PLANNING BOARD MEETING

Tuesday, July 23, 2024 at 6:00 PM

Town Hall - 41 South Main Street Randolph, MA 02368

AGENDA

Pursuant to the temporary provisions pertaining to the Open Meeting Law, public bodies may continue holding meetings remotely without a quorum of the public body physically present at a meeting location until March 31, 2025. The public is invited to participate in the meeting in person, via telephone or computer.

A. Call to Order - Roll Call

B. Chairperson Comments

C. Approval of Minutes

1. Minutes of 7/11/2024

D. Public Speaks

E. Public Hearings

1. Site Plan/Design Review - 300 Pond Street

F. Old/Unfinished Business

G. New Business

1. Subdivision - Orchard Estates (Cherry Circle) - status toward completion

2. Subdivision - Lafayette Estates

H. Staff Report
***Active Subdivision Review**
***Active Project Review**
***Upcoming Items**
- Public hearing for MBTA Zoning - August 13

I. Board Comments

J. Adjournment
Notification of Upcoming Meeting Dates

File Attachments for Item:

1. Minutes of 7/11/2024

Meeting adjourned at 7:05pm.

Motion made by Adjei-Koranteng, Seconded by Taveira to adjourn the meeting.
Voting Yea: Alexopoulos, Adjei-Koranteng, Plizga, Taveira, Sahlu

File Attachments for Item:

1. Site Plan/Design Review - 300 Pond Street

LocaliQ
New England
GANNETT

Order Confirmation

Not an Invoice

Account Number:	663354
Customer Name:	Randolph Planning Director
Customer Address:	Randolph Planning Director 41 South Main St Randolph MA 02368
Contact Name:	Randolph Planning Director
Contact Phone:	7819610936
Contact Email:	
PO Number:	

Date:	06/12/2024
Order Number:	10283281
Prepayment Amount:	$ 0.00

Column Count:	1.0000
Line Count:	32.0000
Height in Inches:	0.0000

Print

Product	#Insertions	Start - End	Category
NEO QUI The Patriot Ledger	2	07/09/2024 - 07/16/2024	Govt Public Notices
NEO wickedlocal.com	2	07/09/2024 - 07/16/2024	Govt Public Notices

As an incentive for customers, we provide a discount off the total order cost equal to the 3.99% service fee if you pay with Cash/Check/ACH. Pay by Cash/Check/ACH and save!

Total Cash Order Confirmation Amount Due	$97.92
Tax Amount	$0.00
Service Fee 3.99%	$3.91
Cash/Check/ACH Discount	-$3.91
Payment Amount by Cash/Check/ACH	$97.92
Payment Amount by Credit Card	$101.83

Order Confirmation Amount	**$97.92**

300 POND STREET

LEGAL NOTICE

Public Hearing

The Randolph Planning Board will hold a Public Hearing on Tuesday, July 23 at 6:15pm on the request of Emerson Swan-Flexon of 300 Pond Street, Randolph to conduct a site plan and design review for construction of a proposed 52,300 s.f. addition to the structure to support manufacturing, infrastructure, stormwater utilities, parking and landscaping. Plans and reports can be viewed at the office of the Town Clerk during regular business hours. Interested parties may participate in person at Randolph Town Hall, 41 S Main St, Randolph, MA 02368 in the Washington Room or virtually via ZOOM. The link to join the meeting is on the Town of Randolph calendar.

#10283281
PL 7/9, 7/16/24

TOWN OF RANDOLPH PLANNING DEPARTMENT

APPLICATION FOR SPECIAL PERMIT ~ AND/OR ~ SITE PLAN & DESIGN REVIEW

Project Type	○ Tier 1 Review (administrative) ○ Tier 2 Review ◉ Tier 3 Site Plan/Design Review		○ In-Law Apartment ○ Two-Family Dwelling ○ Special Permit
Assessor Parcel ID *map-block-parcel*	03-O-2.1	**Norfolk County Registry of Deeds**	*Book& Page or Land Court Cert #* LCC#159807
Parcel Address	300 Pond Street		
Current Use	Manufacturing, Warehouse, Office		
Zoning District	Industrial & Great Pond Commerce Center Overlay	**Size of Parcel**	±435,607 S.F. (10.0 AC)
Project Description	The proposed development will consist of the construction an approximate 52,300 s.f. manufacturing addition to the existing building located at 300 Pond Street. Approximately 21,850 s.f. of existing office space located in place of the addition, will be converted to manufacturing use. The project will also include the construction of related site improvements including stormwater management facilities, utility connections, cement concrete sidewalk, landscaping, and other relevant infrastructure.		
Other permits or approvals may be required	**Are there wetlands on the parcel or within 200 feet of the construction?** ☐ **YES** ☑ **NO** *If yes – the project may require review by the Conservation Commission*		
	Is land disturbance > 5,000 square feet? ☑ **YES** ☐ **NO** *If yes – file a stormwater permit with DPW*		
	Does the proposed use increase pollutant loads? ☐ **YES** ☑ **NO** *If yes – file a stormwater permit with DPW*		
	Is structure > 100 years old? ☐ **YES** ☑ **NO** *If yes – file with the Historic Commission*		

Applicant Name	Emerson - Swan Flexcon					
Contact person	Anthony Palaza					
Applicant Status	◉ Owner ○ Tenant ○ Licensee ○ Buyer ○ Other_____					
Address	300 Pond Street					
	CITY	Randolph	**STATE**	MA	**ZIP**	02368
Phone	339-793-3196	**Email**	apalaza@flexconind.com			

If property owner is not the Applicant, authorization from the owner is required

Surveyor	McKenzie Engineering Group, Inc.					
Contact person	Erik Schoumaker, P.E.					
Address	150 Longwater Drive					
	CITY	Norwell	**STATE**	MA	**ZIP**	02061
Phone	781-792-3900	**Email**	eschoumaker@mckeng.com			

Engineer	McKenzie Engineering Group, Inc.					
Contact person	Erik Schoumaker, P.E.					
Address	150 Longwater Drive					
	CITY	Norwell	**STATE**	MA	**ZIP**	02061
Phone	781-792-3900	**Email**	eschoumaker@mckeng.com			

Property Owner	Emerson - Swan Flexcon					
Address	300 Pond Street					
	CITY	Randolph	**STATE**	MA	**ZIP**	02368
Phone	339-793-3196	**Email**	apalaza@flexconind.com			

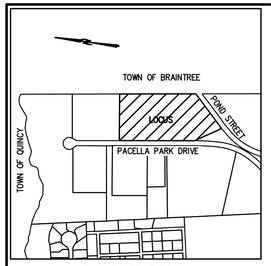
For any application for a **Special Permit**, the applicant shall submit additional documentation to support:

- That the proposed use is in harmony with the general purpose and intent of the Town's ordinances;
- That the proposed use is in an appropriate location and is not detrimental to the neighborhood and does not significantly alter the character of the zoning district;
- Adequate and appropriate facilities will be provided for the proper operation of the proposed use;
- That the proposed use would not be detrimental or offensive to the adjoining zoning districts and neighboring properties due to the effects of lighting, odors, smoke, noise, sewage, refuse materials or other visual nuisances;
- That the proposed use would not cause undue traffic congestion in the immediate area.

I hereby certify, under the pains and penalties of perjury, that the information contained in this application is true, accurate and complete to the best of my knowledge and belief. I agree to abide by the Randolph Zoning Ordinances and complete construction of the project in accordance with said rules and any conditions of the Planning Board.

Applicant Signature

June 5, 2024
Date



LOCUS MAP
Not to Scale

MASSACHUSETTS STATE PLANE COORDINATE SYSTEM

N/F TOWN OF BRAINTREE WATER DEPARTMENT

APPROX. LIMIT OF DEP ZONE

TOWN OF BRAINTREE
TOWN OF RANDOLPH

S 08°56'11" E 755.31'

WEST STREET
(PUBLIC 60' WIDE)

A=36.27'
R=1790.43'

100' WETLAND BUFFER

APPROX. ZONING LINE (TYP.)

RESIDENTIAL SINGLE FAMILY HIGH DENSITY DISTRICT
GREAT POND COMMERCE CENTER OVERLAY DISTRICT

GREAT POND RESERVOIR

LIMIT OF BORDERING VEGETATED WETLANDS DELINEATED BY ENVIRONMENTAL CONSULTING & RESTORATION, LLC ON DECEMBER 1, 2023.

POND STREET
(PUBLIC 60' WIDE)

S 45°18'27" W 408.95'

5' NATURAL BUFFER
20' ROADWAY SETBACK

10' REAR YARD SETBACK

33 PARKING SPACES

25 PARKING SPACES

23 PARKING SPACES

5 PARKING SPACES

37 PARKING SPACES

40 PARKING SPACES

BIT. CONC. PAVEMENT

BIT. CONC. PARKING

CONCRETE

GRASS

LANDSCAPING

4 GARAGE DOORS

BAY DOOR

DOOR ENTRY

COVERED STEPS

LOADING DOCK

RET. WALL

CONCRETE SIDEWALK

APN 3-0-4
#14 PACELLA PARK DR.
N/F THE MAY INSTITUTE INC
LCC 181407

N 82°01'21" E 483.04'

APN 3-0-2.1
300 POND STREET
1½ STORY INDUSTRIAL BUILDING
FFE=141.16
435,607± S.F. (10.0± AC)
COT 159807

APPROX. LIMIT OF ZONE A

APN 4-H-1.0
TOWN OF RANDOLPH

N 07°58'39" W 754.10'

N 35°25'51" W 301.52'

5' SIDE YARD SETBACK

PACELLA PARK DRIVE
(PRIVATE 50' WIDE)

APN 3-0-3.L-2
#21 PACELLA PARK DR.
N/F 21 GREAT POND PARTNERSHIP LLC
LCC 195598

APN 3-0-9.L-11
#27 PACELLA PARK DR.
N/F MS WINNINGS LLC
LCC 182981

APN 4-G-1.01
#41 PACELLA PARK DR.
N/F THE MAY INSTITUTE INC
LCC 172876

APN 3-0-8.H
#35 PACELLA PARK DR.
N/F THE MAY INSTITUTE
LCC 176159

TP#1 TP#2

DMH R=142.00 INV(A)=131.95 INV(B)=132.30 INV(C)=136.95 TOP OF WATER=133.7

CBN R=138.95 INV(A)=132.45 INV(B)=132.75 INV(C)=135.90

CBN R=137.72 TOP HOOD(A)=135.42 INV(B)=133.32 INV(C)=133.22

CBN R=136.98 INV(A)=133.78 INV(B)=133.58

CBN R=138.95 INV(A)=134.16 INV(B)=135.45

DMH R=137.07 INV(A)=133.72 INV(B)=133.97 INV(C)=134.12

CBN R=136.82 TOP OF HOOD=135.22

ROOF DRAIN IVN=139.02

SMH R=141.13 INV=136.38

DMH R=140.94 INV(A)=133.29 INV(B)=133.49

DRAIN I=138.85 12"HDPE

DRAINAGE BASIN STONE BOTTOM

HEAD WALL

CHAIN LINK FENCE

I=131.17

I=132.45 18"DIA OPENING

18"CONCOPEN I=138.24

6" METAL COVER R=141.12 INV(A)=138.37 INV(B)=138.12 8"PVC

SMH R=141.42 INV=132.27

CBN R=140.97 INV(A)=137.77 INV(B)=137.62

DMH R=144.82 INV(A)=138.72 INV(B)=139.67 INV(C)=139.27

SMH R=144.65 INV=131.60 BOTTOM=129.65

CBN R=136.96 TOP OF HOOD=135.36

WATER SERVICE (RECORD)

CBN LEACHING PIT R=139.81 BOTTOM=135.71

SEWER SERVICE (APPROX. LOCATION)

CBN LEACHING PIT R=138.77 BOTTOM=134.67

WATER SERVICE (RECORD)

GAS SERVICE (RECORD)

HVAC

SEWER SERVICE (APPROX. LOCATION)

CONC. PAD

RADIATOR

6"DIA.CONC. STRUCTURE W/VAULT

CBN R=142.84 INV=140.02 6"PIPE

CHAIN LINK FENCE

10' ROADWAY SETBACK

5' NATURAL BUFFER

WATER MAIN (RECORD)

CBN R=143.79 INV=128.37

DMH R=143.54

CBN R=143.19 INV=139.19 12"RCP

CBN R=143.12 INV=139.67 12"RCP

CBN R=141.09 INV=138.09 12"RCP

SMH R=127.65 INV=122.79

SMH R=142.22

CBN R=141.52 INV=137.92 12"RCP

DMH R=141.77 INV(A)=136.67 INV(B)=137.37 INV(C)=136.82 INV(D)=137.32

LEGEND

SURVEY SYMBOLS

CB/DH	□	CONCRETE BOUND WITH DRILL HOLE
SB	□	STONE BOUND
SB/DH	□	STONE BOUND

UTILITY SYMBOLS

	TRANSFORMER
	WATER GATE
EMH	ELECTRIC MANHOLE
SMH	SEWER MANHOLE
DMH	DRAIN MANHOLE
TMH	TELEPHONE MANHOLE
CBN	DRAINAGE CATCH BASIN
	HYDRANT
	UTILITY POLE
B	BOLLARD
	SIGN

LINE DESIGNATORS

W	WATER MAIN
OHW	OVERHEAD WIRES
G	GAS LINE
WS	WATER SERVICE
E	UNDERGROUND ELECTRIC
D	STORM DRAIN LINE
S	SANITARY SEWER LINE
	DRAINAGE SWALE
X	CHAIN LINK FENCE

ABBREVIATIONS

FFE	FIRST FLOOR ELEVATION
BIT CONC.	BITUMINOUS CONCRETE PAVEMENT
CCB	CAPE COD BERM
EP	EDGE OF PAVEMENT
BC	BITUMINOUS CONCRETE CURB
RET WALL	RETAINING WALL
CONC.	CONCRETE
VGC	VERTICAL GRANITE CURB
VCC	VERTICAL CONCRETE CURB
FOOT	CONCRETE FOOTING

SURVEY NOTES:

1. LOCUS IS SHOWN AS PARCEL NUMBER 03-0-2.1 ON THE TOWN OF RANDOLPH ASSESSORS MAPS.
2. DEED TO LOCUS IS RECORDED IN THE NORFOLK COUNTY REGISTRY OF DEEDS LAND COURT AT CERTIFICATE #159807.
3. THIS SURVEY WAS MADE ON THE GROUND IN NOVEMBER OF 2022 AND UPDATED IN SEPTEMBER AND DECEMBER OF 2023 BY MCKENZIE ENGINEERING GROUP, INC.
4. ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.
5. WETLAND RESOURCE AREAS WERE DELINEATED BY ENVIRONMENTAL CONSULTING & RESTORATION, LLC ON DECEMBER 1, 2023.
6. LOCUS IS SITUATED IN ZONE X AS SHOWN ON F.I.R.M. No 25021C0208E, EFFECTIVE 7/17/2012.
7. LOCUS IS NOT LOCATED IN A DEP ZONE 2 OR TOWN OF RANDOLPH AQUIFER PROTECTION DISTRICT ZONE. A PORTION OF THE SITE IS LOCATED WITHIN A DEP ZONE A SURFACE WATER SUPPLY PROTECTION AREA.
8. UTILITY INFORMATION SHOWN HEREON IS DERIVED FROM ABOVE GROUND OBSERVED EVIDENCE IN CONJUNCTION WITH DIG SAFE MARKINGS AND RECORD PLANS. THE LAND SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN HEREON COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE LAND SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. BEFORE CONSTRUCTION CALL DIG SAFE SYSTEMS, INC. AT 1-888-344-7233.

7 PLAN REFERENCES: LCP 34183A
#953 OF 1963
#393 OF 1927 (POND STREET LAYOUT)
#256 OF 1923 (WEST STREET LAYOUT)

ZONING NOTES:
GREAT POND COMMERCE CENTER OVERLAY DISTRICT

MINIMUM SETBACKS:

	REQUIRED:	EXISTING:
FRONT YARD:	20' FROM POND STREET 10' ALL OTHER ROADWAYS	187.1' FROM POND STREET 49.9' FROM PACELLA PARK DRIVE
SIDE YARD	5'	22.8'
REAR YARD	10'	27.3'

AREA:

	REQUIRED:	EXISTING:
FRONTAGE	120'	408.95'
LOT SIZE	60000	435607 (10 AC)
BUILDING COVERAGE	50% (217804 S.F.)	41% 180624 S.F.
IMPERVIOUS AREA	25% (108902 S.F.)	29% 127286 S.F.
OPEN SPACE	25% (108902 S.F.)	29% 127697 S.F.

I HEREBY CERTIFY THAT THIS PLAN IS THE RESULT OF AN ON-THE-GROUND INSTRUMENT SURVEY CONDUCTED BY McKENZIE ENGINEERING GROUP, INC. IN NOVEMBER OF 2022 AND UPDATED IN SEPTEMBER, DECEMBER OF 2023.

RICHARD J. HOOD, PLS — DATE 05JUN24

0 50 100 150

REV	DATE	DESCRIPTION	BY	APP

MCKENZIE ENGINEERING GROUP
Assinippi Office Park
150 Longwater Drive, Suite 101
Norwell, MA 02061
P: 781.792.3900
F: 781.792.0333
www.mckeng.com

EXISTING CONDITIONS PLAN
300 POND STREET
RANDOLPH, MASSACHUSETTS

PROFESSIONAL LAND SURVEYOR
COMMONWEALTH OF MASSACHUSETTS
RICHARD J. HOOD
No. 35031
REGISTERED PROFESSIONAL LAND SURVEYOR

NOT FOR CONSTRUCTION

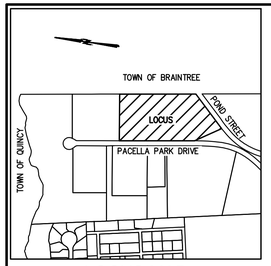
OWNERS/APPLICANT:
EMERSON - SWAN FLEXCON
300 POND STREET
RANDOLPH, MASSACHUSETTS

DRAWN BY:	BDB/AL
DESIGNED BY:	- -
CHECKED BY:	RTLS
APPROVED BY:	RJH
DATE:	26APR24
SCALE:	1"=50'
PROJECT NO.:	222-209

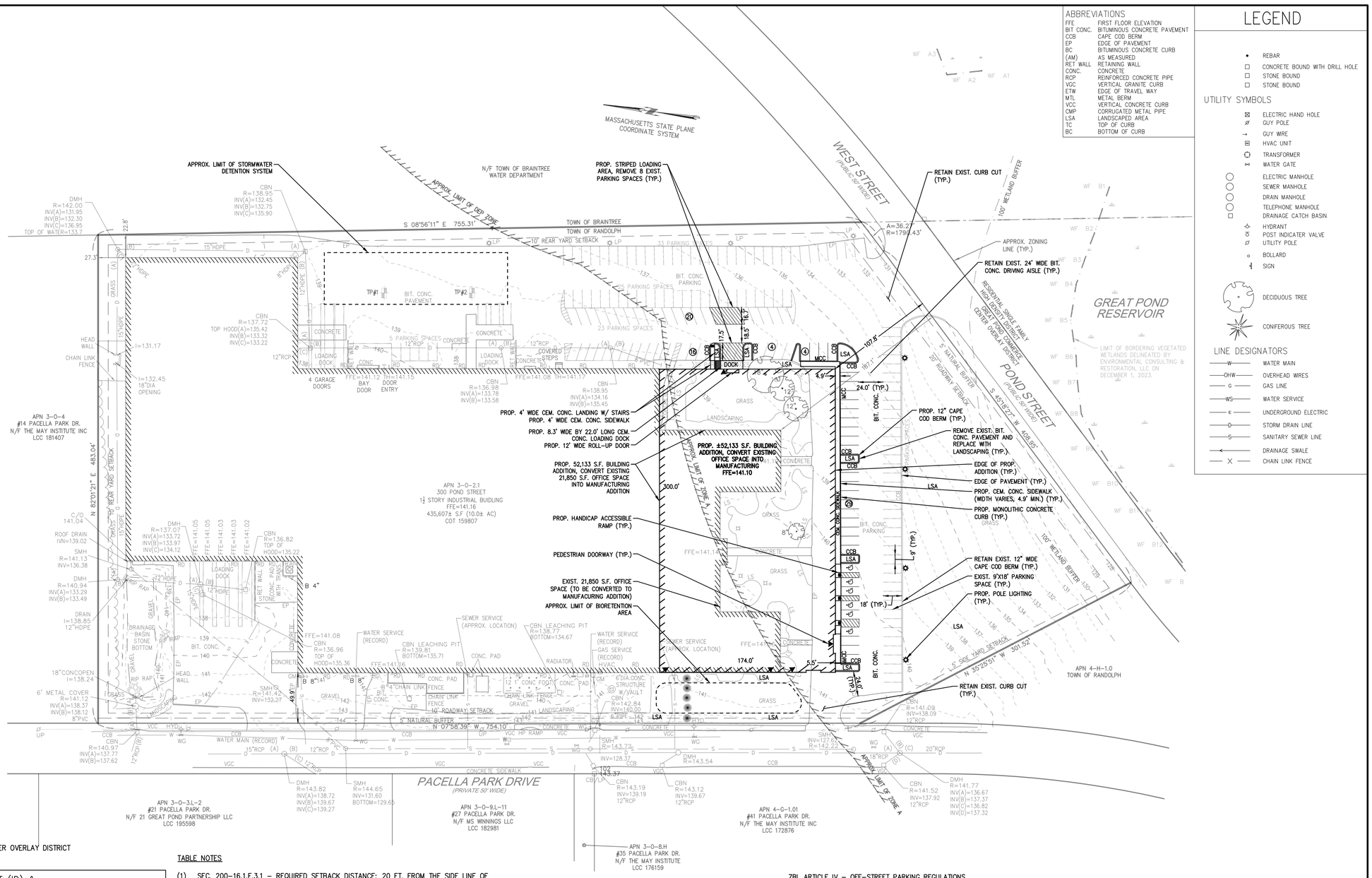
DWG. TITLE:
EXISTING CONDITIONS PLAN

DWG. NO:
EX-1

M:\MEG\2022 PROJECTS\222-209 EMERSON SWAN-FLEXCON - 300 POND ST., RANDOLPH\DWGS\222-209 ECP.DW



LOCUS MAP
Not to Scale



ABBREVIATIONS

FFE	FIRST FLOOR ELEVATION
BIT CONC.	BITUMINOUS CONCRETE PAVEMENT
CCB	CAPE COD BERM
EP	EDGE OF PAVEMENT
BC	BITUMINOUS CONCRETE CURB
(AM)	AS MEASURED
RET WALL	RETAINING WALL
CONC.	CONCRETE
RCP	REINFORCED CONCRETE PIPE
VCC	VERTICAL GRANITE CURB
ETW	EDGE OF TRAVEL WAY
MTL	METAL BERM
VCC	VERTICAL CONCRETE CURB
CMP	CORRUGATED METAL PIPE
LSA	LANDSCAPED AREA
TC	TOP OF CURB
BC	BOTTOM OF CURB

LEGEND

- REBAR
- CONCRETE BOUND WITH DRILL HOLE
- STONE BOUND
- STONE BOUND

UTILITY SYMBOLS

- ELECTRIC HAND HOLE
- GUY POLE
- GUY WIRE
- HVAC UNIT
- TRANSFORMER
- WATER GATE
- ELECTRIC MANHOLE
- SEWER MANHOLE
- DRAIN MANHOLE
- TELEPHONE MANHOLE
- DRAINAGE CATCH BASIN
- HYDRANT
- POST INDICATER VALVE
- UTILITY POLE
- BOLLARD
- SIGN
- DECIDUOUS TREE
- CONIFEROUS TREE

LINE DESIGNATORS

- W — WATER MAIN
- OHW — OVERHEAD WIRES
- G — GAS LINE
- WS — WATER SERVICE
- E — UNDERGROUND ELECTRIC
- D — STORM DRAIN LINE
- S — SANITARY SEWER LINE
- DRAINAGE SWALE
- CHAIN LINK FENCE

LAND USAGE TABLES

RANDOLPH ZBL SEC. 200-16.1 – GREAT POND COMMERCE CENTER OVERLAY DISTRICT
ARTICLE VI – AREA REGULATIONS

INDUSTRIAL DISTRICT (ID) & GREAT POND COMMERCE CENTER OVERLAY DISTRICT (GPCCOD)				
CRITERIA	REQUIRED (GPCCOD)	REQUIRED (ID)	EXISTING	PROPOSED
MIN. LOT SIZE	60,000 S.F.	20,000 S.F.	435,607 S.F.	NO CHANGE
MIN. LOT FRONTAGE	120 FT.	75 FT.	445.2 FT.	NO CHANGE
BUILDING HEIGHT	6 STORIES/78 FT.(4) 2 STORIES/25 FT.	4 STORIES/50 FT.	1.5 STORIES	34 FT. 2 STORIES
MIN. FRONT YARD DEPTH	20 FT./10 FT.(1)	50 FT.	187.1 FT.	107.8 FT.
MIN. SIDE YARD DEPTH	5 FT./40 FT.(2)	6 FT.	22.8 FT.	NO CHANGE
MIN. REAR YARD DEPTH	10 FT./40 FT.(3)	15 FT.	27.3 FT.	NO CHANGE
BUILDING LOT COVERAGE	50%	60%	41.4%	48.4%
IMPERVIOUS LOT COVERAGE	25%	25%	29.9%	27.8%
GREEN AREA OPEN SPACE	10%	15%	28.7%	23.8%

TABLE NOTES

(1) SEC. 200-16.1.F.3.1 – REQUIRED SETBACK DISTANCE: 20 FT. FROM THE SIDE LINE OF POND STREET; 10 FT. FROM THE SIDE LINE OF ANY OTHER STREET.

(2) SEC. 200-16.1.F.3.2 – REQUIRED SIDE YARD WIDTH: 5 FT.; 40 FT. IF SIDE YARD ABUTS A RESIDENTIAL DISTRICT WITHIN THE TOWN OF RANDOLPH OR A BUILDING LOCATED WITHIN THE TOWN OF RANDOLPH AND USED PRIMARILY FOR RESIDENTIAL PURPOSES.

(3) SEC. 200-16.1.F.3.3 – REQUIRED REAR YARD DEPTH 10 FT.; 40 FT. IF REAR YARD ABUTS A RESIDENTIAL DISTRICT WITHIN THE TOWN OF RANDOLPH OR A BUILDING LOCATED WITHIN THE TOWN OF RANDOLPH AND USED PRIMARILY FOR RESIDENTIAL PURPOSES.

(4) SEC. 200-16.1.F.4 – BUILDINGS IN THE GREAT POND COMMERCE CENTER OVERLAY DISTRICT WHICH ARE LOCATED ON LOTS NOT DIRECTLY ABUTTING ANY PORTION OF A RESIDENTIALLY ZONE PREMISE WITHIN THE TOWN OF RANDOLPH MAY CONTAIN A MAX. OF 6 STORIES AND SHALL NOT EXCEED 78 FT. IN HEIGHT. BUILDINGS WHICH ARE LOCATED ON LOTS WHICH DIRECTLY ABUT ANY PORTION OF A RESIDENTIALLY ZONED PREMISED WITHIN RANDOLPH MAY CONTAIN 2 STORIES AND SHALL NOT EXCEED 25 FT. IN HEIGHT.

(5) SEC. 200-16.1.F.6 – BUFFER STRIPS. A MINIMUM FIVE-FOOT-WIDE BUFFER STRIP SHALL BE MAINTAINED ALONG THE ENTIRE FRONTAGE OF ALL LOTS WITHIN THE GREAT POND COMMERCE CENTER OVERLAY DISTRICT, EXCEPTING ONLY THOSE PORTIONS OF THE LOT FRONTAGE WHICH MUST BE PAVED FOR NORMAL VEHICULAR ACCESS. SAID BUFFER SHALL BE MAINTAINED AS A PLANTING AREA AND SHALL BE LANDSCAPED WITH GRASS, TREES, SHRUBS AND/OR OTHER NATURAL MATERIALS. A MINIMUM FORTY-FOOT-WIDE BUFFER STRIP SHALL BE MAINTAINED ALONG THE ENTIRE SIDE AND REAR BOUNDARY LINES OF ALL LOTS WITHIN THE GREAT POND COMMERCE CENTER OVERLAY DISTRICT WHERE THE SIDE OR REAR YARD OF THE LOT IN QUESTION ABUTS A RESIDENTIAL DISTRICT WITHIN THE TOWN OF RANDOLPH OR A BUILDING LOCATED WITHIN THE TOWN OF RANDOLPH WHICH IS USED FOR RESIDENTIAL PURPOSES. OTHERWISE, NO BUFFER REQUIREMENT SHALL APPLY IN THE SIDE AND/OR REAR YARD AREAS.

ZBL ARTICLE IV – OFF-STREET PARKING REGULATIONS

COMPONENT	REQUIRED SPACES	EXISTING CONDITIONS	PROPOSED CONDITIONS	TOTAL SITE
OFFICE	1 SPACE PER 200 S.F.	21,850 S.F. / 200 S.F. = 110 SPACES	13,000 S.F. / 200 S.F. = 65 SPACES APPROX. 13,000 S.F. OF NEW MANUFACTURING ADDITION WILL BE OFFICE SPACE	38 MANUFACTURING SPACES + 65 OFFICE SPACES = 103 SPACES
WAREHOUSE/INDUSTRIAL	1 SPACE PER 2 EMPLOYEES	150 MANUFACTURING / WAREHOUSE EMPLOYEES (2 SHIFTS, 75 PER SHIFT) =75 EMP. X 1 SPACE/2 EMP. =38 SPACES	0 ADDITIONAL EMPLOYEES ASSOCIATED W/ PROPOSED WAREHOUSE ADDITION = 0 ADDITIONAL SPACES REQUIRED. FOR PROPOSED ADDITION	12 SPACE REDUCTION (188 TOTAL EXISTING CONDITION) (176 TOTAL PROPOSED CONDITION) (103 SPACES REQUIRED)

PARKING NOTES:
1. 176 PARKING SPACES INCLUDE 6 AAB ACCESSIBLE 9' X 18' WITH 1 – 8' X 18' ACCESS AREA (VAN ACCESSIBLE SPACE) (521 CMR: ARCHITECTURAL ACCESS BOARD) ACCESSIBLE SPACES REQUIRED = 6 (151-200 PARKING SPACES)

0 50 100 150

REV	DATE	DESCRIPTION	BY
1	7/16/24	PLANNING BOARD REV.	ESS BCM APP

MCKENZIE ENGINEERING GROUP
Assinippi Office Park
150 Longwater Drive, Suite 101
Norwell, MA 02061
P: 781.792.3900
F: 781.792.0333
www.mckeng.com

SITE DEVELOPMENT PLAN
(ASSESSOR'S PARCEL NUMBER 3-O-2.1)
300 POND STREET
RANDOLPH, MASSACHUSETTS

PROFESSIONAL ENGINEER:
BRADLEY C. McKENZIE
COMMONWEALTH OF MASSACHUSETTS
CIVIL
No. 39917
REGISTERED PROFESSIONAL ENGINEER

OWNERS/APPLICANT:
EMERSON - SWAN FLEXCON
300 POND STREET
RANDOLPH, MASSACHUSETTS

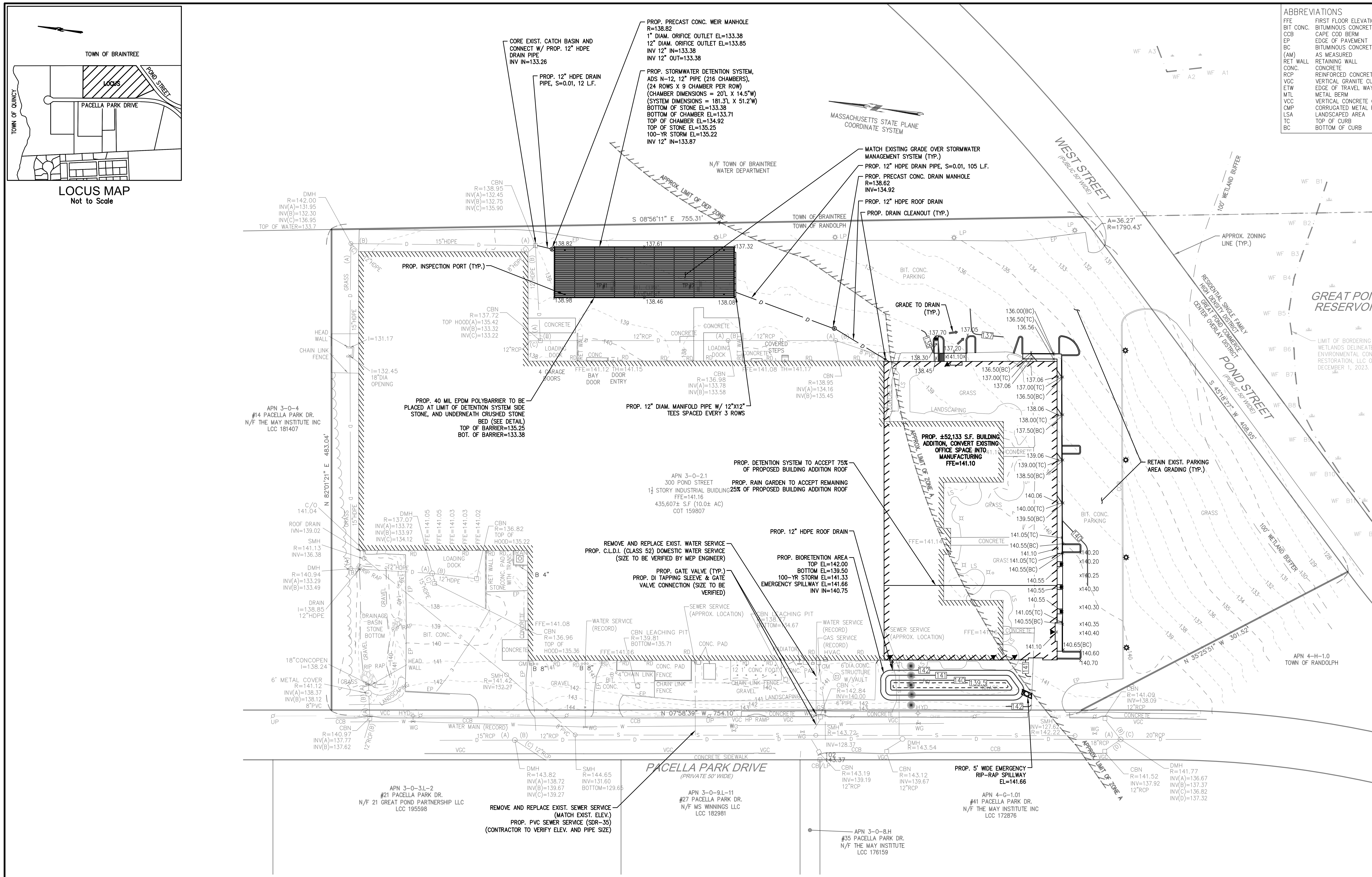
PERMIT PLAN SET

DRAWN BY:	ESS
DESIGNED BY:	ESS
CHECKED BY:	BCM
APPROVED BY:	BCM
DATE:	JUNE 11, 2024
SCALE:	1"=50'
PROJECT NO.:	222-209

DWG. TITLE:
SITE LAYOUT PLAN

DWG. NO:
C-1

M:\MEG\2022 PROJECTS\222-209 EMERSON SWAN-FLEXCON – 300 POND ST., RANDOLPH\DWGS\222-209 MAIN3.DWG



DRAINAGE NOTES:

1. ALL EROSION AND SEDIMENT CONTROLS SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY EARTH MOVING ACTIVITIES.
2. THE CONTRACTOR SHALL KEEP ON SITE AT ALL TIMES, ADDITIONAL SILTATION FENCING AND FILTER FABRIC FOR INSTALLATION AS DIRECTED BY THE TOWN TO MITIGATE ANY EMERGENCY CONDITIONS.
3. UPON COMPLETION OF ALL SITE WORK THE CONTRACTOR SHALL INSPECT ALL ON-SITE AND OFF-SITE CATCH BASINS (THAT RECEIVED CATCH BASIN PROTECTION) AND DRAINAGE MANHOLES AND REMOVE ALL SEDIMENT AND DEBRIS THAT HAS ACCUMULATED DURING THE COURSE OF CONSTRUCTION.

ABBREVIATIONS

FFE	FIRST FLOOR ELEVATION
BIT CONC.	BITUMINOUS CONCRETE PAVEMENT
CCB	CAPE COD BERM
EP	EDGE OF PAVEMENT
BC	BITUMINOUS CONCRETE CURB
(AM)	AS MEASURED
RET WALL	RETAINING WALL
CONC.	CONCRETE
RCP	REINFORCED CONCRETE PIPE
VGC	VERTICAL GRANITE CURB
ETW	EDGE OF TRAVEL WAY
MTL	METAL BERM
VCC	VERTICAL CONCRETE CURB
CMP	CORRUGATED METAL PIPE
LSA	LANDSCAPED AREA
TC	TOP OF CURB
BC	BOTTOM OF CURB

LEGEND

REBAR
CONCRETE BOUND WITH DRILL HOLE
STONE BOUND
STONE BOUND

UTILITY SYMBOLS

ELECTRIC HAND HOLE
GUY POLE
GUY WIRE
HVAC UNIT
TRANSFORMER
WATER GATE
ELECTRIC MANHOLE
SEWER MANHOLE
DRAIN MANHOLE
TELEPHONE MANHOLE
DRAINAGE CATCH BASIN
HYDRANT
POST INDICATER VALVE
UTILITY POLE
BOLLARD
SIGN
DECIDUOUS TREE
CONIFEROUS TREE

LINE DESIGNATORS

W	WATER MAIN
OHW	OVERHEAD WIRES
G	GAS LINE
WS	WATER SERVICE
E	UNDERGROUND ELECTRIC
D	STORM DRAIN LINE
S	SANITARY SEWER LINE
	DRAINAGE SWALE
X	CHAIN LINK FENCE

REV	DATE	DESCRIPTION	BY	APP
1	7/16/24	PLANNING BOARD REV.	ESS	BCM

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Norwell, MA 02061
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SITE DEVELOPMENT PLAN
(ASSESSOR'S PARCEL NUMBER 3-O-2.1)
300 POND STREET
RANDOLPH, MASSACHUSETTS

PROFESSIONAL ENGINEER:

BRADLEY C. McKENZIE CIVIL No. 36917 REGISTERED PROFESSIONAL ENGINEER

OWNERS/APPLICANT:
EMERSON - SWAN FLEXCON
300 POND STREET
RANDOLPH, MASSACHUSETTS

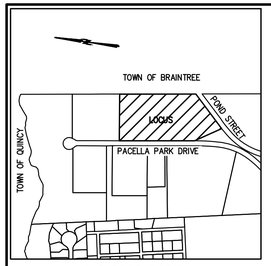
PERMIT PLAN SET

DRAWN BY:	ESS
DESIGNED BY:	ESS
CHECKED BY:	BCM
APPROVED BY:	BCM
DATE:	JUNE 11, 2024
SCALE:	1"=50'
PROJECT NO.:	222-209

DWG. TITLE:
GRADING AND UTILITY PLAN

DWG. NO:
C-2

M:\MEG\2022 PROJECTS\222-209 EMERSON SWAN-FLEXCON - 300 POND ST., RANDOLPH\DWGS\222-209 MAIN3.DWG



LOCUS MAP
Not to Scale

PROP. SILT SACK CATCH BASIN INLET PROTECTION (TYP.) (TO BE REMOVED UPON COMPLETION OF CONSTRUCTION)

PROP. SILT SACK CATCH BASIN INLET PROTECTION (TYP.) (TO BE REMOVED UPON COMPLETION OF CONSTRUCTION)

MASSACHUSETTS STATE PLANE COORDINATE SYSTEM

N/F TOWN OF BRAINTREE WATER DEPARTMENT

APPROX. LIMIT OF DEP ZONE

TOWN OF BRAINTREE
TOWN OF RANDOLPH

S 08°56'11" E 755.31'

WEST STREET
(PUBLIC WAY)

PROP. STABILIZED CONSTRUCTION ENTRANCE (TYP.)

SAWCUT APPROX. 5 L.F. OF EXIST. CURBING AND CREATE CONVEYANCE CHANNEL INTO TEMP. SEDIMENTATION BASIN, CURBING TO BE REPLACED UPON COMPLETION OF CONSTRUCTION

A=36.27'
R=1790.43'

100' WETLAND BUFFER

APPROX. ZONING LINE (TYP.)

RESIDENTIAL SINGLE FAMILY HIGH DENSITY DISTRICT
GREAT POND CONSERVANCY DISTRICT
GREAT POND OVERLAY DISTRICT

GREAT POND RESERVOIR

LIMIT OF BORDERING VEGETATED WETLANDS DELINEATED BY ENVIRONMENTAL CONSULTING & RESTORATION, LLC ON DECEMBER 1, 2023.

POND STREET
(PUBLIC 50' WIDE)

S 45°18'27" W 439.05'

DMH R=142.00 INV(A)=131.95 INV(B)=132.30 INV(C)=136.95 TOP OF WATER=133.7

CBN R=138.95 INV(A)=132.45 INV(B)=132.75 INV(C)=135.90

15"HDPE

12"HDPE

12"RCP

CBN R=137.72 TOP HOOD(A)=135.42 INV(B)=133.32 INV(C)=133.22

CONCRETE

LOADING DOCK

4 GARAGE DOORS

BAY DOOR

DOOR ENTRY

HEAD WALL

CHAIN LINK FENCE

I=131.17

I=132.45 18"DIA OPENING

APN 3-0-4
#14 PACELLA PARK DR.
N/F THE MAY INSTITUTE INC
LCC 181407

N 82°01'21" E 483.04'

C/O 141.04

ROOF DRAIN INV=139.02

SMH R=141.13 INV=136.38

DMH R=140.94 INV(A)=133.29 INV(B)=133.49

DRAIN I=138.85 12"HDPE

DRAINAGE BASIN STONE BOTTOM

RIP RAP

GRAVEL

BIT. CONC.

HEAD WALL

18"CONCOPEN I=138.24

6" METAL COVER R=141.12 INV(A)=138.37 INV(B)=138.12 8"PVC

CBN R=140.97 INV(A)=137.77 INV(B)=137.62

DMH R=137.07 INV(A)=133.72 INV(B)=133.97 INV(C)=134.12

CBN R=136.82 TOP OF HOOD=135.22

LOADING DOCK

STONE PAD WITH RIP RAP

CONCRETE

CBN R=136.96 TOP OF HOOD=135.36

SMH R=141.42 INV=132.27

49.9'

TP#1

TP#2

BIT. CONC. PAVEMENT

BIT. CONC. PARKING

CONCRETE

LOADING DOCK

CBN R=136.98 INV(A)=133.78 INV(B)=133.68

CBN R=138.95 INV(A)=134.16 INV(B)=135.45

APPROX. LIMIT OF STORMWATER DETENTION SYSTEM

PROP. FUELING AND MAINTENANCE AREA (TYP.)

PROP. STAGING AND MATERIAL STORAGE AREA (TYP.)

PROP. SOIL STOCKPILE AREA W/ COMPOST FILTER TUBE EROSION CONTROL BARRIER (TYP.)

APN 3-0-2.1
300 POND STREET
1½ STORY INDUSTRIAL BUILDING
FFE=141.16
435,607± S.F (10.0± AC)
COT 159807

PROP. ±52,133 S.F. BUILDING ADDITION, CONVERT EXISTING OFFICE SPACE INTO MANUFACTURING FFE=141.10

APPROX. LIMIT OF ZONE A

300.0'

174.0'

MCC

CCB

LSA

GRASS

LANDSCAPING

CONCRETE

BIT. CONC.

APPROX. LIMIT OF BIORETENTION AREA

PROP. SEDIMENTATION BASIN CONTRIBUTORY AREA=X S.F. REQUIRED VOLUME=(44,000 S.F. X 3,600 CUBIC FEET/ACRE) / 43,560 S.F./ACRE = 3,636 CUBIC FEET OF STORAGE (MIN.) TOP OF BASIN=135.0 BOT. OF BASIN=134.0

100' WETLAND BUFFER

N 35°25'01" W 301.52'

APN 4-H-1.0
TOWN OF RANDOLPH

PROP. COMPOST FILTER TUBE EROSION CONTROL BARRIER (LIMIT OF WORK) (TYP.)

PROP. STABILIZED CONSTRUCTION ENTRANCE (TYP.)

SEWER SERVICE (APPROX. LOCATION)

CBN LEACHING PIT R=138.77 BOTTOM=134.67

WATER SERVICE (RECORD)

GAS SERVICE (RECORD)

CBN LEACHING PIT R=139.81 BOTTOM=135.71

CONC. PAD

RADIATOR

12" CONC FOOTING

6"DIA CONC STRUCTURE W/VALVE

6"PIPE

CHAIN LINK FENCE

GRAVEL

141 LANDSCAPING

N 07°58'39" W 754.10'

WATER MAIN (RECORD)

CONCRETE SIDEWALK

VGC

VGC HP RAMP

PACELLA PARK DRIVE
(PRIVATE 50' WIDE)

APN 3-0-3.L-2
#21 PACELLA PARK DR.
N/F 21 GREAT POND PARTNERSHIP LLC
LCC 195598

APN 3-0-9.L-11
#27 PACELLA PARK DR.
N/F MS MNNINGS LLC
LCC 182981

APN 4-G-1.01
#41 PACELLA PARK DR.
N/F THE MAY INSTITUTE INC
LCC 172876

APN 3-0-8.H
#35 PACELLA PARK DR.
N/F THE MAY INSTITUTE
LCC 176159

DMH R=143.82 INV(A)=138.72 INV(B)=139.67 INV(C)=139.27

SMH R=144.65 INV=131.60 BOTTOM=129.65

CBN R=143.19 INV=139.19 12"RCP

CBN R=143.12 INV=139.67 12"RCP

CBN R=141.52 INV=137.92 12"RCP

DMH R=141.77 INV(A)=136.67 INV(B)=137.37 INV(C)=136.82 INV(D)=137.32

DMH R=143.54

CBN R=141.09 INV=138.09 12"RCP

DMH R=142.27 INV=142.22

20"RCP

18"RCP

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- CONCRETE BOUND WITH DRILL HOLE
- STONE BOUND
- STONE BOUND

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- ELECTRIC HAND HOLE
- GUY POLE
- GUY WIRE
- HVAC UNIT
- TRANSFORMER
- WATER GATE
- ELECTRIC MANHOLE
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- TELEPHONE MANHOLE
- DRAINAGE CATCH BASIN
- HYDRANT
- POST INDICATER VALVE
- UTILITY POLE
- BOLLARD
- SIGN
- DECIDUOUS TREE
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W	WATER MAIN
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G	GAS LINE
WS	WATER SERVICE
E	UNDERGROUND ELECTRIC
D	STORM DRAIN LINE
S	SANITARY SEWER LINE
	DRAINAGE SWALE
X	CHAIN LINK FENCE

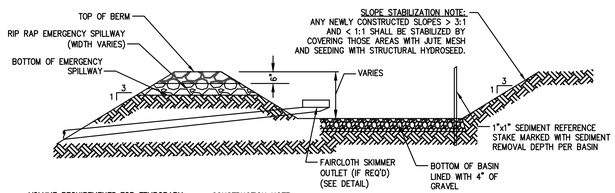
CONSTRUCTION SEQUENCE

TO PREVENT EXCESSIVE EROSION AND SILTING, THE FOLLOWING CONSTRUCTION SEQUENCE COUPLED WITH OTHER WIDELY ACCEPTED PRINCIPALS FOR REDUCING EROSION AND SEDIMENTATION SHALL BE IMPLEMENTED IN THE DEVELOPMENT OF THE SITE.

1. THE CONTRACTOR SHALL COORDINATE A PRE-CONSTRUCTION MEETING PRIOR TO ANY CONSTRUCTION ACTIVITY.
2. STABILIZATION PRACTICES FOR EROSION AND SEDIMENT CONTROL SHALL BE INSTALLED PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES. REFER TO "EROSION AND SEDIMENTATION CONTROL" SECTION OF THIS PLAN & PLACE SILTATION FENCE ON THE SITE PLANS.
3. CLEAR AND GRUB UP AS REQUIRED FOR THE CONSTRUCTION OF THE ADDITION, PARKING AREAS AND RELATED INFRASTRUCTURE.
4. CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE.
5. EXCAVATE TOPSOIL AND SUBSOIL FROM CUT AND FILL AREAS AND STOCKPILE ON SITE IN LOCATIONS SHOWN ON THE PLAN. CONSIDERATION SHOULD BE GIVEN TO LOCATING STOCKPILES ON THE UPHILL SIDE OF DISTURBED AREAS, WHERE POSSIBLE, TO ACT AS TEMPORARY DIVERSIONS.
6. CONSTRUCT CUT AND FILL AREAS, INSTALLING HAYBALE CHECK DAMS AT TOES OF ALL 3:1 OR GREATER SLOPES, AND AT ENDS OF ALL CUT AREAS. ALL FILL WILL BE INSTALLED USING 12" MAXIMUM COMPACTION LIFTS. PLACE ALL SLOPE PROTECTION WHERE INDICATED ON THE PLAN. THE DETENTION SYSTEM SHALL BE CONSTRUCTED IMMEDIATELY AFTER THE PARKING AREA ROUGH GRADING IS COMPLETED AND THE AREA HAS BEEN CLEARED OF VEGETATION.
7. INSTALL CLOSED DRAINAGE SYSTEM AND OTHER UTILITIES. ALL CATCH BASINS SHALL BE COVERED WITH SILTSACK OR EQUIVALENT INLET PROTECTION.
8. GRADE PARKING AREAS TO SUBGRADE ELEVATION AND CONSTRUCT SIDE SLOPES. APPLY TEMPORARY STABILIZATION MEASURES WHERE WARRANTED. REFER TO "EROSION AND SEDIMENTATION CONTROL" SECTION OF THIS PLAN.
9. EXCAVATE AND CONSTRUCT BUILDING FOUNDATION.
10. PLACE GRAVEL SUBBASE.
11. PLACE THE BITUMINOUS CONCRETE BINDER COURSE ON PARKING AREAS.
12. CONSTRUCT BUILDING STRUCTURE AND ASSOCIATED UTILITY CONNECTIONS.
13. GRADE SLOPES AND STABILIZE CUT AREAS AT TOE OF SLOPES. BLEND ALL SLOPES INTO EXISTING TOPOGRAPHY AND LOAM AND SEED ALL DISTURBED AREAS. SLOPES GREATER THAN 3:1 SHALL BE STABILIZED WITH JUTE MESH.
14. PLACE THE FINAL WEARING COURSE OF PAVEMENT.
15. COMPLETE FINE GRADING OF SHOULDERS AND PLACE PAVEMENT IN MISCELLANEOUS AREAS.
16. REMOVE TEMPORARY EROSION CONTROL DEVICES ONCE ADEQUATE GROWTH IS ESTABLISHED. ADEQUATE GROWTH IS DEFINED AS VEGETATION COVERING 75% OR MORE OF THE GROUND SURFACE.

CONSTRUCTION PHASE BMP OPERATION AND MAINTENANCE NOTES:

1. STRUCTURAL PRACTICES UTILIZED FOR THE PROJECT WILL INCLUDE SILT SOCK EROSION CONTROL BARRIERS, STABILIZED CONSTRUCTION ENTRANCES, CONCRETE WASH STATIONS, STOCKPILE AREAS, AND INLET PROTECTION.
2. STABILIZATION PRACTICES UTILIZED FOR THE PROJECT WILL INCLUDE TEMPORARY SEEDING, GEOTEXTILES (JUTE MESH), MULCHING, AND PERMANENT SEEDING.
3. OPERATOR PERSONNEL AND/OR ITS CONSULTANTS MUST INSPECT THE CONSTRUCTION SITE AT LEAST ONCE EVERY 7 CALENDAR DAYS OR EVERY 14 CALENDAR DAYS AND WITHIN 24 HOURS OF A STORM EVENT ½ INCH OR GREATER. THE INSPECTOR SHOULD REVIEW THE EROSION AND SEDIMENT CONTROLS WITH RESPECT TO THE FOLLOWING:
   A. WHETHER OR NOT THE BMP WAS INSTALLED/PERFORMED CORRECTLY.
   B. WHETHER OR NOT THERE HAS BEEN DAMAGE TO THE BMP SINCE IT WAS INSTALLED OR PERFORMED.
   C. WHAT SHOULD BE DONE TO CORRECT ANY PROBLEMS WITH THE BMP.
4. THE INSPECTOR SHALL COMPLETE THE INSPECTION SCHEDULE AND EVALUATION CHECKLIST FOR FINDINGS AND SHOULD REQUEST THE REQUIRED MAINTENANCE OR REPAIR.
5. ALL SLOPES EXCEEDING 15% RESULTING FROM SITE GRADING SHALL BE BOTH COVERED WITH FOUR INCHES OF TOPSOIL AND PLANTED WITH A VEGETATED COVER SUFFICIENT TO PREVENT EROSION.



SLOPE STABILIZATION NOTE:
ANY NEWLY CONSTRUCTED SLOPES > 3:1 AND < 1:1 SHALL BE STABILIZED BY COVERING THOSE AREAS WITH JUTE MESH AND SEEDING WITH STRUCTURAL HYDROSEED.

VOLUME REQUIREMENTS FOR TEMPORARY SEDIMENTION BASINS:
TEMPORARY SEDIMATATION BASINS SHALL HAVE A MINIMUM VOLUME BASED ON 3,600 Cu. Ft. OF STORAGE FOR EACH ACRE DRAINED TO BASIN.

CONSTRUCTION NOTE:
TEMPORARY SEDIMENTATION BASINS SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO LOCATIONS SHOWN ON THE PLAN, BUT SITE CONDITION SUCH AS SOILS, POOL AREA, AND SPILLWAY CONDITIONS SHALL BE CONSIDERED. CONTRACTOR SHALL HAVE THE FLEXIBILITY TO ADJUST LOCATIONS AS LONG AS REQUIRED VOLUME IS PROVIDED.

TEMPORARY SEDIMENTATION BASIN
NOT TO SCALE

0 50 100 150

REV	DATE	DESCRIPTION	BY APP
1	7/16/24	PLANNING BOARD REV.	ESS BCM

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SITE DEVELOPMENT PLAN
(ASSESSOR'S PARCEL NUMBER 3-O-2.1)
300 POND STREET
RANDOLPH, MASSACHUSETTS

PROFESSIONAL ENGINEER:
COMMONWEALTH OF MASSACHUSETTS
BRADLEY C. McKENZIE
CIVIL
No. 36917
REGISTERED PROFESSIONAL ENGINEER

OWNERS/APPLICANT:
EMERSON - SWAN FLEXCON
300 POND STREET
RANDOLPH, MASSACHUSETTS

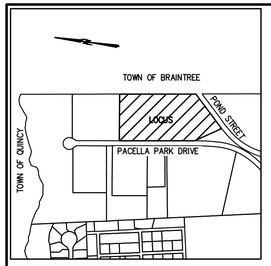
PERMIT PLAN SET

DRAWN BY:	ESS
DESIGNED BY:	ESS
CHECKED BY:	BCM
APPROVED BY:	BCM
DATE:	JUNE 11, 2024
SCALE:	1"=50'
PROJECT NO.:	222-209

DWG. TITLE:
EROSION AND SEDIMENT CONTROL PLAN

DWG. NO:
ESC-1

M:\MEG\2022 PROJECTS\222-209 EMERSON SWAN-FLEXCON - 300 POND ST., RANDOLPH\DWGS\222-209 MAIN3.DWG



LOCUS MAP
Not to Scale

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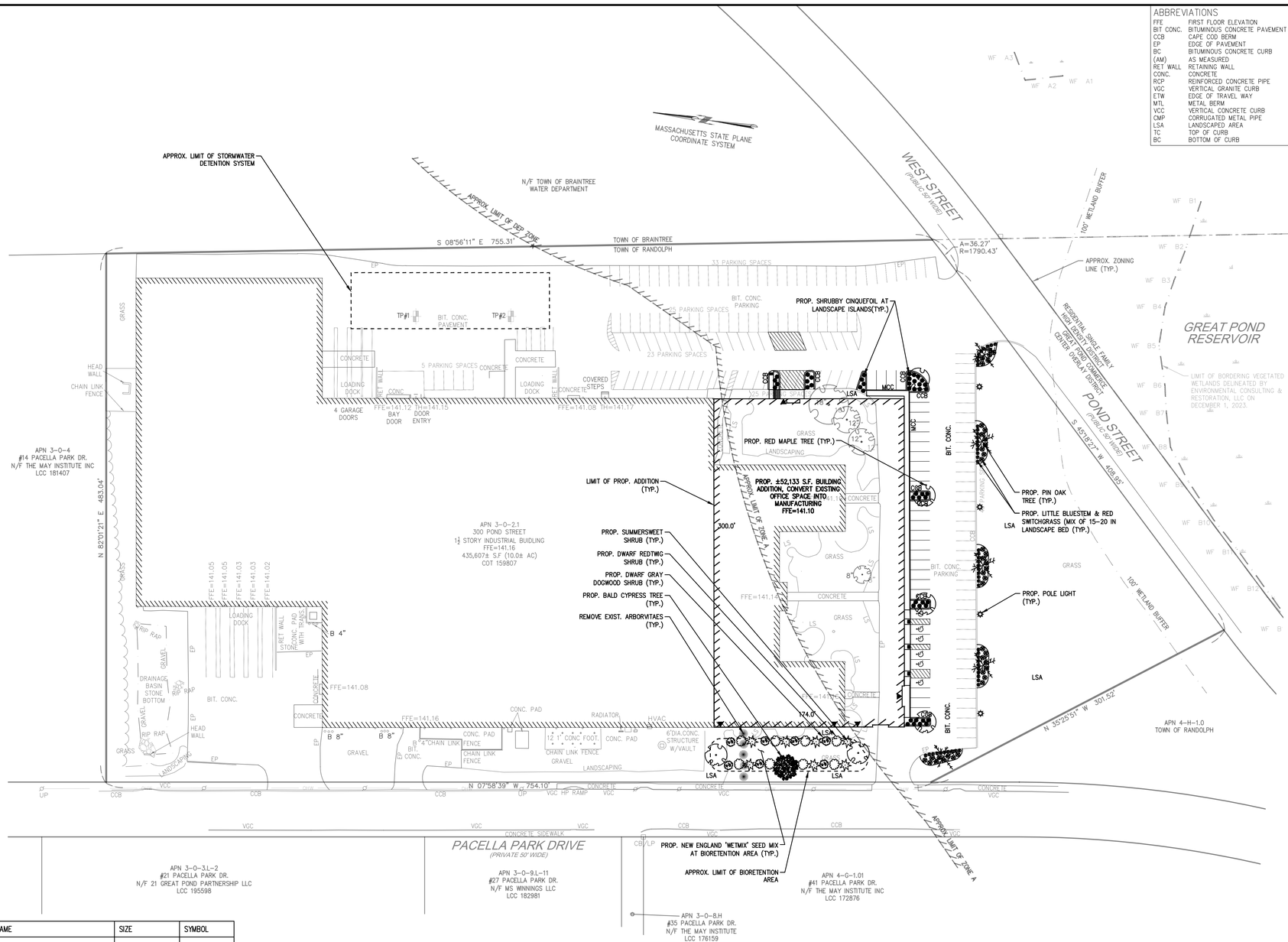

PLANTING LIST

QTY.	BOTANICAL NAME	COMMON NAME	SIZE	SYMBOL
	TREES			
6	ACER RUBRUM	RED MAPLE (SUGGESTED BOWHALL VARIETY)	7'-8' HEIGHT	
1	TAXODIUM DISTICHUM	BALD CYPRESS	2-2.5" CALIPER	
5	QUERCUS PALUSTRIS	PIN OAK	3" CALIPER	
	SHRUBS			
8	CORNUS SERICEA	DWARF REDTWIG DOGWOOD 'ARTIC FIRE'	5 GALLON POT	
7	CLETHRA ALNIFOLIA	SUMMERSWEET 'HUMMINGBIRD'	5 GALLON POT	
7	CORNUS RACEMOSA	DWARF GRAY DOGWOOD 'HURZAM'	5 GALLON POT	
47	POTENTILLA FRUTICOSA	SHRUBBY CINQUEFOIL	3 GALLON POT	
	ORNAMENTAL GRASS			
49	PANICUM VIRGATUM	DWARF RED SWITCHGRASS 'RUBY RIBBONS'	1 GALLON POT	
39	SCHIZACHYRIUM SCOPARIUM	DWARF LITTLE BLUESTEM 'THE BLUES'	1 GALLON POT	

LANDSCAPING NOTES:
1. TO THE GREATEST EXTENT POSSIBLE, EXISTING NATIVE TREES AND SHRUBS SHALL BE MAINTAINED.
2. NO TREE, SHRUB OR PLANT SHALL BE USED THAT HAS BEEN IDENTIFIED AS AN INVASIVE SPECIES BY THE MASSACHUSETTS PLANT ADVISORY GROUP IN THE MOST RECENT VERSION OF "THE EVALUATION OF NON-NATIVE PLANT SPECIES FOR INVASIVENESS IN MASSACHUSETTS" (WITH ANNOTATED LIST) OR HAS BEEN IDENTIFIED AS INVASIVE OR BANNED ON THE "MASSACHUSETTS PROHIBITED PLANT LIST" AS PERIODICALLY UPDATED BY THE MASSACHUSETTS DEPARTMENT OF AGRICULTURE.
3. EXISTING INVASIVE PLANTS SHALL BE REMOVED.
4. THE CONTRACTOR SHALL LOCATE AND VERIFY ALL UTILITY LINE LOCATIONS PRIOR TO EXCAVATION FOR TREE PITS AND REPORT AND CONFLICTS TO THE ENGINEER.
5. ALL PLANTS ARE TO BE THOROUGHLY WATERED AFTER INSTALLATION, AT LEAST TWICE WITHIN THE FIRST 24 HOURS. WE RECOMMEND GATOR BAGS TO BE INSTALLED AND MAINTAINED AT NEW TREE PLANTINGS DURING ESTABLISHMENT. TEMPORARY SPRAY IRRIGATION FOR SHRUB/ORNAMENTAL GRASS PLANTINGS DURING ESTABLISHMENT IS RECOMMEND.
6. NEW ENGLAND "WETMIX" (WETLAND SEED MIX) SHALL BE PLANTED WITHIN LIMIT OF BIORETENTION AREA.

0 50 100 150

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COMMONWEALTH OF MASSACHUSETTS
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DRAWN BY:	ESS
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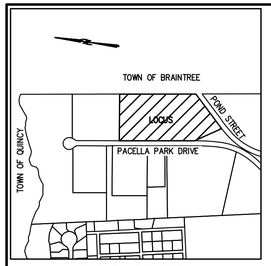
DWG. TITLE:
LANDSCAPE PLAN

DWG. NO:
LA-1

M:\MEG\2022 PROJECTS\222-209 EMERSON SWAN-FLEXCON - 300 POND ST., RANDOLPH\DWGS\222-209 MAIN3.DWG



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ETW	EDGE OF TRAVEL WAY
MTL	METAL BERM
VCC	VERTICAL CONCRETE CURB
CMP	CORRUGATED METAL PIPE
LSA	LANDSCAPED AREA
TC	TOP OF CURB
BC	BOTTOM OF CURB

LEGEND

- REBAR
- CONCRETE BOUND WITH DRILL HOLE
- STONE BOUND
- STONE BOUND

UTILITY SYMBOLS

- ELECTRIC HAND HOLE
- GUY POLE
- GUY WIRE
- HVAC UNIT
- TRANSFORMER
- WATER GATE
- ELECTRIC MANHOLE
- SEWER MANHOLE
- DRAIN MANHOLE
- TELEPHONE MANHOLE
- DRAINAGE CATCH BASIN
- HYDRANT
- POST INDICATER VALVE
- UTILITY POLE
- BOLLARD
- SIGN
- DECIDUOUS TREE
- CONIFEROUS TREE

LINE DESIGNATORS

- W — WATER MAIN
- OHW — OVERHEAD WIRES
- G — GAS LINE
- WS — WATER SERVICE
- E — UNDERGROUND ELECTRIC
- D — STORM DRAIN LINE
- S — SANITARY SEWER LINE
- DRAINAGE SWALE
- X — CHAIN LINK FENCE

APPROX. LIMIT OF STORMWATER DETENTION SYSTEM
APPROX. LIMIT OF DEP ZONE
MASSACHUSETTS STATE PLANE COORDINATE SYSTEM
N/F TOWN OF BRAINTREE WATER DEPARTMENT
WEST STREET (PUBLIC 66' WIDE)
100' WETLAND BUFFER
APPROX. ZONING LINE (TYP.)
RESIDENTIAL SINGLE FAMILY HIGH DENSITY DISTRICT
GREAT POND CONSERVANCY OVERLAY DISTRICT
GREAT POND RESERVOIR
LIMIT OF BORDERING VEGETATED WETLANDS DELINEATED BY ENVIRONMENTAL CONSULTING & RESTORATION, LLC ON DECEMBER 1, 2023.
POND STREET (PUBLIC 50' WIDE)
S 45°18'27" W 409.85'
50' NATURAL BUFFER
200' RIVERFRONT SETBACK
A=36.27'
R=1790.43'
S 08°56'11" E 755.31'
TOWN OF BRAINTREE
TOWN OF RANDOLPH
10' REAR YARD SETBACK
APN 3-0-4
#14 PACELLA PARK DR.
N/F THE MAY INSTITUTE INC
LCC 181407
N 82°01'21" E 483.04'
APN 3-0-2.1
300 POND STREET
1½ STORY INDUSTRIAL BUIDLING
FFE=141.16
435,607± S.F (10.0± AC)
COT 159807
PROP. ±52,133 S.F. BUILDING ADDITION, CONVERT EXISTING OFFICE SPACE INTO MANUFACTURING FFE=141.10
LIMIT OF PROP. ADDITION (TYP.)
APPROX. LIMIT OF BIORETENTION AREA
PROP. SNOW STORAGE AREA (TYP.)
174.0'
300.0'
49.9'
10' ROADWAY SETBACK
S 07°58'39" W 754.10'
SIDE YARD SETBACK
N 35°23'51" W 301.52'
APPROX. LIMIT OF ZONE A
APN 4-H-1.0
TOWN OF RANDOLPH
PACELLA PARK DRIVE
(PRIVATE 50' WIDE)
APN 3-0-3.L-2
#21 PACELLA PARK DR.
N/F 21 GREAT POND PARTNERSHIP LLC
LCC 195598
APN 3-0-9.L-11
#27 PACELLA PARK DR.
N/F MS WINNINGS LLC
LCC 182981
APN 4-G-1.01
#41 PACELLA PARK DR.
N/F THE MAY INSTITUTE INC
LCC 172876
APN 3-0-8.H
#35 PACELLA PARK DR.
N/F THE MAY INSTITUTE
LCC 176159
TP#1
TP#2
BIT. CONC. PAVEMENT
BIT. CONC. PARKING
5 PARKING SPACES
23 PARKING SPACES
CONCRETE STEPS
4 GARAGE DOORS
BAY DOOR
DOOR ENTRY
LOADING DOCK
HEAD WALL
CHAIN LINK FENCE
RIP RAP
DRAINAGE BASIN STONE BOTTOM
GRAVEL
CONCRETE PAD WITH TANK
CONC. PAD
RADIATOR
HVAC
12' 1" CONC. FOOT
6'DIA.CONC. STRUCTURE W/VAULT
CHAIN LINK FENCE
GRAVEL
LANDSCAPING
GRASS
LSA
CCB
VGC
CONCRETE SIDEWALK
CB/LP
UP
MCC

0 50 100 150

SNOW STORAGE NOTES:

1. SNOW ACCUMULATION THAT CANNOT BE STORED ON-SITE WILL BE HAULED OFF-SITE TO A SNOW STORAGE FACILITY, TRANSFER OFF-SITE WILL BE PAID FOR BY THE PROPERTY OWNER.

REV	DATE	DESCRIPTION	BY
1	7/16/24	PLANNING BOARD REV.	ESS BCM

MCKENZIE ENGINEERING GROUP
Assinippi Office Park
150 Longwater Drive, Suite 101
Norwell, MA 02061
P: 781.792.3900
F: 781.792.0333
www.mckeng.com

SITE DEVELOPMENT PLAN
(ASSESSOR'S PARCEL NUMBER 3-O-2.1)
300 POND STREET
RANDOLPH, MASSACHUSETTS

PROFESSIONAL ENGINEER:
BRADLEY C. McKENZIE CIVIL No. 39917 REGISTERED PROFESSIONAL ENGINEER COMMONWEALTH OF MASSACHUSETTS

OWNERS/APPLICANT:
EMERSON - SWAN FLEXCON
300 POND STREET
RANDOLPH, MASSACHUSETTS

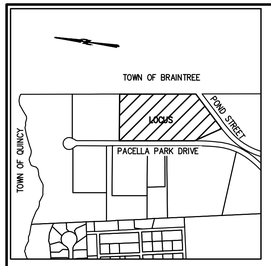
PERMIT PLAN SET

DRAWN BY:	ESS
DESIGNED BY:	ESS
CHECKED BY:	BCM
APPROVED BY:	BCM
DATE:	JUNE 11, 2024
SCALE:	1"=50'
PROJECT NO.:	222-209

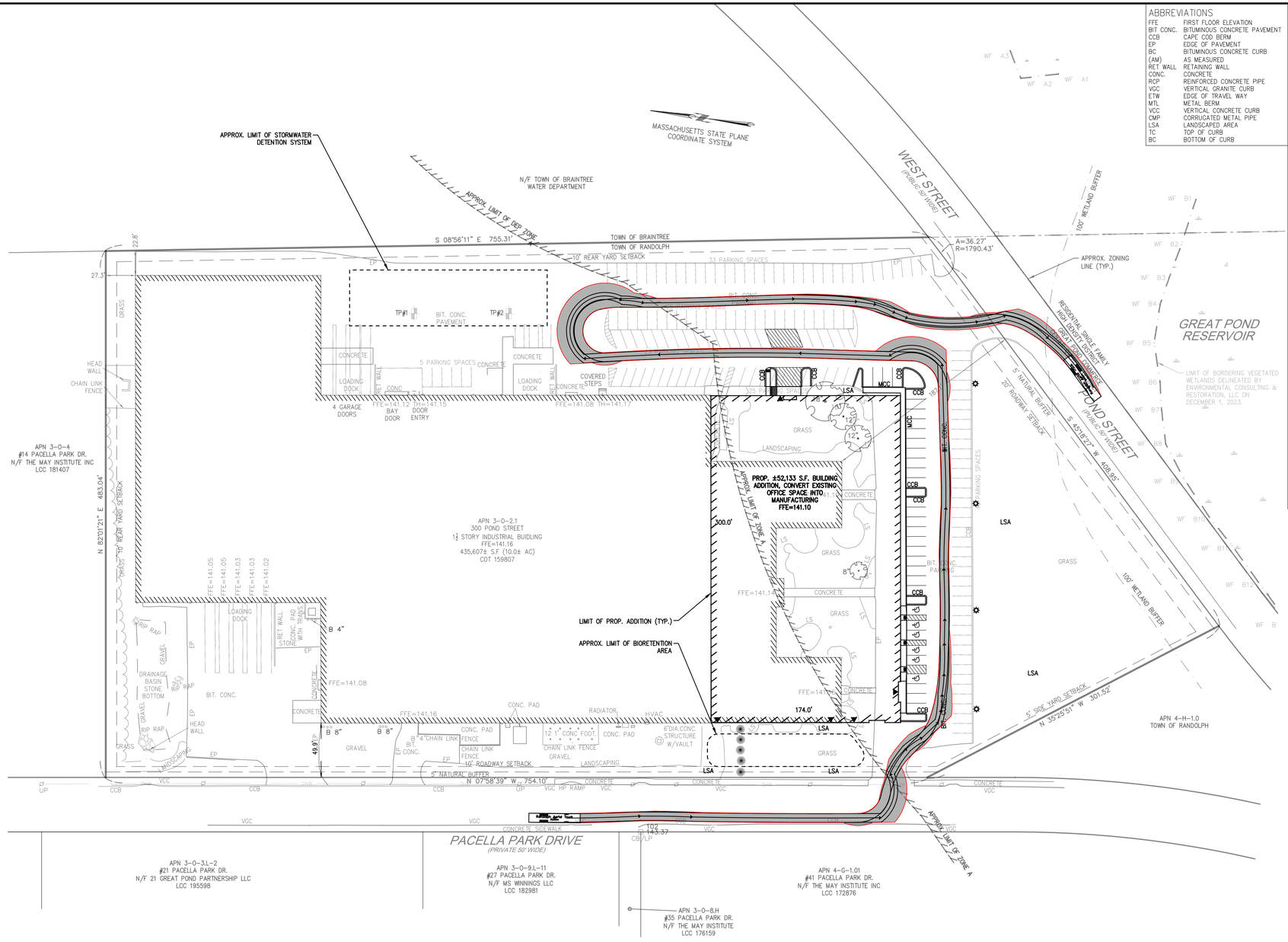
DWG. TITLE:
SNOW STORAGE PLAN

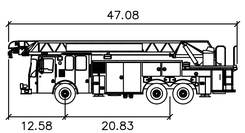
DWG. NO:
SS-1

M:\MEG\2022 PROJECTS\222-209 EMERSON SWAN-FLEXCON - 300 POND ST., RANDOLPH\DWGS\222-209 MAIN3.DWG



LOCUS MAP
Not to Scale





Randolph Aerial Truck

	feet
Width	: 8.33
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 40.6

PLAN NOTES:

1. LIMIT OF BUMPER OVERHANG IS SHOWN IN RED. VEHICLE WHEEL PATH IS SHOWN AS BLACK LINES.

ABBREVIATIONS

FFE	FIRST FLOOR ELEVATION
BIT CONC.	BITUMINOUS CONCRETE PAVEMENT
CCB	CAPE COD BERM
EP	EDGE OF PAVEMENT
BC	BITUMINOUS CONCRETE CURB
(AM)	AS MEASURED
RET WALL	RETAINING WALL
CONC.	CONCRETE
RCP	REINFORCED CONCRETE PIPE
VGC	VERTICAL GRANITE CURB
ETW	EDGE OF TRAVEL WAY
MTL	METAL BERM
VCC	VERTICAL CONCRETE CURB
CMP	CORRUGATED METAL PIPE
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- DRAINAGE SWALE
- CHAIN LINK FENCE

0 50 100 150

REV	DATE	DESCRIPTION	BY
1	7/16/24	PLANNING BOARD REV.	ESS
			BCM

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SITE DEVELOPMENT PLAN
(ASSESSOR'S PARCEL NUMBER 3-O-2.1)
300 POND STREET
RANDOLPH, MASSACHUSETTS

PROFESSIONAL ENGINEER:
BRADLEY C. MCKENZIE CIVIL No. 36917 REGISTERED PROFESSIONAL ENGINEER COMMONWEALTH OF MASSACHUSETTS

OWNERS/APPLICANT:
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300 POND STREET
RANDOLPH, MASSACHUSETTS

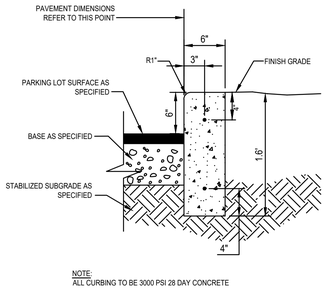
PERMIT PLAN SET

DRAWN BY:	ESS
DESIGNED BY:	ESS
CHECKED BY:	BCM
APPROVED BY:	BCM
DATE:	JUNE 11, 2024
SCALE:	1"=50'
PROJECT NO.:	222-209

DWG. TITLE:
FIRE TRUCK TURNING PLAN

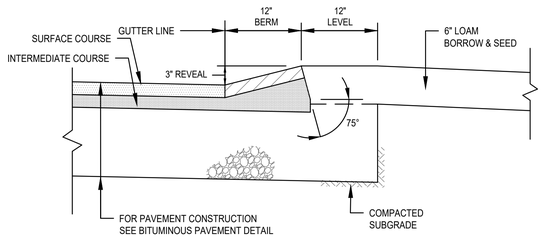
DWG. NO:
T-1

M:\MEG\2022 PROJECTS\222-209 EMERSON SWAN-FLEXCON - 300 POND ST., RANDOLPH\DWGS\222-209 MAIN3.DWG

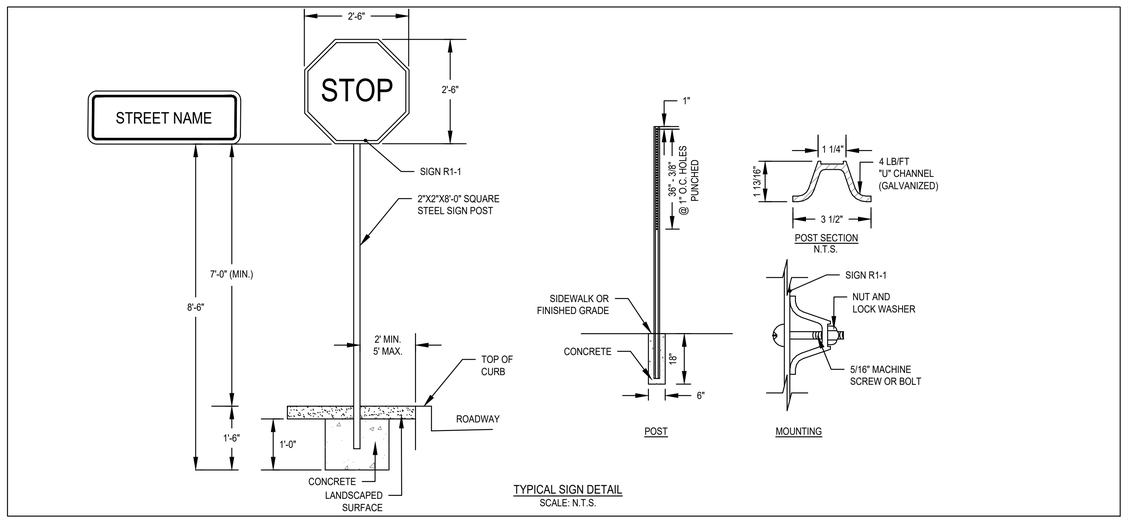


NOTE:
ALL CURBING TO BE 3000 PSI 28 DAY CONCRETE

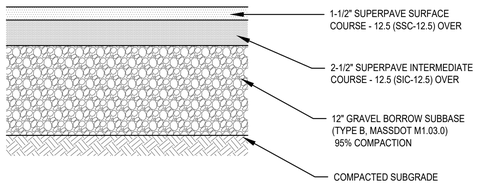
PRECAST MONOLITHIC CEMENT CONCRETE CURB DETAIL
SCALE: N.T.S.



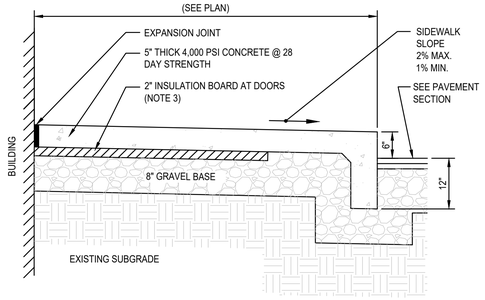
MONOLITHIC BITUMINOUS CONCRETE BERM (CAPE COD BERM) DETAIL
SCALE: N.T.S.



TYPICAL SIGN DETAIL
SCALE: N.T.S.



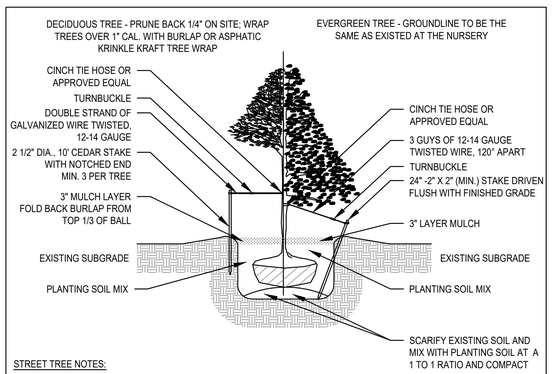
BITUMINOUS PAVEMENT DETAIL
SCALE: N.T.S.



NOTES:

1. SIDEWALK TO HAVE TOOLED JOINTS 5' O.C. (TYP.) WITH EXPANSION JOINTS 15' ON CENTER AND PREMOLDED FILLER.
2. TOOLED JOINT 6" FROM FACE OF CURB
3. PLACE 2" RIGID EXTRUDED STYROFOAM NONEXPANDABLE INSULATION BOARD LIGHT BLUE IN COLOR AT DOORS. BOARD TO BE PLACED IN 2-2'x8' SECTIONS CENTERED ON AND EXTENDING 4' PERPINDICULAR FROM DOOR. BASE MATERIAL SHALL BE CRUSHED STONE AT DOORS.
4. SEE PLAN FOR ELEVATIONS AT DOORS AND CURB

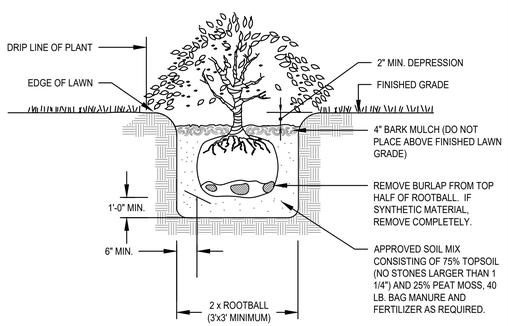
CONCRETE SIDEWALK AND MONOLITHIC CURB AT BUILDING
SCALE: N.T.S.



STREET TREE NOTES:

1. NEW TREES SHALL BE NURSERY GROWN AND COMPLY WITH THE ASSOCIATION OF AMERICAN NURSRIES SPECIFICATIONS AND BE AT LEAST 3 INCHES IN CALIPER.
2. THE PRESERVATION OF EXISTING TREES AND THE VARIETIES OF NEW TREES FOR PLANTING SHALL BE SUBJECT TO THE APPROVAL OF THE PLANNING BOARD WHICH SHALL BE GUIDED BY THE RECOMMENDATION OF THE TOWN'S DIRECTOR OF LANDS AND NATURAL RESOURCES AS TO THE NUMBER, LOCATION, CONDITION AND SPECIES OF SUCH TREES AND UNDER APPENDIX III 0 DETAIL B.

DECIDUOUS AND EVERGREEN TREE
PLANTING DETAIL
SCALE: N.T.S.



TYPICAL SHRUB PLANTING DETAIL
SCALE: N.T.S.

SEEDING SPECIFICATIONS

SEEDING RECOMMENDATIONS

1. SEEDBED PREPARATION

   A. SURFACE AND SEEPAGE WATER SHOULD BE DRAINED OR DIVERTED FROM THE SITE TO PREVENT DROWNING OR WINTER KILLING OF THE PLANTS.

   B. STONES LARGER THAN FOUR INCHES AND TRASH SHOULD BE REMOVED BECAUSE THEY INTERFERE WITH SEEDING AND FUTURE MAINTENANCE OF THE AREA. WHERE FEASIBLE, THE SOIL SHOULD BE TILLED TO A DEPTH OF ABOUT FOUR INCHES TO PREPARE A SEEDBED AND MIX FERTILIZER AND LIME INTO THE SOIL. THE SEEDBED SHOULD BE LEFT IN A REASONABLY FIRM AND SMOOTH CONDITION. THE LAST TILLAGE OPERATION SHOULD BE PERFORMED ACROSS THE SLOPE WHEREVER PRACTICAL.

2. ESTABLISHING A STAND

   A. LIME AND FERTILIZER SHOULD BE APPLIED PRIOR TO OR AT THE TIME OF SEEDING AND INCORPORATED INTO THE SOIL. KINDS AND AMOUNTS OF LIME AND FERTILIZER SHOULD BE BASED ON EVALUATION OF SOIL TESTS. WHEN A SOIL TEST IS NOT AVAILABLE, THE FOLLOWING MINIMUM AMOUNTS SHOULD BE APPLIED:

AGRICULTURAL LIMESTONE:	2 TONS PER ACRE OR 100 LBS. PER 1000 SQ. FT.
NITROGEN (N):	50 LBS. PER ACRE OR 1.1 LBS. PER 1000 SQ. FT.
PHOSPHATE (P O):	100 LBS. PER ACRE OR 2.2 LBS. PER 1000 SQ. FT.
POTASH (K O):	100 LBS. PER ACRE OR 2.2 LBS. PER 1000 SQ. FT.

   (NOTE: THIS IS THE EQUIVALENT OF 500 LBS. PER ACRE OF 10-20-20 FERTILIZER OR 1,000 LBS. PER ACRE OF 5-10-10 FERTILIZER)

   B. SEED SHOULD BE SPREAD UNIFORMLY BY THE METHOD MOST APPROPRIATE FOR THE SITE. METHODS INCLUDE BROADCASTING, DRILLING, AND HYDROSEEDING. WHERE BROADCASTING IS USED, COVER SEED WITH 0.25 INCH OF SOIL OR LESS, BY CULTIVATING OR RAKING.

   C. REFER TO SEEDING RATES AND SEEDING GUIDES FOR APPROPRIATE SEED MIXTURES AND RATES OF SEEDING.

   D. WHEN SEEDED AREAS ARE MULCHED, PLANTINGS MAY BE MADE FROM EARLY SPRING SPRING TO EARLY OCTOBER. WHEN SEEDED AREAS ARE NOT MULCHED, PLANTINGS SHOULD BE MADE FROM EARLY SPRING TO MAY 20 OR FROM AUGUST 10 TO SEPTEMBER 1.

3. MULCH

   A. HAY, STRAW, OR OTHER MULCH, WHEN NEEDED, SHOULD BE APPLIED IMMEDIATELY AFTER SEEDING.

   B. MULCH WILL BE HELD IN PLACE USING TECHNIQUES AS SPECIFIED IN THE "BEST MANAGEMENT PRACTICES OPERATION AND MAINTENANCE PLAN"

4. MAINTENANCE TO ESTABLISH A STAND

   A. PLANTED AREAS SHOULD BE PROTECTED FROM DAMAGE BY FIRE, GRAZING, TRAFFIC, AND DENSE WEED GROWTH.

   B. FERTILIZATION NEEDS SHOULD BE DETERMINED BY ONSITE INSPECTIONS. SUPPLEMENTAL FERTILIZER IS USUALLY THE KEY TO FULLY COMPLETE THE ESTABLISHMENT OF THE STAND BECAUSE MOST PERENNIALS TAKE 2 TO 3 YEARS TO BECOME ESTABLISHED.

   C. IN WATERWAYS, CHANNELS, OR SWALES WHERE UNIFORM FLOW CONDITIONS ARE ANTICIPATED OCCASIONAL MOWING MAY BE NECESSARY TO CONTROL GROWTH OF WOODY VEGETATION.

SEEDING RATES

	POUND / ACRE	POUNDS / 1,000 S.F.
A. TALL FESCUE	20	0.45
CREEPING RED FESCUE	20	0.45
REDTOP	2	0.05
TOTAL	42	0.95
B. TALL FESCUE	15	0.35
CREEPING RED FESCUE	10	0.25
BIRDSFOOT TREFOIL	15	0.35
TOTAL	40	0.95
C. TALL FESCUE	20	0.45
CREEPING RED FESCUE	20	0.45
BIRDSFOOT TREFOIL	8	0.20
TOTAL	48	1.10
D. BIRDSFOOT TREFOIL	10	0.25
REDTOP	5	0.10
TOTAL	15	0.35
E. TALL FESCUE	20	0.45
FLATPEA	30	0.75
TOTAL	50	1.20
F. CREEPING RED FESCUE 1/	85	2.00
KENTUCKY BLUEGRASS 1/	85	2.00
TOTAL	170	4.00
G. TALL FESCUE 1/	150	3.60

TEMPORARY SEEDING RATES

H. WINTER RYE	112	2.50	(BEST FOR FALL SEEDING, AUG 15 TO SEPT. 5)
OATS	80	2.00	(BEST FOR SPRING SEEDING, BEFORE MAY 15)
ANNUAL RYEGRASS	40	1.00	(BEST FOR FALL SEEDING, AUG 15 TO SEPT. 15)
TOTAL	232	5.50	(MAY BE USED EARLY SPRING ALSO)

1/ FOR HEAVY USE ATHLETIC FIELDS CONSULT THE UNIVERSITY OF NEW HAMPSHIRE COOPERATIVE EXTENSION TURF SPECIALIST FOR CURRENT VARIETIES AND SEEDING RATES.

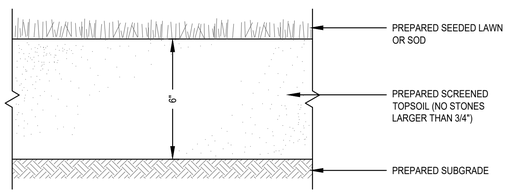
SEEDING GUIDE

USE	SEEDING MIXTURE 1/
STEEP CUTS AND FILLS, BORROW AND DISPOSAL AREAS	E
WATERWAYS, EMERGENCY SPILLWAYS, AND OTHER CHANNELS WITH FLOWING WATER	D
LAWN AREAS	F

NOTES:

1. TOP OF LOAM (TOPSOIL) IS FINISHED GRADE.
2. TOPSOIL SHALL CONTAIN BETWEEN 5% AND 12% ORGANIC MATTER AND SHALL HAVE A MAXIMUM STONE SIZE OF 3/4" AND SHALL CONFORM TO THE FOLLOWING GRADATION:

SIEVE	% PASSING
1 1/4 INCH	100
No.4	85-100
No.40	60-85
No.100	38-60
No.200	28-40



SEEDED OR SODDED LAWN DETAIL
SCALE: N.T.S.

REV	DATE	DESCRIPTION	BY	APP
1	7/16/24	PLANNING BOARD REV.	ESS	BCM

MCKENZIE ENGINEERING GROUP
Assinippi Office Park
150 Longwater Drive, Suite 101
Norwell, MA 02061
P: 781.792.3900
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(ASSESSOR'S PARCEL NUMBER 3-O-2.1)
300 POND STREET
RANDOLPH, MASSACHUSETTS

PROFESSIONAL ENGINEER:

BRADLEY C. McKENZIE
CIVIL
No. 36917
REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS

OWNERS/APPLICANT:
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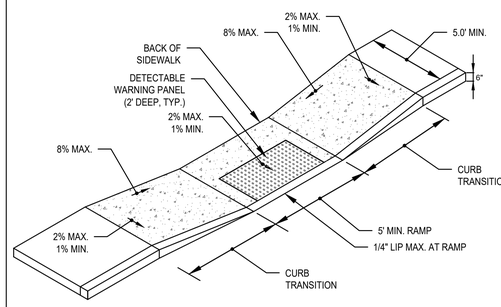
300 POND STREET
RANDOLPH, MASSACHUSETTS

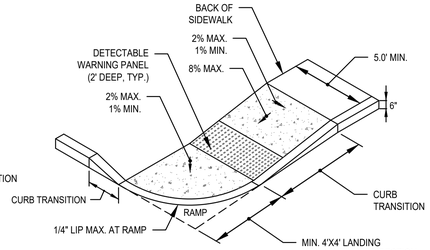
PERMIT PLAN SET

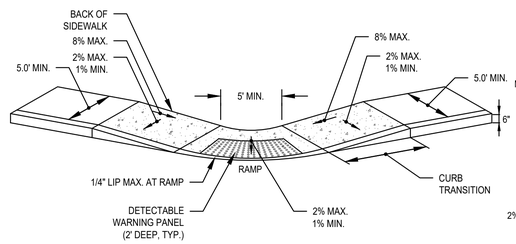
DRAWN BY:	ESS
DESIGNED BY:	ESS
CHECKED BY:	BCM
APPROVED BY:	BCM
DATE:	JUNE 11, 2024
SCALE:	AS NOTED
PROJECT NO.:	222-209

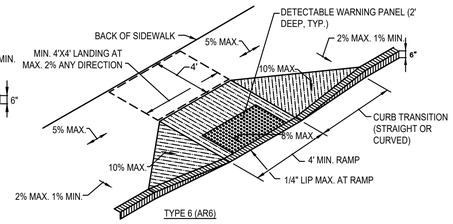
DWG. TITLE:
CONSTRUCTION DETAILS

DWG. NO:
D-1







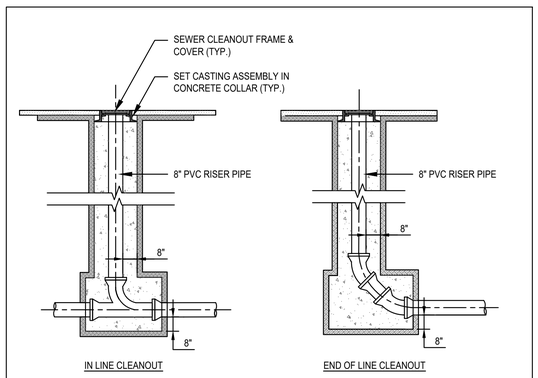


TYPE 6 (AR6)

NOTES:

1. CURBS AND WALKS ALONG ACCESSIBLE ROUTES SHALL MEET OR EXCEED THE APPLICABLE REGULATIONS OF THE MASSACHUSETTS ARCHITECTURAL ACCESS BOARD, FAIR HOUSING ACT AND ADA.
2. THE MAXIMUM ALLOWABLE SIDEWALK AND CURB RAMP CROSS SLOPES SHALL BE 2%.
3. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE EXCLUDING CURB RAMPS SHALL BE 5%.
4. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE CURB RAMPS SHALL BE 7.5%.
5. MAINTAIN A MINIMUM OF 3 FEET CLEAR AT ANY PERMANENT OBSTACLE IN ACCESSIBLE ROUTE (I.E., HYDRANTS, UTILITY POLES, TREE WELLS, SIGNS ETC.).
6. GRADE BASE OF RAMP TO PREVENT PONDING..
7. RAMP CONSTRUCTION SHALL CONFORM TO TYPICAL SIDEWALK SECTION.
8. WHERE ACCESSIBLE ROUTES ARE LESS THAN 5' IN WIDTH (EXCLUDING CURBING) A 5'X5' PASSING AREA SHALL BE PROVIDED AT INTERVALS NOT TO EXCEED 200 FEET.
9. ALL CURBING AT RAMPS SHALL BE VERTICAL CURBING SET FLUSH WHERE IT ABUTS ROADWAY.
10. ALL RAMPS SHALL BE CEMENT CONCRETE WITH ROUGHENED NON-SLIP SURFACE.
11. ALL DETECTABLE WARNING PANELS SHALL BE CAST IN PLACE WITH A STAINLESS STEEL ANCHORING SYSTEM. MINIMUM DIMENSIONS SHALL BE 2-FEET WIDE BY 5-FEET LONG, OR AS APPROVED.
12. THE MATERIAL USED TO PROVIDE CONTRAST SHALL BE AN INTEGRAL PART OF THE WALKING SURFACE. DETECTABLE WARNINGS USED ON INTERIOR SURFACES SHALL DIFFER FROM ADJOINING WALKING SURFACES IN RESILIENCY OR SOUND-ON-CANE-CONTACT.
13. CEMENT CONCRETE TO BE 4000 PSI, 3/4", 610, TYPE II.

CEM. CONC. ACCESSIBLE CURB RAMPS
SCALE: N.T.S.



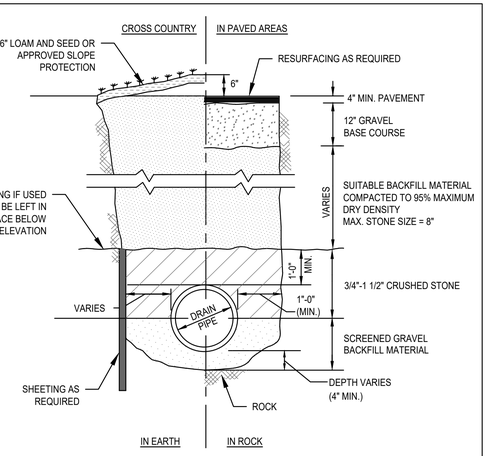
IN LINE CLEANOUT

END OF LINE CLEANOUT

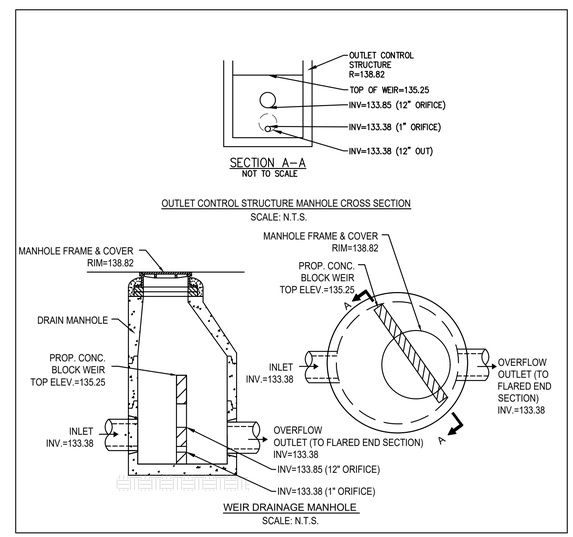
NOTE:

CLEANOUT TOP SHALL BE ENCLOSED IN CASTING AND/OR FABRICATED COVER ASSEMBLY

CLEANOUT DETAIL
SCALE: N.T.S.



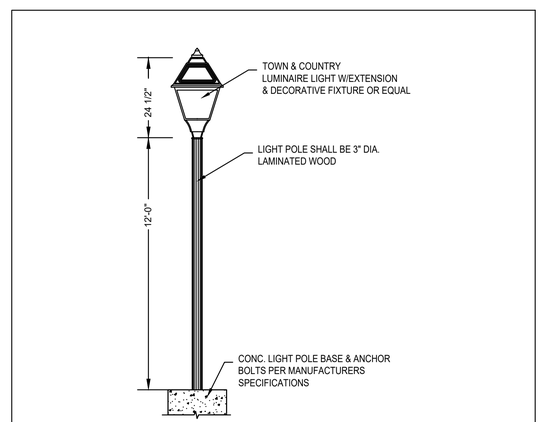
TYPICAL DRAIN TRENCH DETAIL
SCALE: N.T.S.



SECTION A–A
NOT TO SCALE

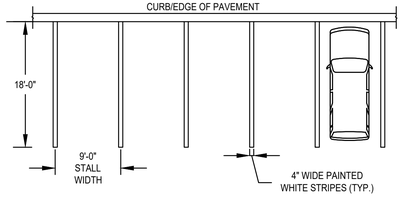
OUTLET CONTROL STRUCTURE MANHOLE CROSS SECTION
SCALE: N.T.S.

WEIR DRAINAGE MANHOLE
SCALE: N.T.S.

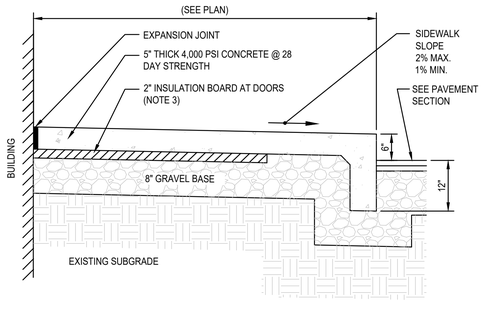


TYPICAL LIGHT POST DETAIL
SCALE: N.T.S.

NOTE: ALL LIGHT BULBS SHALL BE DARK-SKY COMPLIANT AND REFLECTED DOWN TO PREVENT LIGHT POLLUTION.



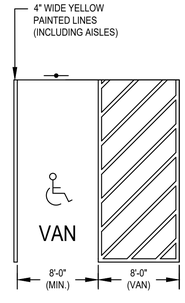
TYPICAL STRIPING DETAILS
SCALE: N.T.S.



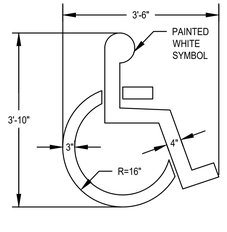
NOTES:

1. SIDEWALK TO HAVE TOOLED JOINTS 5' O.C. (TYP.) WITH EXPANSION JOINTS 15' ON CENTER AND PREMOLDED FILLER.
2. TOOLED JOINT 6" FROM FACE OF CURB
3. PLACE 2" RIGID EXTRUDED STYROFOAM NONEXPANDABLE INSULATION BOARD LIGHT BLUE IN COLOR AT DOORS. BOARD TO BE PLACED IN 2-2'x8' SECTIONS CENTERED ON AND EXTENDING 4' PERPINDICULAR FROM DOOR. BASE MATERIAL SHALL BE CRUSHED STONE AT DOORS.
4. SEE PLAN FOR ELEVATIONS AT DOORS AND CURB

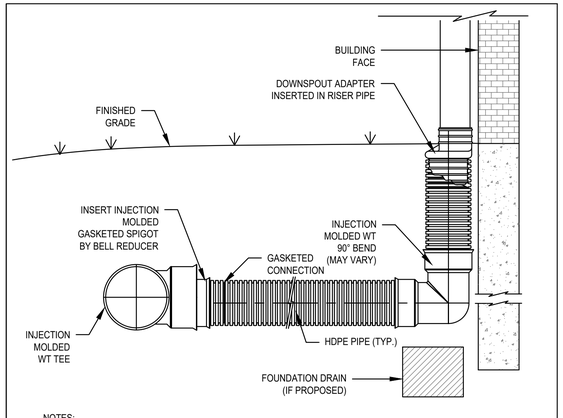
CONCRETE SIDEWALK AND MONOLITHIC CURB AT BUILDING
SCALE: N.T.S.



HANDICAP PARKING STALL DETAIL
SCALE: N.T.S.



PAINTED HANDICAP SYMBOL DETAIL
SCALE: N.T.S.



NOTES:

1. INJECTION MOLDED FITTING ARE AVAILABLE IN TEES, WYES, REDUCERS, 45° BENDS AND BELL/BELL COUPLERS.
2. WATERTIGHT (WT) JOINTS SHOWN. SOIL-TIGHT (ST) FITTINGS ARE ALSO AVAILABLE.

ROOF LEADER CONNECTION DETAIL
SCALE: N.T.S.

REV	DATE	DESCRIPTION	BY	APP
1	7/16/24	PLANNING BOARD REV.	ESS	BCM

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SITE DEVELOPMENT PLAN
(ASSESSOR'S PARCEL NUMBER 3-O-2.1)
300 POND STREET
RANDOLPH, MASSACHUSETTS

PROFESSIONAL ENGINEER:

BRADLEY C. McKENZIE
COMMONWEALTH OF MASSACHUSETTS
CIVIL
No. 36917
REGISTERED
PROFESSIONAL ENGINEER

OWNER/APPLICANT:
EMERSON - SWAN FLEXCON
300 POND STREET
RANDOLPH, MASSACHUSETTS

PERMIT PLAN SET

DRAWN BY:	ESS
DESIGNED BY:	ESS
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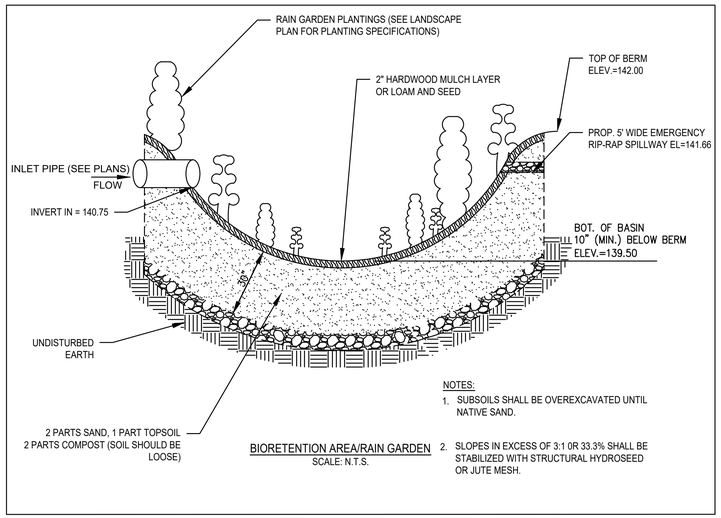
APPROVED BY:	BCM
DATE:	JUNE 11, 2024
SCALE:	AS NOTED
PROJECT NO.:	222-209

DWG. TITLE:

CONSTRUCTION DETAILS

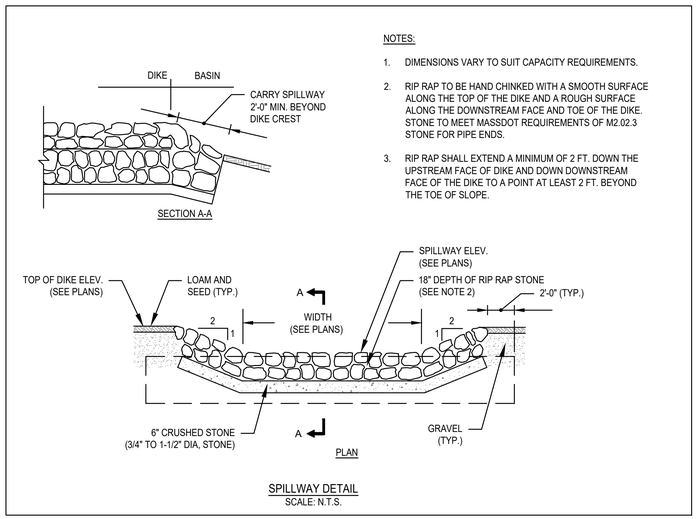
DWG. NO:

D-2



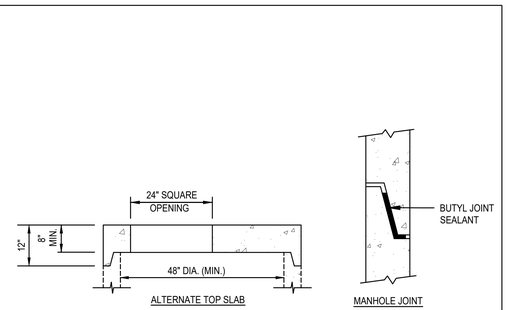
BIORETENTION AREA/RAIN GARDEN
SCALE: N.T.S.

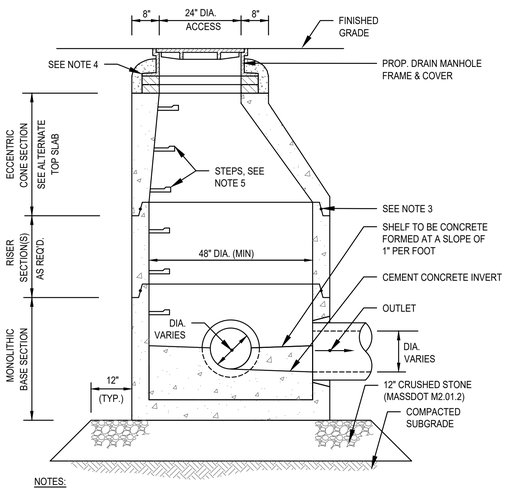
NOTES:
1. SUBSOILS SHALL BE OVEREXCAVATED UNTIL NATIVE SAND.
2. SLOPES IN EXCESS OF 3:1 0R 33.3% SHALL BE STABILIZED WITH STRUCTURAL HYDROSEED OR JUTE MESH.



SPILLWAY DETAIL
SCALE: N.T.S.

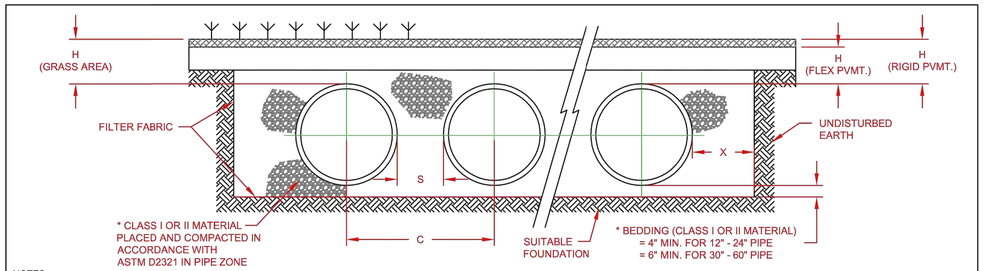
NOTES:
1. DIMENSIONS VARY TO SUIT CAPACITY REQUIREMENTS.
2. RIP RAP TO BE HAND CHINKED WITH A SMOOTH SURFACE ALONG THE TOP OF THE DIKE AND A ROUGH SURFACE ALONG THE DOWNSTREAM FACE AND TOE OF THE DIKE. STONE TO MEET MASSDOT REQUIREMENTS OF M2.02.3 STONE FOR PIPE ENDS.
3. RIP RAP SHALL EXTEND A MINIMUM OF 2 FT. DOWN THE UPSTREAM FACE OF DIKE AND DOWN DOWNSTREAM FACE OF THE DIKE TO A POINT AT LEAST 2 FT. BEYOND THE TOE OF SLOPE.





NOTES:
1. ALL SECTIONS SHALL BE DESIGNED FOR HS-20 LOADING.
2. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.
3. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
4. DRAIN MANHOLE FRAME AND COVER SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICK COURSES TYPICALLY, 5 BRICK COURSES MAXIMUM).
5. COPOLYMER MANHOLE STEPS SHALL BE INSTALLED AT 12" O.C. FOR THE FULL DEPTH OF THE STRUCTURE.

DRAIN MANHOLE DETAIL
SCALE: N.T.S.



NOTES:
1. ALL REFERENCES TO CLASS I OR II MATERIAL ARE PER ASTM D2321 "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST EDITION.
2. ALL RETENTION AND DETENTION SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, LATEST EDITION AND THE MANUFACTURER'S PUBLISHED INSTALLATION GUIDELINES.
3. MEASURES SHOULD BE TAKEN TO PREVENT THE MIGRATION OF NATIVE FINES INTO THE BACKFILL MATERIAL, WHEN REQUIRED. SEE ASTM D2321.
4. FILTER FABRIC: A GEOTEXTILE FABRIC MAY BE USED AS SPECIFIED BY THE ENGINEER TO PREVENT THE MIGRATION OF FINES FROM THE NATIVE SOIL INTO THE SELECT BACKFILL MATERIAL.
5. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.
6. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I OR II. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 4"-24" (100mm-600mm); 6" (150mm) FOR 30"-60" (750mm-1500mm).
7. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I OR II IN THE PIPE ZONE EXTENDING NOT LESS THAN 6" ABOVE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
8. MINIMUM COVER: MINIMUM COVER OVER ALL RETNETION/DETENTION SYSTEMS IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER IS 12" UP TO 36" DIAMETER PIPE AND 24" OF COVER FOR 42" - 60" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT.

NOMINAL DIAMETER	NOMINAL O.D.	TYPICAL SPACING "S"	NOMINAL SPACING "C"	TYPICAL SIDE WALL "X"	H (NON-TRAFFIC)	H (TRAFFIC)
12" (300mm)	14.5" (368mm)	11" (279mm)	25.5" (648mm)	8" (203mm)	12" (305mm)	12" (305mm)
15" (375mm)	18" (457mm)	11.5" (292mm)	29.0" (737mm)	8" (203mm)	12" (305mm)	12" (305mm)
18" (450mm)	21" (533mm)	17.0" (432mm)	38.0" (965mm)	9" (229mm)	12" (305mm)	12" (305mm)
24" (600mm)	28" (711mm)	14.0" (356mm)	41.5" (1054mm)	10" (254mm)	12" (305mm)	12" (305mm)
30" (750mm)	36" (914mm)	18" (457mm)	53.0" (1346mm)	18" (457mm)	12" (305mm)	12" (305mm)
36" (900mm)	42" (1067mm)	22" (559mm)	63.0" (1600mm)	18" (457mm)	12" (305mm)	12" (305mm)
42" (1050mm)	48" (1219mm)	24" (610mm)	72.0" (1829mm)	18" (457mm)	12" (305mm)	24" (610mm)
48" (1200mm)	54" (1372mm)	25" (635mm)	78.5" (1994mm)	18" (457mm)	12" (305mm)	24" (610mm)
60" (1500mm)	67" (1702mm)	24" (610mm)	90" (2286mm)	18" (457mm)	12" (305mm)	24" (610mm)

* CLASS I BACKFILL REQUIRED AROUND 60" DIAMETER FITTINGS.

REV.	DESCRIPTION	BY	MM/DD/YY	CHK'D
4	GENERAL UPDATES AND RENAMED	TJR	02/19/16	

RETENTION–DETENTION SYSTEM (CROSS–SECTION)

DRAWING NUMBER: STD–702

ADS Advanced Drainage Systems, Inc. 4640 TRUEMAN BLVD HILLIARD, OHIO 43026

DRAWN BY: AWM
SCALE: 07.25.06
DATE BY:
REVISION:
NTS
SHEET OF

REV	DATE	DESCRIPTION	BY	APP
1	7/16/24	PLANNING BOARD REV.	ESS	BCM

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SITE DEVELOPMENT PLAN
(ASSESSOR'S PARCEL NUMBER 3-O-2.1)
300 POND STREET
RANDOLPH, MASSACHUSETTS

PROFESSIONAL ENGINEER:
BRADLEY C. MCKENZIE, CIVIL, No. 36917, COMMONWEALTH OF MASSACHUSETTS, REGISTERED PROFESSIONAL ENGINEER

OWNERS/APPLICANT:
EMERSON - SWAN FLEXCON
300 POND STREET
RANDOLPH, MASSACHUSETTS

PERMIT PLAN SET

DRAWN BY:	ESS
DESIGNED BY:	ESS
CHECKED BY:	BCM
APPROVED BY:	BCM
DATE:	JUNE 11, 2024
SCALE:	AS NOTED
PROJECT NO.:	222-209

DWG. TITLE:
CONSTRUCTION DETAILS

DWG. NO:
D-3

CONSTRUCTION SEQUENCE

TO PREVENT EXCESSIVE EROSION AND SILTING, THE FOLLOWING CONSTRUCTION SEQUENCE COUPLED WITH OTHER WIDELY ACCEPTED PRINCIPALS FOR REDUCING EROSION AND SEDIMENTATION SHALL BE IMPLEMENTED IN THE DEVELOPMENT OF THE SITE.

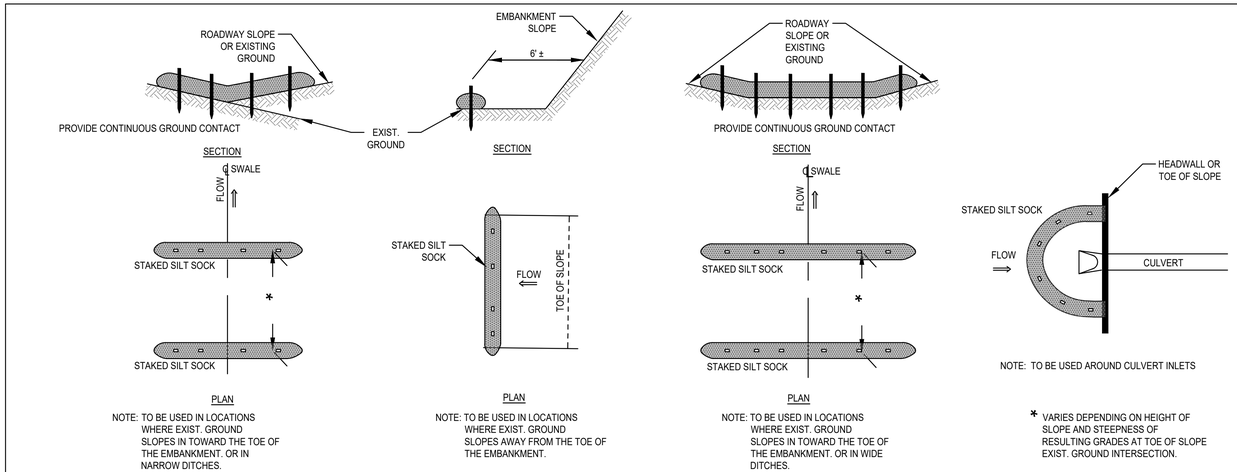
1. THE CONTRACTOR SHALL COORDINATE A PRE-CONSTRUCTION MEETING PRIOR TO ANY CONSTRUCTION ACTIVITY.
2. STABILIZATION PRACTICES FOR EROSION AND SEDIMENT CONTROL SHALL BE INSTALLED PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES. REFER TO "EROSION AND SEDIMENTATION CONTROL" SECTION OF THIS PLAN & PLACE SILTATION FENCE ON THE SITE PLANS.
3. CLEAR AND GRUB UP AS REQUIRED FOR THE CONSTRUCTION OF THE ROADWAY, PARKING AREAS AND RELATED INFRASTRUCTURE.
4. CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE.
5. EXCAVATE TOPSOIL AND SUBSOIL FROM CUT AND FILL AREAS AND STOCKPILE ON SITE IN LOCATIONS SHOWN ON THE PLAN. CONSIDERATION SHOULD BE GIVEN TO LOCATING STOCKPILES ON THE UPHILL SIDE OF DISTURBED AREAS, WHERE POSSIBLE, TO ACT AS TEMPORARY DIVERSIONS.
6. CONSTRUCT CUT AND FILL AREAS, INSTALLING HAYBALE CHECK DAMS AT TOES OF ALL 3:1 OR GREATER SLOPES, AND AT ENDS OF ALL CUT AREAS. ALL FILL WILL BE INSTALLED USING 12" MAXIMUM COMPACTION LIFTS. PLACE ALL SLOPE PROTECTION WHERE INDICATED ON THE PLAN. THE SUBSURFACE INFILTRATION SYSTEM SHALL BE CONSTRUCTED IMMEDIATELY AFTER THE ROADWAY ROUGH GRADING IS COMPLETED AND THE AREA HAS BEEN CLEARED OF VEGETATION.
7. INSTALL CLOSED DRAINAGE SYSTEM AND OTHER UTILITIES. ALL CATCH BASINS SHALL BE COVERED WITH SILTSACK OR EQUIVALENT INLET PROTECTION.
8. GRADE ROADWAY AND PARKING AREAS TO SUBGRADE ELEVATION AND CONSTRUCT SIDE SLOPES. APPLY TEMPORARY STABILIZATION MEASURES WHERE WARRANTED. REFER TO "EROSION AND SEDIMENTATION CONTROL" SECTION OF THIS PLAN.
9. EXCAVATE AND CONSTRUCT BUILDING FOUNDATION.
10. PLACE GRAVEL SUBBASE.
11. PLACE THE BITUMINOUS CONCRETE BINDER COURSE ON ROADWAY AND PARKING AREAS.
12. CONSTRUCT BUILDING STRUCTURES AND ASSOCIATED UTILITY CONNECTIONS.
13. GRADE SLOPES AND STABILIZE CUT AREAS AT TOE OF SLOPES. BLEND ALL SLOPES INTO EXISTING TOPOGRAPHY AND LOAM AND SEED ALL DISTURBED AREAS. SLOPES GREATER THAN 3:1 SHALL BE STABILIZED WITH JUTE MESH.
14. PLACE THE FINAL WEARING COURSE OF PAVEMENT.
15. COMPLETE FINE GRADING OF SHOULDERS AND PLACE PAVEMENT IN MISCELLANEOUS AREAS.
16. REMOVE TEMPORARY EROSION CONTROL DEVICES ONCE ADEQUATE GROWTH IS ESTABLISHED. ADEQUATE GROWTH IS DEFINED AS VEGETATION COVERING 75% OR MORE OF THE GROUND SURFACE.

EROSION AND SEDIMENTATION CONTROL

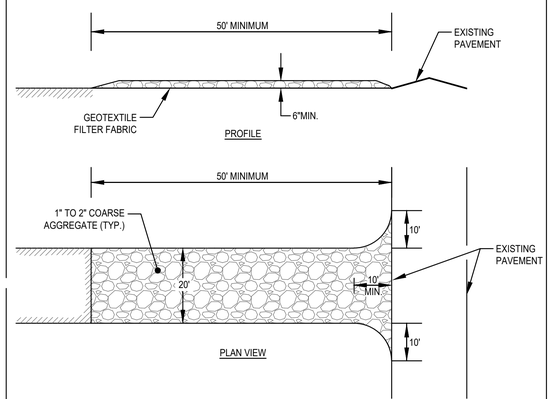
1. STRUCTURAL PRACTICES UTILIZED FOR THE PROJECT WILL INCLUDE SILT SOCK BARRIER CONTROLS, STABILIZED CONSTRUCTION ENTRANCE, TEMPORARY DIVERSION SWALES WITH STONE CHECK DAMS, SEDIMENT BASINS, AND INLET PROTECTION.
2. STABILIZATION PRACTICES UTILIZED FOR THE PROJECT WILL INCLUDE TEMPORARY SEEDING, GEOTEXTILES (JUTE MESH), MULCHING, AND PERMANENT SEEDING.
3. IN GENERAL, THE SMALLEST POSSIBLE AREA OF LAND SHOULD BE EXPOSED AT ONE TIME. WHEN LAND IS EXPOSED DURING DEVELOPMENT, THE EXPOSURE SHALL BE CONFINED TO A MAXIMUM PERIOD OF 3 MONTHS. LAND SHALL NOT BE EXPOSED DURING THE WINTER MONTHS. ANY DISTURBED AREAS WHICH ARE TO BE LEFT TEMPORARILY AND THAT WILL BE REGRADED AT A LATER DATE SHALL BE MACHINE HAY MULCHED AND SEEDED WITH WINTER RYE TO PREVENT EROSION.

CONSTRUCTION PHASE BMP OPERATION AND MAINTENANCE NOTES:

1. STRUCTURAL PRACTICES UTILIZED FOR THE PROJECT WILL INCLUDE SILT SOCK EROSION CONTROL BARRIERS, STABILIZED CONSTRUCTION ENTRANCES, CONCRETE WASH STATIONS, STOCKPILE AREAS, AND INLET PROTECTION.
2. STABILIZATION PRACTICES UTILIZED FOR THE PROJECT WILL INCLUDE TEMPORARY SEEDING, GEOTEXTILES (JUTE MESH), MULCHING, AND PERMANENT SEEDING.
3. OPERATOR PERSONNEL AND/OR ITS CONSULTANTS MUST INSPECT THE CONSTRUCTION SITE AT LEAST ONCE EVERY 7 CALENDAR DAYS OR EVERY 14 CALENDAR DAYS AND WITHIN 24 HOURS OF A STORM EVENT ¼ INCH OR GREATER. THE INSPECTOR SHOULD REVIEW THE EROSION AND SEDIMENT CONTROLS WITH RESPECT TO THE FOLLOWING:
   A. WHETHER OR NOT THE BMP WAS INSTALLED/PERFORMED CORRECTLY.
   B. WHETHER OR NOT THERE HAS BEEN DAMAGE TO THE BMP SINCE IT WAS INSTALLED OR PERFORMED.
   C. WHAT SHOULD BE DONE TO CORRECT ANY PROBLEMS WITH THE BMP.
4. THE INSPECTOR SHALL COMPLETE THE INSPECTION SCHEDULE AND EVALUATION CHECKLIST FOR FINDINGS AND SHOULD REQUEST THE REQUIRED MAINTENANCE OR REPAIR.
5. ALL SLOPES EXCEEDING 15% RESULTING FROM SITE GRADING SHALL BE BOTH COVERED WITH FOUR INCHES OF TOPSOIL AND PLANTED WITH A VEGETATED COVER SUFFICIENT TO PREVENT EROSION.



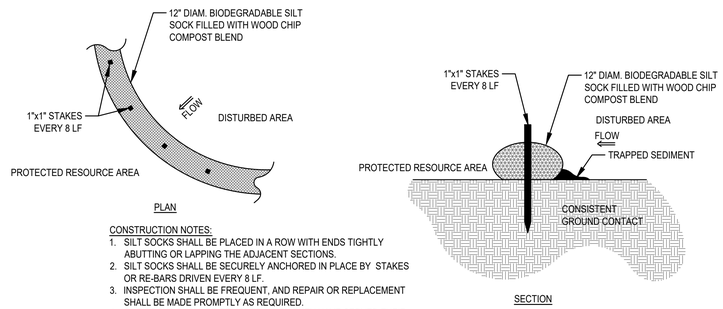
TEMPORARY EROSION CONTROL
SCALE: N.T.S.



(SCE) CONSTRUCTION SPECIFICATIONS:

1. STONE FOR A STABILIZATION CONSTRUCTION ENTRANCE SHALL BE 1 TO 2 INCH STONE. RECLAIMED STONE.
2. THE LENGTH OF THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 50 FEET, EXCEPT FOR A SINGLE RESIDENTIAL LOT A 30 FOOT MINIMUM LENGTH WOULD APPLY.
3. THE THICKNESS OF THE STONE FOR THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 6 INCHES.
4. THE WIDTH OF THE ENTRANCE SHALL NOT BE LESS THAN A FULL WIDTH OF THE ENTRANCE WHERE INGRESS OR EGRESS OCCURS OR 10 FEET, WHICH EVER IS GREATER.
5. GEOTEXTILE FILTER CLOTH SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING THE STONE.
6. ALL SURFACE WATER THAT IS FLOWING TO OR DEVERTED TOWARDS THE CONSTRUCTION ENTRANCE SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A BERM WITH 5:1 SLOPES THAT CAN BE CROSSED BY VEHICLES MAY BE SUBSTITUTED FOR THE PIPE.
7. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOPDRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. SEDIMENT SPILLED, WASHED, OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED PROMPTLY.

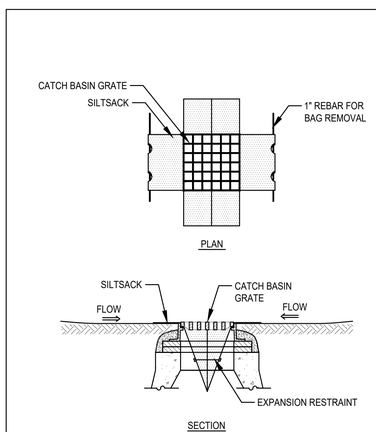
STABILIZED CONSTRUCTION ENTRANCE (SCE) DETAIL
SCALE: N.T.S.



CONSTRUCTION NOTES:

1. SILT SOCKS SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING OR LAPPING THE ADJACENT SECTIONS.
2. SILT SOCKS SHALL BE SECURELY ANCHORED IN PLACE BY STAKES OR RE-BARS DRIVEN EVERY 8 LF.
3. INSPECTION SHALL BE FREQUENT, AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS REQUIRED.
4. SILT SOCKS SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS, SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

SILTSOCK EROSION CONTROL BARRIER DETAIL
SCALE: N.T.S.



SILTSACK SEDIMENT TRAP
SCALE: N.T.S.

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DATE:	JUNE 11, 2024
SCALE:	AS NOTED
PROJECT NO.:	222-209

DWG. TITLE:
CONSTRUCTION DETAILS

DWG. NO:
D-4

PROJECT ADDRESS:

300 Pond Street
Randolph, MA

Flexcon Industries - 300 Pond Street

Proposed Office & Warehouse Addition

ISSUE DATE:

Tuesday, July 16, 2024

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Schematic Design Drawings
Randolph Planning Board Review

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Proposed Front Rendering__View from Pacella Park Drive 4 G1-1

KEARNEY | PIERCE
ARCHITECTS INC
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(781) 740-4556
info@kearneypierce.com

PROJECT NAME:
Flexcon Industries - 300 Pond Street
Proposed Addition

SITE ADDRESS:
300 Pond Street
Randolph, MA

DESCRIPTION:
RANDOLPH
PLANNING BOARD

DRAWING TITLE:
Cover Page

Scale as Noted

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ISSUE DATE:
Tuesday, July 16, 2024

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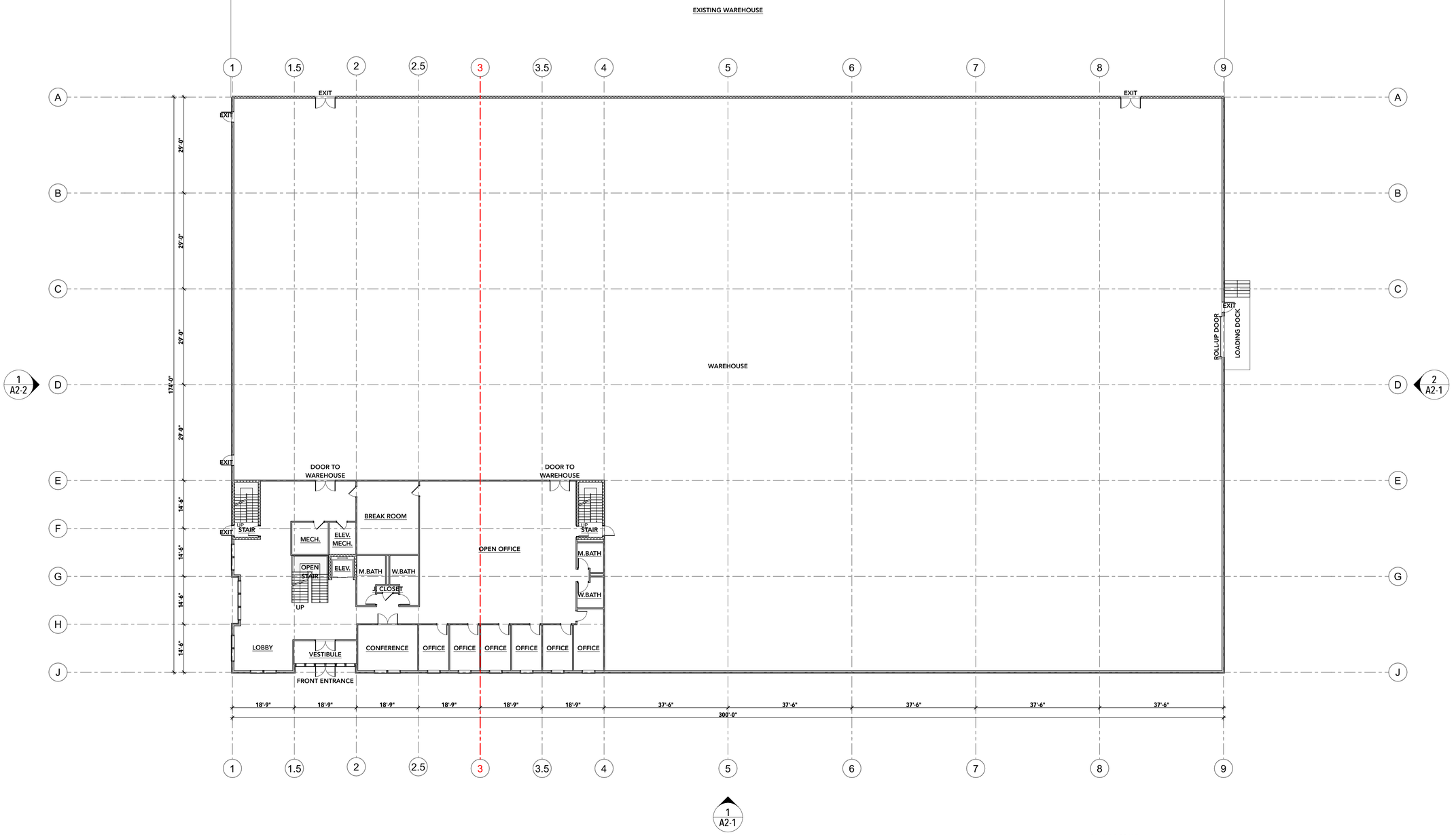

Ground Floor Plan
Scale:1/16" = 1'-0"

1
A1-1

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DRAWING TITLE:
Ground Floor Plan

Scale as Noted

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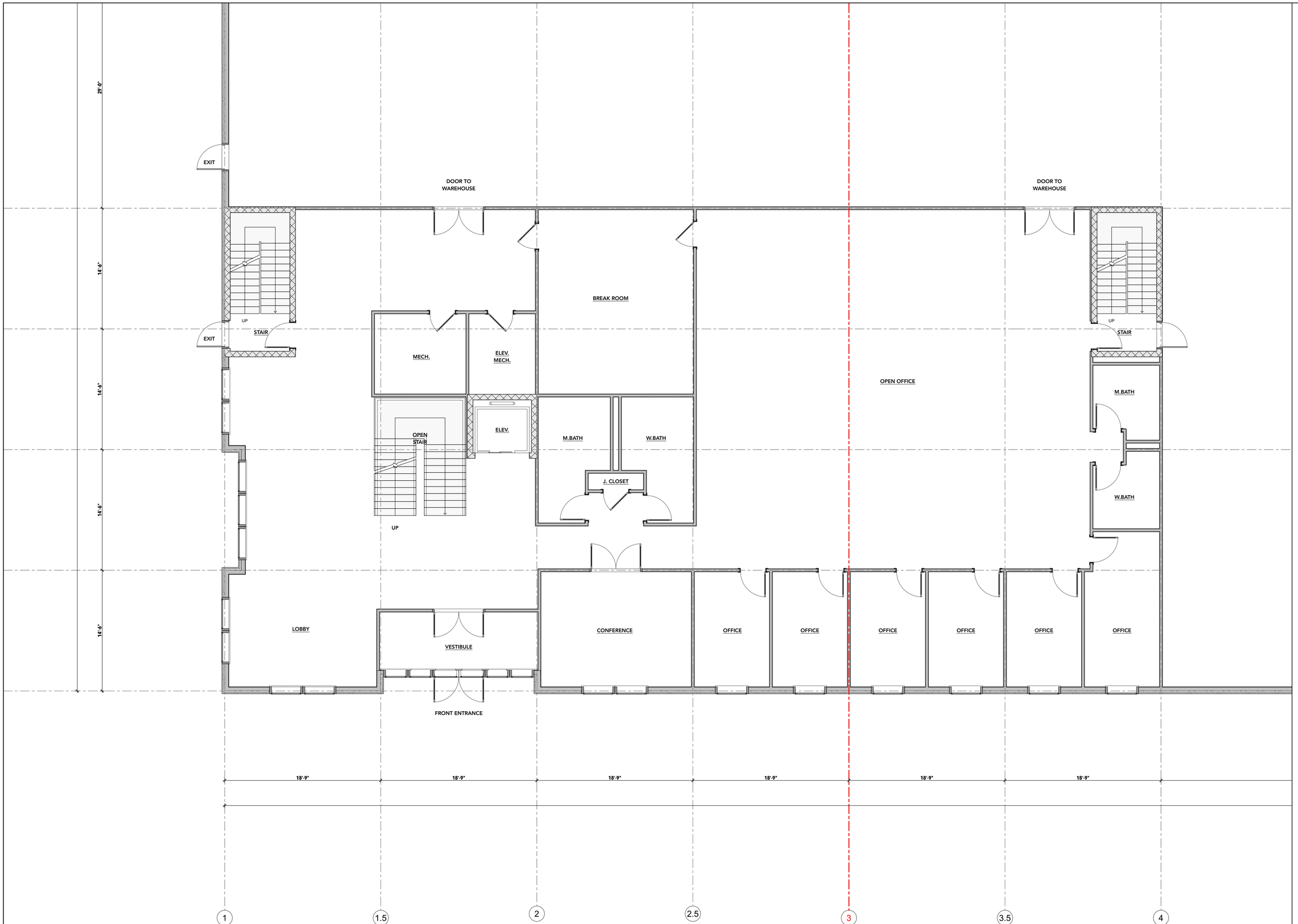

Partial Ground Floor Plan 3/16"=1'

Scale:3/16" = 1'-0"

1 A1-1.1

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Proposed Addition

SITE ADDRESS:
300 Pond Street
Randolph, MA

DESCRIPTION:
RANDOLPH PLANNING BOARD

DRAWING TITLE:
Enlarged Ground Floor Plan

Scale as Noted

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ISSUE DATE:
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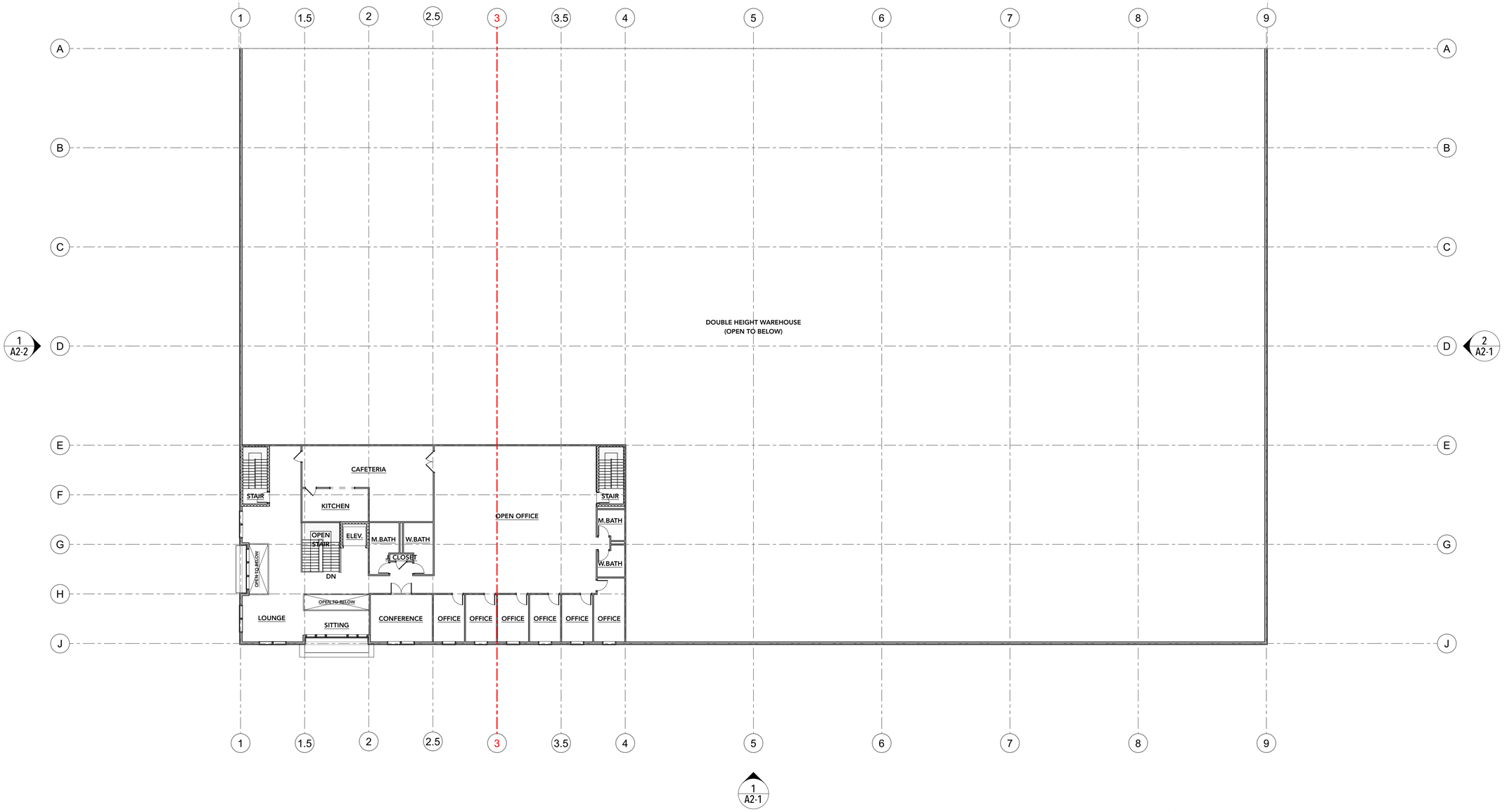

Second Floor Plan
Scale:1/16" = 1'-0"

1
A1-2

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PROJECT NAME:
Flexcon Industries - 300 Pond Street
Proposed Addition

SITE ADDRESS:
300 Pond Street
Randolph, MA

DESCRIPTION:
RANDOLPH
PLANNING BOARD

DRAWING TITLE:
Second Floor Plan

Scale as Noted

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Checked by: AK

Partial Second Floor Plan 3/16"=1'

Scale:3/16" = 1'-0"

1 A1-2.1

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PROJECT NAME:
Flexcon Industries - 300 Pond Street
Proposed Addition

SITE ADDRESS:
300 Pond Street
Randolph, MA

DESCRIPTION:
RANDOLPH PLANNING BOARD

DRAWING TITLE:
Enlarged Second Floor Plan

Scale as Noted

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ISSUE DATE:
Tuesday, July 16, 2024

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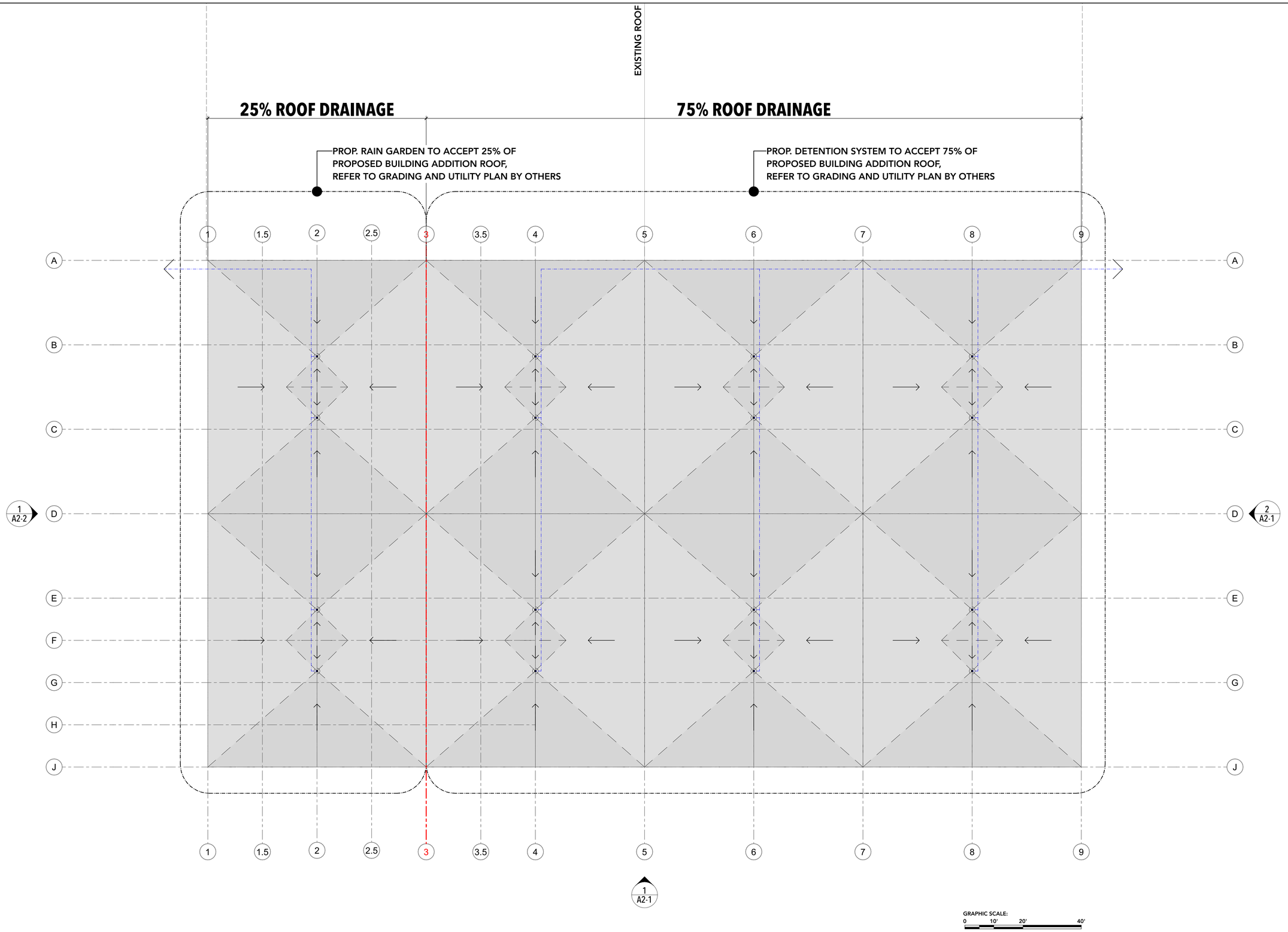

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PROJECT NAME:
Flexcon Industries - 300 Pond Street
Proposed Addition

SITE ADDRESS:
300 Pond Street
Randolph, MA

DESCRIPTION:
RANDOLPH PLANNING BOARD

DRAWING TITLE:
Roof Plan

Scale as Noted

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ISSUE DATE:
Tuesday, July 16, 2024

Drawn by: BP
Checked by: AK

Roof Plan
Scale:1/16" = 1'-0"
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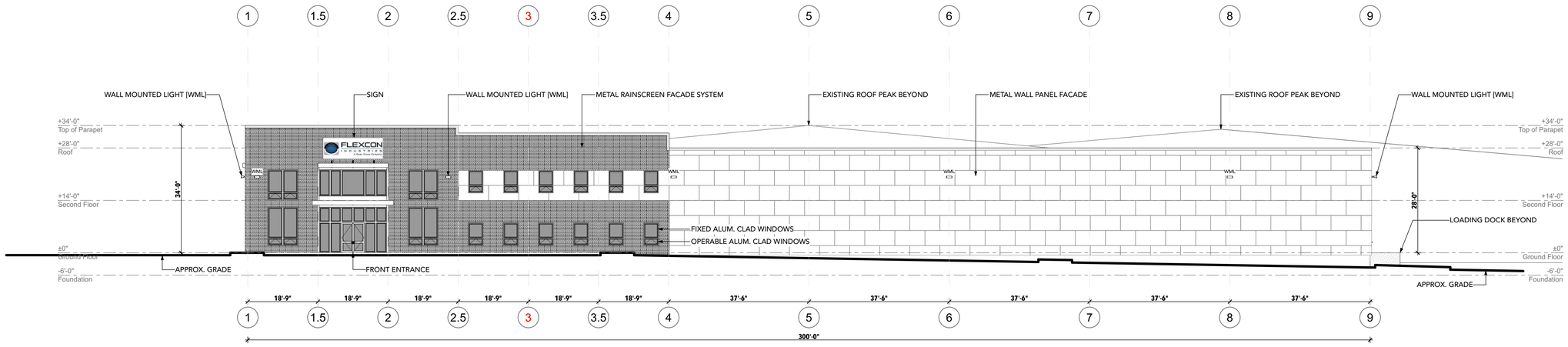
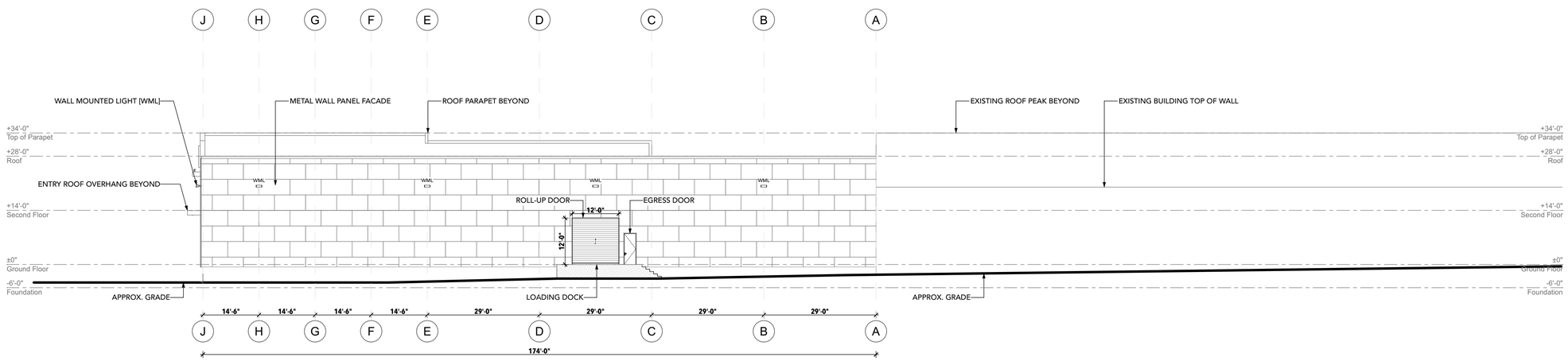


Front Elevation

Scale:1/16" = 1'-0"

1
A2-1



Right Side Elevation

Scale:1/16" = 1'-0"

2
A2-1

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Proposed Addition

SITE ADDRESS:
300 Pond Street
Randolph, MA

DESCRIPTION:
RANDOLPH PLANNING BOARD

DRAWING TITLE:
Front & Right Elevation

Scale as Noted

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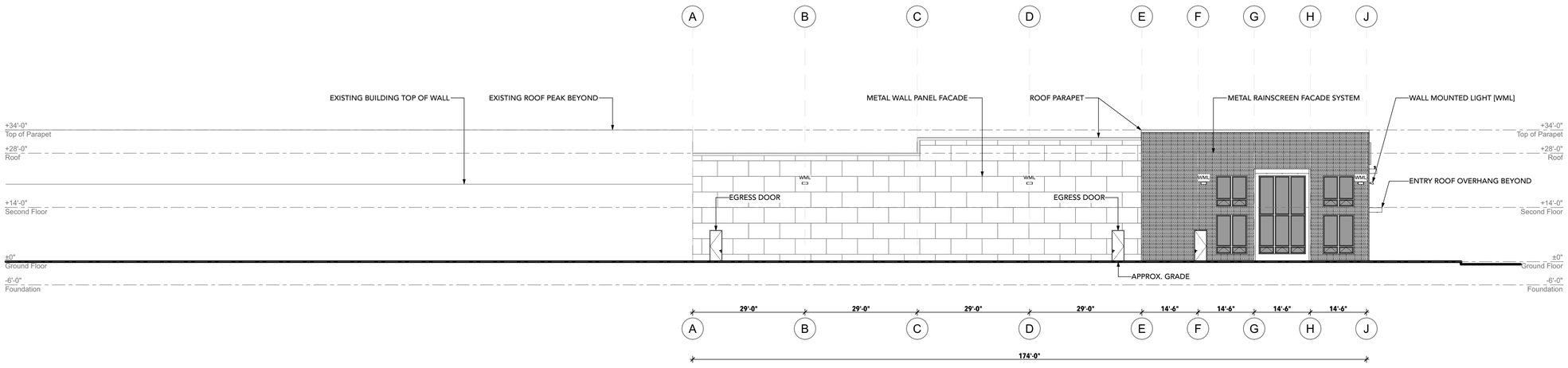

Left Elevation

Scale:1/16" = 1'-0"

1
A2-2

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300 Pond Street
Randolph, MA

DESCRIPTION:
RANDOLPH
PLANNING BOARD

DRAWING TITLE:
Left Elevation

Scale as Noted

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ISSUE DATE:
Tuesday, July 16, 2024

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Proposed Front Rendering__View from Pacella Park Drive

3
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Proposed Left Side Rendering_View from Pacella Drive

2
A3-1

Proposed Right Side Rendering_View from Pond Street

3
A3-1

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DRAWING TITLE:
Renderings

Scale as Noted

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ISSUE DATE:
Tuesday, July 16, 2024

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DRAINAGE CALCULATIONS AND STORMWATER MANAGEMENT PLAN

For:

SITE DEVELOPMENT
ASSESSORS PARCEL NUMBER 3-O-2.1
300 POND STREET
RANDOLPH, MASSACHUSETTS

Located:

300 POND STREET
RANDOLPH, MASSACHUSETTS

Submitted to:

TOWN OF RANDOLPH

Prepared For:

EMERSON – SWAN FLEXCON
300 POND STREET
RANDOLPH, MASSACHUSETTS

Professional Civil Engineering • Project Management • Land Planning
150 Longwater Drive, Suite 101, Norwell, Massachusetts 02061
Tel.: (781) 792-3900 Facsimile: (781) 792-0333
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June 11, 2024

TABLE OF CONTENTS

Drainage Calculations and Stormwater Management Plan
300 Pond Street
Randolph, Massachusetts

Project Summary

The project proponent, Emerson – Swan Flexcon proposes to construct an addition to the existing building located at 300 Pond Street in Randolph, Massachusetts consisting of one (1) parcel as shown on the Randolph Assessor's Map 3, Block O, Lot 2.1 comprising of approximately 10.0 acres (the Site). The Site is located within Town of Randolph's Great Pond Commerce Center Overlay District.

The proposed development will consist of the construction of an approximately 52,300 s.f. addition to the existing building, along with the construction of a subsurface stormwater management systems, utilities, site grading and landscaping. A portion of the existing structure consisting of 21,850 s.f. of office space will be converted to a manufacturing use and included as part of the new addition.

This report contains stormwater runoff calculations for the pre-development and post-development conditions and includes the sizing of the proposed stormwater best management practices (BMPs). The proposed and existing site conditions are illustrated on the project *site plans* entitled "Site Development Plan, 300 Pond Street, Randolph, Massachusetts", prepared by McKenzie Engineering Group, Inc. dated June 11, 2024.

Refer to Figure 1- USGS Locus Map for the location of the parcel.

Pre-Development Condition

The parcel is currently developed and consists of an existing ±180,600 s.f. industrial (office, manufacturing and warehouse use) building with related site infrastucture inlcuding bituminous concrete parking area, loading docks, storwmwater management system, closed-drainage system and utilities. The topography of the site ranges in elevation from approximately 144 ft. (NAVD 88) adjacent to Pacella Park Drive west of the exsiting building, to an elevation of approximately 128 ft. along Pond Street, south of the existing building. Runoff emanating from the eastern and southern portions of the site generally flows in a southerly direction toward Pond Street. Portions of runoff emanating from the western portion of the site generally are captured by the existing leaching pits and crushed stone depression area. Runoff emanating from the northwestern and northeastern portions of the site are captured by the existing stormwater management system are conveyed to the outlet structure located adjacent to the northern property line. A bordering vegetated wetland complex is located offsite across Pond Street to the south, the limit of bordering vegetated wetland resource area was delineated by Environmental Consulting and Restoration, LLC on December 1, 2023. Refer to Appendix F: - Wetland Delineation Report for supporting data.

A review of available environmental databases such as MassGIS reveals that a portion of the Site is located within a MassDEP Zone A - Surface Water Protection Area. The Site is not located within a MassDEP Zone II Wellhead Protection Area or Town of Randolph Aquifer Protection District Zone.

The site is located within the Zone X of the Flood Insurance Rate Map, as shown on the current FEMA Flood Insurance Rate Map Panel No. 25021C0208E with an effective date of July 17, 2012. Refer to Figure 2 – FEMA Flood Map.

The soil types as identified by the Soil Survey, Norfolk County, MA prepared by the NRCS Soil Conservation Service (NRCS) are classified as 104C-Hollis-Rock Outcrop-Charlton Complex, 0 to 15 percent slopes, with hydrologic soil group (HSG) D; 422B-Canton Fine Sandy Loam, 0 to 8 percent slopes, extremely stony with hydrologic soil group (HSG) B, and 654-Udorthents Loamy, with hydrologic soil group (HSG) A. Soil testing conducted by McKenzie Engineering Group, Inc. (MEG) on December 22, 2023 identified the site to be comprised of ledge at approximately 16" depth.

Refer to Figure 3 - Soil Map for the NRCS delineation of soil types and Appendix E – Soil Testing Results for supporting data.

In the pre- and post- development stormwater analysis, the watershed area analyzed was approximately 10.23 acres consisting of the subject parcel to be developed and offsite tributary areas to the west. The watershed consists of four (4) design points Refer to Pre-Development Watershed Delineation Plan WS-1 in Appendix A for a delineation of drainage subareas for the pre-development design condition.

The SCS Technical Release 20 (TR-20) and Technical Release 55 (TR-55) method-based program "HydroCAD" was employed to develop pre- and post-development peak flows. Drainage calculations were prepared for the pre-development condition for the 2, 10, 25 and 100-year, Type III storm events. Refer to Appendix A for computer results, soil characteristics, cover descriptions and times of concentrations for all subareas.

Post-Development Condition

The proposed development will consist of the construction of an approximately 52,300 s.f. addition to the existing building, along with the construction of a subsurface stormwater management systems, utilities, site grading and landscaping. A portion of the existing structure consisting of 21,850 s.f. of office space will be converted to a manufacturing use and included as part of the new addition. The area of the existing bituminous concrete parking area has been reduced as a result of the proposed development. The stormwater management system and will be designed to fully comply with all standards of the Department of Environment Protection's Stormwater Management Regulations.

Watershed areas were analyzed in the post-development condition to design low impact stormwater management facilities to mitigate impacts resulting from developing the property. The objective in designing the proposed drainage facilities for the project was to maintain existing drainage patterns to the extent practicable and to ensure that the post-development rates of runoff are less than pre-development rates at the design points.

Refer to the Post-Development Watershed Plan WS-2 in Appendix B for a delineation of post-development drainage subareas. The design points for the post-development design conditions correspond to those analyzed for the pre-development design condition.

The proposed system utilizes a roof runoff collection system and stormwater detention system to capture, and regulate the flow of the runoff associated with the proposed addition. The stormwater detention system includes an overflow connection to the

existing closed-drainage system onsite and utilizes the existing headwall and outlet structure located north of the existing building. The infiltration tank systems were designed to accommodate peak flows generated by all storms up to the 100-year storm event. Refer to site plans for the drainage system design. All BMPs shall be supported by a comprehensive Construction Phase Pollution Prevention and Erosion Control Plan and Post-Development BMP Operation and Maintenance Plan.

Drainage calculations were prepared by employing the SCS TR-20 Methods for the 1, 2, 10, 25 and 100-year, type III storm events. Refer to Appendix B for computer results.

A comparison of the pre-development and post-development peak rates of runoff indicate that the peak rates of runoff for the post-development condition at all Design Points will be less than the pre-development condition for all storm events.

Stormwater Best Management Practices (BMP's)

Runoff from the proposed building addition is considered “clean” and therefore does not require removal of Total Suspended Solids (TSS). Runoff from the proposed building addition will be conveyed directly to the stormwater detention system and the proposed rain garden. Approximately 25% of the proposed roof addition will be directed to the rain garden, the remaining 75% of the roof addition will be directed to the stormwater detention system. The stormwater detention system will release runoff from the proposed addition at a regulated rate while utilizing the existing outlet structure onsite. The proposed rain garden will recharge runoff into the surrounding native soils, and includes an overflow rip-rap spillway directed at the existing parking area.

The existing treatment stream for the development which consists of deep sump hooded catch basins and infiltration drywells, and captures runoff from the bituminous concrete parking areas and adjacent landscaping, will be maintained.

Erosion and Sedimentation Controls

Compost filter tube (Silt sock) erosion control barriers will be placed at the limit of work prior to the commencement of any construction activity. The integrity of the silt sock will be maintained by periodic inspection and replacement as necessary. Refer to the Erosion Control details on the Site Development Plans and BMP Operation and Maintenance Plan for proposed erosion control measures to be employed for the project.

Compliance with Stormwater Management Standards

Standard 1 – No New Untreated Discharges

The proposed development will not introduce any new untreated discharges to a wetland area or waters of the Commonwealth of Massachusetts. All discharges from the site will be treated through proposed stormwater quality controls such as deep sump hooded catch basins, pre-treatment structures and subsurface infiltration tank systems including the establishment of proper maintenance procedures.

Standard 2 – Peak Rate Attenuation

In the pre- and post- development stormwater analysis, the watershed area analyzed was approximately 10.23 acres consisting of the subject parcel to be developed and offsite tributary areas to the west. Refer to Existing Watershed Delineation Plan WS-1 for

a delineation of drainage subareas for the pre-development design condition and refer to Post-Development Watershed Delineation Plan WS-2 for a delineation of drainage subareas for the post-development design condition.

Drainage calculations were performed by employing SCS TR-20 methods for the 1, 2, 10, 25, and 100-year Type III storm events. Refer to Appendix A and B for computer results. All drainage structures will be designed employing the Rational Method to accommodate peak flows generated by a minimum of a 25-year storm event or a 100-year storm event where applicable. The stormwater management systems were designed to accommodate peak flows generated by a 100-year storm event.

The peak rates of runoff are as follows:

Pre-Development vs. Post-Development Peak Rates of Runoff

Design Point	2 Year Storm **(3.29 Inches)**		10 Year Storm **(4.92 Inches)**		25 Year Storm **(6.19 Inches)**		100 Year Storm **(8.79 Inches)**	
	Exist. (CFS)	**Prop. (CFS)**	**Exist. (CFS)**	**Prop. (CFS)**	**Exist. (CFS)**	**Prop. (CFS)**	**Exist. (CFS)**	**Prop. (CFS)**
Design Point 1	*2.98*	2.84	*7.72*	6.90	*11.96*	10.47	*21.37*	18.25
Design Point 2	*0.11*	0.11	*0.37*	0.37	*0.61*	0.61	*1.17*	1.17
Design Point 3	*4.34*	4.34	*6.82*	6.82	*8.77*	8.77	*12.76*	12.76
Design Point 4	*12.08*	11.15	*19.37*	18.33	*25.13*	23.96	*36.95*	35.55

A comparison of the pre-development and post-development peak rates of runoff indicates that the peak rates of runoff for the post-development condition will be equal or less than the pre-development condition for all storm events.

The peak volumes of runoff are as follows:

Pre-Development vs. Post-Development Volumes of Runoff

Design Point	2 Year Storm **(3.29 Inches)**		10 Year Storm **(4.92 Inches)**		25 Year Storm **(6.19 Inches)**		100 Year Storm **(8.79 Inches)**	
	Exist. (ACRE-FT.)	**Prop. (ACRE-FT.)**	**Exist. (ACRE-FT.)**	**Prop. (ACRE-FT.)**	**Exist. (ACRE-FT.)**	**Prop. (ACRE-FT.)**	**Exist. (ACRE-FT.)**	**Prop. (ACRE-FT.)**
Design Point 1	*0.247*	0.227	*0.575*	0.523	*0.874*	0.805	*1.549*	1.432
Design Point 2	*0.011*	0.011	*0.029*	0.029	*0.046*	0.046	*0.085*	0.085
Design Point 3	*0.342*	0.342	*0.540*	0.540	*0.697*	0.697	*1.019*	1.019
Design								

Point 4	*0.949*	1.033	*1.523*	1.659	*1.980*	2.156	*2.927*	3.185

Standard 3 – Groundwater Recharge

Runoff will be recharged by the proposed rain garden, which will meet the Stormwater Guidelines for infiltration.

Groundwater Recharge Volume

Stormwater System	Soil Type	Target Depth Factor (F) (in)	Total Impervious Area (sf)	Required Recharge Volume (cf)[1]	Provided Recharge Volume (cf)[2]
	A	0.60	52,300	2,615	
1P					0
2P					4,365
				2,615 (2,615 ADJ.)	**4,365**

1. Required Recharge Volume = Target Depth Factor x Impervious Area / (d+Kt) (Refer to supplemental calculations in Appendix D)
2. Provided Recharge Volume = Volume Provided from Bottom of System to invert of overflow pipe.

Per Standard 3, if stormwater runoff from less than 100% of the site's impervious cover is directed to the BMP intended to infiltrate the Required Recharge Volume, then the storage capacity of the infiltration BMP needs to be increased so that the BMP can capture more of the runoff from the impervious surfaces located with the contributing drainage area. The impervious cover of the proposed addition directed towards the stormwater management system is 100.0%; therefore, a capture area adjustment was not required. Refer to Appendix D for Capture Area Adjustment calculations.

The proposed rain garden will provide both water quality treatment and recharge. Per Standard 4, Water Quality, the BMP must be sized to treat or hold the Target Volume, the larger of the Required Water Quality Volume and the Required Recharge Volume. The Required Water Quality Volume is based on the one-inch of runoff and the Required Recharge Volume is based on 0.60-inches (Soil Type A); therefore the Target Volume is the Required Water Quality Volume of 4,358 cubic feet. Refer to Appendix D supplemental calculations.

The proposed rain garden has been designed to completely drain within 72 hours. The drawdown analysis is based on the required recharge volume exfiltrating at the Rawls Rates based on the soil textural analysis conducted at the proposed exfiltration location. Refer to Appendix D for calculations.

Standard 4 – Water Quality

The Long-Term Pollution Prevention Plan has been incorporated into the Post-

Development Operation and Maintenance Plan. Refer to Appendix F for BMP Operation and Maintenance Plans.

The stormwater management system will be designed to be in full compliance with the Standards of the DEP Stormwater Management Policy. Runoff from the proposed building addition is considered “clean” and therefore does not require removal of Total Suspended Solids (TSS). Runoff from the proposed building addition will be conveyed directly to the stormwater detention system and the proposed rain garden. Approximately 25% of the proposed roof addition will be directed to the rain garden, the remaining 75% of the roof addition will be directed to the stormwater detention system. The stormwater detention system will release runoff from the proposed addition at a regulated rate while utilizing the existing outlet structure onsite. The proposed rain garden will recharge runoff into the surrounding native soils and includes an overflow rip-rap spillway directed at the existing parking area.

The existing treatment stream for the development which consists of deep sump hooded catch basins and infiltration drywells, and captures runoff from the bituminous concrete parking areas and adjacent landscaping, will be maintained.

The Water Quality Volume (WQV) to be treated is equal to the proposed impervious area draining to a water quality device multiplied by one half inch. The table below shows the volume required and provided with the proposed development. Refer to Appendix D for further calculations.

Water Quality Treatment Volume

Basin	**Required WQ Volume (cf)**	**Proposed WQ Volume (cf)**	
P-2	4,358	4,365	Rain Garden
	4,358	**4,365**	

Standard 5 – Land Use with Higher Potential Pollutant Loads (LUHPPL)

The proposed project does not include land uses with higher potential pollutant loads. Not Applicable.

Standard 6 – Critical Areas

The proposed project does not discharge to any critical areas. Not Applicable.

Standard 7 - Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

The proposed project is not a redevelopment project. Not Applicable.

Standard 8 – Construction Period Pollution Prevention and Erosion and Sedimentation Control

The project will require a NPDES Construction General Permit but the Stormwater Pollution Prevention Plan (SWPPP) has not been submitted. The SWPPP will be submitted prior to any proposed construction. A Construction Phase BMP Operation and Maintenance Plan will be provided as a basis for the SWPPP during final design.

Standard 9 – Operation and Maintenance 5Plan

The Long-Term Operation and Maintenance Plan is provided in Appendix F.

Standard 10 – Prohibition of Illicit Discharges

No illicit discharges are anticipated on site. An Illicit Discharge Compliance Statement will be submitted prior to the discharge of any stormwater to the post-construction best management practices. Measures to prevent illicit discharges will be included in the Long-Term Pollution Prevention Plan.

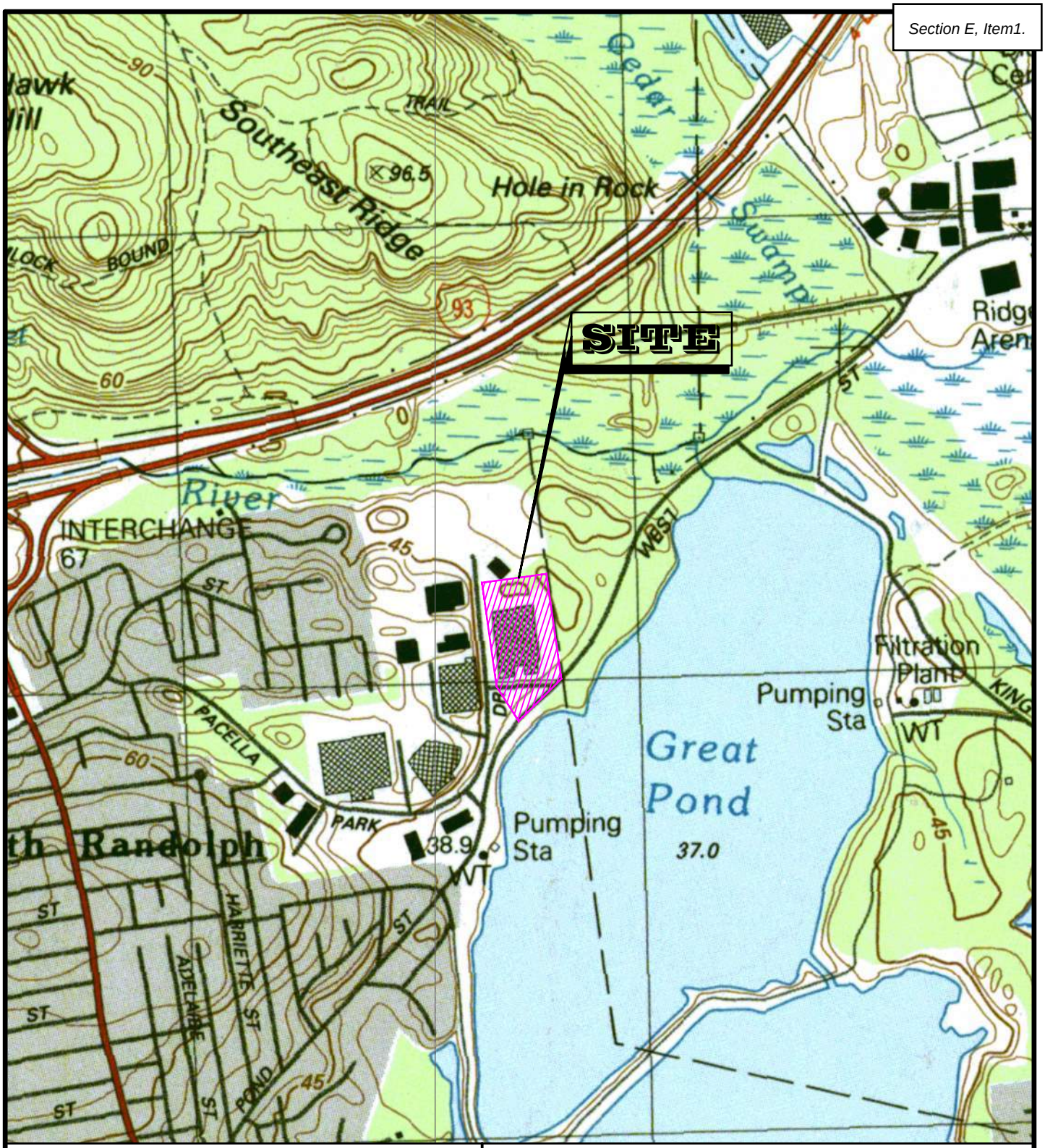

FIGURE - 1

0 1000' 2000' 2500'

U.S. GEOLOGICAL SURVEY
7.5 X 15 MINUTE SERIES

DATE: APRIL 4, 2024

MCKENZIE
ENGINEERING GROUP

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USGS LOCUS MAP

300 POND STREET
ASSESSOR'S PARCEL NUMBER 3-O-2.1
RANDOLPH, MASSACHUSETTS

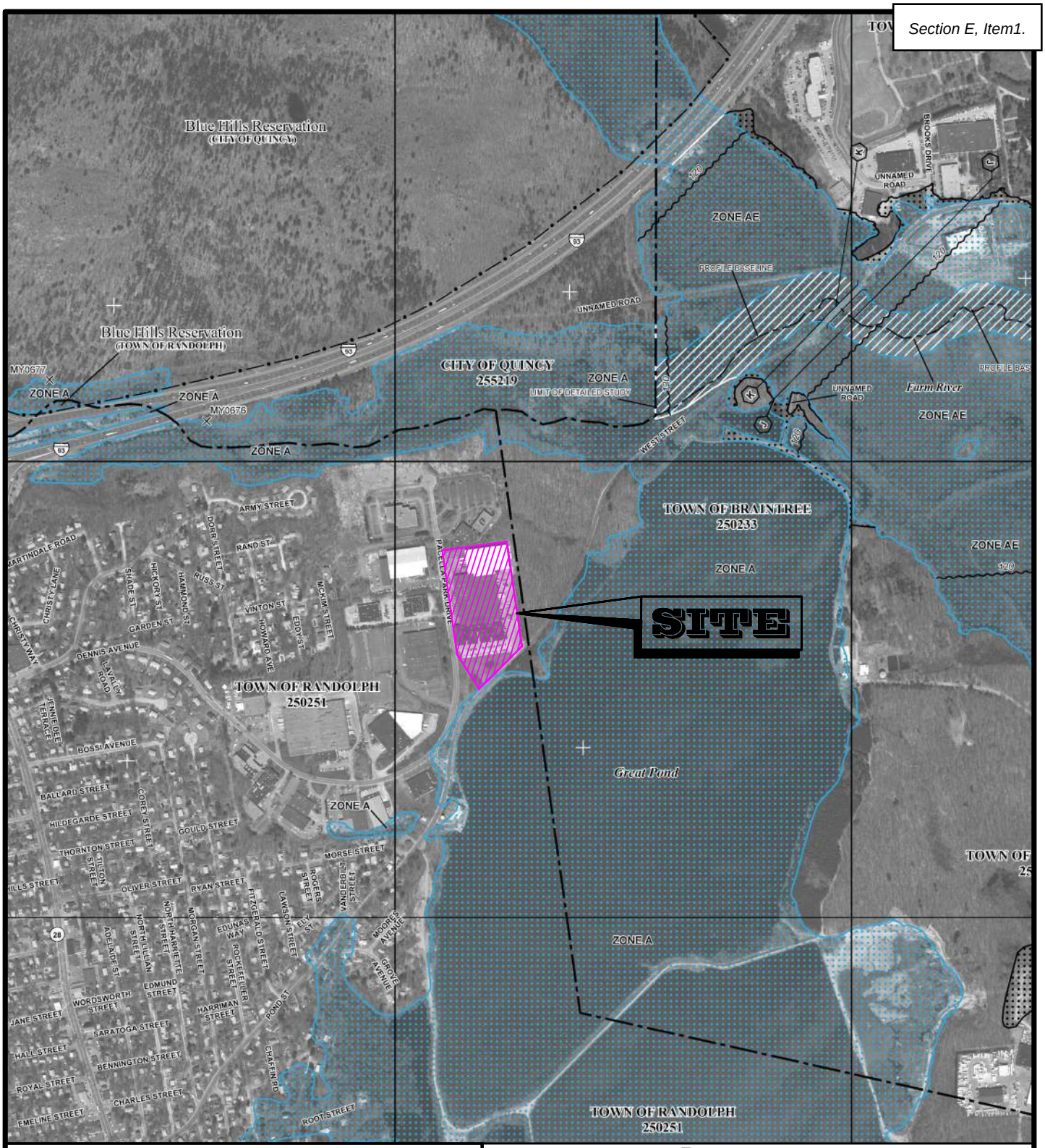

FIGURE - 2

0 250’ 500’ 625’

COMMUNITY PANEL NO: 25021C0208E
EFFECTIVE DATE: JULY 17, 2012

DATE: APRIL 4, 2024

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FEMA FLOOD MAP

300 POND STREET
ASSESSOR'S PARCEL NUMBER 3-O-2.1
RANDOLPH, MASSACHUSETTS

SOIL KEY

SOIL CLASSIFICATION	DESCRIPTION	HYDROLOGIC SOIL GROUP
104C	HOLLIS–ROCK OUTCROP–CHARLTON COMPLEX, 0–15% SLOPES	D
422B	CANTON FINE SANDY LOAM, 0–8% SLOPES, EXTREMELY STONY	B
654	UDORTHENTS, LOAMY	A

FIGURE - 3

0 500' 1000' 1250'

NRCS SOIL SURVEY
NORFOLK COUNTY

DATE: APRIL 4, 2024

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NRCS SOILS MAP

300 POND STREET
ASSESSOR'S PARCEL NUMBER 3-O-2.1
RANDOLPH, MASSACHUSETTS

FIGURE - 4

0 500' 1000' 1250'

Google Earth Imagery
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DATE: APRIL 4, 2024

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www.mckeng.com

AERIAL PHOTOGRAPH

300 POND STREET
ASSESSOR'S PARCEL NUMBER 3-O-2.1
RANDOLPH, MASSACHUSETTS

FIGURE - 5

0 500' 1000' 1250'

Google Earth Imagery
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DATE: APRIL 4, 2024

MCKENZIE ENGINEERING GROUP

Assinippi Office Park
150 Longwater Drive, Suite 101
Norwell, MA 02061
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NATIONAL HERITAGE AND ENDANGERED SPECIES MAP

300 POND STREET
ASSESSOR'S PARCEL NUMBER 3-O-2.1
RANDOLPH, MASSACHUSETTS

A P P E N D I X A

Pre-Development Condition

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point

Smoothing	Yes
State	
Location	
Latitude	42.203 degrees North
Longitude	71.05 degrees West
Elevation	40 feet
Date/Time	Thu Nov 16 2023 11:48:40 GMT-0500 (Eastern Standard Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day
1yr	0.29	0.44	0.54	0.71	0.89	1.12	**1yr**	0.77	1.07	1.30	1.66	2.12	2.72	3.03	**1yr**	2.41	2.91
2yr	0.36	0.55	0.69	0.90	1.14	1.43	**2yr**	0.98	1.32	1.66	2.08	2.62	3.29	3.66	**2yr**	2.91	3.52
5yr	0.43	0.67	0.84	1.13	1.44	1.84	**5yr**	1.25	1.66	2.13	2.67	3.33	4.14	4.66	**5yr**	3.66	4.48
10yr	0.49	0.77	0.98	1.33	1.73	2.21	**10yr**	1.49	1.97	2.57	3.21	3.98	4.92	5.60	**10yr**	4.35	5.39
25yr	0.59	0.93	1.19	1.65	2.19	2.83	**25yr**	1.89	2.47	3.29	4.11	5.07	6.19	7.14	**25yr**	5.48	6.87
50yr	0.68	1.09	1.40	1.96	2.63	3.41	**50yr**	2.27	2.94	3.98	4.95	6.08	7.37	8.59	**50yr**	6.53	8.26
100yr	0.78	1.27	1.64	2.32	3.16	4.12	**100yr**	2.73	3.50	4.80	5.97	7.29	8.79	10.33	**100yr**	7.78	9.94
200yr	0.91	1.48	1.92	2.75	3.80	4.97	**200yr**	3.28	4.16	5.81	7.20	8.74	10.48	12.44	**200yr**	9.27	11.96
500yr	1.12	1.84	2.40	3.47	4.85	6.37	**500yr**	4.19	5.24	7.44	9.19	11.12	13.23	15.90	**500yr**	11.71	15.29

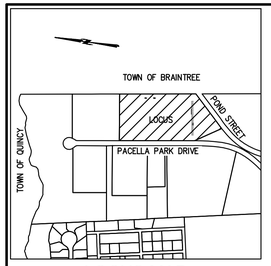
Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day
1yr	0.25	0.38	0.47	0.63	0.77	0.89	**1yr**	0.67	0.87	1.10	1.42	1.85	2.51	2.82	**1yr**	2.22	2.71
2yr	0.34	0.53	0.65	0.88	1.08	1.29	**2yr**	0.94	1.26	1.48	1.97	2.56	3.20	3.56	**2yr**	2.83	3.43
5yr	0.40	0.61	0.76	1.04	1.33	1.55	**5yr**	1.15	1.51	1.77	2.31	2.98	3.87	4.34	**5yr**	3.43	4.17
10yr	0.45	0.69	0.85	1.19	1.53	1.77	**10yr**	1.32	1.73	2.01	2.60	3.33	4.47	5.03	**10yr**	3.96	4.84
25yr	0.52	0.79	0.98	1.40	1.84	2.10	**25yr**	1.59	2.05	2.38	3.04	3.87	5.41	6.13	**25yr**	4.79	5.89
50yr	0.58	0.88	1.09	1.57	2.12	2.39	**50yr**	1.83	2.34	2.71	3.43	4.34	6.26	7.11	**50yr**	5.54	6.84
100yr	0.65	0.98	1.23	1.78	2.44	2.72	**100yr**	2.11	2.65	3.07	3.86	4.86	7.25	8.23	**100yr**	6.42	7.92
200yr	0.73	1.10	1.39	2.02	2.82	3.09	**200yr**	2.43	3.02	3.49	4.34	5.44	8.40	9.56	**200yr**	7.44	9.19
500yr	0.86	1.28	1.64	2.39	3.39	3.66	**500yr**	2.93	3.58	4.13	5.08	6.31	10.27	11.63	**500yr**	9.09	11.18

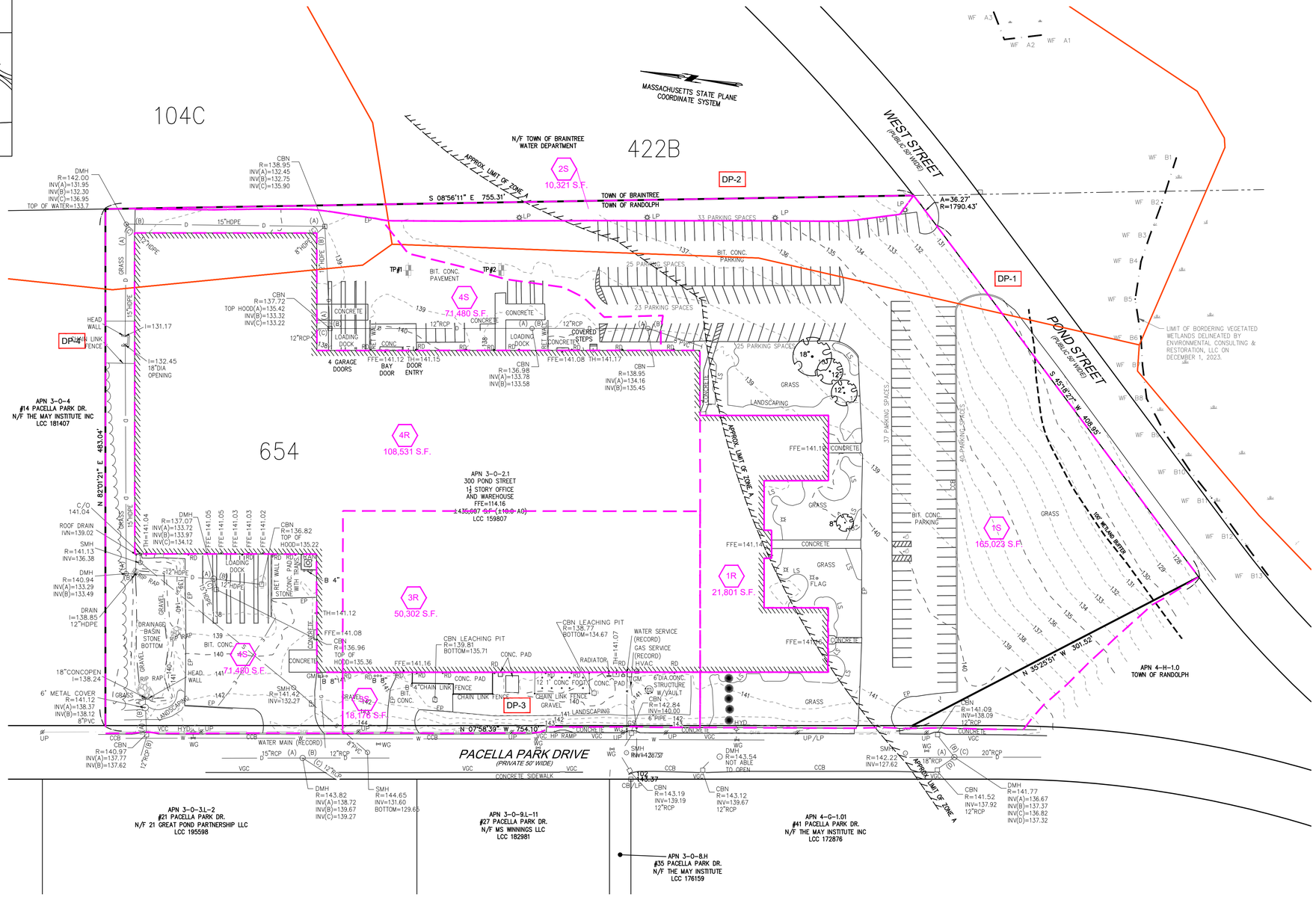
Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day
1yr	0.32	0.49	0.59	0.80	0.98	1.17	**1yr**	0.85	1.14	1.36	1.81	2.35	2.91	3.29	**1yr**	2.58	3.17
2yr	0.37	0.58	0.71	0.96	1.18	1.40	**2yr**	1.02	1.37	1.61	2.13	2.75	3.40	3.80	**2yr**	3.01	3.65
5yr	0.48	0.73	0.91	1.25	1.59	1.84	**5yr**	1.37	1.80	2.13	2.75	3.51	4.41	5.00	**5yr**	3.90	4.81
10yr	0.59	0.90	1.12	1.56	2.02	2.29	**10yr**	1.74	2.24	2.63	3.35	4.23	5.41	6.20	**10yr**	4.79	5.96
25yr	0.78	1.18	1.47	2.10	2.76	3.04	**25yr**	2.38	2.97	3.50	4.36	5.42	7.08	8.22	**25yr**	6.27	7.91
50yr	0.95	1.45	1.80	2.59	3.49	3.78	**50yr**	3.01	3.69	4.34	5.31	6.55	8.68	10.19	**50yr**	7.68	9.80
100yr	1.18	1.79	2.24	3.23	4.43	4.69	**100yr**	3.82	4.59	5.40	6.46	7.91	10.64	12.63	**100yr**	9.42	12.14
200yr	1.46	2.20	2.79	4.03	5.62	5.83	**200yr**	4.85	5.70	6.72	7.89	9.55	13.03	15.67	**200yr**	11.53	15.07
500yr	1.95	2.90	3.74	5.43	7.72	7.77	**500yr**	6.66	7.59	8.98	10.27	12.28	17.04	20.84	**500yr**	15.08	20.04

Powered by ACIS
Northeast Regional Climate Center



LOCUS MAP
Not to Scale



LEGEND

SURVEY SYMBOLS

CB/DH	□	CONCRETE BOUND WITH DRILL HOLE
SB	□	STONE BOUND
SB/DH	□	STONE BOUND

UTILITY SYMBOLS

	TRANSFORMER
	WATER GATE
EMH	ELECTRIC MANHOLE
SMH	SEWER MANHOLE
DMH	DRAIN MANHOLE
TMH	TELEPHONE MANHOLE
CBN	DRAINAGE CATCH BASIN
	HYDRANT
	UTILITY POLE
	BOLLARD
	SIGN

LINE DESIGNATORS

W	WATER MAIN
OHW	OVERHEAD WIRES
G	GAS LINE
WS	WATER SERVICE
E	UNDERGROUND ELECTRIC
D	STORM DRAIN LINE
S	SANITARY SEWER LINE
	DRAINAGE SWALE
X	CHAIN LINK FENCE

ABBREVIATIONS

FFE	FIRST FLOOR ELEVATION
BIT CONC.	BITUMINOUS CONCRETE PAVEMENT
CCB	CAPE COD BERM
EP	EDGE OF PAVEMENT
BC	BITUMINOUS CONCRETE CURB
RET WALL	RETAINING WALL
CONC.	CONCRETE
VGC	VERTICAL GRANITE CURB
VCC	VERTICAL CONCRETE CURB
FOOT	CONCRETE FOOTING

SURVEY NOTES:

1. LOCUS IS SHOWN AS PARCEL NUMBER 03-O-2.1 ON THE TOWN OF RANDOLPH ASSESSORS MAPS.
2. DEED TO LOCUS IS RECORDED IN THE NORFOLK COUNTY REGISTRY OF DEEDS LAND COURT AT CERTIFICATE #159807.
3. THIS SURVEY WAS MADE ON THE GROUND IN NOVEMBER OF 2022 AND UPDATED IN SEPTEMBER AND DECEMBER OF 2023 BY MCKENZIE ENGINEERING GROUP, INC.
4. ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.
5. WETLAND RESOURCE AREAS WERE DELINEATED BY ENVIRONMENTAL CONSULTING & RESTORATION, LLC ON DECEMBER 1, 2023.
6. LOCUS IS SITUATED IN ZONE X AS SHOWN ON F.I.R.M. No 25021C0208E, EFFECTIVE 7/17/2012.
7. LOCUS IS NOT LOCATED IN A DEP ZONE 2 OR TOWN OF RANDOLPH AQUIFER PROTECTION DISTRICT ZONE. A PORTION OF THE SITE IS LOCATED WITHIN A DEP ZONE A SURFACE WATER SUPPLY PROTECTION AREA.
8. UTILITY INFORMATION FROM ABOVE GROUND OBSERVED EVIDENCE IN CONJUNCTION WITH DIG SAFE MARKINGS AND RECORD PLANS. THE LAND SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN HEREON COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE LAND SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. BEFORE CONSTRUCTION CALL DIG SAFE SYSTEMS, INC. AT 1-888-344-7233.

7 PLAN REFERENCES: LCP 34183A
#953 OF 1963
#393 OF 1927 (POND STREET LAYOUT)
#256 OF 1923 (WEST STREET LAYOUT)

SOIL KEY

SOIL CLASSIFICATION	DESCRIPTION	HYDROLOGIC SOIL GROUP
104C	HOLLIS-ROCK OUTCROP-CHARLTON COMPLEX, 0-15% SLOPES	D
422B	CANTON FINE SANDY LOAM, 0-8% SLOPES EXTREMELY STONY	B
654	UDORTHENTS, LOAMY	A

LEGEND

- LIMIT OF WATERSHED
- TIME OF CONCENTRATION FLOW PATH
- LIMIT OF NRCS SOIL MAPPING

0 50 100 150

REV	DATE	DESCRIPTION	BY	APP

MCKENZIE ENGINEERING GROUP
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EXISTING CONDITIONS PLAN
300 POND STREET
RANDOLPH, MASSACHUSETTS

PROFESSIONAL SURVEYOR:

OWNERS/APPLICANT:
EMERSON - SWAN FLEXCON
300 POND STREET
RANDOLPH, MASSACHUSETTS

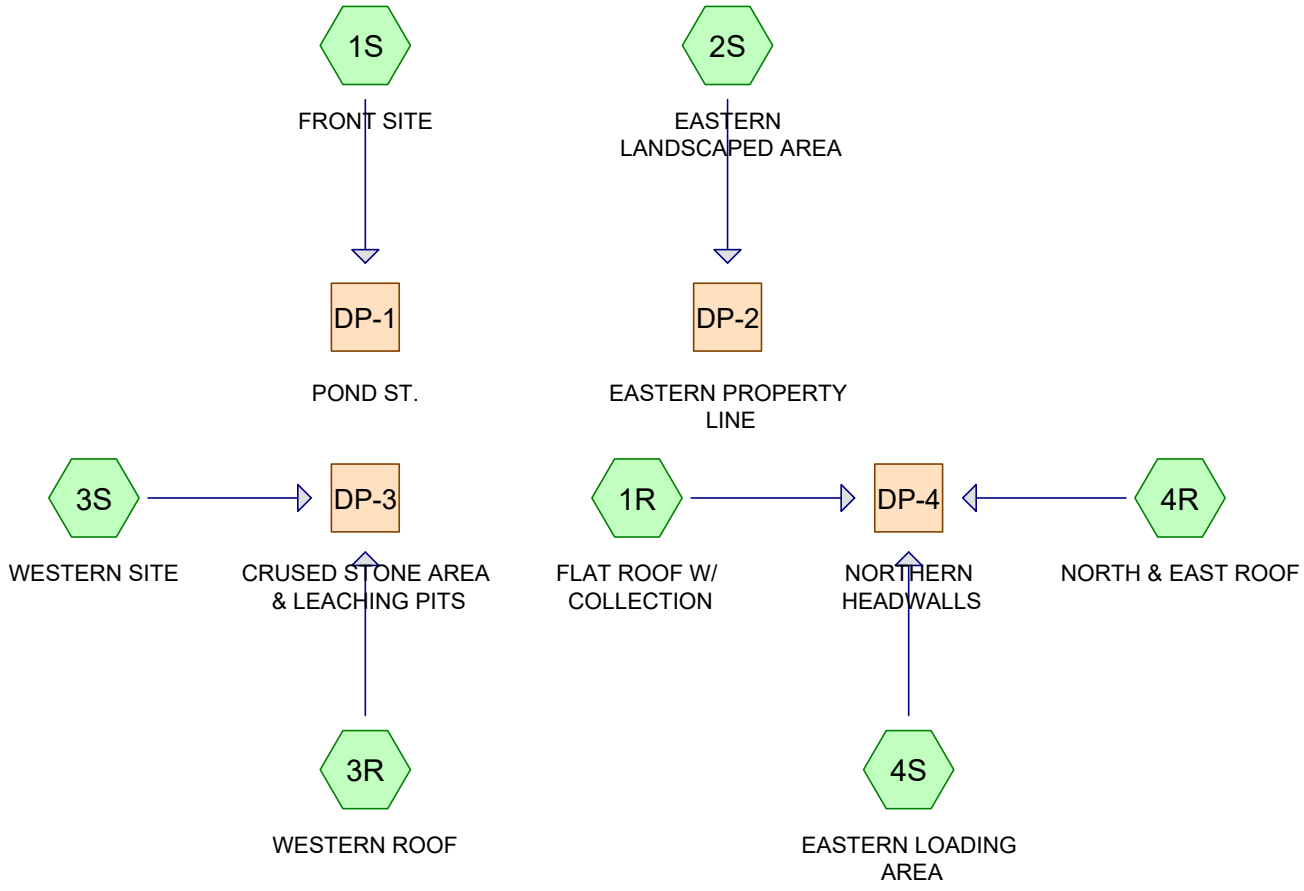
NOT FOR CONSTRUCTION

DRAWN BY:	ESS
DESIGNED BY:	ESS
CHECKED BY:	BCM
APPROVED BY:	BCM
DATE:	APRIL 12, 2024
SCALE:	1"=50'
PROJECT NO.:	222-209

DWG. TITLE:
PRE-DEV. WATERSHED PLAN

DWG. NO:
WS-1

M:\MEG\2022 PROJECTS\222-209 EMERSON SWAN-FLEXCON - 300 POND ST, RANDOLPH\DWGS\222-209 WS-1.DWG



Subcat Reach Pond Link

Routing Diagram for 222-209 PRE DEVELOPMENT
Prepared by McKenzie Engineering Group, Inc., Printed 4/22/2024
HydroCAD® 10.10-7a s/n 00452 © 2021 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.29	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.92	2
3	25-Year	Type III 24-hr		Default	24.00	1	6.19	2
4	100-Year	Type III 24-hr		Default	24.00	1	8.79	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.428	39	>75% Grass cover, Good, HSG A (1S, 3S, 4S)
0.233	61	>75% Grass cover, Good, HSG B (1S, 2S)
0.023	80	>75% Grass cover, Good, HSG D (2S)
0.270	96	Gravel surface, HSG A (3S, 4S)
2.280	98	Paved parking, HSG A (1S, 4S)
0.471	98	Paved parking, HSG B (1S, 4S)
0.156	98	Paved parking, HSG D (4S)
4.147	98	Roofs, HSG A (1R, 3R, 4R)
0.077	98	Unconnected pavement, HSG A (3S)
0.099	30	Woods, Good, HSG A (4S)
0.047	77	Woods, Good, HSG D (4S)
10.230	**82**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
9.301	HSG A	1R, 1S, 3R, 3S, 4R, 4S
0.703	HSG B	1S, 2S, 4S
0.000	HSG C	
0.226	HSG D	2S, 4S
0.000	Other	
10.230		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
2.428	0.233	0.000	0.023	0.000	2.684	>75% Grass cover, Good	1S, 2S, 3S, 4S
0.270	0.000	0.000	0.000	0.000	0.270	Gravel surface	3S, 4S
2.280	0.471	0.000	0.156	0.000	2.906	Paved parking	1S, 4S
4.147	0.000	0.000	0.000	0.000	4.147	Roofs	1R, 3R, 4R
0.077	0.000	0.000	0.000	0.000	0.077	Unconnected pavement	3S
0.099	0.000	0.000	0.047	0.000	0.146	Woods, Good	4S
9.301	**0.703**	**0.000**	**0.226**	**0.000**	**10.230**	**TOTAL AREA**	

Time span=5.00-48.00 hrs, dt=0.05 hrs, 861 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1R: FLAT ROOF W/ Runoff Area=21,801 sf 100.00% Impervious Runoff Depth>3.00"
Tc=6.0 min CN=98 Runoff=1.56 cfs 0.125 af

Subcatchment1S: FRONT SITE Runoff Area=165,023 sf 48.15% Impervious Runoff Depth=0.78"
Tc=6.0 min CN=68 Runoff=2.98 cfs 0.247 af

Subcatchment2S: EASTERN Runoff Area=10,320 sf 0.00% Impervious Runoff Depth=0.56"
Tc=6.0 min CN=63 Runoff=0.11 cfs 0.011 af

Subcatchment3R: WESTERN ROOF Runoff Area=50,302 sf 100.00% Impervious Runoff Depth>3.00"
Tc=6.0 min CN=98 Runoff=3.60 cfs 0.289 af

Subcatchment3S: WESTERN SITE Runoff Area=18,176 sf 18.54% Impervious Runoff Depth=1.54"
Tc=6.0 min UI Adjusted CN=81 Runoff=0.74 cfs 0.054 af

Subcatchment4R: NORTH & EAST Runoff Area=108,531 sf 100.00% Impervious Runoff Depth>3.00"
Tc=6.0 min CN=98 Runoff=7.78 cfs 0.623 af

Subcatchment4S: EASTERN LOADING Runoff Area=71,480 sf 65.94% Impervious Runoff Depth=1.47"
Tc=6.0 min CN=80 Runoff=2.76 cfs 0.201 af

Reach DP-1: POND ST. Inflow=2.98 cfs 0.247 af
Outflow=2.98 cfs 0.247 af

Reach DP-2: EASTERN PROPERTY LINE Inflow=0.11 cfs 0.011 af
Outflow=0.11 cfs 0.011 af

Reach DP-3: CRUSED STONE AREA & LEACHING PITS Inflow=4.34 cfs 0.342 af
Outflow=4.34 cfs 0.342 af

Reach DP-4: NORTHERN HEADWALLS Inflow=12.08 cfs 0.949 af
Outflow=12.08 cfs 0.949 af

Total Runoff Area = 10.230 ac Runoff Volume = 1.549 af Average Runoff Depth = 1.82"
30.30% Pervious = 3.100 ac 69.70% Impervious = 7.130 ac

Summary for Subcatchment 1R: FLAT ROOF W/ COLLECTION

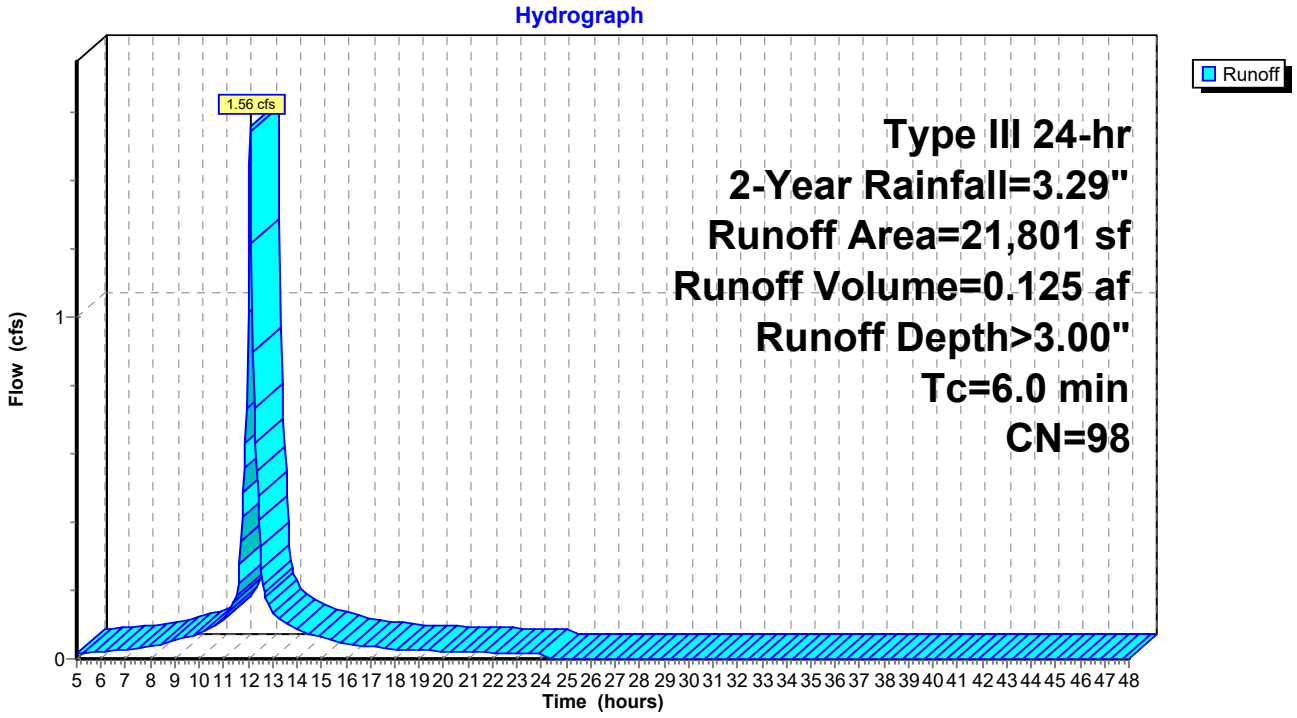
Runoff = 1.56 cfs @ 12.09 hrs, Volume= 0.125 af, Depth> 3.00"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
21,801	98	Roofs, HSG A
21,801		100.00% Impervious Area

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

Subcatchment 1R: FLAT ROOF W/ COLLECTION



Summary for Subcatchment 1S: FRONT SITE

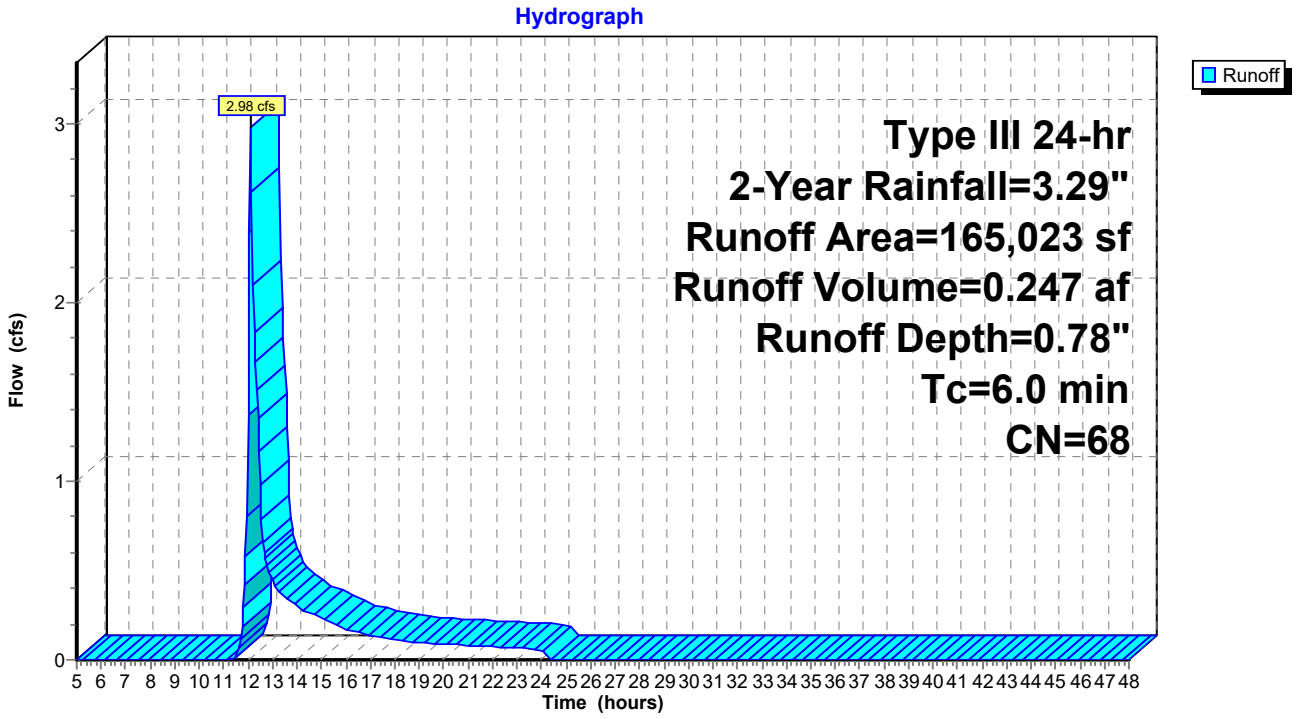
Runoff = 2.98 cfs @ 12.11 hrs, Volume= 0.247 af, Depth= 0.78"
Routed to Reach DP-1 : POND ST.

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
84,758	39	>75% Grass cover, Good, HSG A
809	61	>75% Grass cover, Good, HSG B
20,445	98	Paved parking, HSG B
59,011	98	Paved parking, HSG A
165,023	68	Weighted Average
85,567		51.85% Pervious Area
79,456		48.15% Impervious Area

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

Subcatchment 1S: FRONT SITE



Summary for Subcatchment 2S: EASTERN LANDSCAPED AREA

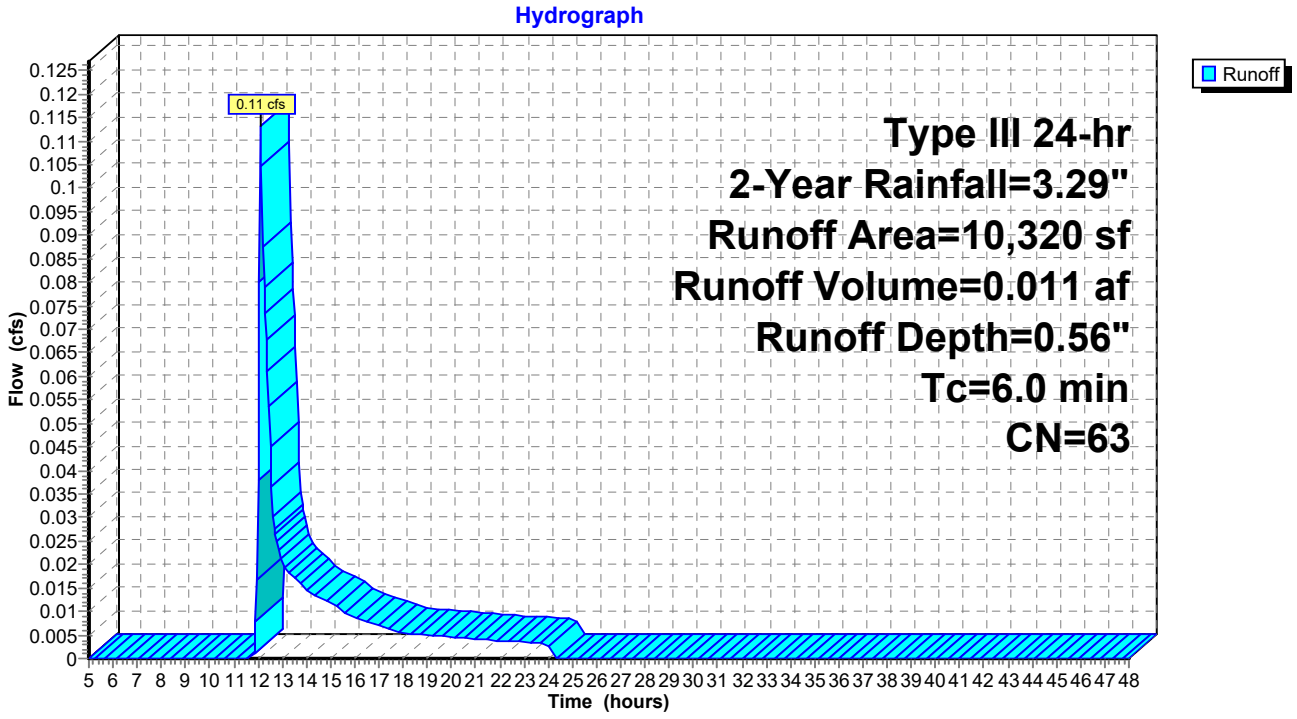
Runoff = 0.11 cfs @ 12.12 hrs, Volume= 0.011 af, Depth= 0.56"
Routed to Reach DP-2 : EASTERN PROPERTY LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
9,320	61	>75% Grass cover, Good, HSG B
1,000	80	>75% Grass cover, Good, HSG D
10,320	63	Weighted Average
10,320		100.00% Pervious Area

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

Subcatchment 2S: EASTERN LANDSCAPED AREA



Summary for Subcatchment 3R: WESTERN ROOF

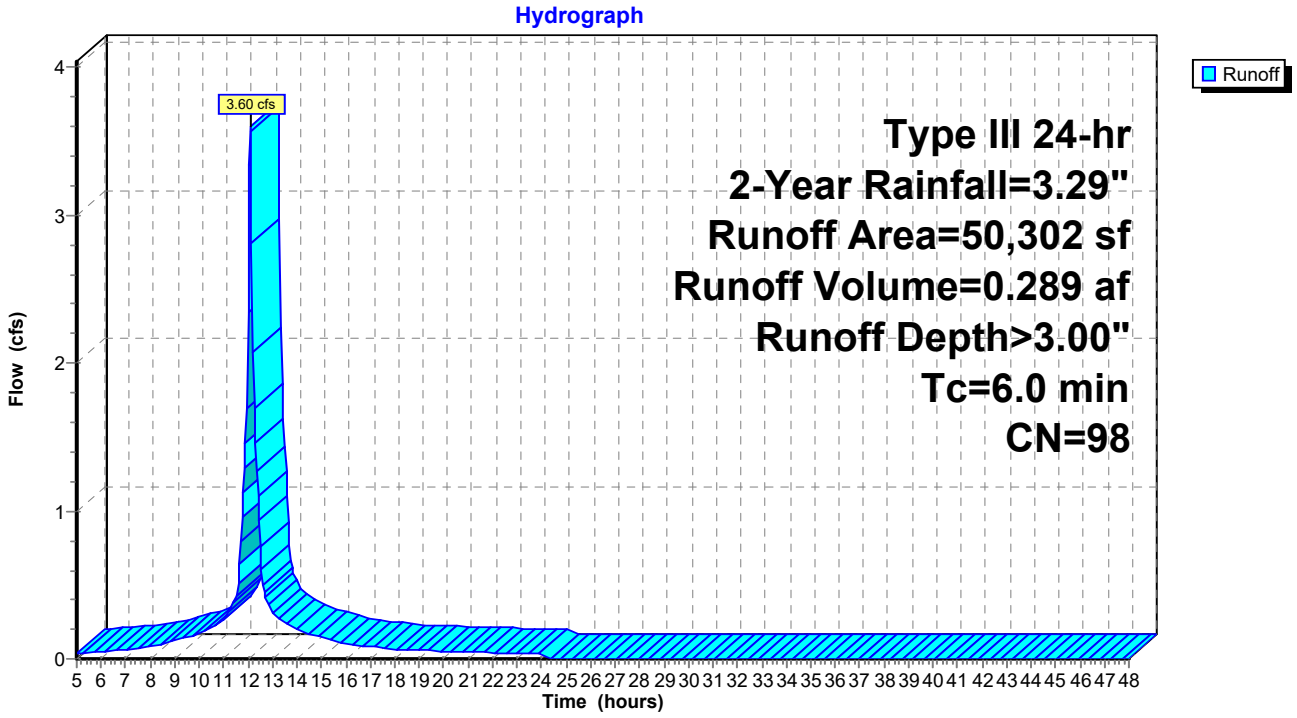
Runoff = 3.60 cfs @ 12.09 hrs, Volume= 0.289 af, Depth> 3.00"
Routed to Reach DP-3 : CRUSED STONE AREA & LEACHING PITS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
50,302	98	Roofs, HSG A
50,302		100.00% Impervious Area

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

Subcatchment 3R: WESTERN ROOF



Summary for Subcatchment 3S: WESTERN SITE

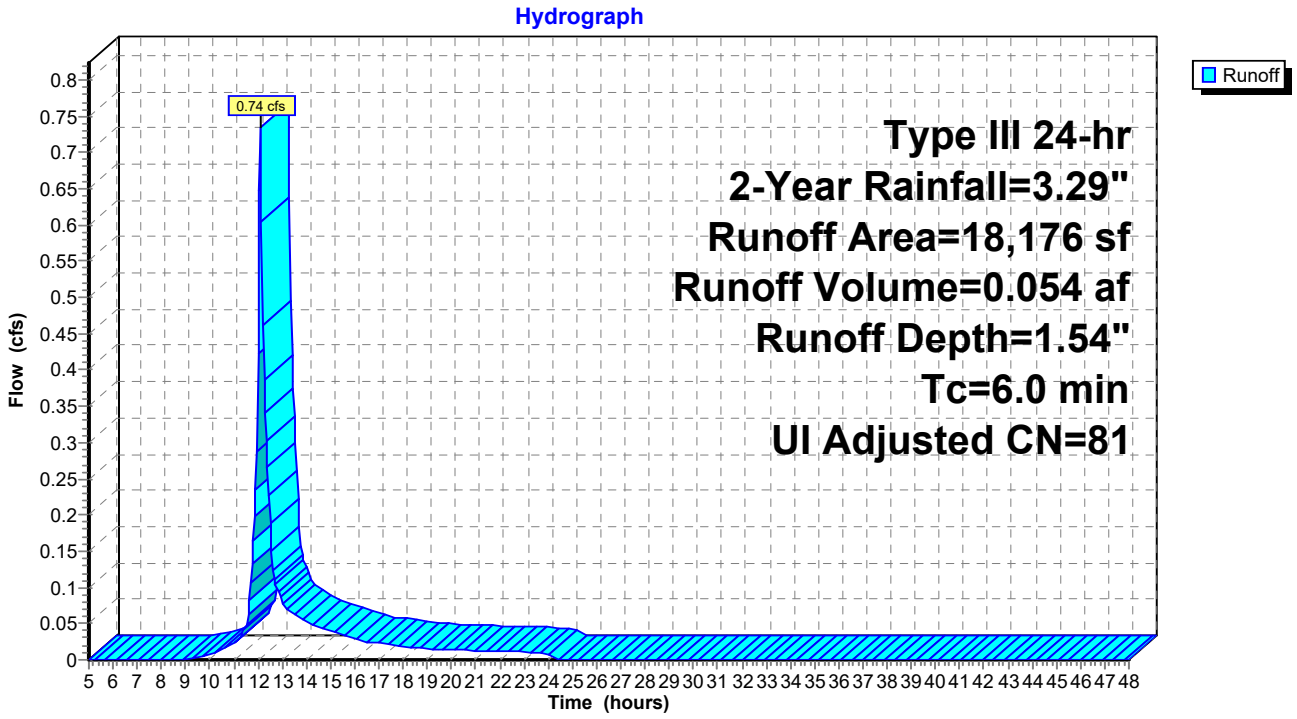
Runoff = 0.74 cfs @ 12.09 hrs, Volume= 0.054 af, Depth= 1.54"
Routed to Reach DP-3 : CRUSED STONE AREA & LEACHING PITS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Adj	Description
3,370	98		Unconnected pavement, HSG A
10,363	96		Gravel surface, HSG A
4,443	39		>75% Grass cover, Good, HSG A
18,176	82	81	Weighted Average, UI Adjusted
14,806			81.46% Pervious Area
3,370			18.54% Impervious Area
3,370			100.00% Unconnected

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

Subcatchment 3S: WESTERN SITE



Summary for Subcatchment 4R: NORTH & EAST ROOF

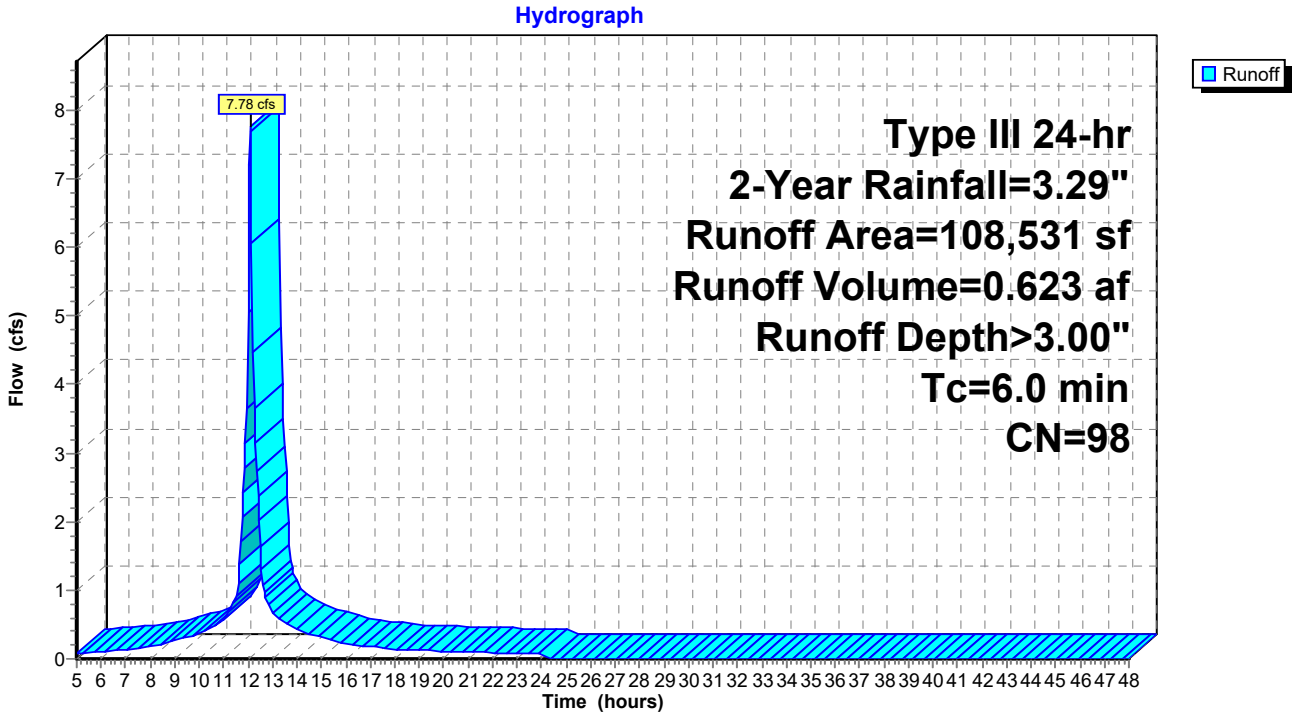
Runoff = 7.78 cfs @ 12.09 hrs, Volume= 0.623 af, Depth> 3.00"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
108,531	98	Roofs, HSG A
108,531		100.00% Impervious Area

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

Subcatchment 4R: NORTH & EAST ROOF



Summary for Subcatchment 4S: EASTERN LOADING AREA

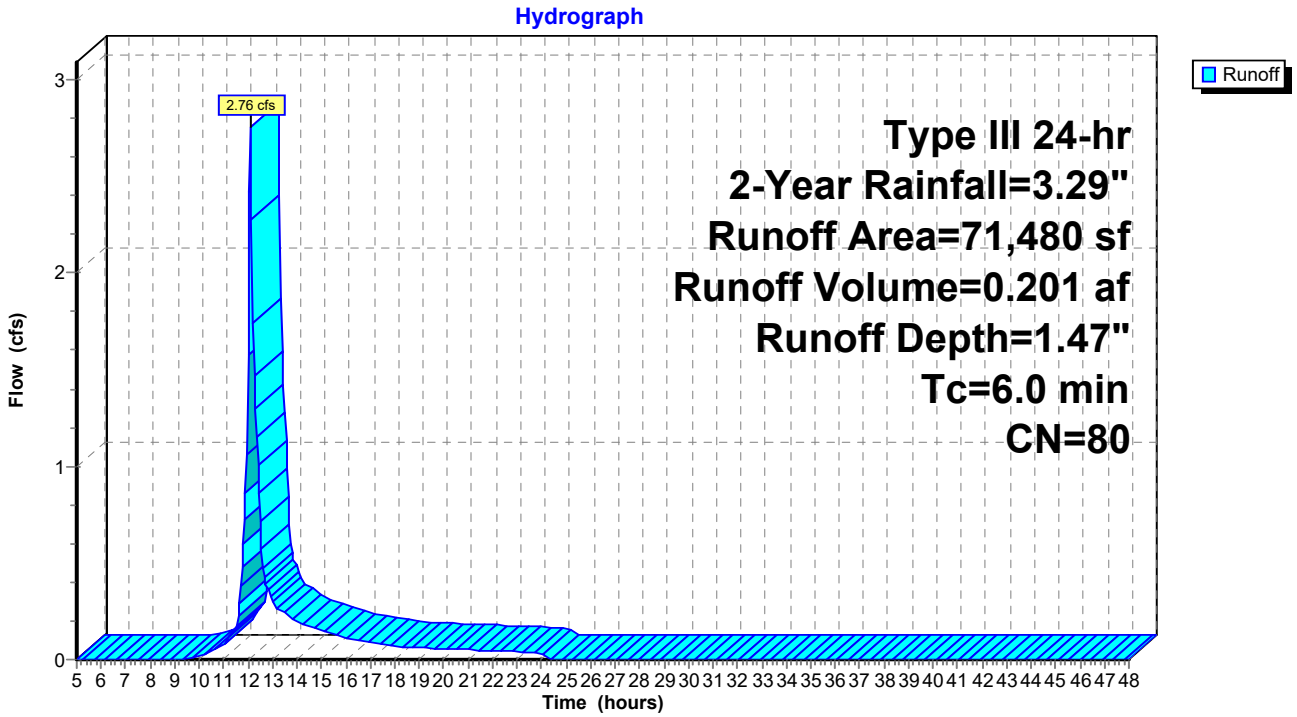
Runoff = 2.76 cfs @ 12.10 hrs, Volume= 0.201 af, Depth= 1.47"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
40,295	98	Paved parking, HSG A
55	98	Paved parking, HSG B
6,783	98	Paved parking, HSG D
4,315	30	Woods, Good, HSG A
2,050	77	Woods, Good, HSG D
16,572	39	>75% Grass cover, Good, HSG A
1,410	96	Gravel surface, HSG A
71,480	80	Weighted Average
24,347		34.06% Pervious Area
47,133		65.94% Impervious Area

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

Subcatchment 4S: EASTERN LOADING AREA



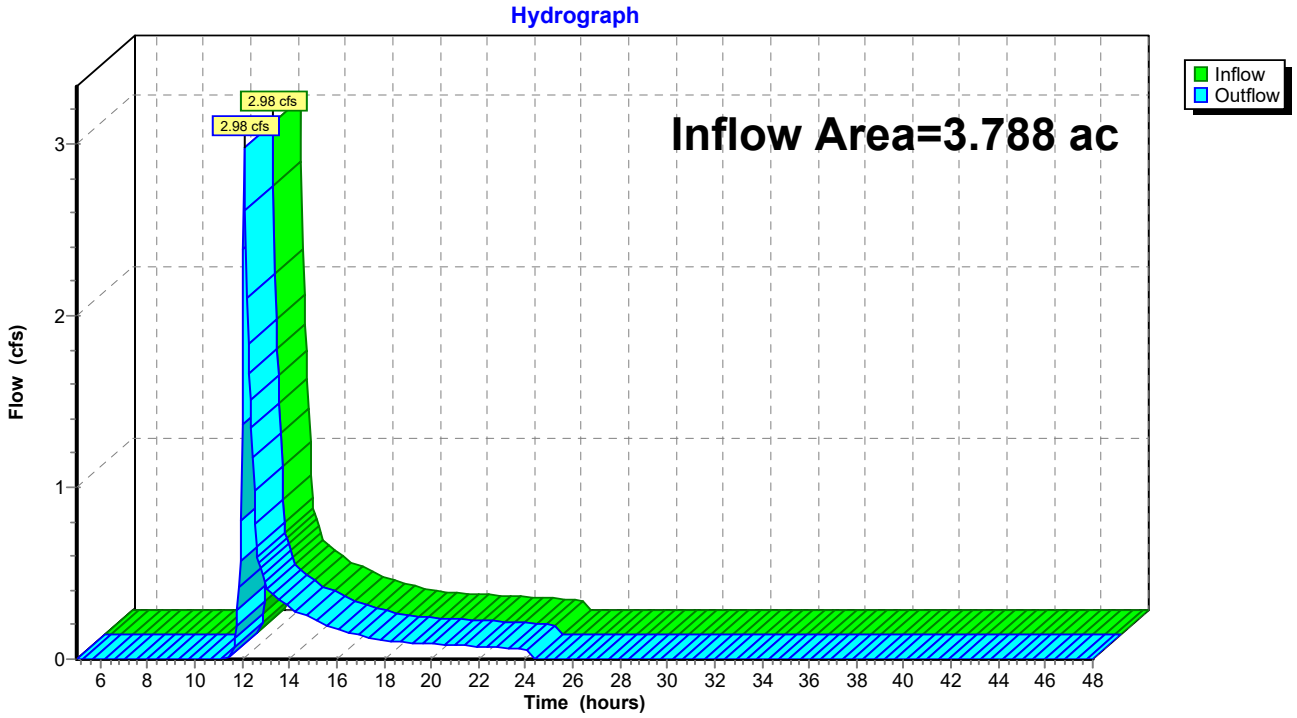
Summary for Reach DP-1: POND ST.

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

Inflow Area = 3.788 ac, 48.15% Impervious, Inflow Depth = 0.78" for 2-Year event
Inflow = 2.98 cfs @ 12.11 hrs, Volume= 0.247 af
Outflow = 2.98 cfs @ 12.11 hrs, Volume= 0.247 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-1: POND ST.



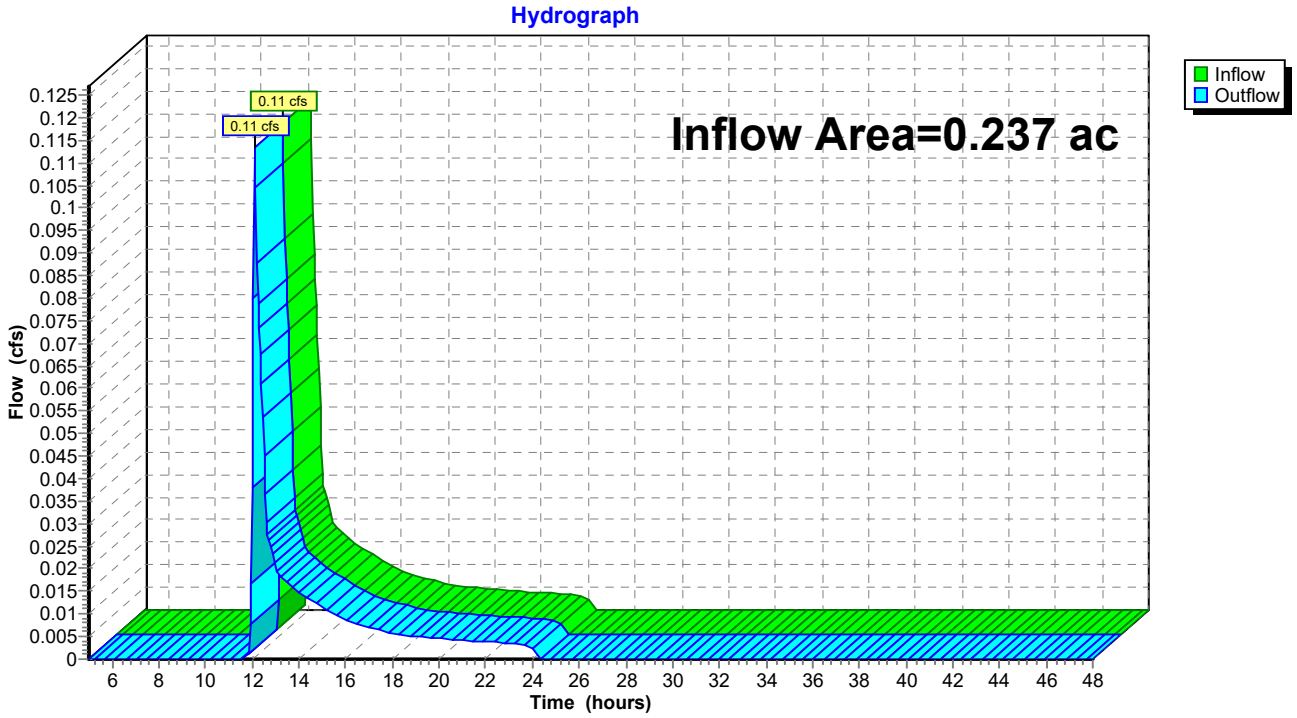
Summary for Reach DP-2: EASTERN PROPERTY LINE

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

Inflow Area = 0.237 ac, 0.00% Impervious, Inflow Depth = 0.56" for 2-Year event
Inflow = 0.11 cfs @ 12.12 hrs, Volume= 0.011 af
Outflow = 0.11 cfs @ 12.12 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-2: EASTERN PROPERTY LINE



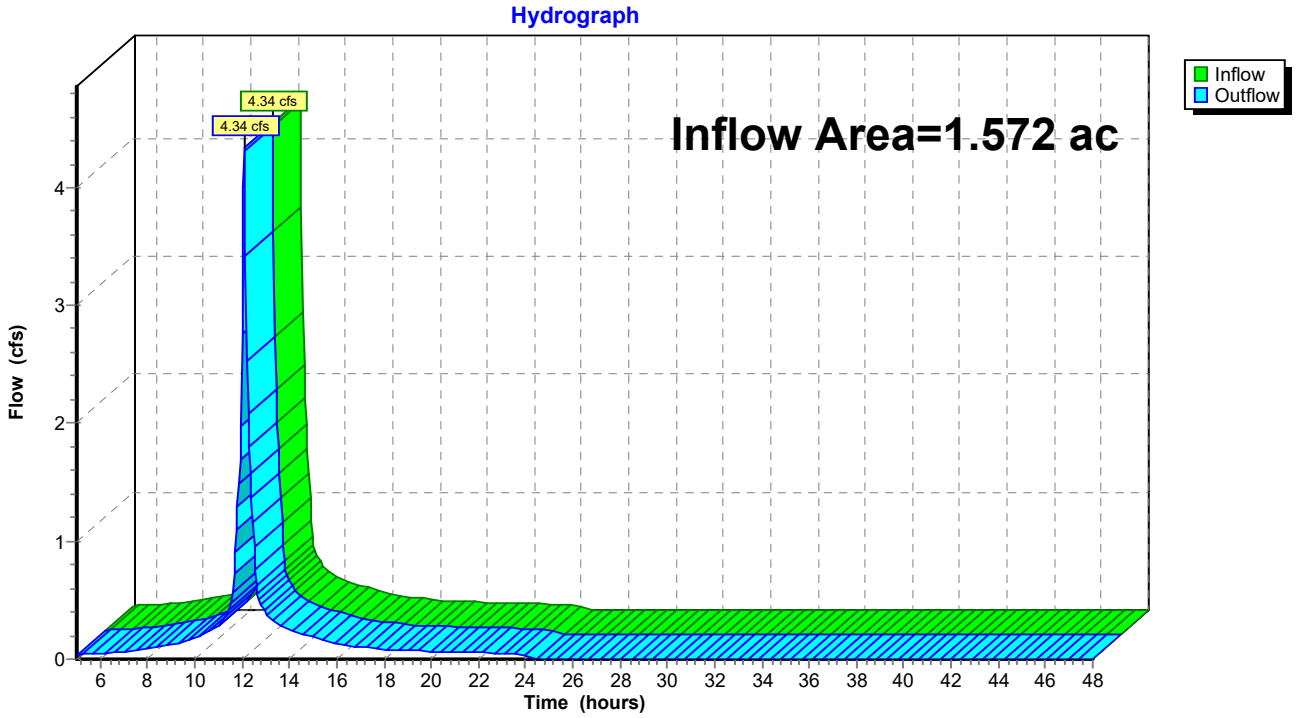
Summary for Reach DP-3: CRUSED STONE AREA & LEACHING PITS

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

Inflow Area = 1.572 ac, 78.38% Impervious, Inflow Depth > 2.61" for 2-Year event
Inflow = 4.34 cfs @ 12.09 hrs, Volume= 0.342 af
Outflow = 4.34 cfs @ 12.09 hrs, Volume= 0.342 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-3: CRUSED STONE AREA & LEACHING PITS



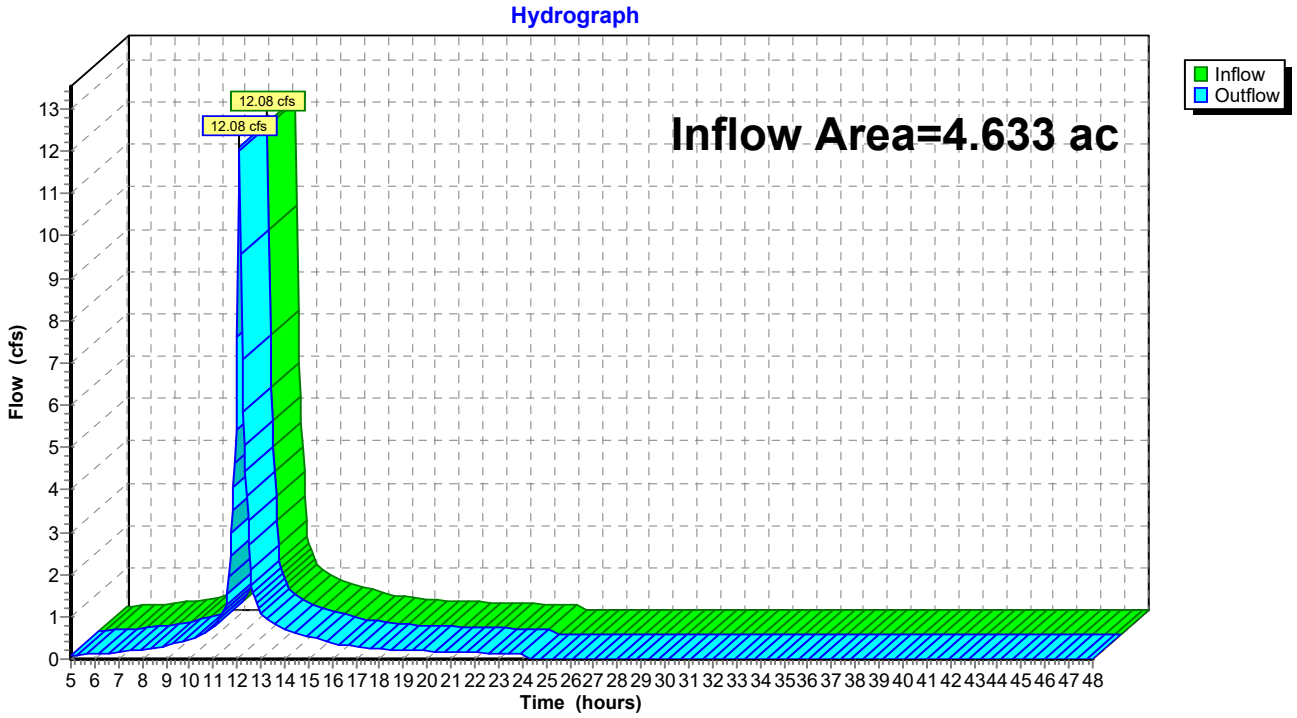
Summary for Reach DP-4: NORTHERN HEADWALLS

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

Inflow Area = 4.633 ac, 87.94% Impervious, Inflow Depth > 2.46" for 2-Year event
Inflow = 12.08 cfs @ 12.09 hrs, Volume= 0.949 af
Outflow = 12.08 cfs @ 12.09 hrs, Volume= 0.949 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-4: NORTHERN HEADWALLS



Time span=5.00-48.00 hrs, dt=0.05 hrs, 861 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1R: FLAT ROOF W/ Runoff Area=21,801 sf 100.00% Impervious Runoff Depth>4.56"
Tc=6.0 min CN=98 Runoff=2.35 cfs 0.190 af

Subcatchment1S: FRONT SITE Runoff Area=165,023 sf 48.15% Impervious Runoff Depth=1.82"
Tc=6.0 min CN=68 Runoff=7.72 cfs 0.575 af

Subcatchment2S: EASTERN Runoff Area=10,320 sf 0.00% Impervious Runoff Depth=1.46"
Tc=6.0 min CN=63 Runoff=0.37 cfs 0.029 af

Subcatchment3R: WESTERN ROOF Runoff Area=50,302 sf 100.00% Impervious Runoff Depth>4.56"
Tc=6.0 min CN=98 Runoff=5.43 cfs 0.439 af

Subcatchment3S: WESTERN SITE Runoff Area=18,176 sf 18.54% Impervious Runoff Depth=2.91"
Tc=6.0 min UI Adjusted CN=81 Runoff=1.40 cfs 0.101 af

Subcatchment4R: NORTH & EAST Runoff Area=108,531 sf 100.00% Impervious Runoff Depth>4.56"
Tc=6.0 min CN=98 Runoff=11.71 cfs 0.947 af

Subcatchment4S: EASTERN LOADING Runoff Area=71,480 sf 65.94% Impervious Runoff Depth=2.82"
Tc=6.0 min CN=80 Runoff=5.32 cfs 0.386 af

Reach DP-1: POND ST. Inflow=7.72 cfs 0.575 af
Outflow=7.72 cfs 0.575 af

Reach DP-2: EASTERN PROPERTY LINE Inflow=0.37 cfs 0.029 af
Outflow=0.37 cfs 0.029 af

Reach DP-3: CRUSED STONE AREA & LEACHING PITS Inflow=6.82 cfs 0.540 af
Outflow=6.82 cfs 0.540 af

Reach DP-4: NORTHERN HEADWALLS Inflow=19.37 cfs 1.523 af
Outflow=19.37 cfs 1.523 af

Total Runoff Area = 10.230 ac Runoff Volume = 2.668 af Average Runoff Depth = 3.13"
30.30% Pervious = 3.100 ac 69.70% Impervious = 7.130 ac

Summary for Subcatchment 1R: FLAT ROOF W/ COLLECTION

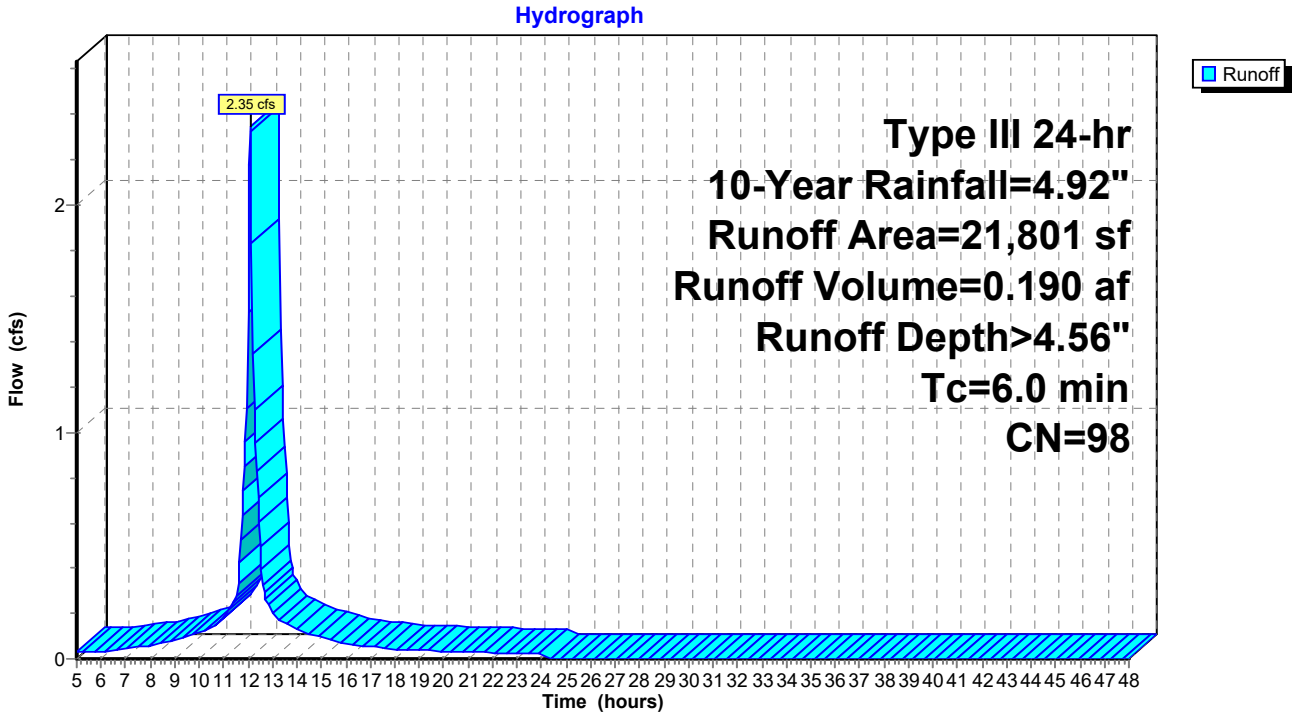
Runoff = 2.35 cfs @ 12.09 hrs, Volume= 0.190 af, Depth> 4.56"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.92"

Area (sf)	CN	Description
21,801	98	Roofs, HSG A
21,801		100.00% Impervious Area

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

Subcatchment 1R: FLAT ROOF W/ COLLECTION



Summary for Subcatchment 1S: FRONT SITE

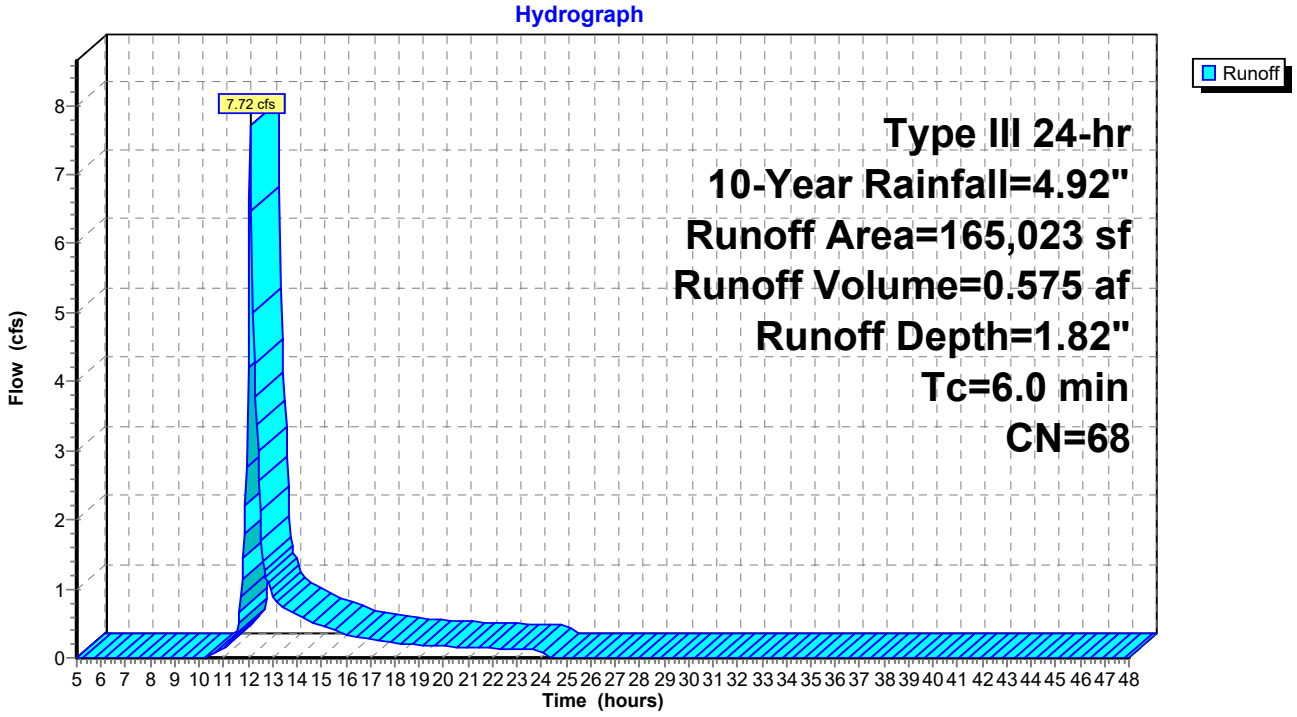
Runoff = 7.72 cfs @ 12.10 hrs, Volume= 0.575 af, Depth= 1.82"
Routed to Reach DP-1 : POND ST.

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.92"

Area (sf)	CN	Description
84,758	39	>75% Grass cover, Good, HSG A
809	61	>75% Grass cover, Good, HSG B
20,445	98	Paved parking, HSG B
59,011	98	Paved parking, HSG A
165,023	68	Weighted Average
85,567		51.85% Pervious Area
79,456		48.15% Impervious Area

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

Subcatchment 1S: FRONT SITE



Summary for Subcatchment 2S: EASTERN LANDSCAPED AREA

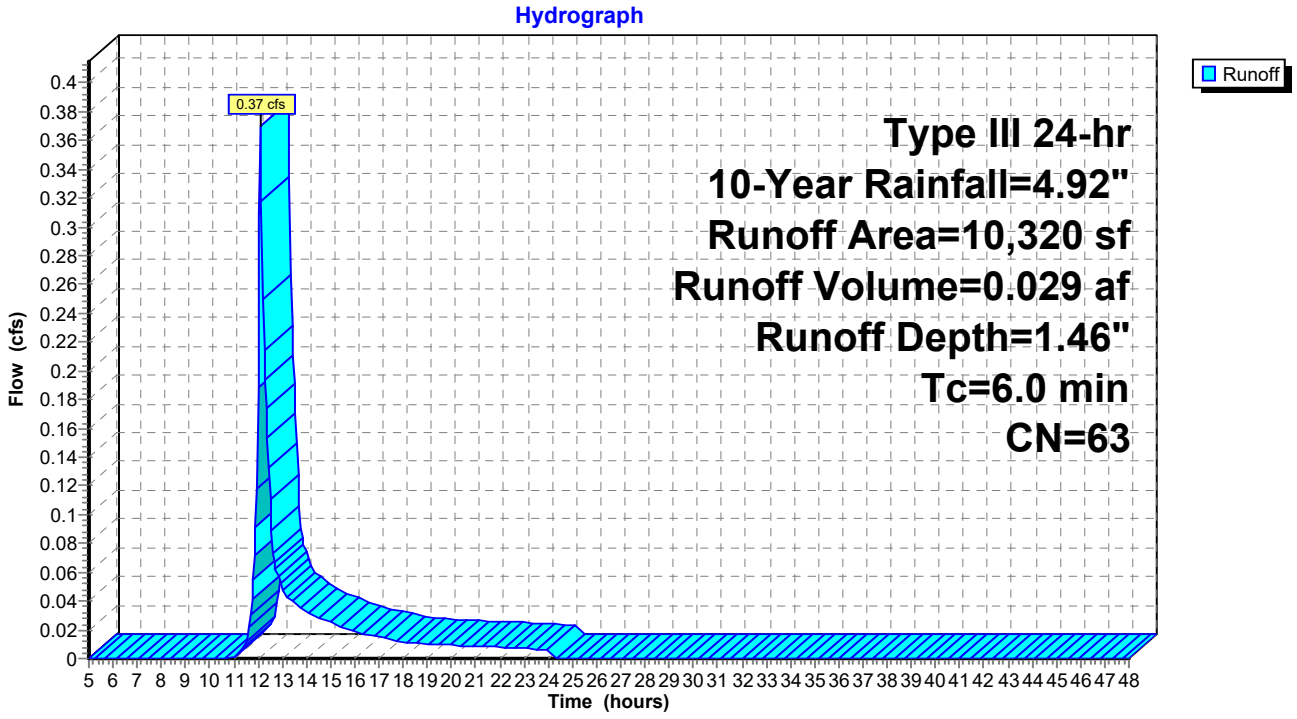
Runoff = 0.37 cfs @ 12.10 hrs, Volume= 0.029 af, Depth= 1.46"
Routed to Reach DP-2 : EASTERN PROPERTY LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.92"

Area (sf)	CN	Description
9,320	61	>75% Grass cover, Good, HSG B
1,000	80	>75% Grass cover, Good, HSG D
10,320	63	Weighted Average
10,320		100.00% Pervious Area

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

Subcatchment 2S: EASTERN LANDSCAPED AREA



Summary for Subcatchment 3R: WESTERN ROOF

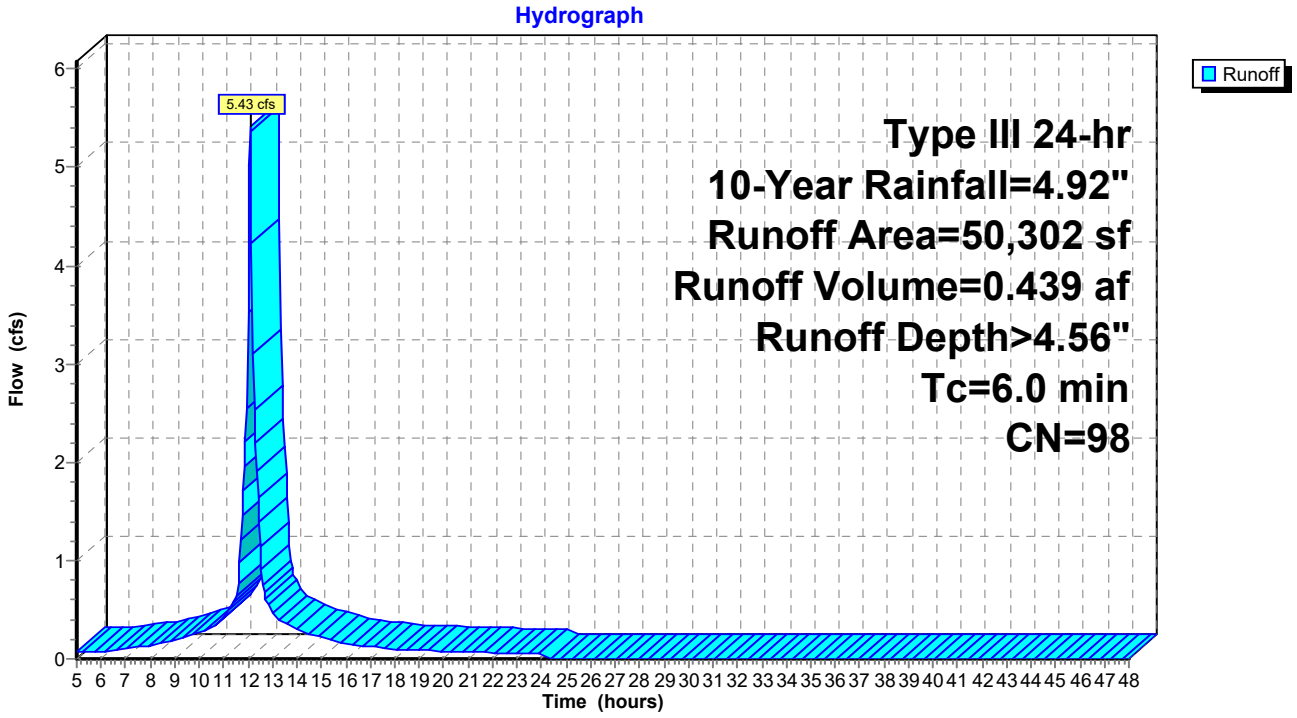
Runoff = 5.43 cfs @ 12.09 hrs, Volume= 0.439 af, Depth> 4.56"
Routed to Reach DP-3 : CRUSED STONE AREA & LEACHING PITS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.92"

Area (sf)	CN	Description
50,302	98	Roofs, HSG A
50,302		100.00% Impervious Area

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

Subcatchment 3R: WESTERN ROOF



Summary for Subcatchment 3S: WESTERN SITE

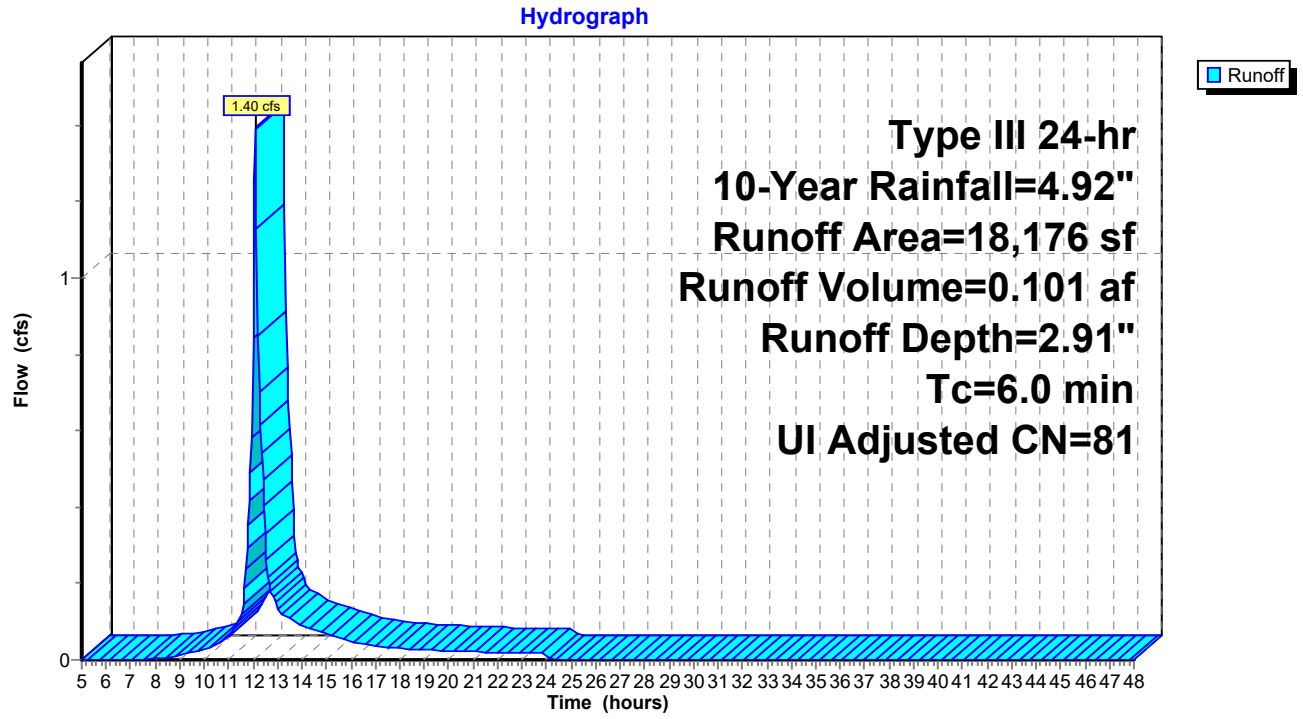
Runoff = 1.40 cfs @ 12.09 hrs, Volume= 0.101 af, Depth= 2.91"
Routed to Reach DP-3 : CRUSED STONE AREA & LEACHING PITS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.92"

Area (sf)	CN	Adj	Description
3,370	98		Unconnected pavement, HSG A
10,363	96		Gravel surface, HSG A
4,443	39		>75% Grass cover, Good, HSG A
18,176	82	81	Weighted Average, UI Adjusted
14,806			81.46% Pervious Area
3,370			18.54% Impervious Area
3,370			100.00% Unconnected

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

Subcatchment 3S: WESTERN SITE



Summary for Subcatchment 4R: NORTH & EAST ROOF

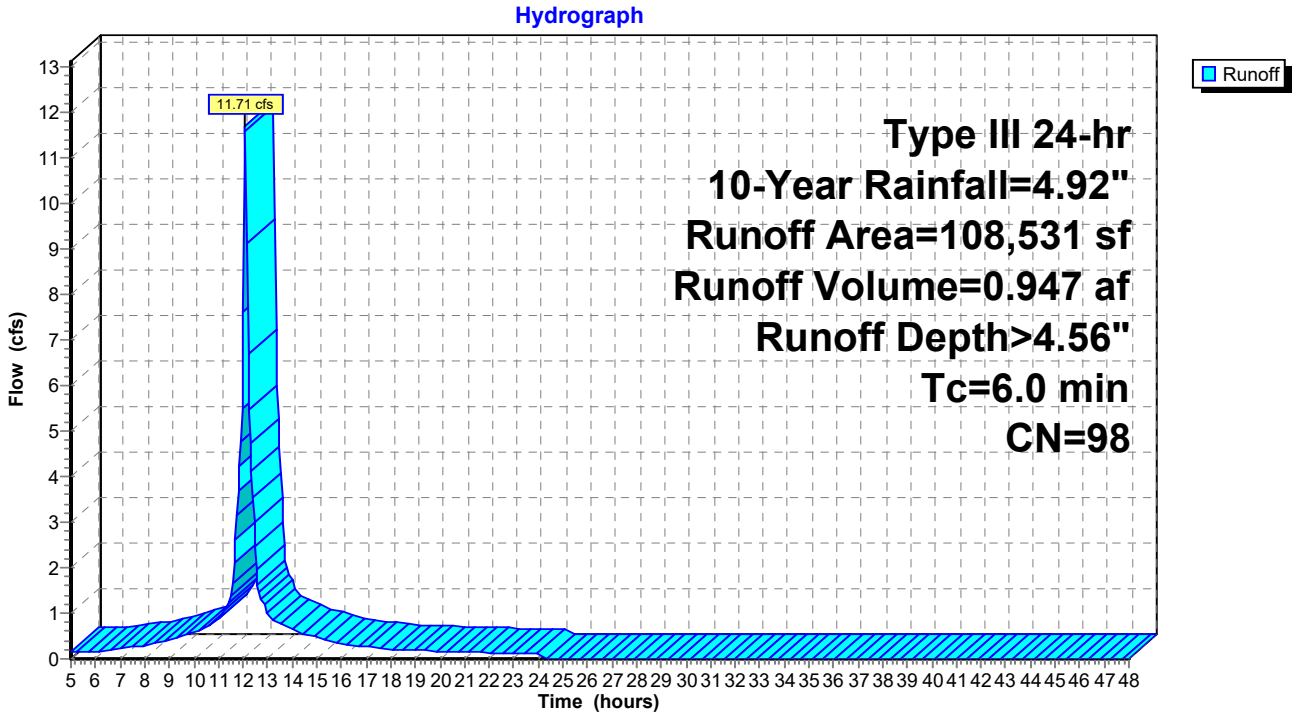
Runoff = 11.71 cfs @ 12.09 hrs, Volume= 0.947 af, Depth> 4.56"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.92"

Area (sf)	CN	Description
108,531	98	Roofs, HSG A
108,531		100.00% Impervious Area

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

Subcatchment 4R: NORTH & EAST ROOF



Summary for Subcatchment 4S: EASTERN LOADING AREA

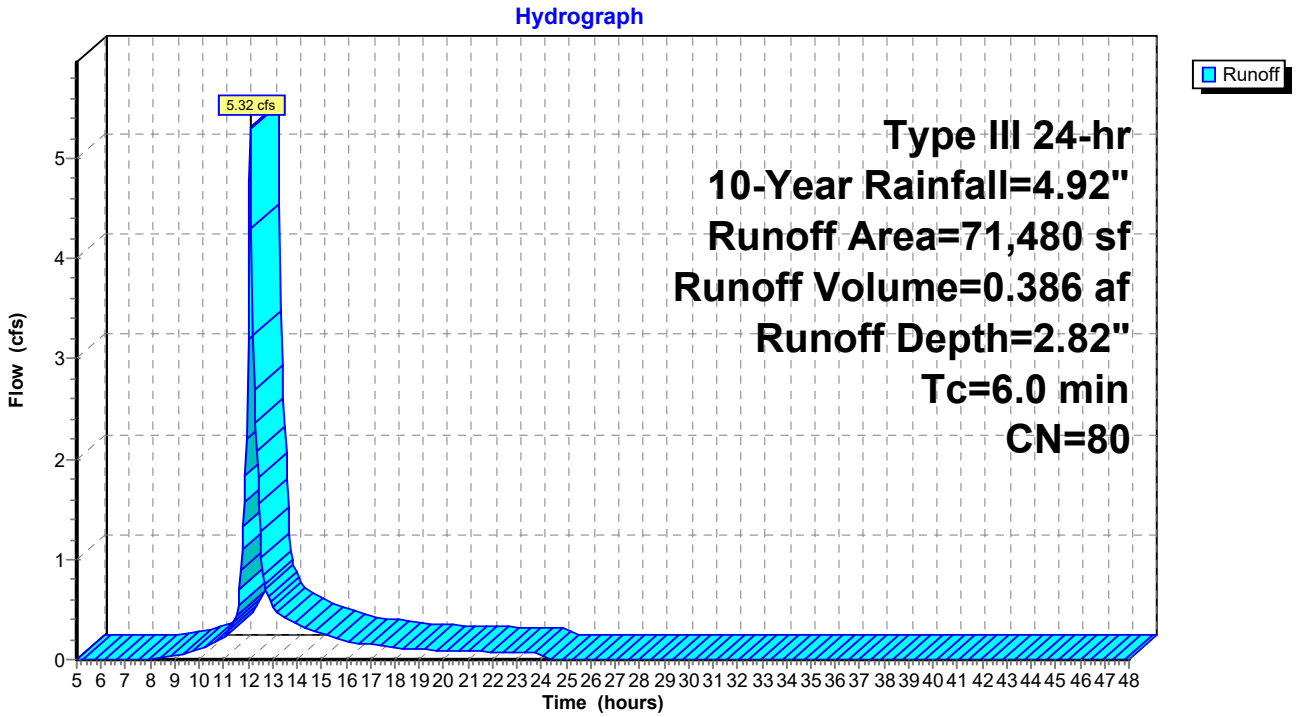
Runoff = 5.32 cfs @ 12.09 hrs, Volume= 0.386 af, Depth= 2.82"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.92"

Area (sf)	CN	Description
40,295	98	Paved parking, HSG A
55	98	Paved parking, HSG B
6,783	98	Paved parking, HSG D
4,315	30	Woods, Good, HSG A
2,050	77	Woods, Good, HSG D
16,572	39	>75% Grass cover, Good, HSG A
1,410	96	Gravel surface, HSG A
71,480	80	Weighted Average
24,347		34.06% Pervious Area
47,133		65.94% Impervious Area

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

Subcatchment 4S: EASTERN LOADING AREA



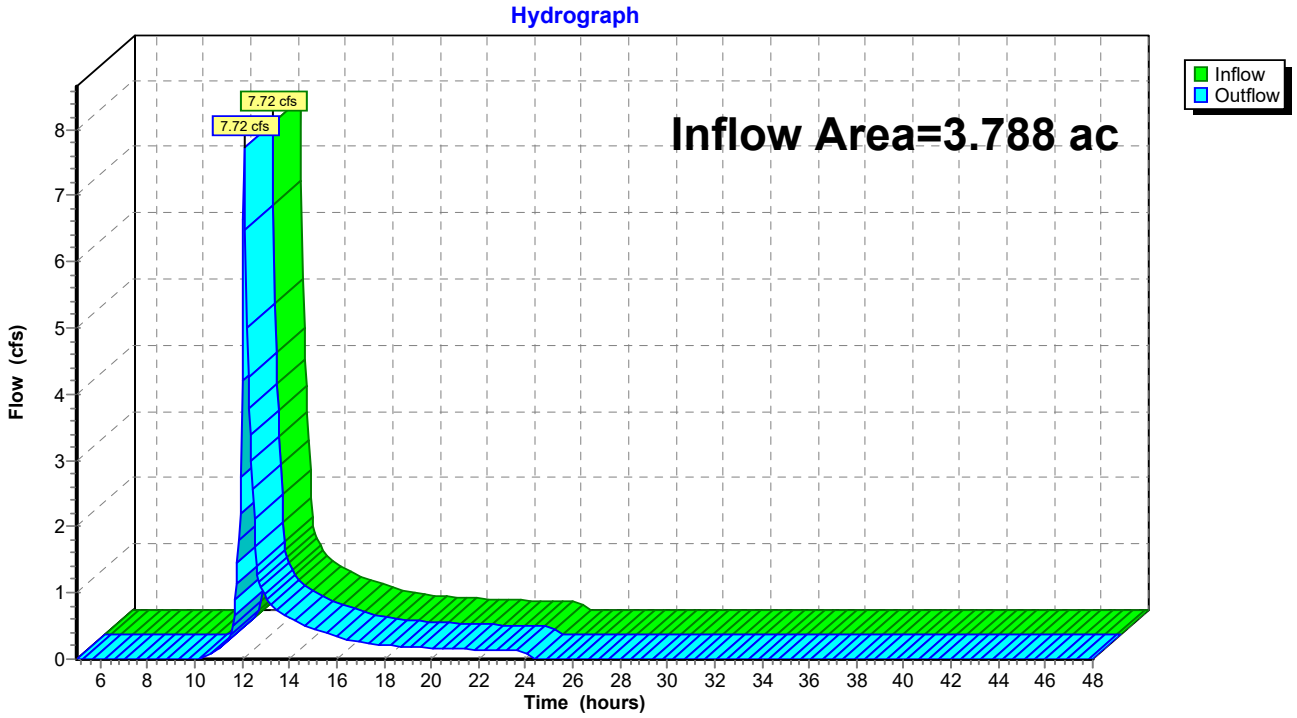
Summary for Reach DP-1: POND ST.

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

Inflow Area = 3.788 ac, 48.15% Impervious, Inflow Depth = 1.82" for 10-Year event
Inflow = 7.72 cfs @ 12.10 hrs, Volume= 0.575 af
Outflow = 7.72 cfs @ 12.10 hrs, Volume= 0.575 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-1: POND ST.



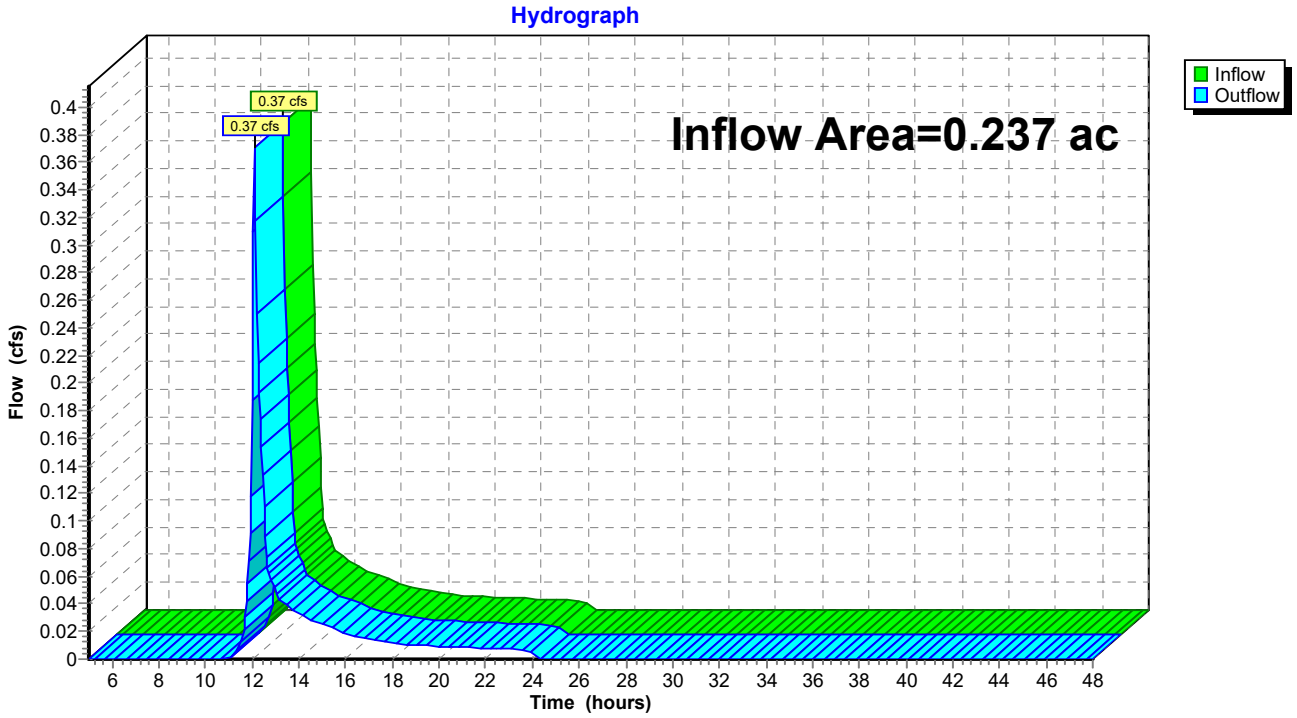
Summary for Reach DP-2: EASTERN PROPERTY LINE

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

Inflow Area = 0.237 ac, 0.00% Impervious, Inflow Depth = 1.46" for 10-Year event
Inflow = 0.37 cfs @ 12.10 hrs, Volume= 0.029 af
Outflow = 0.37 cfs @ 12.10 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-2: EASTERN PROPERTY LINE



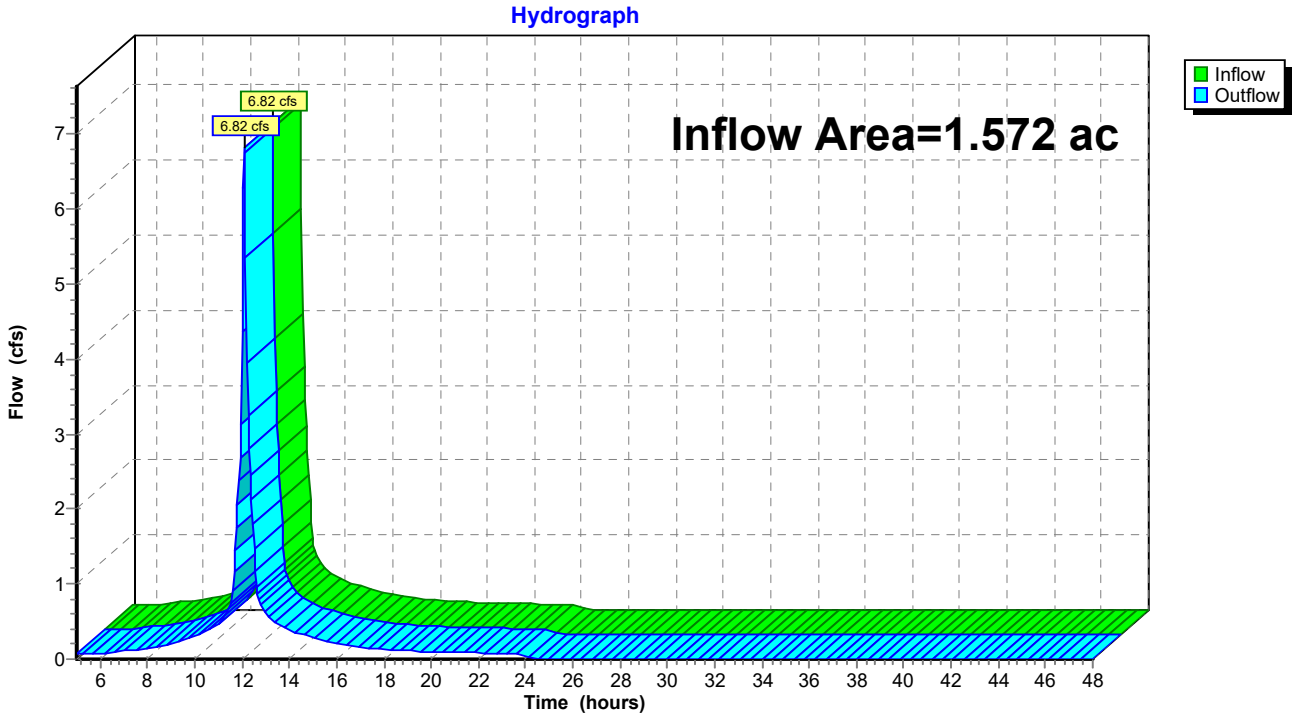
Summary for Reach DP-3: CRUSED STONE AREA & LEACHING PITS

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

Inflow Area = 1.572 ac, 78.38% Impervious, Inflow Depth > 4.12" for 10-Year event
Inflow = 6.82 cfs @ 12.09 hrs, Volume= 0.540 af
Outflow = 6.82 cfs @ 12.09 hrs, Volume= 0.540 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-3: CRUSED STONE AREA & LEACHING PITS



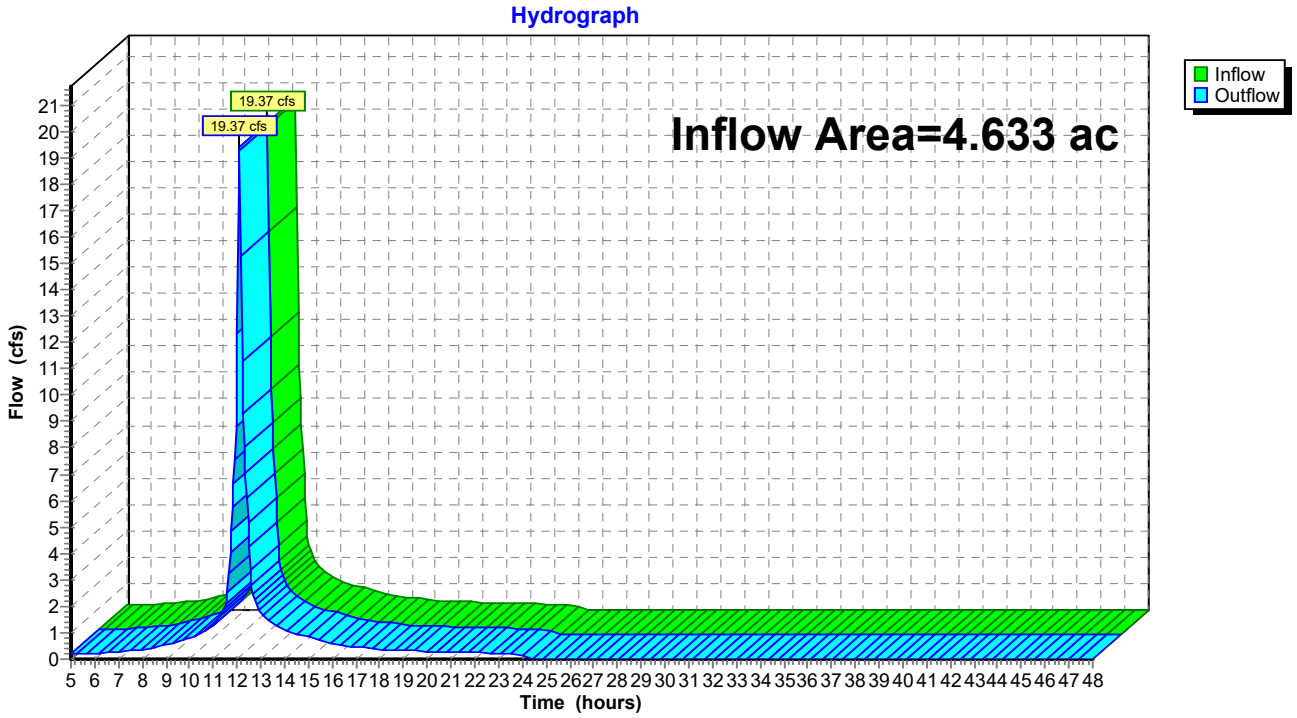
Summary for Reach DP-4: NORTHERN HEADWALLS

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

Inflow Area = 4.633 ac, 87.94% Impervious, Inflow Depth > 3.95" for 10-Year event
Inflow = 19.37 cfs @ 12.09 hrs, Volume= 1.523 af
Outflow = 19.37 cfs @ 12.09 hrs, Volume= 1.523 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-4: NORTHERN HEADWALLS



222-209 PRE DEVELOPMENT *Type III 24-hr 25-Year Rainfall=6.19"*
Prepared by McKenzie Engineering Group, Inc. Printed 4/22/2024

Time span=5.00-48.00 hrs, dt=0.05 hrs, 861 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1R: FLAT ROOF W/ Runoff Area=21,801 sf 100.00% Impervious Runoff Depth>5.77"
Tc=6.0 min CN=98 Runoff=2.97 cfs 0.241 af

Subcatchment1S: FRONT SITE Runoff Area=165,023 sf 48.15% Impervious Runoff Depth=2.77"
Tc=6.0 min CN=68 Runoff=11.96 cfs 0.874 af

Subcatchment2S: EASTERN Runoff Area=10,320 sf 0.00% Impervious Runoff Depth=2.31"
Tc=6.0 min CN=63 Runoff=0.61 cfs 0.046 af

Subcatchment3R: WESTERN ROOF Runoff Area=50,302 sf 100.00% Impervious Runoff Depth>5.77"
Tc=6.0 min CN=98 Runoff=6.84 cfs 0.556 af

Subcatchment3S: WESTERN SITE Runoff Area=18,176 sf 18.54% Impervious Runoff Depth=4.06"
Tc=6.0 min UI Adjusted CN=81 Runoff=1.93 cfs 0.141 af

Subcatchment4R: NORTH & EAST Runoff Area=108,531 sf 100.00% Impervious Runoff Depth>5.77"
Tc=6.0 min CN=98 Runoff=14.76 cfs 1.199 af

Subcatchment4S: EASTERN LOADING Runoff Area=71,480 sf 65.94% Impervious Runoff Depth=3.95"
Tc=6.0 min CN=80 Runoff=7.41 cfs 0.541 af

Reach DP-1: POND ST. Inflow=11.96 cfs 0.874 af
Outflow=11.96 cfs 0.874 af

Reach DP-2: EASTERN PROPERTY LINE Inflow=0.61 cfs 0.046 af
Outflow=0.61 cfs 0.046 af

Reach DP-3: CRUSED STONE AREA & LEACHING PITS Inflow=8.77 cfs 0.697 af
Outflow=8.77 cfs 0.697 af

Reach DP-4: NORTHERN HEADWALLS Inflow=25.13 cfs 1.980 af
Outflow=25.13 cfs 1.980 af

Total Runoff Area = 10.230 ac Runoff Volume = 3.596 af Average Runoff Depth = 4.22"
30.30% Pervious = 3.100 ac 69.70% Impervious = 7.130 ac

Summary for Subcatchment 1R: FLAT ROOF W/ COLLECTION

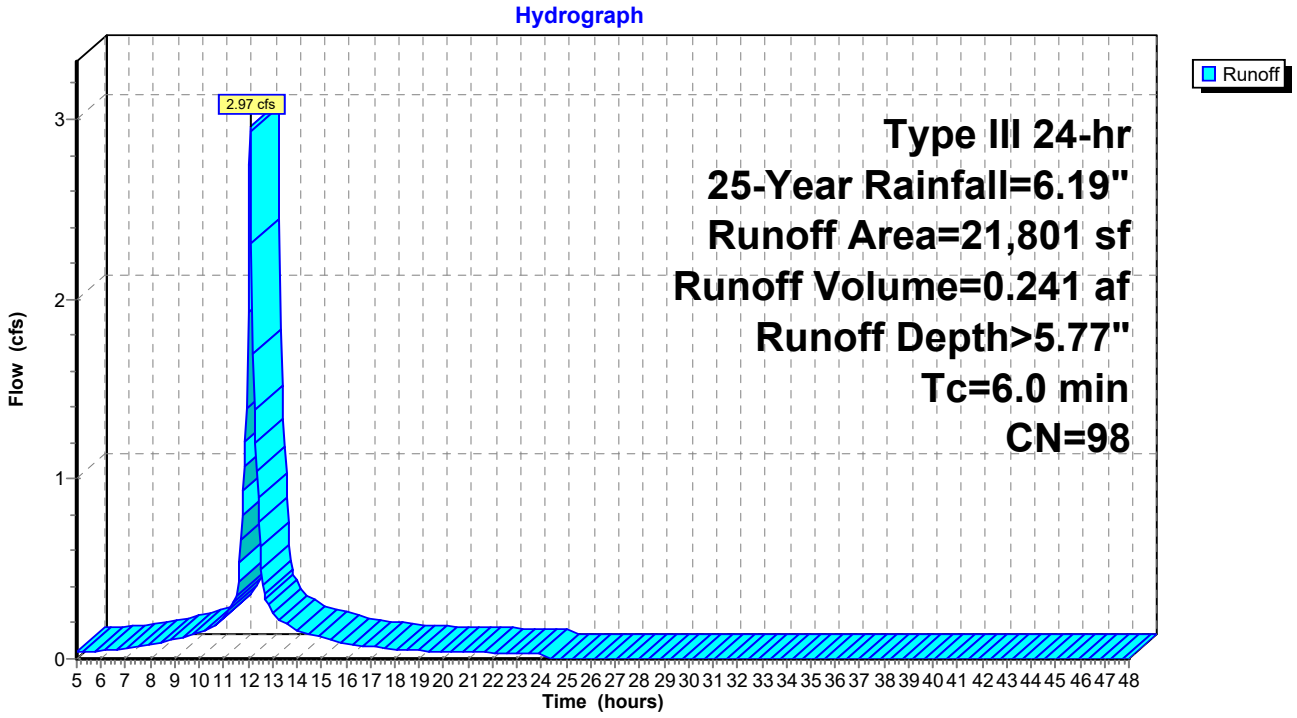
Runoff = 2.97 cfs @ 12.09 hrs, Volume= 0.241 af, Depth> 5.77"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
21,801	98	Roofs, HSG A
21,801		100.00% Impervious Area

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

Subcatchment 1R: FLAT ROOF W/ COLLECTION



Summary for Subcatchment 1S: FRONT SITE

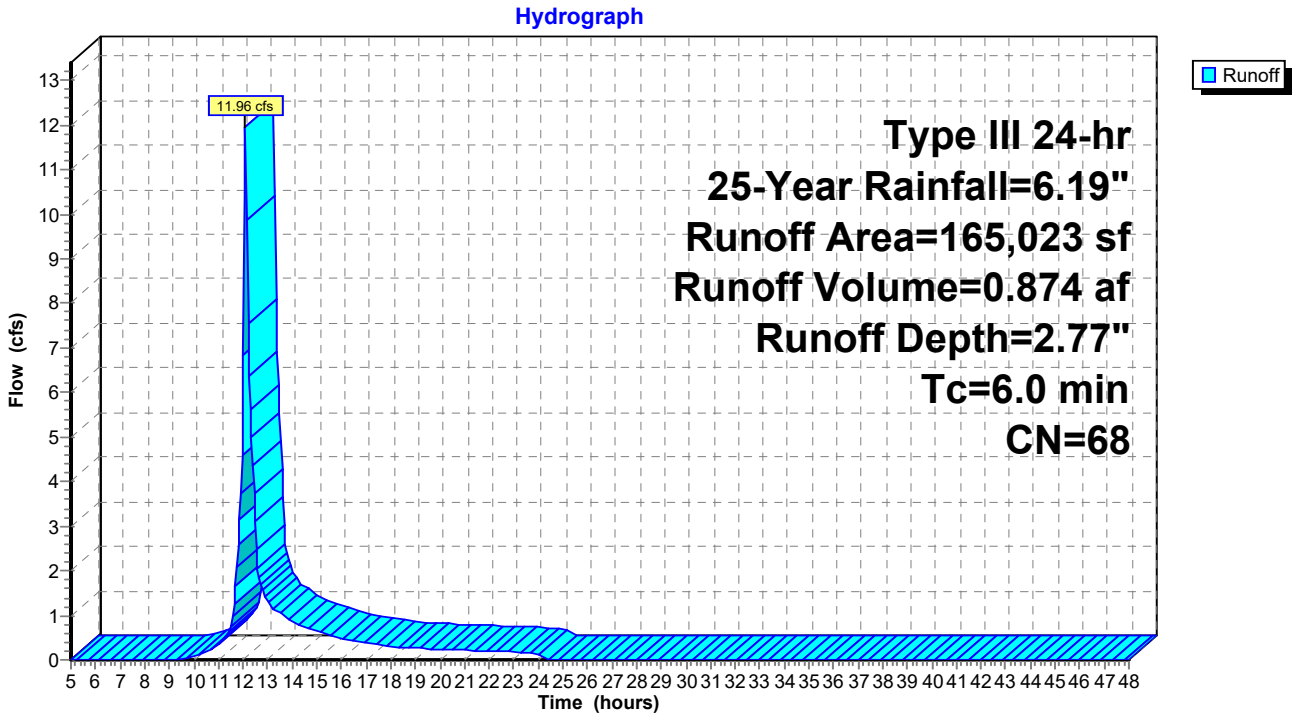
Runoff = 11.96 cfs @ 12.10 hrs, Volume= 0.874 af, Depth= 2.77"
Routed to Reach DP-1 : POND ST.

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
84,758	39	>75% Grass cover, Good, HSG A
809	61	>75% Grass cover, Good, HSG B
20,445	98	Paved parking, HSG B
59,011	98	Paved parking, HSG A
165,023	68	Weighted Average
85,567		51.85% Pervious Area
79,456		48.15% Impervious Area

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

Subcatchment 1S: FRONT SITE



Summary for Subcatchment 2S: EASTERN LANDSCAPED AREA

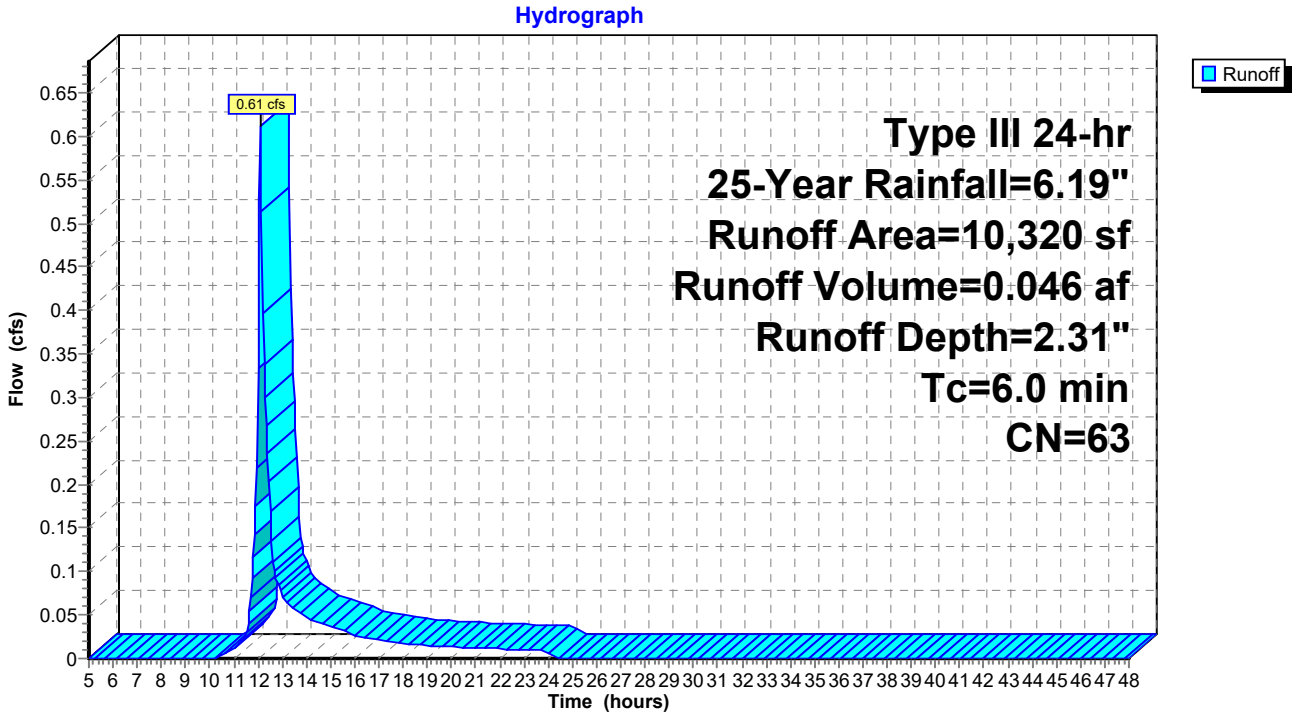
Runoff = 0.61 cfs @ 12.10 hrs, Volume= 0.046 af, Depth= 2.31"
Routed to Reach DP-2 : EASTERN PROPERTY LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
9,320	61	>75% Grass cover, Good, HSG B
1,000	80	>75% Grass cover, Good, HSG D
10,320	63	Weighted Average
10,320		100.00% Pervious Area

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

Subcatchment 2S: EASTERN LANDSCAPED AREA



Summary for Subcatchment 3R: WESTERN ROOF

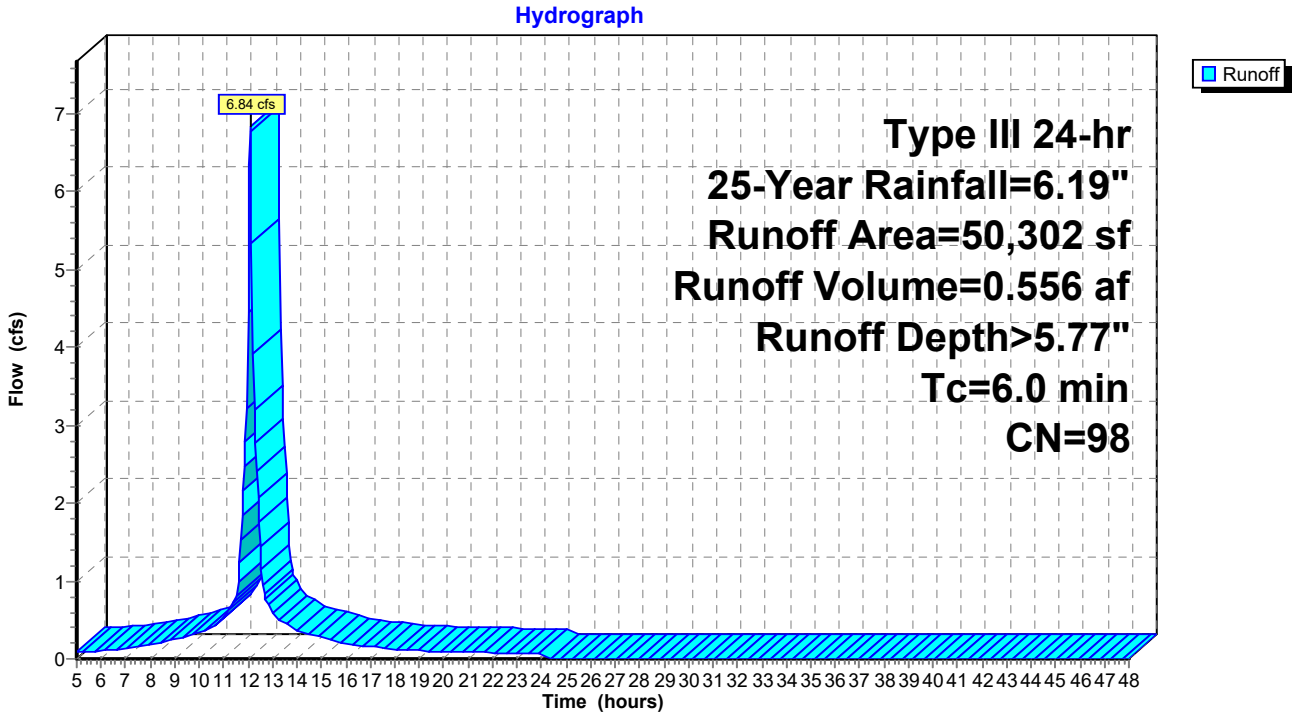
Runoff = 6.84 cfs @ 12.09 hrs, Volume= 0.556 af, Depth> 5.77"
Routed to Reach DP-3 : CRUSED STONE AREA & LEACHING PITS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
50,302	98	Roofs, HSG A
50,302		100.00% Impervious Area

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

Subcatchment 3R: WESTERN ROOF



Summary for Subcatchment 3S: WESTERN SITE

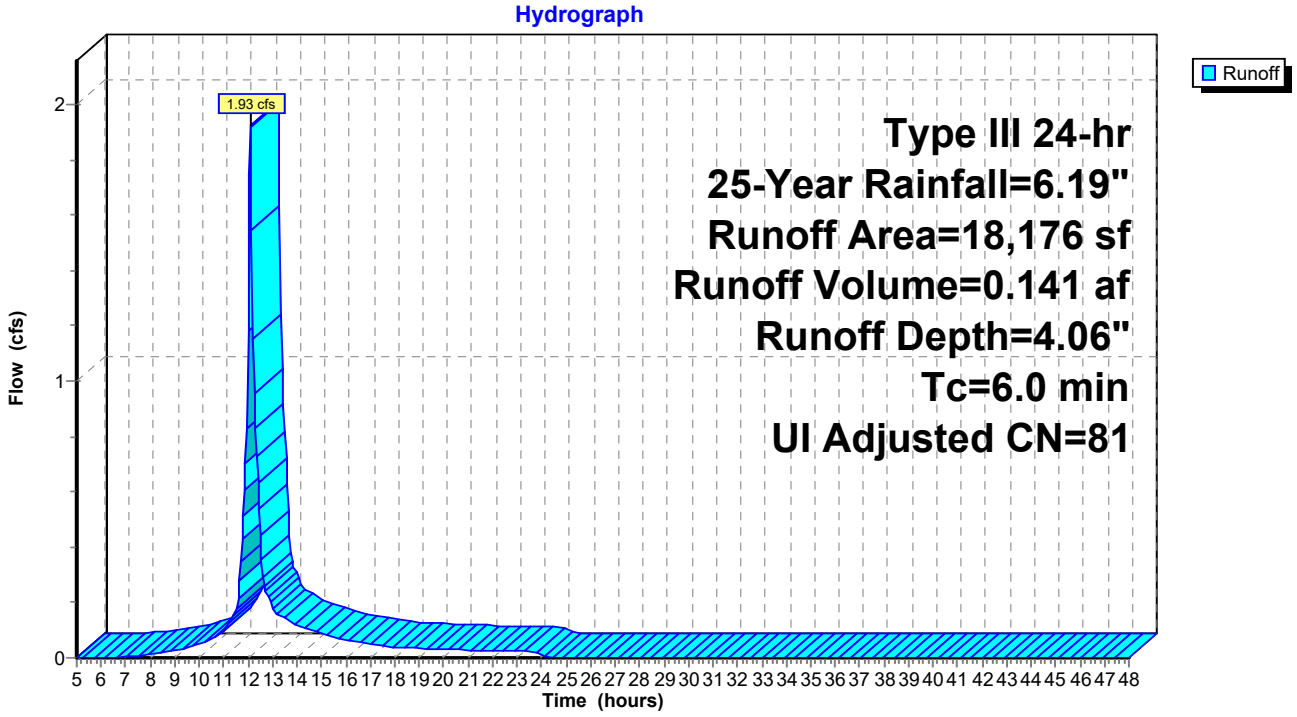
Runoff = 1.93 cfs @ 12.09 hrs, Volume= 0.141 af, Depth= 4.06"
Routed to Reach DP-3 : CRUSED STONE AREA & LEACHING PITS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Adj	Description
3,370	98		Unconnected pavement, HSG A
10,363	96		Gravel surface, HSG A
4,443	39		>75% Grass cover, Good, HSG A
18,176	82	81	Weighted Average, UI Adjusted
14,806			81.46% Pervious Area
3,370			18.54% Impervious Area
3,370			100.00% Unconnected

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

Subcatchment 3S: WESTERN SITE



Summary for Subcatchment 4R: NORTH & EAST ROOF

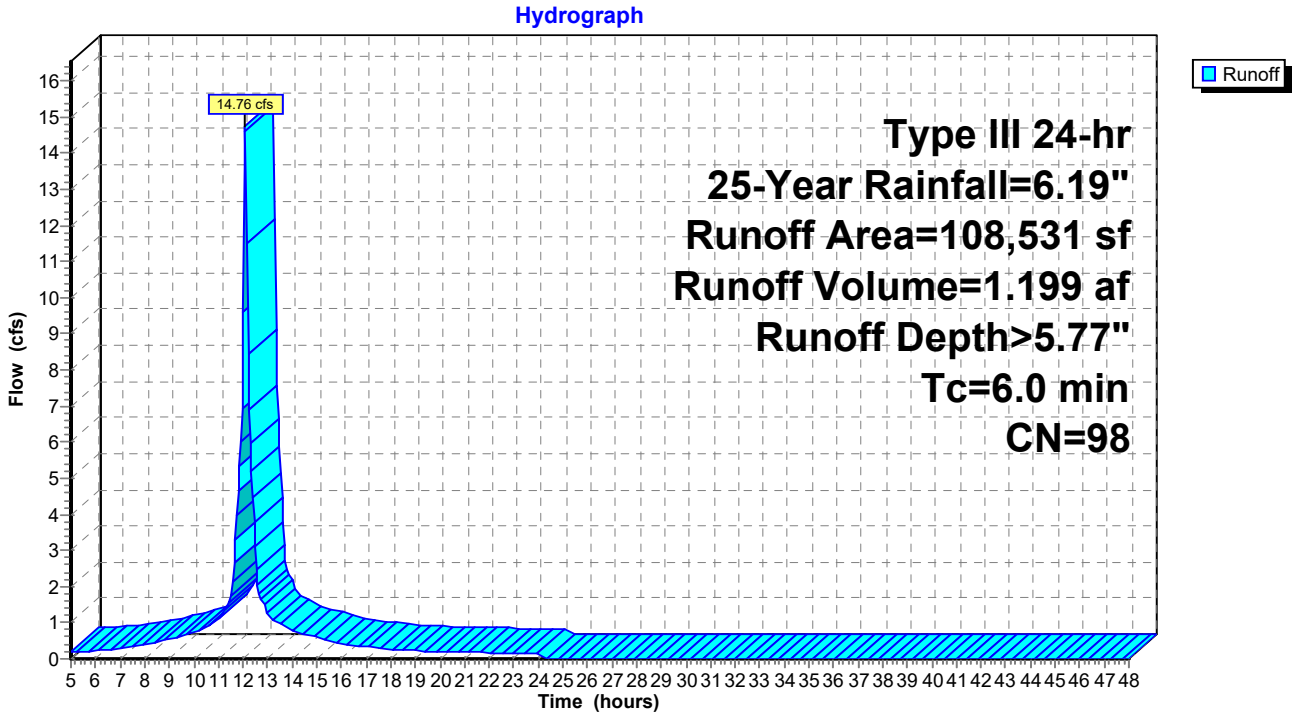
Runoff = 14.76 cfs @ 12.09 hrs, Volume= 1.199 af, Depth> 5.77"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
108,531	98	Roofs, HSG A
108,531		100.00% Impervious Area

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

Subcatchment 4R: NORTH & EAST ROOF



Summary for Subcatchment 4S: EASTERN LOADING AREA

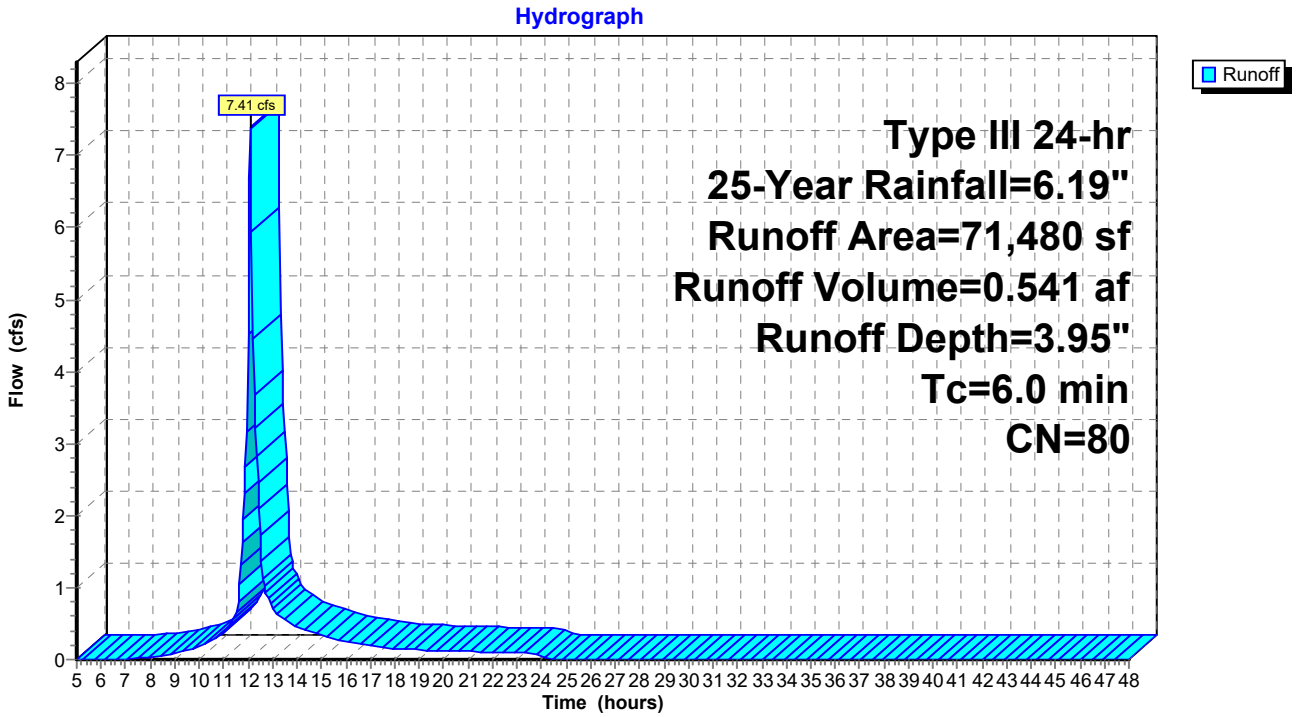
Runoff = 7.41 cfs @ 12.09 hrs, Volume= 0.541 af, Depth= 3.95"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
40,295	98	Paved parking, HSG A
55	98	Paved parking, HSG B
6,783	98	Paved parking, HSG D
4,315	30	Woods, Good, HSG A
2,050	77	Woods, Good, HSG D
16,572	39	>75% Grass cover, Good, HSG A
1,410	96	Gravel surface, HSG A
71,480	80	Weighted Average
24,347		34.06% Pervious Area
47,133		65.94% Impervious Area

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

Subcatchment 4S: EASTERN LOADING AREA



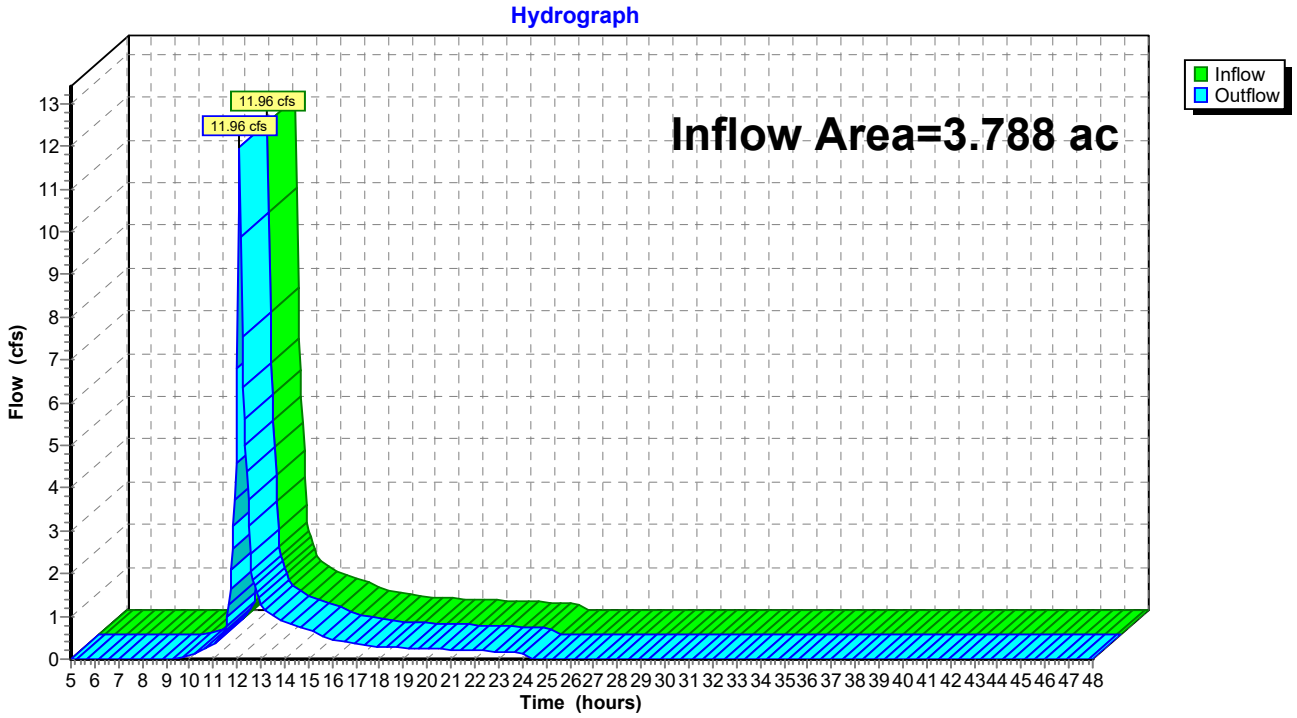
Summary for Reach DP-1: POND ST.

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

Inflow Area = 3.788 ac, 48.15% Impervious, Inflow Depth = 2.77" for 25-Year event
Inflow = 11.96 cfs @ 12.10 hrs, Volume= 0.874 af
Outflow = 11.96 cfs @ 12.10 hrs, Volume= 0.874 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-1: POND ST.



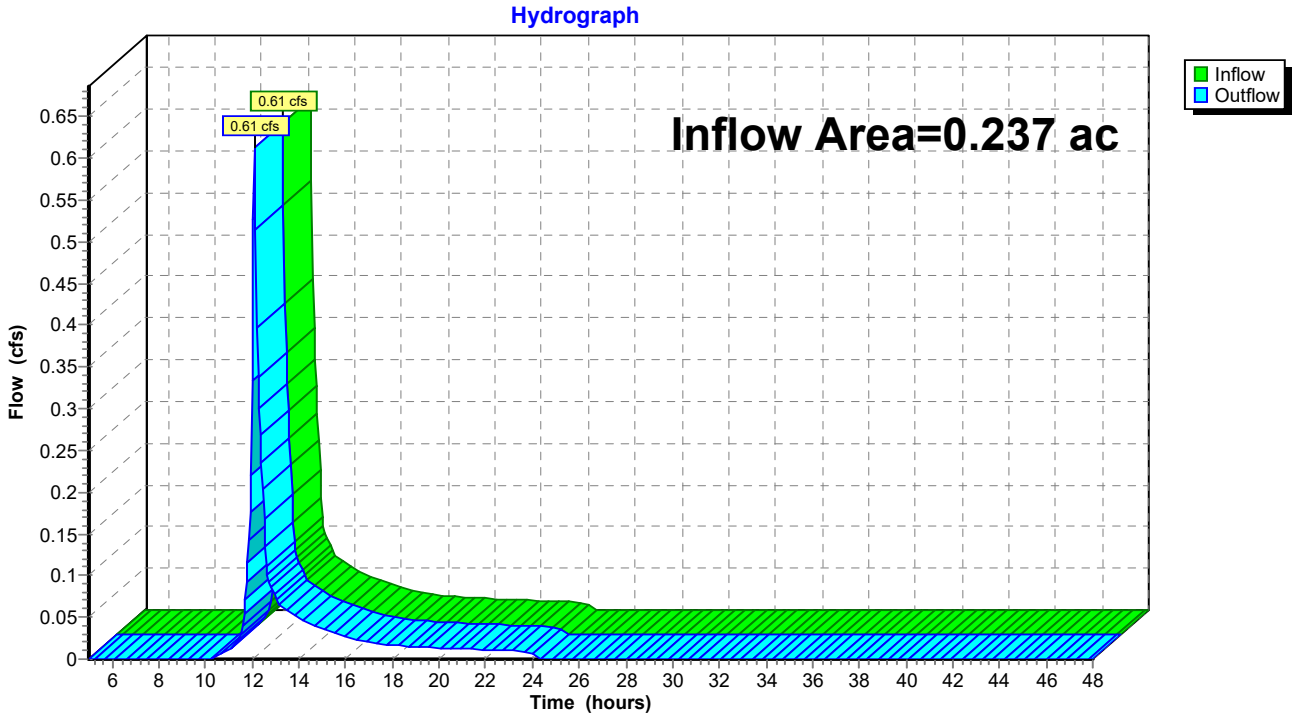
Summary for Reach DP-2: EASTERN PROPERTY LINE

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

Inflow Area = 0.237 ac, 0.00% Impervious, Inflow Depth = 2.31" for 25-Year event
Inflow = 0.61 cfs @ 12.10 hrs, Volume= 0.046 af
Outflow = 0.61 cfs @ 12.10 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-2: EASTERN PROPERTY LINE



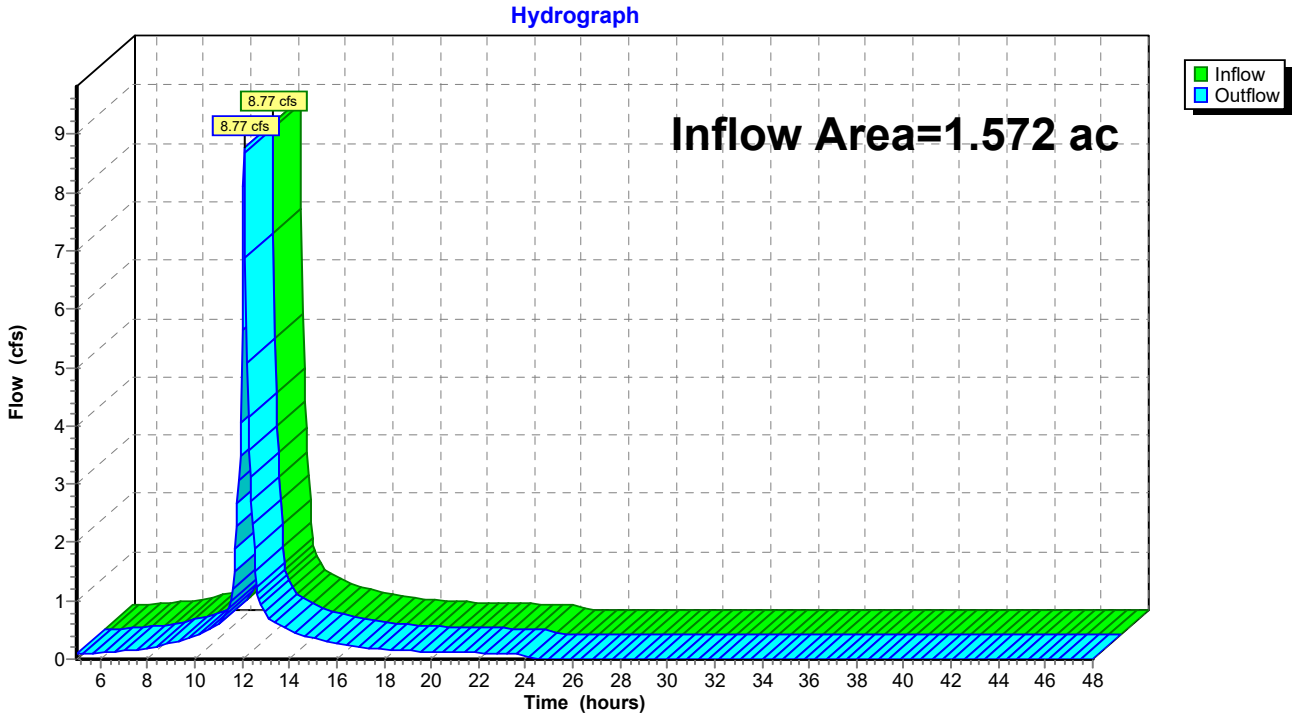
Summary for Reach DP-3: CRUSED STONE AREA & LEACHING PITS

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

Inflow Area = 1.572 ac, 78.38% Impervious, Inflow Depth > 5.32" for 25-Year event
Inflow = 8.77 cfs @ 12.09 hrs, Volume= 0.697 af
Outflow = 8.77 cfs @ 12.09 hrs, Volume= 0.697 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-3: CRUSED STONE AREA & LEACHING PITS



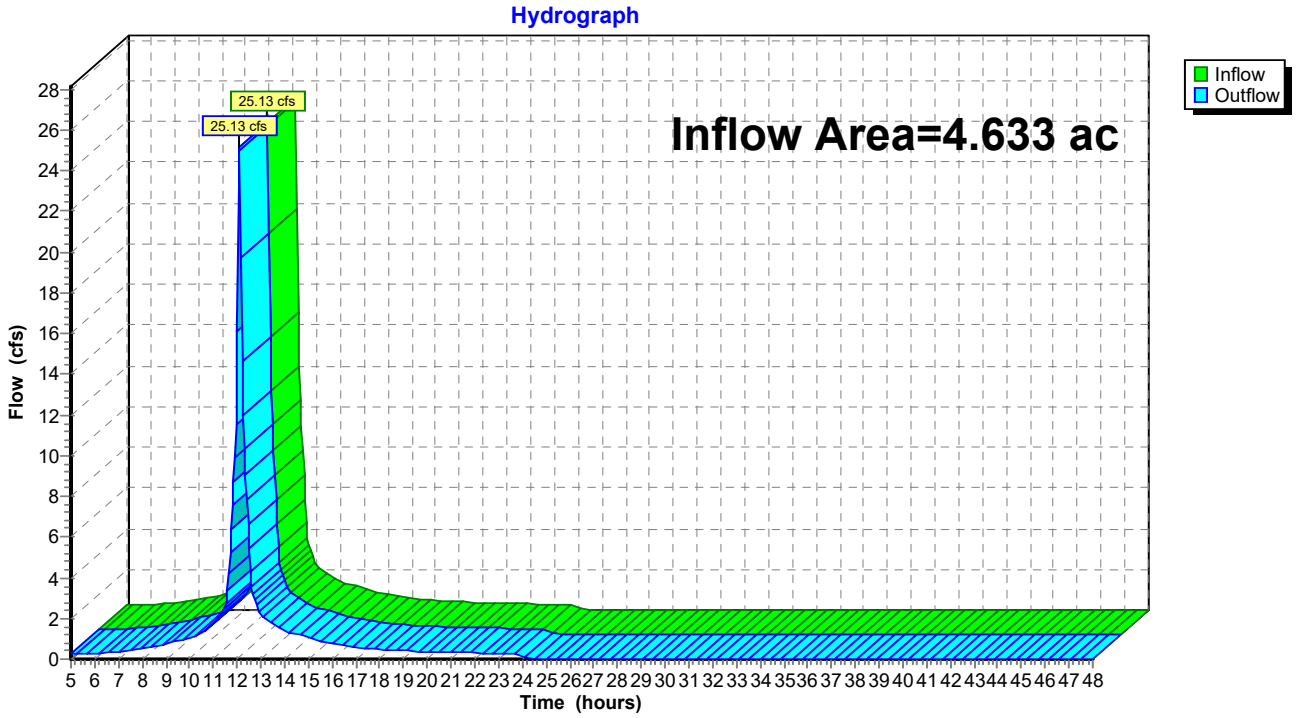
Summary for Reach DP-4: NORTHERN HEADWALLS

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

Inflow Area = 4.633 ac, 87.94% Impervious, Inflow Depth > 5.13" for 25-Year event
Inflow = 25.13 cfs @ 12.09 hrs, Volume= 1.980 af
Outflow = 25.13 cfs @ 12.09 hrs, Volume= 1.980 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-4: NORTHERN HEADWALLS



Time span=5.00-48.00 hrs, dt=0.05 hrs, 861 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1R: FLAT ROOF W/ Runoff Area=21,801 sf 100.00% Impervious Runoff Depth>8.25"
Tc=6.0 min CN=98 Runoff=4.22 cfs 0.344 af

Subcatchment1S: FRONT SITE Runoff Area=165,023 sf 48.15% Impervious Runoff Depth=4.91"
Tc=6.0 min CN=68 Runoff=21.37 cfs 1.549 af

Subcatchment2S: EASTERN Runoff Area=10,320 sf 0.00% Impervious Runoff Depth=4.30"
Tc=6.0 min CN=63 Runoff=1.17 cfs 0.085 af

Subcatchment3R: WESTERN ROOF Runoff Area=50,302 sf 100.00% Impervious Runoff Depth>8.25"
Tc=6.0 min CN=98 Runoff=9.73 cfs 0.794 af

Subcatchment3S: WESTERN SITE Runoff Area=18,176 sf 18.54% Impervious Runoff Depth>6.49"
Tc=6.0 min UI Adjusted CN=81 Runoff=3.03 cfs 0.226 af

Subcatchment4R: NORTH & EAST Runoff Area=108,531 sf 100.00% Impervious Runoff Depth>8.25"
Tc=6.0 min CN=98 Runoff=21.00 cfs 1.712 af

Subcatchment4S: EASTERN LOADING Runoff Area=71,480 sf 65.94% Impervious Runoff Depth=6.37"
Tc=6.0 min CN=80 Runoff=11.73 cfs 0.871 af

Reach DP-1: POND ST. Inflow=21.37 cfs 1.549 af
Outflow=21.37 cfs 1.549 af

Reach DP-2: EASTERN PROPERTY LINE Inflow=1.17 cfs 0.085 af
Outflow=1.17 cfs 0.085 af

Reach DP-3: CRUSED STONE AREA & LEACHING PITS Inflow=12.76 cfs 1.019 af
Outflow=12.76 cfs 1.019 af

Reach DP-4: NORTHERN HEADWALLS Inflow=36.95 cfs 2.927 af
Outflow=36.95 cfs 2.927 af

Total Runoff Area = 10.230 ac Runoff Volume = 5.580 af Average Runoff Depth = 6.55"
30.30% Pervious = 3.100 ac 69.70% Impervious = 7.130 ac

Summary for Subcatchment 1R: FLAT ROOF W/ COLLECTION

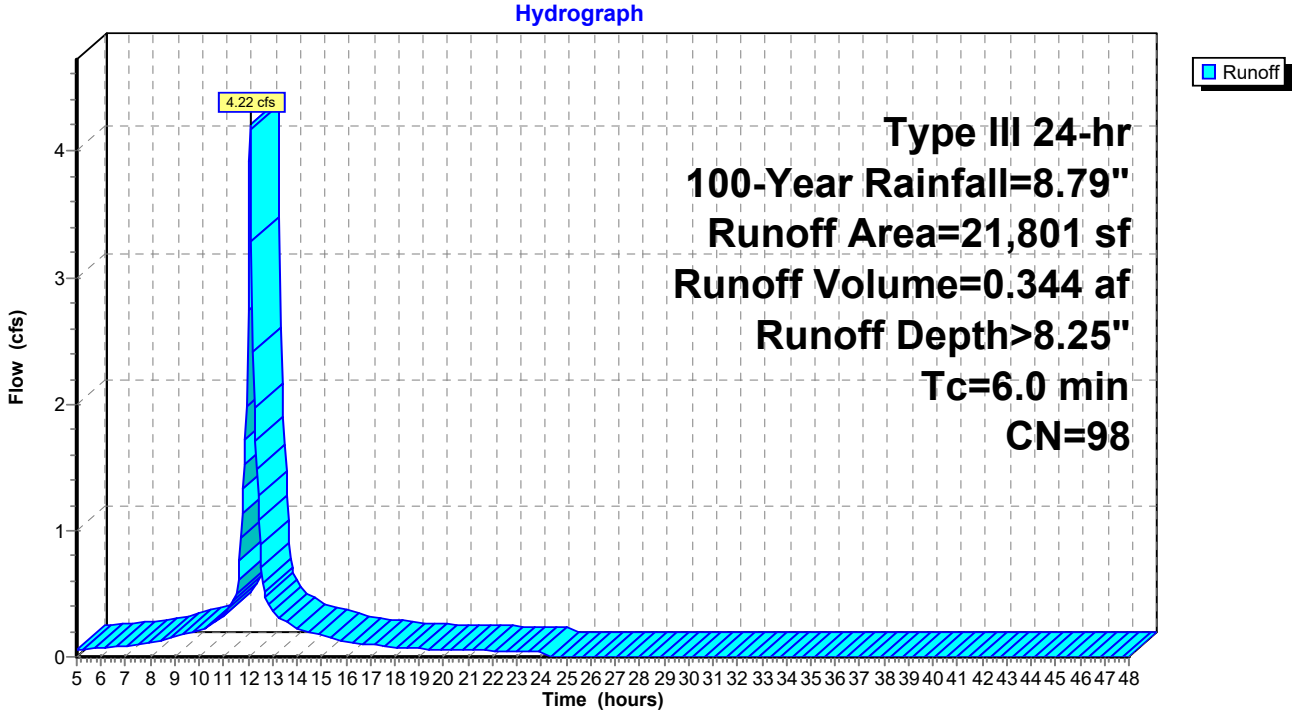
Runoff = 4.22 cfs @ 12.09 hrs, Volume= 0.344 af, Depth> 8.25"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.79"

Area (sf)	CN	Description
21,801	98	Roofs, HSG A
21,801		100.00% Impervious Area

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

Subcatchment 1R: FLAT ROOF W/ COLLECTION



Summary for Subcatchment 1S: FRONT SITE

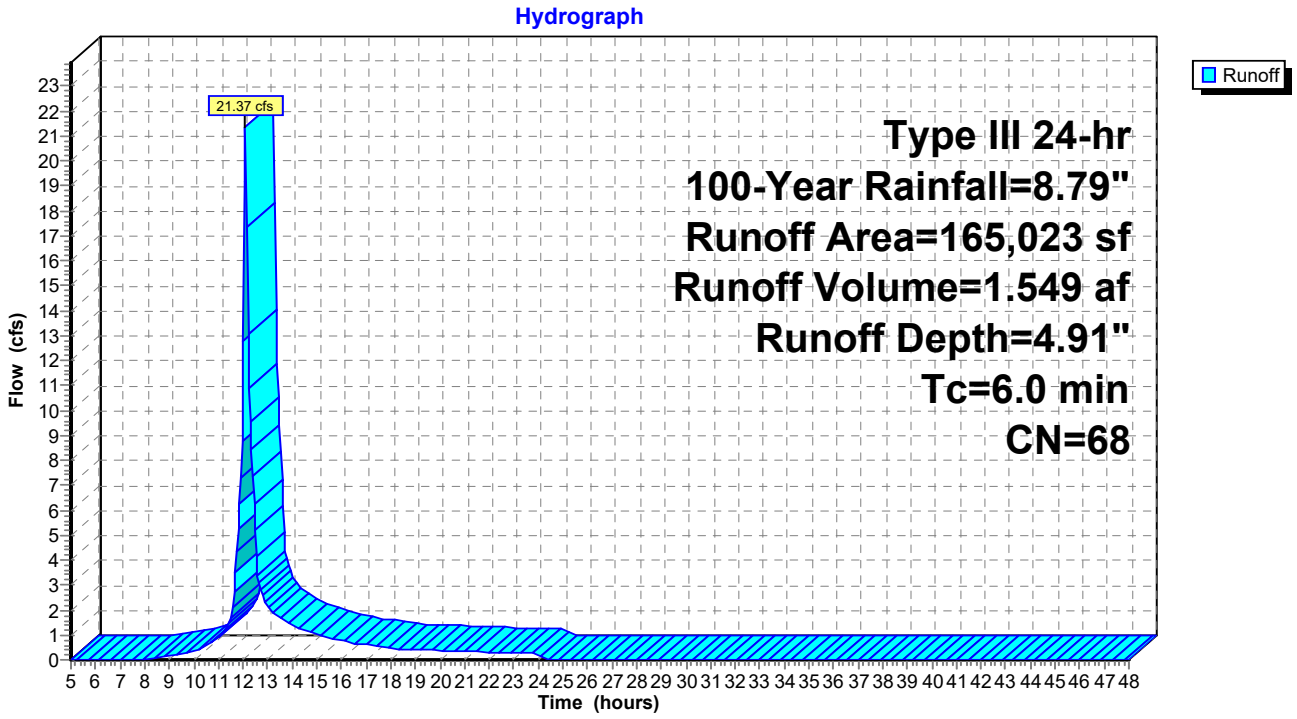
Runoff = 21.37 cfs @ 12.09 hrs, Volume= 1.549 af, Depth= 4.91"
Routed to Reach DP-1 : POND ST.

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.79"

Area (sf)	CN	Description
84,758	39	>75% Grass cover, Good, HSG A
809	61	>75% Grass cover, Good, HSG B
20,445	98	Paved parking, HSG B
59,011	98	Paved parking, HSG A
165,023	68	Weighted Average
85,567		51.85% Pervious Area
79,456		48.15% Impervious Area

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

Subcatchment 1S: FRONT SITE



Summary for Subcatchment 2S: EASTERN LANDSCAPED AREA

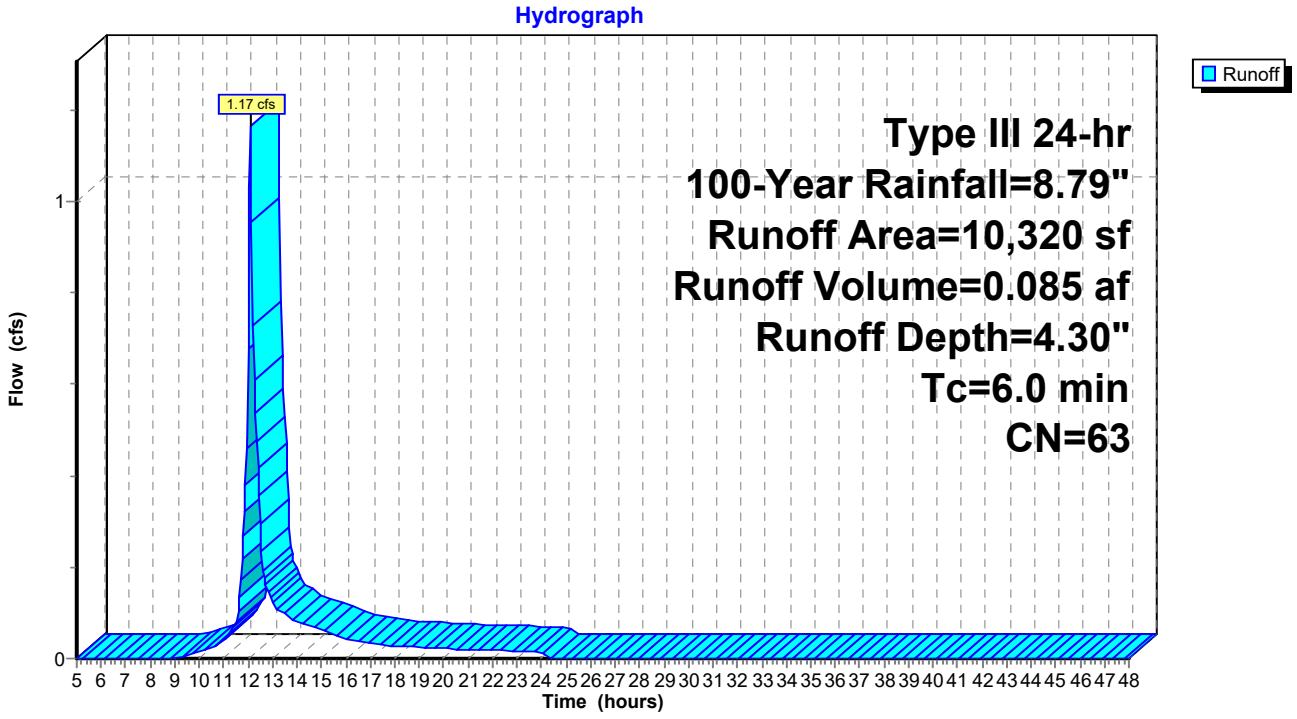
Runoff = 1.17 cfs @ 12.09 hrs, Volume= 0.085 af, Depth= 4.30"
Routed to Reach DP-2 : EASTERN PROPERTY LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.79"

Area (sf)	CN	Description
9,320	61	>75% Grass cover, Good, HSG B
1,000	80	>75% Grass cover, Good, HSG D
10,320	63	Weighted Average
10,320		100.00% Pervious Area

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

Subcatchment 2S: EASTERN LANDSCAPED AREA



Summary for Subcatchment 3R: WESTERN ROOF

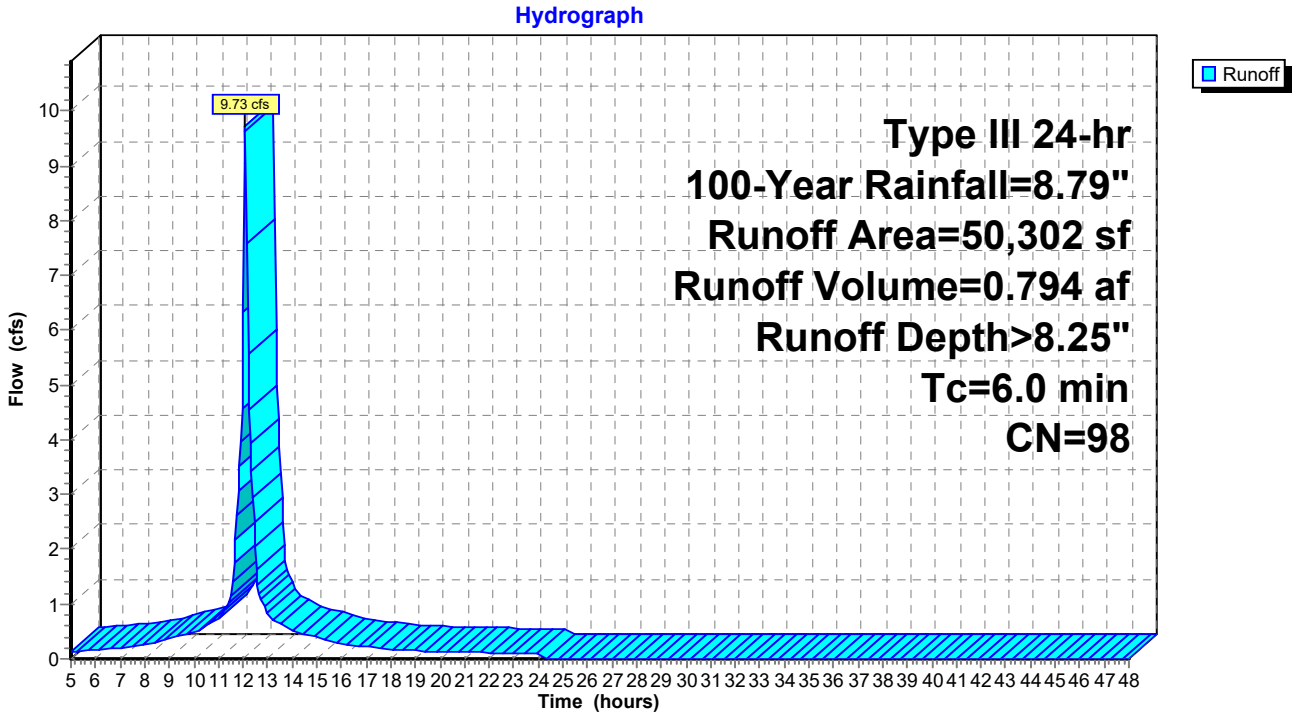
Runoff = 9.73 cfs @ 12.09 hrs, Volume= 0.794 af, Depth> 8.25"
Routed to Reach DP-3 : CRUSED STONE AREA & LEACHING PITS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.79"

Area (sf)	CN	Description
50,302	98	Roofs, HSG A
50,302		100.00% Impervious Area

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

Subcatchment 3R: WESTERN ROOF



Summary for Subcatchment 3S: WESTERN SITE

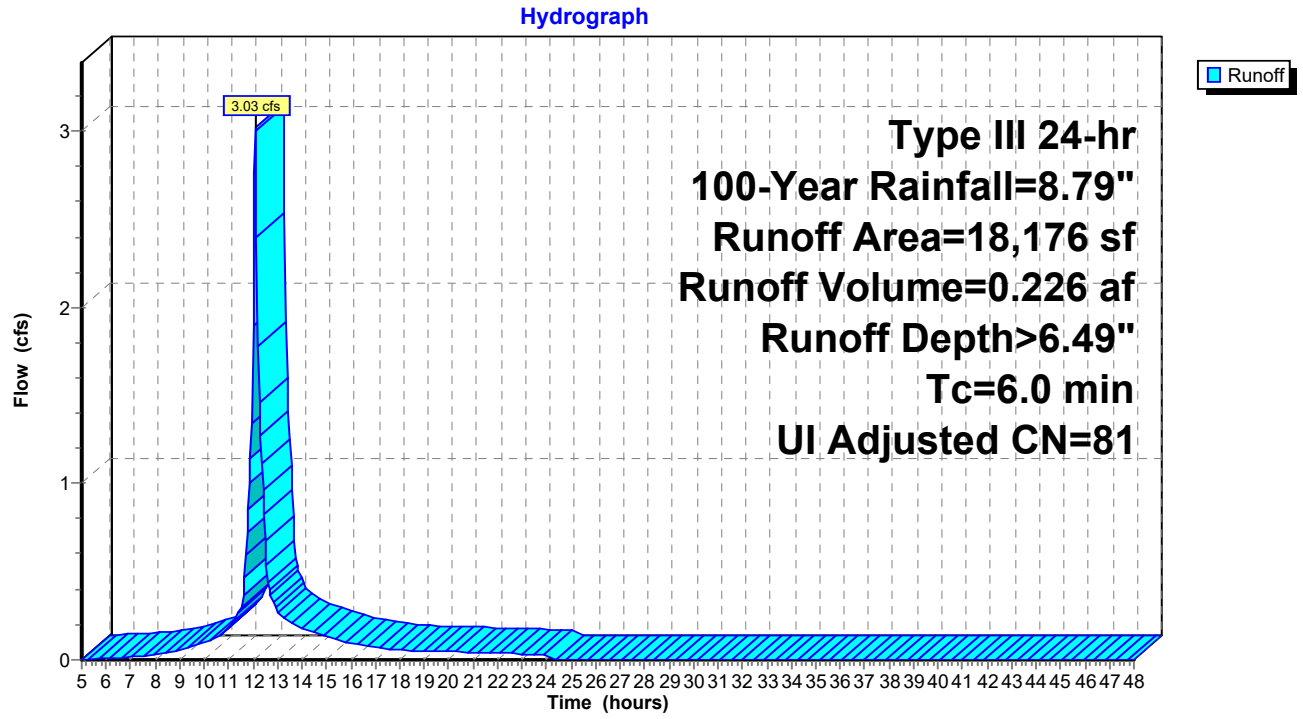
Runoff = 3.03 cfs @ 12.09 hrs, Volume= 0.226 af, Depth> 6.49"
Routed to Reach DP-3 : CRUSED STONE AREA & LEACHING PITS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.79"

Area (sf)	CN	Adj	Description
3,370	98		Unconnected pavement, HSG A
10,363	96		Gravel surface, HSG A
4,443	39		>75% Grass cover, Good, HSG A
18,176	82	81	Weighted Average, UI Adjusted
14,806			81.46% Pervious Area
3,370			18.54% Impervious Area
3,370			100.00% Unconnected

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

Subcatchment 3S: WESTERN SITE



Summary for Subcatchment 4R: NORTH & EAST ROOF

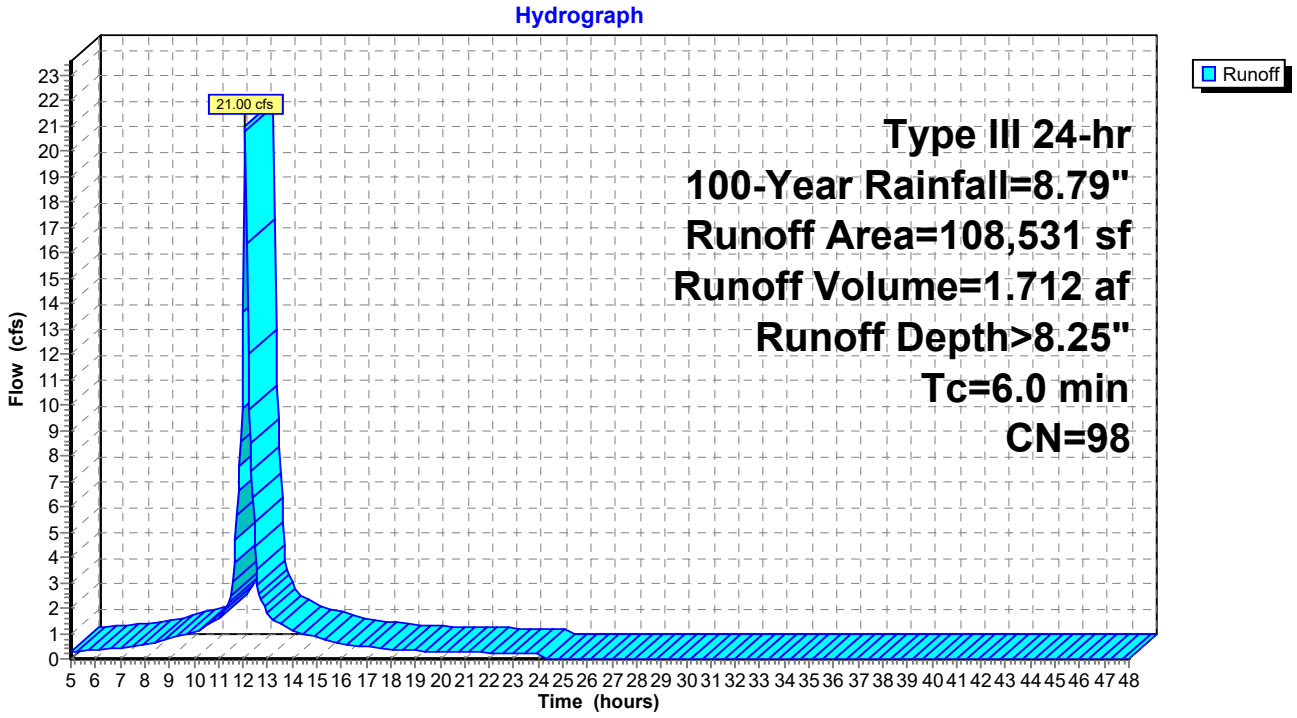
Runoff = 21.00 cfs @ 12.09 hrs, Volume= 1.712 af, Depth> 8.25"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.79"

Area (sf)	CN	Description
108,531	98	Roofs, HSG A
108,531		100.00% Impervious Area

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

Subcatchment 4R: NORTH & EAST ROOF



Summary for Subcatchment 4S: EASTERN LOADING AREA

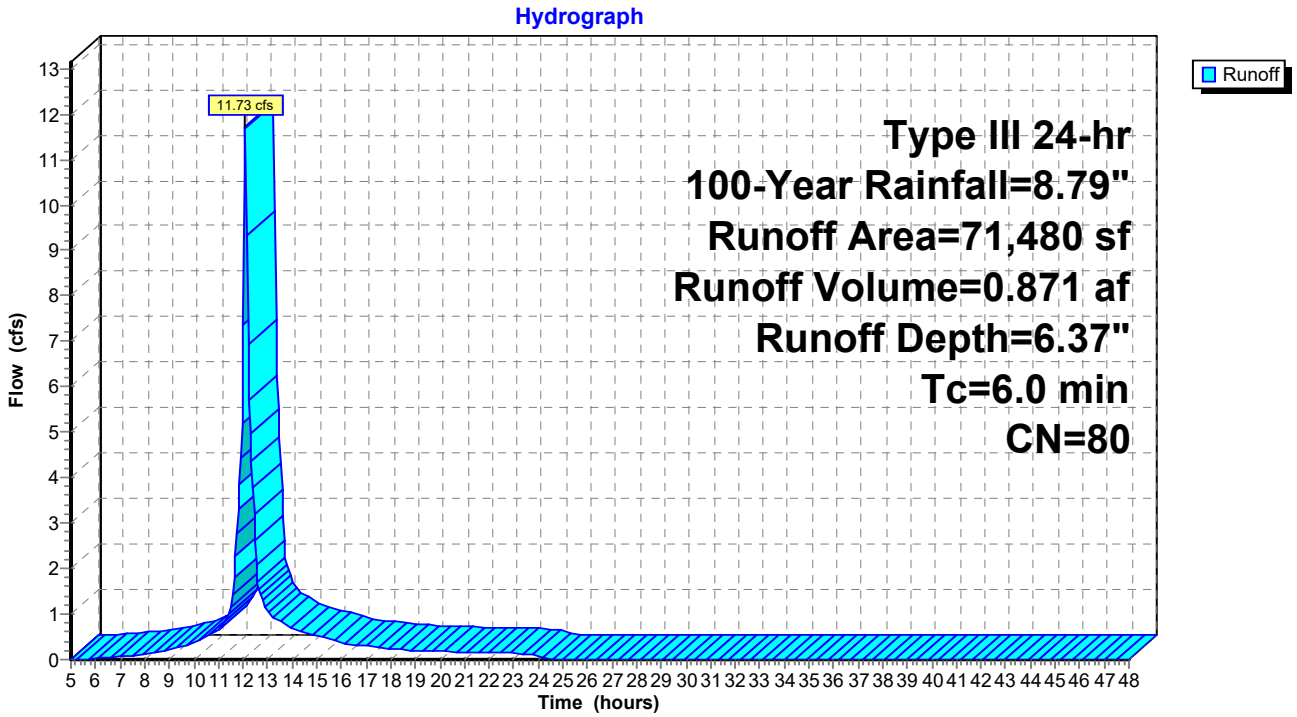
Runoff = 11.73 cfs @ 12.09 hrs, Volume= 0.871 af, Depth= 6.37"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.79"

Area (sf)	CN	Description
40,295	98	Paved parking, HSG A
55	98	Paved parking, HSG B
6,783	98	Paved parking, HSG D
4,315	30	Woods, Good, HSG A
2,050	77	Woods, Good, HSG D
16,572	39	>75% Grass cover, Good, HSG A
1,410	96	Gravel surface, HSG A
71,480	80	Weighted Average
24,347		34.06% Pervious Area
47,133		65.94% Impervious Area

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

Subcatchment 4S: EASTERN LOADING AREA



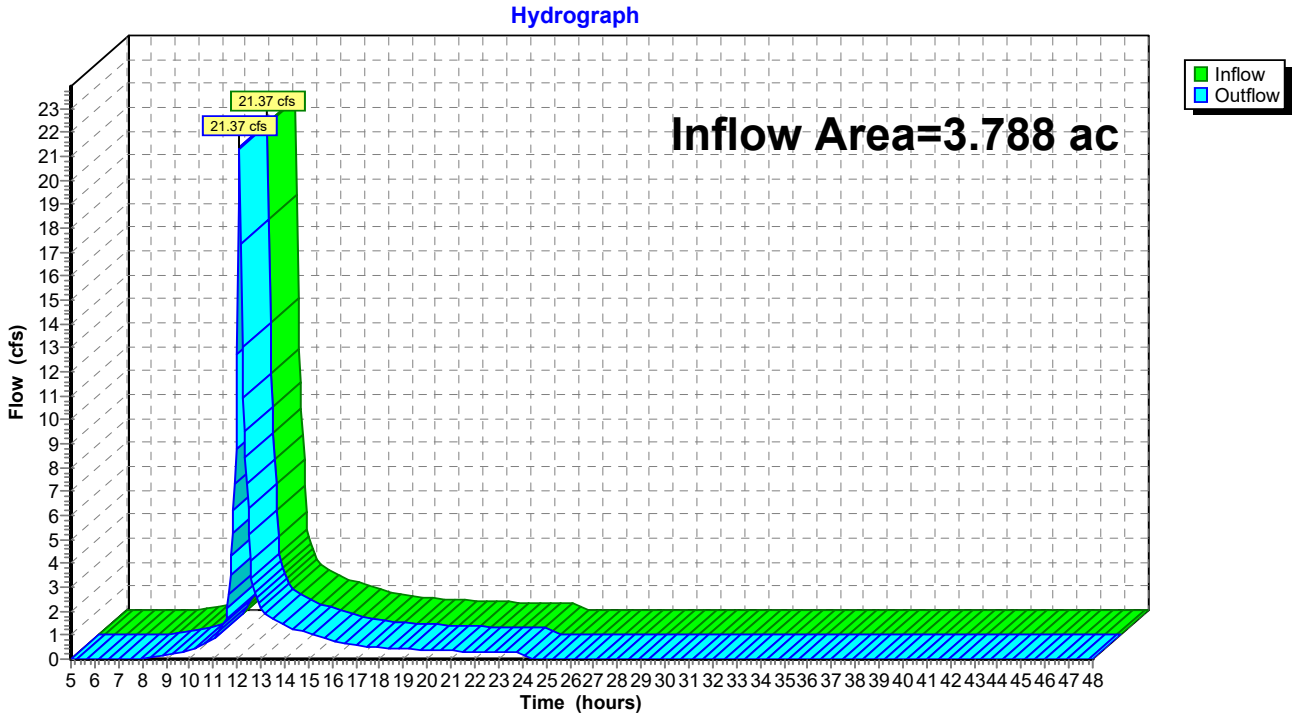
Summary for Reach DP-1: POND ST.

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

Inflow Area = 3.788 ac, 48.15% Impervious, Inflow Depth = 4.91" for 100-Year event
Inflow = 21.37 cfs @ 12.09 hrs, Volume= 1.549 af
Outflow = 21.37 cfs @ 12.09 hrs, Volume= 1.549 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-1: POND ST.



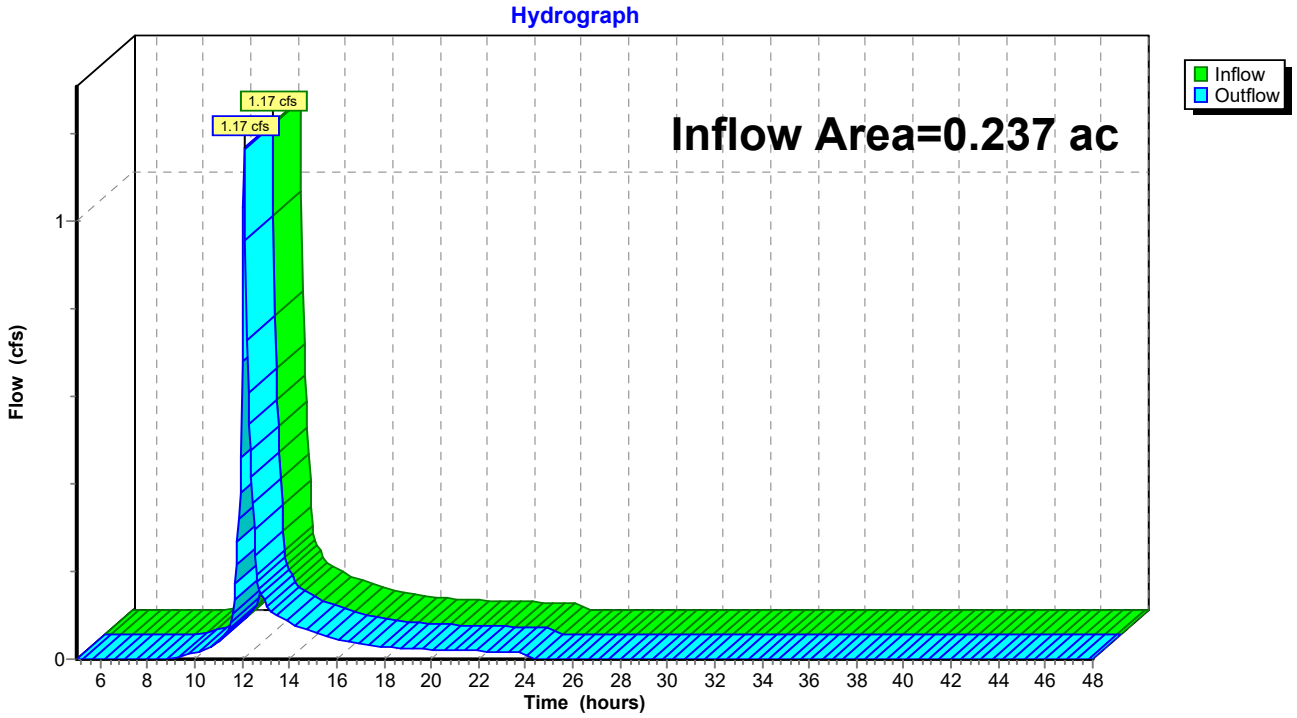
Summary for Reach DP-2: EASTERN PROPERTY LINE

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

Inflow Area = 0.237 ac, 0.00% Impervious, Inflow Depth = 4.30" for 100-Year event
Inflow = 1.17 cfs @ 12.09 hrs, Volume= 0.085 af
Outflow = 1.17 cfs @ 12.09 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-2: EASTERN PROPERTY LINE



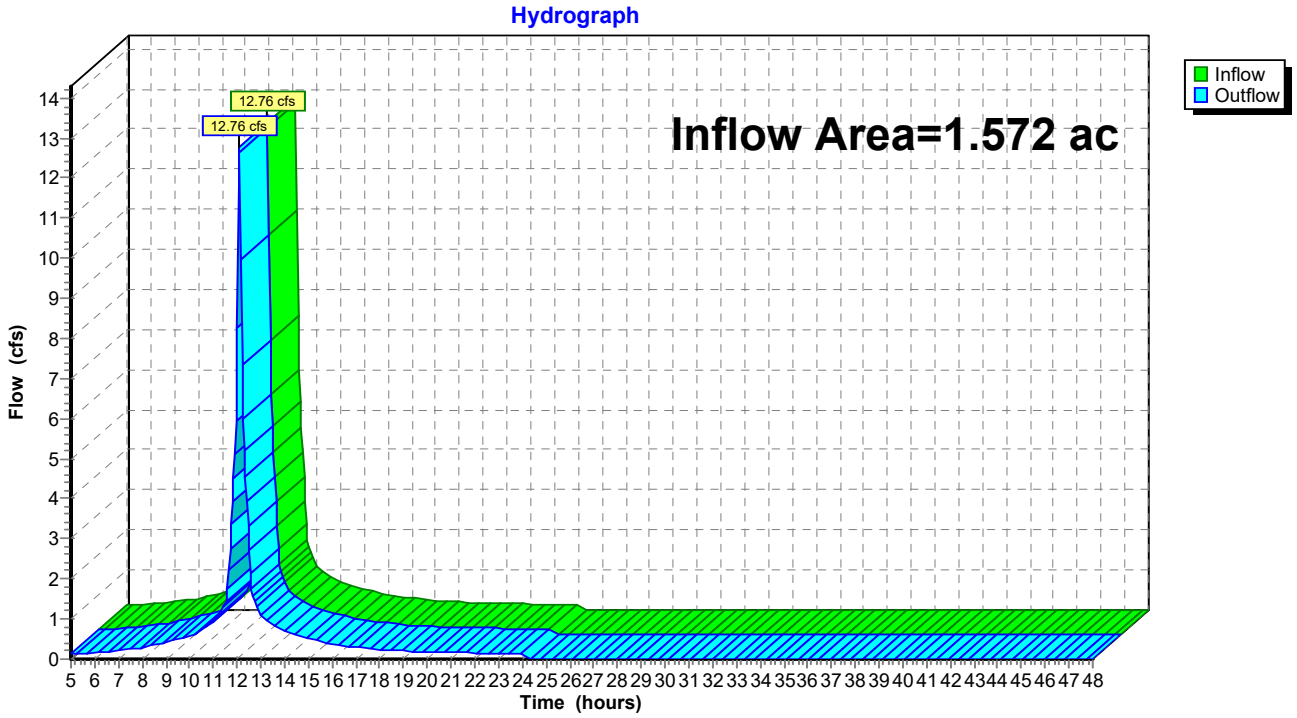
Summary for Reach DP-3: CRUSED STONE AREA & LEACHING PITS

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

Inflow Area = 1.572 ac, 78.38% Impervious, Inflow Depth > 7.78" for 100-Year event
Inflow = 12.76 cfs @ 12.09 hrs, Volume= 1.019 af
Outflow = 12.76 cfs @ 12.09 hrs, Volume= 1.019 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-3: CRUSED STONE AREA & LEACHING PITS



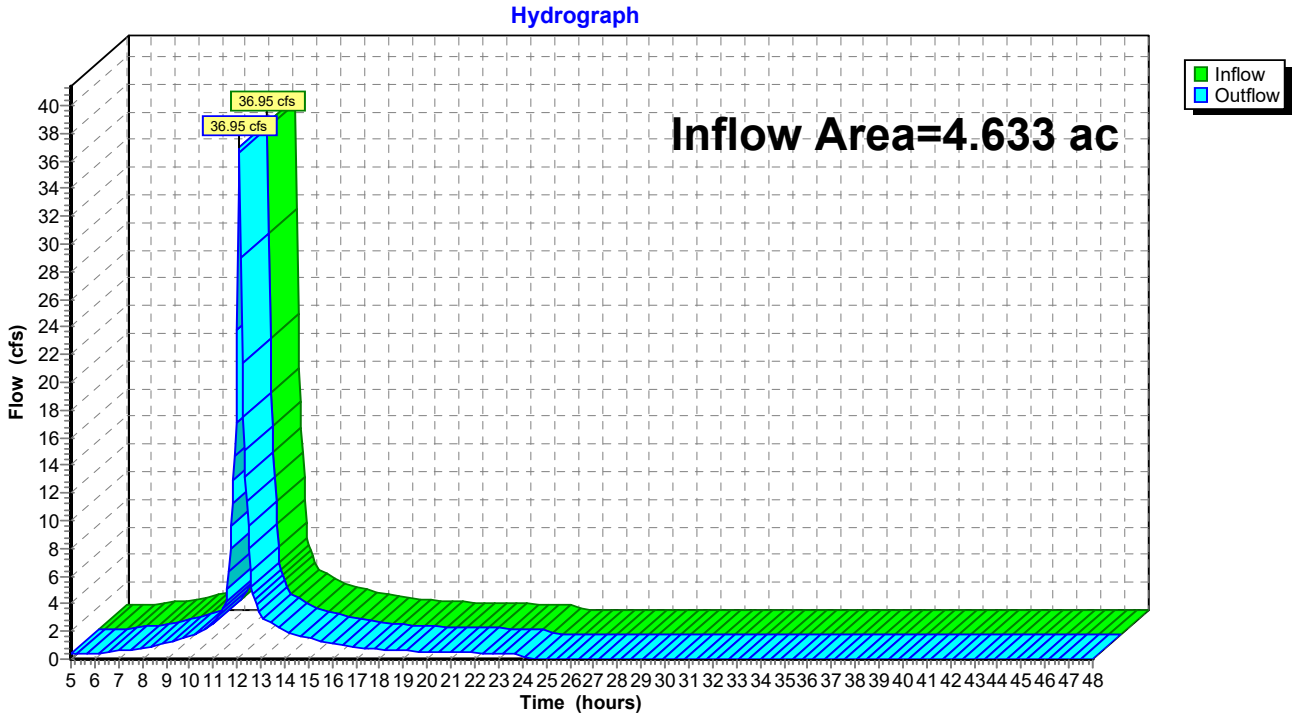
Summary for Reach DP-4: NORTHERN HEADWALLS

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

Inflow Area = 4.633 ac, 87.94% Impervious, Inflow Depth > 7.58" for 100-Year event
Inflow = 36.95 cfs @ 12.09 hrs, Volume= 2.927 af
Outflow = 36.95 cfs @ 12.09 hrs, Volume= 2.927 af, Atten= 0%, Lag= 0.0 min

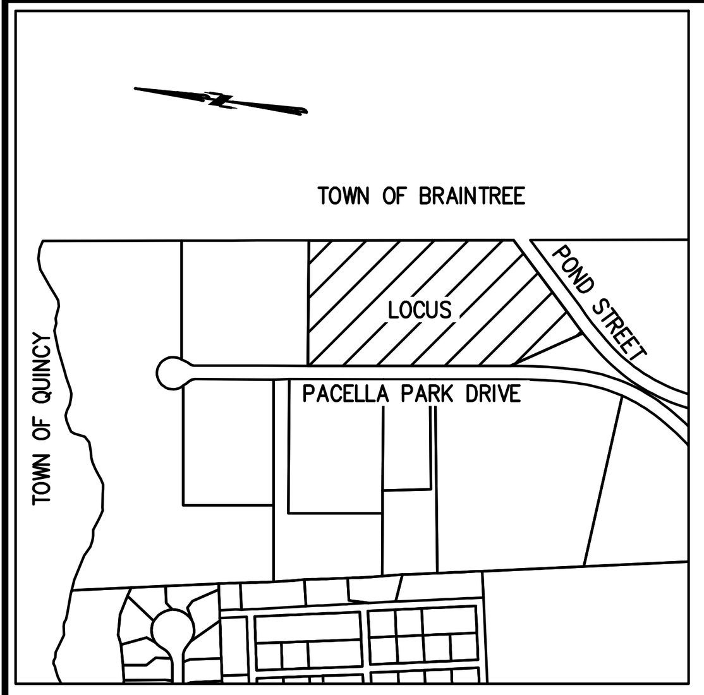
Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-4: NORTHERN HEADWALLS

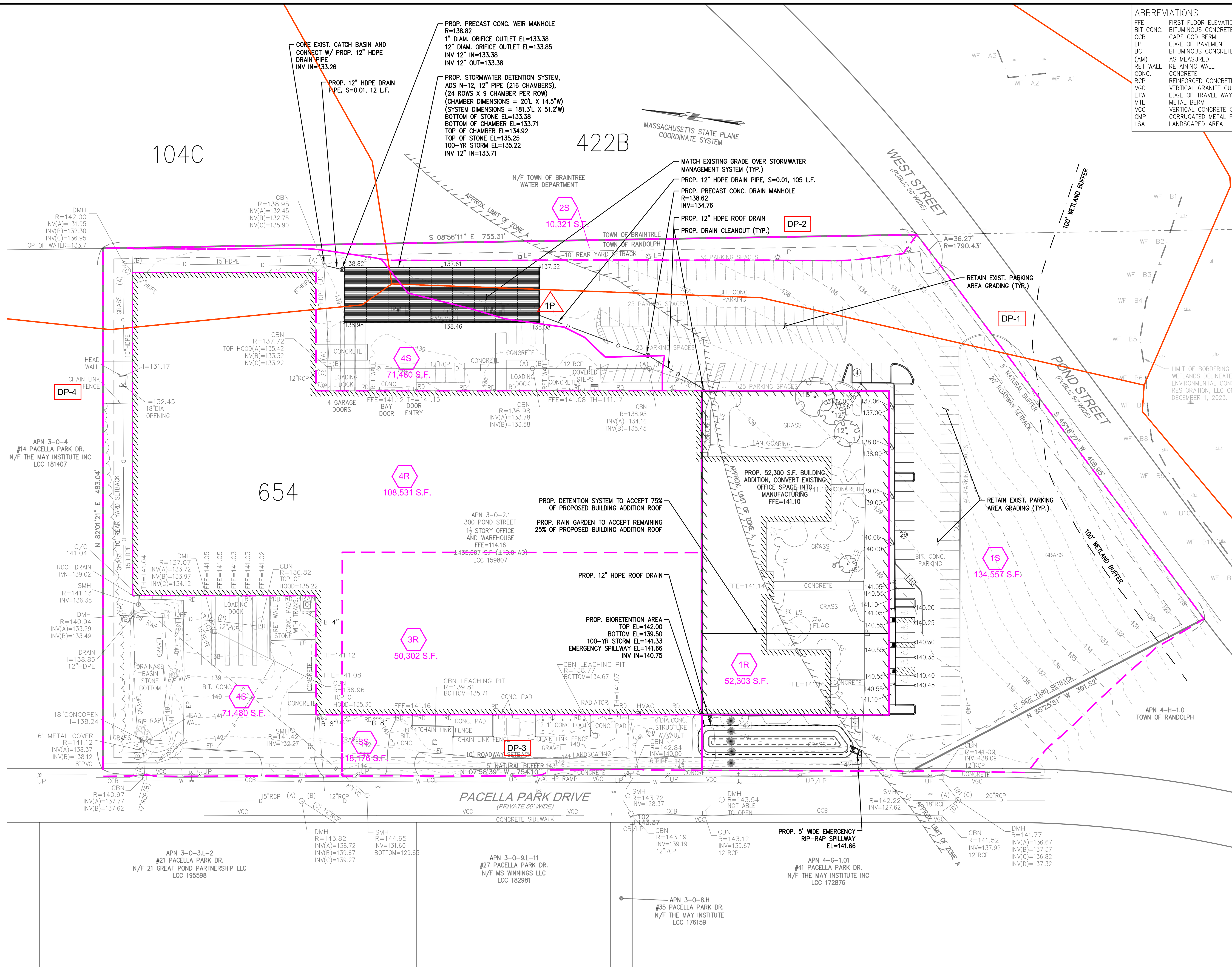


A P P E N D I X B

Post-Development Condition



LOCUS MAP
Not to Scale



ABBREVIATIONS

FFE	FIRST FLOOR ELEVATION
BIT CONC.	BITUMINOUS CONCRETE PAVEMENT
CCB	CAPE COD BERM
EP	EDGE OF PAVEMENT
BC	BITUMINOUS CONCRETE CURB
(AM)	AS MEASURED
RET WALL	RETAINING WALL
CONC.	CONCRETE
RCP	REINFORCED CONCRETE PIPE
VGC	VERTICAL GRANITE CURB
ETW	EDGE OF TRAVEL WAY
MTL	METAL BERM
VCC	VERTICAL CONCRETE CURB
CMP	CORRUGATED METAL PIPE
LSA	LANDSCAPED AREA

LEGEND

REBAR
CONCRETE BOUND WITH DRILL HOLE
STONE BOUND
STONE BOUND

UTILITY SYMBOLS

ELECTRIC HAND HOLE
GUY POLE
GUY WIRE
HVAC UNIT
TRANSFORMER
WATER GATE
ELECTRIC MANHOLE
SEWER MANHOLE
DRAIN MANHOLE
TELEPHONE MANHOLE
DRAINAGE CATCH BASIN
HYDRANT
POST INDICATER VALVE
UTILITY POLE
BOLLARD
SIGN
DECIDUOUS TREE
CONIFEROUS TREE

LINE DESIGNATORS

W — WATER MAIN
OHW — OVERHEAD WIRES
G — GAS LINE
WS — WATER SERVICE
E — UNDERGROUND ELECTRIC
D — STORM DRAIN LINE
S — SANITARY SEWER LINE
DRAINAGE SWALE
X — CHAIN LINK FENCE

SURVEY NOTES:

1. LOCUS IS SHOWN AS PARCEL NUMBER 03-0-2.1 ON THE TOWN OF RANDOLPH ASSESSORS MAPS.
2. DEED TO LOCUS IS RECORDED IN THE NORFOLK COUNTY REGISTRY OF DEEDS LAND COURT AT CERTIFICATE #159807.
3. THIS SURVEY WAS MADE ON THE GROUND IN NOVEMBER OF 2022 AND UPDATED IN SEPTEMBER AND DECEMBER OF 2023 BY MCKENZIE ENGINEERING GROUP, INC.
4. ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.
5. WETLAND RESOURCE AREAS WERE DELINEATED BY ENVIRONMENTAL CONSULTING & RESTORATION, LLC ON DECEMBER 1, 2023.
6. LOCUS IS SITUATED IN ZONE X AS SHOWN ON F.I.R.M. No 25021C0208E, EFFECTIVE 7/17/2012.
7. LOCUS IS NOT LOCATED IN A DEP ZONE 2 OR TOWN OF RANDOLPH AQUIFER PROTECTION DISTRICT ZONE. A PORTION OF THE SITE IS LOCATED WITHIN A DEP ZONE A SURFACE WATER SUPPLY PROTECTION AREA.
8. UTILITY INFORMATION FROM ABOVE GROUND OBSERVED EVIDENCE IN CONJUNCTION WITH DIG SAFE MARKINGS AND RECORD PLANS. THE LAND SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN HEREON COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE LAND SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. BEFORE CONSTRUCTION CALL DIG SAFE SYSTEMS, INC. AT 1-888-344-7233.
7 PLAN REFERENCES: LCP 34183A
#953 OF 1963
#393 OF 1927 (POND STREET LAYOUT)
#256 OF 1923 (WEST STREET LAYOUT)

SOIL KEY

SOIL CLASSIFICATION	DESCRIPTION	HYDROLOGIC SOIL GROUP
104C	HOLLIS-ROCK OUTCROP-CHARLTON COMPLEX, 0-15% SLOPES	D
422B	CANTON FINE SANDY LOAM, 0-8% SLOPES EXTREMELY STONY	B
654	UDORTHENTS, LOAMY	A

LEGEND

LIMIT OF WATERSHED
TIME OF CONCENTRATION FLOW PATH
LIMIT OF NRCS SOIL MAPPING

REV	DATE	DESCRIPTION	BY	APP
-	-	-	-	-

MCKENZIE ENGINEERING GROUP
Assinippi Office Park
150 Longwater Drive, Suite 101
Norwell, MA 02061
P: 781.792.3900
F: 781.792.0333
www.mckeng.com

POST-DEVELOPMENT WATERSHED PLAN
300 POND STREET
RANDOLPH, MASSACHUSETTS

PROFESSIONAL ENGINEER:

OWNERS/APPLICANT:
EMERSON - SWAN FLEXCON
300 POND STREET
RANDOLPH, MASSACHUSETTS

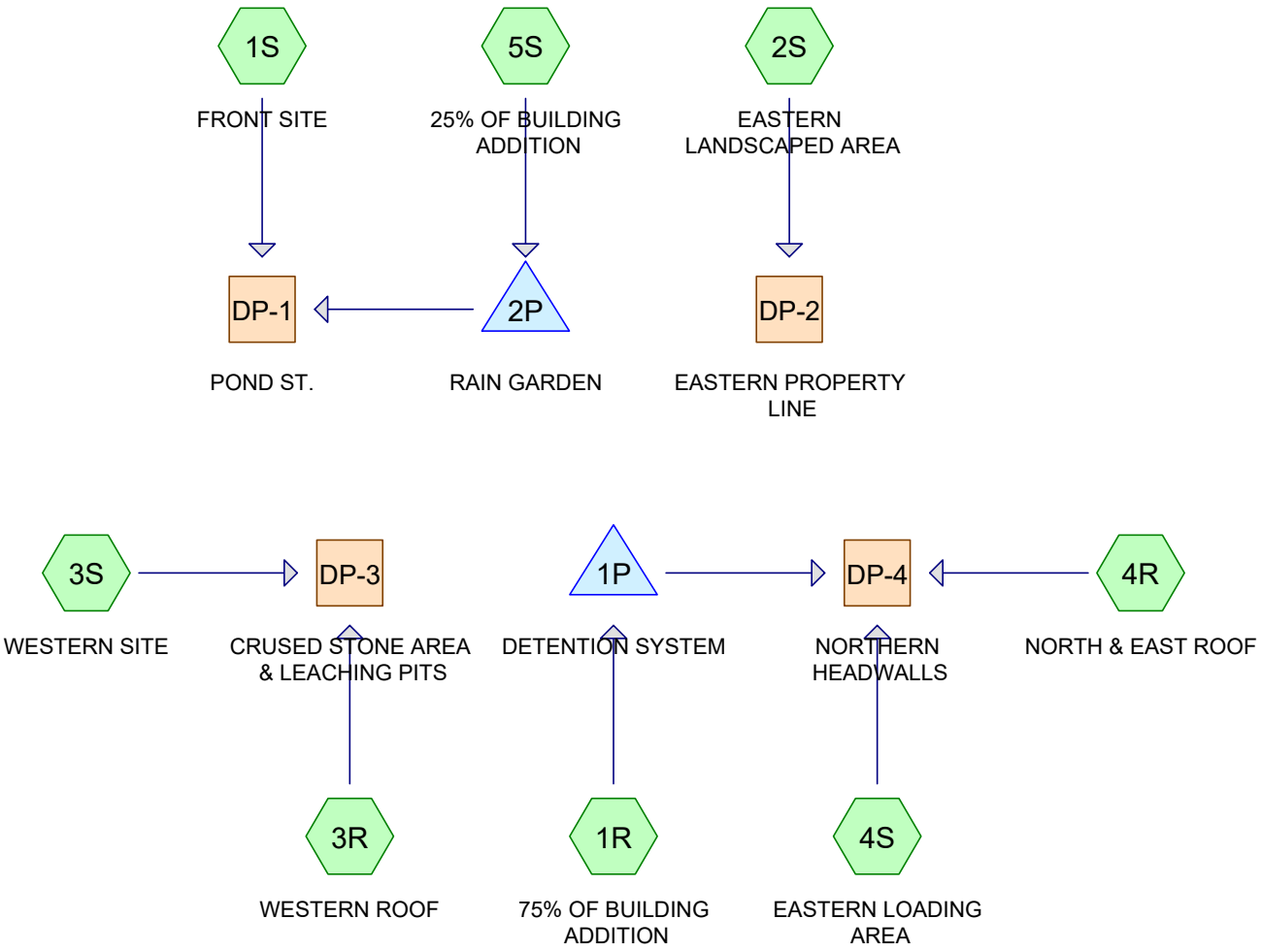
PERMIT PLAN SET

DRAWN BY:	ESS
DESIGNED BY:	ESS
CHECKED BY:	BCM
APPROVED BY:	BCM
DATE:	NOVEMBER 8, 2023
SCALE:	1"=50'
PROJECT NO.:	222-209

DWG. TITLE:
POST-DEV. WATERSHED PLAN

DWG. NO:
WS-2

M:\MEG\2022 PROJECTS\222-209 EMERSON SWAN-FLEXCON - 300 POND ST., RANDOLPH\DWGS\222-209 WS-2.DWG



Subcat Reach Pond Link

Routing Diagram for 222-209 POST DEVELOPMENT
Prepared by McKenzie Engineering Group, Inc., Printed 4/24/2024
HydroCAD® 10.10-7a s/n 00452 © 2021 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.29	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.92	2
3	25-Year	Type III 24-hr		Default	24.00	1	6.19	2
4	100-Year	Type III 24-hr		Default	24.00	1	8.79	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.951	39	>75% Grass cover, Good, HSG A (1S, 3S, 4S)
0.233	61	>75% Grass cover, Good, HSG B (1S, 2S)
0.023	80	>75% Grass cover, Good, HSG D (2S)
0.270	96	Gravel surface, HSG A (3S, 4S)
2.058	98	Paved parking, HSG A (1S, 4S)
0.471	98	Paved parking, HSG B (1S, 4S)
0.156	98	Paved parking, HSG D (4S)
4.847	98	Roofs, HSG A (1R, 3R, 4R, 5S)
0.077	98	Unconnected pavement, HSG A (3S)
0.099	30	Woods, Good, HSG A (4S)
0.047	77	Woods, Good, HSG D (4S)
10.231	**85**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
9.302	HSG A	1R, 1S, 3R, 3S, 4R, 4S, 5S
0.703	HSG B	1S, 2S, 4S
0.000	HSG C	
0.226	HSG D	2S, 4S
0.000	Other	
10.231		**TOTAL AREA**

222-209 POST DEVELOPMENT
Prepared by McKenzie Engineering Group, Inc. Printed 4/24/2024

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
1.951	0.233	0.000	0.023	0.000	2.206	>75% Grass cover, Good	1S, 2S, 3S, 4S
0.270	0.000	0.000	0.000	0.000	0.270	Gravel surface	3S, 4S
2.058	0.471	0.000	0.156	0.000	2.684	Paved parking	1S, 4S
4.847	0.000	0.000	0.000	0.000	4.847	Roofs	1R, 3R, 4R, 5S
0.077	0.000	0.000	0.000	0.000	0.077	Unconnected pavement	3S
0.099	0.000	0.000	0.047	0.000	0.146	Woods, Good	4S
9.302	**0.703**	**0.000**	**0.226**	**0.000**	**10.231**	**TOTAL AREA**	

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)
1	1P	133.38	133.26	12.0	0.0100	0.013	0.0	12.0	0.0

Time span=5.00-48.00 hrs, dt=0.05 hrs, 861 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1R: 75% OF BUILDING Runoff Area=39,227 sf 100.00% Impervious Runoff Depth>3.00"
Tc=6.0 min CN=98 Runoff=2.81 cfs 0.225 af

Subcatchment1S: FRONT SITE Runoff Area=134,557 sf 51.87% Impervious Runoff Depth=0.88"
Tc=6.0 min CN=70 Runoff=2.84 cfs 0.227 af

Subcatchment2S: EASTERN Runoff Area=10,320 sf 0.00% Impervious Runoff Depth=0.56"
Tc=6.0 min CN=63 Runoff=0.11 cfs 0.011 af

Subcatchment3R: WESTERN ROOF Runoff Area=50,302 sf 100.00% Impervious Runoff Depth>3.00"
Tc=6.0 min CN=98 Runoff=3.60 cfs 0.289 af

Subcatchment3S: WESTERN SITE Runoff Area=18,176 sf 18.54% Impervious Runoff Depth=1.54"
Tc=6.0 min UI Adjusted CN=81 Runoff=0.74 cfs 0.054 af

Subcatchment4R: NORTH & EAST Runoff Area=108,531 sf 100.00% Impervious Runoff Depth>3.00"
Tc=6.0 min CN=98 Runoff=7.78 cfs 0.623 af

Subcatchment4S: EASTERN LOADING Runoff Area=71,480 sf 65.94% Impervious Runoff Depth=1.47"
Tc=6.0 min CN=80 Runoff=2.76 cfs 0.201 af

Subcatchment5S: 25% OF BUILDING Runoff Area=13,075 sf 100.00% Impervious Runoff Depth>3.00"
Tc=6.0 min CN=98 Runoff=0.94 cfs 0.075 af

Reach DP-1: POND ST. Inflow=2.84 cfs 0.227 af
Outflow=2.84 cfs 0.227 af

Reach DP-2: EASTERN PROPERTY LINE Inflow=0.11 cfs 0.011 af
Outflow=0.11 cfs 0.011 af

Reach DP-3: CRUSED STONE AREA & LEACHING PITS Inflow=4.34 cfs 0.342 af
Outflow=4.34 cfs 0.342 af

Reach DP-4: NORTHERN HEADWALLS Inflow=11.15 cfs 1.033 af
Outflow=11.15 cfs 1.033 af

Pond 1P: DETENTION SYSTEM Peak Elev=134.36' Storage=4,576 cf Inflow=2.81 cfs 0.225 af
Outflow=1.00 cfs 0.209 af

Pond 2P: RAIN GARDEN Peak Elev=141.33' Storage=3,269 cf Inflow=0.94 cfs 0.075 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 10.231 ac Runoff Volume = 1.704 af Average Runoff Depth = 2.00"
25.63% Pervious = 2.623 ac 74.37% Impervious = 7.609 ac

Summary for Subcatchment 1R: 75% OF BUILDING ADDITION

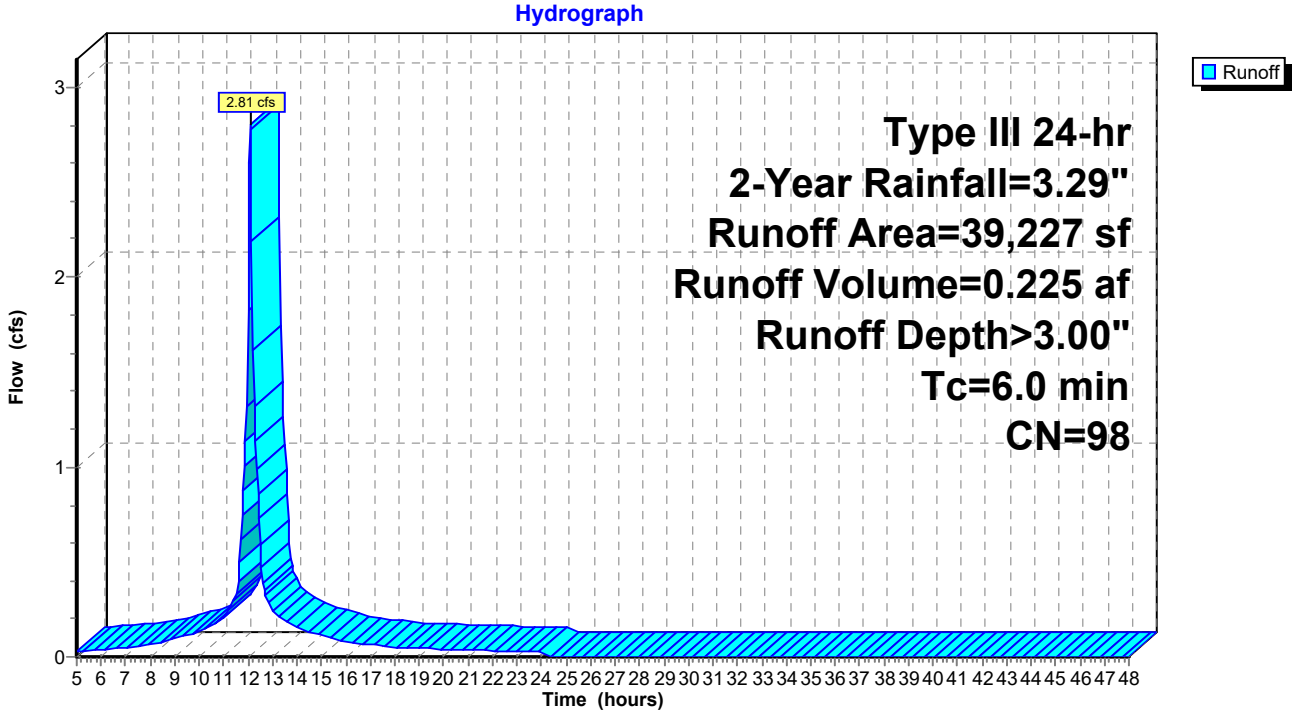
Runoff = 2.81 cfs @ 12.09 hrs, Volume= 0.225 af, Depth> 3.00"
Routed to Pond 1P : DETENTION SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
39,227	98	Roofs, HSG A
39,227		100.00% Impervious Area

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

Subcatchment 1R: 75% OF BUILDING ADDITION



Summary for Subcatchment 1S: FRONT SITE

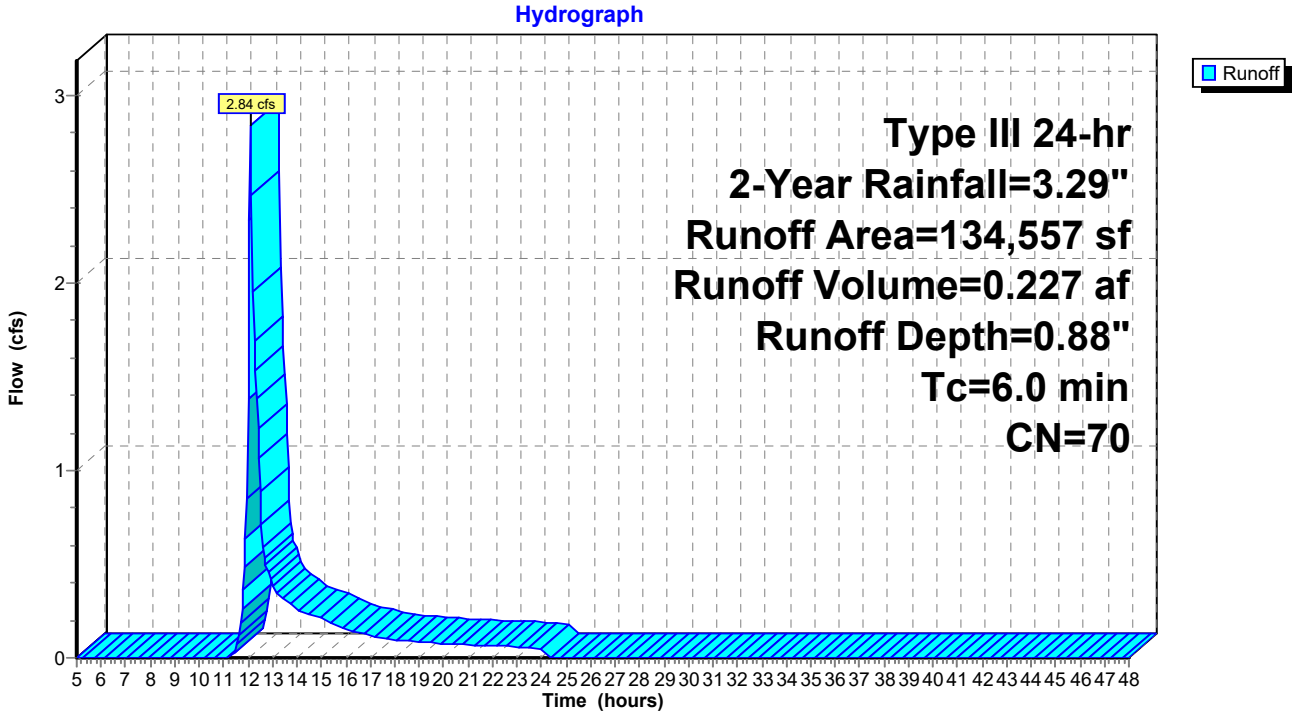
Runoff = 2.84 cfs @ 12.10 hrs, Volume= 0.227 af, Depth= 0.88"
Routed to Reach DP-1 : POND ST.

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
63,959	39	>75% Grass cover, Good, HSG A
809	61	>75% Grass cover, Good, HSG B
20,445	98	Paved parking, HSG B
49,344	98	Paved parking, HSG A
134,557	70	Weighted Average
64,768		48.13% Pervious Area
69,789		51.87% Impervious Area

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

Subcatchment 1S: FRONT SITE



Summary for Subcatchment 2S: EASTERN LANDSCAPED AREA

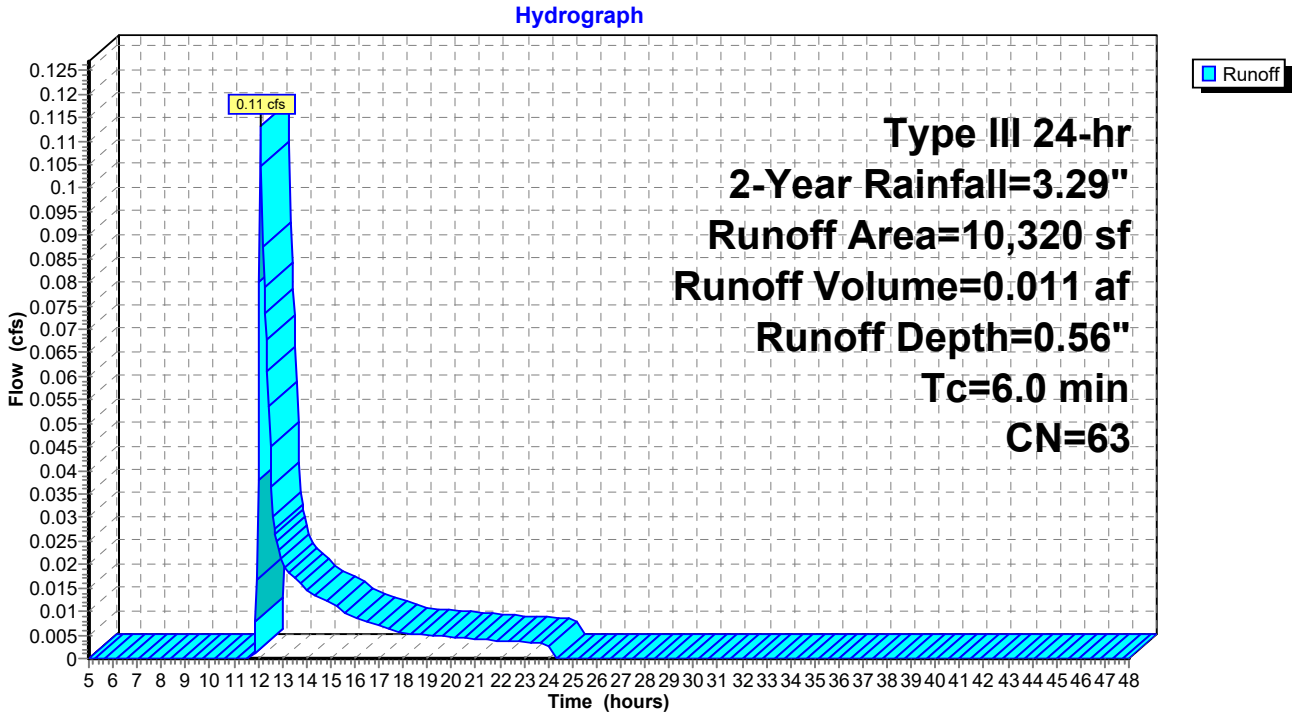
Runoff = 0.11 cfs @ 12.12 hrs, Volume= 0.011 af, Depth= 0.56"
Routed to Reach DP-2 : EASTERN PROPERTY LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
9,320	61	>75% Grass cover, Good, HSG B
1,000	80	>75% Grass cover, Good, HSG D
10,320	63	Weighted Average
10,320		100.00% Pervious Area

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

Subcatchment 2S: EASTERN LANDSCAPED AREA



Summary for Subcatchment 3R: WESTERN ROOF

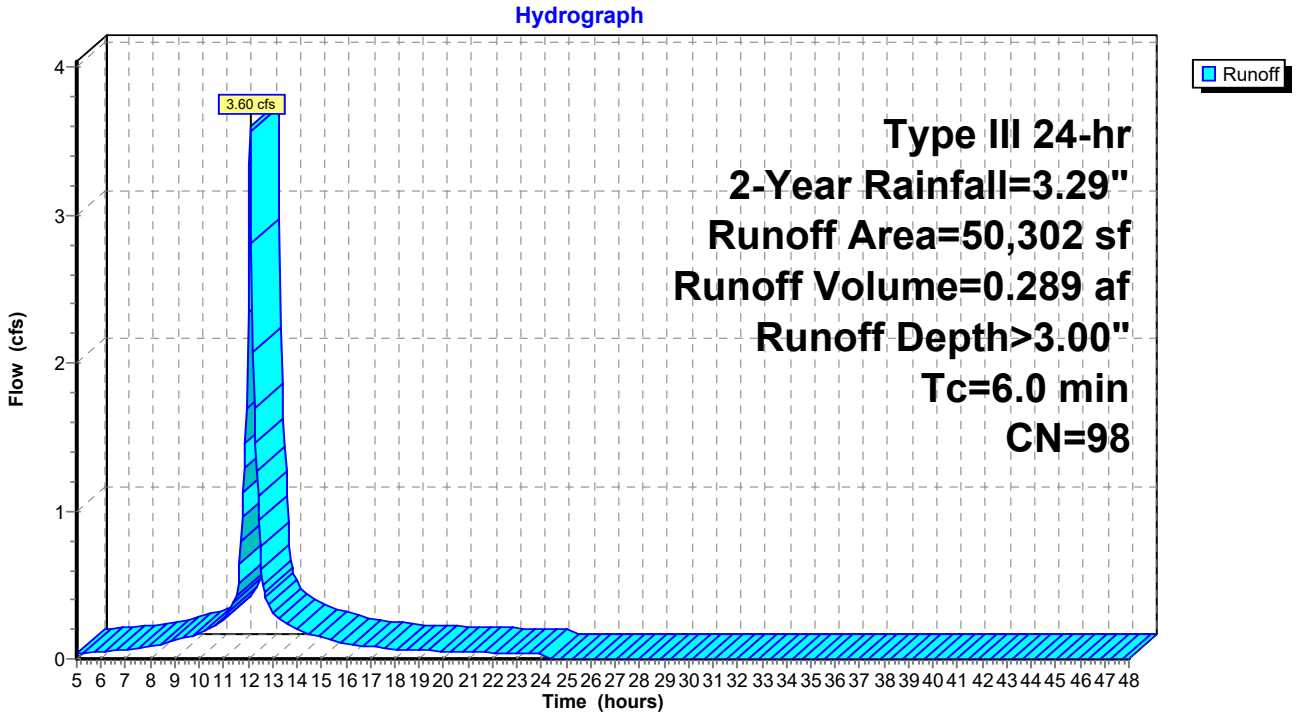
Runoff = 3.60 cfs @ 12.09 hrs, Volume= 0.289 af, Depth> 3.00"
Routed to Reach DP-3 : CRUSED STONE AREA & LEACHING PITS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
50,302	98	Roofs, HSG A
50,302		100.00% Impervious Area

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

Subcatchment 3R: WESTERN ROOF



Summary for Subcatchment 3S: WESTERN SITE

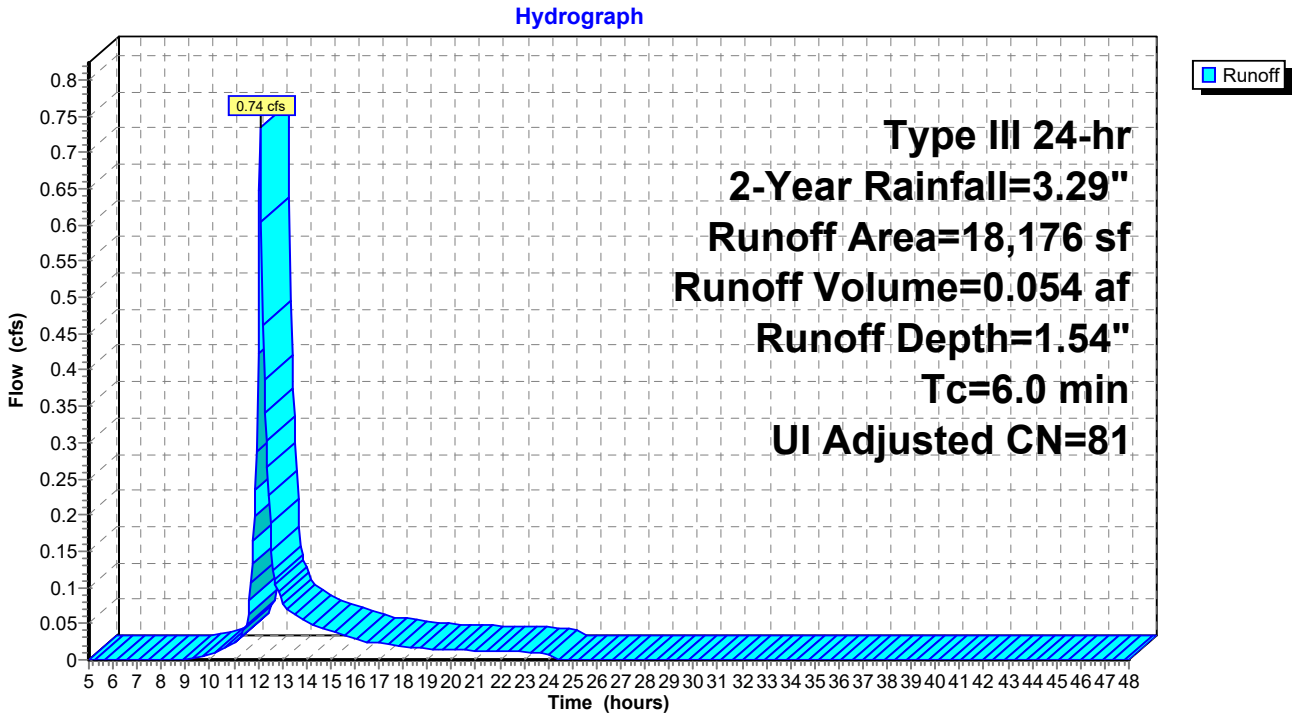
Runoff = 0.74 cfs @ 12.09 hrs, Volume= 0.054 af, Depth= 1.54"
Routed to Reach DP-3 : CRUSED STONE AREA & LEACHING PITS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Adj	Description
3,370	98		Unconnected pavement, HSG A
10,363	96		Gravel surface, HSG A
4,443	39		>75% Grass cover, Good, HSG A
18,176	82	81	Weighted Average, UI Adjusted
14,806			81.46% Pervious Area
3,370			18.54% Impervious Area
3,370			100.00% Unconnected

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

Subcatchment 3S: WESTERN SITE



Summary for Subcatchment 4R: NORTH & EAST ROOF

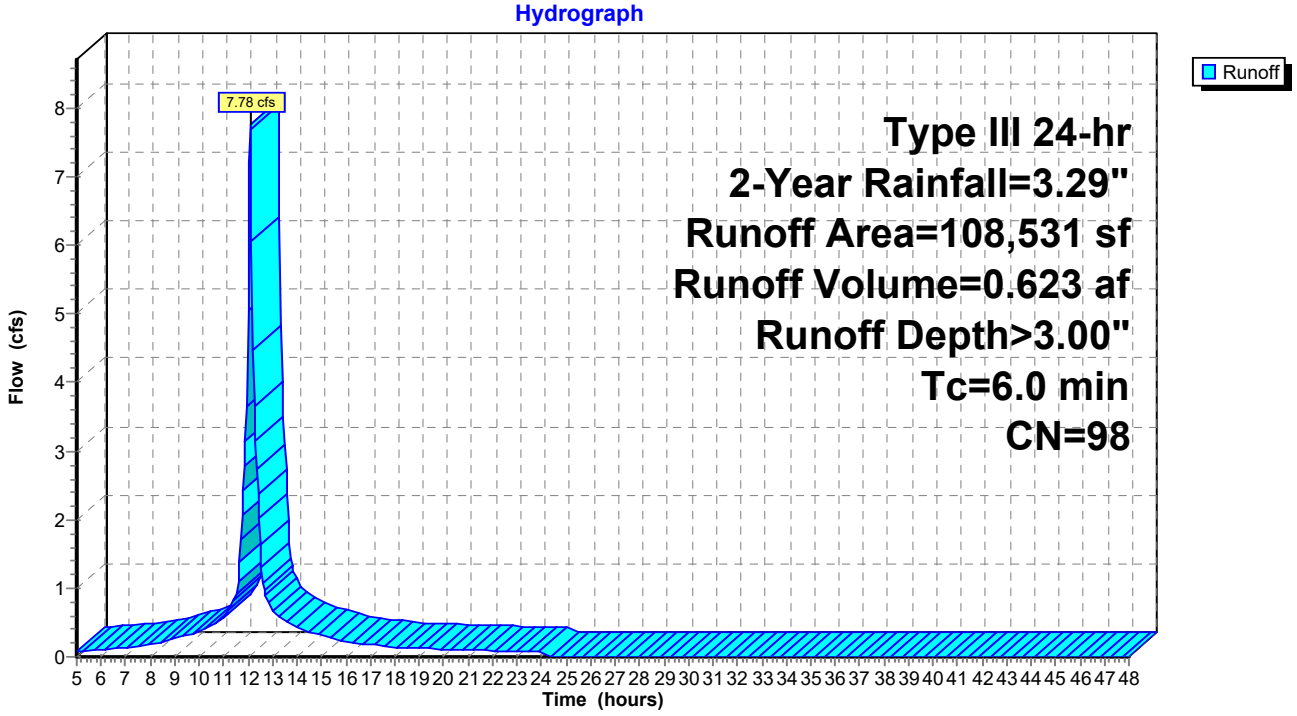
Runoff = 7.78 cfs @ 12.09 hrs, Volume= 0.623 af, Depth> 3.00"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
108,531	98	Roofs, HSG A
108,531		100.00% Impervious Area

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

Subcatchment 4R: NORTH & EAST ROOF



Summary for Subcatchment 4S: EASTERN LOADING AREA

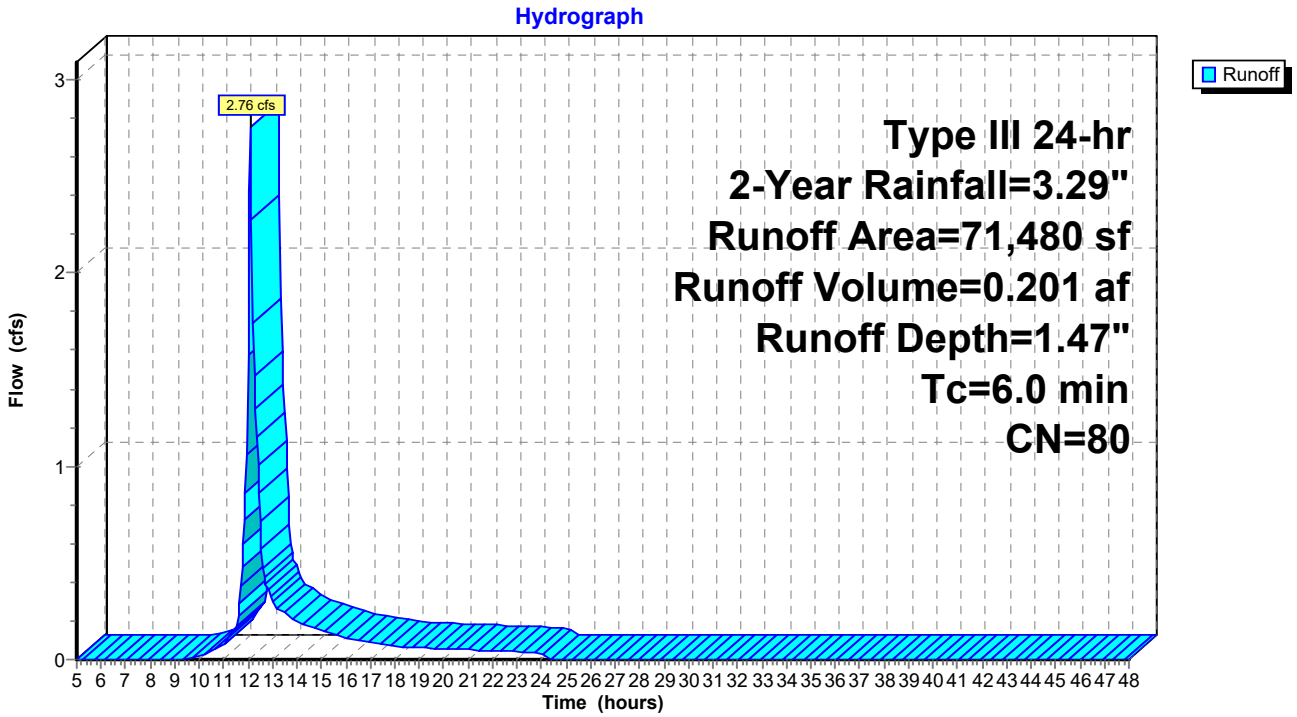
Runoff = 2.76 cfs @ 12.10 hrs, Volume= 0.201 af, Depth= 1.47"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
40,295	98	Paved parking, HSG A
55	98	Paved parking, HSG B
6,783	98	Paved parking, HSG D
4,315	30	Woods, Good, HSG A
2,050	77	Woods, Good, HSG D
16,572	39	>75% Grass cover, Good, HSG A
1,410	96	Gravel surface, HSG A
71,480	80	Weighted Average
24,347		34.06% Pervious Area
47,133		65.94% Impervious Area

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

Subcatchment 4S: EASTERN LOADING AREA



Summary for Subcatchment 5S: 25% OF BUILDING ADDITION

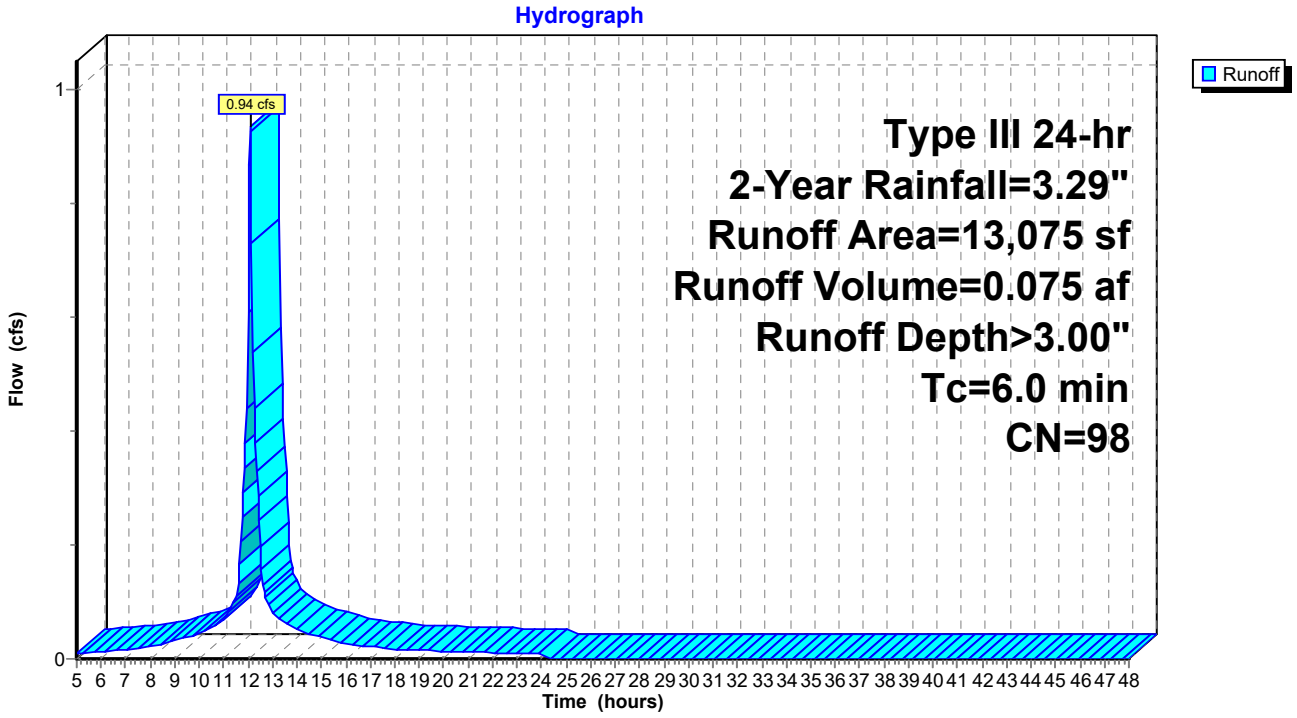
Runoff = 0.94 cfs @ 12.09 hrs, Volume= 0.075 af, Depth> 3.00"
Routed to Pond 2P : RAIN GARDEN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.29"

Area (sf)	CN	Description
13,075	98	Roofs, HSG A
13,075		100.00% Impervious Area

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

Subcatchment 5S: 25% OF BUILDING ADDITION



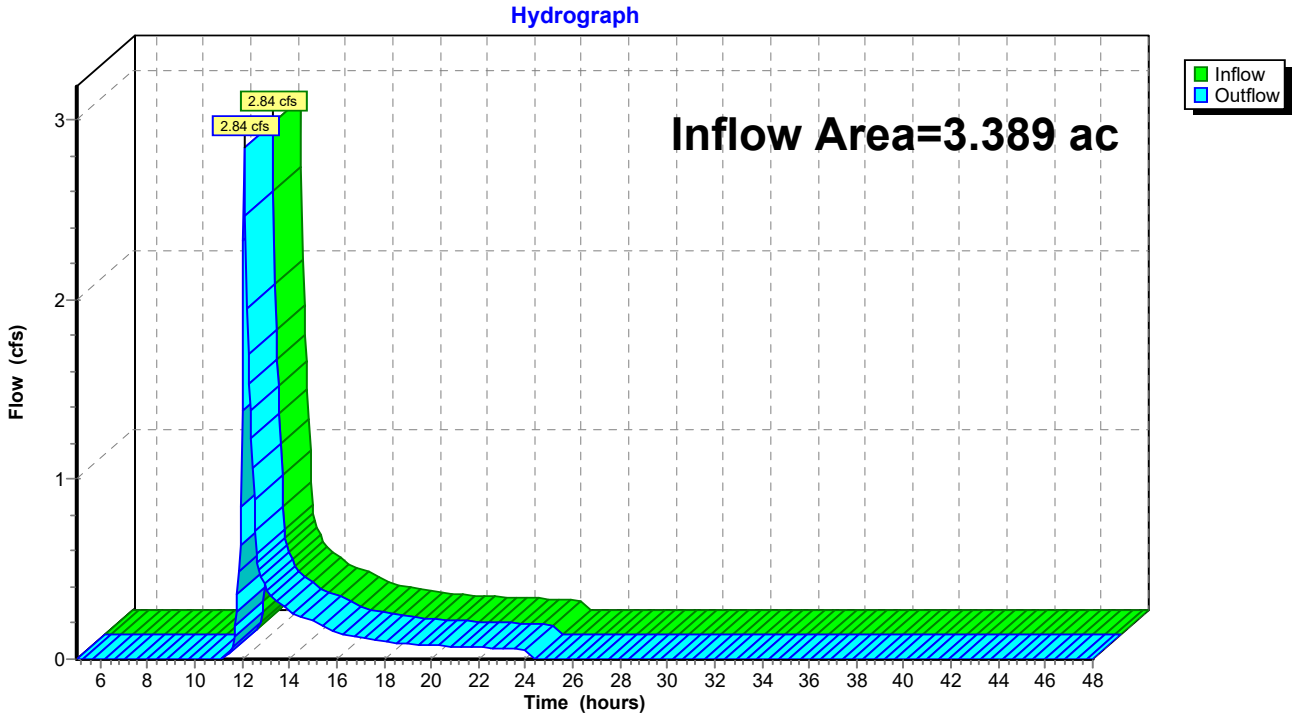
Summary for Reach DP-1: POND ST.

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

Inflow Area = 3.389 ac, 56.13% Impervious, Inflow Depth = 0.80" for 2-Year event
Inflow = 2.84 cfs @ 12.10 hrs, Volume= 0.227 af
Outflow = 2.84 cfs @ 12.10 hrs, Volume= 0.227 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-1: POND ST.



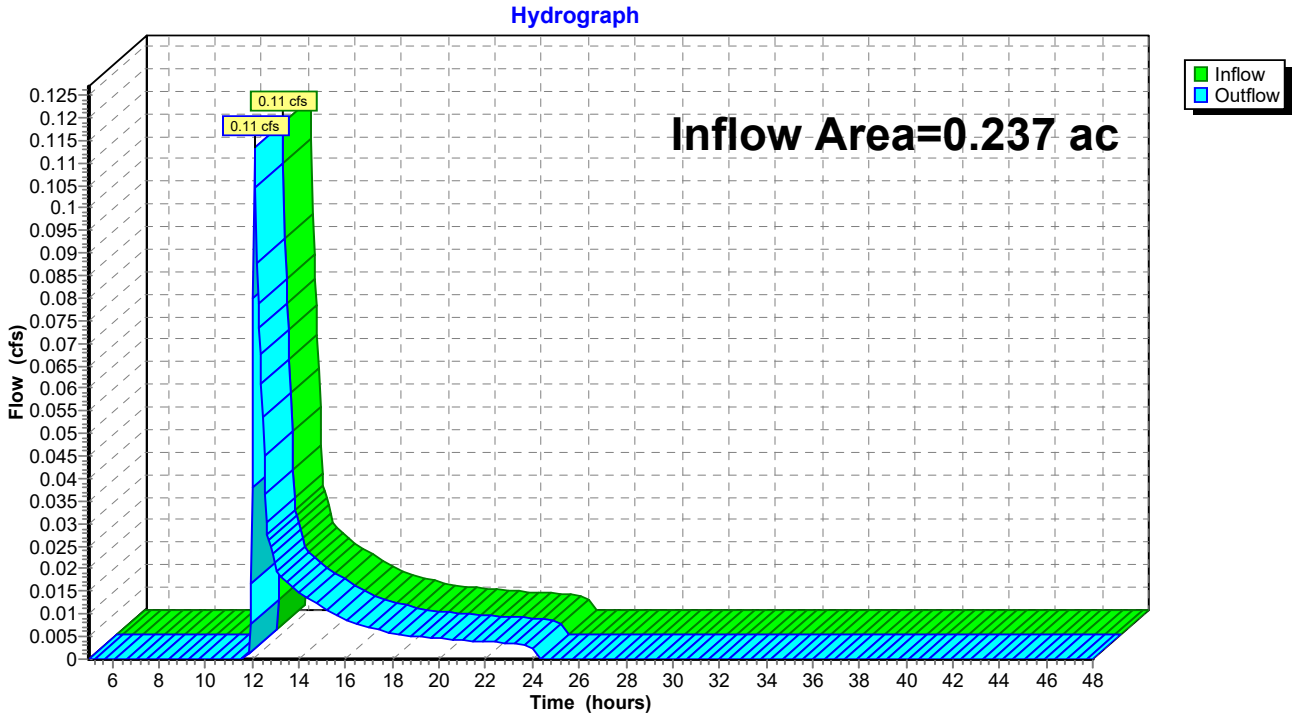
Summary for Reach DP-2: EASTERN PROPERTY LINE

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

Inflow Area = 0.237 ac, 0.00% Impervious, Inflow Depth = 0.56" for 2-Year event
Inflow = 0.11 cfs @ 12.12 hrs, Volume= 0.011 af
Outflow = 0.11 cfs @ 12.12 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-2: EASTERN PROPERTY LINE



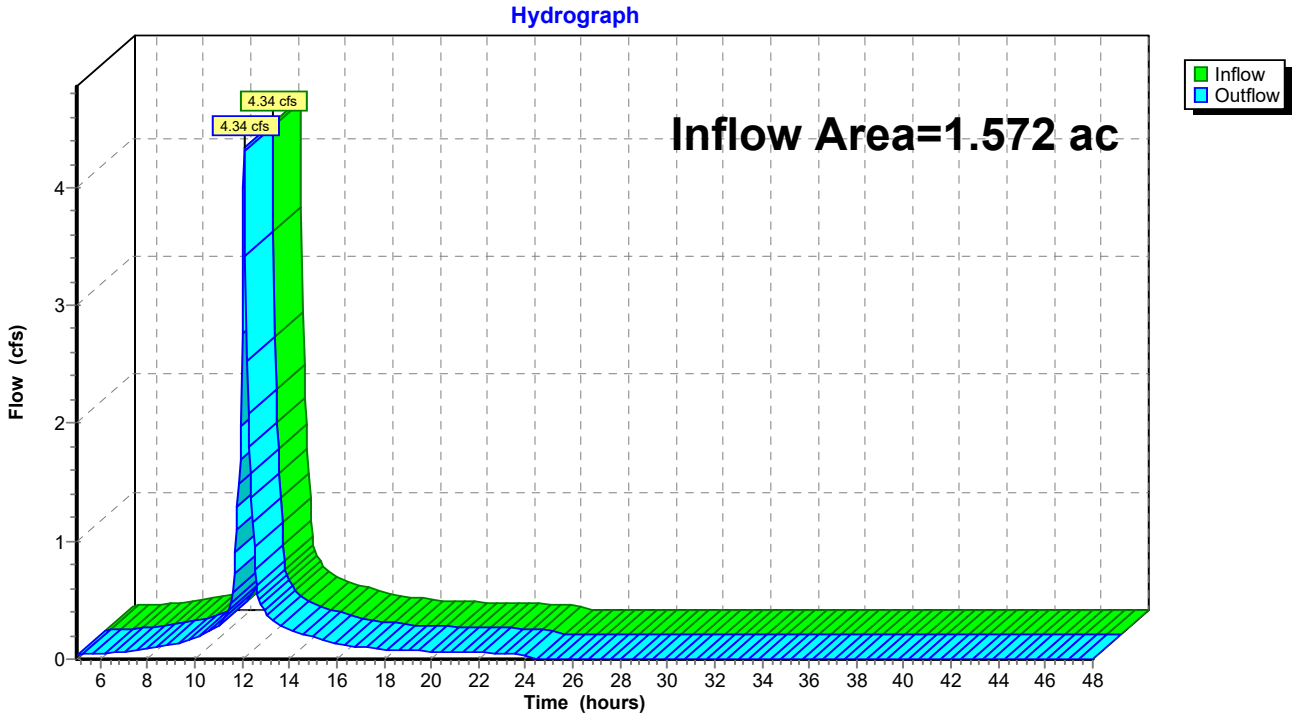
Summary for Reach DP-3: CRUSED STONE AREA & LEACHING PITS

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

Inflow Area = 1.572 ac, 78.38% Impervious, Inflow Depth > 2.61" for 2-Year event
Inflow = 4.34 cfs @ 12.09 hrs, Volume= 0.342 af
Outflow = 4.34 cfs @ 12.09 hrs, Volume= 0.342 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-3: CRUSED STONE AREA & LEACHING PITS



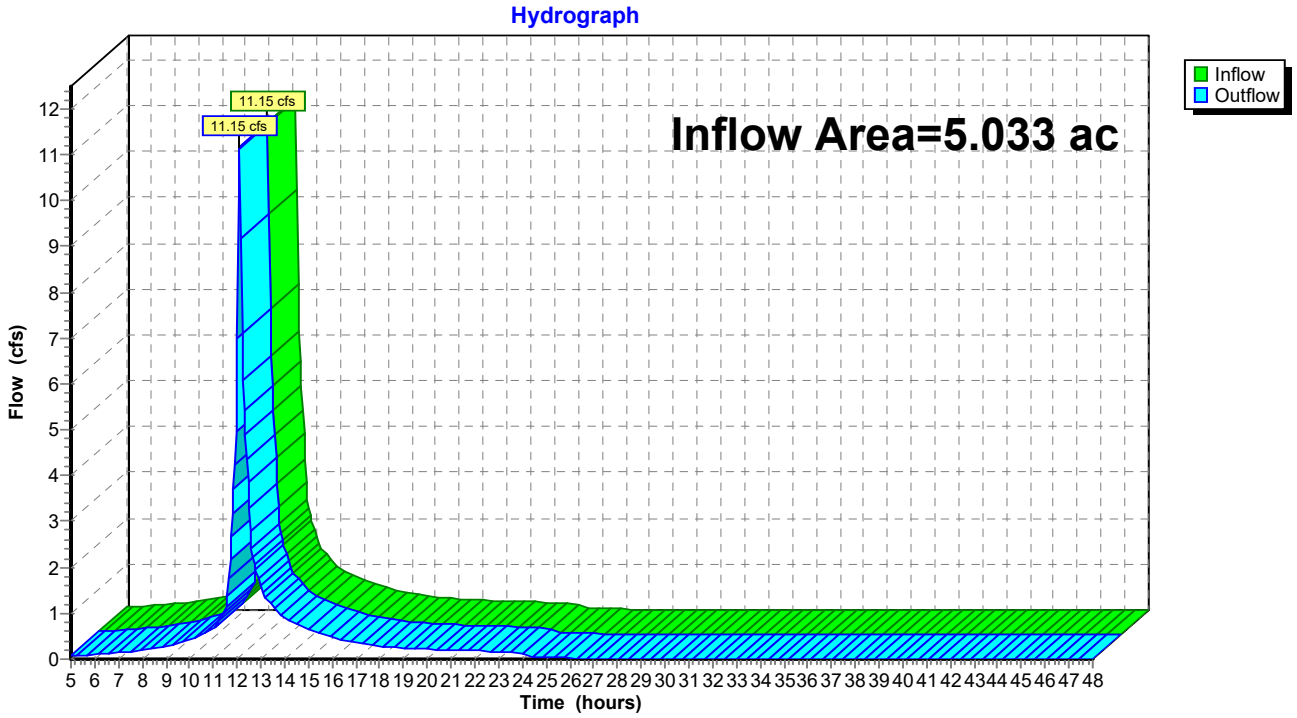
Summary for Reach DP-4: NORTHERN HEADWALLS

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

Inflow Area = 5.033 ac, 88.89% Impervious, Inflow Depth > 2.46" for 2-Year event
Inflow = 11.15 cfs @ 12.09 hrs, Volume= 1.033 af
Outflow = 11.15 cfs @ 12.09 hrs, Volume= 1.033 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-4: NORTHERN HEADWALLS



Summary for Pond 1P: DETENTION SYSTEM

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.901 ac,100.00% Impervious, Inflow Depth > 3.00" for 2-Year event
Inflow = 2.81 cfs @ 12.09 hrs, Volume= 0.225 af
Outflow = 1.00 cfs @ 12.35 hrs, Volume= 0.209 af, Atten= 65%, Lag= 15.8 min
Primary = 1.00 cfs @ 12.35 hrs, Volume= 0.209 af
Routed to Reach DP-4 : NORTHERN HEADWALLS

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 134.36' @ 12.35 hrs Surf.Area= 9,291 sf Storage= 4,576 cf

Plug-Flow detention time= 305.0 min calculated for 0.209 af (93% of inflow)
Center-of-Mass det. time= 268.9 min (1,034.8 - 765.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.38'	5,162 cf	**51.24'W x 181.33'L x 1.88'H Field A** 17,426 cf Overall - 4,522 cf Embedded = 12,904 cf x 40.0% Voids
#2A	133.71'	3,499 cf	**ADS N-12 12"** x 216 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 216 Chambers in 24 Rows
		8,661 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	133.38'	**12.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 133.38' / 133.26' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	133.38'	**1.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	133.85'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.00 cfs @ 12.35 hrs HW=134.36' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.00 cfs of 2.02 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 4.66 fps)
  └─**3=Orifice/Grate** (Orifice Controls 0.97 cfs @ 2.43 fps)

Pond 1P: DETENTION SYSTEM - Chamber Wizard Field A

Chamber Model = ADS N-12 12" (ADS N-12® Pipe)
Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf
Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf

14.5" Wide + 10.9" Spacing = 25.4" C-C Row Spacing

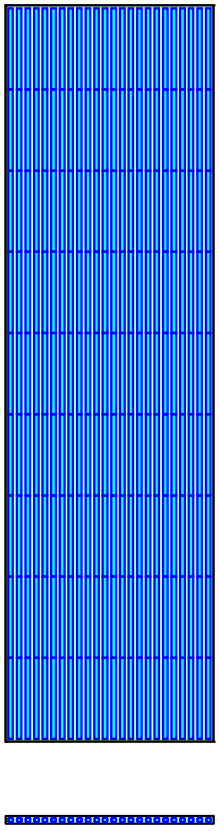
9 Chambers/Row x 20.00' Long = 180.00' Row Length +8.0" End Stone x 2 = 181.33' Base Length
24 Rows x 14.5" Wide + 10.9" Spacing x 23 + 8.0" Side Stone x 2 = 51.24' Base Width
4.0" Stone Base + 14.5" Chamber Height + 4.0" Stone Cover = 1.88' Field Height

216 Chambers x 16.2 cf = 3,499.2 cf Chamber Storage
216 Chambers x 20.9 cf = 4,522.0 cf Displacement

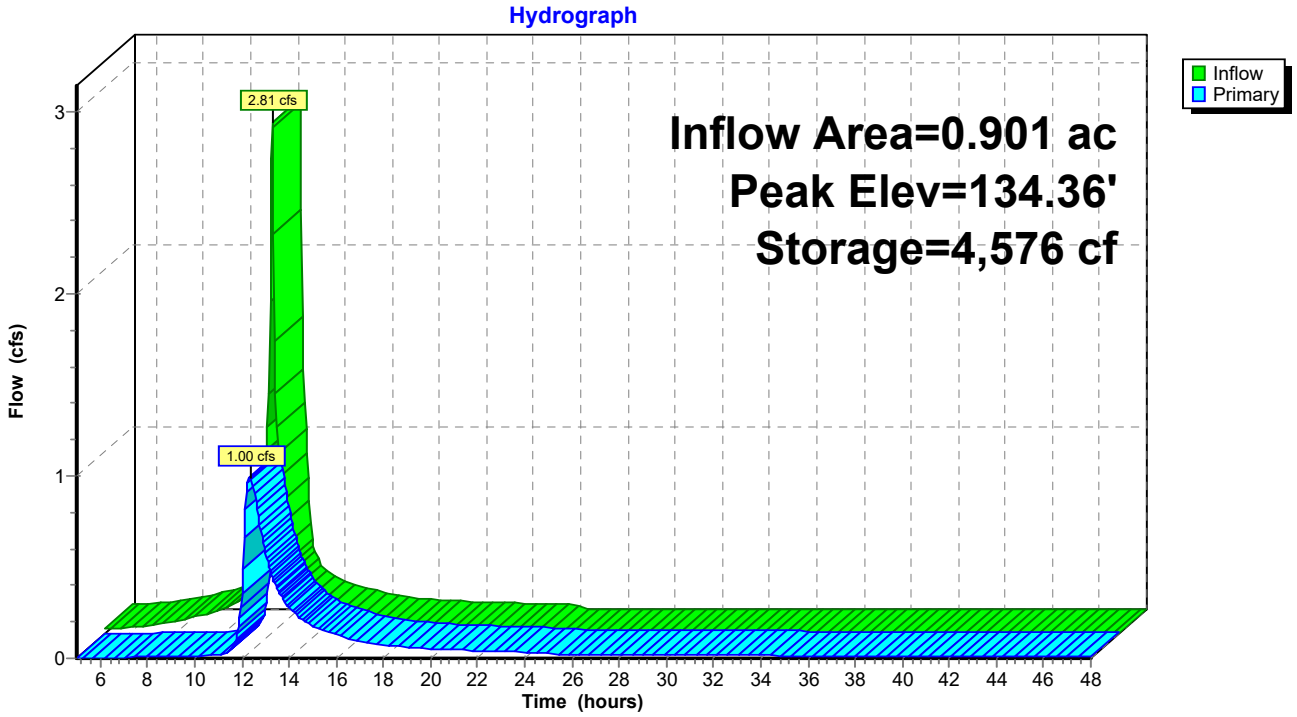
17,426.0 cf Field - 4,522.0 cf Chambers = 12,903.9 cf Stone x 40.0% Voids = 5,161.6 cf Stone Storage

Chamber Storage + Stone Storage = 8,660.8 cf = 0.199 af
Overall Storage Efficiency = 49.7%
Overall System Size = 181.33' x 51.24' x 1.88'

216 Chambers
645.4 cy Field
477.9 cy Stone



Pond 1P: DETENTION SYSTEM



Summary for Pond 2P: RAIN GARDEN

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.300 ac,100.00% Impervious, Inflow Depth > 3.00" for 2-Year event
Inflow = 0.94 cfs @ 12.09 hrs, Volume= 0.075 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach DP-1 : POND ST.

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 141.33' @ 24.40 hrs Surf.Area= 3,097 sf Storage= 3,269 cf

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

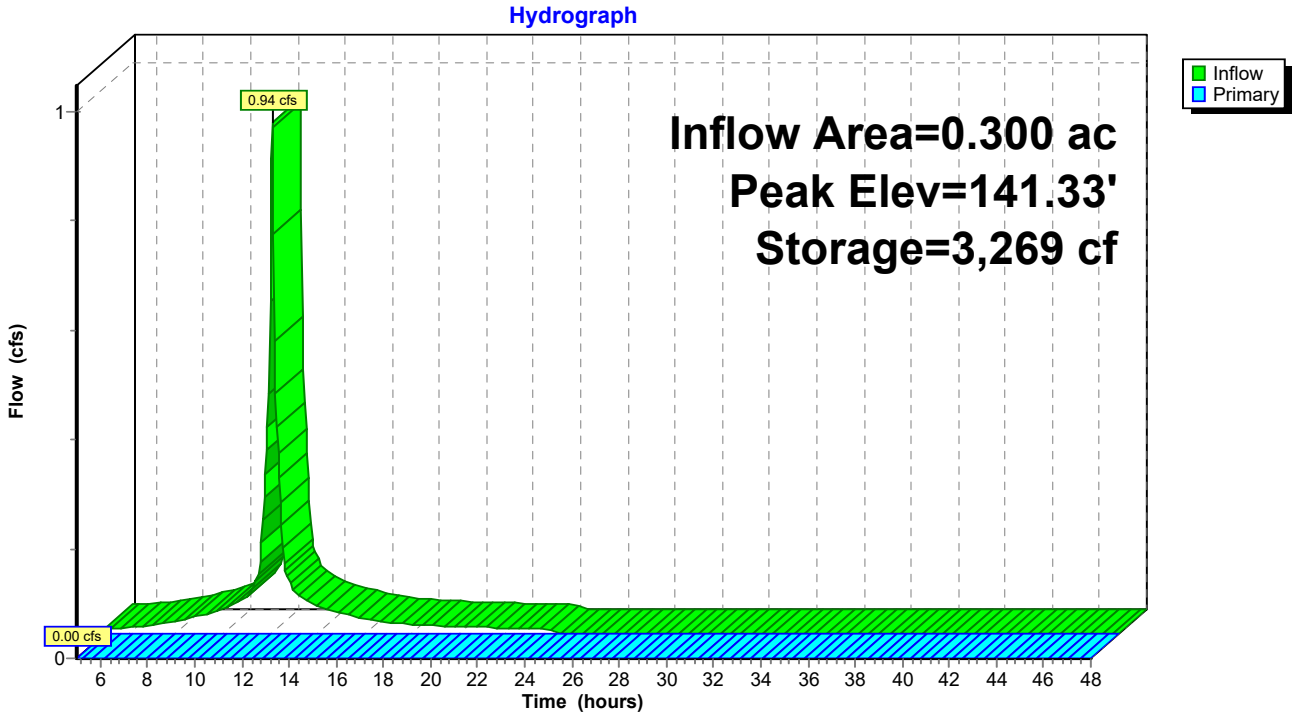
Volume	Invert	Avail.Storage	Storage Description
#1	139.50'	5,680 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
139.50	562	0	0
140.00	1,190	438	438
141.00	2,582	1,886	2,324
142.00	4,130	3,356	5,680

Device	Routing	Invert	Outlet Devices
#1	Primary	141.66'	**5.0' long x 3.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.41 2.56 2.69 2.67 2.66 2.66 2.65 2.67 2.67 2.70 2.77 2.83 2.87 2.93 3.10 3.19 3.32

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=139.50' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: RAIN GARDEN



Time span=5.00-48.00 hrs, dt=0.05 hrs, 861 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1R: 75% OF BUILDING Runoff Area=39,227 sf 100.00% Impervious Runoff Depth>4.56"
Tc=6.0 min CN=98 Runoff=4.23 cfs 0.342 af

Subcatchment1S: FRONT SITE Runoff Area=134,557 sf 51.87% Impervious Runoff Depth=1.98"
Tc=6.0 min CN=70 Runoff=6.90 cfs 0.509 af

Subcatchment2S: EASTERN Runoff Area=10,320 sf 0.00% Impervious Runoff Depth=1.46"
Tc=6.0 min CN=63 Runoff=0.37 cfs 0.029 af

Subcatchment3R: WESTERN ROOF Runoff Area=50,302 sf 100.00% Impervious Runoff Depth>4.56"
Tc=6.0 min CN=98 Runoff=5.43 cfs 0.439 af

Subcatchment3S: WESTERN SITE Runoff Area=18,176 sf 18.54% Impervious Runoff Depth=2.91"
Tc=6.0 min UI Adjusted CN=81 Runoff=1.40 cfs 0.101 af

Subcatchment4R: NORTH & EAST Runoff Area=108,531 sf 100.00% Impervious Runoff Depth>4.56"
Tc=6.0 min CN=98 Runoff=11.71 cfs 0.947 af

Subcatchment4S: EASTERN LOADING Runoff Area=71,480 sf 65.94% Impervious Runoff Depth=2.82"
Tc=6.0 min CN=80 Runoff=5.32 cfs 0.386 af

Subcatchment5S: 25% OF BUILDING Runoff Area=13,075 sf 100.00% Impervious Runoff Depth>4.56"
Tc=6.0 min CN=98 Runoff=1.41 cfs 0.114 af

Reach DP-1: POND ST. Inflow=6.90 cfs 0.523 af
Outflow=6.90 cfs 0.523 af

Reach DP-2: EASTERN PROPERTY LINE Inflow=0.37 cfs 0.029 af
Outflow=0.37 cfs 0.029 af

Reach DP-3: CRUSED STONE AREA & LEACHING PITS Inflow=6.82 cfs 0.540 af
Outflow=6.82 cfs 0.540 af

Reach DP-4: NORTHERN HEADWALLS Inflow=18.33 cfs 1.659 af
Outflow=18.33 cfs 1.659 af

Pond 1P: DETENTION SYSTEM Peak Elev=134.58' Storage=5,911 cf Inflow=4.23 cfs 0.342 af
Outflow=1.81 cfs 0.326 af

Pond 2P: RAIN GARDEN Peak Elev=141.68' Storage=4,430 cf Inflow=1.41 cfs 0.114 af
Outflow=0.03 cfs 0.014 af

Total Runoff Area = 10.231 ac Runoff Volume = 2.868 af Average Runoff Depth = 3.36"
25.63% Pervious = 2.623 ac 74.37% Impervious = 7.609 ac

Summary for Subcatchment 1R: 75% OF BUILDING ADDITION

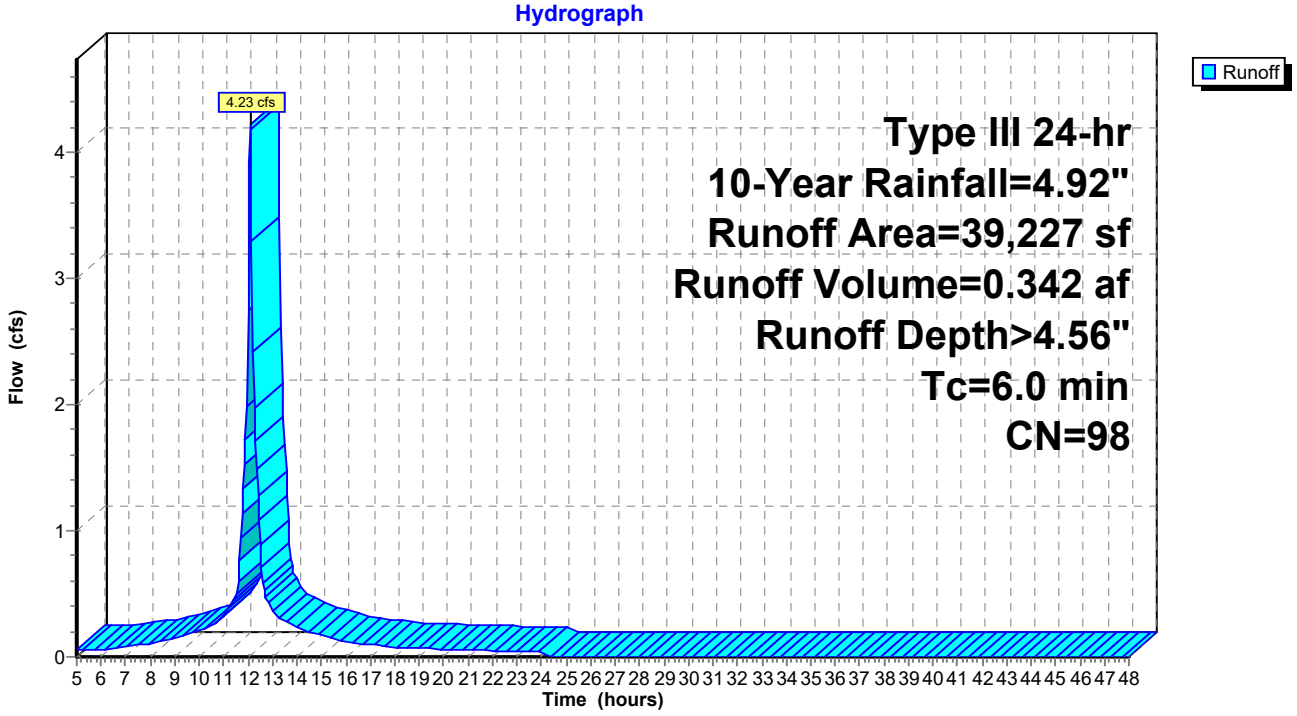
Runoff = 4.23 cfs @ 12.09 hrs, Volume= 0.342 af, Depth> 4.56"
Routed to Pond 1P : DETENTION SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.92"

Area (sf)	CN	Description
39,227	98	Roofs, HSG A
39,227		100.00% Impervious Area

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

Subcatchment 1R: 75% OF BUILDING ADDITION



Summary for Subcatchment 1S: FRONT SITE

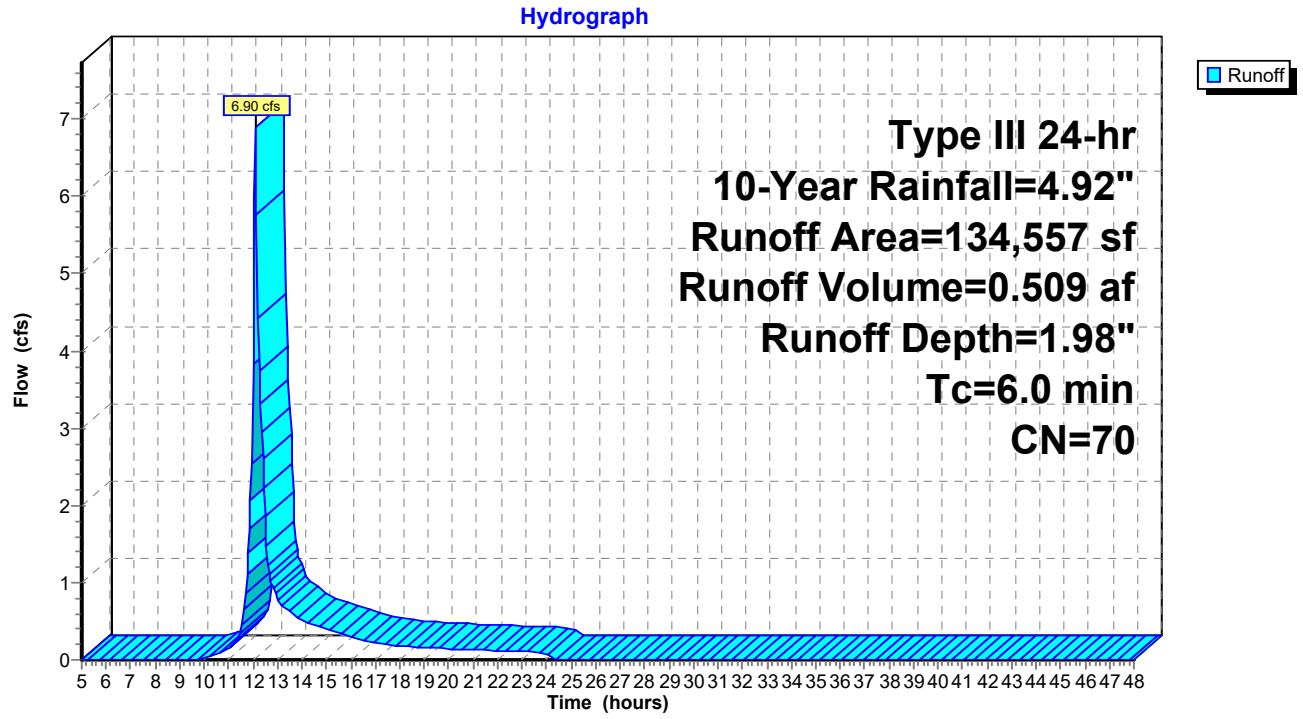
Runoff = 6.90 cfs @ 12.10 hrs, Volume= 0.509 af, Depth= 1.98"
Routed to Reach DP-1 : POND ST.

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.92"

Area (sf)	CN	Description
63,959	39	>75% Grass cover, Good, HSG A
809	61	>75% Grass cover, Good, HSG B
20,445	98	Paved parking, HSG B
49,344	98	Paved parking, HSG A
134,557	70	Weighted Average
64,768		48.13% Pervious Area
69,789		51.87% Impervious Area

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

Subcatchment 1S: FRONT SITE



Summary for Subcatchment 2S: EASTERN LANDSCAPED AREA

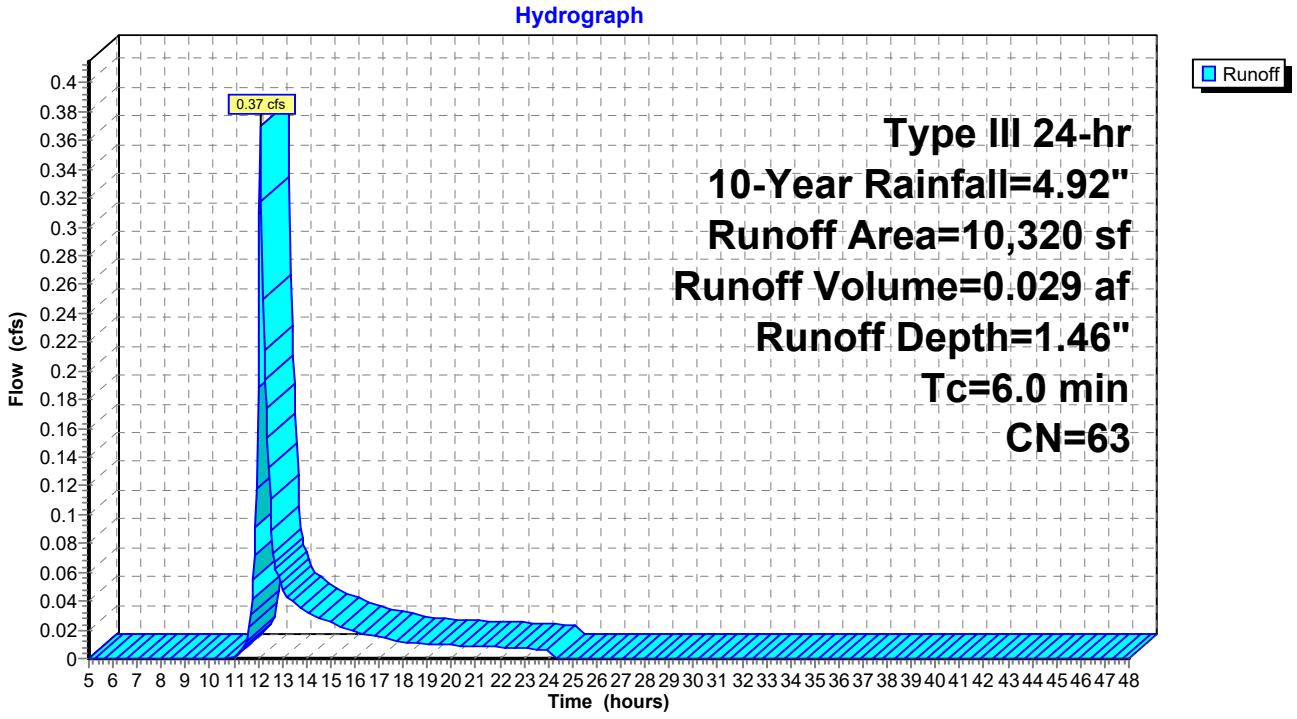
Runoff = 0.37 cfs @ 12.10 hrs, Volume= 0.029 af, Depth= 1.46"
Routed to Reach DP-2 : EASTERN PROPERTY LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.92"

Area (sf)	CN	Description
9,320	61	>75% Grass cover, Good, HSG B
1,000	80	>75% Grass cover, Good, HSG D
10,320	63	Weighted Average
10,320		100.00% Pervious Area

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

Subcatchment 2S: EASTERN LANDSCAPED AREA



Summary for Subcatchment 3R: WESTERN ROOF

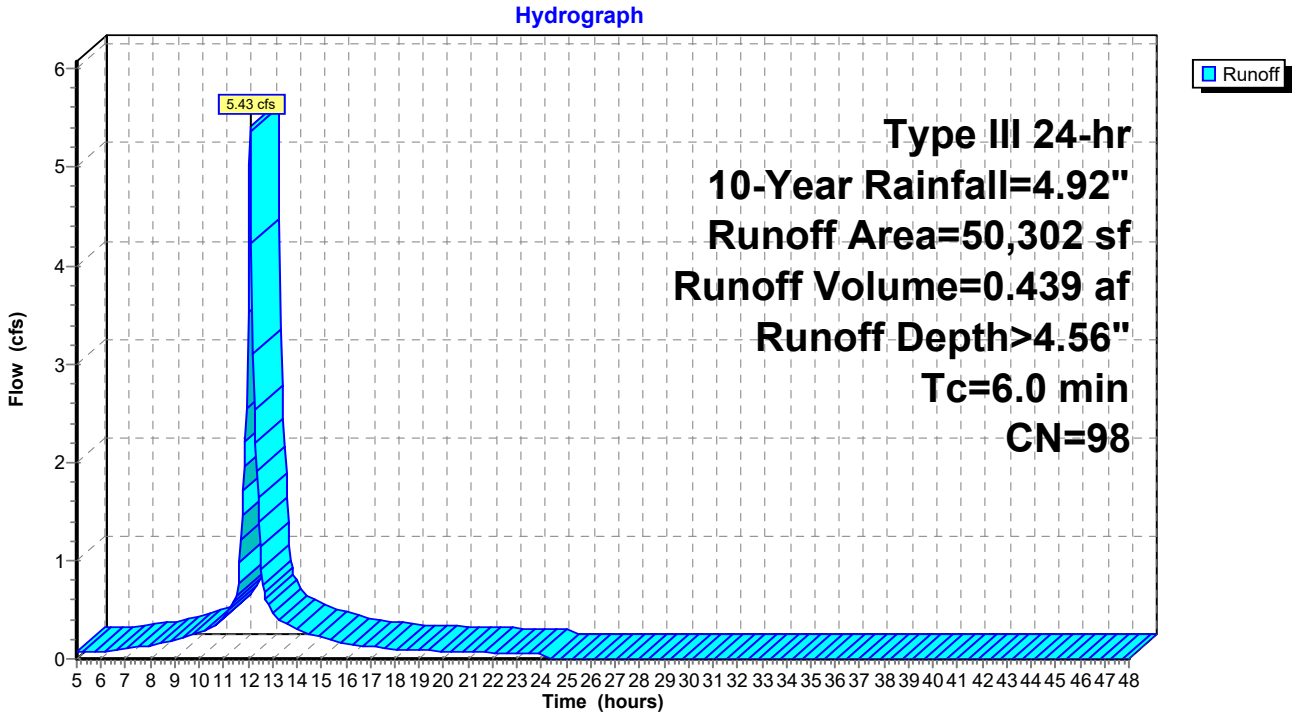
Runoff = 5.43 cfs @ 12.09 hrs, Volume= 0.439 af, Depth> 4.56"
Routed to Reach DP-3 : CRUSED STONE AREA & LEACHING PITS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.92"

Area (sf)	CN	Description
50,302	98	Roofs, HSG A
50,302		100.00% Impervious Area

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

Subcatchment 3R: WESTERN ROOF



Summary for Subcatchment 3S: WESTERN SITE

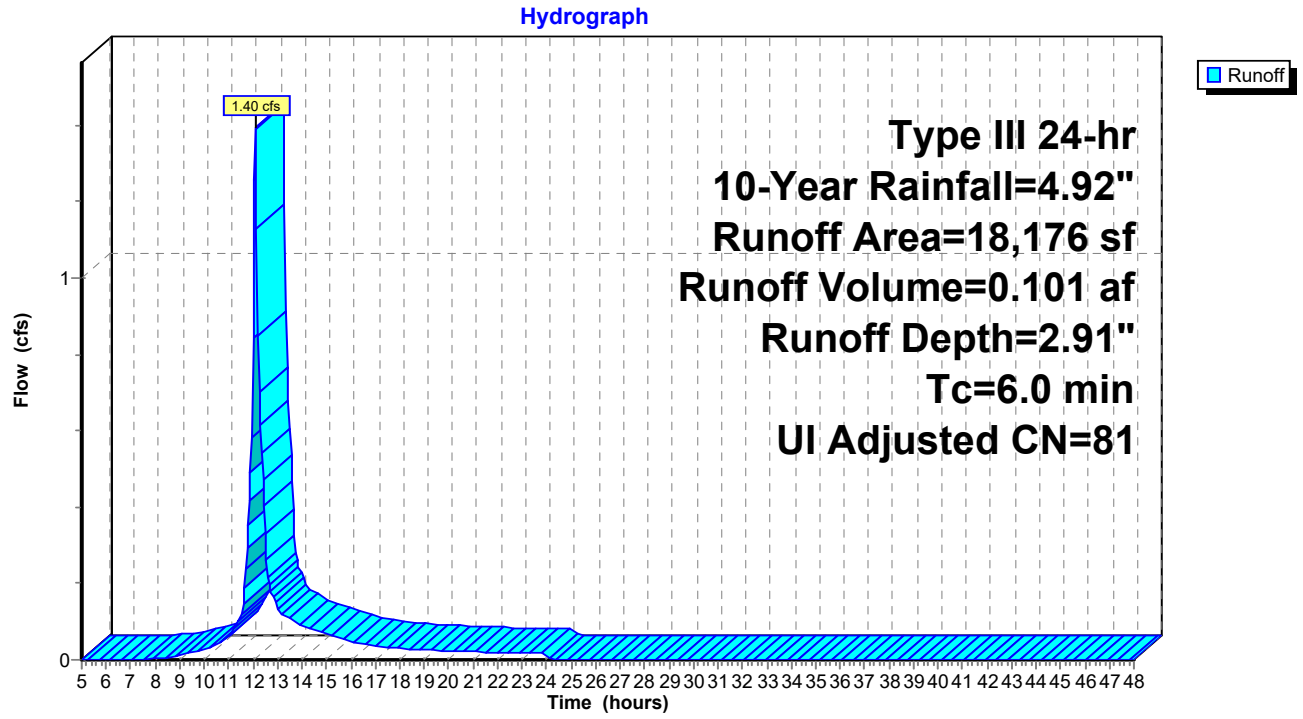
Runoff = 1.40 cfs @ 12.09 hrs, Volume= 0.101 af, Depth= 2.91"
Routed to Reach DP-3 : CRUSED STONE AREA & LEACHING PITS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.92"

Area (sf)	CN	Adj	Description
3,370	98		Unconnected pavement, HSG A
10,363	96		Gravel surface, HSG A
4,443	39		>75% Grass cover, Good, HSG A
18,176	82	81	Weighted Average, UI Adjusted
14,806			81.46% Pervious Area
3,370			18.54% Impervious Area
3,370			100.00% Unconnected

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

Subcatchment 3S: WESTERN SITE



Summary for Subcatchment 4R: NORTH & EAST ROOF

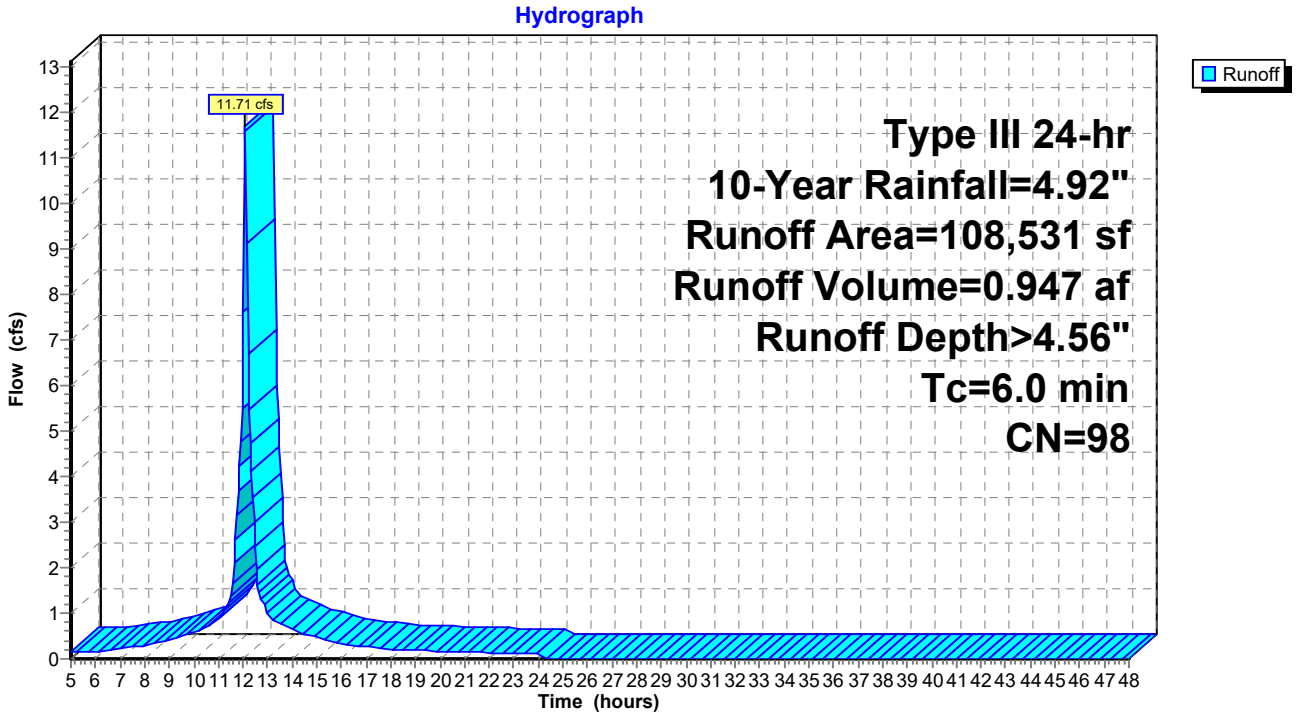
Runoff = 11.71 cfs @ 12.09 hrs, Volume= 0.947 af, Depth> 4.56"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.92"

Area (sf)	CN	Description
108,531	98	Roofs, HSG A
108,531		100.00% Impervious Area

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

Subcatchment 4R: NORTH & EAST ROOF



Summary for Subcatchment 4S: EASTERN LOADING AREA

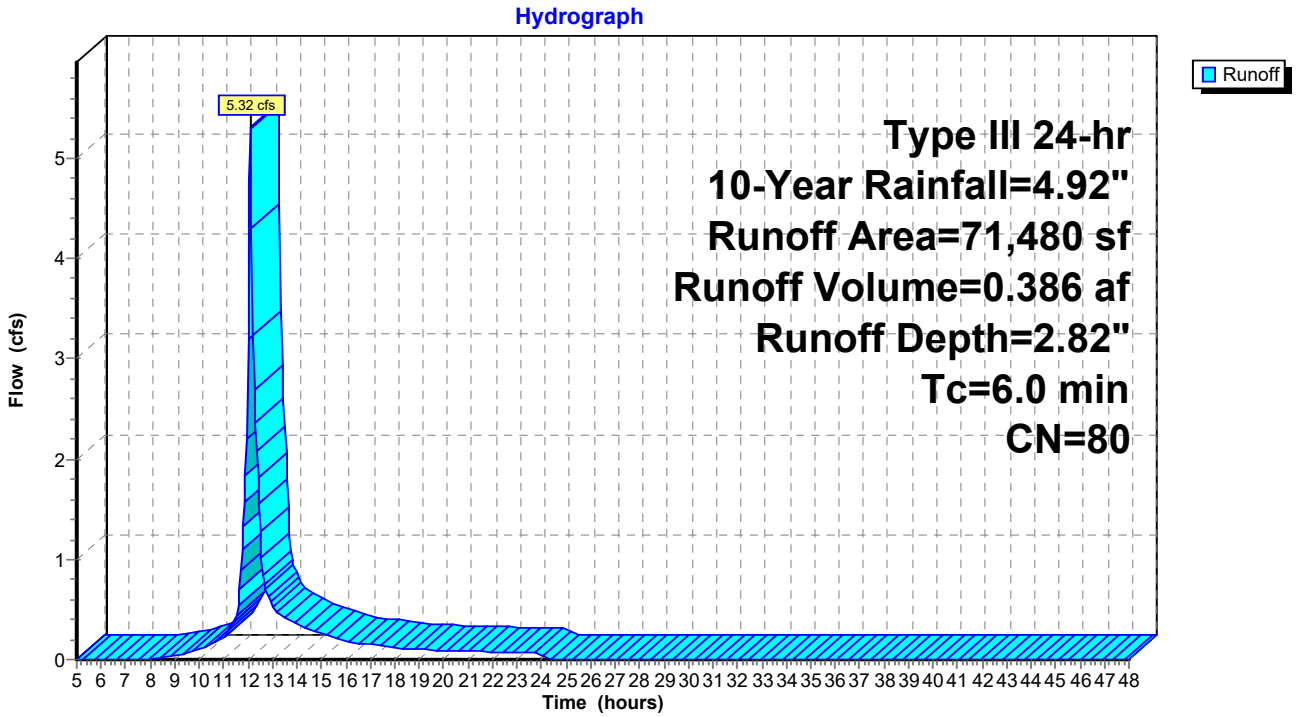
Runoff = 5.32 cfs @ 12.09 hrs, Volume= 0.386 af, Depth= 2.82"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.92"

Area (sf)	CN	Description
40,295	98	Paved parking, HSG A
55	98	Paved parking, HSG B
6,783	98	Paved parking, HSG D
4,315	30	Woods, Good, HSG A
2,050	77	Woods, Good, HSG D
16,572	39	>75% Grass cover, Good, HSG A
1,410	96	Gravel surface, HSG A
71,480	80	Weighted Average
24,347		34.06% Pervious Area
47,133		65.94% Impervious Area

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

Subcatchment 4S: EASTERN LOADING AREA



Summary for Subcatchment 5S: 25% OF BUILDING ADDITION

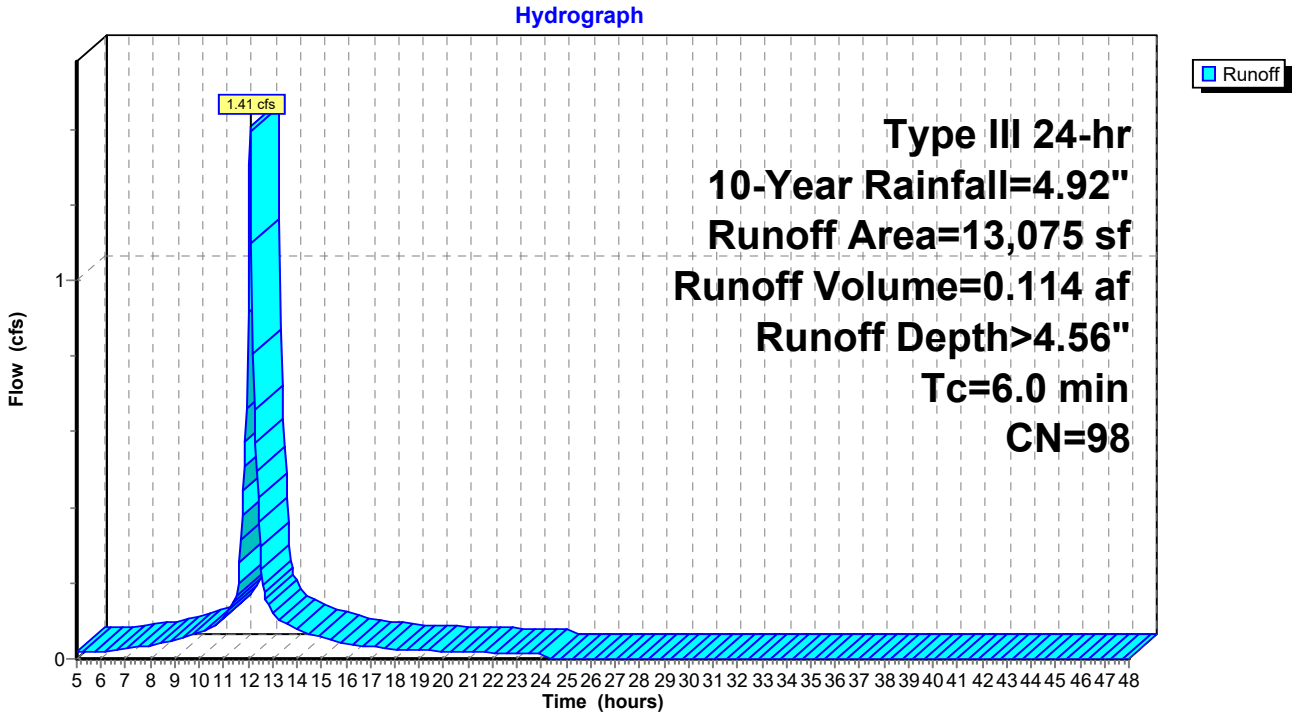
Runoff = 1.41 cfs @ 12.09 hrs, Volume= 0.114 af, Depth> 4.56"
Routed to Pond 2P : RAIN GARDEN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.92"

Area (sf)	CN	Description
13,075	98	Roofs, HSG A
13,075		100.00% Impervious Area

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

Subcatchment 5S: 25% OF BUILDING ADDITION



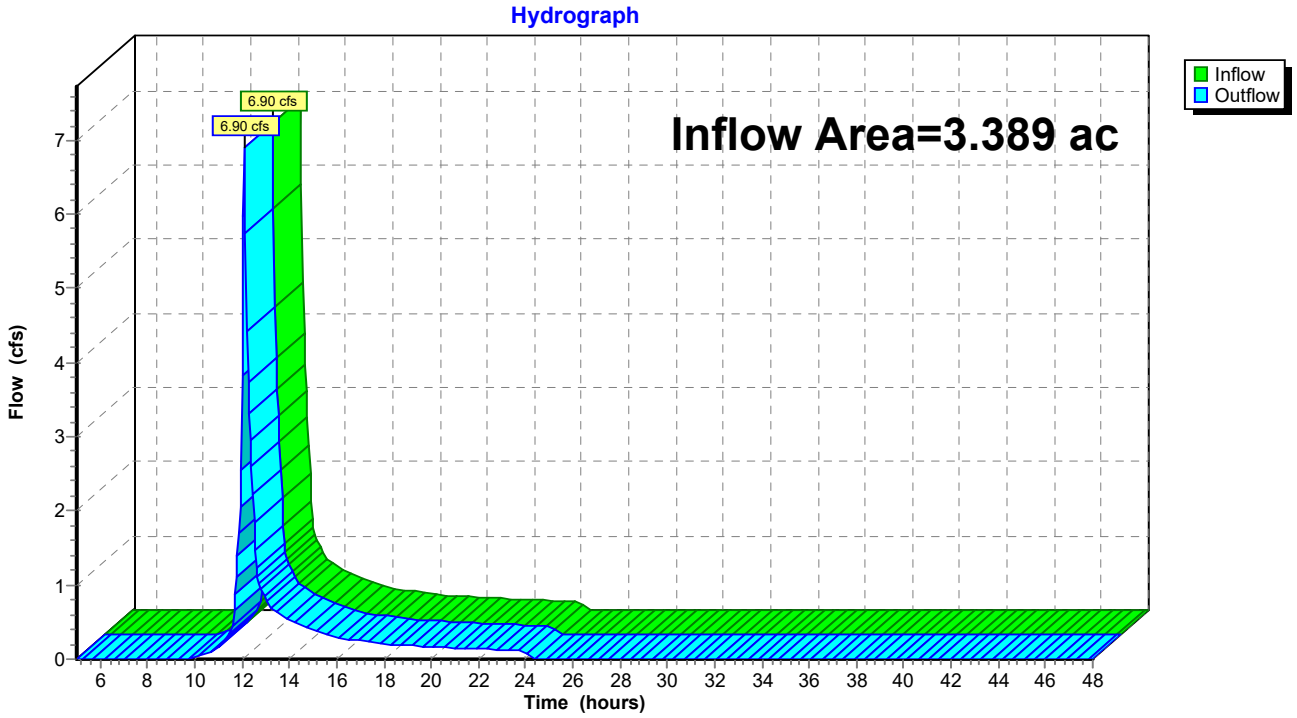
Summary for Reach DP-1: POND ST.

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

Inflow Area = 3.389 ac, 56.13% Impervious, Inflow Depth = 1.85" for 10-Year event
Inflow = 6.90 cfs @ 12.10 hrs, Volume= 0.523 af
Outflow = 6.90 cfs @ 12.10 hrs, Volume= 0.523 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-1: POND ST.



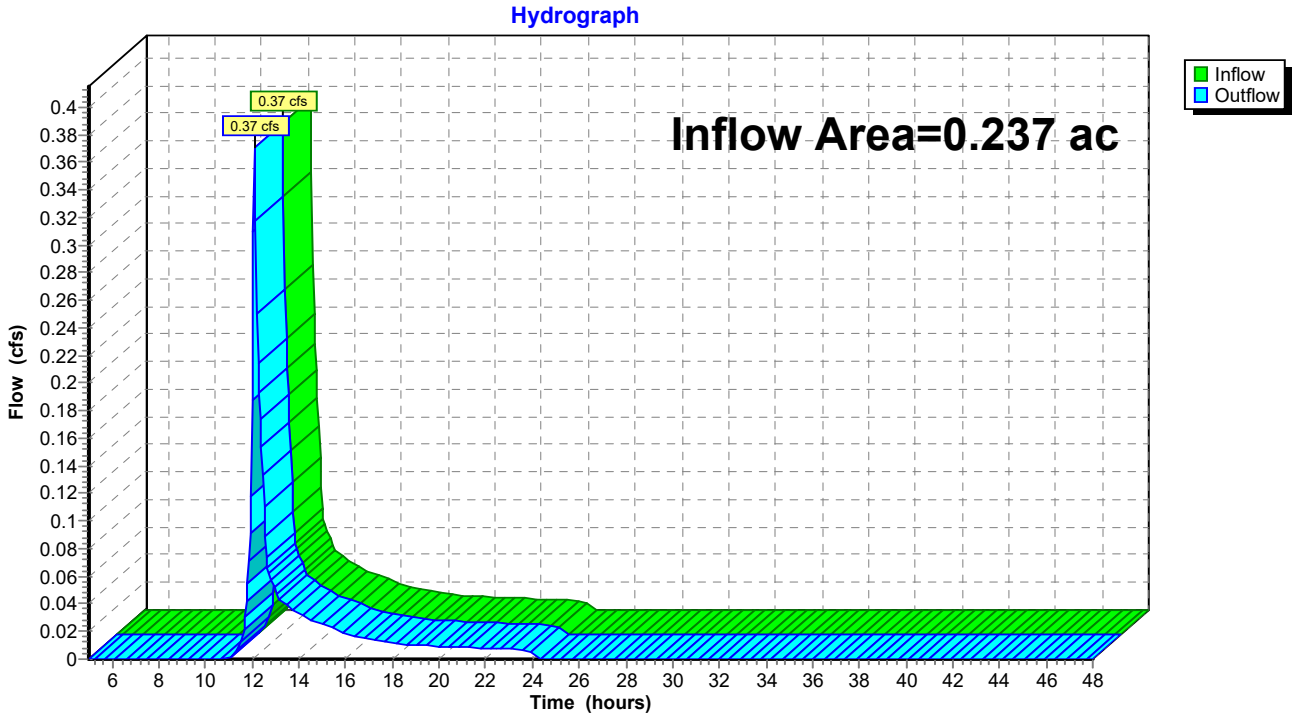
Summary for Reach DP-2: EASTERN PROPERTY LINE

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

Inflow Area = 0.237 ac, 0.00% Impervious, Inflow Depth = 1.46" for 10-Year event
Inflow = 0.37 cfs @ 12.10 hrs, Volume= 0.029 af
Outflow = 0.37 cfs @ 12.10 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-2: EASTERN PROPERTY LINE



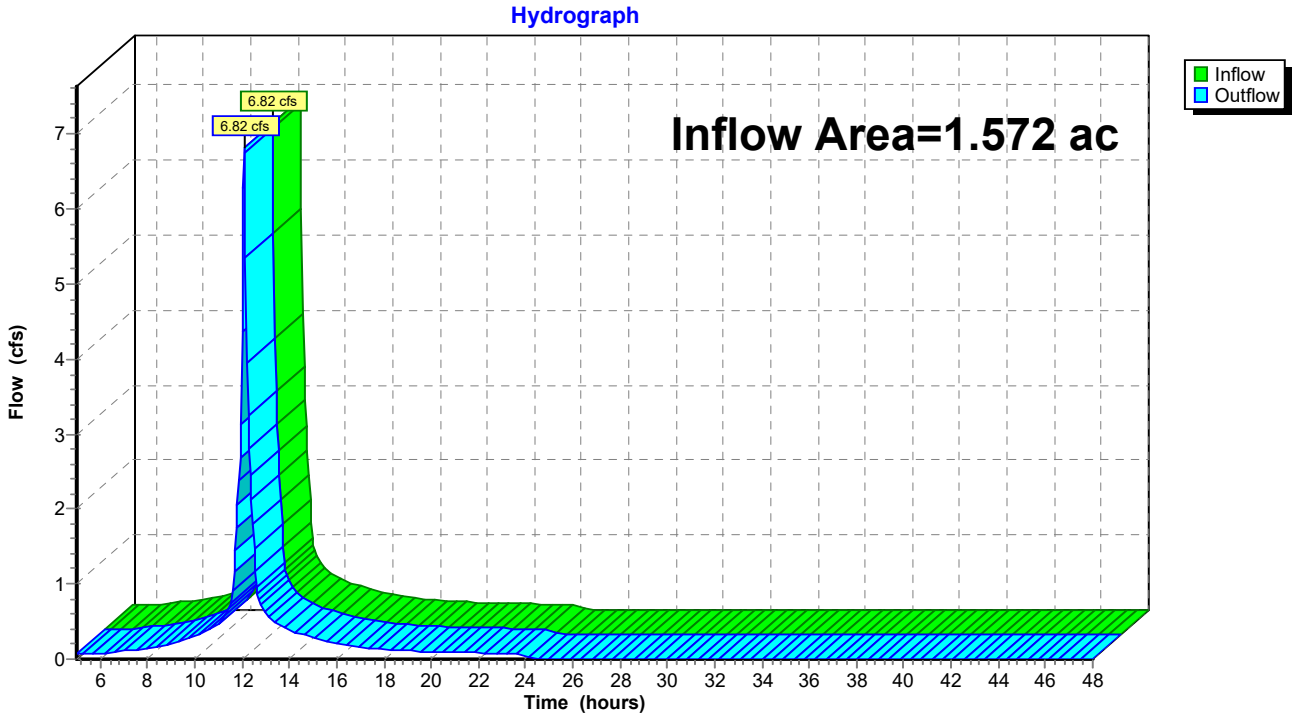
Summary for Reach DP-3: CRUSED STONE AREA & LEACHING PITS

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

Inflow Area = 1.572 ac, 78.38% Impervious, Inflow Depth > 4.12" for 10-Year event
Inflow = 6.82 cfs @ 12.09 hrs, Volume= 0.540 af
Outflow = 6.82 cfs @ 12.09 hrs, Volume= 0.540 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-3: CRUSED STONE AREA & LEACHING PITS



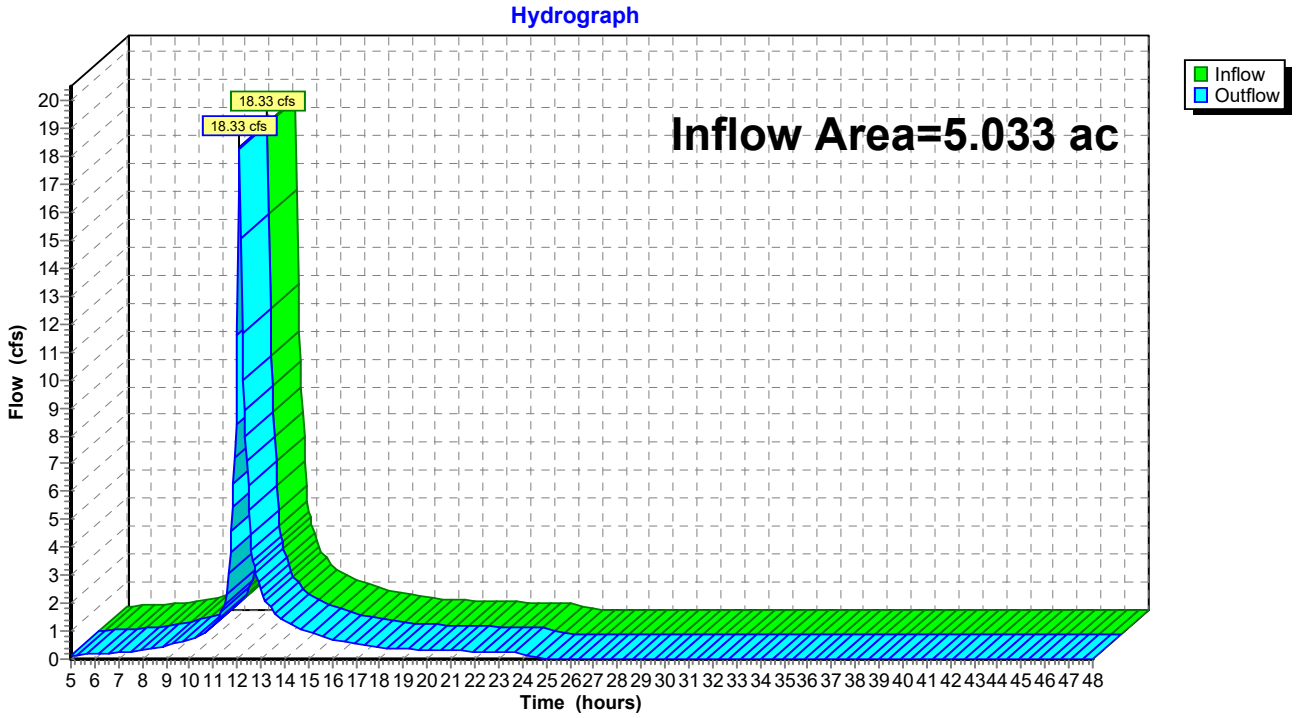
Summary for Reach DP-4: NORTHERN HEADWALLS

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

Inflow Area = 5.033 ac, 88.89% Impervious, Inflow Depth > 3.96" for 10-Year event
Inflow = 18.33 cfs @ 12.09 hrs, Volume= 1.659 af
Outflow = 18.33 cfs @ 12.09 hrs, Volume= 1.659 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-4: NORTHERN HEADWALLS



Summary for Pond 1P: DETENTION SYSTEM

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.901 ac,100.00% Impervious, Inflow Depth > 4.56" for 10-Year event
Inflow = 4.23 cfs @ 12.09 hrs, Volume= 0.342 af
Outflow = 1.81 cfs @ 12.28 hrs, Volume= 0.326 af, Atten= 57%, Lag= 11.8 min
Primary = 1.81 cfs @ 12.28 hrs, Volume= 0.326 af
Routed to Reach DP-4 : NORTHERN HEADWALLS

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 134.58' @ 12.28 hrs Surf.Area= 9,291 sf Storage= 5,911 cf

Plug-Flow detention time= 225.9 min calculated for 0.326 af (95% of inflow)
Center-of-Mass det. time= 197.9 min (960.5 - 762.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.38'	5,162 cf	**51.24'W x 181.33'L x 1.88'H Field A** 17,426 cf Overall - 4,522 cf Embedded = 12,904 cf x 40.0% Voids
#2A	133.71'	3,499 cf	**ADS N-12 12"** x 216 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 216 Chambers in 24 Rows
		8,661 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	133.38'	**12.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 133.38' / 133.26' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	133.38'	**1.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	133.85'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.81 cfs @ 12.28 hrs HW=134.58' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.81 cfs of 2.49 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 5.18 fps)
  └─**3=Orifice/Grate** (Orifice Controls 1.78 cfs @ 2.90 fps)

Pond 1P: DETENTION SYSTEM - Chamber Wizard Field A

Chamber Model = ADS N-12 12" (ADS N-12® Pipe)
Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf
Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf

14.5" Wide + 10.9" Spacing = 25.4" C-C Row Spacing

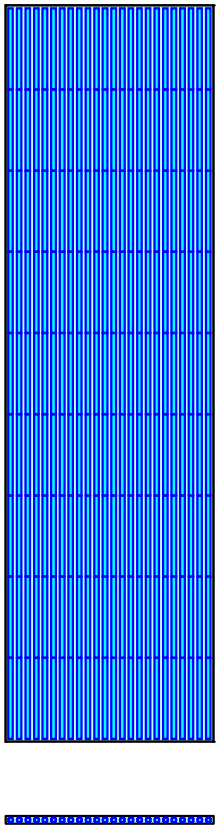
9 Chambers/Row x 20.00' Long = 180.00' Row Length +8.0" End Stone x 2 = 181.33' Base Length
24 Rows x 14.5" Wide + 10.9" Spacing x 23 + 8.0" Side Stone x 2 = 51.24' Base Width
4.0" Stone Base + 14.5" Chamber Height + 4.0" Stone Cover = 1.88' Field Height

216 Chambers x 16.2 cf = 3,499.2 cf Chamber Storage
216 Chambers x 20.9 cf = 4,522.0 cf Displacement

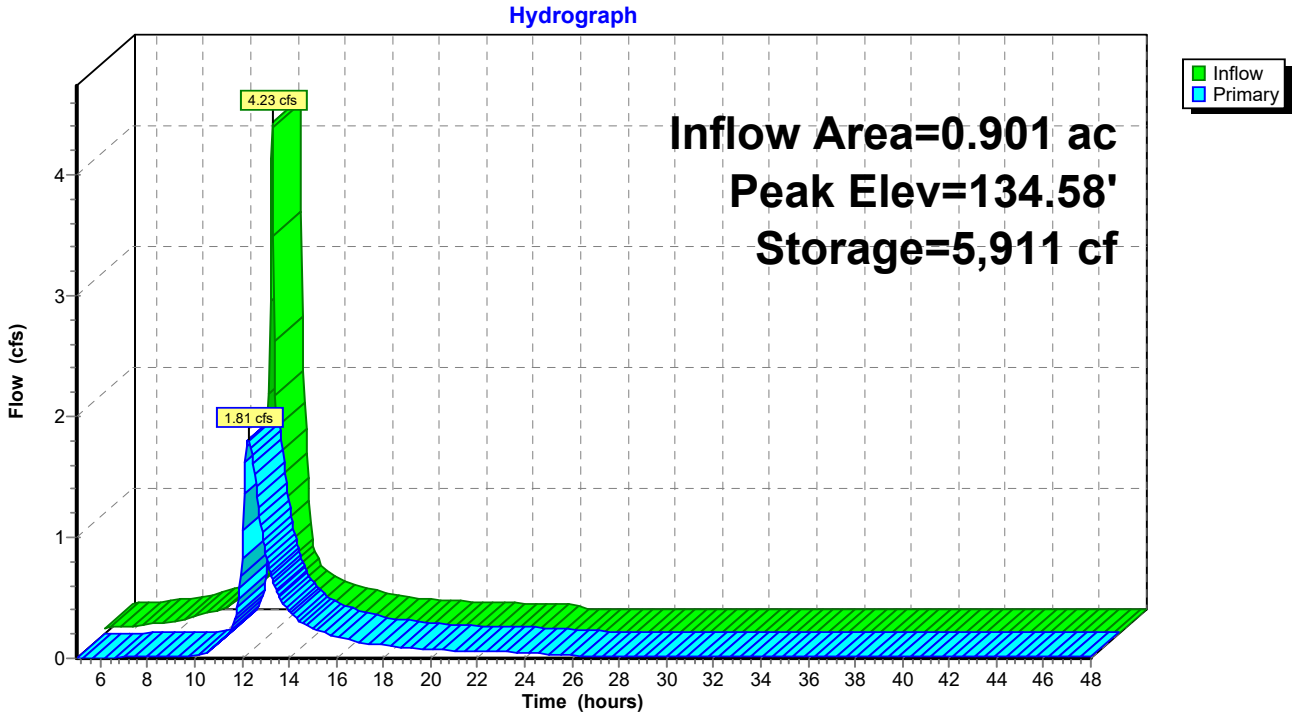
17,426.0 cf Field - 4,522.0 cf Chambers = 12,903.9 cf Stone x 40.0% Voids = 5,161.6 cf Stone Storage

Chamber Storage + Stone Storage = 8,660.8 cf = 0.199 af
Overall Storage Efficiency = 49.7%
Overall System Size = 181.33' x 51.24' x 1.88'

216 Chambers
645.4 cy Field
477.9 cy Stone



Pond 1P: DETENTION SYSTEM



Summary for Pond 2P: RAIN GARDEN

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.300 ac,100.00% Impervious, Inflow Depth > 4.56" for 10-Year event
Inflow = 1.41 cfs @ 12.09 hrs, Volume= 0.114 af
Outflow = 0.03 cfs @ 17.40 hrs, Volume= 0.014 af, Atten= 98%, Lag= 318.8 min
Primary = 0.03 cfs @ 17.40 hrs, Volume= 0.014 af
Routed to Reach DP-1 : POND ST.

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 141.68' @ 17.40 hrs Surf.Area= 3,631 sf Storage= 4,430 cf

Plug-Flow detention time= 728.8 min calculated for 0.014 af (12% of inflow)
Center-of-Mass det. time= 447.7 min (1,210.3 - 762.6)

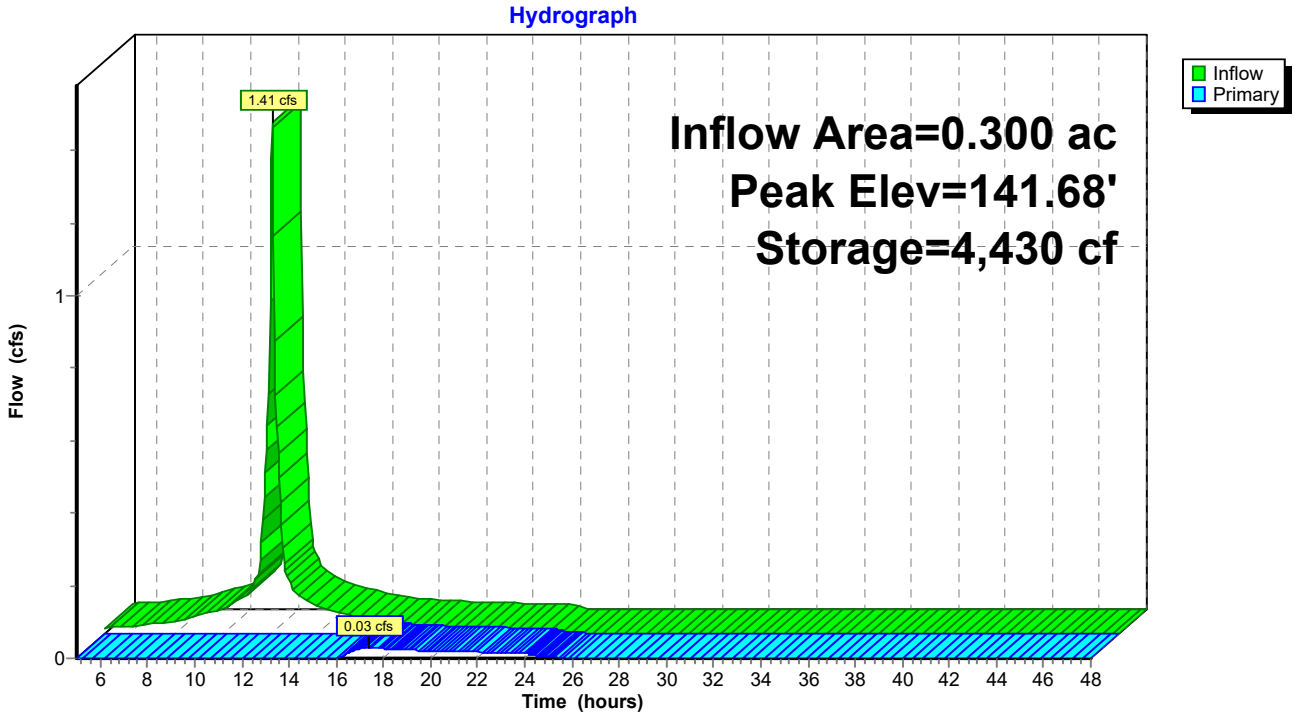
Volume	Invert	Avail.Storage	Storage Description
#1	139.50'	5,680 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
139.50	562	0	0
140.00	1,190	438	438
141.00	2,582	1,886	2,324
142.00	4,130	3,356	5,680

Device	Routing	Invert	Outlet Devices
#1	Primary	141.66'	**5.0' long x 3.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.41 2.56 2.69 2.67 2.66 2.66 2.65 2.67 2.67 2.70 2.77 2.83 2.87 2.93 3.10 3.19 3.32

Primary OutFlow Max=0.03 cfs @ 17.40 hrs HW=141.68' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.03 cfs @ 0.32 fps)

Pond 2P: RAIN GARDEN



Time span=5.00-48.00 hrs, dt=0.05 hrs, 861 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1R: 75% OF BUILDING Runoff Area=39,227 sf 100.00% Impervious Runoff Depth>5.77"
Tc=6.0 min CN=98 Runoff=5.34 cfs 0.433 af

Subcatchment1S: FRONT SITE Runoff Area=134,557 sf 51.87% Impervious Runoff Depth=2.96"
Tc=6.0 min CN=70 Runoff=10.47 cfs 0.761 af

Subcatchment2S: EASTERN Runoff Area=10,320 sf 0.00% Impervious Runoff Depth=2.31"
Tc=6.0 min CN=63 Runoff=0.61 cfs 0.046 af

Subcatchment3R: WESTERN ROOF Runoff Area=50,302 sf 100.00% Impervious Runoff Depth>5.77"
Tc=6.0 min CN=98 Runoff=6.84 cfs 0.556 af

Subcatchment3S: WESTERN SITE Runoff Area=18,176 sf 18.54% Impervious Runoff Depth=4.06"
Tc=6.0 min UI Adjusted CN=81 Runoff=1.93 cfs 0.141 af

Subcatchment4R: NORTH & EAST Runoff Area=108,531 sf 100.00% Impervious Runoff Depth>5.77"
Tc=6.0 min CN=98 Runoff=14.76 cfs 1.199 af

Subcatchment4S: EASTERN LOADING Runoff Area=71,480 sf 65.94% Impervious Runoff Depth=3.95"
Tc=6.0 min CN=80 Runoff=7.41 cfs 0.541 af

Subcatchment5S: 25% OF BUILDING Runoff Area=13,075 sf 100.00% Impervious Runoff Depth>5.77"
Tc=6.0 min CN=98 Runoff=1.78 cfs 0.144 af

Reach DP-1: POND ST. Inflow=10.47 cfs 0.805 af
Outflow=10.47 cfs 0.805 af

Reach DP-2: EASTERN PROPERTY LINE Inflow=0.61 cfs 0.046 af
Outflow=0.61 cfs 0.046 af

Reach DP-3: CRUSED STONE AREA & LEACHING PITS Inflow=8.77 cfs 0.697 af
Outflow=8.77 cfs 0.697 af

Reach DP-4: NORTHERN HEADWALLS Inflow=23.96 cfs 2.156 af
Outflow=23.96 cfs 2.156 af

Pond 1P: DETENTION SYSTEM Peak Elev=134.75' Storage=6,803 cf Inflow=5.34 cfs 0.433 af
Outflow=2.42 cfs 0.417 af

Pond 2P: RAIN GARDEN Peak Elev=141.71' Storage=4,536 cf Inflow=1.78 cfs 0.144 af
Outflow=0.12 cfs 0.044 af

Total Runoff Area = 10.231 ac Runoff Volume = 3.820 af Average Runoff Depth = 4.48"
25.63% Pervious = 2.623 ac 74.37% Impervious = 7.609 ac

Summary for Subcatchment 1R: 75% OF BUILDING ADDITION

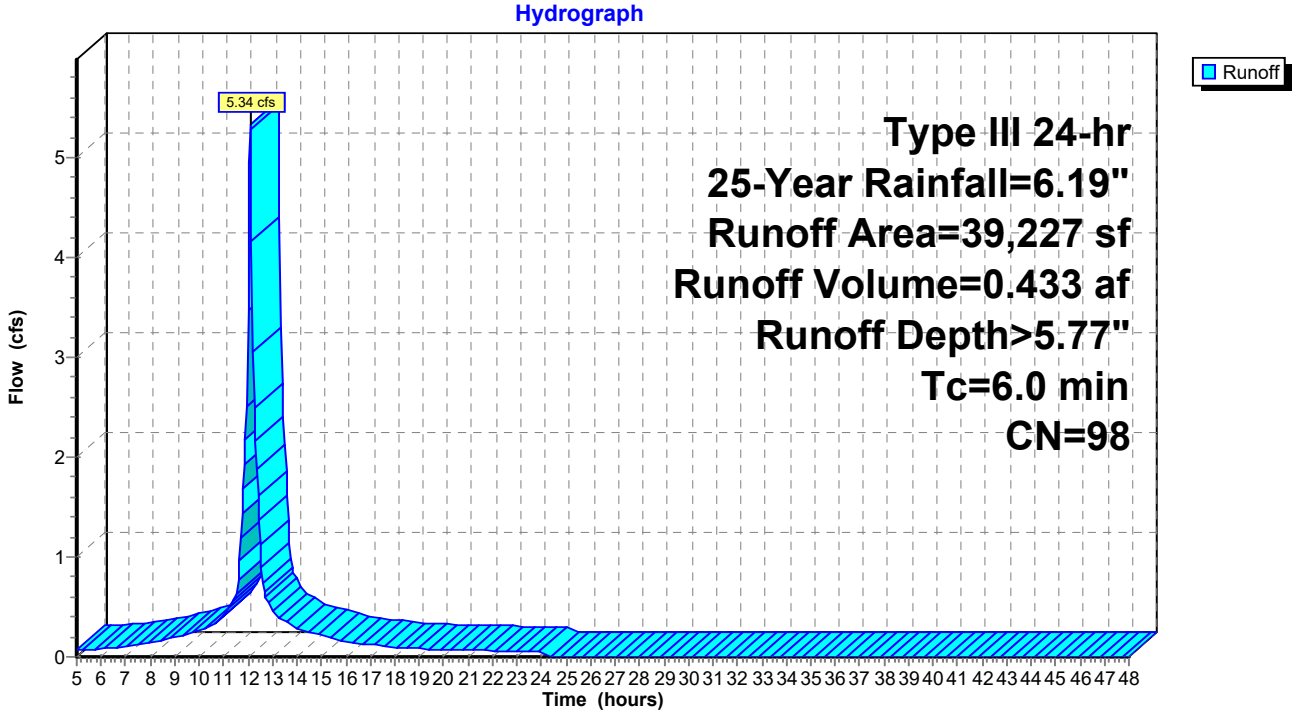
Runoff = 5.34 cfs @ 12.09 hrs, Volume= 0.433 af, Depth> 5.77"
Routed to Pond 1P : DETENTION SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
39,227	98	Roofs, HSG A
39,227		100.00% Impervious Area

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

Subcatchment 1R: 75% OF BUILDING ADDITION



Summary for Subcatchment 1S: FRONT SITE

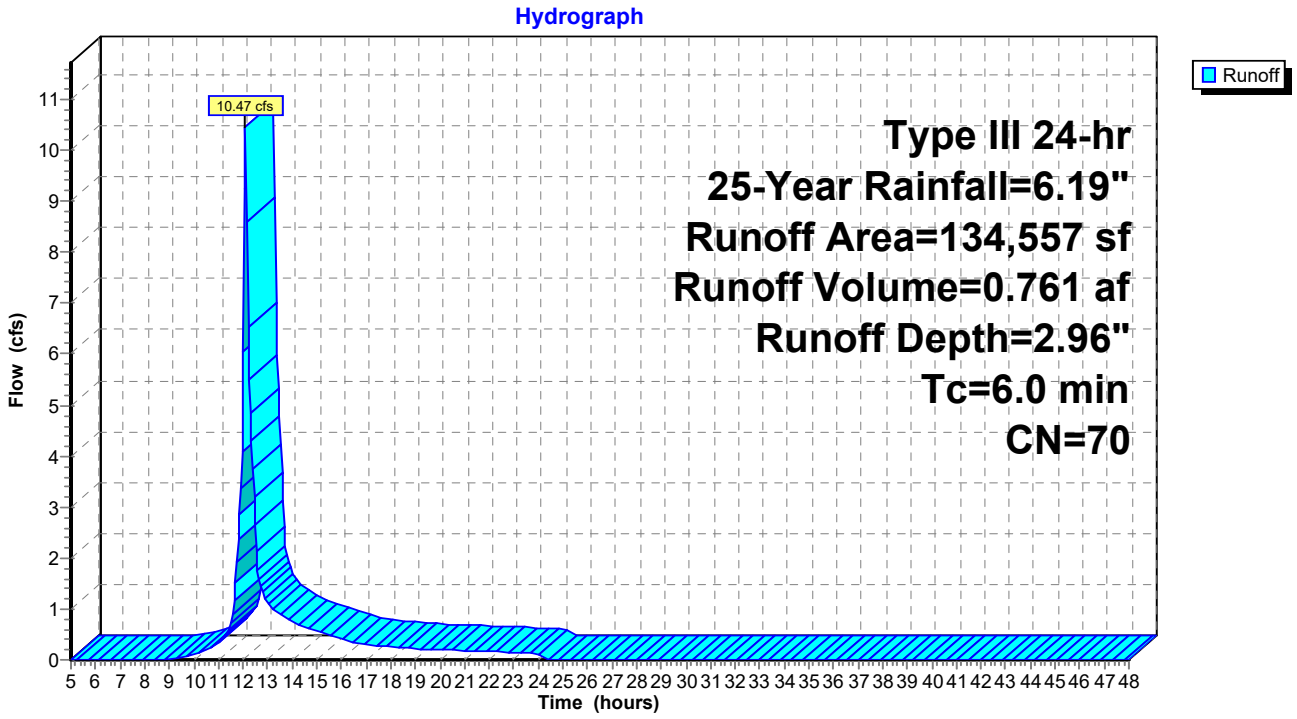
Runoff = 10.47 cfs @ 12.09 hrs, Volume= 0.761 af, Depth= 2.96"
Routed to Reach DP-1 : POND ST.

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
63,959	39	>75% Grass cover, Good, HSG A
809	61	>75% Grass cover, Good, HSG B
20,445	98	Paved parking, HSG B
49,344	98	Paved parking, HSG A
134,557	70	Weighted Average
64,768		48.13% Pervious Area
69,789		51.87% Impervious Area

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

Subcatchment 1S: FRONT SITE



Summary for Subcatchment 2S: EASTERN LANDSCAPED AREA

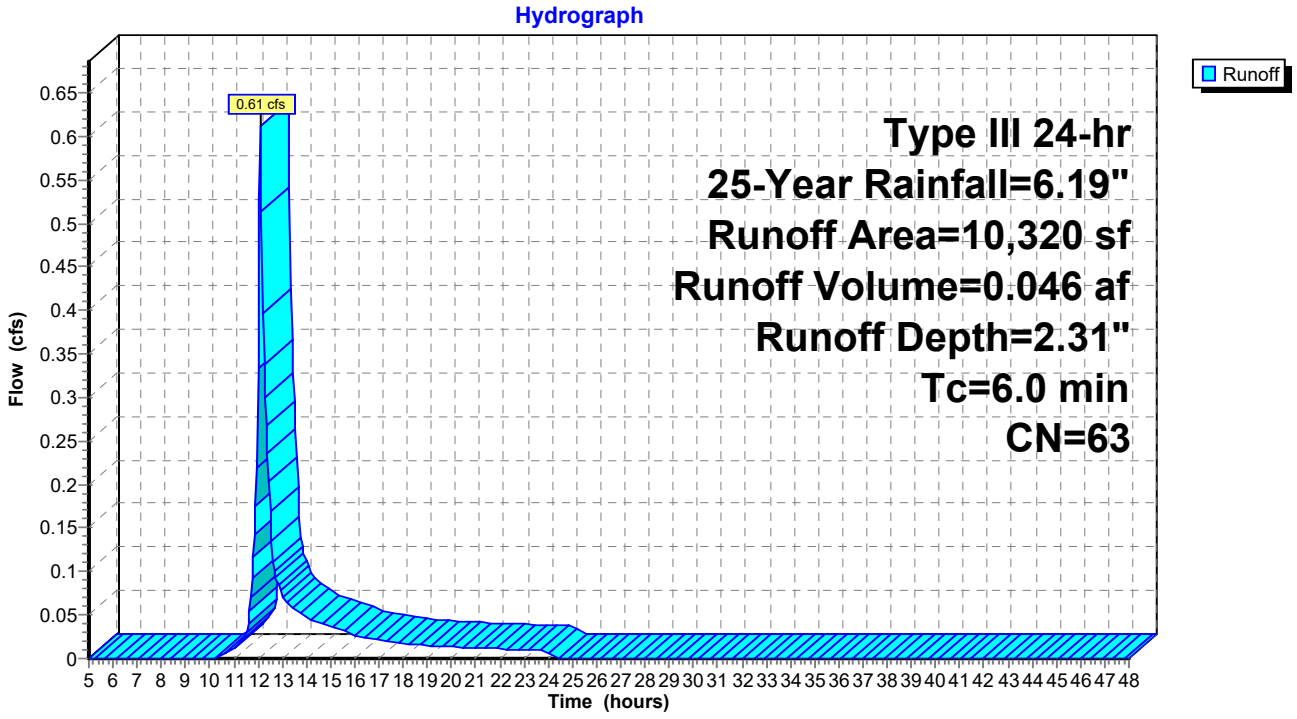
Runoff = 0.61 cfs @ 12.10 hrs, Volume= 0.046 af, Depth= 2.31"
Routed to Reach DP-2 : EASTERN PROPERTY LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
9,320	61	>75% Grass cover, Good, HSG B
1,000	80	>75% Grass cover, Good, HSG D
10,320	63	Weighted Average
10,320		100.00% Pervious Area

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

Subcatchment 2S: EASTERN LANDSCAPED AREA



Summary for Subcatchment 3R: WESTERN ROOF

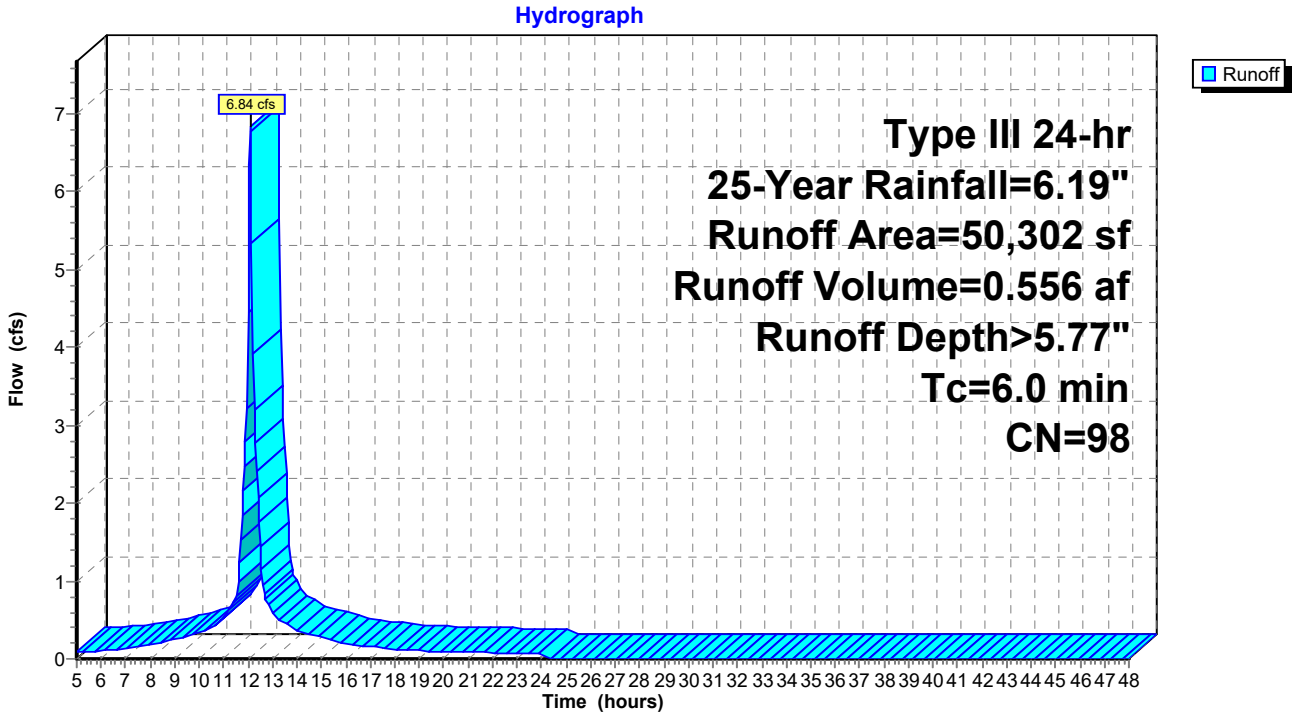
Runoff = 6.84 cfs @ 12.09 hrs, Volume= 0.556 af, Depth> 5.77"
Routed to Reach DP-3 : CRUSED STONE AREA & LEACHING PITS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
50,302	98	Roofs, HSG A
50,302		100.00% Impervious Area

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

Subcatchment 3R: WESTERN ROOF



Summary for Subcatchment 3S: WESTERN SITE

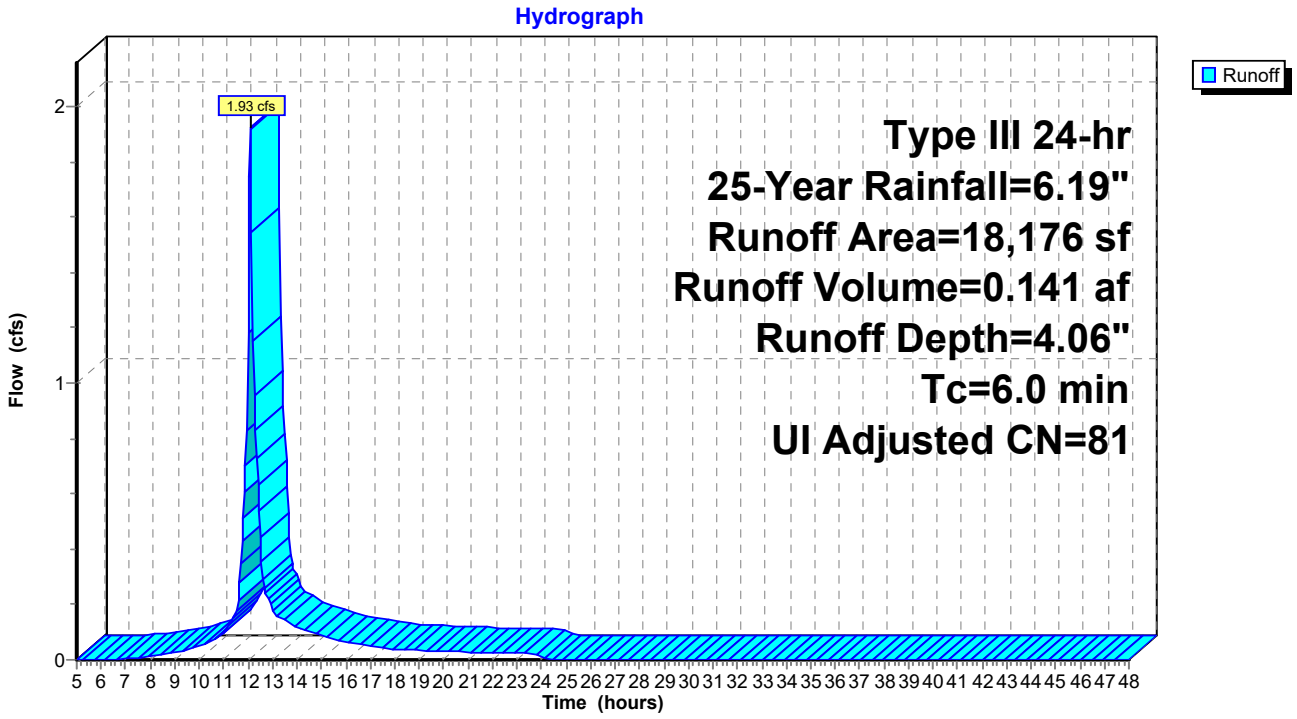
Runoff = 1.93 cfs @ 12.09 hrs, Volume= 0.141 af, Depth= 4.06"
Routed to Reach DP-3 : CRUSED STONE AREA & LEACHING PITS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Adj	Description
3,370	98		Unconnected pavement, HSG A
10,363	96		Gravel surface, HSG A
4,443	39		>75% Grass cover, Good, HSG A
18,176	82	81	Weighted Average, UI Adjusted
14,806			81.46% Pervious Area
3,370			18.54% Impervious Area
3,370			100.00% Unconnected

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

Subcatchment 3S: WESTERN SITE



Summary for Subcatchment 4R: NORTH & EAST ROOF

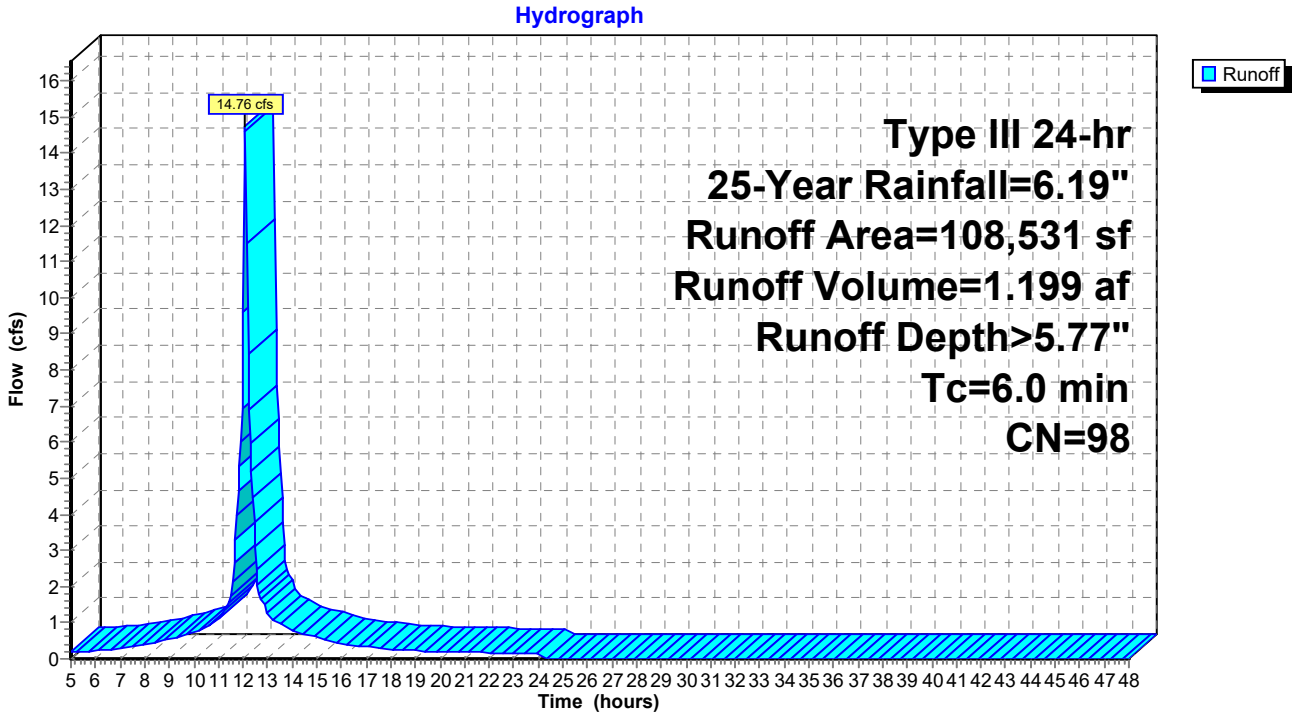
Runoff = 14.76 cfs @ 12.09 hrs, Volume= 1.199 af, Depth> 5.77"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
108,531	98	Roofs, HSG A
108,531		100.00% Impervious Area

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

Subcatchment 4R: NORTH & EAST ROOF



Summary for Subcatchment 4S: EASTERN LOADING AREA

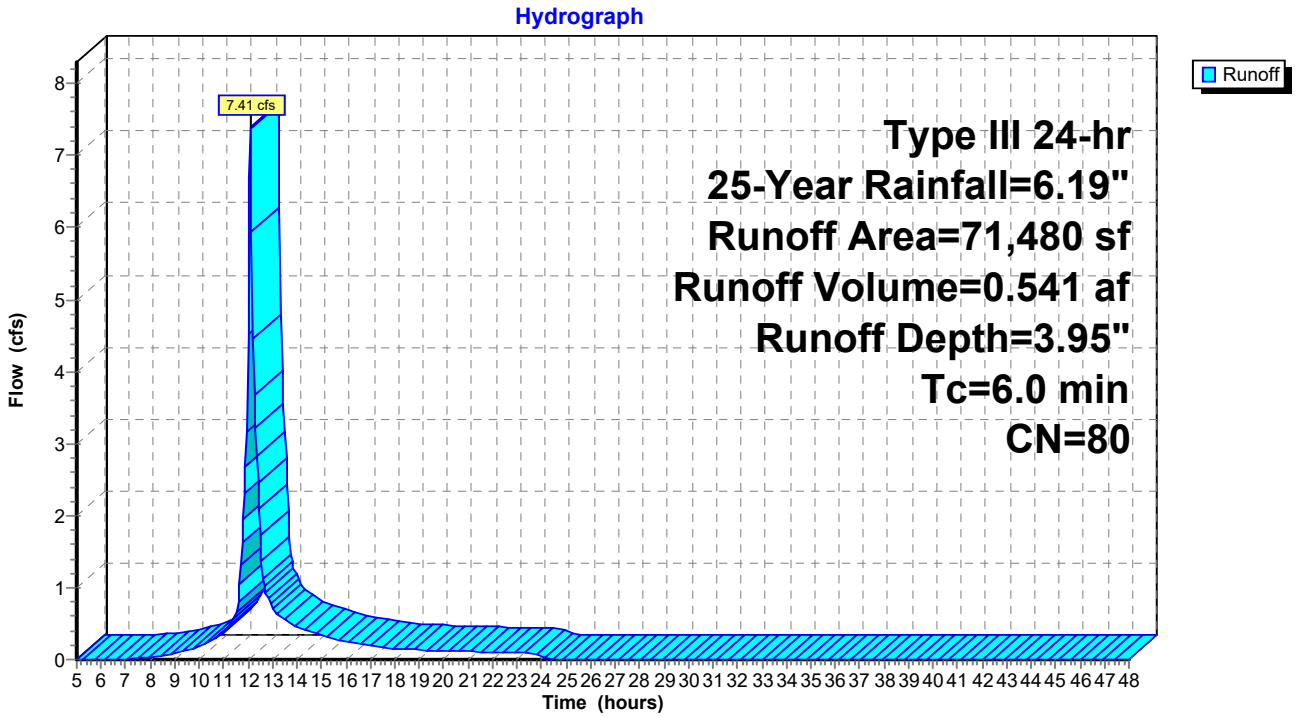
Runoff = 7.41 cfs @ 12.09 hrs, Volume= 0.541 af, Depth= 3.95"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
40,295	98	Paved parking, HSG A
55	98	Paved parking, HSG B
6,783	98	Paved parking, HSG D
4,315	30	Woods, Good, HSG A
2,050	77	Woods, Good, HSG D
16,572	39	>75% Grass cover, Good, HSG A
1,410	96	Gravel surface, HSG A
71,480	80	Weighted Average
24,347		34.06% Pervious Area
47,133		65.94% Impervious Area

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

Subcatchment 4S: EASTERN LOADING AREA



Summary for Subcatchment 5S: 25% OF BUILDING ADDITION

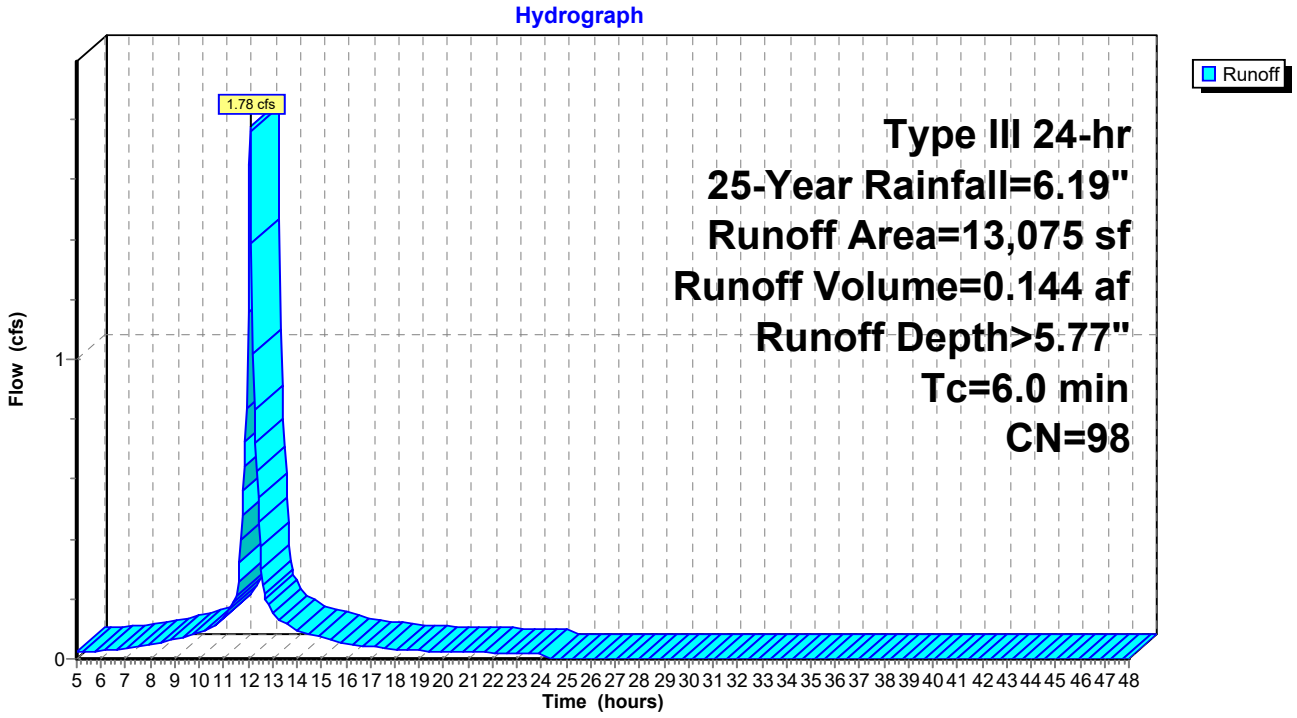
Runoff = 1.78 cfs @ 12.09 hrs, Volume= 0.144 af, Depth> 5.77"
Routed to Pond 2P : RAIN GARDEN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
13,075	98	Roofs, HSG A
13,075		100.00% Impervious Area

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

Subcatchment 5S: 25% OF BUILDING ADDITION



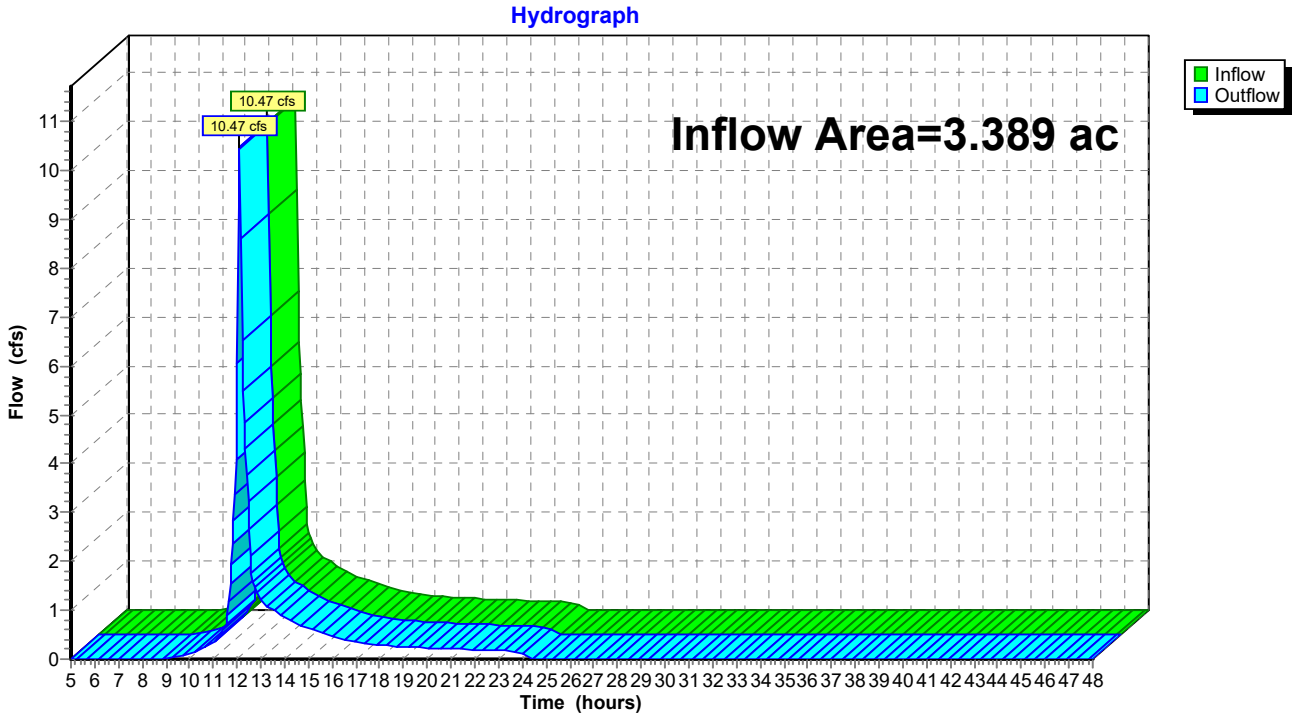
Summary for Reach DP-1: POND ST.

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

Inflow Area = 3.389 ac, 56.13% Impervious, Inflow Depth = 2.85" for 25-Year event
Inflow = 10.47 cfs @ 12.09 hrs, Volume= 0.805 af
Outflow = 10.47 cfs @ 12.09 hrs, Volume= 0.805 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-1: POND ST.



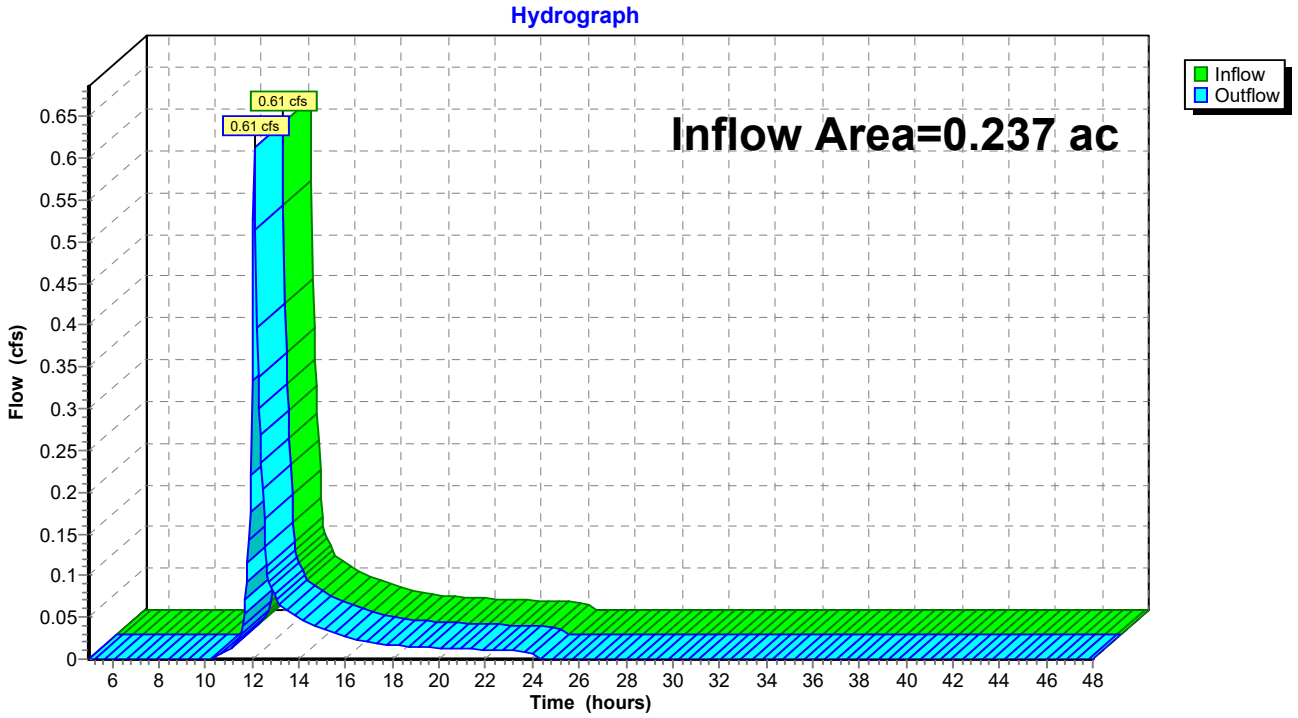
Summary for Reach DP-2: EASTERN PROPERTY LINE

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

Inflow Area = 0.237 ac, 0.00% Impervious, Inflow Depth = 2.31" for 25-Year event
Inflow = 0.61 cfs @ 12.10 hrs, Volume= 0.046 af
Outflow = 0.61 cfs @ 12.10 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-2: EASTERN PROPERTY LINE



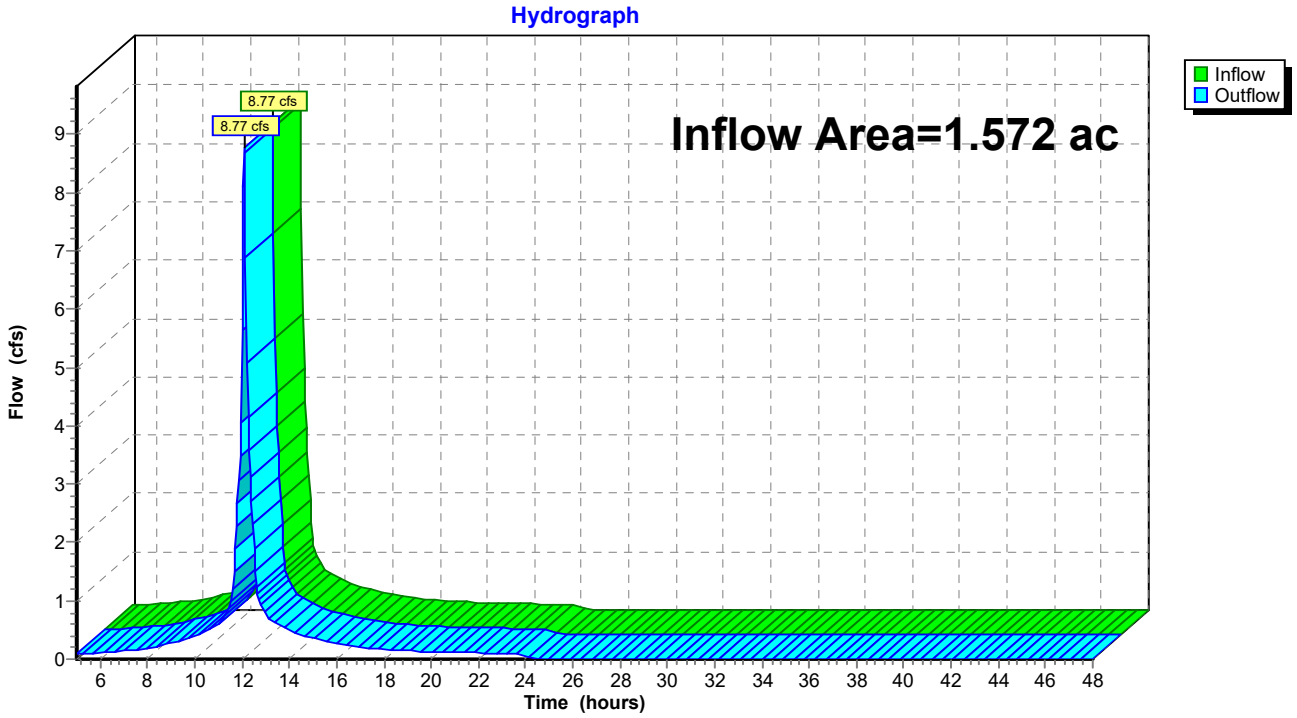
Summary for Reach DP-3: CRUSED STONE AREA & LEACHING PITS

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

Inflow Area = 1.572 ac, 78.38% Impervious, Inflow Depth > 5.32" for 25-Year event
Inflow = 8.77 cfs @ 12.09 hrs, Volume= 0.697 af
Outflow = 8.77 cfs @ 12.09 hrs, Volume= 0.697 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-3: CRUSED STONE AREA & LEACHING PITS



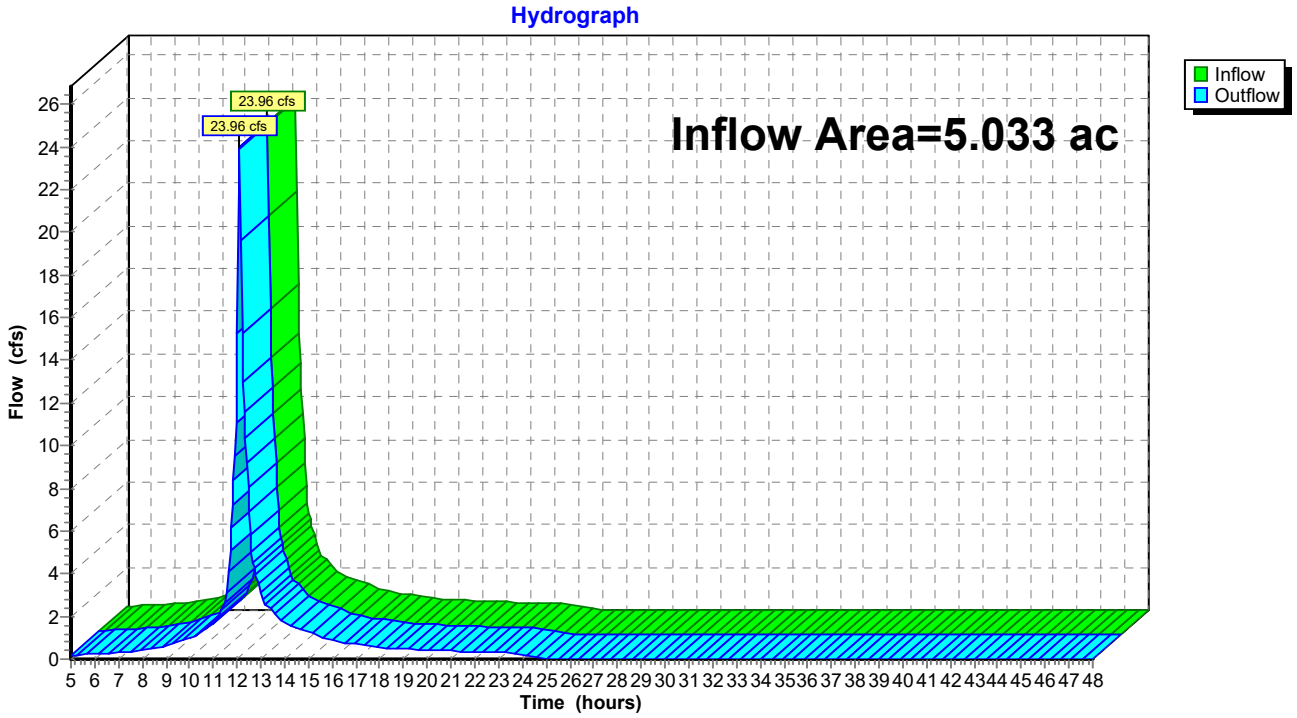
Summary for Reach DP-4: NORTHERN HEADWALLS

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

Inflow Area = 5.033 ac, 88.89% Impervious, Inflow Depth > 5.14" for 25-Year event
Inflow = 23.96 cfs @ 12.09 hrs, Volume= 2.156 af
Outflow = 23.96 cfs @ 12.09 hrs, Volume= 2.156 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-4: NORTHERN HEADWALLS



Summary for Pond 1P: DETENTION SYSTEM

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.901 ac,100.00% Impervious, Inflow Depth > 5.77" for 25-Year event
Inflow = 5.34 cfs @ 12.09 hrs, Volume= 0.433 af
Outflow = 2.42 cfs @ 12.27 hrs, Volume= 0.417 af, Atten= 55%, Lag= 10.7 min
Primary = 2.42 cfs @ 12.27 hrs, Volume= 0.417 af
Routed to Reach DP-4 : NORTHERN HEADWALLS

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 134.75' @ 12.27 hrs Surf.Area= 9,291 sf Storage= 6,803 cf

Plug-Flow detention time= 189.4 min calculated for 0.416 af (96% of inflow)
Center-of-Mass det. time= 167.7 min (929.0 - 761.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.38'	5,162 cf	**51.24'W x 181.33'L x 1.88'H Field A** 17,426 cf Overall - 4,522 cf Embedded = 12,904 cf x 40.0% Voids
#2A	133.71'	3,499 cf	**ADS N-12 12"** x 216 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 216 Chambers in 24 Rows
		8,661 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	133.38'	**12.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 133.38' / 133.26' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	133.38'	**1.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	133.85'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.42 cfs @ 12.27 hrs HW=134.74' TW=0.00' (Dynamic Tailwater)
↑└─**1=Culvert** (Passes 2.42 cfs of 2.78 cfs potential flow)
↑ ├─**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 5.54 fps)
└─**3=Orifice/Grate** (Orifice Controls 2.39 cfs @ 3.22 fps)

Pond 1P: DETENTION SYSTEM - Chamber Wizard Field A

Chamber Model = ADS N-12 12" (ADS N-12® Pipe)
Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf
Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf

14.5" Wide + 10.9" Spacing = 25.4" C-C Row Spacing

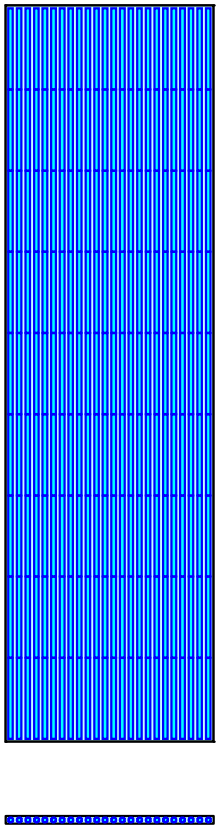
9 Chambers/Row x 20.00' Long = 180.00' Row Length +8.0" End Stone x 2 = 181.33' Base Length
24 Rows x 14.5" Wide + 10.9" Spacing x 23 + 8.0" Side Stone x 2 = 51.24' Base Width
4.0" Stone Base + 14.5" Chamber Height + 4.0" Stone Cover = 1.88' Field Height

216 Chambers x 16.2 cf = 3,499.2 cf Chamber Storage
216 Chambers x 20.9 cf = 4,522.0 cf Displacement

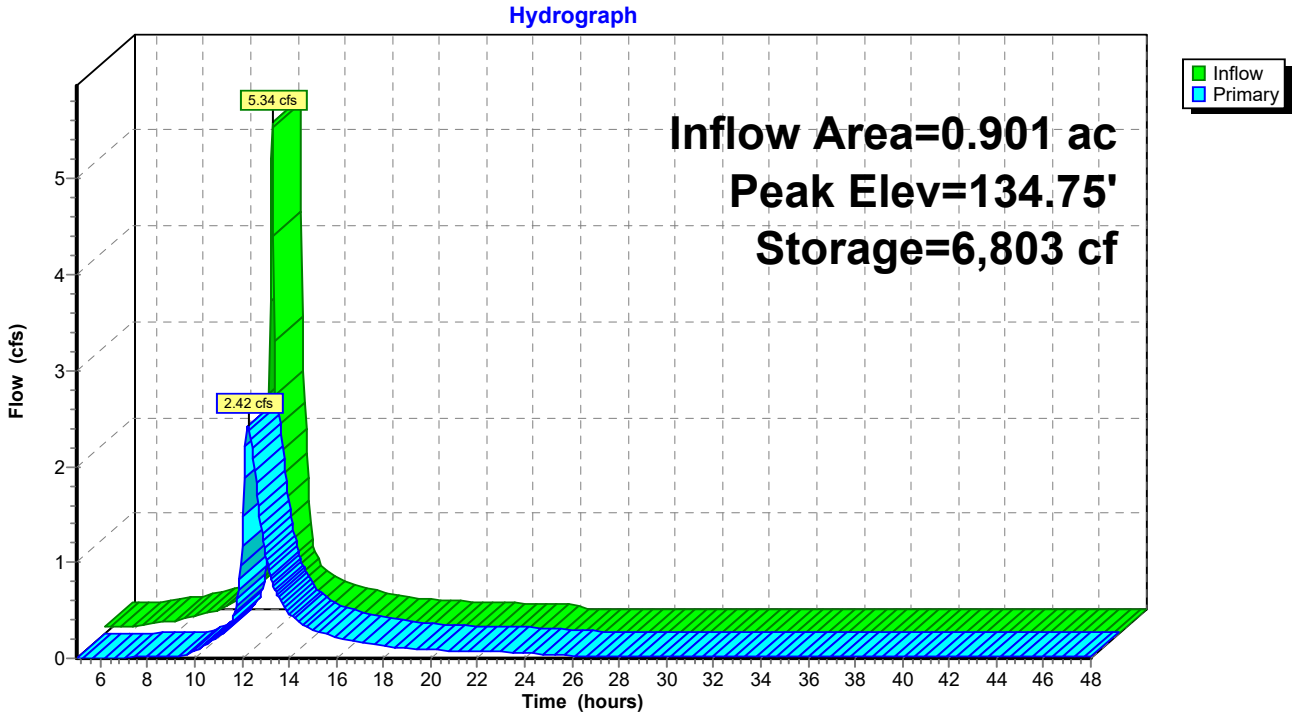
17,426.0 cf Field - 4,522.0 cf Chambers = 12,903.9 cf Stone x 40.0% Voids = 5,161.6 cf Stone Storage

Chamber Storage + Stone Storage = 8,660.8 cf = 0.199 af
Overall Storage Efficiency = 49.7%
Overall System Size = 181.33' x 51.24' x 1.88'

216 Chambers
645.4 cy Field
477.9 cy Stone



Pond 1P: DETENTION SYSTEM



Summary for Pond 2P: RAIN GARDEN

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.300 ac,100.00% Impervious, Inflow Depth > 5.77" for 25-Year event
Inflow = 1.78 cfs @ 12.09 hrs, Volume= 0.144 af
Outflow = 0.12 cfs @ 13.42 hrs, Volume= 0.044 af, Atten= 93%, Lag= 79.9 min
Primary = 0.12 cfs @ 13.42 hrs, Volume= 0.044 af
Routed to Reach DP-1 : POND ST.

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 141.71' @ 13.42 hrs Surf.Area= 3,676 sf Storage= 4,536 cf

Plug-Flow detention time= 411.7 min calculated for 0.044 af (31% of inflow)
Center-of-Mass det. time= 241.3 min (1,002.6 - 761.3)

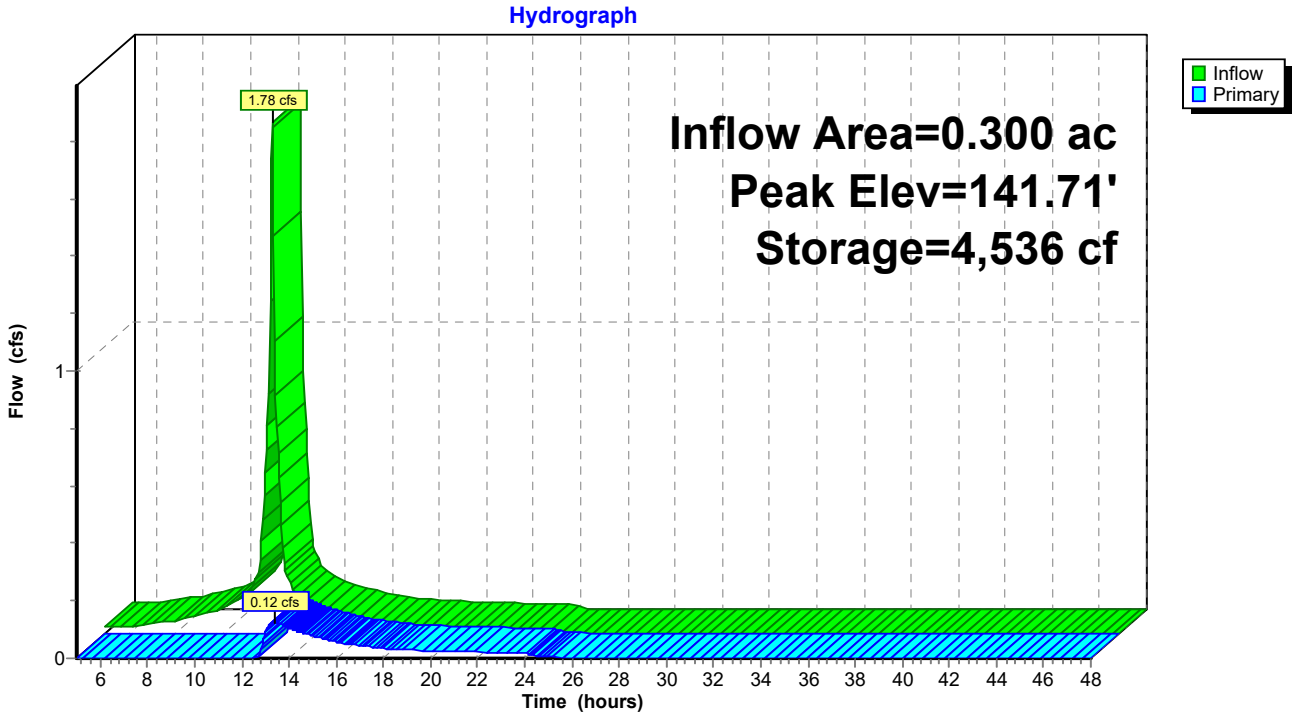
Volume	Invert	Avail.Storage	Storage Description
#1	139.50'	5,680 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
139.50	562	0	0
140.00	1,190	438	438
141.00	2,582	1,886	2,324
142.00	4,130	3,356	5,680

Device	Routing	Invert	Outlet Devices
#1	Primary	141.66'	**5.0' long x 3.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.41 2.56 2.69 2.67 2.66 2.66 2.65 2.67 2.67 2.70 2.77 2.83 2.87 2.93 3.10 3.19 3.32

Primary OutFlow Max=0.12 cfs @ 13.42 hrs HW=141.71' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.12 cfs @ 0.52 fps)

Pond 2P: RAIN GARDEN



Time span=5.00-48.00 hrs, dt=0.05 hrs, 861 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1R: 75% OF BUILDING Runoff Area=39,227 sf 100.00% Impervious Runoff Depth>8.25"
Tc=6.0 min CN=98 Runoff=7.59 cfs 0.619 af

Subcatchment1S: FRONT SITE Runoff Area=134,557 sf 51.87% Impervious Runoff Depth=5.15"
Tc=6.0 min CN=70 Runoff=18.26 cfs 1.326 af

Subcatchment2S: EASTERN Runoff Area=10,320 sf 0.00% Impervious Runoff Depth=4.30"
Tc=6.0 min CN=63 Runoff=1.17 cfs 0.085 af

Subcatchment3R: WESTERN ROOF Runoff Area=50,302 sf 100.00% Impervious Runoff Depth>8.25"
Tc=6.0 min CN=98 Runoff=9.73 cfs 0.794 af

Subcatchment3S: WESTERN SITE Runoff Area=18,176 sf 18.54% Impervious Runoff Depth>6.49"
Tc=6.0 min UI Adjusted CN=81 Runoff=3.03 cfs 0.226 af

Subcatchment4R: NORTH & EAST Runoff Area=108,531 sf 100.00% Impervious Runoff Depth>8.25"
Tc=6.0 min CN=98 Runoff=21.00 cfs 1.712 af

Subcatchment4S: EASTERN LOADING Runoff Area=71,480 sf 65.94% Impervious Runoff Depth=6.37"
Tc=6.0 min CN=80 Runoff=11.73 cfs 0.871 af

Subcatchment5S: 25% OF BUILDING Runoff Area=13,075 sf 100.00% Impervious Runoff Depth>8.25"
Tc=6.0 min CN=98 Runoff=2.53 cfs 0.206 af

Reach DP-1: POND ST. Inflow=18.25 cfs 1.432 af
Outflow=18.25 cfs 1.432 af

Reach DP-2: EASTERN PROPERTY LINE Inflow=1.17 cfs 0.085 af
Outflow=1.17 cfs 0.085 af

Reach DP-3: CRUSED STONE AREA & LEACHING PITS Inflow=12.76 cfs 1.019 af
Outflow=12.76 cfs 1.019 af

Reach DP-4: NORTHERN HEADWALLS Inflow=35.55 cfs 3.185 af
Outflow=35.55 cfs 3.185 af

Pond 1P: DETENTION SYSTEM Peak Elev=135.22' Storage=8,539 cf Inflow=7.59 cfs 0.619 af
Outflow=3.46 cfs 0.602 af

Pond 2P: RAIN GARDEN Peak Elev=141.84' Storage=5,040 cf Inflow=2.53 cfs 0.206 af
Outflow=0.92 cfs 0.106 af

Total Runoff Area = 10.231 ac Runoff Volume = 5.838 af Average Runoff Depth = 6.85"
25.63% Pervious = 2.623 ac 74.37% Impervious = 7.609 ac

Summary for Subcatchment 1R: 75% OF BUILDING ADDITION

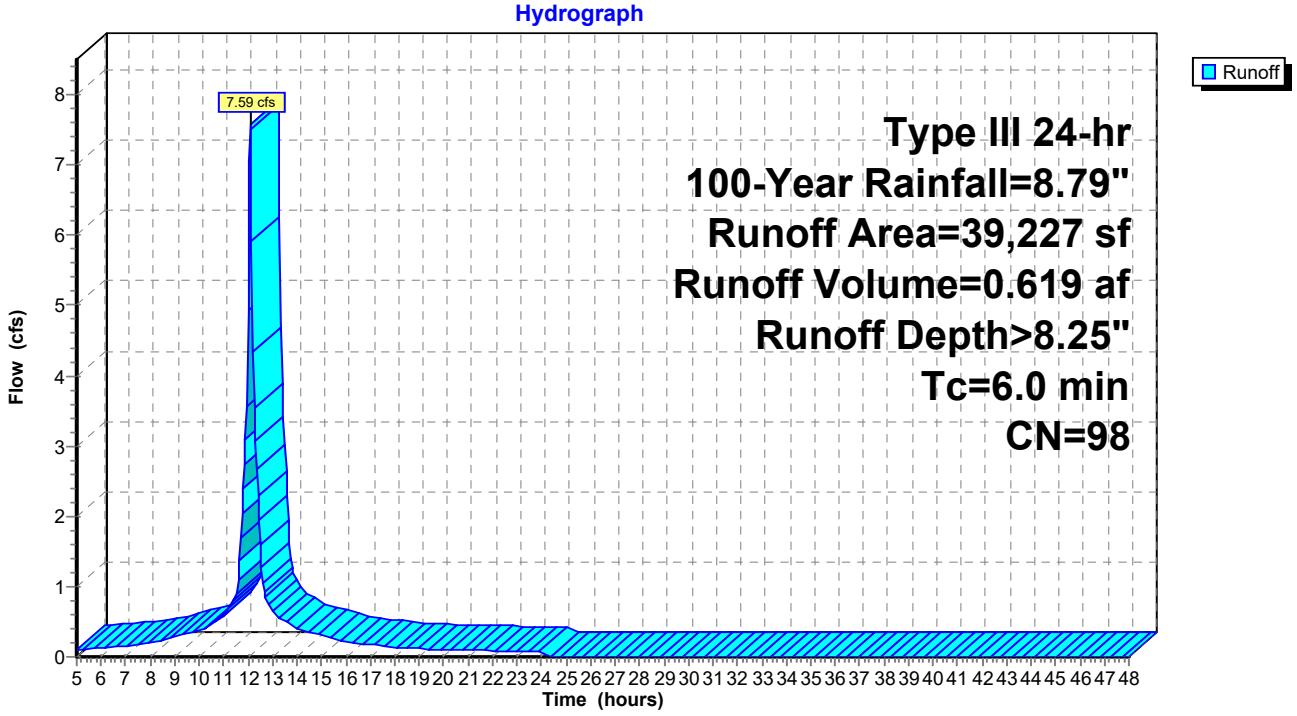
Runoff = 7.59 cfs @ 12.09 hrs, Volume= 0.619 af, Depth> 8.25"
Routed to Pond 1P : DETENTION SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.79"

Area (sf)	CN	Description
39,227	98	Roofs, HSG A
39,227		100.00% Impervious Area

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

Subcatchment 1R: 75% OF BUILDING ADDITION



Summary for Subcatchment 1S: FRONT SITE

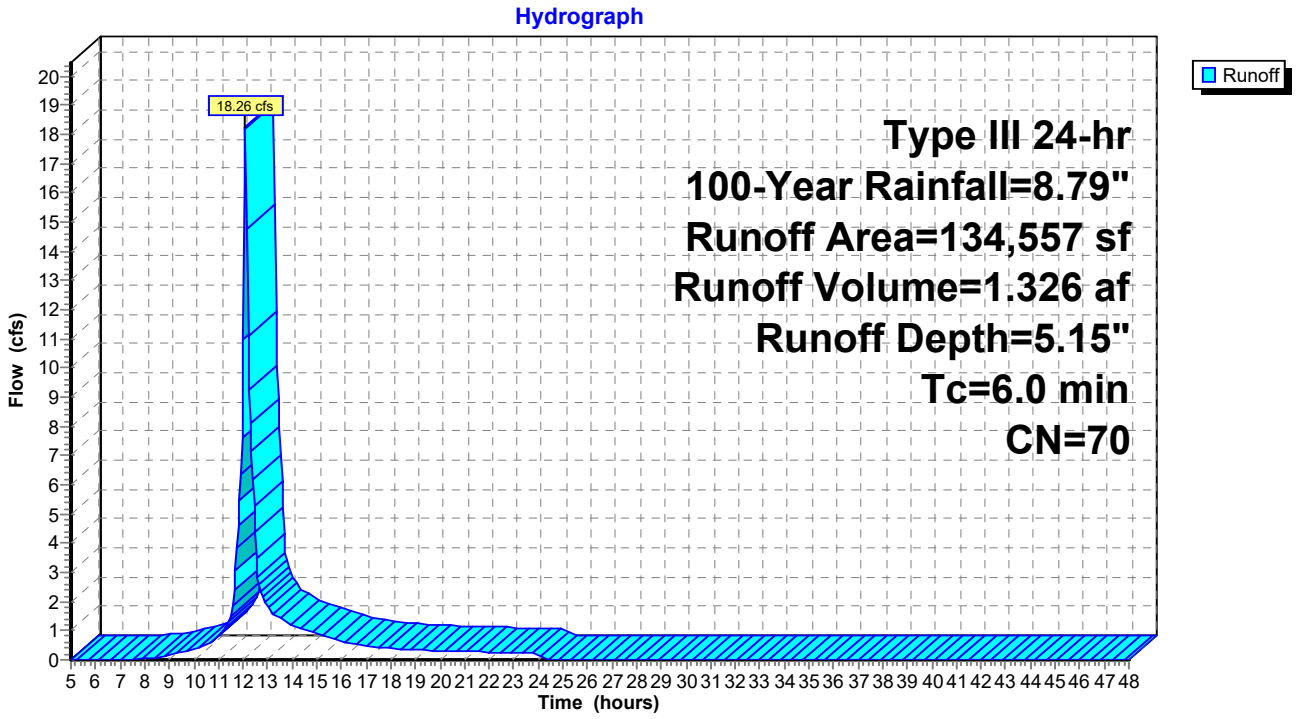
Runoff = 18.26 cfs @ 12.09 hrs, Volume= 1.326 af, Depth= 5.15"
Routed to Reach DP-1 : POND ST.

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.79"

Area (sf)	CN	Description
63,959	39	>75% Grass cover, Good, HSG A
809	61	>75% Grass cover, Good, HSG B
20,445	98	Paved parking, HSG B
49,344	98	Paved parking, HSG A
134,557	70	Weighted Average
64,768		48.13% Pervious Area
69,789		51.87% Impervious Area

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

Subcatchment 1S: FRONT SITE



Summary for Subcatchment 2S: EASTERN LANDSCAPED AREA

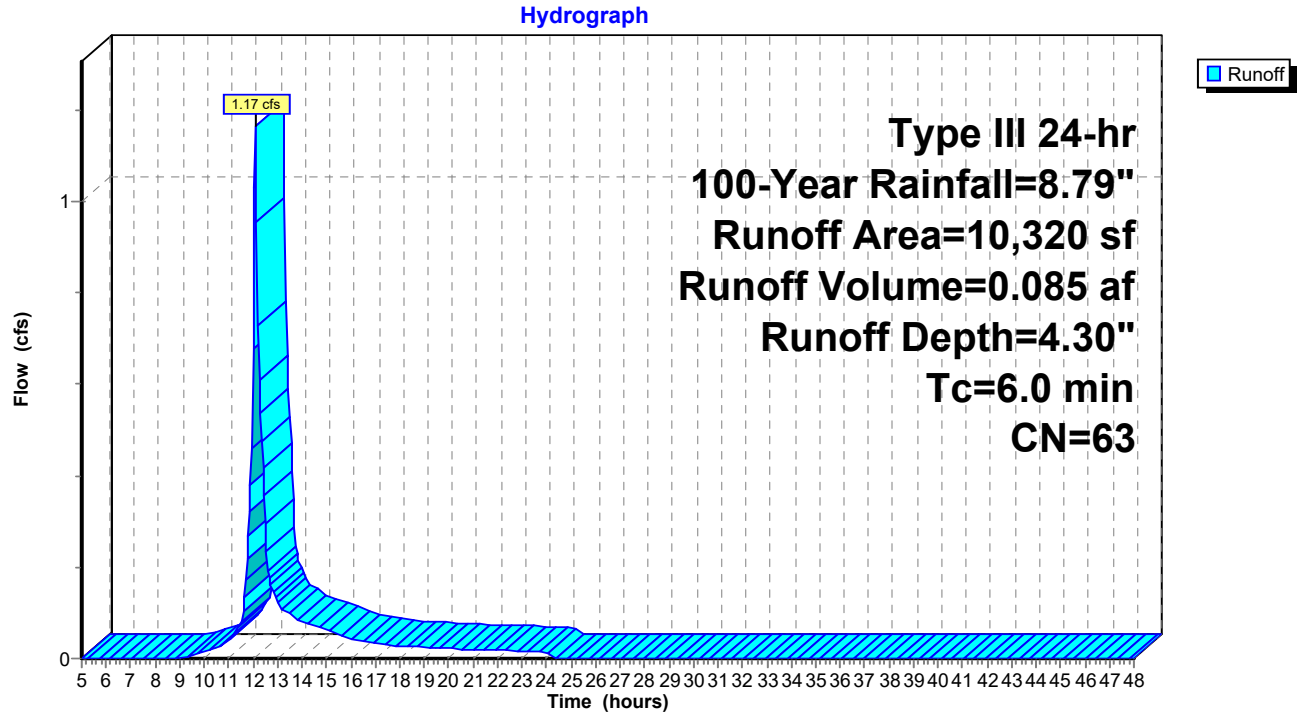
Runoff = 1.17 cfs @ 12.09 hrs, Volume= 0.085 af, Depth= 4.30"
Routed to Reach DP-2 : EASTERN PROPERTY LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.79"

Area (sf)	CN	Description
9,320	61	>75% Grass cover, Good, HSG B
1,000	80	>75% Grass cover, Good, HSG D
10,320	63	Weighted Average
10,320		100.00% Pervious Area

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

Subcatchment 2S: EASTERN LANDSCAPED AREA



Summary for Subcatchment 3R: WESTERN ROOF

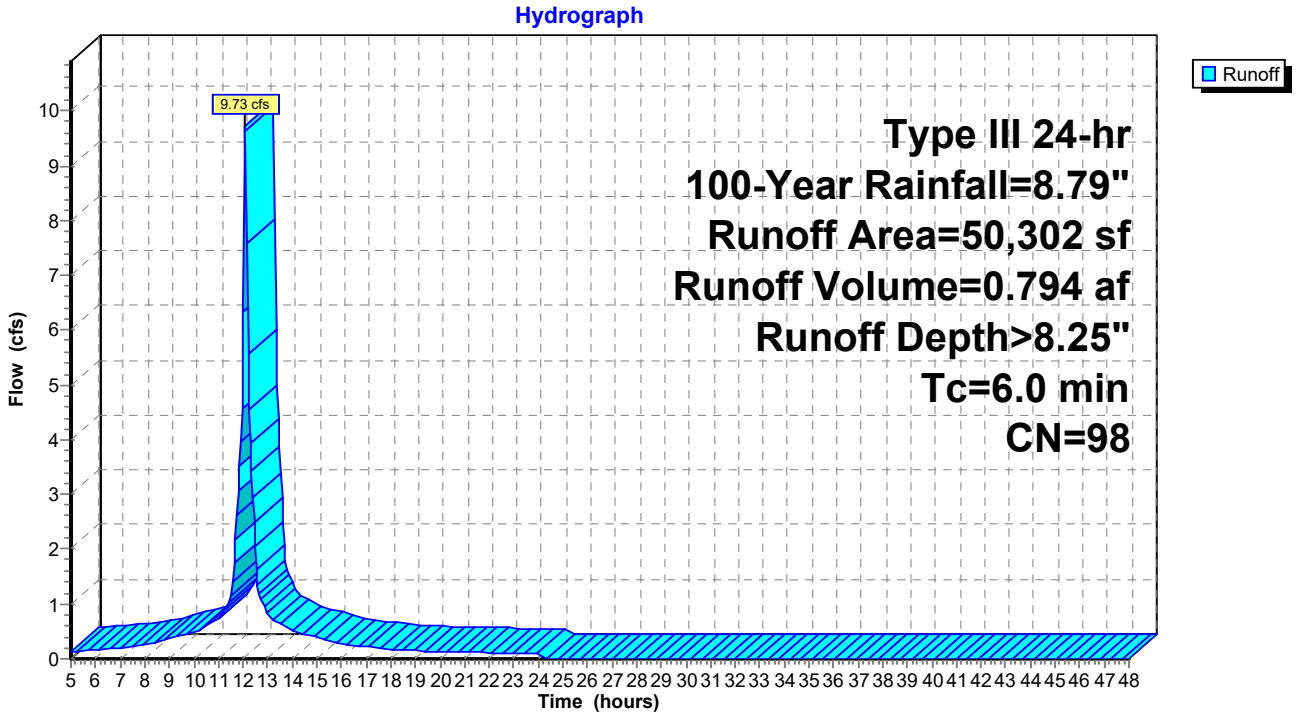
Runoff = 9.73 cfs @ 12.09 hrs, Volume= 0.794 af, Depth> 8.25"
Routed to Reach DP-3 : CRUSED STONE AREA & LEACHING PITS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.79"

Area (sf)	CN	Description
50,302	98	Roofs, HSG A
50,302		100.00% Impervious Area

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

Subcatchment 3R: WESTERN ROOF



Summary for Subcatchment 3S: WESTERN SITE

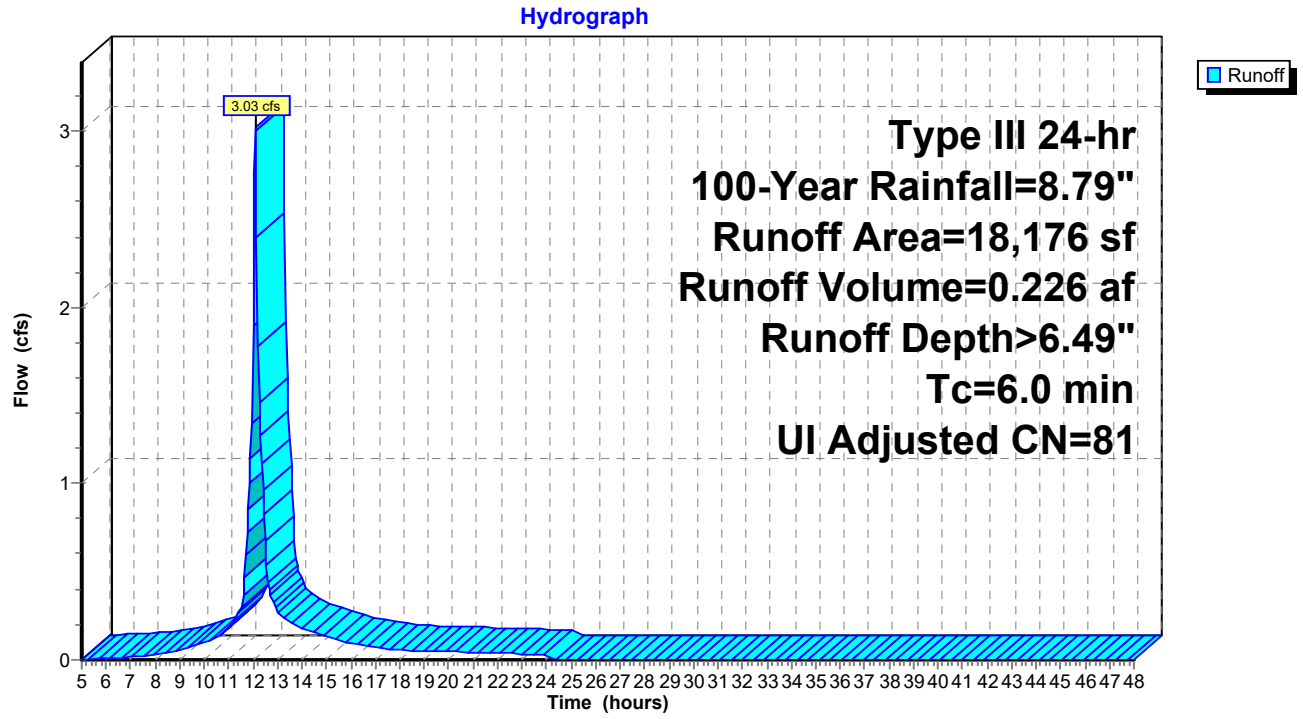
Runoff = 3.03 cfs @ 12.09 hrs, Volume= 0.226 af, Depth> 6.49"
Routed to Reach DP-3 : CRUSED STONE AREA & LEACHING PITS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.79"

Area (sf)	CN	Adj	Description
3,370	98		Unconnected pavement, HSG A
10,363	96		Gravel surface, HSG A
4,443	39		>75% Grass cover, Good, HSG A
18,176	82	81	Weighted Average, UI Adjusted
14,806			81.46% Pervious Area
3,370			18.54% Impervious Area
3,370			100.00% Unconnected

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

Subcatchment 3S: WESTERN SITE



Summary for Subcatchment 4R: NORTH & EAST ROOF

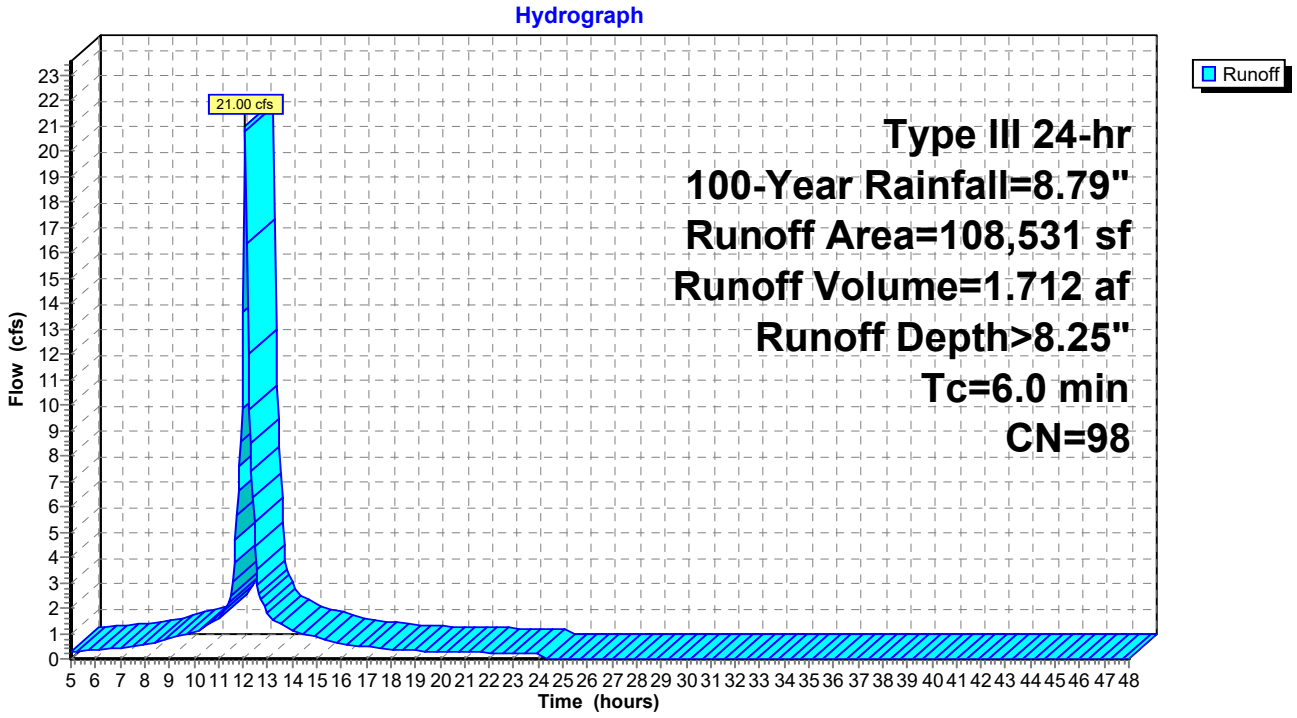
Runoff = 21.00 cfs @ 12.09 hrs, Volume= 1.712 af, Depth> 8.25"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.79"

Area (sf)	CN	Description
108,531	98	Roofs, HSG A
108,531		100.00% Impervious Area

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

Subcatchment 4R: NORTH & EAST ROOF



Summary for Subcatchment 4S: EASTERN LOADING AREA

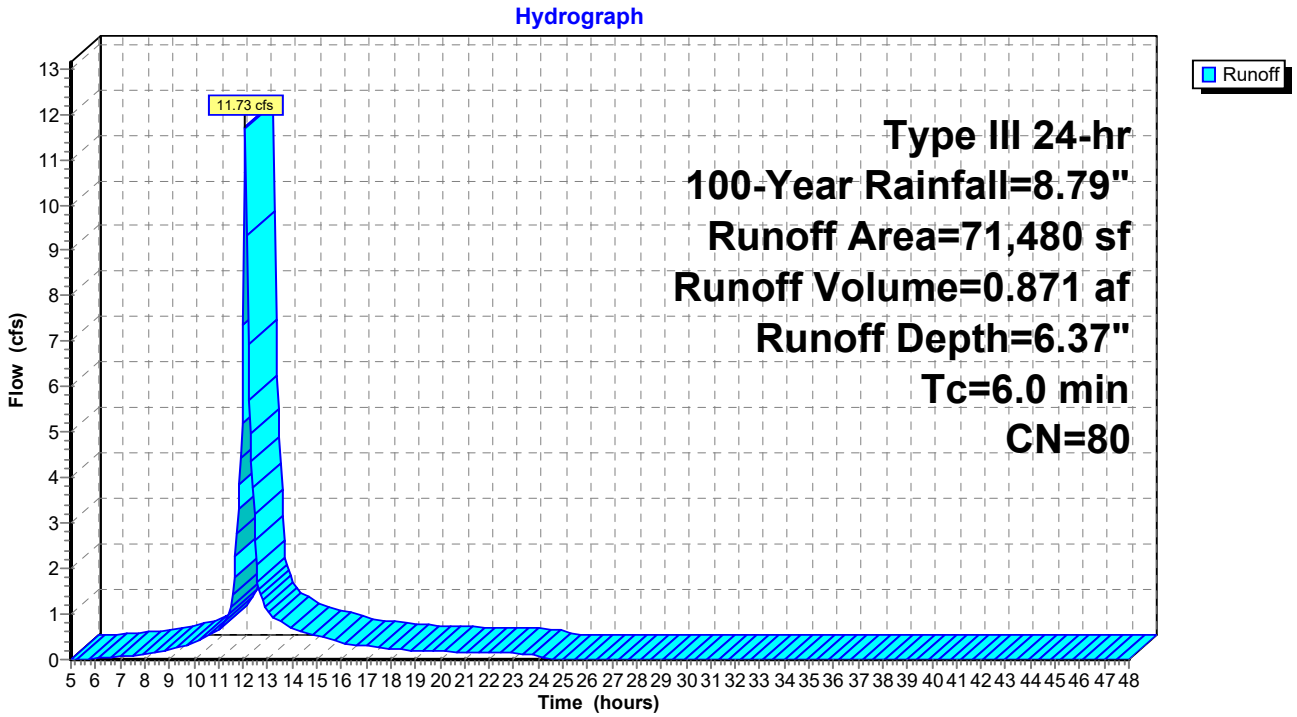
Runoff = 11.73 cfs @ 12.09 hrs, Volume= 0.871 af, Depth= 6.37"
Routed to Reach DP-4 : NORTHERN HEADWALLS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.79"

Area (sf)	CN	Description
40,295	98	Paved parking, HSG A
55	98	Paved parking, HSG B
6,783	98	Paved parking, HSG D
4,315	30	Woods, Good, HSG A
2,050	77	Woods, Good, HSG D
16,572	39	>75% Grass cover, Good, HSG A
1,410	96	Gravel surface, HSG A
71,480	80	Weighted Average
24,347		34.06% Pervious Area
47,133		65.94% Impervious Area

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

Subcatchment 4S: EASTERN LOADING AREA



Summary for Subcatchment 5S: 25% OF BUILDING ADDITION

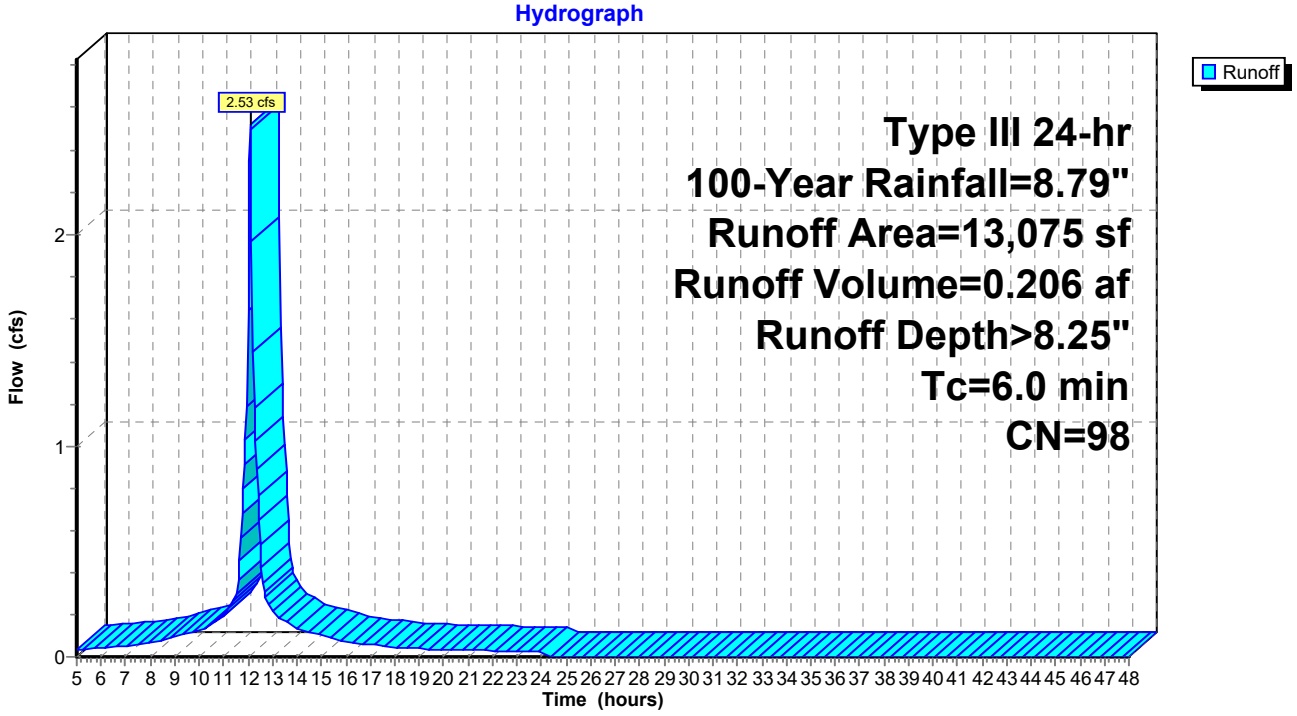
Runoff = 2.53 cfs @ 12.09 hrs, Volume= 0.206 af, Depth> 8.25"
Routed to Pond 2P : RAIN GARDEN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.79"

Area (sf)	CN	Description
13,075	98	Roofs, HSG A
13,075		100.00% Impervious Area

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

Subcatchment 5S: 25% OF BUILDING ADDITION



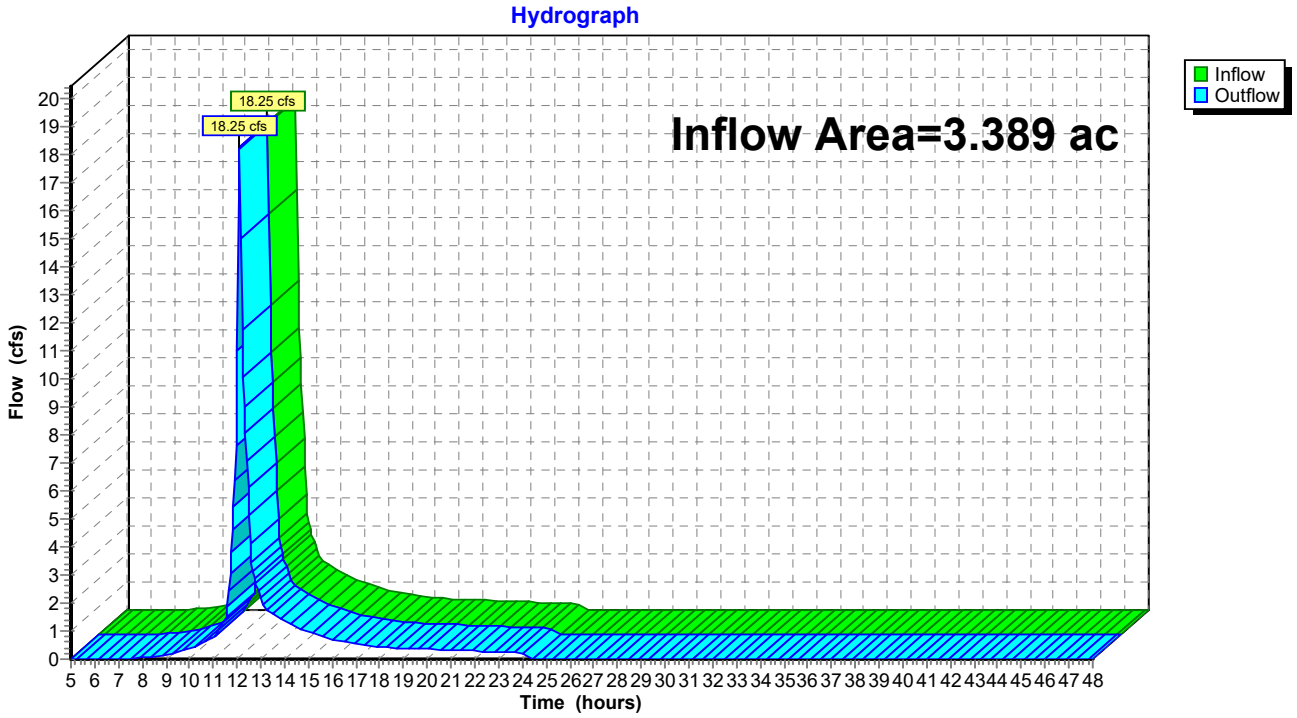
Summary for Reach DP-1: POND ST.

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

Inflow Area = 3.389 ac, 56.13% Impervious, Inflow Depth = 5.07" for 100-Year event
Inflow = 18.25 cfs @ 12.09 hrs, Volume= 1.432 af
Outflow = 18.25 cfs @ 12.09 hrs, Volume= 1.432 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-1: POND ST.



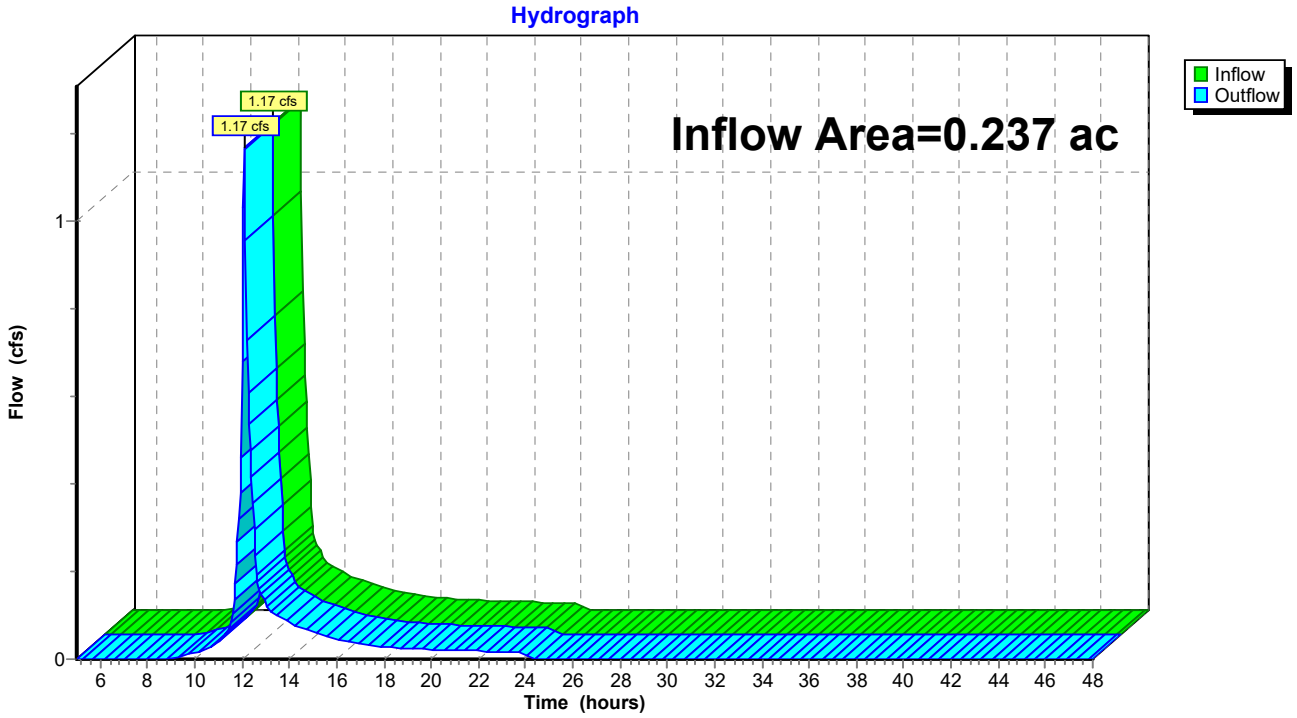
Summary for Reach DP-2: EASTERN PROPERTY LINE

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

Inflow Area = 0.237 ac, 0.00% Impervious, Inflow Depth = 4.30" for 100-Year event
Inflow = 1.17 cfs @ 12.09 hrs, Volume= 0.085 af
Outflow = 1.17 cfs @ 12.09 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-2: EASTERN PROPERTY LINE



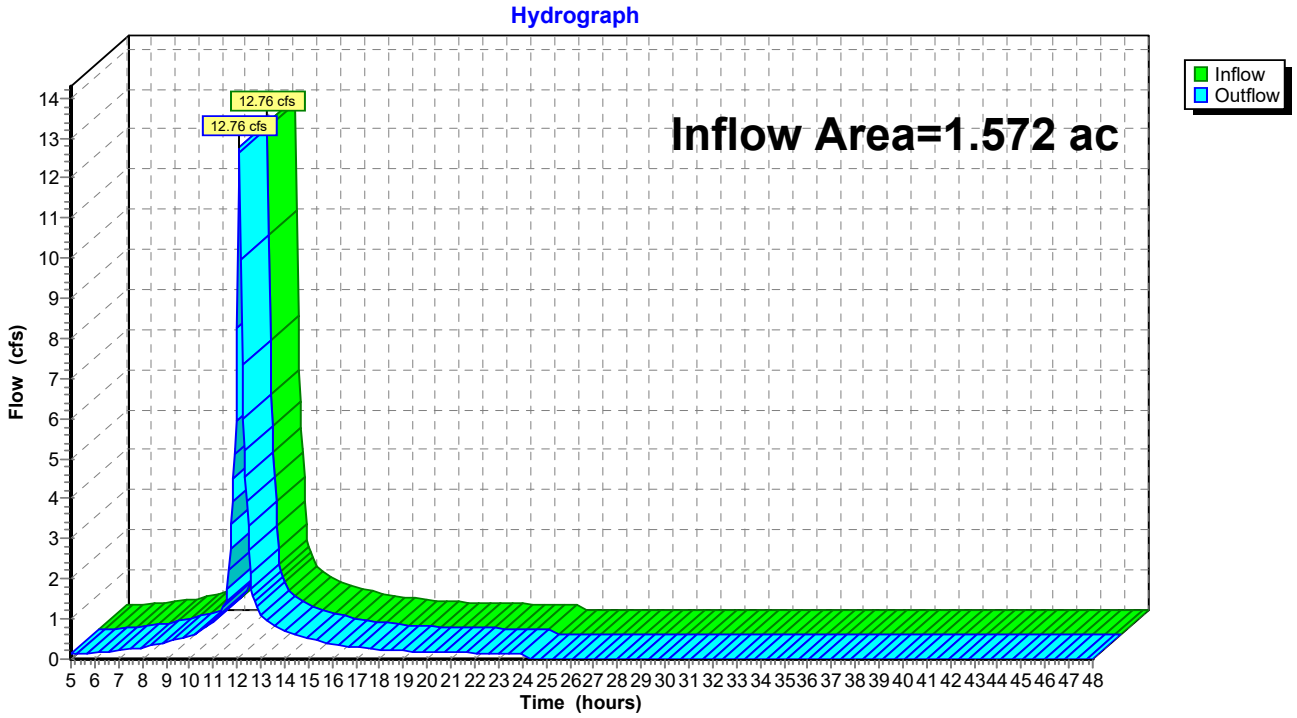
Summary for Reach DP-3: CRUSED STONE AREA & LEACHING PITS

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

Inflow Area = 1.572 ac, 78.38% Impervious, Inflow Depth > 7.78" for 100-Year event
Inflow = 12.76 cfs @ 12.09 hrs, Volume= 1.019 af
Outflow = 12.76 cfs @ 12.09 hrs, Volume= 1.019 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-3: CRUSED STONE AREA & LEACHING PITS



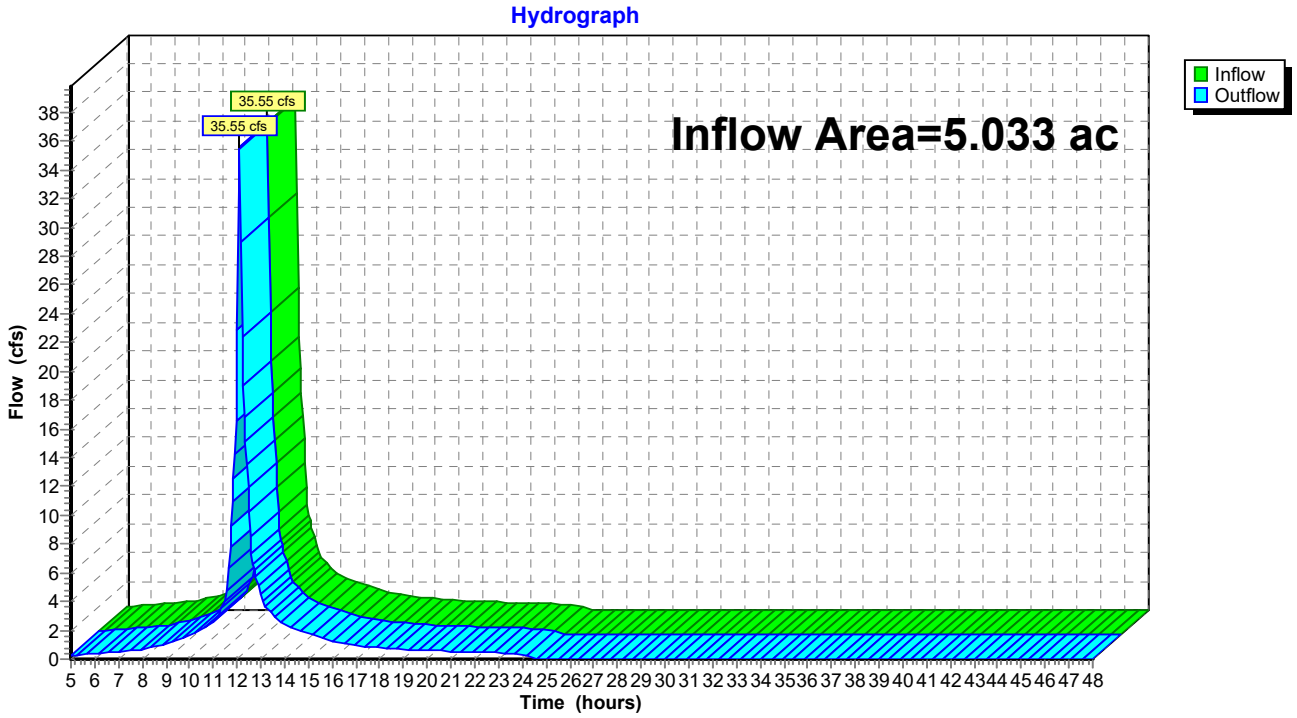
Summary for Reach DP-4: NORTHERN HEADWALLS

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

Inflow Area = 5.033 ac, 88.89% Impervious, Inflow Depth > 7.59" for 100-Year event
Inflow = 35.55 cfs @ 12.09 hrs, Volume= 3.185 af
Outflow = 35.55 cfs @ 12.09 hrs, Volume= 3.185 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach DP-4: NORTHERN HEADWALLS



Summary for Pond 1P: DETENTION SYSTEM

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.901 ac,100.00% Impervious, Inflow Depth > 8.25" for 100-Year event
Inflow = 7.59 cfs @ 12.09 hrs, Volume= 0.619 af
Outflow = 3.46 cfs @ 12.26 hrs, Volume= 0.602 af, Atten= 54%, Lag= 10.6 min
Primary = 3.46 cfs @ 12.26 hrs, Volume= 0.602 af
Routed to Reach DP-4 : NORTHERN HEADWALLS

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 135.22' @ 12.26 hrs Surf.Area= 9,291 sf Storage= 8,539 cf

Plug-Flow detention time= 147.5 min calculated for 0.601 af (97% of inflow)
Center-of-Mass det. time= 131.6 min (891.6 - 760.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.38'	5,162 cf	**51.24'W x 181.33'L x 1.88'H Field A** 17,426 cf Overall - 4,522 cf Embedded = 12,904 cf x 40.0% Voids
#2A	133.71'	3,499 cf	**ADS N-12 12"** x 216 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 216 Chambers in 24 Rows
		8,661 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	133.38'	**12.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 133.38' / 133.26' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	133.38'	**1.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	133.85'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.46 cfs @ 12.26 hrs HW=135.22' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 3.46 cfs @ 4.40 fps)
├─**2=Orifice/Grate** (Passes < 0.04 cfs potential flow)
└─**3=Orifice/Grate** (Passes < 3.53 cfs potential flow)

Pond 1P: DETENTION SYSTEM - Chamber Wizard Field A

Chamber Model = ADS N-12 12" (ADS N-12® Pipe)
Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf
Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf

14.5" Wide + 10.9" Spacing = 25.4" C-C Row Spacing

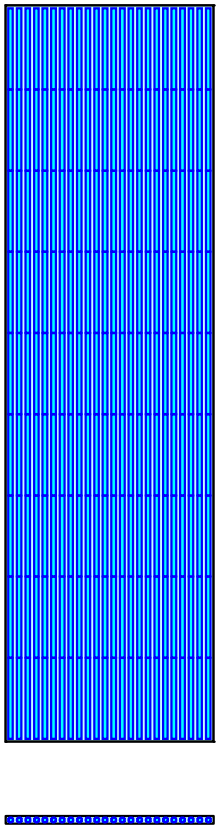
9 Chambers/Row x 20.00' Long = 180.00' Row Length +8.0" End Stone x 2 = 181.33' Base Length
24 Rows x 14.5" Wide + 10.9" Spacing x 23 + 8.0" Side Stone x 2 = 51.24' Base Width
4.0" Stone Base + 14.5" Chamber Height + 4.0" Stone Cover = 1.88' Field Height

216 Chambers x 16.2 cf = 3,499.2 cf Chamber Storage
216 Chambers x 20.9 cf = 4,522.0 cf Displacement

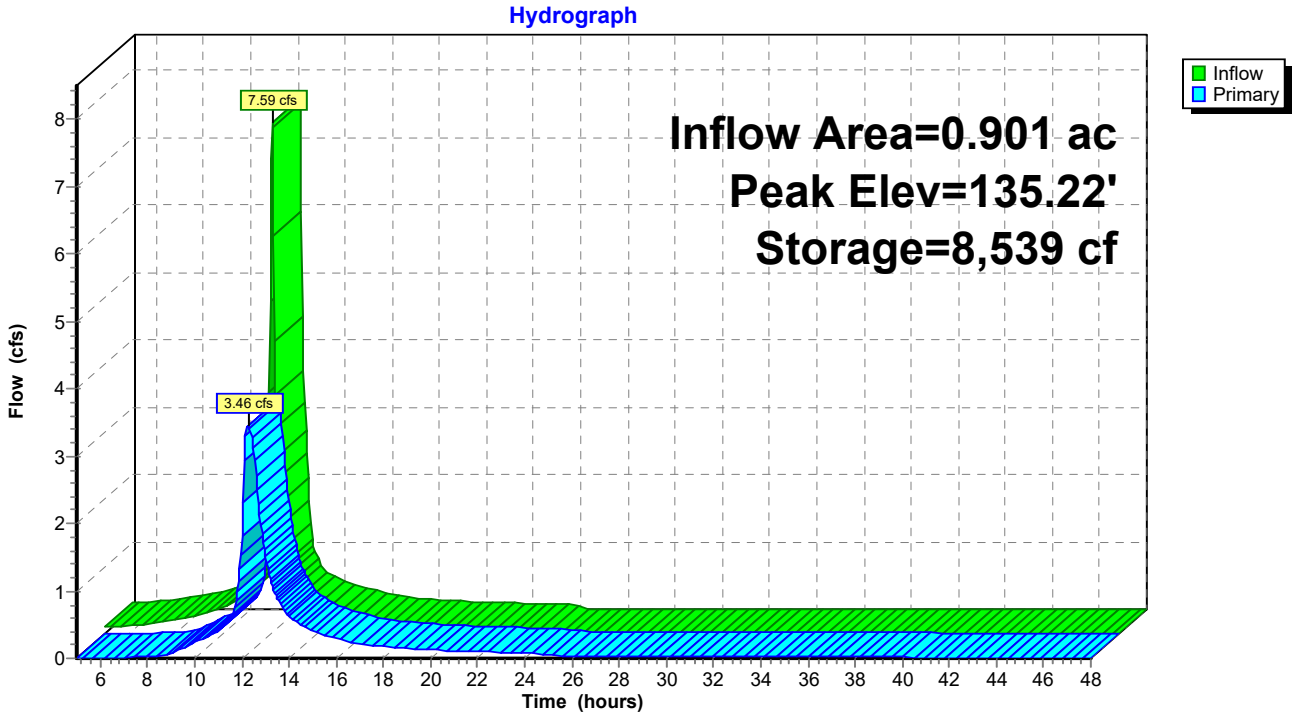
17,426.0 cf Field - 4,522.0 cf Chambers = 12,903.9 cf Stone x 40.0% Voids = 5,161.6 cf Stone Storage

Chamber Storage + Stone Storage = 8,660.8 cf = 0.199 af
Overall Storage Efficiency = 49.7%
Overall System Size = 181.33' x 51.24' x 1.88'

216 Chambers
645.4 cy Field
477.9 cy Stone



Pond 1P: DETENTION SYSTEM



Summary for Pond 2P: RAIN GARDEN

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.300 ac,100.00% Impervious, Inflow Depth > 8.25" for 100-Year event
Inflow = 2.53 cfs @ 12.09 hrs, Volume= 0.206 af
Outflow = 0.92 cfs @ 12.34 hrs, Volume= 0.106 af, Atten= 64%, Lag= 15.3 min
Primary = 0.92 cfs @ 12.34 hrs, Volume= 0.106 af
Routed to Reach DP-1 : POND ST.

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 141.84' @ 12.34 hrs Surf.Area= 3,883 sf Storage= 5,040 cf

Plug-Flow detention time= 256.5 min calculated for 0.106 af (51% of inflow)
Center-of-Mass det. time= 138.1 min (898.1 - 760.0)

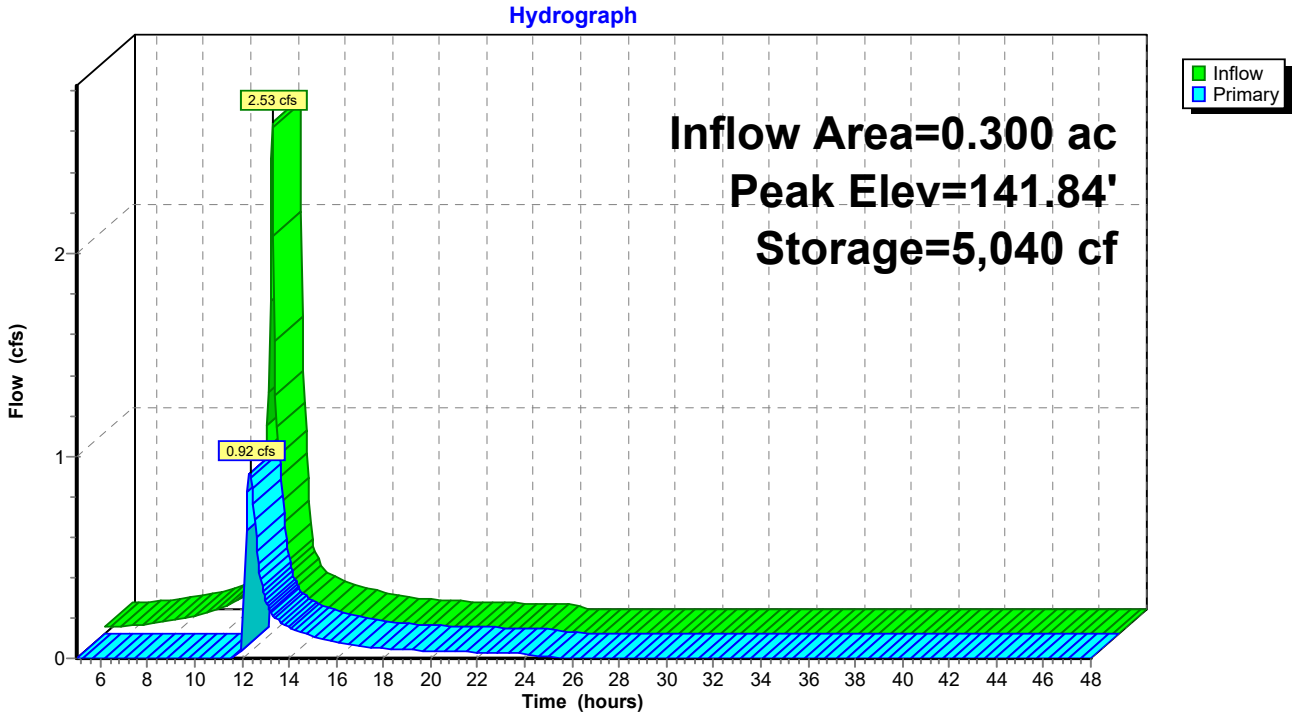
Volume	Invert	Avail.Storage	Storage Description
#1	139.50'	5,680 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
139.50	562	0	0
140.00	1,190	438	438
141.00	2,582	1,886	2,324
142.00	4,130	3,356	5,680

Device	Routing	Invert	Outlet Devices
#1	Primary	141.66'	**5.0' long x 3.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.41 2.56 2.69 2.67 2.66 2.66 2.65 2.67 2.67 2.70 2.77 2.83 2.87 2.93 3.10 3.19 3.32

Primary OutFlow Max=0.92 cfs @ 12.34 hrs HW=141.84' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.92 cfs @ 1.02 fps)

Pond 2P: RAIN GARDEN



A P P E N D I X C

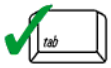
Checklist for Stormwater Report

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

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Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

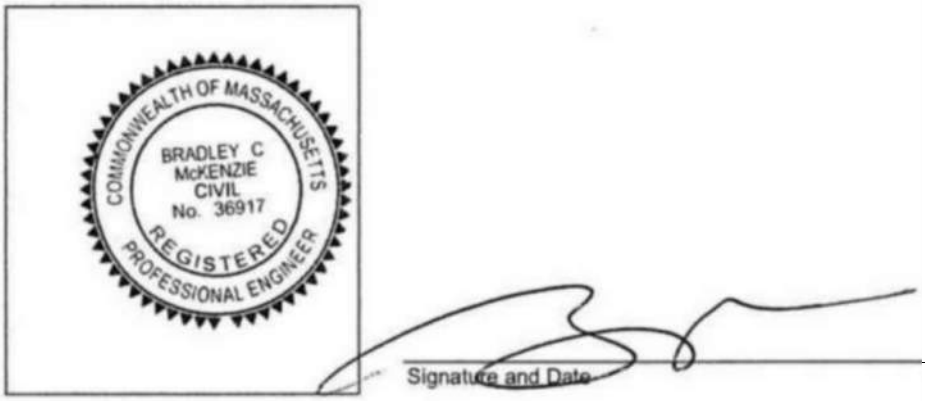
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

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Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

☒ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☐ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☐ Use of "country drainage" versus curb and gutter conveyance and pipe

☒ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☒ Other (describe): Detention System

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

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Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☐ Static ☒ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

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Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☒ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☐ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☒ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☒ Critical areas and BMPs are identified in the Stormwater Report.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☐ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☒ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

A P P E N D I X D

Illicit Discharge Compliance Statement
Supplemental BMP Calculations

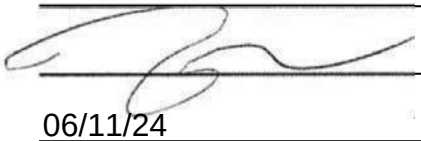
Illicit Discharge Compliance Statement

I, Bradley C. McKenzie, P.E., hereby notify the Randolph Conservation Commission that I have not witnessed, nor am aware of any existing illicit discharges at the site known as 300 Pond Street (Assessor's Parcel Number 3-O-2.1) in Randolph, Massachusetts. I also hereby certify that the development of said property as illustrated on the final plans entitled “Site Development Plan, (Assessor's Parcel Number 3-O-2.1), 300 Pond Street, Randolph, Massachusetts,” prepared by McKenzie Engineering Group. Inc. dated June 11, 2024 and as revised and approved by the Randolph Conservation Commission and maintenance thereof in accordance with the “Construction Phase Operations and Maintenance Plan” and “Long-Term Operations and Maintenance Plan” prepared by McKenzie Engineering Group, Inc. dated June 11, 2024 and as revised and approved by the Randolph Conservation Commission will not create any new illicit discharges. There is no warranty implied regarding future illicit discharges that may occur as a result of improper construction or maintenance of the stormwater management system or unforeseen accidents.

Name: Bradley C. McKenzie, P.E.

Company: McKenzie Engineering Group, Inc.

Title: President

Signature: 

Date: 06/11/24

MCKENZIE ENGINEERING GROUP

Assinippi Office Park
150 Longwater Drive, Suite 101
Norwell, MA 02061

300 POND STREET
RANDOLPH, MA

4/16/2024

WATER QUALITY VOLUME ANALYSIS

POND	IMPERVIOUS AREA (SF) CN=98	PRECIPITATION (IN)	WATER QUALITY VOLUME REQUIRED (CF)	TREATMENT VOLUME PROVIDED (CF) UP TO INVERT ELEVATION	NET TREATMENT VOLUME PROVIDED (CF)
2P	52,300	1.00	4,358	4,365	7
TOTAL	**52,300**		**4,358**	**4,365**	**7**

WATER QUALITY VOLUME ANALYSIS - PROPRIETARY STORMWATER TREATMENT UNITS (FIRST DEFENSE UNITS)*

	IMPERVIOUS AREA (SF) CN=98	PRECIPITATION (IN)	qu (Fig 4) Tc 6 min. (CSM/IN)	AREA (SM)	WATER QUALITY REQUIRED (CFS)
2P	52,300	0.50	774	1.876E-03	0.726

*Use 4' Diameter First Defense Units

MCKENZIE ENGINEERING GROUP

Assinippi Office Park
150 Longwater Drive, Suite 101
Norwell, MA 02061

300 POND STREET
RANDOLPH, MA

4/16/2024

REQUIRED RECHARGE VOLUME (CF) *"STATIC METHOD"*

WATERSHED #	IMPERVIOUS AREA (SF)	TARGET DEPTH FACTOR (F) A SOIL	IMPERVIOUS AREA (SF)	TARGET DEPTH FACTOR (F) B SOIL	IMPERVIOUS AREA (SF)	TARGET DEPTH FACTOR (F) C SOIL	IMPERVIOUS AREA (SF)	TARGET DEPTH FACTOR (F) D SOIL		REQUIRED RECHARGE VOLUME (CF)
TOTAL SITE	52,300	0.60		0.35		0.25		0.10		2,615
		0.60		0.35		0.25		0.10		0
		0.60		0.35		0.25		0.10		0
							TOTAL			**2,615**

CAPTURE ADJUSTMENT

WATERSHED #	TOTAL IMPERVIOUS AREA (SF)	TOTAL IMPERVIOUS COLLECTED	% DIRECTED TOWARDS INFILTRATION SYSTEM	STANDARD NO. 3 <100% - > 65% CAPTURED	CAPTURE ADJUSTMENT	ADJUSTED REQUIRED RECHARGE VOLUME (CF)
TOTAL SITE	52,300	52,300	100.00%	**CAPTURE ADJUSTMENT REQUIRED**	1.00	2,615

* Required Water Quality Volume based on 0.5 inches of runoff; Required Recharge Volume based on 0.60 inches Target Volume is Required Water Quality Volume of 4,358 CF

PROVIDED RECHARGE VOLUME (CF)

BELOW LOWEST INVERT

	REQUIRED RECHARGE VOLUME (CF)	POND	STORAGE VOLUME PROVIDED (CF)	NET STORAGE VOLUME PROVIDED (CF)
	2,615	2P	4,365	1,750
TOTAL	**2,615**		**4,365**	**1,750**

MCKENZIE ENGINEERING GROUP

Assinippi Office Park
150 Longwater Drive, Suite 101
Norwell, MA 02061

300 POND STREET
RANDOLPH, MA

4/16/2024

DRAWDOWN WITHIN 72 HOURS ANALYSIS

POND	RAWLS RATE (IN/HR)	STORAGE VOLUME PROVIDED (CF)	BOTTOM AREA (FT2)	DRAWDOWN (HR)
2P	8.27	5,680	562	15

A P P E N D I X E

Soil Testing Data

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Emerson - Swan Flexcon
Owner Name

300 Pond Street
Street Address

3-0-2.1
Map/Lot #

Randolph
City

MA
State

02368
Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Soil Survey Available? ☒ Yes ☐ No If yes: NRCS (Source) 654 (Soil Map Unit)

udorthents, loamy
Soil Name

N/A
Soil Limitations

excavated and filled coarse-loamy human transported material
Soil Parent material

shoulder, summit
Landform

3. Surficial Geological Report Available? ☒ Yes ☐ No If yes: USGS/2018 (Year Published/Source) thin till (Map Unit)

nonsorted, nonstratified matrix of sand, some silt, and little clay containing pebble, cobble, boulder clasts.
Description of Geologic Map Unit:

4. Flood Rate Insurance Map Within a regulatory floodway? ☐ Yes ☒ No

5. Within a velocity zone? ☐ Yes ☒ No

6. Within a Mapped Wetland Area? ☐ Yes ☒ No If yes, MassGIS Wetland Data Layer: _____ (Wetland Type)

7. Current Water Resource Conditions (USGS): 12/21/23 (Month/Day/ Year) Range: ☐ Above Normal ☒ Normal ☐ Below Normal

8. Other references reviewed: _____

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (*minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 1 (Hole #) | 12/22/23 (Date) | 7AM (Time) | sunny, cold (Weather) | 42.202802 (Latitude) | -71.049873 (Longitude:)

1. Land Use: manufacturing building and parking lot (e.g., woodland, agricultural field, vacant lot, etc.) | none (Vegetation) | large boulders and ledge (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 2 (Slope (%))

Description of Location: parking lot, rear of building

2. Soil Parent Material: ledge and stone outcropping | shoulder, summit (Landform) | SH (Position on Landscape (SU, SH, BS, FS, TS))

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Wetlands >100 feet | Property Line >50 feet | Drinking Water Well _____ feet | Other _____ feet

4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☐ Disturbed Soil ☒ Fill Material ☐ Weathered/Fractured Rock ☒ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No If yes: 52 Depth Weeping from Pit | 82 Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-16		fill					10	5			
16-34	C1	ledge	2.5YR 6/4					80	BLOCKY	RIGID	mostly Ledge, some SL between rock
34-84	C2	Clay	10YR 7/2	52	10YR 6/6	5		10	MASSIVE	FRIABLE	

Additional Notes:

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (*minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 2 (Hole #) | 12/22/23 (Date) | 8AM (Time) | sunny, cold (Weather) | 42.202802 (Latitude) | -71.049873 (Longitude:)

1. Land Use: manufacturing building and parking lot (e.g., woodland, agricultural field, vacant lot, etc.) | none (Vegetation) | large boulders and ledge (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 2 (Slope (%))

Description of Location: parking lot, rear of building

2. Soil Parent Material: ledge and stone outcropping | shoulder, summit (Landform) | SH (Position on Landscape (SU, SH, BS, FS, TS))

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Wetlands >100 feet
Property Line >50 feet | Drinking Water Well _____ feet | Other _____ feet

4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☐ Disturbed Soil ☒ Fill Material ☐ Weathered/Fractured Rock ☒ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: _____ Depth Weeping from Pit _____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-16		fill					10	5			
16-40	C1	ledge	2.5YR 6/4					80	BLOCKY	RIGID	BEDROCK, CANNOT PENETRATE

Additional Notes:
REFUSAL AT 40"

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

	Obs. Hole # 1	Obs. Hole # 2
☐ Depth observed standing water in observation hole	_____ inches	_____ inches
☒ Depth weeping from side of observation hole	52 inches	_____ inches
☐ Depth to soil redoximorphic features (mottles)	_____ inches	_____ inches
☐ Depth to adjusted seasonal high groundwater (S_h) (USGS methodology)	_____ inches	_____ inches

_____ Index Well Number

_____ Reading Date

$S_h = S_c – [S_r \times (OW_c – OW_{max})/OW_r]$

Obs. Hole/Well# _____ S_c _____ S_r _____ OW_c _____ OW_{max} _____ OW_r _____ S_h _____

2. Estimated Depth to High Groundwater: _____ inches

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

☐ Yes ☐ No

b. If yes, at what depth was it observed (exclude A and O Horizons)? Upper boundary: _____ inches Lower boundary: _____ inches

c. If no, at what depth was impervious material observed? Upper boundary: _____ inches Lower boundary: _____ inches

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator	12/22/23 Date
Erik Schoumaker / SE14264 Typed or Printed Name of Soil Evaluator / License #	6/30/24 Expiration Date of License
Name of Approving Authority Witness	Approving Authority

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Field Diagrams: Use this area for field diagrams:

A P P E N D I X F

Best Management Practices
Operation and Maintenance Plans

CONSTRUCTION PHASE POLLUTION PREVENTION AND EROSION AND SEDIMENTATION CONTROL PLAN (BEST MANAGEMENT PRACTICES OPERATION AND MAINTENANCE PLAN)

for

Site Development Plan
300 Pond Street

In

Randolph, Massachusetts
(Assessor's Parcel Number 3-O-2.1)

Submitted to:

TOWN OF RANDOLPH

Prepared for:

Emerson – Swan Flexcon
300 Pond Street, Randolph, MA 02368

Prepared by:

MCKENZIE ENGINEERING GROUP
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April 26, 2024

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Construction Phase Best Management Practices (BMP's)

Erosion and Sedimentation will be controlled at the site by utilizing Structural Practices, Stabilization Practices, and Dust Control. These practices correspond with plans entitled "Site Development Plan, (Assessor's Parcel Number 3-O-2.1), 300 Pond Street, Randolph, Massachusetts", issued June 11, 2024 and as revised hereinafter referred to as the Site Plans.

Responsible Party Contact Information:

Stormwater Management System Owner:
Emerson – Swan Flexcon
300 Pond Street
Randolph, MA 02368
Phone: (339) 793-3196

Town of Randolph Contact Information:

Randolph Department of Public Works
Paul Scott
41 South Main Street
Randolph, MA 02368
Phone: (781) 961-0940

Randolph Conservation Commission
Joe Dunn
41 South Main Street
Randolph, MA 02368
Phone: (781) 961-1519

Randolph Building Department
Ronald Lum
41 South Main Street
Randolph, MA 02368
Phone: (781) 961-0980

Structural Practices:

1) **Compost Filter Tube Barrier Controls** – A compost filter tube barrier will be constructed along downward slopes at the limit of work in locations shown on the plans. This control will be installed prior to major soil disturbance on the site. The sediment silt sack barrier should be installed as shown on the Construction Detail Plan.

   Compost Filter Tube Design/Installation Requirements *

   a) Locate the compost filter tube where identified on the plans.

   b) The compost filter tube line should be nearly level through most of its length to impound a broad, temporary pool. The last 10 to 20 feet at each end of the silt sack should be swung slightly uphill (approximately 0.5 feet in elevation) to provide storage capacity.

c) The compost filter tube shall be staked every 8 linear feet with 1-inch by 1-inch stakes.

d) Compost filter tubes should be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized through one growing season. Retained sediment must be removed and properly disposed of, or mulched and seeded.

Compost Filter Tube Inspection/Maintenance *

a) Compost filter tubes should be inspected immediately after each rainfall event of 1-inch or greater, and at least daily during prolonged rainfall. Inspect the depth of sediment, fabric tears, and to see that the fence posts are firmly in the ground. Repair or replace as necessary.

b) Remove sediment deposits promptly after storm events to provide adequate storage volume for the next rain and to reduce pressure on the fence. Sediment will be removed from behind the sediment fence when it becomes about ½ foot deep at the compost filter tube. Take care to avoid undermining fence during cleanout.

c) If the fabric tears, decomposes, or in any way becomes ineffective, replace it immediately.

d) Remove all compost filter tube materials after the contributing drainage area has been properly stabilized. Sediment deposits remaining after the fabric has been removed should be graded to conform with the existing topography and vegetated.

2) **Sediment Fence Controls** – A sediment fence will be constructed along the limit of work as needed to prevent the spreading of fine sediments from the site. This control will be installed prior to major soil disturbance on the site. The sediment fence should be installed as shown on the Erosion Control Detail Plan and be Amoco woven polypropylene 1198 or equivalent.

Sediment Fence Design/Installation Requirements *

e) Locate the fence upland of the hay bale barriers and where identified on the plans.

f) The fence line should be nearly level through most of its length to impound a broad, temporary pool. The last 10 to 20 feet at each end of the fence should be swung slightly uphill (approximately 0.5 feet in elevation) to provide storage capacity.

g) Excavate a trench approximately 8 inches deep and 4 inches wide, or a V-trench; along the line of the fence, upslope side.

h) Fasten support wire fence (14 gauge with 6-inch mesh) securely to the upslope side of the fence posts with wire ties or staples. Wire should extend 6 inches into the trench.

i) Attach continuous length of fabric to upslope side of fence posts. Avoid joints, particularly at low points in the fence line. Where joints are necessary, fasten fabric securely to support posts and overlap to the next post.

j) Place the bottom one foot of fabric in the trench. Backfill with compacted earth or gravel.

k) Filter cloth shall be fastened securely to the woven wire fence with ties spaced every 24 inches at the top, mid-section, and bottom.

l) Sediment fences should be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized through one growing season and only following approval by the Engineering Department or their representative. Retained sediment must be removed and properly disposed of, or mulched and seeded.

Sediment Fence Inspection/Maintenance *

e) Silt fences should be inspected immediately after each rainfall event of 1-inch or greater, and at least daily during prolonged rainfall. Inspect the depth of sediment, fabric tears, if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground. Repair or replace as necessary.

f) Remove sediment deposits promptly after storm events to provide adequate storage volume for the next rain and to reduce pressure on the fence. Sediment will be removed from behind the sediment fence when it becomes about ½ foot deep at the fence. Take care to avoid undermining fence during cleanout.

g) If the fabric tears, decomposes, or in any way becomes ineffective, replace it immediately.

h) Remove all fencing materials after the contributing drainage area has been properly stabilized. Sediment deposits remaining after the fabric has been removed should be graded to conform to the existing topography and vegetation.

3) **Stabilized Construction Entrance** – A stabilized construction entrance will be placed at the proposed entrance at Pond Street. The construction entrance will keep mud and sediment from being tracked off the construction site onto Pond Street by vehicles leaving the site. The stabilized construction entrance will be installed immediately after the clear and grubbing of the roadway entrance and associated roadway fill to maintain access to the site are completed. The stormwater runoff from the entrance will be diverted to a temporary sedimentation basin.

Construction Entrance Design/Construction Requirements *

a) Grade foundation for positive drainage towards the temporary sedimentation basin.

b) Stone for a stabilized construction entrance shall consist of 1 to 3-inch stone placed on a stable foundation.

c) Pad dimensions: The minimum length of the gravel pad should be 50 feet. The pad should extend the full width of the proposed roadway, or wide enough so that the largest construction vehicle will fit in the entrance with room to spare; whichever is greater.

d) A geotextile filter fabric shall be placed between the stone fill and the earth surface below the pad to reduce the migration of soil particles from the underlying soil into the stone and vice versa. The filter fabric should be Amoco woven polypropylene 1198 or equivalent.

e) Washing: If the site conditions are such that the majority of mud is not removed from the vehicle tires by the gravel pad, then the tires should be washed before the vehicle enters the street. The wash area shall be located at the stabilized construction entrance.

f) Water employed in the washing process shall be directed to the temporary sedimentation basin/dewatering area as shown on the plans prior to discharge. Sediment should be prevented from entering any watercourses.

Construction Entrance Inspection/Maintenance *

a) The entrance should be maintained in a condition that will prevent tracking or flowing of sediment onto Pond Street. This may require periodic topdressing with additional stone.

b) The construction entrance and sediment disposal area shall be inspected weekly and after heavy rains or heavy use.

c) Mud and sediment tracked or washed onto public road shall be immediately removed by sweeping.

d) Once mud and soil particles clog the voids in the gravel and the effectiveness of the gravel pad is no longer satisfactory, the pad must be topdressed with new stone. Replacement of the entire pad may be necessary when the pad becomes completely clogged.

e) If washing facilities are used, the temporary sedimentation basin/dewatering area should be cleaned out as often as necessary to assure that adequate trapping efficiency and storage volume is available. Any water pumped from the temporary sedimentation basin shall be directed into a sediment dirt bag or equivalent inlet protection prior to discharge. Discharge should not be across the disturbed construction site but rather to undisturbed areas.

f) The pad shall be reshaped as needed for drainage and runoff control.

g) Broken road pavement on Pond Street shall be repaired immediately.

h) All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization is achieved or after the temporary practices are no longer needed and only following approval by the Public Works Department or their representative. Trapped sediment shall be removed or stabilized on site. Disturbed soil areas resulting from removal shall be permanently stabilized.

Stabilization Practices:

Stabilization measures shall be implemented as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased, with the following exceptions.

- Where the initiation of stabilization measures by the 14th day after construction activity temporary or permanently cease is precluded by snow cover, stabilization measures shall be initiated as soon as practicable.

- Where construction activity will resume on a portion of the site within 21 days from when activities ceased, (e.g. the total time period that construction activity is temporarily ceased is less than 21 days) then stabilization measures do not have to be initiated on that portion of the site by the 14th day after construction activity temporarily ceased.

- The contractor shall provide erosion control measures around all soil stockpiles.

1) **Temporary Seeding** – Temporary seeding will allow a short-term vegetative cover on disturbed site areas that may be in danger of erosion. Temporary seeding will be done at stock piles and disturbed portions of the site where construction activity will temporarily cease for at least 21 days. The temporary seedings will stabilize cleared and unvegetated areas that will not be brought into final grade for several weeks or months.

Temporary Seeding Planting Procedures *

a) Planting should preferably be done between April 1st and June 30th, and September 1st through September 31st. If planting is done in the months of July and August, irrigation may be required. If planting is done between October 1st and March 31st, mulching should be applied immediately after planting. If seeding is done during the summer months, irrigation of some sort will probably be necessary.

b) Before seeding, install structural practice controls. Utilize Amoco supergro or equivalent.

c) Select the appropriate seed species for temporary cover from the following table.

Species	Seeding Rate (lbs/1,000 sq.ft.)	Seeding Rate (lbs/acre)	Recommended Seeding Dates	Seed Cover required

Annual Ryegrass	1	40	April 1st to June 1st August 15th to Sept. 15th	¼ inch
Foxtail Millet	0.7	30	May 1st to June 30th	½ to ¾ inch
Oats	2	80	April 1st to July 1st August 15th to Sept. 15th	1 to 1-½ inch
Winter Rye	3	120	August 15th to Oct. 15th	1 to 1-½ inch

Apply the seed uniformly by hydroseeding, broadcasting, or by hand.

d) Use effective mulch tacked and/or tied with netting to protect seedbed and encourage plant growth.

Temporary Seeding Inspection/Maintenance *

a) Inspect within 6 weeks of planting to see if stands are adequate. Check for damage within 24 hours of the end to a heavy rainfall, defined as a 2-year storm event (i.e., 3.2 inches of rainfall within a twenty-four hour period). Stands should be uniform and dense. Reseed and mulch damaged and sparse areas immediately. Tack or tie down mulch as necessary.

b) Seeds should be supplied with adequate moisture. Furnish water as needed, especially in abnormally hot or dry weather. Water application rates should be controlled to prevent runoff.

2) **Geotextiles** - Geotextiles such as jute netting will be used in combination with other practices such as mulching to stabilize slopes. The following geotextile materials or equivalent are to be utilized for structural and nonstructural controls as shown in the following table.

Practice	Manufacturer	Product	Remarks
Sediment Fence	Amoco	Woven polypropylene 1198 or equivalent	0.425 mm opening
Construction Entrance	Amoco	Woven polypropylene 2002 or equivalent	0.300 mm opening
Outlet Protection	Amoco	Nonwoven polypropylene 4551 or equivalent	0.150 mm opening
Erosion Control (slope stability)	Amoco	Supergro or equivalent	Erosion control revegetation mix, open polypropylene fiber on degradable polypropylene net scrim

Amoco may be reached at (800) 445-7732

Geotextile Installation

a) Netting and matting require firm, continuous contact between the materials and the soil. If there is no contact, the material will not hold the soil and erosion will occur underneath the material.

Geotextile Inspection/Maintenance *

a) In the field, regular inspections should be made to check for cracks, tears, or breaches in the fabric. The appropriate repairs should be made.

3) **Mulching and Netting** – Mulching will provide immediate protection to exposed soils during the period of short construction delays, or over winter months through the application of plant residues, or other suitable materials, to exposed soil areas. In areas, which have been seeded either for temporary or permanent cover, mulching should immediately follow seeding. On steep slopes, mulch must be supplemented with netting.

Mulch Maintenance *

a) Inspect after rainstorms to check for movement of mulch or erosion. If washout, breakage, or erosion occurs, repair surface, reseed, remulch, and install new netting.

b) Grass mulches that blow or wash away should be repaired promptly.

c) If plastic netting is used to anchor mulch, care should be taken during initial mowings to keep the mower height high. Otherwise, the netting can wrap up on the mower blade shafts. After a period of time, the netting degrades and becomes less of a problem.

d) Continue inspections until vegetation is well established.

4) **Land Grading** – Grading on fill slopes, cut slopes, and stockpile areas will be done with full siltation controls in place.

Land Grading Design/Installation Requirements

a) Areas to be graded should be cleared and grubbed of all timber, logs, brush, rubbish, and vegetated matter that will interfere with the grading operation. Topsoil should be stripped and stockpiled for use on critical disturbed areas for establishment of vegetation. Cut slopes to be topsoiled should be thoroughly scarified to a minimum depth of 3-inches prior to placement of topsoil.

b) Fill materials should be generally free of brush, rubbish, rocks, and stumps. Frozen materials or soft and easily compressible materials should not be used in fills intended to support buildings, parking lots, roads, conduits, or other structures.

c) Earth fill intended to support structural measures should be compacted to a minimum of 90 percent of Standard Proctor Test density with proper moisture control, or as otherwise specified by the engineer responsible for the design. Compaction of other fills should be to the density required to control sloughing, erosion or excessive moisture content. Maximum thickness of fill layers prior to compaction should not exceed 9 inches.

d) The uppermost one foot of fill slopes should be compacted to at least 85 percent of the maximum unit weight (based on the modified AASHTO compaction test). This is usually accomplished by running heavy equipment over the fill.

e) Fill should consist of material from borrow areas and excess cut will be stockpiled in areas shown on the Site Plans. All disturbed areas should be free draining, left with a neat and finished appearance, and should be protected from erosion.

f) Infiltration basins shall be excavated, graded and shaped to subgrade elevation and shall then be suitably protected with installation of erosion control measures to prevent sediment-laden runoff from washing into the basins. The basins shall also be protected from heavy equipment activity from this point forward. Prior to application of loam and seed to infiltration basin surfaces, the contractor shall remove any unsuitable soil such as silt or clay that may have been deposited during construction. The surface shall be scarified with a York rake or other small tractor mounted equipment. The loam and seed shall then be applied as required by this document.

Land Grading Stabilization Inspection/Maintenance *

a) All slopes should be checked periodically to see that vegetation is in good condition. Any rills or damage from erosion and animal burrowing should be repaired immediately to avoid further damage.

b) If seeps develop on the slopes, the area should be evaluated to determine if the seep will cause an unstable condition. Subsurface drains or a gravel mulch may be required to solve seep problems. However, no seeps are anticipated.

c) Areas requiring revegetation should be repaired immediately. Control undesirable vegetation such as weeds and woody growth to avoid bank stability problems in the future.

5) **Topsoiling *** – Topsoiling will help establish vegetation on all disturbed areas throughout the site during the seeding process. The soil texture of the topsoil to be used will be a sandy loam to a silt loam texture with 15% to 20% organic content.

Topsoiling Placement

a) Topsoil should not be placed while in a frozen or muddy condition, when the subgrade is excessively wet, or when conditions exist that may otherwise be detrimental to proper grading or proposed seeding.

b) Do not place topsoil on slopes steeper than 2.5:1, as it will tend to erode.

c) If topsoil and subsoil are not properly bonded, water will not infiltrate the soil profile evenly and it will be difficult to establish vegetation. The best method is to actually work the topsoil into the layer below for a depth of at least 6 inches.

6) **Permanent Seeding** – Permanent Seeding should be done immediately after the final design grades are achieved. Native species of plants should be used to establish perennial vegetative cover on disturbed areas. The revegetation should be

done early enough in the fall so that a good cover is established before cold weather comes and growth stops until the spring. A good cover is defined as vegetation covering 75 percent or more of the ground surface.

Permanent Seeding Seedbed Preparation

a) In infertile or coarse-textured subsoil, it is best to stockpile topsoil and re-spread it over the finished slope at a minimum 2 to 6-inch depth and roll it to provide a firm seedbed. The topsoil must have a sandy loam to silt loam texture with 15% to 20% organic content. If construction fill operations have left soil exposed with a loose, rough, or irregular surface, smooth with blade and roll.

b) Loosen the soil to a depth of 3-5 inches with suitable agricultural or construction equipment.

c) Areas not to receive topsoil shall be treated to firm the seedbed after incorporation of the lime and fertilizer so that it is depressed no more than ½ - 1 inch when stepped on with a shoe. Areas to receive topsoil shall not be firmed until after topsoiling and lime and fertilizer is applied and incorporated, at which time it shall be treated to firm the seedbed as described above.

Permanent Seeding Grass Selection/Application

a) Select an appropriate cool or warm season grass based on site conditions and seeding date. Apply the seed uniformly by hydro-seeding, broadcasting, or by hand. Uniform seed distribution is essential. On steep slopes, hydroseeding may be the most effective seeding method. Surface roughening is particularly important when preparing slopes for hydroseeding.

b) Lime and fertilize. Organic fertilizer shall be utilized in areas within the 100 foot buffer zone to a wetland resource area.

c) Mulch the seedings. Anchor the mulch with erosion control netting or fabric on sloping areas. Amoco supergro or equivalent should be utilized.

Permanent Seeding Inspection/Maintenance *

a) Frequently inspect seeded areas for failure and make necessary repairs and reseed immediately. Conduct or follow-up survey after one year and replace failed plants where necessary.

b) If vegetative cover is inadequate to prevent rill erosion, overseed and fertilize in accordance with soil test results.

c) If a stand has less than 40% cover, reevaluate choice of plant materials and quantities of lime and fertilizer. Re-establish the stand following seedbed preparation and seeding recommendations, omitting lime and fertilizer in the absence of soil test results. If the season prevents resowing, mulch or jute netting is an effective temporary cover.

d) Seeded areas should be fertilized during the second growing season. Lime and fertilize thereafter at periodic intervals, as needed.

Fueling and Maintenance of Equipment and Vehicles:

1. Refueling/maintenance Rules – The site supervisor shall produce a written document received by all subcontractors and employees that delineates their responsibilities on site. This document shall include language that shall permit the maintenance of vehicles only in designated locations on the job site. In the event of mechanical failure of a vehicle, the vehicle shall be moved to the designated maintenance area on the site to perform maintenance. The site supervisor shall document receipt of these instructions by obtaining the signatures of subcontractors and individuals that may enter the site and the date in which they were notified of their responsibilities. Refueling for vehicles or equipment shall occur either within the designated washout area or shall utilize temporary drip protection measures at the location of fueling. The site supervisor or their representative shall be present at the time of any fueling procedure. The site supervisor shall have a fuel spill plan and measures on site to initiate containment and clean-up in the event a fuel spill occurs.

2. Installation Schedule: Prior to start of Work

3. Maintenance and Inspection: The site supervisor shall maintain a log of individuals receiving these instructions.

4. Specific Pollution Prevention Practices

   Pollution Prevention Practice # 1

   a. Description: Fueling operations shall take place in designated area(s) as shown on site maps. Provide temporary drip protection during fueling operations which take place outside of designated area(s). Materials necessary to address a spill shall be made readily available in a location known to the site supervisor or his/her designee.

   b. Installation: Fueling operation procedures shall be in effect throughout the project duration.

   c. Maintenance Requirements: All emergency response equipment listed in the Emergency Response Equipment Inventory shall be made readily available and kept in a designated location known to the site supervisor or his/her designee. All such materials shall be replenished as necessary to the listed amounts.

Dust Control:

Dust control will be utilized throughout the entire construction process of the site. For example, keeping disturbed surfaces moist during windy periods will be an effective control measure, especially for construction access roads. The use of dust control will prevent the movement of soil to offsite areas. However, care must be taken to not

create runoff from excessive use of water to control dust. The following are methods of Dust Control that may be used on-site:

- Vegetative Cover – The most practical method for disturbed areas not subject to traffic.
- Calcium Chloride – Calcium chloride may be applied by mechanical spreader as loose, dry granules or flakes at a rate that keeps the surface moist but not so high as to cause water pollution or plant damage.
- Sprinkling – The site may be sprinkled until the surface is wet. Sprinkling will be effective for dust control on haul roads and other traffic routes.
- Stone – Stone will be used to stabilize construction roads; will also be effective for dust control.

The general contractor shall employ an on-site water vehicle for the control of dust as necessary.

Non-Stormwater Discharges:

The construction de-watering and all non-stormwater discharges will be directed into a sediment dirt bag (or equivalent inlet protection) or a sediment basin. Sediment material removed shall be disposed of in accordance with all applicable local, state, and federal regulations.

The developer and site general contractor will comply with the E.P.A.'s Final General Permit for Construction De-watering Discharges, (N.P.D.E.S., Section 402 and 40 C.F.R. 122.26(b)(14)(x).

Soil Stockpiling:

Topsoil and subsoil from the driveway grading will be stockpiled in locations shown on the plans.

Stockpile Material Construction Procedure

1) Topsoil and subsoil that are stripped will be stockpiled for later distribution on disturbed areas.
2) The stockpiles will be located as shown on the plans. These locations will allow them to not interfere with work on the site.
3) Seed the stockpiles with a temporary erosion control mix if the stockpile is to remain undisturbed for more than 30 days. The stockpiles must be stable and the side slopes should not exceed 2:1.
4) Sediment Fence/Hay Bale Barrier erosion control measures should be placed surrounding each stockpile.
5) As needed, the stockpiled topsoil and subsoil are redistributed throughout the site.

Anticipated Construction Schedule:

To prevent excessive erosion and silting, the following construction sequence coupled with other widely accepted principals for reducing erosion and sedimentation shall be implemented in the development of the site.

1. Obtain all plan approvals and other applicable permits.
2. Flag the work limits and mark trees and buffer areas for protection.
3. Hold a pre-construction meeting prior to any construction activity.
4. Install stabilization practices for erosion and sediment control prior to commencing construction activities. Refer to "Erosion and Sedimentation Control Plan" and place siltation fence and haybale barriers at locations indicated on the site plans.
5. Clear and grub up as required for the construction of the addition and related infrastructure.
6. Construct stabilized construction entrance.
7. Excavate topsoil and subsoil from cut and fill areas and stockpile on site in locations shown on the plan. consideration should be given to locating stockpiles on the uphill side of disturbed areas, where possible, to act as temporary diversions.
8. Construct cut and fill areas, installing haybale check dams at toes of all 3:1 or greater slopes, and at ends of all cut areas. All fill will be installed using 12" maximum compaction lifts. Place all slope protection where indicated on the plan. the stormwater extended detention basin shall be constructed immediately after the addition rough grading is completed and the area has been cleared of vegetation.
9. Install closed drainage system and other utilities. All catch basins shall be covered with siltsack or equivalent inlet protection.
10. Grade parking area to subgrade elevation and construct side slopes. Apply temporary stabilization measures where warranted. Refer to "Erosion and Sedimentation Control Plan".
11. Place gravel subbase.
12. Place the bituminous concrete binder course on parking lot.
13. Grade slopes and stabilize cut areas at toe of slopes. blend all slopes into existing topography and loam and seed all disturbed areas. slopes greater than 3:1 shall be stabilized with jute mesh.
14. Place the final wearing course of pavement.
15. Complete fine grading of shoulders and place pavement in miscellaneous areas.
16. Remove temporary erosion control devices once adequate growth is established. adequate growth is defined as vegetation covering 75% or more of the ground surface.

Inspection/Maintenance:

Operator personnel must inspect the construction site at least once every 14 calendar days and within 24 hours of a storm event of ½-inch or greater. The applicant shall be responsible to secure the services of a design professional or similar professional (inspector) on an on-going basis throughout all phases of the project. Refer to the

Inspection/Maintenance Requirements presented earlier in the “Structural and Stabilization Practices.” The inspector should review the erosion and sediment controls with respect to the following:

- Whether or not the measure was installed/performed correctly.
- Whether or not there has been damage to the measure since it was installed or performed.
- What should be done to correct any problems with the measure.

The inspector should complete the Stormwater Management Construction Phase BMP Inspection Schedule and Evaluation Checklist, as attached, for documenting the findings and should request the required maintenance or repair for the pollution prevention measures when the inspector finds that it is necessary for the measure to be effective. The inspector should notify the appropriate person to make the changes and submit copies of the form to the Randolph Highway Department.

Project Location: 300 Pond Street, Randolph, MA **Date:**
Stormwater Management – Construction Phase
Best Management Practices – Inspection Schedule and Evaluation Checklist

Construction Practices

Best Management Practice	Inspection Frequency	Date Inspected	Inspector	Minimum Maintenance and Key Items to Check	Cleaning/Repair Needed: (List Items)	Date of Cleaning/ Repair	Performed by
Silt Sock and Sediment Fence Controls	After heavy rainfall events (minimum weekly)			1. Sediment Fence Design/Installation Requirements 2. Sediment Fence Inspection/Maintenance	☐yes ☐no		
Stabilized Construction Entrance	After heavy rainfall events (minimum weekly)			1. Construction Entrance Design/ Construction Requirements 2. Construction Entrance Inspection/ Maintenance	☐yes ☐no		
Temporary Sedimentation Basins	After heavy rainfall events (minimum weekly)			1. Sediment Basin Inspection/ Maintenance	☐yes ☐no		
Temporary Seeding	After heavy rainfall events (minimum weekly)			1. Temporary Seeding Planting Procedures 2. Temporary Seeding Inspection/ Maintenance	☐yes ☐no		
Geotextiles	After heavy rainfall events (minimum weekly)			1. Geotextile Inspection/Maintenance	☐yes ☐no		
Mulching & Netting	After heavy rainfall events (minimum weekly)			1. Mulch Maintenance	☐yes ☐no		
Land Grading	After heavy rainfall events (minimum weekly)			1. Land Grading Stabilization Inspection/ Maintenance	☐yes ☐no		

Permanent Seeding	After heavy rainfall events (minimum weekly)			1. Permanent Seeding Inspection/ Maintenance	☐**yes** ☐**no**		
Dust Control	After heavy rainfall events (minimum weekly)				☐**yes** ☐**no**		
Soil Stockpiling	After heavy rainfall events (minimum weekly)				☐**yes** ☐**no**		

(1) Refer to the Massachusetts Stormwater Handbook issued January 2, 2008.

Notes (Include deviations from : Definitive Subdivision Decision and Special Conditions and Approved Plan):

Stormwater Control Manager _____

Spill Containment and Management Plan

December 20, 2023

Initial Notification

In the event of a spill, the facility manager will be notified immediately.

Facility Managers (name) Anthony Palaza
Emerson – Swan Flexcon
Facility Manager (phone) 339-793-3196

Assessment - Initial Containment

The supervisor will assess the incident and initiate containment control measures with the appropriate spill containment equipment included in the spill kit kept on-site. The supervisor will first contact the Fire Department and then notify the Police Department, Department of Public Works, Board of Health and Conservation Commission. The fire department is ultimately responsible for matters of public health and safety and should be notified immediately.

Contact:	Phone Number:
Fire Department:	911
Police Department:	911
Department of Public Works:	(781) 961-0940
Board of Health Phone:	(781) 961-0924
Conservation Commission Phone:	(781) 961-1519

Further Notification

Based on the assessment from the Fire Chief, additional notification to a cleanup contractor may be made. The Massachusetts Department of Environmental Protection (DEP) and the EPA may be notified depending upon the nature and severity of the spill. The Fire Chief will be responsible for determining the level of cleanup and notification required. The attached list of emergency phone numbers shall be posted in the facility office and readily accessible to all employees.

HAZARDOUS WASTE / OIL SPILL REPORT

Date____/_____/_____ Time_____ AM / PM

Exact location (Transformer #)_____

Type of equipment_____Make_____Size_____

S / N_____Weather Conditions_____

On or near water ☐ Yes If yes, name of body of water_____
☐ No

Type of chemical / oil spilled_____

Amount of chemical / oil spilled_____

Cause of spill_____

_____

_____

Measures taken to contain or clean up spill_____

_____

_____

Amount of chemical / oil recovered_____Method_____

Material collected as a result of clean up

_____drums containing_____

_____drums containing_____

_____drums containing_____

Location and method of debris disposal_____

_____

Name and address of any person, firm, or corporation suffering damages_____

_____

Procedures, method, and precautions instituted to prevent a similar occurrence from recurring____

_____

Spill reported to General Office by_____Time_____AM / PM

Spill reported to DEP / National Response Center by_____

DEP Date____/_____/_____ Time_____ AM / PM Inspector_____

NRC Date____/_____/_____ Time_____ AM / PM Inspector_____

Additional comments_____

_____

_____

EMERGENCY RESPONSE EQUIPMENT
INVENTORY

The following equipment and materials shall be maintained at all times and stored in a secure area for long-term emergency response need.

--	SORBENT PADS	1 BALE
--	SAND BAGS (empty)	5
--	SPEEDI-DRI ABSORBENT	2 – 40LB BAGS
--	12” INFLATABLE PIPE PLUG	1
--	SQUARE END SHOVELS	1
--	PRY BAR	1
--	CATCH BASIN COVER	1

EMERGENCY NOTIFICATION PHONE NUMBERS

1. FACILITY MANAGER
   NAME: Anthony Palaza ____ BEEPER: _____
   PHONE: 339-793-3196 _____ CELL PHONE: _____

   ALTERNATE:
   NAME: _____ BEEPER: N/A _____
   PHONE: 781-986-2424 _____ CEL PHONE: N/A _____

2. FIRE DEPARTMENT
   EMERGENCY: 911
   BUSINESS: (781) 963-3131

   POLICE DEPARTMENT
   EMERGENCY: 911
   BUSINESS: (781) 963-1212

   DEPARTMENT OF PUBLIC WORKS
   CONTACT: Paul Scott
   BUSINESS: (781) 961-0940
   ALTERNATE:

   CONSERVATION COMMISSION
   CONTACT: Joe Dunn
   BUSINESS: (781) 961-1519

   BOARD OF HEALTH
   CONTACT: Gerard Cody
   BUSINESS: (781) 961-0924

3. MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
   EMERGENCY: (978) 694-3200
   SOUTHEAST REGION - LAKEVILLE OFFICE: (508) 946-2700

4. NATIONAL RESPONSE CENTER
   PHONE: (800) 424-8802

   ALTERNATE: U.S. ENVIRONMENTAL PROTECTION AGENCY
   EMERGENCY: (617) 223-7265
   BUSINESS: (617) 860-4300

POST-DEVELOPMENT BEST MANAGEMENT PRACTICE
OPERATION AND MAINTENANCE PLAN & LONG-TERM POLLUTION PREVENTION PLAN

for

Site Development Plan
(Assessor's Parcel Number 3-O-2.1)
300 Pond Street
Randolph, Massachusetts

Submitted to:

TOWN OF RANDOLPH

Prepared for:

Emerson – Swan Flexcon
300 Pond Street, Randolph, MA 02368

Prepared by:

MCKENZIE ENGINEERING GROUP
Professional Civil Engineering • Project Management • Land Planning
150 Longwater Drive, Suite 101, Norwell, Massachusetts 02061
Tel.: (781) 792-3900 Facsimile: (781) 792-0333
www.mckeng.com

April 26, 2024

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Post-Development Best Management Practice Operation and Maintenance Plan & Long-Term Pollution Prevention Plan

Post-Development Best Management Practices (BMPs) Operation and Maintenance Plan

Responsible Party/Property Owner/Developer contact information:

Property Owner: Emerson – Swan Flexcon
300 Pond Street
Randolph, MA 02368
Phone: (339) 793-3196

Developer Contact Information:

Emerson – Swan Flexcon
Anthony Palaza, Manager
300 Pond Street
Randolph, MA 02368
Phone: (339) 793-3196

Best Management Practices (BMPs) of the Commonwealth of Massachusetts Department of Environmental Protection's (DEP's) Stormwater Management Policy (SMP) have been implemented and utilized for the project. The following information provided is to be used as a guideline for monitoring and maintaining the performance of the drainage facilities and to ensure that the quality of water runoff meets the standards set forth by the SMP. The structural Best Management Practices (BMPs) shall be inspected during rainfall conditions during the first year of operation to verify functionality.

BMPs included in the design consist of the use of:

- Paved areas maintenance
- Subsurface detention system
- Restrictions on the use of pesticides and herbicides within the 100-foot buffer zone
- Snow removal
- Drainage weir manhole
- Bioretention Area/Rain garden

Operation:

Once the stormwater management systems and roof leaders have been constructed, the operation of the stormwater management system will function as intended. Clean stormwater runoff from the proposed building addition will be conveyed to the subsurface detention system and the bioretention area. The stormwater management systems have been designed to attenuate peak flows for the 2-year through 100-year storm events.

Maintenance:

1. **Paved Areas** –Sweepers shall sweep paved areas periodically during dry weather to remove excess sediments and to reduce the amount of sediments that the drainage

system shall have to remove from the runoff. The sweeping shall be conducted primarily between March 15th and November 15th. Special attention should be made to sweeping paved surfaces in March and April before spring rains wash residual sand into the drainage system.

The frequency of sweeping shall average:

- Monthly if by a high-efficiency vacuum sweeper
- Bi-weekly if by a regenerative air sweeper
- Weekly if by a mechanical sweeper

Salt used for de-icing on the parking lot during winter months shall be limited as much as possible as this will reduce the need for removal and treatment. Sand containing the minimum amount of calcium chloride (or approved equivalent) needed for handling may be applied as part of the routine winter maintenance activities.

Cost: The property owner should consult local sweeping contractors for detailed cost estimates.

2. **Subsurface Detention System** – Proper maintenance of the subsurface detention system is essential to the long-term effectiveness. The subsurface detention system shall have inspection ports and additional inspections should be scheduled during the first few months to ensure proper stabilization and function. Thereafter, they shall be checked semiannually and following heavy rainfalls, defined as a 1-year storm event exceeding 2.5 inches of rainfall within a twenty-four-hour period. Water levels in the chambers shall be checked to verify proper drainage. If water remains within the chambers after 48-hours following a storm event, steps to restore the outlet function shall be taken, as directed by a qualified stormwater management professional. Sediment and material removed from the system shall be disposed of in accordance with all applicable local, state, and federal regulations. Please refer to the Manufacturer's Manual for additional detail on proper inspection and maintenance of the subsurface detention system.

   Cost: The property owner should consult local landscape contractors for a detailed cost estimate.

3. **Pesticides, Herbicides, and Fertilizers -** Pesticides and herbicides shall be used sparingly. Fertilizers should be restricted to the use of organic fertilizers only.

   All structural BMP's as identified on the site plans will be owned and maintained by the property owner of the development and shall run with the title of the property.

   Cost: Included in the routine landscaping maintenance schedule. The Owner should consult local landscaping contractors for details.

4. **Snow Removal -** Snow accumulations removed from driveway and parking areas should be placed in upland areas only, where sand and other debris will remain after snowmelt for later removal. Excess snow should be removed from the site and properly disposed of in an approved snow disposal facility. Care must be exercised not to deposit snow in the following areas: in the rain gardens, bioswales, and where sand and debris can get into the watercourse.

   Cost: The owner should consult local snow removal contractors for a detailed cost estimate.

5. **Bioretention Area/Rain Garden** –Proper maintenance of the bioretention area is essential to the long-term effectiveness of the infiltration function. The rain garden shall be inspected monthly and additional inspections should be scheduled during the first few months to ensure proper stabilization and function. Thereafter, they shall be checked semiannually and following heavy rainfalls. Water levels in the bioretention area shall be checked to verify proper drainage. Ponding water in the bioretention area indicates failure from the bottom. If water remains within the bioretention area after 48-hours following a storm event, steps to restore the infiltration function shall be taken, as directed by a qualified stormwater management professional. In order to rectify the problem, accumulated sediment must be removed from the bottom of the bioretention area. The soil media and mulch must be removed and replaced and the underlying soil layer must be scarified to encourage proper infiltration. Material removed from the system shall be disposed of in accordance with all applicable local, state, and federal regulations. Soil media and hardwood mulch layers of the bioretention area shall be maintained annually. Maintenance shall include inspecting and replacing the hardwood mulch layer and soil media as necessary. Any accumulated debris, leaves, sediment and trash shall be removed from the hardwood mulch and soil media layers of the rain garden in order to encourage proper infiltration.

   Cost: The property owner should consult local landscape contractors for a detailed cost estimate.

6. **Outlet Protection** - All outfall protection structures shall be inspected quarterly and following major storm events defined as a storm event exceeding one inch of rainfall within a twenty-four-hour period to check for signs for erosion. Any necessary repairs shall be performed promptly and cleaned to remove accumulated sediment as necessary. Material removed shall be disposed of in accordance with all applicable local, state, and federal regulations. Rip-Rap overflow structure shall be weeded and cleaned on a quarterly basis to ensure that water overflowing the spillway will not become obstructed by debris.

7. **Drainage Weir Manhole –** Drainage weir manhole shall be checked quarterly and following heavy rainfalls to verify that the weir openings are not clogged by debris. Debris shall be removed from the structure and disposed of properly. Drainage weir manhole shall be inspected and cleaned bi-annually of all accumulated sediments. Material shall be removed from the Drainage weir manhole and disposed of in accordance with all applicable regulations.

   Cost: Estimated $50 - $100 per cleaning as needed. The property owner should consult local vacuum cleaning contractors for detailed cost estimates.

Maintenance Responsibilities:

All post construction maintenance activities will be documented and kept on file in the form of an Evaluation Checklist, see attached form.

All structural BMPs as identified on the site plans will be owned and maintained by the developer or property owner. All post construction maintenance activities shall run with the title of the property.

Long-Term Pollution Prevention Plan

Good Housekeeping:

To develop and implement an operation and maintenance program with the goal of preventing or reducing pollutant runoff by keeping potential pollutants from coming into contact with stormwater or being transported off site without treatment, the following efforts will be made:

- Property Management awareness and training on how to incorporate pollution prevention techniques into maintenance operations.
- Follow appropriate best management practices (BMPs) by proper maintenance and inspection procedures.

Storage and Disposal of Household Waste and Toxics:

This management measure involves educating the general public on the management considerations for hazardous materials. Failure to properly store hazardous materials dramatically increases the probability that they will end up in local waterways. Many people have hazardous chemicals stored throughout their homes, especially in garages and storage sheds. Practices such as covering hazardous materials or even storing them properly, can have dramatic impacts. Property owners are encouraged to support the household hazardous product collection events sponsored by the Town of Randolph.

MADEP has prepared several materials for homeowners on how to properly use and dispose of household hazardous materials:

http://www.mass.gov/dep/recycle/reduce/househol.htm

For consumer questions on household hazardous waste call the following number:

DEP Household Hazardous Waste Hotline 800-343-3420

The following is a list of management considerations for hazardous materials as outlined by the EPA:

- Ensuring sufficient aisle space to provide access for inspections and to improve the ease of material transport;
- Storing materials well away from high-traffic areas to reduce the likelihood of accidents that might cause spills or damage to drums, bags, or containers.
- Stacking containers in accordance with the manufacturers' directions to avoid damaging the container or the product itself;
- Storing containers on pallets or equivalent structures. This facilitates inspection for leaks and prevents the containers from coming into contact with wet floors, which can cause corrosion. This consideration also reduces the incidence of damage by pests.

The following is a list of commonly used hazardous materials used in the household:

Batteries – automotive and rechargeable
.....nickel cadmium batteries
.....(no alkaline batteries)
Disinfectant
Drain clog dissolvers
Driveway sealer

Gasoline
Oil-based paints
Fluorescent light bulbs and lamps
Pool chemicals
Propane tanks
Lawn chemicals,
fertilizers and weed killers
Turpentine
Bug sprays
Antifreeze
Paint thinners, strippers, varnishes and stains
Arts and crafts chemicals
Charcoal lighter fluid
Flea dips, sprays and collars
Houseplant insecticides
Metal polishes
Mothballs
Motor oil and filters
Muriatic acid (concrete cleaner)
Nail polishes and nail polish removers
Oven cleaner
Household pest and rat poisons
Rug and upholstery cleaners
Shoe polish
Windshield wiper fluid

Vehicle Washing:

This management measure involves educating the general public on the water quality impacts of the outdoor washing of automobiles and how to avoid allowing polluted runoff to enter the storm drain system. Outdoor car washing has the potential to result in high loads of nutrients, metals, and hydrocarbons during dry weather conditions in many watersheds, as the detergent-rich water used to wash the grime off our cars flows down the street and into the storm drain. The following management practices will be encouraged:

- Washing cars on gravel, grass, or other permeable surfaces.
- Blocking off the storm drain during car washing and redirecting wash water onto grass or landscaping to provide filtration.
- Using hoses with nozzles that automatically turn off when left unattended.
- Using only biodegradable soaps.
- Minimize the amounts of soap and water used. Wash cars less frequently.
- Promote use of commercial car wash services.

Landscape Maintenance:

This management measure seeks to control the storm water impacts of landscaping and lawn care practices through education and outreach on methods that reduce nutrient loadings and the amount of storm water runoff generated from lawns. Nutrient loads generated by fertilizer use on suburban lawns can be significant, and recent research has shown that lawns produce more surface runoff than previously thought.

Using proper landscaping techniques can effectively increase the value of a property while benefiting the environment. These practices can benefit the environment by reducing water use; decreasing energy use (because less water pumping and treatment is required); minimizing runoff of storm and irrigation water that transports soils, fertilizers, and pesticides; and creating additional habitat for plants and wildlife. The following lawn and landscaping management practices will be encouraged:

- Mow lawns at the highest recommended height.
- Minimize lawn size and maintain existing native vegetation.
- Collect rainwater for landscaping/gardening needs (rain barrels and cisterns to capture roof runoff).
- Raise public awareness for promoting the water efficient maintenance practices by informing users of water efficient irrigation techniques and other innovative approaches to water conservation.
- Abide by water restrictions and other conservation measures implemented by the Town of Randolph.
- Water only when necessary.
- Use automatic irrigation systems to reduce water use.

Integrated Pest Management (IPM):

This management measure seeks to limit the adverse impacts of insecticides and herbicides by providing information on alternative pest control techniques other than chemicals or explaining how to determine the correct dosages needed to manage pests.

The presence of pesticides in stormwater runoff has a direct impact on the health of aquatic organisms and can present a threat to humans through contamination of drinking water supplies. The pesticides of greatest concern are insecticides, such as diazinon and chloropyrifos, which even at very low levels can be harmful to aquatic life. The major source of pesticides to urban steams is home application of products designed to kill insects and weeds in the lawn and garden. The following IPM practices will be encouraged:

- Lawn care and landscaping management programs including appropriate pesticide use management as part of program.
- Raise public awareness by referring homeowners to "A Homeowner's Guide to Environmentally Sound Lawncare, Maintaining a Healthy Lawn the IPM Way", Massachusetts Department of Food and Agriculture, Pesticide Bureau or link **http://www.mass.gov/dep/water/resources/nonpoint.htm#megaman>**

Pet Waste Management:

Pet waste management involves using a combination of pet waste collection programs, pet awareness and education, to alert residents to the proper disposal techniques for pet droppings. The following management practices will be encouraged:

- Raise awareness of homeowners that are also pet owners that they are encouraged to pick up after their pets and dispose of the waste either in the trash, including on their own lawns and walking trails.
- Provide signage along walking trails.

Proper Management of Deicing Chemicals and Snow:

Roadways shall be maintained by the Developer/Property Owners. The following deicing chemicals and snow storage practices will be encouraged:

- Select effective snow disposal sites adjacent to or on pervious surfaces in upland areas away from water resources and wells. At these locations, the snow meltwater can filter in to the soil, leaving behind sand and debris, which can be removed in the springtime.
- No roadway deicing materials shall be stockpiled on site unless all storage areas are protected from exposure to rain, snow, snowmelt and runoff.
- Avoid dumping snow into any waterbody, including wetlands, cranberry bogs, detention/infiltration basins, and grassed swales/channels.
- Avoid disposing of snow on top of storm drain catch basins.

Project Location: 300 Pond Street, Randolph, MA

Stormwater Management – Post Construction Phase
Best Management Practices – Inspection Schedule and Evaluation Checklist

Long Term Practices

Best Management Practice	Inspection Frequency (1)	Date Inspected	Inspector	Minimum Maintenance and Key Items to Check (1)	Cleaning/Repair Needed: ☐yes ☐no (List Items)	Date of Cleaning/ Repair	Performed by
Street Sweeping Maintenance	4-times annually - specifically in Spring and Fall			1. Sediment build-up 2. Trash and debris 3. Minor Spills (vehicular)			
Subsurface Detention System	After heavy rainfall events (minimum semi-annually)			1. Sediment build-up 2. Standing water greater than 48 hours			
Outlet Protection	After heavy rainfall events (minimum quarterly)			1. Sediment build-up 2. Trash and debris 3. Displacement of rip-rap 4. Excess Vegetation			
Bioretention Area	After heavy rainfall events (minimum monthly, cleaned quarterly)			1. Sediment build-up 2. Standing water greater than 48 hours 3. Remove/replace dead vegetation 4. Trash and debris			
Drainage Weir Manhole	After heavy rainfall events (minimum quarterly)			1. Sediment levels exceed 8” 2. Trash and debris 3. Floatable oils or hydrocarbons 4. Weir or outlet blockages			

(1) Refer to the Massachusetts Stormwater Management, Volume Two: Stormwater Technical Handbook (February 2008) for recommendations regarding frequency for inspection and maintenance of specific BMP’s.

Notes (Include deviations from: Con Com Order of Conditions, PB Approval, Construction Sequence and Approved Plan):

1.

Stormwater Control Manager _____ Stamp:

Spill Containment and Management Plan

December 20, 2023

Initial Notification

In the event of a spill, the facility manager will be notified immediately.

Facility Managers (name) Anthony Palaza
Emerson – Swan Flexcon
Facility Manager (phone) 339-793-3196

Assessment - Initial Containment

The supervisor will assess the incident and initiate containment control measures with the appropriate spill containment equipment included in the spill kit kept on-site. The supervisor will first contact the Fire Department and then notify the Police Department, Department of Public Works, Board of Health and Conservation Commission. The fire department is ultimately responsible for matters of public health and safety and should be notified immediately.

Contact:	Phone Number:
Fire Department:	911
Police Department:	911
Department of Public Works:	(781) 961-0940
Board of Health Phone:	(781) 961-0924
Conservation Commission Phone:	(781) 961-1519

Further Notification

Based on the assessment from the Fire Chief, additional notification to a cleanup contractor may be made. The Massachusetts Department of Environmental Protection (DEP) and the EPA may be notified depending upon the nature and severity of the spill. The Fire Chief will be responsible for determining the level of cleanup and notification required. The attached list of emergency phone numbers shall be posted in the facility office and readily accessible to all employees.

HAZARDOUS WASTE / OIL SPILL REPORT

Date____/_____/_____ Time_____ AM / PM

Exact location (Transformer #)_____

Type of equipment_____Make_____Size_____

S / N_____Weather Conditions_____

On or near water ☐ Yes If yes, name of body of water_____
☐ No

Type of chemical / oil spilled_____

Amount of chemical / oil spilled_____

Cause of spill_____

_____

_____

Measures taken to contain or clean up spill_____

_____

_____

Amount of chemical / oil recovered_____Method_____

Material collected as a result of clean up

_____drums containing_____

_____drums containing_____

_____drums containing_____

Location and method of debris disposal_____

_____

Name and address of any person, firm, or corporation suffering damages_____

_____

Procedures, method, and precautions instituted to prevent a similar occurrence from recurring____

_____

Spill reported to General Office by_____Time_____AM / PM

Spill reported to DEP / National Response Center by_____

DEP Date____/_____/_____ Time_____ AM / PM Inspector_____

NRC Date____/_____/_____ Time_____ AM / PM Inspector_____

Additional comments_____

_____

_____

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EMERGENCY NOTIFICATION PHONE NUMBERS

1. FACILITY MANAGER
   NAME: Anthony Palaza ____ BEEPER: _____
   PHONE: 339-793-3196 _____ CELL PHONE: _____

   ALTERNATE:
   NAME: _____ BEEPER: N/A _____
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   CONTACT: Paul Scott
   BUSINESS: (781) 961-0940
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   CONTACT: Joe Dunn
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