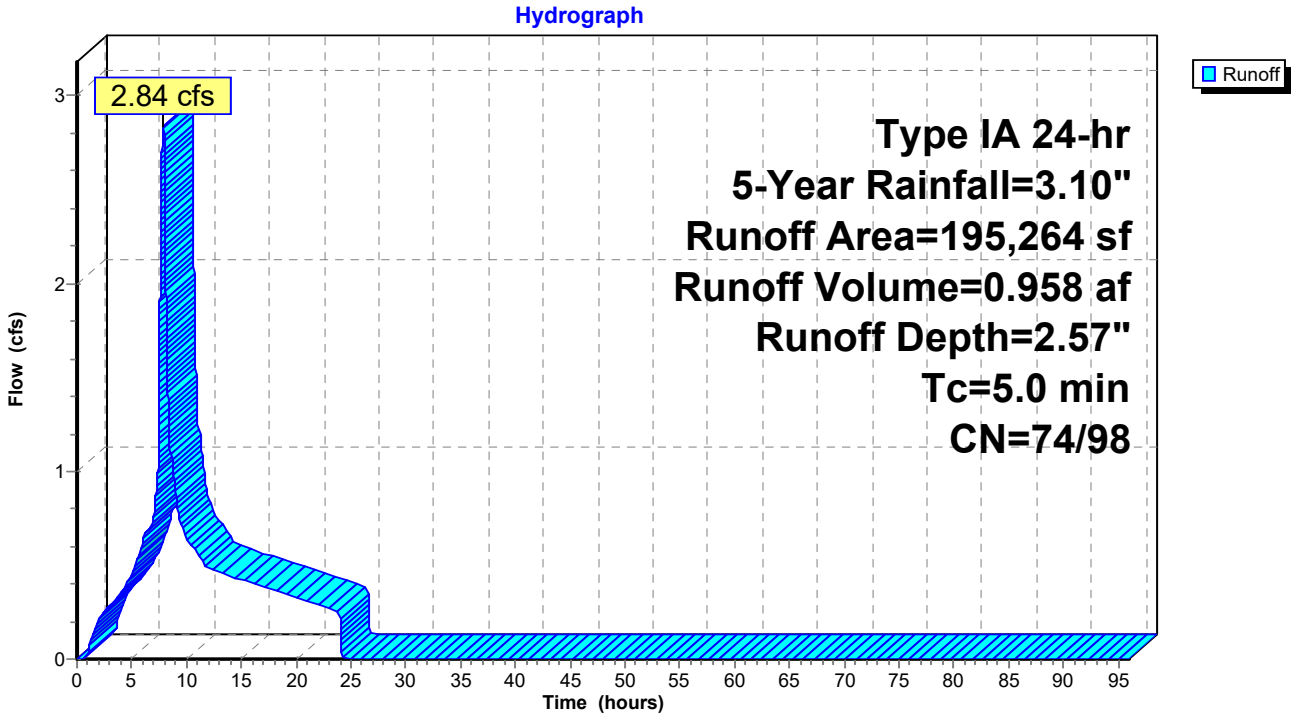
Runoff = 2.84 cfs @ 7.88 hrs, Volume= 0.958 af, Depth= 2.57"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 5-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	164,095	98	
	31,169	74	>75% Grass cover, Good, HSG C
	195,264	94	Weighted Average
	31,169	74	15.96% Pervious Area
	164,095	98	84.04% Impervious Area

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

Subcatchment AW: Apartments - West



Summary for Subcatchment BC: B Street - Center

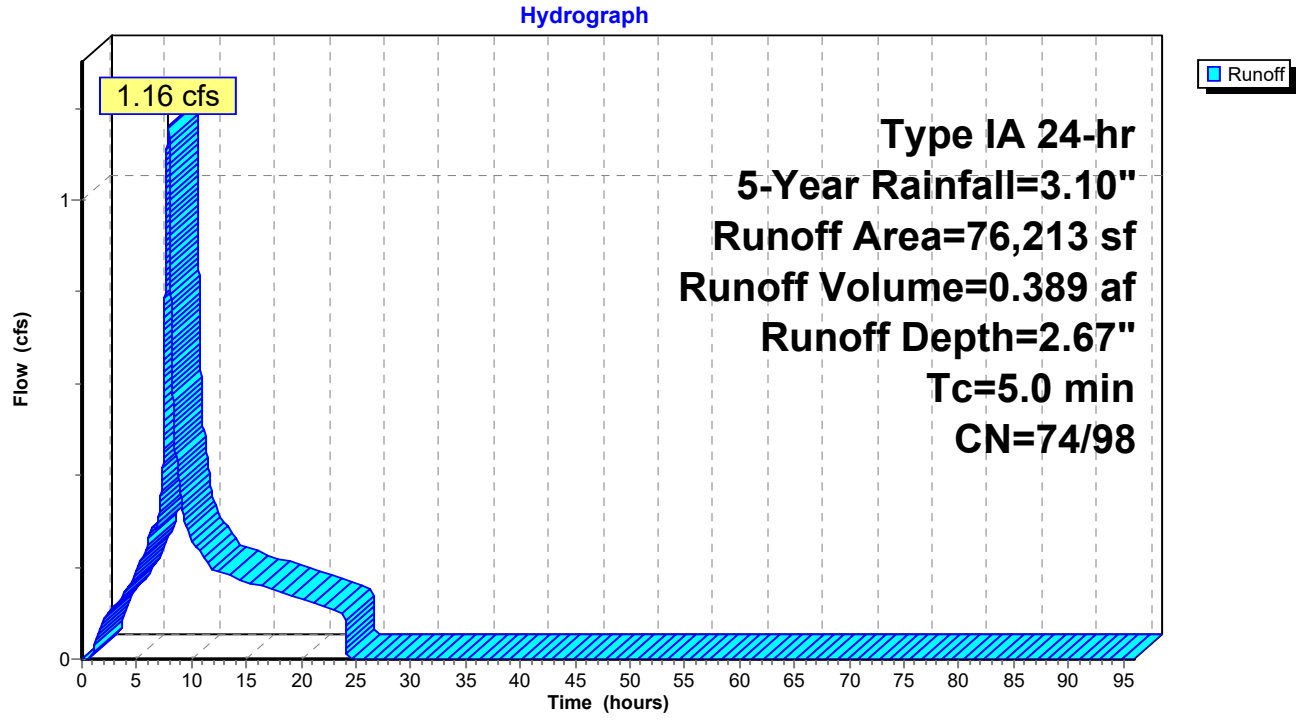
Runoff = 1.16 cfs @ 7.88 hrs, Volume= 0.389 af, Depth= 2.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 5-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	68,209	98	
	8,004	74	>75% Grass cover, Good, HSG C
	76,213	95	Weighted Average
	8,004	74	10.50% Pervious Area
	68,209	98	89.50% Impervious Area

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

Subcatchment BC: B Street - Center



Summary for Subcatchment SE: Single Family - East

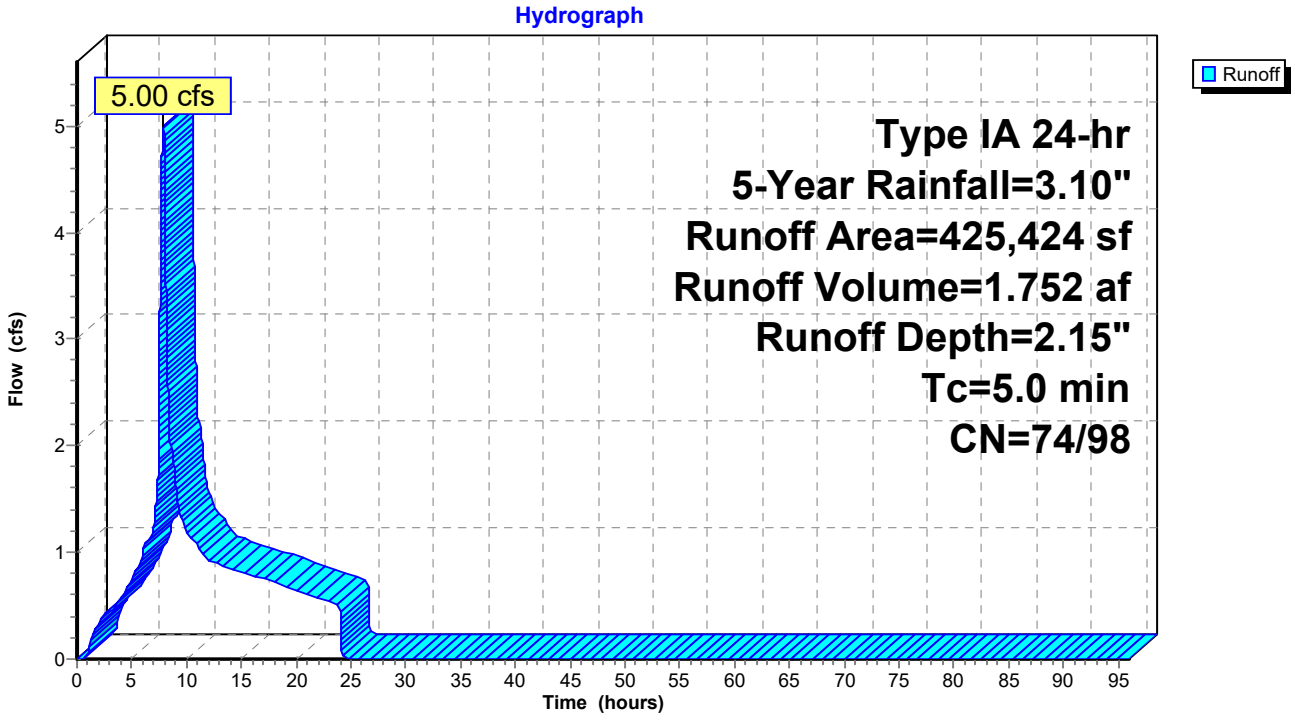
Runoff = 5.00 cfs @ 7.90 hrs, Volume= 1.752 af, Depth= 2.15"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 5-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	264,845	98	
	160,579	74	>75% Grass cover, Good, HSG C
	425,424	89	Weighted Average
	160,579	74	37.75% Pervious Area
	264,845	98	62.25% Impervious Area

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

Subcatchment SE: Single Family - East



Summary for Subcatchment SS: Single Family - South

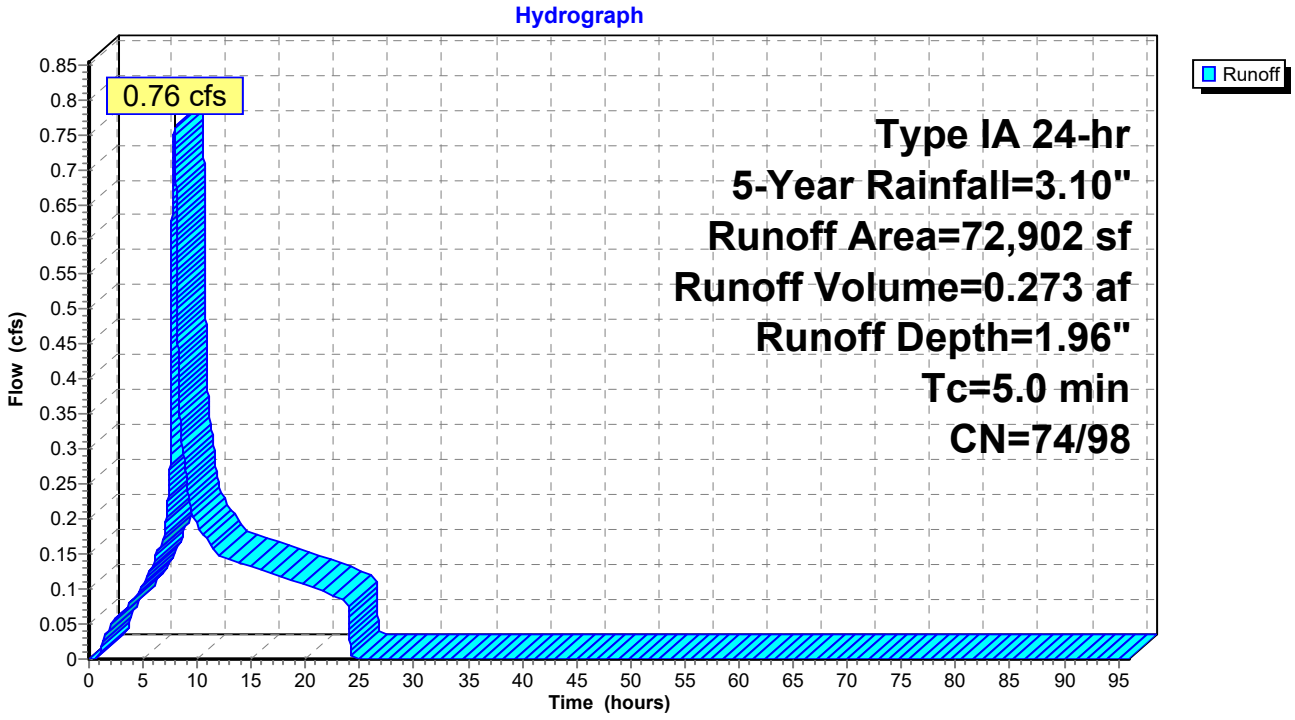
Runoff = 0.76 cfs @ 7.91 hrs, Volume= 0.273 af, Depth= 1.96"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 5-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	37,878	98	
	35,024	74	>75% Grass cover, Good, HSG C
	72,902	86	Weighted Average
	35,024	74	48.04% Pervious Area
	37,878	98	51.96% Impervious Area

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

Subcatchment SS: Single Family - South



Summary for Subcatchment TC: Townhomes - Center

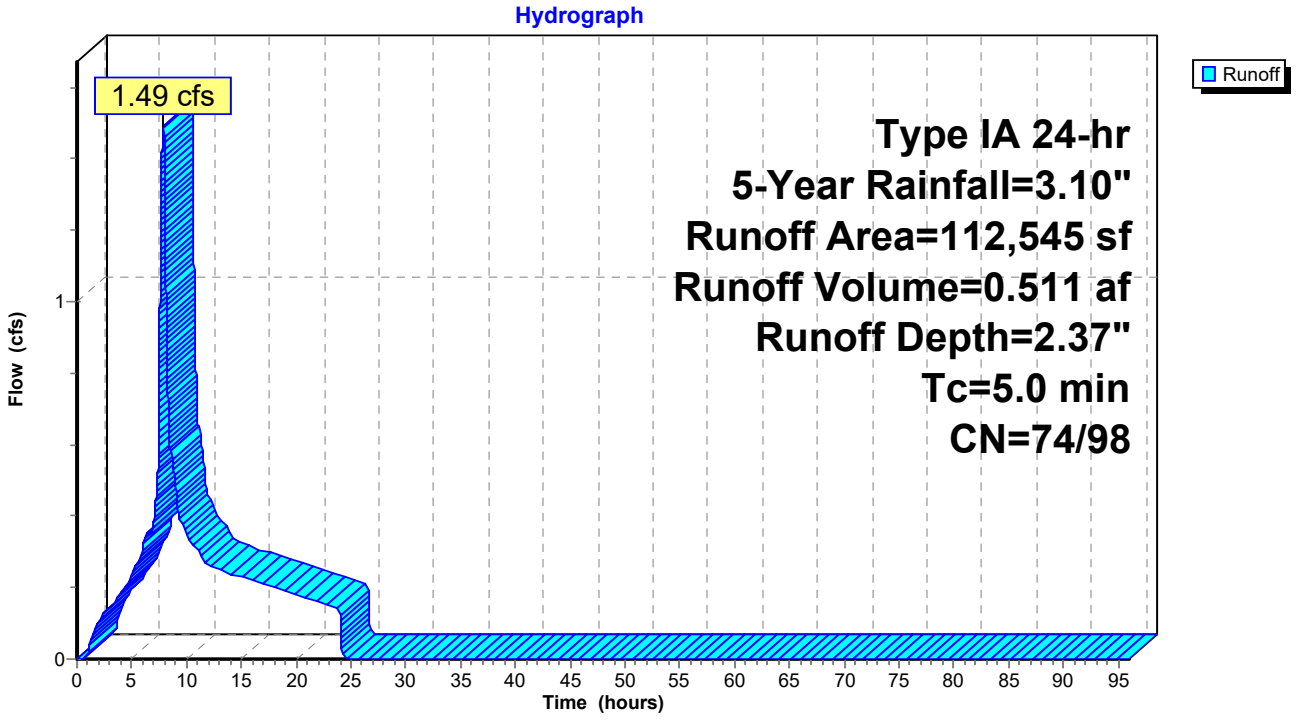
Runoff = 1.49 cfs @ 7.89 hrs, Volume= 0.511 af, Depth= 2.37"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 5-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	83,094	98	
	29,451	74	>75% Grass cover, Good, HSG C
	112,545	92	Weighted Average
	29,451	74	26.17% Pervious Area
	83,094	98	73.83% Impervious Area

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

Subcatchment TC: Townhomes - Center

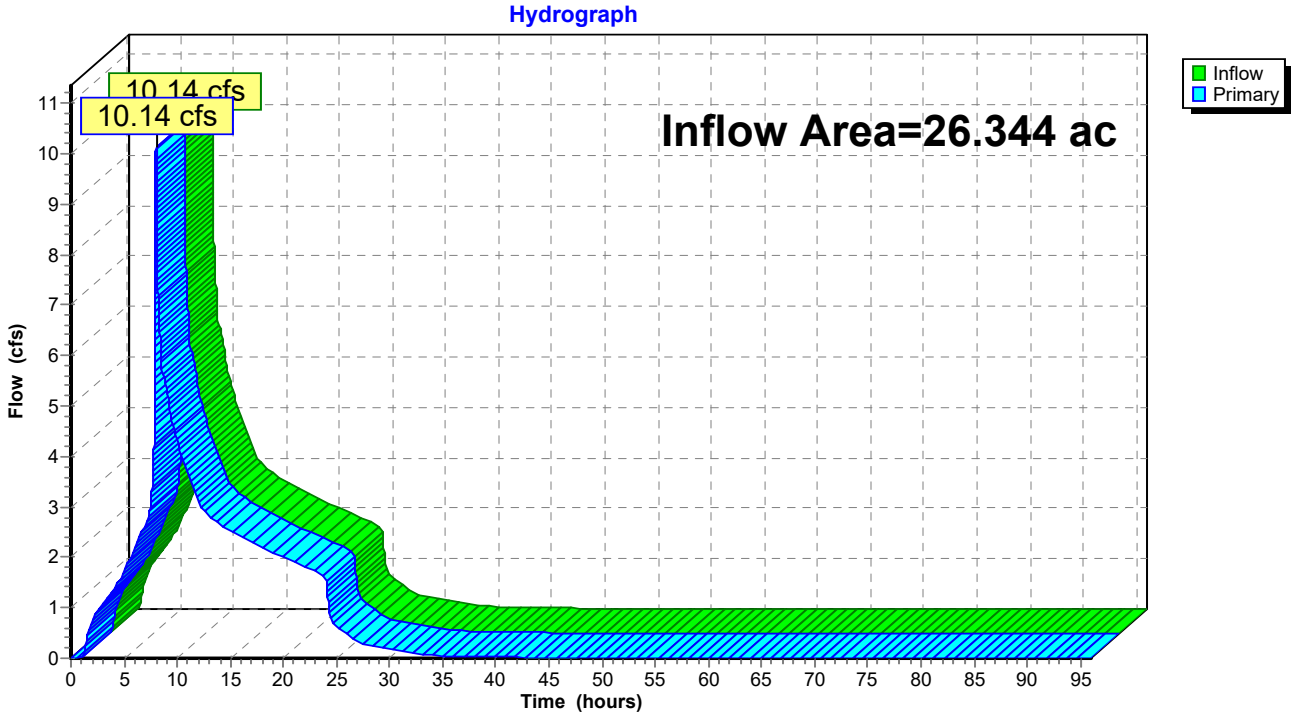


Summary for Pond MAIN OUT: 27" Existing Main

Inflow Area = 26.344 ac, 73.20% Impervious, Inflow Depth = 2.29" for 5-Year event
Inflow = 10.14 cfs @ 8.00 hrs, Volume= 5.034 af
Primary = 10.14 cfs @ 8.00 hrs, Volume= 5.034 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs

Pond MAIN OUT: 27" Existing Main



Summary for Pond SP-S: Storm Pond - South

Inflow Area = 4.746 ac, 72.33% Impervious, Inflow Depth = 2.34" for 5-Year event
Inflow = 2.70 cfs @ 7.89 hrs, Volume= 0.927 af
Outflow = 0.84 cfs @ 9.04 hrs, Volume= 0.927 af, Atten= 69%, Lag= 69.0 min
Discarded = 0.03 cfs @ 9.04 hrs, Volume= 0.069 af
Primary = 0.82 cfs @ 9.04 hrs, Volume= 0.858 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 186.23' @ 9.04 hrs Surf.Area= 4,433 sf Storage= 12,277 cf

Plug-Flow detention time= 377.1 min calculated for 0.927 af (100% of inflow)
Center-of-Mass det. time= 377.1 min (1,066.1 - 689.0)

Volume	Invert	Avail.Storage	Storage Description
#1	182.20'	21,195 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

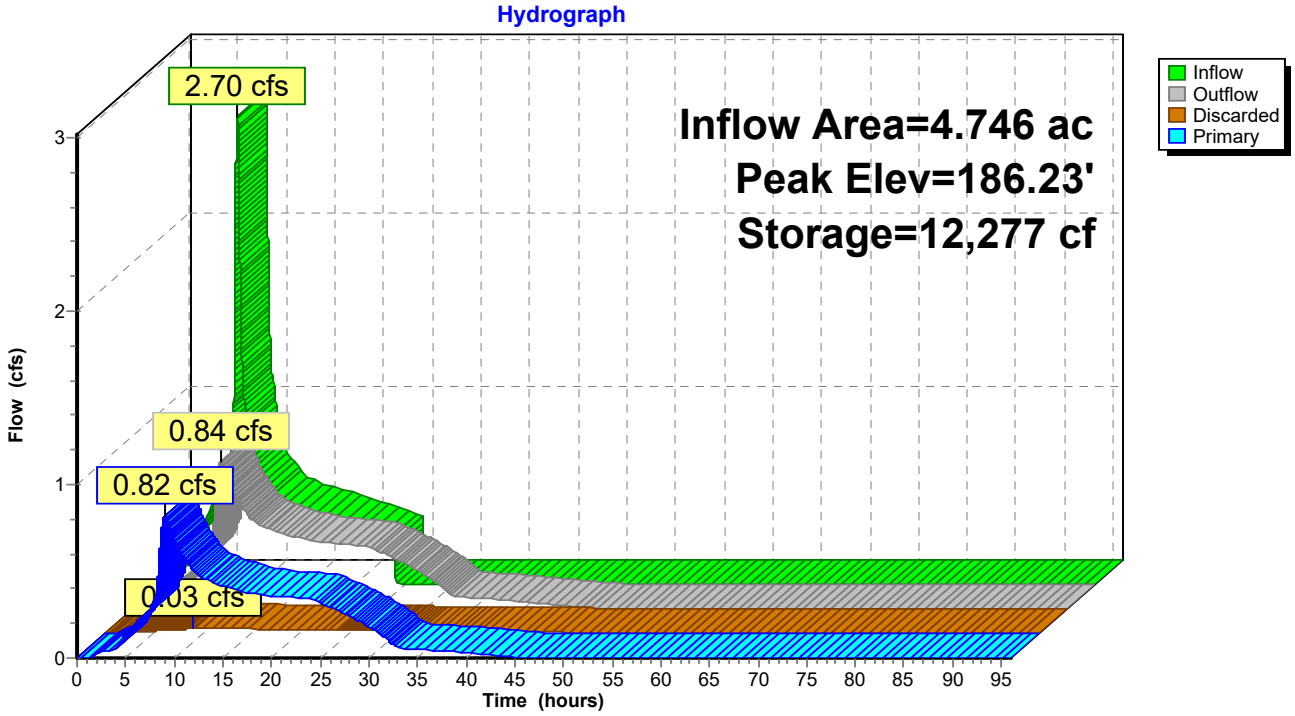
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
182.20	1,760	0	0	1,760
183.00	2,287	1,614	1,614	2,302
184.00	2,880	2,578	4,192	2,922
185.00	3,535	3,202	7,394	3,607
186.00	4,254	3,889	11,283	4,359
187.00	5,064	4,653	15,936	5,204
188.00	5,456	5,259	21,195	5,673

Device	Routing	Invert	Outlet Devices
#1	Primary	182.20'	**1.5" Vert. Orifice/Grate** C= 0.600
#2	Primary	183.15'	**2.4" Vert. Orifice/Grate** C= 0.600
#3	Discarded	182.20'	**0.250 in/hr Exfiltration over Wetted area**
#4	Primary	185.90'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.03 cfs @ 9.04 hrs HW=186.23' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.82 cfs @ 9.04 hrs HW=186.23' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.12 cfs @ 9.59 fps)
├**2=Orifice/Grate** (Orifice Controls 0.26 cfs @ 8.31 fps)
└**4=Orifice/Grate** (Orifice Controls 0.44 cfs @ 1.95 fps)

Pond SP-S: Storm Pond - South



Summary for Pond UGD-N: Underground Detention - North

Inflow Area = 3.016 ac, 83.94% Impervious, Inflow Depth = 2.56" for 5-Year event
Inflow = 1.91 cfs @ 7.88 hrs, Volume= 0.644 af
Outflow = 1.81 cfs @ 8.01 hrs, Volume= 0.644 af, Atten= 5%, Lag= 7.3 min
Discarded = 0.01 cfs @ 8.01 hrs, Volume= 0.014 af
Primary = 1.80 cfs @ 8.01 hrs, Volume= 0.630 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 187.05' @ 8.01 hrs Surf.Area= 0.019 ac Storage= 0.085 af

Plug-Flow detention time= 66.0 min calculated for 0.644 af (100% of inflow)
Center-of-Mass det. time= 66.0 min (744.1 - 678.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	180.00'	0.034 af	**13.00'W x 62.00'L x 7.50'H Field A** 0.139 af Overall - 0.054 af Embedded = 0.085 af x 40.0% Voids
#2A	181.00'	0.054 af	**CMP Round 60** x 6 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 2 Rows of 3 Chambers
		0.088 af	Total Available Storage

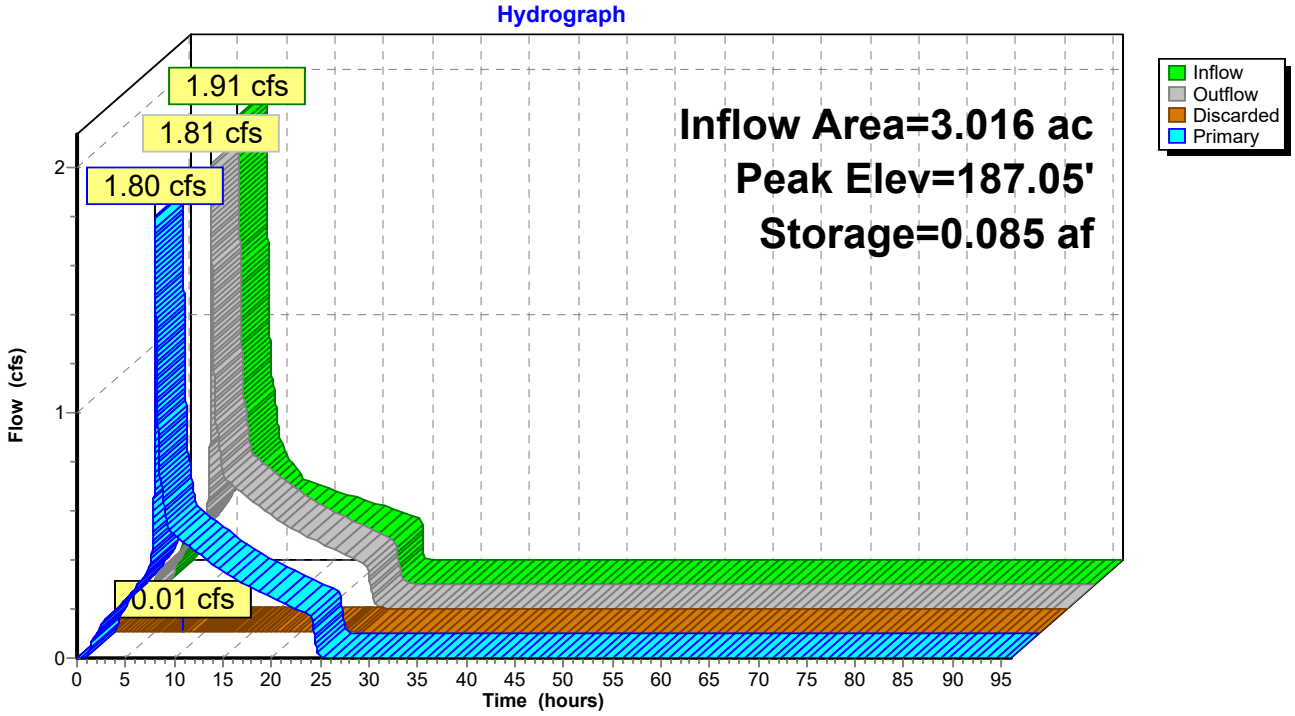
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	180.00'	**2.8" Vert. Orifice/Grate** C= 0.600
#2	Discarded	180.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	186.46'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 8.01 hrs HW=187.05' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.80 cfs @ 8.01 hrs HW=187.05' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.54 cfs @ 12.68 fps)
└**3=Orifice/Grate** (Orifice Controls 1.26 cfs @ 2.61 fps)

Pond UGD-N: Underground Detention - North



Summary for Pond UGD-P: Underground Detention - Primary

Inflow Area = 14.100 ac, 67.76% Impervious, Inflow Depth = 2.26" for 5-Year event
Inflow = 7.65 cfs @ 7.90 hrs, Volume= 2.652 af
Outflow = 7.47 cfs @ 8.00 hrs, Volume= 2.652 af, Atten= 2%, Lag= 5.9 min
Discarded = 0.02 cfs @ 8.00 hrs, Volume= 0.028 af
Primary = 7.44 cfs @ 8.00 hrs, Volume= 2.624 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 186.98' @ 8.00 hrs Surf.Area= 0.042 ac Storage= 0.194 af

Plug-Flow detention time= 19.8 min calculated for 2.651 af (100% of inflow)
Center-of-Mass det. time= 19.8 min (713.7 - 693.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	180.00'	0.077 af	**13.00'W x 142.00'L x 7.50'H Field A** 0.318 af Overall - 0.126 af Embedded = 0.192 af x 40.0% Voids
#2A	181.00'	0.126 af	**CMP Round 60** x 14 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 2 Rows of 7 Chambers
		0.203 af	Total Available Storage

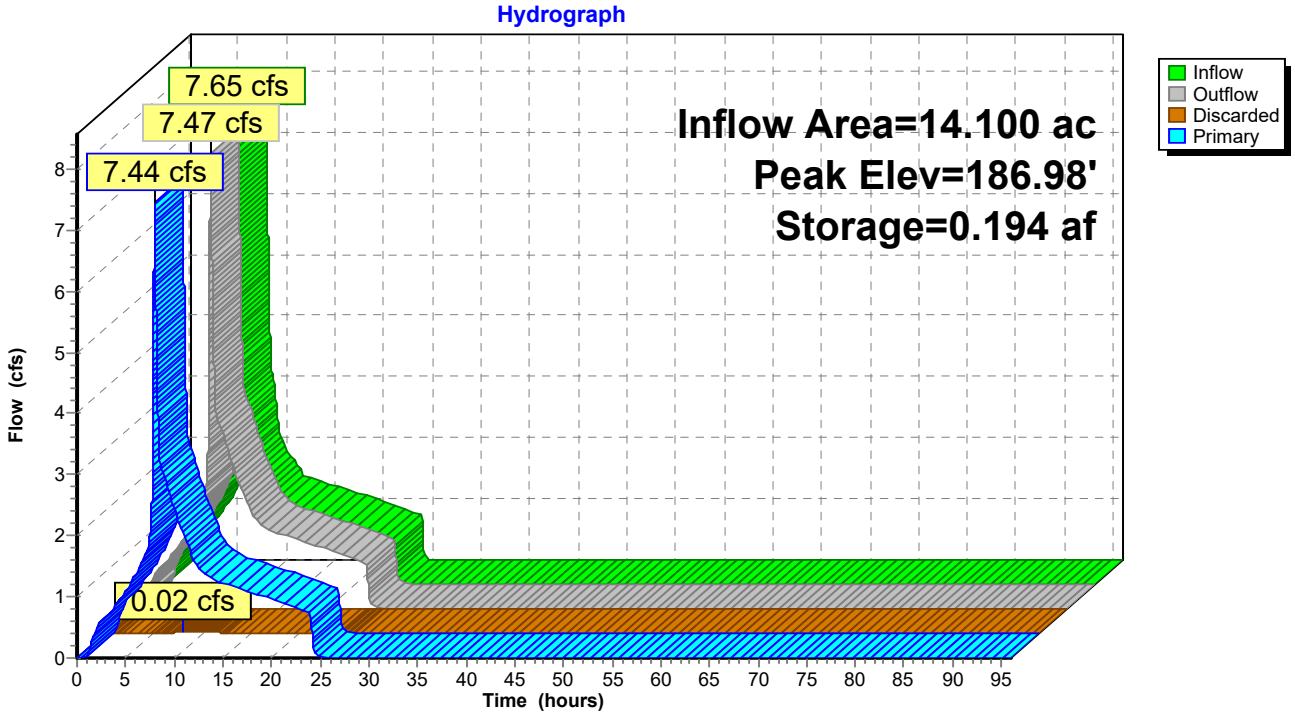
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	180.00'	**7.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	180.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	186.00'	**18.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.02 cfs @ 8.00 hrs HW=186.98' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=7.44 cfs @ 8.00 hrs HW=186.98' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 3.33 cfs @ 12.45 fps)
└**3=Orifice/Grate** (Orifice Controls 4.12 cfs @ 3.37 fps)

Pond UGD-P: Underground Detention - Primary



Summary for Pond UGD-W: Underground Detention - West

Inflow Area = 4.483 ac, 84.04% Impervious, Inflow Depth = 2.57" for 5-Year event
Inflow = 2.84 cfs @ 7.88 hrs, Volume= 0.958 af
Outflow = 1.33 cfs @ 8.33 hrs, Volume= 0.958 af, Atten= 53%, Lag= 26.9 min
Discarded = 0.02 cfs @ 8.33 hrs, Volume= 0.037 af
Primary = 1.31 cfs @ 8.33 hrs, Volume= 0.922 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 187.94' @ 8.33 hrs Surf.Area= 0.044 ac Storage= 0.205 af

Plug-Flow detention time= 168.3 min calculated for 0.958 af (100% of inflow)
Center-of-Mass det. time= 168.3 min (846.3 - 678.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	181.00'	0.079 af	**19.00'W x 102.00'L x 7.50'H Field A** 0.334 af Overall - 0.135 af Embedded = 0.198 af x 40.0% Voids
#2A	182.00'	0.135 af	**CMP Round 60** x 15 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 3 Rows of 5 Chambers
		0.215 af	Total Available Storage

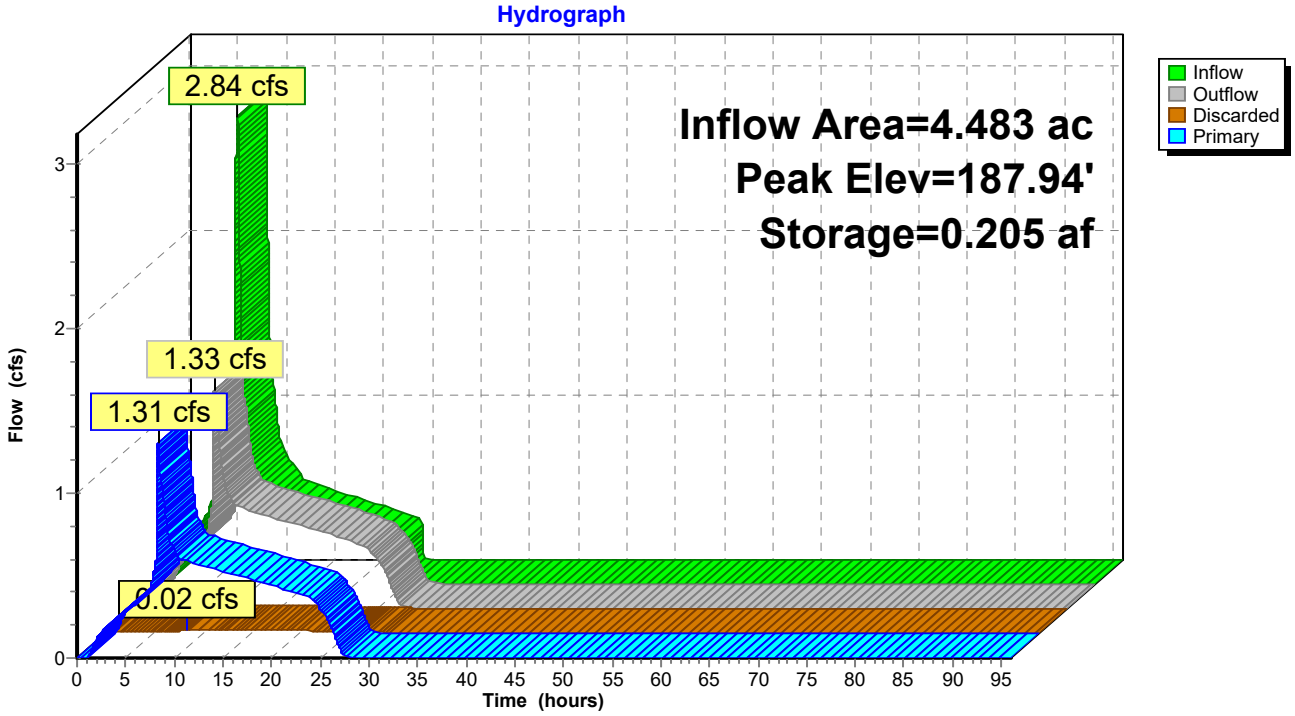
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	181.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	181.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	187.55'	**15.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.02 cfs @ 8.33 hrs HW=187.94' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.31 cfs @ 8.33 hrs HW=187.94' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.62 cfs @ 12.57 fps)
└**3=Orifice/Grate** (Orifice Controls 0.70 cfs @ 2.13 fps)

Pond UGD-W: Underground Detention - West



Summary for Subcatchment AN: Apartments - North

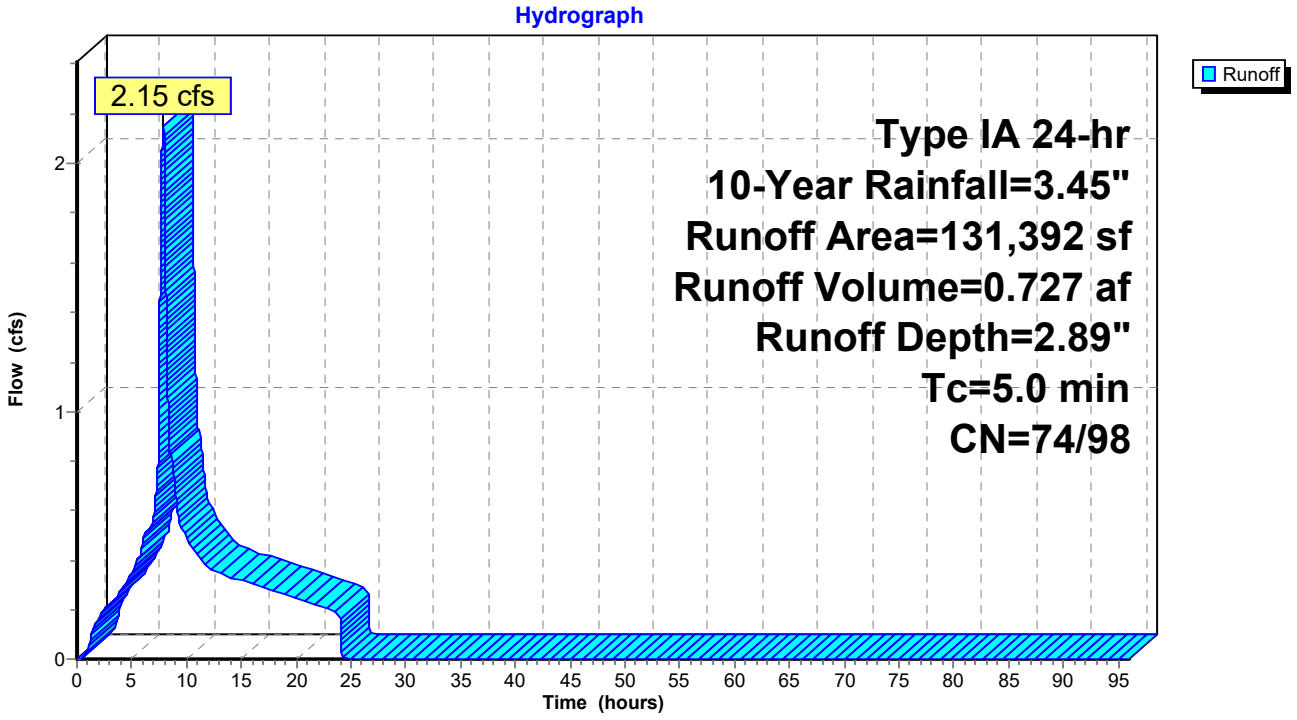
Runoff = 2.15 cfs @ 7.88 hrs, Volume= 0.727 af, Depth= 2.89"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 10-Year Rainfall=3.45"

	Area (sf)	CN	Description
*	110,287	98	
	21,105	74	>75% Grass cover, Good, HSG C
	131,392	94	Weighted Average
	21,105	74	16.06% Pervious Area
	110,287	98	83.94% Impervious Area

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

Subcatchment AN: Apartments - North



Summary for Subcatchment AS: A Street - South

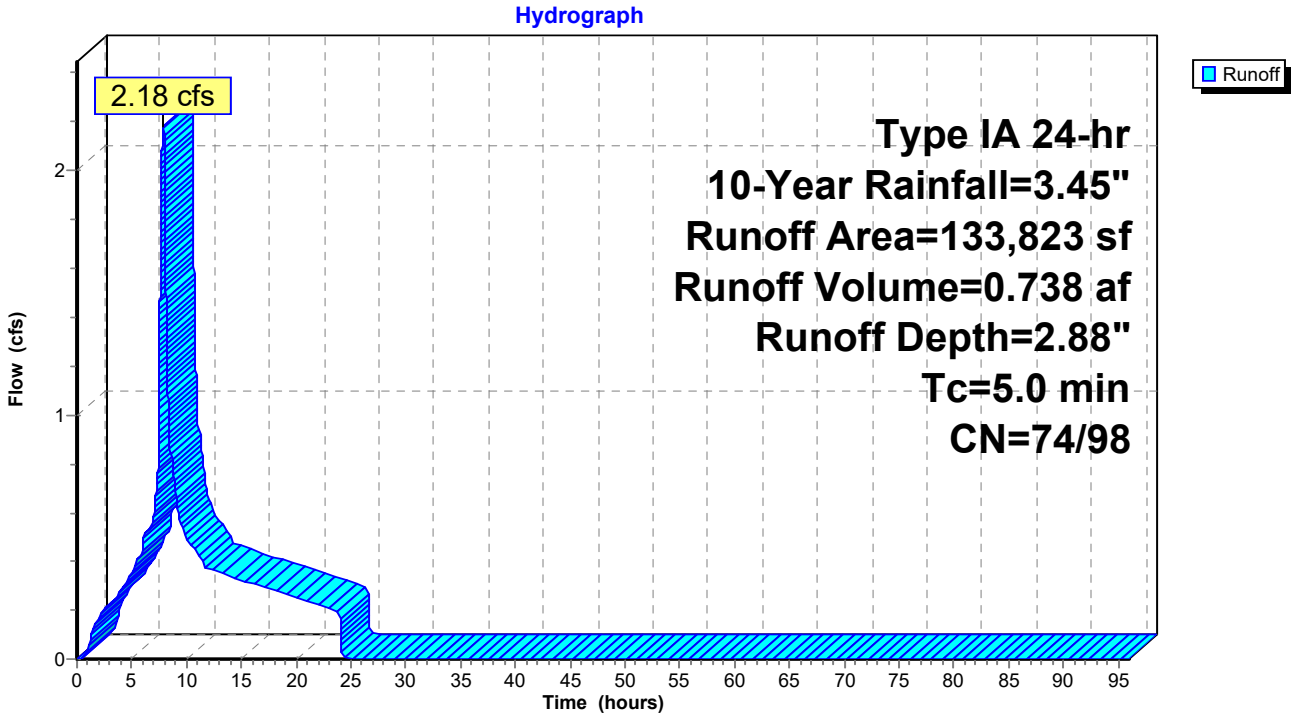
Runoff = 2.18 cfs @ 7.88 hrs, Volume= 0.738 af, Depth= 2.88"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 10-Year Rainfall=3.45"

Area (sf)	CN	Description
111,636	98	
22,187	74	>75% Grass cover, Good, HSG C
133,823	94	Weighted Average
22,187	74	16.58% Pervious Area
111,636	98	83.42% Impervious Area

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

Subcatchment AS: A Street - South



Summary for Subcatchment AW: Apartments - West

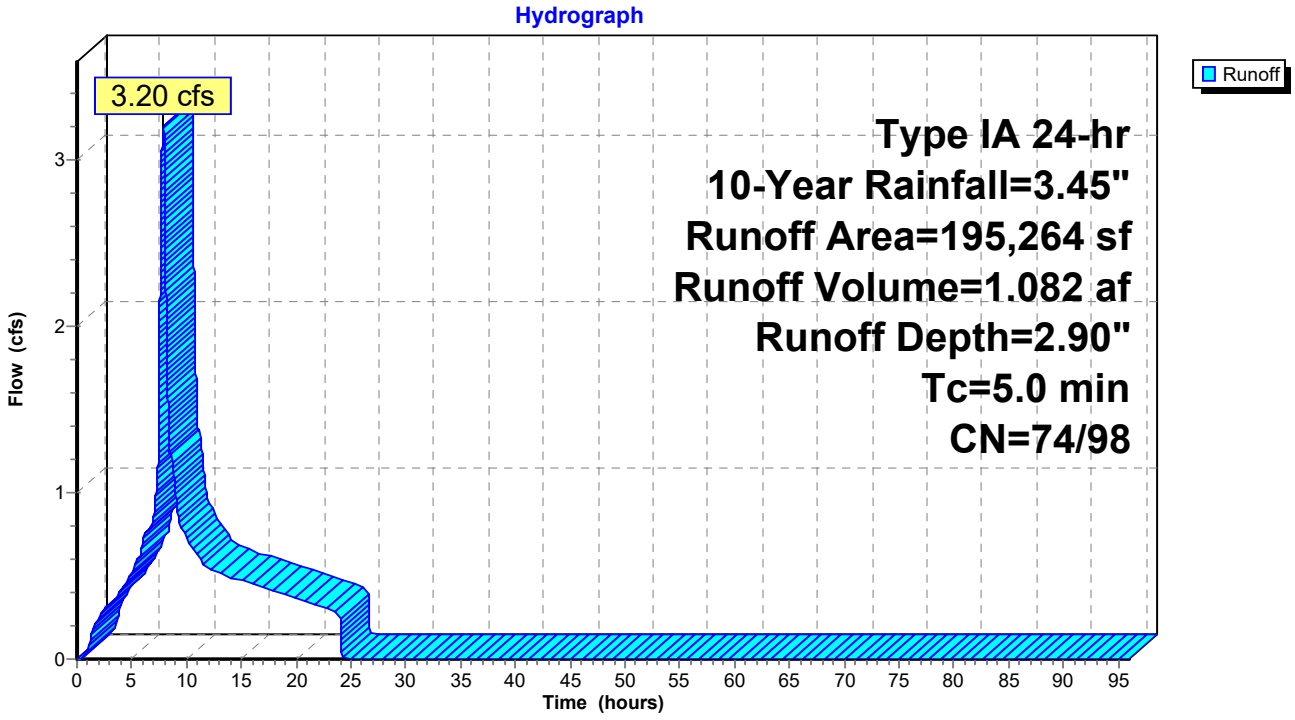
Runoff = 3.20 cfs @ 7.88 hrs, Volume= 1.082 af, Depth= 2.90"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 10-Year Rainfall=3.45"

	Area (sf)	CN	Description
*	164,095	98	
	31,169	74	>75% Grass cover, Good, HSG C
	195,264	94	Weighted Average
	31,169	74	15.96% Pervious Area
	164,095	98	84.04% Impervious Area

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

Subcatchment AW: Apartments - West



Summary for Subcatchment BC: B Street - Center

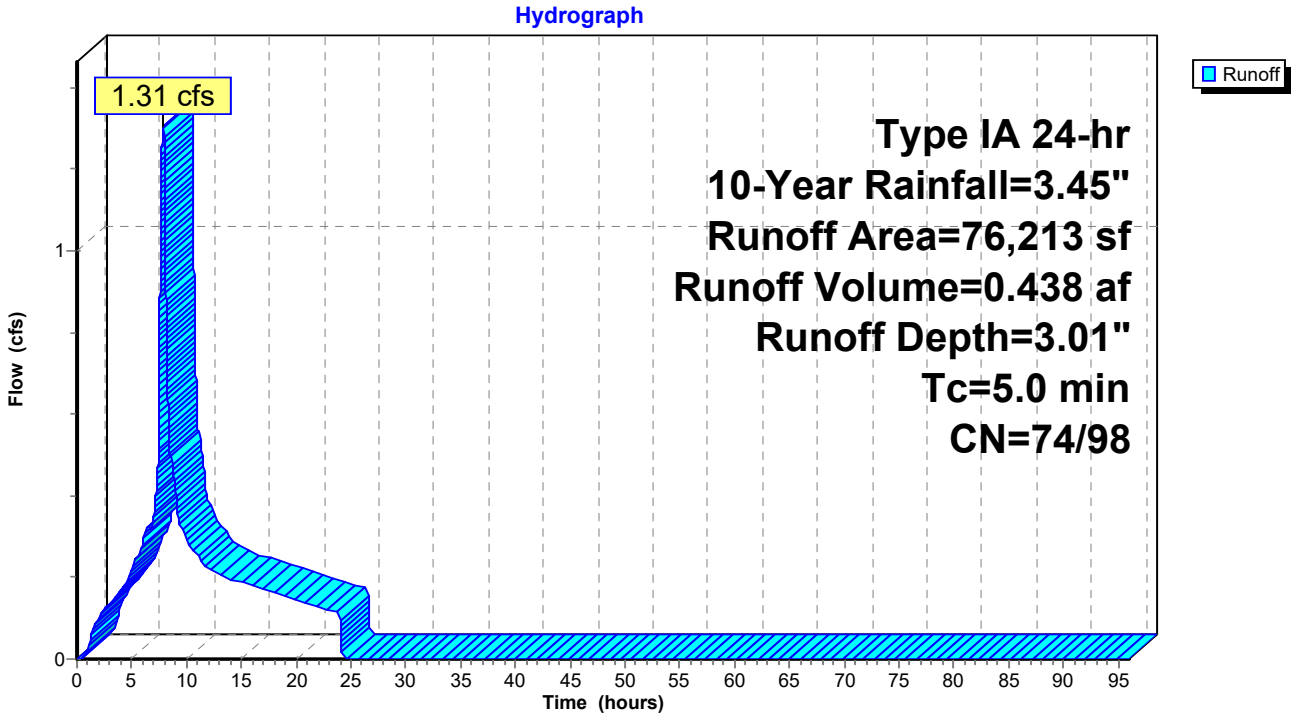
Runoff = 1.31 cfs @ 7.88 hrs, Volume= 0.438 af, Depth= 3.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 10-Year Rainfall=3.45"

	Area (sf)	CN	Description
*	68,209	98	
	8,004	74	>75% Grass cover, Good, HSG C
	76,213	95	Weighted Average
	8,004	74	10.50% Pervious Area
	68,209	98	89.50% Impervious Area

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

Subcatchment BC: B Street - Center



Summary for Subcatchment SE: Single Family - East

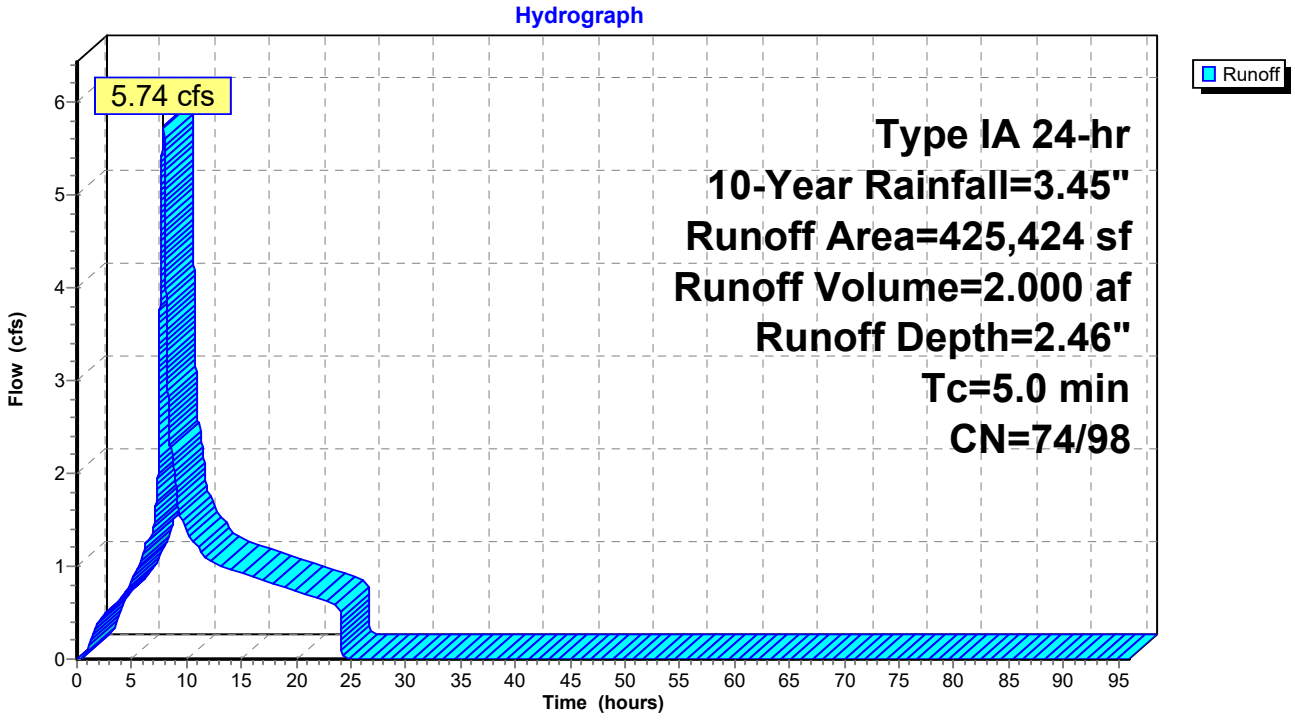
Runoff = 5.74 cfs @ 7.90 hrs, Volume= 2.000 af, Depth= 2.46"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 10-Year Rainfall=3.45"

	Area (sf)	CN	Description
*	264,845	98	
	160,579	74	>75% Grass cover, Good, HSG C
	425,424	89	Weighted Average
	160,579	74	37.75% Pervious Area
	264,845	98	62.25% Impervious Area

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

Subcatchment SE: Single Family - East



Summary for Subcatchment SS: Single Family - South

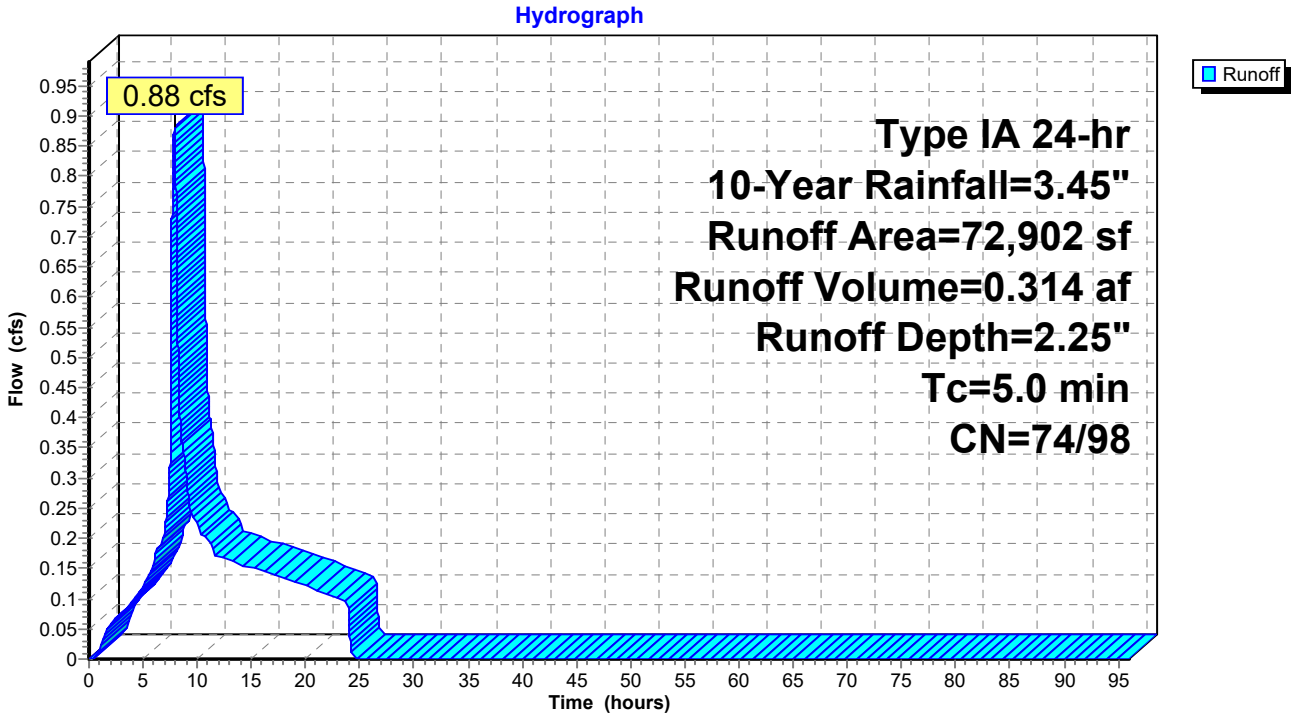
Runoff = 0.88 cfs @ 7.91 hrs, Volume= 0.314 af, Depth= 2.25"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 10-Year Rainfall=3.45"

	Area (sf)	CN	Description
*	37,878	98	
	35,024	74	>75% Grass cover, Good, HSG C
	72,902	86	Weighted Average
	35,024	74	48.04% Pervious Area
	37,878	98	51.96% Impervious Area

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

Subcatchment SS: Single Family - South



Summary for Subcatchment TC: Townhomes - Center

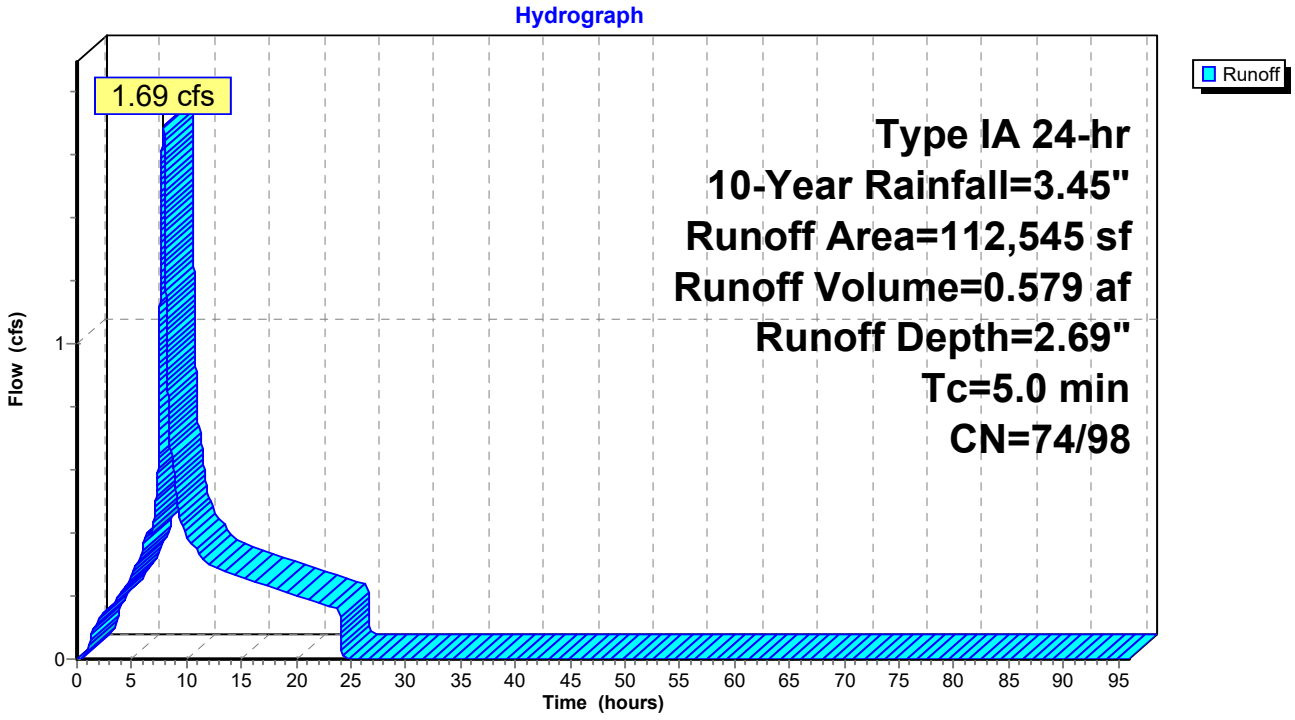
Runoff = 1.69 cfs @ 7.89 hrs, Volume= 0.579 af, Depth= 2.69"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 10-Year Rainfall=3.45"

	Area (sf)	CN	Description
*	83,094	98	
	29,451	74	>75% Grass cover, Good, HSG C
	112,545	92	Weighted Average
	29,451	74	26.17% Pervious Area
	83,094	98	73.83% Impervious Area

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

Subcatchment TC: Townhomes - Center

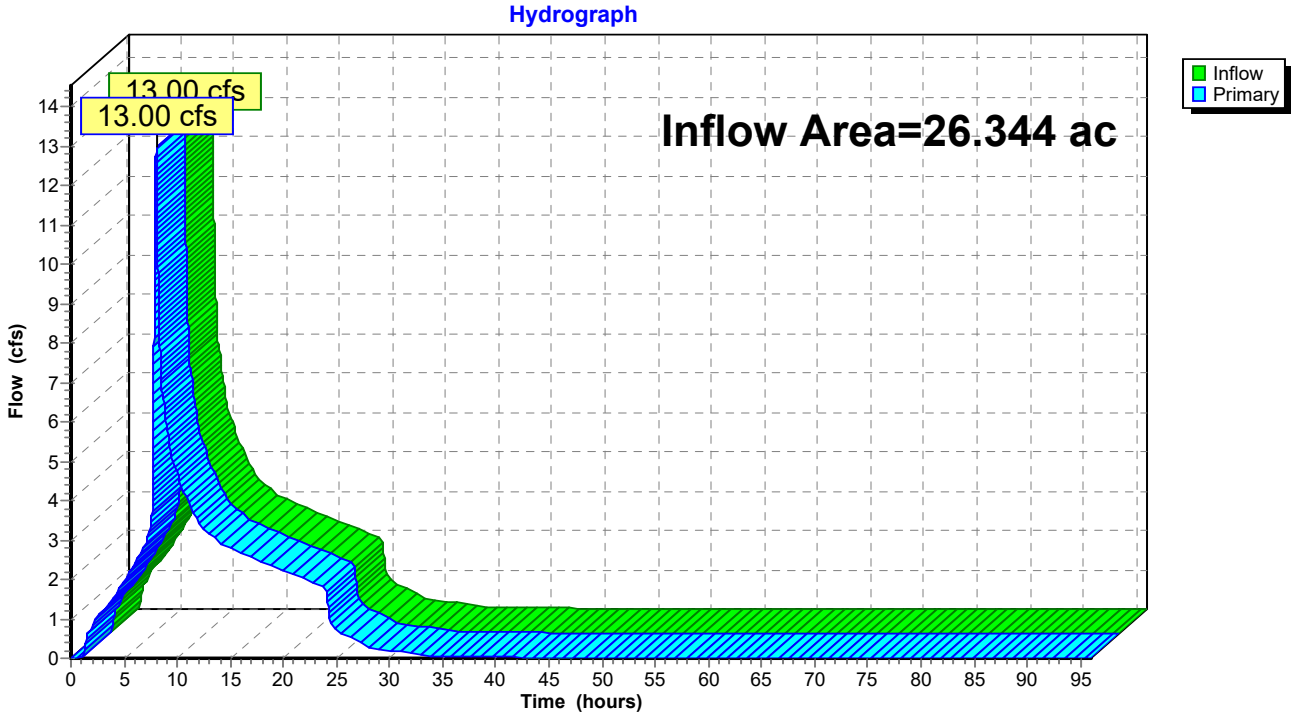


Summary for Pond MAIN OUT: 27" Existing Main

Inflow Area = 26.344 ac, 73.20% Impervious, Inflow Depth = 2.61" for 10-Year event
Inflow = 13.00 cfs @ 8.02 hrs, Volume= 5.726 af
Primary = 13.00 cfs @ 8.02 hrs, Volume= 5.726 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs

Pond MAIN OUT: 27" Existing Main



Summary for Pond SP-S: Storm Pond - South

Inflow Area = 4.746 ac, 72.33% Impervious, Inflow Depth = 2.66" for 10-Year event
Inflow = 3.07 cfs @ 7.89 hrs, Volume= 1.052 af
Outflow = 1.20 cfs @ 8.62 hrs, Volume= 1.052 af, Atten= 61%, Lag= 43.9 min
Discarded = 0.03 cfs @ 8.62 hrs, Volume= 0.071 af
Primary = 1.17 cfs @ 8.62 hrs, Volume= 0.981 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 186.35' @ 8.62 hrs Surf.Area= 4,531 sf Storage= 12,827 cf

Plug-Flow detention time= 350.3 min calculated for 1.052 af (100% of inflow)
Center-of-Mass det. time= 350.3 min (1,037.1 - 686.7)

Volume	Invert	Avail.Storage	Storage Description
#1	182.20'	21,195 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

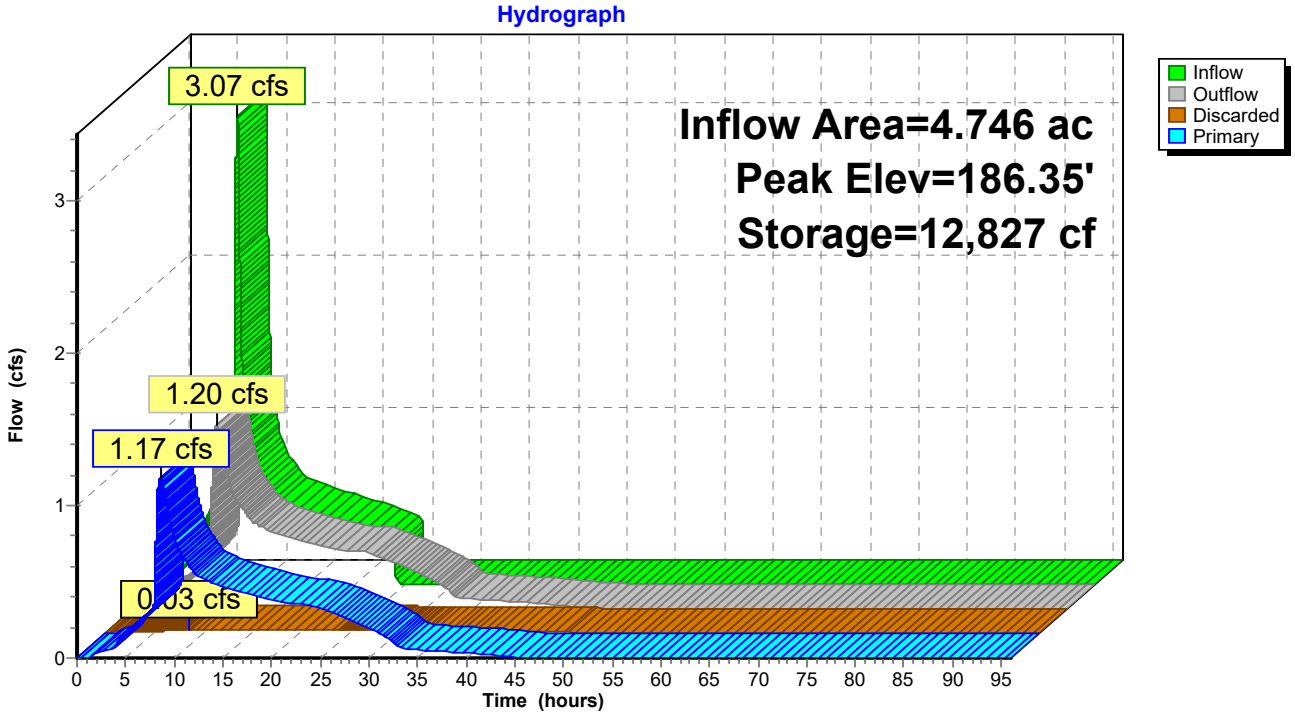
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
182.20	1,760	0	0	1,760
183.00	2,287	1,614	1,614	2,302
184.00	2,880	2,578	4,192	2,922
185.00	3,535	3,202	7,394	3,607
186.00	4,254	3,889	11,283	4,359
187.00	5,064	4,653	15,936	5,204
188.00	5,456	5,259	21,195	5,673

Device	Routing	Invert	Outlet Devices
#1	Primary	182.20'	**1.5" Vert. Orifice/Grate** C= 0.600
#2	Primary	183.15'	**2.4" Vert. Orifice/Grate** C= 0.600
#3	Discarded	182.20'	**0.250 in/hr Exfiltration over Wetted area**
#4	Primary	185.90'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.03 cfs @ 8.62 hrs HW=186.35' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=1.17 cfs @ 8.62 hrs HW=186.35' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.12 cfs @ 9.74 fps)
├**2=Orifice/Grate** (Orifice Controls 0.27 cfs @ 8.48 fps)
└**4=Orifice/Grate** (Orifice Controls 0.79 cfs @ 2.29 fps)

Pond SP-S: Storm Pond - South



Summary for Pond UGD-N: Underground Detention - North

Inflow Area = 3.016 ac, 83.94% Impervious, Inflow Depth = 2.89" for 10-Year event
Inflow = 2.15 cfs @ 7.88 hrs, Volume= 0.727 af
Outflow = 2.14 cfs @ 7.93 hrs, Volume= 0.727 af, Atten= 1%, Lag= 3.0 min
Discarded = 0.01 cfs @ 7.93 hrs, Volume= 0.015 af
Primary = 2.13 cfs @ 7.93 hrs, Volume= 0.712 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 187.14' @ 7.93 hrs Surf.Area= 0.019 ac Storage= 0.085 af

Plug-Flow detention time= 68.5 min calculated for 0.727 af (100% of inflow)
Center-of-Mass det. time= 68.5 min (744.1 - 675.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	180.00'	0.034 af	**13.00'W x 62.00'L x 7.50'H Field A** 0.139 af Overall - 0.054 af Embedded = 0.085 af x 40.0% Voids
#2A	181.00'	0.054 af	**CMP Round 60** x 6 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 2 Rows of 3 Chambers
		0.088 af	Total Available Storage

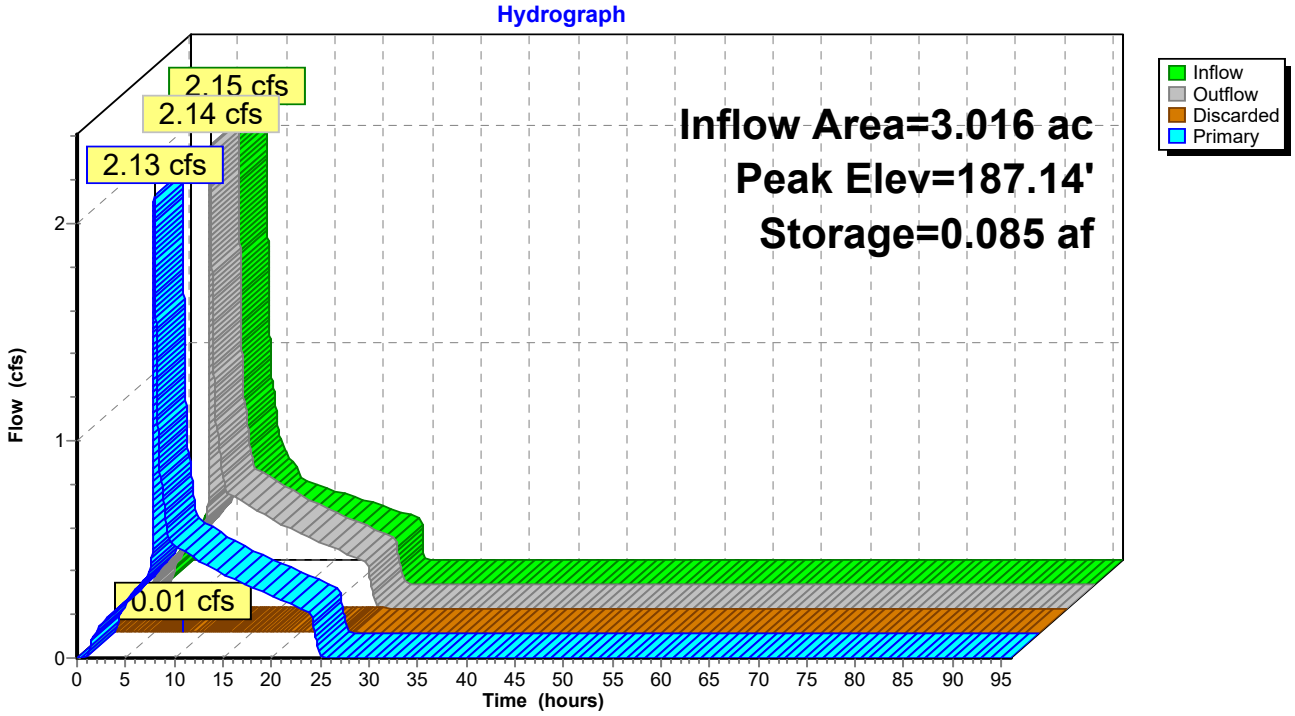
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	180.00'	**2.8" Vert. Orifice/Grate** C= 0.600
#2	Discarded	180.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	186.46'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 7.93 hrs HW=187.14' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=2.13 cfs @ 7.93 hrs HW=187.14' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.55 cfs @ 12.76 fps)
└**3=Orifice/Grate** (Orifice Controls 1.58 cfs @ 2.80 fps)

Pond UGD-N: Underground Detention - North



Summary for Pond UGD-P: Underground Detention - Primary

Inflow Area = 14.100 ac, 67.76% Impervious, Inflow Depth = 2.57" for 10-Year event
Inflow = 8.73 cfs @ 7.90 hrs, Volume= 3.018 af
Outflow = 8.68 cfs @ 7.94 hrs, Volume= 3.018 af, Atten= 1%, Lag= 2.8 min
Discarded = 0.02 cfs @ 7.94 hrs, Volume= 0.029 af
Primary = 8.66 cfs @ 7.94 hrs, Volume= 2.989 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 187.15' @ 7.94 hrs Surf.Area= 0.042 ac Storage= 0.197 af

Plug-Flow detention time= 20.8 min calculated for 3.018 af (100% of inflow)
Center-of-Mass det. time= 20.8 min (712.4 - 691.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	180.00'	0.077 af	**13.00'W x 142.00'L x 7.50'H Field A** 0.318 af Overall - 0.126 af Embedded = 0.192 af x 40.0% Voids
#2A	181.00'	0.126 af	**CMP Round 60** x 14 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 2 Rows of 7 Chambers
		0.203 af	Total Available Storage

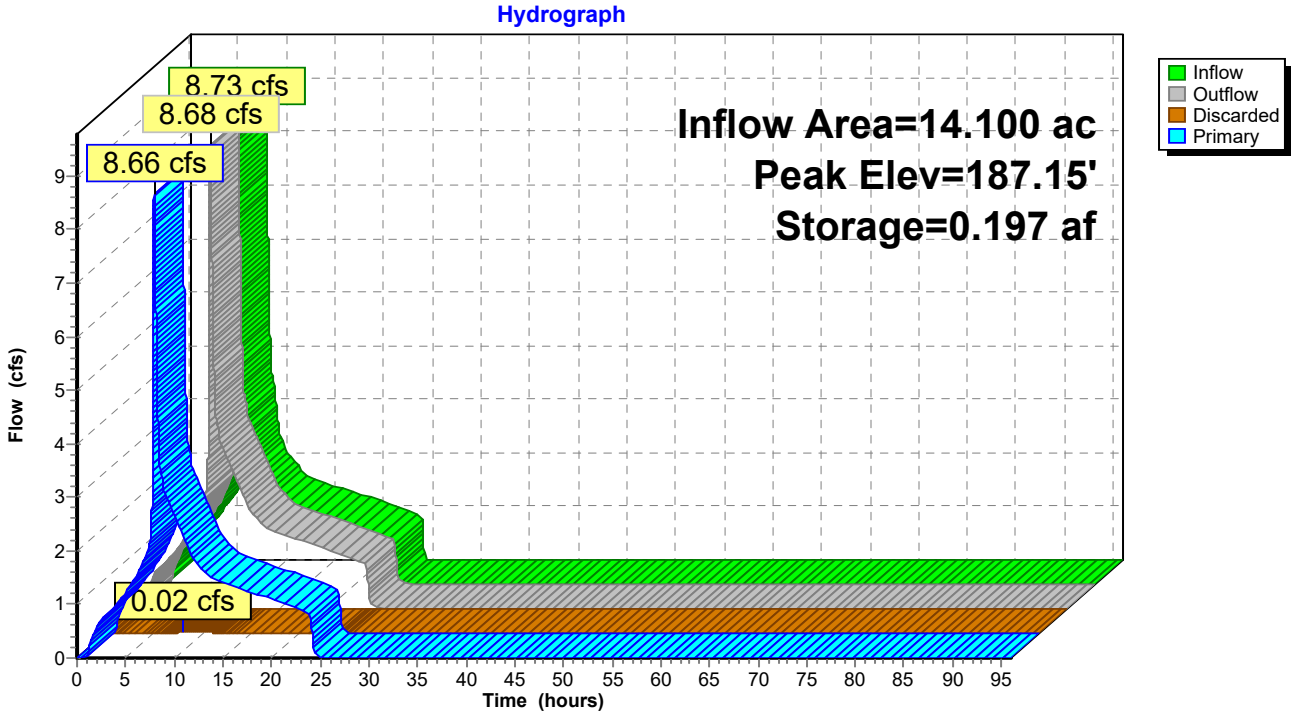
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	180.00'	**7.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	180.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	186.00'	**18.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.02 cfs @ 7.94 hrs HW=187.15' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=8.66 cfs @ 7.94 hrs HW=187.15' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 3.37 cfs @ 12.61 fps)
└**3=Orifice/Grate** (Orifice Controls 5.29 cfs @ 3.65 fps)

Pond UGD-P: Underground Detention - Primary



Summary for Pond UGD-W: Underground Detention - West

Inflow Area = 4.483 ac, 84.04% Impervious, Inflow Depth = 2.90" for 10-Year event
Inflow = 3.20 cfs @ 7.88 hrs, Volume= 1.082 af
Outflow = 2.47 cfs @ 8.07 hrs, Volume= 1.082 af, Atten= 23%, Lag= 11.3 min
Discarded = 0.02 cfs @ 8.07 hrs, Volume= 0.038 af
Primary = 2.45 cfs @ 8.07 hrs, Volume= 1.043 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 188.21' @ 8.07 hrs Surf.Area= 0.044 ac Storage= 0.209 af

Plug-Flow detention time= 167.3 min calculated for 1.082 af (100% of inflow)
Center-of-Mass det. time= 167.3 min (842.8 - 675.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	181.00'	0.079 af	**19.00'W x 102.00'L x 7.50'H Field A** 0.334 af Overall - 0.135 af Embedded = 0.198 af x 40.0% Voids
#2A	182.00'	0.135 af	**CMP Round 60** x 15 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 3 Rows of 5 Chambers
		0.215 af	Total Available Storage

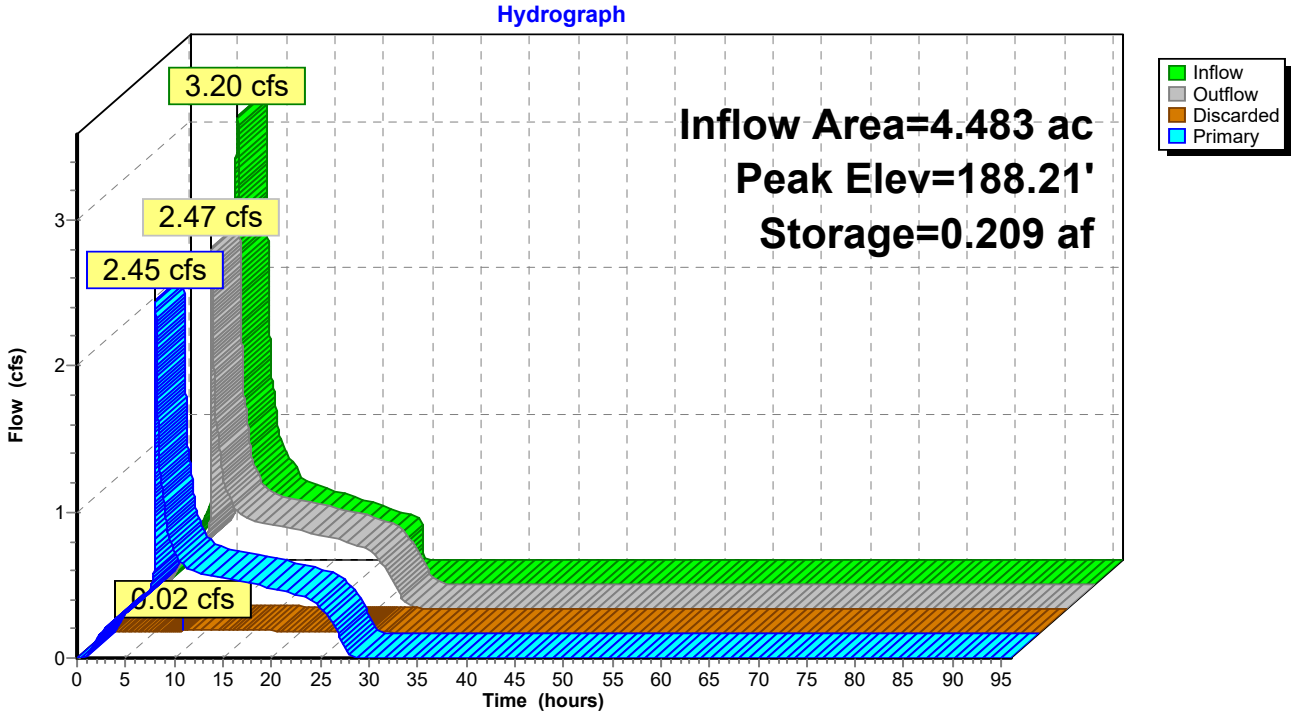
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	181.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	181.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	187.55'	**15.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.02 cfs @ 8.07 hrs HW=188.21' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=2.45 cfs @ 8.07 hrs HW=188.21' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.63 cfs @ 12.82 fps)
└**3=Orifice/Grate** (Orifice Controls 1.82 cfs @ 2.77 fps)

Pond UGD-W: Underground Detention - West



Summary for Subcatchment AN: Apartments - North

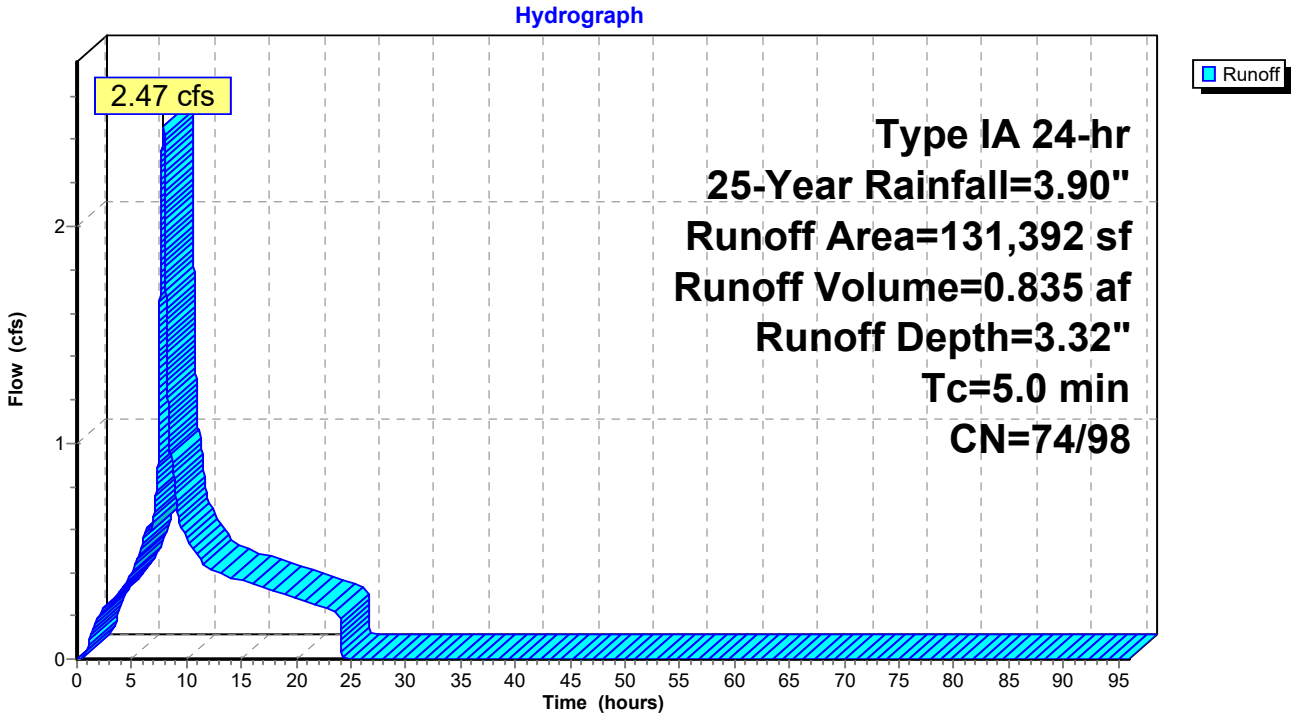
Runoff = 2.47 cfs @ 7.88 hrs, Volume= 0.835 af, Depth= 3.32"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 25-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	110,287	98	
	21,105	74	>75% Grass cover, Good, HSG C
	131,392	94	Weighted Average
	21,105	74	16.06% Pervious Area
	110,287	98	83.94% Impervious Area

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

Subcatchment AN: Apartments - North



Summary for Subcatchment AS: A Street - South

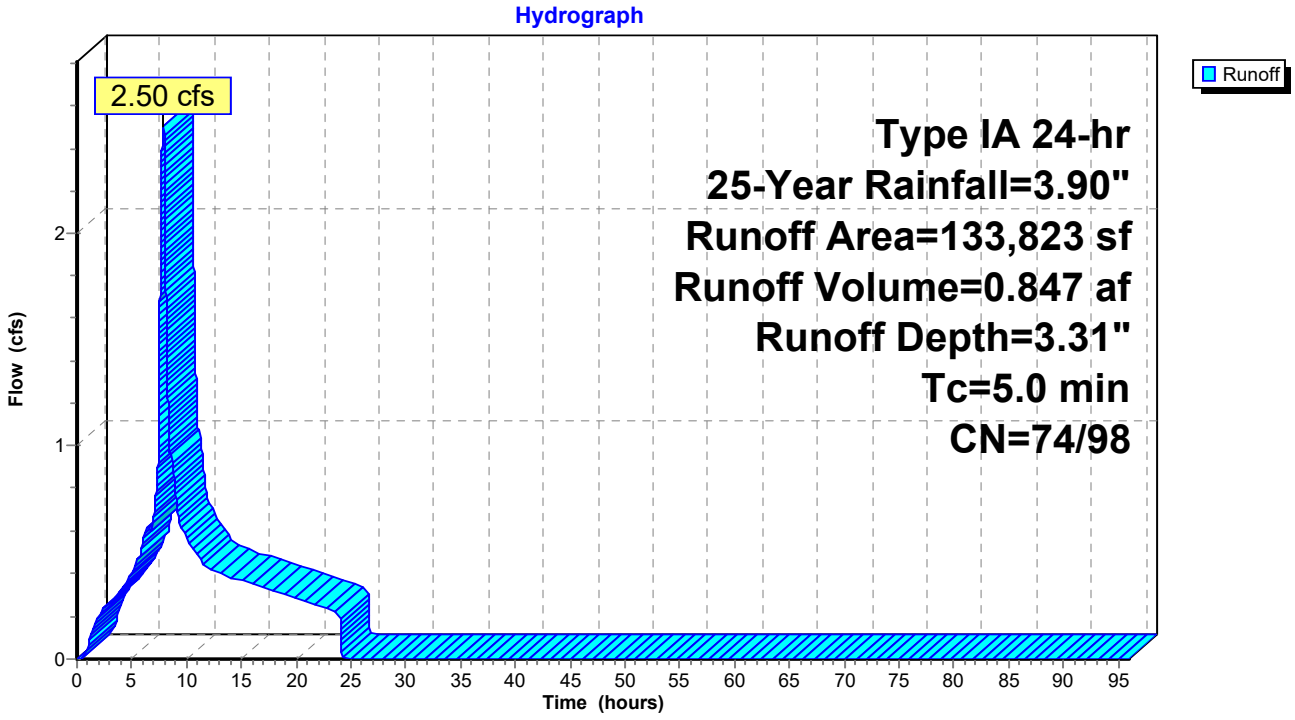
Runoff = 2.50 cfs @ 7.88 hrs, Volume= 0.847 af, Depth= 3.31"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 25-Year Rainfall=3.90"

Area (sf)	CN	Description
111,636	98	
22,187	74	>75% Grass cover, Good, HSG C
133,823	94	Weighted Average
22,187	74	16.58% Pervious Area
111,636	98	83.42% Impervious Area

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

Subcatchment AS: A Street - South



Summary for Subcatchment AW: Apartments - West

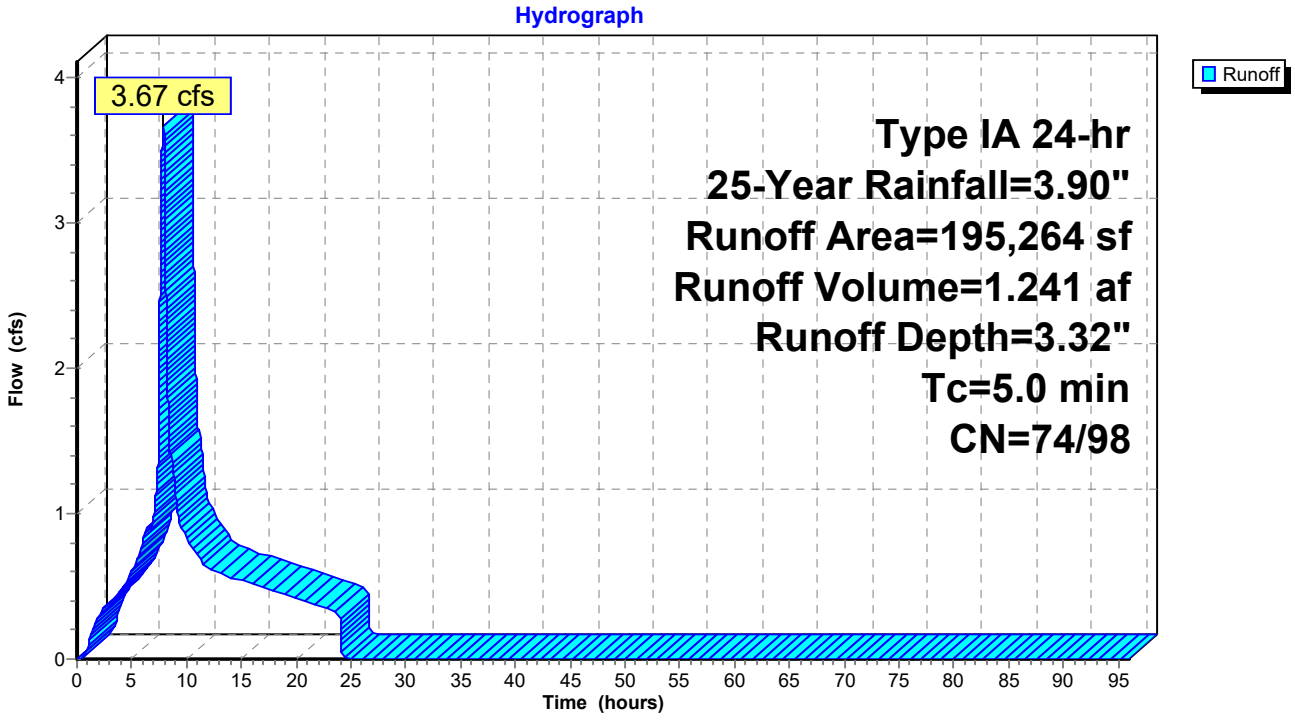
Runoff = 3.67 cfs @ 7.88 hrs, Volume= 1.241 af, Depth= 3.32"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 25-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	164,095	98	
	31,169	74	>75% Grass cover, Good, HSG C
	195,264	94	Weighted Average
	31,169	74	15.96% Pervious Area
	164,095	98	84.04% Impervious Area

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

Subcatchment AW: Apartments - West



Summary for Subcatchment BC: B Street - Center

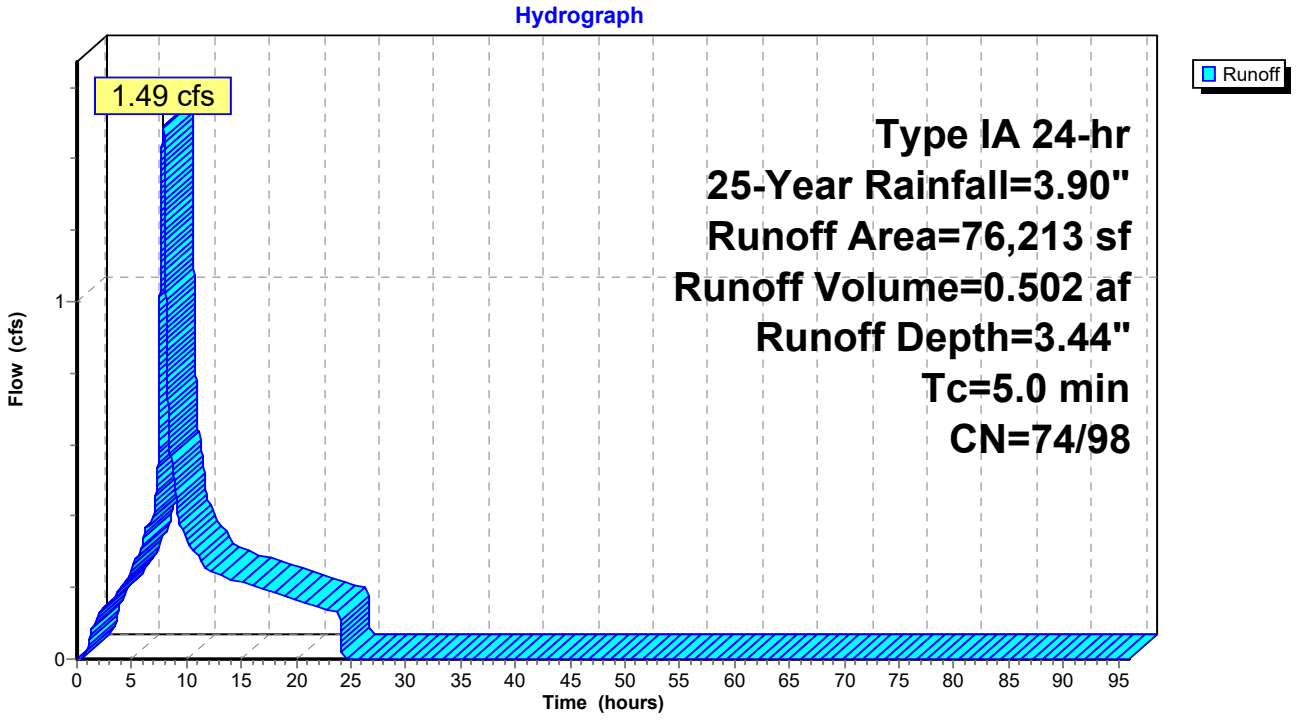
Runoff = 1.49 cfs @ 7.88 hrs, Volume= 0.502 af, Depth= 3.44"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 25-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	68,209	98	
	8,004	74	>75% Grass cover, Good, HSG C
	76,213	95	Weighted Average
	8,004	74	10.50% Pervious Area
	68,209	98	89.50% Impervious Area

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

Subcatchment BC: B Street - Center



Summary for Subcatchment SE: Single Family - East

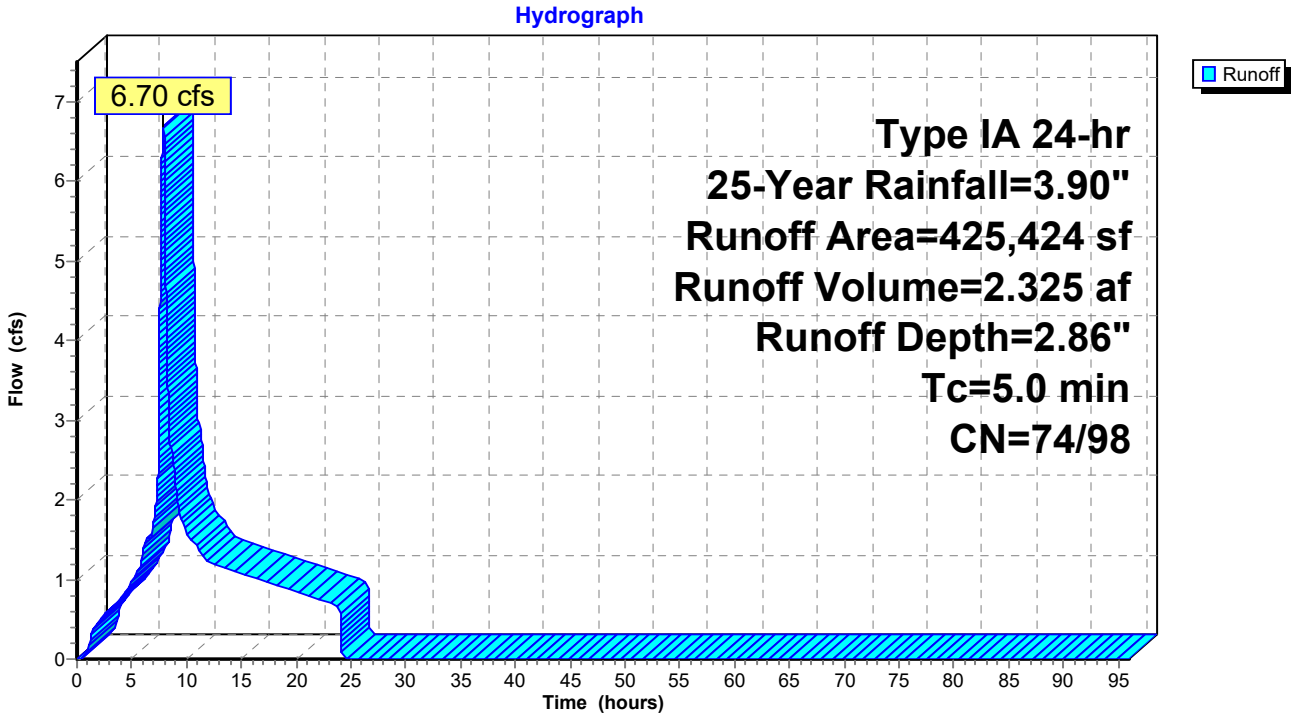
Runoff = 6.70 cfs @ 7.90 hrs, Volume= 2.325 af, Depth= 2.86"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 25-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	264,845	98	
	160,579	74	>75% Grass cover, Good, HSG C
	425,424	89	Weighted Average
	160,579	74	37.75% Pervious Area
	264,845	98	62.25% Impervious Area

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

Subcatchment SE: Single Family - East



Summary for Subcatchment SS: Single Family - South

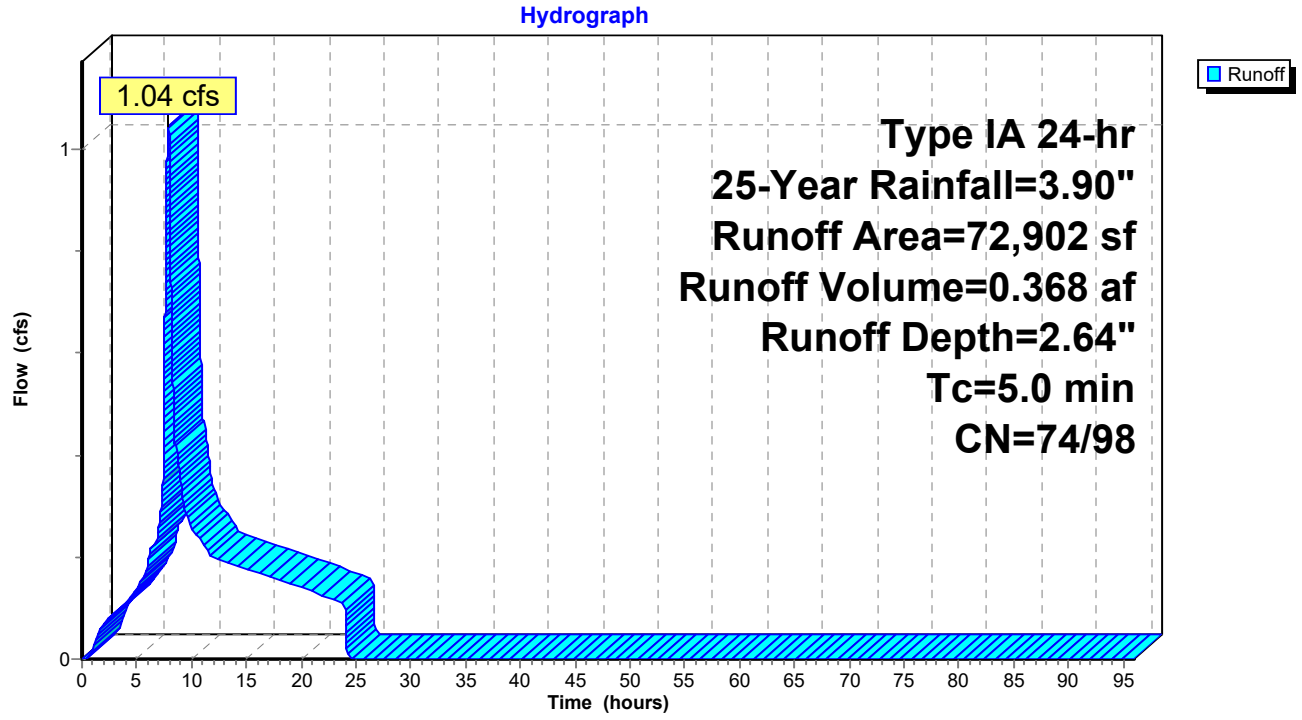
Runoff = 1.04 cfs @ 7.91 hrs, Volume= 0.368 af, Depth= 2.64"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 25-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	37,878	98	
	35,024	74	>75% Grass cover, Good, HSG C
	72,902	86	Weighted Average
	35,024	74	48.04% Pervious Area
	37,878	98	51.96% Impervious Area

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

Subcatchment SS: Single Family - South



Summary for Subcatchment TC: Townhomes - Center

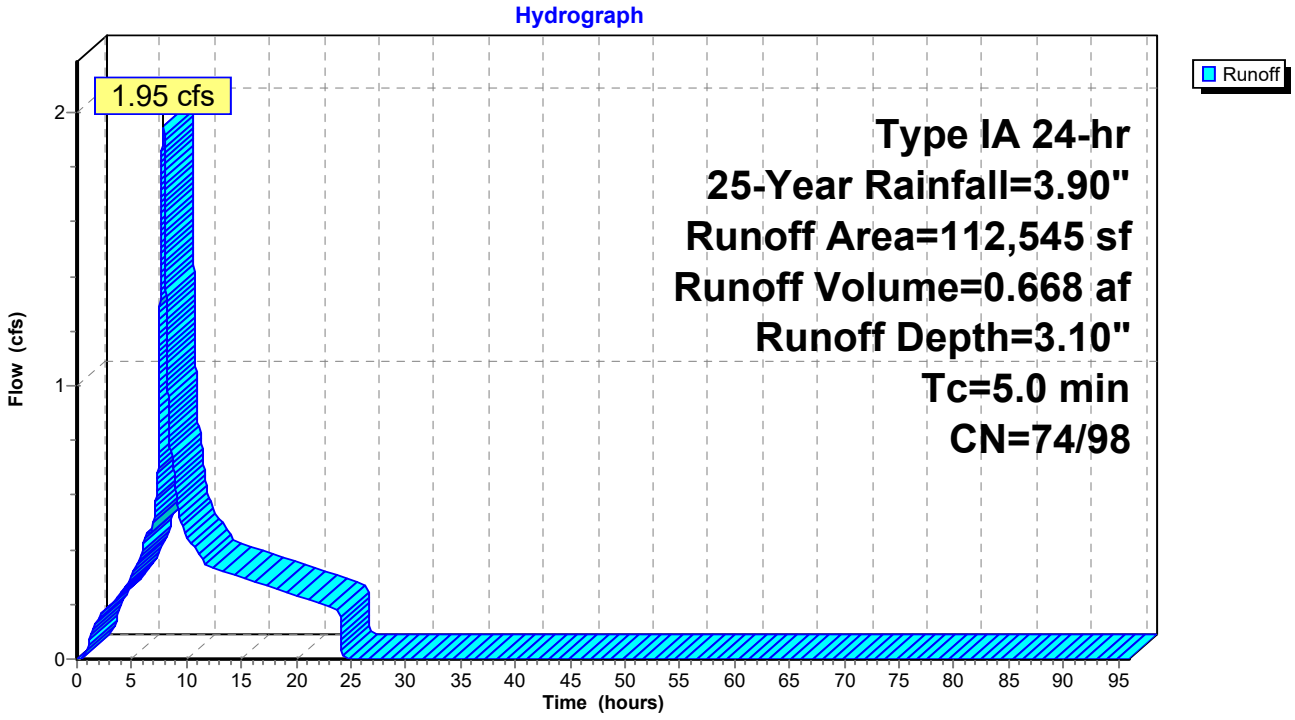
Runoff = 1.95 cfs @ 7.89 hrs, Volume= 0.668 af, Depth= 3.10"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 25-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	83,094	98	
	29,451	74	>75% Grass cover, Good, HSG C
	112,545	92	Weighted Average
	29,451	74	26.17% Pervious Area
	83,094	98	73.83% Impervious Area

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

Subcatchment TC: Townhomes - Center

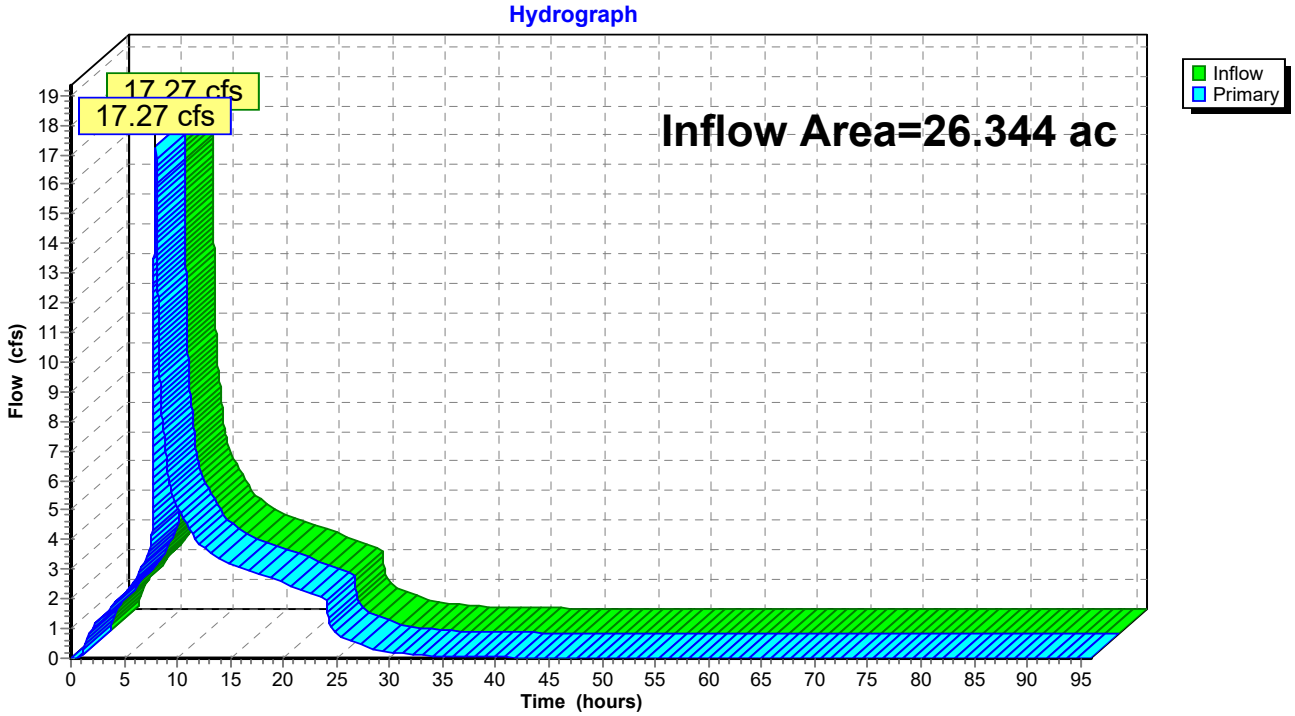


Summary for Pond MAIN OUT: 27" Existing Main

Inflow Area = 26.344 ac, 73.20% Impervious, Inflow Depth = 3.02" for 25-Year event
Inflow = 17.27 cfs @ 8.00 hrs, Volume= 6.628 af
Primary = 17.27 cfs @ 8.00 hrs, Volume= 6.628 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs

Pond MAIN OUT: 27" Existing Main



Summary for Pond SP-S: Storm Pond - South

Inflow Area = 4.746 ac, 72.33% Impervious, Inflow Depth = 3.07" for 25-Year event
Inflow = 3.55 cfs @ 7.89 hrs, Volume= 1.215 af
Outflow = 1.91 cfs @ 8.25 hrs, Volume= 1.215 af, Atten= 46%, Lag= 21.5 min
Discarded = 0.03 cfs @ 8.25 hrs, Volume= 0.073 af
Primary = 1.88 cfs @ 8.25 hrs, Volume= 1.143 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 186.55' @ 8.25 hrs Surf.Area= 4,691 sf Storage= 13,744 cf

Plug-Flow detention time= 318.0 min calculated for 1.215 af (100% of inflow)
Center-of-Mass det. time= 318.0 min (1,002.2 - 684.2)

Volume	Invert	Avail.Storage	Storage Description
#1	182.20'	21,195 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

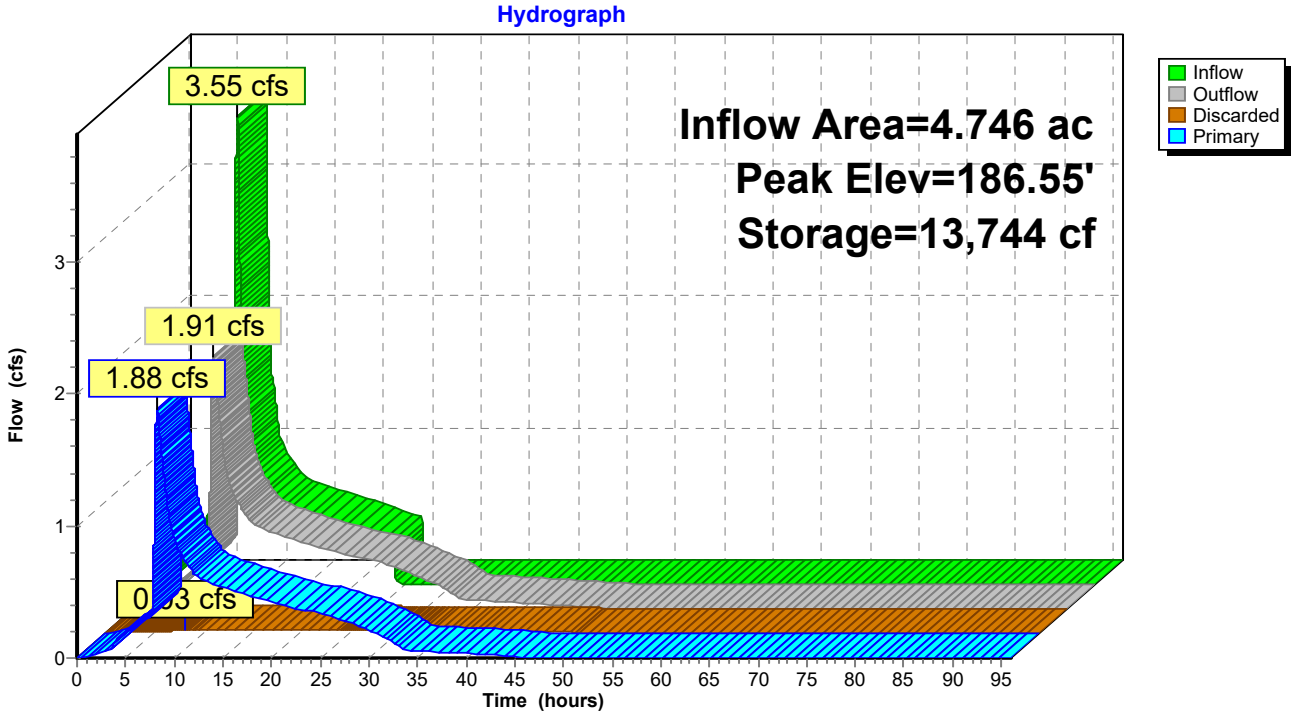
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
182.20	1,760	0	0	1,760
183.00	2,287	1,614	1,614	2,302
184.00	2,880	2,578	4,192	2,922
185.00	3,535	3,202	7,394	3,607
186.00	4,254	3,889	11,283	4,359
187.00	5,064	4,653	15,936	5,204
188.00	5,456	5,259	21,195	5,673

Device	Routing	Invert	Outlet Devices
#1	Primary	182.20'	**1.5" Vert. Orifice/Grate** C= 0.600
#2	Primary	183.15'	**2.4" Vert. Orifice/Grate** C= 0.600
#3	Discarded	182.20'	**0.250 in/hr Exfiltration over Wetted area**
#4	Primary	185.90'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.03 cfs @ 8.25 hrs HW=186.55' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=1.88 cfs @ 8.25 hrs HW=186.55' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.12 cfs @ 9.97 fps)
├**2=Orifice/Grate** (Orifice Controls 0.27 cfs @ 8.75 fps)
└**4=Orifice/Grate** (Orifice Controls 1.49 cfs @ 2.75 fps)

Pond SP-S: Storm Pond - South



Summary for Pond UGD-N: Underground Detention - North

Inflow Area = 3.016 ac, 83.94% Impervious, Inflow Depth = 3.32" for 25-Year event
Inflow = 2.47 cfs @ 7.88 hrs, Volume= 0.835 af
Outflow = 2.46 cfs @ 7.91 hrs, Volume= 0.835 af, Atten= 0%, Lag= 1.4 min
Discarded = 0.01 cfs @ 7.91 hrs, Volume= 0.016 af
Primary = 2.45 cfs @ 7.91 hrs, Volume= 0.819 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 187.22' @ 7.91 hrs Surf.Area= 0.019 ac Storage= 0.086 af

Plug-Flow detention time= 71.1 min calculated for 0.835 af (100% of inflow)
Center-of-Mass det. time= 71.1 min (744.1 - 672.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	180.00'	0.034 af	**13.00'W x 62.00'L x 7.50'H Field A** 0.139 af Overall - 0.054 af Embedded = 0.085 af x 40.0% Voids
#2A	181.00'	0.054 af	**CMP Round 60** x 6 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 2 Rows of 3 Chambers
		0.088 af	Total Available Storage

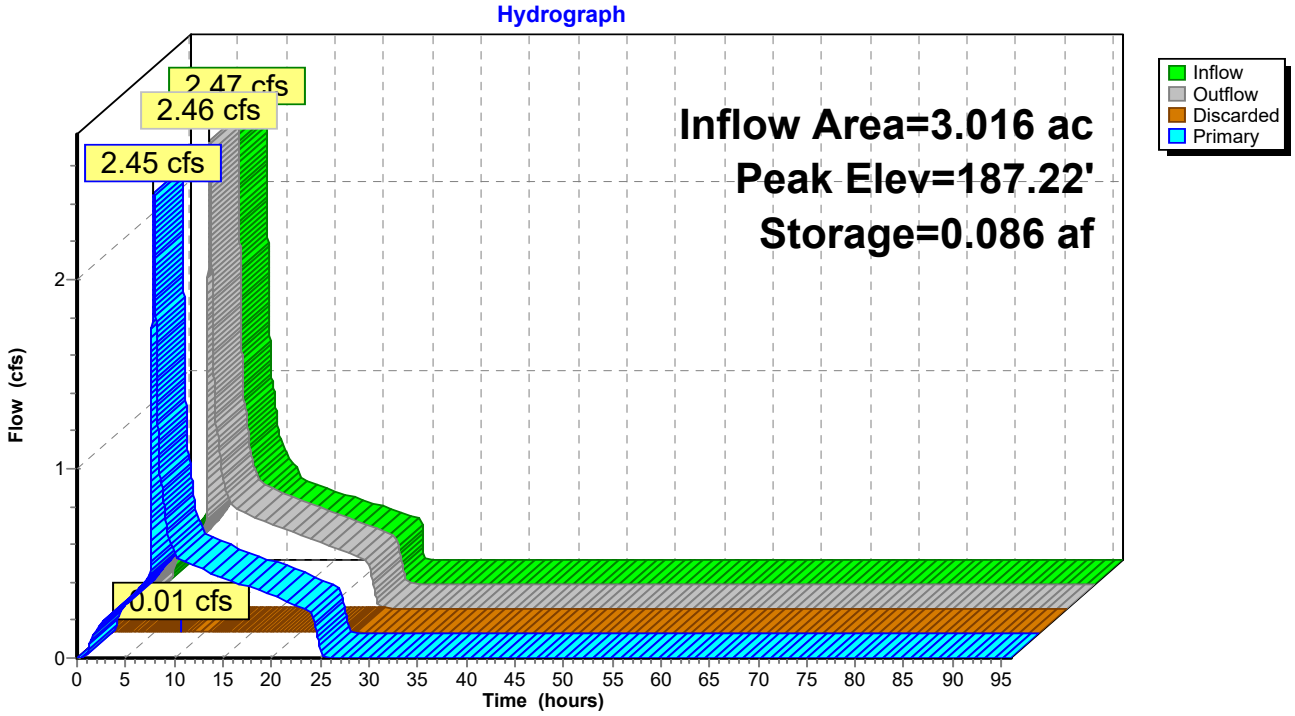
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	180.00'	**2.8" Vert. Orifice/Grate** C= 0.600
#2	Discarded	180.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	186.46'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 7.91 hrs HW=187.22' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=2.45 cfs @ 7.91 hrs HW=187.22' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.55 cfs @ 12.83 fps)
└**3=Orifice/Grate** (Orifice Controls 1.90 cfs @ 2.97 fps)

Pond UGD-N: Underground Detention - North



Summary for Pond UGD-P: Underground Detention - Primary

Inflow Area = 14.100 ac, 67.76% Impervious, Inflow Depth = 2.97" for 25-Year event
Inflow = 10.15 cfs @ 7.89 hrs, Volume= 3.495 af
Outflow = 10.12 cfs @ 7.93 hrs, Volume= 3.495 af, Atten= 0%, Lag= 2.0 min
Discarded = 0.02 cfs @ 7.93 hrs, Volume= 0.030 af
Primary = 10.09 cfs @ 7.93 hrs, Volume= 3.465 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 187.36' @ 7.93 hrs Surf.Area= 0.042 ac Storage= 0.200 af

Plug-Flow detention time= 22.1 min calculated for 3.495 af (100% of inflow)
Center-of-Mass det. time= 22.1 min (711.2 - 689.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	180.00'	0.077 af	**13.00'W x 142.00'L x 7.50'H Field A** 0.318 af Overall - 0.126 af Embedded = 0.192 af x 40.0% Voids
#2A	181.00'	0.126 af	**CMP Round 60** x 14 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 2 Rows of 7 Chambers
		0.203 af	Total Available Storage

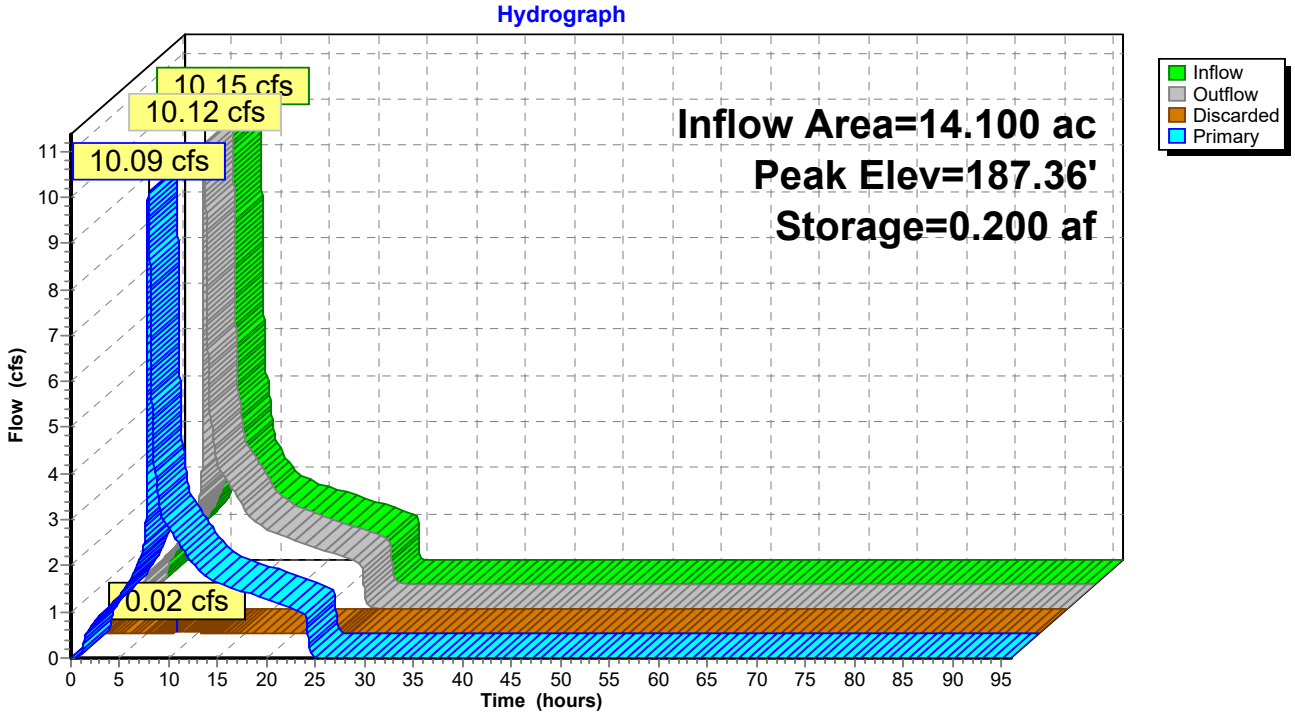
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	180.00'	**7.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	180.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	186.00'	**18.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.02 cfs @ 7.93 hrs HW=187.36' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=10.09 cfs @ 7.93 hrs HW=187.36' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 3.42 cfs @ 12.80 fps)
└**3=Orifice/Grate** (Orifice Controls 6.67 cfs @ 3.97 fps)

Pond UGD-P: Underground Detention - Primary



Summary for Pond UGD-W: Underground Detention - West

Inflow Area = 4.483 ac, 84.04% Impervious, Inflow Depth = 3.32" for 25-Year event
Inflow = 3.67 cfs @ 7.88 hrs, Volume= 1.241 af
Outflow = 3.58 cfs @ 7.98 hrs, Volume= 1.241 af, Atten= 3%, Lag= 6.1 min
Discarded = 0.02 cfs @ 7.98 hrs, Volume= 0.041 af
Primary = 3.55 cfs @ 7.98 hrs, Volume= 1.201 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 188.42' @ 7.98 hrs Surf.Area= 0.044 ac Storage= 0.213 af

Plug-Flow detention time= 164.6 min calculated for 1.241 af (100% of inflow)
Center-of-Mass det. time= 164.6 min (837.5 - 672.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	181.00'	0.079 af	**19.00'W x 102.00'L x 7.50'H Field A** 0.334 af Overall - 0.135 af Embedded = 0.198 af x 40.0% Voids
#2A	182.00'	0.135 af	**CMP Round 60** x 15 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 3 Rows of 5 Chambers
		0.215 af	Total Available Storage

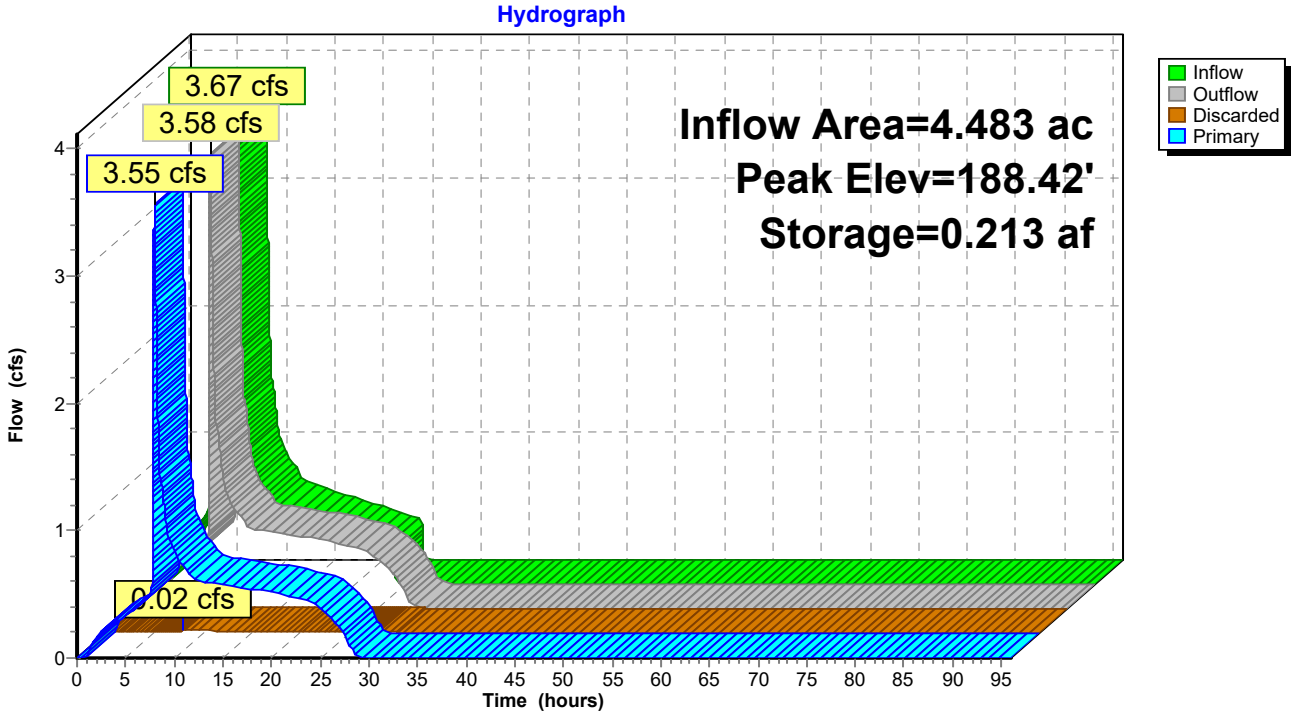
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	181.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	181.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	187.55'	**15.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.02 cfs @ 7.98 hrs HW=188.42' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=3.55 cfs @ 7.98 hrs HW=188.42' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.64 cfs @ 13.01 fps)
└**3=Orifice/Grate** (Orifice Controls 2.92 cfs @ 3.18 fps)

Pond UGD-W: Underground Detention - West



Summary for Subcatchment AN: Apartments - North

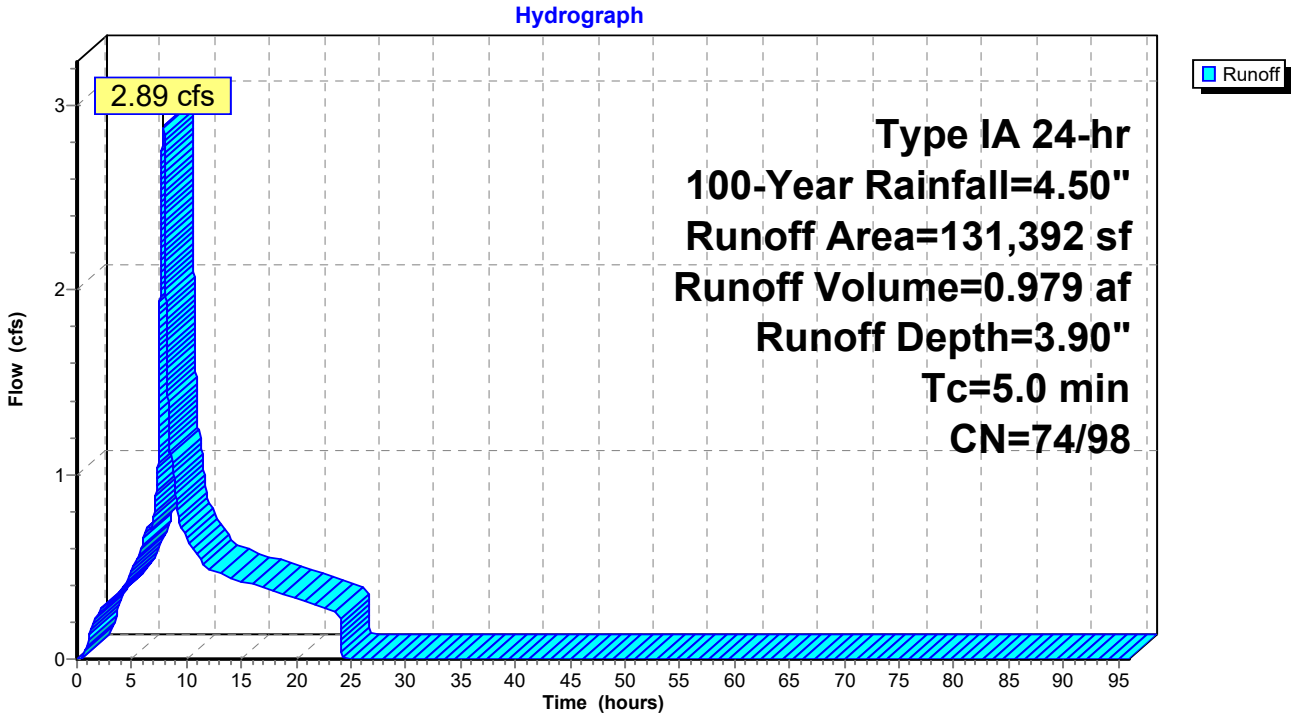
Runoff = 2.89 cfs @ 7.88 hrs, Volume= 0.979 af, Depth= 3.90"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 100-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	110,287	98	
	21,105	74	>75% Grass cover, Good, HSG C
	131,392	94	Weighted Average
	21,105	74	16.06% Pervious Area
	110,287	98	83.94% Impervious Area

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

Subcatchment AN: Apartments - North



Summary for Subcatchment AS: A Street - South

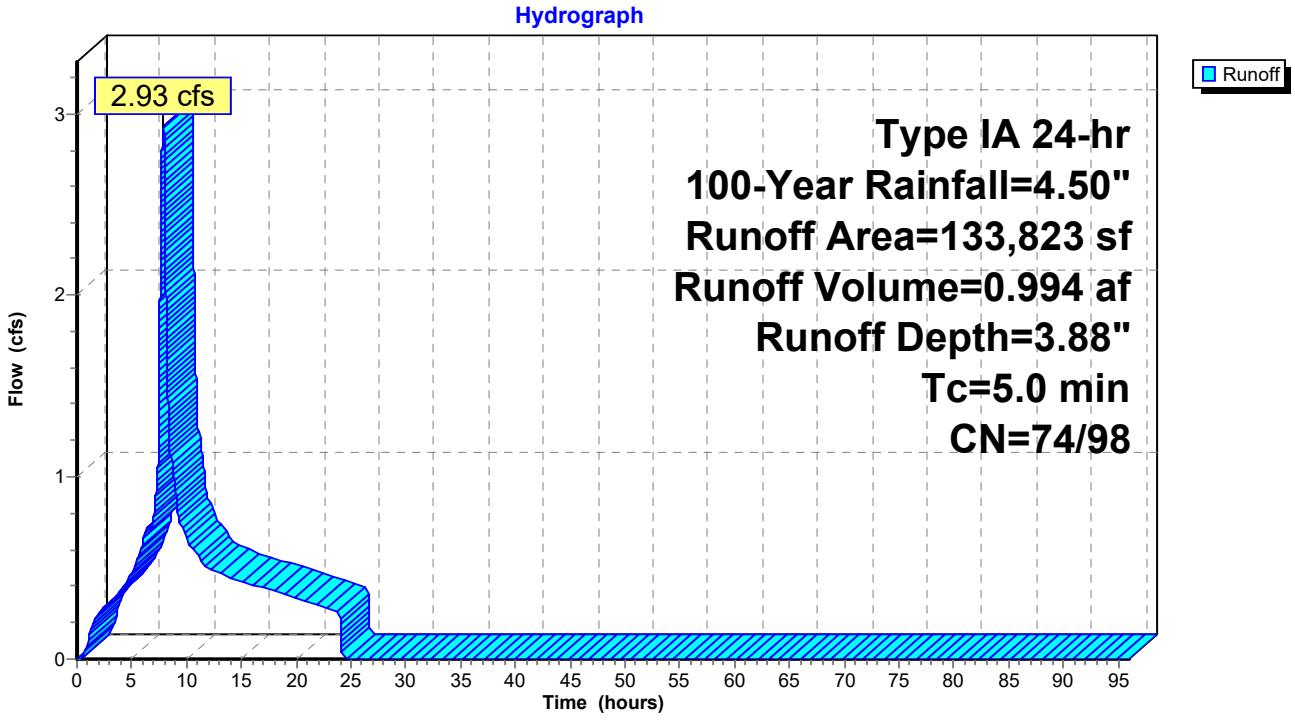
Runoff = 2.93 cfs @ 7.88 hrs, Volume= 0.994 af, Depth= 3.88"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 100-Year Rainfall=4.50"

Area (sf)	CN	Description
111,636	98	
22,187	74	>75% Grass cover, Good, HSG C
133,823	94	Weighted Average
22,187	74	16.58% Pervious Area
111,636	98	83.42% Impervious Area

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

Subcatchment AS: A Street - South



Summary for Subcatchment AW: Apartments - West

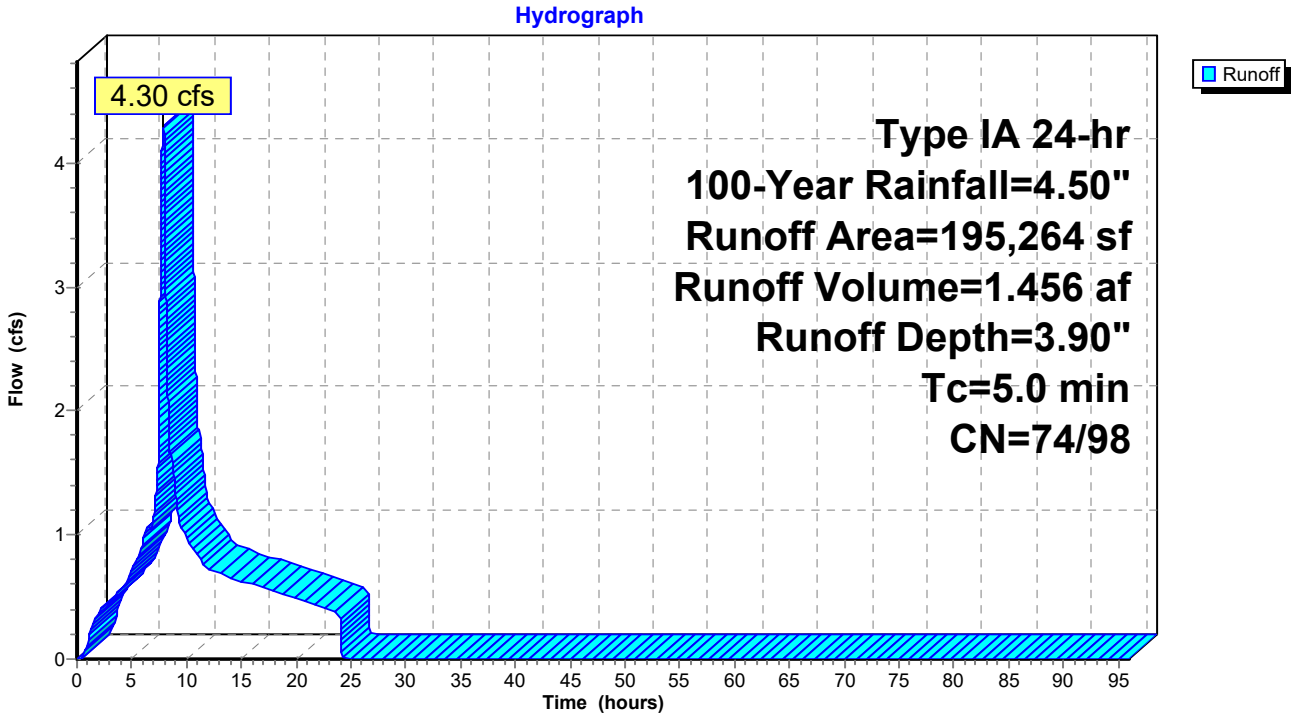
Runoff = 4.30 cfs @ 7.88 hrs, Volume= 1.456 af, Depth= 3.90"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 100-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	164,095	98	
	31,169	74	>75% Grass cover, Good, HSG C
	195,264	94	Weighted Average
	31,169	74	15.96% Pervious Area
	164,095	98	84.04% Impervious Area

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

Subcatchment AW: Apartments - West



Summary for Subcatchment BC: B Street - Center

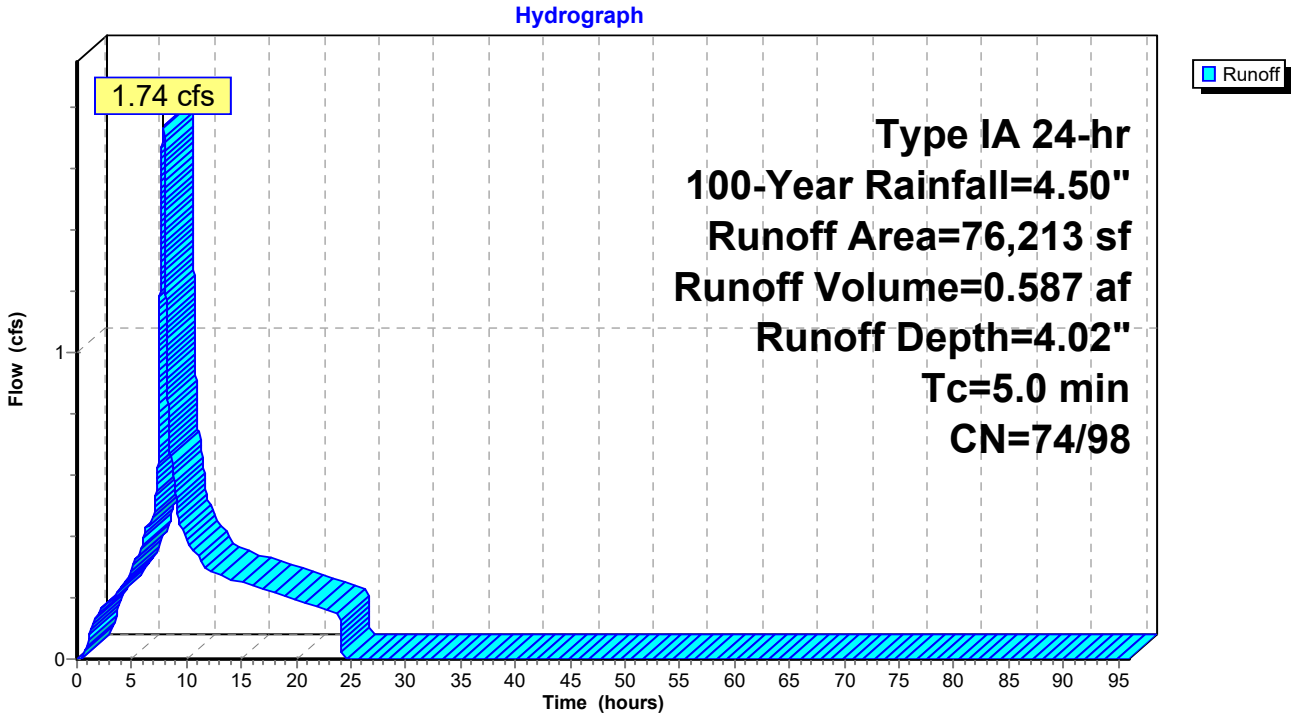
Runoff = 1.74 cfs @ 7.88 hrs, Volume= 0.587 af, Depth= 4.02"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 100-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	68,209	98	
	8,004	74	>75% Grass cover, Good, HSG C
	76,213	95	Weighted Average
	8,004	74	10.50% Pervious Area
	68,209	98	89.50% Impervious Area

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

Subcatchment BC: B Street - Center



Summary for Subcatchment SE: Single Family - East

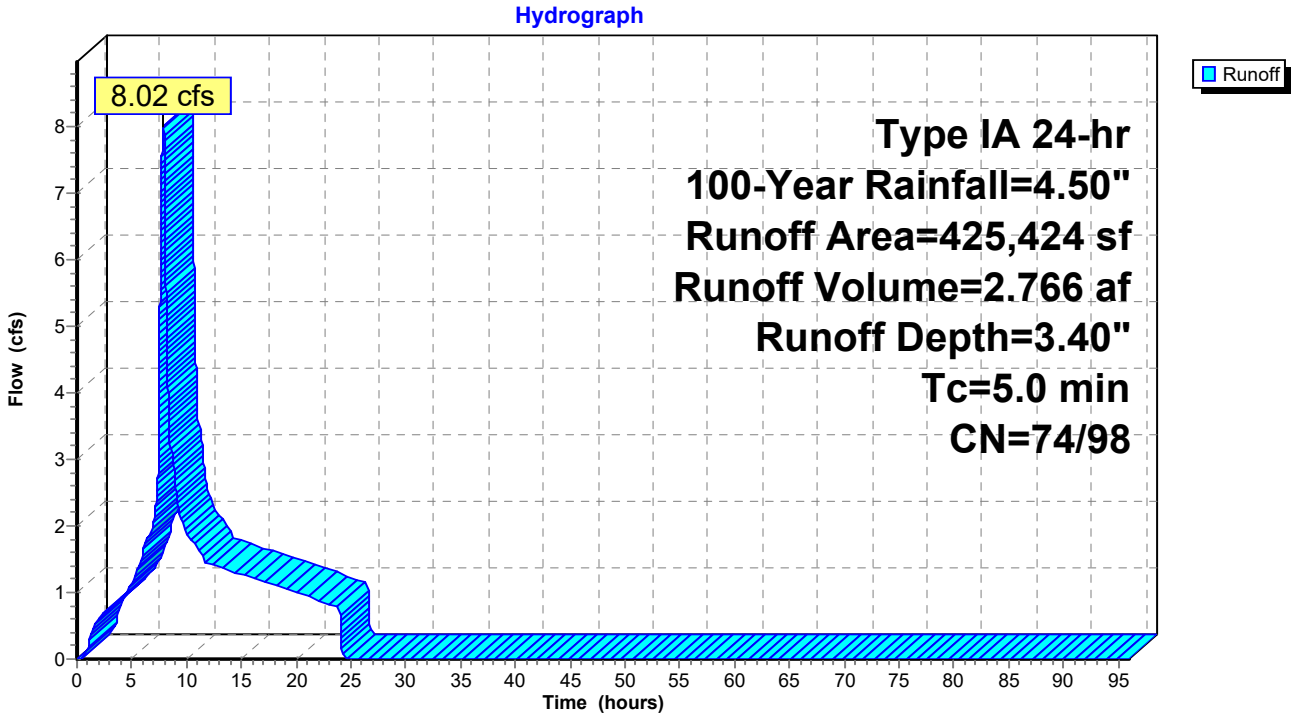
Runoff = 8.02 cfs @ 7.90 hrs, Volume= 2.766 af, Depth= 3.40"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 100-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	264,845	98	
	160,579	74	>75% Grass cover, Good, HSG C
	425,424	89	Weighted Average
	160,579	74	37.75% Pervious Area
	264,845	98	62.25% Impervious Area

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

Subcatchment SE: Single Family - East



Summary for Subcatchment SS: Single Family - South

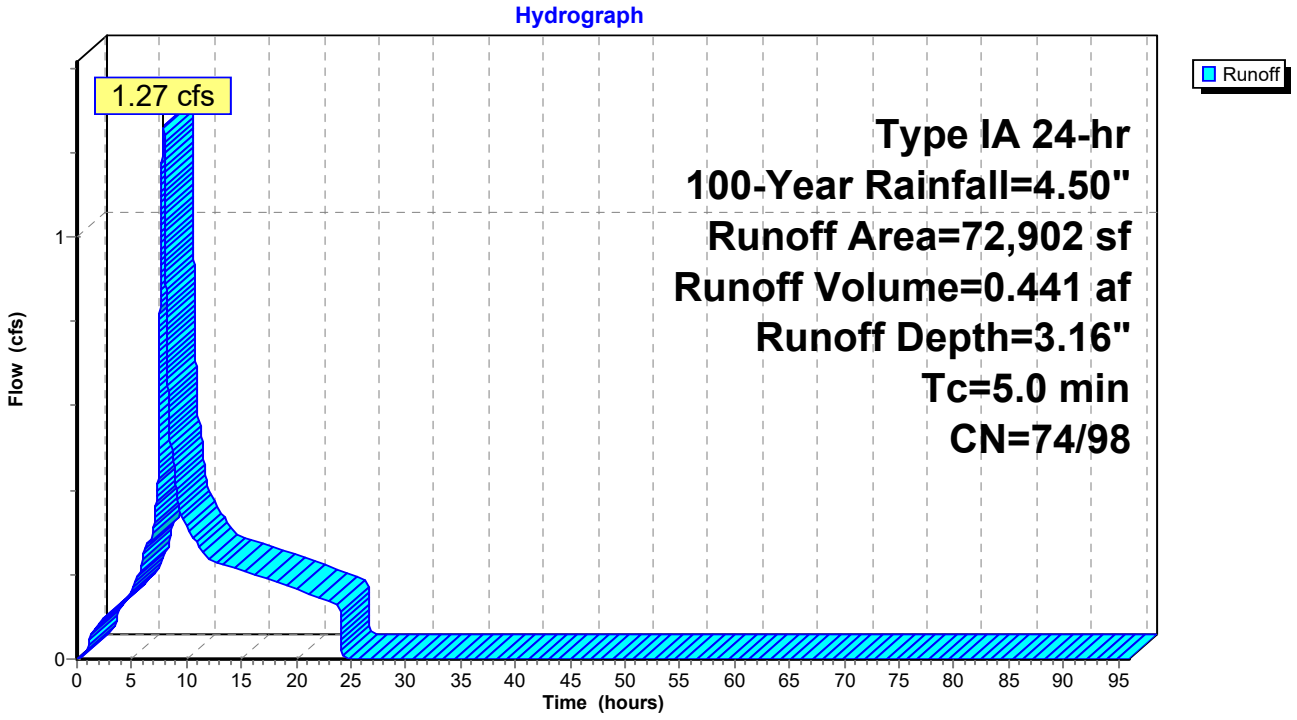
Runoff = 1.27 cfs @ 7.91 hrs, Volume= 0.441 af, Depth= 3.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 100-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	37,878	98	
	35,024	74	>75% Grass cover, Good, HSG C
	72,902	86	Weighted Average
	35,024	74	48.04% Pervious Area
	37,878	98	51.96% Impervious Area

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

Subcatchment SS: Single Family - South



Summary for Subcatchment TC: Townhomes - Center

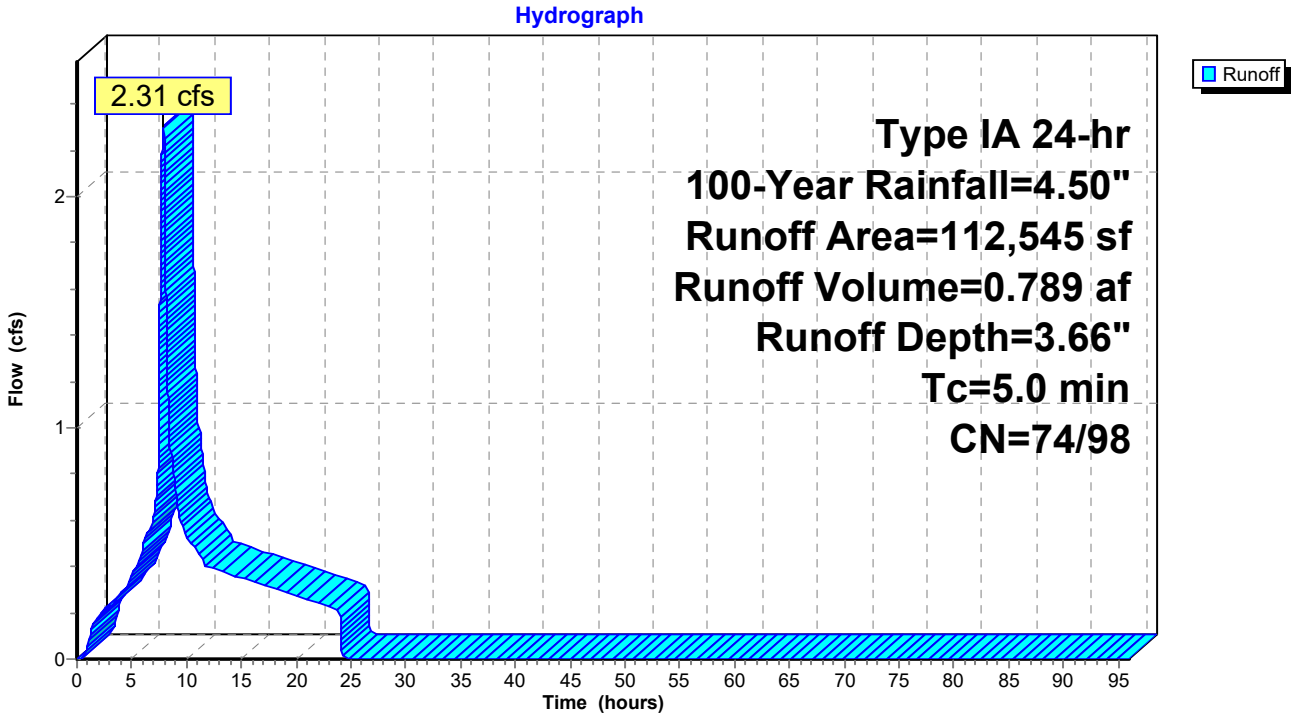
Runoff = 2.31 cfs @ 7.89 hrs, Volume= 0.789 af, Depth= 3.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 100-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	83,094	98	
	29,451	74	>75% Grass cover, Good, HSG C
	112,545	92	Weighted Average
	29,451	74	26.17% Pervious Area
	83,094	98	73.83% Impervious Area

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

Subcatchment TC: Townhomes - Center

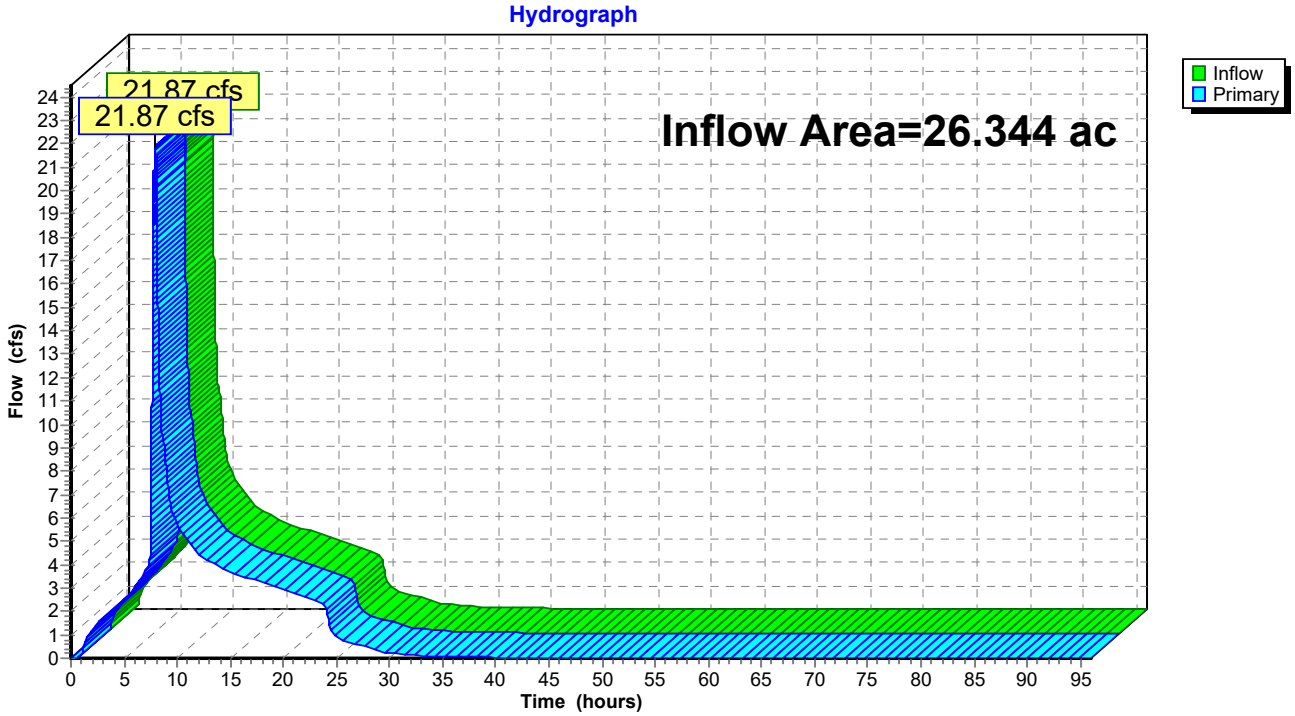


Summary for Pond MAIN OUT: 27" Existing Main

Inflow Area = 26.344 ac, 73.20% Impervious, Inflow Depth = 3.57" for 100-Year event
Inflow = 21.87 cfs @ 7.94 hrs, Volume= 7.847 af
Primary = 21.87 cfs @ 7.94 hrs, Volume= 7.847 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs

Pond MAIN OUT: 27" Existing Main



Summary for Pond SP-S: Storm Pond - South

Inflow Area = 4.746 ac, 72.33% Impervious, Inflow Depth = 3.63" for 100-Year event
Inflow = 4.20 cfs @ 7.89 hrs, Volume= 1.436 af
Outflow = 2.84 cfs @ 8.13 hrs, Volume= 1.436 af, Atten= 32%, Lag= 14.3 min
Discarded = 0.03 cfs @ 8.13 hrs, Volume= 0.074 af
Primary = 2.81 cfs @ 8.13 hrs, Volume= 1.361 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 186.80' @ 8.13 hrs Surf.Area= 4,895 sf Storage= 14,933 cf

Plug-Flow detention time= 281.5 min calculated for 1.436 af (100% of inflow)
Center-of-Mass det. time= 281.5 min (962.7 - 681.3)

Volume	Invert	Avail.Storage	Storage Description
#1	182.20'	21,195 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

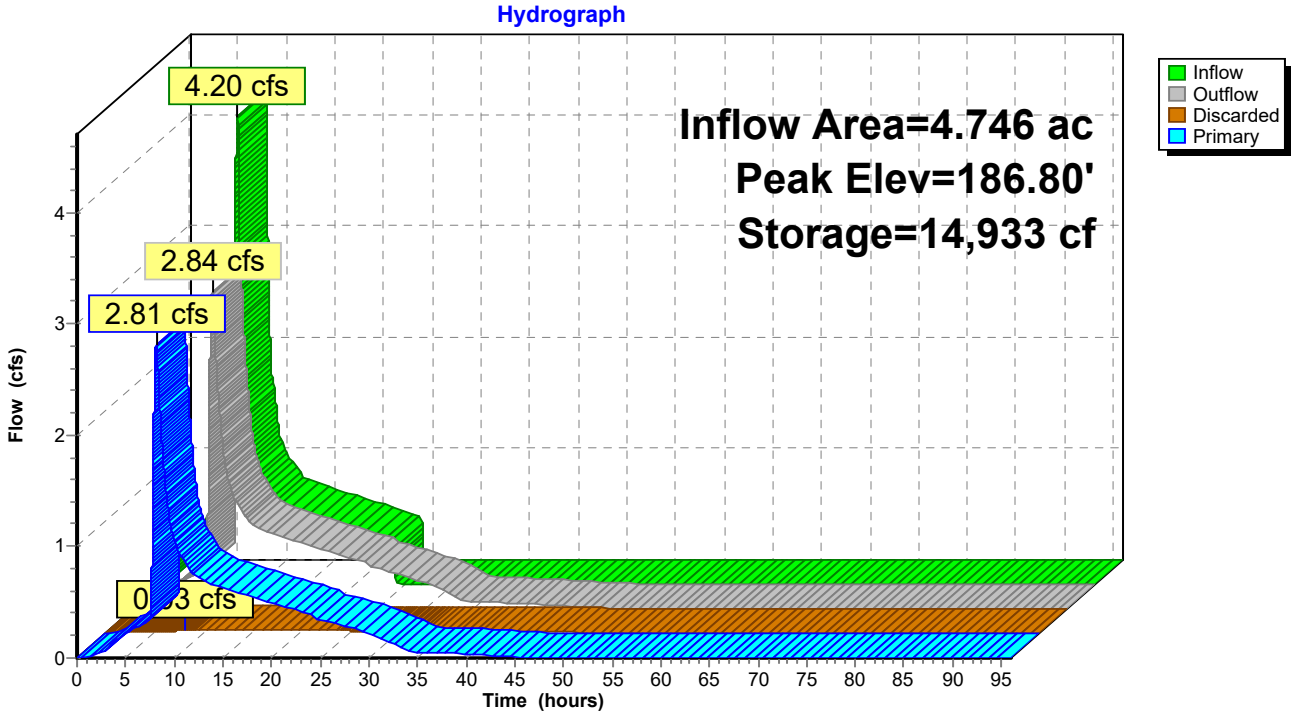
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
182.20	1,760	0	0	1,760
183.00	2,287	1,614	1,614	2,302
184.00	2,880	2,578	4,192	2,922
185.00	3,535	3,202	7,394	3,607
186.00	4,254	3,889	11,283	4,359
187.00	5,064	4,653	15,936	5,204
188.00	5,456	5,259	21,195	5,673

Device	Routing	Invert	Outlet Devices
#1	Primary	182.20'	**1.5" Vert. Orifice/Grate** C= 0.600
#2	Primary	183.15'	**2.4" Vert. Orifice/Grate** C= 0.600
#3	Discarded	182.20'	**0.250 in/hr Exfiltration over Wetted area**
#4	Primary	185.90'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.03 cfs @ 8.13 hrs HW=186.80' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=2.81 cfs @ 8.13 hrs HW=186.80' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.13 cfs @ 10.26 fps)
├**2=Orifice/Grate** (Orifice Controls 0.28 cfs @ 9.07 fps)
└**4=Orifice/Grate** (Orifice Controls 2.40 cfs @ 3.23 fps)

Pond SP-S: Storm Pond - South



Summary for Pond UGD-N: Underground Detention - North

Inflow Area = 3.016 ac, 83.94% Impervious, Inflow Depth = 3.90" for 100-Year event
Inflow = 2.89 cfs @ 7.88 hrs, Volume= 0.979 af
Outflow = 2.89 cfs @ 7.91 hrs, Volume= 0.979 af, Atten= 0%, Lag= 1.6 min
Discarded = 0.01 cfs @ 7.91 hrs, Volume= 0.017 af
Primary = 2.88 cfs @ 7.91 hrs, Volume= 0.962 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 187.34' @ 7.91 hrs Surf.Area= 0.019 ac Storage= 0.087 af

Plug-Flow detention time= 73.4 min calculated for 0.979 af (100% of inflow)
Center-of-Mass det. time= 73.4 min (743.3 - 669.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	180.00'	0.034 af	**13.00'W x 62.00'L x 7.50'H Field A** 0.139 af Overall - 0.054 af Embedded = 0.085 af x 40.0% Voids
#2A	181.00'	0.054 af	**CMP Round 60** x 6 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 2 Rows of 3 Chambers
		0.088 af	Total Available Storage

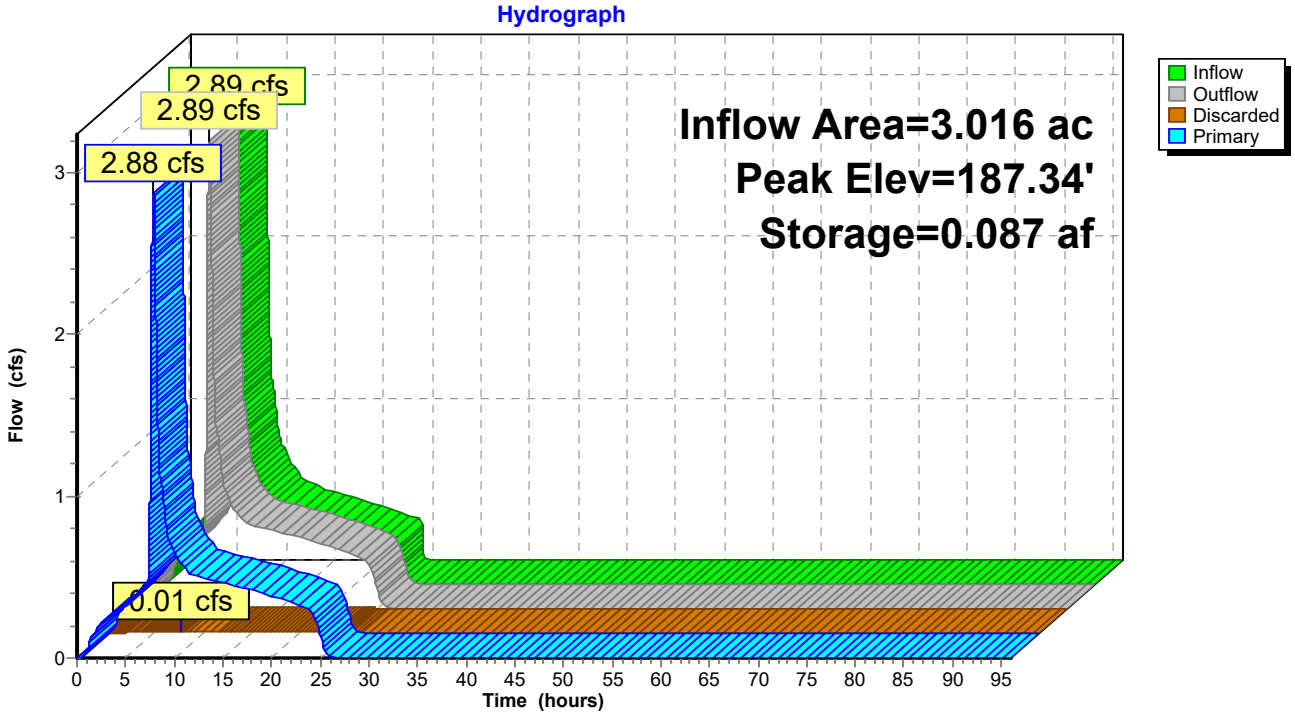
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	180.00'	**2.8" Vert. Orifice/Grate** C= 0.600
#2	Discarded	180.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	186.46'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 7.91 hrs HW=187.34' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=2.88 cfs @ 7.91 hrs HW=187.34' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.55 cfs @ 12.94 fps)
└**3=Orifice/Grate** (Orifice Controls 2.32 cfs @ 3.19 fps)

Pond UGD-N: Underground Detention - North



Summary for Pond UGD-P: Underground Detention - Primary

Inflow Area = 14.100 ac, 67.76% Impervious, Inflow Depth = 3.53" for 100-Year event
Inflow = 12.06 cfs @ 7.89 hrs, Volume= 4.142 af
Outflow = 12.39 cfs @ 7.89 hrs, Volume= 4.142 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.02 cfs @ 7.75 hrs, Volume= 0.032 af
Primary = 12.37 cfs @ 7.89 hrs, Volume= 4.110 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 187.83' @ 7.89 hrs Surf.Area= 0.042 ac Storage= 0.203 af

Plug-Flow detention time= 23.9 min calculated for 4.142 af (100% of inflow)
Center-of-Mass det. time= 23.9 min (710.1 - 686.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	180.00'	0.077 af	**13.00'W x 142.00'L x 7.50'H Field A** 0.318 af Overall - 0.126 af Embedded = 0.192 af x 40.0% Voids
#2A	181.00'	0.126 af	**CMP Round 60** x 14 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 2 Rows of 7 Chambers
		0.203 af	Total Available Storage

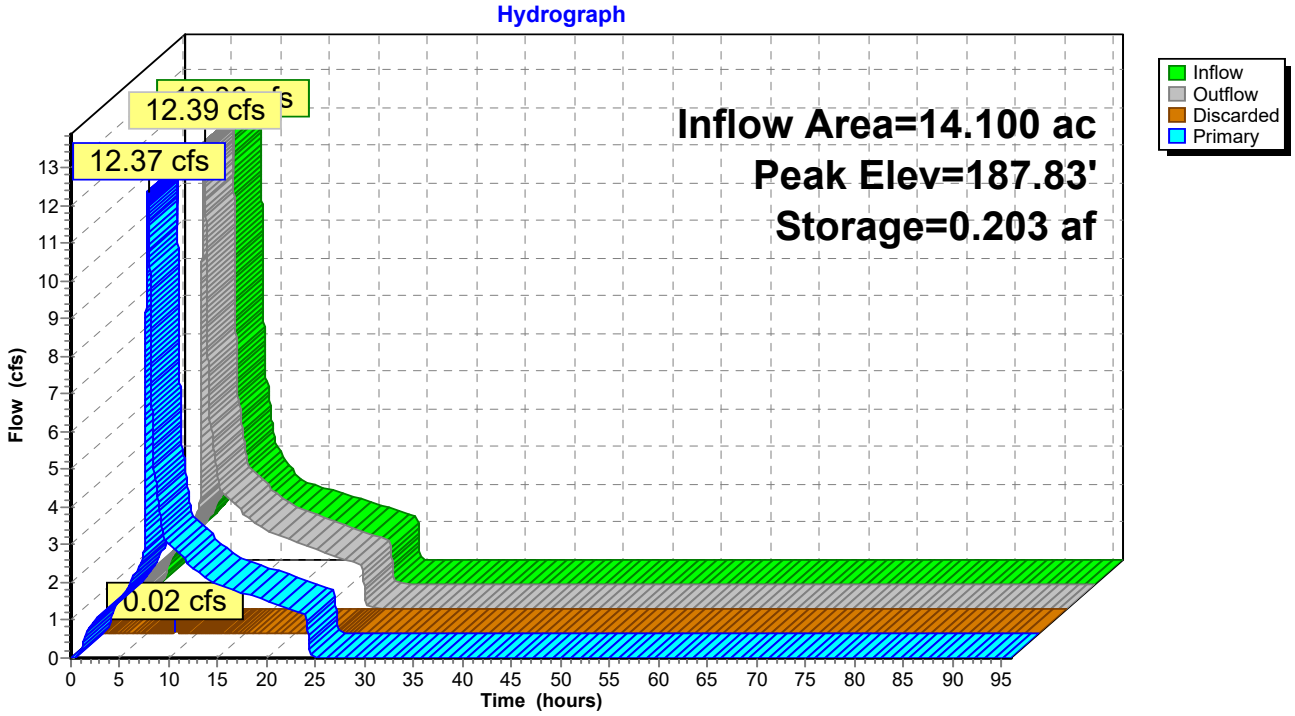
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	180.00'	**7.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	180.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	186.00'	**18.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.02 cfs @ 7.75 hrs HW=187.54' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=12.37 cfs @ 7.89 hrs HW=187.83' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 3.53 cfs @ 13.22 fps)
└**3=Orifice/Grate** (Orifice Controls 8.84 cfs @ 5.00 fps)

Pond UGD-P: Underground Detention - Primary



Summary for Pond UGD-W: Underground Detention - West

Inflow Area = 4.483 ac, 84.04% Impervious, Inflow Depth = 3.90" for 100-Year event
Inflow = 4.30 cfs @ 7.88 hrs, Volume= 1.456 af
Outflow = 4.41 cfs @ 7.88 hrs, Volume= 1.456 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.02 cfs @ 7.78 hrs, Volume= 0.043 af
Primary = 4.39 cfs @ 7.88 hrs, Volume= 1.413 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 188.58' @ 7.88 hrs Surf.Area= 0.044 ac Storage= 0.215 af

Plug-Flow detention time= 157.8 min calculated for 1.456 af (100% of inflow)
Center-of-Mass det. time= 157.8 min (827.6 - 669.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	181.00'	0.079 af	**19.00'W x 102.00'L x 7.50'H Field A** 0.334 af Overall - 0.135 af Embedded = 0.198 af x 40.0% Voids
#2A	182.00'	0.135 af	**CMP Round 60** x 15 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 3 Rows of 5 Chambers
		0.215 af	Total Available Storage

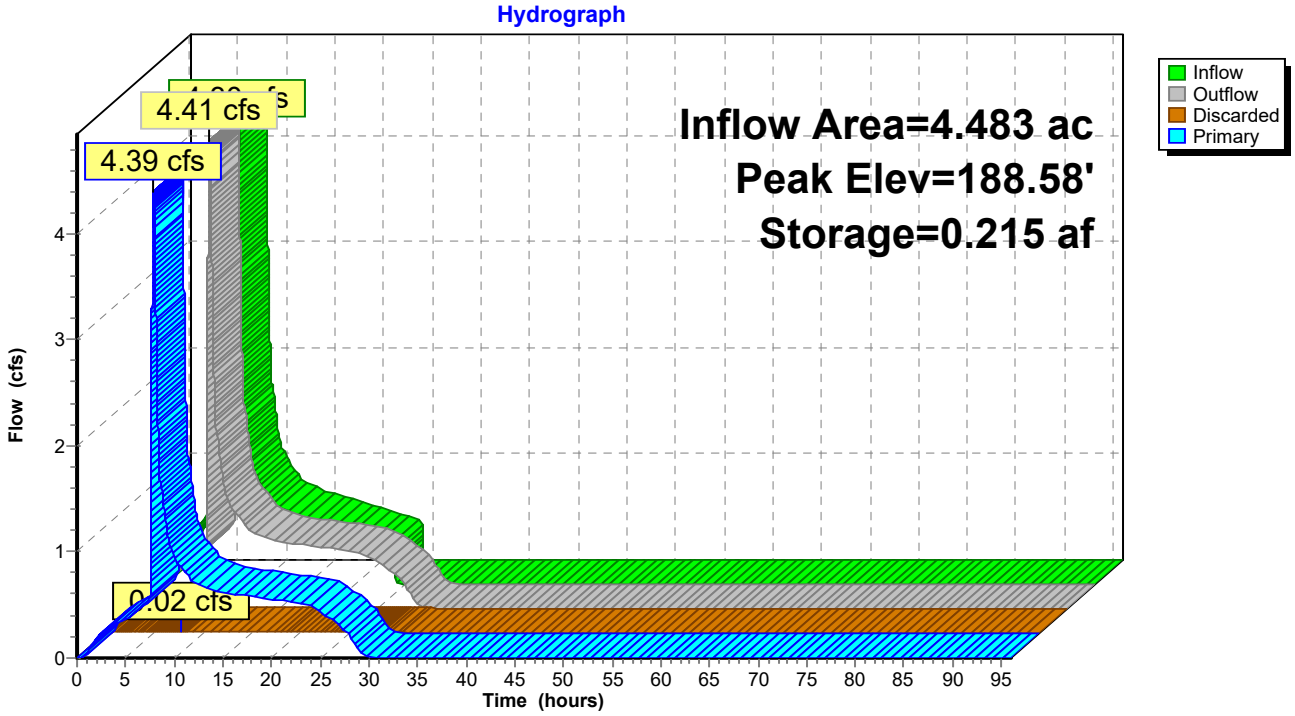
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	181.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	181.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	187.55'	**15.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.02 cfs @ 7.78 hrs HW=188.56' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=4.39 cfs @ 7.88 hrs HW=188.58' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.65 cfs @ 13.15 fps)
└**3=Orifice/Grate** (Orifice Controls 3.74 cfs @ 3.46 fps)

Pond UGD-W: Underground Detention - West



Summary for Subcatchment AN: Apartments - North

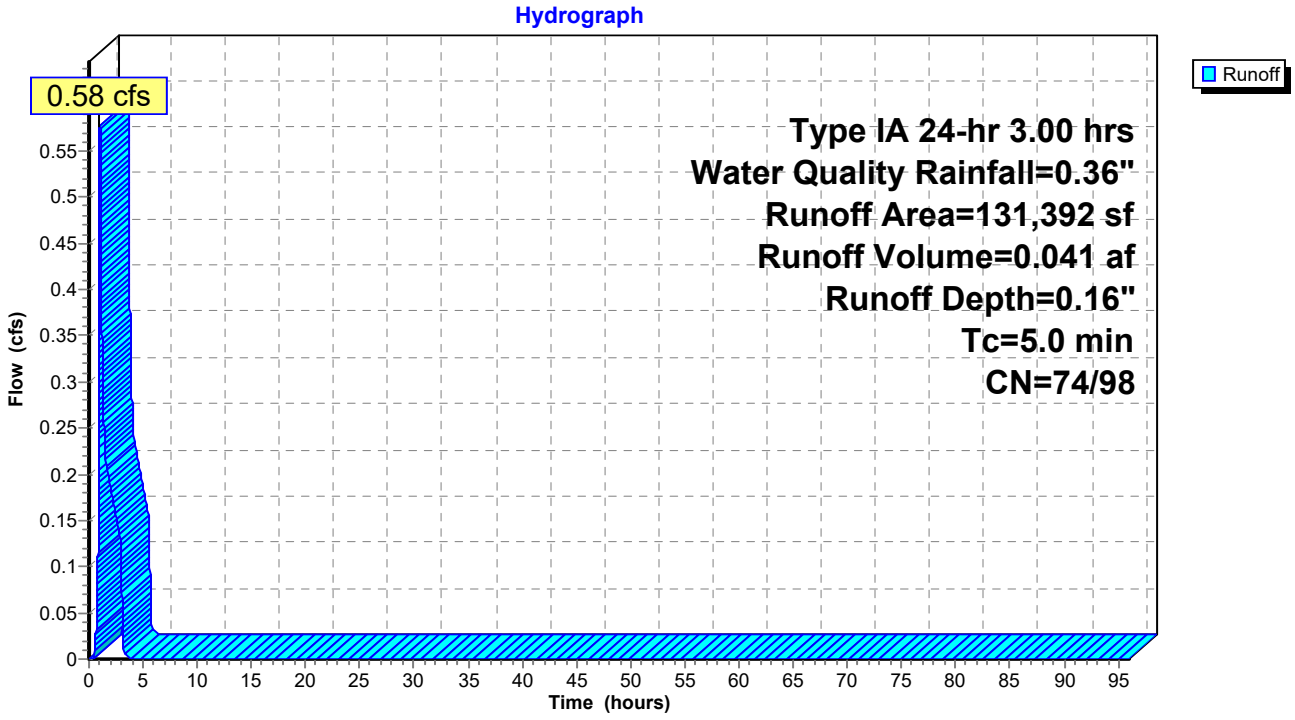
Runoff = 0.58 cfs @ 1.01 hrs, Volume= 0.041 af, Depth= 0.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 3.00 hrs Water Quality Rainfall=0.36"

	Area (sf)	CN	Description
*	110,287	98	
	21,105	74	>75% Grass cover, Good, HSG C
	131,392	94	Weighted Average
	21,105	74	16.06% Pervious Area
	110,287	98	83.94% Impervious Area

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

Subcatchment AN: Apartments - North



Summary for Subcatchment AS: A Street - South

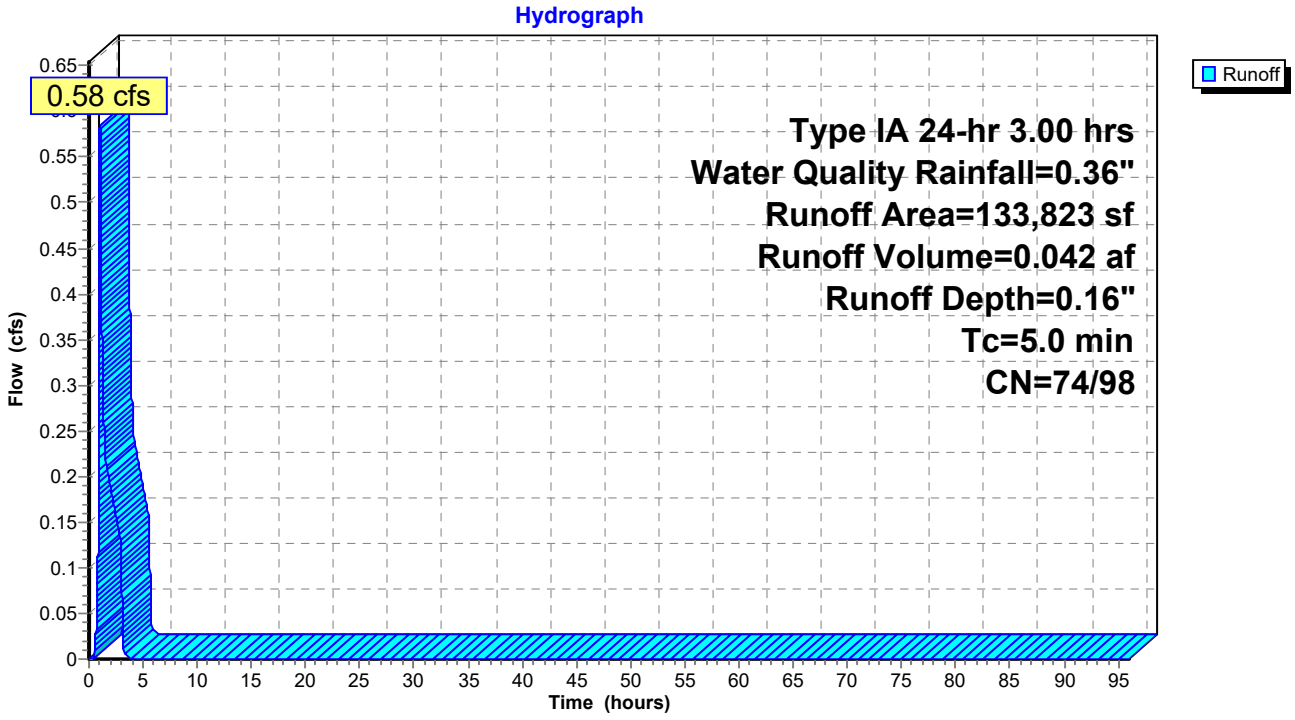
Runoff = 0.58 cfs @ 1.01 hrs, Volume= 0.042 af, Depth= 0.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 3.00 hrs Water Quality Rainfall=0.36"

Area (sf)	CN	Description
111,636	98	
22,187	74	>75% Grass cover, Good, HSG C
133,823	94	Weighted Average
22,187	74	16.58% Pervious Area
111,636	98	83.42% Impervious Area

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

Subcatchment AS: A Street - South



Summary for Subcatchment AW: Apartments - West

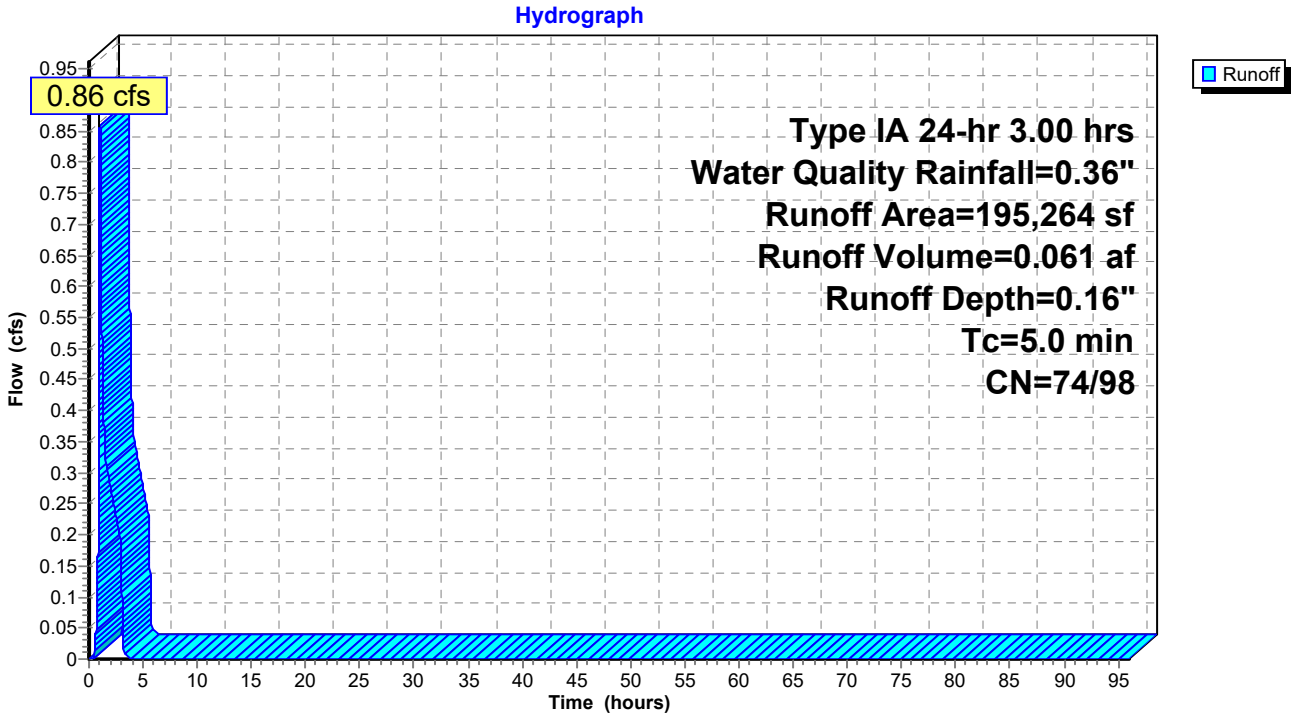
Runoff = 0.86 cfs @ 1.01 hrs, Volume= 0.061 af, Depth= 0.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 3.00 hrs Water Quality Rainfall=0.36"

	Area (sf)	CN	Description
*	164,095	98	
	31,169	74	>75% Grass cover, Good, HSG C
	195,264	94	Weighted Average
	31,169	74	15.96% Pervious Area
	164,095	98	84.04% Impervious Area

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

Subcatchment AW: Apartments - West



Summary for Subcatchment BC: B Street - Center

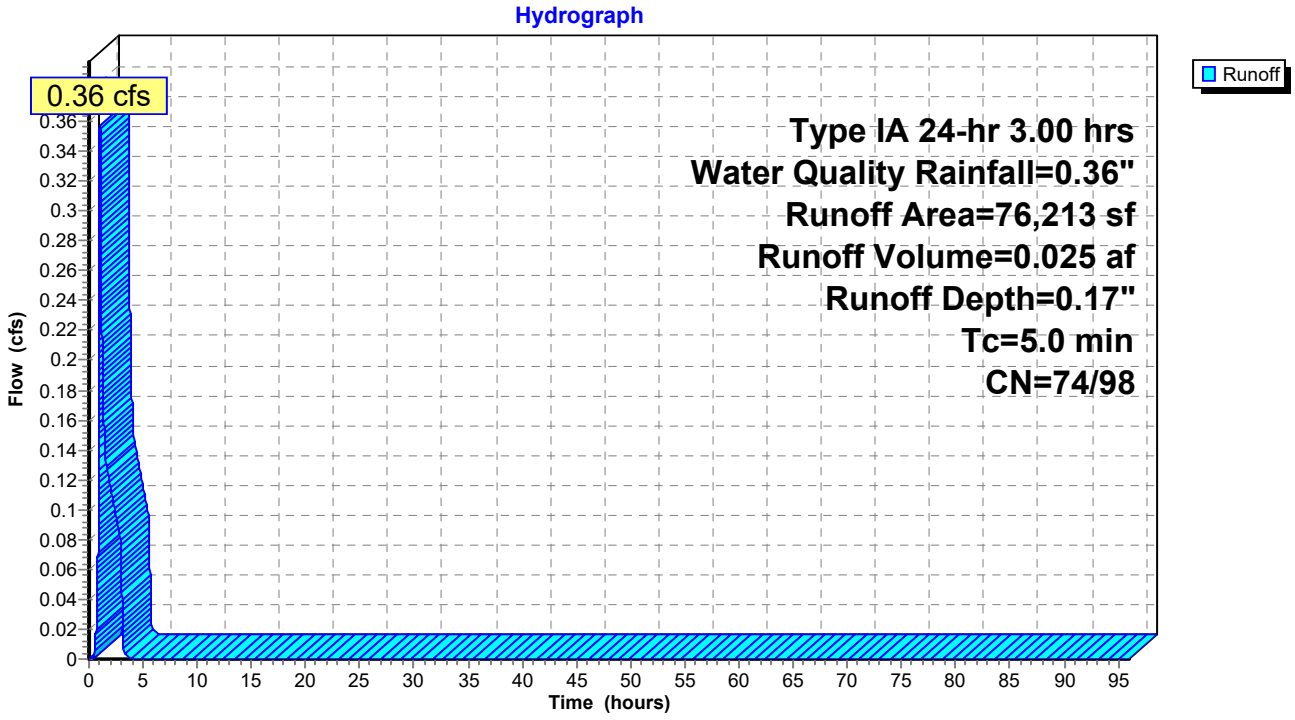
Runoff = 0.36 cfs @ 1.01 hrs, Volume= 0.025 af, Depth= 0.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 3.00 hrs Water Quality Rainfall=0.36"

	Area (sf)	CN	Description
*	68,209	98	
	8,004	74	>75% Grass cover, Good, HSG C
	76,213	95	Weighted Average
	8,004	74	10.50% Pervious Area
	68,209	98	89.50% Impervious Area

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

Subcatchment BC: B Street - Center



Summary for Subcatchment SE: Single Family - East

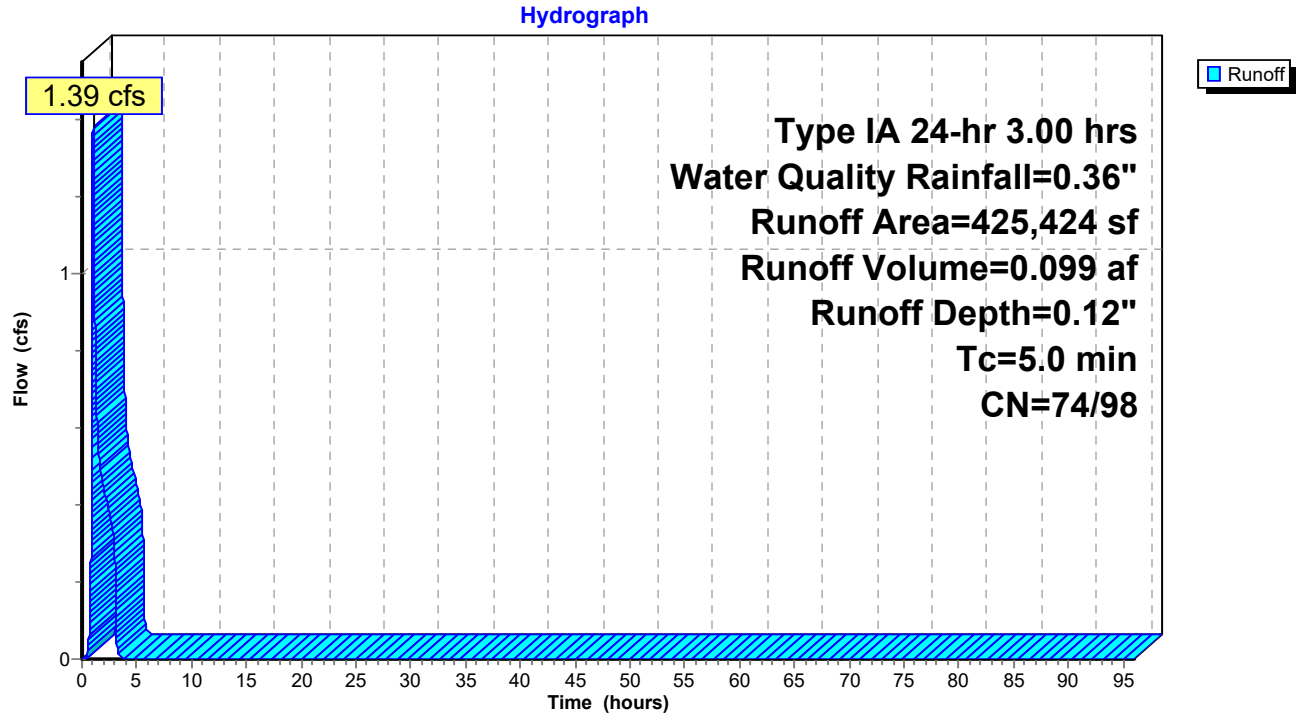
Runoff = 1.39 cfs @ 1.01 hrs, Volume= 0.099 af, Depth= 0.12"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 3.00 hrs Water Quality Rainfall=0.36"

	Area (sf)	CN	Description
*	264,845	98	
	160,579	74	>75% Grass cover, Good, HSG C
	425,424	89	Weighted Average
	160,579	74	37.75% Pervious Area
	264,845	98	62.25% Impervious Area

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

Subcatchment SE: Single Family - East



Summary for Subcatchment SS: Single Family - South

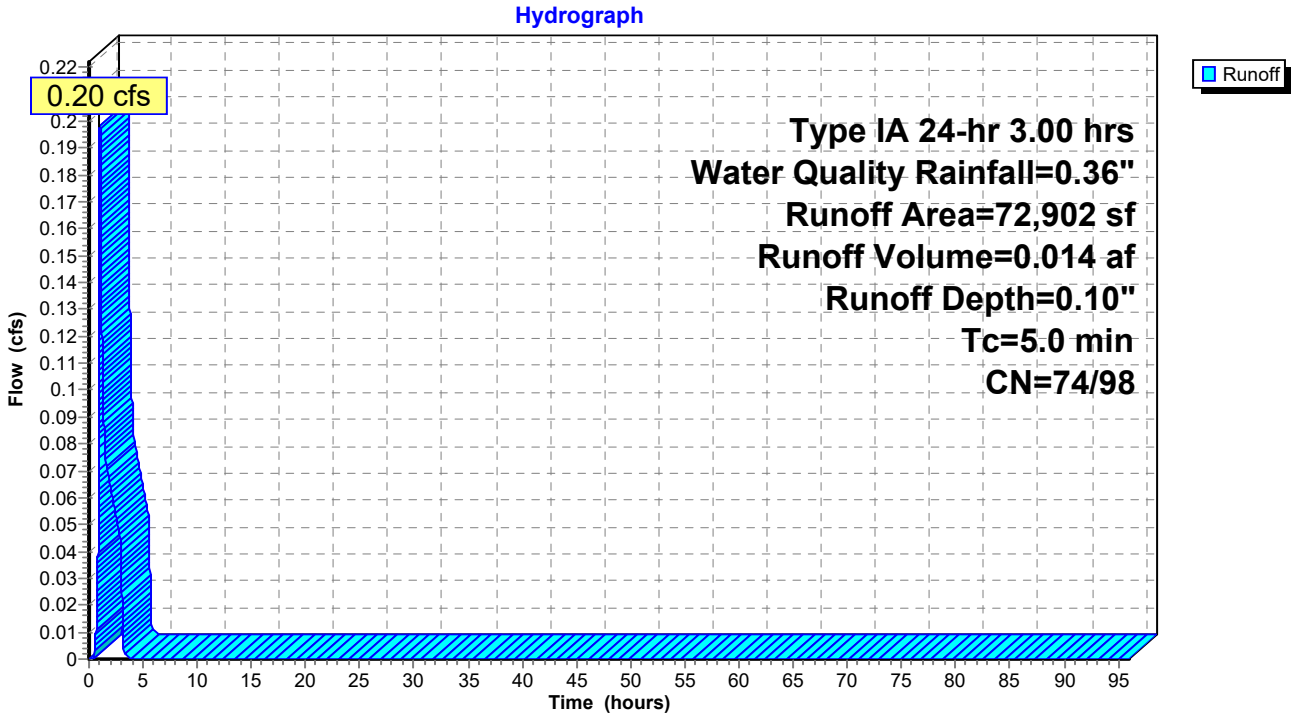
Runoff = 0.20 cfs @ 1.01 hrs, Volume= 0.014 af, Depth= 0.10"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 3.00 hrs Water Quality Rainfall=0.36"

	Area (sf)	CN	Description
*	37,878	98	
	35,024	74	>75% Grass cover, Good, HSG C
	72,902	86	Weighted Average
	35,024	74	48.04% Pervious Area
	37,878	98	51.96% Impervious Area

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

Subcatchment SS: Single Family - South



Summary for Subcatchment TC: Townhomes - Center

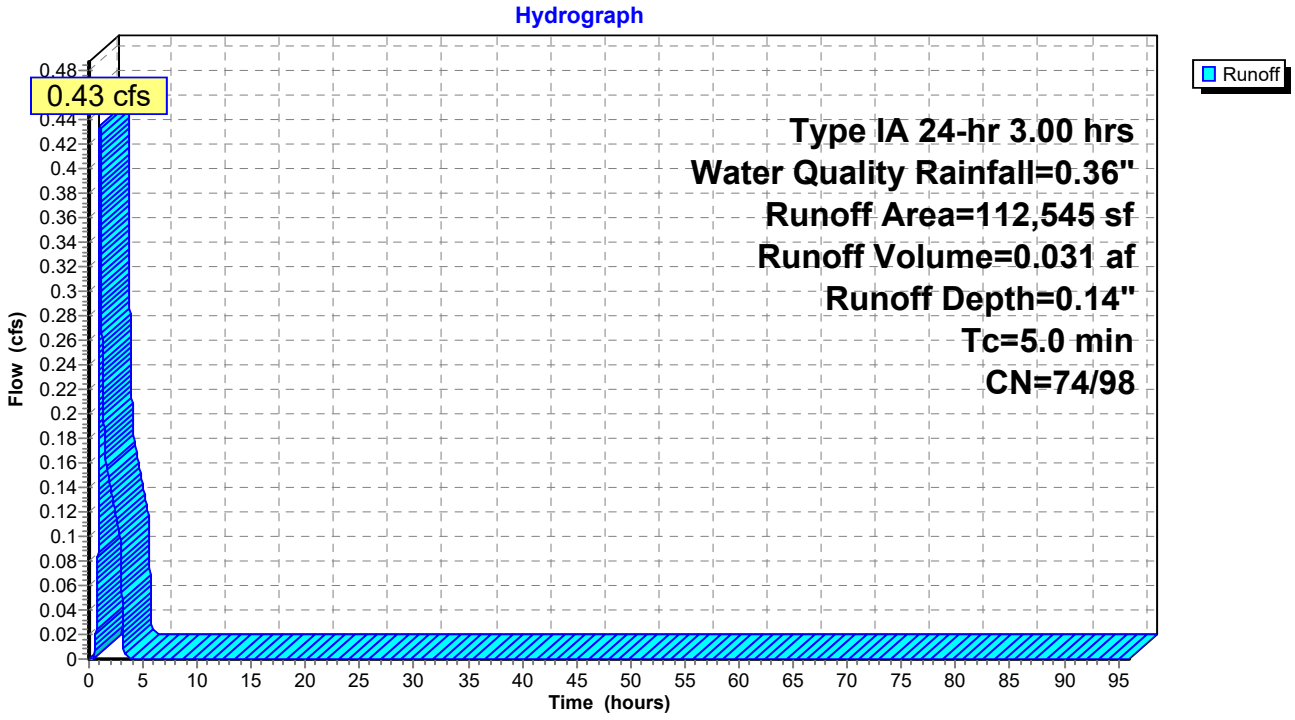
Runoff = 0.43 cfs @ 1.01 hrs, Volume= 0.031 af, Depth= 0.14"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Type IA 24-hr 3.00 hrs Water Quality Rainfall=0.36"

	Area (sf)	CN	Description
*	83,094	98	
	29,451	74	>75% Grass cover, Good, HSG C
	112,545	92	Weighted Average
	29,451	74	26.17% Pervious Area
	83,094	98	73.83% Impervious Area

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

Subcatchment TC: Townhomes - Center

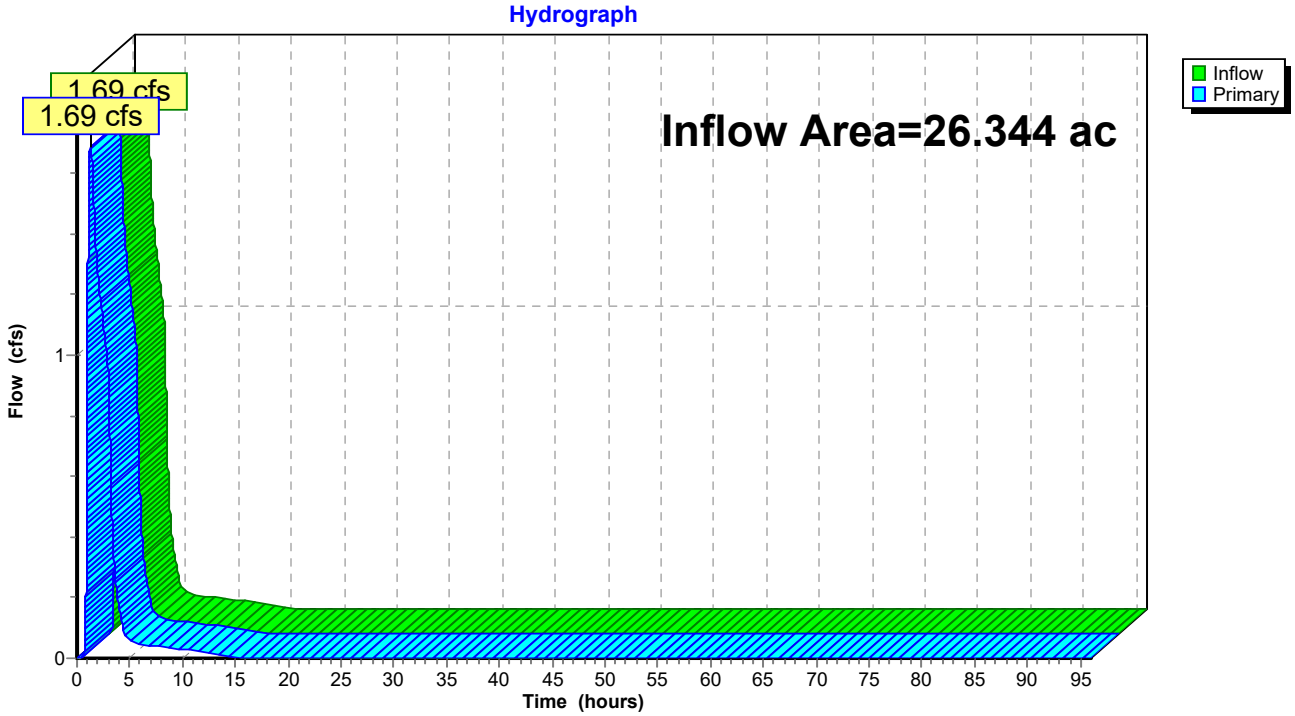


Summary for Pond MAIN OUT: 27" Existing Main

Inflow Area = 26.344 ac, 73.20% Impervious, Inflow Depth = 0.13" for Water Quality event
Inflow = 1.69 cfs @ 1.27 hrs, Volume= 0.286 af
Primary = 1.69 cfs @ 1.27 hrs, Volume= 0.286 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs

Pond MAIN OUT: 27" Existing Main



Summary for Pond SP-S: Storm Pond - South

Inflow Area = 4.746 ac, 72.33% Impervious, Inflow Depth = 0.14" for Water Quality event
Inflow = 0.78 cfs @ 1.01 hrs, Volume= 0.056 af
Outflow = 0.07 cfs @ 3.07 hrs, Volume= 0.056 af, Atten= 91%, Lag= 123.6 min
Discarded = 0.01 cfs @ 3.07 hrs, Volume= 0.016 af
Primary = 0.06 cfs @ 3.07 hrs, Volume= 0.040 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 183.14' @ 3.07 hrs Surf.Area= 2,368 sf Storage= 1,948 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 315.8 min (418.7 - 102.9)

Volume	Invert	Avail.Storage	Storage Description
#1	182.20'	21,195 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

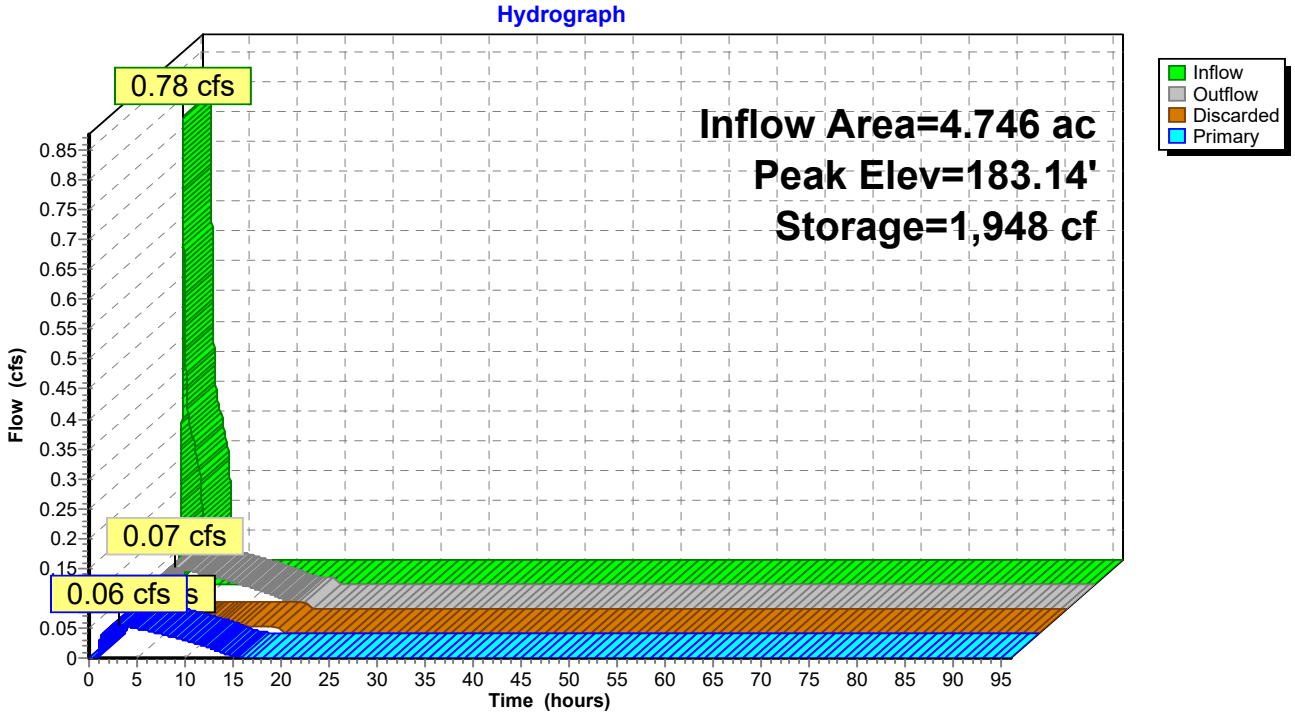
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
182.20	1,760	0	0	1,760
183.00	2,287	1,614	1,614	2,302
184.00	2,880	2,578	4,192	2,922
185.00	3,535	3,202	7,394	3,607
186.00	4,254	3,889	11,283	4,359
187.00	5,064	4,653	15,936	5,204
188.00	5,456	5,259	21,195	5,673

Device	Routing	Invert	Outlet Devices
#1	Primary	182.20'	**1.5" Vert. Orifice/Grate** C= 0.600
#2	Primary	183.15'	**2.4" Vert. Orifice/Grate** C= 0.600
#3	Discarded	182.20'	**0.250 in/hr Exfiltration over Wetted area**
#4	Primary	185.90'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 3.07 hrs HW=183.14' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.06 cfs @ 3.07 hrs HW=183.14' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 4.52 fps)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**4=Orifice/Grate** (Controls 0.00 cfs)

Pond SP-S: Storm Pond - South



Summary for Pond UGD-N: Underground Detention - North

Inflow Area = 3.016 ac, 83.94% Impervious, Inflow Depth = 0.16" for Water Quality event
Inflow = 0.58 cfs @ 1.01 hrs, Volume= 0.041 af
Outflow = 0.22 cfs @ 1.50 hrs, Volume= 0.041 af, Atten= 62%, Lag= 29.3 min
Discarded = 0.01 cfs @ 1.50 hrs, Volume= 0.002 af
Primary = 0.22 cfs @ 1.50 hrs, Volume= 0.039 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 181.22' @ 1.50 hrs Surf.Area= 0.019 ac Storage= 0.010 af

Plug-Flow detention time= 26.8 min calculated for 0.041 af (100% of inflow)
Center-of-Mass det. time= 26.8 min (129.7 - 102.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	180.00'	0.034 af	**13.00'W x 62.00'L x 7.50'H Field A** 0.139 af Overall - 0.054 af Embedded = 0.085 af x 40.0% Voids
#2A	181.00'	0.054 af	**CMP Round 60** x 6 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 2 Rows of 3 Chambers
		0.088 af	Total Available Storage

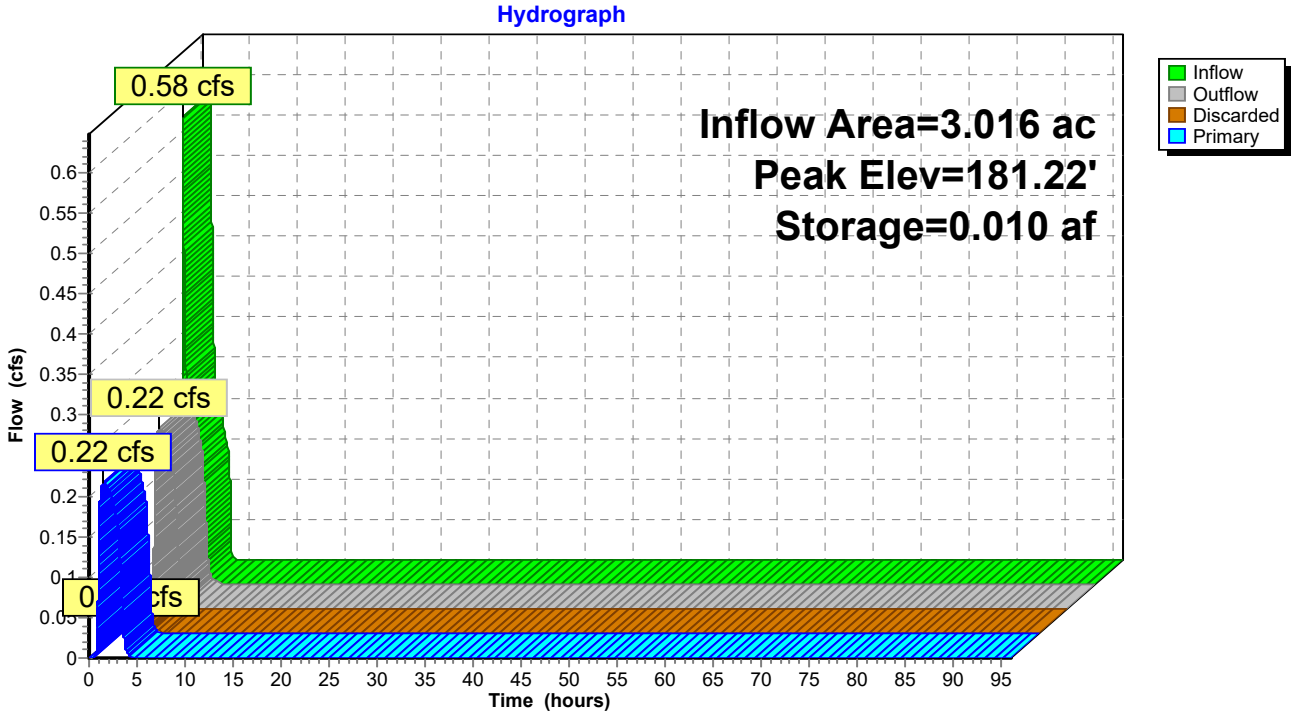
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	180.00'	**2.8" Vert. Orifice/Grate** C= 0.600
#2	Discarded	180.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	186.46'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 1.50 hrs HW=181.22' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.22 cfs @ 1.50 hrs HW=181.22' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.22 cfs @ 5.06 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond UGD-N: Underground Detention - North



Summary for Pond UGD-P: Underground Detention - Primary

Inflow Area = 14.100 ac, 67.76% Impervious, Inflow Depth = 0.13" for Water Quality event
Inflow = 2.18 cfs @ 1.01 hrs, Volume= 0.155 af
Outflow = 1.26 cfs @ 1.23 hrs, Volume= 0.155 af, Atten= 42%, Lag= 12.7 min
Discarded = 0.01 cfs @ 1.23 hrs, Volume= 0.004 af
Primary = 1.24 cfs @ 1.23 hrs, Volume= 0.151 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 181.22' @ 1.23 hrs Surf.Area= 0.042 ac Storage= 0.022 af

Plug-Flow detention time= 11.5 min calculated for 0.155 af (100% of inflow)
Center-of-Mass det. time= 11.5 min (114.3 - 102.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	180.00'	0.077 af	**13.00'W x 142.00'L x 7.50'H Field A** 0.318 af Overall - 0.126 af Embedded = 0.192 af x 40.0% Voids
#2A	181.00'	0.126 af	**CMP Round 60** x 14 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 2 Rows of 7 Chambers
		0.203 af	Total Available Storage

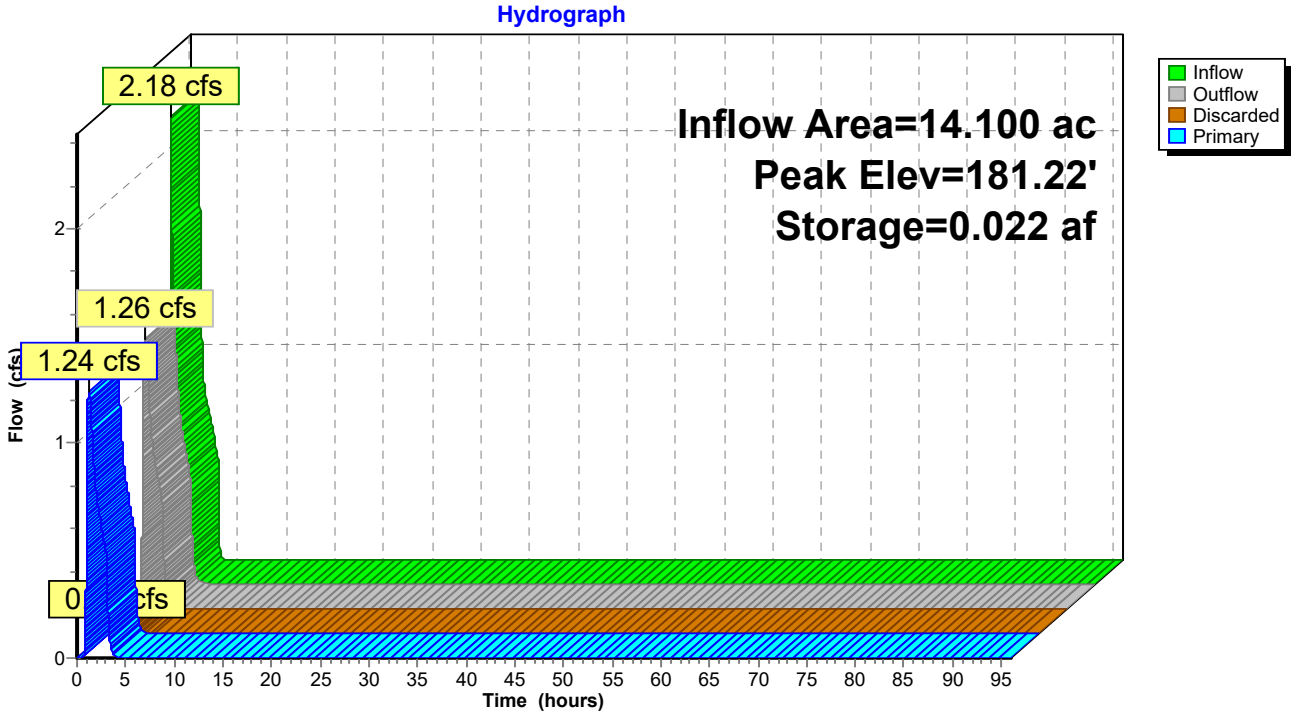
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	180.00'	**7.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	180.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	186.00'	**18.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 1.23 hrs HW=181.22' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.24 cfs @ 1.23 hrs HW=181.22' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 1.24 cfs @ 4.65 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond UGD-P: Underground Detention - Primary



Summary for Pond UGD-W: Underground Detention - West

Inflow Area = 4.483 ac, 84.04% Impervious, Inflow Depth = 0.16" for Water Quality event
Inflow = 0.86 cfs @ 1.01 hrs, Volume= 0.061 af
Outflow = 0.25 cfs @ 2.29 hrs, Volume= 0.061 af, Atten= 71%, Lag= 76.5 min
Discarded = 0.01 cfs @ 2.29 hrs, Volume= 0.005 af
Primary = 0.24 cfs @ 2.29 hrs, Volume= 0.056 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.001 hrs
Peak Elev= 182.15' @ 2.29 hrs Surf.Area= 0.044 ac Storage= 0.021 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 52.9 min (155.7 - 102.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	181.00'	0.079 af	**19.00'W x 102.00'L x 7.50'H Field A** 0.334 af Overall - 0.135 af Embedded = 0.198 af x 40.0% Voids
#2A	182.00'	0.135 af	**CMP Round 60** x 15 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 3 Rows of 5 Chambers
		0.215 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	181.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	181.00'	**0.250 in/hr Exfiltration over Wetted area**
#3	Primary	187.55'	**15.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 2.29 hrs HW=182.15' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.24 cfs @ 2.29 hrs HW=182.15' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.24 cfs @ 4.88 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond UGD-W: Underground Detention - West