

STORMWATER REPORT

**FIRST CATHEDRAL AFFORDABLE HOUSING DEVELOPMENT
1151 BLUE HILLS AVENUE
BLOOMFIELD, CONNECTICUT**

NOVEMBER 2025

Owner/Applicant:

THE FIRST CATHEDRAL
1151 Blue Hills Avenue
Bloomfield, CT 06002

BSC Job Number: 0101403.00



Prepared by:



180 Glastonbury Boulevard, Suite 305
Glastonbury, CT 06033

TABLE OF CONTENTS

- 1.0 PROJECT INFORMATION
 - 1.01 PROJECT DESCRIPTION
 - 1.02 PRE-DEVELOPMENT CONDITIONS
 - 1.03 POST-DEVELOPMENT CONDITIONS
- 2.0 DRAINAGE SUMMARY
 - 2.01 STORMWATER STANDARD 1 – RUNOFF VOLUME AND POLLUTANT REDUCTION
 - 2.02 STORMWATER STANDARD 2 – STORMWATER RUNOFF QUANTITY CONTROL
 - 2.03 STORMWATER STANDARD 3 – CONSTRUCTION OF SOIL EROSION AND SEDIMENT CONTROL
 - 2.04 STORMWATER STANDARD 4 – POST-CONSTRUCTION OPERATION AND MAINTENANCE
 - 2.05 STORMWATER STANDARD 5 – STORMWATER MANAGEMENT PLAN
 - 2.06 CONCLUSIONS
- 3.0 CONSTRUCTION OF SOIL EROSION AND SEDIMENT CONTROL
- 4.0 POST-CONSTRUCTION OPERATION AND MAINTENANCE
- 5.0 HYDROLOGY CALCULATIONS
 - 5.01 EXISTING WATERSHED PLAN
 - 5.02 EXISTING HYDROLOGY CALCULATIONS (HYDROCAD™ PRINTOUTS)
 - 5.03 PROPOSED WATERSHED PLAN
 - 5.04 PROPOSED HYDROLOGY CALCULATIONS (HYDROCAD™ PRINTOUTS)
- 6.0 ADDITIONAL DRAINAGE CALCULATIONS
 - 6.01 WATER QUALITY VOLUME CALCULATIONS
 - 6.02 DRAWDOWN CALCULATIONS

APPENDICES

- APPENDIX A – USGS LOCUS MAP
- APPENDIX B – FEMA MAP
- APPENDIX C – WEB SOIL SURVEY
- APPENDIX D – NOAA 14++ PRECIPITATION TABLES
- APPENDIX E – PROJECT GEOTECHNICAL REPORT

SECTION 1.0

PROJECT INFORMATION

1.01 PROJECT DESCRIPTION

The First Cathedral, the “Applicant”, is proposing to redevelop their existing auxiliary parking lot into an affordable housing complex, including parking accommodations, sidewalks, childcare services, site amenities, lighting, utilities, and stormwater management systems. The overall property, which is approximately 40.54 acres, is currently being permitted as a multi-phase Master Plan. Part of the Master Plan involves a subdivision of the property, which will create a new 14.7-acre lot that comprises the proposed housing complex (Phases 1 and 2). This Report will focus on Phase 1, with consideration to Phase 2 to ensure a complete stormwater management design is provided. The subsequent phases of the Master Plan are not included in this Report.

Phase 1 of the development is to completely demolish the existing paved parking lot and construct two (2) five-story residential buildings, along with the associated paved parking, site amenities, and utilities. Phase 2 consists of one (1) five-story residential building with childcare services provided on the first floor, additional paved parking, and an outdoor playground area. The stormwater management system and stormwater analysis have been designed with consideration to Phase 2 to avoid disruption or modifications to the system post-construction.

The Site is bounded by the First Cathedral Church property to the north, Blue Hills Avenue to the east, and a large inland wetland system to the south and west. Primary site access is through the existing curb cut on Blue Hills Avenue, with secondary access from the bridge that connects to the First Cathedral property. The Site Location Map is included in Appendix A.

There are wetlands located on the property in close proximity to the project, however no disturbance within the wetlands is proposed. A portion of the property is within FEMA Zone A, however there are no proposed improvements or disturbance within that area. See Appendix B for the FEMA Flood Insurance Rate Map (FIRM).

The proposed project has been designed to comply with the 2024 Connecticut Stormwater Quality Manual (WQM), 2024 Connecticut Guidelines for Soil Erosion & Sediment Control (E&S Manual), 2000 Connecticut Department of Transportation Drainage Manual (CTDOT Drainage Manual), and local municipal standards.

1.02 PRE-DEVELOPMENT CONDITIONS

The existing site is currently a large, paved parking lot that serves as overflow parking for major events at the First Cathedral, which is located on the adjacent property to the north, connected via bridge over the onsite wetlands.

Virtually the entire site outside of the wetland boundary is paved, with the majority of stormwater runoff being collected via catch basins located in the parking lot. There are four (4) known outlet/discharge points to the existing stormwater system, three of which are believed to be served by an underground water quality structure of unknown configuration. The four discharge points serve to distribute the runoff from the parking lot to separate locations within the onsite wetlands that border the site on the north, south, and west. Nearly all runoff from the site is via point source discharge from one of the existing discharge locations. A small portion of runoff along the eastern edge of the site flows towards the drainage system in Blue Hills Avenue.

Based on the results of the borings performed on the site, as well as review of the USDA NRCS Web Soil Survey, the onsite natural soils are generally silts and clays, with relatively shallow groundwater. The soils are considered to be very poorly-drained and are therefore classified as hydrologic soil group “D”. The Web Soil Survey is included in Appendix C and the Project Geotechnical Report is included in Appendix E.

1.03 POST-DEVELOPMENT CONDITIONS

As the redevelopment project involves a net reduction in overall site impervious coverage, the proposed stormwater management system will focus on providing water quality treatment, generally maintaining flow patterns to the existing onsite wetlands, and increasing the amount of overland sheet flow distributed linearly along the wetland edge, all to the maximum extent practicable.

A combination of LID and structural measures are proposed to collect and treat stormwater. The intent of the design is to distribute the runoff on the site between the four (4) existing outfall points identified in Section 1.02. The design has also significantly increased the area of overland sheet flow that will distribute linearly into the wetland, which will help reduce point source stormwater discharges. As indicated above, the overall reduction in impervious area will result in a reduction in peak runoff rates from the site for all design storms.

The existing site elevations and storm drainage outfall elevations prevented the design from providing above-ground stormwater BMPs at every low point without significantly raising the elevations of the site. Where a gravity connection was not feasible, a hydrodynamic separator is proposed to provide water quality flow treatment.

Where elevations allow, bioretention basins are proposed to provide above-ground stormwater treatment. Due to the poorly-drained onsite soils, the basins are proposed with underdrains and impermeable liners, as recommended in the WQM. While this does not provide any retention volume credit, the bioretention media is effective at removing pollutants and nutrients from runoff prior to discharging.

Clean runoff from the building roofs will be discharged to an underground detention chamber, which ultimately discharge to one of the existing stormwater outfalls.

The project is proposing to meet the Stormwater Standards of the WQM to the maximum extent practicable with the proposed stormwater management system outlined above. Additional discussion of the Standards can be found in Section 2 of this Report.

SECTION 2.0

DRAINAGE SUMMARY

2.01 Stormwater Standard 1 – Runoff Volume and Pollutant Reduction

Per the WQM Stormwater Management Standard #1, the project should *preserve pre-development hydrology and pollutant loads to protect water quality and maintain groundwater recharge*.

Water Quality Volume

The goal of this section of Stormwater Standard #1 is to for new developments and redevelopments with less than 40% existing directly connected impervious area (DCIA) to retain 100% of the water quality volume (WQV) onsite and redevelopments with greater than 40% existing DCIA to retain 50% of the WQV onsite. The volume of runoff required to be retained onsite is the required retention volume (RRV).

As a redevelopment with greater than 40% DCIA, the project is required to provide an RRV of 50% of the WQV. However, based on the poorly drained onsite soils, the project is proposing to meet this Standard to the maximum extent practicable. Per Table 4-2 of the WQM, a redevelopment project with greater than 40% DCIA is required to treat 100% of the WQV if the RRV cannot be met. The project proposes to meet this Standard to the maximum extent practicable through the implementation of the following measures:

1. Reduction in overall site impervious area
2. Lined bioretention basins with underdrains with rain guardian pretreatment structures to provide TSS, pollutant, and nutrient removal
3. Hydrodynamic separators to provide TSS, pollutant, and nutrient removal
4. Increase in overland sheet flow areas to distribute runoff linearly in lieu of a point source

Table 2-1

<u>BMP Catchment</u>	<u>Imp. Area (ac)</u>	<u>WQV Required (50%) (cf)</u>	<u>RRV Provided (cf)</u>	<u>WQV Provided (cf)</u>
Bioretention Basin 1	0.160	367	0	669
Bioretention Basin 2	0.442	1,014	0	741 (+273) ¹
Bioretention Basin 3	0.162	374	0	637
Hydrodynamic Separator 1	0.568	1,290 (0.35 cfs)	0	1,290
Hydrodynamic Separator 2	0.600	1,370 (0.37 cfs)	0	1,370
Hydrodynamic Separator 3	0.535	1,221 (0.33 cfs)	0	1,221
Uncontrolled ²	0.123	403	0	0
Total Site ²	2.59	6,039	0	6,201

¹ Discharge from bioretention basin receives additional treatment from Hydrodynamic Separator 3. Therefore, entire WQV is met.

² Does not include roof areas or drainage areas with zero impervious.

Table 2-1 above indicates that the total RRV for the site cannot be met due to the poorly-drained soils, however the proposed stormwater measures will provide combined treatment/storage capacity that exceeds the total required WQV.

The project has met this Standard to the maximum extent practicable by providing 100% of the Water Quality Volume.

2.02 Stormwater Standard 2 – Stormwater Runoff Quantity Control

Per the WQM Stormwater Management Standard #2, the project should *not exceed pre-development peak flow rates and manage the volume and timing of runoff to prevent downstream flooding, channel erosion, and other adverse impacts, and safely convey flows into, through, and from structural stormwater BMPs.*

Watershed modeling was performed using HydroCAD Stormwater Modeling Software version 10.20, a computer aided design program that combines SCS runoff methodology with standard hydraulic calculations. A model of the site's hydrology was developed for both pre- and post-development conditions to assess the effects of the proposed development on the project site and surrounding areas.

Stormwater runoff was modeled using rainfall data from the NOAA Atlas 14 Point Precipitation Frequency Database. A Storm Type of NOAA10, Storm Curve D, 24-hour duration was used for each rainfall event. NOAA Atlas 14 Precipitation Data is included in Appendix D.

Table 2-2

<u>Storm Frequency</u>	<u>NOAA 14++ Rainfall (Inches)</u>
2-year	3.17
10-year	5.06
25-year	6.24
100-year	8.06

The peak rates of runoff for pre- and post-development conditions are provided in the following table:

Table 2-3

Storm Discharge Comparison				
Watershed	Storm Event	Existing (cfs)	Proposed (cfs)	Difference (cfs)
Onsite Wetlands	2-year	15.82	13.68	-2.14
	10-year	27.20	26.11	-1.09
	25-year	34.27	33.10	-1.17
	100-year	45.13	43.83	-1.30
Blue Hills Avenue	2-year	0.22	0.21	-0.01
	10-year	0.38	0.38	0.00
	25-year	0.49	0.48	-0.01
	100-year	0.65	0.64	-0.01
Total Site	2-year	16.03	13.89	-2.14
	10-year	27.58	26.49	-1.09
	25-year	34.76	33.58	-1.18
	100-year	45.77	44.74	-1.30

The above table demonstrates that the peak runoff rate for each design storm will be decreased from pre- to post-development. Pre- and post-development hydrologic computations are included in Section 5 of this Report.

In accordance with the WQM, Standard 2 has been met if the project demonstrates that the peak runoff rate has been reduced for all design storms.

2.03 Stormwater Standard 3 – Construction Soil Erosion and Sediment Control

Per the WQM Stormwater Management Standard #3, the project should *design, install, and maintain effective soil erosion and sedimentation control measures during construction and land disturbance activities. Consideration for final site stabilization should also be included during the development of a SESC Plan.*

An Erosion & Sedimentation Control Plan, construction drawings, and construction details have been developed for the proposed project to demonstrate compliance with this Standard and the CT E&S Manual. Provisions for operations and maintenance during construction are included in Section 3 of this report.

2.04 Stormwater Standard 4 – Post-Construction Operation and Maintenance

Per the WQM Stormwater Management Standard #4, the project should *perform long-term maintenance of structural stormwater management systems to ensure that they continue to function as designed and implement operational source control and pollution prevention measures.*

Provisions for post-construction operations and maintenance are included in Section 4 of this report.

2.05 Stormwater Standard 5 – Stormwater Management Plan

Per the WQM Stormwater Management Standard #5, the project should *document how the proposed stormwater management measures meet the stormwater management standards, performance criteria, and design guidelines.*

The intent of this Stormwater Management Report is to meet Stormwater Standard #5 and demonstrate compliance with the WQM for the proposed project.

2.06 Conclusion

The project has been designed in accordance with local standards, the CT DEEP WQM, CT DEEP E&S Manual, and CTDOT Drainage Manual. The Stormwater Standards have been met to the maximum extent practicable for the proposed redevelopment project.

SECTION 3.0

CONSTRUCTION PERIOD EROSION AND SEDIMENTATION CONTROL PLAN

3.0 CONSTRUCTION PERIOD EROSION AND SEDIMENTATION CONTROL PLAN

The objective of temporary erosion control during construction is to minimize the area of exposed soil, control runoff rate and direction, and provide for rapid stabilization of exposed areas. Prior to any construction activity, trenched silt fence, staked hay bales, or straw wattles will be placed down gradient of the proposed work areas. The fence/barrier will provide some sediment control, as well as provide a limit of construction activity.

Construction entrances will be utilized to remove sediment from construction vehicle tires and prevent it from being tracked onto adjoining paved roadway areas.

Any excavated and stockpiled topsoil will be contained within staked hay bales, silt fence, or straw wattles. Topsoil locations have been shown on the Erosion and Sediment Control (E&S) Plan. Erosion-prone areas to be left exposed for extended periods (>30 days) will be mulched and seeded for temporary vegetative cover. After construction, all exposed areas will be graded, mulched and re-vegetated with appropriate ground cover. The perimeter controls will remain in place until groundcover is established.

Filter inserts will be used to collect sediment that may be carried in the storm runoff during construction. Filter inserts will be placed in each existing catch basin, yard drain, dry well, and in each new catch basin during construction and until all disturbed areas of the site have been stabilized. Replacement of the insert shall be as often as necessary to prevent excessive ponding due to clogged fabric.

Temporary diversion swales may be constructed to direct storm runoff away from disturbed areas. Stone or hay bale check dams will be installed at intervals along the swales to reduce the runoff velocity. In areas of excessive grade changes, temporary pipe slope drains will be constructed to convey runoff flows down the face of slopes without causing erosion problems. The diversion swales will outlet into temporary sediment traps.

Dewatering settling basins will be utilized where groundwater is encountered in trenching, foundation excavation, or any other excavation. The dewatering wastewaters will be infiltrated into the ground or discharged, after filtration into the nearest catch basin.

Throughout all phases of construction, the erosion control measures will be routinely inspected and cleaned, repaired, and replaced as necessary. See Section 4.0 entitled “Operation and Maintenance Plan” for more details.

Throughout the construction process, extra stocks of hay bales, silt fence, and straw wattles will be kept on-site to replace those that become damaged and/or deteriorated.

Any erosion and sediment control measures, which, upon inspection, are found to be damaged, deteriorated or not functioning properly, will be repaired, replaced, and corrected immediately after inspection.

Areas which are mulched or seeded for temporary vegetative cover will be inspected for proper cover at the end of each workday if precipitation is forecast and prior to weekends. Additional seeding or mulch will be placed as necessary.

The temporary erosion and sediment control systems will not be removed until all stormwater drainage system components are in place, cleaned and working properly and until permanent vegetative cover and other stabilization measures are established.

The following maintenance procedures shall be followed by the Contractor for temporary and permanent erosion and sedimentation measures and stormwater treatment systems installed during the construction period:

- a. Dust Control: Moisten disturbed soil areas with water periodically or use a non-asphaltic soil tackifier to minimize dust.
- b. Temporary Seeding: Inspect weekly and within 24 hours of a storm with a rainfall generating a discharge. Continue inspection until vegetation is firmly established.
- c. Permanent Seeding: Inspect seeded areas weekly and within 24 hours after a storm with a rainfall generating a discharge. Continue inspection until vegetation is firmly established.
- d. Temporary Soil Protection: Inspect seeded areas weekly and within 24 hours after a storm with a rainfall generating a discharge.
- e. Temporary Erosion Control Mat: Inspect mats weekly and within 24 hours after a storm with a rainfall generating a discharge.
- f. Temporary Filter Inserts: Inspect the fabric at least once a week and within 24 hours after the end of a storm with a rainfall generating a discharge. Check the fabric for structural soundness (i.e. tears), proper anchoring/alignment within the grate and ability to drain runoff (i.e. percent of clogging by sediment). Remove the sediment every week, or sooner if ponding is excessive. Each time the sediment is removed, replace the section of fabric removed with a new section. Do not remove the sediment and reuse the same section of fabric.
- g. Hay Bale/ Silt Fence / Straw Wattle Barrier: Inspect the barrier at least once a week and within 24 hours after the end of a storm with a rainfall generating a discharge. For dewatering operations, inspect frequently before, during and after pumping operations. Remove the sediment deposits when the depth reaches one half the barrier heights. Repair or replace a barrier within 24 hours of observed failure. Maintain the barrier until the contributing disturbed area is stabilized.
- h. Construction Entrance/Exit Pad: Maintain the pad in a condition that will prevent tracking and washing of sediment onto paved surfaces. Place additional clean gravel on top of gravel that has become silted or remove the silted gravel and replace the gravel to the depth removed with clean gravel, as conditions warrant. Remove immediately all sediment spilled, dropped, washed, or tracked onto paved surfaces. Roads adjacent to the construction site shall be cleaned at the end of each day by hand sweeping or sweeper truck.
- i. Dewatering Settling Basin (if used): Inspect the basin at least every two hours during periods of use. Remove accumulated sediments when the volume equals one half the provided storage volume.
- j. Existing Catch Basins and Sumps: Inspect the sediment traps as specified in f. above. After final removal of the sediment traps at the end of construction, clean the sump of all silt and debris.
- k. New Catch Basins and Sumps: As new catch basins are constructed; a sediment filter basket shall be installed in the unit and a sediment barrier installed around the grate. Inspect the basket and barrier weekly and within 24 hours after a storm with a rainfall generating a discharge. After stabilization of the drainage area entering the catch basin, remove the trap and barrier and clean the basin sump of all silt and debris.
- l. Stone or Hay Bale Check Dams: Inspect the check dam at least once a week and within 24 hours after the end of a storm with a rainfall generating a discharge. Remove the sediment deposits when the depth reaches one half the check dam heights. Repair or replace a check dam within 24 hours of observed failure. Maintain the check dam until the contributing disturbed area is stabilized.

- m. Waterbars: Inspect the waterbars daily when exposed to vehicle traffic and within 24 hours after the end of a storm with a rainfall generating a discharge. Repair and reshape the waterbar immediately after observing any damages. Remove the sediment deposits when the depth reaches one half the waterbar heights. Maintain the waterbar until the contributing disturbed area is stabilized.
- n. Temporary Diversion Swales & Pipe Slope Drains: Inspect at least once a week and within 24 hours after the end of a storm with a rainfall generating a discharge. Inspect daily when construction activities are in close proximity to the swales or slope drains. Repair damaged areas within 24 hours of observed failure. Maintain the swales and slope drains until the contributing disturbed area is stabilized.
- o. Temporary Stockpiles: Inspect temporary stockpiles at the end of each workday to ensure that tarps are in place and secured. Temporary stockpiles that are expected to be inactive for more than 30 days should be temporarily seeded (see above).
- p. Temporary Sediment Traps: Inspect monthly and within 24 hours after a storm with a rainfall generating a discharge. Sediment and oil shall be removed when the storage volume is reduced by one half, or at least every 6 months during construction.

During construction, the Contractor shall be required to remove accumulated sediment from sediment control measures and water quality measures. Sediment shall be disposed of off-site in a manner and location approved by local and state agencies. Temporary storage of sediment on-site is permissible if it is protected from erosion and stockpiled in a manner that will prevent it from being carried by erosion into adjacent properties or resource areas.

Temporary sediment traps may be removed if the contributing drainage area is stabilized. The area shall be re-graded to match original grades or proposed grades as shown on the plans. The disturbed area shall be temporarily, or permanently seeded and mulched if the area is not to be paved.

For hay bale barriers, the stakes may be removed as soon as the upslope areas have been permanently stabilized. Unless proposed construction requires otherwise, any accumulated sediment shall be left in place and the hay bales left in place or broken up for ground cover.

Upon the stabilization of the contributing drainage area, silt fence shall be inspected for sediment accumulation prior to removal. For sediment depths greater than 6", the sediment shall be re-graded or removed. The silt fence shall be removed by pulling the support posts and cutting the geotextile at the ground level. Re-grade or remove the sediment as necessary and stabilize the disturbed soils by placing temporary or permanent seeding and mulch.

When dewatering has been completed, remove the hay bale barrier, sediment and stone, as appropriate, and re-grade the area to original or proposed grade. Stabilize the disturbed area with temporary or permanent seed and mulch.

After the drainage areas to the new and existing catch basins have been stabilized, the Contractor shall be required to clean all sumps and hoods of debris and silt. In addition, within the limits of work, the Contractor shall clean all storm drain piping of collected silt and debris by flushing with water. If the storm system discharges to ground, a sediment barrier must remain in place at each outfall to capture any sediment or debris carried down by the flushing. If the storm drainage system discharges into a public or private drainage collection system, the Contractor must install a means of collecting debris and filtering the sediment from the flushing water in the on-site storm system before discharge to the existing storm system.

SECTION 4.0

OPERATION AND MAINTENANCE PLAN

4.0 OPERATION AND MAINTENANCE PLAN

As required by Stormwater Standard #4, this Operation and Maintenance Plan has been developed for source control and pollution prevention at the site after construction.

MAINTENANCE RESPONSIBILITY

After construction is completed and accepted by the Owner, it shall be the responsibility of the Owner to maintain all drainage and water quality structures. In addition, the following inspection and maintenance guidelines shall be the responsibility of the Owner, or the Owner's representative, beginning the first year period following construction completion and acceptance, and shall be followed each year thereafter.

GOOD HOUSEKEEPING PRACTICES

The site to be kept clean of trash and debris at all times. Trash, junk, etc. is not to be left outside. Inspect on a regular basis not to exceed weekly for litter and debris.

REQUIREMENTS FOR ROUTINE INSPECTIONS AND MAINTENANCE OF STORMWATER BMPs

All stormwater BMPs are to be inspected and maintained as follows;

Parking Lot and Driveway Sweeping

At least twice per year, with the first occurring as soon as possible after snowmelt and the second not less than 90 days following the first.

Landscaped Areas

Inspect semi-annually for erosion or dying vegetation. Repair and stabilize any bare or eroded areas and replace vegetation as soon as possible.

Hydrodynamic Separators

Follow manufacturer's recommended maintenance guidelines. At a minimum, inspect after major storms (1 inch or more of precipitation) during the first six months following construction, then inspect semi-annually. Perform inspections once in late Spring after snowmelt and once in late Fall after leaf fall and before first snowfall. Remove trash and organic debris (leaves) in the Spring and Fall. Remove accumulated sediment when storage capacity is reduced by 50% or more.

Underground Detention System

Follow manufacturer's recommended maintenance guidelines. At a minimum, inspect after major storms (1 inch or more of precipitation) during the first six months following construction, then inspect semi-annually. Perform inspections once in late Spring after snowmelt and once in late Fall after leaf fall and before first snowfall. Remove trash and organic debris (leaves) in the Spring and Fall. Remove accumulated sediment from the system when accumulation exceeds 1 inch or when drawdown time exceeds 48 hours after the end of a storm event.

Bioretention Basins

At a minimum, inspect after major storms (1 inch or more of precipitation) during the first six months following construction, then inspect annually. Remove trash and organic debris (leaves) in the Spring and Fall. Maintain vegetated filter strip and/or grassed side slopes. Remove accumulated sediment from the system when accumulation exceeds 1 inch or when drawdown time exceeds 48 hours after the end of a storm event, in which case the soil media shall be replaced in accordance with the CT Stormwater Quality Manual.

PROVISIONS FOR SOLID WASTE MANAGEMENT (SITE TRASH)

Trash will be placed in on-site dumpsters and the Owner will make provisions for its regular and timely removal.

SNOW DISPOSAL AND PLOWING PLANS

The purpose of the snow and snowmelt management plan is to provide guidelines regarding snow disposal site selection, site preparation and maintenance. For the areas that require snow removal, snow storage onsite will largely be accomplished by using pervious areas along the shoulder of the roadway and development as windrowed by plows.

- Avoid dumping of snow into any water body, including rivers, ponds, or wetlands. In addition to water quality impacts and flooding, snow disposed of in open water can cause navigational hazards when it freezes into ice blocks.
- Avoid disposing of snow on top of storm drain catch basins or in stormwater basins. Snow combined with sand and debris may block a storm drainage system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water.
- In significant storm events, the melting or off-site trucking of snow may be implemented. These activities shall be conducted in accordance with all local, state and federal regulations.
- Snow shall be removed from the areas around on-site fire-hydrants to maintain emergency access to hydrants at all times. Removable flags or markers should be placed on hydrants to allow snow removal crews to more easily locate hydrants and not damage them with plows or other snow removal equipment.

WINTER ROAD SALT AND/OR SAND USE AND STORAGE RESTRICTIONS

The Owner will be responsible for sanding and salting the site. No storage on site.

STREET SWEEPING SCHEDULES

There are three types of sweepers: Mechanical, Regenerative Air, and Vacuum Filter.

- 1) Mechanical: Mechanical sweepers use brooms or rotary brushes to scour the pavement.
- 2) Regenerative Air: These sweepers blow air onto the road or parking lot surface, causing fines to rise where they are vacuumed.
- 3) Vacuum filter: These sweepers remove fines along roads. Two general types of vacuum filter sweepers are available - wet and dry. The dry type uses a broom in combination with the vacuum. The wet type uses water for dust suppression.

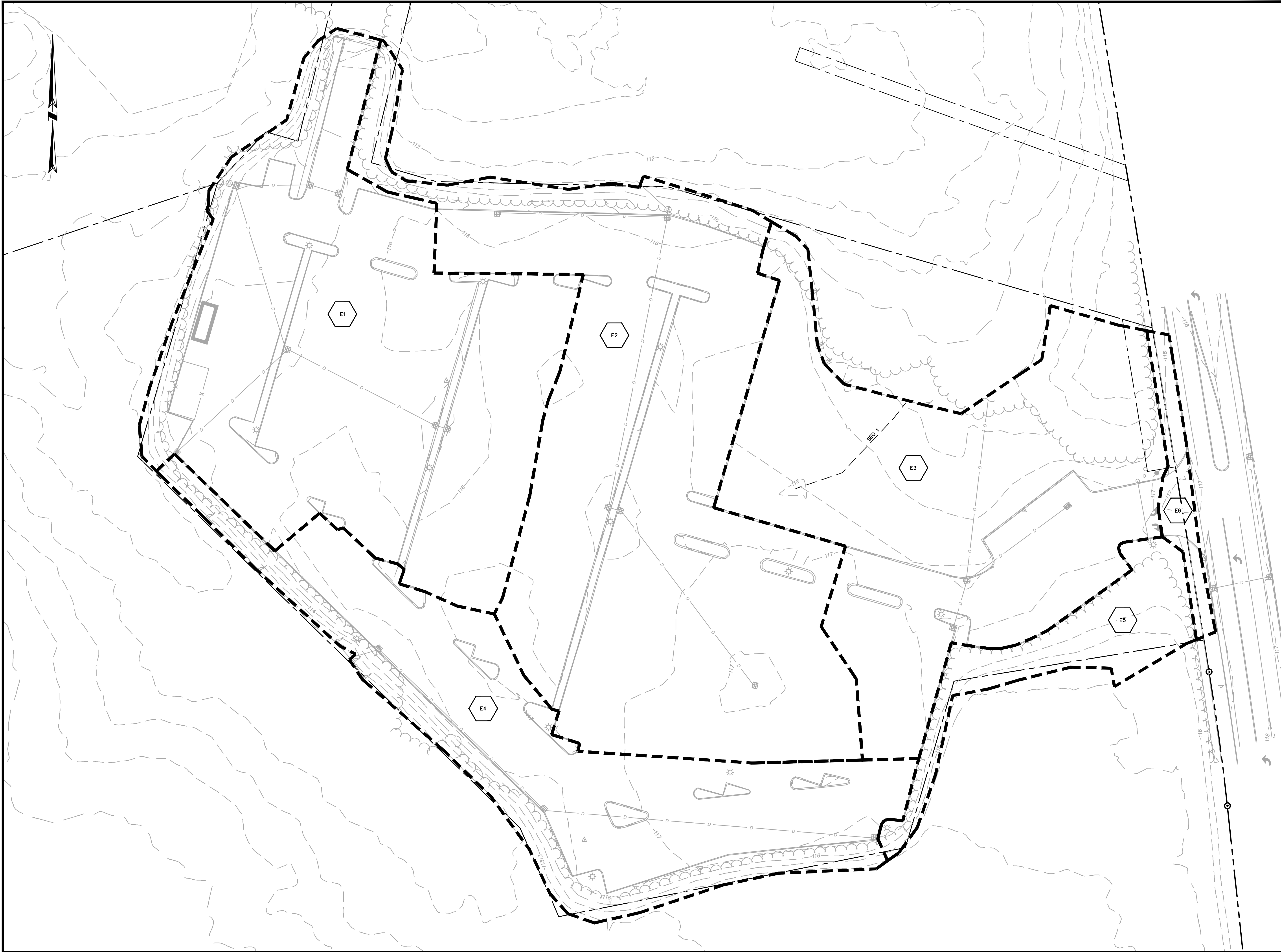
Regardless of the type chosen, the efficiency of street sweeping is increased when sweepers are operated in tandem.

It is recommended that street sweeping of the parking areas occur four times a year, including once after the spring snow melt.

SECTION 5.0

HYDROLOGY CALCULATIONS

5.01 EXISTING WATERSHED PLAN



FIRST CATHEDRAL
AFFORDABLE
HOUSING
DEVELOPMENT

1151 BLUE HILLS AVENUE

IN
BLOOMFIELD
CONNECTICUT

EXISTING WATERSHED
AREA MAP

NOVEMBER 2025

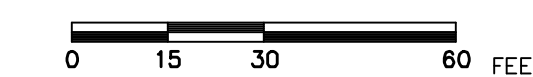
REVISIONS:

PREPARED FOR:
THE FIRST CATHEDRAL
1151 BLUE HILLS AVENUE
BLOOMFIELD, CT 06002

BSC GROUP 
BUILD | SUPPORT | CONNECT
665 Winding Brook Drive
Glastonbury, Connecticut
06033
860 652 8227

© 2025 BSC GROUP, INC.

SCALE: 1" = 30'



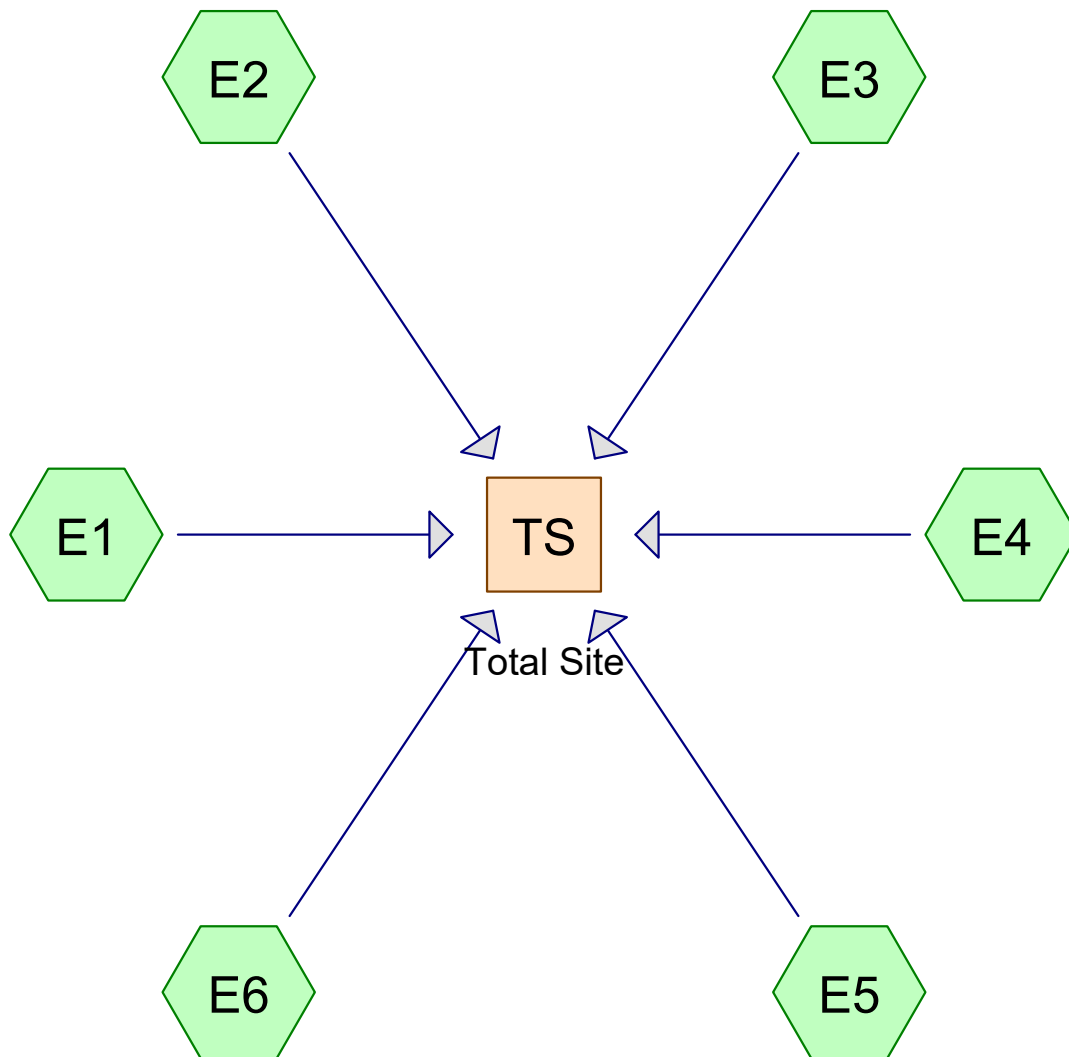
FILE: P:\010140300\CIVIL\ENGINEERING\DESIGN\DRAWING\DESIGN\W

DWG. NO:

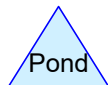
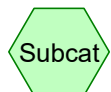
JOB. NO: 0101403.00

FIG. 5.01

5.02 EXISTING HYDROLOGY CALCULATIONS (HYDROCAD™ PRINTOUTS)



Flow to Blue Hills Ave



010140300-EWAM

Prepared by BSC Group

Printed 11/12/2025

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

Page 2

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YEAR	NOAA10 24-hr	D	Default	24.00	1	3.17	2
2	10-YEAR	NOAA10 24-hr	D	Default	24.00	1	5.06	2
3	25-YEAR	NOAA10 24-hr	D	Default	24.00	1	6.24	2
4	100-YEAR	NOAA10 24-hr	D	Default	24.00	1	8.06	2

010140300-EWAM

Prepared by BSC Group

Printed 11/12/2025

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.182	80	>75% Grass cover, Good, HSG D (E1, E2, E3, E4, E5, E6)
4.092	98	Paved parking, HSG D (E1, E2, E3, E4, E6)
0.817	79	Woods, Fair, HSG D (E1, E2, E3, E4, E5)
6.091	92	TOTAL AREA

010140300-EWAM

Prepared by BSC Group

Printed 11/12/2025

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

Page 4

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
6.091	HSG D	E1, E2, E3, E4, E5, E6
0.000	Other	
6.091		TOTAL AREA

010140300-EWAM

Prepared by BSC Group

Printed 11/12/2025

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

Page 5

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	1.182	0.000	1.182	>75% Grass cover, Good	E1, E2, E3, E4, E5, E6
0.000	0.000	0.000	4.092	0.000	4.092	Paved parking	E1, E2, E3, E4, E6
0.000	0.000	0.000	0.817	0.000	0.817	Woods, Fair	E1, E2, E3, E4, E5
0.000	0.000	0.000	6.091	0.000	6.091	TOTAL AREA	

010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 6

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1: Runoff Area=1.606 ac 83.81% Impervious Runoff Depth>2.61"
Tc=6.0 min CN=95 Runoff=4.84 cfs 0.350 af

SubcatchmentE2: Runoff Area=1.809 ac 86.35% Impervious Runoff Depth>2.61"
Tc=6.0 min CN=95 Runoff=5.45 cfs 0.394 af

SubcatchmentE3: Runoff Area=1.331 ac 34.11% Impervious Runoff Depth>1.80"
Flow Length=100' Slope=0.0200 '/' Tc=9.8 min CN=86 Runoff=2.54 cfs 0.200 af

SubcatchmentE4: Runoff Area=1.022 ac 66.83% Impervious Runoff Depth>2.32"
Tc=6.0 min CN=92 Runoff=2.85 cfs 0.198 af

SubcatchmentE5: Runoff Area=0.240 ac 0.00% Impervious Runoff Depth>1.31"
Tc=6.0 min CN=79 Runoff=0.39 cfs 0.026 af

SubcatchmentE6: Flow to Blue Hills Ave Runoff Area=0.083 ac 56.63% Impervious Runoff Depth>2.14"
Tc=6.0 min CN=90 Runoff=0.22 cfs 0.015 af

Reach TS: Total Site Inflow=16.03 cfs 1.182 af
Outflow=16.03 cfs 1.182 af

Total Runoff Area = 6.091 ac Runoff Volume = 1.182 af Average Runoff Depth = 2.33"
32.82% Pervious = 1.999 ac 67.18% Impervious = 4.092 ac

010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 7

Summary for Subcatchment E1:

Runoff = 4.84 cfs @ 12.13 hrs, Volume= 0.350 af, Depth> 2.61"
Routed to Reach TS : Total Site

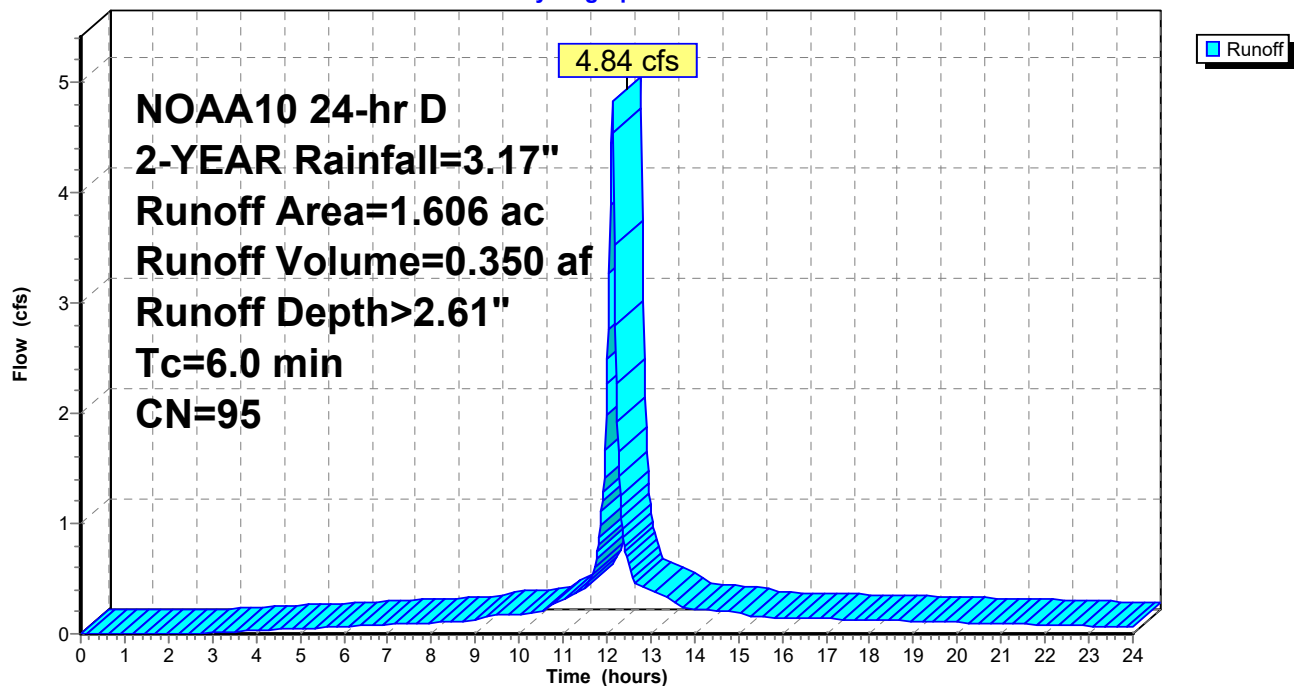
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.184	80	>75% Grass cover, Good, HSG D
0.076	79	Woods, Fair, HSG D
1.346	98	Paved parking, HSG D
1.606	95	Weighted Average
0.260		16.19% Pervious Area
1.346		83.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E1:

Hydrograph



010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 8

Summary for Subcatchment E2:

Runoff = 5.45 cfs @ 12.13 hrs, Volume= 0.394 af, Depth> 2.61"
Routed to Reach TS : Total Site

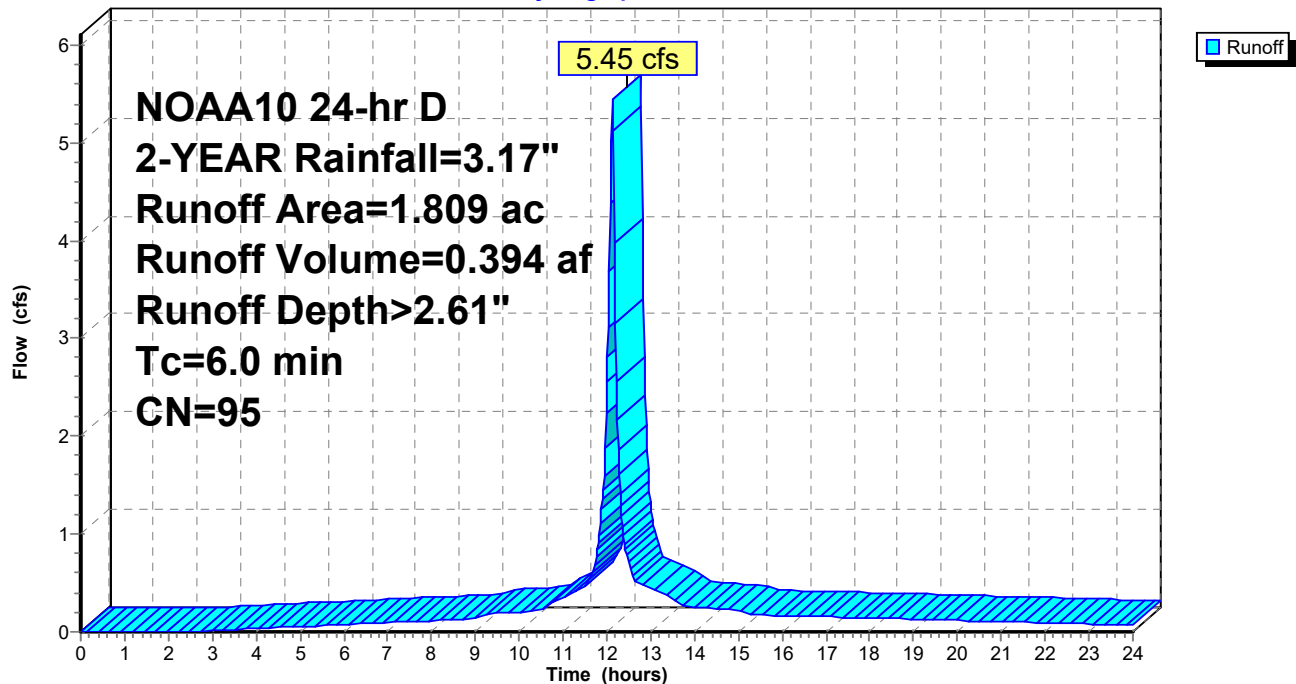
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.122	80	>75% Grass cover, Good, HSG D
0.125	79	Woods, Fair, HSG D
1.562	98	Paved parking, HSG D
1.809	95	Weighted Average
0.247		13.65% Pervious Area
1.562		86.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E2:

Hydrograph



Summary for Subcatchment E3:

Runoff = 2.54 cfs @ 12.17 hrs, Volume= 0.200 af, Depth> 1.80"
 Routed to Reach TS : Total Site

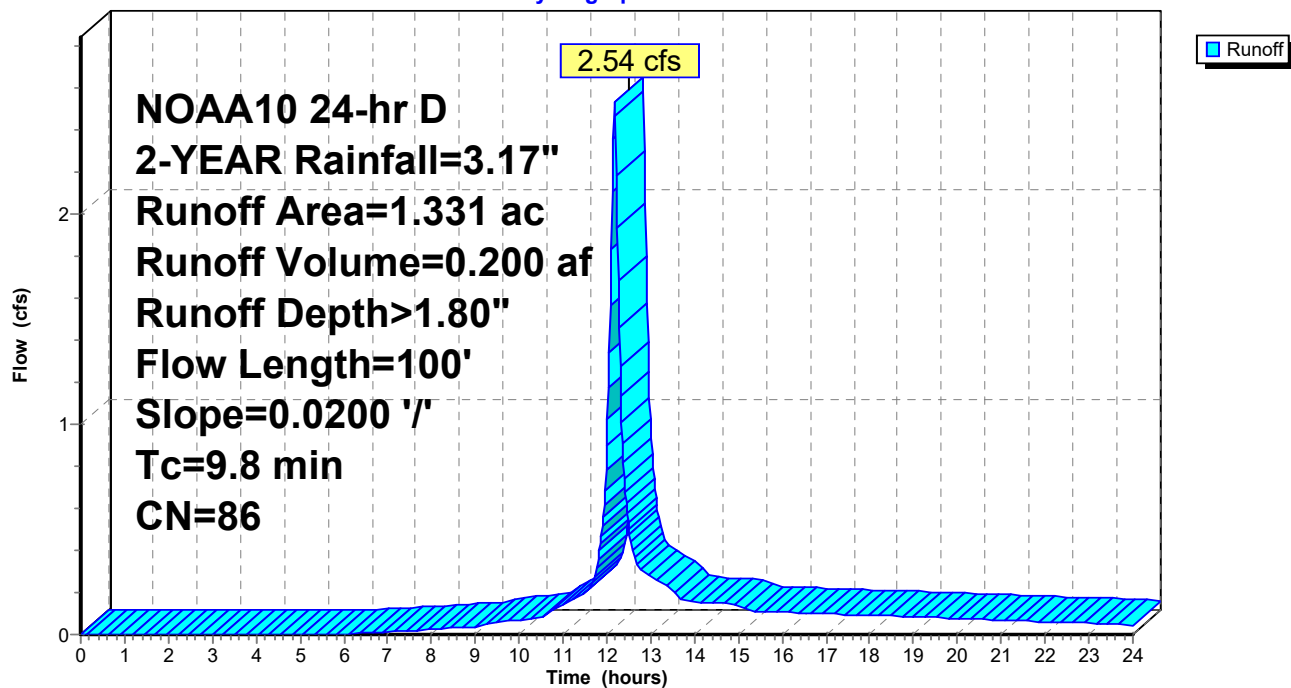
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.669	80	>75% Grass cover, Good, HSG D
0.208	79	Woods, Fair, HSG D
0.454	98	Paved parking, HSG D
1.331	86	Weighted Average
0.877		65.89% Pervious Area
0.454		34.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		Sheet Flow, Seg 1 Grass: Short n= 0.150 P2= 3.17"

Subcatchment E3:

Hydrograph



010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 10

Summary for Subcatchment E4:

Runoff = 2.85 cfs @ 12.13 hrs, Volume= 0.198 af, Depth> 2.32"
Routed to Reach TS : Total Site

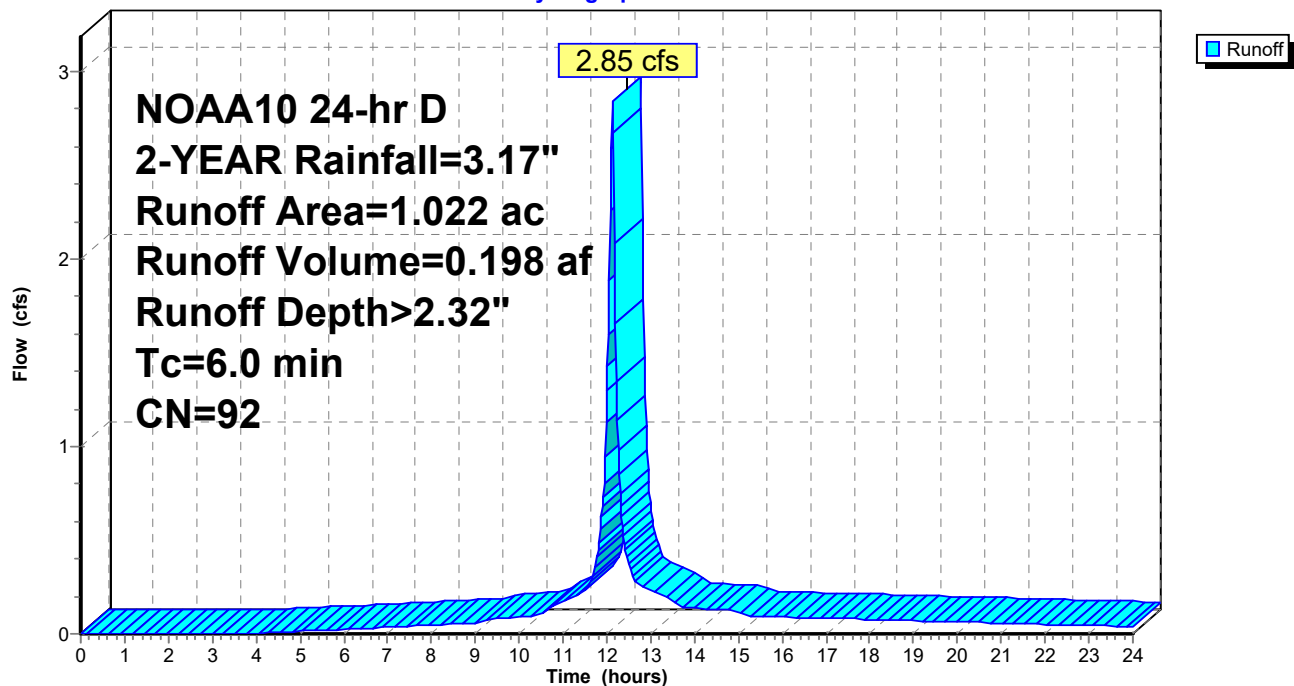
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.136	80	>75% Grass cover, Good, HSG D
0.203	79	Woods, Fair, HSG D
0.683	98	Paved parking, HSG D
1.022	92	Weighted Average
0.339		33.17% Pervious Area
0.683		66.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E4:

Hydrograph



010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 11

Summary for Subcatchment E5:

Runoff = 0.39 cfs @ 12.13 hrs, Volume= 0.026 af, Depth> 1.31"
Routed to Reach TS : Total Site

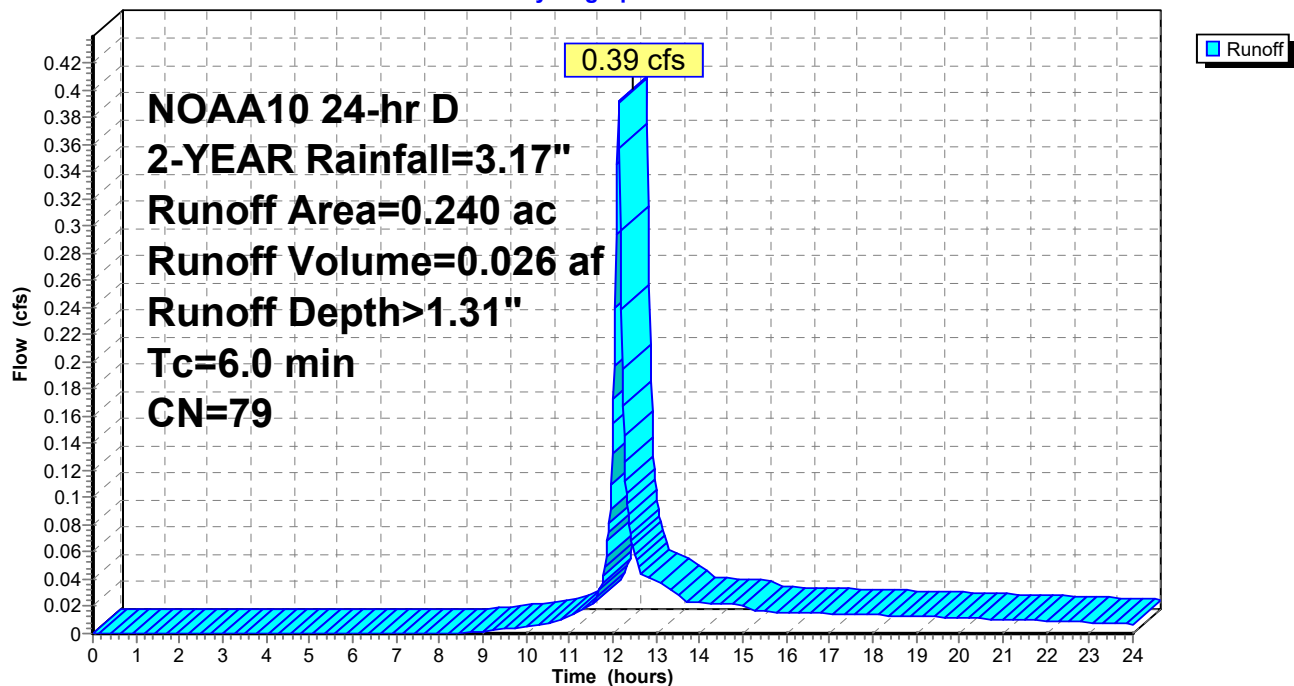
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.035	80	>75% Grass cover, Good, HSG D
0.205	79	Woods, Fair, HSG D
0.000	98	Paved parking, HSG D
0.240	79	Weighted Average
0.240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E5:

Hydrograph



010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 12

Summary for Subcatchment E6: Flow to Blue Hills Ave

Runoff = 0.22 cfs @ 12.13 hrs, Volume= 0.015 af, Depth> 2.14"
Routed to Reach TS : Total Site

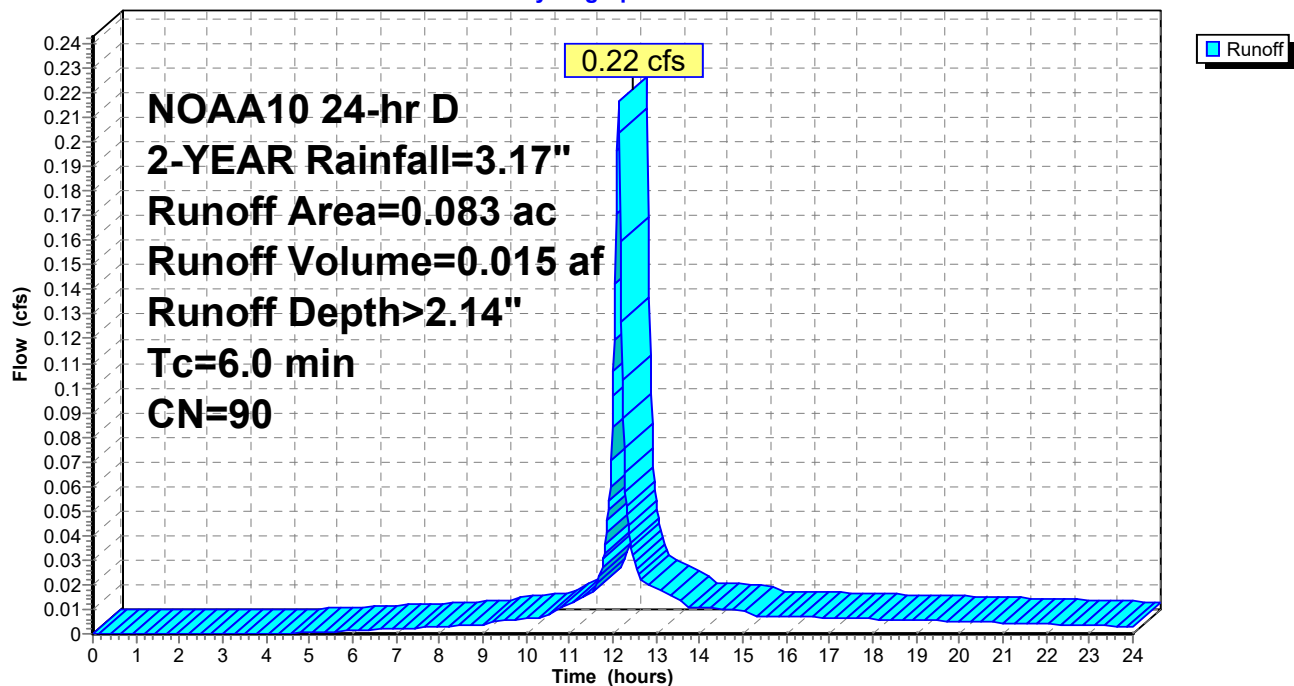
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.036	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.047	98	Paved parking, HSG D
0.083	90	Weighted Average
0.036		43.37% Pervious Area
0.047		56.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E6: Flow to Blue Hills Ave

Hydrograph

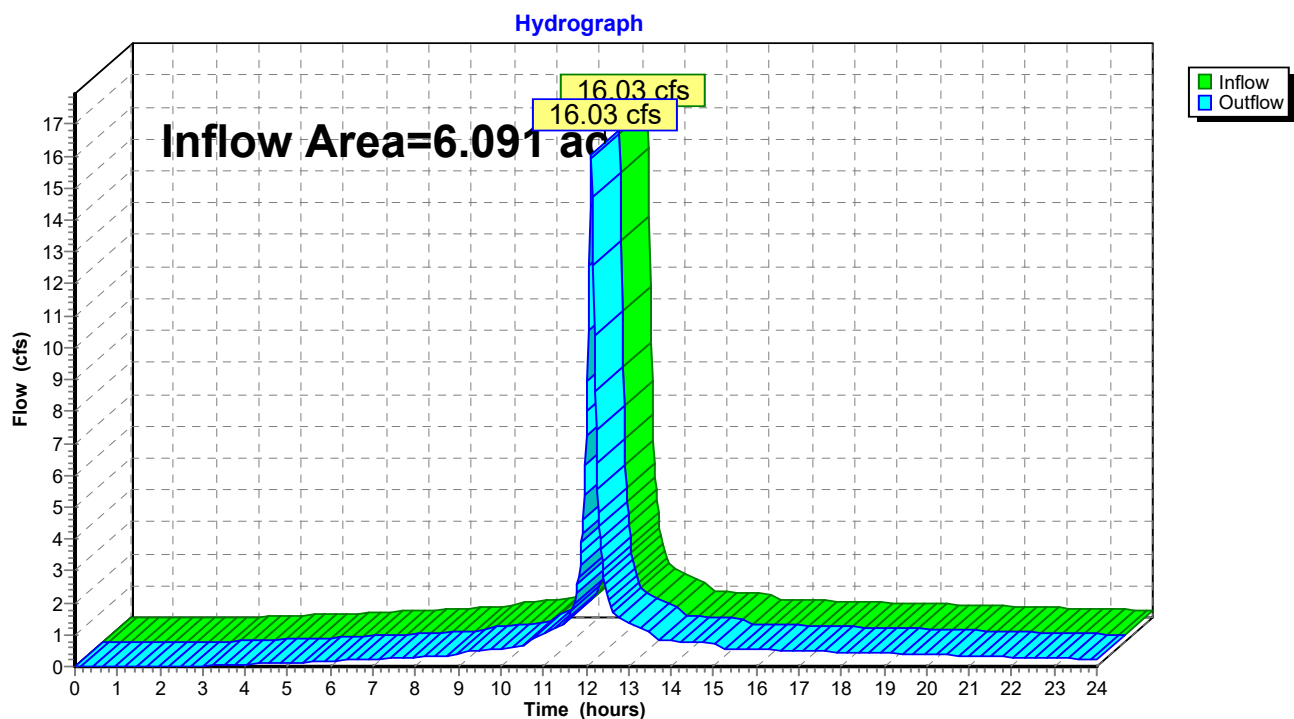


Summary for Reach TS: Total Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.091 ac, 67.18% Impervious, Inflow Depth > 2.33" for 2-YEAR event
Inflow = 16.03 cfs @ 12.13 hrs, Volume= 1.182 af
Outflow = 16.03 cfs @ 12.13 hrs, Volume= 1.182 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach TS: Total Site

010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 14

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1: Runoff Area=1.606 ac 83.81% Impervious Runoff Depth>4.47"
Tc=6.0 min CN=95 Runoff=8.01 cfs 0.599 af

SubcatchmentE2: Runoff Area=1.809 ac 86.35% Impervious Runoff Depth>4.47"
Tc=6.0 min CN=95 Runoff=9.03 cfs 0.674 af

SubcatchmentE3: Runoff Area=1.331 ac 34.11% Impervious Runoff Depth>3.51"
Flow Length=100' Slope=0.0200 '/' Tc=9.8 min CN=86 Runoff=4.84 cfs 0.390 af

SubcatchmentE4: Runoff Area=1.022 ac 66.83% Impervious Runoff Depth>4.14"
Tc=6.0 min CN=92 Runoff=4.90 cfs 0.353 af

SubcatchmentE5: Runoff Area=0.240 ac 0.00% Impervious Runoff Depth>2.85"
Tc=6.0 min CN=79 Runoff=0.85 cfs 0.057 af

SubcatchmentE6: Flow to Blue Hills Ave Runoff Area=0.083 ac 56.63% Impervious Runoff Depth>3.93"
Tc=6.0 min CN=90 Runoff=0.38 cfs 0.027 af

Reach TS: Total Site Inflow=27.58 cfs 2.100 af
Outflow=27.58 cfs 2.100 af

Total Runoff Area = 6.091 ac Runoff Volume = 2.100 af Average Runoff Depth = 4.14"
32.82% Pervious = 1.999 ac 67.18% Impervious = 4.092 ac

010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 15

Summary for Subcatchment E1:

Runoff = 8.01 cfs @ 12.13 hrs, Volume= 0.599 af, Depth> 4.47"
Routed to Reach TS : Total Site

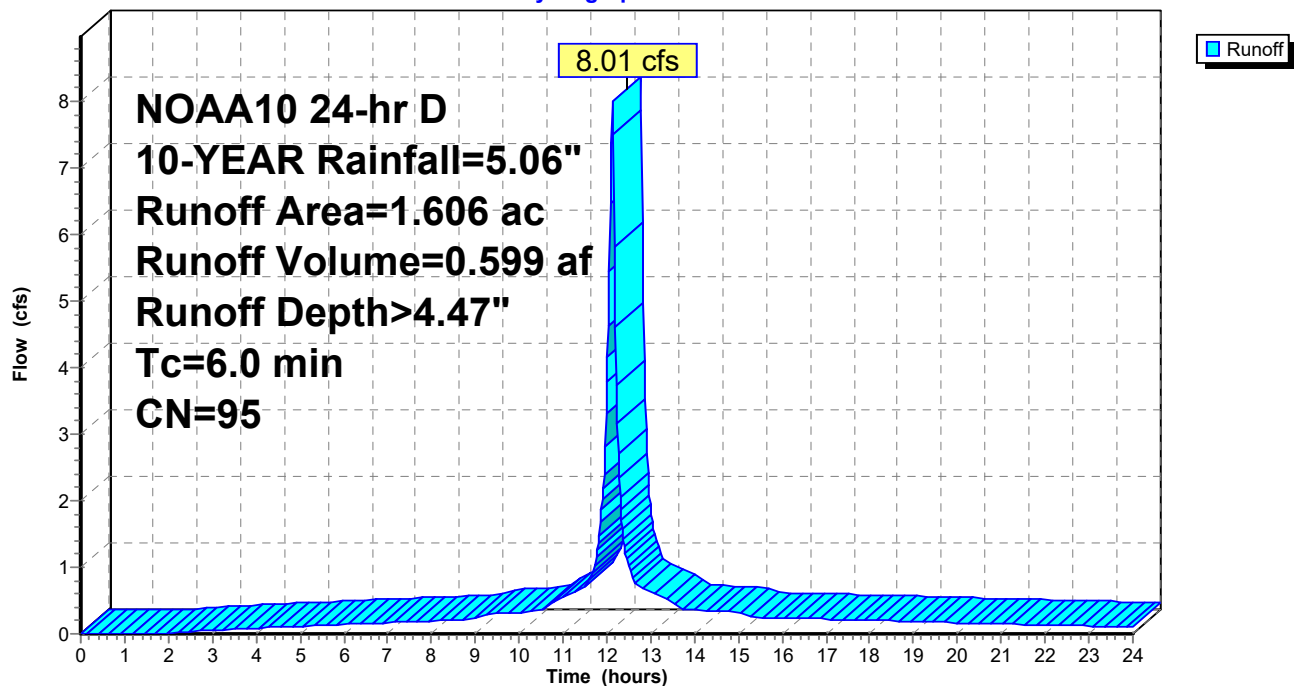
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.184	80	>75% Grass cover, Good, HSG D
0.076	79	Woods, Fair, HSG D
1.346	98	Paved parking, HSG D
1.606	95	Weighted Average
0.260		16.19% Pervious Area
1.346		83.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E1:

Hydrograph



010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 16

Summary for Subcatchment E2:

Runoff = 9.03 cfs @ 12.13 hrs, Volume= 0.674 af, Depth> 4.47"
Routed to Reach TS : Total Site

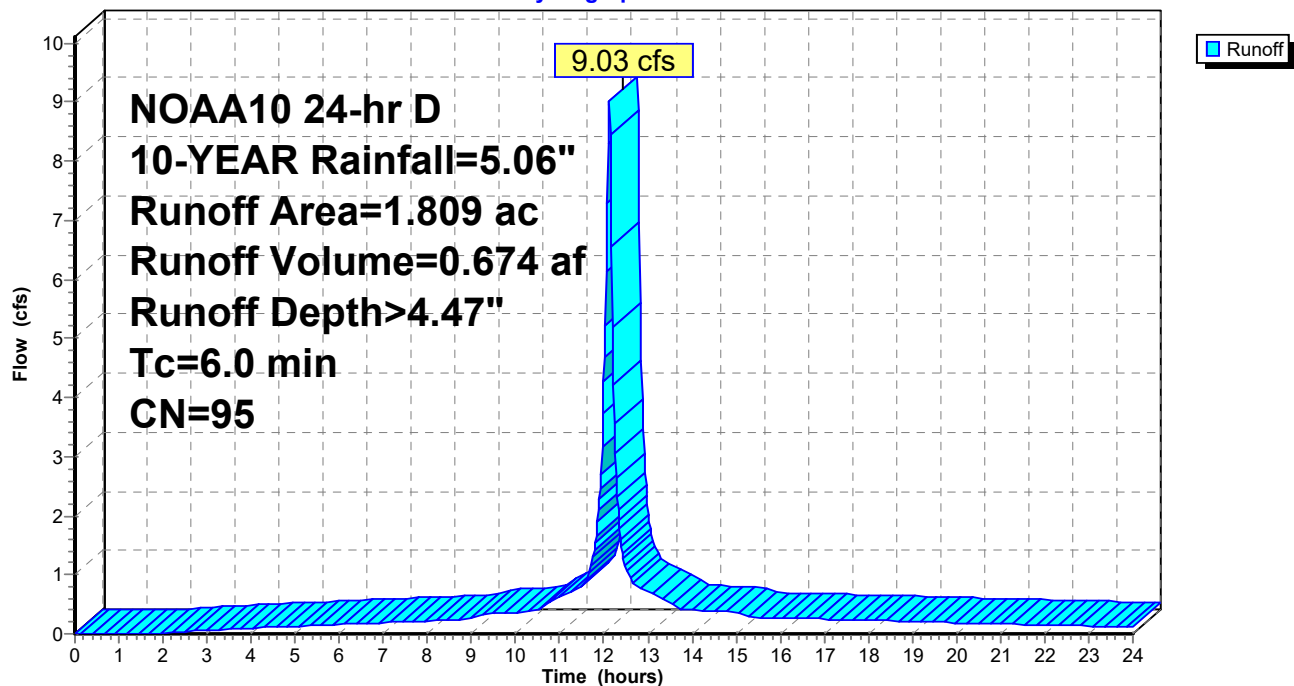
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.122	80	>75% Grass cover, Good, HSG D
0.125	79	Woods, Fair, HSG D
1.562	98	Paved parking, HSG D
1.809	95	Weighted Average
0.247		13.65% Pervious Area
1.562		86.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E2:

Hydrograph



Summary for Subcatchment E3:

Runoff = 4.84 cfs @ 12.17 hrs, Volume= 0.390 af, Depth> 3.51"
Routed to Reach TS : Total Site

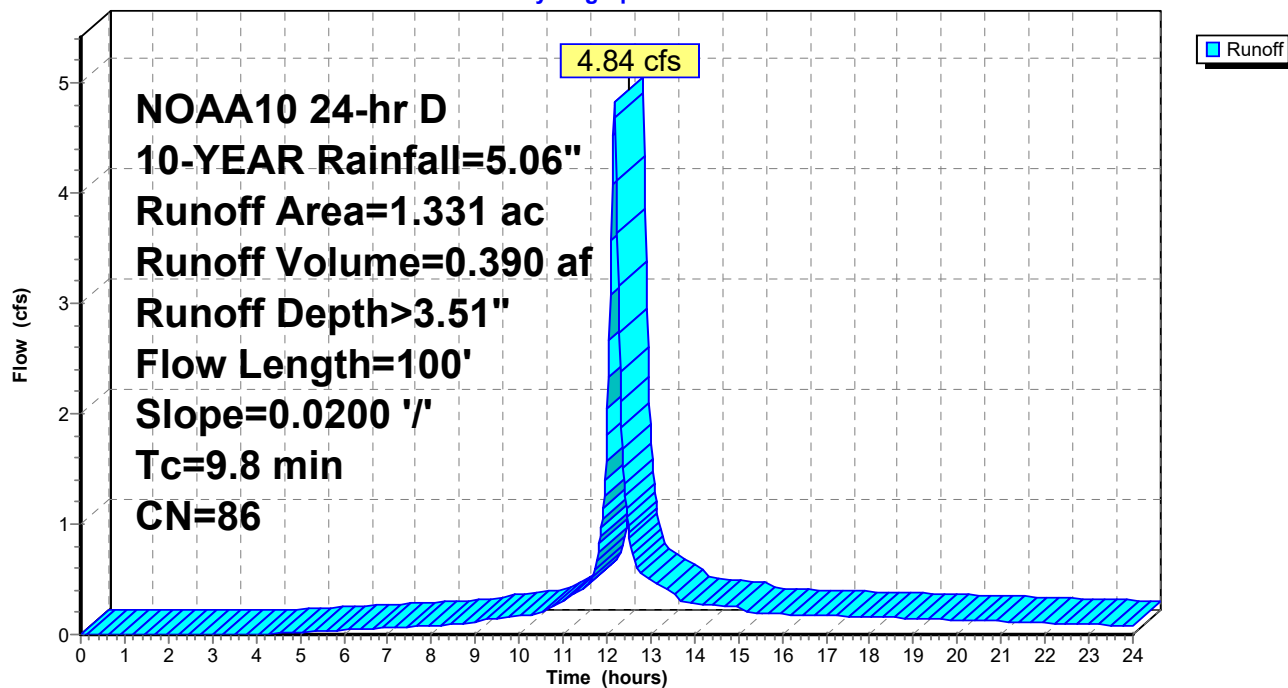
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.669	80	>75% Grass cover, Good, HSG D
0.208	79	Woods, Fair, HSG D
0.454	98	Paved parking, HSG D
1.331	86	Weighted Average
0.877		65.89% Pervious Area
0.454		34.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		Sheet Flow, Seg 1 Grass: Short n= 0.150 P2= 3.17"

Subcatchment E3:

Hydrograph



010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 18

Summary for Subcatchment E4:

Runoff = 4.90 cfs @ 12.13 hrs, Volume= 0.353 af, Depth> 4.14"
Routed to Reach TS : Total Site

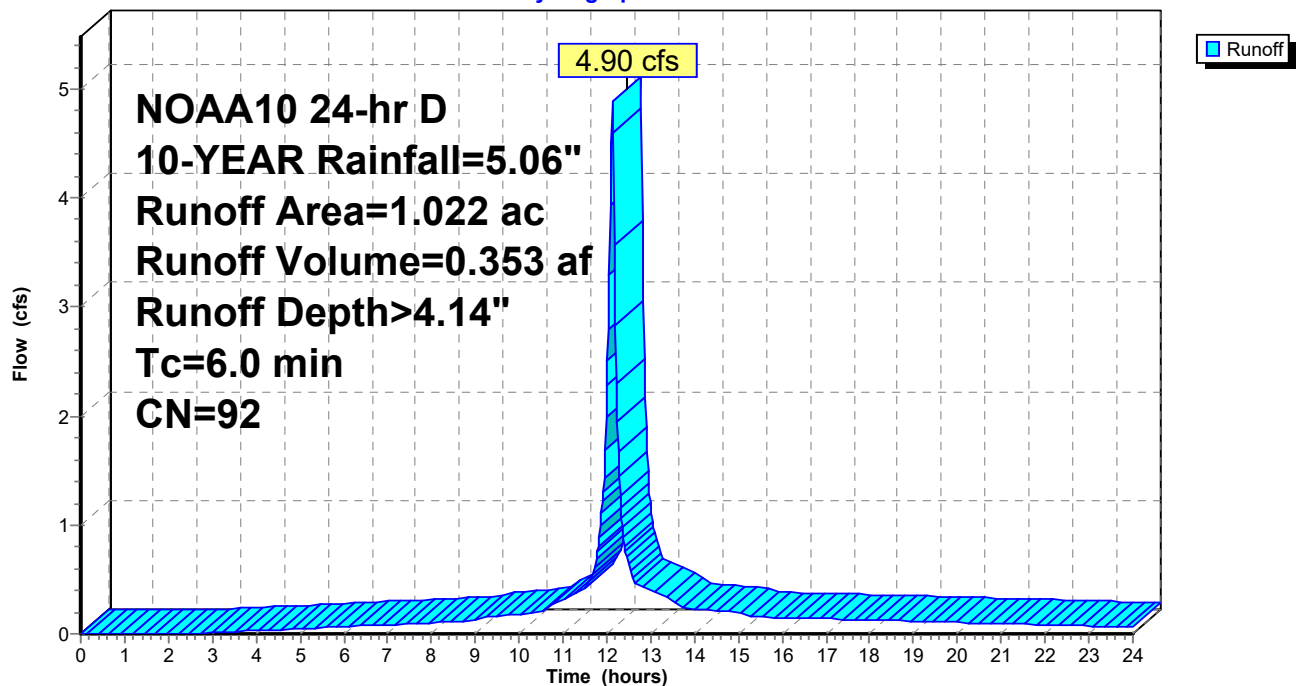
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.136	80	>75% Grass cover, Good, HSG D
0.203	79	Woods, Fair, HSG D
0.683	98	Paved parking, HSG D
1.022	92	Weighted Average
0.339		33.17% Pervious Area
0.683		66.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E4:

Hydrograph



010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 19

Summary for Subcatchment E5:

Runoff = 0.85 cfs @ 12.13 hrs, Volume= 0.057 af, Depth> 2.85"
Routed to Reach TS : Total Site

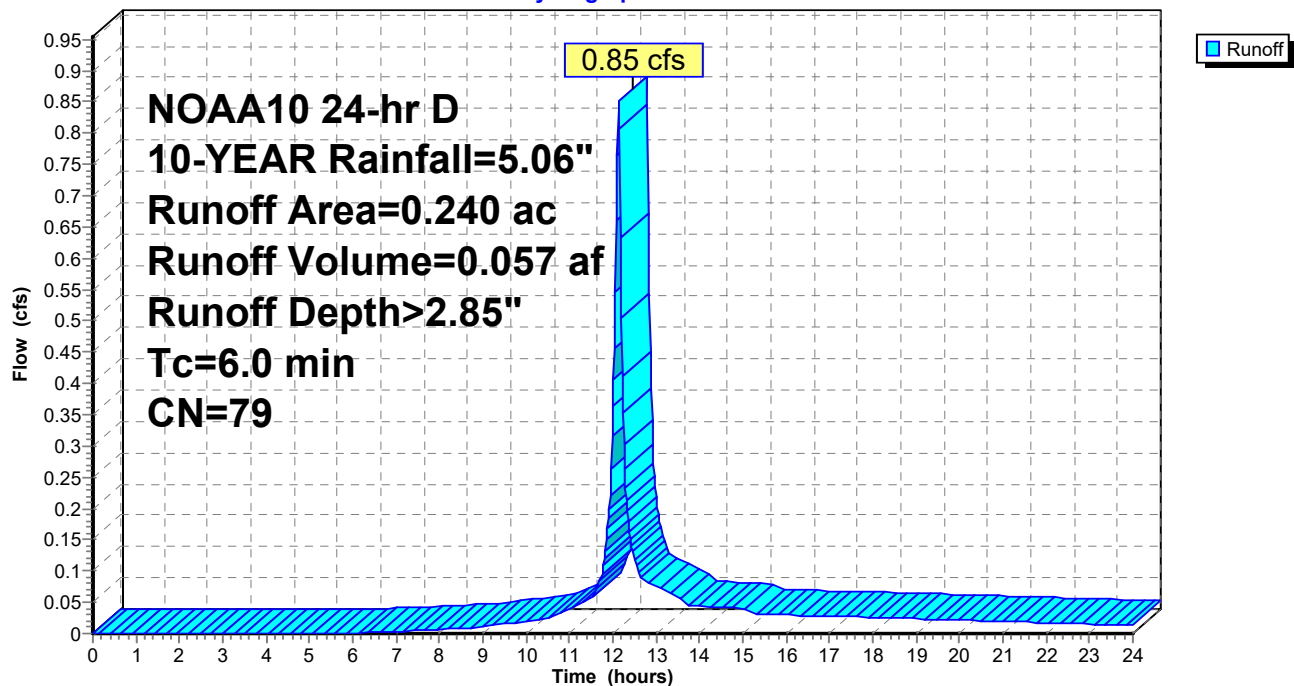
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.035	80	>75% Grass cover, Good, HSG D
0.205	79	Woods, Fair, HSG D
0.000	98	Paved parking, HSG D
0.240	79	Weighted Average
0.240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E5:

Hydrograph



Summary for Subcatchment E6: Flow to Blue Hills Ave

Runoff = 0.38 cfs @ 12.13 hrs, Volume= 0.027 af, Depth> 3.93"
 Routed to Reach TS : Total Site

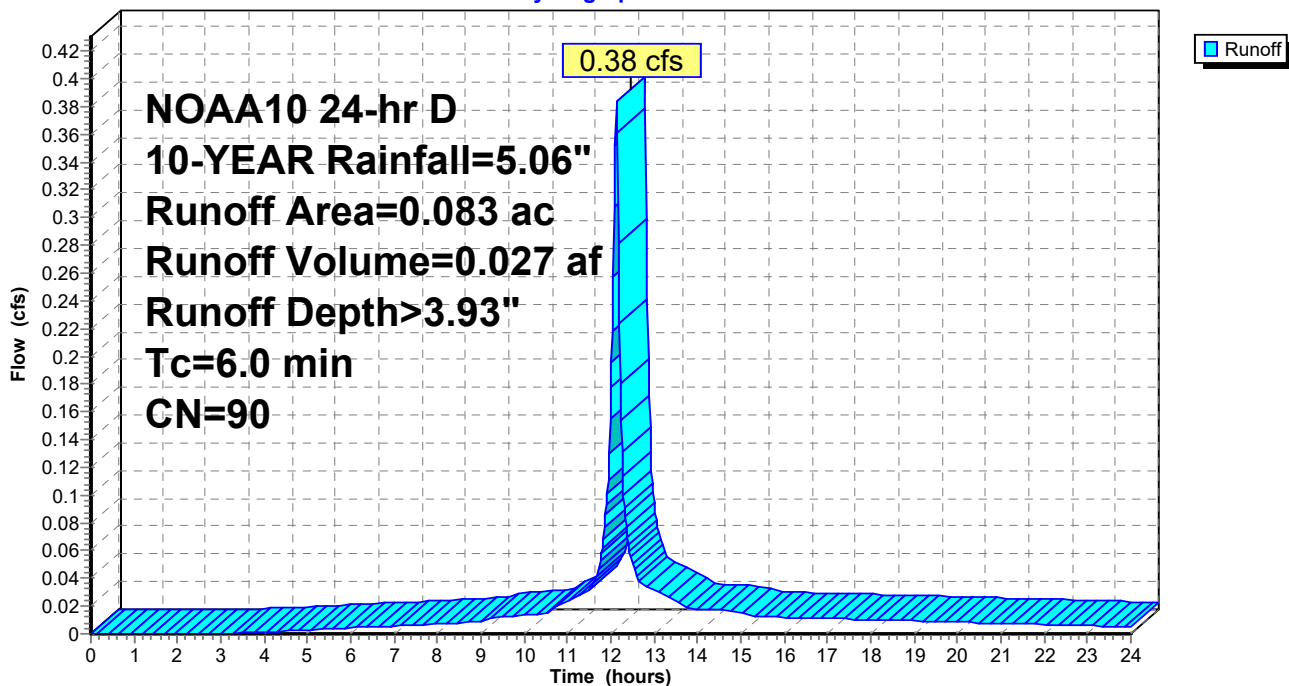
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.036	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.047	98	Paved parking, HSG D
0.083	90	Weighted Average
0.036		43.37% Pervious Area
0.047		56.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E6: Flow to Blue Hills Ave

Hydrograph



Summary for Reach TS: Total Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.091 ac, 67.18% Impervious, Inflow Depth > 4.14" for 10-YEAR event

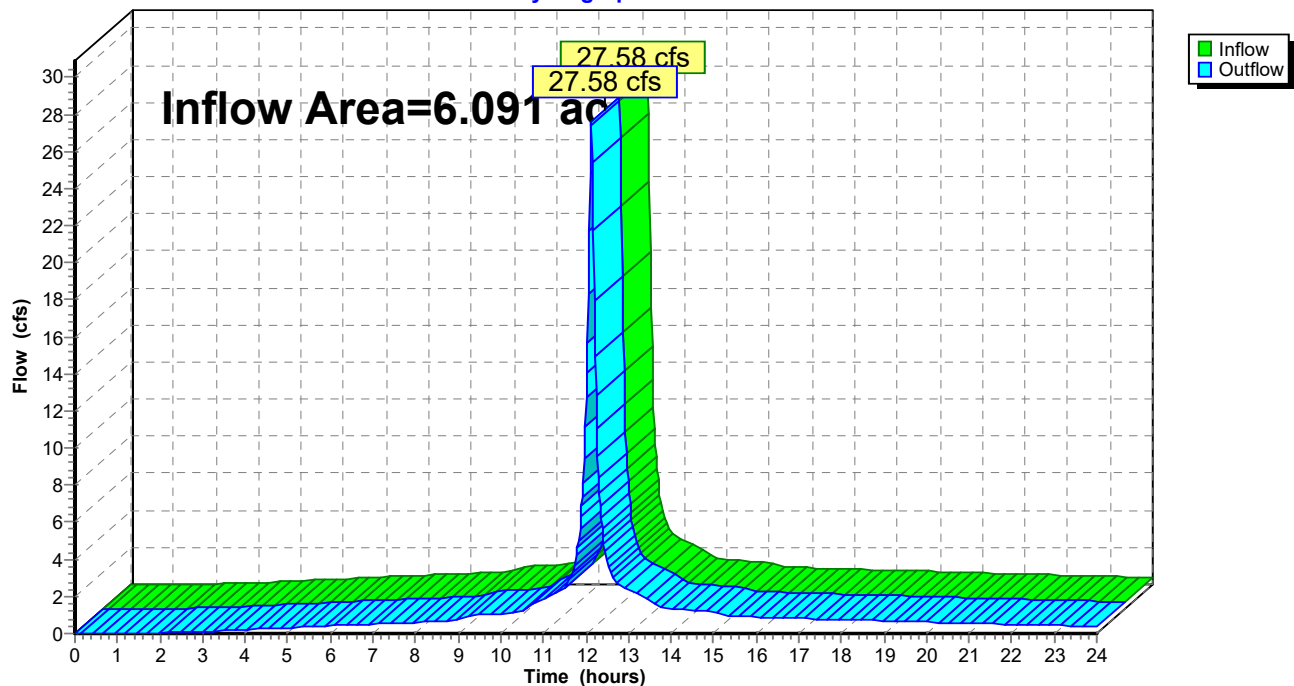
Inflow = 27.58 cfs @ 12.13 hrs, Volume= 2.100 af

Outflow = 27.58 cfs @ 12.13 hrs, Volume= 2.100 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach TS: Total Site

Hydrograph



010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 22

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1: Runoff Area=1.606 ac 83.81% Impervious Runoff Depth>5.64"
Tc=6.0 min CN=95 Runoff=9.98 cfs 0.755 af

SubcatchmentE2: Runoff Area=1.809 ac 86.35% Impervious Runoff Depth>5.64"
Tc=6.0 min CN=95 Runoff=11.24 cfs 0.851 af

SubcatchmentE3: Runoff Area=1.331 ac 34.11% Impervious Runoff Depth>4.63"
Flow Length=100' Slope=0.0200 '/' Tc=9.8 min CN=86 Runoff=6.28 cfs 0.513 af

SubcatchmentE4: Runoff Area=1.022 ac 66.83% Impervious Runoff Depth>5.30"
Tc=6.0 min CN=92 Runoff=6.17 cfs 0.451 af

SubcatchmentE5: Runoff Area=0.240 ac 0.00% Impervious Runoff Depth>3.89"
Tc=6.0 min CN=79 Runoff=1.15 cfs 0.078 af

SubcatchmentE6: Flow to Blue Hills Ave Runoff Area=0.083 ac 56.63% Impervious Runoff Depth>5.07"
Tc=6.0 min CN=90 Runoff=0.49 cfs 0.035 af

Reach TS: Total Site Inflow=34.76 cfs 2.684 af
Outflow=34.76 cfs 2.684 af

Total Runoff Area = 6.091 ac Runoff Volume = 2.684 af Average Runoff Depth = 5.29"
32.82% Pervious = 1.999 ac 67.18% Impervious = 4.092 ac

010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 23

Summary for Subcatchment E1:

Runoff = 9.98 cfs @ 12.13 hrs, Volume= 0.755 af, Depth> 5.64"
Routed to Reach TS : Total Site

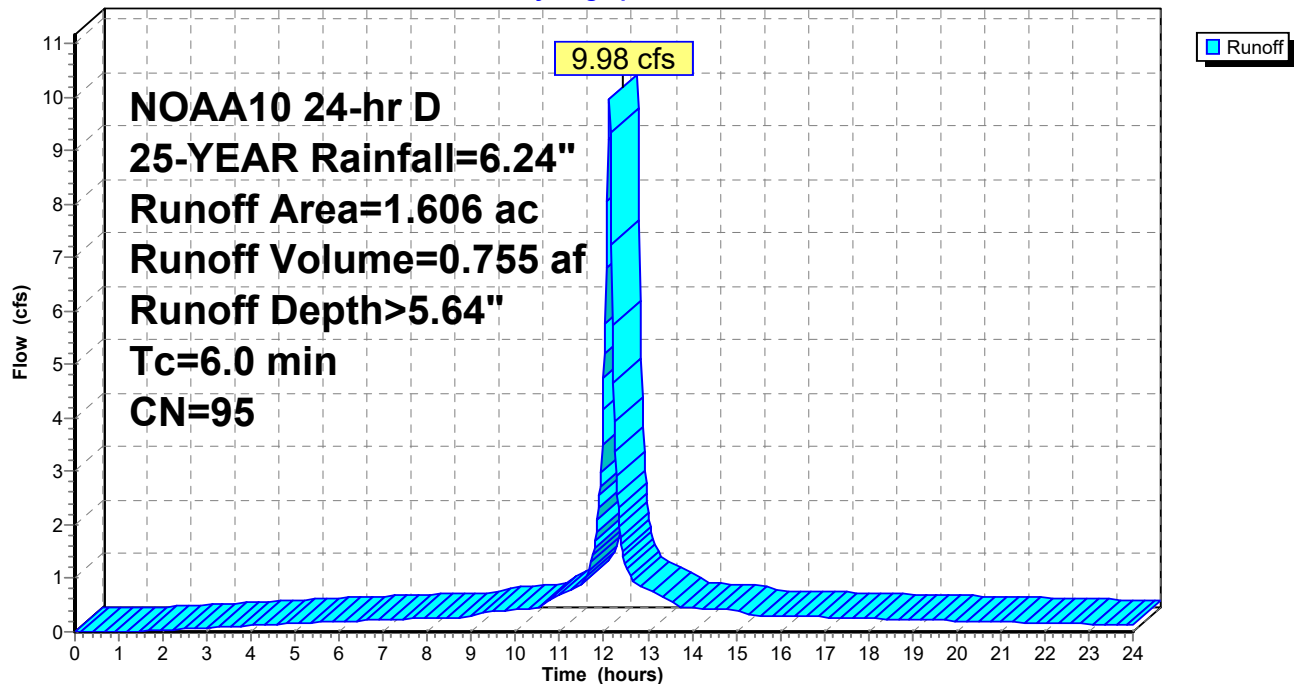
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.184	80	>75% Grass cover, Good, HSG D
0.076	79	Woods, Fair, HSG D
1.346	98	Paved parking, HSG D
1.606	95	Weighted Average
0.260		16.19% Pervious Area
1.346		83.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E1:

Hydrograph



010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 24

Summary for Subcatchment E2:

Runoff = 11.24 cfs @ 12.13 hrs, Volume= 0.851 af, Depth> 5.64"
Routed to Reach TS : Total Site

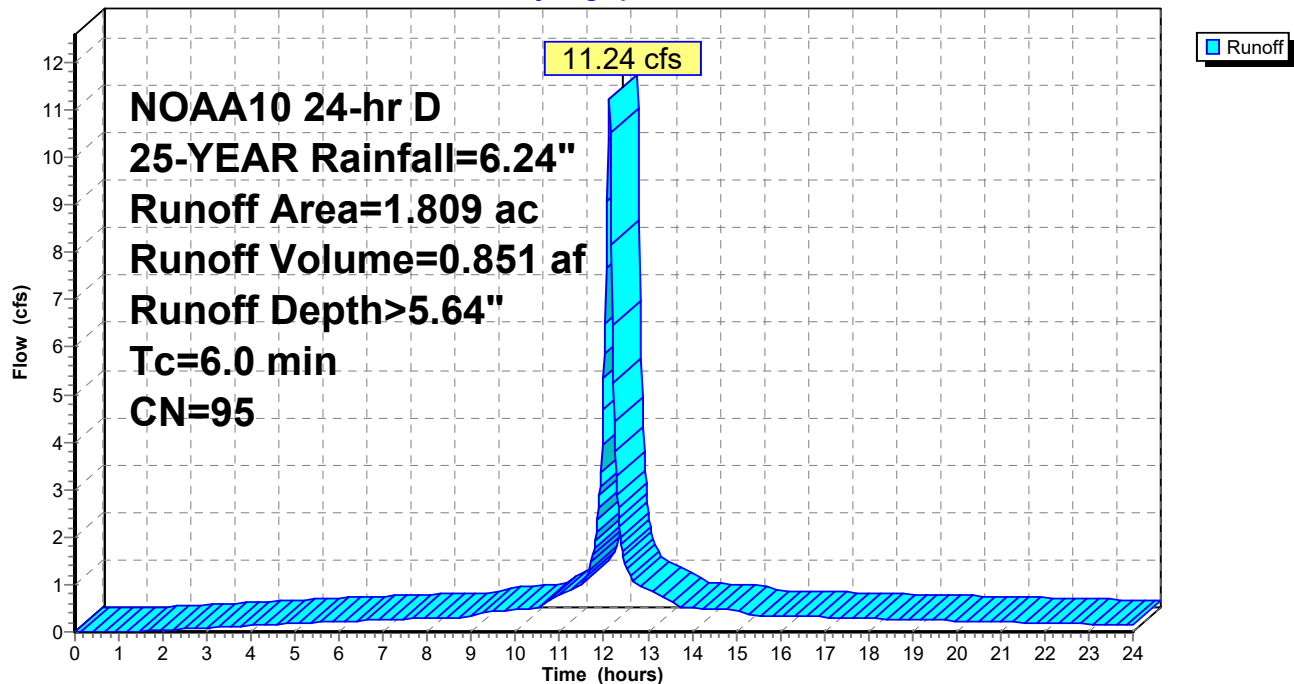
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.122	80	>75% Grass cover, Good, HSG D
0.125	79	Woods, Fair, HSG D
1.562	98	Paved parking, HSG D
1.809	95	Weighted Average
0.247		13.65% Pervious Area
1.562		86.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E2:

Hydrograph



010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 25

Summary for Subcatchment E3:

Runoff = 6.28 cfs @ 12.17 hrs, Volume= 0.513 af, Depth> 4.63"
Routed to Reach TS : Total Site

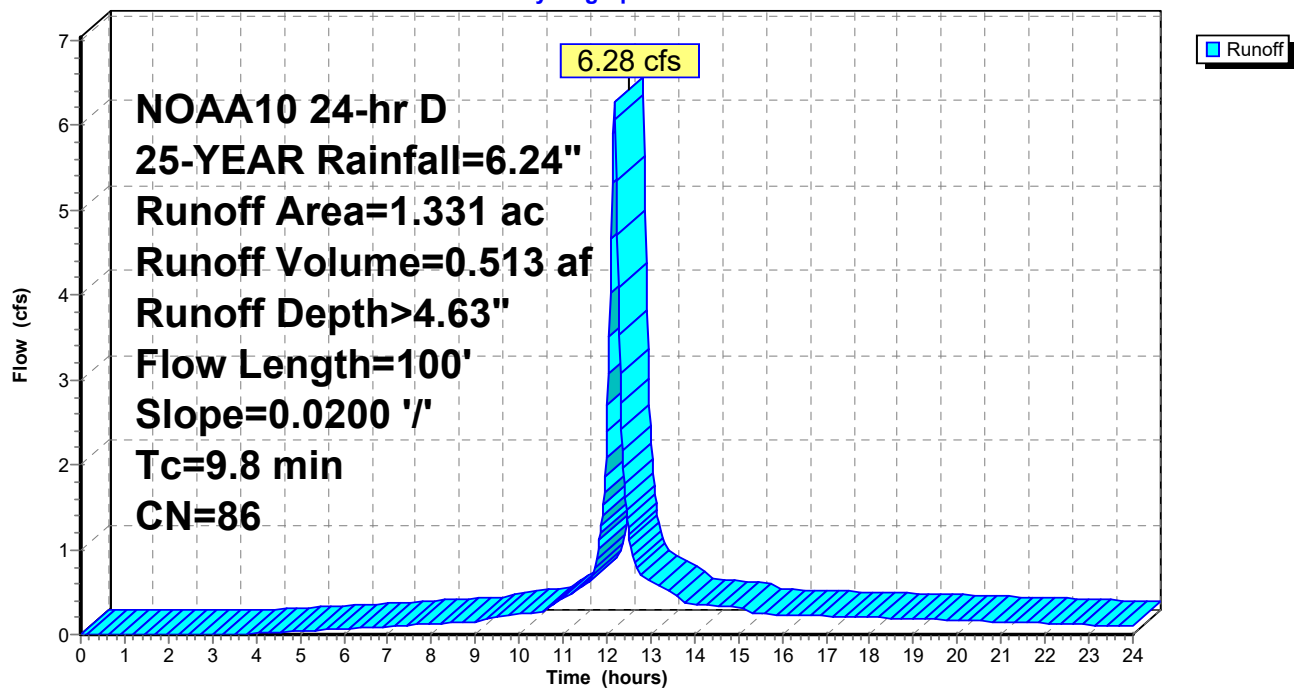
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.669	80	>75% Grass cover, Good, HSG D
0.208	79	Woods, Fair, HSG D
0.454	98	Paved parking, HSG D
1.331	86	Weighted Average
0.877		65.89% Pervious Area
0.454		34.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		Sheet Flow, Seg 1
					Grass: Short n= 0.150 P2= 3.17"

Subcatchment E3:

Hydrograph



010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 26

Summary for Subcatchment E4:

Runoff = 6.17 cfs @ 12.13 hrs, Volume= 0.451 af, Depth> 5.30"
Routed to Reach TS : Total Site

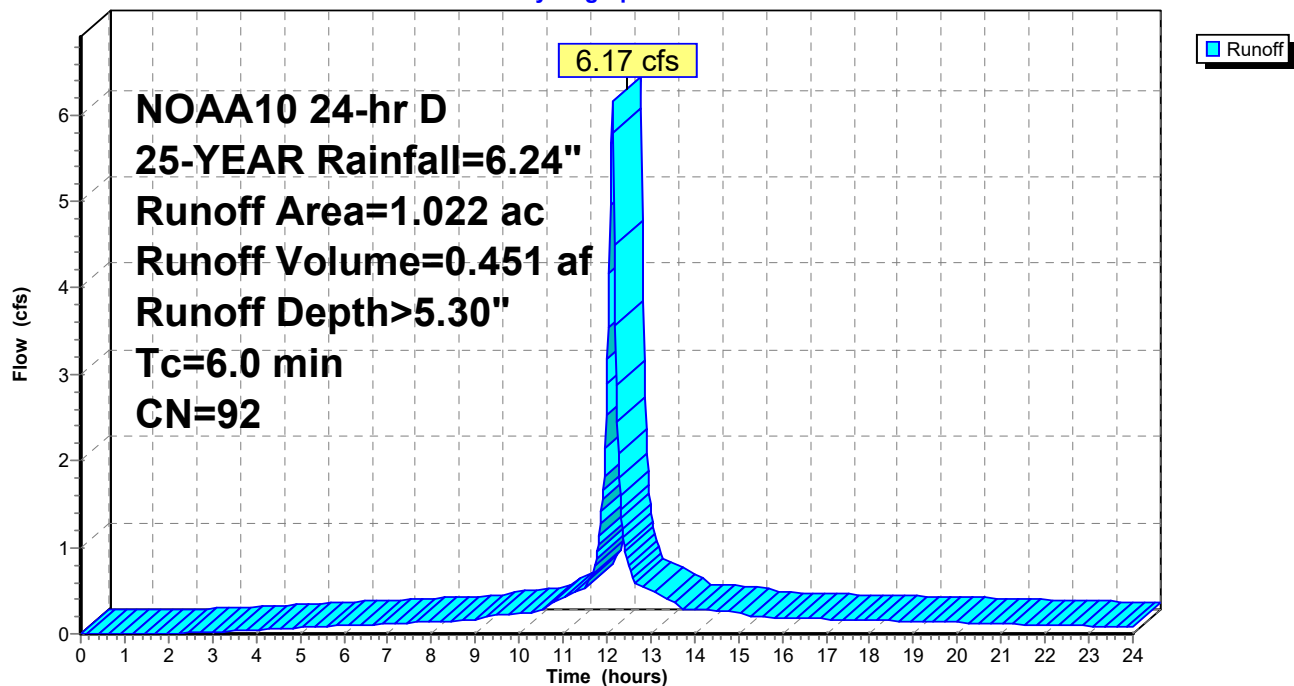
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.136	80	>75% Grass cover, Good, HSG D
0.203	79	Woods, Fair, HSG D
0.683	98	Paved parking, HSG D
1.022	92	Weighted Average
0.339		33.17% Pervious Area
0.683		66.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E4:

Hydrograph



010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 27

Summary for Subcatchment E5:

Runoff = 1.15 cfs @ 12.13 hrs, Volume= 0.078 af, Depth> 3.89"
Routed to Reach TS : Total Site

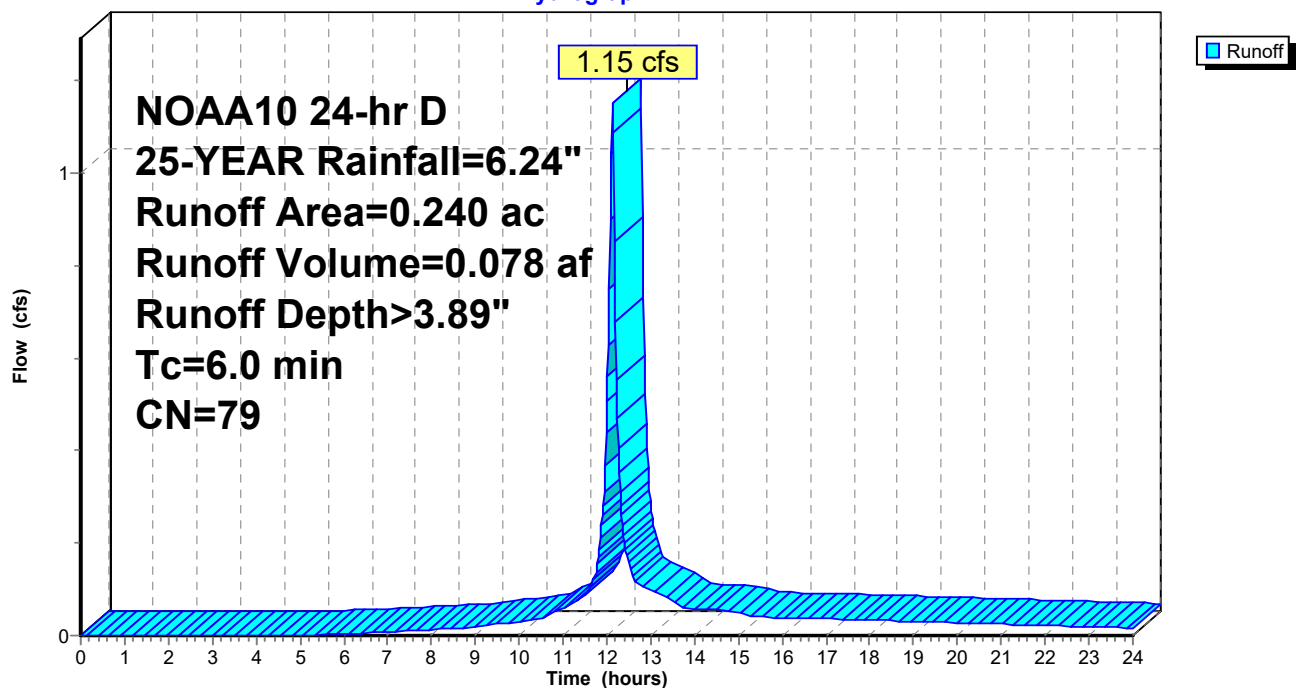
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.035	80	>75% Grass cover, Good, HSG D
0.205	79	Woods, Fair, HSG D
0.000	98	Paved parking, HSG D
0.240	79	Weighted Average
0.240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E5:

Hydrograph



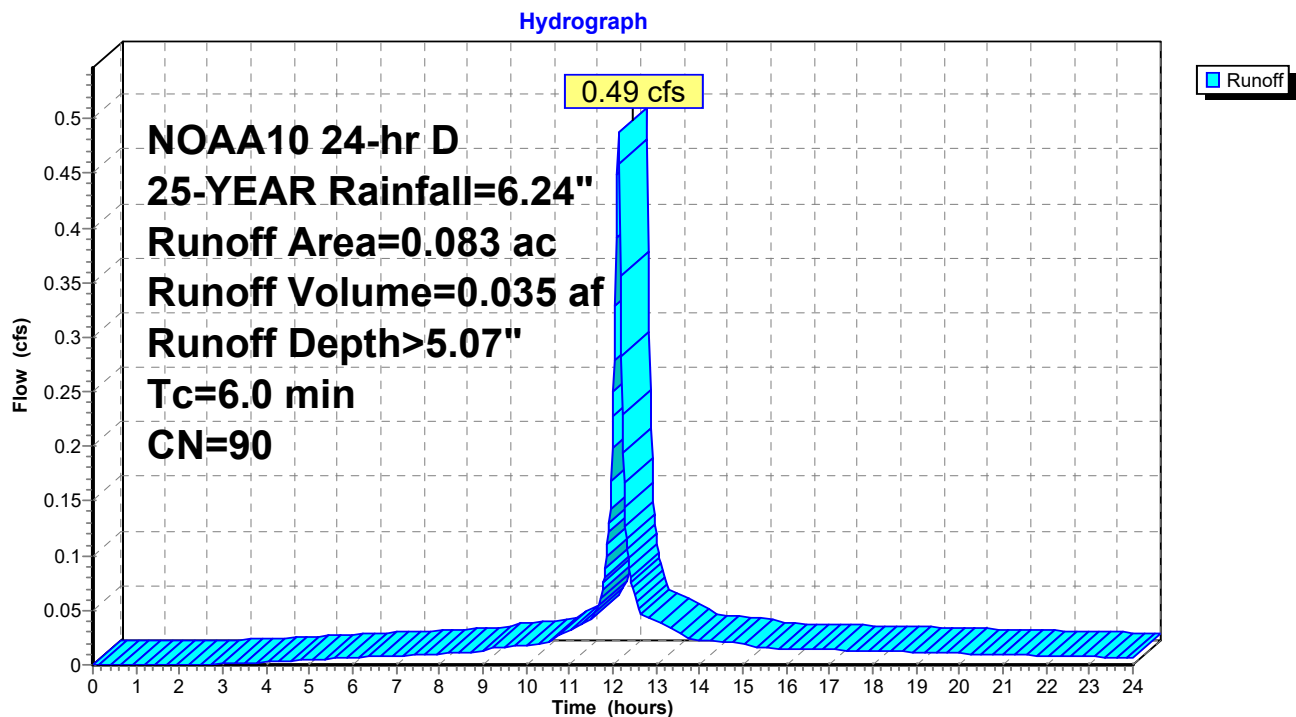
Summary for Subcatchment E6: Flow to Blue Hills Ave

Runoff = 0.49 cfs @ 12.13 hrs, Volume= 0.035 af, Depth> 5.07"
 Routed to Reach TS : Total Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.036	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.047	98	Paved parking, HSG D
0.083	90	Weighted Average
0.036		43.37% Pervious Area
0.047		56.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E6: Flow to Blue Hills Ave

Summary for Reach TS: Total Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.091 ac, 67.18% Impervious, Inflow Depth > 5.29" for 25-YEAR event

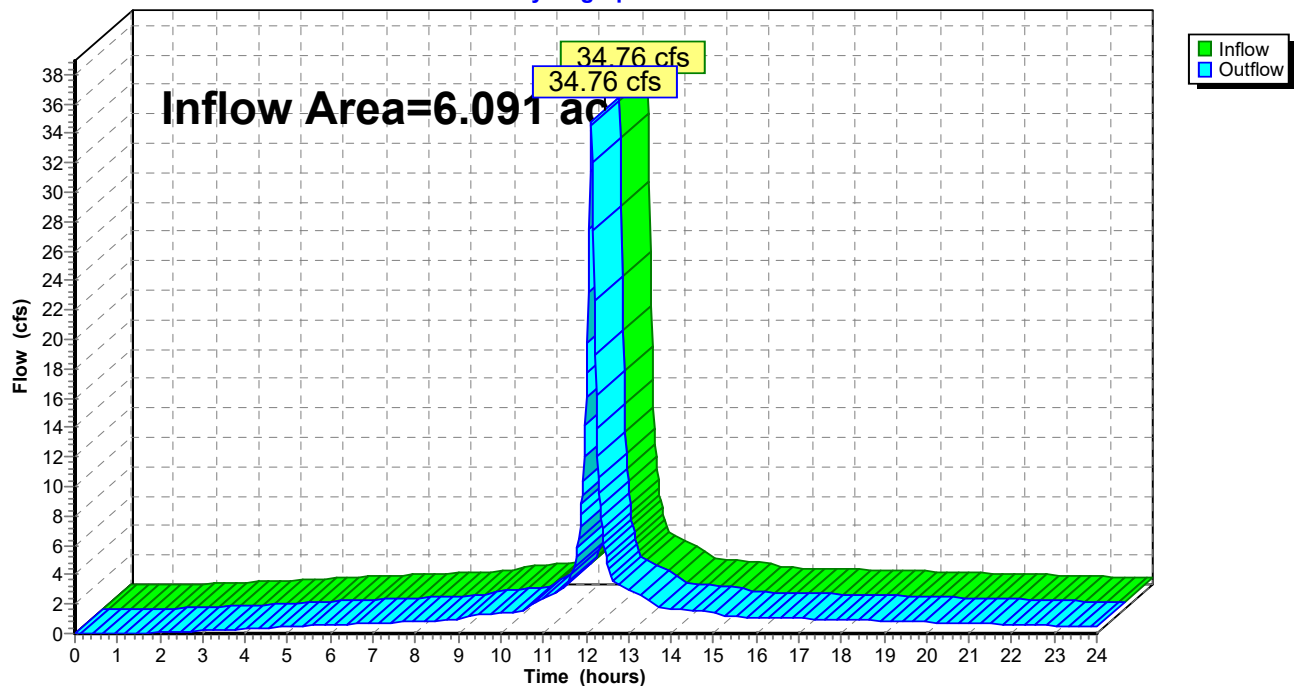
Inflow = 34.76 cfs @ 12.13 hrs, Volume= 2.684 af

Outflow = 34.76 cfs @ 12.13 hrs, Volume= 2.684 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach TS: Total Site

Hydrograph



010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 30

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1: Runoff Area=1.606 ac 83.81% Impervious Runoff Depth>7.45"
Tc=6.0 min CN=95 Runoff=12.99 cfs 0.997 af

SubcatchmentE2: Runoff Area=1.809 ac 86.35% Impervious Runoff Depth>7.45"
Tc=6.0 min CN=95 Runoff=14.63 cfs 1.124 af

SubcatchmentE3: Runoff Area=1.331 ac 34.11% Impervious Runoff Depth>6.38"
Flow Length=100' Slope=0.0200 ' Slope=0.0200 ' Tc=9.8 min CN=86 Runoff=8.50 cfs 0.707 af

SubcatchmentE4: Runoff Area=1.022 ac 66.83% Impervious Runoff Depth>7.09"
Tc=6.0 min CN=92 Runoff=8.11 cfs 0.604 af

SubcatchmentE5: Runoff Area=0.240 ac 0.00% Impervious Runoff Depth>5.56"
Tc=6.0 min CN=79 Runoff=1.62 cfs 0.111 af

SubcatchmentE6: Flow to Blue Hills Ave Runoff Area=0.083 ac 56.63% Impervious Runoff Depth>6.86"
Tc=6.0 min CN=90 Runoff=0.65 cfs 0.047 af

Reach TS: Total Site Inflow=45.77 cfs 3.591 af
Outflow=45.77 cfs 3.591 af

Total Runoff Area = 6.091 ac Runoff Volume = 3.591 af Average Runoff Depth = 7.07"
32.82% Pervious = 1.999 ac 67.18% Impervious = 4.092 ac

010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 31

Summary for Subcatchment E1:

Runoff = 12.99 cfs @ 12.13 hrs, Volume= 0.997 af, Depth> 7.45"
Routed to Reach TS : Total Site

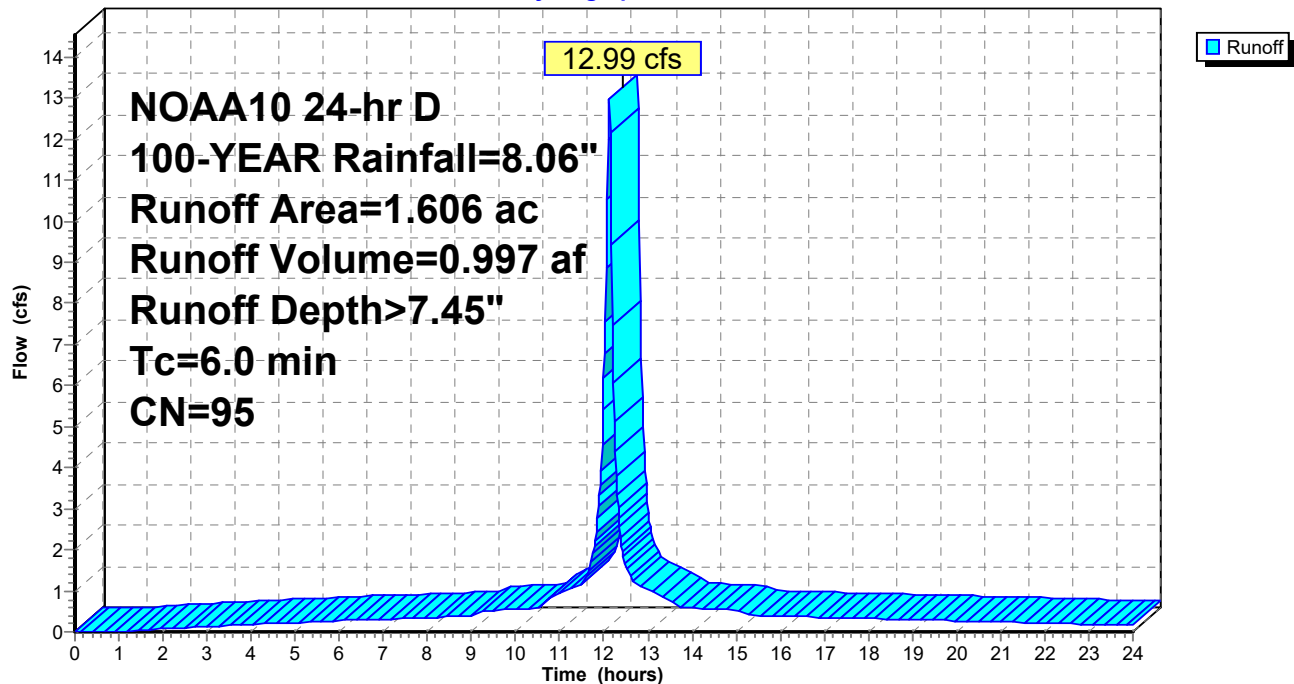
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.184	80	>75% Grass cover, Good, HSG D
0.076	79	Woods, Fair, HSG D
1.346	98	Paved parking, HSG D
1.606	95	Weighted Average
0.260		16.19% Pervious Area
1.346		83.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E1:

Hydrograph



010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 32

Summary for Subcatchment E2:

Runoff = 14.63 cfs @ 12.13 hrs, Volume= 1.124 af, Depth> 7.45"
Routed to Reach TS : Total Site

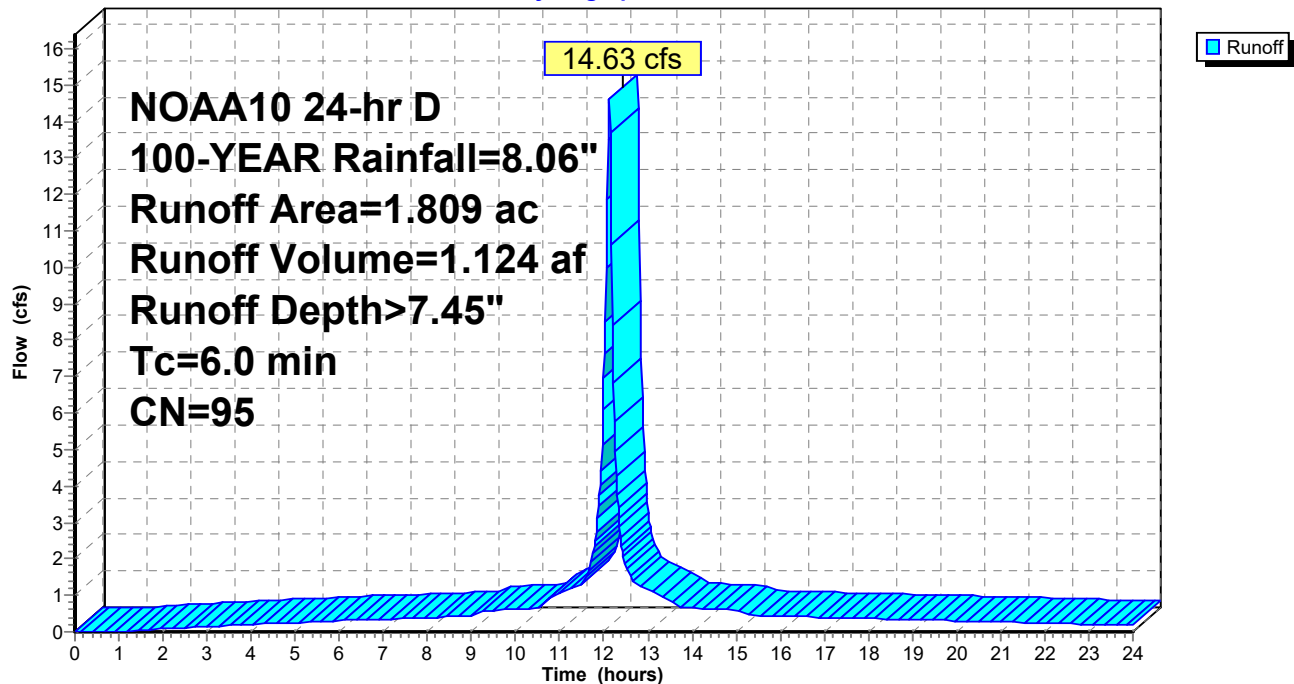
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.122	80	>75% Grass cover, Good, HSG D
0.125	79	Woods, Fair, HSG D
1.562	98	Paved parking, HSG D
1.809	95	Weighted Average
0.247		13.65% Pervious Area
1.562		86.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E2:

Hydrograph



Summary for Subcatchment E3:

Runoff = 8.50 cfs @ 12.17 hrs, Volume= 0.707 af, Depth> 6.38"
Routed to Reach TS : Total Site

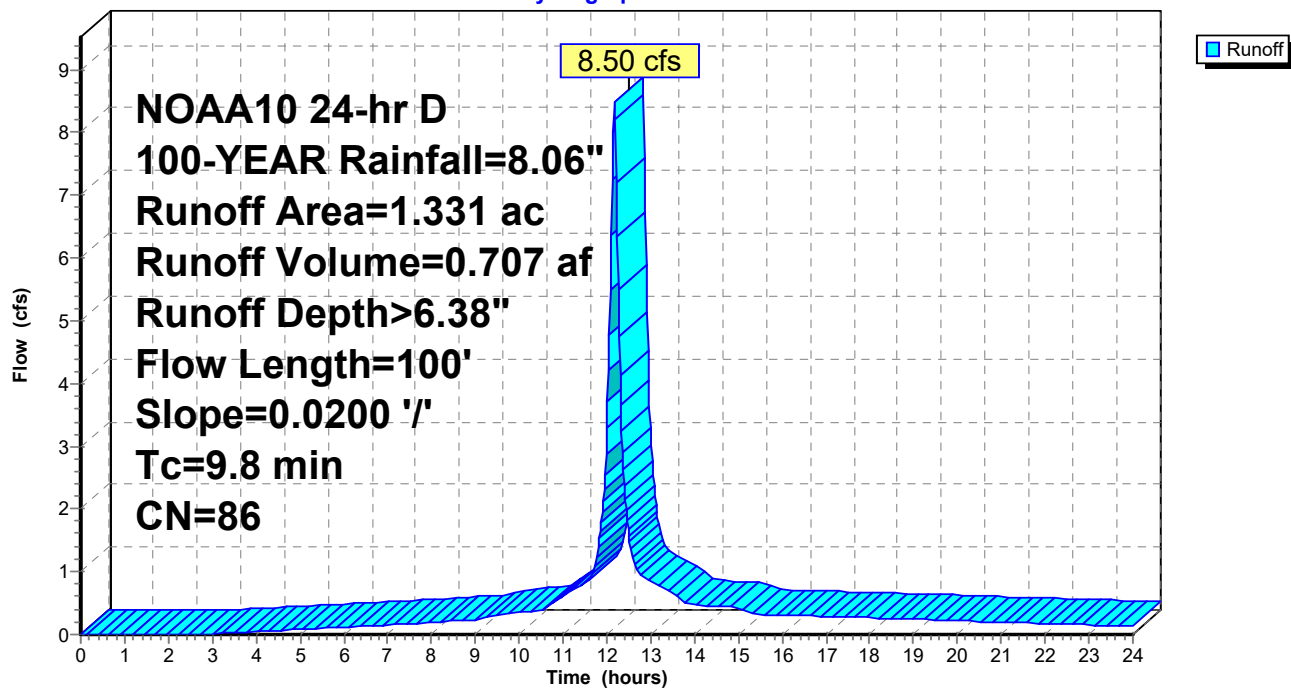
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.669	80	>75% Grass cover, Good, HSG D
0.208	79	Woods, Fair, HSG D
0.454	98	Paved parking, HSG D
1.331	86	Weighted Average
0.877		65.89% Pervious Area
0.454		34.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		Sheet Flow, Seg 1
					Grass: Short n= 0.150 P2= 3.17"

Subcatchment E3:

Hydrograph



010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 34

Summary for Subcatchment E4:

Runoff = 8.11 cfs @ 12.13 hrs, Volume= 0.604 af, Depth> 7.09"
Routed to Reach TS : Total Site

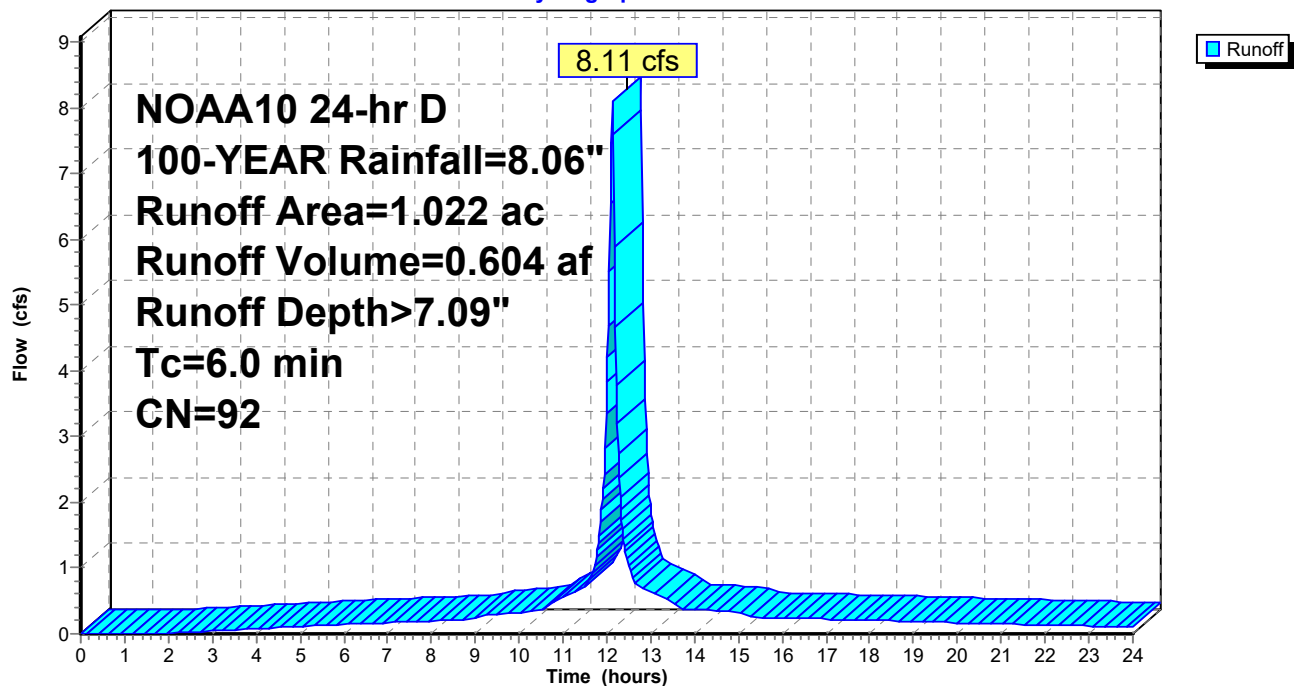
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.136	80	>75% Grass cover, Good, HSG D
0.203	79	Woods, Fair, HSG D
0.683	98	Paved parking, HSG D
1.022	92	Weighted Average
0.339		33.17% Pervious Area
0.683		66.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E4:

Hydrograph



010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 35

Summary for Subcatchment E5:

Runoff = 1.62 cfs @ 12.13 hrs, Volume= 0.111 af, Depth> 5.56"
Routed to Reach TS : Total Site

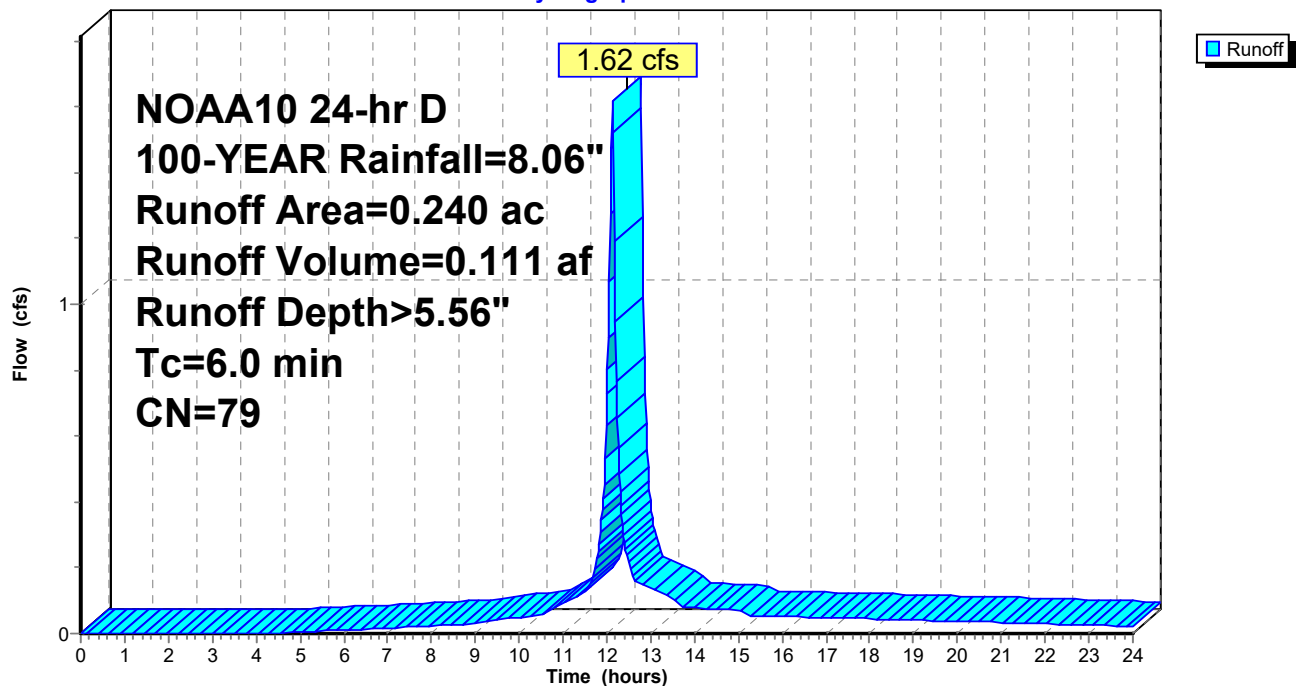
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.035	80	>75% Grass cover, Good, HSG D
0.205	79	Woods, Fair, HSG D
0.000	98	Paved parking, HSG D
0.240	79	Weighted Average
0.240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E5:

Hydrograph



010140300-EWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Pre-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 36

Summary for Subcatchment E6: Flow to Blue Hills Ave

Runoff = 0.65 cfs @ 12.13 hrs, Volume= 0.047 af, Depth> 6.86"
Routed to Reach TS : Total Site

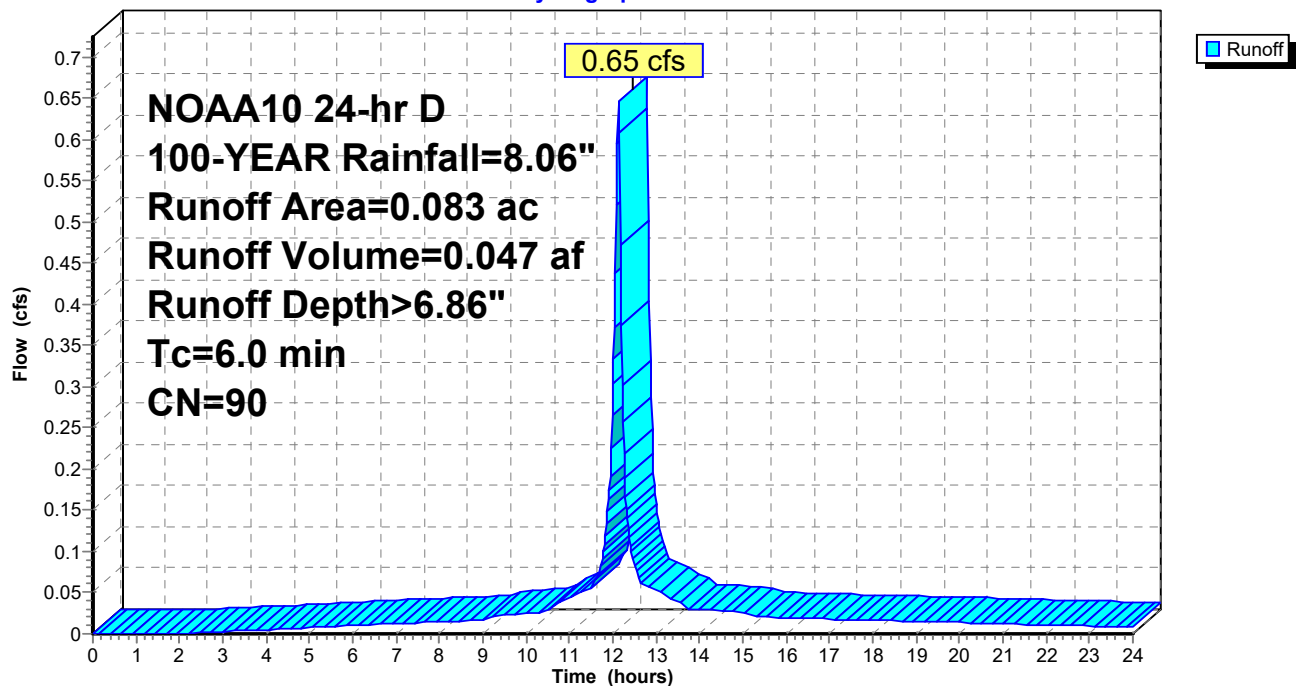
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.036	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.047	98	Paved parking, HSG D
0.083	90	Weighted Average
0.036		43.37% Pervious Area
0.047		56.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment E6: Flow to Blue Hills Ave

Hydrograph



Summary for Reach TS: Total Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.091 ac, 67.18% Impervious, Inflow Depth > 7.07" for 100-YEAR event

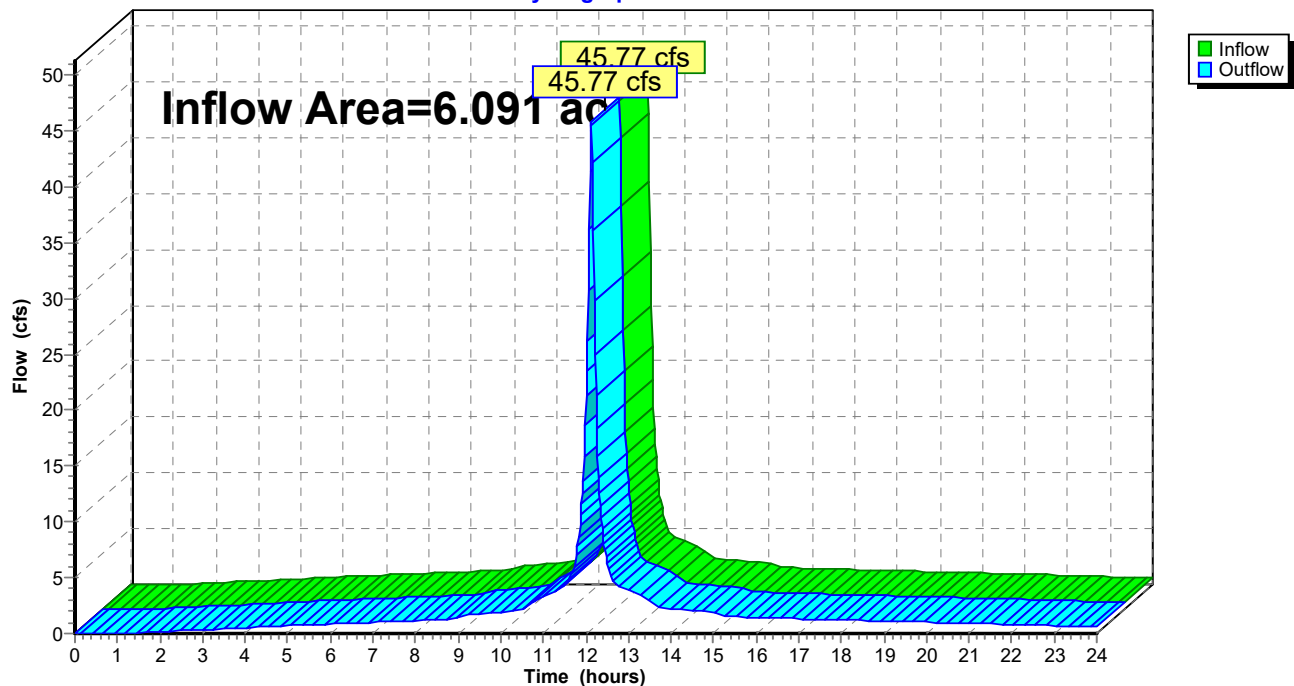
Inflow = 45.77 cfs @ 12.13 hrs, Volume= 3.591 af

Outflow = 45.77 cfs @ 12.13 hrs, Volume= 3.591 af, Atten= 0%, Lag= 0.0 min

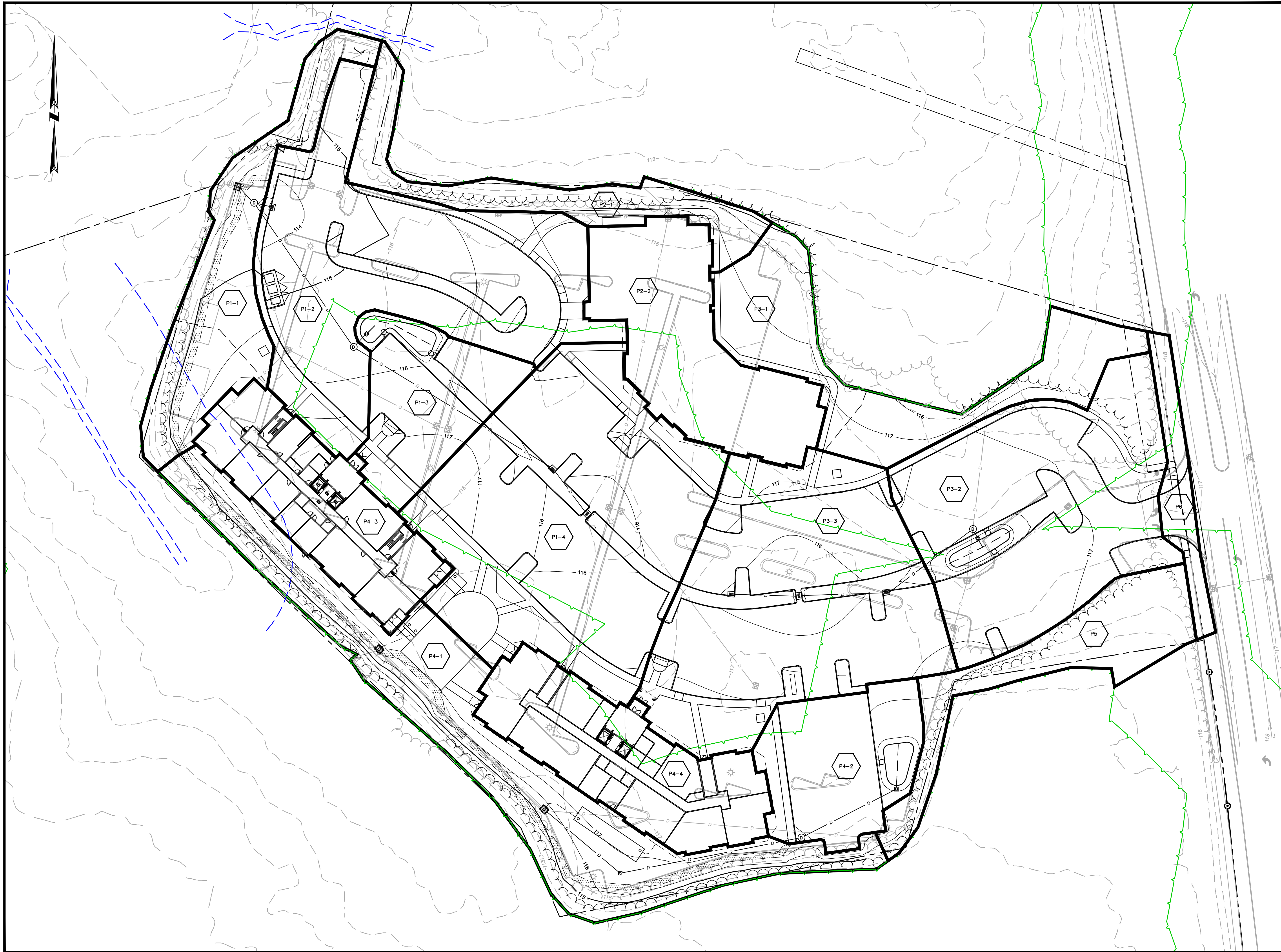
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach TS: Total Site

Hydrograph



5.03 PROPOSED WATERSHED PLAN



FIRST CATHEDRAL
AFFORDABLE
HOUSING
DEVELOPMENT

1151 BLUE HILLS AVENUE

IN
BLOOMFIELD
CONNECTICUT

PROPOSED WATERSHED
AREA MAP

NOVEMBER 2025

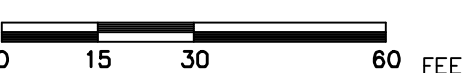
REVISIONS:

PREPARED FOR:
THE FIRST CATHEDRAL
1151 BLUE HILLS AVENUE
BLOOMFIELD, CT 06002

BSC GROUP 
BUILD | SUPPORT | CONNECT
665 Winding Brook Drive
Glastonbury, Connecticut
06033
860 652 8227

© 2025 BSC GROUP, INC.

SCALE: 1" = 30'



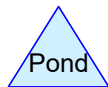
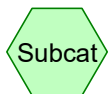
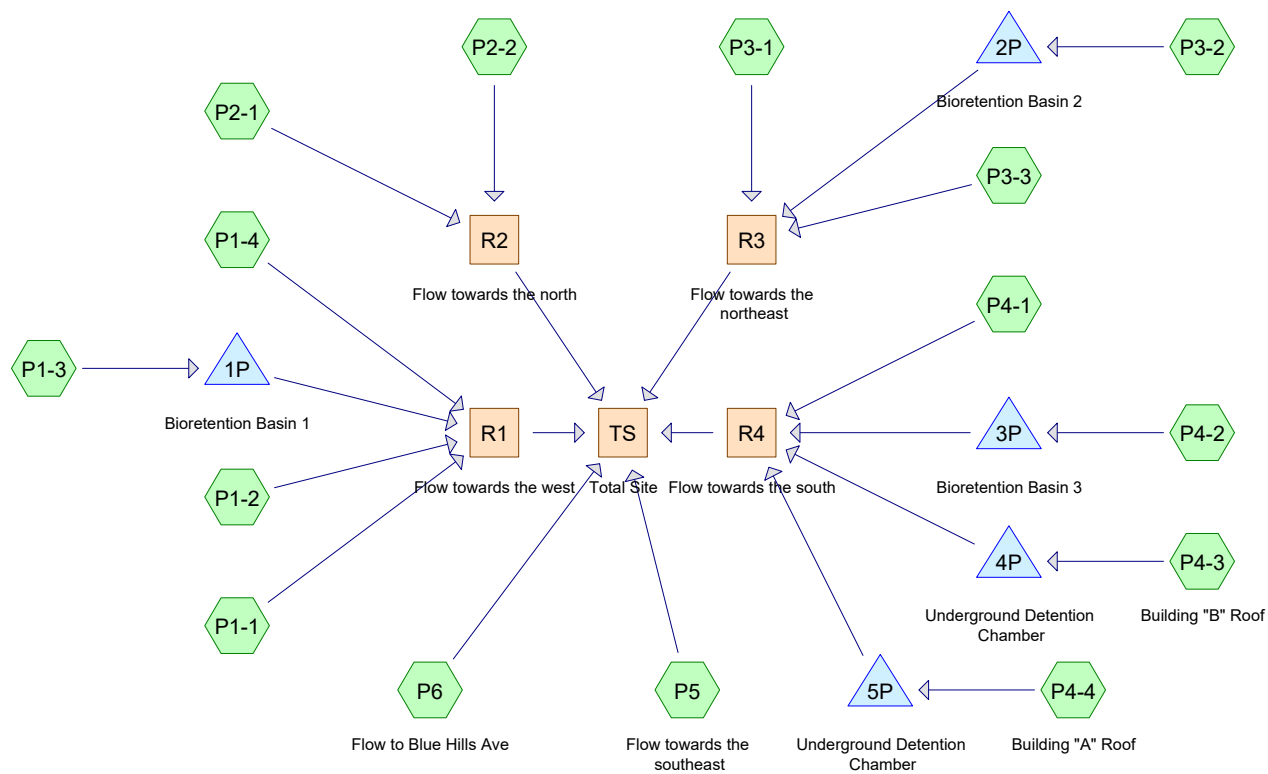
FILE: P:\010140300\CIVIL\ENGINEERING\DESIGN\DRAWING\DESIGN\W

DWG. NO:

JOB. NO: 0101403.00

FIG. 5.03

5.04 PROPOSED HYDROLOGY CALCULATIONS (HYDROCAD™ PRINTOUTS)



010140300-PWAM

Prepared by BSC Group

Printed 11/12/2025

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

Page 2

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YEAR	NOAA10 24-hr	D	Default	24.00	1	3.17	2
2	10-YEAR	NOAA10 24-hr	D	Default	24.00	1	5.06	2
3	25-YEAR	NOAA10 24-hr	D	Default	24.00	1	6.24	2
4	100-YEAR	NOAA10 24-hr	D	Default	24.00	1	8.06	2

010140300-PWAM

Prepared by BSC Group

Printed 11/12/2025

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.983	80	>75% Grass cover, Good, HSG D (P1-1, P1-2, P1-3, P1-4, P2-1, P3-1, P3-2, P3-3, P4-1, P4-2, P5, P6)
3.571	98	Paved parking, HSG D (P1-2, P1-3, P1-4, P2-1, P2-2, P3-1, P3-2, P3-3, P4-1, P4-2, P4-3, P4-4, P6)
0.537	79	Woods, Fair, HSG D (P1-1, P2-1, P3-1, P3-2, P4-1, P5)
6.091	90	TOTAL AREA

010140300-PWAM

Prepared by BSC Group

Printed 11/12/2025

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

Page 4

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
6.091	HSG D	P1-1, P1-2, P1-3, P1-4, P2-1, P2-2, P3-1, P3-2, P3-3, P4-1, P4-2, P4-3, P4-4, P5, P6
0.000	Other	
6.091		TOTAL AREA

010140300-PWAM

Prepared by BSC Group

Printed 11/12/2025

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

Page 5

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	1.983	0.000	1.983	>75% Grass cover, Good	P1-1, P1-2, P1-3, P1-4, P2-1, P3-1, P3-2, P3-3, P4-1, P4-2, P5, P6
0.000	0.000	0.000	3.571	0.000	3.571	Paved parking	P1-2, P1-3, P1-4, P2-1, P2-2, P3-1, P3-2, P3-3, P4-1, P4-2, P4-3, P4-4, P6
0.000	0.000	0.000	0.537	0.000	0.537	Woods, Fair	P1-1, P2-1, P3-1, P3-2, P4-1, P5
0.000	0.000	0.000	6.091	0.000	6.091	TOTAL AREA	

010140300-PWAM

Prepared by BSC Group

Printed 11/12/2025

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

Page 6

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	1P	111.92	111.83	9.0	0.0100	0.011	0.0	12.0	0.0	
2	2P	112.85	112.81	4.0	0.0100	0.011	0.0	12.0	0.0	
3	3P	113.81	113.52	72.0	0.0040	0.011	0.0	10.0	0.0	
4	4P	113.00	112.75	25.0	0.0100	0.011	0.0	8.0	0.0	
5	5P	113.00	112.75	25.0	0.0100	0.011	0.0	8.0	0.0	

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 7

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1-1:	Runoff Area=0.308 ac 0.00% Impervious Runoff Depth>1.38" Flow Length=80' Slope=0.0180 '/' Tc=8.6 min CN=80 Runoff=0.47 cfs 0.035 af
SubcatchmentP1-2:	Runoff Area=0.717 ac 79.22% Impervious Runoff Depth>2.51" Tc=6.0 min CN=94 Runoff=2.11 cfs 0.150 af
SubcatchmentP1-3:	Runoff Area=0.232 ac 68.97% Impervious Runoff Depth>2.32" Tc=6.0 min CN=92 Runoff=0.65 cfs 0.045 af
SubcatchmentP1-4:	Runoff Area=0.824 ac 72.82% Impervious Runoff Depth>2.41" Tc=6.0 min CN=93 Runoff=2.36 cfs 0.166 af
SubcatchmentP2-1:	Runoff Area=0.197 ac 10.15% Impervious Runoff Depth>1.44" Tc=6.0 min CN=81 Runoff=0.36 cfs 0.024 af
SubcatchmentP2-2:	Runoff Area=0.353 ac 100.00% Impervious Runoff Depth>2.93" Tc=6.0 min CN=98 Runoff=1.12 cfs 0.086 af
SubcatchmentP3-1:	Runoff Area=0.337 ac 6.82% Impervious Runoff Depth>1.44" Flow Length=51' Slope=0.0180 '/' Tc=6.0 min CN=81 Runoff=0.61 cfs 0.041 af
SubcatchmentP3-2:	Runoff Area=0.633 ac 69.83% Impervious Runoff Depth>2.32" Tc=6.0 min CN=92 Runoff=1.76 cfs 0.122 af
SubcatchmentP3-3:	Runoff Area=0.727 ac 73.59% Impervious Runoff Depth>2.41" Tc=6.0 min CN=93 Runoff=2.08 cfs 0.146 af
SubcatchmentP4-1:	Runoff Area=0.582 ac 6.70% Impervious Runoff Depth>1.44" Tc=6.0 min CN=81 Runoff=1.05 cfs 0.070 af
SubcatchmentP4-2:	Runoff Area=0.250 ac 64.80% Impervious Runoff Depth>2.32" Tc=6.0 min CN=92 Runoff=0.70 cfs 0.048 af
SubcatchmentP4-3: Building "B" Roof	Runoff Area=0.296 ac 100.00% Impervious Runoff Depth>2.93" Tc=6.0 min CN=98 Runoff=0.94 cfs 0.072 af
SubcatchmentP4-4: Building "A" Roof	Runoff Area=0.330 ac 100.00% Impervious Runoff Depth>2.93" Tc=6.0 min CN=98 Runoff=1.05 cfs 0.081 af
SubcatchmentP5: Flow towards the	Runoff Area=0.222 ac 0.00% Impervious Runoff Depth>1.31" Tc=6.0 min CN=79 Runoff=0.36 cfs 0.024 af
SubcatchmentP6: Flow to Blue Hills Ave	Runoff Area=0.083 ac 51.81% Impervious Runoff Depth>2.05" Tc=6.0 min CN=89 Runoff=0.21 cfs 0.014 af
Reach R1: Flow towards the west	Inflow=4.92 cfs 0.377 af Outflow=4.92 cfs 0.377 af

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 8

Reach R2: Flow towards the north

Inflow=1.48 cfs 0.110 af

Outflow=1.48 cfs 0.110 af

Reach R3: Flow towards the northeast

Inflow=4.33 cfs 0.288 af

Outflow=4.33 cfs 0.288 af

Reach R4: Flow towards the south

Inflow=2.75 cfs 0.246 af

Outflow=2.75 cfs 0.246 af

Reach TS: Total Site

Inflow=13.89 cfs 1.059 af

Outflow=13.89 cfs 1.059 af

Pond 1P: Bioretention Basin 1

Peak Elev=115.22' Storage=888 cf Inflow=0.65 cfs 0.045 af

Outflow=0.19 cfs 0.026 af

Pond 2P: Bioretention Basin 2

Peak Elev=115.73' Storage=1,089 cf Inflow=1.76 cfs 0.122 af

Outflow=1.68 cfs 0.102 af

Pond 3P: Bioretention Basin 3

Peak Elev=115.83' Storage=902 cf Inflow=0.70 cfs 0.048 af

Outflow=0.36 cfs 0.029 af

Pond 4P: Underground Detention Chamber

Peak Elev=113.57' Storage=379 cf Inflow=0.94 cfs 0.072 af

8.0" Round Culvert n=0.011 L=25.0' S=0.0100 '/' Outflow=0.78 cfs 0.069 af

Pond 5P: Underground Detention Chamber

Peak Elev=113.62' Storage=400 cf Inflow=1.05 cfs 0.081 af

8.0" Round Culvert n=0.011 L=25.0' S=0.0100 '/' Outflow=0.88 cfs 0.077 af

Total Runoff Area = 6.091 ac Runoff Volume = 1.125 af Average Runoff Depth = 2.22"
41.37% Pervious = 2.520 ac 58.63% Impervious = 3.571 ac

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 9

Summary for Subcatchment P1-1:

Runoff = 0.47 cfs @ 12.16 hrs, Volume= 0.035 af, Depth> 1.38"
Routed to Reach R1 : Flow towards the west

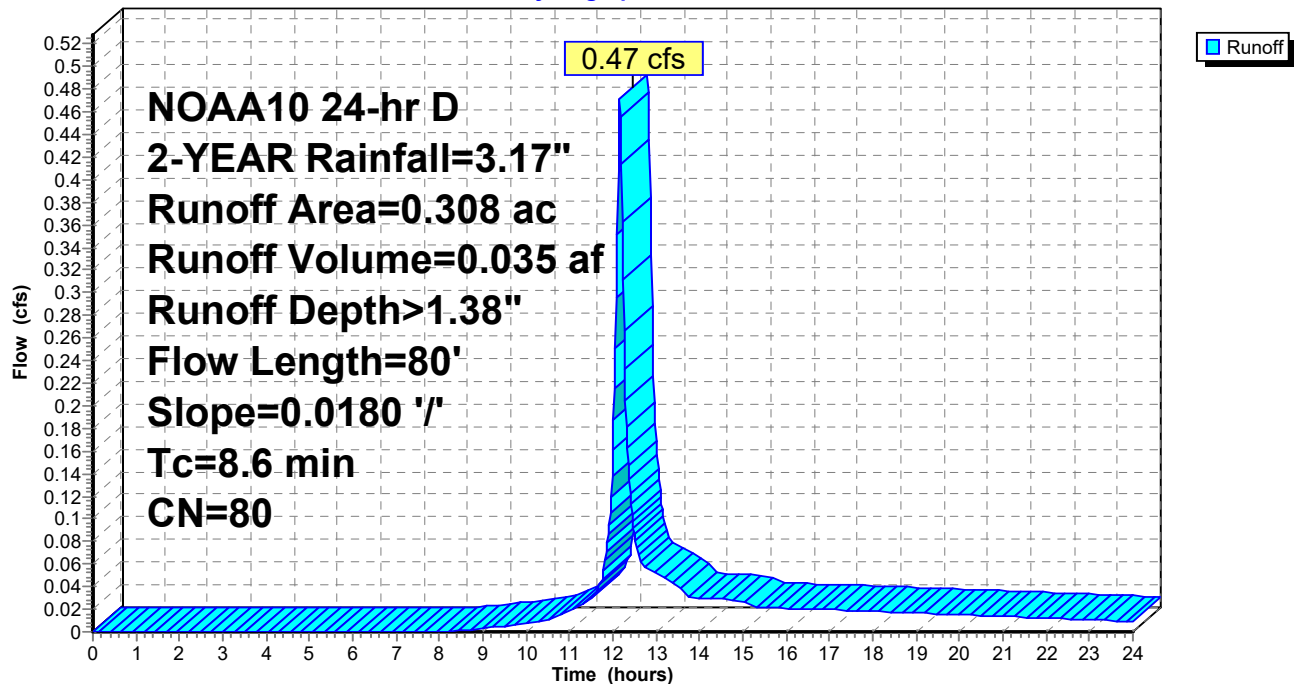
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.236	80	>75% Grass cover, Good, HSG D
0.072	79	Woods, Fair, HSG D
0.000	98	Paved parking, HSG D
0.308	80	Weighted Average
0.308		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	80	0.0180	0.16		Sheet Flow, Seg 1
					Grass: Short n= 0.150 P2= 3.17"

Subcatchment P1-1:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 10

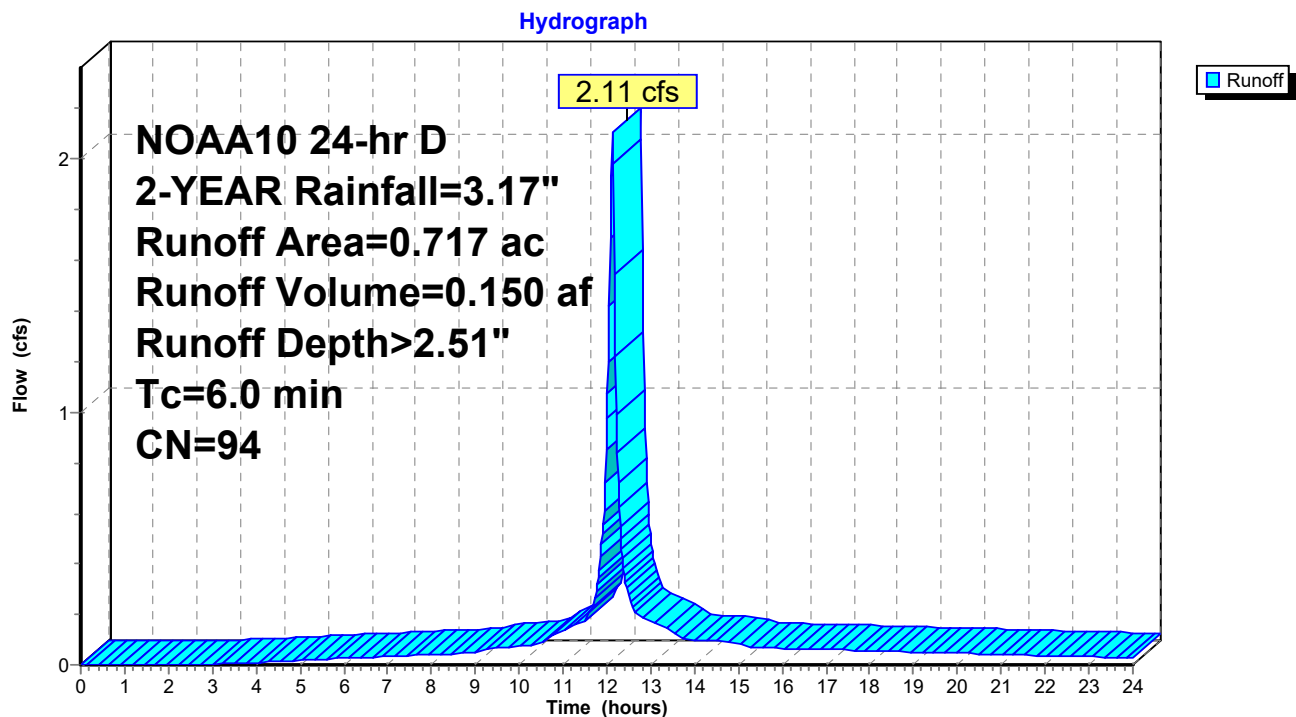
Summary for Subcatchment P1-2:

Runoff = 2.11 cfs @ 12.13 hrs, Volume= 0.150 af, Depth> 2.51"
Routed to Reach R1 : Flow towards the west

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.149	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.568	98	Paved parking, HSG D
0.717	94	Weighted Average
0.149		20.78% Pervious Area
0.568		79.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P1-2:

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 11

Summary for Subcatchment P1-3:

Runoff = 0.65 cfs @ 12.13 hrs, Volume= 0.045 af, Depth> 2.32"
Routed to Pond 1P : Bioretention Basin 1

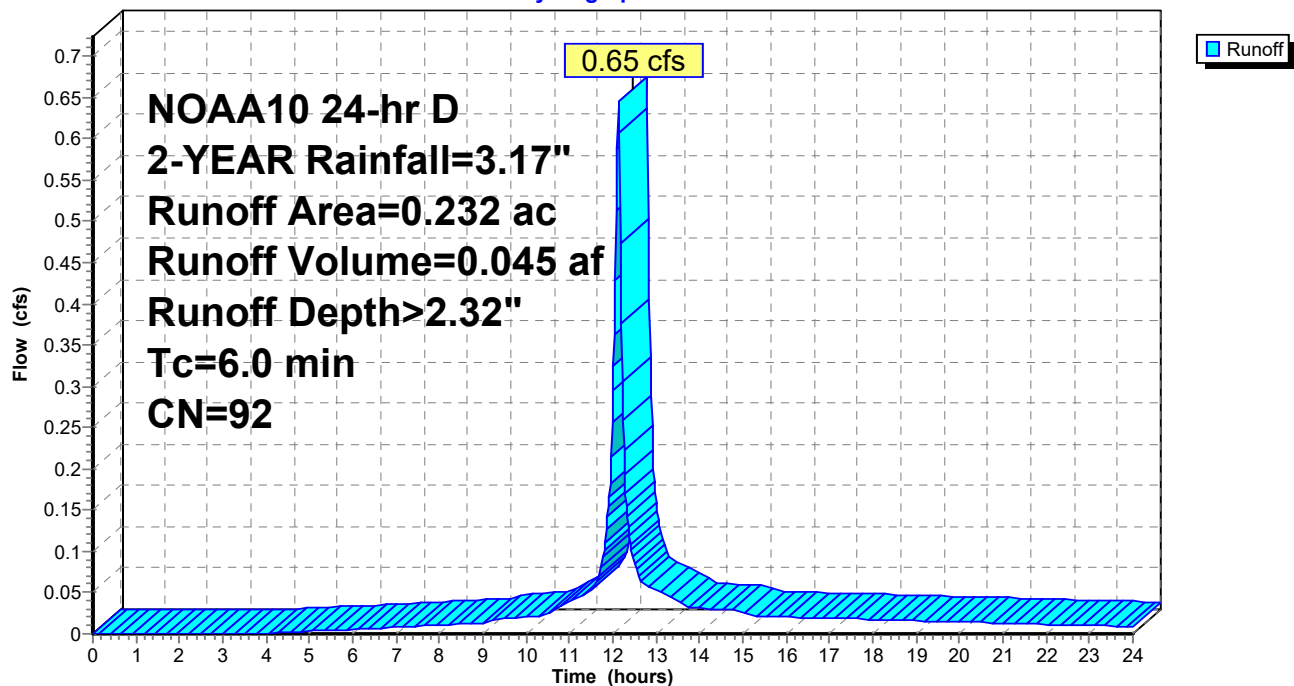
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.072	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.160	98	Paved parking, HSG D
0.232	92	Weighted Average
0.072		31.03% Pervious Area
0.160		68.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P1-3:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 12

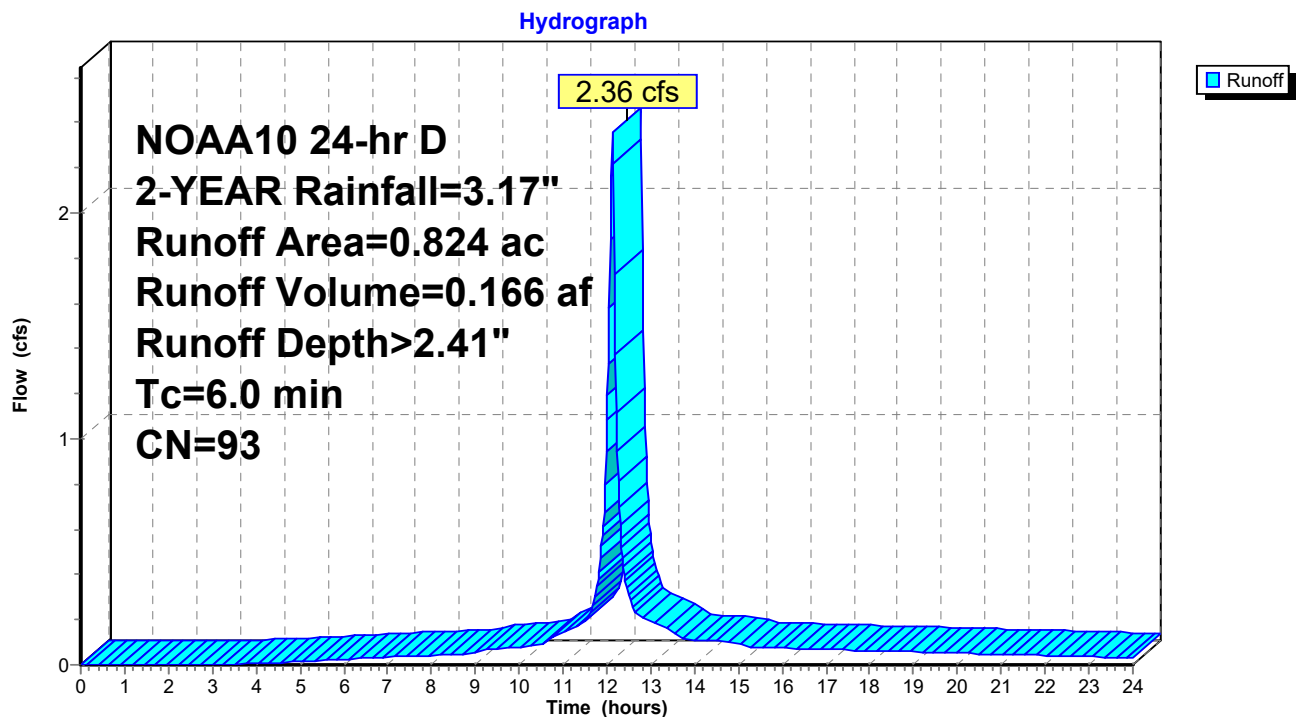
Summary for Subcatchment P1-4:

Runoff = 2.36 cfs @ 12.13 hrs, Volume= 0.166 af, Depth> 2.41"
Routed to Reach R1 : Flow towards the west

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.224	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.600	98	Paved parking, HSG D
0.824	93	Weighted Average
0.224		27.18% Pervious Area
0.600		72.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P1-4:

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 13

Summary for Subcatchment P2-1:

Runoff = 0.36 cfs @ 12.13 hrs, Volume= 0.024 af, Depth> 1.44"
Routed to Reach R2 : Flow towards the north

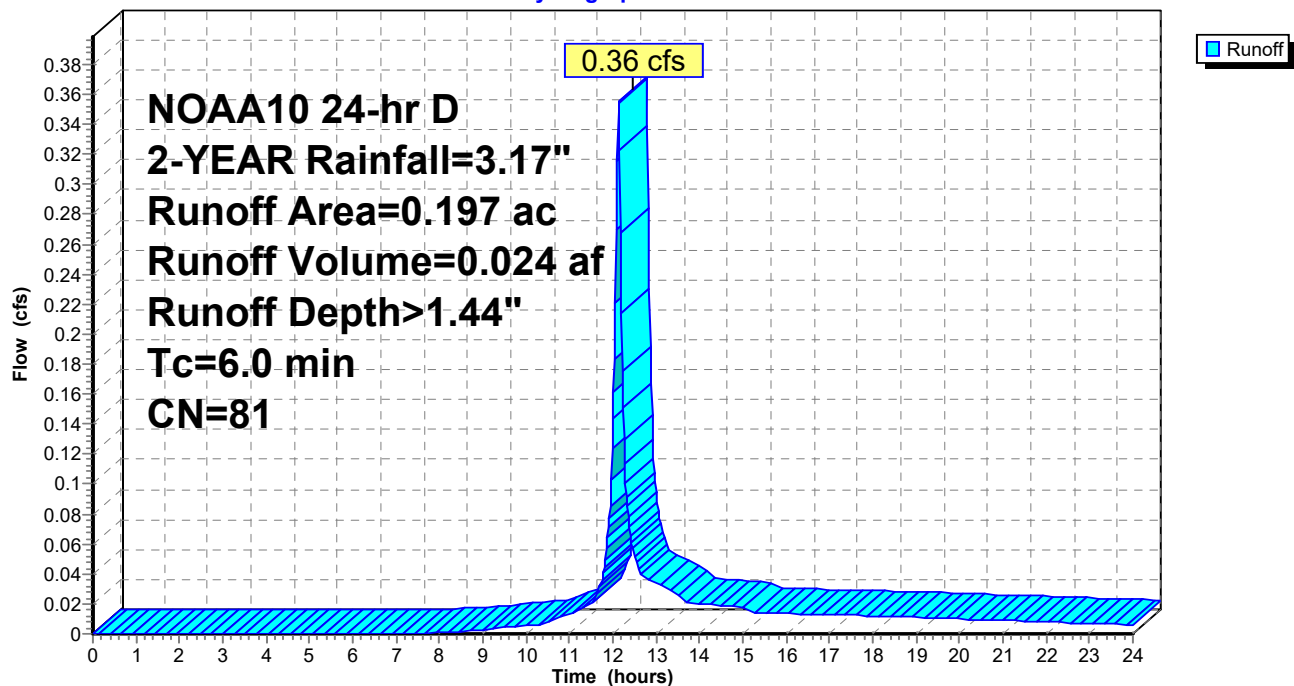
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.093	80	>75% Grass cover, Good, HSG D
0.084	79	Woods, Fair, HSG D
0.020	98	Paved parking, HSG D
0.197	81	Weighted Average
0.177		89.85% Pervious Area
0.020		10.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P2-1:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 14

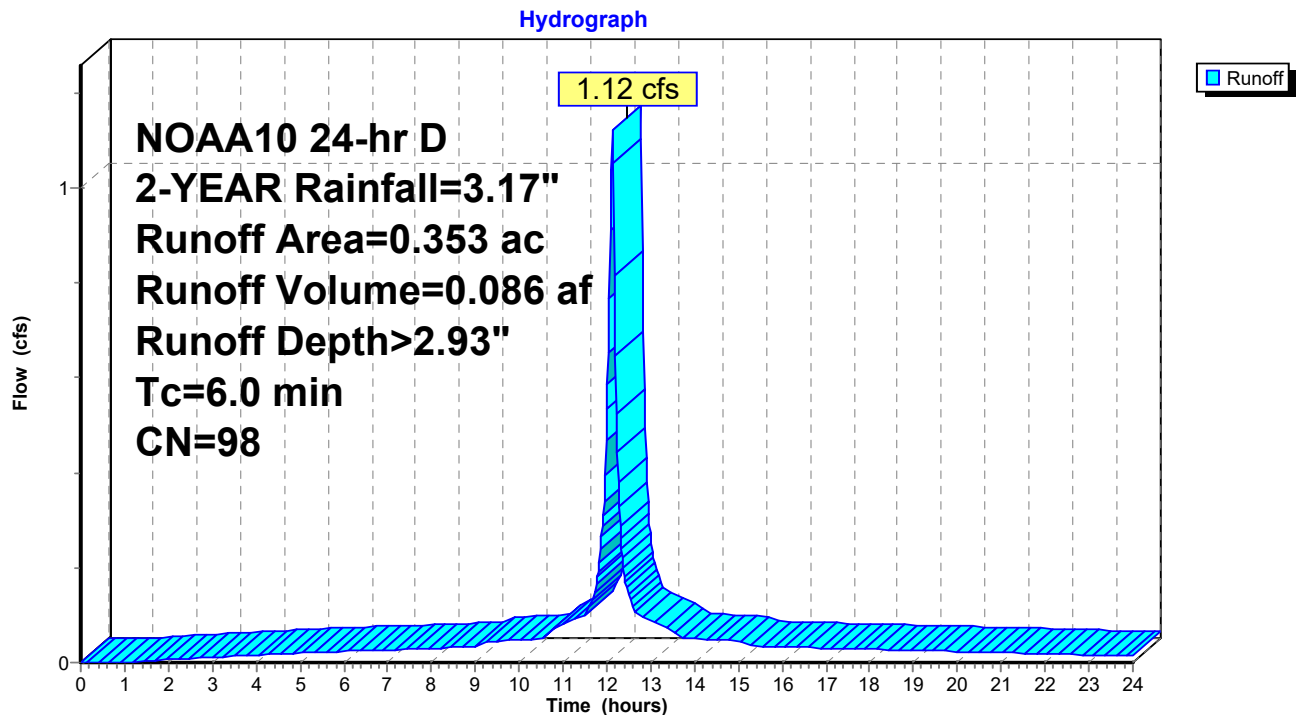
Summary for Subcatchment P2-2:

Runoff = 1.12 cfs @ 12.13 hrs, Volume= 0.086 af, Depth> 2.93"
Routed to Reach R2 : Flow towards the north

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.000	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.353	98	Paved parking, HSG D
0.353	98	Weighted Average
0.353		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P2-2:

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 15

Summary for Subcatchment P3-1:

Runoff = 0.61 cfs @ 12.13 hrs, Volume= 0.041 af, Depth> 1.44"
Routed to Reach R3 : Flow towards the northeast

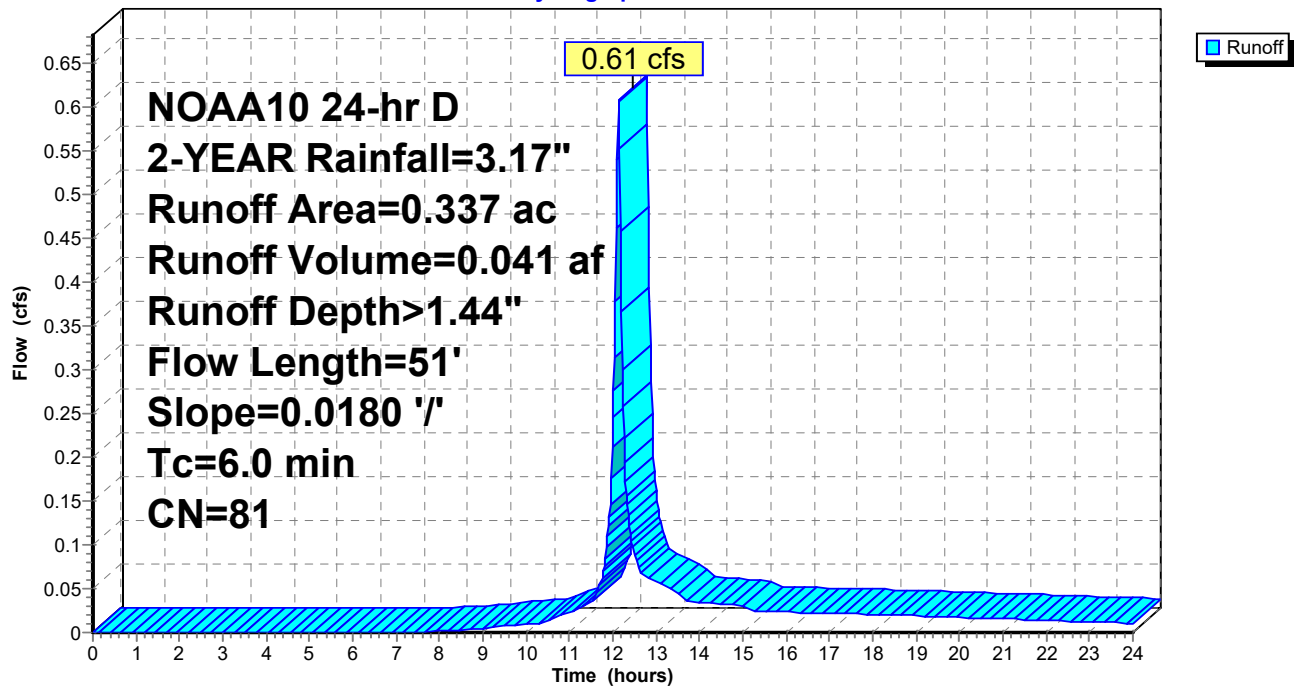
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.244	80	>75% Grass cover, Good, HSG D
0.070	79	Woods, Fair, HSG D
0.023	98	Paved parking, HSG D
0.337	81	Weighted Average
0.314		93.18% Pervious Area
0.023		6.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	51	0.0180	0.14		Sheet Flow, Seg 1 Grass: Short n= 0.150 P2= 3.17"

Subcatchment P3-1:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 16

Summary for Subcatchment P3-2:

Runoff = 1.76 cfs @ 12.13 hrs, Volume= 0.122 af, Depth> 2.32"
Routed to Pond 2P : Bioretention Basin 2

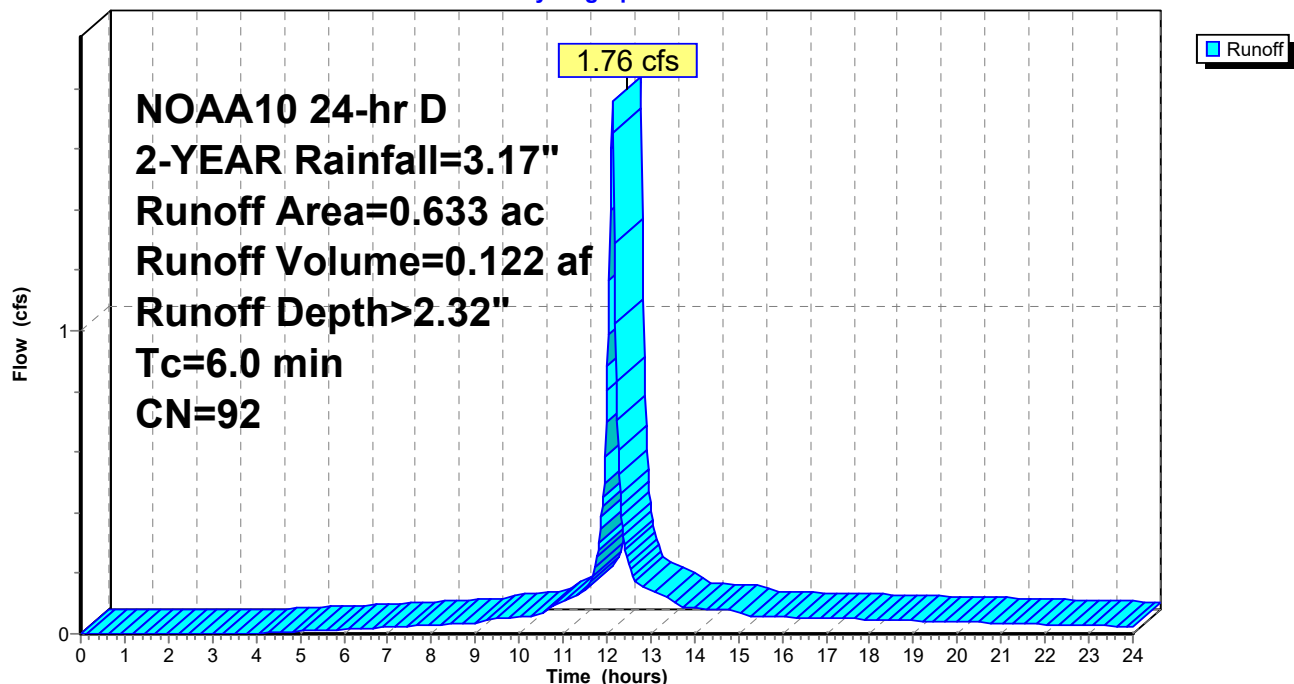
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.147	80	>75% Grass cover, Good, HSG D
0.044	79	Woods, Fair, HSG D
0.442	98	Paved parking, HSG D
0.633	92	Weighted Average
0.191		30.17% Pervious Area
0.442		69.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P3-2:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 17

Summary for Subcatchment P3-3:

Runoff = 2.08 cfs @ 12.13 hrs, Volume= 0.146 af, Depth> 2.41"
Routed to Reach R3 : Flow towards the northeast

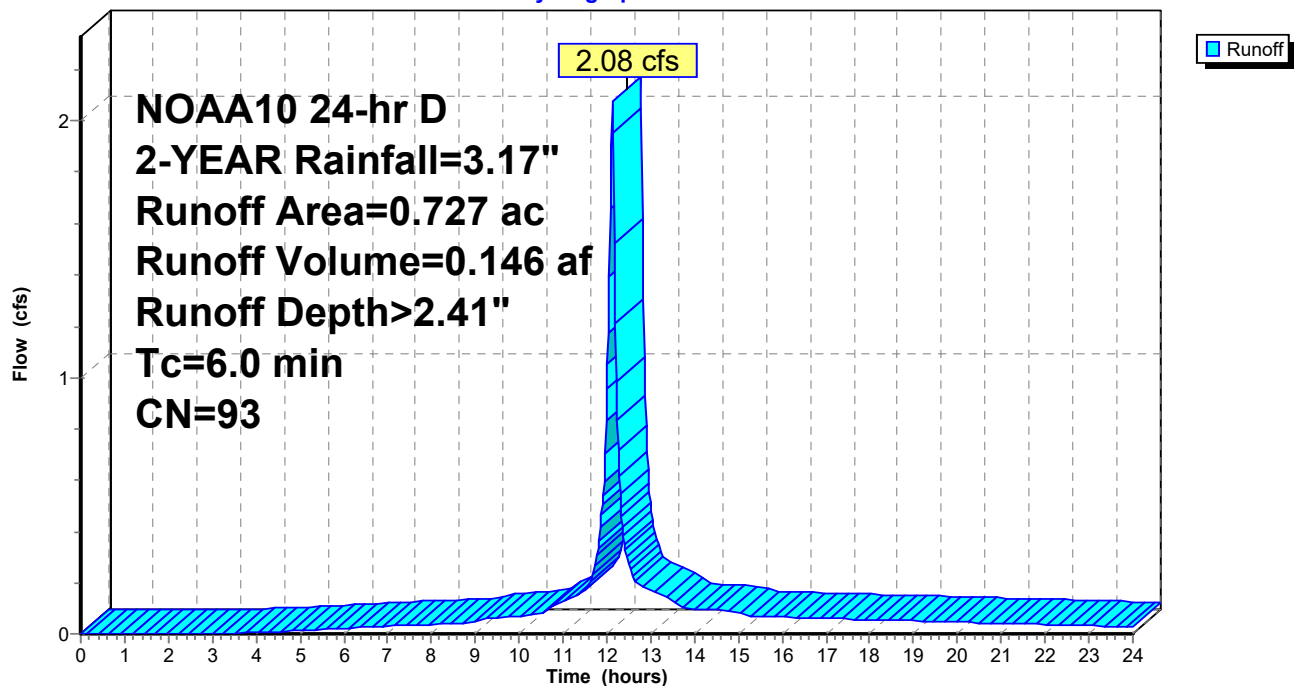
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.192	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.535	98	Paved parking, HSG D
0.727	93	Weighted Average
0.192		26.41% Pervious Area
0.535		73.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P3-3:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 18

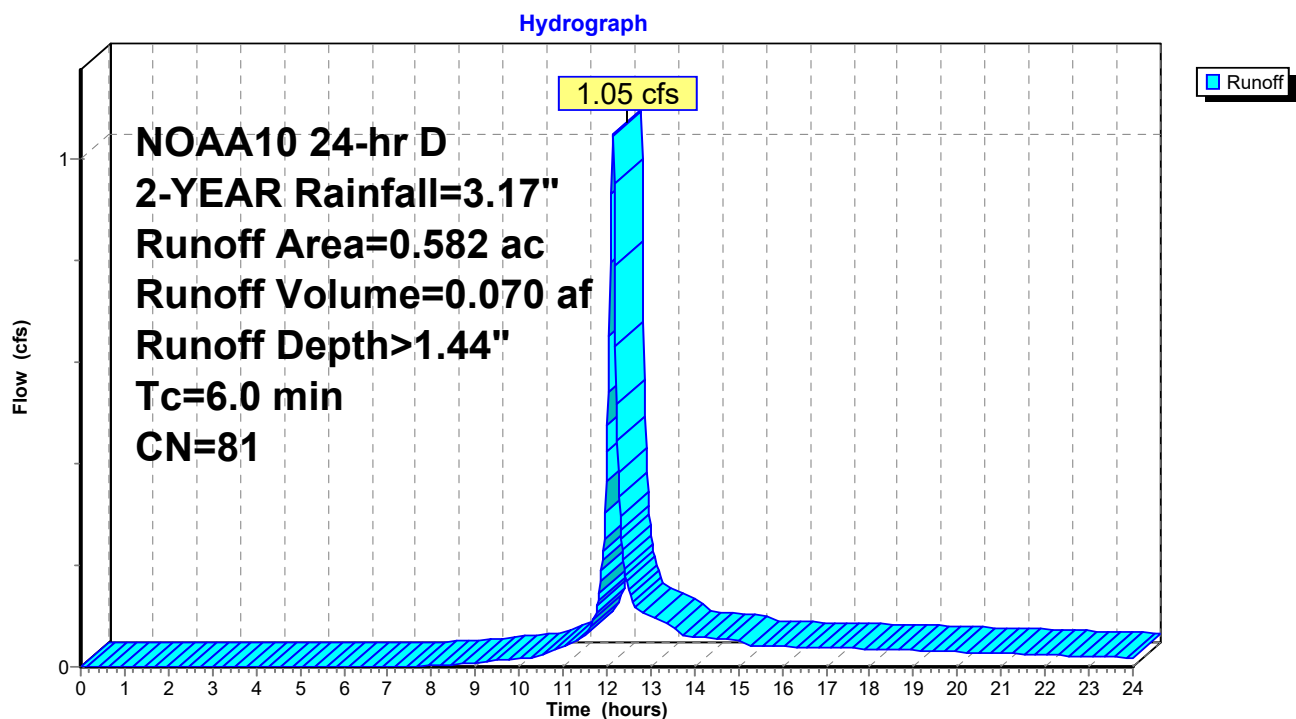
Summary for Subcatchment P4-1:

Runoff = 1.05 cfs @ 12.13 hrs, Volume= 0.070 af, Depth> 1.44"
Routed to Reach R4 : Flow towards the south

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.431	80	>75% Grass cover, Good, HSG D
0.112	79	Woods, Fair, HSG D
0.039	98	Paved parking, HSG D
0.582	81	Weighted Average
0.543		93.30% Pervious Area
0.039		6.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P4-1:

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 19

Summary for Subcatchment P4-2:

Runoff = 0.70 cfs @ 12.13 hrs, Volume= 0.048 af, Depth> 2.32"
Routed to Pond 3P : Bioretention Basin 3

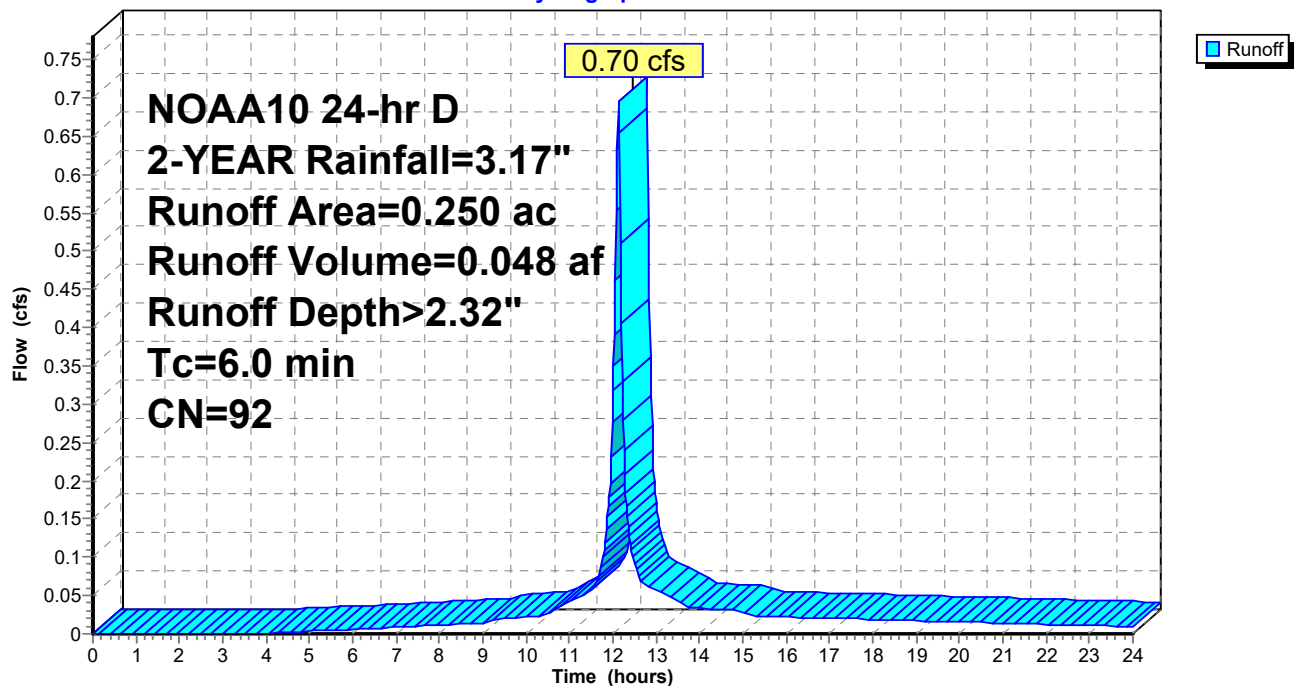
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.088	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.162	98	Paved parking, HSG D
0.250	92	Weighted Average
0.088		35.20% Pervious Area
0.162		64.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P4-2:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 20

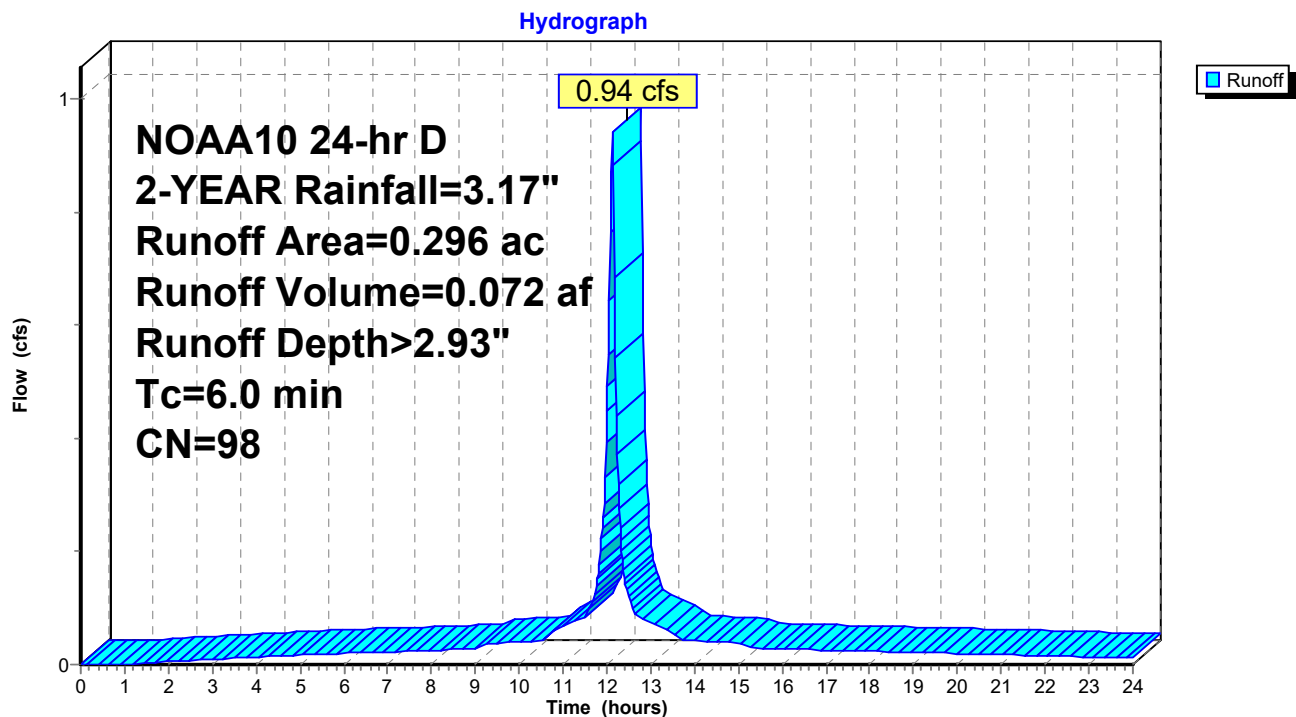
Summary for Subcatchment P4-3: Building "B" Roof

Runoff = 0.94 cfs @ 12.13 hrs, Volume= 0.072 af, Depth> 2.93"
Routed to Pond 4P : Underground Detention Chamber

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.000	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.296	98	Paved parking, HSG D
0.296	98	Weighted Average
0.296		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P4-3: Building "B" Roof

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 21

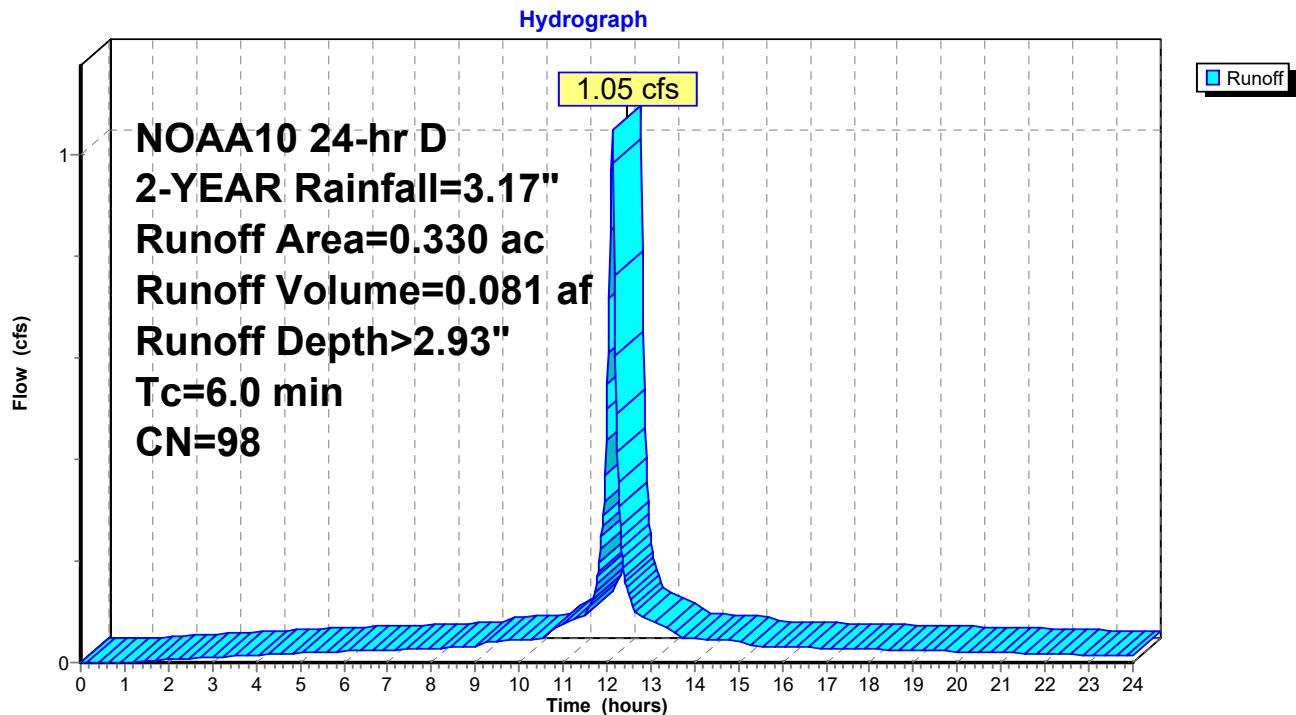
Summary for Subcatchment P4-4: Building "A" Roof

Runoff = 1.05 cfs @ 12.13 hrs, Volume= 0.081 af, Depth> 2.93"
Routed to Pond 5P : Underground Detention Chamber

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.000	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.330	98	Paved parking, HSG D
0.330	98	Weighted Average
0.330		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P4-4: Building "A" Roof

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 22

Summary for Subcatchment P5: Flow towards the southeast

Runoff = 0.36 cfs @ 12.13 hrs, Volume= 0.024 af, Depth> 1.31"
Routed to Reach TS : Total Site

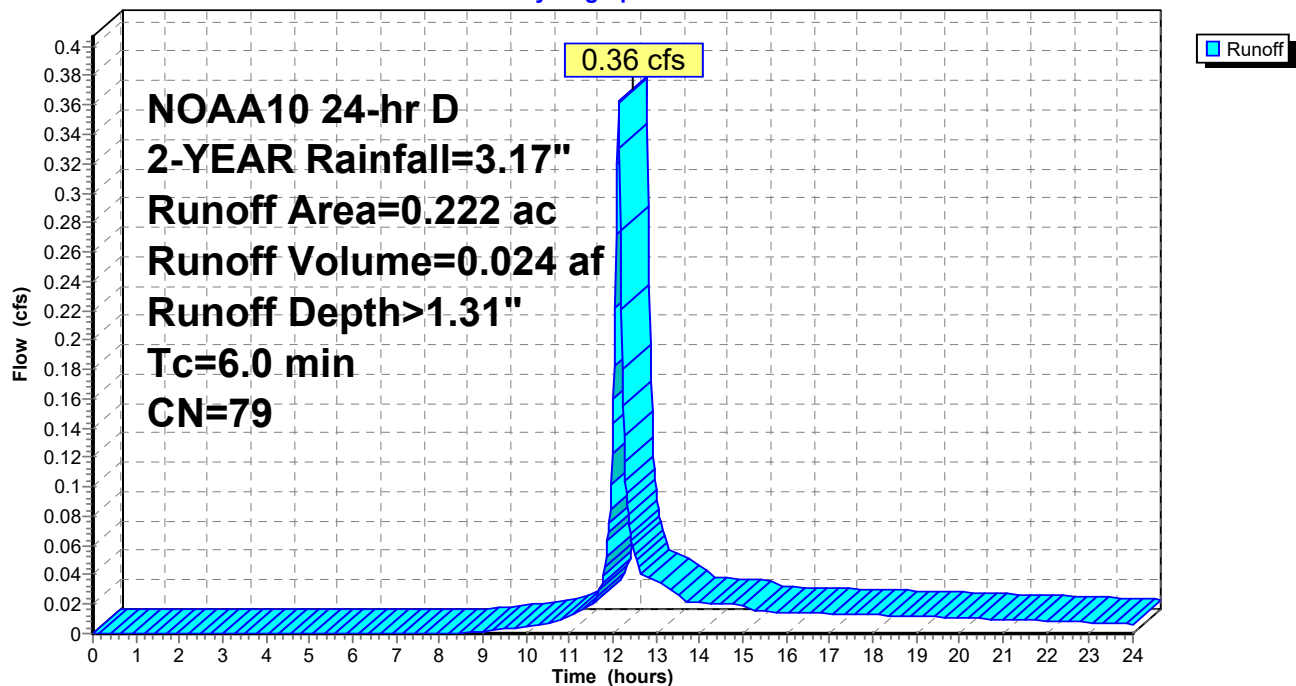
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.067	80	>75% Grass cover, Good, HSG D
0.155	79	Woods, Fair, HSG D
0.000	98	Paved parking, HSG D
0.222	79	Weighted Average
0.222		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P5: Flow towards the southeast

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 23

Summary for Subcatchment P6: Flow to Blue Hills Ave

Runoff = 0.21 cfs @ 12.13 hrs, Volume= 0.014 af, Depth> 2.05"
Routed to Reach TS : Total Site

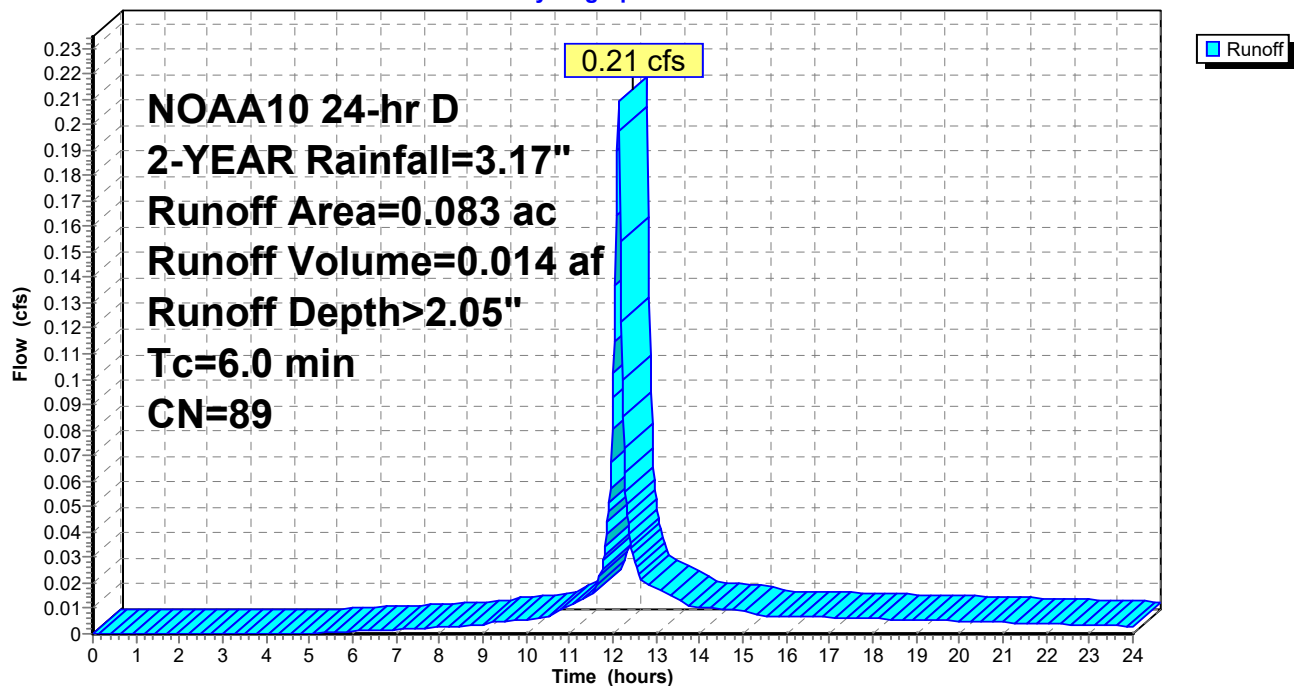
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Area (ac)	CN	Description
0.040	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.043	98	Paved parking, HSG D
0.083	89	Weighted Average
0.040		48.19% Pervious Area
0.043		51.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P6: Flow to Blue Hills Ave

Hydrograph

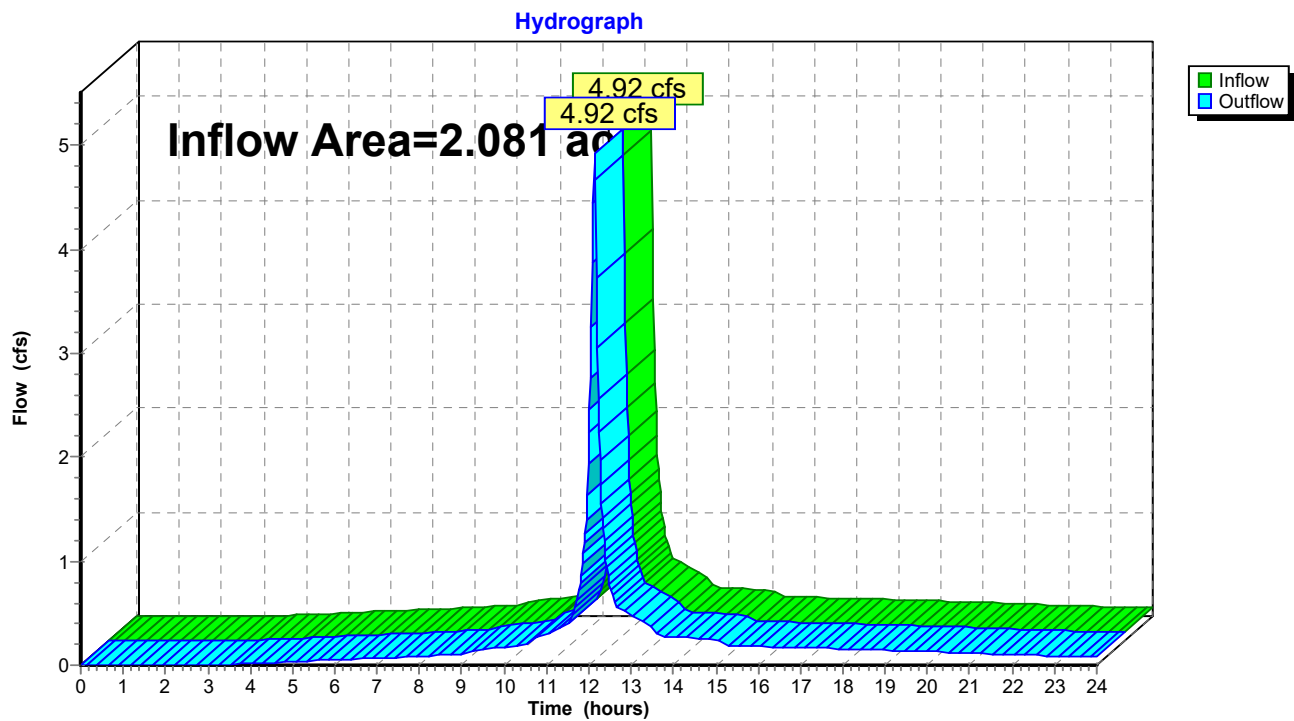


Summary for Reach R1: Flow towards the west

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.081 ac, 63.82% Impervious, Inflow Depth > 2.17" for 2-YEAR event
Inflow = 4.92 cfs @ 12.13 hrs, Volume= 0.377 af
Outflow = 4.92 cfs @ 12.13 hrs, Volume= 0.377 af, Atten= 0%, Lag= 0.0 min
Routed to Reach TS : Total Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

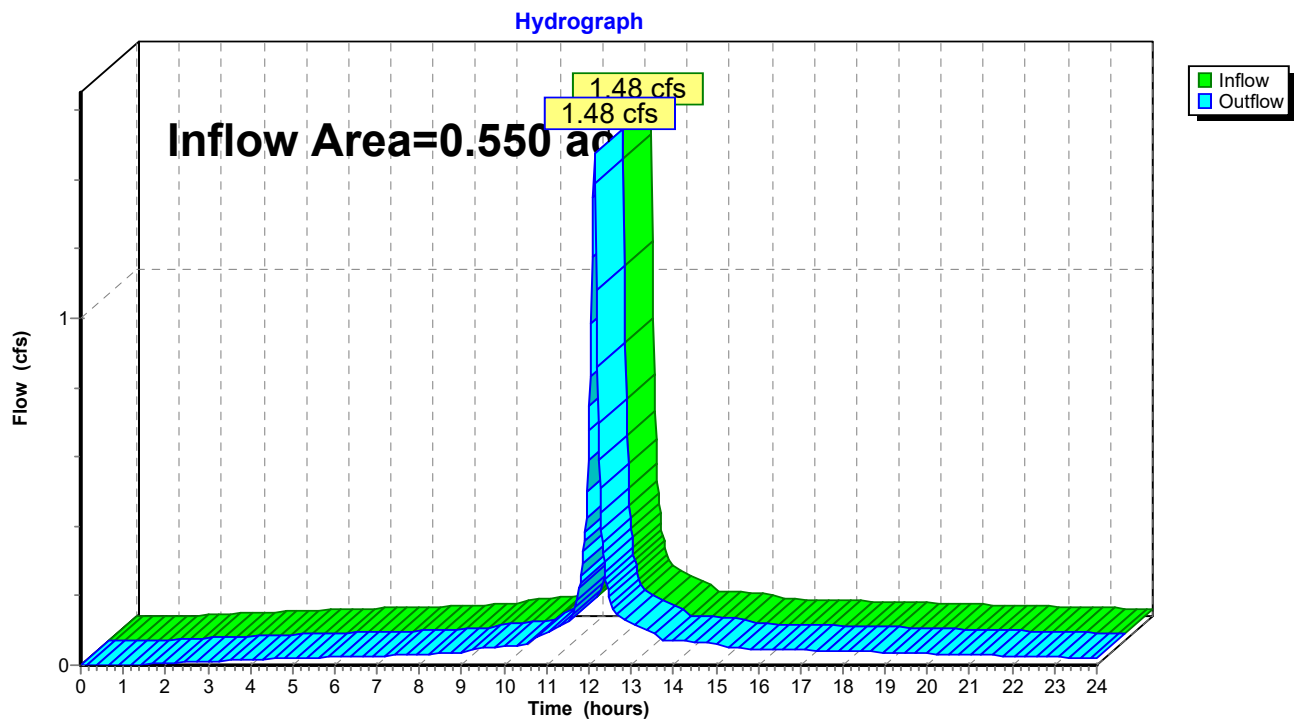
Reach R1: Flow towards the west

Summary for Reach R2: Flow towards the north

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.550 ac, 67.82% Impervious, Inflow Depth > 2.40" for 2-YEAR event
Inflow = 1.48 cfs @ 12.13 hrs, Volume= 0.110 af
Outflow = 1.48 cfs @ 12.13 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min
Routed to Reach TS : Total Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

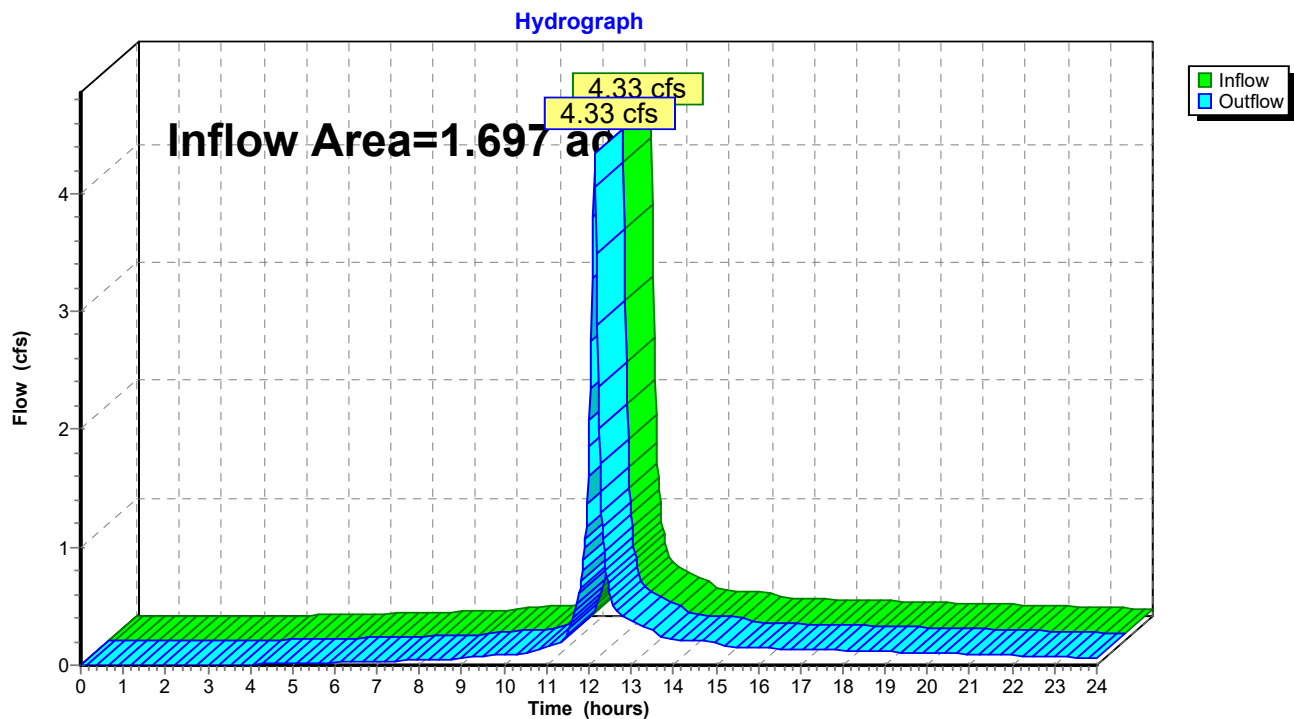
Reach R2: Flow towards the north

Summary for Reach R3: Flow towards the northeast

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.697 ac, 58.93% Impervious, Inflow Depth > 2.04" for 2-YEAR event
Inflow = 4.33 cfs @ 12.14 hrs, Volume= 0.288 af
Outflow = 4.33 cfs @ 12.14 hrs, Volume= 0.288 af, Atten= 0%, Lag= 0.0 min
Routed to Reach TS : Total Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

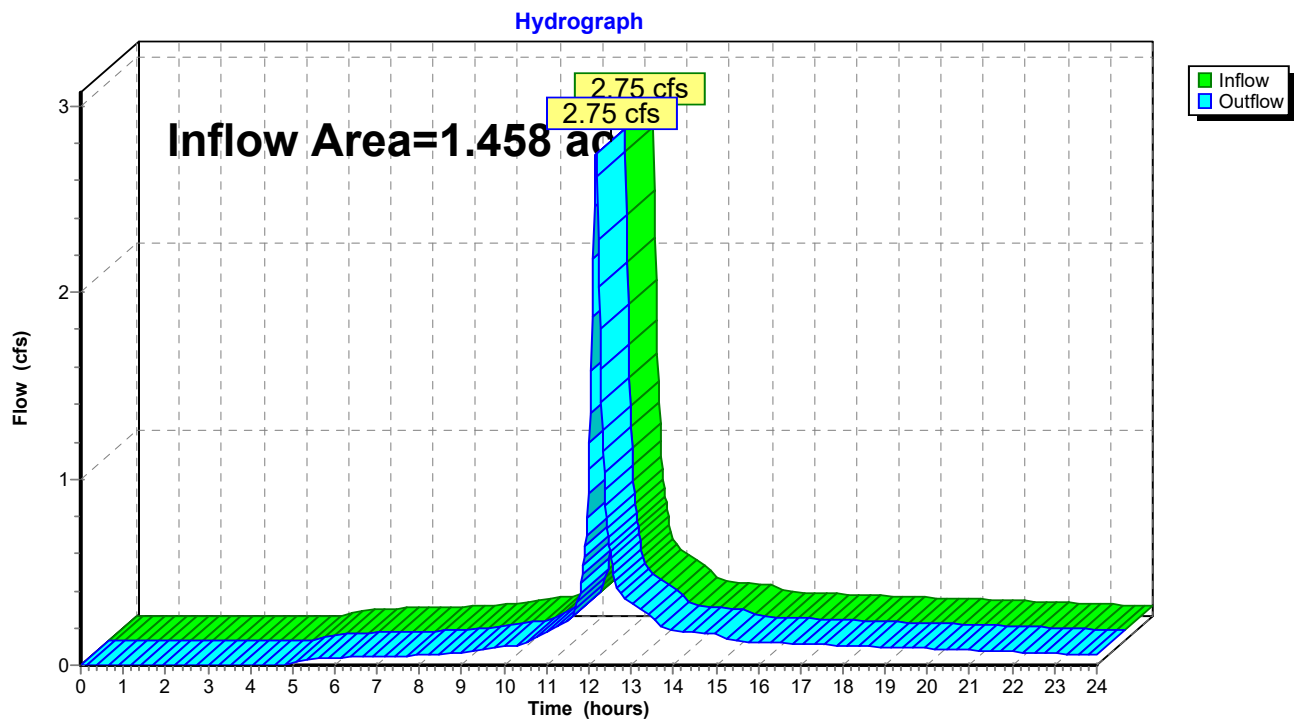
Reach R3: Flow towards the northeast

Summary for Reach R4: Flow towards the south

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.458 ac, 56.72% Impervious, Inflow Depth > 2.02" for 2-YEAR event
Inflow = 2.75 cfs @ 12.17 hrs, Volume= 0.246 af
Outflow = 2.75 cfs @ 12.17 hrs, Volume= 0.246 af, Atten= 0%, Lag= 0.0 min
Routed to Reach TS : Total Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach R4: Flow towards the south

Summary for Reach TS: Total Site

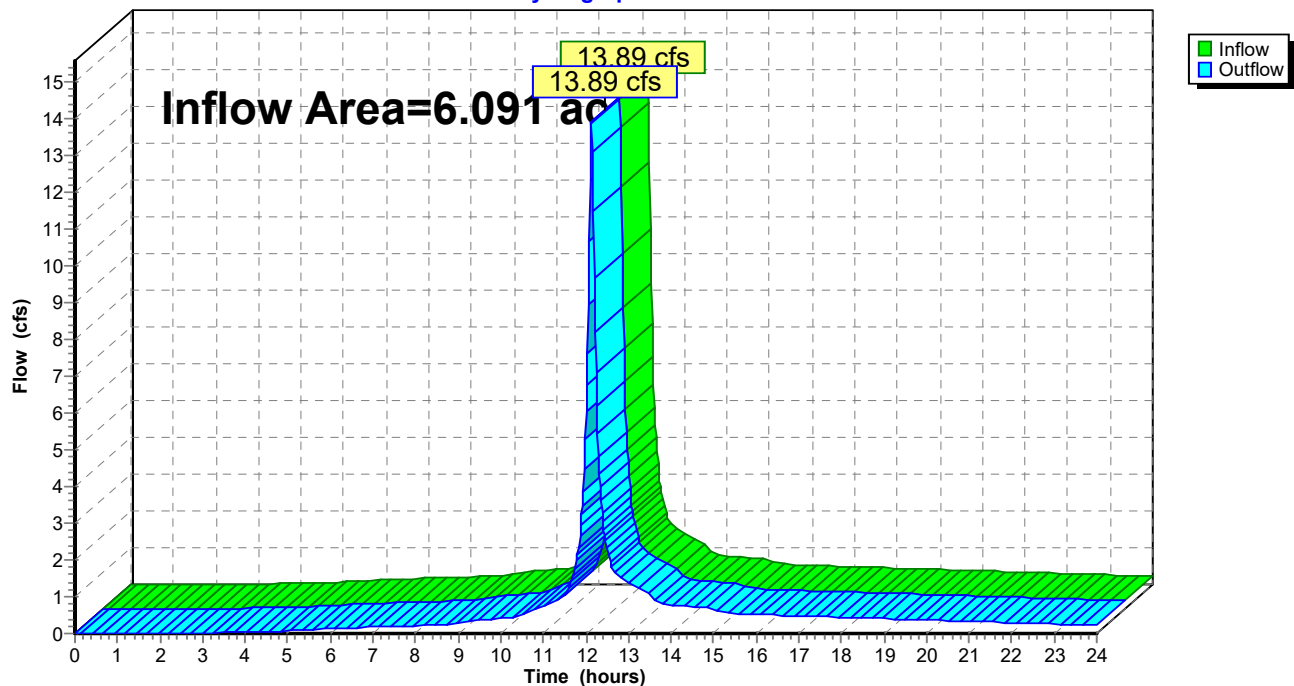
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.091 ac, 58.63% Impervious, Inflow Depth > 2.09" for 2-YEAR event
Inflow = 13.89 cfs @ 12.14 hrs, Volume= 1.059 af
Outflow = 13.89 cfs @ 12.14 hrs, Volume= 1.059 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach TS: Total Site

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 29

Summary for Pond 1P: Bioretention Basin 1

Inflow Area = 0.232 ac, 68.97% Impervious, Inflow Depth > 2.32" for 2-YEAR event
 Inflow = 0.65 cfs @ 12.13 hrs, Volume= 0.045 af
 Outflow = 0.19 cfs @ 12.29 hrs, Volume= 0.026 af, Atten= 71%, Lag= 9.5 min
 Primary = 0.19 cfs @ 12.29 hrs, Volume= 0.026 af
 Routed to Reach R1 : Flow towards the west

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
 Peak Elev= 115.22' @ 12.29 hrs Surf.Area= 817 sf Storage= 888 cf

Plug-Flow detention time= 265.1 min calculated for 0.026 af (57% of inflow)
 Center-of-Mass det. time= 123.4 min (938.0 - 814.5)

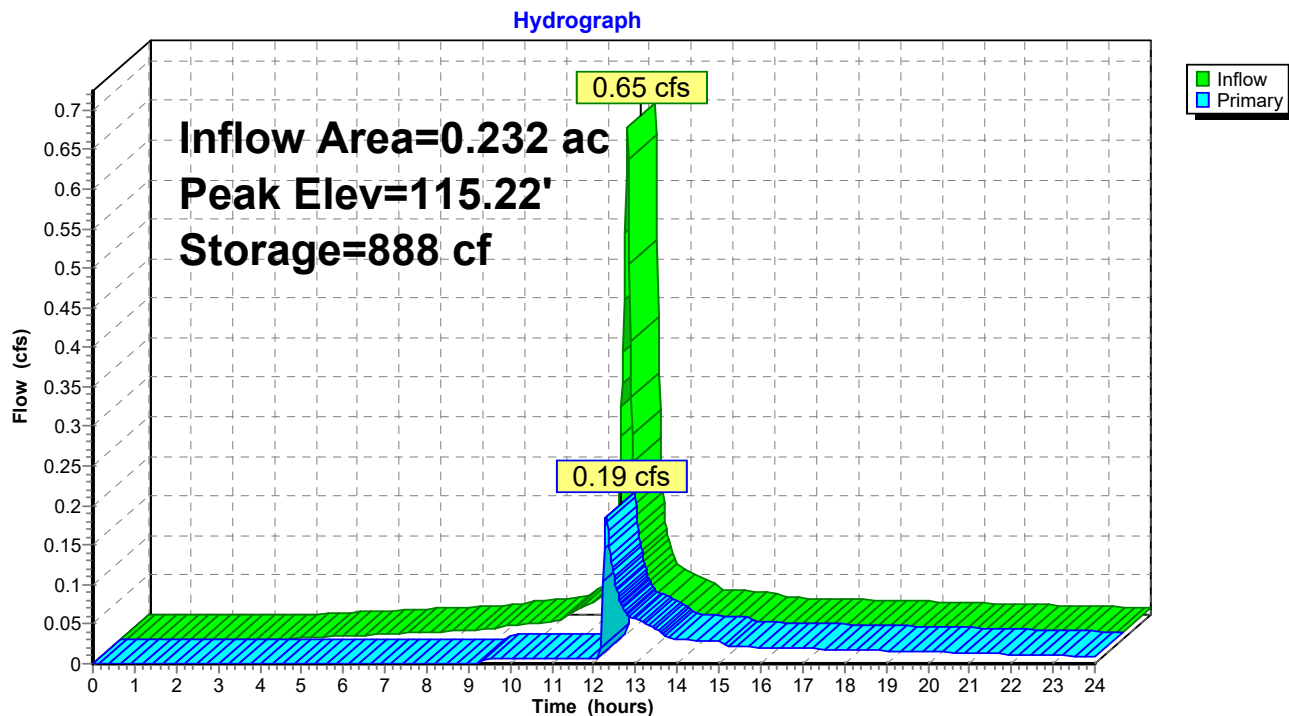
Volume	Invert	Avail.Storage	Storage Description			
#1	111.25'	1,140 cf	Bioretention Basin (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
111.25	517	134.2	0.0	0	0	517
112.25	517	134.2	40.0	207	207	651
112.50	517	134.2	0.0	0	207	685
114.50	517	134.2	20.0	207	414	953
115.00	725	143.6	100.0	309	723	1,172
115.50	948	153.0	100.0	417	1,140	1,406

Device	Routing	Invert	Outlet Devices
#1	Primary	111.92'	12.0" Round Outlet Pipe L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 111.92' / 111.83' S= 0.0100 ' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Device 1	111.42'	4.0" Vert. Underdrain C= 0.600 Limited to weir flow at low heads
#3	Device 1	115.15'	12.0" Horiz. Beehive Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	111.25'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Primary OutFlow Max=0.18 cfs @ 12.29 hrs HW=115.21' (Free Discharge)

1=Outlet Pipe (Passes 0.18 cfs of 6.32 cfs potential flow)
 2=Underdrain (Passes 0.01 cfs of 0.76 cfs potential flow)
 4=Exfiltration (Exfiltration Controls 0.01 cfs)
 3=Beehive Grate (Weir Controls 0.17 cfs @ 0.83 fps)

Pond 1P: Bioretention Basin 1



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 31

Stage-Discharge for Pond 1P: Bioretention Basin 1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
111.25	0.00	113.80	0.01
111.30	0.00	113.85	0.01
111.35	0.00	113.90	0.01
111.40	0.00	113.95	0.01
111.45	0.00	114.00	0.01
111.50	0.00	114.05	0.01
111.55	0.00	114.10	0.01
111.60	0.00	114.15	0.01
111.65	0.00	114.20	0.01
111.70	0.00	114.25	0.01
111.75	0.00	114.30	0.01
111.80	0.00	114.35	0.01
111.85	0.00	114.40	0.01
111.90	0.00	114.45	0.01
111.95	0.00	114.50	0.01
112.00	0.01	114.55	0.01
112.05	0.01	114.60	0.01
112.10	0.01	114.65	0.01
112.15	0.01	114.70	0.01
112.20	0.01	114.75	0.01
112.25	0.01	114.80	0.01
112.30	0.01	114.85	0.01
112.35	0.01	114.90	0.01
112.40	0.01	114.95	0.01
112.45	0.01	115.00	0.01
112.50	0.01	115.05	0.01
112.55	0.01	115.10	0.01
112.60	0.01	115.15	0.01
112.65	0.01	115.20	0.12
112.70	0.01	115.25	0.33
112.75	0.01	115.30	0.61
112.80	0.01	115.35	0.93
112.85	0.01	115.40	1.29
112.90	0.01	115.45	1.70
112.95	0.01	115.50	2.14
113.00	0.01		
113.05	0.01		
113.10	0.01		
113.15	0.01		
113.20	0.01		
113.25	0.01		
113.30	0.01		
113.35	0.01		
113.40	0.01		
113.45	0.01		
113.50	0.01		
113.55	0.01		
113.60	0.01		
113.65	0.01		
113.70	0.01		
113.75	0.01		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 32

Stage-Area-Storage for Pond 1P: Bioretention Basin 1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
111.25	517	0	113.80	517	341
111.30	517	10	113.85	517	346
111.35	517	21	113.90	517	352
111.40	517	31	113.95	517	357
111.45	517	41	114.00	517	362
111.50	517	52	114.05	517	367
111.55	517	62	114.10	517	372
111.60	517	72	114.15	517	377
111.65	517	83	114.20	517	383
111.70	517	93	114.25	517	388
111.75	517	103	114.30	517	393
111.80	517	114	114.35	517	398
111.85	517	124	114.40	517	403
111.90	517	134	114.45	517	408
111.95	517	145	114.50	517	414
112.00	517	155	114.55	536	440
112.05	517	165	114.60	556	467
112.10	517	176	114.65	576	496
112.15	517	186	114.70	596	525
112.20	517	196	114.75	617	555
112.25	517	207	114.80	638	586
112.30	517	207	114.85	659	619
112.35	517	207	114.90	681	652
112.40	517	207	114.95	703	687
112.45	517	207	115.00	725	723
112.50	517	207	115.05	746	759
112.55	517	212	115.10	767	797
112.60	517	217	115.15	789	836
112.65	517	222	115.20	811	876
112.70	517	227	115.25	833	917
112.75	517	233	115.30	855	959
112.80	517	238	115.35	878	1,003
112.85	517	243	115.40	901	1,047
112.90	517	248	115.45	924	1,093
112.95	517	253	115.50	948	1,140
113.00	517	259			
113.05	517	264			
113.10	517	269			
113.15	517	274			
113.20	517	279			
113.25	517	284			
113.30	517	290			
113.35	517	295			
113.40	517	300			
113.45	517	305			
113.50	517	310			
113.55	517	315			
113.60	517	321			
113.65	517	326			
113.70	517	331			
113.75	517	336			

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 33

Summary for Pond 2P: Bioretention Basin 2

Inflow Area = 0.633 ac, 69.83% Impervious, Inflow Depth > 2.32" for 2-YEAR event
 Inflow = 1.76 cfs @ 12.13 hrs, Volume= 0.122 af
 Outflow = 1.68 cfs @ 12.15 hrs, Volume= 0.102 af, Atten= 5%, Lag= 1.1 min
 Primary = 1.68 cfs @ 12.15 hrs, Volume= 0.102 af
 Routed to Reach R3 : Flow towards the northeast

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
 Peak Elev= 115.73' @ 12.15 hrs Surf.Area= 884 sf Storage= 1,089 cf

Plug-Flow detention time= 136.5 min calculated for 0.102 af (83% of inflow)
 Center-of-Mass det. time= 54.9 min (869.4 - 814.5)

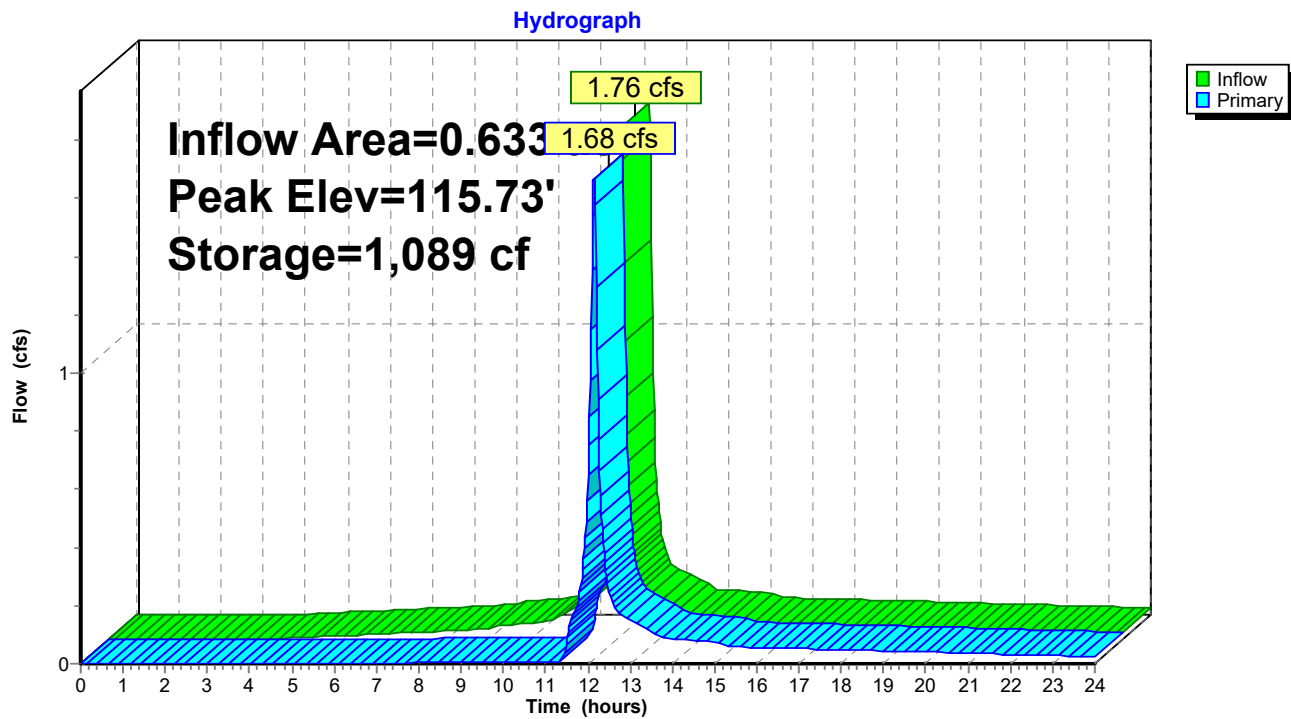
Volume	Invert	Avail.Storage	Storage Description			
#1	111.25'	1,349 cf	Bioretention Basin (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
111.25	401	122.6	0.0	0	0	401
112.25	401	122.6	40.0	160	160	524
112.50	401	122.6	0.0	0	160	554
114.50	401	122.6	20.0	160	321	799
116.00	1,017	150.9	100.0	1,028	1,349	1,449

Device	Routing	Invert	Outlet Devices
#1	Primary	112.85'	12.0" Round Outlet Pipe L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 112.85' / 112.81' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Device 1	112.85'	4.0" Vert. Underdrain C= 0.600 Limited to weir flow at low heads
#3	Device 1	115.50'	18.0" Horiz. Beehive Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	111.25'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Primary OutFlow Max=1.66 cfs @ 12.15 hrs HW=115.73' (Free Discharge)

1=Outlet Pipe (Passes 1.66 cfs of 5.83 cfs potential flow)
 2=Underdrain (Passes 0.01 cfs of 0.69 cfs potential flow)
 4=Exfiltration (Exfiltration Controls 0.01 cfs)
 3=Beehive Grate (Weir Controls 1.64 cfs @ 1.55 fps)

Pond 2P: Bioretention Basin 2



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 35

Stage-Discharge for Pond 2P: Bioretention Basin 2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
111.25	0.00	113.80	0.00
111.30	0.00	113.85	0.00
111.35	0.00	113.90	0.00
111.40	0.00	113.95	0.00
111.45	0.00	114.00	0.00
111.50	0.00	114.05	0.00
111.55	0.00	114.10	0.00
111.60	0.00	114.15	0.00
111.65	0.00	114.20	0.00
111.70	0.00	114.25	0.00
111.75	0.00	114.30	0.00
111.80	0.00	114.35	0.00
111.85	0.00	114.40	0.00
111.90	0.00	114.45	0.00
111.95	0.00	114.50	0.00
112.00	0.00	114.55	0.00
112.05	0.00	114.60	0.01
112.10	0.00	114.65	0.01
112.15	0.00	114.70	0.01
112.20	0.00	114.75	0.01
112.25	0.00	114.80	0.01
112.30	0.00	114.85	0.01
112.35	0.00	114.90	0.01
112.40	0.00	114.95	0.01
112.45	0.00	115.00	0.01
112.50	0.00	115.05	0.01
112.55	0.00	115.10	0.01
112.60	0.00	115.15	0.01
112.65	0.00	115.20	0.01
112.70	0.00	115.25	0.01
112.75	0.00	115.30	0.01
112.80	0.00	115.35	0.01
112.85	0.00	115.40	0.01
112.90	0.00	115.45	0.01
112.95	0.00	115.50	0.01
113.00	0.00	115.55	0.18
113.05	0.00	115.60	0.50
113.10	0.00	115.65	0.91
113.15	0.00	115.70	1.39
113.20	0.00	115.75	1.94
113.25	0.00	115.80	2.54
113.30	0.00	115.85	3.20
113.35	0.00	115.90	3.91
113.40	0.00	115.95	4.66
113.45	0.00	116.00	5.46
113.50	0.00		
113.55	0.00		
113.60	0.00		
113.65	0.00		
113.70	0.00		
113.75	0.00		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 36

Stage-Area-Storage for Pond 2P: Bioretention Basin 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
111.25	401	0	113.80	401	265
111.30	401	8	113.85	401	269
111.35	401	16	113.90	401	273
111.40	401	24	113.95	401	277
111.45	401	32	114.00	401	281
111.50	401	40	114.05	401	285
111.55	401	48	114.10	401	289
111.60	401	56	114.15	401	293
111.65	401	64	114.20	401	297
111.70	401	72	114.25	401	301
111.75	401	80	114.30	401	305
111.80	401	88	114.35	401	309
111.85	401	96	114.40	401	313
111.90	401	104	114.45	401	317
111.95	401	112	114.50	401	321
112.00	401	120	114.55	417	341
112.05	401	128	114.60	433	363
112.10	401	136	114.65	450	385
112.15	401	144	114.70	467	408
112.20	401	152	114.75	484	431
112.25	401	160	114.80	502	456
112.30	401	160	114.85	520	481
112.35	401	160	114.90	538	508
112.40	401	160	114.95	556	535
112.45	401	160	115.00	575	564
112.50	401	160	115.05	594	593
112.55	401	164	115.10	614	623
112.60	401	168	115.15	633	654
112.65	401	172	115.20	653	686
112.70	401	176	115.25	674	719
112.75	401	180	115.30	694	754
112.80	401	184	115.35	715	789
112.85	401	188	115.40	737	825
112.90	401	192	115.45	758	863
112.95	401	196	115.50	780	901
113.00	401	201	115.55	803	941
113.05	401	205	115.60	825	981
113.10	401	209	115.65	848	1,023
113.15	401	213	115.70	871	1,066
113.20	401	217	115.75	895	1,110
113.25	401	221	115.80	919	1,156
113.30	401	225	115.85	943	1,202
113.35	401	229	115.90	967	1,250
113.40	401	233	115.95	992	1,299
113.45	401	237	116.00	1,017	1,349
113.50	401	241			
113.55	401	245			
113.60	401	249			
113.65	401	253			
113.70	401	257			
113.75	401	261			

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 37

Summary for Pond 3P: Bioretention Basin 3

Inflow Area = 0.250 ac, 64.80% Impervious, Inflow Depth > 2.32" for 2-YEAR event
 Inflow = 0.70 cfs @ 12.13 hrs, Volume= 0.048 af
 Outflow = 0.36 cfs @ 12.21 hrs, Volume= 0.029 af, Atten= 48%, Lag= 4.9 min
 Primary = 0.36 cfs @ 12.21 hrs, Volume= 0.029 af
 Routed to Reach R4 : Flow towards the south

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
 Peak Elev= 115.83' @ 12.21 hrs Surf.Area= 860 sf Storage= 902 cf

Plug-Flow detention time= 250.4 min calculated for 0.029 af (60% of inflow)
 Center-of-Mass det. time= 113.6 min (928.2 - 814.5)

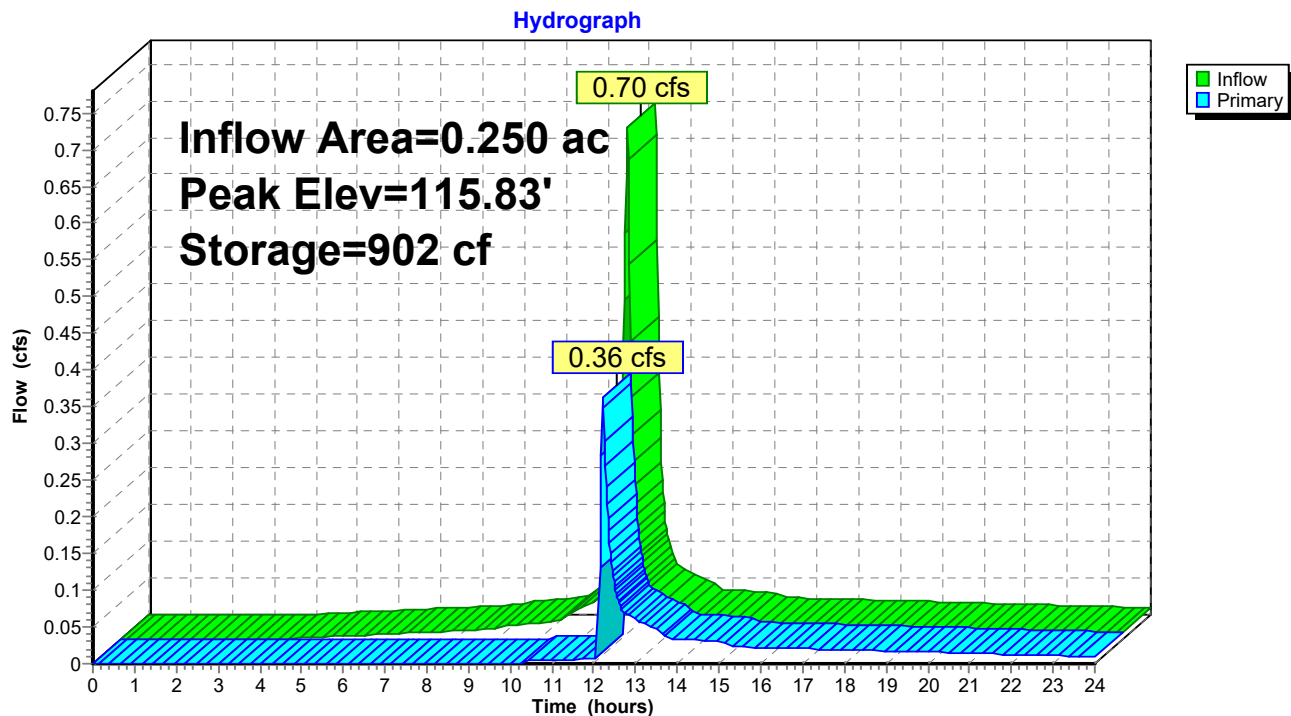
Volume	Invert	Avail.Storage	Storage Description			
#1	112.25'	1,056 cf	Bioretention Basin (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
112.25	495	86.4	0.0	0	0	495
113.25	495	86.4	40.0	198	198	581
113.50	495	86.4	0.0	0	198	603
115.00	495	86.4	20.0	149	347	733
116.00	948	114.7	100.0	709	1,056	1,197

Device	Routing	Invert	Outlet Devices
#1	Primary	113.81'	10.0" Round Outlet Pipe L= 72.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 113.81' / 113.52' S= 0.0040 '/' Cc= 0.900 n= 0.011, Flow Area= 0.55 sf
#2	Device 1	113.81'	4.0" Vert. Underdrain C= 0.600 Limited to weir flow at low heads
#3	Device 1	115.75'	18.0" Horiz. Beehive Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	112.25'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Primary OutFlow Max=0.35 cfs @ 12.21 hrs HW=115.83' (Free Discharge)

1=Outlet Pipe (Passes 0.35 cfs of 2.82 cfs potential flow)
 2=Underdrain (Passes 0.01 cfs of 0.57 cfs potential flow)
 4=Exfiltration (Exfiltration Controls 0.01 cfs)
 3=Beehive Grate (Weir Controls 0.34 cfs @ 0.92 fps)

Pond 3P: Bioretention Basin 3



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 39

Stage-Discharge for Pond 3P: Bioretention Basin 3

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
112.25	0.00	113.27	0.00	114.29	0.01	115.31	0.01
112.27	0.00	113.29	0.00	114.31	0.01	115.33	0.01
112.29	0.00	113.31	0.00	114.33	0.01	115.35	0.01
112.31	0.00	113.33	0.00	114.35	0.01	115.37	0.01
112.33	0.00	113.35	0.00	114.37	0.01	115.39	0.01
112.35	0.00	113.37	0.00	114.39	0.01	115.41	0.01
112.37	0.00	113.39	0.00	114.41	0.01	115.43	0.01
112.39	0.00	113.41	0.00	114.43	0.01	115.45	0.01
112.41	0.00	113.43	0.00	114.45	0.01	115.47	0.01
112.43	0.00	113.45	0.00	114.47	0.01	115.49	0.01
112.45	0.00	113.47	0.00	114.49	0.01	115.51	0.01
112.47	0.00	113.49	0.00	114.51	0.01	115.53	0.01
112.49	0.00	113.51	0.00	114.53	0.01	115.55	0.01
112.51	0.00	113.53	0.00	114.55	0.01	115.57	0.01
112.53	0.00	113.55	0.00	114.57	0.01	115.59	0.01
112.55	0.00	113.57	0.00	114.59	0.01	115.61	0.01
112.57	0.00	113.59	0.00	114.61	0.01	115.63	0.01
112.59	0.00	113.61	0.00	114.63	0.01	115.65	0.01
112.61	0.00	113.63	0.00	114.65	0.01	115.67	0.01
112.63	0.00	113.65	0.00	114.67	0.01	115.69	0.01
112.65	0.00	113.67	0.00	114.69	0.01	115.71	0.01
112.67	0.00	113.69	0.00	114.71	0.01	115.73	0.01
112.69	0.00	113.71	0.00	114.73	0.01	115.75	0.01
112.71	0.00	113.73	0.00	114.75	0.01	115.77	0.05
112.73	0.00	113.75	0.00	114.77	0.01	115.79	0.13
112.75	0.00	113.77	0.00	114.79	0.01	115.81	0.24
112.77	0.00	113.79	0.00	114.81	0.01	115.83	0.36
112.79	0.00	113.81	0.00	114.83	0.01	115.85	0.50
112.81	0.00	113.83	0.00	114.85	0.01	115.87	0.65
112.83	0.00	113.85	0.00	114.87	0.01	115.89	0.82
112.85	0.00	113.87	0.01	114.89	0.01	115.91	1.00
112.87	0.00	113.89	0.01	114.91	0.01	115.93	1.19
112.89	0.00	113.91	0.01	114.93	0.01	115.95	1.39
112.91	0.00	113.93	0.01	114.95	0.01	115.97	1.60
112.93	0.00	113.95	0.01	114.97	0.01	115.99	1.82
112.95	0.00	113.97	0.01	114.99	0.01		
112.97	0.00	113.99	0.01	115.01	0.01		
112.99	0.00	114.01	0.01	115.03	0.01		
113.01	0.00	114.03	0.01	115.05	0.01		
113.03	0.00	114.05	0.01	115.07	0.01		
113.05	0.00	114.07	0.01	115.09	0.01		
113.07	0.00	114.09	0.01	115.11	0.01		
113.09	0.00	114.11	0.01	115.13	0.01		
113.11	0.00	114.13	0.01	115.15	0.01		
113.13	0.00	114.15	0.01	115.17	0.01		
113.15	0.00	114.17	0.01	115.19	0.01		
113.17	0.00	114.19	0.01	115.21	0.01		
113.19	0.00	114.21	0.01	115.23	0.01		
113.21	0.00	114.23	0.01	115.25	0.01		
113.23	0.00	114.25	0.01	115.27	0.01		
113.25	0.00	114.27	0.01	115.29	0.01		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 40

Stage-Area-Storage for Pond 3P: Bioretention Basin 3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
112.25	495	0	114.80	495	327
112.30	495	10	114.85	495	332
112.35	495	20	114.90	495	337
112.40	495	30	114.95	495	342
112.45	495	40	115.00	495	347
112.50	495	50	115.05	514	372
112.55	495	59	115.10	534	398
112.60	495	69	115.15	554	425
112.65	495	79	115.20	574	453
112.70	495	89	115.25	595	483
112.75	495	99	115.30	616	513
112.80	495	109	115.35	637	544
112.85	495	119	115.40	659	576
112.90	495	129	115.45	681	610
112.95	495	139	115.50	703	645
113.00	495	149	115.55	726	680
113.05	495	158	115.60	749	717
113.10	495	168	115.65	773	755
113.15	495	178	115.70	797	794
113.20	495	188	115.75	821	835
113.25	495	198	115.80	846	877
113.30	495	198	115.85	871	919
113.35	495	198	115.90	896	964
113.40	495	198	115.95	922	1,009
113.45	495	198	116.00	948	1,056
113.50	495	198			
113.55	495	203			
113.60	495	208			
113.65	495	213			
113.70	495	218			
113.75	495	223			
113.80	495	228			
113.85	495	233			
113.90	495	238			
113.95	495	243			
114.00	495	248			
114.05	495	252			
114.10	495	257			
114.15	495	262			
114.20	495	267			
114.25	495	272			
114.30	495	277			
114.35	495	282			
114.40	495	287			
114.45	495	292			
114.50	495	297			
114.55	495	302			
114.60	495	307			
114.65	495	312			
114.70	495	317			
114.75	495	322			

Summary for Pond 4P: Underground Detention Chamber

Inflow Area = 0.296 ac, 100.00% Impervious, Inflow Depth > 2.93" for 2-YEAR event
 Inflow = 0.94 cfs @ 12.13 hrs, Volume= 0.072 af
 Outflow = 0.78 cfs @ 12.17 hrs, Volume= 0.069 af, Atten= 17%, Lag= 2.3 min
 Primary = 0.78 cfs @ 12.17 hrs, Volume= 0.069 af
 Routed to Reach R4 : Flow towards the south

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 113.57' @ 12.17 hrs Surf.Area= 589 sf Storage= 379 cf

Plug-Flow detention time= 61.4 min calculated for 0.069 af (95% of inflow)
 Center-of-Mass det. time= 33.0 min (793.3 - 760.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	112.50'	595 cf	11.00'W x 53.58'L x 3.75'H Field A 2,210 cf Overall - 722 cf Embedded = 1,488 cf x 40.0% Voids
#2A	113.00'	722 cf	ADS_StormTech SC-800 +Cap x 14 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 14 Chambers in 2 Rows Cap Storage= 3.4 cf x 2 x 2 rows = 13.7 cf
		1,317 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	113.00'	8.0" Round Outlet Pipe L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 113.00' / 112.75' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf

Primary OutFlow Max=0.78 cfs @ 12.17 hrs HW=113.57' (Free Discharge)
 ↑ **1=Outlet Pipe** (Barrel Controls 0.78 cfs @ 3.31 fps)

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 42

Pond 4P: Underground Detention Chamber - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-800 +Cap (ADS StormTech®SC-800 with cap volume)

Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf

Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap

Cap Storage= 3.4 cf x 2 x 2 rows = 13.7 cf

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

7 Chambers/Row x 7.12' Long +0.88' Cap Length x 2 = 51.58' Row Length +12.0" End Stone x 2 = 53.58' Base Length

2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width

6.0" Stone Base + 33.0" Chamber Height + 6.0" Stone Cover = 3.75' Field Height

14 Chambers x 50.6 cf + 3.4 cf Cap Volume x 2 x 2 Rows = 722.0 cf Chamber Storage

2,210.3 cf Field - 722.0 cf Chambers = 1,488.3 cf Stone x 40.0% Voids = 595.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,317.3 cf = 0.030 af

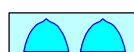
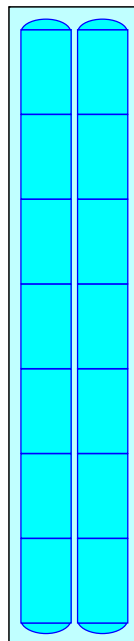
Overall Storage Efficiency = 59.6%

Overall System Size = 53.58' x 11.00' x 3.75'

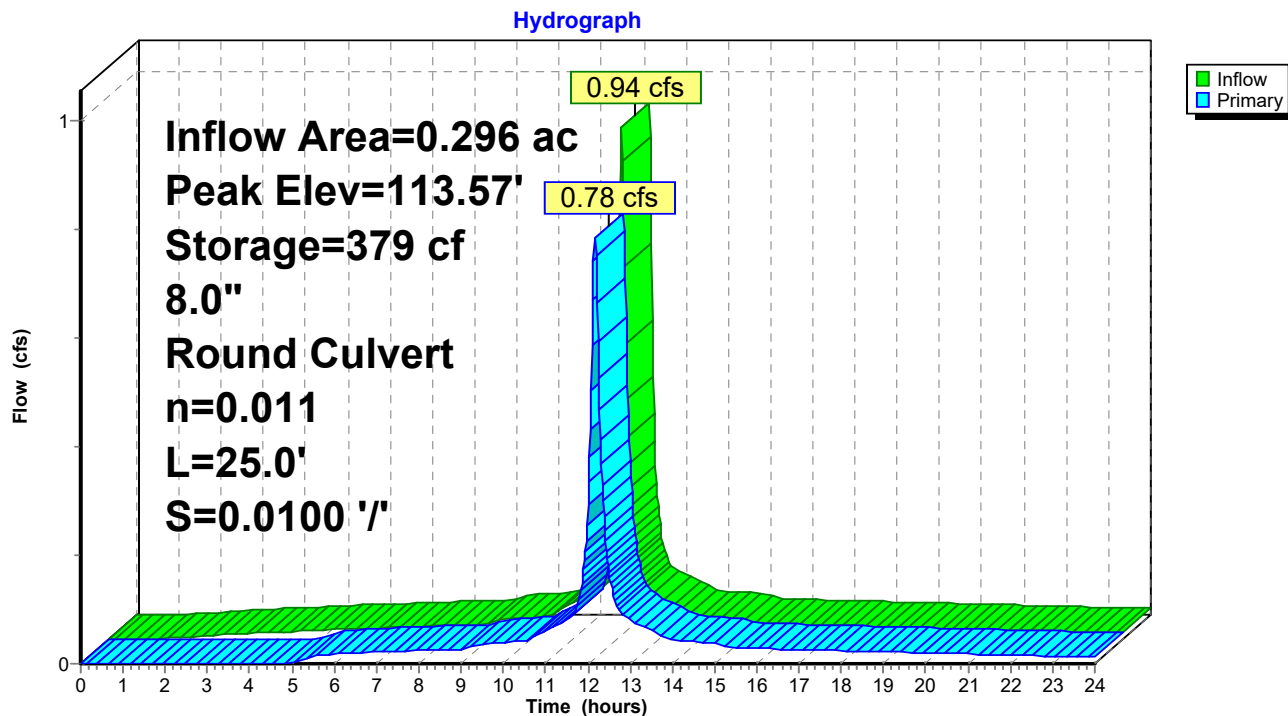
14 Chambers

81.9 cy Field

55.1 cy Stone



Pond 4P: Underground Detention Chamber



Stage-Discharge for Pond 4P: Underground Detention Chamber

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
112.50	0.00	113.52	0.68	114.54	1.85	115.56	2.51
112.52	0.00	113.54	0.72	114.56	1.86	115.58	2.52
112.54	0.00	113.56	0.76	114.58	1.88	115.60	2.53
112.56	0.00	113.58	0.80	114.60	1.89	115.62	2.54
112.58	0.00	113.60	0.84	114.62	1.91	115.64	2.55
112.60	0.00	113.62	0.88	114.64	1.92	115.66	2.56
112.62	0.00	113.64	0.92	114.66	1.94	115.68	2.57
112.64	0.00	113.66	0.96	114.68	1.95	115.70	2.59
112.66	0.00	113.68	0.99	114.70	1.96	115.72	2.60
112.68	0.00	113.70	1.02	114.72	1.98	115.74	2.61
112.70	0.00	113.72	1.05	114.74	1.99	115.76	2.62
112.72	0.00	113.74	1.07	114.76	2.01	115.78	2.63
112.74	0.00	113.76	1.10	114.78	2.02	115.80	2.64
112.76	0.00	113.78	1.12	114.80	2.04	115.82	2.65
112.78	0.00	113.80	1.15	114.82	2.05	115.84	2.66
112.80	0.00	113.82	1.17	114.84	2.06	115.86	2.67
112.82	0.00	113.84	1.20	114.86	2.08	115.88	2.68
112.84	0.00	113.86	1.22	114.88	2.09	115.90	2.69
112.86	0.00	113.88	1.24	114.90	2.10	115.92	2.70
112.88	0.00	113.90	1.24	114.92	2.12	115.94	2.71
112.90	0.00	113.92	1.27	114.94	2.13	115.96	2.72
112.92	0.00	113.94	1.29	114.96	2.14	115.98	2.73
112.94	0.00	113.96	1.32	114.98	2.16	116.00	2.74
112.96	0.00	113.98	1.34	115.00	2.17	116.02	2.75
112.98	0.00	114.00	1.36	115.02	2.18	116.04	2.77
113.00	0.00	114.02	1.39	115.04	2.20	116.06	2.78
113.02	0.00	114.04	1.41	115.06	2.21	116.08	2.79
113.04	0.01	114.06	1.43	115.08	2.22	116.10	2.80
113.06	0.01	114.08	1.45	115.10	2.23	116.12	2.81
113.08	0.02	114.10	1.47	115.12	2.25	116.14	2.82
113.10	0.04	114.12	1.49	115.14	2.26	116.16	2.83
113.12	0.05	114.14	1.51	115.16	2.27	116.18	2.84
113.14	0.07	114.16	1.53	115.18	2.28	116.20	2.85
113.16	0.09	114.18	1.55	115.20	2.30	116.22	2.86
113.18	0.11	114.20	1.56	115.22	2.31	116.24	2.87
113.20	0.13	114.22	1.58	115.24	2.32		
113.22	0.16	114.24	1.60	115.26	2.33		
113.24	0.19	114.26	1.62	115.28	2.35		
113.26	0.22	114.28	1.64	115.30	2.36		
113.28	0.25	114.30	1.65	115.32	2.37		
113.30	0.28	114.32	1.67	115.34	2.38		
113.32	0.31	114.34	1.69	115.36	2.39		
113.34	0.34	114.36	1.70	115.38	2.40		
113.36	0.38	114.38	1.72	115.40	2.42		
113.38	0.42	114.40	1.74	115.42	2.43		
113.40	0.45	114.42	1.75	115.44	2.44		
113.42	0.49	114.44	1.77	115.46	2.45		
113.44	0.53	114.46	1.78	115.48	2.46		
113.46	0.57	114.48	1.80	115.50	2.47		
113.48	0.61	114.50	1.82	115.52	2.49		
113.50	0.64	114.52	1.83	115.54	2.50		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 45

Stage-Area-Storage for Pond 4P: Underground Detention Chamber

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
112.50	0	115.05	989
112.55	12	115.10	1,007
112.60	24	115.15	1,024
112.65	35	115.20	1,042
112.70	47	115.25	1,058
112.75	59	115.30	1,075
112.80	71	115.35	1,091
112.85	83	115.40	1,106
112.90	94	115.45	1,121
112.95	106	115.50	1,136
113.00	118	115.55	1,149
113.05	141	115.60	1,162
113.10	164	115.65	1,175
113.15	187	115.70	1,187
113.20	210	115.75	1,199
113.25	233	115.80	1,211
113.30	256	115.85	1,223
113.35	279	115.90	1,235
113.40	302	115.95	1,247
113.45	324	116.00	1,258
113.50	347	116.05	1,270
113.55	370	116.10	1,282
113.60	392	116.15	1,294
113.65	414	116.20	1,306
113.70	437	116.25	1,317
113.75	459		
113.80	481		
113.85	503		
113.90	525		
113.95	546		
114.00	568		
114.05	590		
114.10	611		
114.15	632		
114.20	654		
114.25	675		
114.30	696		
114.35	716		
114.40	737		
114.45	757		
114.50	778		
114.55	798		
114.60	818		
114.65	838		
114.70	857		
114.75	877		
114.80	896		
114.85	915		
114.90	934		
114.95	953		
115.00	971		

Summary for Pond 5P: Underground Detention Chamber

Inflow Area = 0.330 ac, 100.00% Impervious, Inflow Depth > 2.93" for 2-YEAR event
 Inflow = 1.05 cfs @ 12.13 hrs, Volume= 0.081 af
 Outflow = 0.88 cfs @ 12.17 hrs, Volume= 0.077 af, Atten= 17%, Lag= 2.3 min
 Primary = 0.88 cfs @ 12.17 hrs, Volume= 0.077 af
 Routed to Reach R4 : Flow towards the south

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 113.62' @ 12.17 hrs Surf.Area= 589 sf Storage= 400 cf

Plug-Flow detention time= 56.4 min calculated for 0.077 af (96% of inflow)
 Center-of-Mass det. time= 30.5 min (790.7 - 760.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	112.50'	595 cf	11.00'W x 53.58'L x 3.75'H Field A 2,210 cf Overall - 722 cf Embedded = 1,488 cf x 40.0% Voids
#2A	113.00'	722 cf	ADS_StormTech SC-800 +Cap x 14 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 14 Chambers in 2 Rows Cap Storage= 3.4 cf x 2 x 2 rows = 13.7 cf
		1,317 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	113.00'	8.0" Round Outlet Pipe L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 113.00' / 112.75' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf

Primary OutFlow Max=0.87 cfs @ 12.17 hrs HW=113.61' (Free Discharge)
 ↑ **1=Outlet Pipe** (Barrel Controls 0.87 cfs @ 3.38 fps)

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 47

Pond 5P: Underground Detention Chamber - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-800 +Cap (ADS StormTech®SC-800 with cap volume)

Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf

Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap

Cap Storage= 3.4 cf x 2 x 2 rows = 13.7 cf

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

7 Chambers/Row x 7.12' Long +0.88' Cap Length x 2 = 51.58' Row Length +12.0" End Stone x 2 = 53.58' Base Length

2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width

6.0" Stone Base + 33.0" Chamber Height + 6.0" Stone Cover = 3.75' Field Height

14 Chambers x 50.6 cf + 3.4 cf Cap Volume x 2 x 2 Rows = 722.0 cf Chamber Storage

2,210.3 cf Field - 722.0 cf Chambers = 1,488.3 cf Stone x 40.0% Voids = 595.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,317.3 cf = 0.030 af

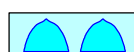
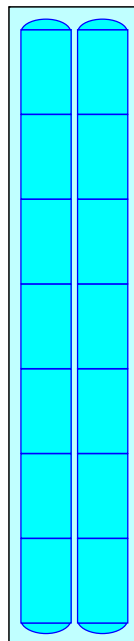
Overall Storage Efficiency = 59.6%

Overall System Size = 53.58' x 11.00' x 3.75'

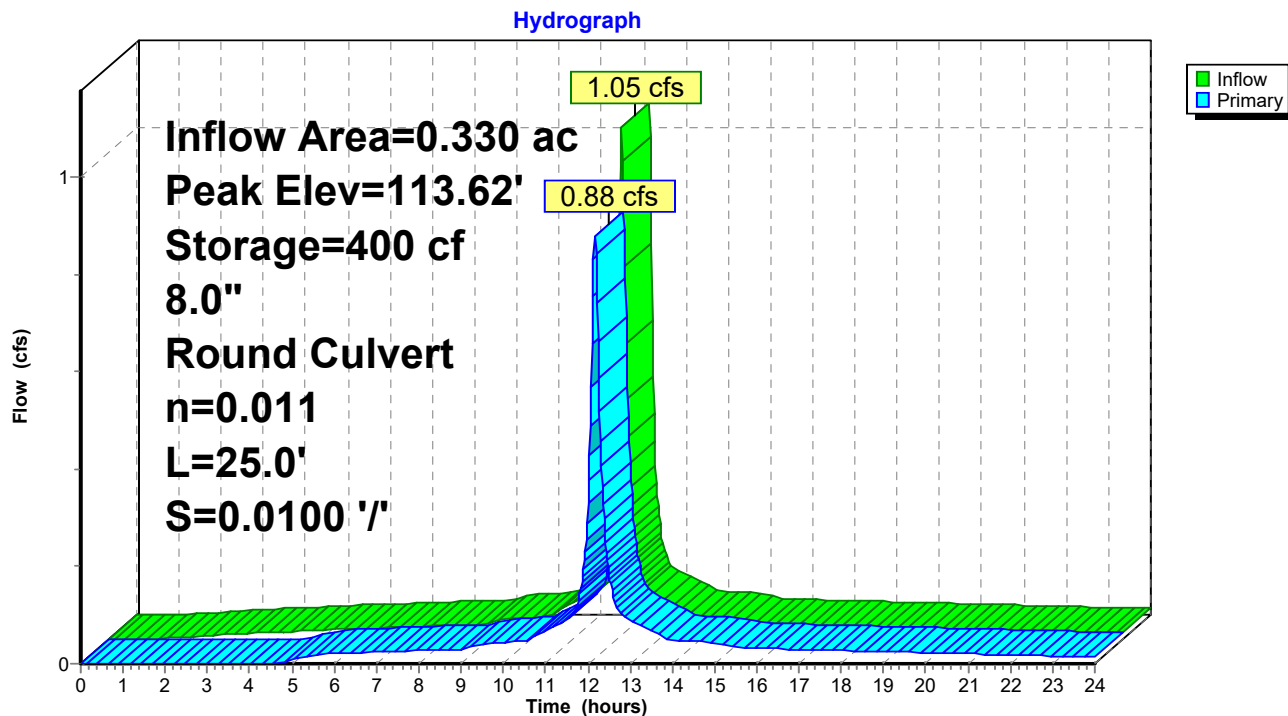
14 Chambers

81.9 cy Field

55.1 cy Stone



Pond 5P: Underground Detention Chamber



Stage-Discharge for Pond 5P: Underground Detention Chamber

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
112.50	0.00	113.52	0.68	114.54	1.85	115.56	2.51
112.52	0.00	113.54	0.72	114.56	1.86	115.58	2.52
112.54	0.00	113.56	0.76	114.58	1.88	115.60	2.53
112.56	0.00	113.58	0.80	114.60	1.89	115.62	2.54
112.58	0.00	113.60	0.84	114.62	1.91	115.64	2.55
112.60	0.00	113.62	0.88	114.64	1.92	115.66	2.56
112.62	0.00	113.64	0.92	114.66	1.94	115.68	2.57
112.64	0.00	113.66	0.96	114.68	1.95	115.70	2.59
112.66	0.00	113.68	0.99	114.70	1.96	115.72	2.60
112.68	0.00	113.70	1.02	114.72	1.98	115.74	2.61
112.70	0.00	113.72	1.05	114.74	1.99	115.76	2.62
112.72	0.00	113.74	1.07	114.76	2.01	115.78	2.63
112.74	0.00	113.76	1.10	114.78	2.02	115.80	2.64
112.76	0.00	113.78	1.12	114.80	2.04	115.82	2.65
112.78	0.00	113.80	1.15	114.82	2.05	115.84	2.66
112.80	0.00	113.82	1.17	114.84	2.06	115.86	2.67
112.82	0.00	113.84	1.20	114.86	2.08	115.88	2.68
112.84	0.00	113.86	1.22	114.88	2.09	115.90	2.69
112.86	0.00	113.88	1.24	114.90	2.10	115.92	2.70
112.88	0.00	113.90	1.24	114.92	2.12	115.94	2.71
112.90	0.00	113.92	1.27	114.94	2.13	115.96	2.72
112.92	0.00	113.94	1.29	114.96	2.14	115.98	2.73
112.94	0.00	113.96	1.32	114.98	2.16	116.00	2.74
112.96	0.00	113.98	1.34	115.00	2.17	116.02	2.75
112.98	0.00	114.00	1.36	115.02	2.18	116.04	2.77
113.00	0.00	114.02	1.39	115.04	2.20	116.06	2.78
113.02	0.00	114.04	1.41	115.06	2.21	116.08	2.79
113.04	0.01	114.06	1.43	115.08	2.22	116.10	2.80
113.06	0.01	114.08	1.45	115.10	2.23	116.12	2.81
113.08	0.02	114.10	1.47	115.12	2.25	116.14	2.82
113.10	0.04	114.12	1.49	115.14	2.26	116.16	2.83
113.12	0.05	114.14	1.51	115.16	2.27	116.18	2.84
113.14	0.07	114.16	1.53	115.18	2.28	116.20	2.85
113.16	0.09	114.18	1.55	115.20	2.30	116.22	2.86
113.18	0.11	114.20	1.56	115.22	2.31	116.24	2.87
113.20	0.13	114.22	1.58	115.24	2.32		
113.22	0.16	114.24	1.60	115.26	2.33		
113.24	0.19	114.26	1.62	115.28	2.35		
113.26	0.22	114.28	1.64	115.30	2.36		
113.28	0.25	114.30	1.65	115.32	2.37		
113.30	0.28	114.32	1.67	115.34	2.38		
113.32	0.31	114.34	1.69	115.36	2.39		
113.34	0.34	114.36	1.70	115.38	2.40		
113.36	0.38	114.38	1.72	115.40	2.42		
113.38	0.42	114.40	1.74	115.42	2.43		
113.40	0.45	114.42	1.75	115.44	2.44		
113.42	0.49	114.44	1.77	115.46	2.45		
113.44	0.53	114.46	1.78	115.48	2.46		
113.46	0.57	114.48	1.80	115.50	2.47		
113.48	0.61	114.50	1.82	115.52	2.49		
113.50	0.64	114.52	1.83	115.54	2.50		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 2-YEAR Rainfall=3.17"

Printed 11/12/2025

Page 50

Stage-Area-Storage for Pond 5P: Underground Detention Chamber

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
112.50	0	115.05	989
112.55	12	115.10	1,007
112.60	24	115.15	1,024
112.65	35	115.20	1,042
112.70	47	115.25	1,058
112.75	59	115.30	1,075
112.80	71	115.35	1,091
112.85	83	115.40	1,106
112.90	94	115.45	1,121
112.95	106	115.50	1,136
113.00	118	115.55	1,149
113.05	141	115.60	1,162
113.10	164	115.65	1,175
113.15	187	115.70	1,187
113.20	210	115.75	1,199
113.25	233	115.80	1,211
113.30	256	115.85	1,223
113.35	279	115.90	1,235
113.40	302	115.95	1,247
113.45	324	116.00	1,258
113.50	347	116.05	1,270
113.55	370	116.10	1,282
113.60	392	116.15	1,294
113.65	414	116.20	1,306
113.70	437	116.25	1,317
113.75	459		
113.80	481		
113.85	503		
113.90	525		
113.95	546		
114.00	568		
114.05	590		
114.10	611		
114.15	632		
114.20	654		
114.25	675		
114.30	696		
114.35	716		
114.40	737		
114.45	757		
114.50	778		
114.55	798		
114.60	818		
114.65	838		
114.70	857		
114.75	877		
114.80	896		
114.85	915		
114.90	934		
114.95	953		
115.00	971		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 51

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1-1:	Runoff Area=0.308 ac 0.00% Impervious Runoff Depth>2.94" Flow Length=80' Slope=0.0180 '/' Tc=8.6 min CN=80 Runoff=1.01 cfs 0.075 af
SubcatchmentP1-2:	Runoff Area=0.717 ac 79.22% Impervious Runoff Depth>4.36" Tc=6.0 min CN=94 Runoff=3.54 cfs 0.261 af
SubcatchmentP1-3:	Runoff Area=0.232 ac 68.97% Impervious Runoff Depth>4.14" Tc=6.0 min CN=92 Runoff=1.11 cfs 0.080 af
SubcatchmentP1-4:	Runoff Area=0.824 ac 72.82% Impervious Runoff Depth>4.25" Tc=6.0 min CN=93 Runoff=4.01 cfs 0.292 af
SubcatchmentP2-1:	Runoff Area=0.197 ac 10.15% Impervious Runoff Depth>3.03" Tc=6.0 min CN=81 Runoff=0.74 cfs 0.050 af
SubcatchmentP2-2:	Runoff Area=0.353 ac 100.00% Impervious Runoff Depth>4.82" Tc=6.0 min CN=98 Runoff=1.81 cfs 0.142 af
SubcatchmentP3-1:	Runoff Area=0.337 ac 6.82% Impervious Runoff Depth>3.03" Flow Length=51' Slope=0.0180 '/' Tc=6.0 min CN=81 Runoff=1.27 cfs 0.085 af
SubcatchmentP3-2:	Runoff Area=0.633 ac 69.83% Impervious Runoff Depth>4.14" Tc=6.0 min CN=92 Runoff=3.03 cfs 0.219 af
SubcatchmentP3-3:	Runoff Area=0.727 ac 73.59% Impervious Runoff Depth>4.25" Tc=6.0 min CN=93 Runoff=3.54 cfs 0.258 af
SubcatchmentP4-1:	Runoff Area=0.582 ac 6.70% Impervious Runoff Depth>3.03" Tc=6.0 min CN=81 Runoff=2.19 cfs 0.147 af
SubcatchmentP4-2:	Runoff Area=0.250 ac 64.80% Impervious Runoff Depth>4.14" Tc=6.0 min CN=92 Runoff=1.20 cfs 0.086 af
SubcatchmentP4-3: Building "B" Roof	Runoff Area=0.296 ac 100.00% Impervious Runoff Depth>4.82" Tc=6.0 min CN=98 Runoff=1.51 cfs 0.119 af
SubcatchmentP4-4: Building "A" Roof	Runoff Area=0.330 ac 100.00% Impervious Runoff Depth>4.82" Tc=6.0 min CN=98 Runoff=1.69 cfs 0.132 af
SubcatchmentP5: Flow towards the	Runoff Area=0.222 ac 0.00% Impervious Runoff Depth>2.85" Tc=6.0 min CN=79 Runoff=0.79 cfs 0.053 af
SubcatchmentP6: Flow to Blue Hills Ave	Runoff Area=0.083 ac 51.81% Impervious Runoff Depth>3.82" Tc=6.0 min CN=89 Runoff=0.38 cfs 0.026 af
Reach R1: Flow towards the west	Inflow=9.47 cfs 0.689 af Outflow=9.47 cfs 0.689 af

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 52

Reach R2: Flow towards the north

Inflow=2.54 cfs 0.192 af

Outflow=2.54 cfs 0.192 af

Reach R3: Flow towards the northeast

Inflow=7.68 cfs 0.540 af

Outflow=7.68 cfs 0.540 af

Reach R4: Flow towards the south

Inflow=5.67 cfs 0.459 af

Outflow=5.67 cfs 0.459 af

Reach TS: Total Site

Inflow=26.49 cfs 1.959 af

Outflow=26.49 cfs 1.959 af

Pond 1P: Bioretention Basin 1

Peak Elev=115.36' Storage=1,013 cf Inflow=1.11 cfs 0.080 af

Outflow=1.02 cfs 0.061 af

Pond 2P: Bioretention Basin 2

Peak Elev=115.83' Storage=1,182 cf Inflow=3.03 cfs 0.219 af

Outflow=2.92 cfs 0.198 af

Pond 3P: Bioretention Basin 3

Peak Elev=115.92' Storage=985 cf Inflow=1.20 cfs 0.086 af

Outflow=1.13 cfs 0.067 af

Pond 4P: Underground Detention Chamber

Peak Elev=113.85' Storage=501 cf Inflow=1.51 cfs 0.119 af

8.0" Round Culvert n=0.011 L=25.0' S=0.0100 '/' Outflow=1.20 cfs 0.115 af

Pond 5P: Underground Detention Chamber

Peak Elev=113.95' Storage=547 cf Inflow=1.69 cfs 0.132 af

8.0" Round Culvert n=0.011 L=25.0' S=0.0100 '/' Outflow=1.30 cfs 0.129 af

Total Runoff Area = 6.091 ac Runoff Volume = 2.025 af Average Runoff Depth = 3.99"
41.37% Pervious = 2.520 ac 58.63% Impervious = 3.571 ac

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 53

Summary for Subcatchment P1-1:

Runoff = 1.01 cfs @ 12.16 hrs, Volume= 0.075 af, Depth> 2.94"
Routed to Reach R1 : Flow towards the west

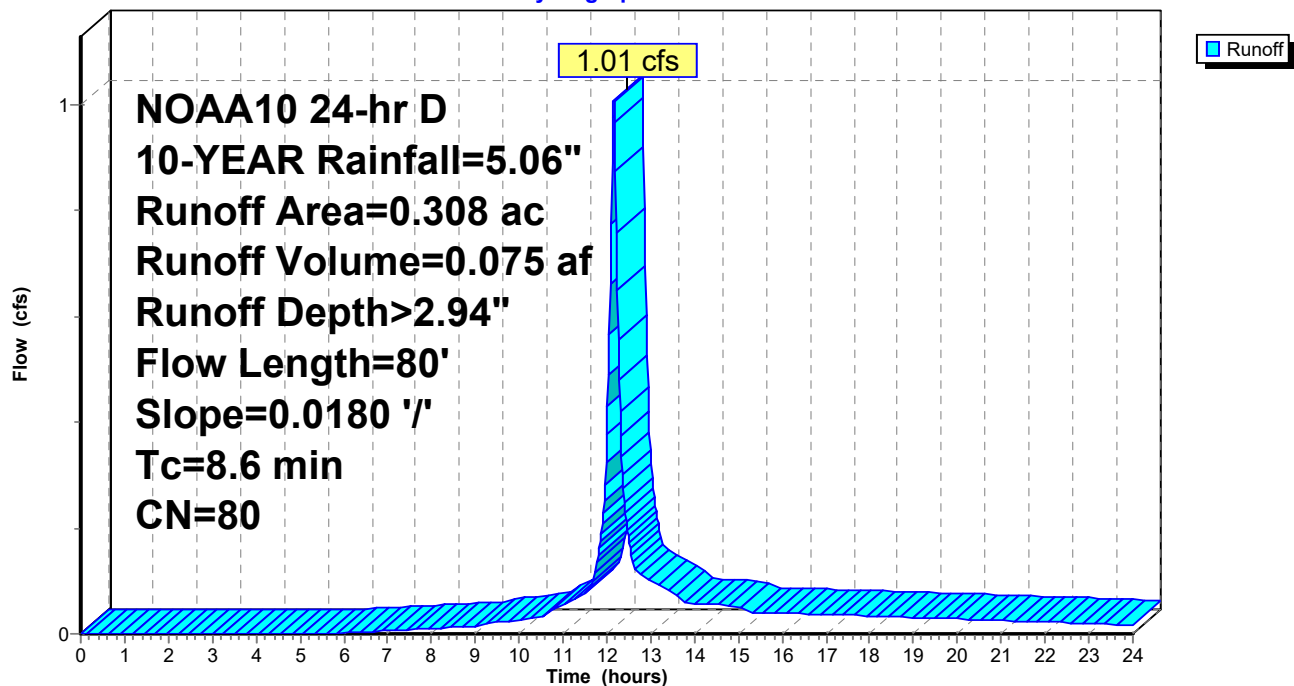
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.236	80	>75% Grass cover, Good, HSG D
0.072	79	Woods, Fair, HSG D
0.000	98	Paved parking, HSG D
0.308	80	Weighted Average
0.308		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	80	0.0180	0.16		Sheet Flow, Seg 1
					Grass: Short n= 0.150 P2= 3.17"

Subcatchment P1-1:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 54

Summary for Subcatchment P1-2:

Runoff = 3.54 cfs @ 12.13 hrs, Volume= 0.261 af, Depth> 4.36"
Routed to Reach R1 : Flow towards the west

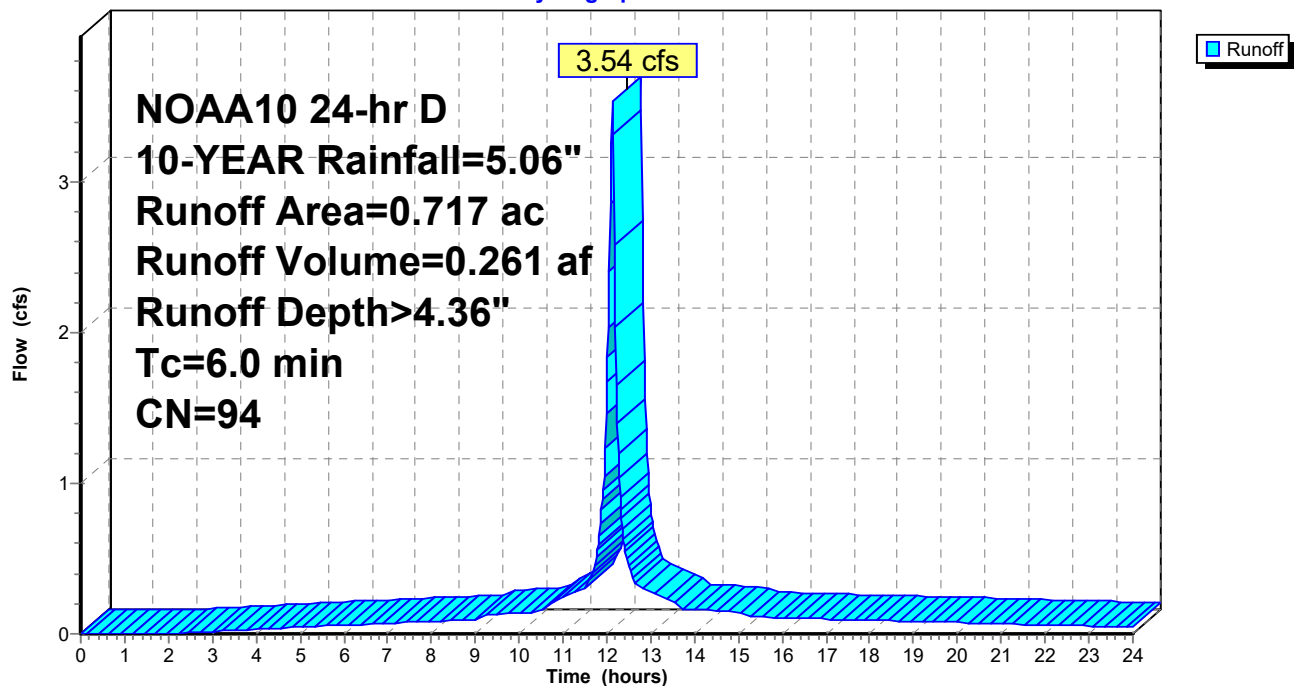
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.149	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.568	98	Paved parking, HSG D
0.717	94	Weighted Average
0.149		20.78% Pervious Area
0.568		79.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P1-2:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 55

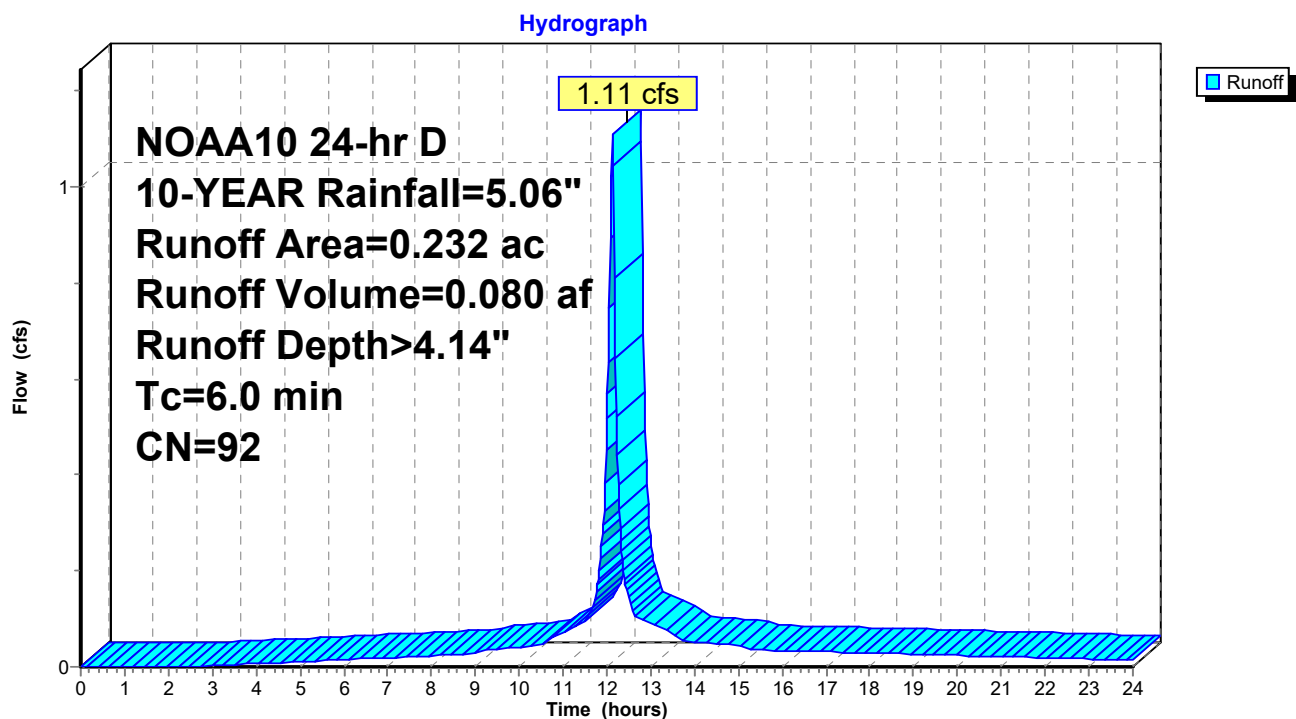
Summary for Subcatchment P1-3:

Runoff = 1.11 cfs @ 12.13 hrs, Volume= 0.080 af, Depth> 4.14"
Routed to Pond 1P : Bioretention Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.072	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.160	98	Paved parking, HSG D
0.232	92	Weighted Average
0.072		31.03% Pervious Area
0.160		68.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P1-3:

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 56

Summary for Subcatchment P1-4:

Runoff = 4.01 cfs @ 12.13 hrs, Volume= 0.292 af, Depth> 4.25"
Routed to Reach R1 : Flow towards the west

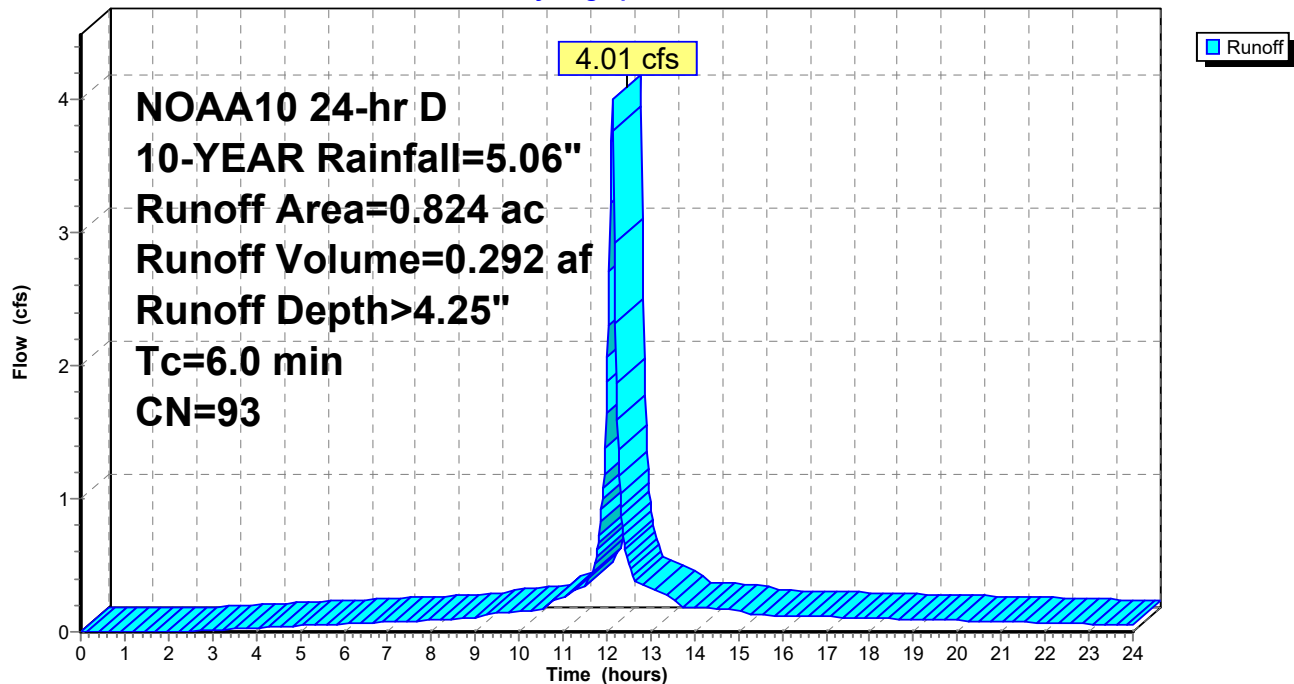
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.224	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.600	98	Paved parking, HSG D
0.824	93	Weighted Average
0.224		27.18% Pervious Area
0.600		72.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P1-4:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 57

Summary for Subcatchment P2-1:

Runoff = 0.74 cfs @ 12.13 hrs, Volume= 0.050 af, Depth> 3.03"
Routed to Reach R2 : Flow towards the north

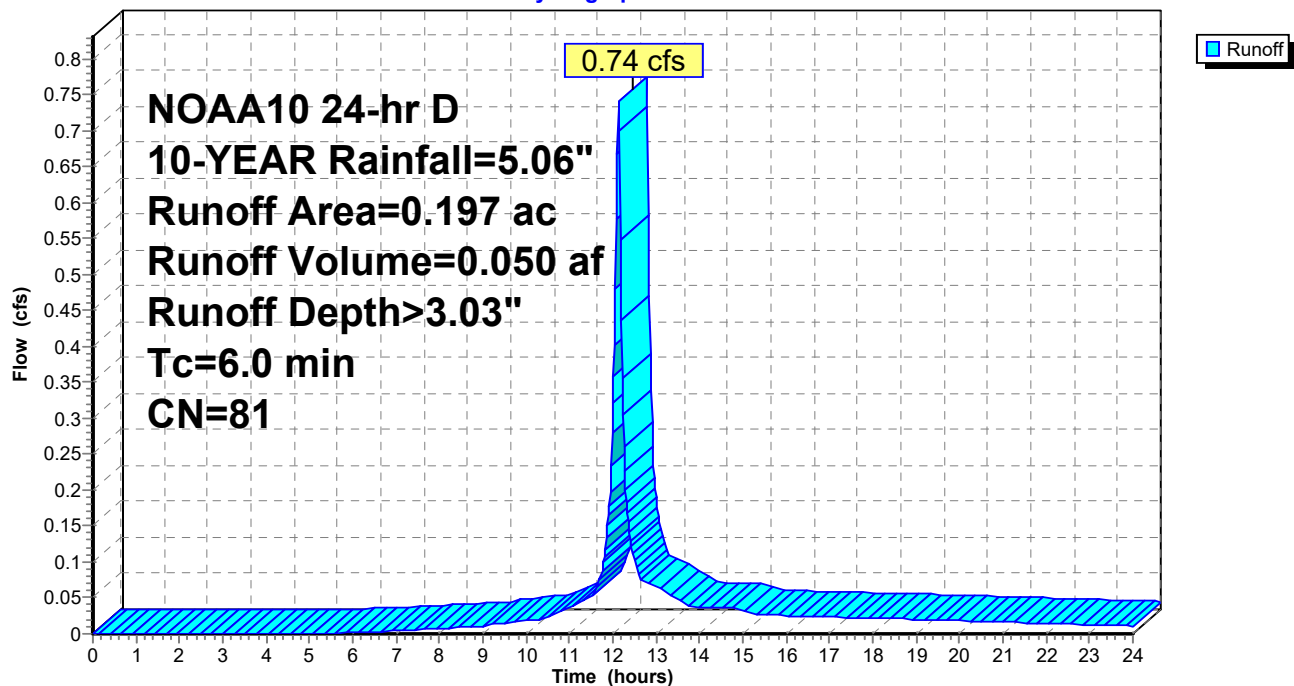
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.093	80	>75% Grass cover, Good, HSG D
0.084	79	Woods, Fair, HSG D
0.020	98	Paved parking, HSG D
0.197	81	Weighted Average
0.177		89.85% Pervious Area
0.020		10.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P2-1:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 58

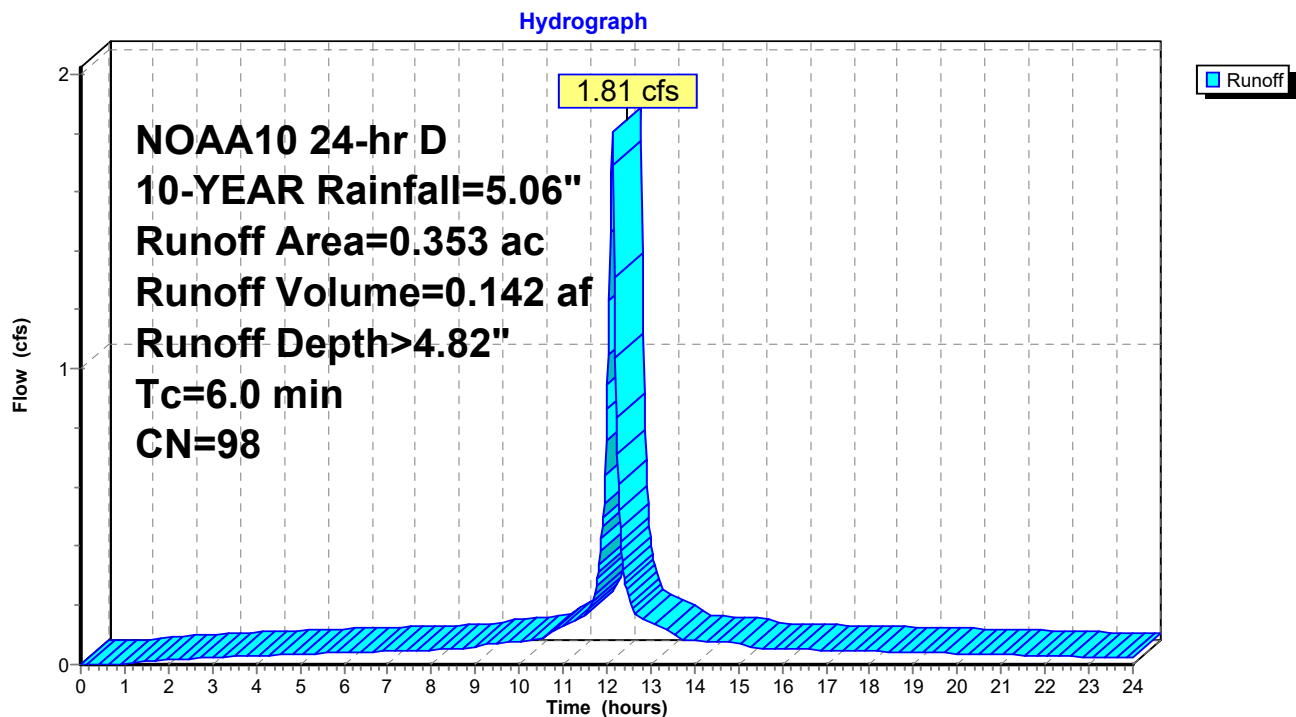
Summary for Subcatchment P2-2:

Runoff = 1.81 cfs @ 12.13 hrs, Volume= 0.142 af, Depth> 4.82"
Routed to Reach R2 : Flow towards the north

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.000	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.353	98	Paved parking, HSG D
0.353	98	Weighted Average
0.353		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P2-2:

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 59

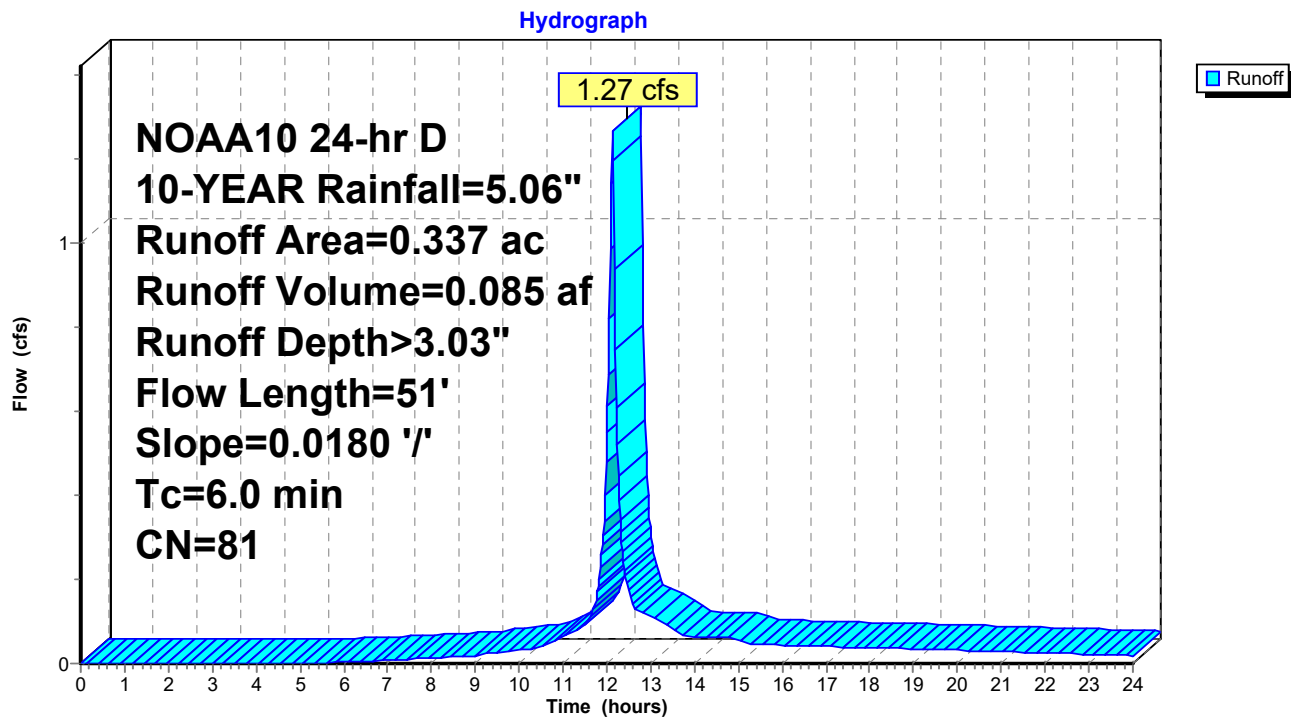
Summary for Subcatchment P3-1:

Runoff = 1.27 cfs @ 12.13 hrs, Volume= 0.085 af, Depth> 3.03"
Routed to Reach R3 : Flow towards the northeast

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.244	80	>75% Grass cover, Good, HSG D
0.070	79	Woods, Fair, HSG D
0.023	98	Paved parking, HSG D
0.337	81	Weighted Average
0.314		93.18% Pervious Area
0.023		6.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	51	0.0180	0.14		Sheet Flow, Seg 1 Grass: Short n= 0.150 P2= 3.17"

Subcatchment P3-1:

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 60

Summary for Subcatchment P3-2:

Runoff = 3.03 cfs @ 12.13 hrs, Volume= 0.219 af, Depth> 4.14"
Routed to Pond 2P : Bioretention Basin 2

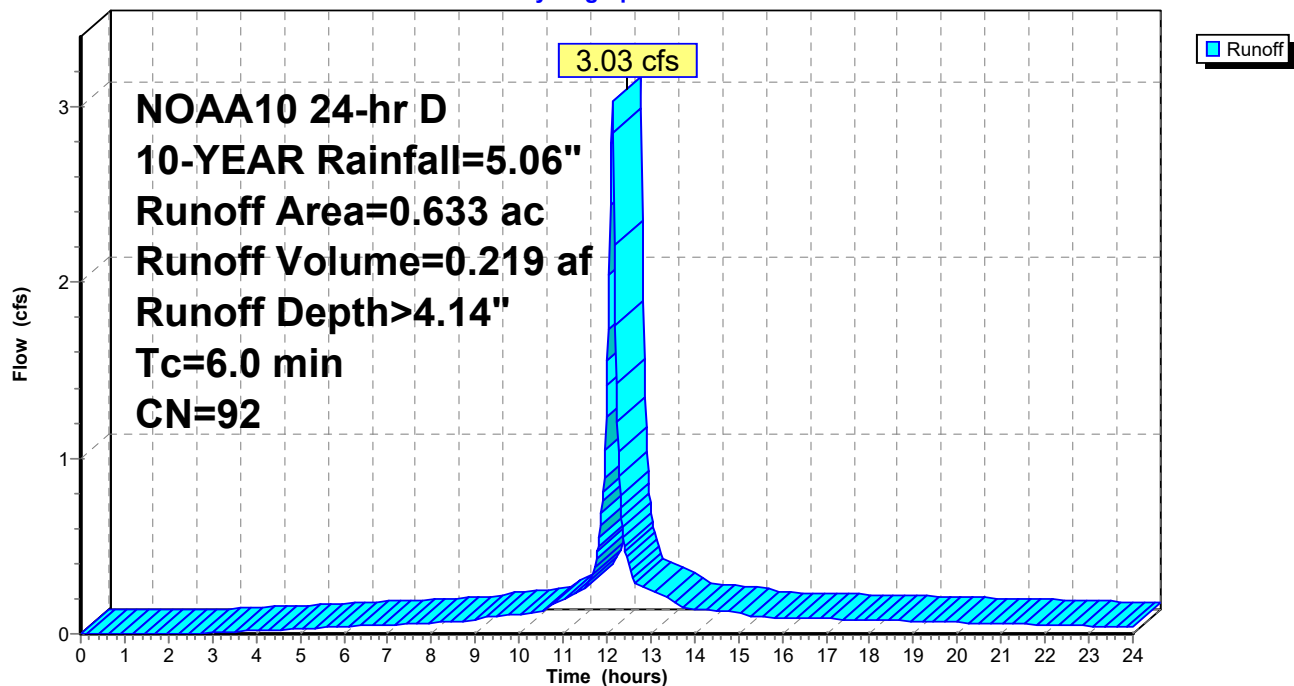
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.147	80	>75% Grass cover, Good, HSG D
0.044	79	Woods, Fair, HSG D
0.442	98	Paved parking, HSG D
0.633	92	Weighted Average
0.191		30.17% Pervious Area
0.442		69.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P3-2:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 61

Summary for Subcatchment P3-3:

Runoff = 3.54 cfs @ 12.13 hrs, Volume= 0.258 af, Depth> 4.25"
Routed to Reach R3 : Flow towards the northeast

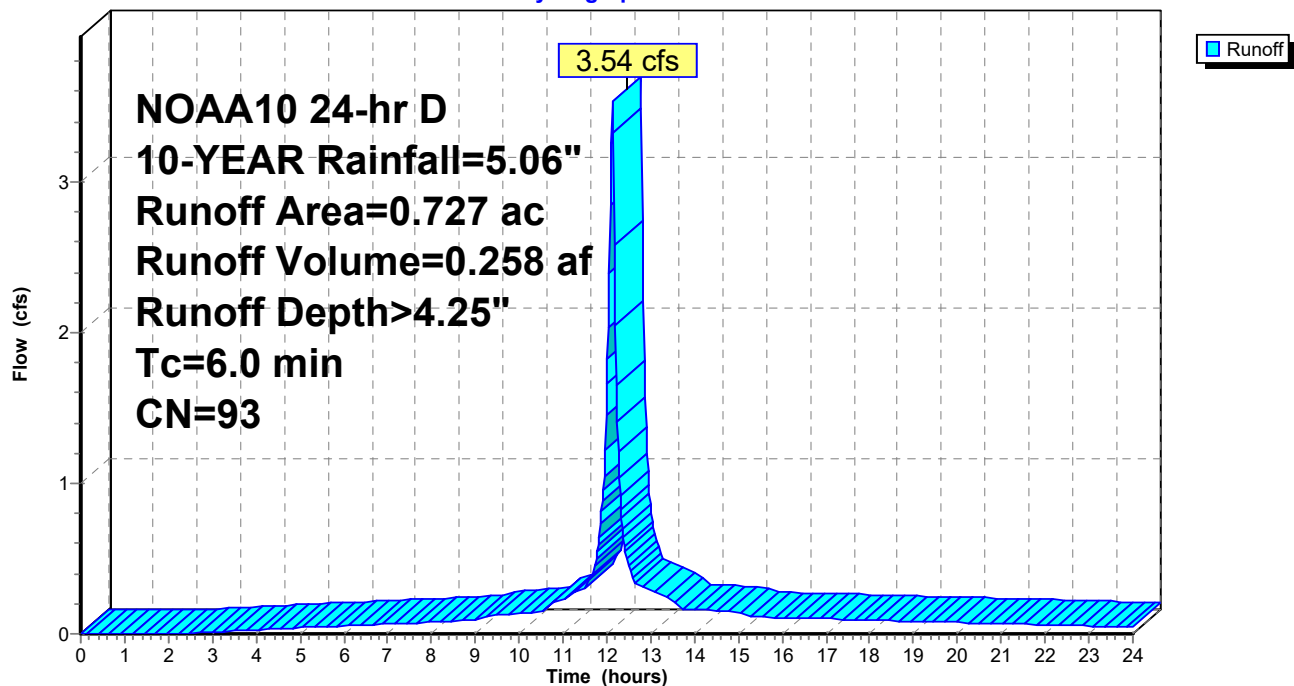
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.192	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.535	98	Paved parking, HSG D
0.727	93	Weighted Average
0.192		26.41% Pervious Area
0.535		73.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P3-3:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 62

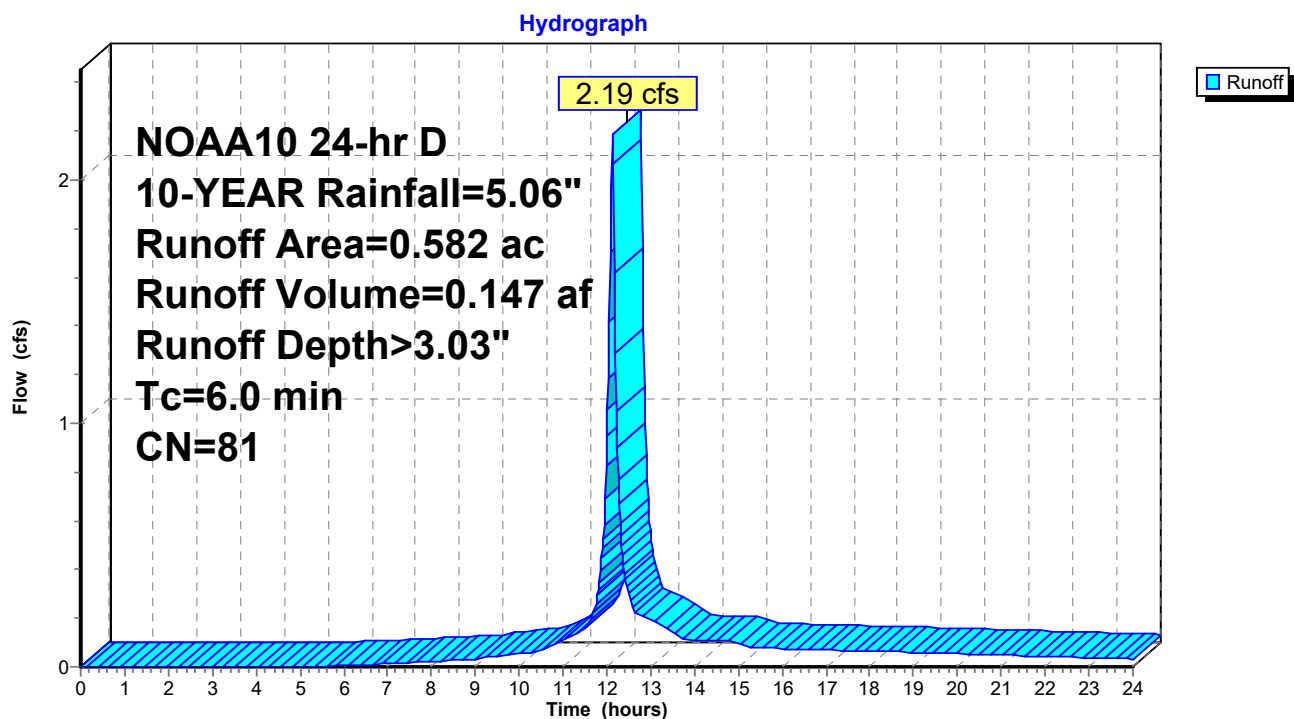
Summary for Subcatchment P4-1:

Runoff = 2.19 cfs @ 12.13 hrs, Volume= 0.147 af, Depth> 3.03"
Routed to Reach R4 : Flow towards the south

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.431	80	>75% Grass cover, Good, HSG D
0.112	79	Woods, Fair, HSG D
0.039	98	Paved parking, HSG D
0.582	81	Weighted Average
0.543		93.30% Pervious Area
0.039		6.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P4-1:

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 63

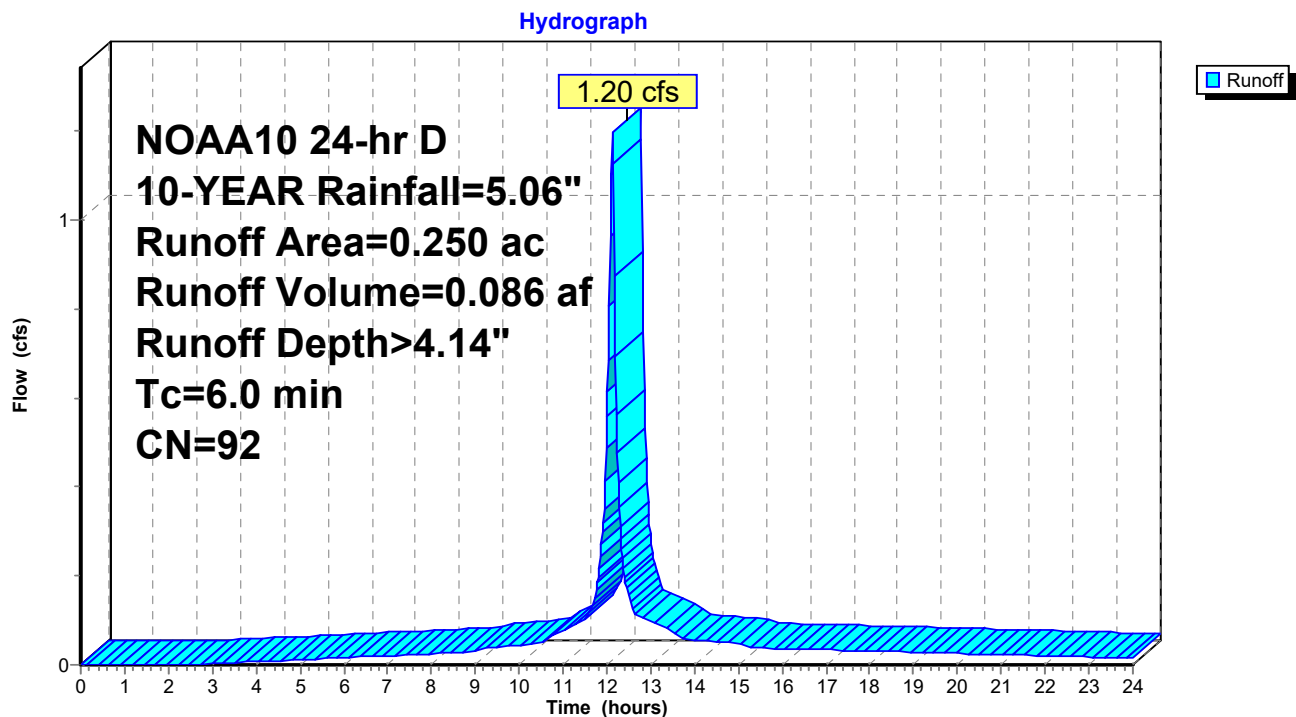
Summary for Subcatchment P4-2:

Runoff = 1.20 cfs @ 12.13 hrs, Volume= 0.086 af, Depth> 4.14"
Routed to Pond 3P : Bioretention Basin 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.088	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.162	98	Paved parking, HSG D
0.250	92	Weighted Average
0.088		35.20% Pervious Area
0.162		64.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P4-2:

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 64

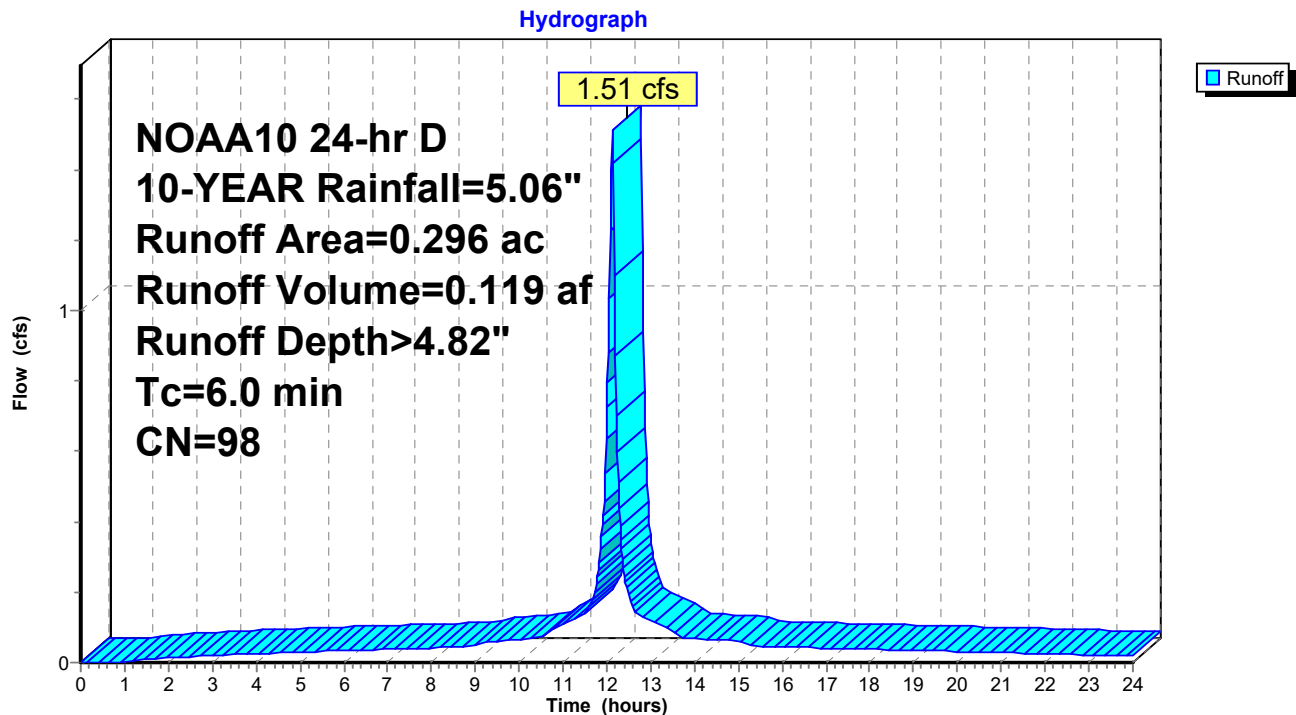
Summary for Subcatchment P4-3: Building "B" Roof

Runoff = 1.51 cfs @ 12.13 hrs, Volume= 0.119 af, Depth> 4.82"
Routed to Pond 4P : Underground Detention Chamber

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.000	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.296	98	Paved parking, HSG D
0.296	98	Weighted Average
0.296		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P4-3: Building "B" Roof

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 65

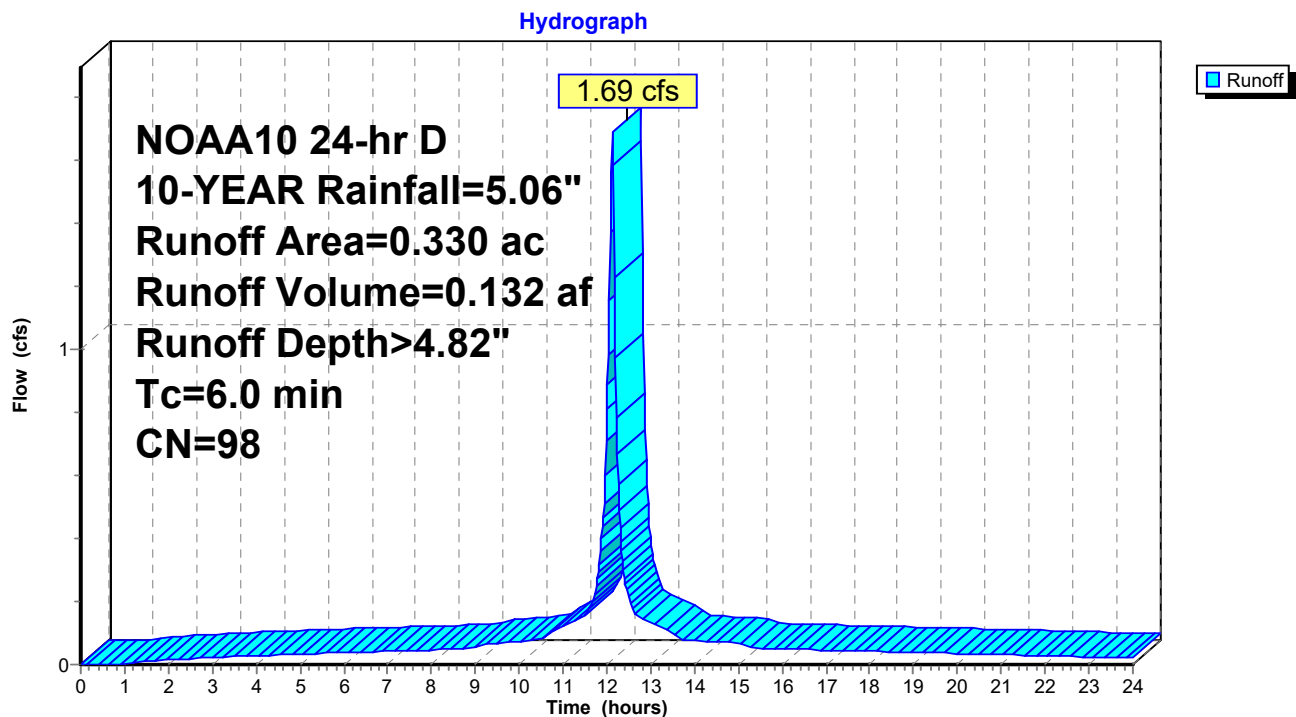
Summary for Subcatchment P4-4: Building "A" Roof

Runoff = 1.69 cfs @ 12.13 hrs, Volume= 0.132 af, Depth> 4.82"
Routed to Pond 5P : Underground Detention Chamber

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.000	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.330	98	Paved parking, HSG D
0.330	98	Weighted Average
0.330		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P4-4: Building "A" Roof

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 66

Summary for Subcatchment P5: Flow towards the southeast

Runoff = 0.79 cfs @ 12.13 hrs, Volume= 0.053 af, Depth> 2.85"
Routed to Reach TS : Total Site

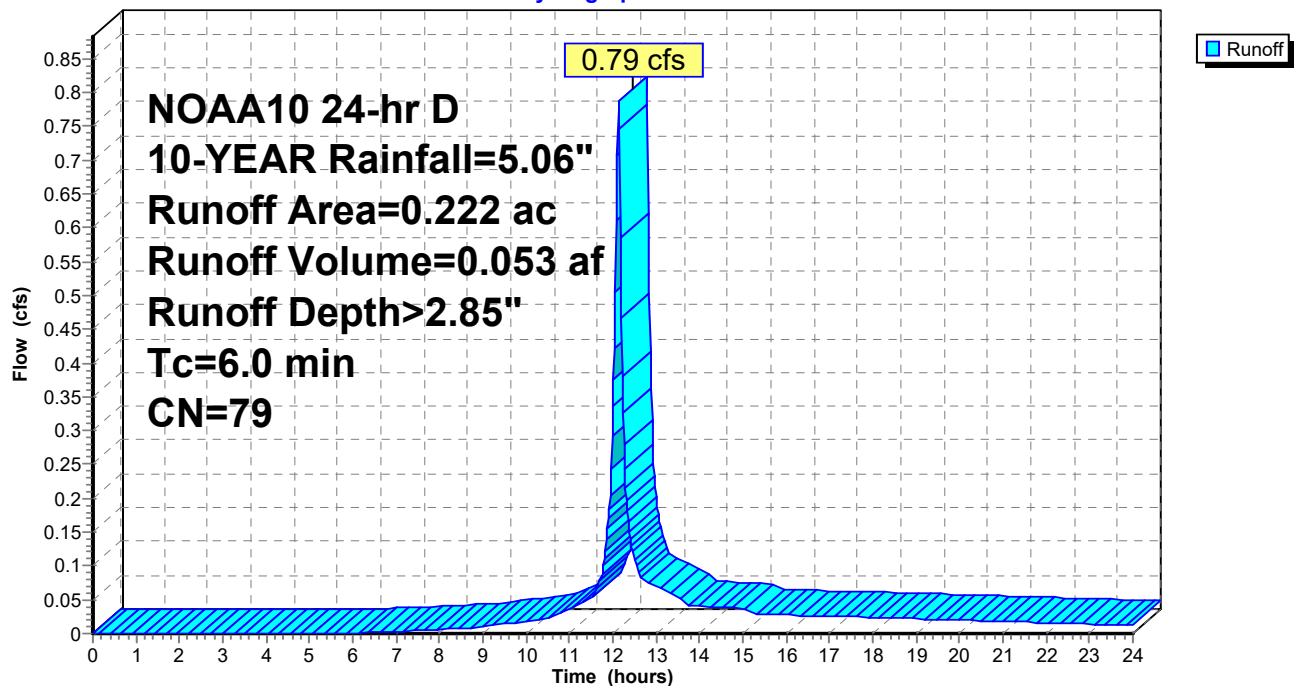
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.067	80	>75% Grass cover, Good, HSG D
0.155	79	Woods, Fair, HSG D
0.000	98	Paved parking, HSG D
0.222	79	Weighted Average
0.222		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P5: Flow towards the southeast

Hydrograph



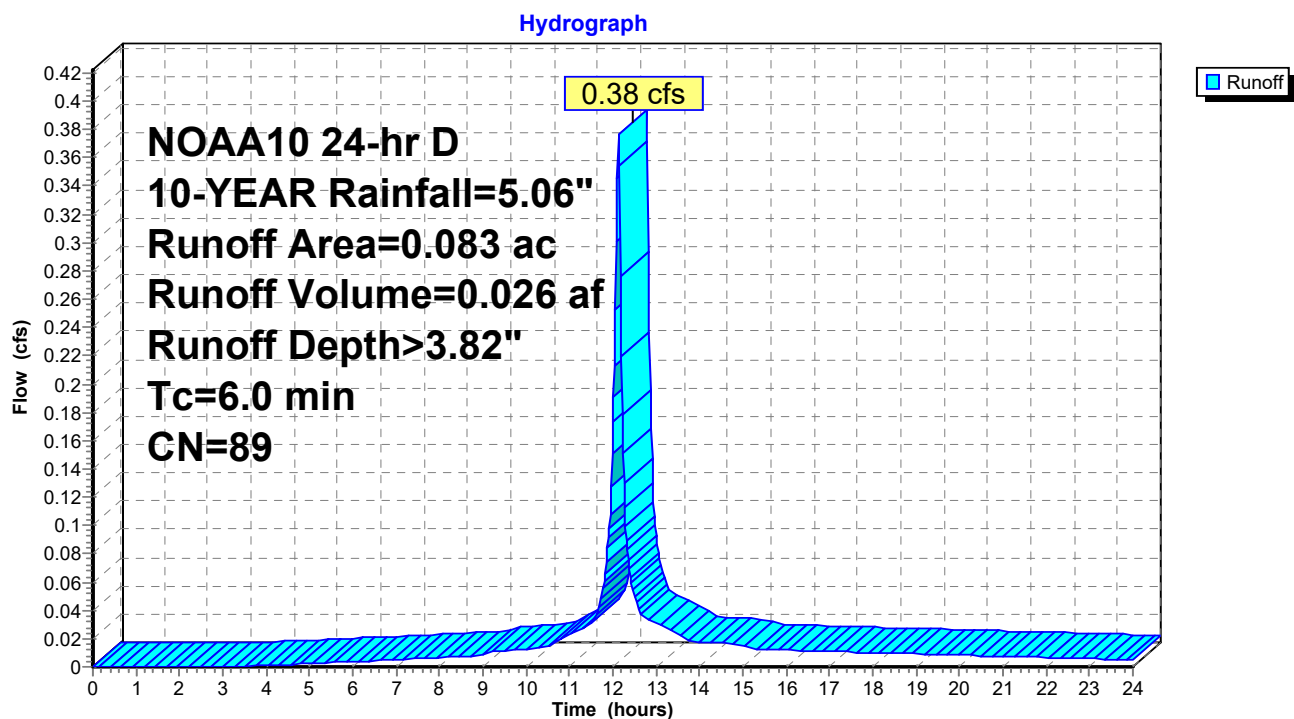
Summary for Subcatchment P6: Flow to Blue Hills Ave

Runoff = 0.38 cfs @ 12.13 hrs, Volume= 0.026 af, Depth> 3.82"
 Routed to Reach TS : Total Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Area (ac)	CN	Description
0.040	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.043	98	Paved parking, HSG D
0.083	89	Weighted Average
0.040		48.19% Pervious Area
0.043		51.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P6: Flow to Blue Hills Ave

Summary for Reach R1: Flow towards the west

[40] Hint: Not Described (Outflow=Inflow)

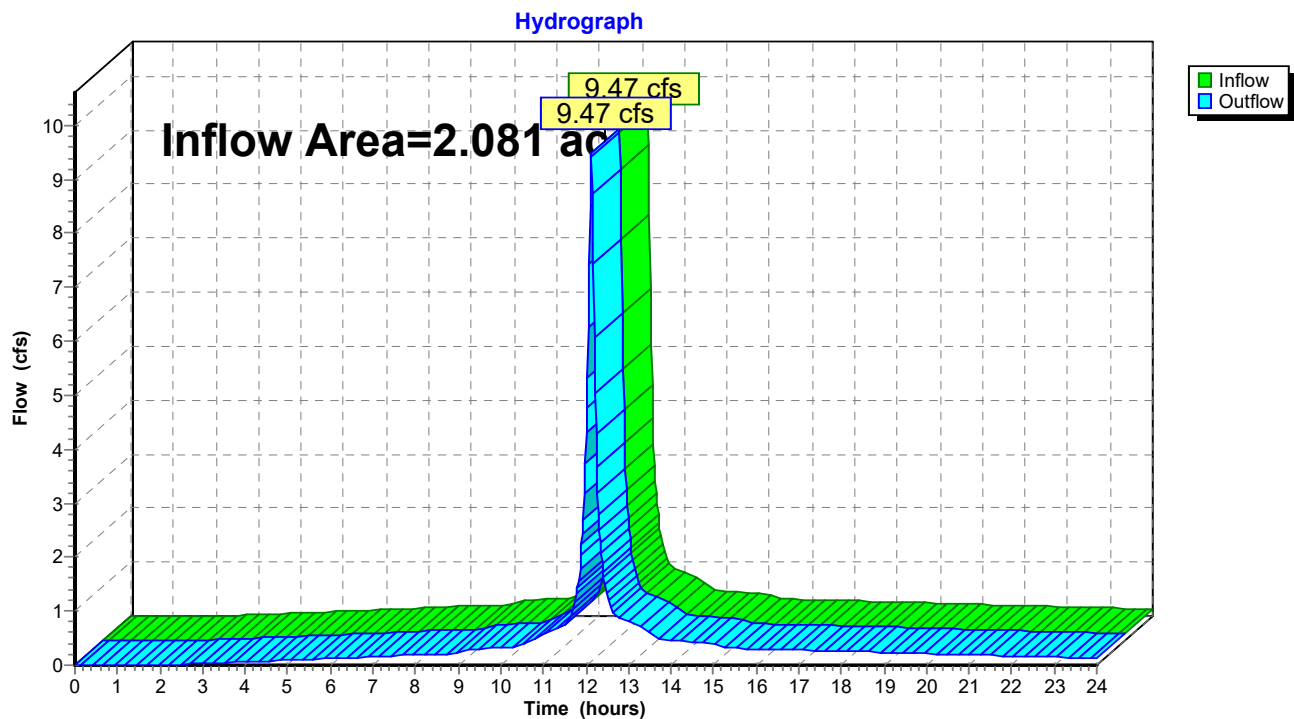
Inflow Area = 2.081 ac, 63.82% Impervious, Inflow Depth > 3.97" for 10-YEAR event

Inflow = 9.47 cfs @ 12.13 hrs, Volume= 0.689 af

Outflow = 9.47 cfs @ 12.13 hrs, Volume= 0.689 af, Atten= 0%, Lag= 0.0 min

Routed to Reach TS : Total Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach R1: Flow towards the west

Summary for Reach R2: Flow towards the north

[40] Hint: Not Described (Outflow=Inflow)

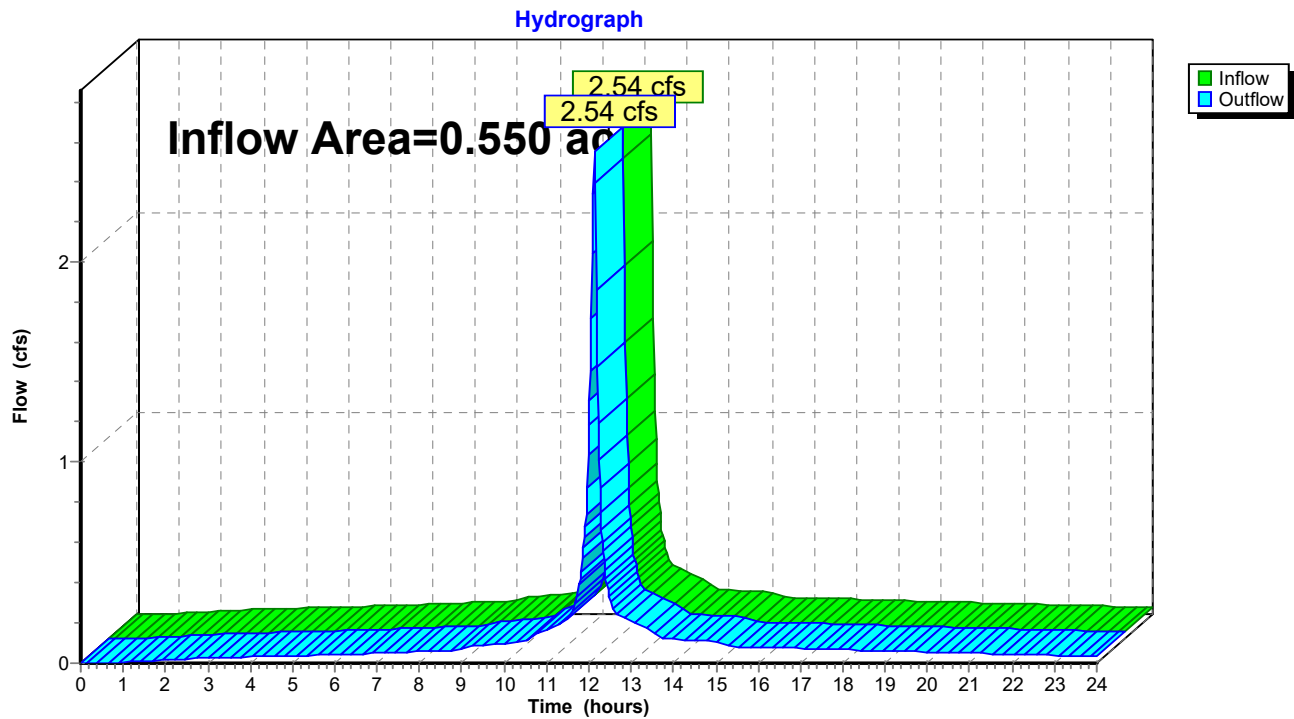
Inflow Area = 0.550 ac, 67.82% Impervious, Inflow Depth > 4.18" for 10-YEAR event

Inflow = 2.54 cfs @ 12.13 hrs, Volume= 0.192 af

Outflow = 2.54 cfs @ 12.13 hrs, Volume= 0.192 af, Atten= 0%, Lag= 0.0 min

Routed to Reach TS : Total Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach R2: Flow towards the north

Summary for Reach R3: Flow towards the northeast

[40] Hint: Not Described (Outflow=Inflow)

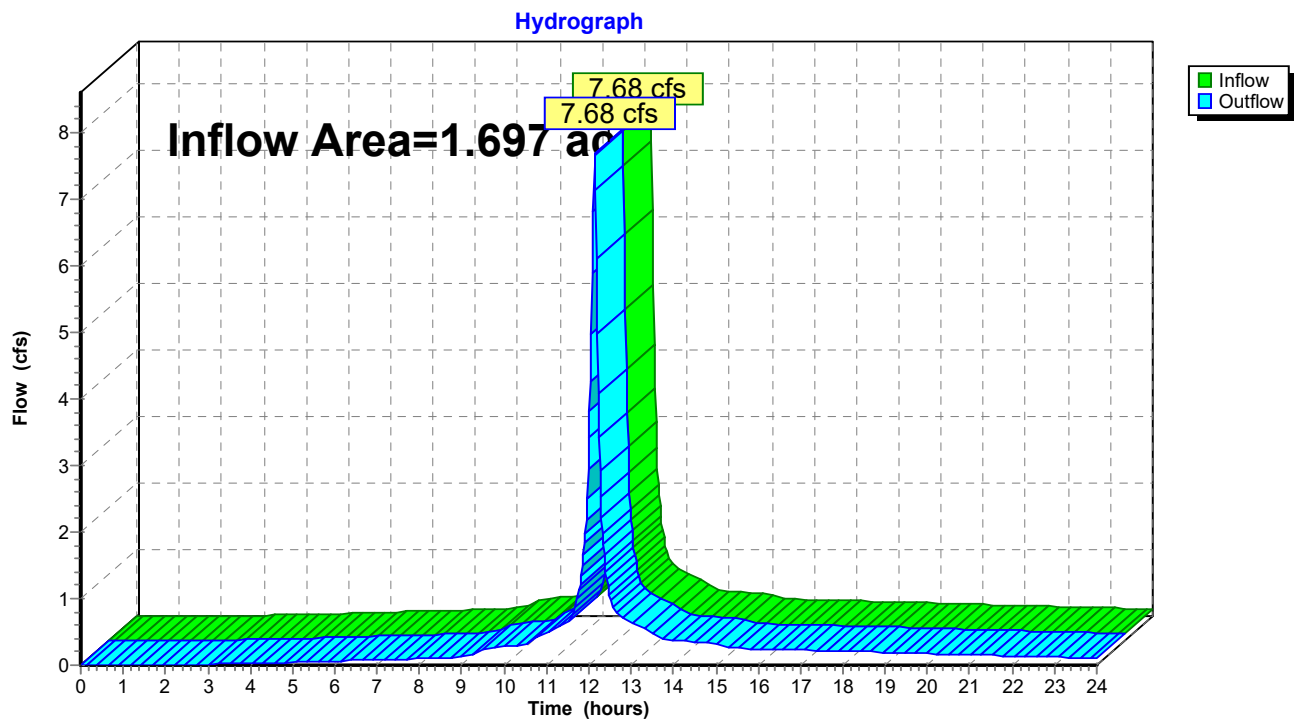
Inflow Area = 1.697 ac, 58.93% Impervious, Inflow Depth > 3.82" for 10-YEAR event

Inflow = 7.68 cfs @ 12.13 hrs, Volume= 0.540 af

Outflow = 7.68 cfs @ 12.13 hrs, Volume= 0.540 af, Atten= 0%, Lag= 0.0 min

Routed to Reach TS : Total Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach R3: Flow towards the northeast

Summary for Reach R4: Flow towards the south

[40] Hint: Not Described (Outflow=Inflow)

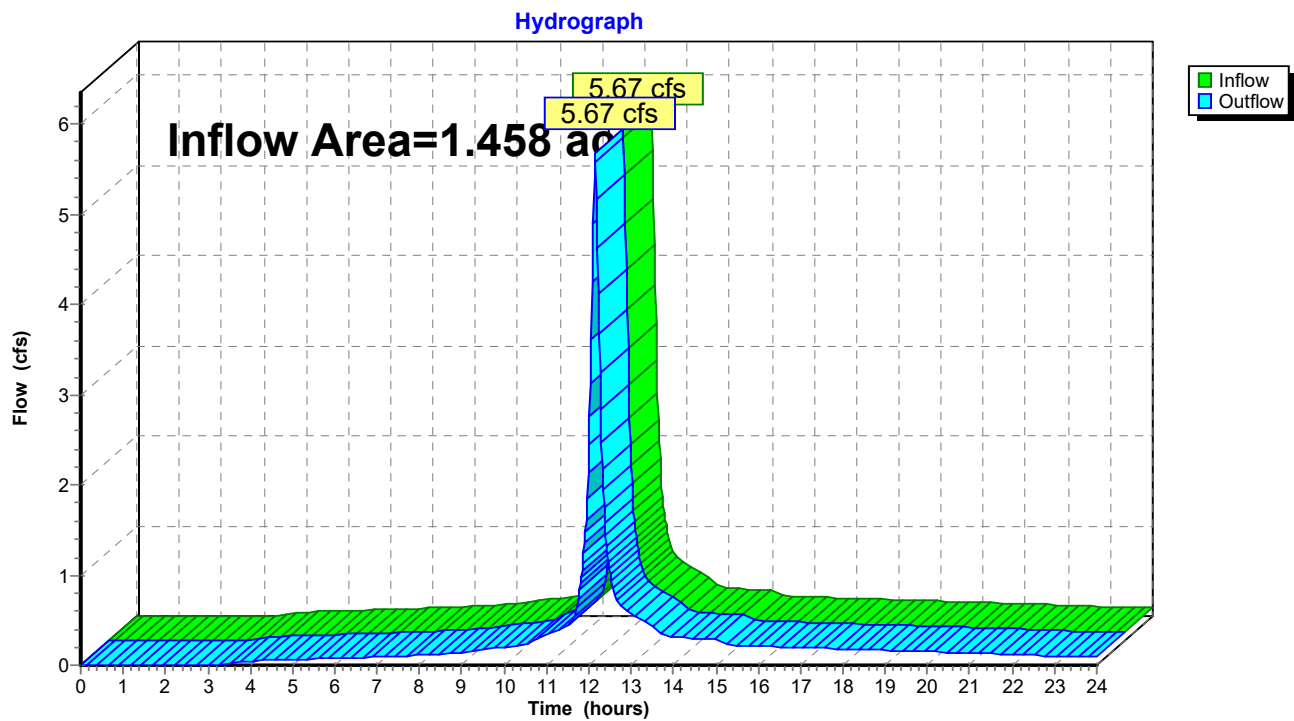
Inflow Area = 1.458 ac, 56.72% Impervious, Inflow Depth > 3.77" for 10-YEAR event

Inflow = 5.67 cfs @ 12.14 hrs, Volume= 0.459 af

Outflow = 5.67 cfs @ 12.14 hrs, Volume= 0.459 af, Atten= 0%, Lag= 0.0 min

Routed to Reach TS : Total Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach R4: Flow towards the south

Summary for Reach TS: Total Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.091 ac, 58.63% Impervious, Inflow Depth > 3.86" for 10-YEAR event

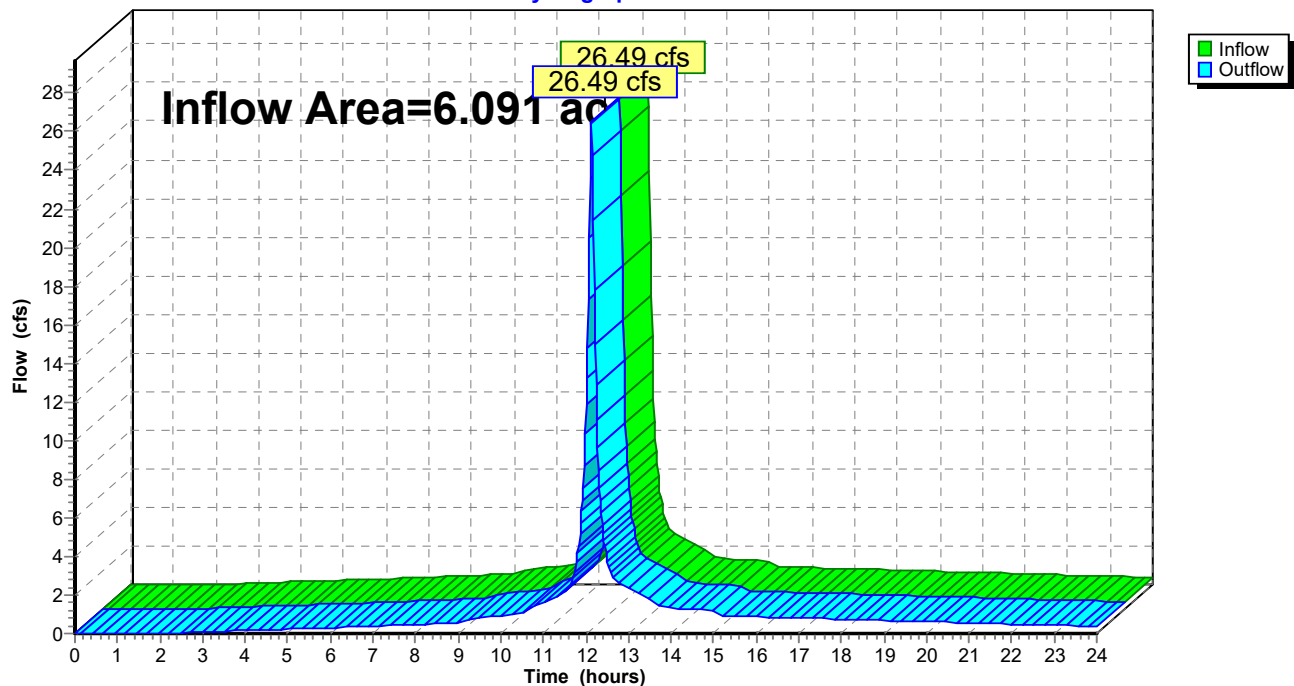
Inflow = 26.49 cfs @ 12.13 hrs, Volume= 1.959 af

Outflow = 26.49 cfs @ 12.13 hrs, Volume= 1.959 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach TS: Total Site

Hydrograph



Summary for Pond 1P: Bioretention Basin 1

Inflow Area = 0.232 ac, 68.97% Impervious, Inflow Depth > 4.14" for 10-YEAR event
 Inflow = 1.11 cfs @ 12.13 hrs, Volume= 0.080 af
 Outflow = 1.02 cfs @ 12.16 hrs, Volume= 0.061 af, Atten= 9%, Lag= 1.6 min
 Primary = 1.02 cfs @ 12.16 hrs, Volume= 0.061 af
 Routed to Reach R1 : Flow towards the west

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
 Peak Elev= 115.36' @ 12.16 hrs Surf.Area= 883 sf Storage= 1,013 cf

Plug-Flow detention time= 181.3 min calculated for 0.061 af (76% of inflow)
 Center-of-Mass det. time= 75.9 min (869.1 - 793.3)

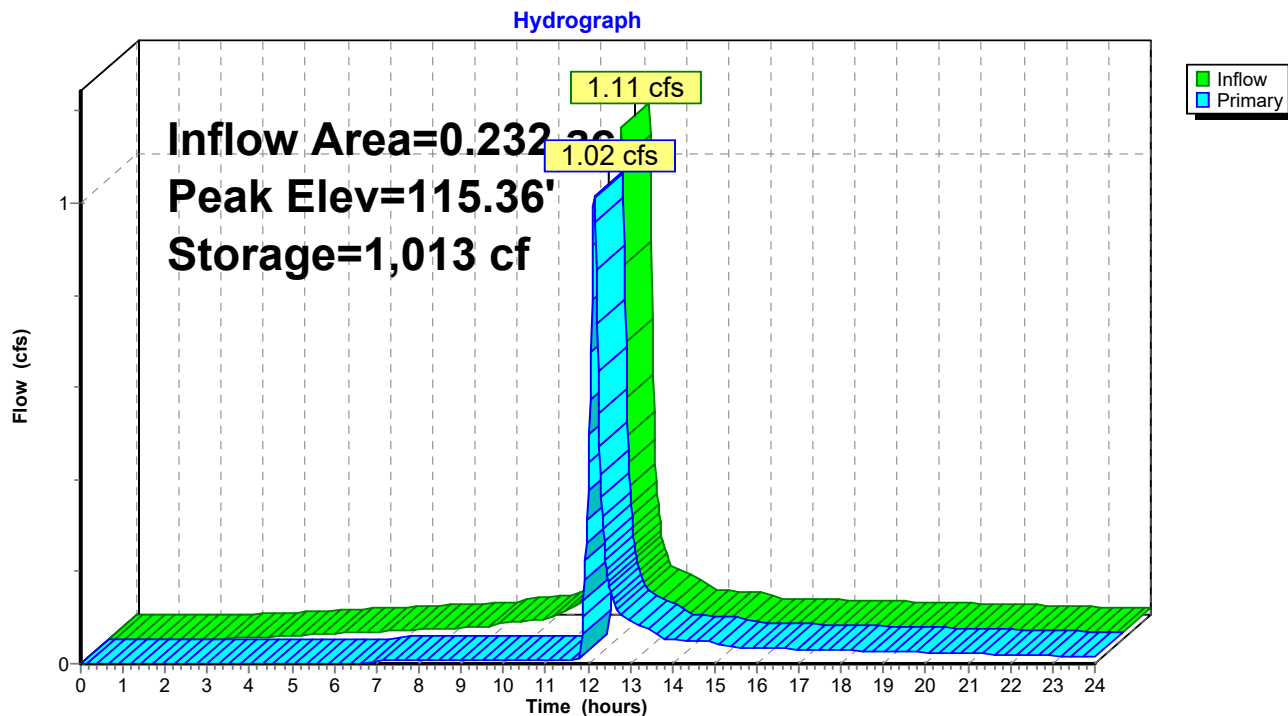
Volume	Invert	Avail.Storage	Storage Description			
#1	111.25'	1,140 cf	Bioretention Basin (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
111.25	517	134.2	0.0	0	0	517
112.25	517	134.2	40.0	207	207	651
112.50	517	134.2	0.0	0	207	685
114.50	517	134.2	20.0	207	414	953
115.00	725	143.6	100.0	309	723	1,172
115.50	948	153.0	100.0	417	1,140	1,406

Device	Routing	Invert	Outlet Devices
#1	Primary	111.92'	12.0" Round Outlet Pipe L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 111.92' / 111.83' S= 0.0100 ' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Device 1	111.42'	4.0" Vert. Underdrain C= 0.600 Limited to weir flow at low heads
#3	Device 1	115.15'	12.0" Horiz. Beehive Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	111.25'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Primary OutFlow Max=1.01 cfs @ 12.16 hrs HW=115.36' (Free Discharge)

1=Outlet Pipe (Passes 1.01 cfs of 6.49 cfs potential flow)
 2=Underdrain (Passes 0.01 cfs of 0.78 cfs potential flow)
 4=Exfiltration (Exfiltration Controls 0.01 cfs)
 3=Beehive Grate (Weir Controls 1.00 cfs @ 1.50 fps)

Pond 1P: Bioretention Basin 1



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 75

Stage-Discharge for Pond 1P: Bioretention Basin 1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
111.25	0.00	113.80	0.01
111.30	0.00	113.85	0.01
111.35	0.00	113.90	0.01
111.40	0.00	113.95	0.01
111.45	0.00	114.00	0.01
111.50	0.00	114.05	0.01
111.55	0.00	114.10	0.01
111.60	0.00	114.15	0.01
111.65	0.00	114.20	0.01
111.70	0.00	114.25	0.01
111.75	0.00	114.30	0.01
111.80	0.00	114.35	0.01
111.85	0.00	114.40	0.01
111.90	0.00	114.45	0.01
111.95	0.00	114.50	0.01
112.00	0.01	114.55	0.01
112.05	0.01	114.60	0.01
112.10	0.01	114.65	0.01
112.15	0.01	114.70	0.01
112.20	0.01	114.75	0.01
112.25	0.01	114.80	0.01
112.30	0.01	114.85	0.01
112.35	0.01	114.90	0.01
112.40	0.01	114.95	0.01
112.45	0.01	115.00	0.01
112.50	0.01	115.05	0.01
112.55	0.01	115.10	0.01
112.60	0.01	115.15	0.01
112.65	0.01	115.20	0.12
112.70	0.01	115.25	0.33
112.75	0.01	115.30	0.61
112.80	0.01	115.35	0.93
112.85	0.01	115.40	1.29
112.90	0.01	115.45	1.70
112.95	0.01	115.50	2.14
113.00	0.01		
113.05	0.01		
113.10	0.01		
113.15	0.01		
113.20	0.01		
113.25	0.01		
113.30	0.01		
113.35	0.01		
113.40	0.01		
113.45	0.01		
113.50	0.01		
113.55	0.01		
113.60	0.01		
113.65	0.01		
113.70	0.01		
113.75	0.01		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 76

Stage-Area-Storage for Pond 1P: Bioretention Basin 1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
111.25	517	0	113.80	517	341
111.30	517	10	113.85	517	346
111.35	517	21	113.90	517	352
111.40	517	31	113.95	517	357
111.45	517	41	114.00	517	362
111.50	517	52	114.05	517	367
111.55	517	62	114.10	517	372
111.60	517	72	114.15	517	377
111.65	517	83	114.20	517	383
111.70	517	93	114.25	517	388
111.75	517	103	114.30	517	393
111.80	517	114	114.35	517	398
111.85	517	124	114.40	517	403
111.90	517	134	114.45	517	408
111.95	517	145	114.50	517	414
112.00	517	155	114.55	536	440
112.05	517	165	114.60	556	467
112.10	517	176	114.65	576	496
112.15	517	186	114.70	596	525
112.20	517	196	114.75	617	555
112.25	517	207	114.80	638	586
112.30	517	207	114.85	659	619
112.35	517	207	114.90	681	652
112.40	517	207	114.95	703	687
112.45	517	207	115.00	725	723
112.50	517	207	115.05	746	759
112.55	517	212	115.10	767	797
112.60	517	217	115.15	789	836
112.65	517	222	115.20	811	876
112.70	517	227	115.25	833	917
112.75	517	233	115.30	855	959
112.80	517	238	115.35	878	1,003
112.85	517	243	115.40	901	1,047
112.90	517	248	115.45	924	1,093
112.95	517	253	115.50	948	1,140
113.00	517	259			
113.05	517	264			
113.10	517	269			
113.15	517	274			
113.20	517	279			
113.25	517	284			
113.30	517	290			
113.35	517	295			
113.40	517	300			
113.45	517	305			
113.50	517	310			
113.55	517	315			
113.60	517	321			
113.65	517	326			
113.70	517	331			
113.75	517	336			

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 77

Summary for Pond 2P: Bioretention Basin 2

Inflow Area = 0.633 ac, 69.83% Impervious, Inflow Depth > 4.14" for 10-YEAR event
 Inflow = 3.03 cfs @ 12.13 hrs, Volume= 0.219 af
 Outflow = 2.92 cfs @ 12.15 hrs, Volume= 0.198 af, Atten= 4%, Lag= 1.0 min
 Primary = 2.92 cfs @ 12.15 hrs, Volume= 0.198 af
 Routed to Reach R3 : Flow towards the northeast

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
 Peak Elev= 115.83' @ 12.15 hrs Surf.Area= 932 sf Storage= 1,182 cf

Plug-Flow detention time= 93.9 min calculated for 0.198 af (90% of inflow)
 Center-of-Mass det. time= 41.7 min (834.9 - 793.3)

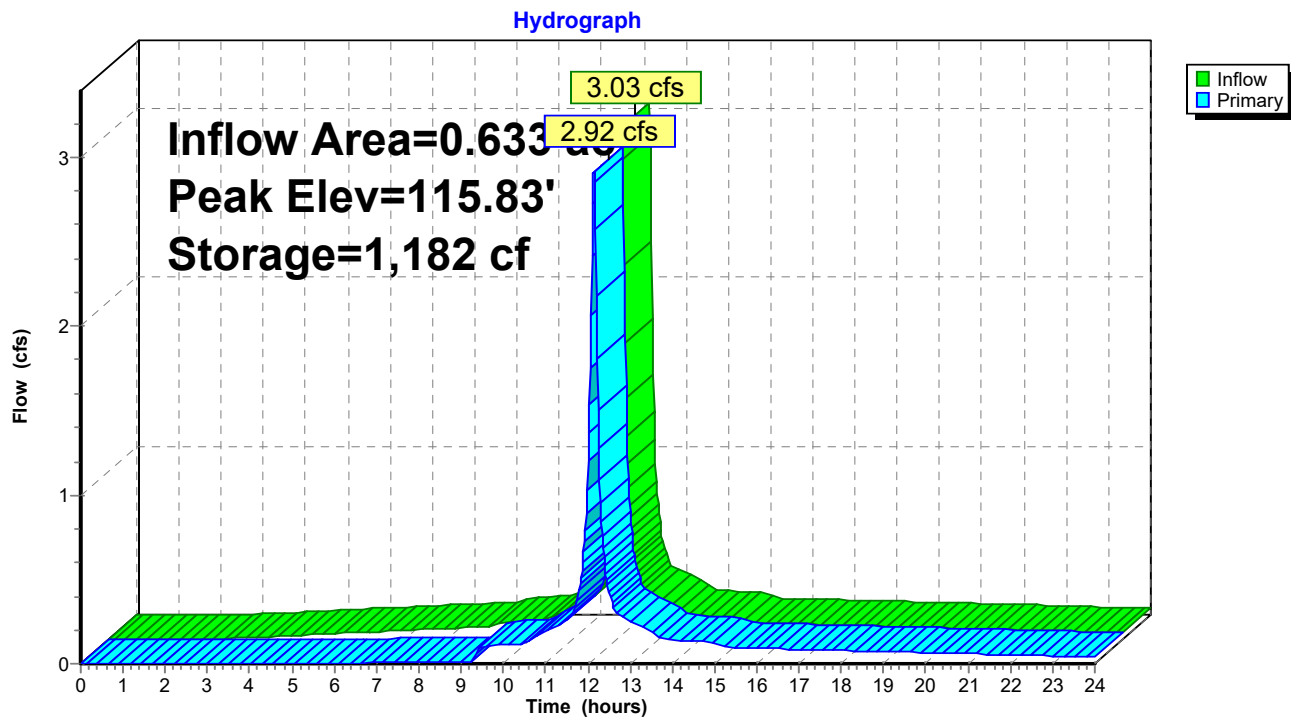
Volume	Invert	Avail.Storage	Storage Description			
#1	111.25'	1,349 cf	Bioretention Basin (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
111.25	401	122.6	0.0	0	0	401
112.25	401	122.6	40.0	160	160	524
112.50	401	122.6	0.0	0	160	554
114.50	401	122.6	20.0	160	321	799
116.00	1,017	150.9	100.0	1,028	1,349	1,449

Device	Routing	Invert	Outlet Devices
#1	Primary	112.85'	12.0" Round Outlet Pipe L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 112.85' / 112.81' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Device 1	112.85'	4.0" Vert. Underdrain C= 0.600 Limited to weir flow at low heads
#3	Device 1	115.50'	18.0" Horiz. Beehive Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	111.25'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Primary OutFlow Max=2.89 cfs @ 12.15 hrs HW=115.83' (Free Discharge)

1=Outlet Pipe (Passes 2.89 cfs of 5.95 cfs potential flow)
 2=Underdrain (Passes 0.01 cfs of 0.70 cfs potential flow)
 4=Exfiltration (Exfiltration Controls 0.01 cfs)
 3=Beehive Grate (Weir Controls 2.88 cfs @ 1.87 fps)

Pond 2P: Bioretention Basin 2



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 79

Stage-Discharge for Pond 2P: Bioretention Basin 2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
111.25	0.00	113.80	0.00
111.30	0.00	113.85	0.00
111.35	0.00	113.90	0.00
111.40	0.00	113.95	0.00
111.45	0.00	114.00	0.00
111.50	0.00	114.05	0.00
111.55	0.00	114.10	0.00
111.60	0.00	114.15	0.00
111.65	0.00	114.20	0.00
111.70	0.00	114.25	0.00
111.75	0.00	114.30	0.00
111.80	0.00	114.35	0.00
111.85	0.00	114.40	0.00
111.90	0.00	114.45	0.00
111.95	0.00	114.50	0.00
112.00	0.00	114.55	0.00
112.05	0.00	114.60	0.01
112.10	0.00	114.65	0.01
112.15	0.00	114.70	0.01
112.20	0.00	114.75	0.01
112.25	0.00	114.80	0.01
112.30	0.00	114.85	0.01
112.35	0.00	114.90	0.01
112.40	0.00	114.95	0.01
112.45	0.00	115.00	0.01
112.50	0.00	115.05	0.01
112.55	0.00	115.10	0.01
112.60	0.00	115.15	0.01
112.65	0.00	115.20	0.01
112.70	0.00	115.25	0.01
112.75	0.00	115.30	0.01
112.80	0.00	115.35	0.01
112.85	0.00	115.40	0.01
112.90	0.00	115.45	0.01
112.95	0.00	115.50	0.01
113.00	0.00	115.55	0.18
113.05	0.00	115.60	0.50
113.10	0.00	115.65	0.91
113.15	0.00	115.70	1.39
113.20	0.00	115.75	1.94
113.25	0.00	115.80	2.54
113.30	0.00	115.85	3.20
113.35	0.00	115.90	3.91
113.40	0.00	115.95	4.66
113.45	0.00	116.00	5.46
113.50	0.00		
113.55	0.00		
113.60	0.00		
113.65	0.00		
113.70	0.00		
113.75	0.00		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 80

Stage-Area-Storage for Pond 2P: Bioretention Basin 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
111.25	401	0	113.80	401	265
111.30	401	8	113.85	401	269
111.35	401	16	113.90	401	273
111.40	401	24	113.95	401	277
111.45	401	32	114.00	401	281
111.50	401	40	114.05	401	285
111.55	401	48	114.10	401	289
111.60	401	56	114.15	401	293
111.65	401	64	114.20	401	297
111.70	401	72	114.25	401	301
111.75	401	80	114.30	401	305
111.80	401	88	114.35	401	309
111.85	401	96	114.40	401	313
111.90	401	104	114.45	401	317
111.95	401	112	114.50	401	321
112.00	401	120	114.55	417	341
112.05	401	128	114.60	433	363
112.10	401	136	114.65	450	385
112.15	401	144	114.70	467	408
112.20	401	152	114.75	484	431
112.25	401	160	114.80	502	456
112.30	401	160	114.85	520	481
112.35	401	160	114.90	538	508
112.40	401	160	114.95	556	535
112.45	401	160	115.00	575	564
112.50	401	160	115.05	594	593
112.55	401	164	115.10	614	623
112.60	401	168	115.15	633	654
112.65	401	172	115.20	653	686
112.70	401	176	115.25	674	719
112.75	401	180	115.30	694	754
112.80	401	184	115.35	715	789
112.85	401	188	115.40	737	825
112.90	401	192	115.45	758	863
112.95	401	196	115.50	780	901
113.00	401	201	115.55	803	941
113.05	401	205	115.60	825	981
113.10	401	209	115.65	848	1,023
113.15	401	213	115.70	871	1,066
113.20	401	217	115.75	895	1,110
113.25	401	221	115.80	919	1,156
113.30	401	225	115.85	943	1,202
113.35	401	229	115.90	967	1,250
113.40	401	233	115.95	992	1,299
113.45	401	237	116.00	1,017	1,349
113.50	401	241			
113.55	401	245			
113.60	401	249			
113.65	401	253			
113.70	401	257			
113.75	401	261			

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 81

Summary for Pond 3P: Bioretention Basin 3

Inflow Area = 0.250 ac, 64.80% Impervious, Inflow Depth > 4.14" for 10-YEAR event
 Inflow = 1.20 cfs @ 12.13 hrs, Volume= 0.086 af
 Outflow = 1.13 cfs @ 12.15 hrs, Volume= 0.067 af, Atten= 6%, Lag= 1.3 min
 Primary = 1.13 cfs @ 12.15 hrs, Volume= 0.067 af
 Routed to Reach R4 : Flow towards the south

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
 Peak Elev= 115.92' @ 12.15 hrs Surf.Area= 908 sf Storage= 985 cf

Plug-Flow detention time= 173.6 min calculated for 0.067 af (78% of inflow)
 Center-of-Mass det. time= 73.7 min (867.0 - 793.3)

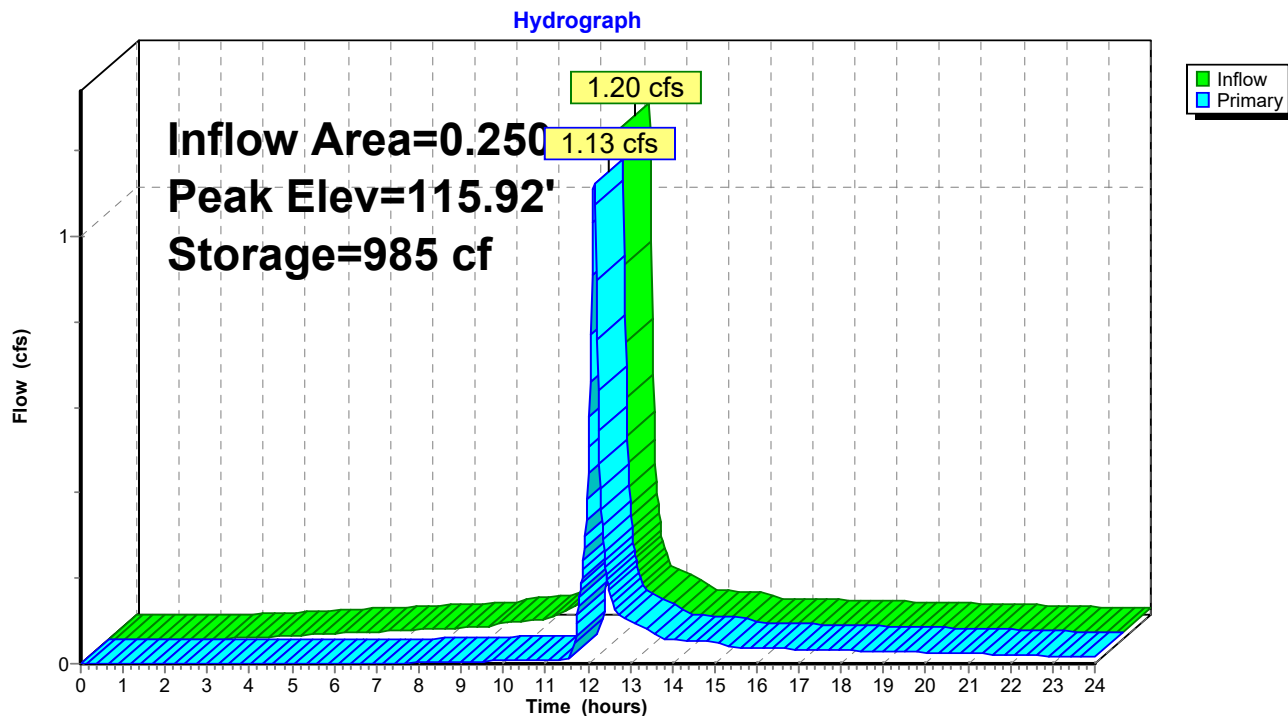
Volume	Invert	Avail.Storage	Storage Description			
#1	112.25'	1,056 cf	Bioretention Basin (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
112.25	495	86.4	0.0	0	0	495
113.25	495	86.4	40.0	198	198	581
113.50	495	86.4	0.0	0	198	603
115.00	495	86.4	20.0	149	347	733
116.00	948	114.7	100.0	709	1,056	1,197

Device	Routing	Invert	Outlet Devices
#1	Primary	113.81'	10.0" Round Outlet Pipe L= 72.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 113.81' / 113.52' S= 0.0040 ' / Cc= 0.900 n= 0.011, Flow Area= 0.55 sf
#2	Device 1	113.81'	4.0" Vert. Underdrain C= 0.600 Limited to weir flow at low heads
#3	Device 1	115.75'	18.0" Horiz. Beehive Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	112.25'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Primary OutFlow Max=1.11 cfs @ 12.15 hrs HW=115.92' (Free Discharge)

1=Outlet Pipe (Passes 1.11 cfs of 2.90 cfs potential flow)
 2=Underdrain (Passes 0.01 cfs of 0.59 cfs potential flow)
 4=Exfiltration (Exfiltration Controls 0.01 cfs)
 3=Beehive Grate (Weir Controls 1.10 cfs @ 1.36 fps)

Pond 3P: Bioretention Basin 3



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 83

Stage-Discharge for Pond 3P: Bioretention Basin 3

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
112.25	0.00	113.27	0.00	114.29	0.01	115.31	0.01
112.27	0.00	113.29	0.00	114.31	0.01	115.33	0.01
112.29	0.00	113.31	0.00	114.33	0.01	115.35	0.01
112.31	0.00	113.33	0.00	114.35	0.01	115.37	0.01
112.33	0.00	113.35	0.00	114.37	0.01	115.39	0.01
112.35	0.00	113.37	0.00	114.39	0.01	115.41	0.01
112.37	0.00	113.39	0.00	114.41	0.01	115.43	0.01
112.39	0.00	113.41	0.00	114.43	0.01	115.45	0.01
112.41	0.00	113.43	0.00	114.45	0.01	115.47	0.01
112.43	0.00	113.45	0.00	114.47	0.01	115.49	0.01
112.45	0.00	113.47	0.00	114.49	0.01	115.51	0.01
112.47	0.00	113.49	0.00	114.51	0.01	115.53	0.01
112.49	0.00	113.51	0.00	114.53	0.01	115.55	0.01
112.51	0.00	113.53	0.00	114.55	0.01	115.57	0.01
112.53	0.00	113.55	0.00	114.57	0.01	115.59	0.01
112.55	0.00	113.57	0.00	114.59	0.01	115.61	0.01
112.57	0.00	113.59	0.00	114.61	0.01	115.63	0.01
112.59	0.00	113.61	0.00	114.63	0.01	115.65	0.01
112.61	0.00	113.63	0.00	114.65	0.01	115.67	0.01
112.63	0.00	113.65	0.00	114.67	0.01	115.69	0.01
112.65	0.00	113.67	0.00	114.69	0.01	115.71	0.01
112.67	0.00	113.69	0.00	114.71	0.01	115.73	0.01
112.69	0.00	113.71	0.00	114.73	0.01	115.75	0.01
112.71	0.00	113.73	0.00	114.75	0.01	115.77	0.05
112.73	0.00	113.75	0.00	114.77	0.01	115.79	0.13
112.75	0.00	113.77	0.00	114.79	0.01	115.81	0.24
112.77	0.00	113.79	0.00	114.81	0.01	115.83	0.36
112.79	0.00	113.81	0.00	114.83	0.01	115.85	0.50
112.81	0.00	113.83	0.00	114.85	0.01	115.87	0.65
112.83	0.00	113.85	0.00	114.87	0.01	115.89	0.82
112.85	0.00	113.87	0.01	114.89	0.01	115.91	1.00
112.87	0.00	113.89	0.01	114.91	0.01	115.93	1.19
112.89	0.00	113.91	0.01	114.93	0.01	115.95	1.39
112.91	0.00	113.93	0.01	114.95	0.01	115.97	1.60
112.93	0.00	113.95	0.01	114.97	0.01	115.99	1.82
112.95	0.00	113.97	0.01	114.99	0.01		
112.97	0.00	113.99	0.01	115.01	0.01		
112.99	0.00	114.01	0.01	115.03	0.01		
113.01	0.00	114.03	0.01	115.05	0.01		
113.03	0.00	114.05	0.01	115.07	0.01		
113.05	0.00	114.07	0.01	115.09	0.01		
113.07	0.00	114.09	0.01	115.11	0.01		
113.09	0.00	114.11	0.01	115.13	0.01		
113.11	0.00	114.13	0.01	115.15	0.01		
113.13	0.00	114.15	0.01	115.17	0.01		
113.15	0.00	114.17	0.01	115.19	0.01		
113.17	0.00	114.19	0.01	115.21	0.01		
113.19	0.00	114.21	0.01	115.23	0.01		
113.21	0.00	114.23	0.01	115.25	0.01		
113.23	0.00	114.25	0.01	115.27	0.01		
113.25	0.00	114.27	0.01	115.29	0.01		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 84

Stage-Area-Storage for Pond 3P: Bioretention Basin 3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
112.25	495	0	114.80	495	327
112.30	495	10	114.85	495	332
112.35	495	20	114.90	495	337
112.40	495	30	114.95	495	342
112.45	495	40	115.00	495	347
112.50	495	50	115.05	514	372
112.55	495	59	115.10	534	398
112.60	495	69	115.15	554	425
112.65	495	79	115.20	574	453
112.70	495	89	115.25	595	483
112.75	495	99	115.30	616	513
112.80	495	109	115.35	637	544
112.85	495	119	115.40	659	576
112.90	495	129	115.45	681	610
112.95	495	139	115.50	703	645
113.00	495	149	115.55	726	680
113.05	495	158	115.60	749	717
113.10	495	168	115.65	773	755
113.15	495	178	115.70	797	794
113.20	495	188	115.75	821	835
113.25	495	198	115.80	846	877
113.30	495	198	115.85	871	919
113.35	495	198	115.90	896	964
113.40	495	198	115.95	922	1,009
113.45	495	198	116.00	948	1,056
113.50	495	198			
113.55	495	203			
113.60	495	208			
113.65	495	213			
113.70	495	218			
113.75	495	223			
113.80	495	228			
113.85	495	233			
113.90	495	238			
113.95	495	243			
114.00	495	248			
114.05	495	252			
114.10	495	257			
114.15	495	262			
114.20	495	267			
114.25	495	272			
114.30	495	277			
114.35	495	282			
114.40	495	287			
114.45	495	292			
114.50	495	297			
114.55	495	302			
114.60	495	307			
114.65	495	312			
114.70	495	317			
114.75	495	322			

Summary for Pond 4P: Underground Detention Chamber

Inflow Area = 0.296 ac, 100.00% Impervious, Inflow Depth > 4.82" for 10-YEAR event
 Inflow = 1.51 cfs @ 12.13 hrs, Volume= 0.119 af
 Outflow = 1.20 cfs @ 12.17 hrs, Volume= 0.115 af, Atten= 21%, Lag= 2.6 min
 Primary = 1.20 cfs @ 12.17 hrs, Volume= 0.115 af
 Routed to Reach R4 : Flow towards the south

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 113.85' @ 12.17 hrs Surf.Area= 589 sf Storage= 501 cf

Plug-Flow detention time= 42.7 min calculated for 0.115 af (97% of inflow)
 Center-of-Mass det. time= 23.8 min (773.5 - 749.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	112.50'	595 cf	11.00'W x 53.58'L x 3.75'H Field A 2,210 cf Overall - 722 cf Embedded = 1,488 cf x 40.0% Voids
#2A	113.00'	722 cf	ADS_StormTech SC-800 +Cap x 14 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 14 Chambers in 2 Rows Cap Storage= 3.4 cf x 2 x 2 rows = 13.7 cf
		1,317 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	113.00'	8.0" Round Outlet Pipe L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 113.00' / 112.75' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf

Primary OutFlow Max=1.20 cfs @ 12.17 hrs HW=113.84' (Free Discharge)
 ↑ **1=Outlet Pipe** (Inlet Controls 1.20 cfs @ 3.43 fps)

Pond 4P: Underground Detention Chamber - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-800 +Cap (ADS StormTech®SC-800 with cap volume)

Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf

Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap

Cap Storage= 3.4 cf x 2 x 2 rows = 13.7 cf

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

7 Chambers/Row x 7.12' Long +0.88' Cap Length x 2 = 51.58' Row Length +12.0" End Stone x 2 = 53.58' Base Length

2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width

6.0" Stone Base + 33.0" Chamber Height + 6.0" Stone Cover = 3.75' Field Height

14 Chambers x 50.6 cf + 3.4 cf Cap Volume x 2 x 2 Rows = 722.0 cf Chamber Storage

2,210.3 cf Field - 722.0 cf Chambers = 1,488.3 cf Stone x 40.0% Voids = 595.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,317.3 cf = 0.030 af

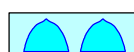
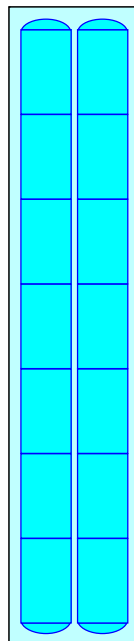
Overall Storage Efficiency = 59.6%

Overall System Size = 53.58' x 11.00' x 3.75'

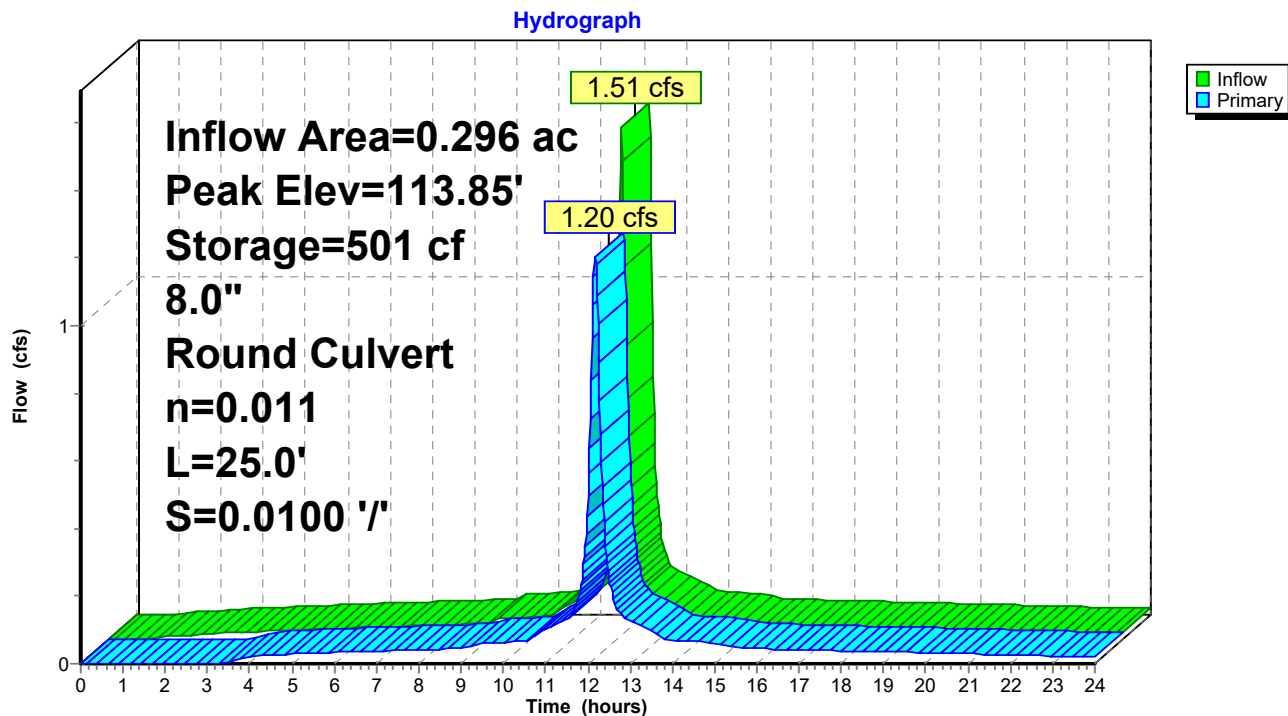
14 Chambers

81.9 cy Field

55.1 cy Stone



Pond 4P: Underground Detention Chamber



Stage-Discharge for Pond 4P: Underground Detention Chamber

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
112.50	0.00	113.52	0.68	114.54	1.85	115.56	2.51
112.52	0.00	113.54	0.72	114.56	1.86	115.58	2.52
112.54	0.00	113.56	0.76	114.58	1.88	115.60	2.53
112.56	0.00	113.58	0.80	114.60	1.89	115.62	2.54
112.58	0.00	113.60	0.84	114.62	1.91	115.64	2.55
112.60	0.00	113.62	0.88	114.64	1.92	115.66	2.56
112.62	0.00	113.64	0.92	114.66	1.94	115.68	2.57
112.64	0.00	113.66	0.96	114.68	1.95	115.70	2.59
112.66	0.00	113.68	0.99	114.70	1.96	115.72	2.60
112.68	0.00	113.70	1.02	114.72	1.98	115.74	2.61
112.70	0.00	113.72	1.05	114.74	1.99	115.76	2.62
112.72	0.00	113.74	1.07	114.76	2.01	115.78	2.63
112.74	0.00	113.76	1.10	114.78	2.02	115.80	2.64
112.76	0.00	113.78	1.12	114.80	2.04	115.82	2.65
112.78	0.00	113.80	1.15	114.82	2.05	115.84	2.66
112.80	0.00	113.82	1.17	114.84	2.06	115.86	2.67
112.82	0.00	113.84	1.20	114.86	2.08	115.88	2.68
112.84	0.00	113.86	1.22	114.88	2.09	115.90	2.69
112.86	0.00	113.88	1.24	114.90	2.10	115.92	2.70
112.88	0.00	113.90	1.24	114.92	2.12	115.94	2.71
112.90	0.00	113.92	1.27	114.94	2.13	115.96	2.72
112.92	0.00	113.94	1.29	114.96	2.14	115.98	2.73
112.94	0.00	113.96	1.32	114.98	2.16	116.00	2.74
112.96	0.00	113.98	1.34	115.00	2.17	116.02	2.75
112.98	0.00	114.00	1.36	115.02	2.18	116.04	2.77
113.00	0.00	114.02	1.39	115.04	2.20	116.06	2.78
113.02	0.00	114.04	1.41	115.06	2.21	116.08	2.79
113.04	0.01	114.06	1.43	115.08	2.22	116.10	2.80
113.06	0.01	114.08	1.45	115.10	2.23	116.12	2.81
113.08	0.02	114.10	1.47	115.12	2.25	116.14	2.82
113.10	0.04	114.12	1.49	115.14	2.26	116.16	2.83
113.12	0.05	114.14	1.51	115.16	2.27	116.18	2.84
113.14	0.07	114.16	1.53	115.18	2.28	116.20	2.85
113.16	0.09	114.18	1.55	115.20	2.30	116.22	2.86
113.18	0.11	114.20	1.56	115.22	2.31	116.24	2.87
113.20	0.13	114.22	1.58	115.24	2.32		
113.22	0.16	114.24	1.60	115.26	2.33		
113.24	0.19	114.26	1.62	115.28	2.35		
113.26	0.22	114.28	1.64	115.30	2.36		
113.28	0.25	114.30	1.65	115.32	2.37		
113.30	0.28	114.32	1.67	115.34	2.38		
113.32	0.31	114.34	1.69	115.36	2.39		
113.34	0.34	114.36	1.70	115.38	2.40		
113.36	0.38	114.38	1.72	115.40	2.42		
113.38	0.42	114.40	1.74	115.42	2.43		
113.40	0.45	114.42	1.75	115.44	2.44		
113.42	0.49	114.44	1.77	115.46	2.45		
113.44	0.53	114.46	1.78	115.48	2.46		
113.46	0.57	114.48	1.80	115.50	2.47		
113.48	0.61	114.50	1.82	115.52	2.49		
113.50	0.64	114.52	1.83	115.54	2.50		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 89

Stage-Area-Storage for Pond 4P: Underground Detention Chamber

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
112.50	0	115.05	989
112.55	12	115.10	1,007
112.60	24	115.15	1,024
112.65	35	115.20	1,042
112.70	47	115.25	1,058
112.75	59	115.30	1,075
112.80	71	115.35	1,091
112.85	83	115.40	1,106
112.90	94	115.45	1,121
112.95	106	115.50	1,136
113.00	118	115.55	1,149
113.05	141	115.60	1,162
113.10	164	115.65	1,175
113.15	187	115.70	1,187
113.20	210	115.75	1,199
113.25	233	115.80	1,211
113.30	256	115.85	1,223
113.35	279	115.90	1,235
113.40	302	115.95	1,247
113.45	324	116.00	1,258
113.50	347	116.05	1,270
113.55	370	116.10	1,282
113.60	392	116.15	1,294
113.65	414	116.20	1,306
113.70	437	116.25	1,317
113.75	459		
113.80	481		
113.85	503		
113.90	525		
113.95	546		
114.00	568		
114.05	590		
114.10	611		
114.15	632		
114.20	654		
114.25	675		
114.30	696		
114.35	716		
114.40	737		
114.45	757		
114.50	778		
114.55	798		
114.60	818		
114.65	838		
114.70	857		
114.75	877		
114.80	896		
114.85	915		
114.90	934		
114.95	953		
115.00	971		

Summary for Pond 5P: Underground Detention Chamber

Inflow Area = 0.330 ac, 100.00% Impervious, Inflow Depth > 4.82" for 10-YEAR event
 Inflow = 1.69 cfs @ 12.13 hrs, Volume= 0.132 af
 Outflow = 1.30 cfs @ 12.18 hrs, Volume= 0.129 af, Atten= 23%, Lag= 2.8 min
 Primary = 1.30 cfs @ 12.18 hrs, Volume= 0.129 af
 Routed to Reach R4 : Flow towards the south

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 113.95' @ 12.18 hrs Surf.Area= 589 sf Storage= 547 cf

Plug-Flow detention time= 39.4 min calculated for 0.129 af (97% of inflow)
 Center-of-Mass det. time= 22.1 min (771.7 - 749.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	112.50'	595 cf	11.00'W x 53.58'L x 3.75'H Field A 2,210 cf Overall - 722 cf Embedded = 1,488 cf x 40.0% Voids
#2A	113.00'	722 cf	ADS_StormTech SC-800 +Cap x 14 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 14 Chambers in 2 Rows Cap Storage= 3.4 cf x 2 x 2 rows = 13.7 cf
		1,317 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	113.00'	8.0" Round Outlet Pipe L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 113.00' / 112.75' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf

Primary OutFlow Max=1.30 cfs @ 12.18 hrs HW=113.95' (Free Discharge)
 ↑ **1=Outlet Pipe** (Barrel Controls 1.30 cfs @ 3.72 fps)

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 91

Pond 5P: Underground Detention Chamber - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-800 +Cap (ADS StormTech®SC-800 with cap volume)

Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf

Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap

Cap Storage= 3.4 cf x 2 x 2 rows = 13.7 cf

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

7 Chambers/Row x 7.12' Long +0.88' Cap Length x 2 = 51.58' Row Length +12.0" End Stone x 2 = 53.58' Base Length

2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width

6.0" Stone Base + 33.0" Chamber Height + 6.0" Stone Cover = 3.75' Field Height

14 Chambers x 50.6 cf + 3.4 cf Cap Volume x 2 x 2 Rows = 722.0 cf Chamber Storage

2,210.3 cf Field - 722.0 cf Chambers = 1,488.3 cf Stone x 40.0% Voids = 595.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,317.3 cf = 0.030 af

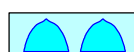
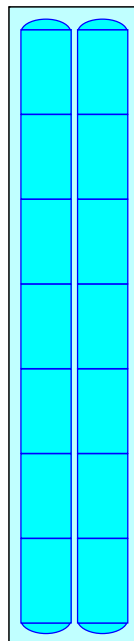
Overall Storage Efficiency = 59.6%

Overall System Size = 53.58' x 11.00' x 3.75'

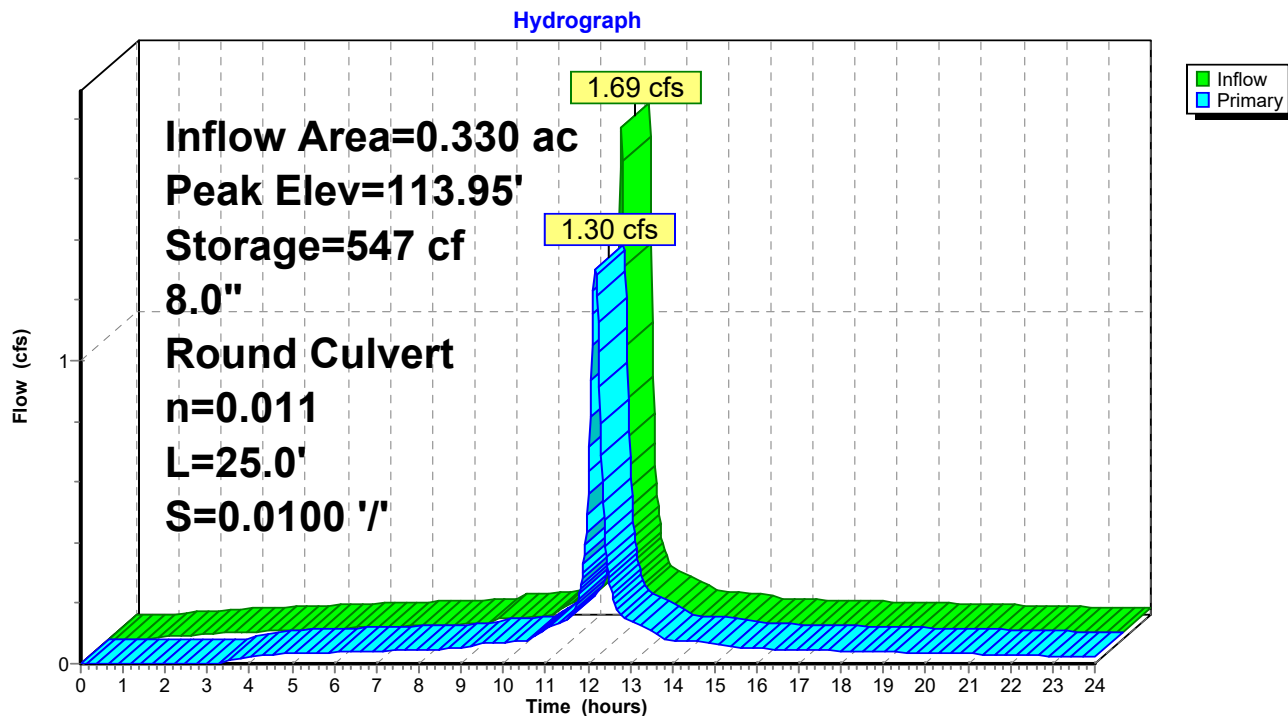
14 Chambers

81.9 cy Field

55.1 cy Stone



Pond 5P: Underground Detention Chamber



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 93

Stage-Discharge for Pond 5P: Underground Detention Chamber

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
112.50	0.00	113.52	0.68	114.54	1.85	115.56	2.51
112.52	0.00	113.54	0.72	114.56	1.86	115.58	2.52
112.54	0.00	113.56	0.76	114.58	1.88	115.60	2.53
112.56	0.00	113.58	0.80	114.60	1.89	115.62	2.54
112.58	0.00	113.60	0.84	114.62	1.91	115.64	2.55
112.60	0.00	113.62	0.88	114.64	1.92	115.66	2.56
112.62	0.00	113.64	0.92	114.66	1.94	115.68	2.57
112.64	0.00	113.66	0.96	114.68	1.95	115.70	2.59
112.66	0.00	113.68	0.99	114.70	1.96	115.72	2.60
112.68	0.00	113.70	1.02	114.72	1.98	115.74	2.61
112.70	0.00	113.72	1.05	114.74	1.99	115.76	2.62
112.72	0.00	113.74	1.07	114.76	2.01	115.78	2.63
112.74	0.00	113.76	1.10	114.78	2.02	115.80	2.64
112.76	0.00	113.78	1.12	114.80	2.04	115.82	2.65
112.78	0.00	113.80	1.15	114.82	2.05	115.84	2.66
112.80	0.00	113.82	1.17	114.84	2.06	115.86	2.67
112.82	0.00	113.84	1.20	114.86	2.08	115.88	2.68
112.84	0.00	113.86	1.22	114.88	2.09	115.90	2.69
112.86	0.00	113.88	1.24	114.90	2.10	115.92	2.70
112.88	0.00	113.90	1.24	114.92	2.12	115.94	2.71
112.90	0.00	113.92	1.27	114.94	2.13	115.96	2.72
112.92	0.00	113.94	1.29	114.96	2.14	115.98	2.73
112.94	0.00	113.96	1.32	114.98	2.16	116.00	2.74
112.96	0.00	113.98	1.34	115.00	2.17	116.02	2.75
112.98	0.00	114.00	1.36	115.02	2.18	116.04	2.77
113.00	0.00	114.02	1.39	115.04	2.20	116.06	2.78
113.02	0.00	114.04	1.41	115.06	2.21	116.08	2.79
113.04	0.01	114.06	1.43	115.08	2.22	116.10	2.80
113.06	0.01	114.08	1.45	115.10	2.23	116.12	2.81
113.08	0.02	114.10	1.47	115.12	2.25	116.14	2.82
113.10	0.04	114.12	1.49	115.14	2.26	116.16	2.83
113.12	0.05	114.14	1.51	115.16	2.27	116.18	2.84
113.14	0.07	114.16	1.53	115.18	2.28	116.20	2.85
113.16	0.09	114.18	1.55	115.20	2.30	116.22	2.86
113.18	0.11	114.20	1.56	115.22	2.31	116.24	2.87
113.20	0.13	114.22	1.58	115.24	2.32		
113.22	0.16	114.24	1.60	115.26	2.33		
113.24	0.19	114.26	1.62	115.28	2.35		
113.26	0.22	114.28	1.64	115.30	2.36		
113.28	0.25	114.30	1.65	115.32	2.37		
113.30	0.28	114.32	1.67	115.34	2.38		
113.32	0.31	114.34	1.69	115.36	2.39		
113.34	0.34	114.36	1.70	115.38	2.40		
113.36	0.38	114.38	1.72	115.40	2.42		
113.38	0.42	114.40	1.74	115.42	2.43		
113.40	0.45	114.42	1.75	115.44	2.44		
113.42	0.49	114.44	1.77	115.46	2.45		
113.44	0.53	114.46	1.78	115.48	2.46		
113.46	0.57	114.48	1.80	115.50	2.47		
113.48	0.61	114.50	1.82	115.52	2.49		
113.50	0.64	114.52	1.83	115.54	2.50		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 10-YEAR Rainfall=5.06"

Printed 11/12/2025

Page 94

Stage-Area-Storage for Pond 5P: Underground Detention Chamber

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
112.50	0	115.05	989
112.55	12	115.10	1,007
112.60	24	115.15	1,024
112.65	35	115.20	1,042
112.70	47	115.25	1,058
112.75	59	115.30	1,075
112.80	71	115.35	1,091
112.85	83	115.40	1,106
112.90	94	115.45	1,121
112.95	106	115.50	1,136
113.00	118	115.55	1,149
113.05	141	115.60	1,162
113.10	164	115.65	1,175
113.15	187	115.70	1,187
113.20	210	115.75	1,199
113.25	233	115.80	1,211
113.30	256	115.85	1,223
113.35	279	115.90	1,235
113.40	302	115.95	1,247
113.45	324	116.00	1,258
113.50	347	116.05	1,270
113.55	370	116.10	1,282
113.60	392	116.15	1,294
113.65	414	116.20	1,306
113.70	437	116.25	1,317
113.75	459		
113.80	481		
113.85	503		
113.90	525		
113.95	546		
114.00	568		
114.05	590		
114.10	611		
114.15	632		
114.20	654		
114.25	675		
114.30	696		
114.35	716		
114.40	737		
114.45	757		
114.50	778		
114.55	798		
114.60	818		
114.65	838		
114.70	857		
114.75	877		
114.80	896		
114.85	915		
114.90	934		
114.95	953		
115.00	971		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 95

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1-1:	Runoff Area=0.308 ac 0.00% Impervious Runoff Depth>3.99" Flow Length=80' Slope=0.0180 '/' Tc=8.6 min CN=80 Runoff=1.36 cfs 0.102 af
SubcatchmentP1-2:	Runoff Area=0.717 ac 79.22% Impervious Runoff Depth>5.53" Tc=6.0 min CN=94 Runoff=4.42 cfs 0.330 af
SubcatchmentP1-3:	Runoff Area=0.232 ac 68.97% Impervious Runoff Depth>5.30" Tc=6.0 min CN=92 Runoff=1.40 cfs 0.102 af
SubcatchmentP1-4:	Runoff Area=0.824 ac 72.82% Impervious Runoff Depth>5.41" Tc=6.0 min CN=93 Runoff=5.03 cfs 0.372 af
SubcatchmentP2-1:	Runoff Area=0.197 ac 10.15% Impervious Runoff Depth>4.10" Tc=6.0 min CN=81 Runoff=0.99 cfs 0.067 af
SubcatchmentP2-2:	Runoff Area=0.353 ac 100.00% Impervious Runoff Depth>6.00" Tc=6.0 min CN=98 Runoff=2.23 cfs 0.176 af
SubcatchmentP3-1:	Runoff Area=0.337 ac 6.82% Impervious Runoff Depth>4.10" Flow Length=51' Slope=0.0180 '/' Tc=6.0 min CN=81 Runoff=1.69 cfs 0.115 af
SubcatchmentP3-2:	Runoff Area=0.633 ac 69.83% Impervious Runoff Depth>5.30" Tc=6.0 min CN=92 Runoff=3.82 cfs 0.280 af
SubcatchmentP3-3:	Runoff Area=0.727 ac 73.59% Impervious Runoff Depth>5.41" Tc=6.0 min CN=93 Runoff=4.43 cfs 0.328 af
SubcatchmentP4-1:	Runoff Area=0.582 ac 6.70% Impervious Runoff Depth>4.10" Tc=6.0 min CN=81 Runoff=2.93 cfs 0.199 af
SubcatchmentP4-2:	Runoff Area=0.250 ac 64.80% Impervious Runoff Depth>5.30" Tc=6.0 min CN=92 Runoff=1.51 cfs 0.110 af
SubcatchmentP4-3: Building "B" Roof	Runoff Area=0.296 ac 100.00% Impervious Runoff Depth>6.00" Tc=6.0 min CN=98 Runoff=1.87 cfs 0.148 af
SubcatchmentP4-4: Building "A" Roof	Runoff Area=0.330 ac 100.00% Impervious Runoff Depth>6.00" Tc=6.0 min CN=98 Runoff=2.09 cfs 0.165 af
SubcatchmentP5: Flow towards the	Runoff Area=0.222 ac 0.00% Impervious Runoff Depth>3.89" Tc=6.0 min CN=79 Runoff=1.07 cfs 0.072 af
SubcatchmentP6: Flow to Blue Hills Ave	Runoff Area=0.083 ac 51.81% Impervious Runoff Depth>4.96" Tc=6.0 min CN=89 Runoff=0.48 cfs 0.034 af
Reach R1: Flow towards the west	Inflow=11.97 cfs 0.888 af Outflow=11.97 cfs 0.888 af

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 96

Reach R2: Flow towards the north

Inflow=3.22 cfs 0.244 af

Outflow=3.22 cfs 0.244 af

Reach R3: Flow towards the northeast

Inflow=9.77 cfs 0.702 af

Outflow=9.77 cfs 0.702 af

Reach R4: Flow towards the south

Inflow=7.14 cfs 0.595 af

Outflow=7.14 cfs 0.595 af

Reach TS: Total Site

Inflow=33.58 cfs 2.534 af

Outflow=33.58 cfs 2.534 af

Pond 1P: Bioretention Basin 1

Peak Elev=115.40' Storage=1,046 cf Inflow=1.40 cfs 0.102 af

Outflow=1.29 cfs 0.083 af

Pond 2P: Bioretention Basin 2

Peak Elev=115.88' Storage=1,235 cf Inflow=3.82 cfs 0.280 af

Outflow=3.68 cfs 0.259 af

Pond 3P: Bioretention Basin 3

Peak Elev=115.95' Storage=1,012 cf Inflow=1.51 cfs 0.110 af

Outflow=1.43 cfs 0.091 af

Pond 4P: Underground Detention Chamber

Peak Elev=114.06' Storage=594 cf Inflow=1.87 cfs 0.148 af

8.0" Round Culvert n=0.011 L=25.0' S=0.0100 '/' Outflow=1.43 cfs 0.144 af

Pond 5P: Underground Detention Chamber

Peak Elev=114.20' Storage=653 cf Inflow=2.09 cfs 0.165 af

8.0" Round Culvert n=0.011 L=25.0' S=0.0100 '/' Outflow=1.56 cfs 0.161 af

Total Runoff Area = 6.091 ac Runoff Volume = 2.601 af Average Runoff Depth = 5.12"
41.37% Pervious = 2.520 ac 58.63% Impervious = 3.571 ac

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 97

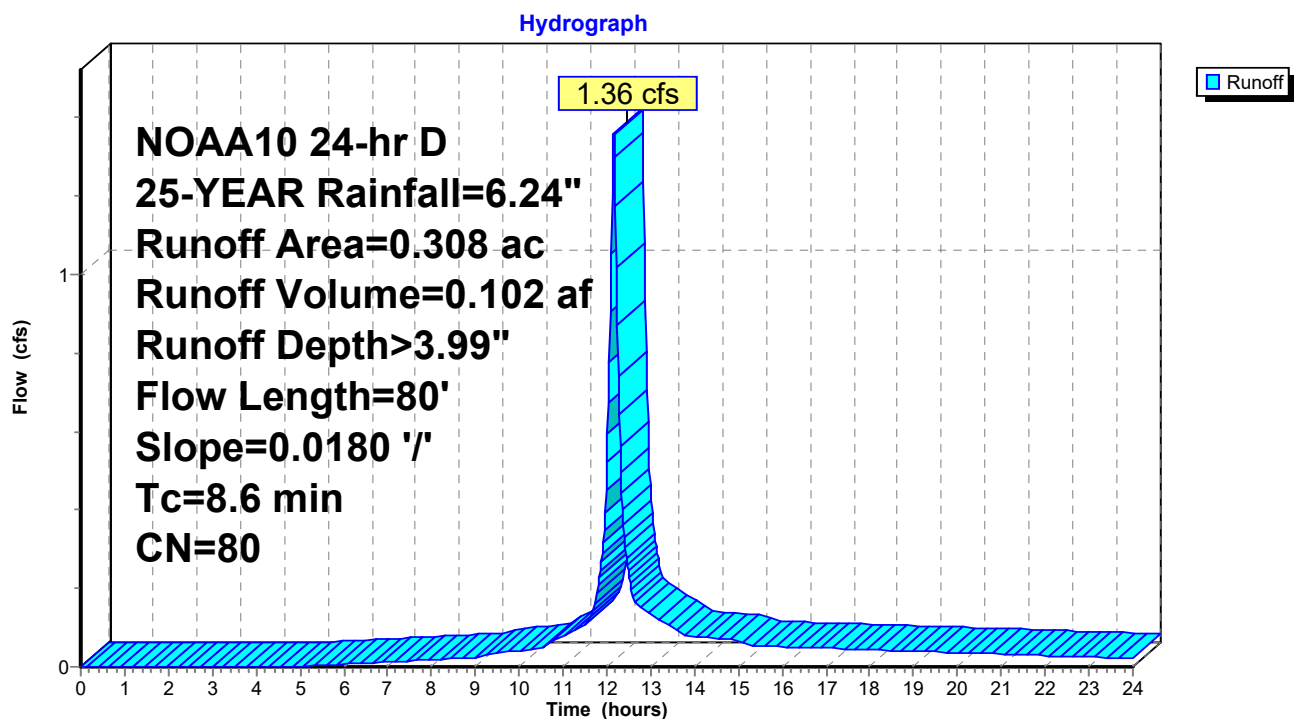
Summary for Subcatchment P1-1:

Runoff = 1.36 cfs @ 12.16 hrs, Volume= 0.102 af, Depth> 3.99"
Routed to Reach R1 : Flow towards the west

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.236	80	>75% Grass cover, Good, HSG D
0.072	79	Woods, Fair, HSG D
0.000	98	Paved parking, HSG D
0.308	80	Weighted Average
0.308		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	80	0.0180	0.16		Sheet Flow, Seg 1
					Grass: Short n= 0.150 P2= 3.17"

Subcatchment P1-1:

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 98

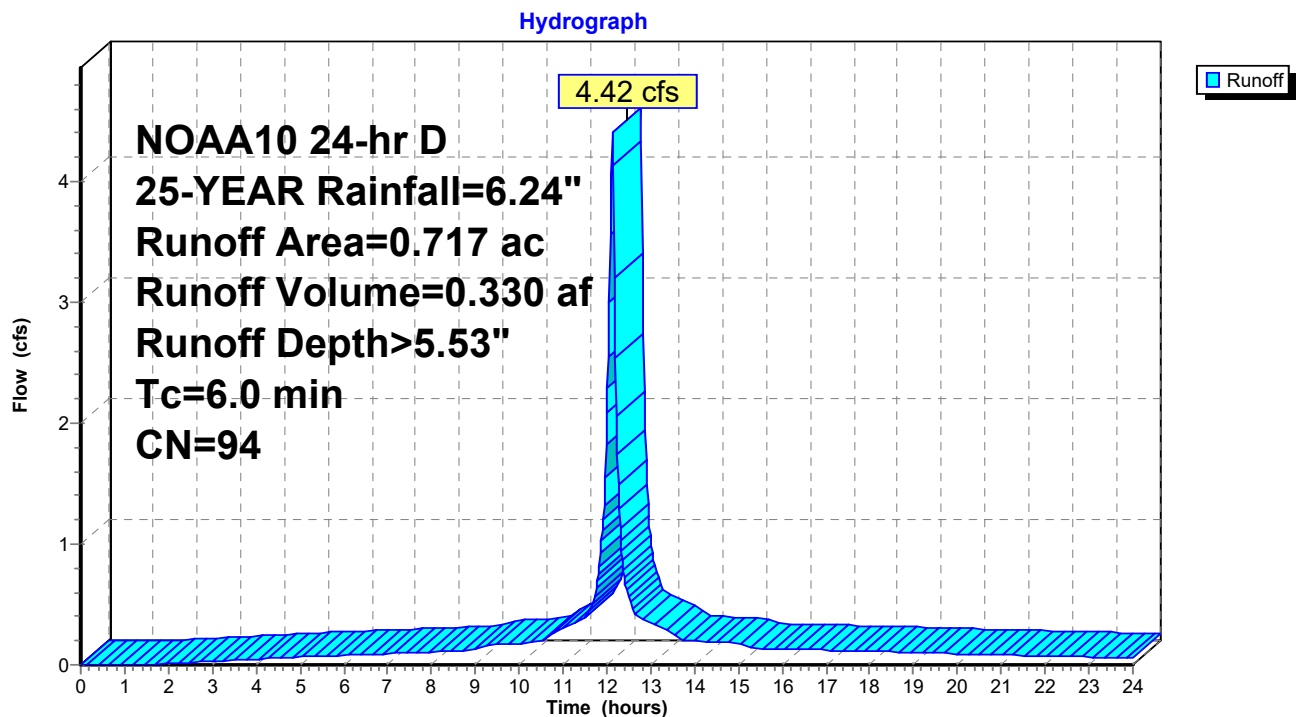
Summary for Subcatchment P1-2:

Runoff = 4.42 cfs @ 12.13 hrs, Volume= 0.330 af, Depth> 5.53"
Routed to Reach R1 : Flow towards the west

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.149	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.568	98	Paved parking, HSG D
0.717	94	Weighted Average
0.149		20.78% Pervious Area
0.568		79.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P1-2:

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 99

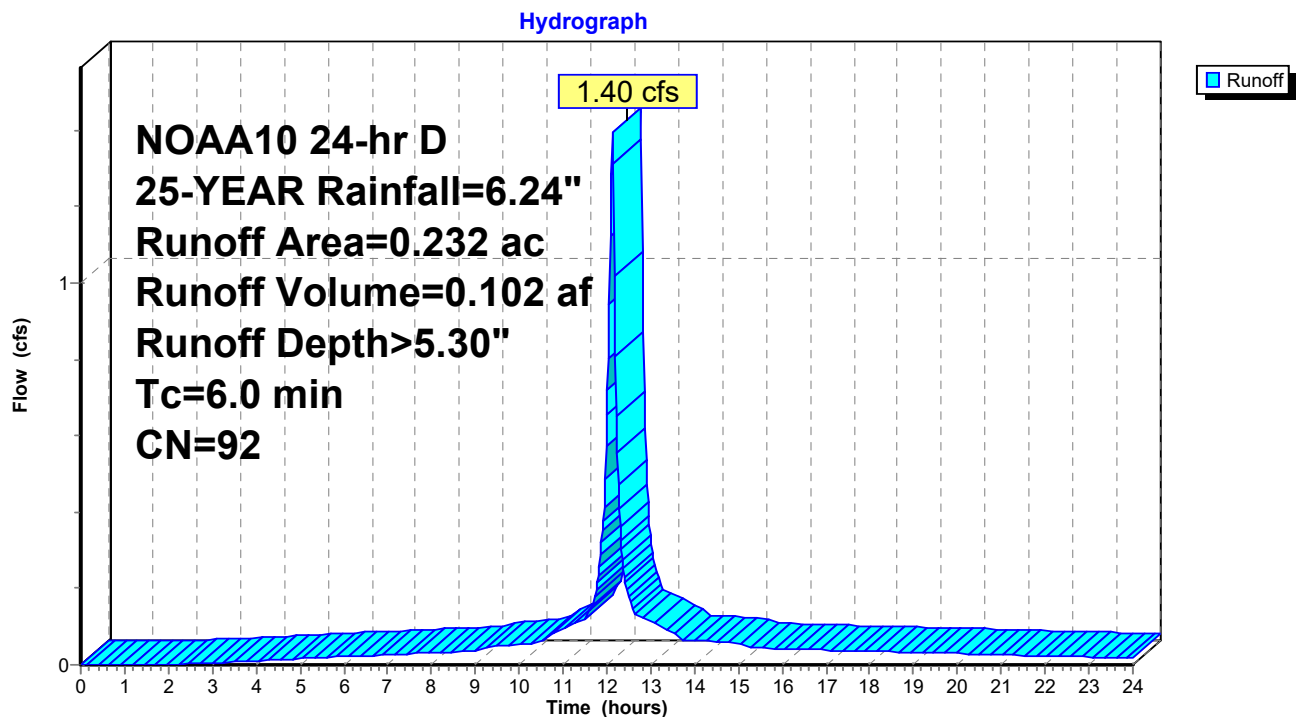
Summary for Subcatchment P1-3:

Runoff = 1.40 cfs @ 12.13 hrs, Volume= 0.102 af, Depth> 5.30"
Routed to Pond 1P : Bioretention Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.072	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.160	98	Paved parking, HSG D
0.232	92	Weighted Average
0.072		31.03% Pervious Area
0.160		68.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P1-3:

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 100

Summary for Subcatchment P1-4:

Runoff = 5.03 cfs @ 12.13 hrs, Volume= 0.372 af, Depth> 5.41"
Routed to Reach R1 : Flow towards the west

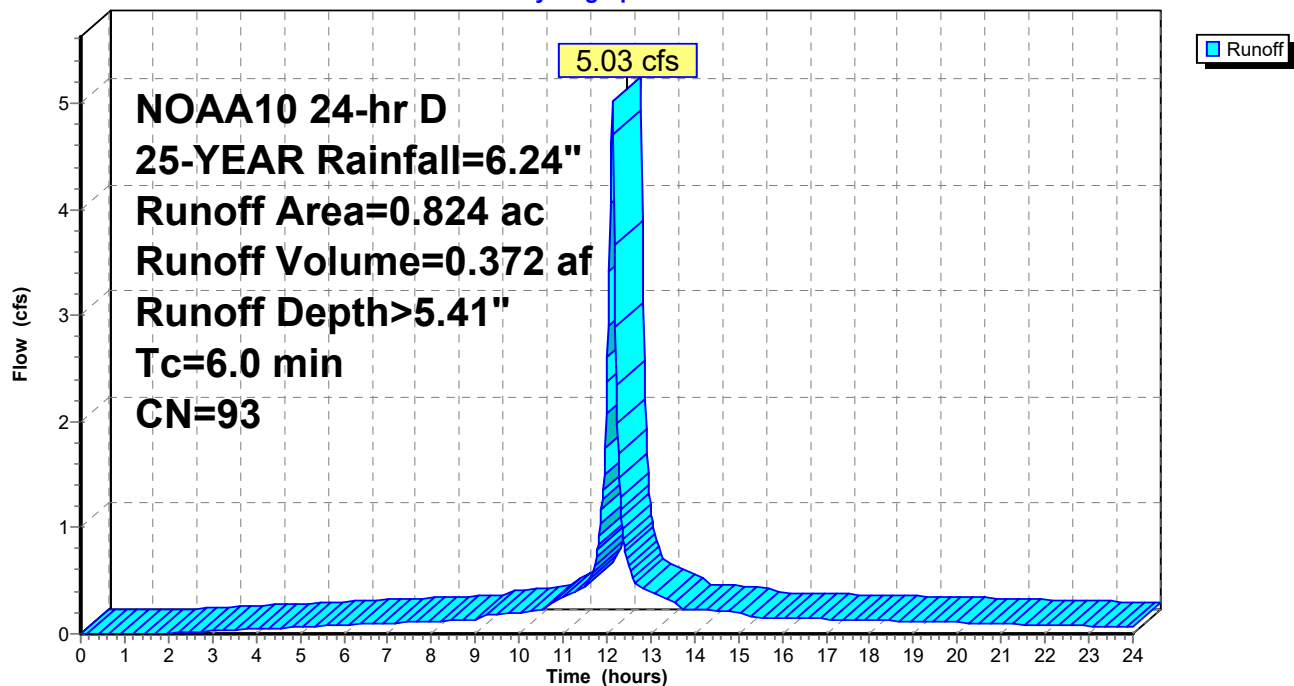
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.224	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.600	98	Paved parking, HSG D
0.824	93	Weighted Average
0.224		27.18% Pervious Area
0.600		72.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P1-4:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 101

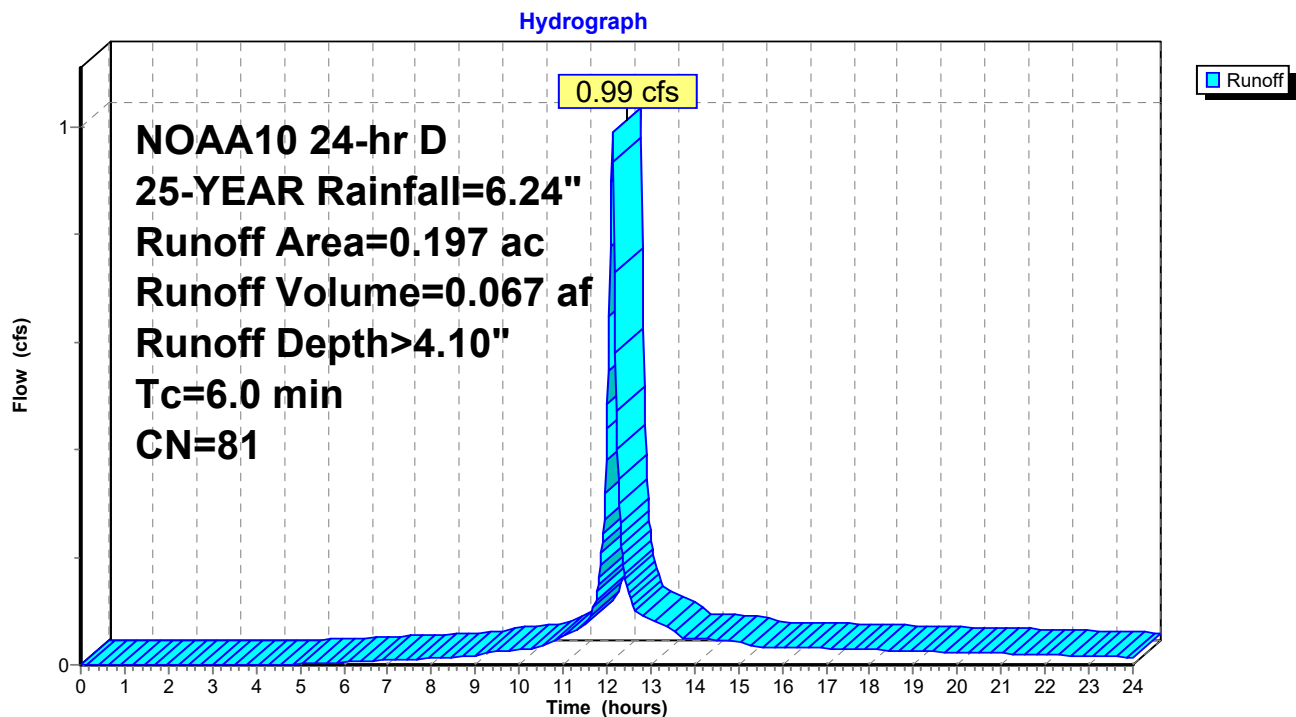
Summary for Subcatchment P2-1:

Runoff = 0.99 cfs @ 12.13 hrs, Volume= 0.067 af, Depth> 4.10"
Routed to Reach R2 : Flow towards the north

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.093	80	>75% Grass cover, Good, HSG D
0.084	79	Woods, Fair, HSG D
0.020	98	Paved parking, HSG D
0.197	81	Weighted Average
0.177		89.85% Pervious Area
0.020		10.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P2-1:

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 102

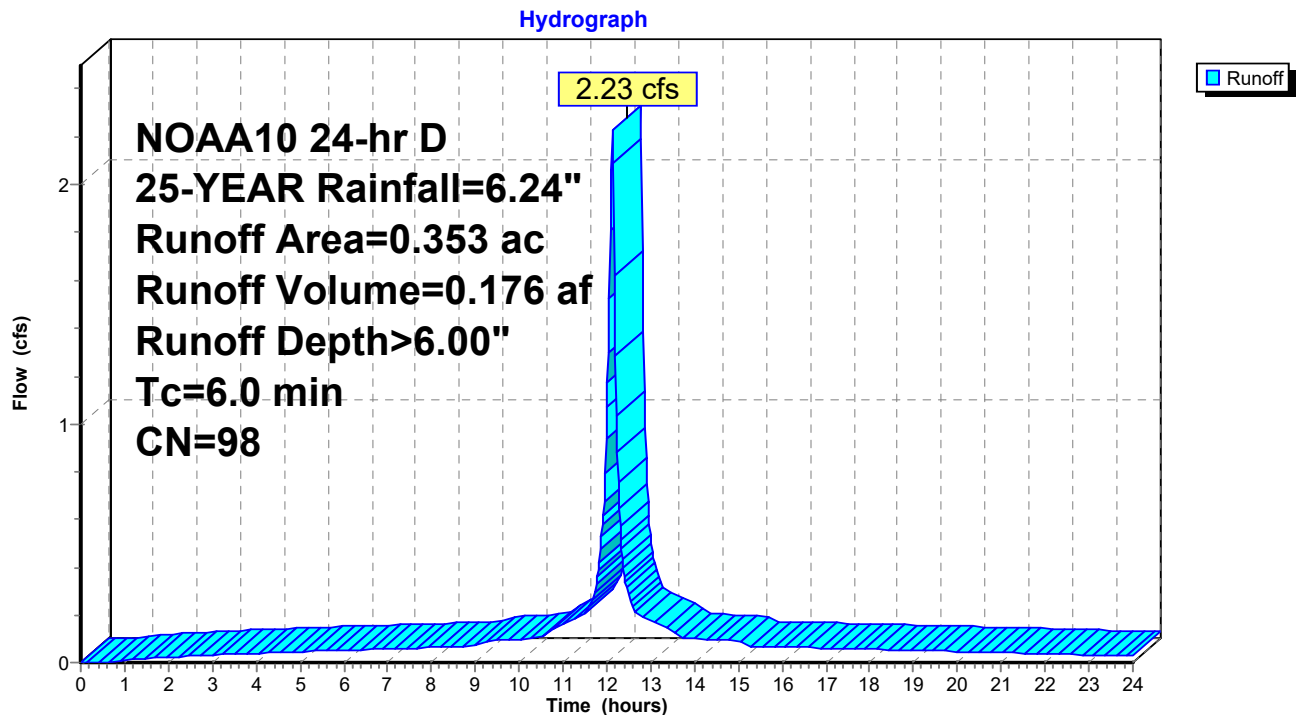
Summary for Subcatchment P2-2:

Runoff = 2.23 cfs @ 12.13 hrs, Volume= 0.176 af, Depth> 6.00"
Routed to Reach R2 : Flow towards the north

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.000	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.353	98	Paved parking, HSG D
0.353	98	Weighted Average
0.353		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P2-2:

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 103

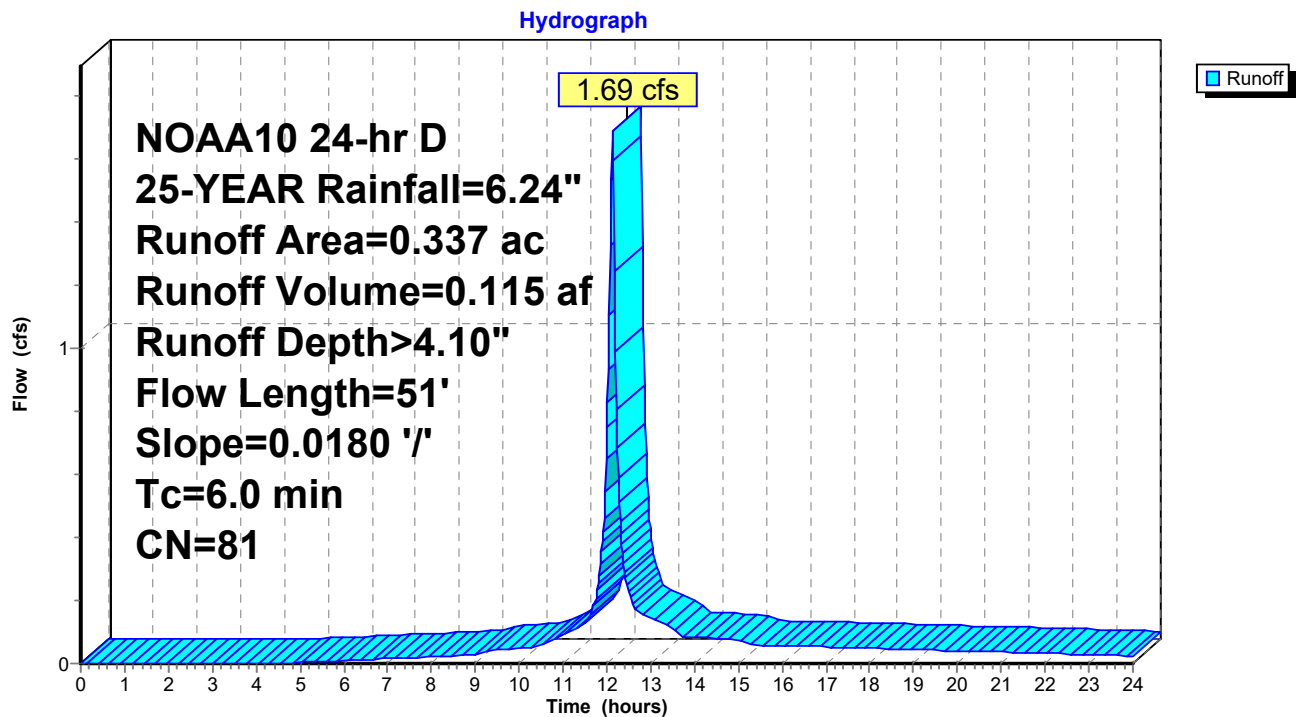
Summary for Subcatchment P3-1:

Runoff = 1.69 cfs @ 12.13 hrs, Volume= 0.115 af, Depth> 4.10"
Routed to Reach R3 : Flow towards the northeast

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.244	80	>75% Grass cover, Good, HSG D
0.070	79	Woods, Fair, HSG D
0.023	98	Paved parking, HSG D
0.337	81	Weighted Average
0.314		93.18% Pervious Area
0.023		6.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	51	0.0180	0.14		Sheet Flow, Seg 1 Grass: Short n= 0.150 P2= 3.17"

Subcatchment P3-1:

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 104

Summary for Subcatchment P3-2:

Runoff = 3.82 cfs @ 12.13 hrs, Volume= 0.280 af, Depth> 5.30"
Routed to Pond 2P : Bioretention Basin 2

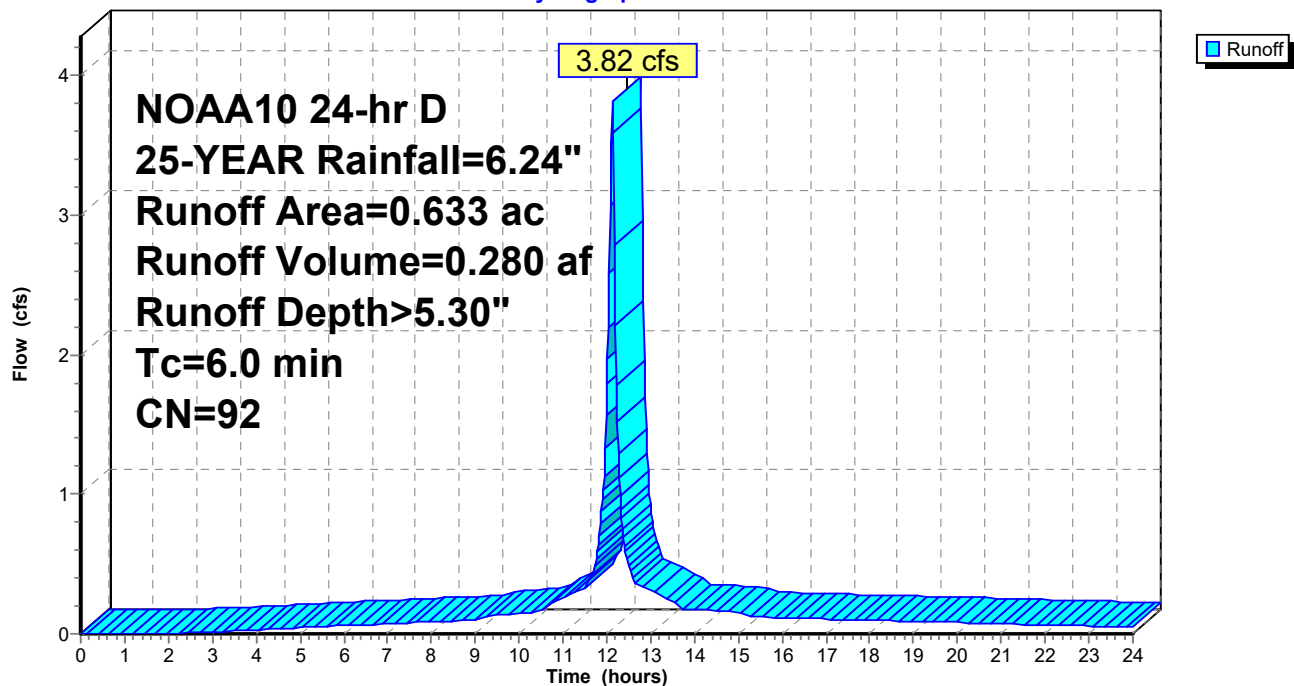
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.147	80	>75% Grass cover, Good, HSG D
0.044	79	Woods, Fair, HSG D
0.442	98	Paved parking, HSG D
0.633	92	Weighted Average
0.191		30.17% Pervious Area
0.442		69.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P3-2:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 105

Summary for Subcatchment P3-3:

Runoff = 4.43 cfs @ 12.13 hrs, Volume= 0.328 af, Depth> 5.41"
Routed to Reach R3 : Flow towards the northeast

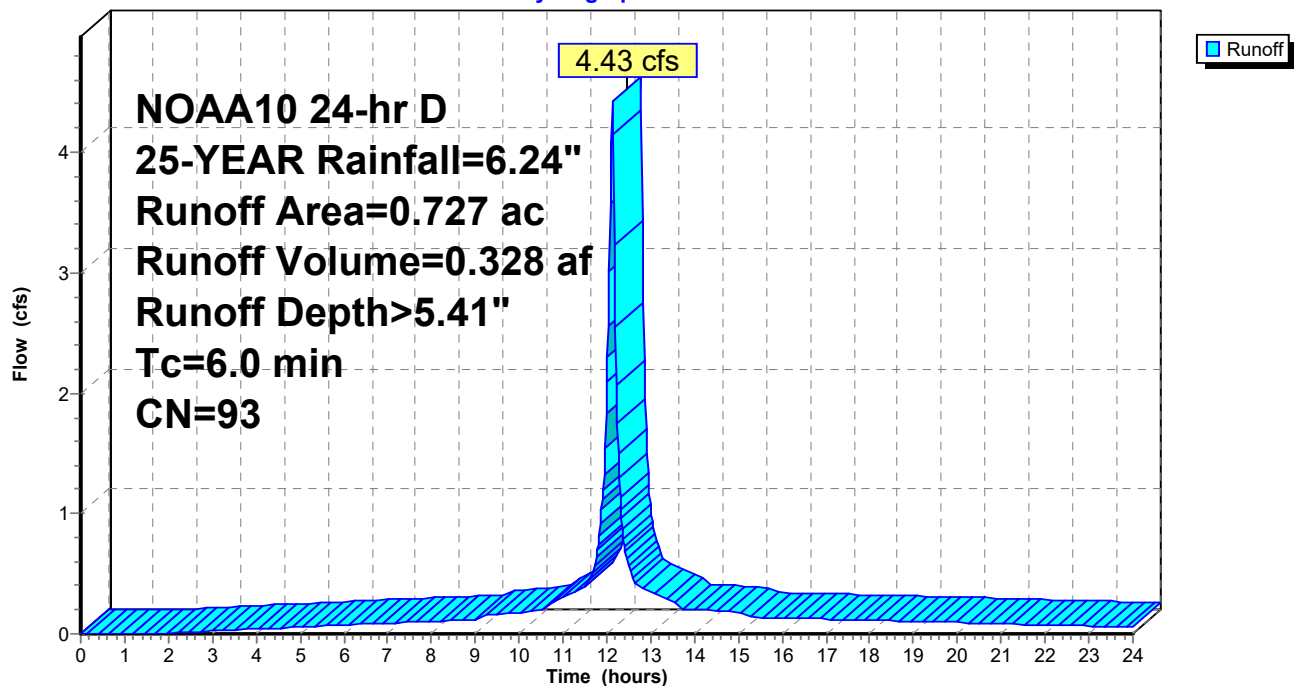
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.192	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.535	98	Paved parking, HSG D
0.727	93	Weighted Average
0.192		26.41% Pervious Area
0.535		73.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P3-3:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 106

Summary for Subcatchment P4-1:

Runoff = 2.93 cfs @ 12.13 hrs, Volume= 0.199 af, Depth> 4.10"
Routed to Reach R4 : Flow towards the south

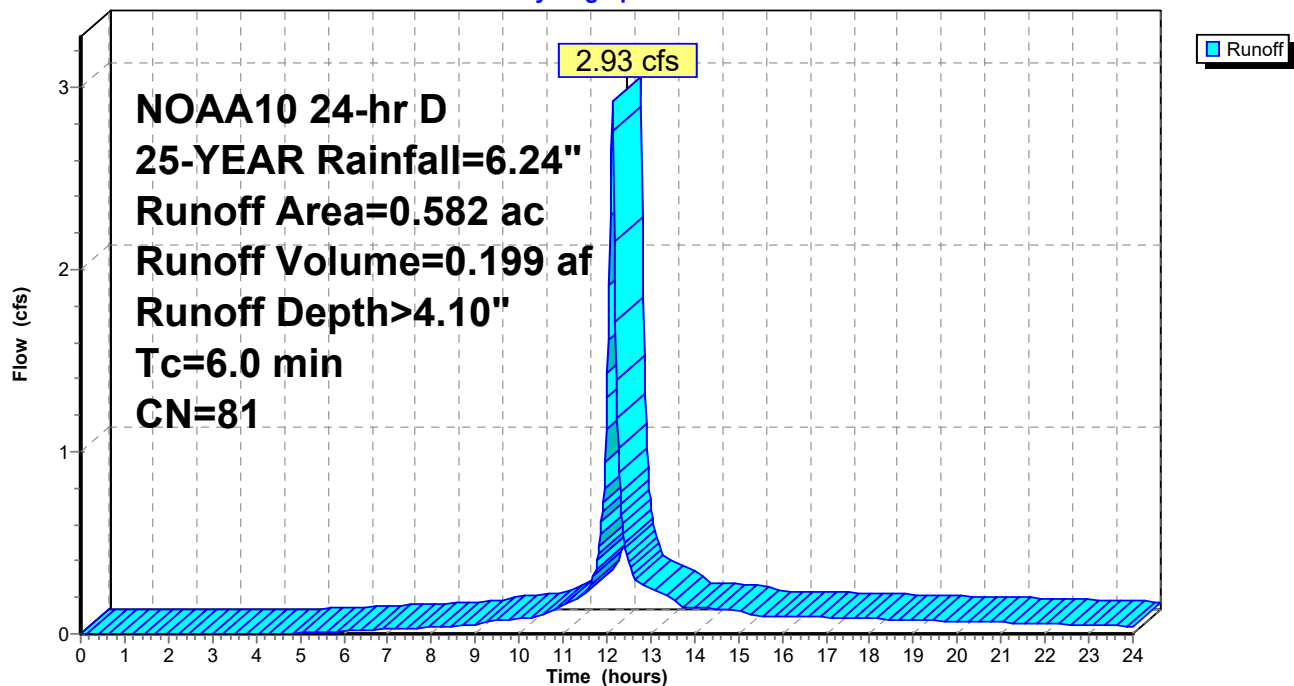
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.431	80	>75% Grass cover, Good, HSG D
0.112	79	Woods, Fair, HSG D
0.039	98	Paved parking, HSG D
0.582	81	Weighted Average
0.543		93.30% Pervious Area
0.039		6.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P4-1:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 107

Summary for Subcatchment P4-2:

Runoff = 1.51 cfs @ 12.13 hrs, Volume= 0.110 af, Depth> 5.30"
Routed to Pond 3P : Bioretention Basin 3

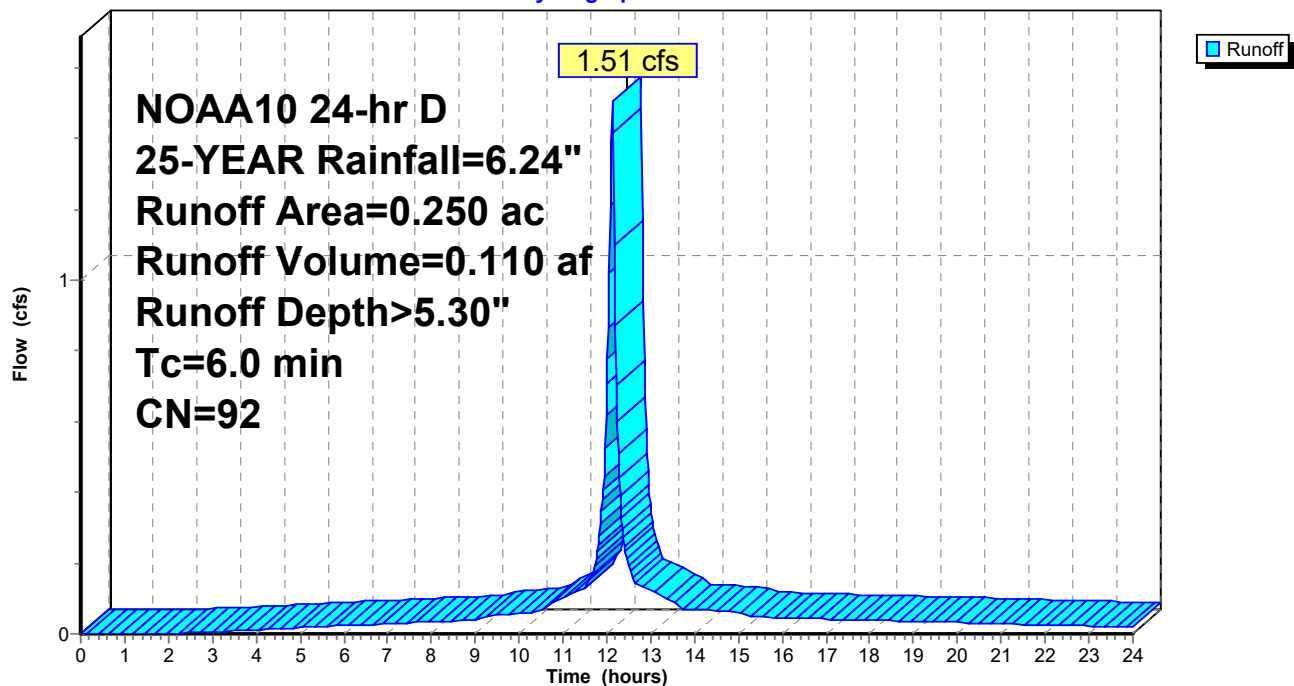
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.088	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.162	98	Paved parking, HSG D
0.250	92	Weighted Average
0.088		35.20% Pervious Area
0.162		64.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P4-2:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 108

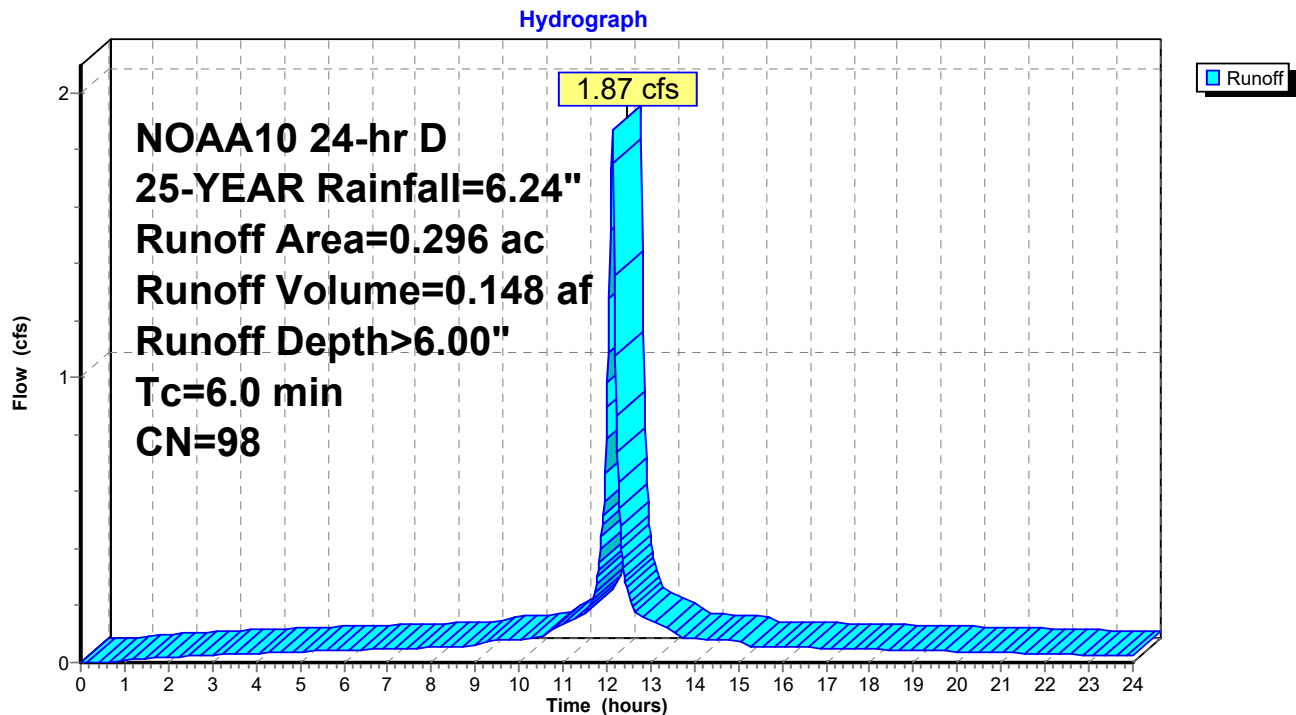
Summary for Subcatchment P4-3: Building "B" Roof

Runoff = 1.87 cfs @ 12.13 hrs, Volume= 0.148 af, Depth> 6.00"
Routed to Pond 4P : Underground Detention Chamber

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.000	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.296	98	Paved parking, HSG D
0.296	98	Weighted Average
0.296		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P4-3: Building "B" Roof

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 109

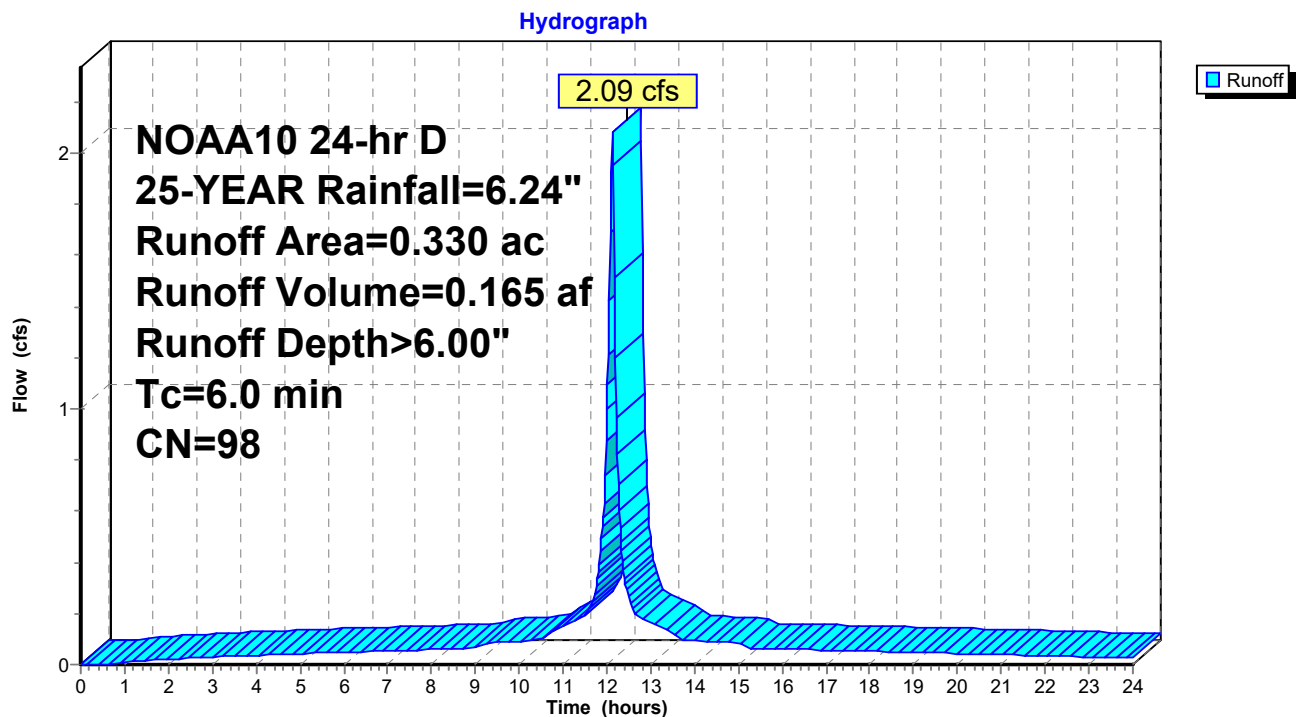
Summary for Subcatchment P4-4: Building "A" Roof

Runoff = 2.09 cfs @ 12.13 hrs, Volume= 0.165 af, Depth> 6.00"
Routed to Pond 5P : Underground Detention Chamber

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.000	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.330	98	Paved parking, HSG D
0.330	98	Weighted Average
0.330		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P4-4: Building "A" Roof

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 110

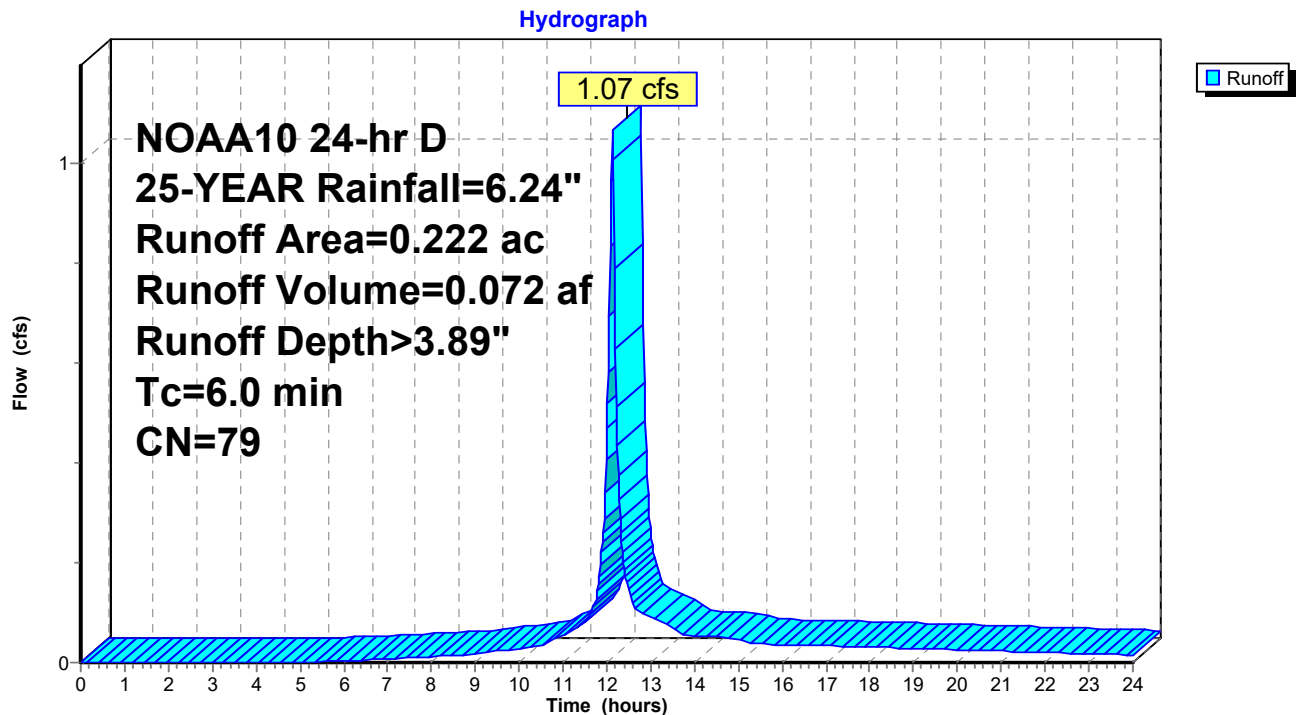
Summary for Subcatchment P5: Flow towards the southeast

Runoff = 1.07 cfs @ 12.13 hrs, Volume= 0.072 af, Depth> 3.89"
Routed to Reach TS : Total Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.067	80	>75% Grass cover, Good, HSG D
0.155	79	Woods, Fair, HSG D
0.000	98	Paved parking, HSG D
0.222	79	Weighted Average
0.222		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P5: Flow towards the southeast

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 111

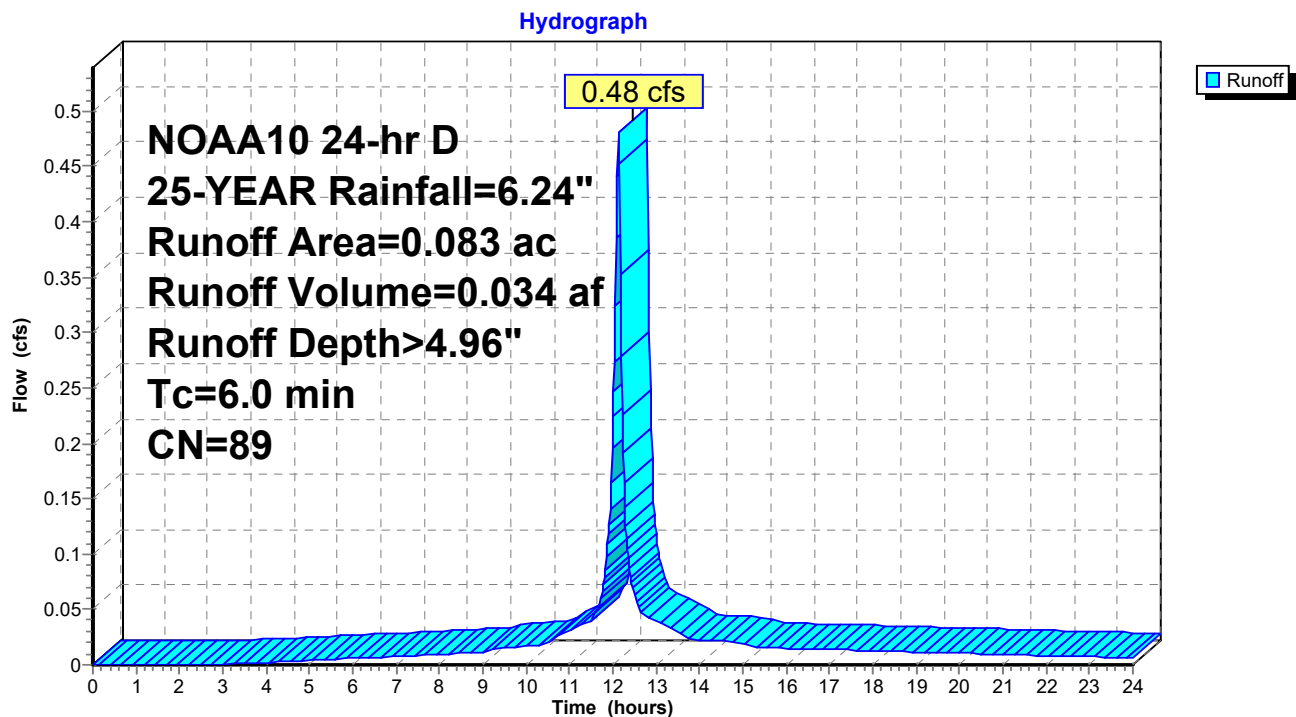
Summary for Subcatchment P6: Flow to Blue Hills Ave

Runoff = 0.48 cfs @ 12.13 hrs, Volume= 0.034 af, Depth> 4.96"
Routed to Reach TS : Total Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Area (ac)	CN	Description
0.040	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.043	98	Paved parking, HSG D
0.083	89	Weighted Average
0.040		48.19% Pervious Area
0.043		51.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P6: Flow to Blue Hills Ave

Summary for Reach R1: Flow towards the west

[40] Hint: Not Described (Outflow=Inflow)

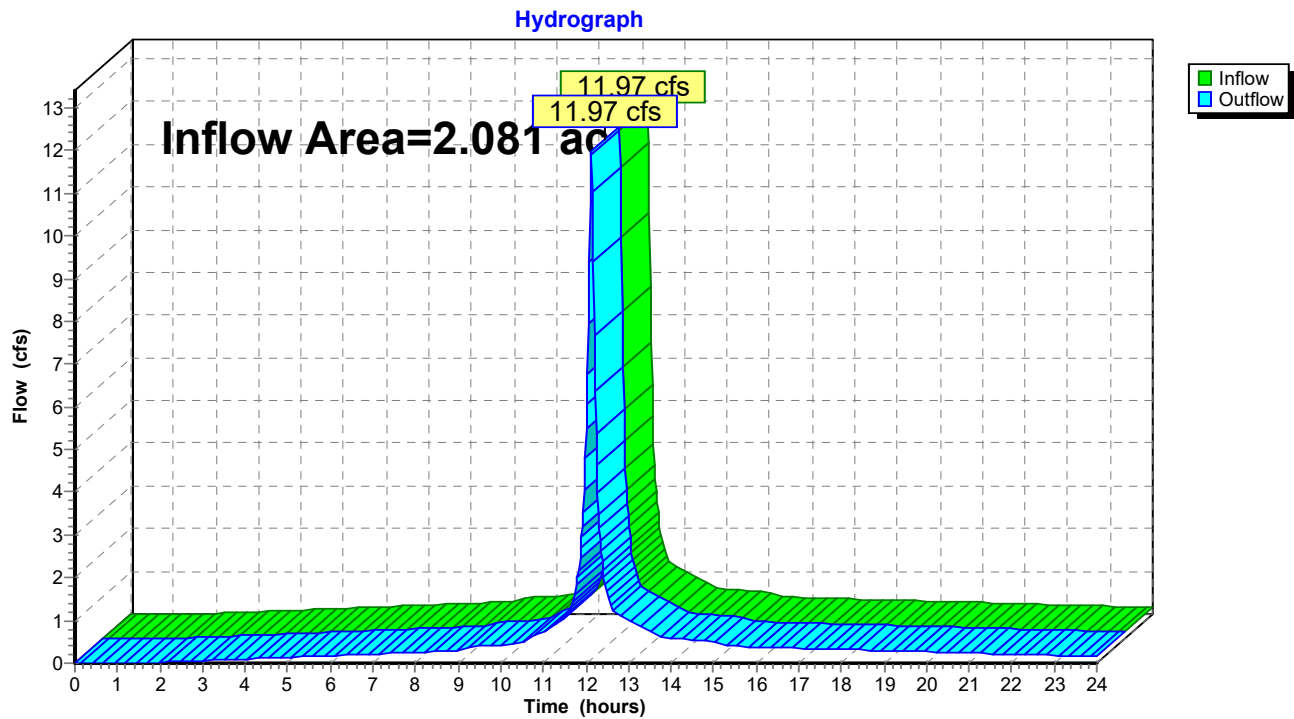
Inflow Area = 2.081 ac, 63.82% Impervious, Inflow Depth > 5.12" for 25-YEAR event

Inflow = 11.97 cfs @ 12.13 hrs, Volume= 0.888 af

Outflow = 11.97 cfs @ 12.13 hrs, Volume= 0.888 af, Atten= 0%, Lag= 0.0 min

Routed to Reach TS : Total Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach R1: Flow towards the west

Summary for Reach R2: Flow towards the north

[40] Hint: Not Described (Outflow=Inflow)

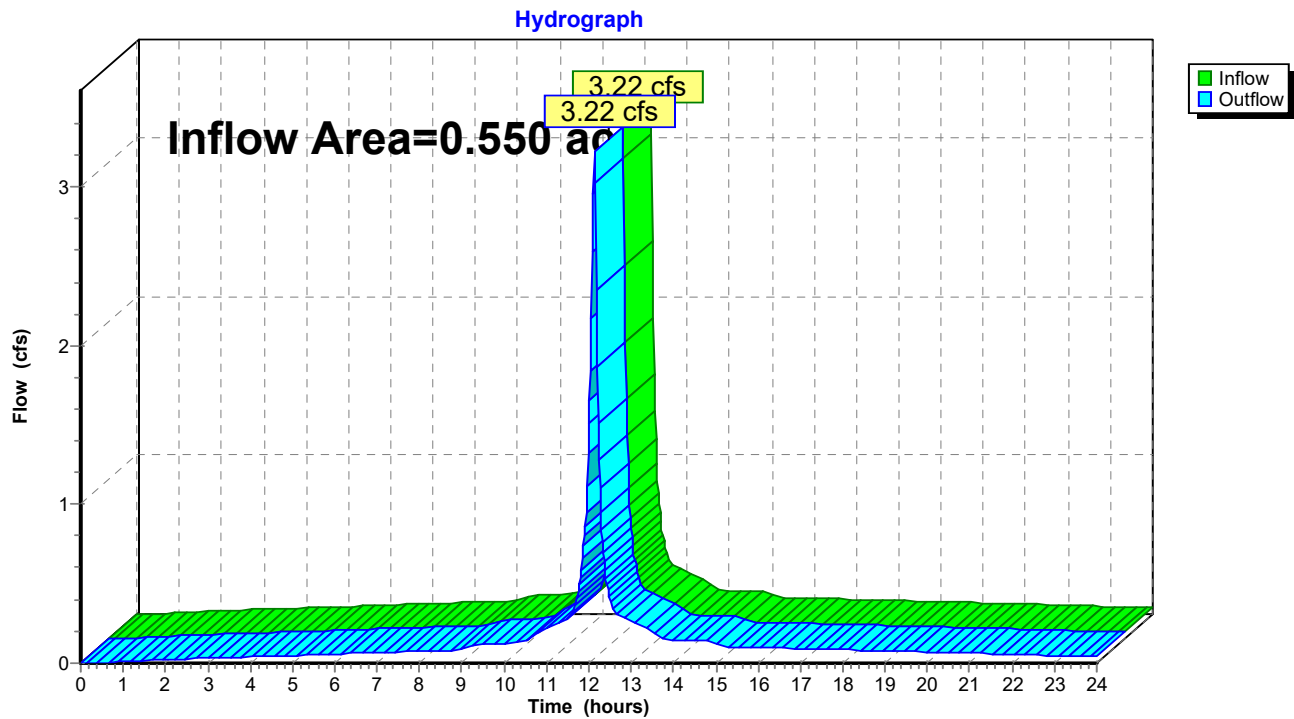
Inflow Area = 0.550 ac, 67.82% Impervious, Inflow Depth > 5.32" for 25-YEAR event

Inflow = 3.22 cfs @ 12.13 hrs, Volume= 0.244 af

Outflow = 3.22 cfs @ 12.13 hrs, Volume= 0.244 af, Atten= 0%, Lag= 0.0 min

Routed to Reach TS : Total Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach R2: Flow towards the north

Summary for Reach R3: Flow towards the northeast

[40] Hint: Not Described (Outflow=Inflow)

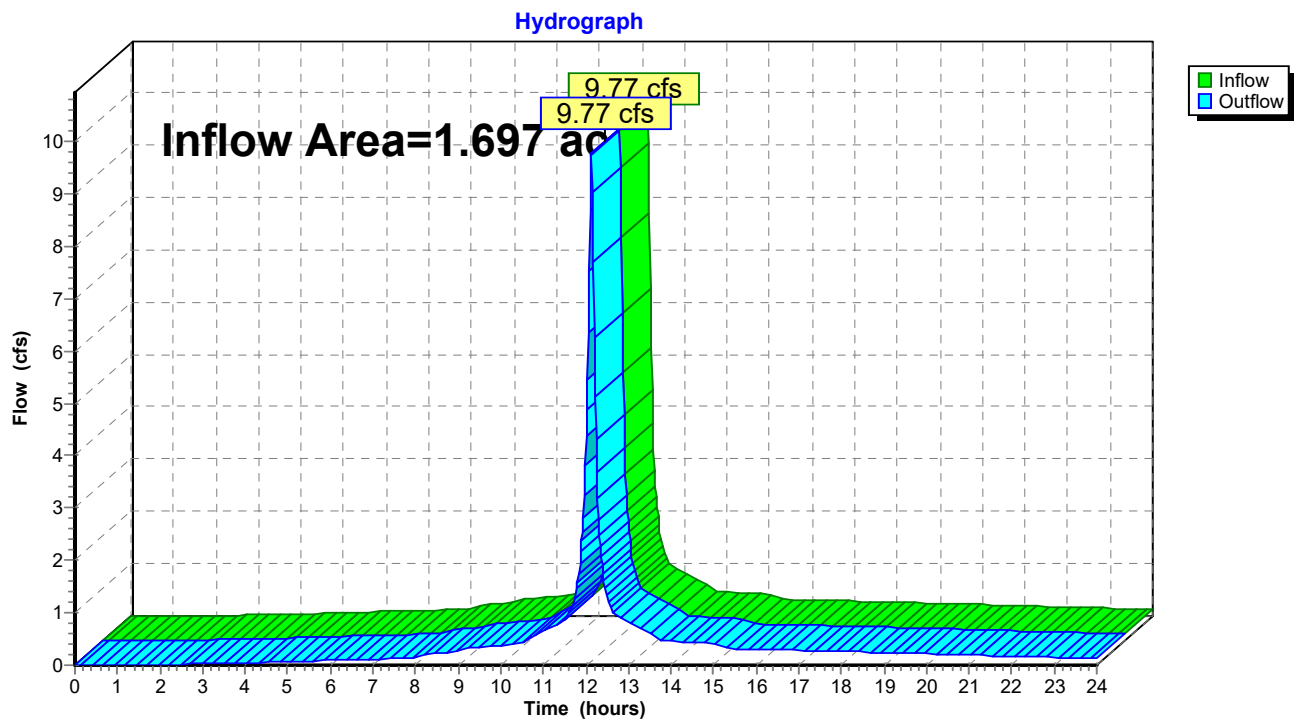
Inflow Area = 1.697 ac, 58.93% Impervious, Inflow Depth > 4.96" for 25-YEAR event

Inflow = 9.77 cfs @ 12.13 hrs, Volume= 0.702 af

Outflow = 9.77 cfs @ 12.13 hrs, Volume= 0.702 af, Atten= 0%, Lag= 0.0 min

Routed to Reach TS : Total Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach R3: Flow towards the northeast

Summary for Reach R4: Flow towards the south

[40] Hint: Not Described (Outflow=Inflow)

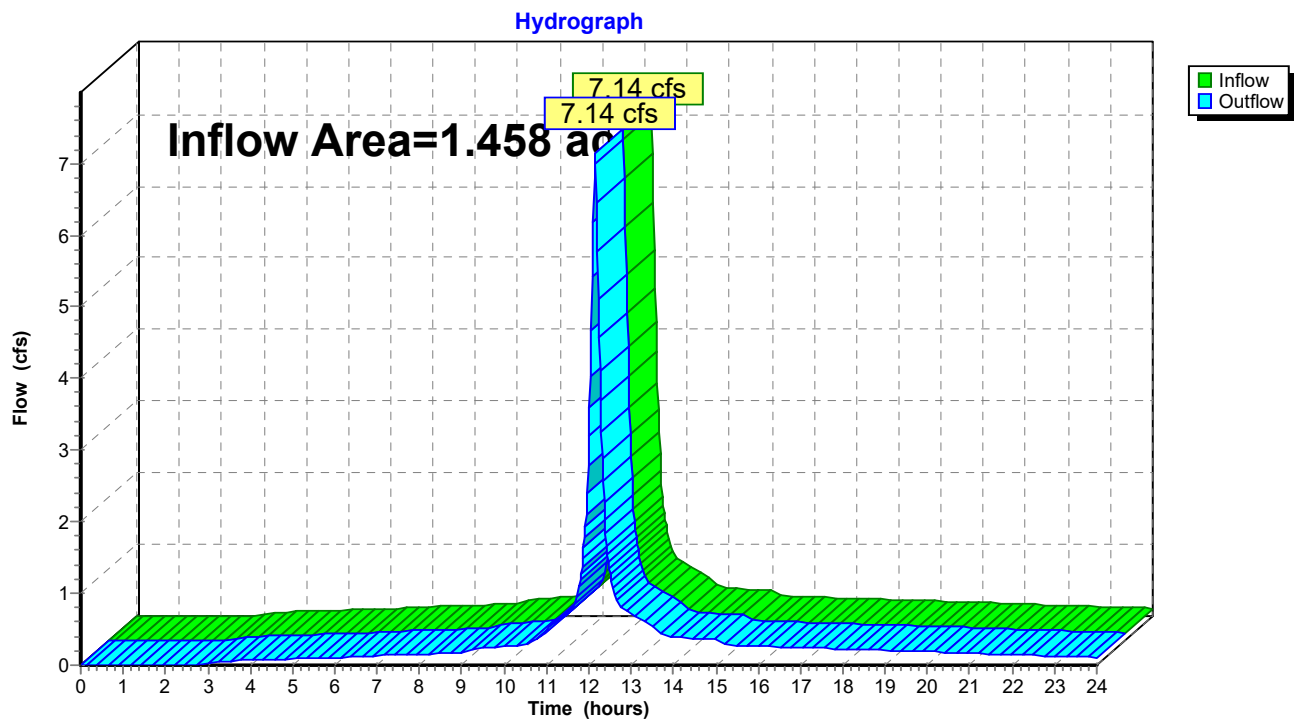
Inflow Area = 1.458 ac, 56.72% Impervious, Inflow Depth > 4.90" for 25-YEAR event

Inflow = 7.14 cfs @ 12.14 hrs, Volume= 0.595 af

Outflow = 7.14 cfs @ 12.14 hrs, Volume= 0.595 af, Atten= 0%, Lag= 0.0 min

Routed to Reach TS : Total Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach R4: Flow towards the south

Summary for Reach TS: Total Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.091 ac, 58.63% Impervious, Inflow Depth > 4.99" for 25-YEAR event

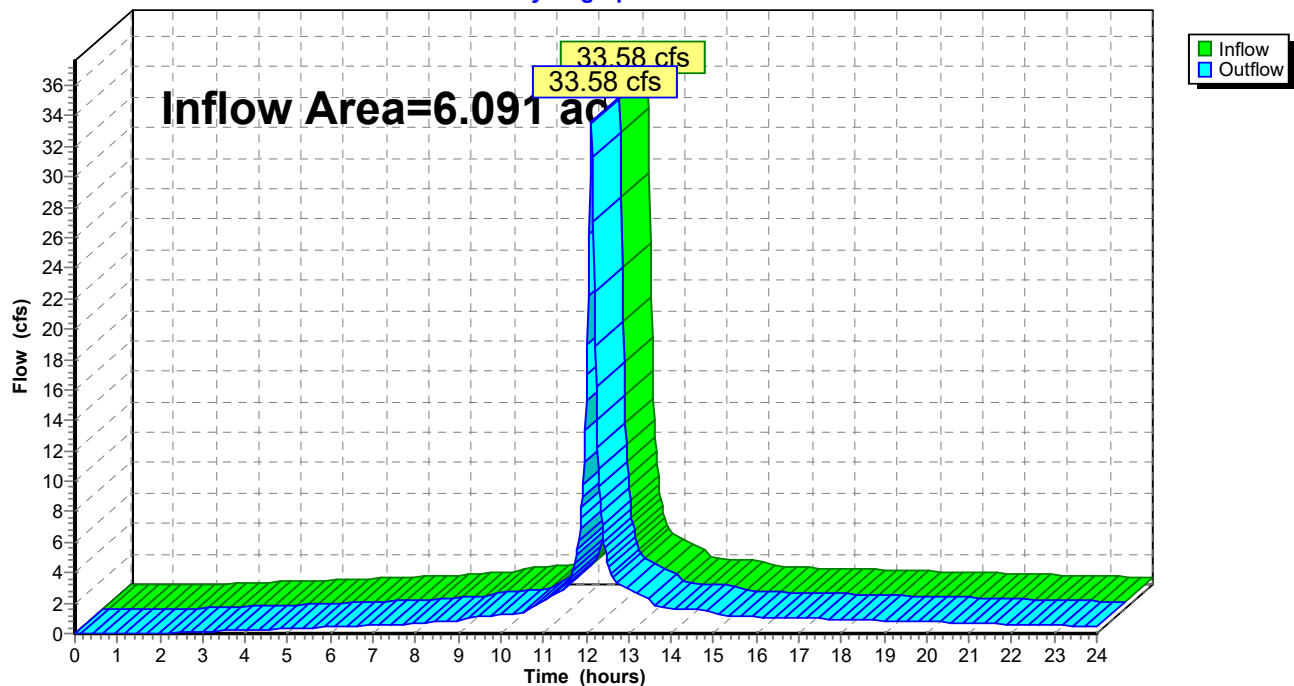
Inflow = 33.58 cfs @ 12.13 hrs, Volume= 2.534 af

Outflow = 33.58 cfs @ 12.13 hrs, Volume= 2.534 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach TS: Total Site

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 117

Summary for Pond 1P: Bioretention Basin 1

Inflow Area = 0.232 ac, 68.97% Impervious, Inflow Depth > 5.30" for 25-YEAR event
 Inflow = 1.40 cfs @ 12.13 hrs, Volume= 0.102 af
 Outflow = 1.29 cfs @ 12.15 hrs, Volume= 0.083 af, Atten= 8%, Lag= 1.5 min
 Primary = 1.29 cfs @ 12.15 hrs, Volume= 0.083 af
 Routed to Reach R1 : Flow towards the west

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
 Peak Elev= 115.40' @ 12.15 hrs Surf.Area= 901 sf Storage= 1,046 cf

Plug-Flow detention time= 157.8 min calculated for 0.083 af (81% of inflow)
 Center-of-Mass det. time= 67.6 min (852.5 - 784.9)

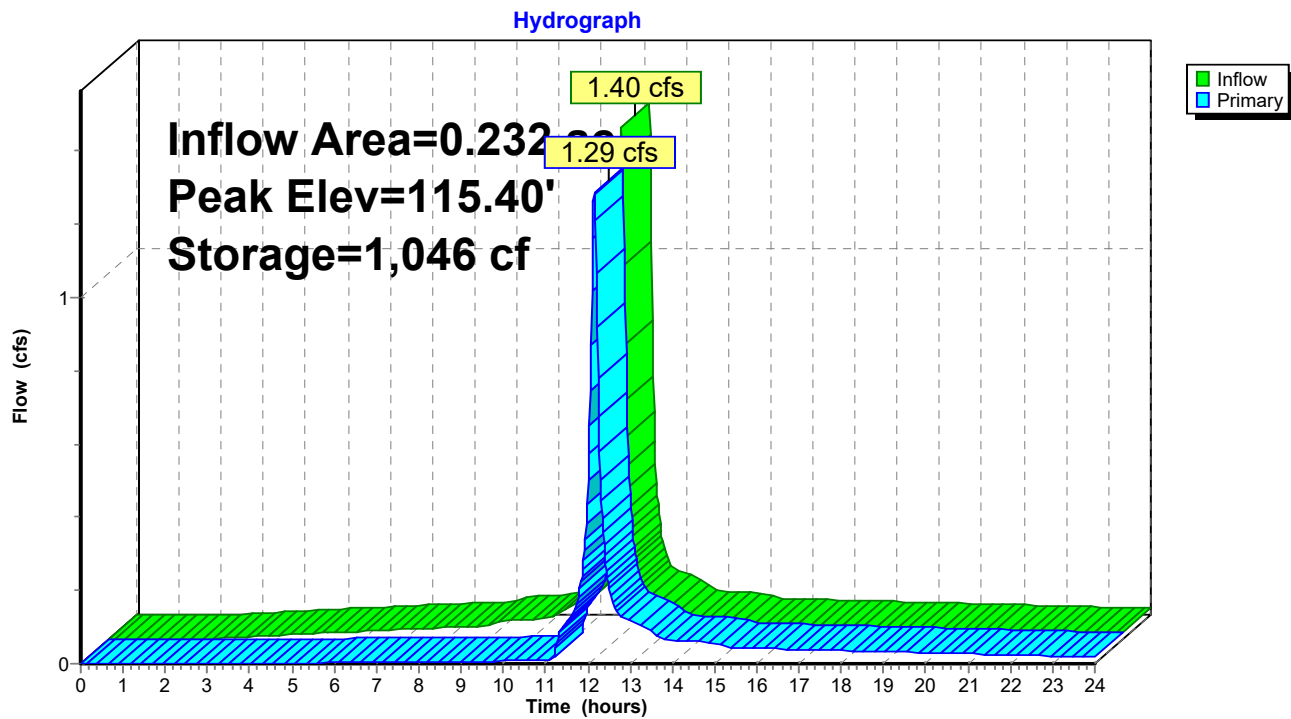
Volume	Invert	Avail.Storage	Storage Description			
#1	111.25'	1,140 cf	Bioretention Basin (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
111.25	517	134.2	0.0	0	0	517
112.25	517	134.2	40.0	207	207	651
112.50	517	134.2	0.0	0	207	685
114.50	517	134.2	20.0	207	414	953
115.00	725	143.6	100.0	309	723	1,172
115.50	948	153.0	100.0	417	1,140	1,406

Device	Routing	Invert	Outlet Devices
#1	Primary	111.92'	12.0" Round Outlet Pipe L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 111.92' / 111.83' S= 0.0100 ' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Device 1	111.42'	4.0" Vert. Underdrain C= 0.600 Limited to weir flow at low heads
#3	Device 1	115.15'	12.0" Horiz. Beehive Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	111.25'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Primary OutFlow Max=1.28 cfs @ 12.15 hrs HW=115.40' (Free Discharge)

1=Outlet Pipe (Passes 1.28 cfs of 6.53 cfs potential flow)
 2=Underdrain (Passes 0.01 cfs of 0.78 cfs potential flow)
 4=Exfiltration (Exfiltration Controls 0.01 cfs)
 3=Beehive Grate (Weir Controls 1.27 cfs @ 1.63 fps)

Pond 1P: Bioretention Basin 1



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 119

Stage-Discharge for Pond 1P: Bioretention Basin 1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
111.25	0.00	113.80	0.01
111.30	0.00	113.85	0.01
111.35	0.00	113.90	0.01
111.40	0.00	113.95	0.01
111.45	0.00	114.00	0.01
111.50	0.00	114.05	0.01
111.55	0.00	114.10	0.01
111.60	0.00	114.15	0.01
111.65	0.00	114.20	0.01
111.70	0.00	114.25	0.01
111.75	0.00	114.30	0.01
111.80	0.00	114.35	0.01
111.85	0.00	114.40	0.01
111.90	0.00	114.45	0.01
111.95	0.00	114.50	0.01
112.00	0.01	114.55	0.01
112.05	0.01	114.60	0.01
112.10	0.01	114.65	0.01
112.15	0.01	114.70	0.01
112.20	0.01	114.75	0.01
112.25	0.01	114.80	0.01
112.30	0.01	114.85	0.01
112.35	0.01	114.90	0.01
112.40	0.01	114.95	0.01
112.45	0.01	115.00	0.01
112.50	0.01	115.05	0.01
112.55	0.01	115.10	0.01
112.60	0.01	115.15	0.01
112.65	0.01	115.20	0.12
112.70	0.01	115.25	0.33
112.75	0.01	115.30	0.61
112.80	0.01	115.35	0.93
112.85	0.01	115.40	1.29
112.90	0.01	115.45	1.70
112.95	0.01	115.50	2.14
113.00	0.01		
113.05	0.01		
113.10	0.01		
113.15	0.01		
113.20	0.01		
113.25	0.01		
113.30	0.01		
113.35	0.01		
113.40	0.01		
113.45	0.01		
113.50	0.01		
113.55	0.01		
113.60	0.01		
113.65	0.01		
113.70	0.01		
113.75	0.01		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 120

Stage-Area-Storage for Pond 1P: Bioretention Basin 1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
111.25	517	0	113.80	517	341
111.30	517	10	113.85	517	346
111.35	517	21	113.90	517	352
111.40	517	31	113.95	517	357
111.45	517	41	114.00	517	362
111.50	517	52	114.05	517	367
111.55	517	62	114.10	517	372
111.60	517	72	114.15	517	377
111.65	517	83	114.20	517	383
111.70	517	93	114.25	517	388
111.75	517	103	114.30	517	393
111.80	517	114	114.35	517	398
111.85	517	124	114.40	517	403
111.90	517	134	114.45	517	408
111.95	517	145	114.50	517	414
112.00	517	155	114.55	536	440
112.05	517	165	114.60	556	467
112.10	517	176	114.65	576	496
112.15	517	186	114.70	596	525
112.20	517	196	114.75	617	555
112.25	517	207	114.80	638	586
112.30	517	207	114.85	659	619
112.35	517	207	114.90	681	652
112.40	517	207	114.95	703	687
112.45	517	207	115.00	725	723
112.50	517	207	115.05	746	759
112.55	517	212	115.10	767	797
112.60	517	217	115.15	789	836
112.65	517	222	115.20	811	876
112.70	517	227	115.25	833	917
112.75	517	233	115.30	855	959
112.80	517	238	115.35	878	1,003
112.85	517	243	115.40	901	1,047
112.90	517	248	115.45	924	1,093
112.95	517	253	115.50	948	1,140
113.00	517	259			
113.05	517	264			
113.10	517	269			
113.15	517	274			
113.20	517	279			
113.25	517	284			
113.30	517	290			
113.35	517	295			
113.40	517	300			
113.45	517	305			
113.50	517	310			
113.55	517	315			
113.60	517	321			
113.65	517	326			
113.70	517	331			
113.75	517	336			

Summary for Pond 2P: Bioretention Basin 2

Inflow Area = 0.633 ac, 69.83% Impervious, Inflow Depth > 5.30" for 25-YEAR event
 Inflow = 3.82 cfs @ 12.13 hrs, Volume= 0.280 af
 Outflow = 3.68 cfs @ 12.14 hrs, Volume= 0.259 af, Atten= 4%, Lag= 0.9 min
 Primary = 3.68 cfs @ 12.14 hrs, Volume= 0.259 af
 Routed to Reach R3 : Flow towards the northeast

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
 Peak Elev= 115.88' @ 12.14 hrs Surf.Area= 959 sf Storage= 1,235 cf

Plug-Flow detention time= 79.1 min calculated for 0.259 af (92% of inflow)
 Center-of-Mass det. time= 36.3 min (821.2 - 784.9)

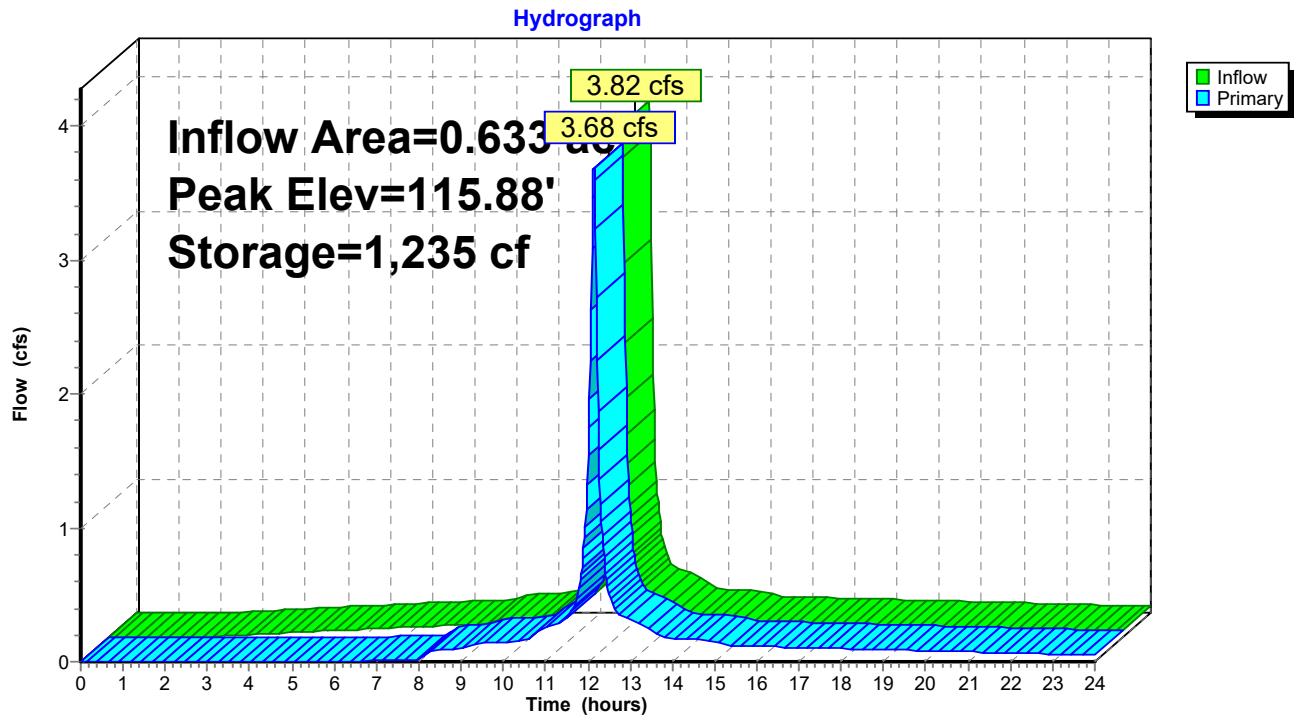
Volume	Invert	Avail.Storage	Storage Description			
#1	111.25'	1,349 cf	Bioretention Basin (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
111.25	401	122.6	0.0	0	0	401
112.25	401	122.6	40.0	160	160	524
112.50	401	122.6	0.0	0	160	554
114.50	401	122.6	20.0	160	321	799
116.00	1,017	150.9	100.0	1,028	1,349	1,449

Device	Routing	Invert	Outlet Devices
#1	Primary	112.85'	12.0" Round Outlet Pipe L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 112.85' / 112.81' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Device 1	112.85'	4.0" Vert. Underdrain C= 0.600 Limited to weir flow at low heads
#3	Device 1	115.50'	18.0" Horiz. Beehive Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	111.25'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Primary OutFlow Max=3.65 cfs @ 12.14 hrs HW=115.88' (Free Discharge)

1=Outlet Pipe (Passes 3.65 cfs of 6.02 cfs potential flow)
 2=Underdrain (Passes 0.01 cfs of 0.71 cfs potential flow)
 4=Exfiltration (Exfiltration Controls 0.01 cfs)
 3=Beehive Grate (Weir Controls 3.64 cfs @ 2.02 fps)

Pond 2P: Bioretention Basin 2



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 123

Stage-Discharge for Pond 2P: Bioretention Basin 2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
111.25	0.00	113.80	0.00
111.30	0.00	113.85	0.00
111.35	0.00	113.90	0.00
111.40	0.00	113.95	0.00
111.45	0.00	114.00	0.00
111.50	0.00	114.05	0.00
111.55	0.00	114.10	0.00
111.60	0.00	114.15	0.00
111.65	0.00	114.20	0.00
111.70	0.00	114.25	0.00
111.75	0.00	114.30	0.00
111.80	0.00	114.35	0.00
111.85	0.00	114.40	0.00
111.90	0.00	114.45	0.00
111.95	0.00	114.50	0.00
112.00	0.00	114.55	0.00
112.05	0.00	114.60	0.01
112.10	0.00	114.65	0.01
112.15	0.00	114.70	0.01
112.20	0.00	114.75	0.01
112.25	0.00	114.80	0.01
112.30	0.00	114.85	0.01
112.35	0.00	114.90	0.01
112.40	0.00	114.95	0.01
112.45	0.00	115.00	0.01
112.50	0.00	115.05	0.01
112.55	0.00	115.10	0.01
112.60	0.00	115.15	0.01
112.65	0.00	115.20	0.01
112.70	0.00	115.25	0.01
112.75	0.00	115.30	0.01
112.80	0.00	115.35	0.01
112.85	0.00	115.40	0.01
112.90	0.00	115.45	0.01
112.95	0.00	115.50	0.01
113.00	0.00	115.55	0.18
113.05	0.00	115.60	0.50
113.10	0.00	115.65	0.91
113.15	0.00	115.70	1.39
113.20	0.00	115.75	1.94
113.25	0.00	115.80	2.54
113.30	0.00	115.85	3.20
113.35	0.00	115.90	3.91
113.40	0.00	115.95	4.66
113.45	0.00	116.00	5.46
113.50	0.00		
113.55	0.00		
113.60	0.00		
113.65	0.00		
113.70	0.00		
113.75	0.00		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 124

Stage-Area-Storage for Pond 2P: Bioretention Basin 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
111.25	401	0	113.80	401	265
111.30	401	8	113.85	401	269
111.35	401	16	113.90	401	273
111.40	401	24	113.95	401	277
111.45	401	32	114.00	401	281
111.50	401	40	114.05	401	285
111.55	401	48	114.10	401	289
111.60	401	56	114.15	401	293
111.65	401	64	114.20	401	297
111.70	401	72	114.25	401	301
111.75	401	80	114.30	401	305
111.80	401	88	114.35	401	309
111.85	401	96	114.40	401	313
111.90	401	104	114.45	401	317
111.95	401	112	114.50	401	321
112.00	401	120	114.55	417	341
112.05	401	128	114.60	433	363
112.10	401	136	114.65	450	385
112.15	401	144	114.70	467	408
112.20	401	152	114.75	484	431
112.25	401	160	114.80	502	456
112.30	401	160	114.85	520	481
112.35	401	160	114.90	538	508
112.40	401	160	114.95	556	535
112.45	401	160	115.00	575	564
112.50	401	160	115.05	594	593
112.55	401	164	115.10	614	623
112.60	401	168	115.15	633	654
112.65	401	172	115.20	653	686
112.70	401	176	115.25	674	719
112.75	401	180	115.30	694	754
112.80	401	184	115.35	715	789
112.85	401	188	115.40	737	825
112.90	401	192	115.45	758	863
112.95	401	196	115.50	780	901
113.00	401	201	115.55	803	941
113.05	401	205	115.60	825	981
113.10	401	209	115.65	848	1,023
113.15	401	213	115.70	871	1,066
113.20	401	217	115.75	895	1,110
113.25	401	221	115.80	919	1,156
113.30	401	225	115.85	943	1,202
113.35	401	229	115.90	967	1,250
113.40	401	233	115.95	992	1,299
113.45	401	237	116.00	1,017	1,349
113.50	401	241			
113.55	401	245			
113.60	401	249			
113.65	401	253			
113.70	401	257			
113.75	401	261			

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 125

Summary for Pond 3P: Bioretention Basin 3

Inflow Area = 0.250 ac, 64.80% Impervious, Inflow Depth > 5.30" for 25-YEAR event
 Inflow = 1.51 cfs @ 12.13 hrs, Volume= 0.110 af
 Outflow = 1.43 cfs @ 12.15 hrs, Volume= 0.091 af, Atten= 5%, Lag= 1.2 min
 Primary = 1.43 cfs @ 12.15 hrs, Volume= 0.091 af
 Routed to Reach R4 : Flow towards the south

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
 Peak Elev= 115.95' @ 12.15 hrs Surf.Area= 924 sf Storage= 1,012 cf

Plug-Flow detention time= 150.8 min calculated for 0.091 af (83% of inflow)
 Center-of-Mass det. time= 65.7 min (850.6 - 784.9)

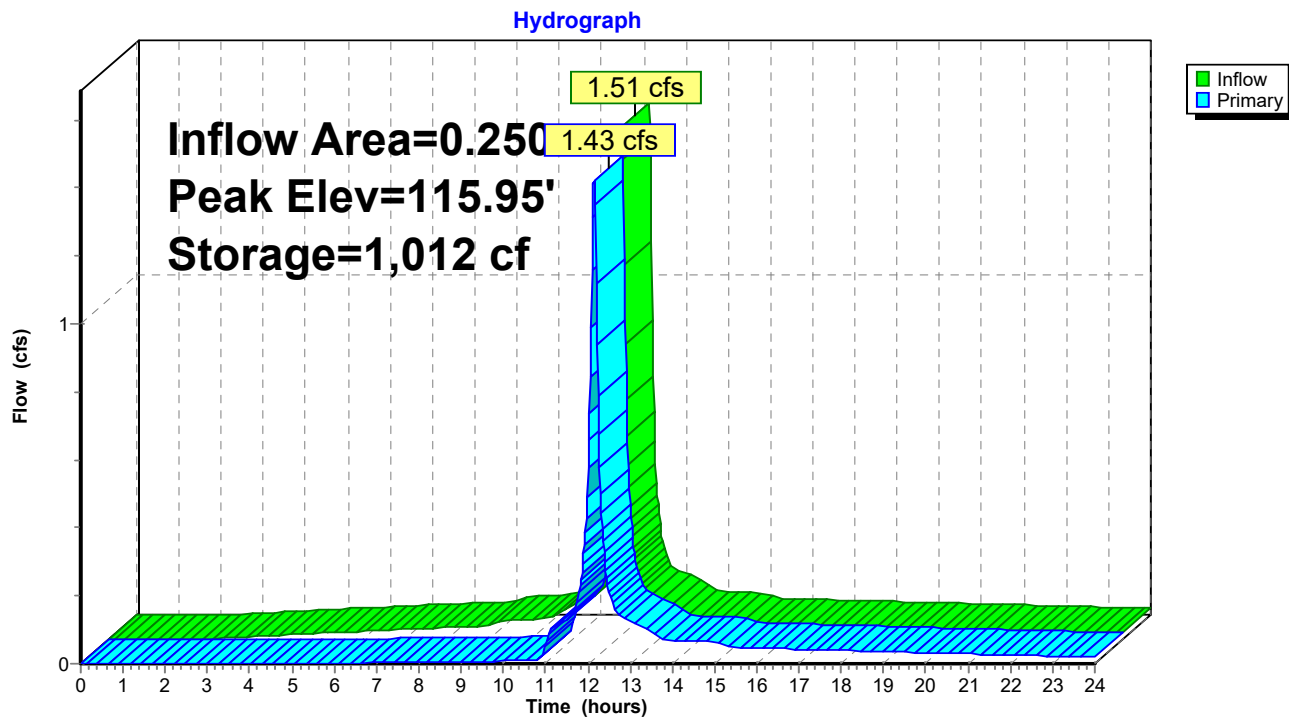
Volume	Invert	Avail.Storage	Storage Description			
#1	112.25'	1,056 cf	Bioretention Basin (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
112.25	495	86.4	0.0	0	0	495
113.25	495	86.4	40.0	198	198	581
113.50	495	86.4	0.0	0	198	603
115.00	495	86.4	20.0	149	347	733
116.00	948	114.7	100.0	709	1,056	1,197

Device	Routing	Invert	Outlet Devices
#1	Primary	113.81'	10.0" Round Outlet Pipe L= 72.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 113.81' / 113.52' S= 0.0040 ' / Cc= 0.900 n= 0.011, Flow Area= 0.55 sf
#2	Device 1	113.81'	4.0" Vert. Underdrain C= 0.600 Limited to weir flow at low heads
#3	Device 1	115.75'	18.0" Horiz. Beehive Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	112.25'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Primary OutFlow Max=1.41 cfs @ 12.15 hrs HW=115.95' (Free Discharge)

1=Outlet Pipe (Passes 1.41 cfs of 2.93 cfs potential flow)
 2=Underdrain (Passes 0.01 cfs of 0.59 cfs potential flow)
 4=Exfiltration (Exfiltration Controls 0.01 cfs)
 3=Beehive Grate (Weir Controls 1.40 cfs @ 1.47 fps)

Pond 3P: Bioretention Basin 3



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 127

Stage-Discharge for Pond 3P: Bioretention Basin 3

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
112.25	0.00	113.27	0.00	114.29	0.01	115.31	0.01
112.27	0.00	113.29	0.00	114.31	0.01	115.33	0.01
112.29	0.00	113.31	0.00	114.33	0.01	115.35	0.01
112.31	0.00	113.33	0.00	114.35	0.01	115.37	0.01
112.33	0.00	113.35	0.00	114.37	0.01	115.39	0.01
112.35	0.00	113.37	0.00	114.39	0.01	115.41	0.01
112.37	0.00	113.39	0.00	114.41	0.01	115.43	0.01
112.39	0.00	113.41	0.00	114.43	0.01	115.45	0.01
112.41	0.00	113.43	0.00	114.45	0.01	115.47	0.01
112.43	0.00	113.45	0.00	114.47	0.01	115.49	0.01
112.45	0.00	113.47	0.00	114.49	0.01	115.51	0.01
112.47	0.00	113.49	0.00	114.51	0.01	115.53	0.01
112.49	0.00	113.51	0.00	114.53	0.01	115.55	0.01
112.51	0.00	113.53	0.00	114.55	0.01	115.57	0.01
112.53	0.00	113.55	0.00	114.57	0.01	115.59	0.01
112.55	0.00	113.57	0.00	114.59	0.01	115.61	0.01
112.57	0.00	113.59	0.00	114.61	0.01	115.63	0.01
112.59	0.00	113.61	0.00	114.63	0.01	115.65	0.01
112.61	0.00	113.63	0.00	114.65	0.01	115.67	0.01
112.63	0.00	113.65	0.00	114.67	0.01	115.69	0.01
112.65	0.00	113.67	0.00	114.69	0.01	115.71	0.01
112.67	0.00	113.69	0.00	114.71	0.01	115.73	0.01
112.69	0.00	113.71	0.00	114.73	0.01	115.75	0.01
112.71	0.00	113.73	0.00	114.75	0.01	115.77	0.05
112.73	0.00	113.75	0.00	114.77	0.01	115.79	0.13
112.75	0.00	113.77	0.00	114.79	0.01	115.81	0.24
112.77	0.00	113.79	0.00	114.81	0.01	115.83	0.36
112.79	0.00	113.81	0.00	114.83	0.01	115.85	0.50
112.81	0.00	113.83	0.00	114.85	0.01	115.87	0.65
112.83	0.00	113.85	0.00	114.87	0.01	115.89	0.82
112.85	0.00	113.87	0.01	114.89	0.01	115.91	1.00
112.87	0.00	113.89	0.01	114.91	0.01	115.93	1.19
112.89	0.00	113.91	0.01	114.93	0.01	115.95	1.39
112.91	0.00	113.93	0.01	114.95	0.01	115.97	1.60
112.93	0.00	113.95	0.01	114.97	0.01	115.99	1.82
112.95	0.00	113.97	0.01	114.99	0.01		
112.97	0.00	113.99	0.01	115.01	0.01		
112.99	0.00	114.01	0.01	115.03	0.01		
113.01	0.00	114.03	0.01	115.05	0.01		
113.03	0.00	114.05	0.01	115.07	0.01		
113.05	0.00	114.07	0.01	115.09	0.01		
113.07	0.00	114.09	0.01	115.11	0.01		
113.09	0.00	114.11	0.01	115.13	0.01		
113.11	0.00	114.13	0.01	115.15	0.01		
113.13	0.00	114.15	0.01	115.17	0.01		
113.15	0.00	114.17	0.01	115.19	0.01		
113.17	0.00	114.19	0.01	115.21	0.01		
113.19	0.00	114.21	0.01	115.23	0.01		
113.21	0.00	114.23	0.01	115.25	0.01		
113.23	0.00	114.25	0.01	115.27	0.01		
113.25	0.00	114.27	0.01	115.29	0.01		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 128

Stage-Area-Storage for Pond 3P: Bioretention Basin 3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
112.25	495	0	114.80	495	327
112.30	495	10	114.85	495	332
112.35	495	20	114.90	495	337
112.40	495	30	114.95	495	342
112.45	495	40	115.00	495	347
112.50	495	50	115.05	514	372
112.55	495	59	115.10	534	398
112.60	495	69	115.15	554	425
112.65	495	79	115.20	574	453
112.70	495	89	115.25	595	483
112.75	495	99	115.30	616	513
112.80	495	109	115.35	637	544
112.85	495	119	115.40	659	576
112.90	495	129	115.45	681	610
112.95	495	139	115.50	703	645
113.00	495	149	115.55	726	680
113.05	495	158	115.60	749	717
113.10	495	168	115.65	773	755
113.15	495	178	115.70	797	794
113.20	495	188	115.75	821	835
113.25	495	198	115.80	846	877
113.30	495	198	115.85	871	919
113.35	495	198	115.90	896	964
113.40	495	198	115.95	922	1,009
113.45	495	198	116.00	948	1,056
113.50	495	198			
113.55	495	203			
113.60	495	208			
113.65	495	213			
113.70	495	218			
113.75	495	223			
113.80	495	228			
113.85	495	233			
113.90	495	238			
113.95	495	243			
114.00	495	248			
114.05	495	252			
114.10	495	257			
114.15	495	262			
114.20	495	267			
114.25	495	272			
114.30	495	277			
114.35	495	282			
114.40	495	287			
114.45	495	292			
114.50	495	297			
114.55	495	302			
114.60	495	307			
114.65	495	312			
114.70	495	317			
114.75	495	322			

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 129

Summary for Pond 4P: Underground Detention Chamber

Inflow Area = 0.296 ac, 100.00% Impervious, Inflow Depth > 6.00" for 25-YEAR event
 Inflow = 1.87 cfs @ 12.13 hrs, Volume= 0.148 af
 Outflow = 1.43 cfs @ 12.18 hrs, Volume= 0.144 af, Atten= 23%, Lag= 2.9 min
 Primary = 1.43 cfs @ 12.18 hrs, Volume= 0.144 af
 Routed to Reach R4 : Flow towards the south

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 114.06' @ 12.18 hrs Surf.Area= 589 sf Storage= 594 cf

Plug-Flow detention time= 36.5 min calculated for 0.144 af (98% of inflow)
 Center-of-Mass det. time= 20.6 min (766.5 - 745.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	112.50'	595 cf	11.00'W x 53.58'L x 3.75'H Field A 2,210 cf Overall - 722 cf Embedded = 1,488 cf x 40.0% Voids
#2A	113.00'	722 cf	ADS_StormTech SC-800 +Cap x 14 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 14 Chambers in 2 Rows Cap Storage= 3.4 cf x 2 x 2 rows = 13.7 cf
		1,317 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	113.00'	8.0" Round Outlet Pipe L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 113.00' / 112.75' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf

Primary OutFlow Max=1.43 cfs @ 12.18 hrs HW=114.06' (Free Discharge)
 ↑ **1=Outlet Pipe** (Barrel Controls 1.43 cfs @ 4.09 fps)

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 130

Pond 4P: Underground Detention Chamber - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-800 +Cap (ADS StormTech®SC-800 with cap volume)

Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf

Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap

Cap Storage= 3.4 cf x 2 x 2 rows = 13.7 cf

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

7 Chambers/Row x 7.12' Long +0.88' Cap Length x 2 = 51.58' Row Length +12.0" End Stone x 2 = 53.58' Base Length

2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width

6.0" Stone Base + 33.0" Chamber Height + 6.0" Stone Cover = 3.75' Field Height

14 Chambers x 50.6 cf + 3.4 cf Cap Volume x 2 x 2 Rows = 722.0 cf Chamber Storage

2,210.3 cf Field - 722.0 cf Chambers = 1,488.3 cf Stone x 40.0% Voids = 595.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,317.3 cf = 0.030 af

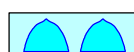
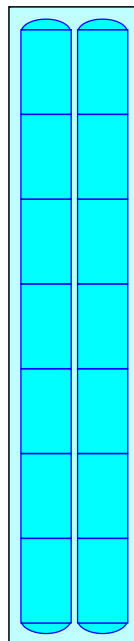
Overall Storage Efficiency = 59.6%

Overall System Size = 53.58' x 11.00' x 3.75'

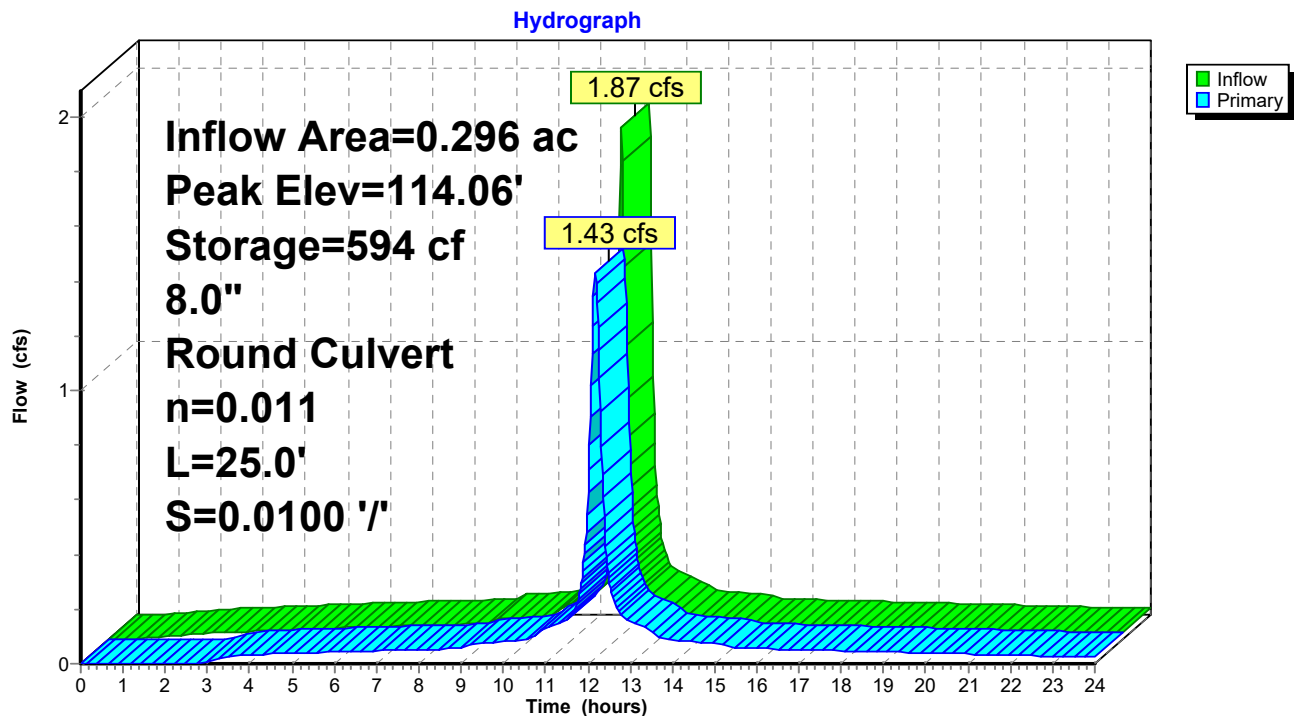
14 Chambers

81.9 cy Field

55.1 cy Stone



Pond 4P: Underground Detention Chamber



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 132

Stage-Discharge for Pond 4P: Underground Detention Chamber

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
112.50	0.00	113.52	0.68	114.54	1.85	115.56	2.51
112.52	0.00	113.54	0.72	114.56	1.86	115.58	2.52
112.54	0.00	113.56	0.76	114.58	1.88	115.60	2.53
112.56	0.00	113.58	0.80	114.60	1.89	115.62	2.54
112.58	0.00	113.60	0.84	114.62	1.91	115.64	2.55
112.60	0.00	113.62	0.88	114.64	1.92	115.66	2.56
112.62	0.00	113.64	0.92	114.66	1.94	115.68	2.57
112.64	0.00	113.66	0.96	114.68	1.95	115.70	2.59
112.66	0.00	113.68	0.99	114.70	1.96	115.72	2.60
112.68	0.00	113.70	1.02	114.72	1.98	115.74	2.61
112.70	0.00	113.72	1.05	114.74	1.99	115.76	2.62
112.72	0.00	113.74	1.07	114.76	2.01	115.78	2.63
112.74	0.00	113.76	1.10	114.78	2.02	115.80	2.64
112.76	0.00	113.78	1.12	114.80	2.04	115.82	2.65
112.78	0.00	113.80	1.15	114.82	2.05	115.84	2.66
112.80	0.00	113.82	1.17	114.84	2.06	115.86	2.67
112.82	0.00	113.84	1.20	114.86	2.08	115.88	2.68
112.84	0.00	113.86	1.22	114.88	2.09	115.90	2.69
112.86	0.00	113.88	1.24	114.90	2.10	115.92	2.70
112.88	0.00	113.90	1.24	114.92	2.12	115.94	2.71
112.90	0.00	113.92	1.27	114.94	2.13	115.96	2.72
112.92	0.00	113.94	1.29	114.96	2.14	115.98	2.73
112.94	0.00	113.96	1.32	114.98	2.16	116.00	2.74
112.96	0.00	113.98	1.34	115.00	2.17	116.02	2.75
112.98	0.00	114.00	1.36	115.02	2.18	116.04	2.77
113.00	0.00	114.02	1.39	115.04	2.20	116.06	2.78
113.02	0.00	114.04	1.41	115.06	2.21	116.08	2.79
113.04	0.01	114.06	1.43	115.08	2.22	116.10	2.80
113.06	0.01	114.08	1.45	115.10	2.23	116.12	2.81
113.08	0.02	114.10	1.47	115.12	2.25	116.14	2.82
113.10	0.04	114.12	1.49	115.14	2.26	116.16	2.83
113.12	0.05	114.14	1.51	115.16	2.27	116.18	2.84
113.14	0.07	114.16	1.53	115.18	2.28	116.20	2.85
113.16	0.09	114.18	1.55	115.20	2.30	116.22	2.86
113.18	0.11	114.20	1.56	115.22	2.31	116.24	2.87
113.20	0.13	114.22	1.58	115.24	2.32		
113.22	0.16	114.24	1.60	115.26	2.33		
113.24	0.19	114.26	1.62	115.28	2.35		
113.26	0.22	114.28	1.64	115.30	2.36		
113.28	0.25	114.30	1.65	115.32	2.37		
113.30	0.28	114.32	1.67	115.34	2.38		
113.32	0.31	114.34	1.69	115.36	2.39		
113.34	0.34	114.36	1.70	115.38	2.40		
113.36	0.38	114.38	1.72	115.40	2.42		
113.38	0.42	114.40	1.74	115.42	2.43		
113.40	0.45	114.42	1.75	115.44	2.44		
113.42	0.49	114.44	1.77	115.46	2.45		
113.44	0.53	114.46	1.78	115.48	2.46		
113.46	0.57	114.48	1.80	115.50	2.47		
113.48	0.61	114.50	1.82	115.52	2.49		
113.50	0.64	114.52	1.83	115.54	2.50		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 133

Stage-Area-Storage for Pond 4P: Underground Detention Chamber

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
112.50	0	115.05	989
112.55	12	115.10	1,007
112.60	24	115.15	1,024
112.65	35	115.20	1,042
112.70	47	115.25	1,058
112.75	59	115.30	1,075
112.80	71	115.35	1,091
112.85	83	115.40	1,106
112.90	94	115.45	1,121
112.95	106	115.50	1,136
113.00	118	115.55	1,149
113.05	141	115.60	1,162
113.10	164	115.65	1,175
113.15	187	115.70	1,187
113.20	210	115.75	1,199
113.25	233	115.80	1,211
113.30	256	115.85	1,223
113.35	279	115.90	1,235
113.40	302	115.95	1,247
113.45	324	116.00	1,258
113.50	347	116.05	1,270
113.55	370	116.10	1,282
113.60	392	116.15	1,294
113.65	414	116.20	1,306
113.70	437	116.25	1,317
113.75	459		
113.80	481		
113.85	503		
113.90	525		
113.95	546		
114.00	568		
114.05	590		
114.10	611		
114.15	632		
114.20	654		
114.25	675		
114.30	696		
114.35	716		
114.40	737		
114.45	757		
114.50	778		
114.55	798		
114.60	818		
114.65	838		
114.70	857		
114.75	877		
114.80	896		
114.85	915		
114.90	934		
114.95	953		
115.00	971		

Summary for Pond 5P: Underground Detention Chamber

Inflow Area = 0.330 ac, 100.00% Impervious, Inflow Depth > 6.00" for 25-YEAR event
 Inflow = 2.09 cfs @ 12.13 hrs, Volume= 0.165 af
 Outflow = 1.56 cfs @ 12.18 hrs, Volume= 0.161 af, Atten= 25%, Lag= 3.0 min
 Primary = 1.56 cfs @ 12.18 hrs, Volume= 0.161 af
 Routed to Reach R4 : Flow towards the south

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 114.20' @ 12.18 hrs Surf.Area= 589 sf Storage= 653 cf

Plug-Flow detention time= 33.6 min calculated for 0.161 af (98% of inflow)
 Center-of-Mass det. time= 19.1 min (765.0 - 745.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	112.50'	595 cf	11.00'W x 53.58'L x 3.75'H Field A 2,210 cf Overall - 722 cf Embedded = 1,488 cf x 40.0% Voids
#2A	113.00'	722 cf	ADS_StormTech SC-800 +Cap x 14 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 14 Chambers in 2 Rows Cap Storage= 3.4 cf x 2 x 2 rows = 13.7 cf
		1,317 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	113.00'	8.0" Round Outlet Pipe L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 113.00' / 112.75' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf

Primary OutFlow Max=1.56 cfs @ 12.18 hrs HW=114.20' (Free Discharge)
 ↑ **1=Outlet Pipe** (Inlet Controls 1.56 cfs @ 4.47 fps)

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 135

Pond 5P: Underground Detention Chamber - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-800 +Cap (ADS StormTech®SC-800 with cap volume)

Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf

Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap

Cap Storage= 3.4 cf x 2 x 2 rows = 13.7 cf

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

7 Chambers/Row x 7.12' Long +0.88' Cap Length x 2 = 51.58' Row Length +12.0" End Stone x 2 = 53.58' Base Length

2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width

6.0" Stone Base + 33.0" Chamber Height + 6.0" Stone Cover = 3.75' Field Height

14 Chambers x 50.6 cf + 3.4 cf Cap Volume x 2 x 2 Rows = 722.0 cf Chamber Storage

2,210.3 cf Field - 722.0 cf Chambers = 1,488.3 cf Stone x 40.0% Voids = 595.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,317.3 cf = 0.030 af

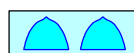
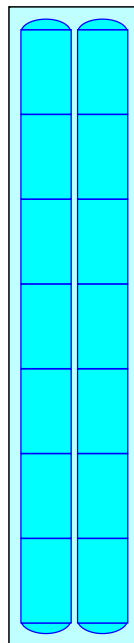
Overall Storage Efficiency = 59.6%

Overall System Size = 53.58' x 11.00' x 3.75'

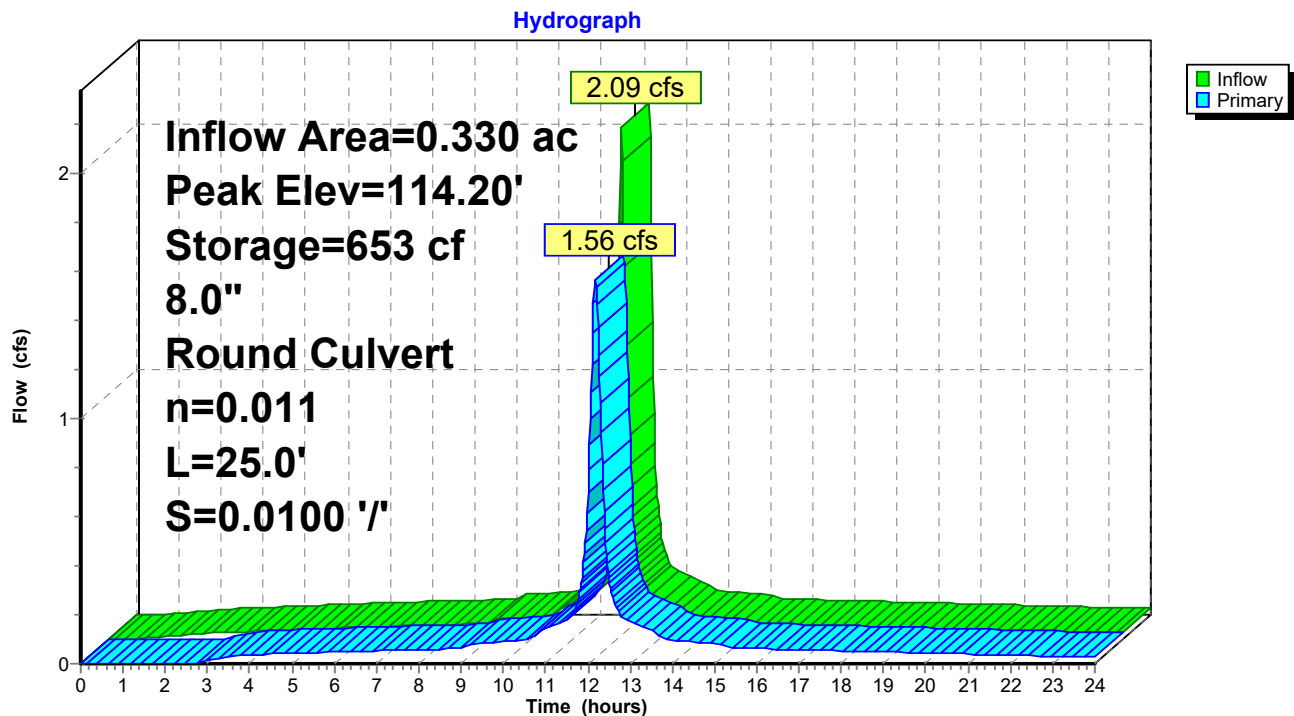
14 Chambers

81.9 cy Field

55.1 cy Stone



Pond 5P: Underground Detention Chamber



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 137

Stage-Discharge for Pond 5P: Underground Detention Chamber

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
112.50	0.00	113.52	0.68	114.54	1.85	115.56	2.51
112.52	0.00	113.54	0.72	114.56	1.86	115.58	2.52
112.54	0.00	113.56	0.76	114.58	1.88	115.60	2.53
112.56	0.00	113.58	0.80	114.60	1.89	115.62	2.54
112.58	0.00	113.60	0.84	114.62	1.91	115.64	2.55
112.60	0.00	113.62	0.88	114.64	1.92	115.66	2.56
112.62	0.00	113.64	0.92	114.66	1.94	115.68	2.57
112.64	0.00	113.66	0.96	114.68	1.95	115.70	2.59
112.66	0.00	113.68	0.99	114.70	1.96	115.72	2.60
112.68	0.00	113.70	1.02	114.72	1.98	115.74	2.61
112.70	0.00	113.72	1.05	114.74	1.99	115.76	2.62
112.72	0.00	113.74	1.07	114.76	2.01	115.78	2.63
112.74	0.00	113.76	1.10	114.78	2.02	115.80	2.64
112.76	0.00	113.78	1.12	114.80	2.04	115.82	2.65
112.78	0.00	113.80	1.15	114.82	2.05	115.84	2.66
112.80	0.00	113.82	1.17	114.84	2.06	115.86	2.67
112.82	0.00	113.84	1.20	114.86	2.08	115.88	2.68
112.84	0.00	113.86	1.22	114.88	2.09	115.90	2.69
112.86	0.00	113.88	1.24	114.90	2.10	115.92	2.70
112.88	0.00	113.90	1.24	114.92	2.12	115.94	2.71
112.90	0.00	113.92	1.27	114.94	2.13	115.96	2.72
112.92	0.00	113.94	1.29	114.96	2.14	115.98	2.73
112.94	0.00	113.96	1.32	114.98	2.16	116.00	2.74
112.96	0.00	113.98	1.34	115.00	2.17	116.02	2.75
112.98	0.00	114.00	1.36	115.02	2.18	116.04	2.77
113.00	0.00	114.02	1.39	115.04	2.20	116.06	2.78
113.02	0.00	114.04	1.41	115.06	2.21	116.08	2.79
113.04	0.01	114.06	1.43	115.08	2.22	116.10	2.80
113.06	0.01	114.08	1.45	115.10	2.23	116.12	2.81
113.08	0.02	114.10	1.47	115.12	2.25	116.14	2.82
113.10	0.04	114.12	1.49	115.14	2.26	116.16	2.83
113.12	0.05	114.14	1.51	115.16	2.27	116.18	2.84
113.14	0.07	114.16	1.53	115.18	2.28	116.20	2.85
113.16	0.09	114.18	1.55	115.20	2.30	116.22	2.86
113.18	0.11	114.20	1.56	115.22	2.31	116.24	2.87
113.20	0.13	114.22	1.58	115.24	2.32		
113.22	0.16	114.24	1.60	115.26	2.33		
113.24	0.19	114.26	1.62	115.28	2.35		
113.26	0.22	114.28	1.64	115.30	2.36		
113.28	0.25	114.30	1.65	115.32	2.37		
113.30	0.28	114.32	1.67	115.34	2.38		
113.32	0.31	114.34	1.69	115.36	2.39		
113.34	0.34	114.36	1.70	115.38	2.40		
113.36	0.38	114.38	1.72	115.40	2.42		
113.38	0.42	114.40	1.74	115.42	2.43		
113.40	0.45	114.42	1.75	115.44	2.44		
113.42	0.49	114.44	1.77	115.46	2.45		
113.44	0.53	114.46	1.78	115.48	2.46		
113.46	0.57	114.48	1.80	115.50	2.47		
113.48	0.61	114.50	1.82	115.52	2.49		
113.50	0.64	114.52	1.83	115.54	2.50		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 25-YEAR Rainfall=6.24"

Printed 11/12/2025

Page 138

Stage-Area-Storage for Pond 5P: Underground Detention Chamber

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
112.50	0	115.05	989
112.55	12	115.10	1,007
112.60	24	115.15	1,024
112.65	35	115.20	1,042
112.70	47	115.25	1,058
112.75	59	115.30	1,075
112.80	71	115.35	1,091
112.85	83	115.40	1,106
112.90	94	115.45	1,121
112.95	106	115.50	1,136
113.00	118	115.55	1,149
113.05	141	115.60	1,162
113.10	164	115.65	1,175
113.15	187	115.70	1,187
113.20	210	115.75	1,199
113.25	233	115.80	1,211
113.30	256	115.85	1,223
113.35	279	115.90	1,235
113.40	302	115.95	1,247
113.45	324	116.00	1,258
113.50	347	116.05	1,270
113.55	370	116.10	1,282
113.60	392	116.15	1,294
113.65	414	116.20	1,306
113.70	437	116.25	1,317
113.75	459		
113.80	481		
113.85	503		
113.90	525		
113.95	546		
114.00	568		
114.05	590		
114.10	611		
114.15	632		
114.20	654		
114.25	675		
114.30	696		
114.35	716		
114.40	737		
114.45	757		
114.50	778		
114.55	798		
114.60	818		
114.65	838		
114.70	857		
114.75	877		
114.80	896		
114.85	915		
114.90	934		
114.95	953		
115.00	971		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 139

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1-1:	Runoff Area=0.308 ac 0.00% Impervious Runoff Depth>5.67" Flow Length=80' Slope=0.0180 '/' Tc=8.6 min CN=80 Runoff=1.90 cfs 0.146 af
SubcatchmentP1-2:	Runoff Area=0.717 ac 79.22% Impervious Runoff Depth>7.33" Tc=6.0 min CN=94 Runoff=5.77 cfs 0.438 af
SubcatchmentP1-3:	Runoff Area=0.232 ac 68.97% Impervious Runoff Depth>7.09" Tc=6.0 min CN=92 Runoff=1.84 cfs 0.137 af
SubcatchmentP1-4:	Runoff Area=0.824 ac 72.82% Impervious Runoff Depth>7.21" Tc=6.0 min CN=93 Runoff=6.58 cfs 0.495 af
SubcatchmentP2-1:	Runoff Area=0.197 ac 10.15% Impervious Runoff Depth>5.79" Tc=6.0 min CN=81 Runoff=1.38 cfs 0.095 af
SubcatchmentP2-2:	Runoff Area=0.353 ac 100.00% Impervious Runoff Depth>7.81" Tc=6.0 min CN=98 Runoff=2.89 cfs 0.230 af
SubcatchmentP3-1:	Runoff Area=0.337 ac 6.82% Impervious Runoff Depth>5.79" Flow Length=51' Slope=0.0180 '/' Tc=6.0 min CN=81 Runoff=2.35 cfs 0.163 af
SubcatchmentP3-2:	Runoff Area=0.633 ac 69.83% Impervious Runoff Depth>7.09" Tc=6.0 min CN=92 Runoff=5.02 cfs 0.374 af
SubcatchmentP3-3:	Runoff Area=0.727 ac 73.59% Impervious Runoff Depth>7.21" Tc=6.0 min CN=93 Runoff=5.81 cfs 0.437 af
SubcatchmentP4-1:	Runoff Area=0.582 ac 6.70% Impervious Runoff Depth>5.79" Tc=6.0 min CN=81 Runoff=4.07 cfs 0.281 af
SubcatchmentP4-2:	Runoff Area=0.250 ac 64.80% Impervious Runoff Depth>7.09" Tc=6.0 min CN=92 Runoff=1.98 cfs 0.148 af
SubcatchmentP4-3: Building "B" Roof	Runoff Area=0.296 ac 100.00% Impervious Runoff Depth>7.81" Tc=6.0 min CN=98 Runoff=2.42 cfs 0.193 af
SubcatchmentP4-4: Building "A" Roof	Runoff Area=0.330 ac 100.00% Impervious Runoff Depth>7.81" Tc=6.0 min CN=98 Runoff=2.70 cfs 0.215 af
SubcatchmentP5: Flow towards the	Runoff Area=0.222 ac 0.00% Impervious Runoff Depth>5.56" Tc=6.0 min CN=79 Runoff=1.50 cfs 0.103 af
SubcatchmentP6: Flow to Blue Hills Ave	Runoff Area=0.083 ac 51.81% Impervious Runoff Depth>6.74" Tc=6.0 min CN=89 Runoff=0.64 cfs 0.047 af
Reach R1: Flow towards the west	Inflow=15.81 cfs 1.197 af Outflow=15.81 cfs 1.197 af

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 140

Reach R2: Flow towards the north

Inflow=4.26 cfs 0.325 af

Outflow=4.26 cfs 0.325 af

Reach R3: Flow towards the northeast

Inflow=12.97 cfs 0.953 af

Outflow=12.97 cfs 0.953 af

Reach R4: Flow towards the south

Inflow=9.34 cfs 0.809 af

Outflow=9.34 cfs 0.809 af

Reach TS: Total Site

Inflow=44.47 cfs 3.433 af

Outflow=44.47 cfs 3.433 af

Pond 1P: Bioretention Basin 1

Peak Elev=115.45' Storage=1,094 cf Inflow=1.84 cfs 0.137 af

Outflow=1.71 cfs 0.118 af

Pond 2P: Bioretention Basin 2

Peak Elev=115.96' Storage=1,311 cf Inflow=5.02 cfs 0.374 af

Outflow=4.86 cfs 0.353 af

Pond 3P: Bioretention Basin 3

Peak Elev=116.00' Storage=1,051 cf Inflow=1.98 cfs 0.148 af

Outflow=1.89 cfs 0.129 af

Pond 4P: Underground Detention Chamber

Peak Elev=114.43' Storage=750 cf Inflow=2.42 cfs 0.193 af

8.0" Round Culvert n=0.011 L=25.0' S=0.0100 '/' Outflow=1.76 cfs 0.189 af

Pond 5P: Underground Detention Chamber

Peak Elev=114.64' Storage=835 cf Inflow=2.70 cfs 0.215 af

8.0" Round Culvert n=0.011 L=25.0' S=0.0100 '/' Outflow=1.92 cfs 0.211 af

Total Runoff Area = 6.091 ac Runoff Volume = 3.501 af Average Runoff Depth = 6.90"
41.37% Pervious = 2.520 ac 58.63% Impervious = 3.571 ac

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 141

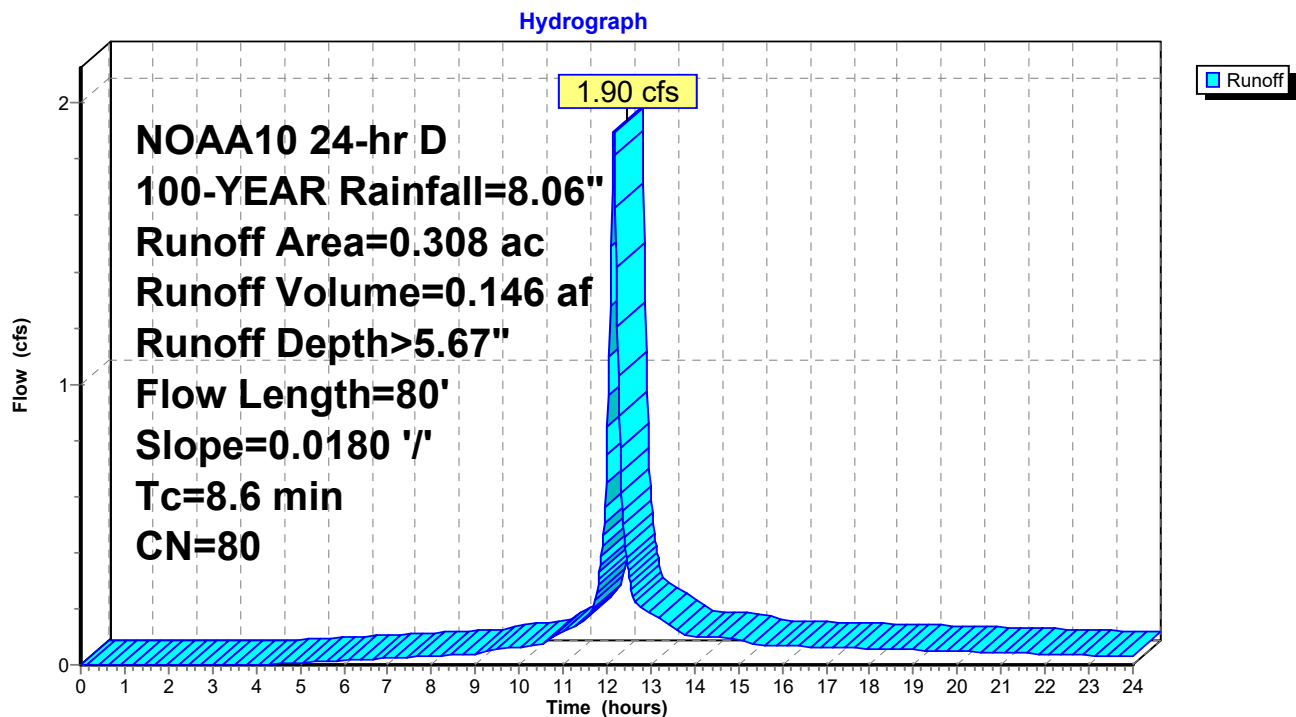
Summary for Subcatchment P1-1:

Runoff = 1.90 cfs @ 12.16 hrs, Volume= 0.146 af, Depth> 5.67"
Routed to Reach R1 : Flow towards the west

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.236	80	>75% Grass cover, Good, HSG D
0.072	79	Woods, Fair, HSG D
0.000	98	Paved parking, HSG D
0.308	80	Weighted Average
0.308		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	80	0.0180	0.16		Sheet Flow, Seg 1
					Grass: Short n= 0.150 P2= 3.17"

Subcatchment P1-1:

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 142

Summary for Subcatchment P1-2:

Runoff = 5.77 cfs @ 12.13 hrs, Volume= 0.438 af, Depth> 7.33"
Routed to Reach R1 : Flow towards the west

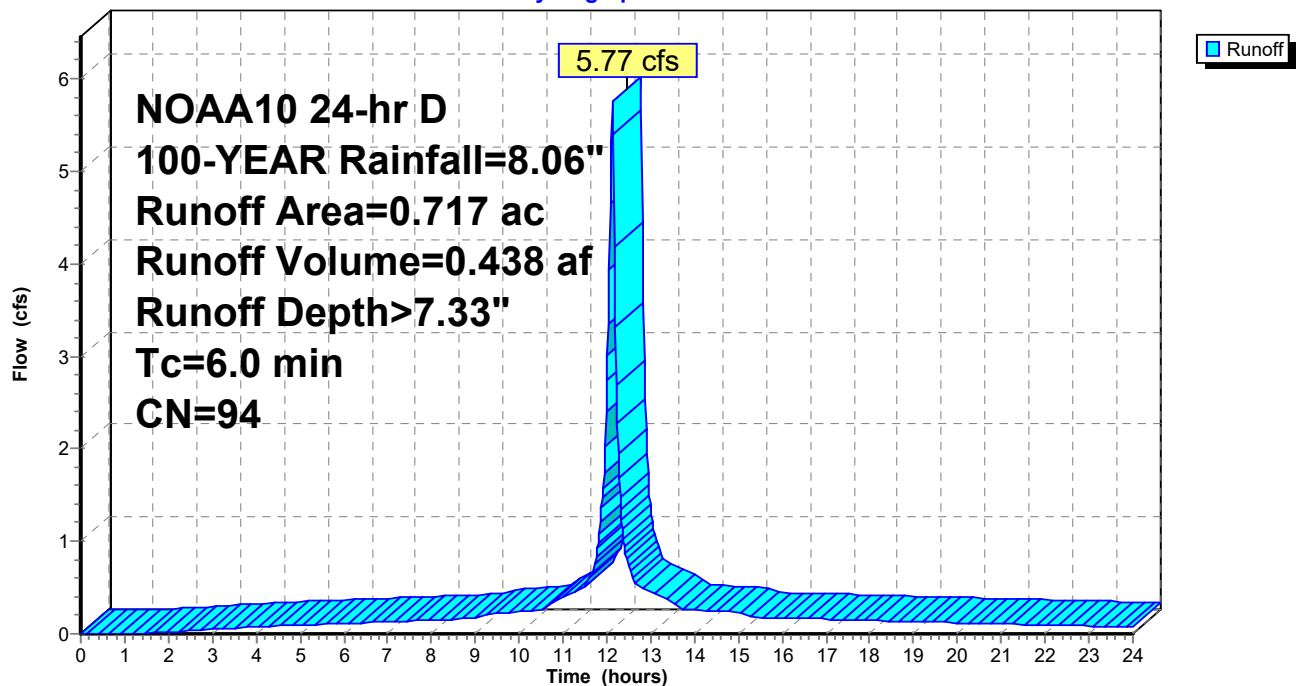
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.149	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.568	98	Paved parking, HSG D
0.717	94	Weighted Average
0.149		20.78% Pervious Area
0.568		79.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P1-2:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 143

Summary for Subcatchment P1-3:

Runoff = 1.84 cfs @ 12.13 hrs, Volume= 0.137 af, Depth> 7.09"
Routed to Pond 1P : Bioretention Basin 1

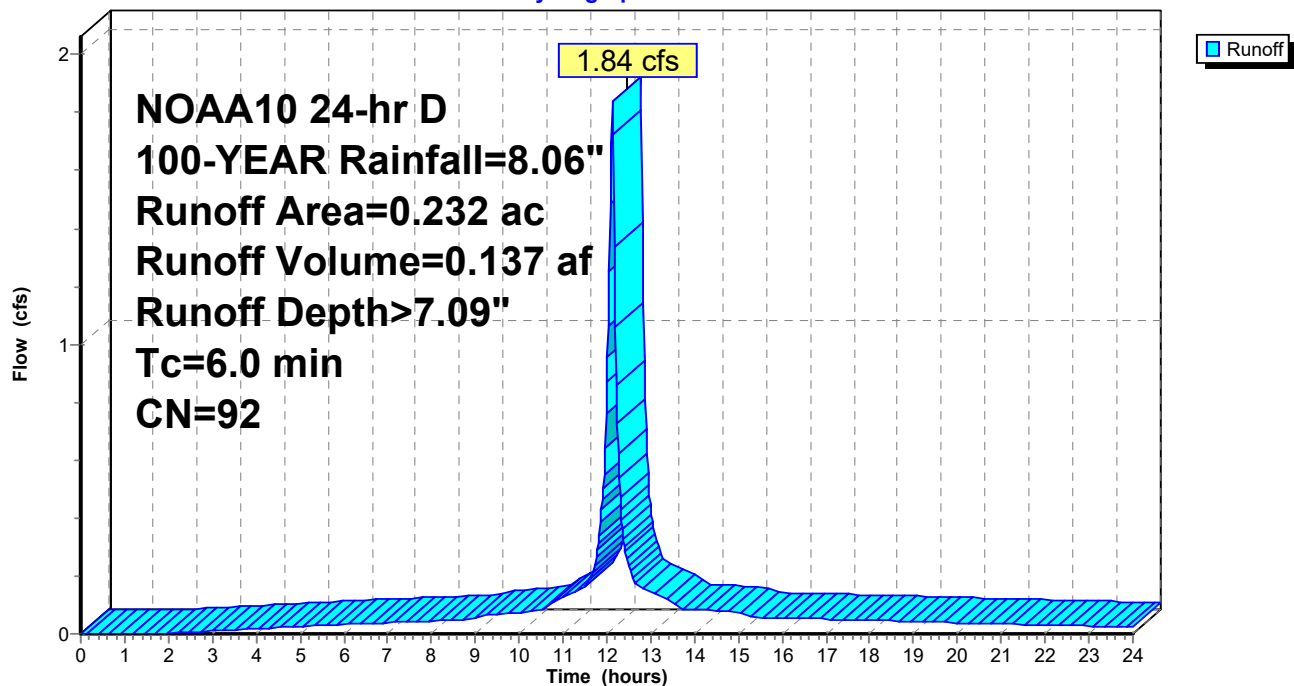
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.072	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.160	98	Paved parking, HSG D
0.232	92	Weighted Average
0.072		31.03% Pervious Area
0.160		68.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P1-3:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 144

Summary for Subcatchment P1-4:

Runoff = 6.58 cfs @ 12.13 hrs, Volume= 0.495 af, Depth> 7.21"
Routed to Reach R1 : Flow towards the west

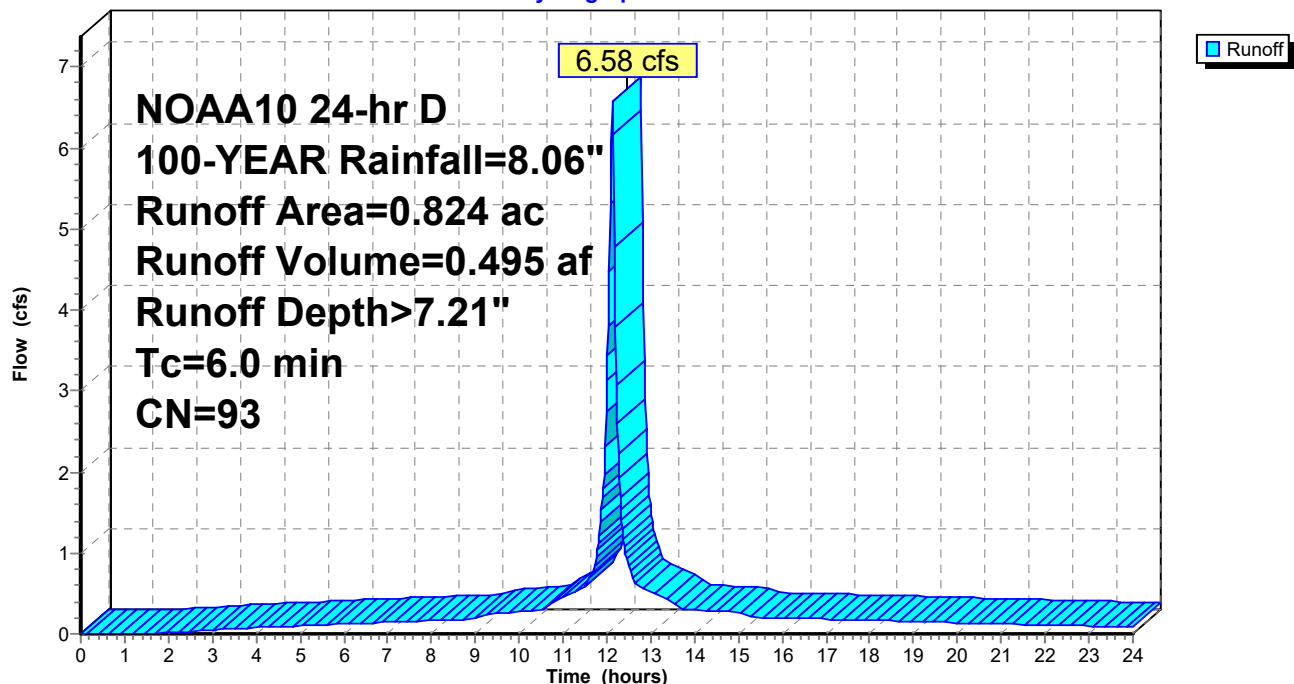
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.224	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.600	98	Paved parking, HSG D
0.824	93	Weighted Average
0.224		27.18% Pervious Area
0.600		72.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P1-4:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 145

Summary for Subcatchment P2-1:

Runoff = 1.38 cfs @ 12.13 hrs, Volume= 0.095 af, Depth> 5.79"
Routed to Reach R2 : Flow towards the north

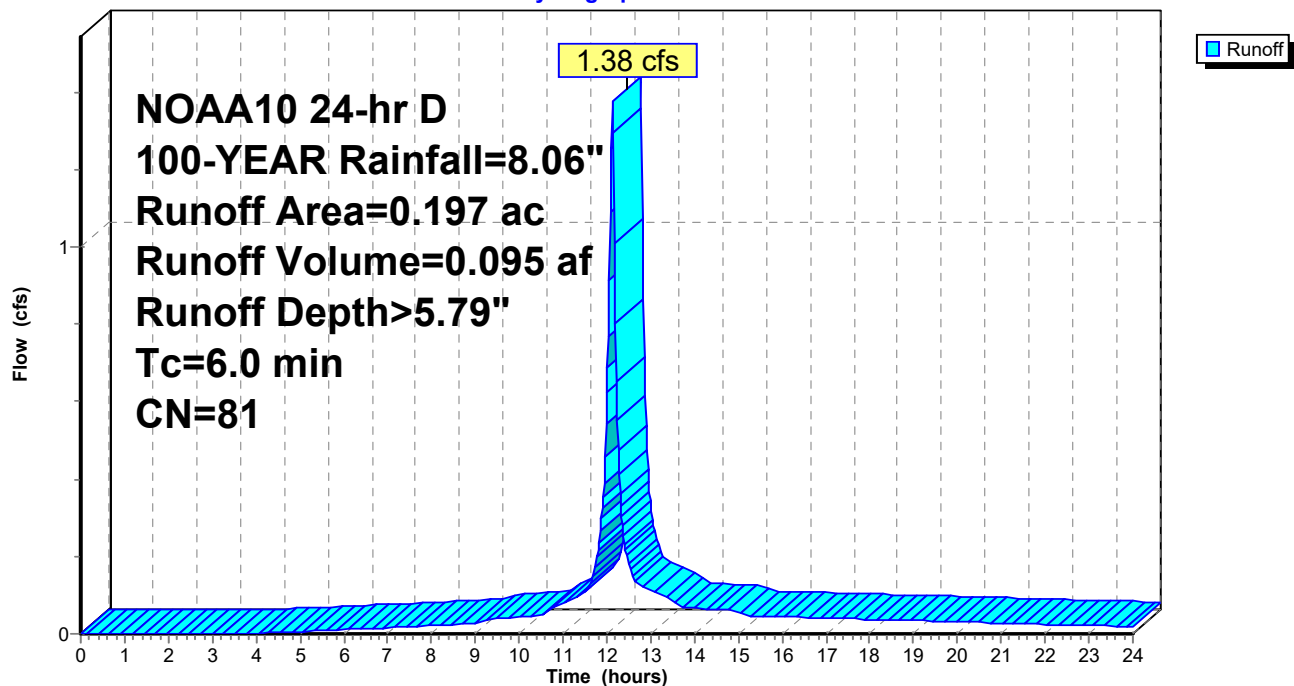
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.093	80	>75% Grass cover, Good, HSG D
0.084	79	Woods, Fair, HSG D
0.020	98	Paved parking, HSG D
0.197	81	Weighted Average
0.177		89.85% Pervious Area
0.020		10.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P2-1:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 146

Summary for Subcatchment P2-2:

Runoff = 2.89 cfs @ 12.13 hrs, Volume= 0.230 af, Depth> 7.81"
Routed to Reach R2 : Flow towards the north

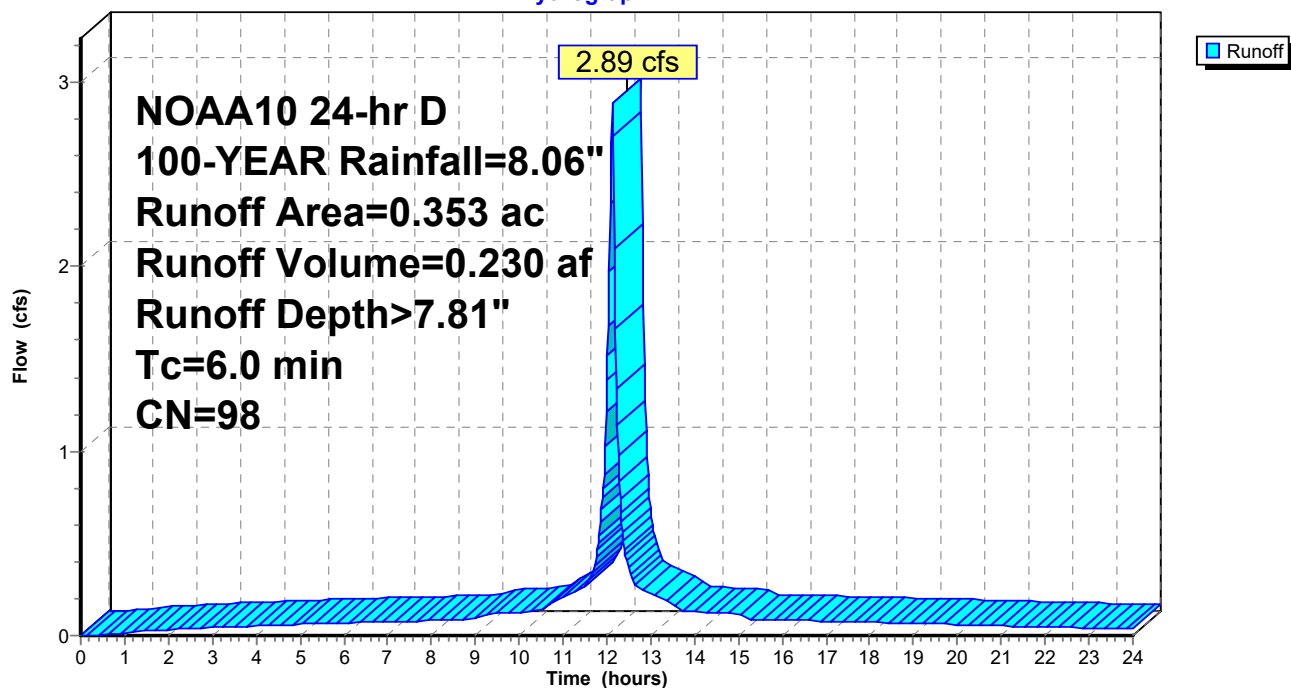
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.000	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.353	98	Paved parking, HSG D
0.353	98	Weighted Average
0.353		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P2-2:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 147

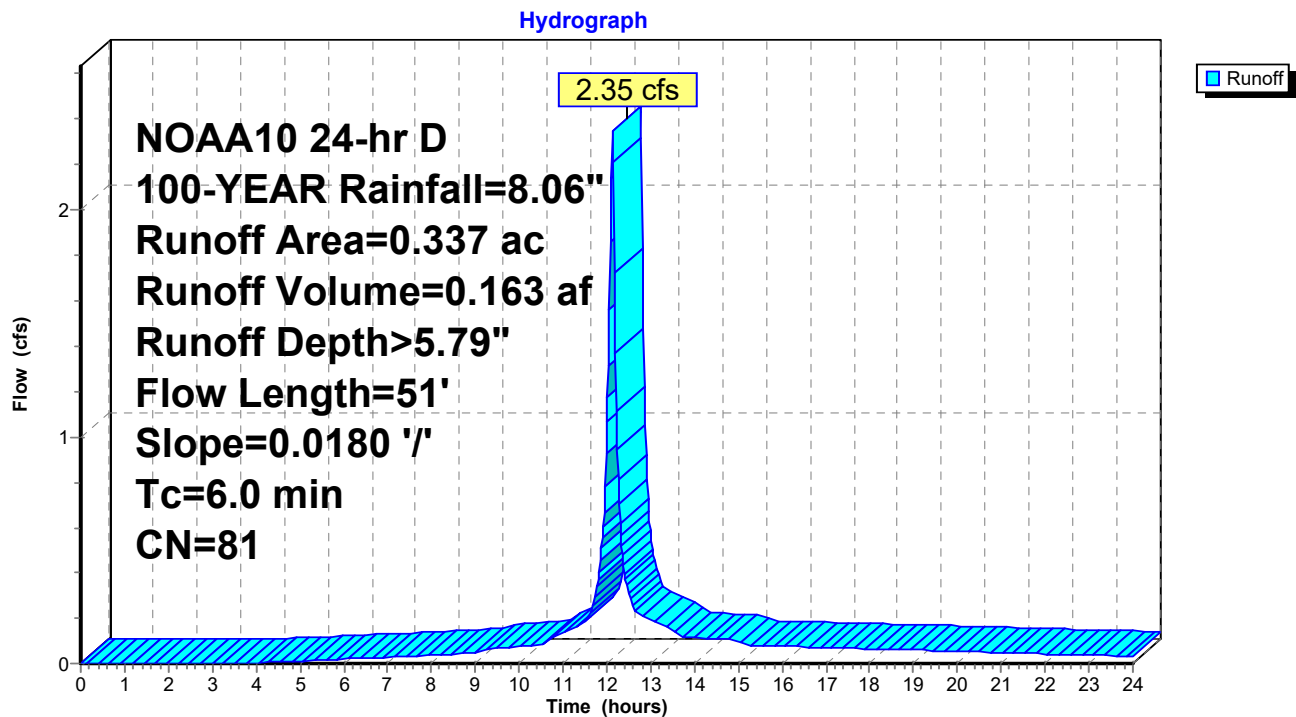
Summary for Subcatchment P3-1:

Runoff = 2.35 cfs @ 12.13 hrs, Volume= 0.163 af, Depth> 5.79"
Routed to Reach R3 : Flow towards the northeast

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.244	80	>75% Grass cover, Good, HSG D
0.070	79	Woods, Fair, HSG D
0.023	98	Paved parking, HSG D
0.337	81	Weighted Average
0.314		93.18% Pervious Area
0.023		6.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	51	0.0180	0.14		Sheet Flow, Seg 1 Grass: Short n= 0.150 P2= 3.17"

Subcatchment P3-1:

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 148

Summary for Subcatchment P3-2:

Runoff = 5.02 cfs @ 12.13 hrs, Volume= 0.374 af, Depth> 7.09"
Routed to Pond 2P : Bioretention Basin 2

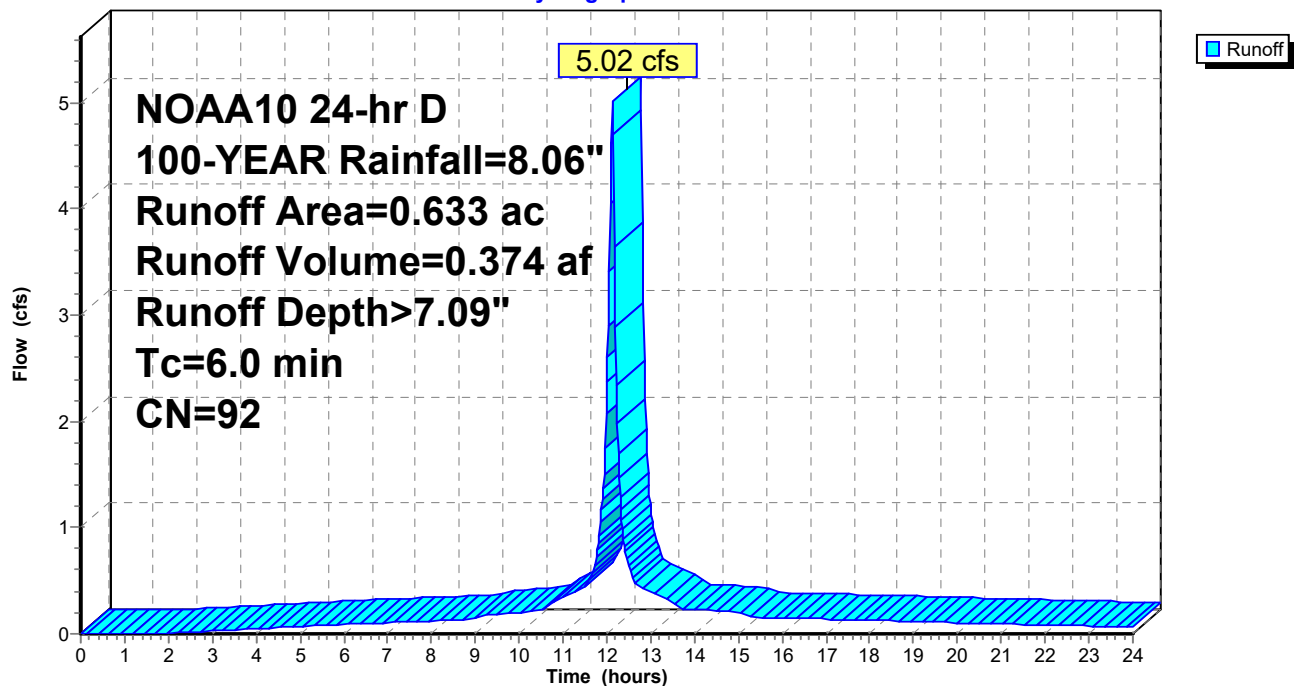
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.147	80	>75% Grass cover, Good, HSG D
0.044	79	Woods, Fair, HSG D
0.442	98	Paved parking, HSG D
0.633	92	Weighted Average
0.191		30.17% Pervious Area
0.442		69.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P3-2:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 149

Summary for Subcatchment P3-3:

Runoff = 5.81 cfs @ 12.13 hrs, Volume= 0.437 af, Depth> 7.21"
Routed to Reach R3 : Flow towards the northeast

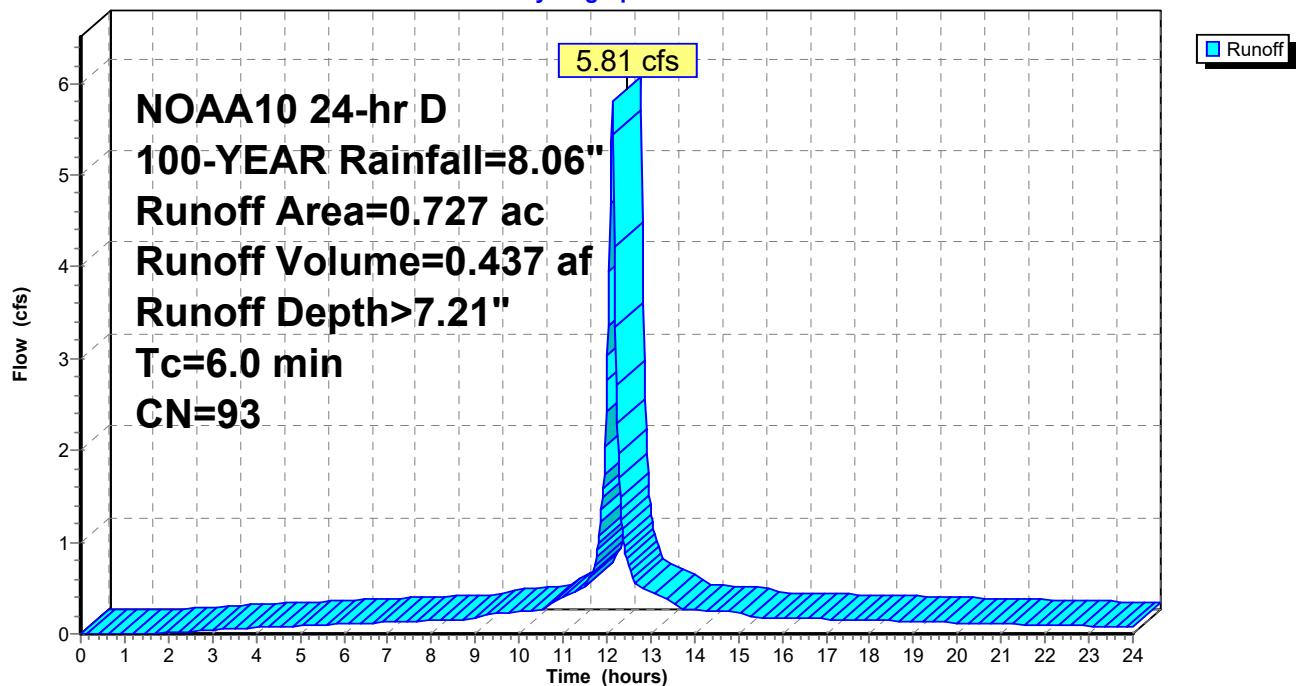
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.192	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.535	98	Paved parking, HSG D
0.727	93	Weighted Average
0.192		26.41% Pervious Area
0.535		73.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P3-3:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 150

Summary for Subcatchment P4-1:

Runoff = 4.07 cfs @ 12.13 hrs, Volume= 0.281 af, Depth> 5.79"
Routed to Reach R4 : Flow towards the south

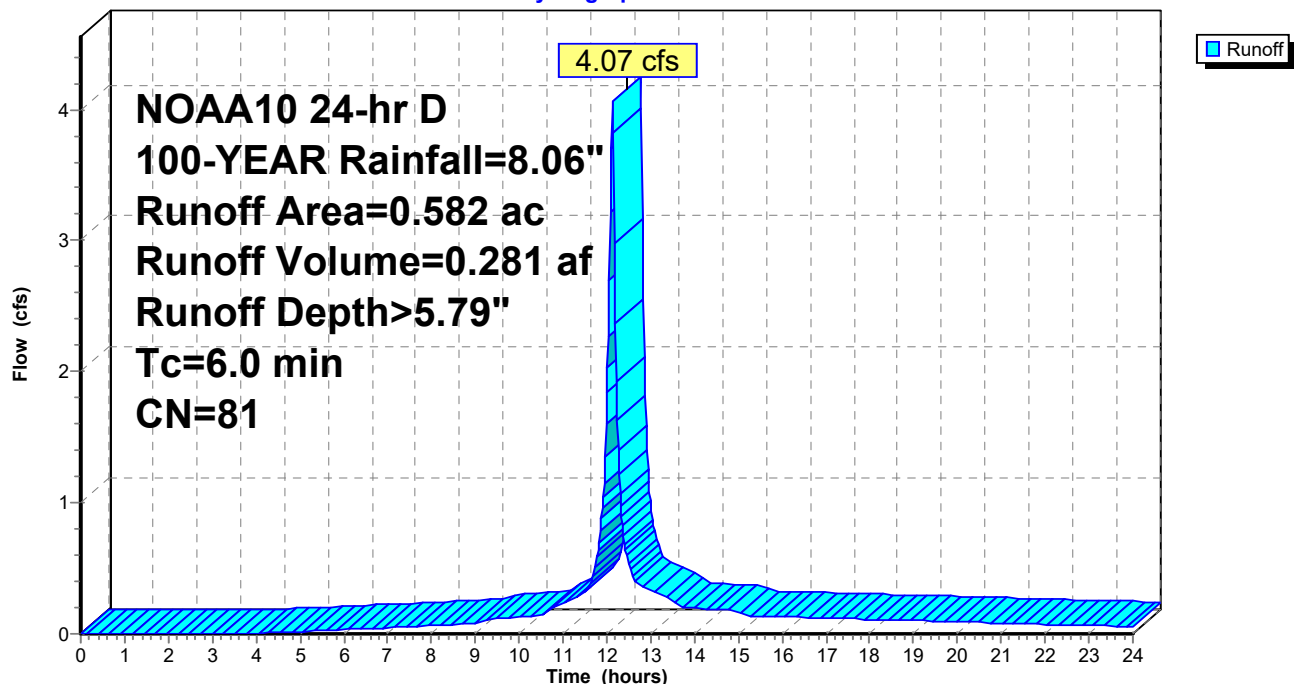
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.431	80	>75% Grass cover, Good, HSG D
0.112	79	Woods, Fair, HSG D
0.039	98	Paved parking, HSG D
0.582	81	Weighted Average
0.543		93.30% Pervious Area
0.039		6.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P4-1:

Hydrograph



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 151

Summary for Subcatchment P4-2:

Runoff = 1.98 cfs @ 12.13 hrs, Volume= 0.148 af, Depth> 7.09"
Routed to Pond 3P : Bioretention Basin 3

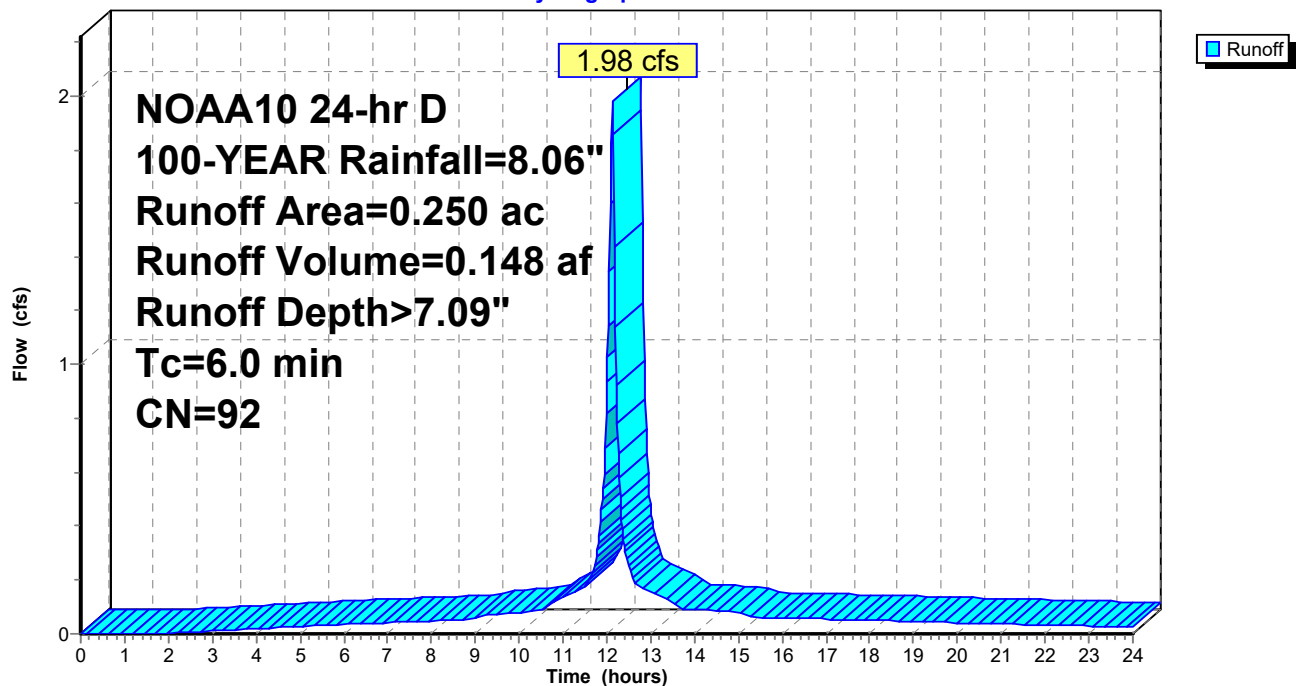
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.088	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.162	98	Paved parking, HSG D
0.250	92	Weighted Average
0.088		35.20% Pervious Area
0.162		64.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P4-2:

Hydrograph



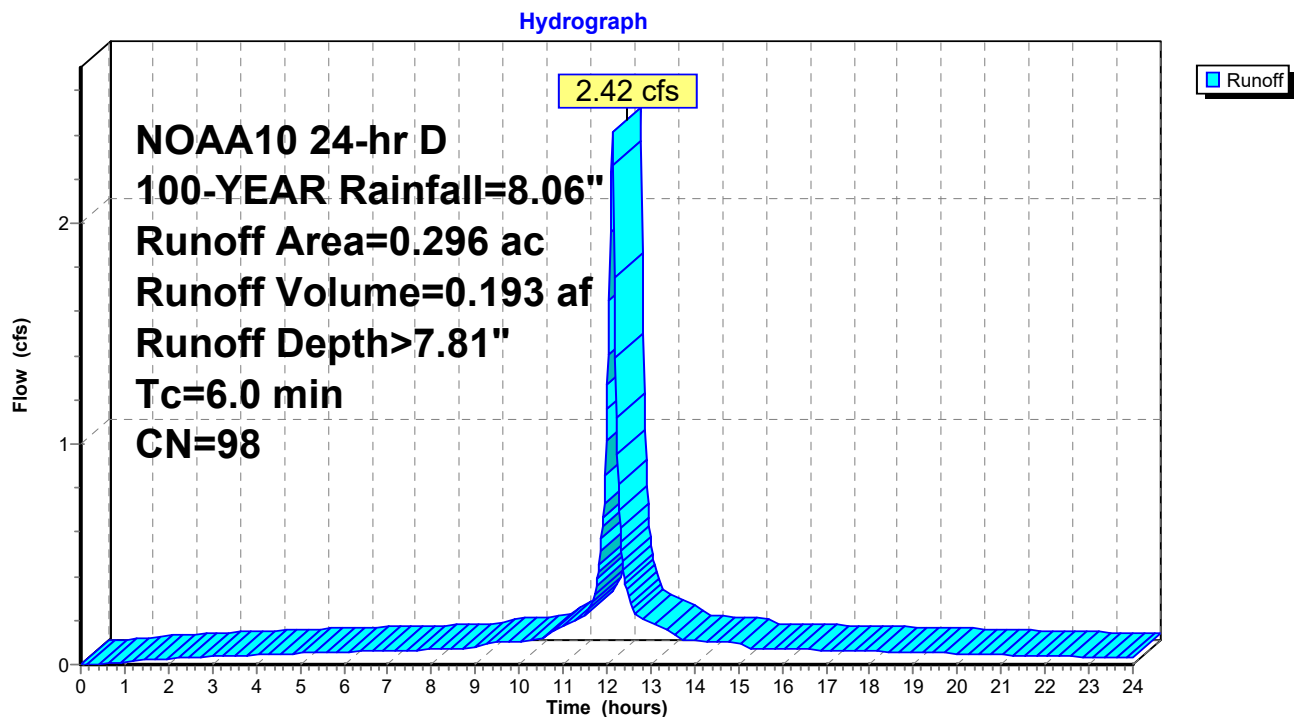
Summary for Subcatchment P4-3: Building "B" Roof

Runoff = 2.42 cfs @ 12.13 hrs, Volume= 0.193 af, Depth> 7.81"
 Routed to Pond 4P : Underground Detention Chamber

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.000	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.296	98	Paved parking, HSG D
0.296	98	Weighted Average
0.296		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P4-3: Building "B" Roof

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 153

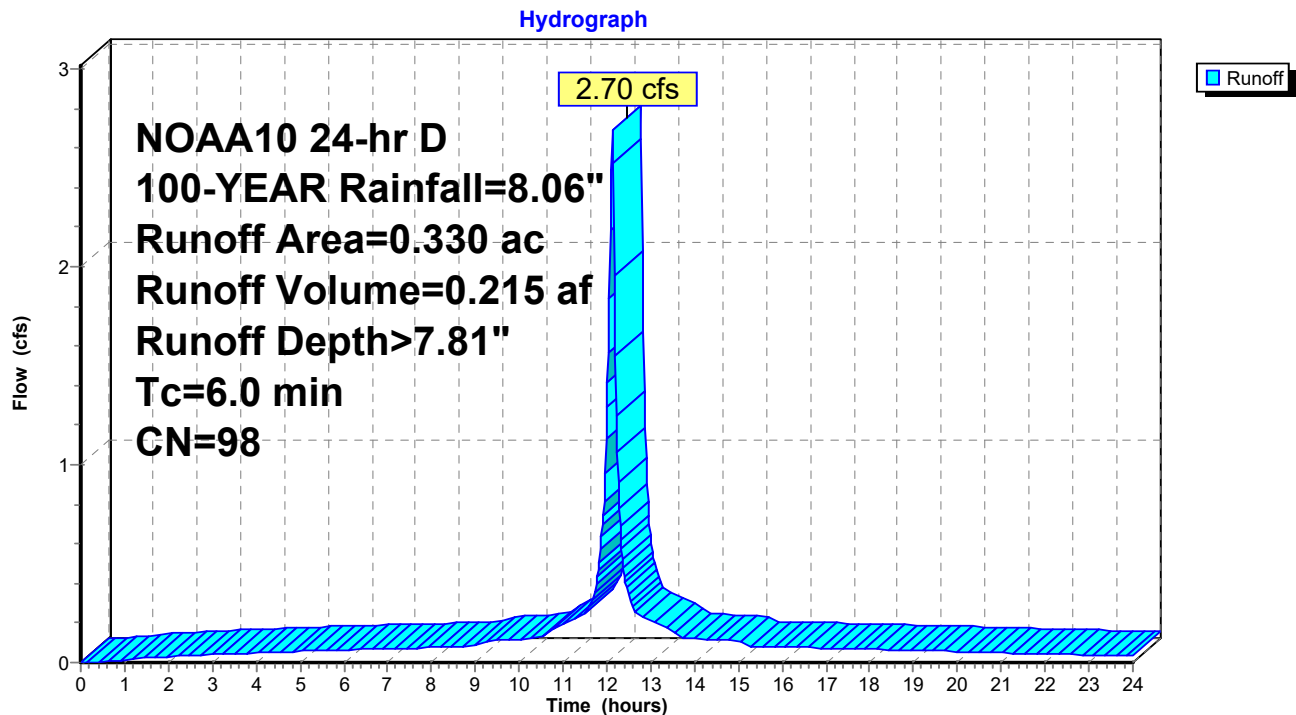
Summary for Subcatchment P4-4: Building "A" Roof

Runoff = 2.70 cfs @ 12.13 hrs, Volume= 0.215 af, Depth> 7.81"
Routed to Pond 5P : Underground Detention Chamber

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.000	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.330	98	Paved parking, HSG D
0.330	98	Weighted Average
0.330		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P4-4: Building "A" Roof

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 154

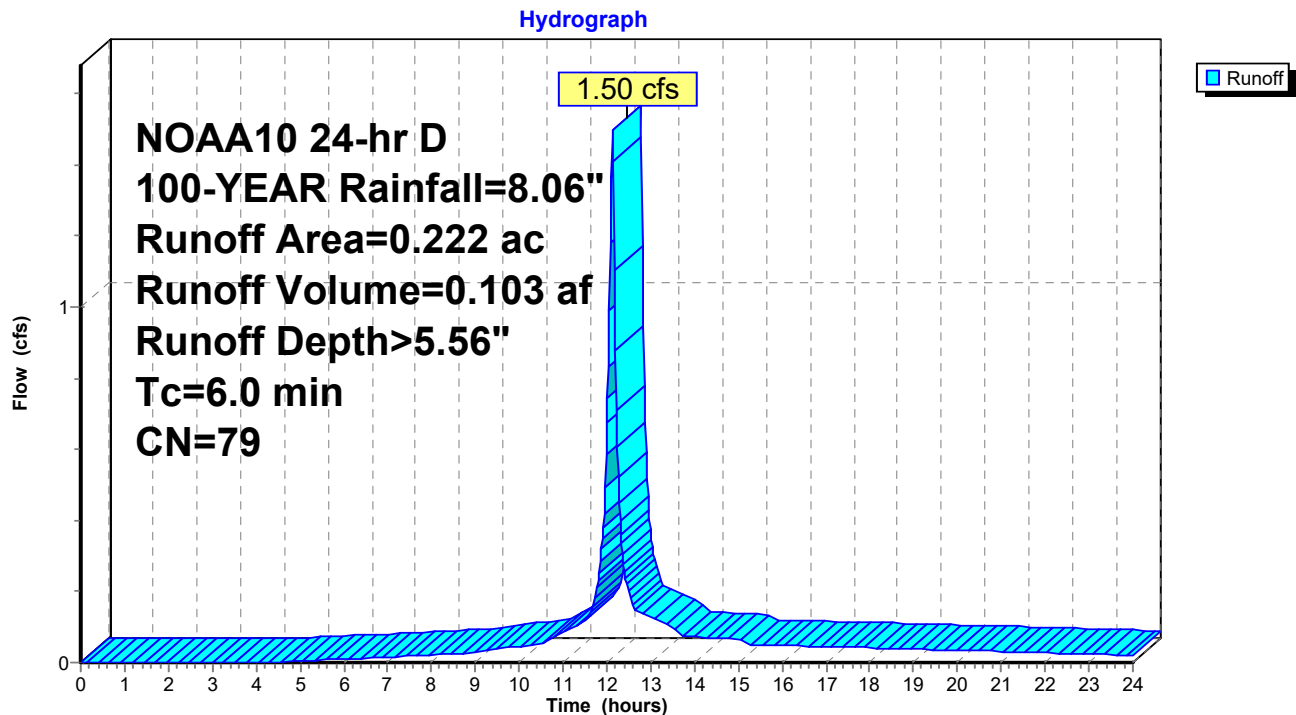
Summary for Subcatchment P5: Flow towards the southeast

Runoff = 1.50 cfs @ 12.13 hrs, Volume= 0.103 af, Depth> 5.56"
Routed to Reach TS : Total Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.067	80	>75% Grass cover, Good, HSG D
0.155	79	Woods, Fair, HSG D
0.000	98	Paved parking, HSG D
0.222	79	Weighted Average
0.222		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P5: Flow towards the southeast

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 155

Summary for Subcatchment P6: Flow to Blue Hills Ave

Runoff = 0.64 cfs @ 12.13 hrs, Volume= 0.047 af, Depth> 6.74"
Routed to Reach TS : Total Site

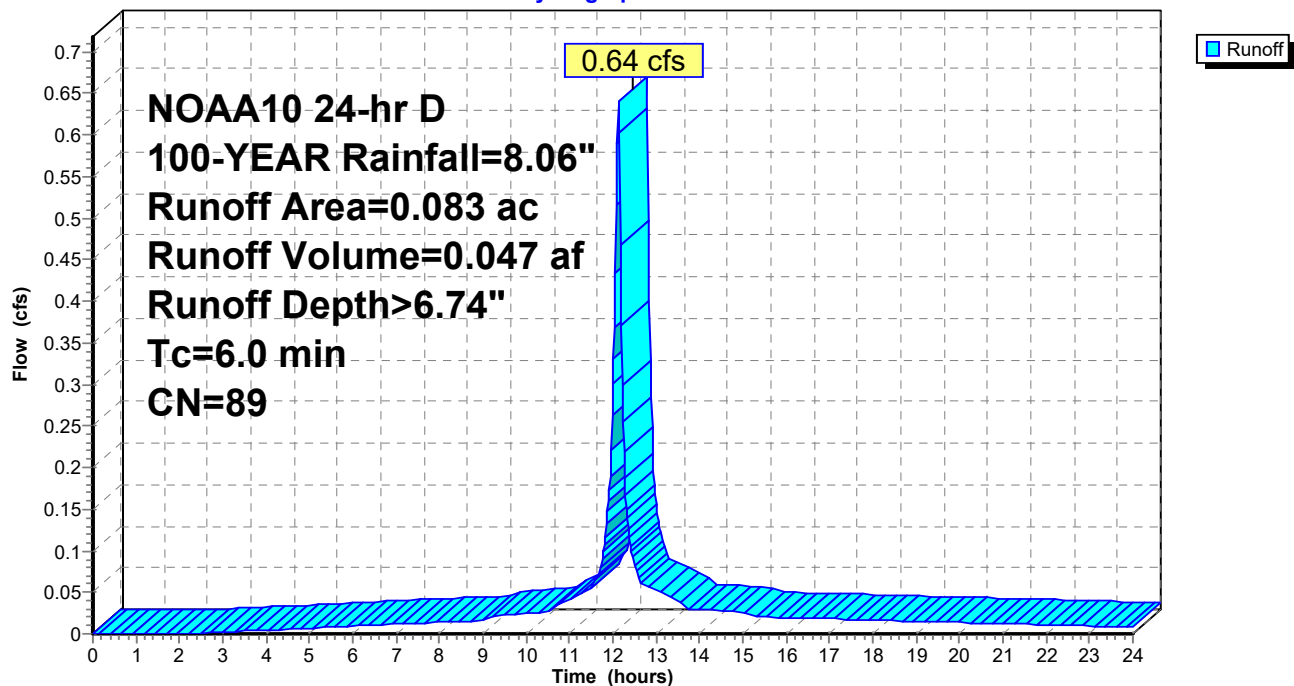
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Area (ac)	CN	Description
0.040	80	>75% Grass cover, Good, HSG D
0.000	79	Woods, Fair, HSG D
0.043	98	Paved parking, HSG D
0.083	89	Weighted Average
0.040		48.19% Pervious Area
0.043		51.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, min time to pond

Subcatchment P6: Flow to Blue Hills Ave

Hydrograph

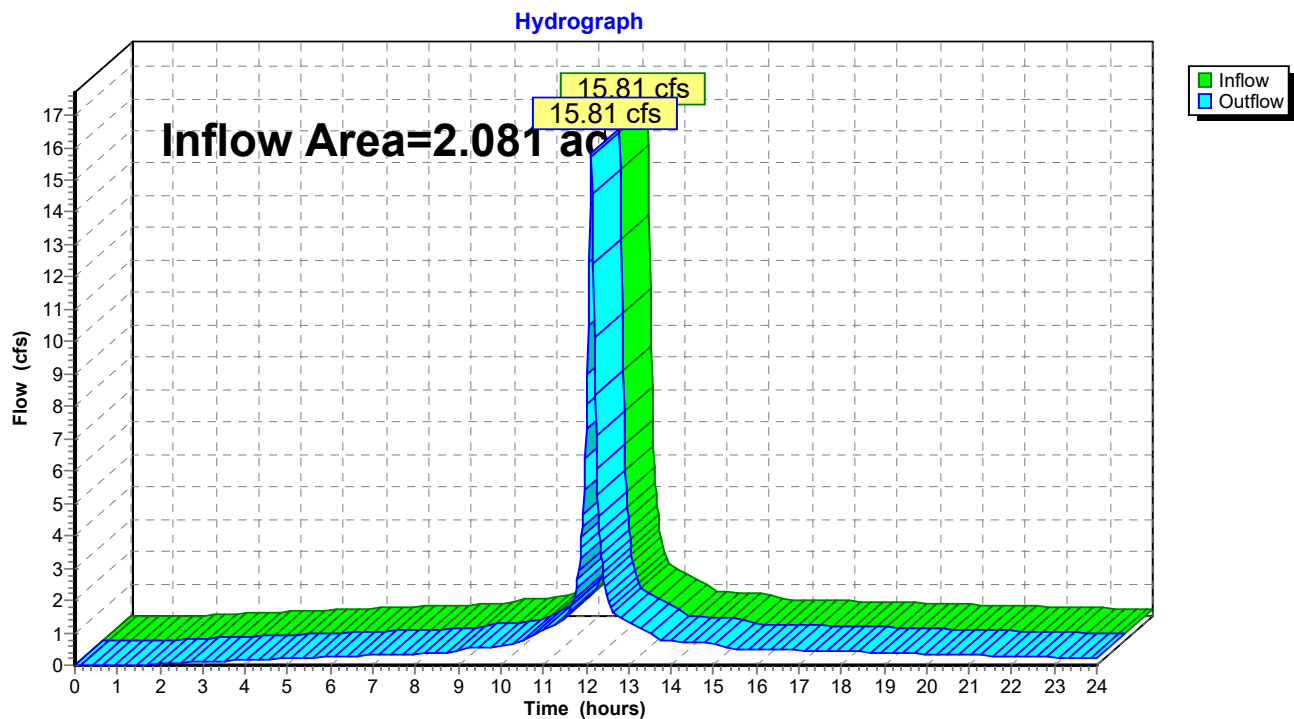


Summary for Reach R1: Flow towards the west

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.081 ac, 63.82% Impervious, Inflow Depth > 6.90" for 100-YEAR event
Inflow = 15.81 cfs @ 12.13 hrs, Volume= 1.197 af
Outflow = 15.81 cfs @ 12.13 hrs, Volume= 1.197 af, Atten= 0%, Lag= 0.0 min
Routed to Reach TS : Total Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

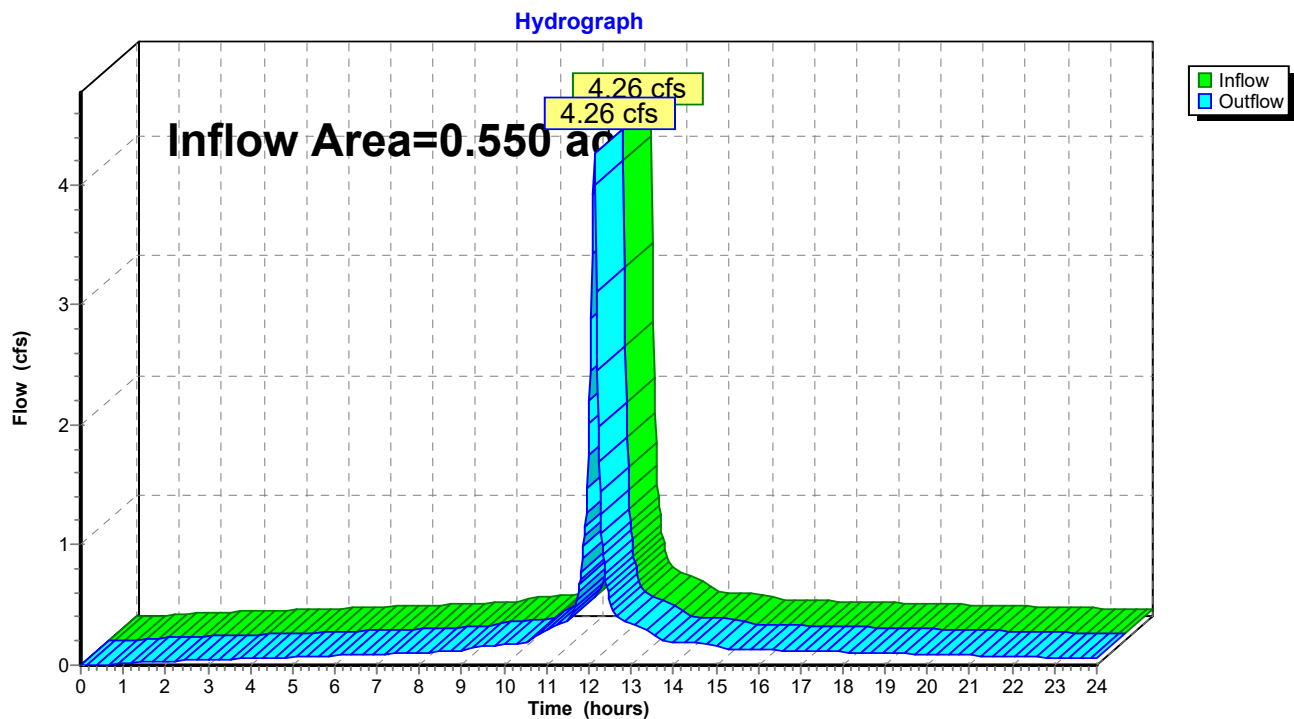
Reach R1: Flow towards the west

Summary for Reach R2: Flow towards the north

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.550 ac, 67.82% Impervious, Inflow Depth > 7.09" for 100-YEAR event
Inflow = 4.26 cfs @ 12.13 hrs, Volume= 0.325 af
Outflow = 4.26 cfs @ 12.13 hrs, Volume= 0.325 af, Atten= 0%, Lag= 0.0 min
Routed to Reach TS : Total Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

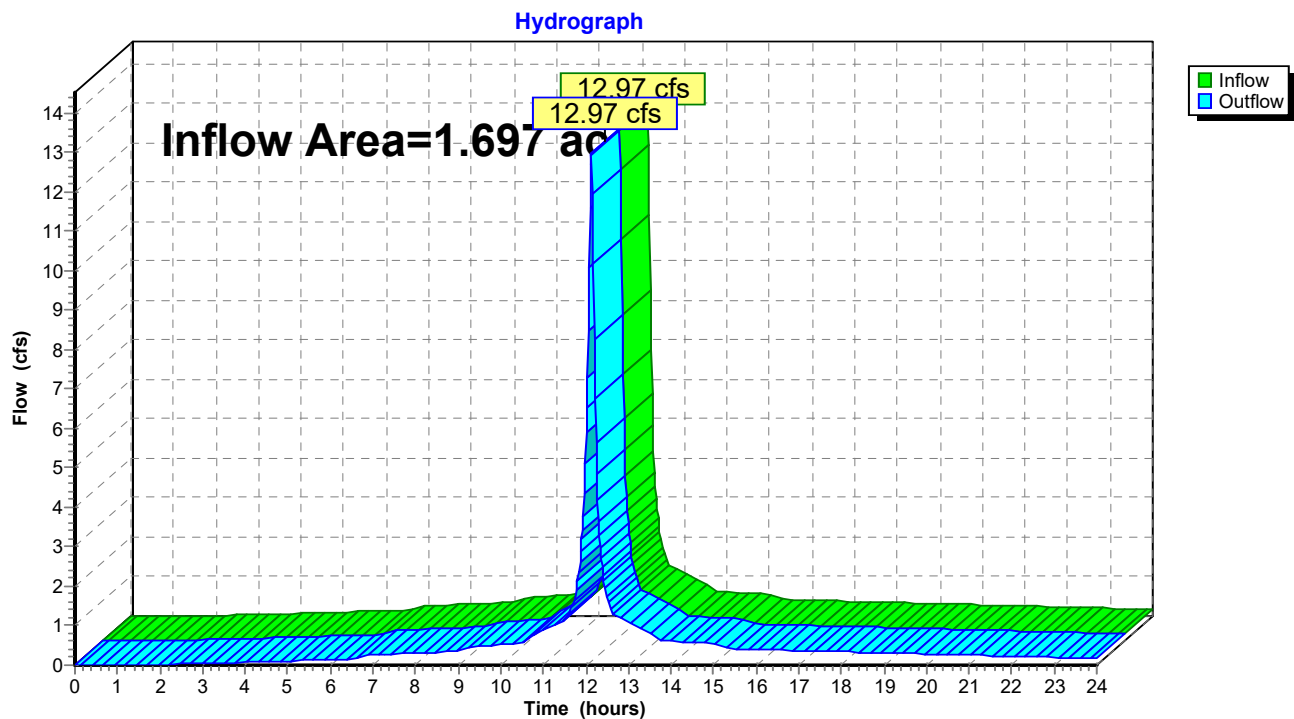
Reach R2: Flow towards the north

Summary for Reach R3: Flow towards the northeast

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.697 ac, 58.93% Impervious, Inflow Depth > 6.74" for 100-YEAR event
Inflow = 12.97 cfs @ 12.13 hrs, Volume= 0.953 af
Outflow = 12.97 cfs @ 12.13 hrs, Volume= 0.953 af, Atten= 0%, Lag= 0.0 min
Routed to Reach TS : Total Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

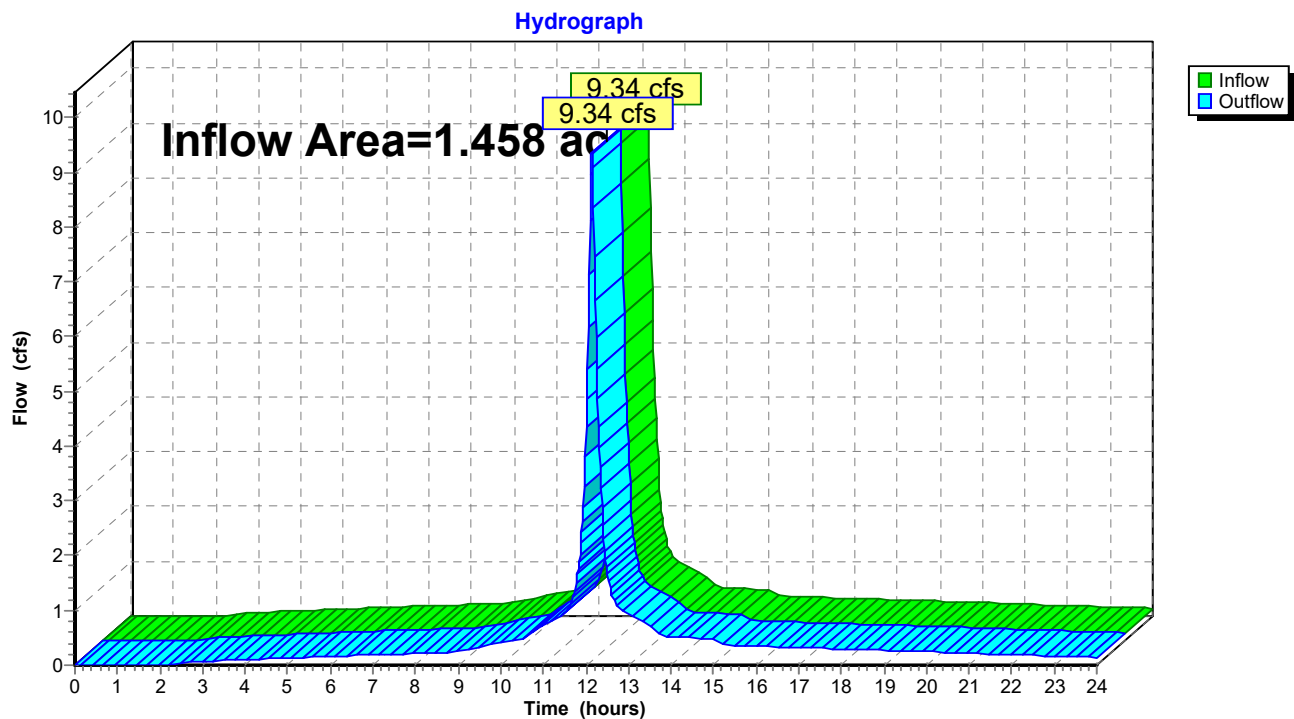
Reach R3: Flow towards the northeast

Summary for Reach R4: Flow towards the south

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.458 ac, 56.72% Impervious, Inflow Depth > 6.66" for 100-YEAR event
Inflow = 9.34 cfs @ 12.14 hrs, Volume= 0.809 af
Outflow = 9.34 cfs @ 12.14 hrs, Volume= 0.809 af, Atten= 0%, Lag= 0.0 min
Routed to Reach TS : Total Site

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

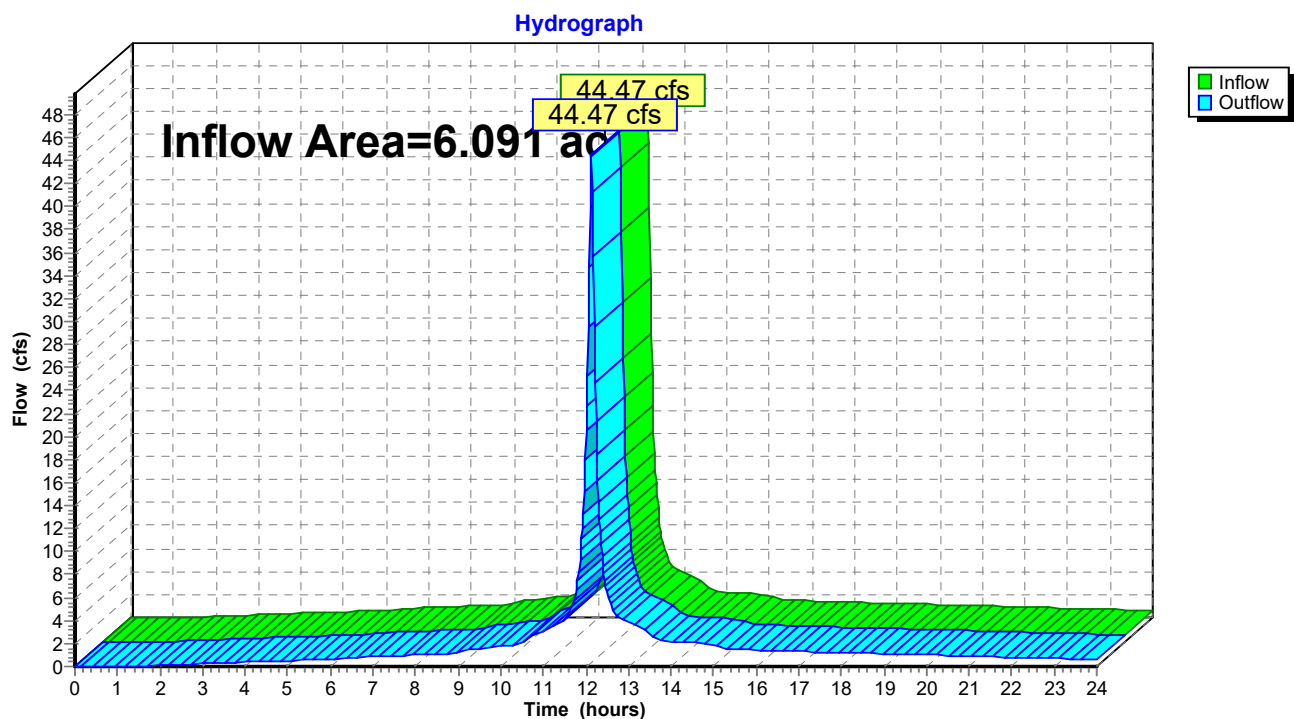
Reach R4: Flow towards the south

Summary for Reach TS: Total Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.091 ac, 58.63% Impervious, Inflow Depth > 6.76" for 100-YEAR event
Inflow = 44.47 cfs @ 12.13 hrs, Volume= 3.433 af
Outflow = 44.47 cfs @ 12.13 hrs, Volume= 3.433 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach TS: Total Site

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 161

Summary for Pond 1P: Bioretention Basin 1

Inflow Area = 0.232 ac, 68.97% Impervious, Inflow Depth > 7.09" for 100-YEAR event
 Inflow = 1.84 cfs @ 12.13 hrs, Volume= 0.137 af
 Outflow = 1.71 cfs @ 12.15 hrs, Volume= 0.118 af, Atten= 7%, Lag= 1.4 min
 Primary = 1.71 cfs @ 12.15 hrs, Volume= 0.118 af
 Routed to Reach R1 : Flow towards the west

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
 Peak Elev= 115.45' @ 12.15 hrs Surf.Area= 925 sf Storage= 1,094 cf

Plug-Flow detention time= 132.7 min calculated for 0.118 af (86% of inflow)
 Center-of-Mass det. time= 59.6 min (835.2 - 775.7)

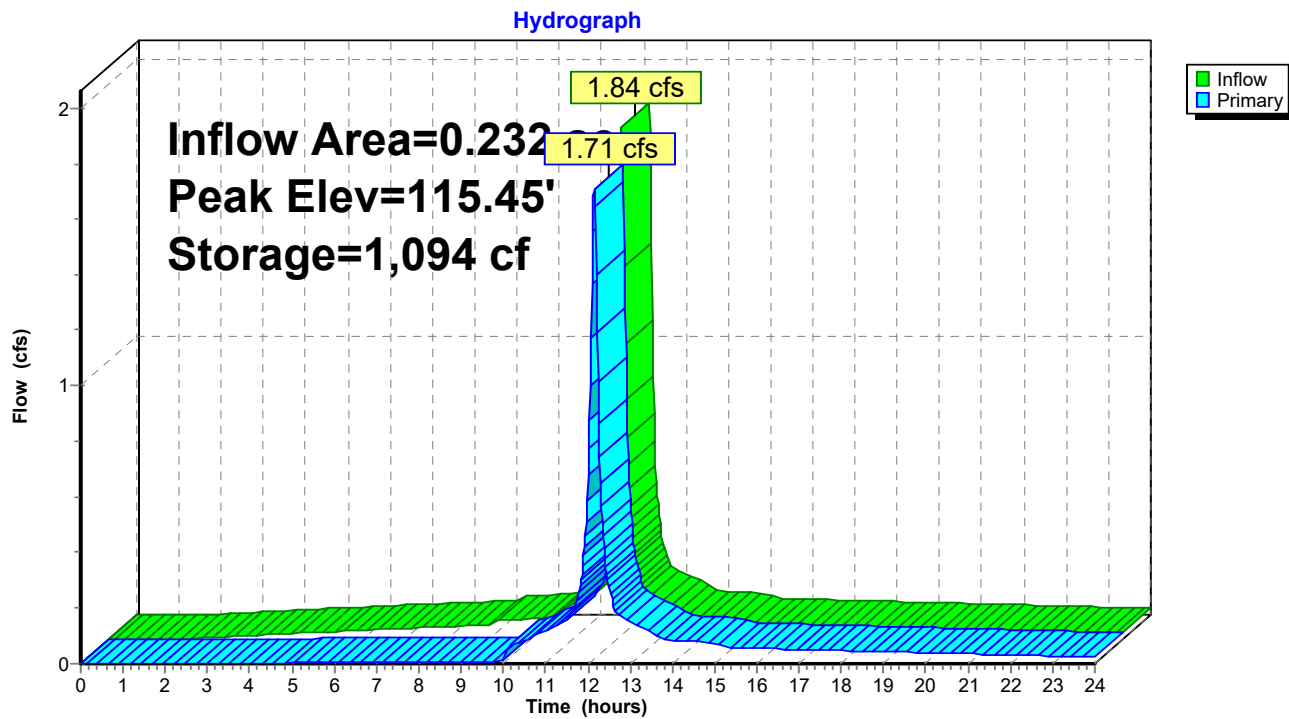
Volume	Invert	Avail.Storage	Storage Description			
#1	111.25'	1,140 cf	Bioretention Basin (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
111.25	517	134.2	0.0	0	0	517
112.25	517	134.2	40.0	207	207	651
112.50	517	134.2	0.0	0	207	685
114.50	517	134.2	20.0	207	414	953
115.00	725	143.6	100.0	309	723	1,172
115.50	948	153.0	100.0	417	1,140	1,406

Device	Routing	Invert	Outlet Devices
#1	Primary	111.92'	12.0" Round Outlet Pipe L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 111.92' / 111.83' S= 0.0100 ' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Device 1	111.42'	4.0" Vert. Underdrain C= 0.600 Limited to weir flow at low heads
#3	Device 1	115.15'	12.0" Horiz. Beehive Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	111.25'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Primary OutFlow Max=1.69 cfs @ 12.15 hrs HW=115.45' (Free Discharge)

1=Outlet Pipe (Passes 1.69 cfs of 6.58 cfs potential flow)
 2=Underdrain (Passes 0.01 cfs of 0.79 cfs potential flow)
 4=Exfiltration (Exfiltration Controls 0.01 cfs)
 3=Beehive Grate (Weir Controls 1.68 cfs @ 1.79 fps)

Pond 1P: Bioretention Basin 1



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 163

Stage-Discharge for Pond 1P: Bioretention Basin 1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
111.25	0.00	113.80	0.01
111.30	0.00	113.85	0.01
111.35	0.00	113.90	0.01
111.40	0.00	113.95	0.01
111.45	0.00	114.00	0.01
111.50	0.00	114.05	0.01
111.55	0.00	114.10	0.01
111.60	0.00	114.15	0.01
111.65	0.00	114.20	0.01
111.70	0.00	114.25	0.01
111.75	0.00	114.30	0.01
111.80	0.00	114.35	0.01
111.85	0.00	114.40	0.01
111.90	0.00	114.45	0.01
111.95	0.00	114.50	0.01
112.00	0.01	114.55	0.01
112.05	0.01	114.60	0.01
112.10	0.01	114.65	0.01
112.15	0.01	114.70	0.01
112.20	0.01	114.75	0.01
112.25	0.01	114.80	0.01
112.30	0.01	114.85	0.01
112.35	0.01	114.90	0.01
112.40	0.01	114.95	0.01
112.45	0.01	115.00	0.01
112.50	0.01	115.05	0.01
112.55	0.01	115.10	0.01
112.60	0.01	115.15	0.01
112.65	0.01	115.20	0.12
112.70	0.01	115.25	0.33
112.75	0.01	115.30	0.61
112.80	0.01	115.35	0.93
112.85	0.01	115.40	1.29
112.90	0.01	115.45	1.70
112.95	0.01	115.50	2.14
113.00	0.01		
113.05	0.01		
113.10	0.01		
113.15	0.01		
113.20	0.01		
113.25	0.01		
113.30	0.01		
113.35	0.01		
113.40	0.01		
113.45	0.01		
113.50	0.01		
113.55	0.01		
113.60	0.01		
113.65	0.01		
113.70	0.01		
113.75	0.01		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 164

Stage-Area-Storage for Pond 1P: Bioretention Basin 1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
111.25	517	0	113.80	517	341
111.30	517	10	113.85	517	346
111.35	517	21	113.90	517	352
111.40	517	31	113.95	517	357
111.45	517	41	114.00	517	362
111.50	517	52	114.05	517	367
111.55	517	62	114.10	517	372
111.60	517	72	114.15	517	377
111.65	517	83	114.20	517	383
111.70	517	93	114.25	517	388
111.75	517	103	114.30	517	393
111.80	517	114	114.35	517	398
111.85	517	124	114.40	517	403
111.90	517	134	114.45	517	408
111.95	517	145	114.50	517	414
112.00	517	155	114.55	536	440
112.05	517	165	114.60	556	467
112.10	517	176	114.65	576	496
112.15	517	186	114.70	596	525
112.20	517	196	114.75	617	555
112.25	517	207	114.80	638	586
112.30	517	207	114.85	659	619
112.35	517	207	114.90	681	652
112.40	517	207	114.95	703	687
112.45	517	207	115.00	725	723
112.50	517	207	115.05	746	759
112.55	517	212	115.10	767	797
112.60	517	217	115.15	789	836
112.65	517	222	115.20	811	876
112.70	517	227	115.25	833	917
112.75	517	233	115.30	855	959
112.80	517	238	115.35	878	1,003
112.85	517	243	115.40	901	1,047
112.90	517	248	115.45	924	1,093
112.95	517	253	115.50	948	1,140
113.00	517	259			
113.05	517	264			
113.10	517	269			
113.15	517	274			
113.20	517	279			
113.25	517	284			
113.30	517	290			
113.35	517	295			
113.40	517	300			
113.45	517	305			
113.50	517	310			
113.55	517	315			
113.60	517	321			
113.65	517	326			
113.70	517	331			
113.75	517	336			

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 165

Summary for Pond 2P: Bioretention Basin 2

Inflow Area = 0.633 ac, 69.83% Impervious, Inflow Depth > 7.09" for 100-YEAR event
 Inflow = 5.02 cfs @ 12.13 hrs, Volume= 0.374 af
 Outflow = 4.86 cfs @ 12.14 hrs, Volume= 0.353 af, Atten= 3%, Lag= 0.9 min
 Primary = 4.86 cfs @ 12.14 hrs, Volume= 0.353 af
 Routed to Reach R3 : Flow towards the northeast

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
 Peak Elev= 115.96' @ 12.14 hrs Surf.Area= 998 sf Storage= 1,311 cf

Plug-Flow detention time= 63.5 min calculated for 0.353 af (94% of inflow)
 Center-of-Mass det. time= 30.1 min (805.8 - 775.7)

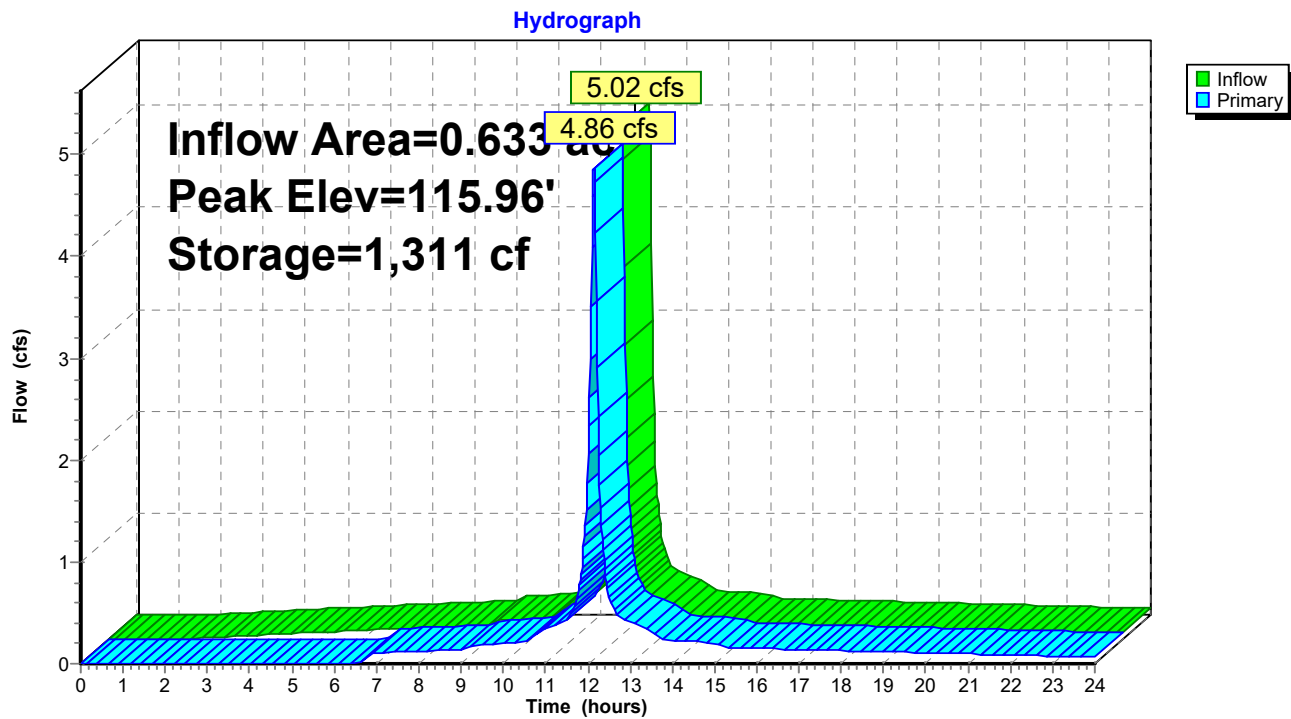
Volume	Invert	Avail.Storage	Storage Description			
#1	111.25'	1,349 cf	Bioretention Basin (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
111.25	401	122.6	0.0	0	0	401
112.25	401	122.6	40.0	160	160	524
112.50	401	122.6	0.0	0	160	554
114.50	401	122.6	20.0	160	321	799
116.00	1,017	150.9	100.0	1,028	1,349	1,449

Device	Routing	Invert	Outlet Devices
#1	Primary	112.85'	12.0" Round Outlet Pipe L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 112.85' / 112.81' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Device 1	112.85'	4.0" Vert. Underdrain C= 0.600 Limited to weir flow at low heads
#3	Device 1	115.50'	18.0" Horiz. Beehive Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	111.25'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Primary OutFlow Max=4.83 cfs @ 12.14 hrs HW=115.96' (Free Discharge)

1=Outlet Pipe (Passes 4.83 cfs of 6.11 cfs potential flow)
 2=Underdrain (Passes 0.01 cfs of 0.72 cfs potential flow)
 4=Exfiltration (Exfiltration Controls 0.01 cfs)
 3=Beehive Grate (Weir Controls 4.82 cfs @ 2.22 fps)

Pond 2P: Bioretention Basin 2



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 167

Stage-Discharge for Pond 2P: Bioretention Basin 2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
111.25	0.00	113.80	0.00
111.30	0.00	113.85	0.00
111.35	0.00	113.90	0.00
111.40	0.00	113.95	0.00
111.45	0.00	114.00	0.00
111.50	0.00	114.05	0.00
111.55	0.00	114.10	0.00
111.60	0.00	114.15	0.00
111.65	0.00	114.20	0.00
111.70	0.00	114.25	0.00
111.75	0.00	114.30	0.00
111.80	0.00	114.35	0.00
111.85	0.00	114.40	0.00
111.90	0.00	114.45	0.00
111.95	0.00	114.50	0.00
112.00	0.00	114.55	0.00
112.05	0.00	114.60	0.01
112.10	0.00	114.65	0.01
112.15	0.00	114.70	0.01
112.20	0.00	114.75	0.01
112.25	0.00	114.80	0.01
112.30	0.00	114.85	0.01
112.35	0.00	114.90	0.01
112.40	0.00	114.95	0.01
112.45	0.00	115.00	0.01
112.50	0.00	115.05	0.01
112.55	0.00	115.10	0.01
112.60	0.00	115.15	0.01
112.65	0.00	115.20	0.01
112.70	0.00	115.25	0.01
112.75	0.00	115.30	0.01
112.80	0.00	115.35	0.01
112.85	0.00	115.40	0.01
112.90	0.00	115.45	0.01
112.95	0.00	115.50	0.01
113.00	0.00	115.55	0.18
113.05	0.00	115.60	0.50
113.10	0.00	115.65	0.91
113.15	0.00	115.70	1.39
113.20	0.00	115.75	1.94
113.25	0.00	115.80	2.54
113.30	0.00	115.85	3.20
113.35	0.00	115.90	3.91
113.40	0.00	115.95	4.66
113.45	0.00	116.00	5.46
113.50	0.00		
113.55	0.00		
113.60	0.00		
113.65	0.00		
113.70	0.00		
113.75	0.00		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 168

Stage-Area-Storage for Pond 2P: Bioretention Basin 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
111.25	401	0	113.80	401	265
111.30	401	8	113.85	401	269
111.35	401	16	113.90	401	273
111.40	401	24	113.95	401	277
111.45	401	32	114.00	401	281
111.50	401	40	114.05	401	285
111.55	401	48	114.10	401	289
111.60	401	56	114.15	401	293
111.65	401	64	114.20	401	297
111.70	401	72	114.25	401	301
111.75	401	80	114.30	401	305
111.80	401	88	114.35	401	309
111.85	401	96	114.40	401	313
111.90	401	104	114.45	401	317
111.95	401	112	114.50	401	321
112.00	401	120	114.55	417	341
112.05	401	128	114.60	433	363
112.10	401	136	114.65	450	385
112.15	401	144	114.70	467	408
112.20	401	152	114.75	484	431
112.25	401	160	114.80	502	456
112.30	401	160	114.85	520	481
112.35	401	160	114.90	538	508
112.40	401	160	114.95	556	535
112.45	401	160	115.00	575	564
112.50	401	160	115.05	594	593
112.55	401	164	115.10	614	623
112.60	401	168	115.15	633	654
112.65	401	172	115.20	653	686
112.70	401	176	115.25	674	719
112.75	401	180	115.30	694	754
112.80	401	184	115.35	715	789
112.85	401	188	115.40	737	825
112.90	401	192	115.45	758	863
112.95	401	196	115.50	780	901
113.00	401	201	115.55	803	941
113.05	401	205	115.60	825	981
113.10	401	209	115.65	848	1,023
113.15	401	213	115.70	871	1,066
113.20	401	217	115.75	895	1,110
113.25	401	221	115.80	919	1,156
113.30	401	225	115.85	943	1,202
113.35	401	229	115.90	967	1,250
113.40	401	233	115.95	992	1,299
113.45	401	237	116.00	1,017	1,349
113.50	401	241			
113.55	401	245			
113.60	401	249			
113.65	401	253			
113.70	401	257			
113.75	401	261			

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 169

Summary for Pond 3P: Bioretention Basin 3

Inflow Area = 0.250 ac, 64.80% Impervious, Inflow Depth > 7.09" for 100-YEAR event
 Inflow = 1.98 cfs @ 12.13 hrs, Volume= 0.148 af
 Outflow = 1.89 cfs @ 12.15 hrs, Volume= 0.129 af, Atten= 5%, Lag= 1.1 min
 Primary = 1.89 cfs @ 12.15 hrs, Volume= 0.129 af
 Routed to Reach R4 : Flow towards the south

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
 Peak Elev= 116.00' @ 12.15 hrs Surf.Area= 946 sf Storage= 1,051 cf

Plug-Flow detention time= 125.9 min calculated for 0.129 af (87% of inflow)
 Center-of-Mass det. time= 57.1 min (832.8 - 775.7)

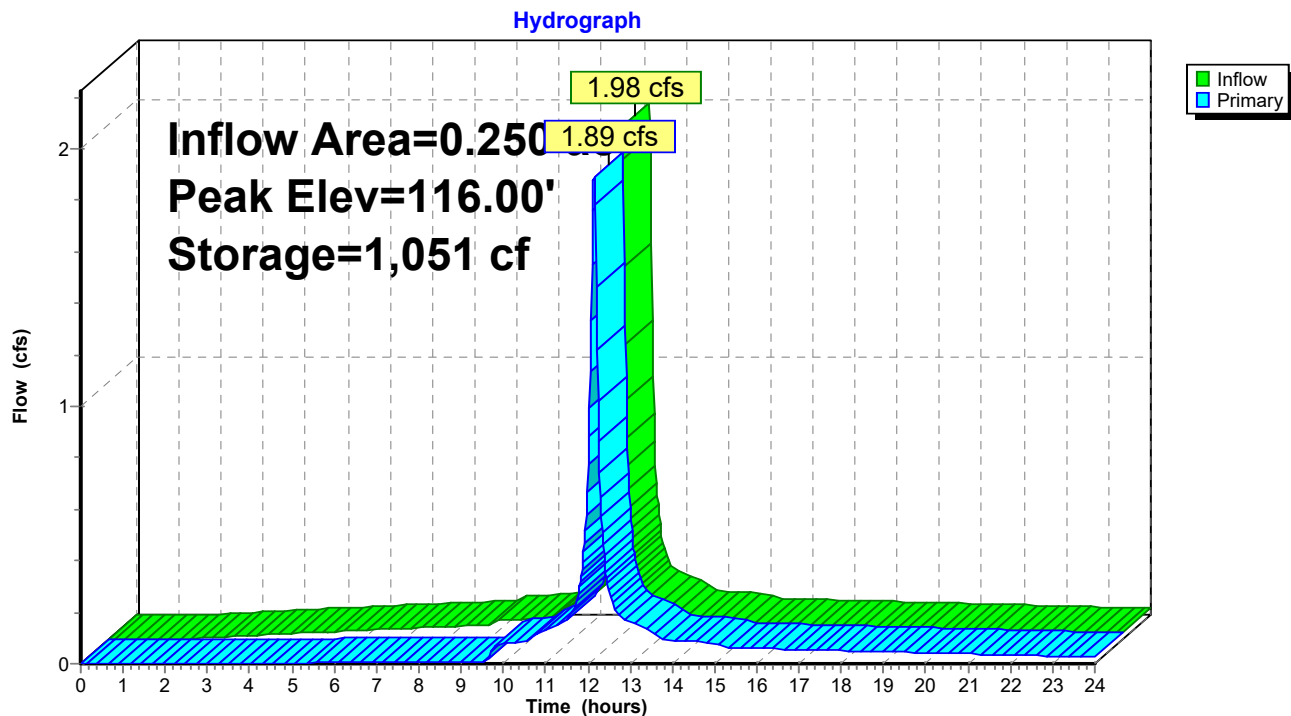
Volume	Invert	Avail.Storage	Storage Description			
#1	112.25'	1,056 cf	Bioretention Basin (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
112.25	495	86.4	0.0	0	0	495
113.25	495	86.4	40.0	198	198	581
113.50	495	86.4	0.0	0	198	603
115.00	495	86.4	20.0	149	347	733
116.00	948	114.7	100.0	709	1,056	1,197

Device	Routing	Invert	Outlet Devices
#1	Primary	113.81'	10.0" Round Outlet Pipe L= 72.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 113.81' / 113.52' S= 0.0040 ' / Cc= 0.900 n= 0.011, Flow Area= 0.55 sf
#2	Device 1	113.81'	4.0" Vert. Underdrain C= 0.600 Limited to weir flow at low heads
#3	Device 1	115.75'	18.0" Horiz. Beehive Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	112.25'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Primary OutFlow Max=1.87 cfs @ 12.15 hrs HW=115.99' (Free Discharge)

1=Outlet Pipe (Passes 1.87 cfs of 2.97 cfs potential flow)
 2=Underdrain (Passes 0.01 cfs of 0.60 cfs potential flow)
 4=Exfiltration (Exfiltration Controls 0.01 cfs)
 3=Beehive Grate (Weir Controls 1.86 cfs @ 1.62 fps)

Pond 3P: Bioretention Basin 3



Stage-Discharge for Pond 3P: Bioretention Basin 3

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
112.25	0.00	113.27	0.00	114.29	0.01	115.31	0.01
112.27	0.00	113.29	0.00	114.31	0.01	115.33	0.01
112.29	0.00	113.31	0.00	114.33	0.01	115.35	0.01
112.31	0.00	113.33	0.00	114.35	0.01	115.37	0.01
112.33	0.00	113.35	0.00	114.37	0.01	115.39	0.01
112.35	0.00	113.37	0.00	114.39	0.01	115.41	0.01
112.37	0.00	113.39	0.00	114.41	0.01	115.43	0.01
112.39	0.00	113.41	0.00	114.43	0.01	115.45	0.01
112.41	0.00	113.43	0.00	114.45	0.01	115.47	0.01
112.43	0.00	113.45	0.00	114.47	0.01	115.49	0.01
112.45	0.00	113.47	0.00	114.49	0.01	115.51	0.01
112.47	0.00	113.49	0.00	114.51	0.01	115.53	0.01
112.49	0.00	113.51	0.00	114.53	0.01	115.55	0.01
112.51	0.00	113.53	0.00	114.55	0.01	115.57	0.01
112.53	0.00	113.55	0.00	114.57	0.01	115.59	0.01
112.55	0.00	113.57	0.00	114.59	0.01	115.61	0.01
112.57	0.00	113.59	0.00	114.61	0.01	115.63	0.01
112.59	0.00	113.61	0.00	114.63	0.01	115.65	0.01
112.61	0.00	113.63	0.00	114.65	0.01	115.67	0.01
112.63	0.00	113.65	0.00	114.67	0.01	115.69	0.01
112.65	0.00	113.67	0.00	114.69	0.01	115.71	0.01
112.67	0.00	113.69	0.00	114.71	0.01	115.73	0.01
112.69	0.00	113.71	0.00	114.73	0.01	115.75	0.01
112.71	0.00	113.73	0.00	114.75	0.01	115.77	0.05
112.73	0.00	113.75	0.00	114.77	0.01	115.79	0.13
112.75	0.00	113.77	0.00	114.79	0.01	115.81	0.24
112.77	0.00	113.79	0.00	114.81	0.01	115.83	0.36
112.79	0.00	113.81	0.00	114.83	0.01	115.85	0.50
112.81	0.00	113.83	0.00	114.85	0.01	115.87	0.65
112.83	0.00	113.85	0.00	114.87	0.01	115.89	0.82
112.85	0.00	113.87	0.01	114.89	0.01	115.91	1.00
112.87	0.00	113.89	0.01	114.91	0.01	115.93	1.19
112.89	0.00	113.91	0.01	114.93	0.01	115.95	1.39
112.91	0.00	113.93	0.01	114.95	0.01	115.97	1.60
112.93	0.00	113.95	0.01	114.97	0.01	115.99	1.82
112.95	0.00	113.97	0.01	114.99	0.01		
112.97	0.00	113.99	0.01	115.01	0.01		
112.99	0.00	114.01	0.01	115.03	0.01		
113.01	0.00	114.03	0.01	115.05	0.01		
113.03	0.00	114.05	0.01	115.07	0.01		
113.05	0.00	114.07	0.01	115.09	0.01		
113.07	0.00	114.09	0.01	115.11	0.01		
113.09	0.00	114.11	0.01	115.13	0.01		
113.11	0.00	114.13	0.01	115.15	0.01		
113.13	0.00	114.15	0.01	115.17	0.01		
113.15	0.00	114.17	0.01	115.19	0.01		
113.17	0.00	114.19	0.01	115.21	0.01		
113.19	0.00	114.21	0.01	115.23	0.01		
113.21	0.00	114.23	0.01	115.25	0.01		
113.23	0.00	114.25	0.01	115.27	0.01		
113.25	0.00	114.27	0.01	115.29	0.01		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 172

Stage-Area-Storage for Pond 3P: Bioretention Basin 3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
112.25	495	0	114.80	495	327
112.30	495	10	114.85	495	332
112.35	495	20	114.90	495	337
112.40	495	30	114.95	495	342
112.45	495	40	115.00	495	347
112.50	495	50	115.05	514	372
112.55	495	59	115.10	534	398
112.60	495	69	115.15	554	425
112.65	495	79	115.20	574	453
112.70	495	89	115.25	595	483
112.75	495	99	115.30	616	513
112.80	495	109	115.35	637	544
112.85	495	119	115.40	659	576
112.90	495	129	115.45	681	610
112.95	495	139	115.50	703	645
113.00	495	149	115.55	726	680
113.05	495	158	115.60	749	717
113.10	495	168	115.65	773	755
113.15	495	178	115.70	797	794
113.20	495	188	115.75	821	835
113.25	495	198	115.80	846	877
113.30	495	198	115.85	871	919
113.35	495	198	115.90	896	964
113.40	495	198	115.95	922	1,009
113.45	495	198	116.00	948	1,056
113.50	495	198			
113.55	495	203			
113.60	495	208			
113.65	495	213			
113.70	495	218			
113.75	495	223			
113.80	495	228			
113.85	495	233			
113.90	495	238			
113.95	495	243			
114.00	495	248			
114.05	495	252			
114.10	495	257			
114.15	495	262			
114.20	495	267			
114.25	495	272			
114.30	495	277			
114.35	495	282			
114.40	495	287			
114.45	495	292			
114.50	495	297			
114.55	495	302			
114.60	495	307			
114.65	495	312			
114.70	495	317			
114.75	495	322			

Summary for Pond 4P: Underground Detention Chamber

Inflow Area = 0.296 ac, 100.00% Impervious, Inflow Depth > 7.81" for 100-YEAR event
 Inflow = 2.42 cfs @ 12.13 hrs, Volume= 0.193 af
 Outflow = 1.76 cfs @ 12.18 hrs, Volume= 0.189 af, Atten= 27%, Lag= 3.1 min
 Primary = 1.76 cfs @ 12.18 hrs, Volume= 0.189 af
 Routed to Reach R4 : Flow towards the south

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 114.43' @ 12.18 hrs Surf.Area= 589 sf Storage= 750 cf

Plug-Flow detention time= 30.1 min calculated for 0.189 af (98% of inflow)
 Center-of-Mass det. time= 17.4 min (759.3 - 741.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	112.50'	595 cf	11.00'W x 53.58'L x 3.75'H Field A 2,210 cf Overall - 722 cf Embedded = 1,488 cf x 40.0% Voids
#2A	113.00'	722 cf	ADS_StormTech SC-800 +Cap x 14 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 14 Chambers in 2 Rows Cap Storage= 3.4 cf x 2 x 2 rows = 13.7 cf
		1,317 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	113.00'	8.0" Round Outlet Pipe L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 113.00' / 112.75' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf

Primary OutFlow Max=1.76 cfs @ 12.18 hrs HW=114.43' (Free Discharge)
 ↑ **1=Outlet Pipe** (Inlet Controls 1.76 cfs @ 5.05 fps)

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 174

Pond 4P: Underground Detention Chamber - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-800 +Cap (ADS StormTech®SC-800 with cap volume)

Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf

Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap

Cap Storage= 3.4 cf x 2 x 2 rows = 13.7 cf

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

7 Chambers/Row x 7.12' Long +0.88' Cap Length x 2 = 51.58' Row Length +12.0" End Stone x 2 = 53.58' Base Length

2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width

6.0" Stone Base + 33.0" Chamber Height + 6.0" Stone Cover = 3.75' Field Height

14 Chambers x 50.6 cf + 3.4 cf Cap Volume x 2 x 2 Rows = 722.0 cf Chamber Storage

2,210.3 cf Field - 722.0 cf Chambers = 1,488.3 cf Stone x 40.0% Voids = 595.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,317.3 cf = 0.030 af

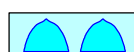
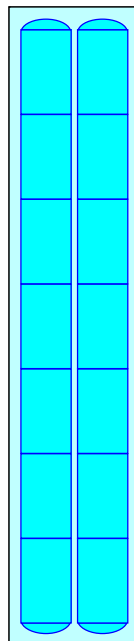
Overall Storage Efficiency = 59.6%

Overall System Size = 53.58' x 11.00' x 3.75'

14 Chambers

81.9 cy Field

55.1 cy Stone



010140300-PWAM

Prepared by BSC Group

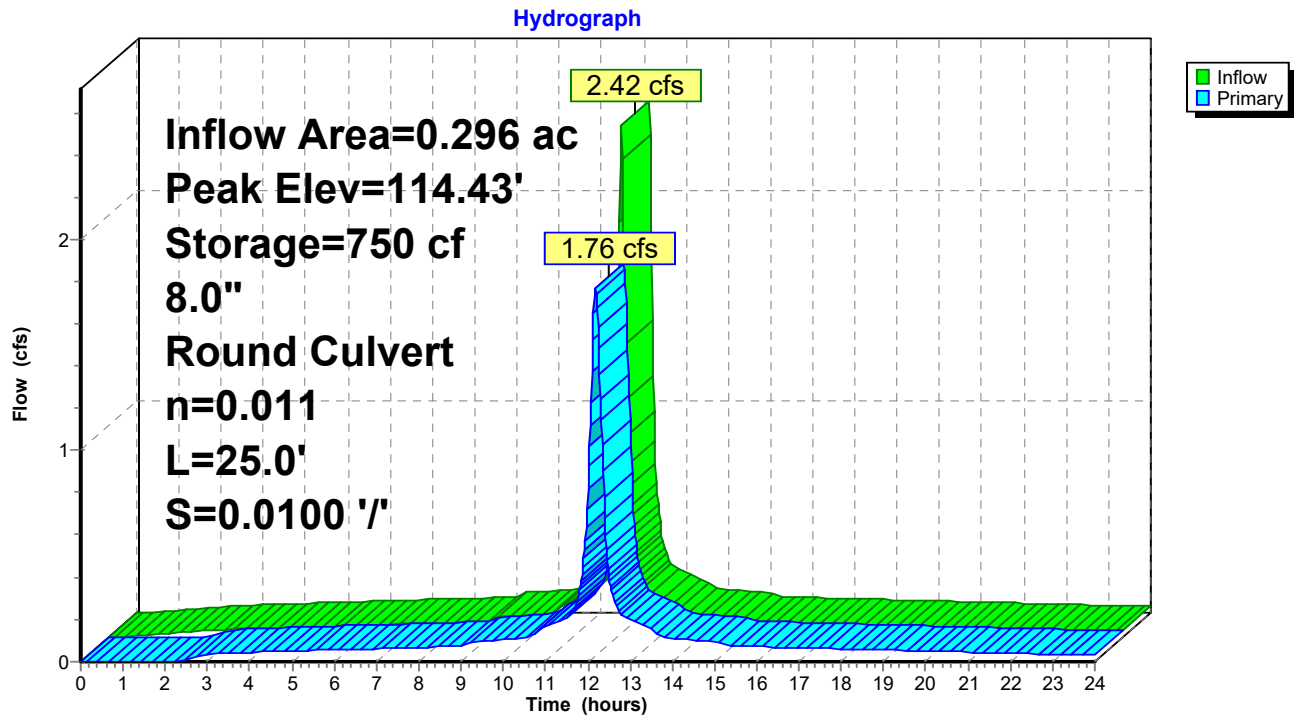
HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 175

Pond 4P: Underground Detention Chamber



Stage-Discharge for Pond 4P: Underground Detention Chamber

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
112.50	0.00	113.52	0.68	114.54	1.85	115.56	2.51
112.52	0.00	113.54	0.72	114.56	1.86	115.58	2.52
112.54	0.00	113.56	0.76	114.58	1.88	115.60	2.53
112.56	0.00	113.58	0.80	114.60	1.89	115.62	2.54
112.58	0.00	113.60	0.84	114.62	1.91	115.64	2.55
112.60	0.00	113.62	0.88	114.64	1.92	115.66	2.56
112.62	0.00	113.64	0.92	114.66	1.94	115.68	2.57
112.64	0.00	113.66	0.96	114.68	1.95	115.70	2.59
112.66	0.00	113.68	0.99	114.70	1.96	115.72	2.60
112.68	0.00	113.70	1.02	114.72	1.98	115.74	2.61
112.70	0.00	113.72	1.05	114.74	1.99	115.76	2.62
112.72	0.00	113.74	1.07	114.76	2.01	115.78	2.63
112.74	0.00	113.76	1.10	114.78	2.02	115.80	2.64
112.76	0.00	113.78	1.12	114.80	2.04	115.82	2.65
112.78	0.00	113.80	1.15	114.82	2.05	115.84	2.66
112.80	0.00	113.82	1.17	114.84	2.06	115.86	2.67
112.82	0.00	113.84	1.20	114.86	2.08	115.88	2.68
112.84	0.00	113.86	1.22	114.88	2.09	115.90	2.69
112.86	0.00	113.88	1.24	114.90	2.10	115.92	2.70
112.88	0.00	113.90	1.24	114.92	2.12	115.94	2.71
112.90	0.00	113.92	1.27	114.94	2.13	115.96	2.72
112.92	0.00	113.94	1.29	114.96	2.14	115.98	2.73
112.94	0.00	113.96	1.32	114.98	2.16	116.00	2.74
112.96	0.00	113.98	1.34	115.00	2.17	116.02	2.75
112.98	0.00	114.00	1.36	115.02	2.18	116.04	2.77
113.00	0.00	114.02	1.39	115.04	2.20	116.06	2.78
113.02	0.00	114.04	1.41	115.06	2.21	116.08	2.79
113.04	0.01	114.06	1.43	115.08	2.22	116.10	2.80
113.06	0.01	114.08	1.45	115.10	2.23	116.12	2.81
113.08	0.02	114.10	1.47	115.12	2.25	116.14	2.82
113.10	0.04	114.12	1.49	115.14	2.26	116.16	2.83
113.12	0.05	114.14	1.51	115.16	2.27	116.18	2.84
113.14	0.07	114.16	1.53	115.18	2.28	116.20	2.85
113.16	0.09	114.18	1.55	115.20	2.30	116.22	2.86
113.18	0.11	114.20	1.56	115.22	2.31	116.24	2.87
113.20	0.13	114.22	1.58	115.24	2.32		
113.22	0.16	114.24	1.60	115.26	2.33		
113.24	0.19	114.26	1.62	115.28	2.35		
113.26	0.22	114.28	1.64	115.30	2.36		
113.28	0.25	114.30	1.65	115.32	2.37		
113.30	0.28	114.32	1.67	115.34	2.38		
113.32	0.31	114.34	1.69	115.36	2.39		
113.34	0.34	114.36	1.70	115.38	2.40		
113.36	0.38	114.38	1.72	115.40	2.42		
113.38	0.42	114.40	1.74	115.42	2.43		
113.40	0.45	114.42	1.75	115.44	2.44		
113.42	0.49	114.44	1.77	115.46	2.45		
113.44	0.53	114.46	1.78	115.48	2.46		
113.46	0.57	114.48	1.80	115.50	2.47		
113.48	0.61	114.50	1.82	115.52	2.49		
113.50	0.64	114.52	1.83	115.54	2.50		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 177

Stage-Area-Storage for Pond 4P: Underground Detention Chamber

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
112.50	0	115.05	989
112.55	12	115.10	1,007
112.60	24	115.15	1,024
112.65	35	115.20	1,042
112.70	47	115.25	1,058
112.75	59	115.30	1,075
112.80	71	115.35	1,091
112.85	83	115.40	1,106
112.90	94	115.45	1,121
112.95	106	115.50	1,136
113.00	118	115.55	1,149
113.05	141	115.60	1,162
113.10	164	115.65	1,175
113.15	187	115.70	1,187
113.20	210	115.75	1,199
113.25	233	115.80	1,211
113.30	256	115.85	1,223
113.35	279	115.90	1,235
113.40	302	115.95	1,247
113.45	324	116.00	1,258
113.50	347	116.05	1,270
113.55	370	116.10	1,282
113.60	392	116.15	1,294
113.65	414	116.20	1,306
113.70	437	116.25	1,317
113.75	459		
113.80	481		
113.85	503		
113.90	525		
113.95	546		
114.00	568		
114.05	590		
114.10	611		
114.15	632		
114.20	654		
114.25	675		
114.30	696		
114.35	716		
114.40	737		
114.45	757		
114.50	778		
114.55	798		
114.60	818		
114.65	838		
114.70	857		
114.75	877		
114.80	896		
114.85	915		
114.90	934		
114.95	953		
115.00	971		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 178

Summary for Pond 5P: Underground Detention Chamber

Inflow Area = 0.330 ac, 100.00% Impervious, Inflow Depth > 7.81" for 100-YEAR event
 Inflow = 2.70 cfs @ 12.13 hrs, Volume= 0.215 af
 Outflow = 1.92 cfs @ 12.18 hrs, Volume= 0.211 af, Atten= 29%, Lag= 3.3 min
 Primary = 1.92 cfs @ 12.18 hrs, Volume= 0.211 af
 Routed to Reach R4 : Flow towards the south

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 114.64' @ 12.18 hrs Surf.Area= 589 sf Storage= 835 cf

Plug-Flow detention time= 27.8 min calculated for 0.211 af (98% of inflow)
 Center-of-Mass det. time= 16.2 min (758.1 - 741.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	112.50'	595 cf	11.00'W x 53.58'L x 3.75'H Field A 2,210 cf Overall - 722 cf Embedded = 1,488 cf x 40.0% Voids
#2A	113.00'	722 cf	ADS_StormTech SC-800 +Cap x 14 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 14 Chambers in 2 Rows Cap Storage= 3.4 cf x 2 x 2 rows = 13.7 cf
		1,317 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	113.00'	8.0" Round Outlet Pipe L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 113.00' / 112.75' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf

Primary OutFlow Max=1.92 cfs @ 12.18 hrs HW=114.64' (Free Discharge)
 ↑ **1=Outlet Pipe** (Inlet Controls 1.92 cfs @ 5.50 fps)

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 179

Pond 5P: Underground Detention Chamber - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-800 +Cap (ADS StormTech®SC-800 with cap volume)

Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf

Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap

Cap Storage= 3.4 cf x 2 x 2 rows = 13.7 cf

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

7 Chambers/Row x 7.12' Long +0.88' Cap Length x 2 = 51.58' Row Length +12.0" End Stone x 2 = 53.58' Base Length

2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width

6.0" Stone Base + 33.0" Chamber Height + 6.0" Stone Cover = 3.75' Field Height

14 Chambers x 50.6 cf + 3.4 cf Cap Volume x 2 x 2 Rows = 722.0 cf Chamber Storage

2,210.3 cf Field - 722.0 cf Chambers = 1,488.3 cf Stone x 40.0% Voids = 595.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,317.3 cf = 0.030 af

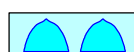
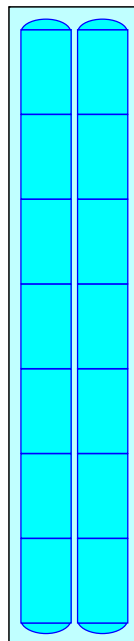
Overall Storage Efficiency = 59.6%

Overall System Size = 53.58' x 11.00' x 3.75'

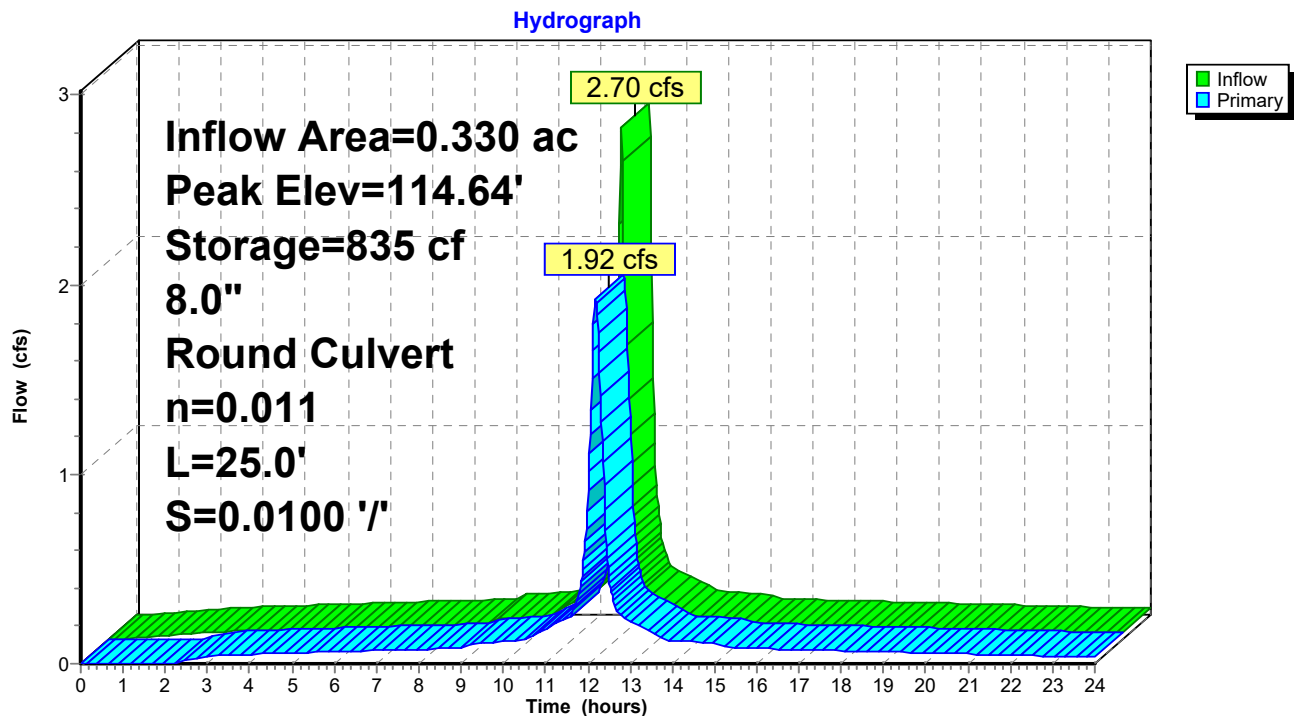
14 Chambers

81.9 cy Field

55.1 cy Stone



Pond 5P: Underground Detention Chamber



010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 181

Stage-Discharge for Pond 5P: Underground Detention Chamber

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
112.50	0.00	113.52	0.68	114.54	1.85	115.56	2.51
112.52	0.00	113.54	0.72	114.56	1.86	115.58	2.52
112.54	0.00	113.56	0.76	114.58	1.88	115.60	2.53
112.56	0.00	113.58	0.80	114.60	1.89	115.62	2.54
112.58	0.00	113.60	0.84	114.62	1.91	115.64	2.55
112.60	0.00	113.62	0.88	114.64	1.92	115.66	2.56
112.62	0.00	113.64	0.92	114.66	1.94	115.68	2.57
112.64	0.00	113.66	0.96	114.68	1.95	115.70	2.59
112.66	0.00	113.68	0.99	114.70	1.96	115.72	2.60
112.68	0.00	113.70	1.02	114.72	1.98	115.74	2.61
112.70	0.00	113.72	1.05	114.74	1.99	115.76	2.62
112.72	0.00	113.74	1.07	114.76	2.01	115.78	2.63
112.74	0.00	113.76	1.10	114.78	2.02	115.80	2.64
112.76	0.00	113.78	1.12	114.80	2.04	115.82	2.65
112.78	0.00	113.80	1.15	114.82	2.05	115.84	2.66
112.80	0.00	113.82	1.17	114.84	2.06	115.86	2.67
112.82	0.00	113.84	1.20	114.86	2.08	115.88	2.68
112.84	0.00	113.86	1.22	114.88	2.09	115.90	2.69
112.86	0.00	113.88	1.24	114.90	2.10	115.92	2.70
112.88	0.00	113.90	1.24	114.92	2.12	115.94	2.71
112.90	0.00	113.92	1.27	114.94	2.13	115.96	2.72
112.92	0.00	113.94	1.29	114.96	2.14	115.98	2.73
112.94	0.00	113.96	1.32	114.98	2.16	116.00	2.74
112.96	0.00	113.98	1.34	115.00	2.17	116.02	2.75
112.98	0.00	114.00	1.36	115.02	2.18	116.04	2.77
113.00	0.00	114.02	1.39	115.04	2.20	116.06	2.78
113.02	0.00	114.04	1.41	115.06	2.21	116.08	2.79
113.04	0.01	114.06	1.43	115.08	2.22	116.10	2.80
113.06	0.01	114.08	1.45	115.10	2.23	116.12	2.81
113.08	0.02	114.10	1.47	115.12	2.25	116.14	2.82
113.10	0.04	114.12	1.49	115.14	2.26	116.16	2.83
113.12	0.05	114.14	1.51	115.16	2.27	116.18	2.84
113.14	0.07	114.16	1.53	115.18	2.28	116.20	2.85
113.16	0.09	114.18	1.55	115.20	2.30	116.22	2.86
113.18	0.11	114.20	1.56	115.22	2.31	116.24	2.87
113.20	0.13	114.22	1.58	115.24	2.32		
113.22	0.16	114.24	1.60	115.26	2.33		
113.24	0.19	114.26	1.62	115.28	2.35		
113.26	0.22	114.28	1.64	115.30	2.36		
113.28	0.25	114.30	1.65	115.32	2.37		
113.30	0.28	114.32	1.67	115.34	2.38		
113.32	0.31	114.34	1.69	115.36	2.39		
113.34	0.34	114.36	1.70	115.38	2.40		
113.36	0.38	114.38	1.72	115.40	2.42		
113.38	0.42	114.40	1.74	115.42	2.43		
113.40	0.45	114.42	1.75	115.44	2.44		
113.42	0.49	114.44	1.77	115.46	2.45		
113.44	0.53	114.46	1.78	115.48	2.46		
113.46	0.57	114.48	1.80	115.50	2.47		
113.48	0.61	114.50	1.82	115.52	2.49		
113.50	0.64	114.52	1.83	115.54	2.50		

010140300-PWAM

Prepared by BSC Group

HydroCAD® 10.20-7a s/n 00904 © 2025 HydroCAD Software Solutions LLC

First Cathedral Housing Post-Development
NOAA10 24-hr D 100-YEAR Rainfall=8.06"

Printed 11/12/2025

Page 182

Stage-Area-Storage for Pond 5P: Underground Detention Chamber

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
112.50	0	115.05	989
112.55	12	115.10	1,007
112.60	24	115.15	1,024
112.65	35	115.20	1,042
112.70	47	115.25	1,058
112.75	59	115.30	1,075
112.80	71	115.35	1,091
112.85	83	115.40	1,106
112.90	94	115.45	1,121
112.95	106	115.50	1,136
113.00	118	115.55	1,149
113.05	141	115.60	1,162
113.10	164	115.65	1,175
113.15	187	115.70	1,187
113.20	210	115.75	1,199
113.25	233	115.80	1,211
113.30	256	115.85	1,223
113.35	279	115.90	1,235
113.40	302	115.95	1,247
113.45	324	116.00	1,258
113.50	347	116.05	1,270
113.55	370	116.10	1,282
113.60	392	116.15	1,294
113.65	414	116.20	1,306
113.70	437	116.25	1,317
113.75	459		
113.80	481		
113.85	503		
113.90	525		
113.95	546		
114.00	568		
114.05	590		
114.10	611		
114.15	632		
114.20	654		
114.25	675		
114.30	696		
114.35	716		
114.40	737		
114.45	757		
114.50	778		
114.55	798		
114.60	818		
114.65	838		
114.70	857		
114.75	877		
114.80	896		
114.85	915		
114.90	934		
114.95	953		
115.00	971		

SECTION 6.0

ADDITIONAL DRAINAGE CALCULATIONS

6.01 WATER QUALITY VOLUME CALCULATIONS

PROJECT NAME: FIRST CATHEDRAL AFFORDABLE HOUSING DEVELOPMENT

DATE: 11/12/2025

CALCS BY: MS

CHECKED BY: MS

Water Quality Volume Calculation - Bioretention Basin 1

$$WQV = \frac{(P)(R)(A)}{12}$$

where:

WQV = water quality volume (cubic feet)

P = 1.3 inches (90th percentile rainfall event)

R = volumetric runoff coefficient = 0.05+0.009(I)

I = post- development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs

A = post-development total drainage area of site or design point (square feet)

$$WQV = \underline{734} \text{ cf}$$

P =	1.3	in
I =	68.85	%
R =	0.67	unitless
A =	0.232	ac
A =	10,114	sf

	User input
	Calculated value

Water Quality Volume shall be 50% for Redevelopment Projects with > 40% Existing DCIA

$$WQV = \underline{367} \text{ cf} \quad \text{Total WQV required to retain on-site, see SMR for provided volume}$$

Water Quality Volume Calculation - Bioretention Basin 2

$$WQV = \frac{(P)(R)(A)}{12}$$

where:

WQV = water quality volume (cubic feet)

P = 1.3 inches (90th percentile rainfall event)

R = volumetric runoff coefficient = 0.05+0.009(I)

I = post- development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs

A = post-development total drainage area of site or design point (square feet)

$$WQV = \underline{2,027} \text{ cf}$$

P =	1.3	in
I =	69.80	%
R =	0.68	unitless
A =	0.633	ac
A =	27,590	sf

	User input
	Calculated value

Water Quality Volume shall be 50% for Redevelopment Projects with > 40% Existing DCIA

$$WQV = \underline{1,014} \text{ cf} \quad \text{Total WQV required to retain on-site, see SMR for provided volume}$$

Water Quality Volume Calculation - Bioretention Basin 3

$$WQV = \frac{(P)(R)(A)}{12}$$

where:

WQV = water quality volume (cubic feet)

P = 1.3 inches (90th percentile rainfall event)

R = volumetric runoff coefficient = $0.05 + 0.009(I)$

I = post- development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs

A = post-development total drainage area of site or design point (square feet)

$$WQV = \underline{748} \text{ cf}$$

P =	1.3	in
I =	64.81	%
R =	0.63	unitless
A =	0.250	ac
A =	10,908	sf

	User input
	Calculated value

Water Quality Volume shall be 50% for Redevelopment Projects with > 40% Existing DCIA

$$WQV = \underline{374} \text{ cf} \quad \text{Total WQV required to retain on-site, see SMR for provided volume}$$

Water Quality Volume Calculation - Cascade Separator 1

$$WQV = \frac{(P)(R)(A)}{12}$$

where:

WQV = water quality volume (cubic feet)

P = 1.3 inches (90th percentile rainfall event)

R = volumetric runoff coefficient = $0.05 + 0.009(I)$

I = post- development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs

A = post-development total drainage area of site or design point (square feet)

$$WQV = \underline{2,580} \text{ cf}$$

P =	1.3	in
I =	79.22	%
R =	0.76	unitless
A =	0.717	ac
A =	31,211	sf

	User input
	Calculated value

Water Quality Volume shall be 50% for Redevelopment Projects with > 40% Existing DCIA

$$WQV = \underline{1,290} \text{ cf} \quad \text{Total WQV required to retain on-site, see SMR for provided volume}$$

Water Quality Flow Calculation - Cascade Separator 1

$$CN = \frac{1000}{\left[10 + 5P + 10Q - 10 * (Q^2 + 1.25 * Q * P)^{1/2}\right]}$$

where:

CN = Runoff Curve Number

P = Design precipitation, inches (1.3 inches⁹⁶ for 100% of the WQV and 0.65 inches for 50% of the WQV)

Q = Runoff depth (in watershed inches)

$$Q = \frac{WQV \text{ (cubic feet)}}{\text{Drainage Area (acres)}} * \frac{12 \text{ inches}}{\text{foot}} * \frac{\text{acre}}{43,560 \text{ square feet}}$$

where:

WQV= design Water Quality Volume (100% or 50% of the WQV)

CN = 90 unitless

P = 1.3 in

Q = 0.50 in

WQV = 1,290 cf

A = 0.717 ac

Time of Concentration, t_c = 6 min

min. value per WQM

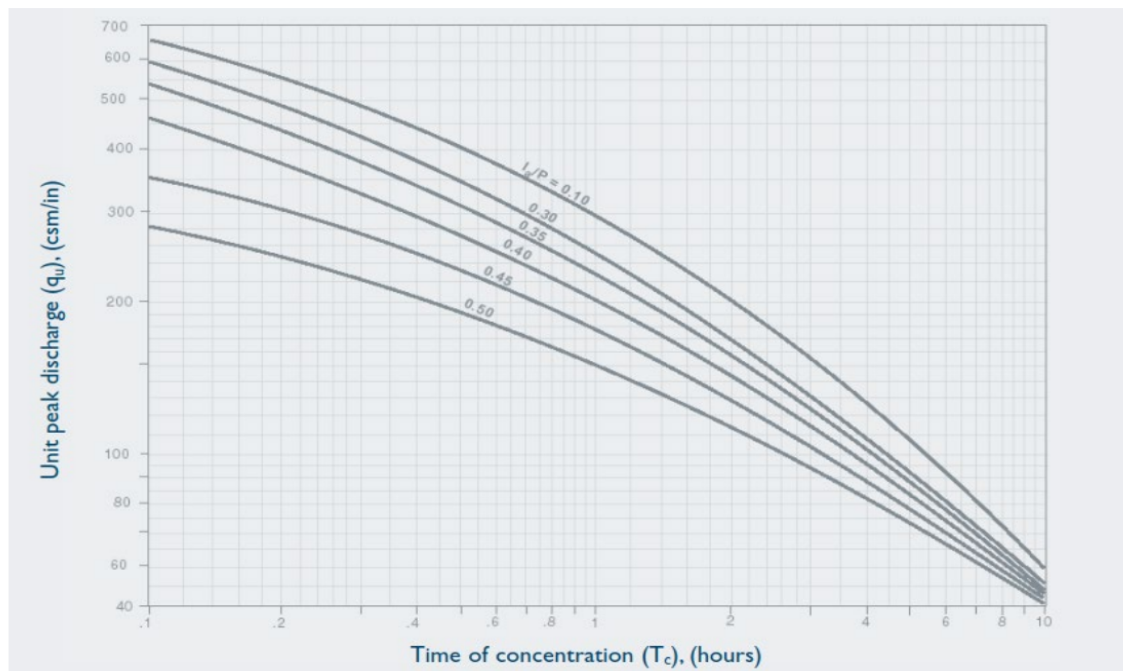
t_c = 0.100 hr

I_a = 0.222 in

Fig. 2, App. D, WQM

I_a/P = 0.17 unitless

Figure 3. Unit Peak Discharge for NRCS Type III Rainfall Distribution



q_u = 625 csm/in

Fig. 3, App. D, WQM

A = 0.00112 sqmi

Q = 0.50 in

WQF = 0.35 cfs

Water Quality Volume Calculation - Cascade Separator 2

$$WQV = \frac{(P)(R)(A)}{12}$$

where:

WQV = water quality volume (cubic feet)

P = 1.3 inches (90th percentile rainfall event)

R = volumetric runoff coefficient = $0.05 + 0.009(I)$

I = post- development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs

A = post-development total drainage area of site or design point (square feet)

$$WQV = \underline{2,741} \text{ cf}$$

P =	1.3	in
I =	72.76	%
R =	0.70	unitless
A =	0.824	ac
A =	35,892	sf

	User input
	Calculated value

Water Quality Volume shall be 50% for Redevelopment Projects with > 40% Existing DCIA

$$WQV = \underline{1,370} \text{ cf} \quad \text{Total WQV required to retain on-site, see SMR for provided volume}$$

Water Quality Flow Calculation - Cascade Separator 2

$$CN = \frac{1000}{\left[10 + 5P + 10Q - 10 * (Q^2 + 1.25 * Q * P)^{1/2}\right]}$$

where:

CN = Runoff Curve Number

P = Design precipitation, inches (1.3 inches⁹⁶ for 100% of the WQV and 0.65 inches for 50% of the WQV)

Q = Runoff depth (in watershed inches)

$$Q = \frac{WQV \text{ (cubic feet)}}{\text{Drainage Area (acres)}} * \frac{12 \text{ inches}}{\text{foot}} * \frac{\text{acre}}{43,560 \text{ square feet}}$$

where:

WQV = design Water Quality Volume (100% or 50% of the WQV)

$$CN = \underline{89} \text{ unitless}$$

P =	1.3	in
Q =	0.46	in
WQV =	1,370	cf
A =	0.824	ac

$$\text{Time of Concentration, } t_c = \underline{6} \text{ min}$$

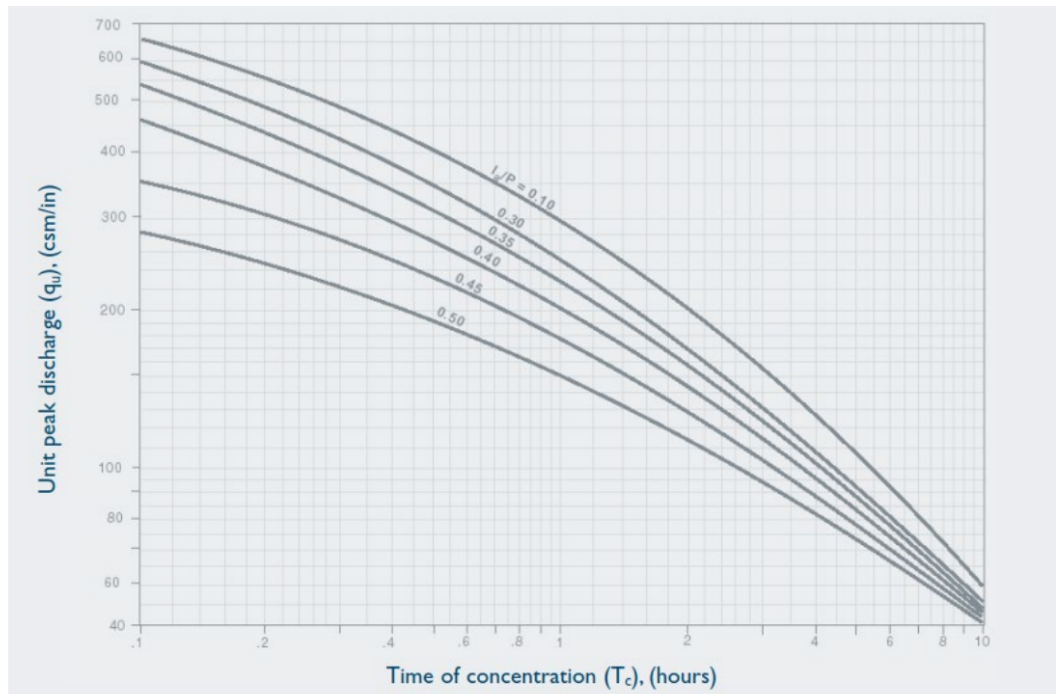
$$t_c = 0.100 \text{ hr}$$

min. value per WQM

I_a =	0.247	in
I_a/P =	0.19	unitless

Fig. 2, App. D, WQM

Figure 3. Unit Peak Discharge for NRCS Type III Rainfall Distribution



$q_u =$ 625 csm/in
 $A =$ 0.00129 sqmi
 $Q =$ 0.46 in

Fig. 3, App. D, WQM

WQF = 0.37 cfs

Water Quality Volume Calculation - Cascade Separator 3

$$WQV = \frac{(P)(R)(A)}{12}$$

where:

WQV = water quality volume (cubic feet)

P = 1.3 inches (90th percentile rainfall event)

R = volumetric runoff coefficient = $0.05 + 0.009(I)$

I = post-development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs

A = post-development total drainage area of site or design point (square feet)

WQV = 2,442 cf

$P =$ 1.3 in
 $I =$ 73.54 %
 $R =$ 0.71 unitless
 $A =$ 0.727 ac
 $A =$ 31,668 sf

	User input
	Calculated value

Water Quality Volume shall be 50% for Redevelopment Projects with > 40% Existing DCIA

WQV = 1,221 cf Total WQV required to retain on-site, see SMR for provided volume

Water Quality Flow Calculation - Cascade Separator 3

$$CN = \frac{1000}{\left[10 + 5P + 10Q - 10 * (Q^2 + 1.25 * Q * P)^{1/2}\right]}$$

where:

CN = Runoff Curve Number

P = Design precipitation, inches (1.3 inches⁹⁶ for 100% of the WQV and 0.65 inches for 50% of the WQV)

Q = Runoff depth (in watershed inches)

$$Q = \frac{WQV \text{ (cubic feet)}}{\text{Drainage Area (acres)}} * \frac{12 \text{ inches}}{\text{foot}} * \frac{\text{acre}}{43,560 \text{ square feet}}$$

where:

WQV = design Water Quality Volume (100% or 50% of the WQV)

CN = 89 unitless

P = 1.3 in

Q = 0.46 in

WQV = 1,221 cf

A = 0.727 ac

Time of Concentration, t_c = 6 min

min. value per WQM

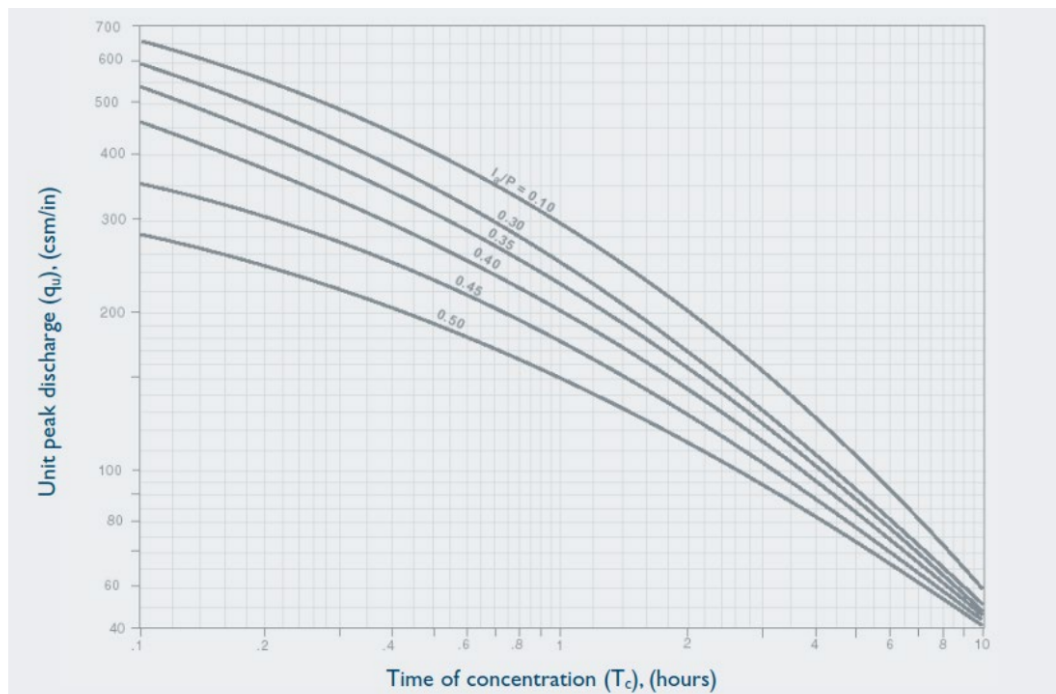
t_c = 0.100 hr

I_a = 0.247 in

Fig. 2, App. D, WQM

I_a/P = 0.19 unitless

Figure 3. Unit Peak Discharge for NRCS Type III Rainfall Distribution



q_u = 625 csm/in

Fig. 3, App. D, WQM

A = 0.00114 sqmi

Q = 0.46 in

WQF = 0.33 cfs

Water Quality Volume Calculation - Uncontrolled

$$WQV = \frac{(P)(R)(A)}{12}$$

where:

WQV = water quality volume (cubic feet)
P = 1.3 inches (90th percentile rainfall event)
R = volumetric runoff coefficient = 0.05+0.009(*I*)
I = post- development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
A = post-development total drainage area of site or design point (square feet)

WQV =	807	cf
P =	1.3	in
I =	10.30	%
R =	0.14	unitless
A =	1.198	ac
A =	52,188	sf

	User input
	Calculated value

Water Quality Volume shall be 50% for Redevelopment Projects with > 40% Existing DCIA

WQV = 403 cf *Total WQV required to retain on-site, see SMR for provided volume*

6.02 DRAWDOWN CALCULATIONS

PROJECT NAME: FIRST CATHEDRAL AFFORDABLE HOUSING DEVELOPMENT

DATE: 11/12/2025

CALCS BY: MS

CHECKED BY: MS

Drawdown (Static Method) - Bioretention 1

$$T_d = \left(\frac{V}{K * A} \right) * 12 \text{ inches/foot}$$

where:

T_d = drain time (hours)

V = design infiltration volume or static storage volume calculated using the equations in [Table 10- 5](#) (cubic feet)

K = design infiltration rate (inches per hour)

A = average surface area of infiltration system (square feet)

$$T_d = \underline{31.1} \text{ hr}$$

$V =$	669	cf	<i>volume below lowest outlet, from HydroCAD</i>
$K =$	0.50	in/hr	<i>Rawl's Rate for bioretention media</i>
$A =$	517	sf	<i>bottom area of infiltration, from HydroCAD</i>

	<i>User input</i>
	<i>Calculated value</i>

Drawdown (Static Method) - Bioretention 2

$$T_d = \left(\frac{V}{K * A} \right) * 12 \text{ inches/foot}$$

where:

T_d = drain time (hours)

V = design infiltration volume or static storage volume calculated using the equations in [Table 10- 5](#) (cubic feet)

K = design infiltration rate (inches per hour)

A = average surface area of infiltration system (square feet)

$$T_d = \underline{44.3} \text{ hr}$$

$V =$	741	cf	<i>volume below lowest outlet, from HydroCAD</i>
$K =$	0.50	in/hr	<i>Rawl's Rate for bioretention media</i>
$A =$	401	sf	<i>bottom area of infiltration, from HydroCAD</i>

	<i>User input</i>
	<i>Calculated value</i>

$$T_d = \left(\frac{V}{K * A} \right) * 12 \text{ inches/foot}$$

where:

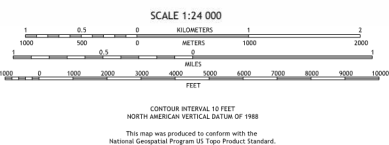
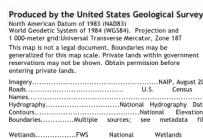
- T_d = drain time (hours)
- V = design infiltration volume or static storage volume calculated using the equations in [Table 10- 5](#) (cubic feet)
- K = design infiltration rate (inches per hour)
- A = average surface area of infiltration system (square feet)

Td = 30.9 hr

V =	637	cf	volume below lowest outlet, from HydroCAD
K =	0.50	in/hr	Rawl's Rate for bioretention media
A =	495	sf	bottom area of infiltration, from HydroCAD

	User input
	Calculated value

APPENDIX A
USGS LOCUS MAP



APPENDIX B

FEMA MAP

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repeatedly should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevation (BFEs)** and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevation (CBFEs) shown on this map apply only landward of 0.2% Annual Chance Flood (ACF) zone. Users of this FIRM should be aware that coastal flood elevations may also be provided in the Summary of Bolivaster Elevations table in the Flood Insurance Study report for this community. Elevations shown in the Summary of Bolivaster Elevations table should be used for construction, and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection used** in the preparation of this map is Universal Transverse Mercator (UTM), zone 18. The **horizontal datum** is NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East West Highway
Silver Spring, Maryland 20910
(201) 713-3242

To obtain current elevation, description, and/or location information for **benchmark** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (201) 713-3242, or visit their website at www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by CT DEP.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map sheets, community map repository addresses, and a listing of Communities table containing National Flood Insurance Program data for each community as well as a listing of the panels on which each community is located.

An accompanying Flood Insurance Study report, Letters of Map Revision or Letters of Map Amendment revising portions of this panel, and digital versions of this PANEL may be available. Contact the **FEMA Map Service Center** at the following phone numbers and Internet address for information on all related products available from FEMA:

Phone: 800-358-9616
FAX: 800-358-9620
<http://flood.fema.gov/>
If you have **questions about this map** or **questions concerning the National Flood Insurance Program** in general, please call 1-877-FEMA-MAP (1-877-338-2627) or visit the FEMA website at <http://www.fema.gov/business/firm/>

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report may reflect stream channel distances that differ from what is shown on this map.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zone A, AE, AH, AO, AR, ARB, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

- ZONE A**
No base flood elevations determined.
- ZONE AE**
Base flood elevations determined.
- ZONE AH**
Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- ZONE AO**
Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of shallow fan flooding, velocities also determined.
- ZONE AR**
Areas of annual flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently determined to be an obsolete system. Areas of annual flood hazard formerly being material to provide protection from the 1% annual chance event or greater flood event.
- ZONE ARB**
Area to be protected from 1% annual chance flood event by a Federal protection system under construction; no base flood elevations determined.
- ZONE V**
Coastal flood zone with velocity hazard (wave action); no base flood elevations determined.
- ZONE VE**
Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE
The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X
Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with damage areas less than 1 square mile, and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE XA
Areas determined to be outside the 0.2% annual chance floodplain.

ZONE XD
Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Postlevee boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or velocities.

Base Flood Elevation line and value; elevation in 0'

Base Flood Elevation value where uniform within zone; elevation in 0'

*Referenced to the North American Vertical Datum of 1988

Cross Section Line

Transect Line

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

100-meter Universal Transverse Mercator grid values, zone 18

5000-foot grid ticks

Bench mark less explanation in Notes to Users section of this FIRM panel.

River Mile

MAP REPOSITORY

Refer to Regulatory Listing on Index Map

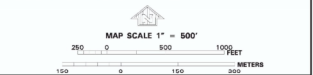
EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

SEPTEMBER 26, 2008

EFFECTIVE DATES OF REVISIONS TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 800-638-6620.



NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0354F

FIRM
FLOOD INSURANCE RATE MAP
HARTFORD COUNTY,
CONNECTICUT
(ALL JURISDICTIONS)

PANEL 354 OF 675
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
18030000, TOWN OF WINDSOR, TOWN OF	1810000	0354	F

MAP NUMBER
05003C0354F

EFFECTIVE DATE:
SEPTEMBER 26, 2008

Federal Emergency Management Agency

APPENDIX C

WEB SOIL SURVEY



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

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

Custom Soil Resource Report for State of Connecticut, Western Part



Preface

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

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

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

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

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

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

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface	2
How Soil Surveys Are Made	5
Soil Map	8
Soil Map.....	9
Legend.....	10
Map Unit Legend.....	11
Map Unit Descriptions.....	11
State of Connecticut, Western Part.....	13
9—Scitico, Shaker, and Maybid soils, 0 to 3 percent slopes.....	13
25A—Brancroft silt loam, 0 to 3 percent slopes.....	15
27A—Belgrade silt loam, 0 to 5 percent slopes.....	17
87B—Wethersfield loam, 3 to 8 percent slopes.....	19
References	22

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Custom Soil Resource Report

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 1:12,000.

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: State of Connecticut, Western Part
Survey Area Data: Version 6, Sep 16, 2025

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

Date(s) aerial images were photographed: Mar 1, 2024—Jul 1, 2024

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
9	Scitico, Shaker, and Maybid soils, 0 to 3 percent slopes	11.7	71.5%
25A	Brancroft silt loam, 0 to 3 percent slopes	4.1	25.3%
27A	Belgrade silt loam, 0 to 5 percent slopes	0.4	2.4%
87B	Wethersfield loam, 3 to 8 percent slopes	0.1	0.7%
Totals for Area of Interest		16.3	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.

Custom Soil Resource Report

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

State of Connecticut, Western Part

9—Scitico, Shaker, and Maybid soils, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9lrq
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 50 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Scitico and similar soils: 40 percent
Shaker and similar soils: 35 percent
Maybid and similar soils: 15 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scitico

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Clayey glaciolacustrine deposits

Typical profile

Ap - 0 to 8 inches: silt loam
Eg - 8 to 11 inches: silt loam
Bg1 - 11 to 18 inches: silty clay loam
Bg2 - 18 to 30 inches: silty clay loam
Bg3 - 30 to 38 inches: silty clay
Cg1 - 38 to 52 inches: silty clay loam
Cg2 - 52 to 65 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: D
Ecological site: F145XY004CT - Wet Lake Plain

Custom Soil Resource Report

Hydric soil rating: Yes

Description of Shaker

Setting

Landform: Terraces

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Coarse-loamy eolian deposits over clayey glaciolacustrine deposits

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material

Ap - 2 to 6 inches: fine sandy loam

Bg - 6 to 20 inches: sandy loam

Bw - 20 to 30 inches: sandy loam

2C - 30 to 65 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)

Depth to water table: About 0 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: C/D

Ecological site: F145XY004CT - Wet Lake Plain

Hydric soil rating: Yes

Description of Maybid

Setting

Landform: Depressions

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Clayey glaciolacustrine deposits

Typical profile

A - 0 to 9 inches: silt loam

Bg1 - 9 to 18 inches: silty clay loam

Bg2 - 18 to 26 inches: silty clay loam

Cg1 - 26 to 36 inches: silty clay loam

Cg2 - 36 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Custom Soil Resource Report

Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Ecological site: F145XY004CT - Wet Lake Plain
Hydric soil rating: Yes

Minor Components

Brancroft

Percent of map unit: 5 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F145XY005MA - Moist Lake Plain
Hydric soil rating: No

Elmridge

Percent of map unit: 5 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F145XY006CT - Semi-Rich Moist Lake Plain
Hydric soil rating: No

25A—Brancroft silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 91l6
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 52 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Brancroft and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brancroft

Setting

Landform: Terraces

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Fine-silty glaciolacustrine deposits

Typical profile

Ap - 0 to 6 inches: silt loam

Bw1 - 6 to 17 inches: silt loam

Bw2 - 17 to 22 inches: silty clay loam

Bw3 - 22 to 32 inches: silt loam

C1 - 32 to 43 inches: silty clay loam

C2 - 43 to 66 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.57 in/hr)

Depth to water table: About 17 to 30 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C/D

Ecological site: F145XY006CT - Semi-Rich Moist Lake Plain

Hydric soil rating: No

Minor Components

Elmridge

Percent of map unit: 5 percent

Landform: Terraces

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Berlin

Percent of map unit: 5 percent

Landform: Terraces

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Maybid

Percent of map unit: 3 percent
Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scitico

Percent of map unit: 2 percent
Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Unnamed, sand or gravel substratum

Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed, till substratum

Percent of map unit: 2 percent
Hydric soil rating: No

Belgrade

Percent of map unit: 1 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

27A—Belgrade silt loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 9llr
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 52 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Belgrade and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Belgrade

Setting

Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty glaciolacustrine deposits

Typical profile

Ap - 0 to 8 inches: silt loam
Bw1 - 8 to 16 inches: silt loam
Bw2 - 16 to 27 inches: silt loam
C1 - 27 to 45 inches: silt loam
C2 - 45 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)
Depth to water table: About 15 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F145XY006CT - Semi-Rich Moist Lake Plain
Hydric soil rating: No

Minor Components

Elmridge

Percent of map unit: 5 percent
Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Brancroft

Percent of map unit: 5 percent
Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Shaker

Percent of map unit: 3 percent
Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scitico

Percent of map unit: 2 percent
Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Unnamed, red parent material

Percent of map unit: 2 percent

Hydric soil rating: No

Raynham

Percent of map unit: 1 percent

Landform: Drainageways, depressions

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Maybid

Percent of map unit: 1 percent

Landform: Terraces, drainageways, depressions

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Berlin

Percent of map unit: 1 percent

Landform: Terraces

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

87B—Wethersfield loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9lrh

Elevation: 0 to 1,200 feet

Mean annual precipitation: 43 to 54 inches

Mean annual air temperature: 45 to 55 degrees F

Frost-free period: 140 to 185 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Wethersfield and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wethersfield

Setting

Landform: Hills, drumlins

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Coarse-loamy lodgment till derived from basalt and/or sandstone and shale

Typical profile

Ap - 0 to 3 inches: loam

Custom Soil Resource Report

Bw1 - 3 to 13 inches: loam
Bw2 - 13 to 27 inches: gravelly loam
Cd - 27 to 65 inches: gravelly loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F145XY012CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Ludlow

Percent of map unit: 5 percent
Landform: Hills, drumlins
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Cheshire

Percent of map unit: 5 percent
Landform: Till plains, hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Yalesville

Percent of map unit: 5 percent
Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Wilbraham

Percent of map unit: 3 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Menlo

Percent of map unit: 2 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave

Custom Soil Resource Report

Hydric soil rating: Yes

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelpdb1043084>

Custom Soil Resource Report

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

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

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

APPENDIX D

NOAA 14++ PRECIPITATION TABLES



NOAA Atlas 14, Volume 10, Version 3
Location name: Bloomfield, Connecticut, USA*
Latitude: 41.831°, Longitude: -72.6995°
Elevation: 117 ft**
* source: ESRI Maps
** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aerals](#)

PF tabular

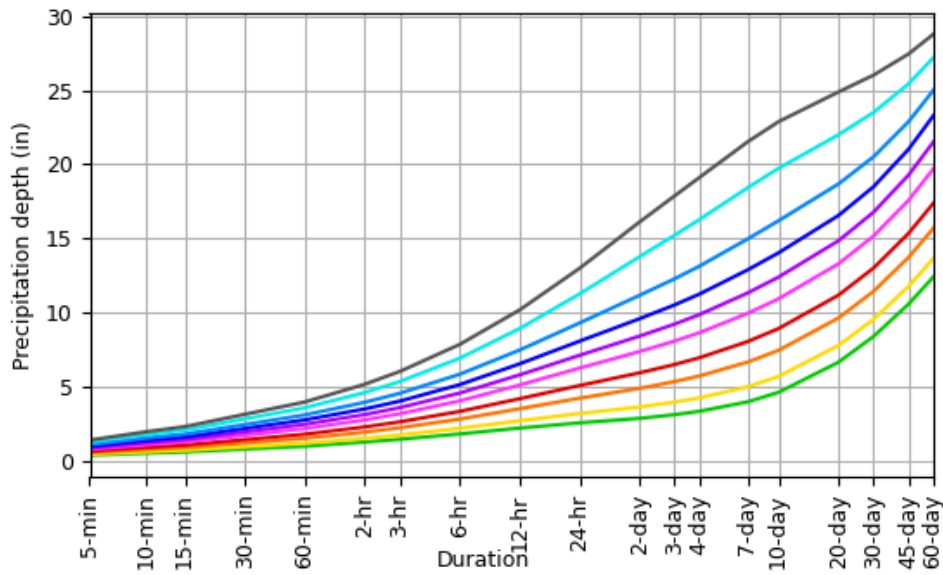
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.341 (0.264-0.440)	0.411 (0.318-0.531)	0.525 (0.405-0.682)	0.620 (0.475-0.809)	0.751 (0.558-1.02)	0.849 (0.619-1.18)	0.952 (0.674-1.38)	1.07 (0.718-1.58)	1.23 (0.798-1.90)	1.37 (0.867-2.15)
10-min	0.483 (0.374-0.623)	0.582 (0.450-0.752)	0.744 (0.573-0.964)	0.878 (0.673-1.14)	1.06 (0.790-1.45)	1.20 (0.876-1.68)	1.35 (0.955-1.95)	1.51 (1.02-2.24)	1.75 (1.13-2.69)	1.94 (1.23-3.05)
15-min	0.568 (0.440-0.733)	0.685 (0.530-0.884)	0.876 (0.676-1.14)	1.03 (0.793-1.35)	1.25 (0.930-1.71)	1.42 (1.03-1.97)	1.59 (1.12-2.30)	1.78 (1.20-2.64)	2.06 (1.33-3.16)	2.28 (1.44-3.58)
30-min	0.763 (0.590-0.984)	0.923 (0.714-1.19)	1.18 (0.913-1.54)	1.40 (1.08-1.83)	1.70 (1.26-2.32)	1.93 (1.40-2.69)	2.16 (1.53-3.13)	2.43 (1.63-3.60)	2.80 (1.82-4.32)	3.11 (1.97-4.89)
60-min	0.957 (0.741-1.23)	1.16 (0.898-1.50)	1.50 (1.15-1.94)	1.77 (1.36-2.31)	2.15 (1.60-2.94)	2.44 (1.78-3.40)	2.74 (1.94-3.97)	3.08 (2.07-4.56)	3.55 (2.30-5.47)	3.95 (2.50-6.20)
2-hr	1.24 (0.964-1.59)	1.49 (1.16-1.92)	1.91 (1.48-2.46)	2.26 (1.74-2.93)	2.74 (2.05-3.72)	3.10 (2.27-4.31)	3.48 (2.49-5.04)	3.92 (2.65-5.79)	4.59 (2.98-7.02)	5.14 (3.26-8.03)
3-hr	1.43 (1.12-1.82)	1.72 (1.34-2.20)	2.20 (1.72-2.83)	2.60 (2.02-3.36)	3.16 (2.37-4.28)	3.56 (2.63-4.95)	4.00 (2.88-5.80)	4.53 (3.06-6.67)	5.33 (3.47-8.13)	6.01 (3.82-9.35)
6-hr	1.79 (1.41-2.27)	2.17 (1.70-2.75)	2.79 (2.19-3.56)	3.31 (2.58-4.24)	4.02 (3.04-5.43)	4.55 (3.38-6.29)	5.12 (3.71-7.41)	5.82 (3.95-8.52)	6.90 (4.50-10.5)	7.84 (5.00-12.1)
12-hr	2.18 (1.73-2.75)	2.68 (2.12-3.38)	3.49 (2.75-4.42)	4.17 (3.27-5.30)	5.09 (3.88-6.84)	5.78 (4.32-7.96)	6.52 (4.77-9.41)	7.46 (5.07-10.8)	8.90 (5.83-13.4)	10.2 (6.50-15.6)
24-hr	2.54 (2.02-3.18)	3.17 (2.52-3.97)	4.20 (3.34-5.28)	5.06 (3.99-6.40)	6.24 (4.79-8.35)	7.10 (5.35-9.76)	8.06 (5.94-11.6)	9.28 (6.34-13.4)	11.2 (7.38-16.9)	13.0 (8.33-19.9)
2-day	2.84 (2.28-3.53)	3.61 (2.89-4.49)	4.87 (3.89-6.08)	5.91 (4.70-7.43)	7.35 (5.69-9.82)	8.39 (6.39-11.5)	9.57 (7.15-13.9)	11.1 (7.63-16.1)	13.8 (9.06-20.5)	16.1 (10.4-24.5)
3-day	3.09 (2.49-3.82)	3.94 (3.17-4.88)	5.32 (4.27-6.62)	6.48 (5.16-8.10)	8.06 (6.26-10.7)	9.20 (7.04-12.6)	10.5 (7.89-15.2)	12.3 (8.42-17.6)	15.2 (10.0-22.6)	17.9 (11.5-27.1)
4-day	3.32 (2.68-4.10)	4.22 (3.41-5.22)	5.71 (4.59-7.08)	6.93 (5.54-8.65)	8.62 (6.72-11.5)	9.85 (7.55-13.5)	11.2 (8.46-16.2)	13.1 (9.02-18.8)	16.3 (10.7-24.1)	19.1 (12.3-28.9)
7-day	3.96 (3.21-4.86)	4.98 (4.04-6.12)	6.65 (5.37-8.20)	8.03 (6.45-9.96)	9.94 (7.77-13.1)	11.3 (8.70-15.4)	12.9 (9.70-18.4)	15.0 (10.3-21.3)	18.4 (12.2-27.2)	21.5 (13.9-32.4)
10-day	4.60 (3.75-5.62)	5.68 (4.62-6.95)	7.44 (6.04-9.14)	8.90 (7.18-11.0)	10.9 (8.56-14.3)	12.4 (9.53-16.7)	14.0 (10.6-19.9)	16.2 (11.2-23.0)	19.7 (13.1-29.0)	22.9 (14.8-34.3)
20-day	6.63 (5.44-8.06)	7.77 (6.37-9.45)	9.62 (7.86-11.7)	11.2 (9.06-13.7)	13.3 (10.4-17.2)	14.8 (11.4-19.7)	16.5 (12.4-23.0)	18.7 (13.0-26.3)	22.0 (14.7-32.1)	24.9 (16.2-37.1)
30-day	8.37 (6.90-10.1)	9.53 (7.84-11.5)	11.4 (9.37-13.9)	13.0 (10.6-15.9)	15.2 (11.9-19.4)	16.8 (12.9-22.0)	18.5 (13.8-25.3)	20.5 (14.3-28.7)	23.5 (15.7-34.2)	26.0 (17.0-38.7)
45-day	10.6 (8.74-12.7)	11.8 (9.72-14.2)	13.7 (11.3-16.6)	15.3 (12.5-18.7)	17.6 (13.8-22.3)	19.3 (14.8-25.0)	21.0 (15.6-28.3)	22.9 (16.1-31.9)	25.4 (17.1-36.8)	27.5 (17.9-40.7)
60-day	12.4 (10.3-14.9)	13.6 (11.3-16.4)	15.7 (12.9-18.9)	17.4 (14.2-21.1)	19.7 (15.5-24.8)	21.5 (16.5-27.7)	23.3 (17.2-31.0)	25.0 (17.6-34.7)	27.2 (18.3-39.2)	28.8 (18.8-42.6)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.
Please refer to NOAA Atlas 14 document for more information.

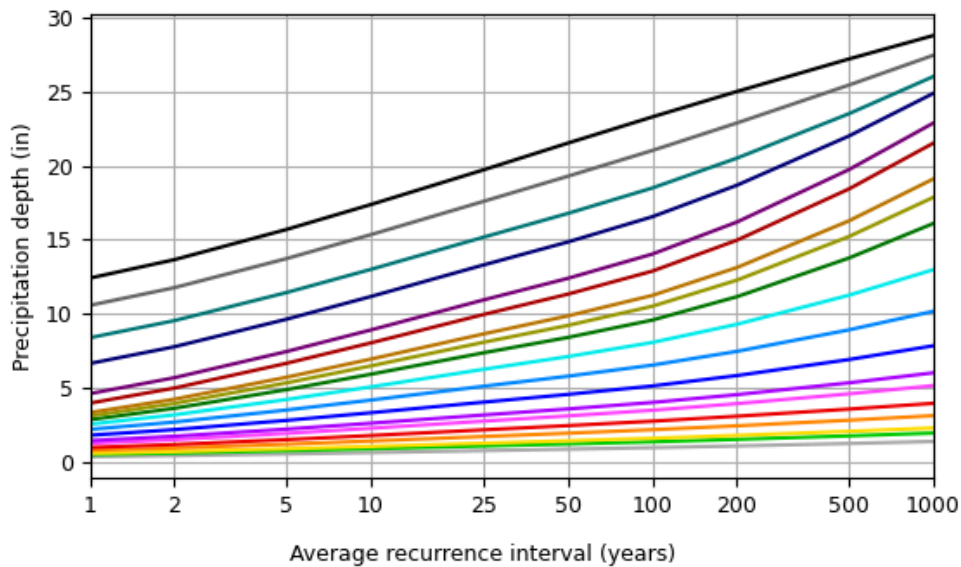
[Back to Top](#)

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 41.8310°, Longitude: -72.6995°



Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000

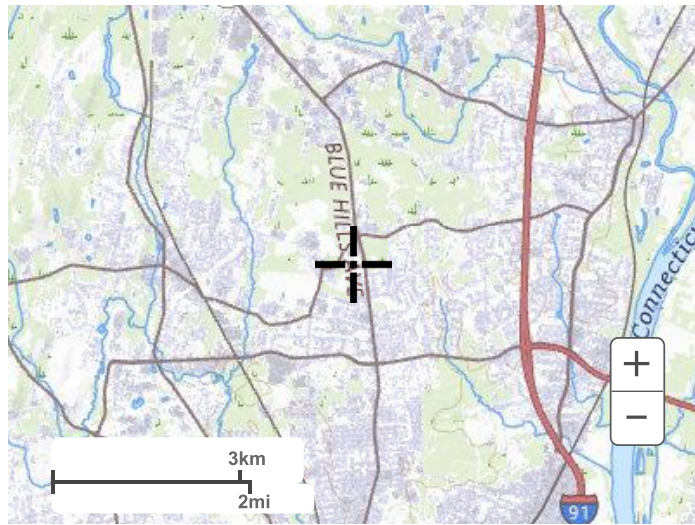


Duration	
5-min	2-day
10-min	3-day
15-min	4-day
30-min	7-day
60-min	10-day
2-hr	20-day
3-hr	30-day
6-hr	45-day
12-hr	60-day
24-hr	

[Back to Top](#)

Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



[Back to Top](#)

[US Department of Commerce](#)
[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

[Disclaimer](#)

APPENDIX E

PROJECT GEOTECHNICAL REPORT

WELTI GEOTECHNICAL, P.C.

227 Williams Street · P.O. Box 397
Glastonbury, CT 06033-0397

(860) 633-4623 / FAX (860) 657-2514

June 11, 2025

Mr. Paul B. Bailey, AIA
Paul B. Bailey Architects, LLC
110 Audubon Street
New Haven, CT 06510

Re: Geotechnical Study for Proposed Apartment Buildings at Bloomfield First Cathedral, 1151 Blue Hills Avenue, Bloomfield, CT

Dear Paul:

1.0 Herewith are the boring data pertaining to the above. Five borings were taken at each of the proposed three apartment buildings. Three of the borings were drilled to auger refusal at 34 to 39.5 feet below the existing grades. The remainder of the borings were drilled to a depth of 21.5 feet. The boring locations are shown on the attached plan. *The borings were drilled by Clarence Welti Associates, Inc. and sampling was conducted by this firm solely to obtain indications of subsurface conditions as part of a geotechnical exploration program. No services were performed to evaluate subsurface environmental conditions.*

2.0 The **Subject Project** will include the construction of three five-story slab on grade apartment buildings with footprints of about 11,000 sf.

2.1 The site of the proposed apartments is currently an overflow parking lot for the Bloomfield First Cathedral. An existing topographic survey and proposed grading plan were not available at the time of this report. Based on Town of Bloomfield GIS mapping, the existing grades across the proposed buildings range from about Elev.115 to Elev.117. Two of the buildings will be located within the existing paved parking lot. The third building will be located partially within the parking lot and partially within a grass area.

3.0 The **Geologic Origin** of the natural inorganic soils is from glacial lake deposits to a maximum depth of 40 feet. The soils consist of stratified sands and silts. The bedrock at 100+ feet below grade is Portland Arkose (Sandstone).

3.1 The **Soil Cross Section** from the borings is generally as follows:

Buildings A, B & C (see borings B-1 thru B-15)

Bituminous Concrete 1.5" to 3" over fine to coarse SAND, some Garvel, little Silt to 6" to 9"

Locally (see boring B-15); Topsoil to 2 feet, loose

FILL; fine to coarse SAND, little to some Silt and Gravel, trace to little Bricks Fragments and Asphalt to 3 to 5 feet, medium compact

Locally; fine SAND, some Silt, trace Roots; or SILT, little fine Sand, trace Roots to 4 to 6 feet, loose to

SILT, trace fine Sand and Clay to 8 to 15 feet, medium compact/medium stiff

SILT, trace to some Clay 17 to 23 feet, medium stiff

Varved SILT and CLAY to 31 to 34 feet, soft to medium stiff.

Moraine; fine to medium SAND and SILT, little Gravel to auger refusal on bedrock at 34 to 39.5 feet, medium compact to dense

Bedrock; Arkosic Sandstone

3.2 The Water Table was evident at 4 to 10 feet below the existing grades at the completion of the borings. The soils below 5 feet were saturated in all of the borings. It should be assumed that the water table will within 5 feet of the existing grades. The capillary water in the silty soils can be 1 to 2 feet above the static water levels.

3.3 Soil Properties:

Stratum	Unit Weight (pcf)	Submerged Unit Weight (pcf)	Angle of Internal Friction (θ)	Cohesion (psf)
SILT, trace to little fine Sand	120	58	32°	-
SILT, trace to little Clay	115	53	25°	100
Varved CLAY and SILT	115	53	5°	450

3.4 Regarding the varved silt and clay and the impact on building performance, this stratum varies in characteristics across the Connecticut River Valley. The silt/clay in the Bloomfield area tends to be somewhat more pre-consolidated by prior loading or possibly from periods of dessication with the depositing of the soil. Based on measurements at bridge abutments along

Route 91, approximate average settlements appeared to be based on a value of a_v equal to 0.006 sf/ton x effective depth of stressed soil. The existing fill within the proposed building footprint is up to 4 feet or about 500 psf. Assuming 500 psf or 0.25 Tons/sf and a silt/clay stratum thickness of about 20 feet, the silt/clay consolidation which would have already occurred would be about 3/8". The proposed five-story buildings with a footprint pressure of 500 psf would have similar settlements due to silt clay consolidation. There would be additional settlements from shear stresses immediately beneath the foundation. The total settlement from the silt/clay consolidation and the footing shear stresses could be up to 1".

4.0 The Criteria for Foundation Type and Loading are as follows:

1. The maximum total settlement should not exceed 1" and the maximum differential settlement should not exceed 1/2 the maximum settlement.
2. The Foundations and Structures must address the seismic section of the building code
3. The Slab at Grade floors should not settle differentially more than 1/2" in excess of the structure subsidence.

4.1 Regarding item 2 (above), the seismic site soil profile classification is "**D**". The mapped MCE spectral response acceleration values for Bloomfield, CT are $S_1 = 0.055$ for one second period and $S_s = 0.182$ for short period. For transfer of ground shear into the soil the ultimate friction factor can be **0.60**.

5.0 Regarding **Foundation Type**, the building can be supported on spread footings, which are tied together or on mats. The footing sub-grades should be on the natural inorganic soils or on a controlled fill placed after the removal of any existing fills or organic material. Based on the borings and footings at frost depth, the footing subgrades would be atop a wet stratum of silt with trace fine sand and clay. These soils will be very sensitive to remolding beneath equipment when wet. To address this condition there should be a minimum 8" layer of 3/8" crushed stone atop a geotextile (Mirafi 500X, or equal) beneath the footings on the natural soils and as an initial layer beneath controlled fills. Controlled fills should conform to section 6.0 below and should extend horizontally beyond the footings for a distance equal to at least the depth of fill beneath the footings.

5.1 The **Allowable Bearing Pressure** for spread footings on the crushed stone atop the natural soils and for footings on controlled fill can be 3,000 psf at columns and 2,000 psf at wall footings. The allowable loading can be increased by 1/3 for seismic or wind loading. At retaining walls, the maximum pressure on the toe can be 50% higher than the average pressure, cited above.

5.2 The static **Lateral Soil Loading** on retaining walls that are part of the building (if any), should be based on at-rest pressure using the coefficient $K_0 = 0.45$ as cited in the table below. Lateral soil

loading on retaining walls apart from the building can be designed with active pressure using the coefficient $K_A = 0.28$ for level backfill. The ultimate sliding coefficient for concrete on crushed stone or controlled fill is **0.60**.

5.3 The Frost Protection Depth is 3.5 feet below the finish grades in areas, which are exposed to weather.

5.4 Summary of Foundation Design Parameters:

Parameter	Value
Allowable Bearing Pressure	3,000 psf at column footings 2,000 psf at wall footings
Soil Unit Weight (Backfill) *	125 pcf
Internal Friction Angle (Backfill) *	34°
At-Rest Pressure Coefficient, K_0	0.45
Active Pressure Coefficient, K_A (level backfill)	0.28
Ultimate Sliding Coefficient, concrete on crushed stone over soil or rock	0.60
Seismic Site Soil Profile Classification	D
Mapped MCE Spectral Response Acceleration for one second period, S_1	0.055
Mapped MCE Spectral Response Acceleration for short period, S_s	0.182
Frost Protection Depth	3.5 feet

* Backfill material conforming to section 6.0 below

6.0 Regarding Controlled Fill, Backfill for Retaining Walls and Excavations at Columns and Walls, plus Slab at Grade Underlayment (to 4" below the slab bottom) the material should conform to the following or be 3/8" crushed stone:

Percent Passing	Sieve Size
100	3.5"
50 - 100	3/4"
25 - 75	No.4

The fraction, passing the No.4 sieve should have less than 15%, passing the No. 200 sieve.

All backfill and fill must be compacted to at least 95% of modified optimum density.

6.1 All existing fills, existing structures and topsoil should be removed beneath the floors and be replaced with controlled fill conforming to section 6.0 above. There should be at least 18" of controlled fill beneath the floor placed to within 4" of the slab bottom. The final 4" layer directly beneath the floor slab should be with 3/4" minus processed stone base. A vapor retarder is required beneath the slab at grade floors.

7.0 Regarding **Earthwork**, excavations in the natural soils will fall in OSHA Class C. This will require sloping of excavations, which are un-shored and exceed 5 feet in height, to be cut back to slopes less than 34° from the horizontal (1.5H:1V).

7.1 Regarding pavement construction and pavement sections, the finish grades in parking area are assumed to be close to the building floor level at Elev. 115 to 117. It is assumed the existing bituminous concrete and 6" of existing base would be reclaimed and stock piled.

7.1.1 The **recommended pavement cross section** (bituminous concrete + base + subbase) over the existing fills or silt subgrade are as follows:

For main access road; 4" of bituminous concrete (1.5" Class 2 over 2.5" Class 1) on 6" of processed stone base over 12" of gravel subbase

For parking areas; 3.5 "(1.5" over 2.0") of bituminous concrete on 6" of processed stone base over 12" of gravel subbase

Part of the reclaimed pavement could be used for part of the subbase

7.1.2 The natural silt deposits will be sensitive to remodeling beneath equipment when wet. Where the pavement section subgrades are atop the natural soils, there may be requirement for the placement of an initial 12"+ layer of ¾" crushed stone to provide a stable base for the placement of controlled fills and pavement sections.

8.0 This report has been prepared for specific application to the subject project in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made. In the event that any changes in the nature, design and location of structures are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

The analyses and recommendations submitted in this report are based in part upon data obtained

from referenced explorations. The extent of variations between explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

Welti Geotechnical, P.C., should perform a general review of the final design and specifications in order that geotechnical design recommendations may be properly interpreted and implemented as they were intended.

If you have any questions, please call our office.

Very truly yours,

Max Welti

Max Welti, P.E.
President, Welti Geotechnical, P.C.

Clarence Welti

Clarence Welti Ph.D., P. E.
Vice President

APPENDIX

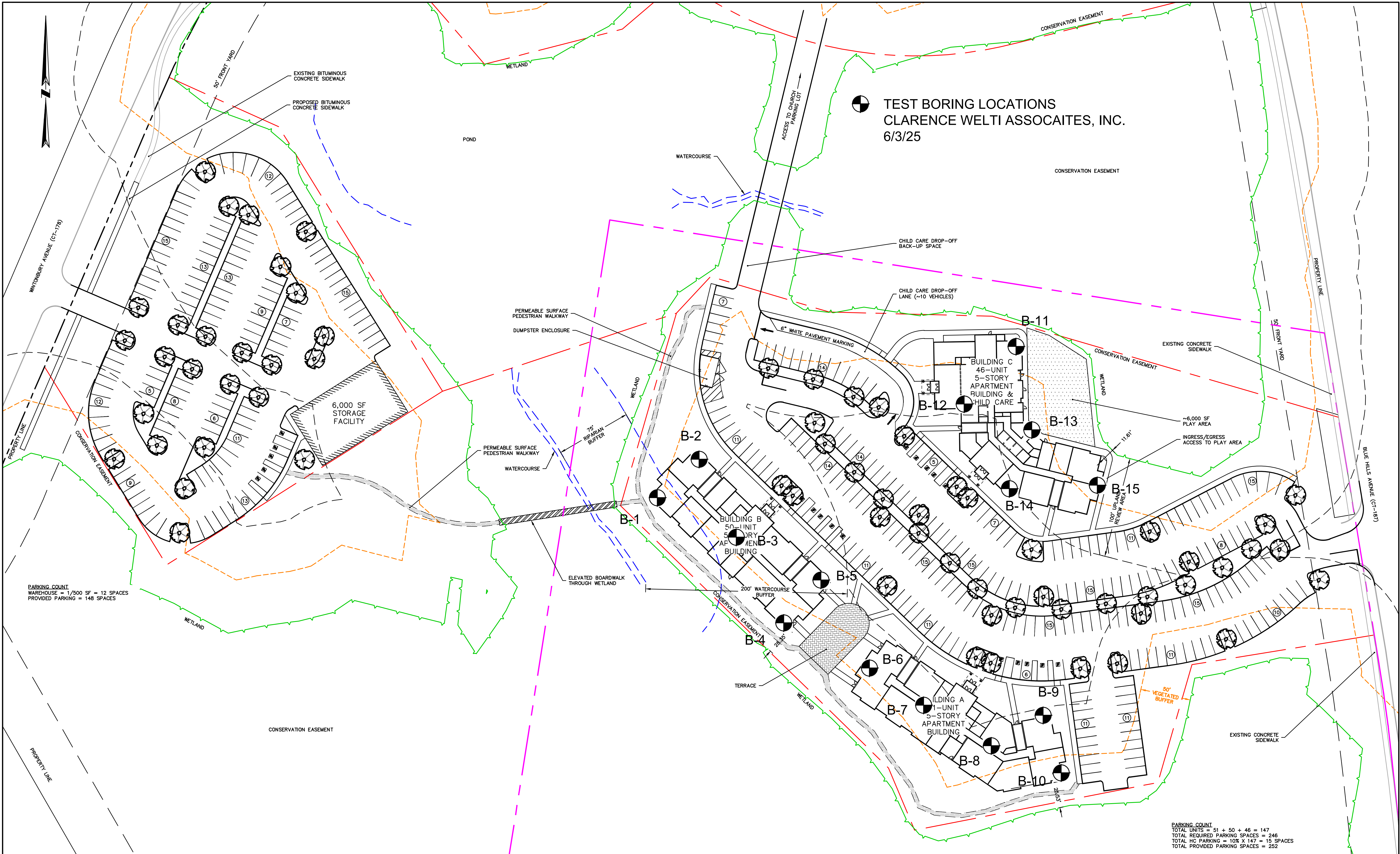
BORING LOCATION PLAN

+

TEST BORING LOGS

+

LABORATORY WATER CONTENT TESTS



CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT PAUL BAILEY ARCHITECT, LLC		PROJECT NAME PROPOSED APARTMENT BUILDINGS LOCATION 1151 BLUE HILLS AVENUE, BLOOMFIELD, CT			
	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.		HOLE NO. B-1	
TYPE	HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS		START DATE	5/29/25
SIZE I.D.	3.75"		1.375"		LONGITUDE	AT 8.0 FT. AFTER 0 HOURS		FINISH DATE	5/29/25
HAMMER WT.			140lbs		LATITUDE	AT 2.8 FT. AFTER 24 HOURS			
HAMMER FALL			30"						
DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS				ELEV.
	NO.	BLOWS/6"	DEPTH						
0					ASPHALT				0.10
	1	6-20-15-13	1.0'-3.0'		GREY/BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT - FILL				0.70
					GREY/BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT & BRICK FRAGMENTS - FILL				
	2	14-8-5-4	3.0'-5.0'						
					GREY/BR.SILT, TRACE FINE SAND & CLAY				3.5
5	3	2-3-4-5	5.0'-7.0'						
10	4	2-3-6	10.0'-11.5'						
					GREY SILT, TRACE TO LITTLE CLAY				13.0
15	5	2-1-2	15.0'-16.5'						
20	6	3-3-3	20.0'-21.5'						
					GREY/BR.VARVED CLAY AND SILT				23.0
25	7	1-2-3	25.0'-26.5'						
30	8	3-2-3	30.0'-31.5'						
35	9	60	34.5'-34.5'						34.5
LEGEND: COL. A: SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%						DRILLER: J. BREWER INSPECTOR:			
						SHEET 1 OF 2		HOLE NO. B-1	

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT PAUL BAILEY ARCHITECT, LLC		PROJECT NAME PROPOSED APARTMENT BUILDINGS LOCATION 1151 BLUE HILLS AVENUE, BLOOMFIELD, CT	
DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS		ELEV.
	NO.	BLOWS/6"	DEPTH				
40					BOTTOM OF BORING @ 34.5' (AUGER REFUSAL)		
45							
50							
55							
60							
65							
70							
75							

LEGEND: COL. A: SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%				DRILLER: J. BREWER INSPECTOR:			
				SHEET 2 OF 2		HOLE NO. B-1	

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT PAUL BAILEY ARCHITECT, LLC		PROJECT NAME PROPOSED APARTMENT BUILDINGS LOCATION 1151 BLUE HILLS AVENUE, BLOOMFIELD, CT			
	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.		HOLE NO. B-2	
TYPE	HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS		START DATE	5/29/25
SIZE I.D.	3.75"		1.375"		LONGITUDE	AT 8.0 FT. AFTER 0 HOURS		FINISH DATE	5/29/25
HAMMER WT.			140lbs		LATITUDE	AT FT. AFTER HOURS			
HAMMER FALL			30"						
DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS				ELEV.
	NO.	BLOWS/6"	DEPTH						
0					ASPHALT				0.25
	1	7-13-12-12	1.0'-3.0'		GREY/BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT, TRACE BRICK FRAGMENTS - FILL				0.70
					BR.FINE-MED.SAND, SOME SILT, LITTLE GRAVEL - FILL				
	2	8-5-5-5	3.0'-5.0'		GREY/BR.SILT, TRACE FINE SAND				3.0
5									
	3	3-4-6-5	5.0'-7.0'		BR.SILT, TRACE FINE SAND & CLAY				5.0
10									
	4	3-4-4	10.0'-11.5'						
					GREY/BR.SILT, TRACE TO LITTLE CLAY				13.0
15									
	5	2-3-2	15.0'-16.5'						
20									
	6	3-2-2	20.0'-21.5'						
					BOTTOM OF BORING @ 21.5'				21.5
					NOTE: SOILS WERE SATURATED BELOW 5 FEET				
25									
30									
35									
LEGEND: COL. A: SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%						DRILLER: J. BREWER INSPECTOR:			
						SHEET 1 OF 1		HOLE NO. B-2	

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT PAUL BAILEY ARCHITECT, LLC		PROJECT NAME PROPOSED APARTMENT BUILDINGS LOCATION 1151 BLUE HILLS AVENUE, BLOOMFIELD, CT			
	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.		HOLE NO. B-3	
TYPE	HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS		START DATE	5/29/25
SIZE I.D.	3.75"		1.375"		LONGITUDE	AT 8.0 FT. AFTER 0 HOURS		FINISH DATE	5/29/25
HAMMER WT.			140lbs		LATITUDE	AT FT. AFTER HOURS			
HAMMER FALL			30"						
DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS				ELEV.
	NO.	BLOWS/6"	DEPTH						
0					ASPHALT 0.10				
	1	7-10-15-11	1.0'-3.0'		BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT - FILL 0.50				
	2	11-9-8-11	3.0'-5.0'		GREY/BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE TO SOME SILT, LITTLE BRICK FRAGMENTS - FILL				
5	3	7-7-7-7	5.0'-7.0'		BR.SILT, TRACE FINE SAND 5.0				
10	4	2-4-5	10.0'-11.5'						
15	5	3-1-2	15.0'-16.5'		GREY/BR.SILT, TRACE TO LITTLE CLAY 15.5				
20	6	3-4-4	20.0'-21.5'		BOTTOM OF BORING @ 21.5' 21.5				
25									
30									
35									
LEGEND: COL. A: SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%						DRILLER: J. BREWER INSPECTOR:			
						SHEET 1 OF 1		HOLE NO. B-3	

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT PAUL BAILEY ARCHITECT, LLC		PROJECT NAME PROPOSED APARTMENT BUILDINGS LOCATION 1151 BLUE HILLS AVENUE, BLOOMFIELD, CT			
	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.		HOLE NO. B-4	
TYPE	HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS		START DATE	5/30/25
SIZE I.D.	3.75"		1.375"		LONGITUDE	AT 4.0 FT. AFTER 0 HOURS		FINISH DATE	5/30/25
HAMMER WT.			140lbs		LATITUDE	AT FT. AFTER HOURS			
HAMMER FALL			30"						
DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS				ELEV.
	NO.	BLOWS/6"	DEPTH						
0					ASPHALT 0.20				
	1	5-9-12-16	1.0'-3.0'		BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT - FILL 0.70				
	2	14-10-10-7	3.0'-5.0'		BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT, TRACE ASPHALT & BRICK FRAGMENTS - FILL				
5					DARK GREY FINE SAND, SOME SILT 4.0				
	3	7-8-7-3	5.0'-7.0'		GREY/BR.SILT, TRACE FINE SAND & CLAY 5.0				
10	4	3-3-4	10.0'-11.5'						
15	5	2-2-3	15.0'-16.5'						
20	6	3-4-2	20.0'-21.5'						
					BOTTOM OF BORING @ 21.5' 21.5				
25									
30									
35									
LEGEND: COL. A: SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%						DRILLER: J. BREWER INSPECTOR:			
						SHEET 1 OF 1		HOLE NO. B-4	

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT PAUL BAILEY ARCHITECT, LLC		PROJECT NAME PROPOSED APARTMENT BUILDINGS LOCATION 1151 BLUE HILLS AVENUE, BLOOMFIELD, CT			
	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.		HOLE NO. B-5	
TYPE	HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS		START DATE	5/30/25
SIZE I.D.	3.75"		1.375"		LONGITUDE	AT 4.0 FT. AFTER 0 HOURS		FINISH DATE	5/30/25
HAMMER WT.			140lbs		LATITUDE	AT FT. AFTER HOURS			
HAMMER FALL			30"						
DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS	ELEV.			
	NO.	BLOWS/6"	DEPTH						
0					ASPHALT	0.20			
	1	8-9-11-8	1.0'-3.0'		BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT - FILL	0.75			
					GREY/BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE TO SOME SILT, LITTLE ASPHALT FRGAMENTS - FILL				
	2	5-4-9-6	3.0'-5.0'						
5					GREY SILT, LITTLE FINE SAND	4.5			
	3	5-6-7-7	5.0'-7.0'		GREY/BR.SILT, TRACE FINE SAND & CLAY	5.0			
10									
	4	2-4-6	10.0'-11.5'						
15									
	5	2-3-4	15.0'-16.5'		GREY/BR.SILT, LITTLE TO SOME CLAY	15.5			
20									
	6	1-1-4	20.0'-21.5'						
25									
30									
35									
LEGEND: COL. A: SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%						DRILLER: J. BREWER INSPECTOR:			
						SHEET 1 OF 1		HOLE NO. B-5	

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT PAUL BAILEY ARCHITECT, LLC		PROJECT NAME PROPOSED APARTMENT BUILDINGS LOCATION 1151 BLUE HILLS AVENUE, BLOOMFIELD, CT			
	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.		HOLE NO. B-6	
TYPE	HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS		START DATE	5/30/25
SIZE I.D.	3.75"		1.375"		LONGITUDE	AT 4.0 FT. AFTER 0 HOURS		FINISH DATE	5/30/25
HAMMER WT.			140lbs		LATITUDE	AT FT. AFTER HOURS			
HAMMER FALL			30"						
DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS				ELEV.
	NO.	BLOWS/6"	DEPTH						
0					ASPHALT 0.20				
	1	8-18-12-11	1.0'-3.0'		BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT - FILL 0.75				
	2	14-7-6-4	3.0'-5.0'		BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE TO SOME SILT, TRACE ASPHALT & BRICK FRAGMENTS - FILL				
					DARK GREY FINE SAND, SOME SILT, TRACE ROOTS 4.0				
5	3	1-2-2-3	5.0'-7.0'		GREY/BR.SILT, TRACE FINE SAND & CLAY 5.0				
10	4	3-4-7	10.0'-11.5'						
					GREY/BR.SILT, LITTLE TO SOME CLAY 13.0				
15	5	2-2-2	15.0'-16.5'						
20	6	2-2-2	20.0'-21.5'						
					BOTTOM OF BORING @ 21.5' 21.5				
25									
30									
35									
LEGEND: COL. A: SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%						DRILLER: J. BREWER INSPECTOR:			
						SHEET 1 OF 1		HOLE NO. B-6	

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT PAUL BAILEY ARCHITECT, LLC		PROJECT NAME PROPOSED APARTMENT BUILDINGS LOCATION 1151 BLUE HILLS AVENUE, BLOOMFIELD, CT			
	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.		HOLE NO. B-7	
TYPE	HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS		START DATE	5/30/25
SIZE I.D.	3.75"		1.375"		LONGITUDE	AT 5.0 FT. AFTER 0 HOURS		FINISH DATE	5/30/25
HAMMER WT.			140lbs		LATITUDE	AT FT. AFTER HOURS			
HAMMER FALL			30"						
DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS				ELEV.
	NO.	BLOWS/6"	DEPTH						
0					ASPHALT 0.20				
	1	10-18-12-8	1.0'-3.0'		BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT - FILL 0.75				
	2	8-11-8-7	3.0'-5.0'		GREY/BR.FINE-CRS.SAND, LITTLE TO SOME SILT, LITTLE GRAVEL & BRICK FRAGMENTS - FILL				
5					GREY FINE SAND, SOME SILT 4.5				
	3	1-1-3-4	5.0'-7.0'		GREY/BR.SILT, TRACE TO LITTLE CLAY 6.0				
10	4	3-5-6	10.0'-11.5'						
15	5	2-3-2	15.0'-16.5'						
20	6	2-2-2	20.0'-21.5'						
					BOTTOM OF BORING @ 21.5' 21.5				
25									
30									
35									
LEGEND: COL. A: SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%						DRILLER: J. BREWER INSPECTOR:			
						SHEET 1 OF 1		HOLE NO. B-7	

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT PAUL BAILEY ARCHITECT, LLC		PROJECT NAME PROPOSED APARTMENT BUILDINGS LOCATION 1151 BLUE HILLS AVENUE, BLOOMFIELD, CT			
	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.		HOLE NO. B-8	
TYPE	HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS		START DATE	5/30/25
SIZE I.D.	3.75"		1.375"		LONGITUDE	AT 5.0 FT. AFTER 0 HOURS		FINISH DATE	5/30/25
HAMMER WT.			140lbs		LATITUDE	AT FT. AFTER HOURS			
HAMMER FALL			30"						
DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS				ELEV.
	NO.	BLOWS/6"	DEPTH						
0					ASPHALT 0.40 GREY/BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT, TRACE BRICK FRAGMENTS, WIRE & WOOD - FILL 2 14-10-6-3 3.0'-5.0' 3 1-1-2-5 5.0'-7.0' 4 1-4-5 10.0'-11.5' 5 3-3-3 15.0'-16.5' 6 2-2-2 20.0'-21.5' 13.0 GREY/BR.SILT, LITTLE TO SOME CLAY 21.5 BOTTOM OF BORING @ 21.5'				
1	10-16-10-11	1.0'-3.0'							
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									

LEGEND: COL. A: SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%				DRILLER: J. BREWER INSPECTOR:	
SHEET 1 OF 1				HOLE NO. B-8	

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT PAUL BAILEY ARCHITECT, LLC		PROJECT NAME PROPOSED APARTMENT BUILDINGS LOCATION 1151 BLUE HILLS AVENUE, BLOOMFIELD, CT			
	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.		HOLE NO. B-9	
TYPE	HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS		START DATE 6/2/25	
SIZE I.D.	3.75"		1.375"		LONGITUDE	AT 5.0 FT. AFTER 0 HOURS			
HAMMER WT.			140lbs		LATITUDE	AT FT. AFTER HOURS		FINISH DATE 6/2/25	
HAMMER FALL			30"						
DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS				ELEV.
	NO.	BLOWS/6"	DEPTH						
0	1	12-20-20	0.5'-2.0'		ASPHALT 0.56				
					GREY/BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT, TRACE BRICK FRAGMENTS & ASPHALT - FILL 2.0				
	2	14-14-12-10	2.0'-4.0'		BR.FINE-MED.SAND, TRACE SILT - FILL				
5	3	4-3-6-7	4.0'-6.0'						
					GREY/BR.SILT, LITTLE TO SOME FINE SAND 5.0				
10	4	2-4-4	10.0'-11.5'		GREY/BR.SILT, TRACE TO SOME CLAY 10.0				
15	5	2-2-2	15.0'-16.5'						
20	6	2-2-2	20.0'-21.5'						
25					BOTTOM OF BORING @ 21.5' 21.5				
30									
35									
LEGEND: COL. A: SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%					DRILLER: J. TURGEON INSPECTOR:				
					SHEET 1 OF 1		HOLE NO. B-9		

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT PAUL BAILEY ARCHITECT, LLC		PROJECT NAME PROPOSED APARTMENT BUILDINGS LOCATION 1151 BLUE HILLS AVENUE, BLOOMFIELD, CT				
	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.		HOLE NO. B-10		
TYPE	HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS		START DATE 6/2/25		
SIZE I.D.	3.75"		1.375"		LONGITUDE	AT 5.0 FT. AFTER 0 HOURS				
HAMMER WT.			140lbs		LATITUDE	AT FT. AFTER HOURS		FINISH DATE 6/2/25		
HAMMER FALL			30"							
DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS				ELEV.	
	NO.	BLOWS/6"	DEPTH							
0					ASPHALT 0.20					
	1	6-7-15-14	1.0'-3.0'		BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT - FILL 0.75					
					GREY/BR.FINE-CRS.SAND, LITTLE SILT, GRAVEL & BRICK FRAGMENTS - FILL					
5	2	8-8-7-7	3.0'-5.0'							
					GREY FINE SAND, SOME SILT 4.0					
	3	2-6-8-8	5.0'-7.0'		GREY/BR.SILT, TRACE FINE SAND & CLAY 5.5					
10										
	4	2-4-5	10.0'-11.5'							
15										
	5	2-4-3	15.0'-16.5'							
20										
	6	2-2-1	20.0'-21.5'							
25										
	7	1-1-3	25.0'-26.5'							
30										
	9	1-1-1	30.0'-31.5'							
35										
					RED/BR.FINE-MED.SAND AND SILT, LITTLE GRAVEL 33.0					
LEGEND: COL. A: SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%						DRILLER: J. TURGEON INSPECTOR:				
						SHEET 1 OF 2		HOLE NO. B-10		

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT PAUL BAILEY ARCHITECT, LLC		PROJECT NAME PROPOSED APARTMENT BUILDINGS LOCATION 1151 BLUE HILLS AVENUE, BLOOMFIELD, CT	
DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS	ELEV.	
	NO.	BLOWS/6"	DEPTH				
40	10	3-5-6	35.0'-36.5'		BOTTOM OF BORING @ 39.5' (AUGER REFUSAL)	39.5	
	45						
50							
55							
60							
65							
70							
75							
LEGEND: COL. A: SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%					DRILLER: J. TURGEON INSPECTOR: SHEET 2 OF 2 HOLE NO. B-10		

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT PAUL BAILEY ARCHITECT, LLC		PROJECT NAME PROPOSED APARTMENT BUILDINGS LOCATION 1151 BLUE HILLS AVENUE, BLOOMFIELD, CT			
	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.		HOLE NO. B-11	
TYPE	HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS		START DATE 6/2/25	
SIZE I.D.	3.75"		1.375"		LONGITUDE	AT 2.5 FT. AFTER 0 HOURS			
HAMMER WT.			140lbs		LATITUDE	AT FT. AFTER HOURS		FINISH DATE 6/2/25	
HAMMER FALL			30"						

DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS	ELEV.
	NO.	BLOWS/6"	DEPTH			
0					ASPHALT	0.33
	1	25-20-18-11	1.0'-3.0'		BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT - FILL	0.75
					GREY/BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT, TRACE BRICK FRAGMENTS & ASPHALT - FILL	2.0
	2	4-5-5-7	3.0'-5.0'		GREY/BR.SILT, TRACE FINE SAND	
5						
	3	5-8-7-6	5.0'-7.0'		GREY/BR.SILT, TRACE FINE SAND	5.5
10						
	4	5-6-6	10.0'-11.5'			
15						
	5	5-6-6	15.0'-16.5'			
20						
	6	2-3-3	20.0'-21.5'			
25						
	7	1-1-1	25.0'-26.5'			
30						
	9	2-7-4	30.0'-31.5'		RED/BR.FINE-MED.SAND AND SILT, LITTLE GRAVEL	31.0
35					BOTTOM OF BORING @ 34.0' (AUGER REFUSAL)	34.0

LEGEND: COL. A: SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%				DRILLER: J. TURGEON INSPECTOR:	
				SHEET 1 OF 1 HOLE NO. B-11	

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT PAUL BAILEY ARCHITECT, LLC		PROJECT NAME PROPOSED APARTMENT BUILDINGS LOCATION 1151 BLUE HILLS AVENUE, BLOOMFIELD, CT			
	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.		HOLE NO. B-12	
TYPE	HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS		START DATE 6/3/25	
SIZE I.D.	3.75"		1.375"		LONGITUDE	AT 10.0 FT. AFTER 0 HOURS			
HAMMER WT.			140lbs		LATITUDE	AT FT. AFTER HOURS		FINISH DATE 6/3/25	
HAMMER FALL			30"						
DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS				ELEV.
	NO.	BLOWS/6"	DEPTH						
0					ASPHALT 0.33				
	1	15-17-15-10	1.0'-3.0'		BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT - FILL 0.75				
					BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT, TRACE BRICK FRAGMENTS, ASPHALT & WOOD - FILL				
	2	7-7-10-10	3.0'-5.0'		BR.SILT, TRACE FINE SAND 3.0				
5									
	3	5-4-5-5	5.0'-7.0'						
10					GREY/BR.SILT, TRACE TO LITTLE CLAY 9.0				
	4	2-2-4	10.0'-11.5'						
15									
	5	2-2-3	15.0'-16.5'						
20					GREY/BR.VARVED SILT AND CLAY 17.0				
	6	1-1-3	20.0'-21.5'						
25									
30									
35									
LEGEND: COL. A: SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%						DRILLER: J. TURGEON INSPECTOR:			
						SHEET 1 OF 1		HOLE NO. B-12	

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT PAUL BAILEY ARCHITECT, LLC		PROJECT NAME PROPOSED APARTMENT BUILDINGS LOCATION 1151 BLUE HILLS AVENUE, BLOOMFIELD, CT			
	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.		HOLE NO. B-13	
TYPE	HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS		START DATE 6/3/25	
SIZE I.D.	3.75"		1.375"		LONGITUDE	AT 10.0 FT. AFTER 0 HOURS			
HAMMER WT.			140lbs		LATITUDE	AT FT. AFTER HOURS		FINISH DATE 6/3/25	
HAMMER FALL			30"						
DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS				ELEV.
	NO.	BLOWS/6"	DEPTH						
0					ASPHALT	0.33			
	1	22-18-11-8	1.0'-3.0'		BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT - FILL	0.75			
					BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT, TRACE BRICK FRAGMENTS, ASPHALT & WOOD - FILL				
	2	7-7-10-12	3.0'-5.0'		BR.SILT, LITTLE FINE SAND	3.0			
5									
	3	5-6-5-6	5.0'-7.0'		BR.SILT, TRACE FINE SAND & CLAY	5.0			
10									
	4	3-3-4	10.0'-11.5'						
					GREY/BR.SILT, LITTLE TO SOME CLAY	13.0			
15									
	5	2-3-3	15.0'-16.5'						
					GREY/BR.VARVED SILT AND CLAY	18.0			
20									
	6	1-2-2	20.0'-21.5'						
					BOTTOM OF BORING @ 21.5'	21.5			
					NOTE: SOILS WERE SATURATED BELOW 5 FEET				
25									
30									
35									
LEGEND: COL. A: SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%						DRILLER: J. TURGEON INSPECTOR:			
						SHEET 1 OF 1		HOLE NO. B-13	

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT PAUL BAILEY ARCHITECT, LLC			PROJECT NAME PROPOSED APARTMENT BUILDINGS LOCATION 1151 BLUE HILLS AVENUE, BLOOMFIELD, CT		
	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.		HOLE NO. B-14	
TYPE	HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS		START DATE 6/3/25	
SIZE I.D.	3.75"		1.375"		LONGITUDE	AT 10.0 FT. AFTER 0 HOURS			
HAMMER WT.			140lbs		LATITUDE	AT FT. AFTER HOURS		FINISH DATE 6/3/25	
HAMMER FALL			30"						
DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS				ELEV.
	NO.	BLOWS/6"	DEPTH						
0					ASPHALT 0.30 BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT - FILL 0.75 GREY/BR.FINE-CRS.SAND, LITTLE SILT & GRAVEL, TRACE BRICK FRAGMENTS & ASPHALT - FILL BR.SILT, TRACE FINE SAND 3.0				
5									
	3	5-7-6-5	5.0'-7.0'						
10					GREY/BR.SILT, TRACE TO LITTLE CLAY 9.0				
	4	2-4-5	10.0'-11.5'						
15									
	5	2-2-2	15.0'-16.5'						
20									
	6	1-2-3	20.0'-21.5'						
25									
30									
35									
LEGEND: COL. A: SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%						DRILLER: J. TURGEON INSPECTOR:			
						SHEET 1 OF 1		HOLE NO. B-14	

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT PAUL BAILEY ARCHITECT, LLC			PROJECT NAME PROPOSED APARTMENT BUILDINGS LOCATION 1151 BLUE HILLS AVENUE, BLOOMFIELD, CT		
	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.		HOLE NO. B-15	
TYPE	HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS		START DATE 6/3/25	
SIZE I.D.	3.75"		1.375"		LONGITUDE	AT 9.0 FT. AFTER 0 HOURS			
HAMMER WT.			140lbs		LATITUDE	AT FT. AFTER HOURS		FINISH DATE 6/3/25	
HAMMER FALL			30"						
DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS				ELEV.
	NO.	BLOWS/6"	DEPTH						
0	1	1-1-1-2	0.0'-2.0'		TOPSOIL - FILL				
	2	3-5-7-6	2.0'-4.0'		BR.SILT, LITTLE FINE SAND, TRACE GRAVEL & ROOTS - FILL				2.0
	3	6-6-7-7	4.0'-6.0'		GREY/BR.SILT, TRACE CLAY				4.0
5									
	4	5-6-8-6	6.0'-8.0'						
	5	2-3-2-2	8.0'-10.0'		GREY/BR.VARVED SILT AND CLAY				8.0
10	6	4-5-5	10.0'-11.5'						
15	7	1-3-3	15.0'-16.5'						
20	8	2-3-3	20.0'-21.5'						
25									
30									
35									
LEGEND: COL. A: SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%					DRILLER: J. TURGEON INSPECTOR:				
					SHEET 1 OF 1		HOLE NO. B-15		

Bloomfield First Cathedral
Proposed Apartment Buildings
1151 Blue Hills Avenue, Bloomfield, CT

6/4/25

Water Content Tests

Sample #	Water Content %	Sample #	Water Content %
B-1, 3'-5'	22.4	B-10, 20'-22'	40.0
B-1, 5'-7'	28.2	B-10, 25'-27'	42.6
B-1, 10'-12'	34.0	B-10, 30'-32'	45.4
B-1, 15'-17'	32.0	B-11, 5'-7'	24.8
B-1, 20'-22'	33.3	B-11, 10'-12'	30.9
B-1, 25'-27'	33.4	B-11, 15'-17'	32.2
B-1, 30'-32'	35.0	B-11, 20'-22'	35.2
B-10, 10'-12'	28.3	B-11, 25'-27'	39.2
B-10, 15'-17'	37.1		