



Proactive by Design



Conceptual Drainage Narrative Proposed Multi Family Residential Building 27 East River Street (AP 15, Lots 483) Providence, Rhode Island 02906

December 11, 2025
GZA File No.: 03.0035228.00



PREPARED FOR:

City Plan Commission
Department of Planning & Development
444 Westminister Street, Suite 3A
Providence, RI 02903-3215

ON BEHALF OF:

27 E River LLC

GZA GeoEnvironmental, Inc.

188 Valley Street Suite 300 | Providence, RI 02909
401-421-4140



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1.0 INTRODUCTION

On behalf of our client, 27 E River LLC, GZA GeoEnvironmental, Inc. has prepared this Conceptual Drainage Narrative for the proposed multi-family residential building at 27 East River Street. The proposed structure will encompass approximately 47,974 square feet of the 87,784-square-foot parcel. The existing conditions and conceptual drainage plan are shown on drawings S1-00.00 and PP-LP.03 Preliminary Approval submission Plan Set. This Conceptual Drainage Narrative discusses the conceptual stormwater management design proposed to service the proposed development. Contact information for the Site owner and design professional is listed in the following table.

	Organization	Contact Person	Address	Phone Number
<i>Applicant</i>	Providence Building and Architecture Company	Kevin Diamond	244 Weybosset Street, Providence, RI	919-886-2426
<i>Stormwater Engineer</i>	GZA GeoEnvironmental, Inc. (GZA)	Ryan DaPonte, P.E.	188 Valley Street, Suite 300 Providence, RI	401-427-2715

This Drainage Narrative is subject to the Limitations included in **Appendix A**.

2.0 PROPOSED SITE DEVELOPMENT

The parcel is located at 27 East River Street, Providence, along the Seekonk River, just south of the Henderson Bridge. On the north side is a section of East River Street and to the south is the Waterman Grille. The Blackstone River Bikeway begins just south of the parcel and continues into Massachusetts. The parcel is predominantly wooded with remnants of a building that once stood there. Historic uses of the parcel include a gasoline filling station, textile manufacturing, and jewelry manufacturing. The total lot area is 87,784 square feet and the site is currently naturally vegetated with trees and shrubs. The lot generally slopes from west to east from approximate elevation 34 to elevation 0¹ along the Seekonk River. Steep slopes are present along the riverbank.

27 E River LLC is proposing to construct a 47,974 square-foot, 9-story apartment building with parking located on the first two floors. The first floor will be below the site’s finish grade. As part of the proposed site development, a paved walking path connected to the Urban Coastal Greenway will be constructed along the waterfront.

3.0 SUMMARY OF CONCEPTUAL DRAINAGE DESIGN

GZA has performed a conceptual level drainage analysis for the proposed development in accordance with Chapter 5, Section 5-85 of the City of Providence Ordinances (stormwater ordinance).

The proposed conceptual drainage system is shown on drawing PP-LP.03 and consists of a series of four (4) subsurface infiltration fields constructed with prefabricated infiltration chambers. Stormwater runoff will be conveyed from the proposed building via roof leaders and downspouts to the proposed subsurface infiltration fields.

Runoff from the paved areas associated with the proposed Urban Coastal Greenway will be conveyed via sheet flow to vegetated dry swale located to the west of the Urban Coastal Greenway.

¹ Elevations reference the 1988 North American Vertical Datum



3.1 CONCEPTUAL HYDROLOGIC AND HYDRAULIC MODELING

GZA performed a conceptual hydrologic and hydraulic analysis (H & H) to estimate the peak storm water runoff rate and volume for the pre- and post-development site configuration. The hydrologic soil groups of the existing Site and the adjacent areas were obtained from the Natural Resources Conservation Service (NRCS). Storm events were modeled using the NRCC Type III Precipitation Distribution for the 1, 10 and 100-year storm events, with data obtained from the NRCS stormwater values.

The Site-wide conceptual hydrologic study delineated contributing drainage areas and evaluated peak stormwater runoff rates utilizing the HydroCAD 10 hydrologic modeling software, the results are discussed below. The HydroCAD 10 report for existing conditions and post-development stormwater modeling is included in **Appendix B**.

3.1.1 Pre-Development Hydrologic and Hydraulic Summary

Based on information obtained from the NRCS web soil survey, the existing soils on the Site are currently classified as HSG A. The Site is currently comprised of wooded areas in good condition; a small portion of the site is covered by a structure. Stormwater runoff generated from the property ultimately discharges to the Seekonk River.

The following table summarizes the input parameters of the pre-development watershed areas.

Table 1. Pre-Development Stormwater Modeling					
Drainage Area	Size (acres)	Weighted Cn	Tc (min.)	NRCS Soil Group	Percent Impervious
WS-1	3.015	31	14.0	A	0.99%

3.1.2 Post-Development Hydrologic and Hydraulic Summary

The post-development watershed/drainage areas were delineated according to proposed Site grading, proposed site developments, and the proposed stormwater management improvements. The pre-development drainage area perimeters and characteristics were modified accordingly to approximate post-development stormwater runoff flow patterns and surface conditions.

The primary differences between the pre- and post-development stormwater runoff conditions are:

- The modification of the cover type over the developed area as depicted on the **Plan Set** and in the HydroCAD reports in **Appendix B**.
- Construction of the stormwater management system to maintain stormwater runoff at pre-development rates and provide treatment for water quality.

The table below summarizes the input parameters of the proposed drainage areas. WS-1 includes the building area that drains to the proposed subsurface infiltration system. WS-2 includes the lawn, patio and Urban Coastal Greenway areas that drain to the proposed vegetated dray swale. WS-3 includes the undeveloped, sloped areas of the site that drain to the Seekonk River.

An infiltration rate of 8.33 inches per hour was used to model the proposed stormwater best management practices based on the soil profiles encountered in test borings GZ-2 and GZ-3.



Table 2. Post-Development Stormwater Modeling					
Drainage Area	Size (acres)	Weighted Cn	Tc (min.)	NRCS Soil Group	Percent Impervious
WS-1	1.101	98	6.0	A	100%
WS-2	0.43	61	6.0	A	37.44%
WS-3	0.485	30	6.0	A	0.00%

The following table summarizes the peak stormwater runoff discharge rates for pre- and post-development design points:

Table 3. Hydraulic Analysis Summary								
Drainage Area	Design Storm Frequency							
	2-year Peak Flow (cfs)		10-year Peak Flow (cfs)		25-year Peak Flow (cfs)		100-year Peak Flow (cfs)	
	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)
1L- Seekonk River	0.00	0.00	0.00	0.00	0.03	0.00	0.52	0.12

3.1.3 Proposed Stormwater Overflow Protection

Proposed BMPs will be designed with outlet devices capable of discharging the 100-year design event without overtopping.



DRAWINGS

SEE LATEST PLANS PREPARED BY GZA GEOENVIRONMENTAL

RIVERVIEW RESIDENCES on EAST RIVER

27 E RIVER ST,
PROVIDENCE RI 02906



CONTEXT MAP



LOCUS MAP

APPLICATION: MINOR LAND DEVELOPMENT PROJECT
SUBMISSION: PRELIMINARY PLAN
DATE: 11/18/2025

APPLICANT
PROVIDENCE ARCHITECTURE & BUILDING CO.
244 WEYBOSSET STREET,
PROVIDENCE, RI 02903
KEVIN@PABCOR.COM

OWNER
27 EAST RIVER LLC
244 WEYBOSSET STREET,
PROVIDENCE, RI 02903

ARCHITECT
PROVIDENCE ARCHITECTURE & BUILDING CO.
244 WEYBOSSET STREET,
PROVIDENCE, RI 02903

CIVIL/SURVEY
GARAFOLO & ASSOCIATES, INC
CIVIL ENGINEERS / SURVEYORS
85 CORLISS STREET
PROVIDENCE, RI 02940

LIST OF DRAWINGS - PLAN SET	
No.	Sheet Name
PP-00.00	COVER SHEET
PP-00.01	DEVELOPMENT RENDERINGS
S1-00.00	EXISTING CONDITIONS PLAN
S1-00.01	SITE PLAN
PP-LP.00	ARCHITECTURAL SITE AND GRADING PLAN
PP-LP.01	LANDSCAPE PLAN
PP-LP.02	LANDSCAPE DETAILS
PP-LP.03	DRAINAGE & EROSION PLAN

LIST OF DRAWINGS - PLAN SET	
No.	Sheet Name
PP-A0.00	BUILDING AREA PLANS
PP-A0.01	AVERAGE GRADE AND HEIGHT
PP-A1.00	PARKING LEVELS - 1ST AND 2ND FLOORS
PP-A1.01	RESIDENT LEVELS - 3RD AND 4TH FLOORS
PP-A1.02	TYPICAL RESIDENT LEVELS - 5TH AND 7TH FLOORS - 4th, 6th AND 8TH FLOORS
PP-A1.03	RESIDENT LEVEL - 9TH FLOOR AND ROOF PLAN
PP-A2.00	EXTERIOR ELEVATIONS
PP-A2.01	EXTERIOR LIGHTING PLAN AND CUT SHEETS
PP-A2.02	EXTERIOR LIGHTING PHOTOMETRICS

PROJECT INFORMATION:

THE APPLICANT IS SEEKING TO PERMIT A 335 UNIT APARTMENT BUILDING LOCATED AT 27 RIVER STREET IN THE WATERFRONT W-2 DISTRICT. THE PROPERTY FROTS RIVER STREET TO THE WEST AND SLOPES DOWN TO THE SEASON RIVER WITH VIEWS EAST. THE EXISTING 87,784 SF LOT IS DENSELY WOODED WITH A VARIETY OF TALL DECIDUOUS MATURE TREES. THE SITE IS IMPROVED BY A SMALL SINGLE STORY STRUCTURE AT THE SOUTH PROPERTY LINE ADJACENT TO RICHMOND SQUARE. THE SITE WILL BE RE DEVELOPED BASED ON THE DESIGN HEREIN THESE DOCUMENTS.

PARKING WILL BE PROVIDED OFF STREET WITHIN THE BUILDING. AN ENCLOSED PARKING GARAGE WILL ACCOMMODATE A TOTAL OF 281 SPACES IN A VARIETY OF STANDARD, COMPACT, TANDER, AND HANDICAP SPACES ON THREE (3) FLOORS. THERE ARE TWO ACCESS POINTS INTO AND OUT OF THE GARAGE FROM EAST RIVER STREET LOCATED AT THE 1ST AND SECOND FLOORS.

A TOTAL OF 48 BICYCLE SPACES SHALL BE PROVIDED. AFTER THE FIRST 25 BICYCLE SPACE ADDITIONAL SPACES ARE REQUIRED AT A 50% REDUCTION. SPACE TO ACCOMMODATE 26 LONG-TERM BICYCLES WILL BE PROVIDED WITHIN THE BUILDING ON THE GARAGE FLOOR LEVELS. SHORT TERM BICYCLE SPACE FOR 10 BICYCLES SHALL BE LOCATED WITHIN 50 FEET OF THE MAIN ENTRY OF THE BUILDING. NEW CURB CUTS ARE PROPOSED THAT WILL PROVIDE ACCESS TO THE SITE FROM EAST RIVER STREET. TWO NEW CURB CUTS WILL PROVIDE ACCESS FOR THE PARKING GARAGE ENTRANCES. A THIRD CURB CUT WILL PROVIDE ACCESS TO THE BUILDING AND LOADING DOCK AT THE NORTHERN END OF THE SITE.

BUILDING CHARACTERISTICS	
USE:	MULTI-FAMILY
NUMBER OF UNITS:	335 APARTMENTS
NUMBER OF STORIES ABOVE AVE. GRADE:	8
CELLAR FLOORS:	1
TOTAL FLOORS:	9
PARKING STANDARD:	162
COMPACT:	115
ACCESSIBLE:	5
VAN:	2
TOTAL SPACES:	284

ZONING AND USE REGULATIONS

Table 9-1: Waterfront District Dimensional Standards			
Block Dimension	Required / Allowed	Proposed	Relief Items
Zoning District	W-2	W-2	
Historic District	No		
Min. Lot Area SF	None	87,784 SF	
Min. Lot Width	None	N/A	
Max. Building Height	N/A	39'-0" (38'-4" actual)	Approved 10/31/2024
Surface Coverage - Front Yard	N/A		
Max. Impervious Surface Coverage - Rear Yard	N/A		
Total Max. Impervious Surface Coverage	N/A		
Total Min. Previous Surface Coverage	N/A		
Setback Requirements			
Front Setback Zone	None	0'	
Min. Interior Side and Min. Corner Side Setback	6'	29' north 8' south	
Min. Rear Setback	None, unless abutting a residential district, then 20'	57'	
Table 12-1 Use Matrix			
Dwelling Multi-Family SEC. 1202 K	Permitted	Multi-Family	
	Facade transparency facing a street	See elevations	
	Multi-family 25%		
Table 13-1 Exterior Lighting			
Lighting Plan	Required		
Table 13-2 Permitted Encroachments			
Obstruction	6' into front setback	6' Balcony(s)	
Table 14-1 Off-Street Vehicle and Bicycle Parking Requirements			
Parking Spaces	1 per dwelling unit	284 Parking Spaces	
Bicycle Spaces	1 per 5 dwelling units - *After the first 25 provided - 50% reduction 80% long term / 20% short term	350 / 5 = 71 71 - 25 = 46 46 x 50% = 23 23 + 23 = 48 spaces (8 long term / 10 short term)	
Off-Street Loading Zone	Multi-family 40,000 SF - 3 space required	325,729 sf / required	
Table 15-1 Trees and Landscaping			
Landscaping Plan	Required	Refers to sheet PP-LP-01	
Table 16-1 Signs - Exempt from Permit			
Exempt	Directory sign Nameplate, name and address of the building Property identification sign - management co. Parking Lot Signs.	Building name and address	

The PROVIDENCE ARCHITECTURE & BUILDING Co.

Revision Schedule
No. Date Description

RIVERVIEW RESIDENCES on EAST RIVER
27 E RIVER ST., PROVIDENCE RI 02906
COVER SHEET

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Project No.: Project Number
Checked By: PABCO
Drawn By: PABCO
Scale: 12" = 1'-0"
Date: 11/18/2025
Current Issue: Project Status

Drawing No.
PP-00.00

Revision Schedule

No.	Date	Description



RIVERVIEW RESIDENCES on EAST RIVER
27 E RIVER ST., PROVIDENCE RI 02906

DEVELOPMENT RENDERINGS

Stamp:

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Scale:
Date: 11/18/2025
Current Issue: Project Status

Drawing No.
PP-00.01

11/21/2025 2:05:06 PM



LOCUS MAP
N.T.S.

PARCEL DATA

A.P. 15, LOT 483
N/A
27 EAST RIVER LLC
DEED BK. 13947 / PG. 26
#27 EAST RIVER STREET
LOT AREA =
87,784 S.F. ± OR
2.015 ACRES ±

ZONING DATA

WATERFRONT DISTRICT - W2
MIN. LOT AREA: NONE
MIN. LOT WIDTH: NONE
MAX. BLDG. HEIGHT: 75'
MIN. SETBACKS REQUIREMENT:
FRONT SETBACK: NONE
INTERIOR SIDE SETBACK: 6'
CORNER SIDE SETBACK: NONE
REAR SETBACK: NONE, 20' IF
ABUTTING A RESIDENTIAL DISTRICT.
* PLEASE REFER TO ZONING REGS.
FOR ADDITIONAL INFORMATION.

- PLAN REFERENCES:**
- "ADMINISTRATIVE SUBDIVISION PLAN AP 15 - LOTS 2, 343, 452 & 453 EAST RIVER ST. & RICHMOND SQUARE - PROVIDENCE, RHODE ISLAND" PREPARED FOR BROWN & LIVES LAND COMPANY BY WATERMAN ENGINEERING CO., DATED JAN. 13, 2003, FILED IN BOOK 62 PLAN 11.
 - RHODE ISLAND DEPARTMENT OF PUBLIC WORKS DIVISION OF ROADS AND BRIDGES:
A. PLAN NO. 782: PROVIDENCE EAST RIVER STREET AT WATERMAN ST. AND AT SOUTH ANSELL ST., DATED DECEMBER 29, 1945, IN TWO SHEETS.
B. PLAN NO. 1283: FREEWAY NO. 49 PROVIDENCE SEEKONK RIVER CROSSING FROM - PITMAN STREET TO - SEEKONK RIVER, DATED JANUARY 23, 1963, IN FOUR SHEETS.
C. PLAN NO. 1729: PLAT SHOWING LAND SITUATED IN CITY OF PROVIDENCE CONVEYED BY THE STATE OF RHODE ISLAND & PROVIDENCE PLANTATIONS DEPARTMENT OF TRANSPORTATION DIVISION OF PUBLIC WORKS ON THE 9TH DAY JULY 9TH, 1975, IN ONE SHEET.
 - PROVIDENCE, R.I. CITY ENGINEERING OFFICE STREET LINE DEPARTMENT:
A. MAP OF EAST RIVER STREET, WATERMAN & PITMAN STREETS FROM GANO ST. EASTWARD, MADE BY ORDER OF CHAS. ANTHONY, SAM'L. L. BLAISDELL, & WM. S. HAINES: A COMMITTEE APPOINTED TO LAY OUT THE MAP BY THE BOARD OF ALDERMEN, SURVEYED & DRAWN BY WM. S. HAINES, OCT. 15, 1874, DRAWER 74, SHEET C-1.
B. EAST RIVER STREET FROM PITMAN ST. TO SOUTH ANSELL ST., DATED DEC. 6, 1895, DRAWER 96, SHEET B-31.
C. PROVIDENCE - EAST PROVIDENCE: PATWICKET CITY LINES, AND SEEKONK HARBOR LINE, DATED APRIL 10, 1913, DRAWER 753, SHEET 67.
D. PROVIDENCE SECTION MAP 41/22.

- NOTES:**
- THE PROJECT SITE IS LOCATED WITHIN ZONE AE WITH BASE FLOOD ELEVATION OF 12 FEET (AREAS DETERMINED TO BE INSIDE THE 1% ANNUAL CHANCE FLOODPLAIN), ZONE X (AREAS OUTSIDE THE 0.2% ANNUAL FLOODPLAIN) AND ZONE X* (AREAS OF 0.2% ANNUAL CHANCE FLOODPLAIN, AREAS OF 1% ANNUAL CHANCE FLOODPLAIN WITH AVERAGE DEPTHS OF 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEES FROM 1% ANNUAL CHANCE FLOOD) AS SHOWN ON FEMA FLOOD INSURANCE RATE MAP FOR THE CITY OF PROVIDENCE, PROVIDENCE COUNTY, RHODE ISLAND, COMMUNITY MAP NO. 14007C0309K, HAVING AN EFFECTIVE DATE OF OCTOBER 2, 2015.
 - THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. PLEASE CONTACT DISAGEE PRIOR TO CONSTRUCTION @ 1-888-344-7233.
 - HORIZONTAL DATUM: RHODE ISLAND STATE PLANE - NAD 83
VERTICAL DATUM: NAVD 83
*DATUM WAS DERIVED BY OBSERVED GPS DYNAMIC HEIGHTS VARIATIONS BETWEEN LOCAL BENCHMARKS MAY APPLY.
 - TOPOGRAPHIC PROVIDENCE BY DOUGLAS DESIGN GROUP.
 - LOT IS TREED NO SIGNIFICANT TREES OBSERVED ON SITE PER 1503.B
 - LOT FALLS WITHIN THE 200 FT BUFFER OF C.R.M.C.

CERTIFICATION:
THIS SURVEY HAS BEEN CONDUCTED AND THE PLAN HAS BEEN PREPARED PURSUANT TO SECTION 435-RIC-00-00-1.9 OF THE RULES AND REGULATIONS ADOPTED BY THE RHODE ISLAND BOARD OF REGISTRATION FOR PROFESSIONAL LAND SURVEYORS ON NOVEMBER 25, 2015, AS FOLLOWS:

TYPE OF BOUNDARY SURVEY: BOUNDARY SURVEY
CLASS: CLASS II-3
MEASUREMENT SPECIFICATION: DATA ACCUMULATION SURVEY
CLASS: CLASS II-3
TOPOGRAPHIC SURVEY ACCURACY: CLASS II-3

THE PURPOSE FOR THE CONDUCT OF THE SURVEY AND FOR THE PREPARATION OF THE PLAN IS AS FOLLOWS: TO PROVIDE A PROPERTY AND EXISTING CONDITION SURVEY FOR ASSESSOR'S LOT 483, PLAT 15 IN CITY OF PROVIDENCE, RHODE ISLAND.

BY: *Samuel A. White, Jr.*
SAMUEL A. WHITE LICENSE NO. 1781
LS 459-00A

GENERAL LEGEND & ABBREVIATIONS

ASSESSORS LINE	● BOLLARD
ABANDONED LOT LINE	■ CATCH BASIN
LOCUS PROPERTY LINE	■ CATCH BASIN/GUARD INLET
STATE HIGHWAY LINE	■ DETECTABLE WARNING STRIP
SURVEYOR'S LINE	■ DRAIN MANHOLE
FLOODWAY AREA	■ ELECTRIC MANHOLE
FENCE - CHAIN LINK	■ FLAG POLE
FENCE - METAL	■ GAS GATE
FENCE - STOCKADE	■ HANDHOLE (UNKNOWN)
GUARD RAIL - METAL	■ HORRANT
STONE WALL	■ LIGHT POLE
COMMUNICATION PAINT LINE	■ MONITORING WELL
STONE WALL	■ SIGN
SEWER SCALE LINE	■ SEWER MANHOLE
ELECTRIC PAINT LINE	■ TELEPHONE MANHOLE
ELECTRIC SCALE LINE	■ TEST POINT
GAS PAINT LINE	■ WATER GATE
GAS SCALE LINE	■ WATER SHUTOFF
SEWER SCALE LINE	■ EXISTING DRILL HOLE
TELEPHONE PAINT LINE	■ EXISTING GRANITE MONUMENT
COMMUNICATION SCALE LINE	■ EXISTING IRON PIPE
ELECTRIC PAINT LINE	■ EXISTING IRON ROD
ELECTRIC SCALE LINE	■ EXISTING RAIL ROAD SPIKE
VERIZON PAINT LINE	■ EXISTING RHODE ISLAND HIGHWAY BOUND
VERIZON SCALE LINE	
WATER PAINT LINE	
WATER SCALE LINE	
EXISTING CONTOUR MAJOR	
EXISTING CONTOUR MINOR	

WATERFRONT DISTRICT - W-2

BULK STANDARDS	REQUIRED	EXISTING	PROPOSED
Minimum Lot Area	None	87,784 S.F. ±	Same
Minimum Lot Width	None	470' ±	Same
Maximum Building Height	75'	None	88.3'

MINIMUM SETBACKS REQUIREMENTS

Setback	Required	Existing	Proposed
Front setback	None	None	0'
Interior side setbacks	6'	None	14.3'
Corner side setbacks	None	None	42.3'
Rear setbacks	None, unless abutting residential, then 20'	None	0
Maximum building coverage	55%	None	55%
Maximum impervious coverage	55%	None	57%
Minimum pervious coverage	None	None	14,304 S.F. ±

DIMENSIONAL VARIANCE

PER ZONING BOARD OF REVIEW, RESOLUTION NO. 8075 DATED MAY 16, 2009

THE APPLICANT IS GRANTED DIMENSIONAL VARIANCES FROM SECTIONS 307, 412, AND 420.2 MAXIMUM BUILDING HEIGHT, MAXIMUM LOT COVERAGE AND ROOF STRUCTURES

PARKING DATA

OFF STREET PARKING IS DESIGNED BY USE AS OF THIS SURVEY THE LOT IS VACANT THEREFORE THERE IS NO WAY TO COMPUTE THE REQUIRED PARKING OR LOADING AREAS.

STREET INDEX

EAST RIVER STREET
WATERMAN STREET

PERIMETER AND TOPOGRAPHY SURVEY
AP 15, LOT 483
SITUATION ON
27 EAST RIVER STREET
PROVIDENCE, RHODE ISLAND
PREPARED FOR
PROVIDENCE ARCHITECTURE
+ BUILDING CO.

NO.	REVISION	BY	DATE
1.	PROPOSED FEATURES	LFA	11/17/2023
2.	PROPOSED FEATURES	LFA	11/18/2023

SAMUEL A. WHITE, JR.
LAND SURVEYOR
11-17-2025

GAROFALO
GAROFALO & ASSOCIATES, INC.
CIVIL & STRUCTURAL ENGINEERS/SURVEYORS
LAND PLANNERS/ENVIRONMENTAL SCIENTISTS

88 CORLUS STREET
P.O. BOX 6145
PROVIDENCE, R.I. 02980
TEL: 401-273-9300

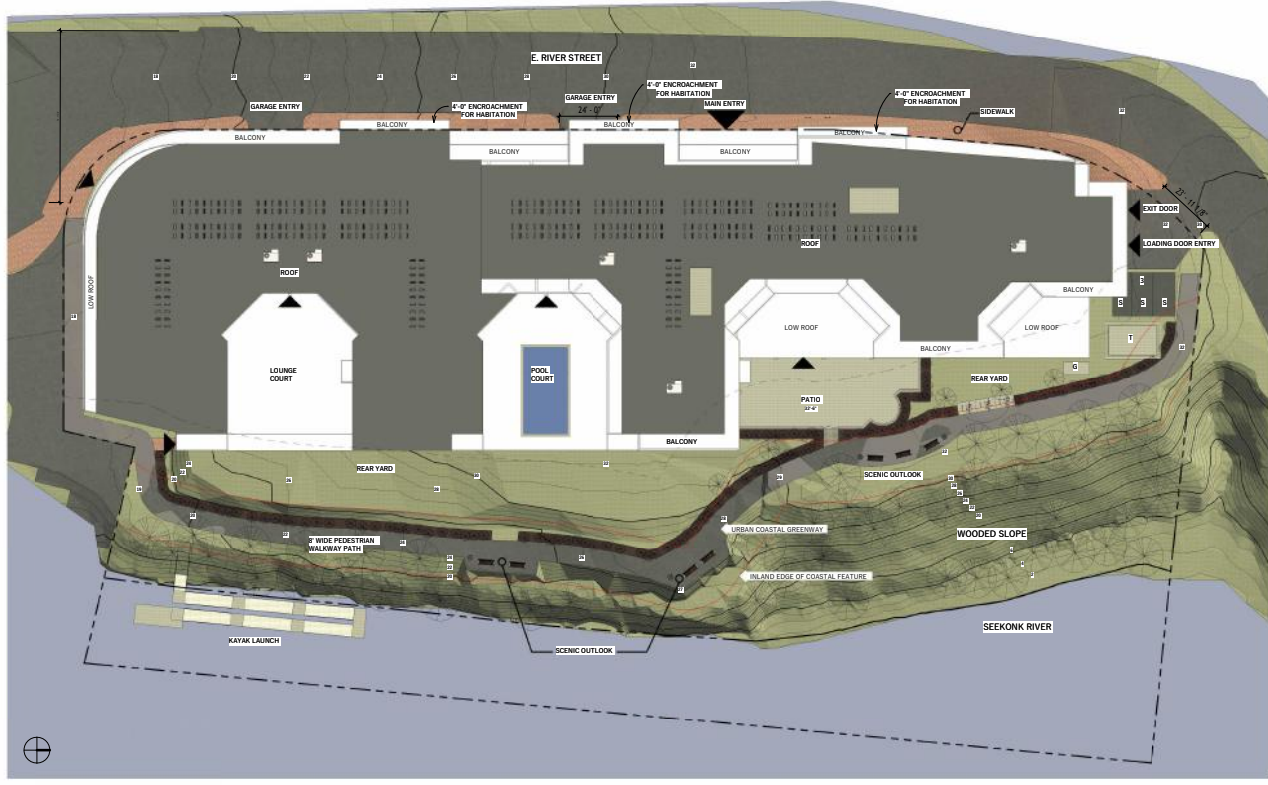
JOB NO. 7500.00
DWG. NO. 7500-00-ECS

DRAWN BY LFA
CALCS BY RSE
APPROVED SAW
DATE: SEPTEMBER 2025

SHEET
1
OF 11 SHEETS

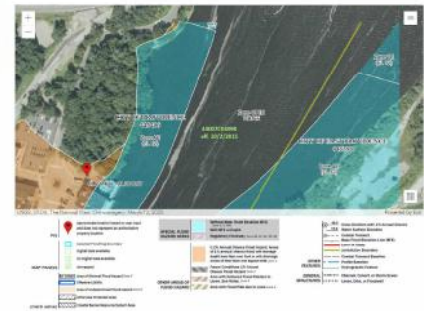
Revision Schedule

No.	Date	Description



1 Site Plan
3/64" = 1'-0"

FEMA FLOODPLAIN MAP



ZONING AND USE REGULATIONS			
Table 9-3: Waterfront District Dimensional Standards			
Table Standards	Proposed / Allowed	Proposed	Rebut Items
Zoning District	W-2	W-2	
Historic District	No		
Min. Lot Area SF	None	81,784 SF	
Min. Lot Width	None	N/A	
Max. Building Height	25'	50'-0" (38'-4" actual)	Approved 10/31/2024
Max. Building Coverage	N/A		
Surface Coverage - Front Yard	N/A		
Max. Impervious Surface Coverage - Rear Yard	N/A		
Total Max. Impervious Surface Coverage	N/A		
Total Min. Permeous Surface Coverage	N/A		
Setback Requirements			
Front Setback Zone	None	0'	
Min. Interior Side and Min. Corner Side Setback	0'	25' north 0' south	
Min. Rear Setback	None, unless abutting a residential district, then 25'	57'	

RIVERVIEW RESIDENCES on EAST RIVER
27 E RIVER ST., PROVIDENCE RI 02906

ARCHITECTURAL SITE AND GRADING PLAN

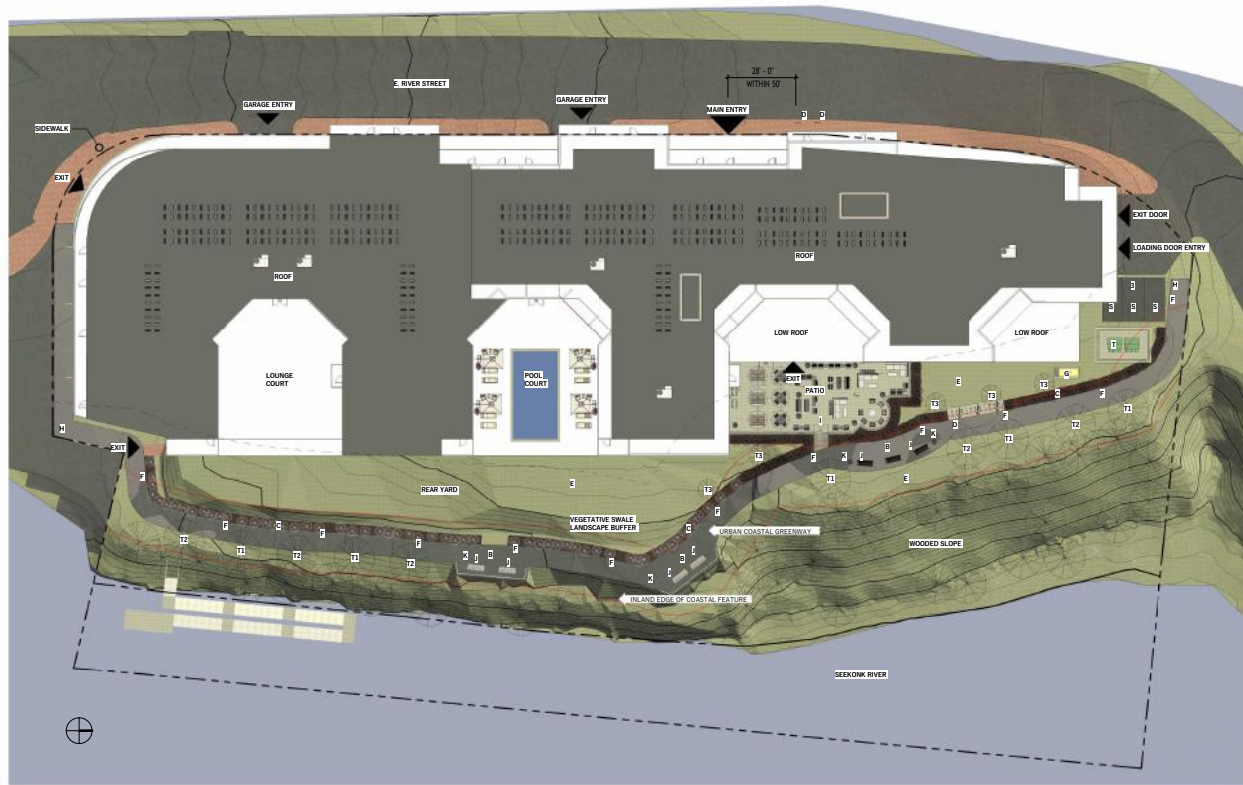
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Scale: As indicated
Date: 11/18/2025
Current Issue: Project Status

Drawing No.
PP-LP.00

Revision Schedule

No.	Date	Description



1 LANDSCAPE PLAN
3/64" = 1'-0"

LANDSCAPE PLAN LEGEND	
A	ASPHALT WALKING PATH
B	SCENIC OVERLOOK
C	4' WIDE MIXED DENSE SHRUBBERY - VEGETATIVE SWALE
D	SHORT-TERM BIKE RACK
E	SEED & LOAM
F	LIGHT POLE
G	STANDBY GENERATOR
H	USG WALKING PATH SIGN
I	PATIO
J	PARK BENCH
K	TRASH RECEPTACLE
T1	RED MAPLE
T2	RED OAK
T3	RED HORSECHESTNUT

RIVERVIEW RESIDENCES on EAST RIVER
27 E RIVER ST., PROVIDENCE RI 02906

LANDSCAPE PLAN

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Project No.: Project Number
Checked By: PABCO
Drawn By: PABCO
Scale: As indicated
Date: 11/18/2025
Current Issue: Project Status

Drawing No.
PP-LP.01

Revision Schedule

No.	Date	Description

RIVERVIEW RESIDENCES on EAST RIVER
27 E RIVER ST., PROVIDENCE RI 02906

LANDSCAPE DETAILS

Stamp:

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Project No.: Project Number
Checked By: PABCO
Drawn By: PABCO
Scale: 12" = 1'-0"
Date: 11/18/2025
Current Issue: Project Status

Drawing No.
PP-LP.02

DESIGN INSPIRATION - PEDESTRIAN BICYCLE / WALKING TRAIL



ASPHALT PATH WITH LIGHT POLES



ASPHALT PATH WITH LIGHT POLES

DESIGN INSPIRATION - SCENIC OVERLOOK



PEDESTRIAN BENCH WITH SCENIC VIEWS



PEDESTRIAN BENCH WITH SCENIC VIEWS

ARTICLE 15- TREES AND LANDSCAPING

1500: LANDSCAPING REQUIRED

A2 IF LAND WITHIN THE LIMITS OF DISTURBANCE EQUALS MORE THAN 50% OF THE AREA OF THE LOT OR LOTS BEING DEVELOPED, THE ENTIRE DEVELOPMENT SHALL FULLY CONFORM TO THE REQUIREMENTS OF THIS ARTICLE.

1503: ON-SITE LANDSCAPING AND TREES REQUIRED

A GENERAL REQUIREMENTS

1. ALL PORTIONS OF A LOT NOT COVERED BY STRUCTURES OR PAVED SURFACES SHALL BE LANDSCAPED WITH TREES, SHRUBBERY, GRASS, LIVE GROUNDCOVERS, AND OTHER PLANTINGS. THE LANDSCAPE DESIGN MAY ALSO INCLUDE THE USE OF STONE, MULCH BEDS, OR OTHER PERVIOUS LANDSCAPING MATERIALS (THIS EXCLUDES PERVIOUS PAVEMENT).
2. ALL EXISTING PLANTINGS THAT ARE MAINTAINED ON A SITE MAY BE COUNTED TOWARD ANY REQUIRED ON-SITE LANDSCAPING.

B SIGNIFICANT TREE PRESERVATION

1. A SIGNIFICANT TREE IS ANY TREE THAT MEASURES 32 INCHES OR MORE IN DIAMETER AT 4 1/2 FEET ABOVE THE GROUND. NO SIGNIFICANT TREE MAY BE REMOVED WITHOUT THE PERMISSION OF THE CITY FORESTER.

C REQUIRED TREE CANOPY

1. REQUIRED TREE CANOPY PERCENTAGE
SUFFICIENT TREES SHALL BE RETAINED AND/OR PLANTED ON A LOT SO THAT THE SQUARE FOOTAGE OF VEGETATIVE CANOPY OF SUCH TREES, WHEN MATURE, EQUALS A CERTAIN PERCENTAGE OF THE SQUARE FOOTAGE OF THE LOT. PERCENTAGE IS BY DISTRICT:
 - a. ALL OTHER DISTRICTS - 15% OF THE LOT SQUARE FOOTAGE.
2. CALCULATION OF TREE CANOPY COVERAGE
 - a. LARGE: 3,000 SF
 - b. MEDIUM: 700 SF
 - c. SMALL: 300 SF

4. STREET TREE ACCOMMODATION

EXISTING OR PLANNED STREET TREES LOCATED IN THE PUBLIC RIGHT-OF-WAY DIRECTLY ADJACENT TO THE LOT LINE MAY BE COUNTED TOWARD THE CANOPY COVERAGE FOR THE LOT.

1507 WATERBODY VEGETATIVE BUFFERS

A. UNLESS OTHERWISE SPECIFIED BY THE RHODE ISLAND COASTAL RESOURCES PROGRAM SPECIAL MANAGEMENT PLAN, A VEGETATIVE BUFFER A MINIMUM OF 25 FEET IN WIDTH IS REQUIRED TO THE ENTIRE LENGTH OF ANY WATER BODY. THIS BUFFER IS MEASURED FROM THE WATER'S EDGE OR INLAND EDGE OF A COASTAL SHORELINE.

B. THIS BUFFER SHALL INCLUDE TREES AND PLANT MATERIAL THAT FILTER STORMWATER RUNOFF AND HELP TO IMPROVE THE QUALITY OF THE WATER BODY.

C. NO PARKING OR STRUCTURES ARE PERMITTED WITHIN THIS BUFFER. HOWEVER, PAVING FOR RA WALKING PATH, BICYCLES PATH, OR ACCESS TO DOCKS, PIER, OR REACHES MAY BE INCLUDED WITHIN THIS BUFFER.

ARTICLE 15- REQUIRED AND PROPOSED TREES AND LANDSCAPING

1500: LANDSCAPING REQUIRED

LOT SIZE: 87,784 SF
DISTRICT: W-2
REQUIRED CANOPY (%) 15%
REQUIRED CANOPY (LOT SIZE x 30%) 87,784 x 15% = 13,168 SF

PROPOSED COVERAGE:

LARGE TREES 10 x 1,000 = 10,000 SF
MEDIUM TREES 5 x 750 = 3,500 SF
TOTAL CANOPY 13,500 SF

TREE LIST				
TYPE	LATIN NAME	COMMON NAME	SIZE	QTY
T1	Acer rubrum	Red Maple	Large - 1,000 SF	5
T2	Quercus rubra	Red Oak	Large - 1,000 SF	5
T3	Aesculus x carnea	Red Horsechestnut	Medium - 700 SF	5
Total	(1,000 x 10 = 10,000) + (700 x 5 = 3,500) = 13,500 SF			15

STORMWATER AND SEDIMENT

STORMWATER MANAGEMENT STATEMENT:

1. STORMWATER MAY NOT BE TIED INTO SANITARY SEWER LINE. ONLY DEDICATED STORMWATER (DRAIN) LINE.

SEDIMENT CONTROL PLAN:

1. THROUGHOUT CONSTRUCTION, APPROPRIATE MEASURES WILL BE TAKEN TO AVOID EROSION & PREVENT SEDIMENT FROM LEAVING THE SITE. MEASURES SHALL INCLUDE TEMPORARY SILT FENCING AT THE PERIMETER OF THE SITE AT ALL LOT LINES. ADDITIONALLY, HIGH FLOW INLET PROTECTION FILTERS, SUCH AS SUTTERBUCKLES, WILL BE INSTALLED WHERE THE SITE MEETS THE CURB ROW TO PREVENT SEDIMENT FROM FLOWING INTO THE CITY'S STORMWATER SYSTEM DURING CONSTRUCTION.
2. EROSION CONTROL TO BE INSPECTED PERIODICALLY OR AFTER SIGNIFICANT RAINFALL, AND REPAIRED OR REPLACED AS NECESSARY.
3. EROSION CONTROL SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE AND AREA HAS STABILIZED.

TREES



T1 - RED MAPLE



T2 - RED OAK



T3 - RED HORSEHESTNUT

SHRUBS



S1 - HASS HALO WILD HYDRANGEA



S2 - HUMMINGBIRD

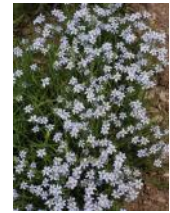


S3 - LEADPLANT



S3 - INKERRY

PERENNIALS



P1 - HASS HALO WILD HYDRANGEA



P2 - RUBY SWAN



P3 - WHITE SWAN



G1 - LITTLE BLUESTEM CULTIVAR

ORNAMENTAL GRASS

SITE AMENITIES



6 RECYCLED PLASTIC BENCH



RECYCLED PLASTIC SLAT ROUND RECEPTACLE CEDAR_45 GAL

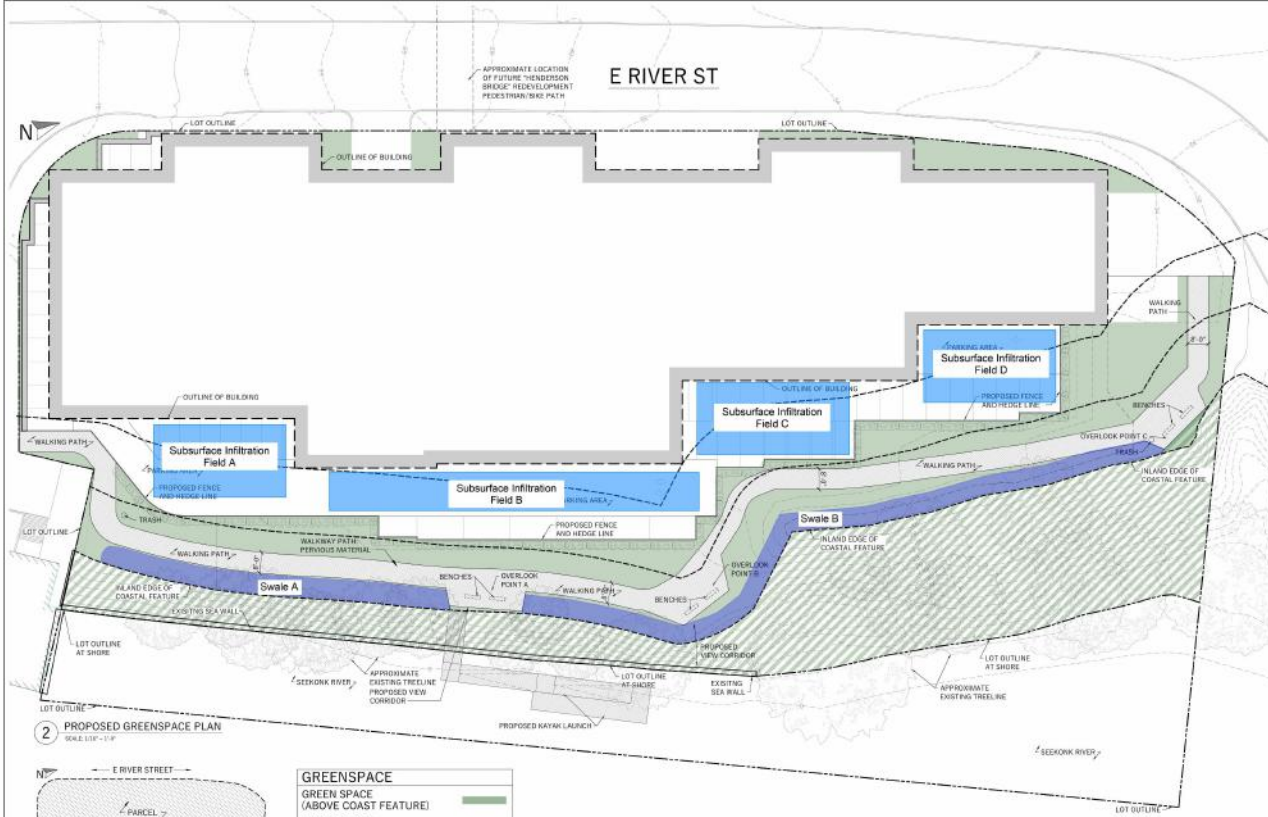


U-SHAPE BIKE RACK

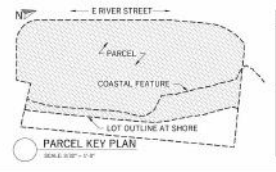


SPLIT-RAIL FENCE_HEMLOCK / SPRUCE

Revision Schedule		
No.	Date	Description



2 PROPOSED GREENSPACE PLAN
SCALE: 1/8" = 1'-0"



GREENSPACE	
GREEN SPACE (ABOVE COAST FEATURE)	12,776 SF
GREEN SPACE (BELOW COASTAL FEATURE)	6,524 SF
TOTAL LOT:	88,074 SF
TOTAL GREEN SPACE:	19,700 SF
GREEN SPACE % (19,700/88,074):	22.37%

Project Name:	EAST RIVER STREET DEVELOPMENT 27 EAST RIVER STREET, PROVIDENCE, RI 02906
Sheet Name:	PROPOSED GREENSPACE PLAN
Copyright © 2024	Project No.: --
Checked By:	KB
Drawn By:	KB
Scale:	AS NOTED
Date:	05-17-2024
Current Issue:	--
Drawing No.:	SD1.2

RIVERVIEW RESIDENCES on EAST RIVER
27 E RIVER ST., PROVIDENCE RI 02906

DRAINAGE & EROSION PLAN

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Scale:
Date: 11/18/2025
Current Issue: Project Status

Drawing No. PP-LP.03

Revision Schedule

No.	Date	Description

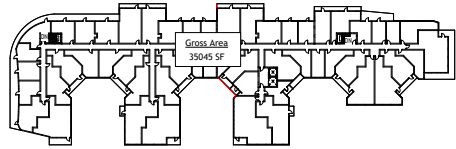
RIVERVIEW RESIDENCES on EAST RIVER
27 E RIVER ST., PROVIDENCE RI 02906

BUILDING AREA PLANS

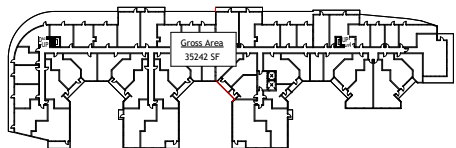
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Date: 11/18/2025
Current Issue: Project Status

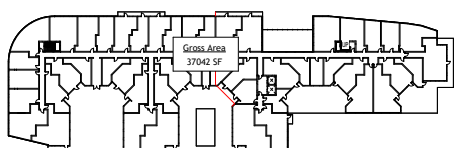
Drawing No.
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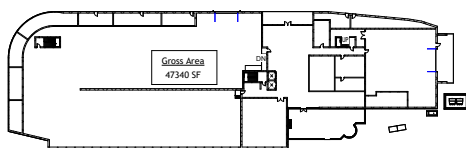
5TH FLOOR PLAN
1" = 50'-0"



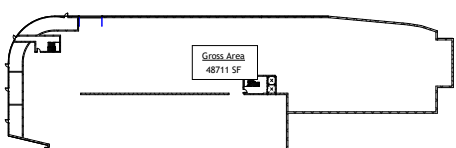
4TH FLOOR PLAN
1" = 50'-0"



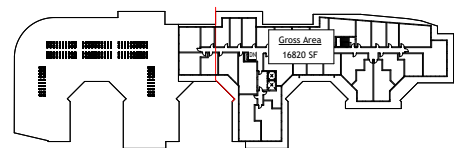
3RD FLOOR PLAN
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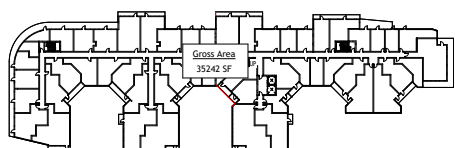
2ND FLOOR PLAN
1" = 50'-0"



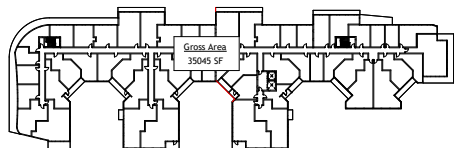
1ST FLOOR PLAN
1" = 50'-0"



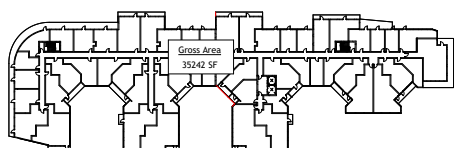
9TH FLOOR PLAN
1" = 50'-0"



8TH FLOOR PLAN
1" = 50'-0"



7TH FLOOR PLAN
1" = 50'-0"



6TH FLOOR PLAN
1" = 50'-0"

THIS SHEET USED TO ILLUSTRATE THE OFF-STREET LOADING REQUIREMENT PER TABLE 14-2.

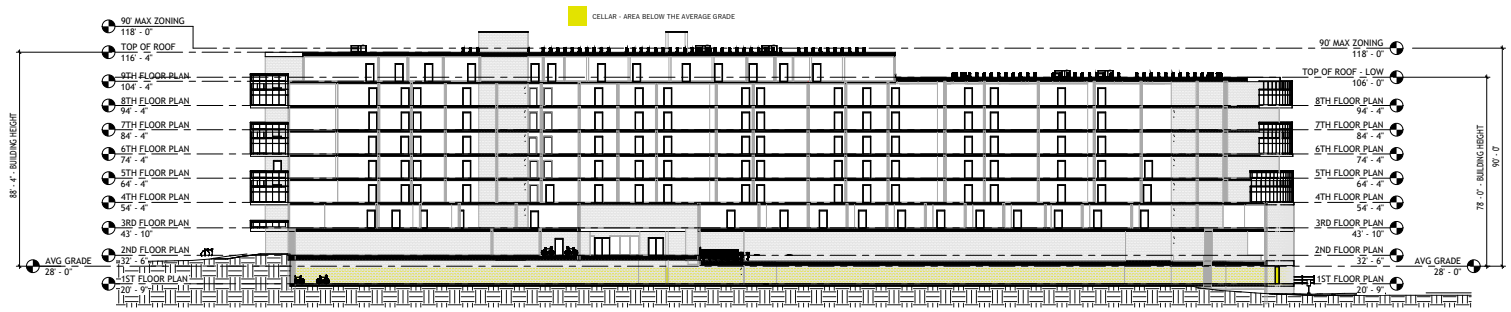
TABLE 14-2 OFF-STREET LOADING REQUIREMENTS	
USE TYPE	NUMBER OF SPACES
MULTI-FAMILY DWELLING 40,000 SF OR MORE GFA	1 LOADING SPACE REQ'D.

GROSS RESIDENTIAL BUILDING SQUARE FOOTAGE			
LEVEL	USE	AREA	UNITS
9	RESIDENTIAL	16,820	31
8	RESIDENTIAL	35,242	53
7	RESIDENTIAL	35,045	53
6	RESIDENTIAL	35,242	53
5	RESIDENTIAL	35,045	53
4	RESIDENTIAL	35,242	53
3	RESIDENTIAL	37,042	50
2	PARKING	47,340	5
1	PARKING	48,711	4
TOTAL		325,729 GSF	355 UNITS

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Revision Schedule

No.	Date	Description



1 AVERAGE GRADE SECTION
3/64" = 1'-0"



2 AVERAGE GRADE PLAN
1" = 30'-0"

AVERAGE GRADE	
Spot Elevation	
17'	
33'	
34'	
33'	
32.2'	
32.2'	
33.3'	
33'	
31'	
28'	
19.9'	
19.9'	
18.5'	
Total	363.5 / 13 = 28'

AVERAGE GRADE AND BUILDING HEIGHT

202: BUILDING HEIGHT - BUILDING HEIGHT SHALL BE MEASURED FROM THE AVERAGE, EXISTING GRADE ELEVATION WHERE THE FOUNDATION OF THE STRUCTURE IS PROPOSED

- EXEMPT - BUILDING APPURTENANCES SUCH AS CHIMNEYS, PARAPET WALLS, SKYLIGHTS, STEEPLES, COOLING TOWERS, ELEVATOR BULKHEADS, STAIR TOWERS.
- STORY - THAT PORTION OF A BUILDING BETWEEN THE UPPER SURFACE OF ANY FLOOR AND THE UPPER SURFACE OF THE FLOOR NEXT ABOVE.
- GRADE - A REFERENCE PLANE REPRESENTING THE AVERAGE OF FINISHED GROUND LEVEL ADJOINING THE BUILDING.
- CELLAR - THAT PORTION OF A BUILDING INCLUDED BETWEEN THE UPPER SURFACE OF ITS FLOOR AND THE UPPER SURFACE OF THE FLOOR NEXT ABOVE, HAVING LESS THAN ONE-HALF ITS HEIGHT ABOVE THE AVERAGE ELEVATION OF THE FINISHED LOT GRADE.
- SITE PLAN - CALCULATED AVERAGE GRADE SEE 'AVERAGE GRADE PLAN' ON THIS SHEET WHICH ILLUSTRATES THE CALCULATED AVERAGE GRADE.
- AVERAGE GRADE = 28' (SITE/SURVEY)
28'-0" (ARCHITECTURAL)

RIVERVIEW RESIDENCES on EAST RIVER
27 E RIVER ST, PROVIDENCE RI 02906

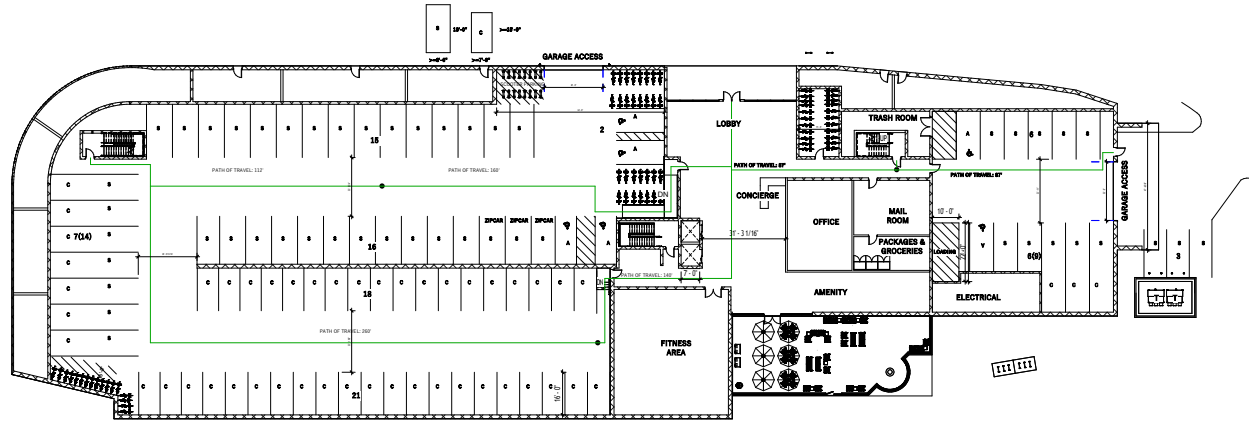
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Revision Schedule

No.	Date	Descri



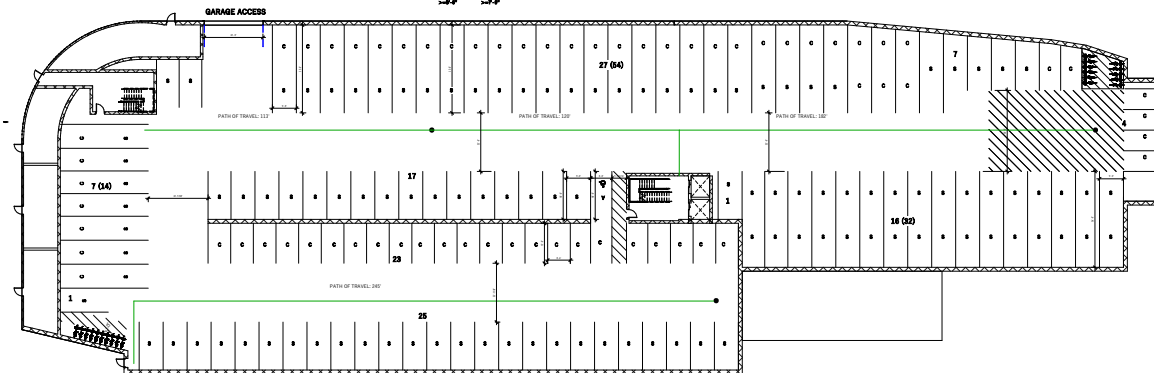
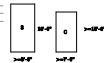
2 2ND FLOOR PLAN
3/64" = 1'-0"

SPACING CALCULATIONS

Space Type	# Spaces	% Compliant Spaces
Compliant Standard Spaces	362	87.1%
Compliant Accessible Spaces	7	2.0%
Compliant Compact Spaces per §1404B(2)(7)	17	8.1%
Total Compliant Spaces	386	100%
§1404B(2) - non-compliant Compact Functional Spaces	88	
Parking Spaces Grand Total	298	

*10% of the 178 Required Spaces (20% of 352 Units) may be compact

NUMBER CALCULATIONS
TOTAL IN BICYCLE DOCKS



1 1ST FLOOR PLAN
3/64" = 1'-0"

RIVERVIEW RESIDENCES ON EAST RIVER
27 E RIVER ST, PROVIDENCE RI 02906

PARKING LEVELS - 1ST AND 2ND FLOORS

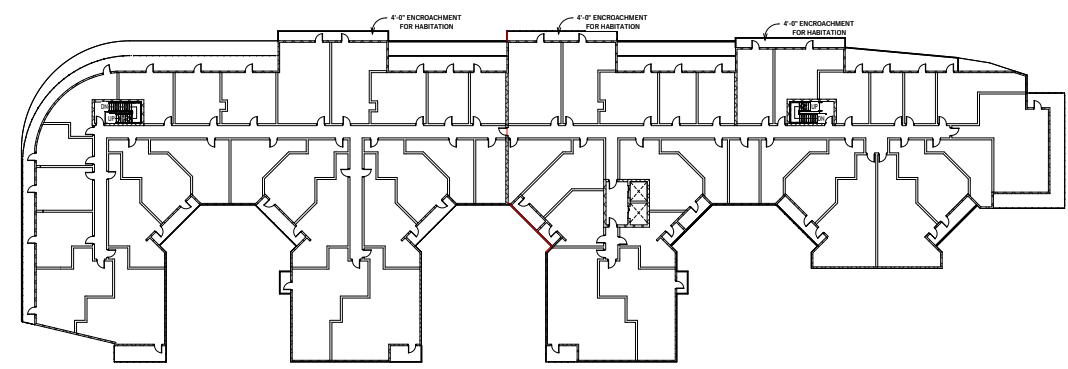
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Project No.: Project Num
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Drawn By: PA
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Date: 11/18/
Current Issue: Project S

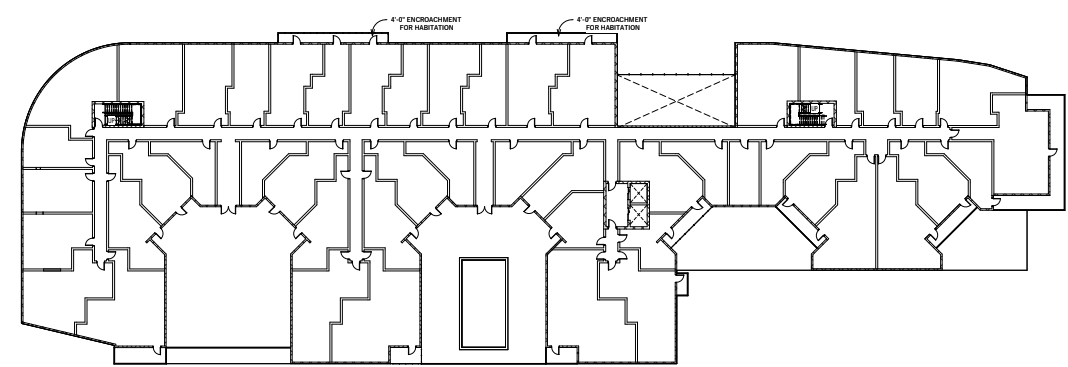
Drawing No.
PP-A1.C

Revision Schedule

No.	Date	Description



④ 4TH FLOOR PLAN
3/64" = 1'-0"



③ 3RD FLOOR PLAN
3/64" = 1'-0"

RIVERVIEW RESIDENCES on EAST RIVER
27 E RIVER ST., PROVIDENCE RI 02906

RESIDENT LEVELS - 3RD AND 4TH FLOORS

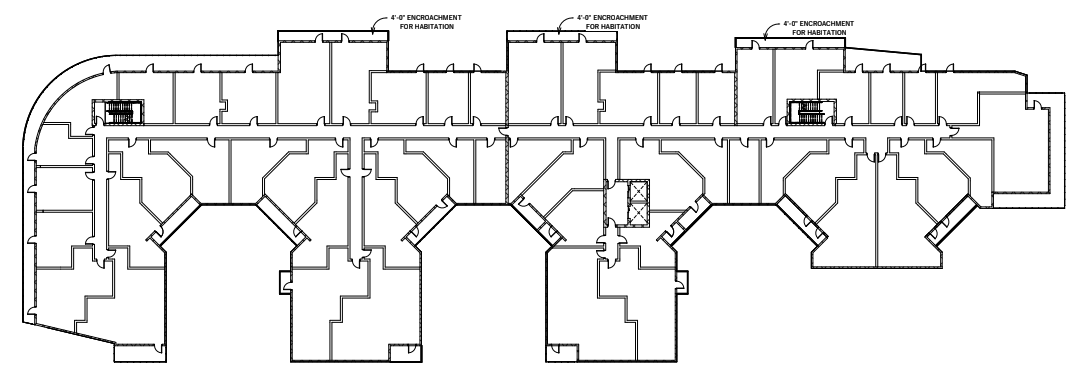
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Checked By: PABCO
Drawn By: PABCO
Scale: 3/64" = 1'-0"
Date: 11/18/2025
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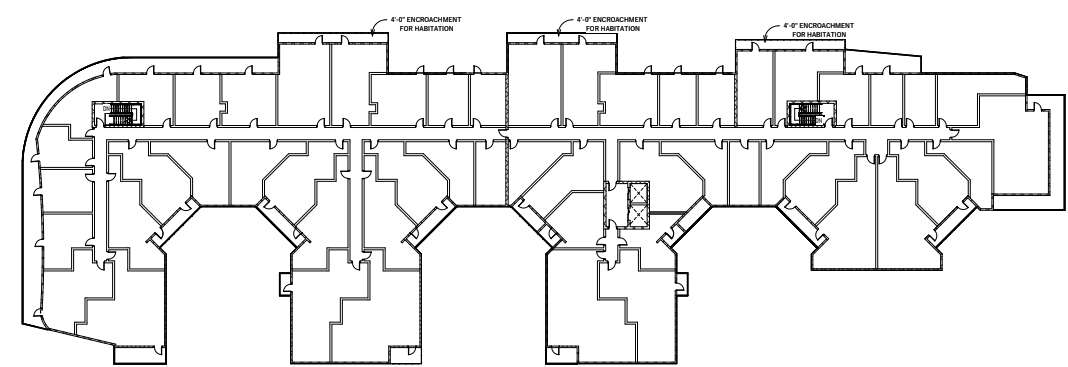
Drawing No.
PP-A1.01

Revision Schedule

No.	Date	Description



② 4, 6, & 8TH FLOOR PLAN
3/64" = 1'-0"



① 5 & 7TH FLOOR PLAN
3/64" = 1'-0"

RIVERVIEW RESIDENCES on EAST RIVER
27 E RIVER ST., PROVIDENCE RI 02906

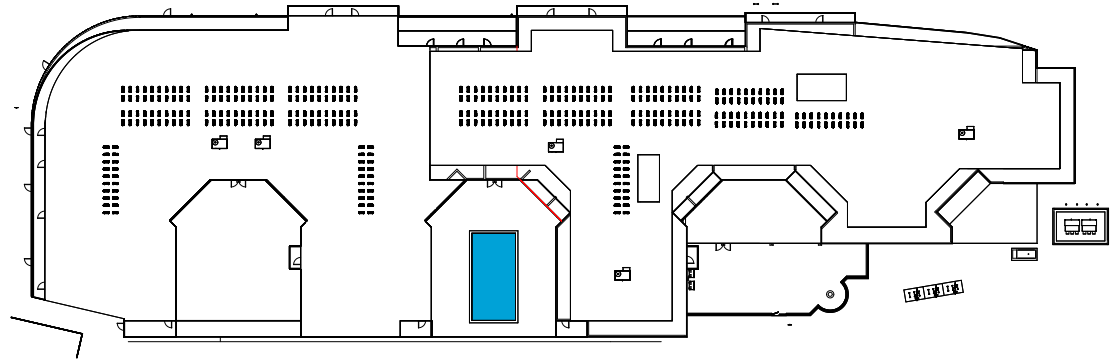
TYPICAL RESIDENT LEVELS - 5TH AND 7TH FLOORS, 4th, 6TH
AND 8TH FLOORS

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Checked By: KD
Drawn By: MD
Scale: 3/64" = 1'-0"
Date: 11/18/2025
Current Issue: Project Status

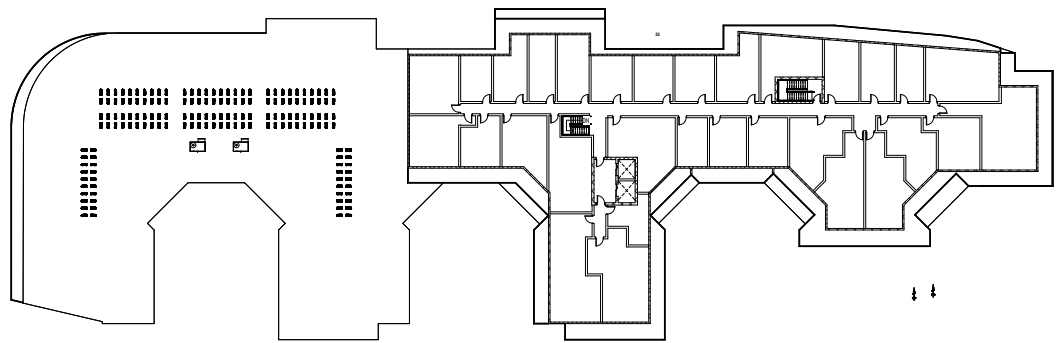
Drawing No.
PP-A1.02

Revision Schedule

No.	Date	Description



① ROOF PLAN
3/64" = 1'-0"



① 9TH FLOOR PLAN
3/64" = 1'-0"

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RESIDENT LEVEL - 9TH FLOOR AND ROOF PLAN

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PP-A1.03

Revision Schedule

No.	Date	Description



WEST ELEVATION - EAST RIVER STREET FACADE



SOUTH ELEVATION



NORTH ELEVATION



EAST ELEVATION - SEEKONK RIVER

LEGEND

A	METAL COMPOSITE PANEL
B	CANTILEVER BALCONY
C	BRICK VENEER
D	ALUMINUM RAILING

FACADE TRANSPARENCY

SEC 903 C:	
WEST ELEVATION:	41.00%
SOUTH ELEVATION:	38.12%
NORTH ELEVATION:	27.81%
EAST ELEVATION:	31.19%

RIVERVIEW RESIDENCES on EAST RIVER
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EXTERIOR ELEVATIONS

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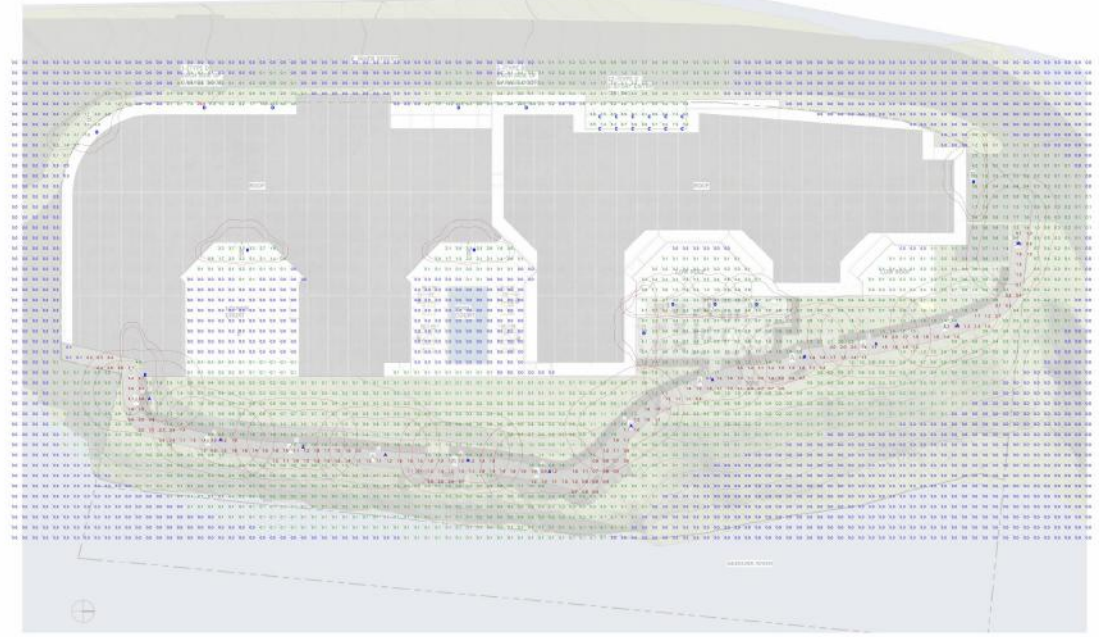
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Revision Schedule

No.	Date	Description



Plan View
Scale - 1" = 15ft

NOTES:
 REFLECTANCES ASSUMED:
 CEILING: 80
 WALLS: 50
 FLOOR: 20
 MOUNTING HEIGHTS:
 WALLPACKS: 8'-0"
 POLE: 10'-0"
 C: 15'-0"
 D: 8'-0"
 TASK HEIGHT: 0'-0" ABOVE GRADE
 CALCULATION POINT SPACING: 10x10 OC

DISCLAIMER:
 THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES ONLY AND ARE NOT INTENDED FOR CONSTRUCTION. VALUES REPRESENTED ARE AN APPROXIMATION GATHERED FROM MANUFACTURERS PHOTOMETRIC IN-HOUSE OR INDEPENDENT LAB TEST WITH DATA SUPPLIED BY LAMP MANUFACTURERS.

SCHEDULE							
Symbol	Label	Quantity	Manufacturer	Catalog Number	Description	Light Loss Factor	Wattage
⊙	A	12	Lithonia Lighting	RADPT P1 30K PATH	RADIAN Post-Top with P1 3000K Pathway distribution "ADVISE POLE"	0.9	25-41
⊙	B	9	Lithonia Lighting	WIDGE2 LED P1 30K 80CRI T1S	WIDGE2 LED WITH P1 - PERFORMANCE PACKAGE, 3000K, 80CRI, TYPE 1 SHORT OPTIC	0.9	11,1658
⊙	C	12	LUMINIS	SNB000-L1L11-40K	Scene - Ceiling Round 8.5in	0.9	13.9
⊙	D	4	Lithonia Lighting	WMC46 Downlight Only - 3000K 75 Beam	LED lamp	0.9	19

STATISTICS						
DESCRIPTION	SYMBOL	AVG.	MAX.	MIN.	MAX./MIN.	AVG./MIN.
GROUND	+	0.5 fc	25.6 fc	0.0 fc	N/A	N/A
PATHWAY	+	1.2 fc	4.1 fc	0.1 fc	41.0:1	12.0:1

RIVERVIEW RESIDENCES on EAST RIVER
 27 E RIVER ST., PROVIDENCE RI 02906
 Exterior Lighting Photometrics
 Scale:
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PP-A2.02



APPENDIX A

LIMITATIONS



USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the contract documents, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in Proposal for Services and/or Report, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. If conditions other than those described in this report are found at the subject location(s), or the design has been altered in any way, GZA shall be so notified and afforded the opportunity to revise the report, as appropriate, to reflect the unanticipated changed conditions .
3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.
4. In conducting our work, GZA relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the Report.

SUBSURFACE CONDITIONS

5. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs. The nature and extent of variations between these explorations may not become evident until further exploration or construction. If variations or other latent conditions then become evident, it will be necessary to reevaluate the conclusions and recommendations of this report.
6. In preparing this report, GZA relied on certain information provided by the Client, state and local officials, and other parties referenced therein which were made available to GZA at the time of our evaluation. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.
7. Water level readings have been made in test holes (as described in this Report) and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this Report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The water table encountered in the course of the work may differ from that indicated in the Report.
8. GZA's services did not include an assessment of the presence of oil or hazardous materials at the property. Consequently, we did not consider the potential impacts (if any) that contaminants in soil or groundwater may have on construction activities, or the use of structures on the property.



9. Recommendations for foundation drainage, waterproofing, and moisture control address the conventional geotechnical engineering aspects of seepage control. These recommendations may not preclude an environment that allows the infestation of mold or other biological pollutants.

COMPLIANCE WITH CODES AND REGULATIONS

10. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

COST ESTIMATES

11. Unless otherwise stated, our cost estimates are only for comparative and general planning purposes. These estimates may involve approximate quantity evaluations. Note that these quantity estimates are not intended to be sufficiently accurate to develop construction bids, or to predict the actual cost of work addressed in this Report. Further, since we have no control over either when the work will take place or the labor and material costs required to plan and execute the anticipated work, our cost estimates were made by relying on our experience, the experience of others, and other sources of readily available information. Actual costs may vary over time and could be significantly more, or less, than stated in the Report.

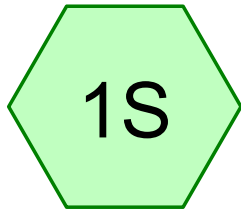
ADDITIONAL SERVICES

12. GZA recommends that we be retained to provide services during any future: site observations, design, implementation activities, construction and/or property development/redevelopment. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.

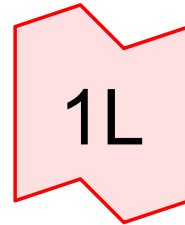


APPENDIX B

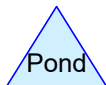
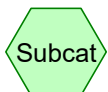
HYDROCAD 10 STORMWATER MODELLING



WS-1



Seekonk River



Routing Diagram for Existing E River Street
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Existing E River Street

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Project Notes

Rainfall events imported from "Proposed E River Street.hcp"

Existing E River Street

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Rainfall Events Listing (selected events)

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	3.30	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.90	2
3	25-Year	Type III 24-hr		Default	24.00	1	6.10	2
4	100-Year	Type III 24-hr		Default	24.00	1	8.70	2
5	WQV	Type III 24-hr		Default	24.00	1	1.00	2

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.020	98	Roofs, HSG A (1S)
1.995	30	Woods, Good, HSG A (1S)
2.015	31	TOTAL AREA

Existing E River Street

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.015	HSG A	1S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
2.015		TOTAL AREA

Existing E River Street

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.020	0.000	0.000	0.000	0.000	0.020	Roofs	1S
1.995	0.000	0.000	0.000	0.000	1.995	Woods, Good	1S
2.015	0.000	0.000	0.000	0.000	2.015	TOTAL AREA	

Existing E River Street

Type III 24-hr 2-Year Rainfall=3.30"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: WS-1

Runoff Area=2.015 ac 0.99% Impervious Runoff Depth=0.00"
Flow Length=212' Slope=0.1400 '/' Tc=14.0 min CN=31 Runoff=0.00 cfs 0.000 af

Link 1L: Seekonk River

Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 2.015 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
99.01% Pervious = 1.995 ac 0.99% Impervious = 0.020 ac

Existing E River Street

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Type III 24-hr 2-Year Rainfall=3.30"

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Summary for Subcatchment 1S: WS-1

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Routed to Link 1L : Seekonk River

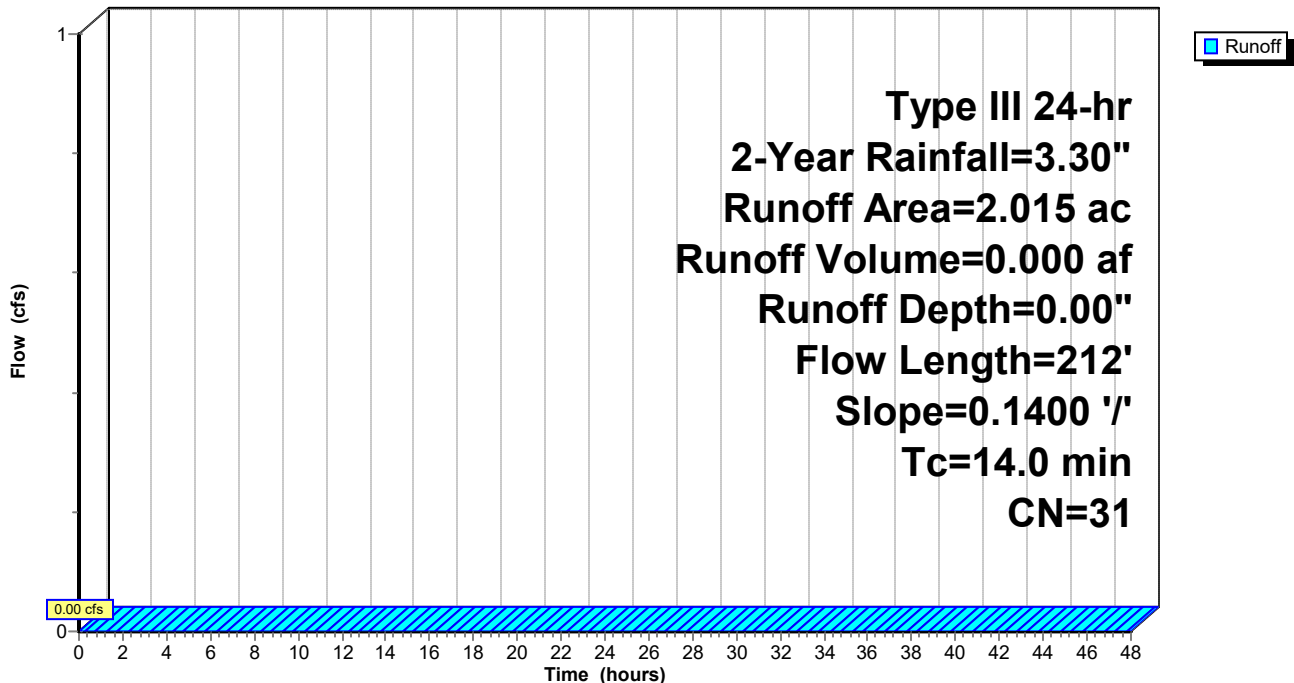
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.30"

Area (ac)	CN	Description
0.020	98	Roofs, HSG A
1.995	30	Woods, Good, HSG A
2.015	31	Weighted Average
1.995		99.01% Pervious Area
0.020		0.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	150	0.1400	0.19		Sheet Flow, Sheet flow through woods Woods: Light underbrush n= 0.400 P2= 3.30"
0.6	62	0.1400	1.87		Shallow Concentrated Flow, Shallow flow through woods Woodland Kv= 5.0 fps
14.0	212	Total			

Subcatchment 1S: WS-1

Hydrograph



Existing E River Street

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Type III 24-hr 2-Year Rainfall=3.30"

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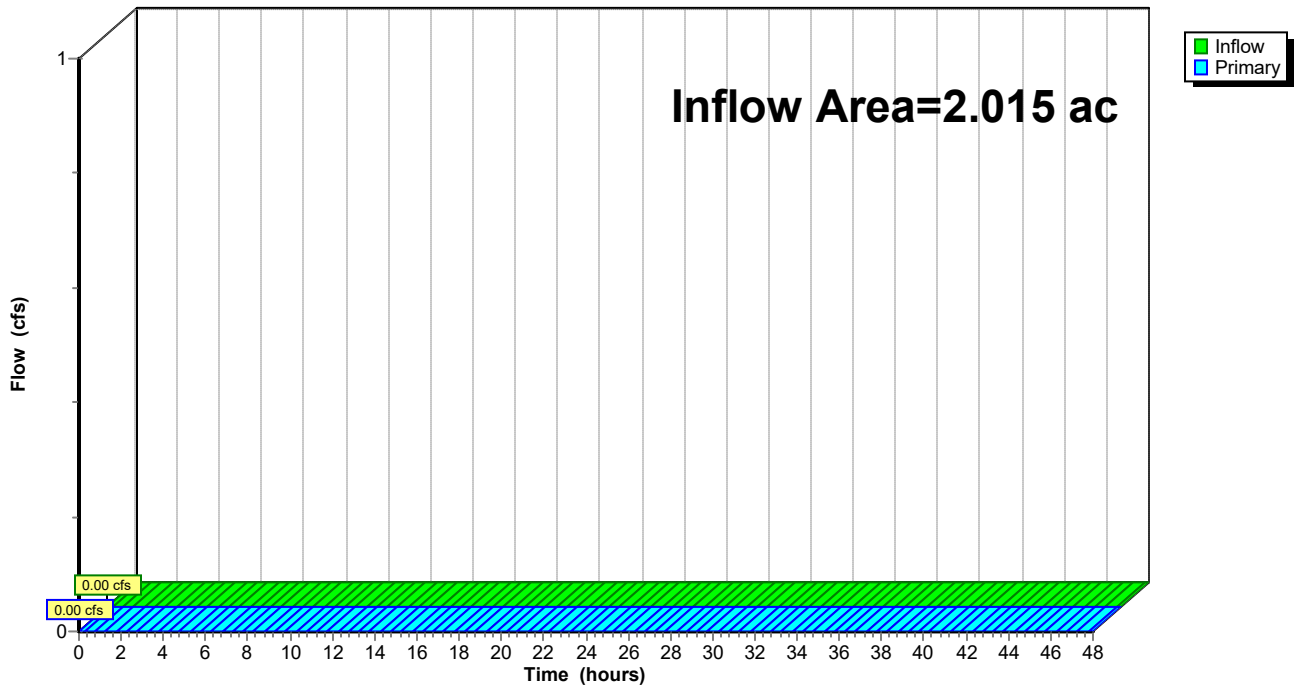
Summary for Link 1L: Seekonk River

Inflow Area = 2.015 ac, 0.99% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 1L: Seekonk River

Hydrograph



Existing E River Street

Type III 24-hr 10-Year Rainfall=4.90"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: WS-1

Runoff Area=2.015 ac 0.99% Impervious Runoff Depth=0.01"
Flow Length=212' Slope=0.1400 '/' Tc=14.0 min CN=31 Runoff=0.00 cfs 0.001 af

Link 1L: Seekonk River

Inflow=0.00 cfs 0.001 af
Primary=0.00 cfs 0.001 af

Total Runoff Area = 2.015 ac Runoff Volume = 0.001 af Average Runoff Depth = 0.01"
99.01% Pervious = 1.995 ac 0.99% Impervious = 0.020 ac

Existing E River Street

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Type III 24-hr 10-Year Rainfall=4.90"

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Summary for Subcatchment 1S: WS-1

Runoff = 0.00 cfs @ 23.15 hrs, Volume= 0.001 af, Depth= 0.01"
 Routed to Link 1L : Seekonk River

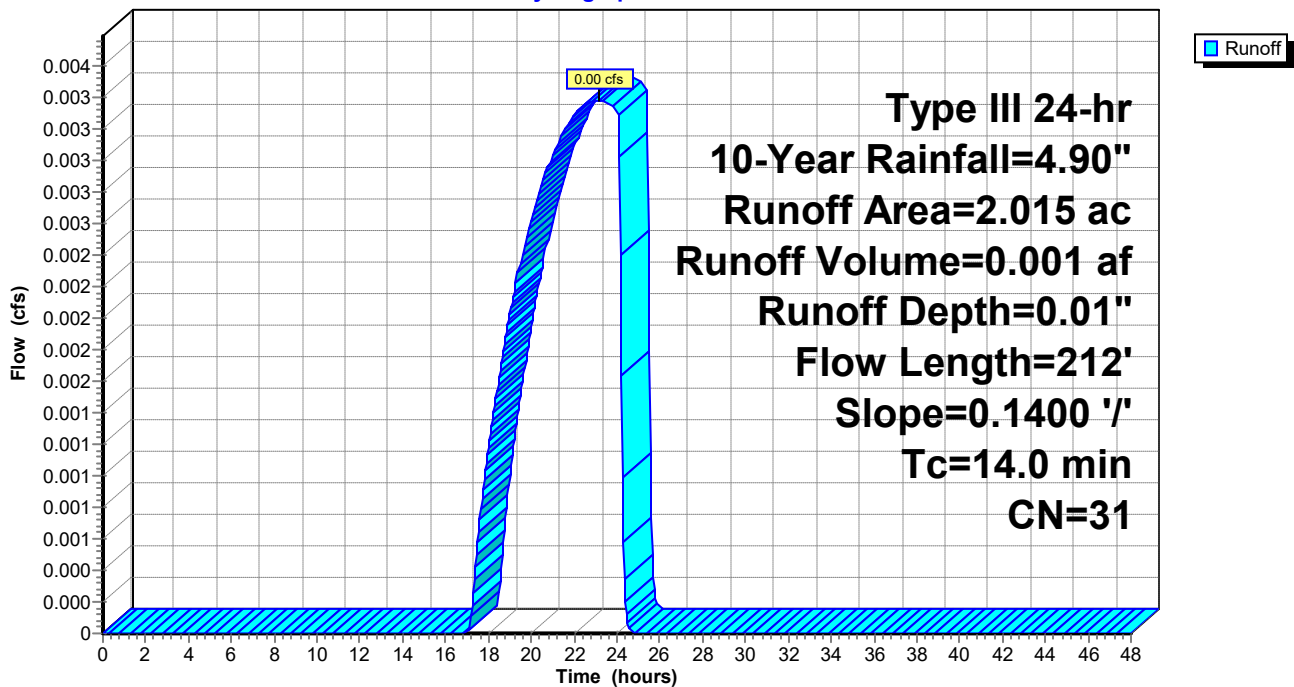
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.90"

Area (ac)	CN	Description
0.020	98	Roofs, HSG A
1.995	30	Woods, Good, HSG A
2.015	31	Weighted Average
1.995		99.01% Pervious Area
0.020		0.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	150	0.1400	0.19		Sheet Flow, Sheet flow through woods Woods: Light underbrush n= 0.400 P2= 3.30"
0.6	62	0.1400	1.87		Shallow Concentrated Flow, Shallow flow through woods Woodland Kv= 5.0 fps
14.0	212	Total			

Subcatchment 1S: WS-1

Hydrograph



Existing E River Street

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Type III 24-hr 10-Year Rainfall=4.90"

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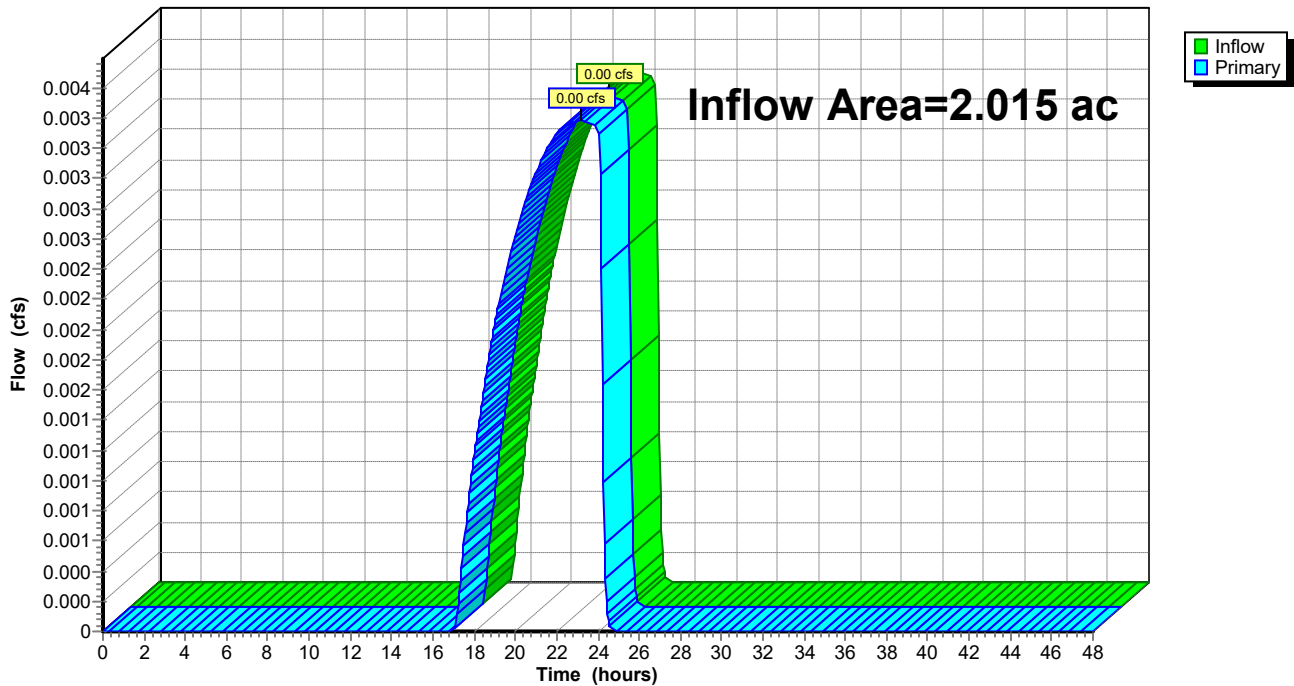
Summary for Link 1L: Seekonk River

Inflow Area = 2.015 ac, 0.99% Impervious, Inflow Depth = 0.01" for 10-Year event
Inflow = 0.00 cfs @ 23.15 hrs, Volume= 0.001 af
Primary = 0.00 cfs @ 23.15 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 1L: Seekonk River

Hydrograph



Existing E River Street

Type III 24-hr 25-Year Rainfall=6.10"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: WS-1

Runoff Area=2.015 ac 0.99% Impervious Runoff Depth=0.11"
Flow Length=212' Slope=0.1400 '/' Tc=14.0 min CN=31 Runoff=0.03 cfs 0.019 af

Link 1L: Seekonk River

Inflow=0.03 cfs 0.019 af
Primary=0.03 cfs 0.019 af

Total Runoff Area = 2.015 ac Runoff Volume = 0.019 af Average Runoff Depth = 0.11"
99.01% Pervious = 1.995 ac 0.99% Impervious = 0.020 ac

Existing E River Street

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Type III 24-hr 25-Year Rainfall=6.10"

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Summary for Subcatchment 1S: WS-1

Runoff = 0.03 cfs @ 15.15 hrs, Volume= 0.019 af, Depth= 0.11"
 Routed to Link 1L : Seekonk River

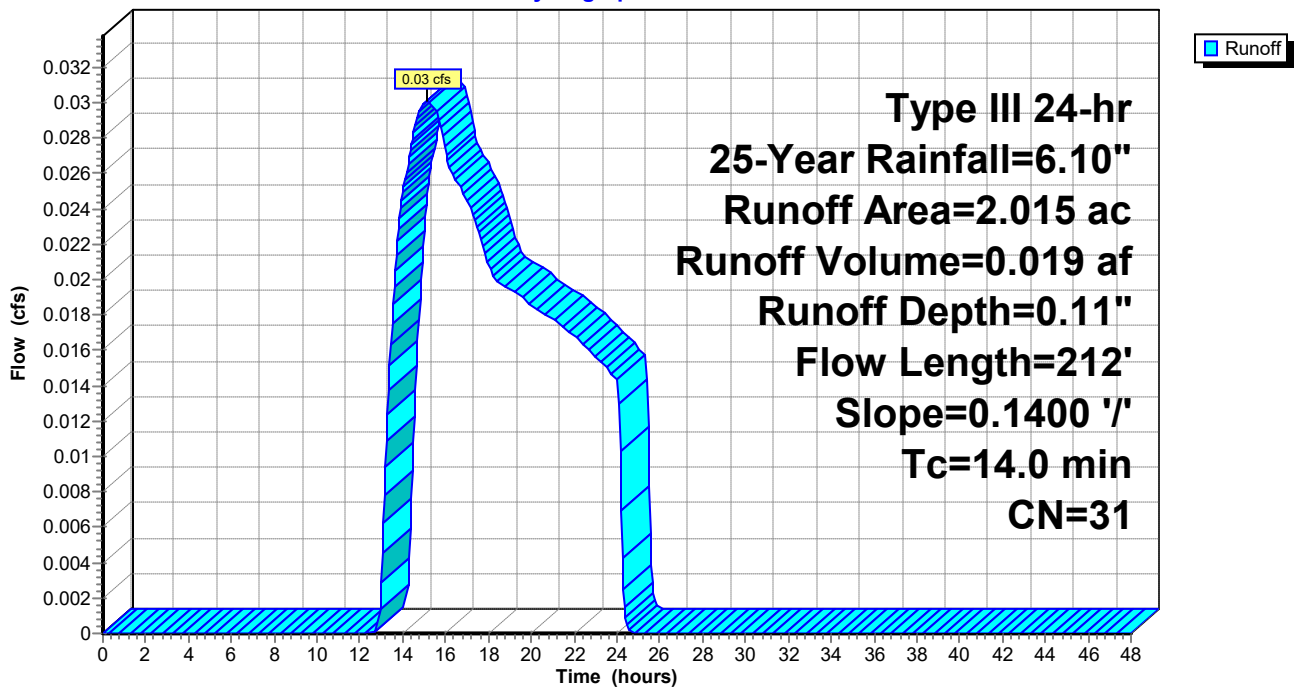
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.10"

Area (ac)	CN	Description
0.020	98	Roofs, HSG A
1.995	30	Woods, Good, HSG A
2.015	31	Weighted Average
1.995		99.01% Pervious Area
0.020		0.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	150	0.1400	0.19		Sheet Flow, Sheet flow through woods Woods: Light underbrush n= 0.400 P2= 3.30"
0.6	62	0.1400	1.87		Shallow Concentrated Flow, Shallow flow through woods Woodland Kv= 5.0 fps
14.0	212	Total			

Subcatchment 1S: WS-1

Hydrograph



Existing E River Street

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Type III 24-hr 25-Year Rainfall=6.10"

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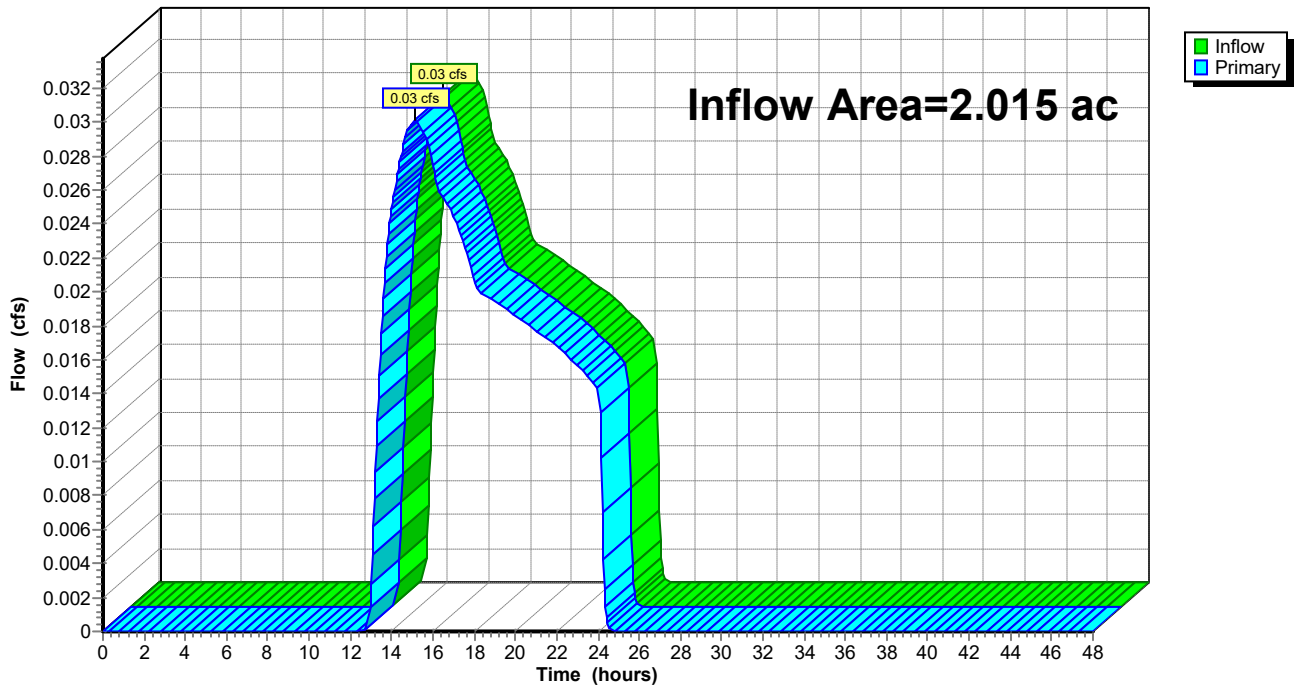
Summary for Link 1L: Seekonk River

Inflow Area = 2.015 ac, 0.99% Impervious, Inflow Depth = 0.11" for 25-Year event
Inflow = 0.03 cfs @ 15.15 hrs, Volume= 0.019 af
Primary = 0.03 cfs @ 15.15 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 1L: Seekonk River

Hydrograph



Existing E River Street

Type III 24-hr 100-Year Rainfall=8.70"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: WS-1

Runoff Area=2.015 ac 0.99% Impervious Runoff Depth=0.68"
Flow Length=212' Slope=0.1400 '/' Tc=14.0 min CN=31 Runoff=0.52 cfs 0.114 af

Link 1L: Seekonk River

Inflow=0.52 cfs 0.114 af
Primary=0.52 cfs 0.114 af

Total Runoff Area = 2.015 ac Runoff Volume = 0.114 af Average Runoff Depth = 0.68"
99.01% Pervious = 1.995 ac 0.99% Impervious = 0.020 ac

Existing E River Street

Summary for Subcatchment 1S: WS-1

Runoff = 0.52 cfs @ 12.46 hrs, Volume= 0.114 af, Depth= 0.68"
 Routed to Link 1L : Seekonk River

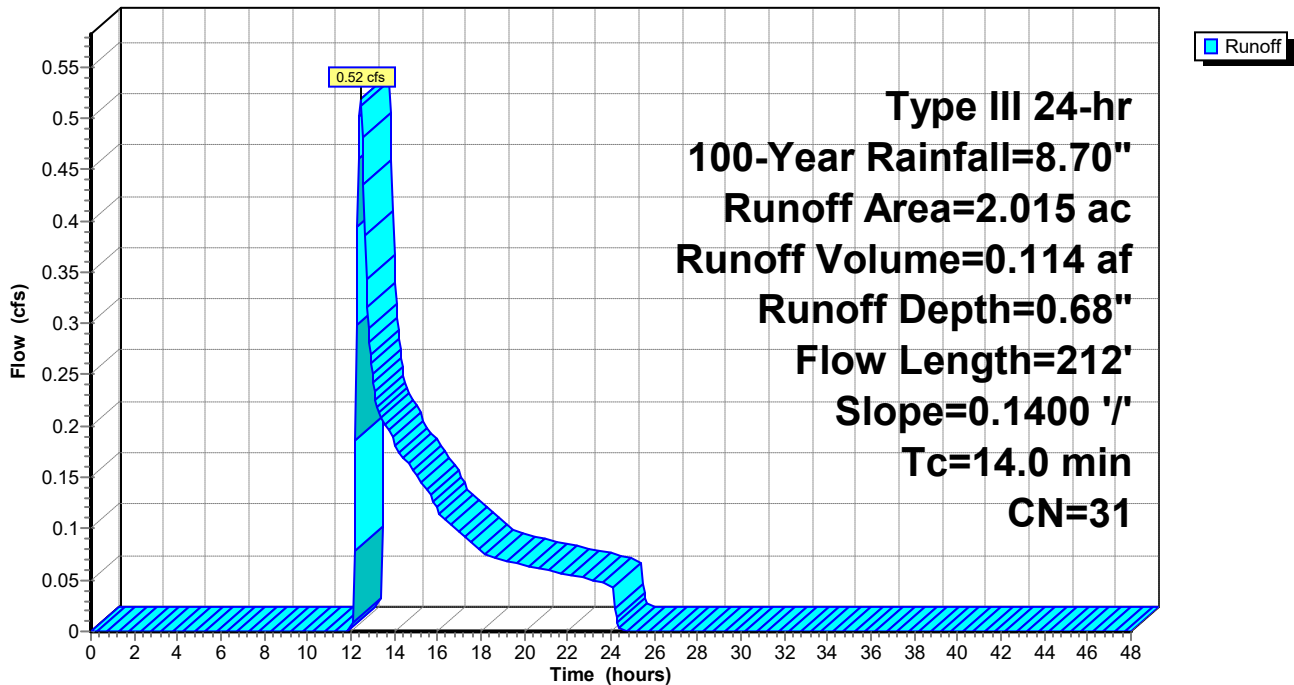
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.70"

Area (ac)	CN	Description
0.020	98	Roofs, HSG A
1.995	30	Woods, Good, HSG A
2.015	31	Weighted Average
1.995		99.01% Pervious Area
0.020		0.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	150	0.1400	0.19		Sheet Flow, Sheet flow through woods Woods: Light underbrush n= 0.400 P2= 3.30"
0.6	62	0.1400	1.87		Shallow Concentrated Flow, Shallow flow through woods Woodland Kv= 5.0 fps
14.0	212	Total			

Subcatchment 1S: WS-1

Hydrograph



Existing E River Street

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Type III 24-hr 100-Year Rainfall=8.70"

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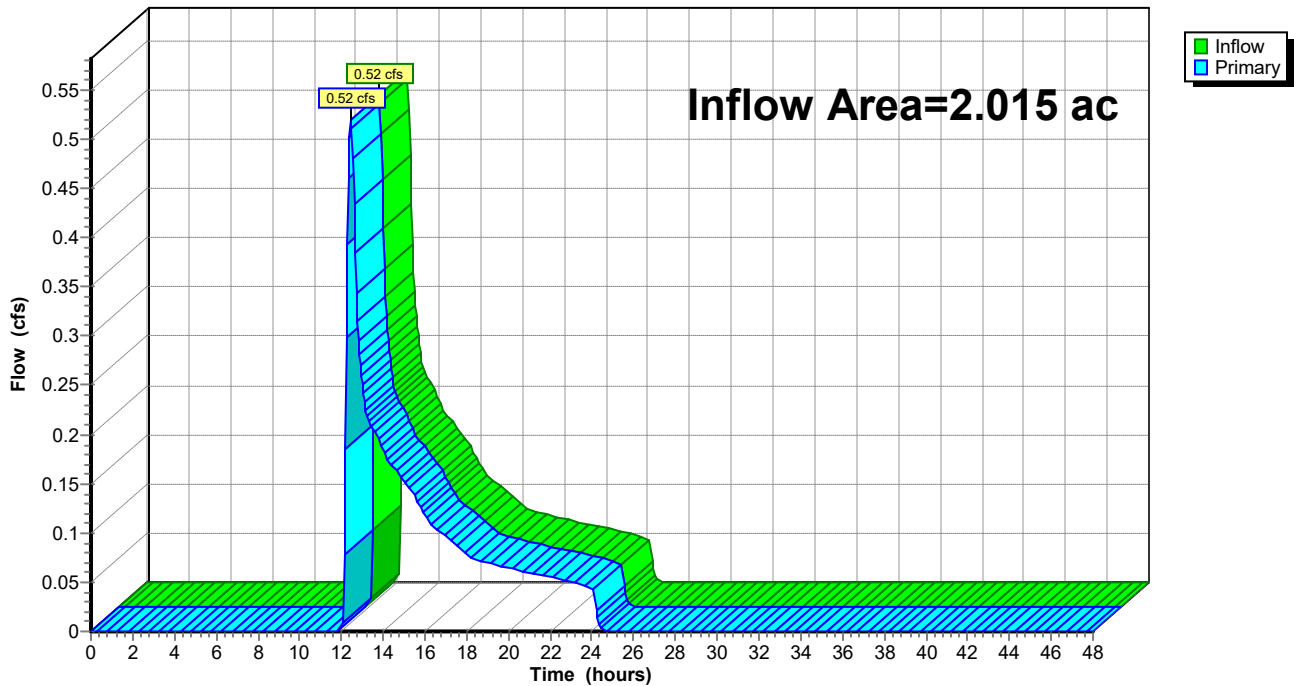
Summary for Link 1L: Seekonk River

Inflow Area = 2.015 ac, 0.99% Impervious, Inflow Depth = 0.68" for 100-Year event
Inflow = 0.52 cfs @ 12.46 hrs, Volume= 0.114 af
Primary = 0.52 cfs @ 12.46 hrs, Volume= 0.114 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 1L: Seekonk River

Hydrograph



Existing E River Street

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Type III 24-hr WQV Rainfall=1.00"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: WS-1

Runoff Area=2.015 ac 0.99% Impervious Runoff Depth=0.00"
Flow Length=212' Slope=0.1400 '/' Tc=14.0 min CN=31 Runoff=0.00 cfs 0.000 af

Link 1L: Seekonk River

Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 2.015 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
99.01% Pervious = 1.995 ac 0.99% Impervious = 0.020 ac

Existing E River Street

Summary for Subcatchment 1S: WS-1

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Link 1L : Seekonk River

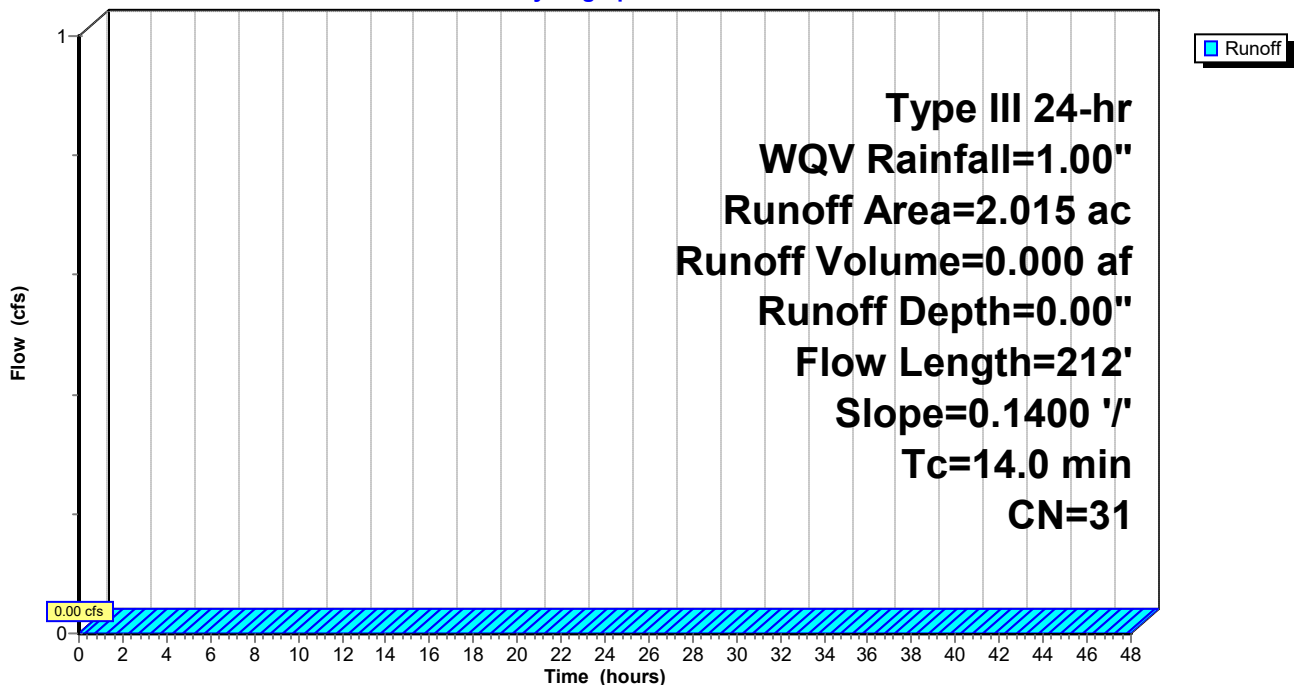
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr WQV Rainfall=1.00"

Area (ac)	CN	Description
0.020	98	Roofs, HSG A
1.995	30	Woods, Good, HSG A
2.015	31	Weighted Average
1.995		99.01% Pervious Area
0.020		0.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	150	0.1400	0.19		Sheet Flow, Sheet flow through woods Woods: Light underbrush n= 0.400 P2= 3.30"
0.6	62	0.1400	1.87		Shallow Concentrated Flow, Shallow flow through woods Woodland Kv= 5.0 fps
14.0	212	Total			

Subcatchment 1S: WS-1

Hydrograph



Existing E River Street

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Type III 24-hr WQV Rainfall=1.00"

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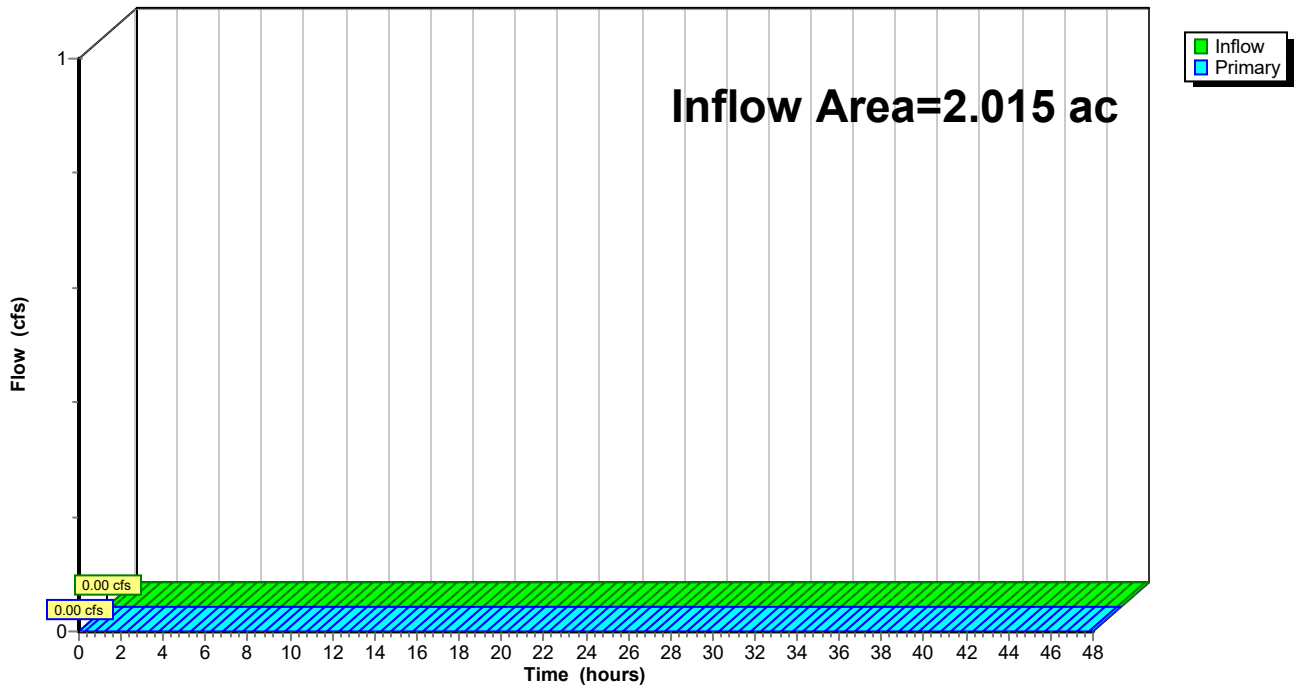
Summary for Link 1L: Seekonk River

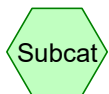
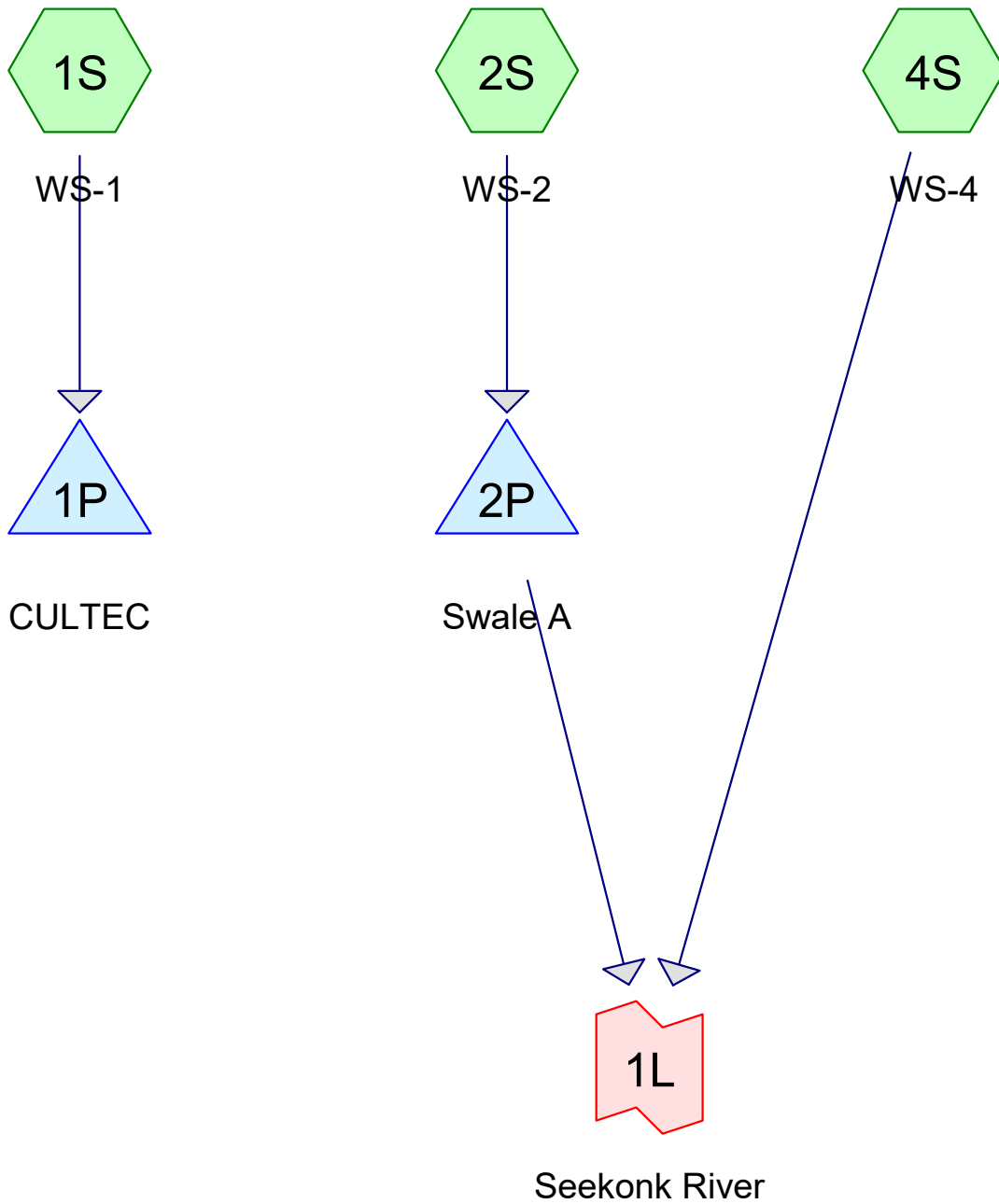
Inflow Area = 2.015 ac, 0.99% Impervious, Inflow Depth = 0.00" for WQV event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 1L: Seekonk River

Hydrograph

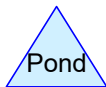




Subcat



Reach



Pond



Link

Routing Diagram for Proposed E River Street

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Proposed E River Street

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Project Notes

Rainfall events imported from "FPLP As Built Model.hcp"

Proposed E River Street

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Rainfall Events Listing (selected events)

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	3.30	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.90	2
3	25-Year	Type III 24-hr		Default	24.00	1	6.10	2
4	100-Year	Type III 24-hr		Default	24.00	1	8.70	2
5	WQV	Type III 24-hr		Default	24.00	1	1.00	2

Proposed E River Street

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.269	39	>75% Grass cover, Good, HSG A (2S)
0.161	98	Asphalt walking path (2S)
1.101	98	Roofs/Paved (1S)
0.485	30	Woods, Good, HSG A (4S)
2.016	74	TOTAL AREA

Proposed E River Street

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.754	HSG A	2S, 4S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
1.262	Other	1S, 2S
2.016		TOTAL AREA

Proposed E River Street

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.269	0.000	0.000	0.000	0.000	0.269	>75% Grass cover, Good	2S
0.000	0.000	0.000	0.000	0.161	0.161	Asphalt walking path	2S
0.000	0.000	0.000	0.000	1.101	1.101	Roofs/Paved	1S
0.485	0.000	0.000	0.000	0.000	0.485	Woods, Good	4S
0.754	0.000	0.000	0.000	1.262	2.016	TOTAL AREA	

Proposed E River Street

Type III 24-hr 2-Year Rainfall=3.30"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: WS-1 Runoff Area=1.101 ac 100.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=98 Runoff=3.45 cfs 0.281 af

Subcatchment 2S: WS-2 Runoff Area=0.430 ac 37.44% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=61 Runoff=0.16 cfs 0.017 af

Subcatchment 4S: WS-4 Runoff Area=0.485 ac 0.00% Impervious Runoff Depth=0.00"
Tc=0.0 min CN=30 Runoff=0.00 cfs 0.000 af

Pond 1P: CULTEC Peak Elev=17.38' Storage=0.056 af Inflow=3.45 cfs 0.281 af
Outflow=1.35 cfs 0.281 af

Pond 2P: Swale A Peak Elev=19.01' Storage=0.000 af Inflow=0.16 cfs 0.017 af
Discarded=0.15 cfs 0.017 af Primary=0.00 cfs 0.000 af Outflow=0.15 cfs 0.017 af

Link 1L: Seekonk River Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 2.016 ac Runoff Volume = 0.299 af Average Runoff Depth = 1.78"
37.40% Pervious = 0.754 ac 62.60% Impervious = 1.262 ac

Proposed E River Street

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Type III 24-hr 2-Year Rainfall=3.30"

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Summary for Subcatchment 1S: WS-1

Runoff = 3.45 cfs @ 12.09 hrs, Volume= 0.281 af, Depth= 3.07"
Routed to Pond 1P : CULTEC

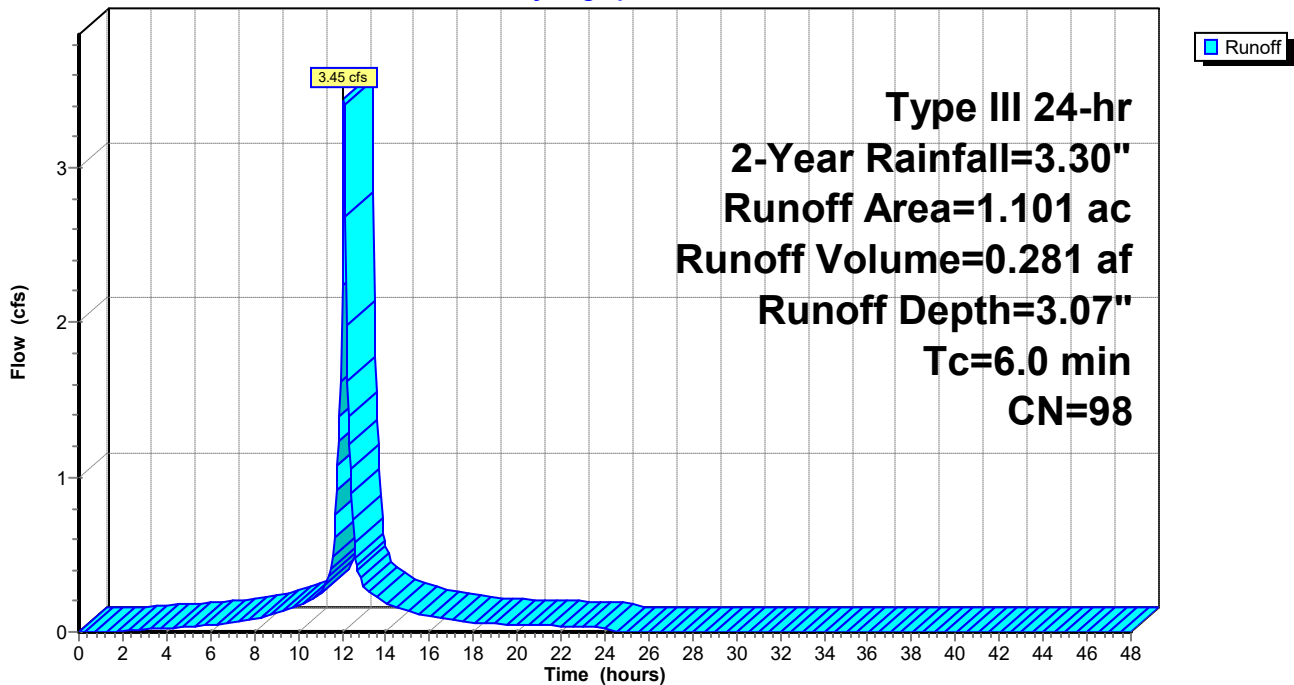
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.30"

Area (ac)	CN	Description
* 1.101	98	Roofs/Paved
1.101		100.00% Impervious Area

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

Subcatchment 1S: WS-1

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.30"

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Summary for Subcatchment 2S: WS-2

Runoff = 0.16 cfs @ 12.12 hrs, Volume= 0.017 af, Depth= 0.49"
 Routed to Pond 2P : Swale A

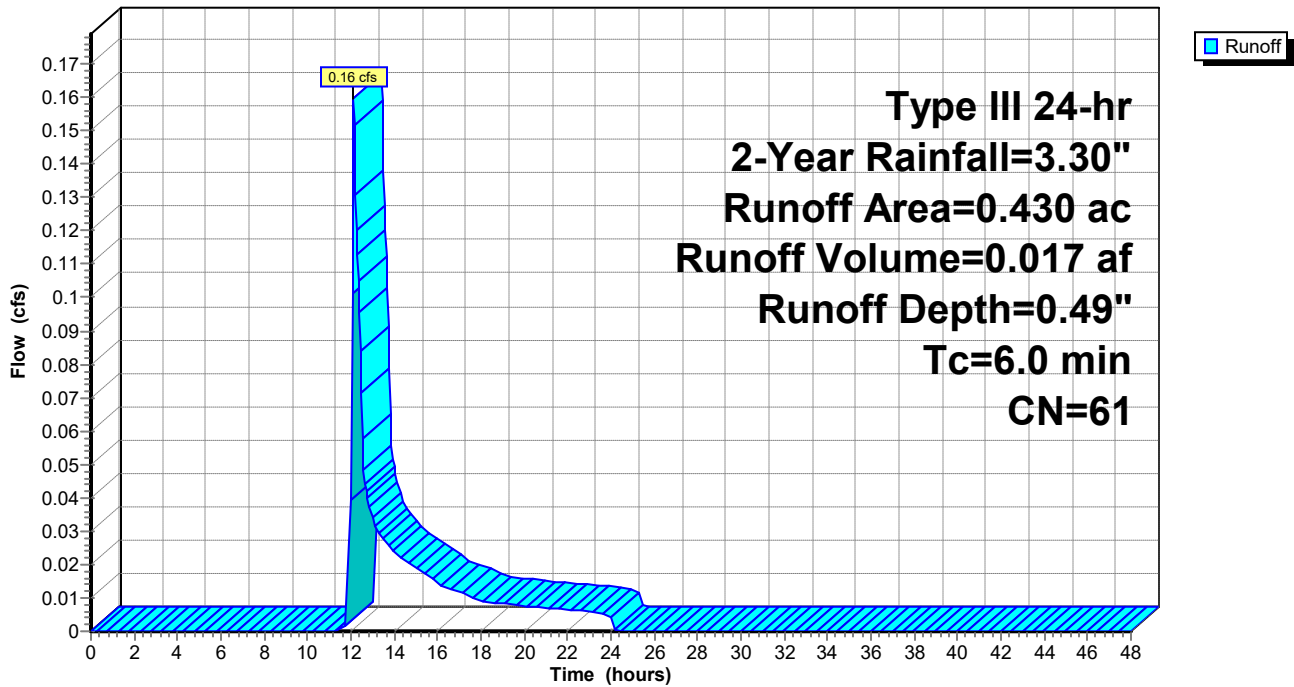
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.30"

Area (ac)	CN	Description
* 0.161	98	Asphalt walking path
0.269	39	>75% Grass cover, Good, HSG A
0.430	61	Weighted Average
0.269		62.56% Pervious Area
0.161		37.44% Impervious Area

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

Subcatchment 2S: WS-2

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.30"

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Summary for Subcatchment 4S: WS-4

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

[45] Hint: Runoff=Zero

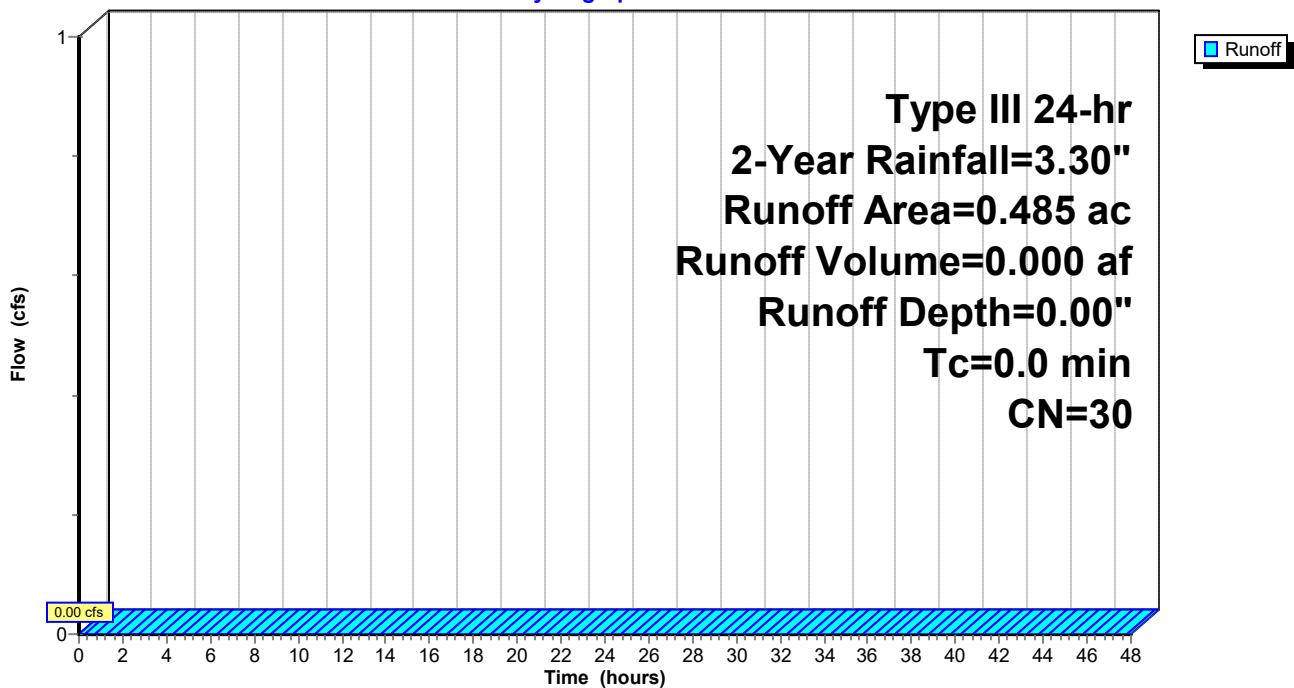
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link 1L : Seekonk River

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.30"

Area (ac)	CN	Description
0.485	30	Woods, Good, HSG A
0.485		100.00% Pervious Area

Subcatchment 4S: WS-4

Hydrograph



Proposed E River Street

Type III 24-hr 2-Year Rainfall=3.30"

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Summary for Pond 1P: CULTEC

Inflow Area = 1.101 ac, 100.00% Impervious, Inflow Depth = 3.07" for 2-Year event
 Inflow = 3.45 cfs @ 12.09 hrs, Volume= 0.281 af
 Outflow = 1.35 cfs @ 12.31 hrs, Volume= 0.281 af, Atten= 61%, Lag= 13.7 min
 Discarded = 1.35 cfs @ 12.31 hrs, Volume= 0.281 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 17.38' @ 12.31 hrs Surf.Area= 0.153 ac Storage= 0.056 af

Plug-Flow detention time= 20.6 min calculated for 0.281 af (100% of inflow)
 Center-of-Mass det. time= 20.5 min (776.3 - 755.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	15.75'	0.026 af	28.00'W x 52.00'L x 3.21'H Field A 0.107 af Overall - 0.042 af Embedded = 0.065 af x 40.0% Voids
#2A	16.25'	0.042 af	Cultec R-280HD x 42 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
#3B	17.00'	0.039 af	14.75'W x 143.00'L x 3.21'H Field B 0.155 af Overall - 0.059 af Embedded = 0.096 af x 40.0% Voids
#4B	17.50'	0.059 af	Cultec R-280HD x 60 Inside #3 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 3 rows
#5C	17.00'	0.030 af	28.00'W x 59.00'L x 3.21'H Field C 0.122 af Overall - 0.048 af Embedded = 0.074 af x 40.0% Voids
#6C	17.50'	0.048 af	Cultec R-280HD x 48 Inside #5 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
#7D	17.00'	0.026 af	28.00'W x 52.00'L x 3.21'H Field D 0.107 af Overall - 0.042 af Embedded = 0.065 af x 40.0% Voids
#8D	17.50'	0.042 af	Cultec R-280HD x 42 Inside #7 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
		0.311 af	Total Available Storage

Storage Group A created with Chamber Wizard
 Storage Group B created with Chamber Wizard
 Storage Group C created with Chamber Wizard
 Storage Group D created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	15.75'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 4.84'

Discarded OutFlow Max=1.35 cfs @ 12.31 hrs HW=17.38' (Free Discharge)
 ↑1=Exfiltration (Controls 1.35 cfs)

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Type III 24-hr 2-Year Rainfall=3.30"

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Pond 1P: CULTEC - Chamber Wizard Field A

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 6 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

7 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 50.00' Row Length +12.0" End Stone x 2 = 52.00' Base Length

6 Rows x 47.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 28.00' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

42 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 6 Rows = 1,821.5 cf Chamber Storage

4,671.3 cf Field - 1,821.5 cf Chambers = 2,849.8 cf Stone x 40.0% Voids = 1,139.9 cf Stone Storage

Chamber Storage + Stone Storage = 2,961.4 cf = 0.068 af

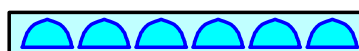
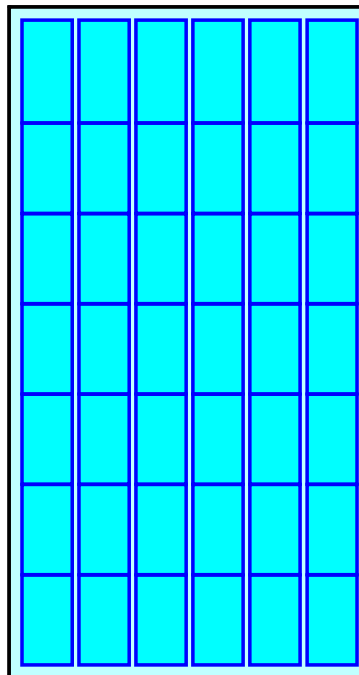
Overall Storage Efficiency = 63.4%

Overall System Size = 52.00' x 28.00' x 3.21'

42 Chambers

173.0 cy Field

105.5 cy Stone



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Type III 24-hr 2-Year Rainfall=3.30"

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Pond 1P: CULTEC - Chamber Wizard Field B

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 3 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

20 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 141.00' Row Length +12.0" End Stone x 2 = 143.00' Base Length

3 Rows x 47.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 14.75' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

60 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 3 Rows = 2,568.4 cf Chamber Storage

6,767.2 cf Field - 2,568.4 cf Chambers = 4,198.8 cf Stone x 40.0% Voids = 1,679.5 cf Stone Storage

Chamber Storage + Stone Storage = 4,247.9 cf = 0.098 af

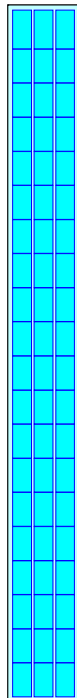
Overall Storage Efficiency = 62.8%

Overall System Size = 143.00' x 14.75' x 3.21'

60 Chambers

250.6 cy Field

155.5 cy Stone



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Pond 1P: CULTEC - Chamber Wizard Field C

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 6 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

8 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 57.00' Row Length +12.0" End Stone x 2 = 59.00' Base Length

6 Rows x 47.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 28.00' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

48 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 6 Rows = 2,076.5 cf Chamber Storage

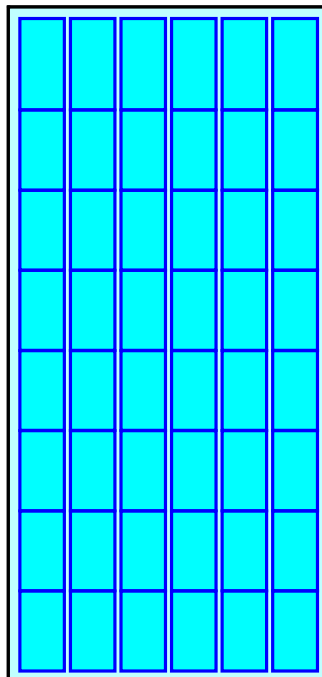
5,300.2 cf Field - 2,076.5 cf Chambers = 3,223.6 cf Stone x 40.0% Voids = 1,289.5 cf Stone Storage

Chamber Storage + Stone Storage = 3,366.0 cf = 0.077 af

Overall Storage Efficiency = 63.5%

Overall System Size = 59.00' x 28.00' x 3.21'

48 Chambers
196.3 cy Field
119.4 cy Stone



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Pond 1P: CULTEC - Chamber Wizard Field D

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 6 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

7 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 50.00' Row Length +12.0" End Stone x 2 = 52.00' Base Length

6 Rows x 47.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 28.00' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

42 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 6 Rows = 1,821.5 cf Chamber Storage

4,671.3 cf Field - 1,821.5 cf Chambers = 2,849.8 cf Stone x 40.0% Voids = 1,139.9 cf Stone Storage

Chamber Storage + Stone Storage = 2,961.4 cf = 0.068 af

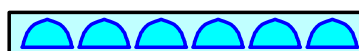
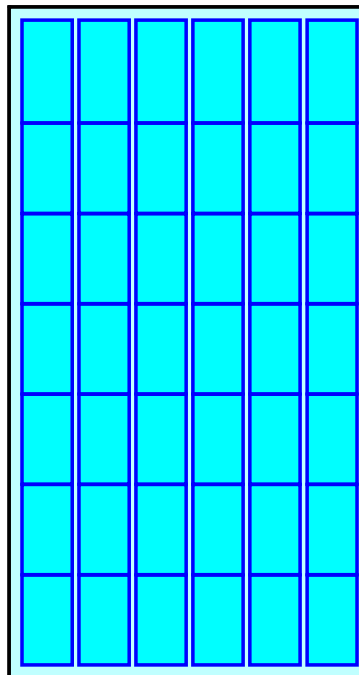
Overall Storage Efficiency = 63.4%

Overall System Size = 52.00' x 28.00' x 3.21'

42 Chambers

173.0 cy Field

105.5 cy Stone



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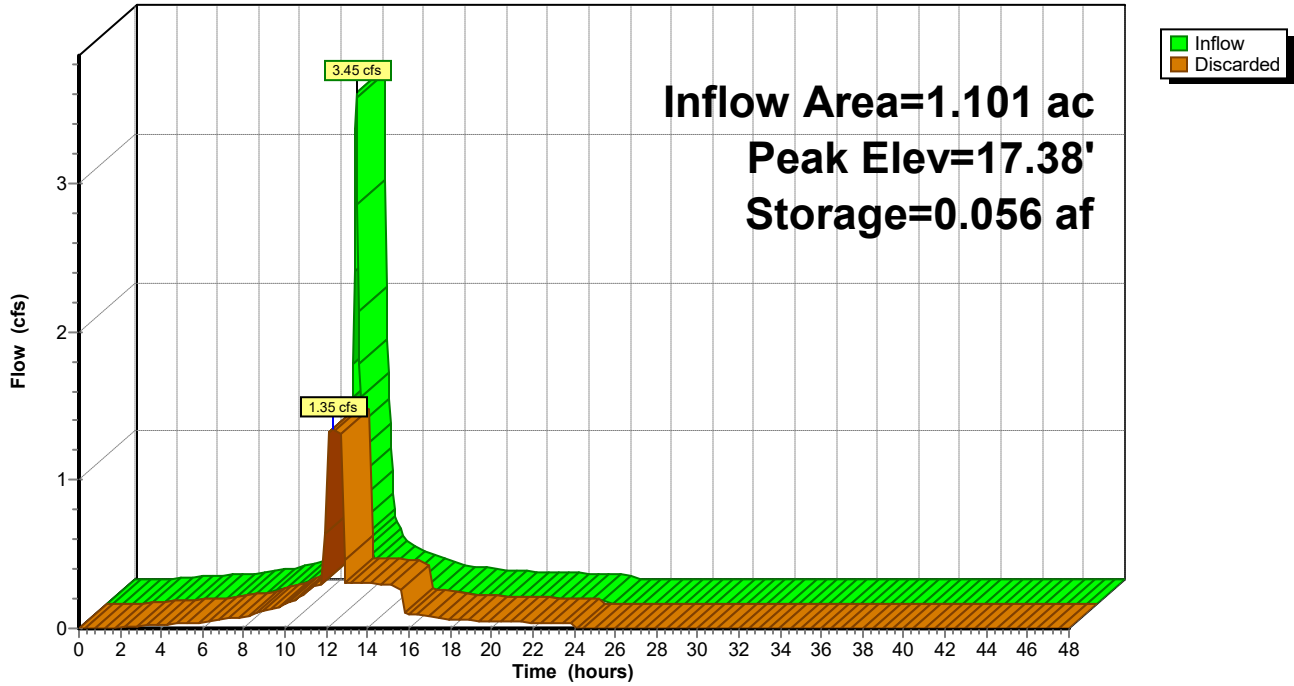
Type III 24-hr 2-Year Rainfall=3.30"

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Pond 1P: CULTEC

Hydrograph



Proposed E River Street

Type III 24-hr 2-Year Rainfall=3.30"

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Summary for Pond 2P: Swale A

Inflow Area = 0.430 ac, 37.44% Impervious, Inflow Depth = 0.49" for 2-Year event
 Inflow = 0.16 cfs @ 12.12 hrs, Volume= 0.017 af
 Outflow = 0.15 cfs @ 12.16 hrs, Volume= 0.017 af, Atten= 6%, Lag= 2.1 min
 Discarded = 0.15 cfs @ 12.16 hrs, Volume= 0.017 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link 1L : Seekonk River

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 19.01' @ 12.15 hrs Surf.Area= 0.018 ac Storage= 0.000 af

Plug-Flow detention time= 0.9 min calculated for 0.017 af (100% of inflow)
 Center-of-Mass det. time= 0.9 min (911.8 - 910.9)

Volume	Invert	Avail.Storage	Storage Description
#1	19.00'	0.052 af	1.50'W x 500.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	19.75'	5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	19.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 5.00'

Discarded OutFlow Max=0.15 cfs @ 12.16 hrs HW=19.01' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.15 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=19.00' (Free Discharge)
 ↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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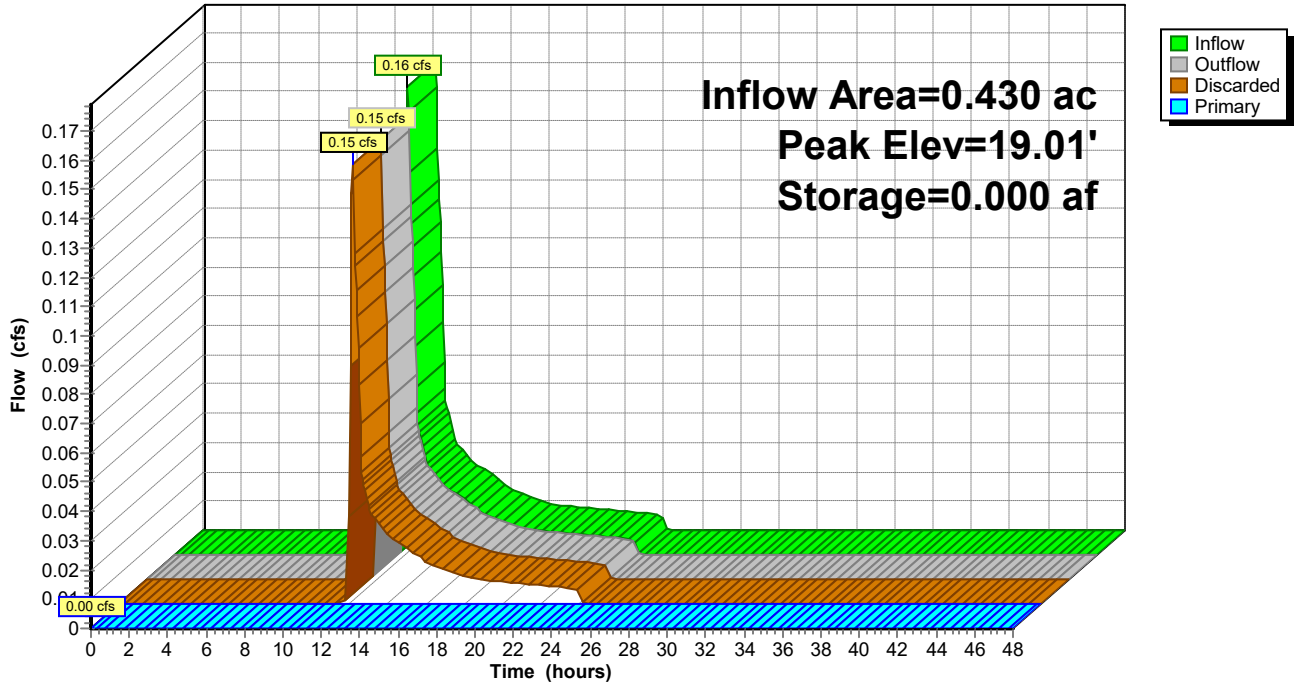
Type III 24-hr 2-Year Rainfall=3.30"

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Pond 2P: Swale A

Hydrograph



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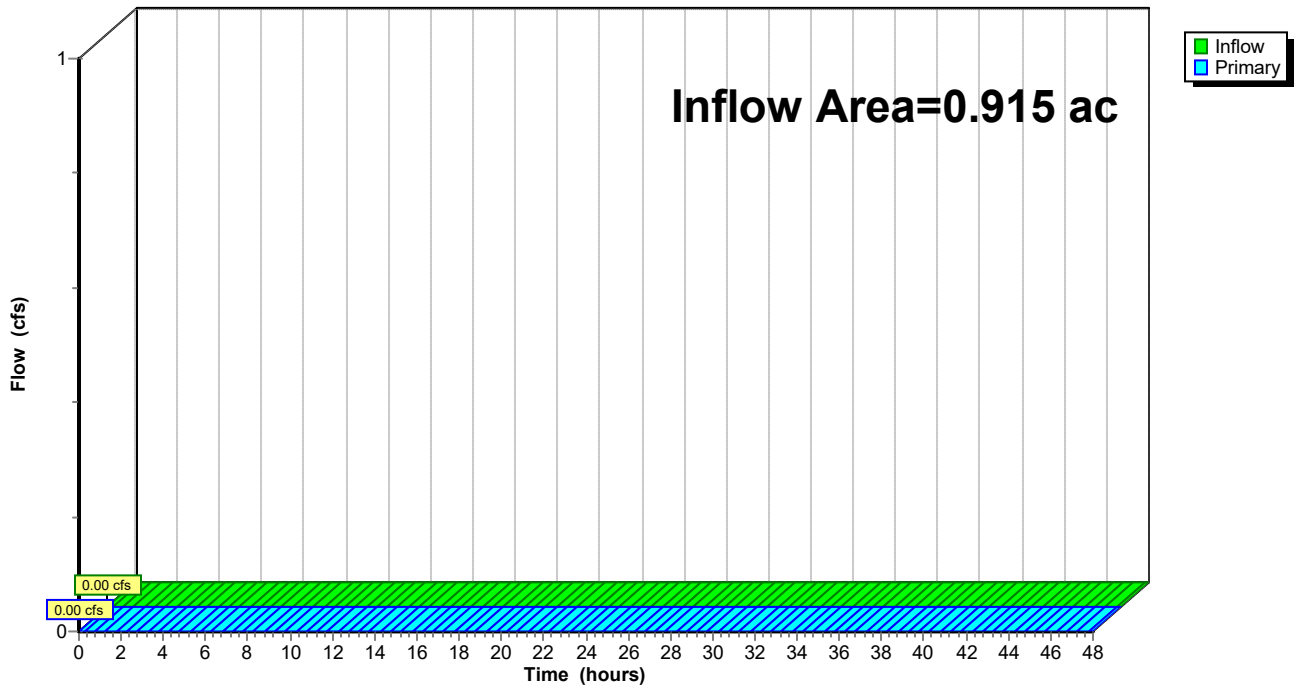
Summary for Link 1L: Seekonk River

Inflow Area = 0.915 ac, 17.60% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 1L: Seekonk River

Hydrograph



Proposed E River Street

Type III 24-hr 10-Year Rainfall=4.90"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: WS-1 Runoff Area=1.101 ac 100.00% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=5.15 cfs 0.428 af

Subcatchment 2S: WS-2 Runoff Area=0.430 ac 37.44% Impervious Runoff Depth=1.31"
Tc=6.0 min CN=61 Runoff=0.59 cfs 0.047 af

Subcatchment 4S: WS-4 Runoff Area=0.485 ac 0.00% Impervious Runoff Depth=0.00"
Tc=0.0 min CN=30 Runoff=0.00 cfs 0.000 af

Pond 1P: CULTEC Peak Elev=17.81' Storage=0.105 af Inflow=5.15 cfs 0.428 af
Outflow=1.39 cfs 0.428 af

Pond 2P: Swale A Peak Elev=19.23' Storage=0.006 af Inflow=0.59 cfs 0.047 af
Discarded=0.28 cfs 0.047 af Primary=0.00 cfs 0.000 af Outflow=0.28 cfs 0.047 af

Link 1L: Seekonk River Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 2.016 ac Runoff Volume = 0.475 af Average Runoff Depth = 2.83"
37.40% Pervious = 0.754 ac 62.60% Impervious = 1.262 ac

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Type III 24-hr 10-Year Rainfall=4.90"

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Summary for Subcatchment 1S: WS-1

Runoff = 5.15 cfs @ 12.09 hrs, Volume= 0.428 af, Depth= 4.66"
Routed to Pond 1P : CULTEC

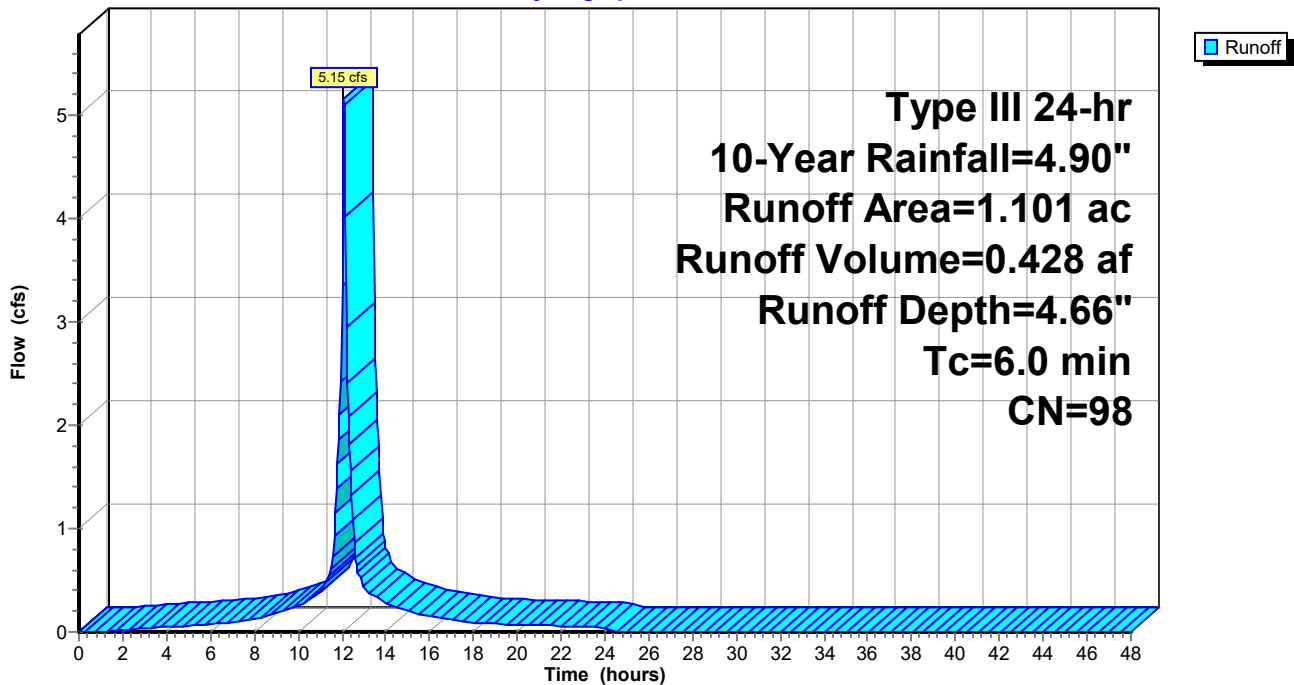
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

Area (ac)	CN	Description
* 1.101	98	Roofs/Paved
1.101		100.00% Impervious Area

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

Subcatchment 1S: WS-1

Hydrograph



Proposed E River Street

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Type III 24-hr 10-Year Rainfall=4.90"

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Summary for Subcatchment 2S: WS-2

Runoff = 0.59 cfs @ 12.10 hrs, Volume= 0.047 af, Depth= 1.31"
 Routed to Pond 2P : Swale A

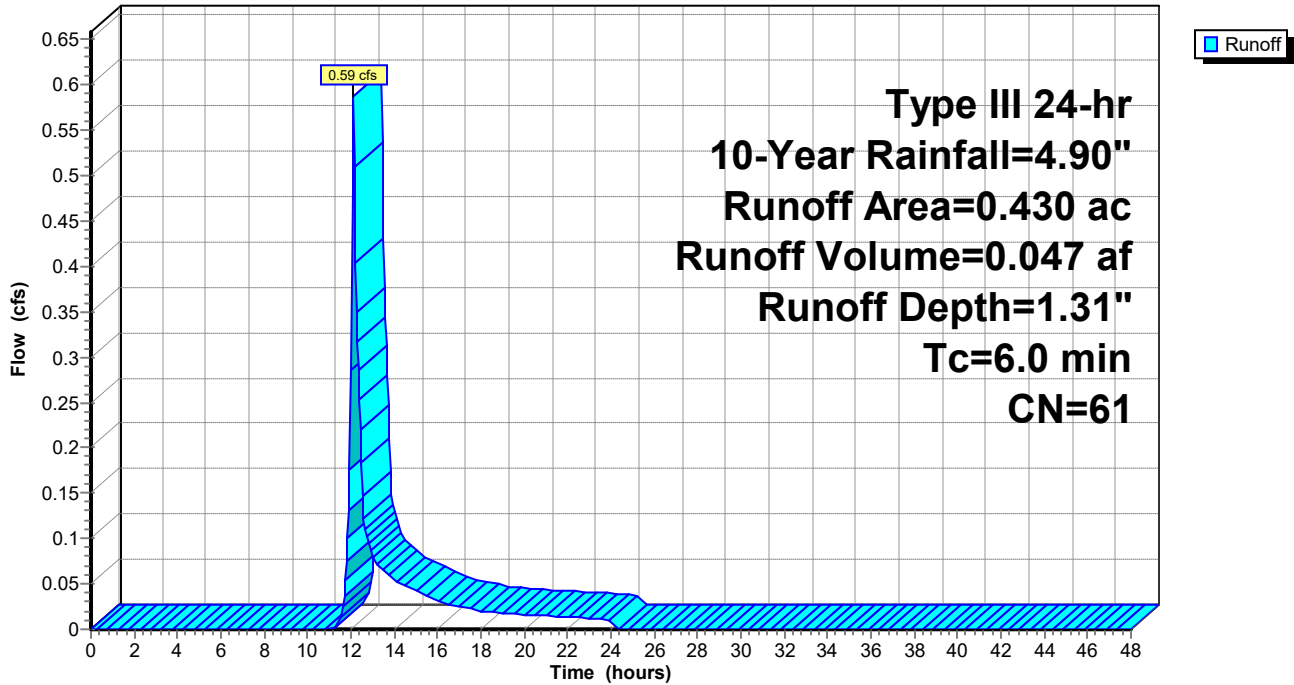
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.90"

Area (ac)	CN	Description
* 0.161	98	Asphalt walking path
0.269	39	>75% Grass cover, Good, HSG A
0.430	61	Weighted Average
0.269		62.56% Pervious Area
0.161		37.44% Impervious Area

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

Subcatchment 2S: WS-2

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.90"

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Summary for Subcatchment 4S: WS-4

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

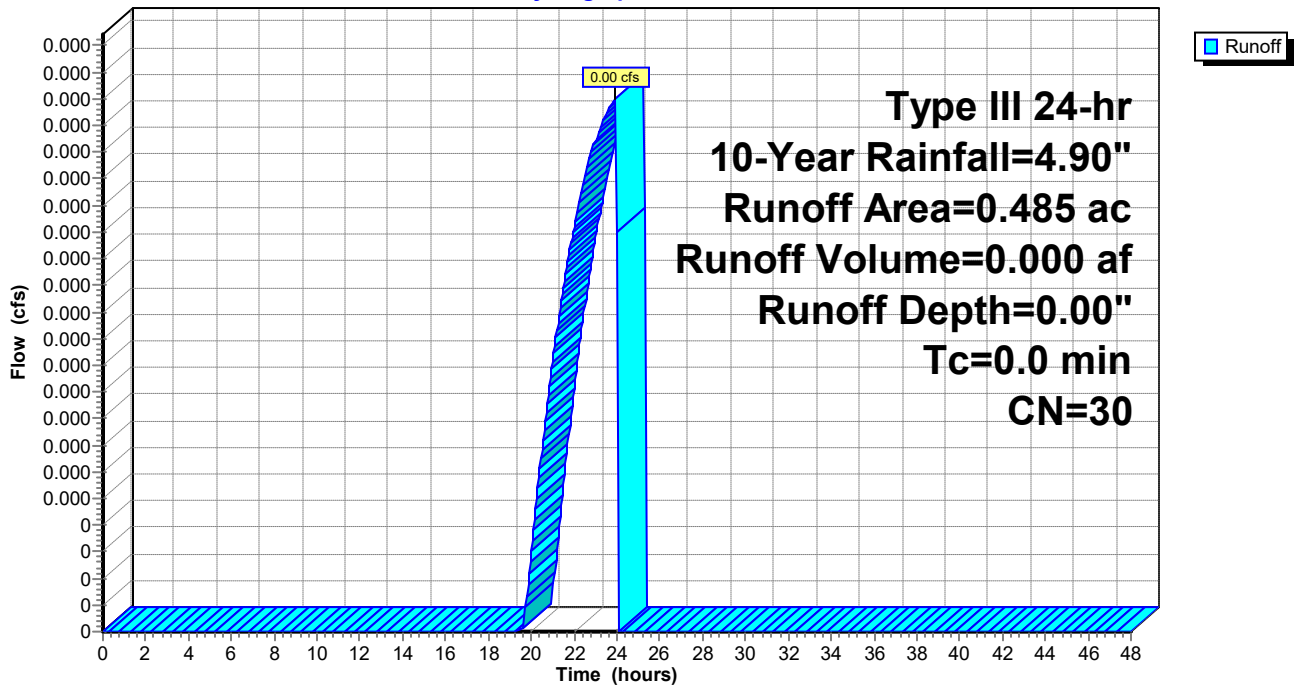
Runoff = 0.00 cfs @ 23.95 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link 1L : Seekonk River

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

Area (ac)	CN	Description
0.485	30	Woods, Good, HSG A
0.485		100.00% Pervious Area

Subcatchment 4S: WS-4

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.90"

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Summary for Pond 1P: CULTEC

Inflow Area = 1.101 ac, 100.00% Impervious, Inflow Depth = 4.66" for 10-Year event
 Inflow = 5.15 cfs @ 12.09 hrs, Volume= 0.428 af
 Outflow = 1.39 cfs @ 12.44 hrs, Volume= 0.428 af, Atten= 73%, Lag= 21.0 min
 Discarded = 1.39 cfs @ 12.44 hrs, Volume= 0.428 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 17.81' @ 12.44 hrs Surf.Area= 0.153 ac Storage= 0.105 af

Plug-Flow detention time= 27.5 min calculated for 0.427 af (100% of inflow)
 Center-of-Mass det. time= 27.5 min (775.9 - 748.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	15.75'	0.026 af	28.00'W x 52.00'L x 3.21'H Field A 0.107 af Overall - 0.042 af Embedded = 0.065 af x 40.0% Voids
#2A	16.25'	0.042 af	Cultec R-280HD x 42 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
#3B	17.00'	0.039 af	14.75'W x 143.00'L x 3.21'H Field B 0.155 af Overall - 0.059 af Embedded = 0.096 af x 40.0% Voids
#4B	17.50'	0.059 af	Cultec R-280HD x 60 Inside #3 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 3 rows
#5C	17.00'	0.030 af	28.00'W x 59.00'L x 3.21'H Field C 0.122 af Overall - 0.048 af Embedded = 0.074 af x 40.0% Voids
#6C	17.50'	0.048 af	Cultec R-280HD x 48 Inside #5 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
#7D	17.00'	0.026 af	28.00'W x 52.00'L x 3.21'H Field D 0.107 af Overall - 0.042 af Embedded = 0.065 af x 40.0% Voids
#8D	17.50'	0.042 af	Cultec R-280HD x 42 Inside #7 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
		0.311 af	Total Available Storage

Storage Group A created with Chamber Wizard
 Storage Group B created with Chamber Wizard
 Storage Group C created with Chamber Wizard
 Storage Group D created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	15.75'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 4.84'

Discarded OutFlow Max=1.39 cfs @ 12.44 hrs HW=17.81' (Free Discharge)
 ↑1=Exfiltration (Controls 1.39 cfs)

Proposed E River Street

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Type III 24-hr 10-Year Rainfall=4.90"

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Pond 1P: CULTEC - Chamber Wizard Field A

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 6 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

7 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 50.00' Row Length +12.0" End Stone x 2 = 52.00' Base Length

6 Rows x 47.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 28.00' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

42 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 6 Rows = 1,821.5 cf Chamber Storage

4,671.3 cf Field - 1,821.5 cf Chambers = 2,849.8 cf Stone x 40.0% Voids = 1,139.9 cf Stone Storage

Chamber Storage + Stone Storage = 2,961.4 cf = 0.068 af

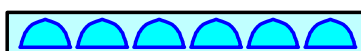
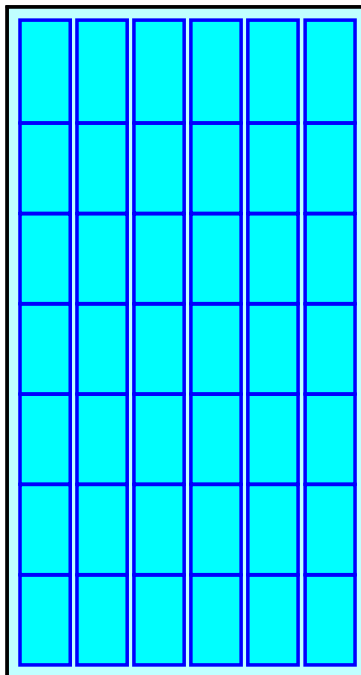
Overall Storage Efficiency = 63.4%

Overall System Size = 52.00' x 28.00' x 3.21'

42 Chambers

173.0 cy Field

105.5 cy Stone



Proposed E River Street

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Type III 24-hr 10-Year Rainfall=4.90"

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Pond 1P: CULTEC - Chamber Wizard Field B

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 3 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

20 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 141.00' Row Length +12.0" End Stone x 2 = 143.00' Base Length

3 Rows x 47.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 14.75' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

60 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 3 Rows = 2,568.4 cf Chamber Storage

6,767.2 cf Field - 2,568.4 cf Chambers = 4,198.8 cf Stone x 40.0% Voids = 1,679.5 cf Stone Storage

Chamber Storage + Stone Storage = 4,247.9 cf = 0.098 af

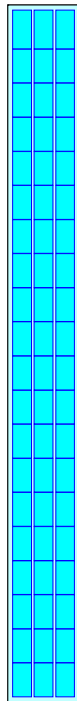
Overall Storage Efficiency = 62.8%

Overall System Size = 143.00' x 14.75' x 3.21'

60 Chambers

250.6 cy Field

155.5 cy Stone



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Pond 1P: CULTEC - Chamber Wizard Field C

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 6 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

8 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 57.00' Row Length +12.0" End Stone x 2 = 59.00' Base Length

6 Rows x 47.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 28.00' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

48 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 6 Rows = 2,076.5 cf Chamber Storage

5,300.2 cf Field - 2,076.5 cf Chambers = 3,223.6 cf Stone x 40.0% Voids = 1,289.5 cf Stone Storage

Chamber Storage + Stone Storage = 3,366.0 cf = 0.077 af

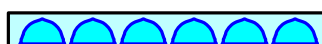
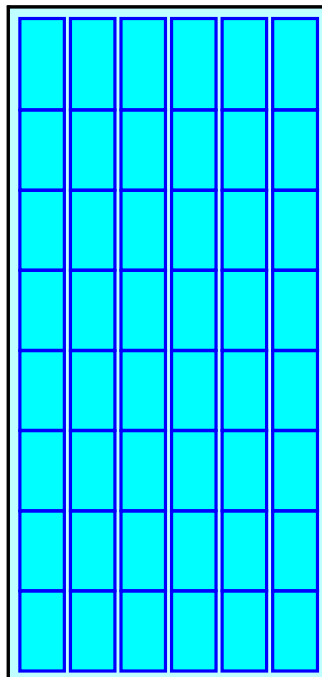
Overall Storage Efficiency = 63.5%

Overall System Size = 59.00' x 28.00' x 3.21'

48 Chambers

196.3 cy Field

119.4 cy Stone



Proposed E River Street

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Pond 1P: CULTEC - Chamber Wizard Field D

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 6 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

7 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 50.00' Row Length +12.0" End Stone x 2 = 52.00' Base Length

6 Rows x 47.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 28.00' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

42 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 6 Rows = 1,821.5 cf Chamber Storage

4,671.3 cf Field - 1,821.5 cf Chambers = 2,849.8 cf Stone x 40.0% Voids = 1,139.9 cf Stone Storage

Chamber Storage + Stone Storage = 2,961.4 cf = 0.068 af

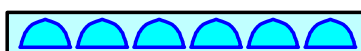
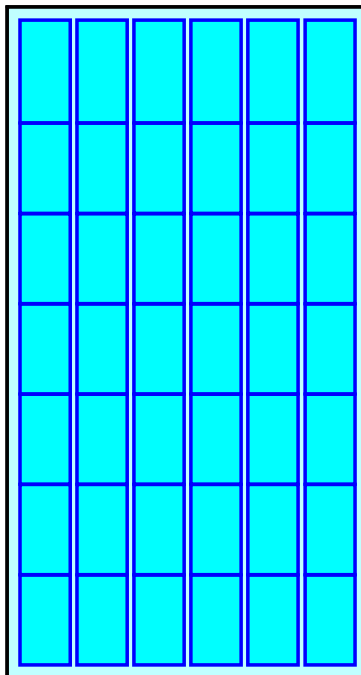
Overall Storage Efficiency = 63.4%

Overall System Size = 52.00' x 28.00' x 3.21'

42 Chambers

173.0 cy Field

105.5 cy Stone



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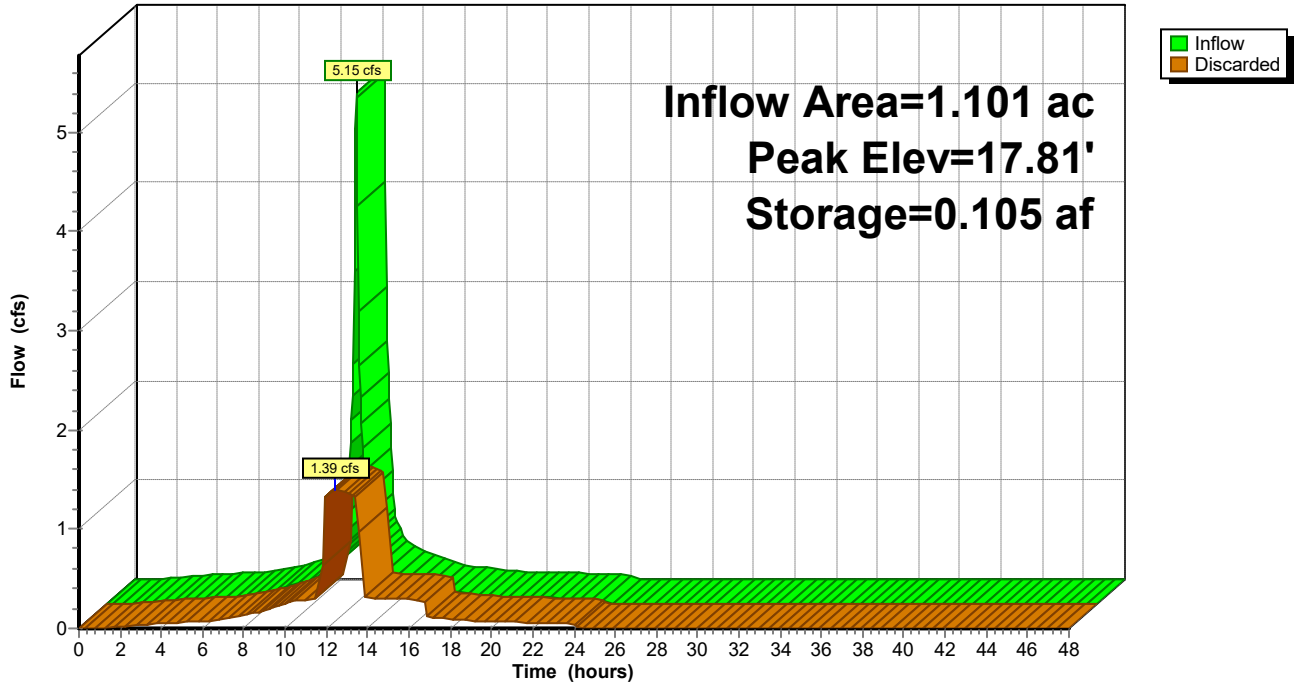
Type III 24-hr 10-Year Rainfall=4.90"

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Pond 1P: CULTEC

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.90"

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Summary for Pond 2P: Swale A

Inflow Area = 0.430 ac, 37.44% Impervious, Inflow Depth = 1.31" for 10-Year event
Inflow = 0.59 cfs @ 12.10 hrs, Volume= 0.047 af
Outflow = 0.28 cfs @ 12.36 hrs, Volume= 0.047 af, Atten= 53%, Lag= 15.5 min
Discarded = 0.28 cfs @ 12.36 hrs, Volume= 0.047 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 1L : Seekonk River

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 19.23' @ 12.36 hrs Surf.Area= 0.033 ac Storage= 0.006 af

Plug-Flow detention time= 5.2 min calculated for 0.047 af (100% of inflow)
Center-of-Mass det. time= 5.1 min (878.9 - 873.8)

Volume	Invert	Avail.Storage	Storage Description
#1	19.00'	0.052 af	1.50'W x 500.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	19.75'	5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	19.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 5.00'

Discarded OutFlow Max=0.28 cfs @ 12.36 hrs HW=19.23' (Free Discharge)
↑**2=Exfiltration** (Controls 0.28 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=19.00' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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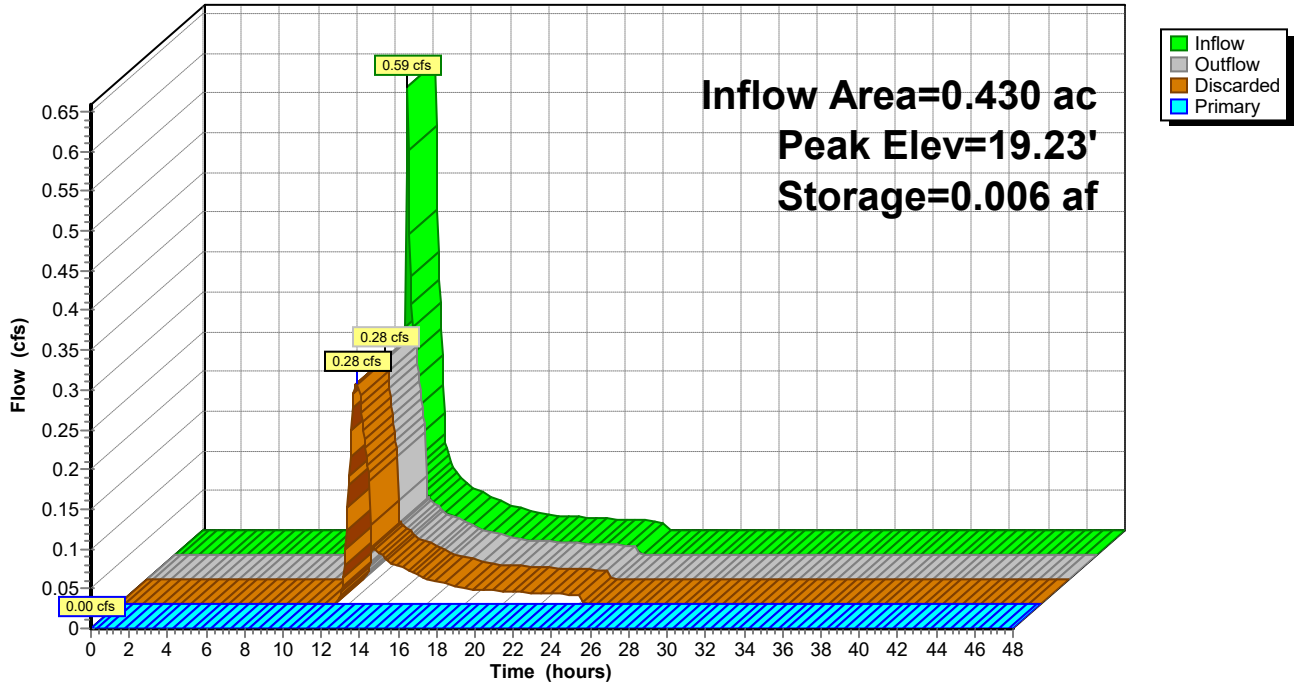
Type III 24-hr 10-Year Rainfall=4.90"

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Pond 2P: Swale A

Hydrograph



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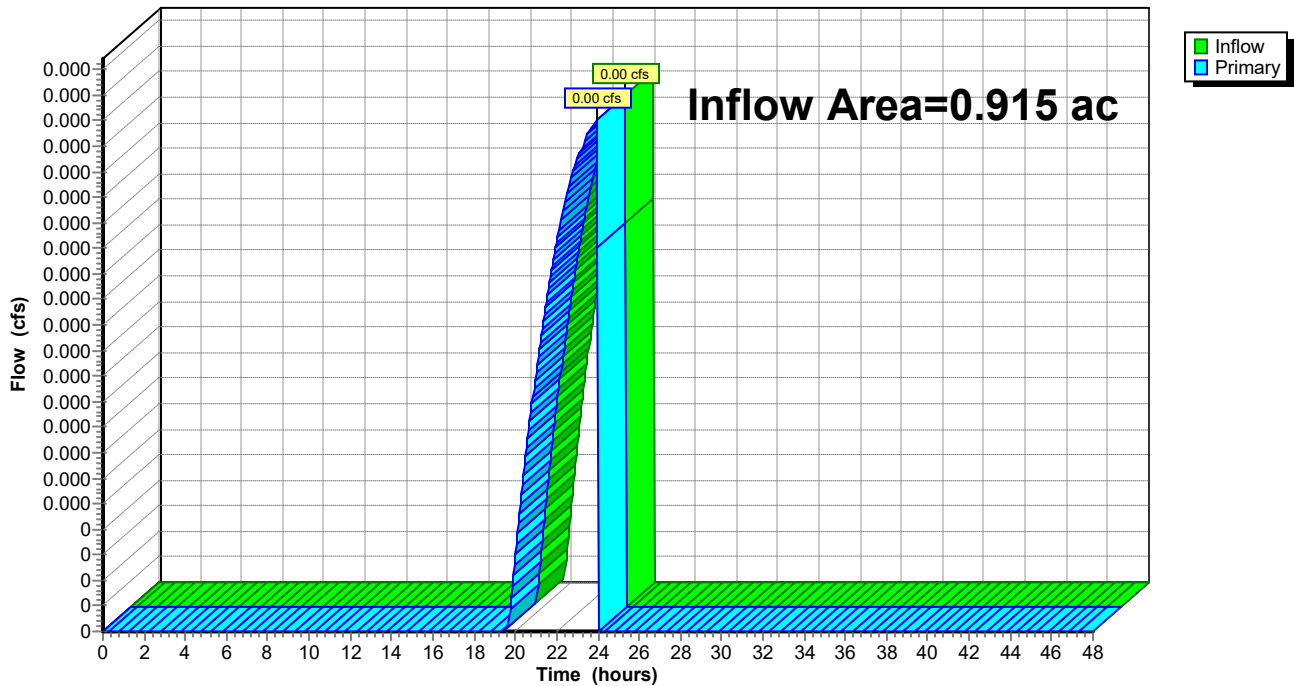
Summary for Link 1L: Seekonk River

Inflow Area = 0.915 ac, 17.60% Impervious, Inflow Depth = 0.00" for 10-Year event
Inflow = 0.00 cfs @ 23.95 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 23.95 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 1L: Seekonk River

Hydrograph



Proposed E River Street

Type III 24-hr 25-Year Rainfall=6.10"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: WS-1 Runoff Area=1.101 ac 100.00% Impervious Runoff Depth=5.86"
Tc=6.0 min CN=98 Runoff=6.43 cfs 0.538 af

Subcatchment 2S: WS-2 Runoff Area=0.430 ac 37.44% Impervious Runoff Depth=2.07"
Tc=6.0 min CN=61 Runoff=0.98 cfs 0.074 af

Subcatchment 4S: WS-4 Runoff Area=0.485 ac 0.00% Impervious Runoff Depth=0.08"
Tc=0.0 min CN=30 Runoff=0.01 cfs 0.003 af

Pond 1P: CULTEC Peak Elev=18.13' Storage=0.144 af Inflow=6.43 cfs 0.538 af
Outflow=1.43 cfs 0.538 af

Pond 2P: Swale A Peak Elev=19.41' Storage=0.013 af Inflow=0.98 cfs 0.074 af
Discarded=0.39 cfs 0.074 af Primary=0.00 cfs 0.000 af Outflow=0.39 cfs 0.074 af

Link 1L: Seekonk River Inflow=0.01 cfs 0.003 af
Primary=0.01 cfs 0.003 af

Total Runoff Area = 2.016 ac Runoff Volume = 0.615 af Average Runoff Depth = 3.66"
37.40% Pervious = 0.754 ac 62.60% Impervious = 1.262 ac

Proposed E River Street

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Type III 24-hr 25-Year Rainfall=6.10"

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Summary for Subcatchment 1S: WS-1

Runoff = 6.43 cfs @ 12.09 hrs, Volume= 0.538 af, Depth= 5.86"

Routed to Pond 1P : CULTEC

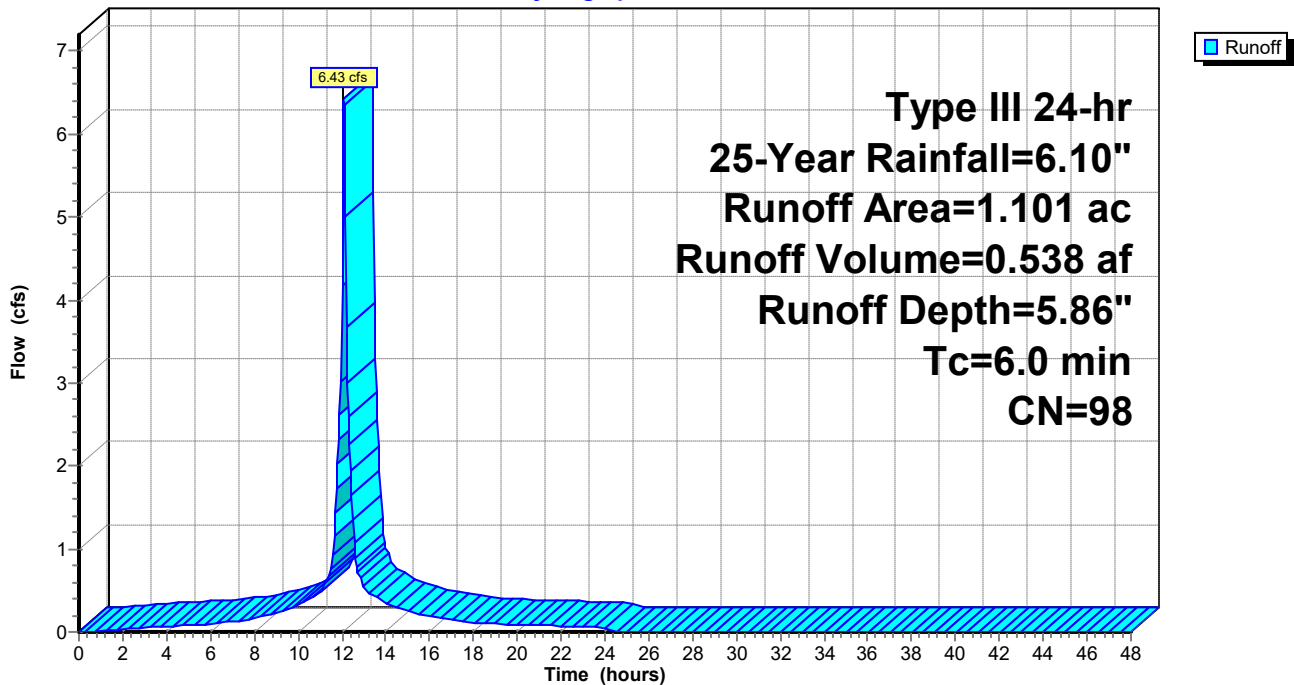
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.10"

Area (ac)	CN	Description
* 1.101	98	Roofs/Paved
1.101		100.00% Impervious Area

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

Subcatchment 1S: WS-1

Hydrograph



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Type III 24-hr 25-Year Rainfall=6.10"

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Summary for Subcatchment 2S: WS-2

Runoff = 0.98 cfs @ 12.10 hrs, Volume= 0.074 af, Depth= 2.07"
Routed to Pond 2P : Swale A

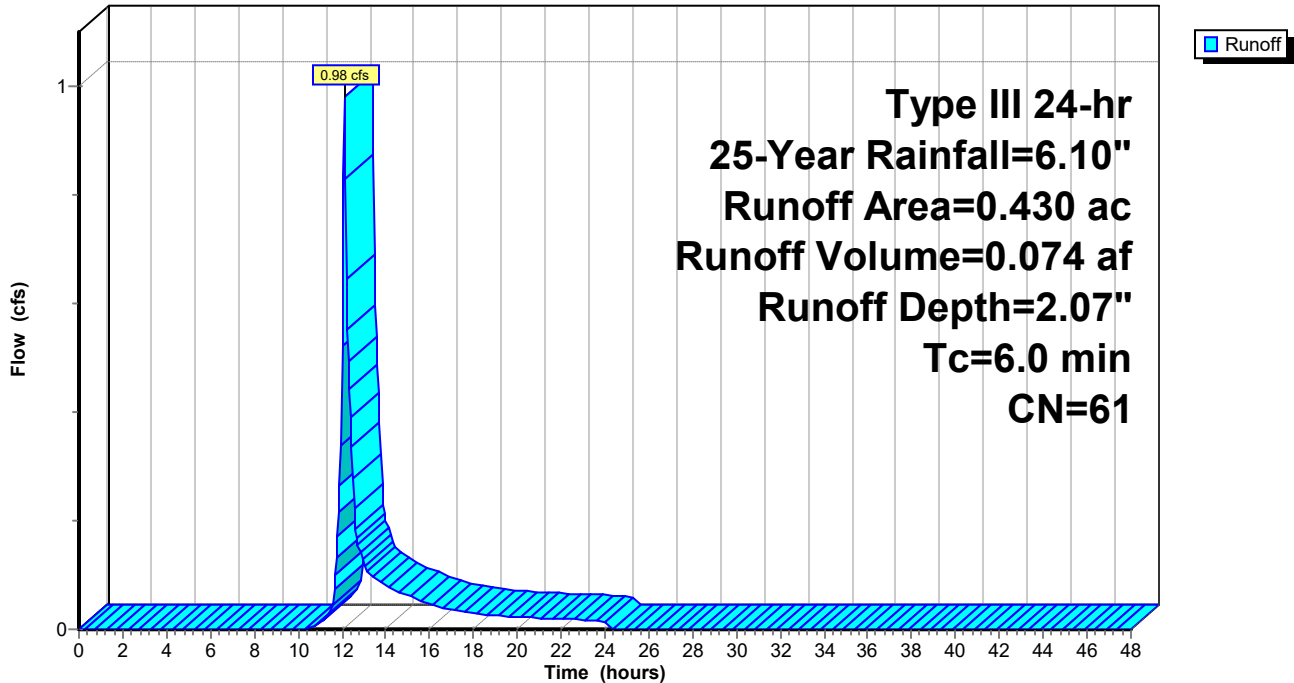
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.10"

Area (ac)	CN	Description
* 0.161	98	Asphalt walking path
0.269	39	>75% Grass cover, Good, HSG A
0.430	61	Weighted Average
0.269		62.56% Pervious Area
0.161		37.44% Impervious Area

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

Subcatchment 2S: WS-2

Hydrograph



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Type III 24-hr 25-Year Rainfall=6.10"

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Summary for Subcatchment 4S: WS-4

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

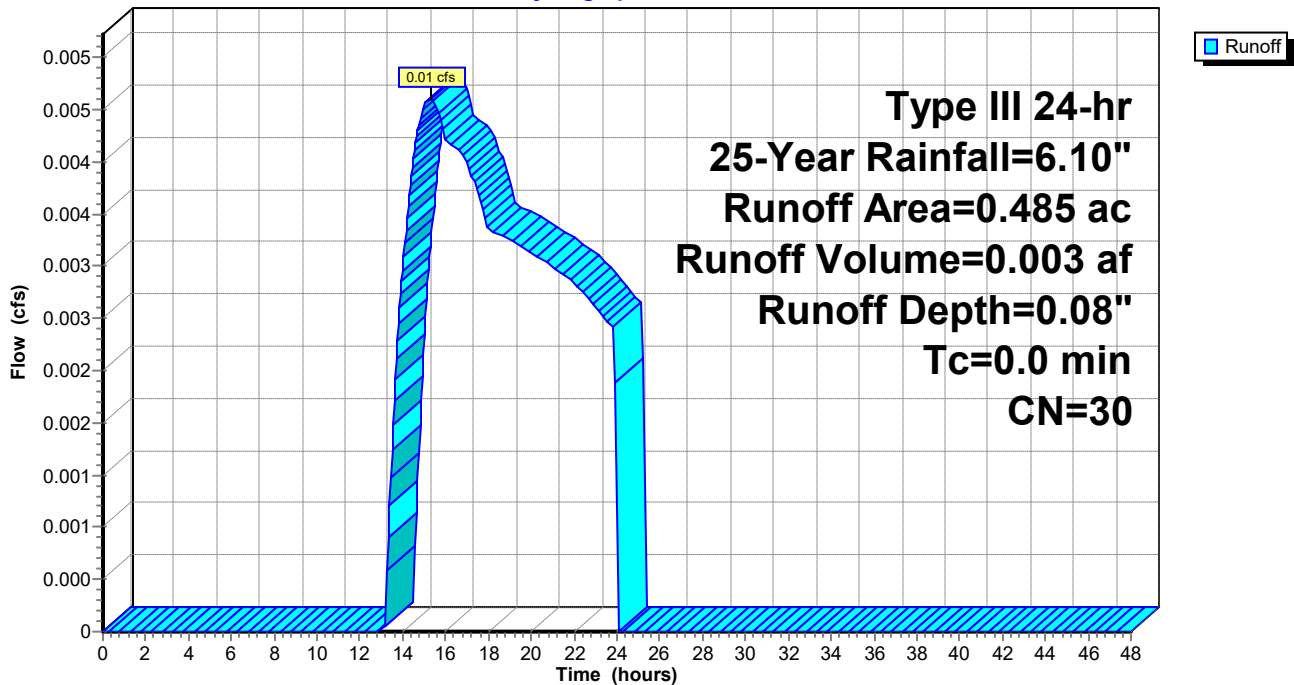
Runoff = 0.01 cfs @ 15.27 hrs, Volume= 0.003 af, Depth= 0.08"
Routed to Link 1L : Seekonk River

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.10"

Area (ac)	CN	Description
0.485	30	Woods, Good, HSG A
0.485		100.00% Pervious Area

Subcatchment 4S: WS-4

Hydrograph



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Type III 24-hr 25-Year Rainfall=6.10"

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Summary for Pond 1P: CULTEC

Inflow Area = 1.101 ac, 100.00% Impervious, Inflow Depth = 5.86" for 25-Year event
 Inflow = 6.43 cfs @ 12.09 hrs, Volume= 0.538 af
 Outflow = 1.43 cfs @ 12.49 hrs, Volume= 0.538 af, Atten= 78%, Lag= 24.1 min
 Discarded = 1.43 cfs @ 12.49 hrs, Volume= 0.538 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 18.13' @ 12.49 hrs Surf.Area= 0.153 ac Storage= 0.144 af

Plug-Flow detention time= 33.7 min calculated for 0.537 af (100% of inflow)
 Center-of-Mass det. time= 33.7 min (778.6 - 744.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	15.75'	0.026 af	28.00'W x 52.00'L x 3.21'H Field A 0.107 af Overall - 0.042 af Embedded = 0.065 af x 40.0% Voids
#2A	16.25'	0.042 af	Cultec R-280HD x 42 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
#3B	17.00'	0.039 af	14.75'W x 143.00'L x 3.21'H Field B 0.155 af Overall - 0.059 af Embedded = 0.096 af x 40.0% Voids
#4B	17.50'	0.059 af	Cultec R-280HD x 60 Inside #3 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 3 rows
#5C	17.00'	0.030 af	28.00'W x 59.00'L x 3.21'H Field C 0.122 af Overall - 0.048 af Embedded = 0.074 af x 40.0% Voids
#6C	17.50'	0.048 af	Cultec R-280HD x 48 Inside #5 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
#7D	17.00'	0.026 af	28.00'W x 52.00'L x 3.21'H Field D 0.107 af Overall - 0.042 af Embedded = 0.065 af x 40.0% Voids
#8D	17.50'	0.042 af	Cultec R-280HD x 42 Inside #7 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
		0.311 af	Total Available Storage

Storage Group A created with Chamber Wizard
 Storage Group B created with Chamber Wizard
 Storage Group C created with Chamber Wizard
 Storage Group D created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	15.75'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 4.84'

Discarded OutFlow Max=1.43 cfs @ 12.49 hrs HW=18.13' (Free Discharge)
 ↑1=Exfiltration (Controls 1.43 cfs)

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Type III 24-hr 25-Year Rainfall=6.10"

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Pond 1P: CULTEC - Chamber Wizard Field A

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 6 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

7 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 50.00' Row Length +12.0" End Stone x 2 = 52.00' Base Length

6 Rows x 47.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 28.00' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

42 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 6 Rows = 1,821.5 cf Chamber Storage

4,671.3 cf Field - 1,821.5 cf Chambers = 2,849.8 cf Stone x 40.0% Voids = 1,139.9 cf Stone Storage

Chamber Storage + Stone Storage = 2,961.4 cf = 0.068 af

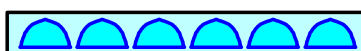
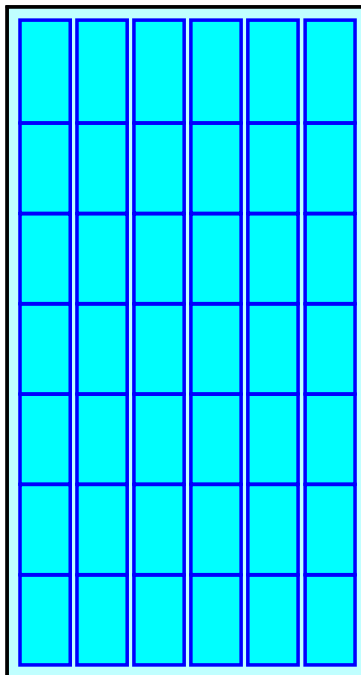
Overall Storage Efficiency = 63.4%

Overall System Size = 52.00' x 28.00' x 3.21'

42 Chambers

173.0 cy Field

105.5 cy Stone



Proposed E River Street

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Type III 24-hr 25-Year Rainfall=6.10"

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Pond 1P: CULTEC - Chamber Wizard Field B

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 3 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

20 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 141.00' Row Length +12.0" End Stone x 2 = 143.00' Base Length

3 Rows x 47.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 14.75' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

60 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 3 Rows = 2,568.4 cf Chamber Storage

6,767.2 cf Field - 2,568.4 cf Chambers = 4,198.8 cf Stone x 40.0% Voids = 1,679.5 cf Stone Storage

Chamber Storage + Stone Storage = 4,247.9 cf = 0.098 af

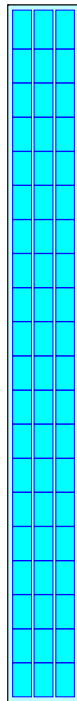
Overall Storage Efficiency = 62.8%

Overall System Size = 143.00' x 14.75' x 3.21'

60 Chambers

250.6 cy Field

155.5 cy Stone



Proposed E River Street

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Pond 1P: CULTEC - Chamber Wizard Field C

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 6 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

8 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 57.00' Row Length +12.0" End Stone x 2 = 59.00' Base Length

6 Rows x 47.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 28.00' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

48 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 6 Rows = 2,076.5 cf Chamber Storage

5,300.2 cf Field - 2,076.5 cf Chambers = 3,223.6 cf Stone x 40.0% Voids = 1,289.5 cf Stone Storage

Chamber Storage + Stone Storage = 3,366.0 cf = 0.077 af

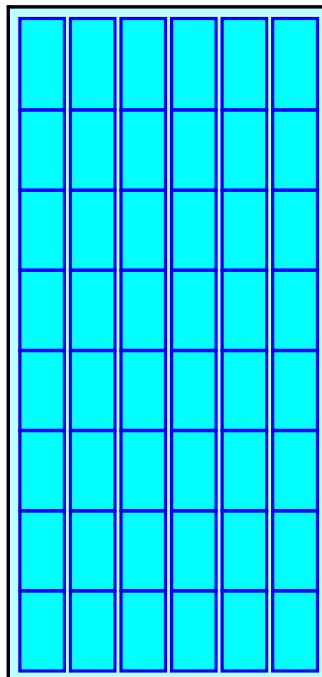
Overall Storage Efficiency = 63.5%

Overall System Size = 59.00' x 28.00' x 3.21'

48 Chambers

196.3 cy Field

119.4 cy Stone



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Pond 1P: CULTEC - Chamber Wizard Field D

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 6 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

7 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 50.00' Row Length +12.0" End Stone x 2 = 52.00' Base Length

6 Rows x 47.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 28.00' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

42 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 6 Rows = 1,821.5 cf Chamber Storage

4,671.3 cf Field - 1,821.5 cf Chambers = 2,849.8 cf Stone x 40.0% Voids = 1,139.9 cf Stone Storage

Chamber Storage + Stone Storage = 2,961.4 cf = 0.068 af

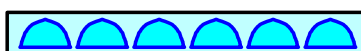
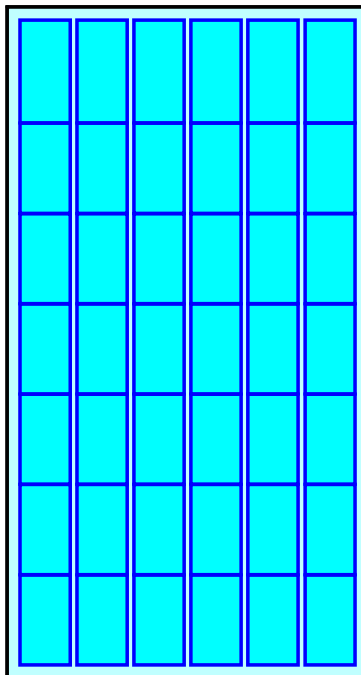
Overall Storage Efficiency = 63.4%

Overall System Size = 52.00' x 28.00' x 3.21'

42 Chambers

173.0 cy Field

105.5 cy Stone



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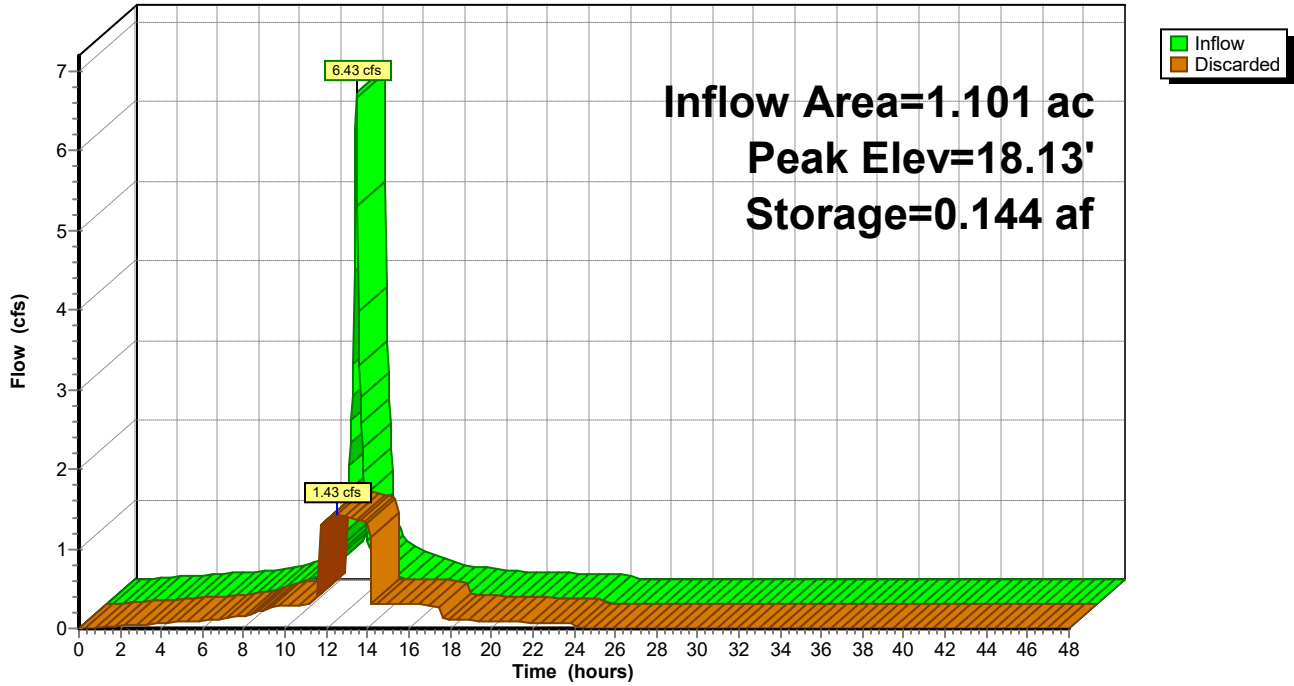
Type III 24-hr 25-Year Rainfall=6.10"

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Pond 1P: CULTEC

Hydrograph



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Type III 24-hr 25-Year Rainfall=6.10"

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Summary for Pond 2P: Swale A

Inflow Area = 0.430 ac, 37.44% Impervious, Inflow Depth = 2.07" for 25-Year event
 Inflow = 0.98 cfs @ 12.10 hrs, Volume= 0.074 af
 Outflow = 0.39 cfs @ 12.40 hrs, Volume= 0.074 af, Atten= 61%, Lag= 18.2 min
 Discarded = 0.39 cfs @ 12.40 hrs, Volume= 0.074 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link 1L : Seekonk River

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 19.41' @ 12.40 hrs Surf.Area= 0.046 ac Storage= 0.013 af

Plug-Flow detention time= 9.4 min calculated for 0.074 af (100% of inflow)
 Center-of-Mass det. time= 9.4 min (868.6 - 859.2)

Volume	Invert	Avail.Storage	Storage Description
#1	19.00'	0.052 af	1.50'W x 500.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	19.75'	5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	19.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 5.00'

Discarded OutFlow Max=0.39 cfs @ 12.40 hrs HW=19.41' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.39 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=19.00' (Free Discharge)
 ↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Proposed E River Street

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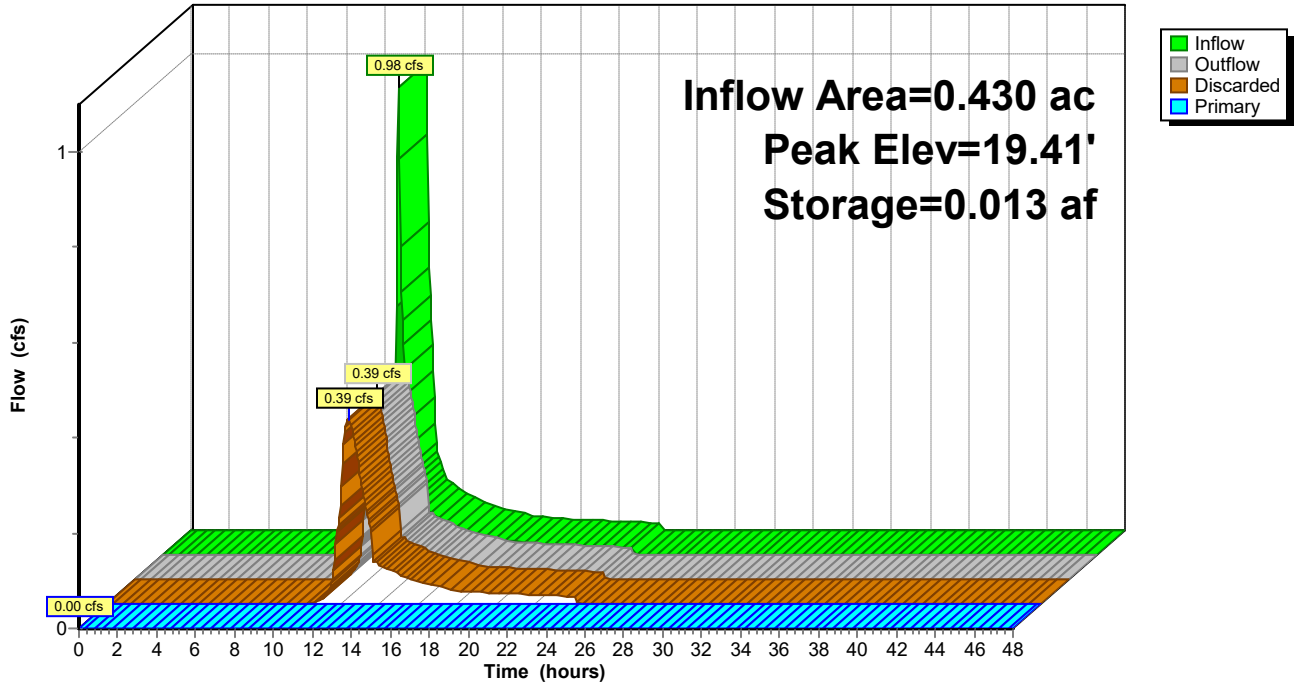
Type III 24-hr 25-Year Rainfall=6.10"

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Pond 2P: Swale A

Hydrograph



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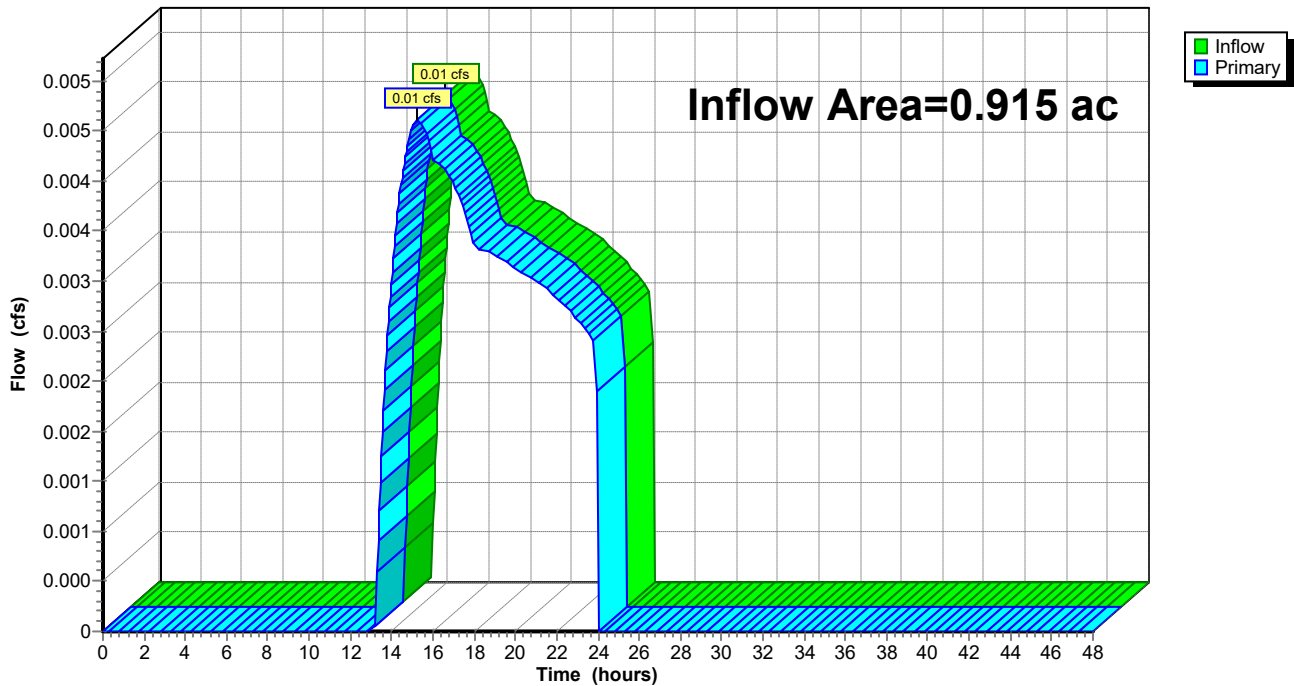
Summary for Link 1L: Seekonk River

Inflow Area = 0.915 ac, 17.60% Impervious, Inflow Depth = 0.04" for 25-Year event
Inflow = 0.01 cfs @ 15.27 hrs, Volume= 0.003 af
Primary = 0.01 cfs @ 15.27 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 1L: Seekonk River

Hydrograph



Proposed E River Street

Type III 24-hr 100-Year Rainfall=8.70"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: WS-1 Runoff Area=1.101 ac 100.00% Impervious Runoff Depth=8.46"
Tc=6.0 min CN=98 Runoff=9.19 cfs 0.776 af

Subcatchment 2S: WS-2 Runoff Area=0.430 ac 37.44% Impervious Runoff Depth=3.99"
Tc=6.0 min CN=61 Runoff=1.96 cfs 0.143 af

Subcatchment 4S: WS-4 Runoff Area=0.485 ac 0.00% Impervious Runoff Depth=0.59"
Tc=0.0 min CN=30 Runoff=0.11 cfs 0.024 af

Pond 1P: CULTEC Peak Elev=18.94' Storage=0.232 af Inflow=9.19 cfs 0.776 af
Outflow=1.51 cfs 0.776 af

Pond 2P: Swale A Peak Elev=19.77' Storage=0.034 af Inflow=1.96 cfs 0.143 af
Discarded=0.61 cfs 0.142 af Primary=0.03 cfs 0.000 af Outflow=0.64 cfs 0.143 af

Link 1L: Seekonk River Inflow=0.12 cfs 0.024 af
Primary=0.12 cfs 0.024 af

Total Runoff Area = 2.016 ac Runoff Volume = 0.943 af Average Runoff Depth = 5.61"
37.40% Pervious = 0.754 ac 62.60% Impervious = 1.262 ac

Proposed E River Street

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Type III 24-hr 100-Year Rainfall=8.70"

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Summary for Subcatchment 1S: WS-1

Runoff = 9.19 cfs @ 12.09 hrs, Volume= 0.776 af, Depth= 8.46"
Routed to Pond 1P : CULTEC

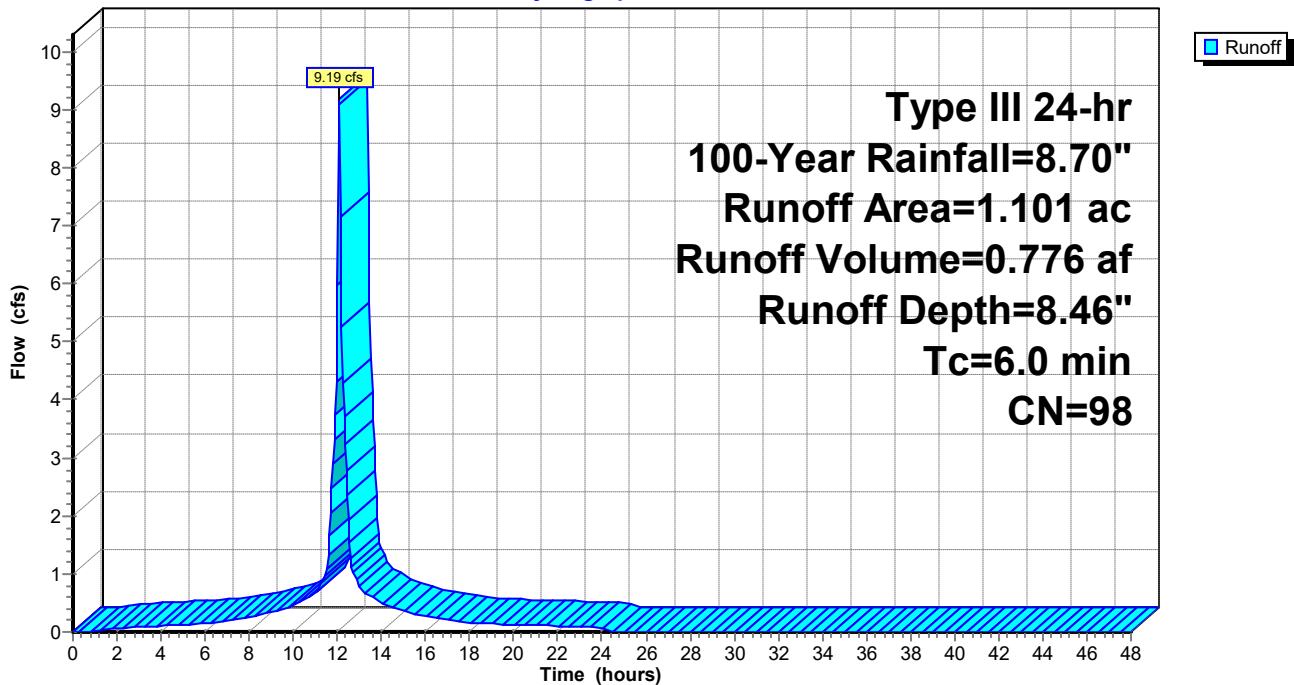
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (ac)	CN	Description
* 1.101	98	Roofs/Paved
1.101		100.00% Impervious Area

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

Subcatchment 1S: WS-1

Hydrograph



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Type III 24-hr 100-Year Rainfall=8.70"

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Summary for Subcatchment 2S: WS-2

Runoff = 1.96 cfs @ 12.10 hrs, Volume= 0.143 af, Depth= 3.99"
 Routed to Pond 2P : Swale A

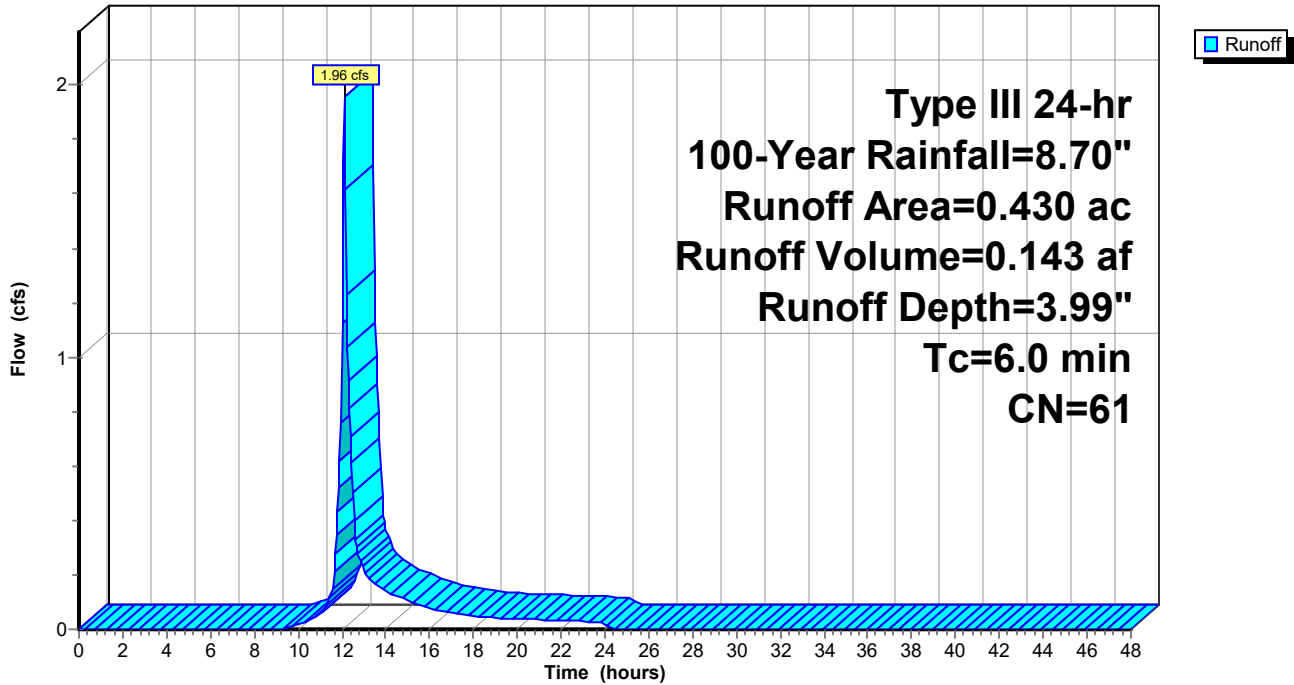
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.70"

Area (ac)	CN	Description
* 0.161	98	Asphalt walking path
0.269	39	>75% Grass cover, Good, HSG A
0.430	61	Weighted Average
0.269		62.56% Pervious Area
0.161		37.44% Impervious Area

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

Subcatchment 2S: WS-2

Hydrograph



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Type III 24-hr 100-Year Rainfall=8.70"

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Summary for Subcatchment 4S: WS-4

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

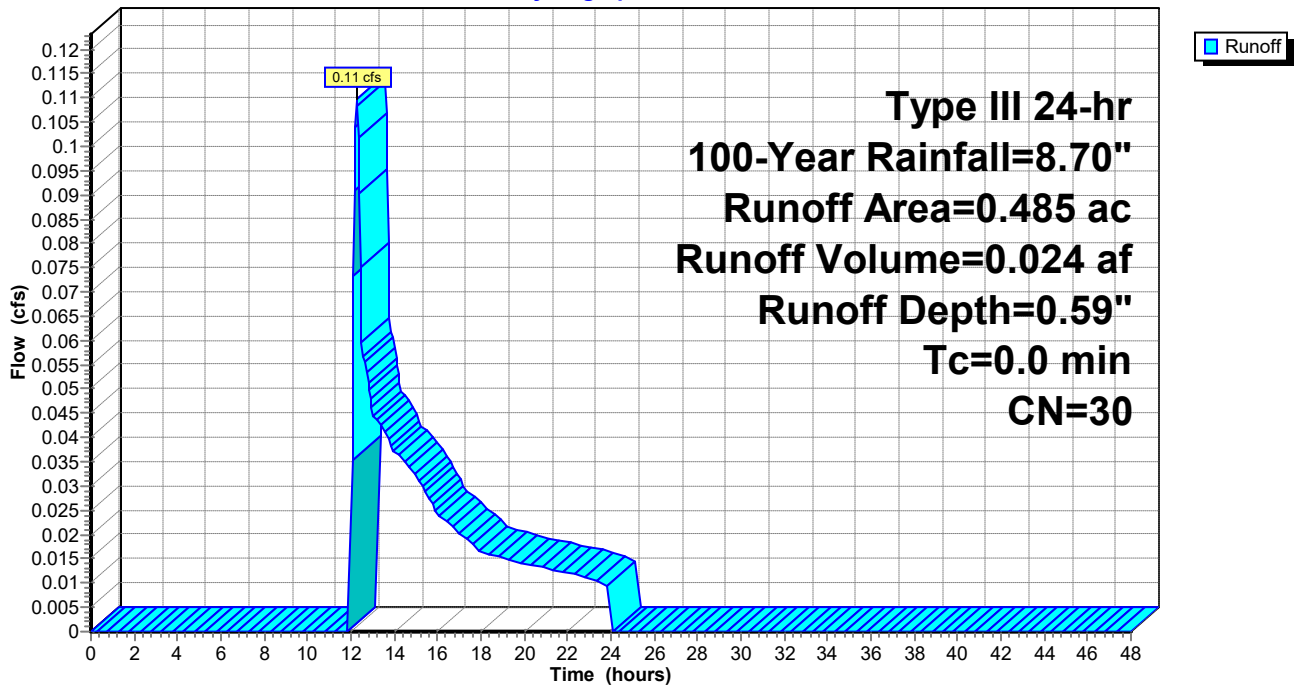
Runoff = 0.11 cfs @ 12.27 hrs, Volume= 0.024 af, Depth= 0.59"
Routed to Link 1L : Seekonk River

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (ac)	CN	Description
0.485	30	Woods, Good, HSG A
0.485		100.00% Pervious Area

Subcatchment 4S: WS-4

Hydrograph



Proposed E River Street

Type III 24-hr 100-Year Rainfall=8.70"

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Summary for Pond 1P: CULTEC

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=5)

Inflow Area = 1.101 ac, 100.00% Impervious, Inflow Depth = 8.46" for 100-Year event
 Inflow = 9.19 cfs @ 12.09 hrs, Volume= 0.776 af
 Outflow = 1.51 cfs @ 12.56 hrs, Volume= 0.776 af, Atten= 84%, Lag= 28.2 min
 Discarded = 1.51 cfs @ 12.56 hrs, Volume= 0.776 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 18.94' @ 12.56 hrs Surf.Area= 0.153 ac Storage= 0.232 af

Plug-Flow detention time= 48.8 min calculated for 0.776 af (100% of inflow)
 Center-of-Mass det. time= 48.8 min (789.0 - 740.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	15.75'	0.026 af	28.00'W x 52.00'L x 3.21'H Field A 0.107 af Overall - 0.042 af Embedded = 0.065 af x 40.0% Voids
#2A	16.25'	0.042 af	Cultec R-280HD x 42 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
#3B	17.00'	0.039 af	14.75'W x 143.00'L x 3.21'H Field B 0.155 af Overall - 0.059 af Embedded = 0.096 af x 40.0% Voids
#4B	17.50'	0.059 af	Cultec R-280HD x 60 Inside #3 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 3 rows
#5C	17.00'	0.030 af	28.00'W x 59.00'L x 3.21'H Field C 0.122 af Overall - 0.048 af Embedded = 0.074 af x 40.0% Voids
#6C	17.50'	0.048 af	Cultec R-280HD x 48 Inside #5 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
#7D	17.00'	0.026 af	28.00'W x 52.00'L x 3.21'H Field D 0.107 af Overall - 0.042 af Embedded = 0.065 af x 40.0% Voids
#8D	17.50'	0.042 af	Cultec R-280HD x 42 Inside #7 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
		0.311 af	Total Available Storage

Storage Group A created with Chamber Wizard
 Storage Group B created with Chamber Wizard
 Storage Group C created with Chamber Wizard
 Storage Group D created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	15.75'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 4.84'

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Type III 24-hr 100-Year Rainfall=8.70"

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Discarded OutFlow Max=1.51 cfs @ 12.56 hrs HW=18.94' (Free Discharge)

↳ **1=Exfiltration** (Controls 1.51 cfs)

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Type III 24-hr 100-Year Rainfall=8.70"

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Pond 1P: CULTEC - Chamber Wizard Field A

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 6 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

7 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 50.00' Row Length +12.0" End Stone x 2 = 52.00' Base Length

6 Rows x 47.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 28.00' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

42 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 6 Rows = 1,821.5 cf Chamber Storage

4,671.3 cf Field - 1,821.5 cf Chambers = 2,849.8 cf Stone x 40.0% Voids = 1,139.9 cf Stone Storage

Chamber Storage + Stone Storage = 2,961.4 cf = 0.068 af

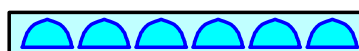
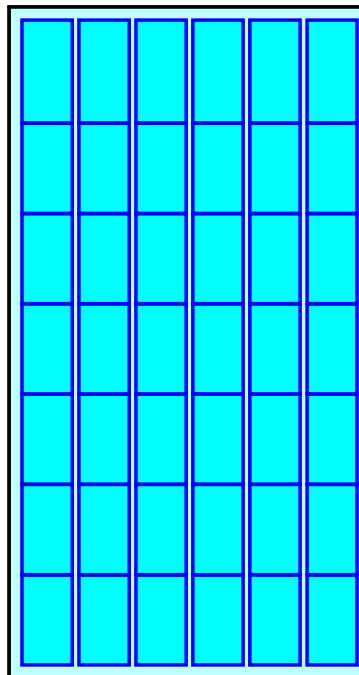
Overall Storage Efficiency = 63.4%

Overall System Size = 52.00' x 28.00' x 3.21'

42 Chambers

173.0 cy Field

105.5 cy Stone



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Pond 1P: CULTEC - Chamber Wizard Field B

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 3 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

20 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 141.00' Row Length +12.0" End Stone x 2 = 143.00' Base Length

3 Rows x 47.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 14.75' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

60 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 3 Rows = 2,568.4 cf Chamber Storage

6,767.2 cf Field - 2,568.4 cf Chambers = 4,198.8 cf Stone x 40.0% Voids = 1,679.5 cf Stone Storage

Chamber Storage + Stone Storage = 4,247.9 cf = 0.098 af

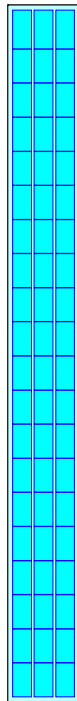
Overall Storage Efficiency = 62.8%

Overall System Size = 143.00' x 14.75' x 3.21'

60 Chambers

250.6 cy Field

155.5 cy Stone



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Pond 1P: CULTEC - Chamber Wizard Field C

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 6 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

8 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 57.00' Row Length +12.0" End Stone x 2 = 59.00' Base Length

6 Rows x 47.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 28.00' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

48 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 6 Rows = 2,076.5 cf Chamber Storage

5,300.2 cf Field - 2,076.5 cf Chambers = 3,223.6 cf Stone x 40.0% Voids = 1,289.5 cf Stone Storage

Chamber Storage + Stone Storage = 3,366.0 cf = 0.077 af

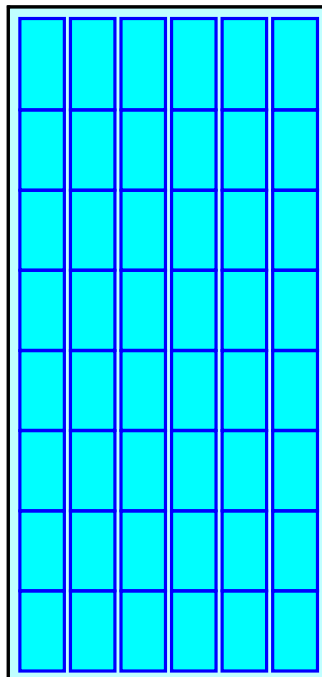
Overall Storage Efficiency = 63.5%

Overall System Size = 59.00' x 28.00' x 3.21'

48 Chambers

196.3 cy Field

119.4 cy Stone



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Pond 1P: CULTEC - Chamber Wizard Field D

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 6 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

7 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 50.00' Row Length +12.0" End Stone x 2 = 52.00' Base Length

6 Rows x 47.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 28.00' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

42 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 6 Rows = 1,821.5 cf Chamber Storage

4,671.3 cf Field - 1,821.5 cf Chambers = 2,849.8 cf Stone x 40.0% Voids = 1,139.9 cf Stone Storage

Chamber Storage + Stone Storage = 2,961.4 cf = 0.068 af

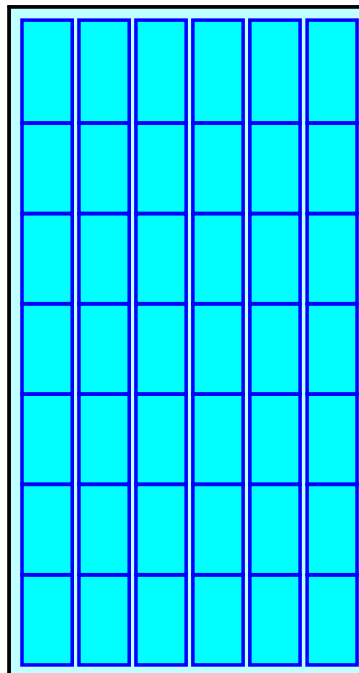
Overall Storage Efficiency = 63.4%

Overall System Size = 52.00' x 28.00' x 3.21'

42 Chambers

173.0 cy Field

105.5 cy Stone



Proposed E River Street

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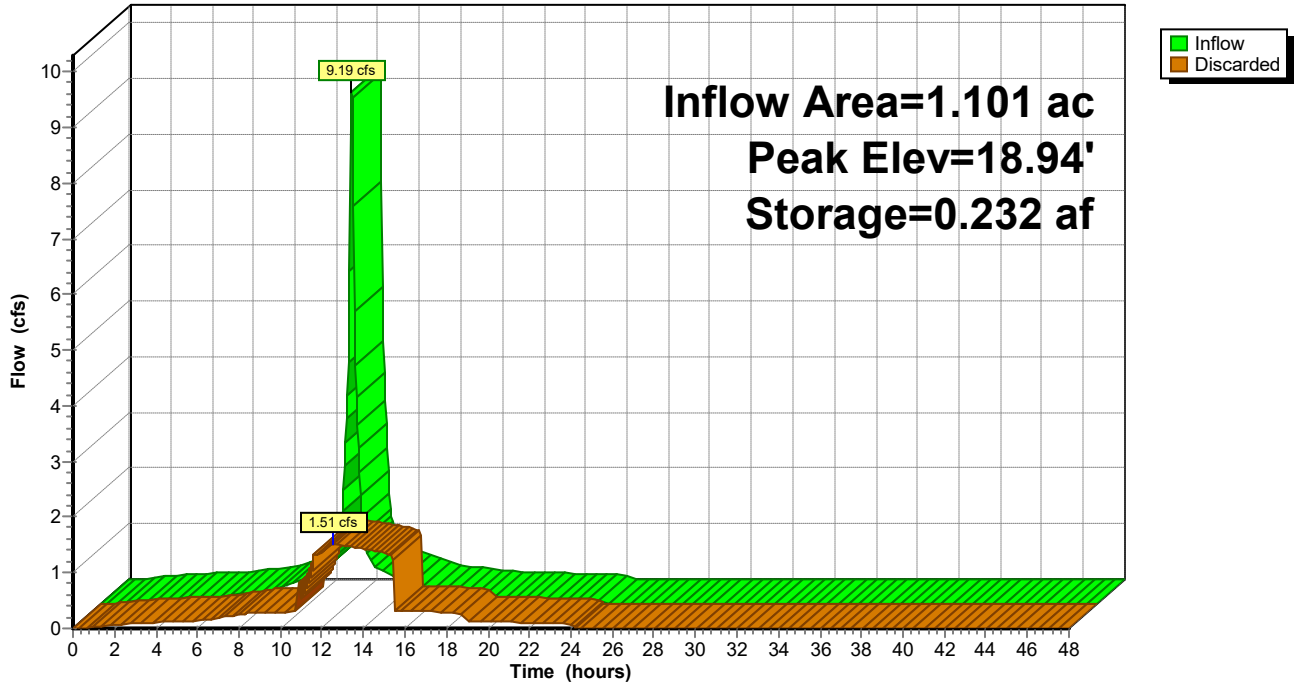
Type III 24-hr 100-Year Rainfall=8.70"

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Pond 1P: CULTEC

Hydrograph



Proposed E River Street

Type III 24-hr 100-Year Rainfall=8.70"

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Summary for Pond 2P: Swale A

Inflow Area = 0.430 ac, 37.44% Impervious, Inflow Depth = 3.99" for 100-Year event
 Inflow = 1.96 cfs @ 12.10 hrs, Volume= 0.143 af
 Outflow = 0.64 cfs @ 12.44 hrs, Volume= 0.143 af, Atten= 67%, Lag= 20.4 min
 Discarded = 0.61 cfs @ 12.44 hrs, Volume= 0.142 af
 Primary = 0.03 cfs @ 12.44 hrs, Volume= 0.000 af
 Routed to Link 1L : Seekonk River

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 19.77' @ 12.44 hrs Surf.Area= 0.071 ac Storage= 0.034 af

Plug-Flow detention time= 18.3 min calculated for 0.143 af (100% of inflow)
 Center-of-Mass det. time= 18.3 min (857.9 - 839.7)

Volume	Invert	Avail.Storage	Storage Description
#1	19.00'	0.052 af	1.50'W x 500.00'L x 1.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	19.75'	5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	19.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 5.00'

Discarded OutFlow Max=0.61 cfs @ 12.44 hrs HW=19.77' (Free Discharge)
 ↳2=Exfiltration (Controls 0.61 cfs)

Primary OutFlow Max=0.03 cfs @ 12.44 hrs HW=19.77' (Free Discharge)
 ↳1=Broad-Crested Rectangular Weir (Weir Controls 0.03 cfs @ 0.35 fps)

Proposed E River Street

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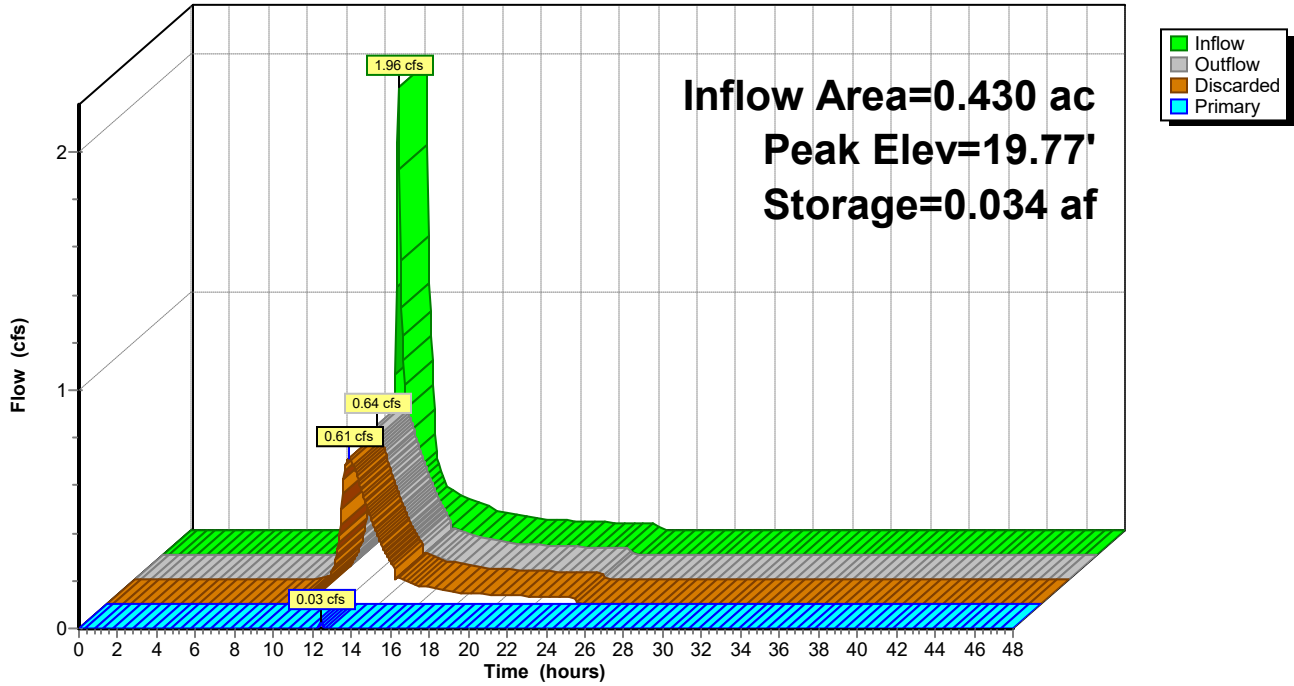
Type III 24-hr 100-Year Rainfall=8.70"

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Pond 2P: Swale A

Hydrograph



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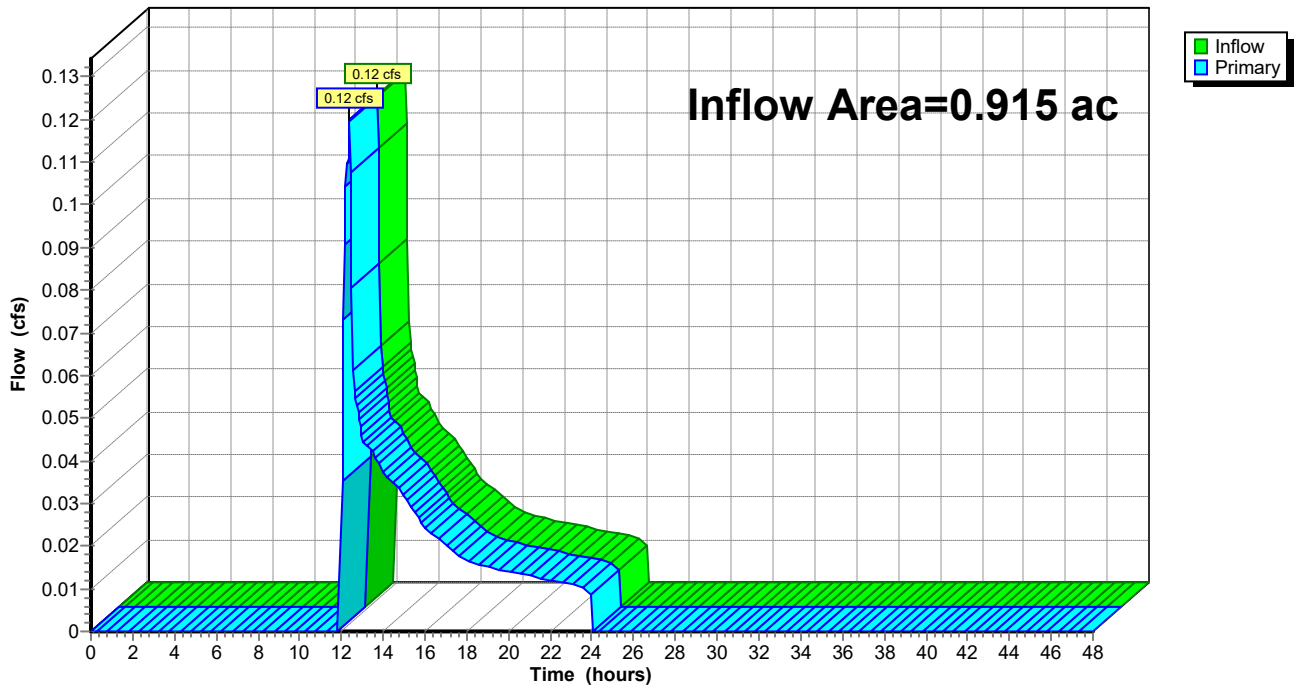
Summary for Link 1L: Seekonk River

Inflow Area = 0.915 ac, 17.60% Impervious, Inflow Depth = 0.32" for 100-Year event
Inflow = 0.12 cfs @ 12.39 hrs, Volume= 0.024 af
Primary = 0.12 cfs @ 12.39 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 1L: Seekonk River

Hydrograph



Proposed E River Street

Type III 24-hr WQV Rainfall=1.00"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: WS-1 Runoff Area=1.101 ac 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.96 cfs 0.073 af

Subcatchment 2S: WS-2 Runoff Area=0.430 ac 37.44% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment 4S: WS-4 Runoff Area=0.485 ac 0.00% Impervious Runoff Depth=0.00"
Tc=0.0 min CN=30 Runoff=0.00 cfs 0.000 af

Pond 1P: CULTEC Peak Elev=16.45' Storage=0.013 af Inflow=0.96 cfs 0.073 af
Outflow=0.30 cfs 0.073 af

Pond 2P: Swale A Peak Elev=19.00' Storage=0.000 af Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Link 1L: Seekonk River Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 2.016 ac Runoff Volume = 0.073 af Average Runoff Depth = 0.43"
37.40% Pervious = 0.754 ac 62.60% Impervious = 1.262 ac

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Type III 24-hr WQV Rainfall=1.00"

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Summary for Subcatchment 1S: WS-1

Runoff = 0.96 cfs @ 12.09 hrs, Volume= 0.073 af, Depth= 0.79"

Routed to Pond 1P : CULTEC

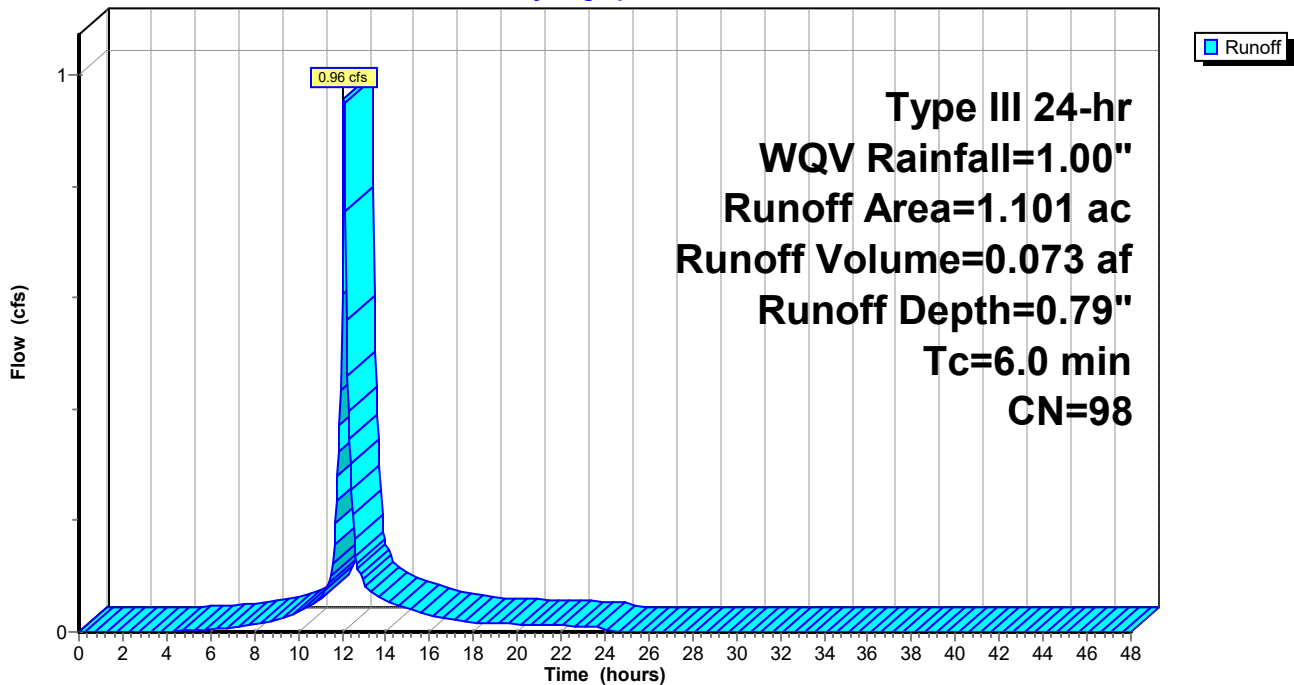
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr WQV Rainfall=1.00"

Area (ac)	CN	Description
* 1.101	98	Roofs/Paved
1.101		100.00% Impervious Area

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

Subcatchment 1S: WS-1

Hydrograph



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Type III 24-hr WQV Rainfall=1.00"

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Summary for Subcatchment 2S: WS-2

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Pond 2P : Swale A

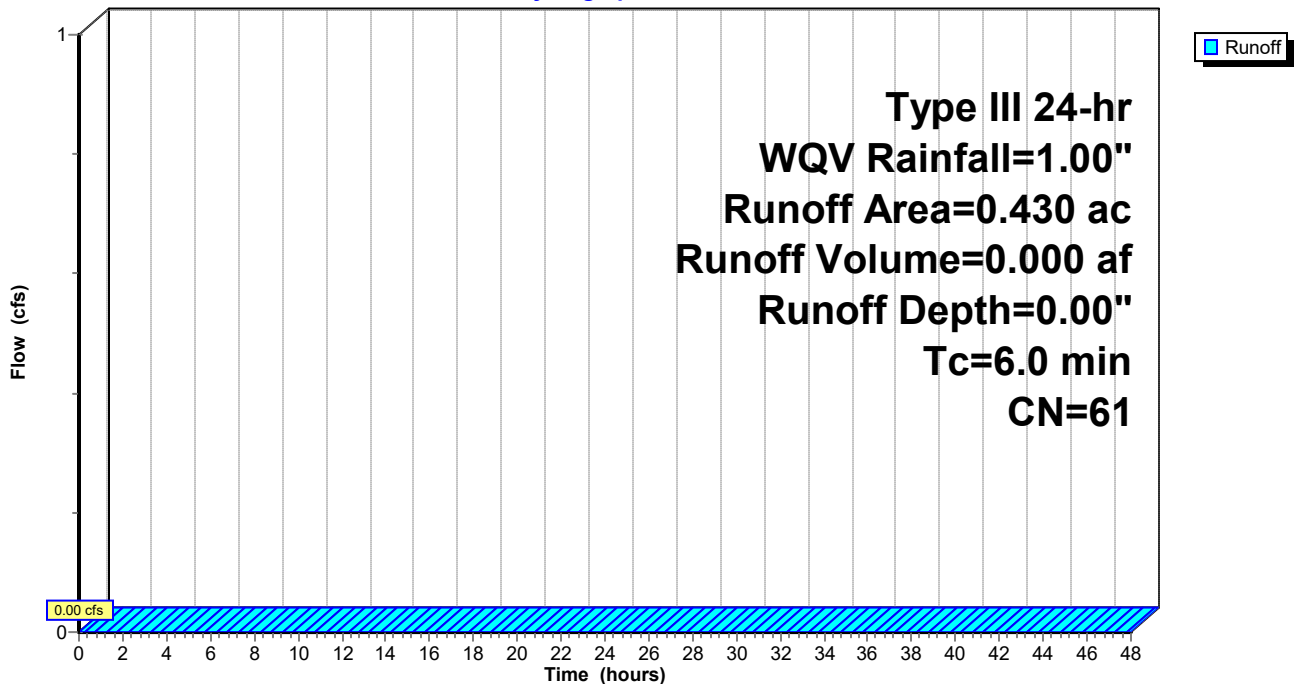
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr WQV Rainfall=1.00"

Area (ac)	CN	Description
* 0.161	98	Asphalt walking path
0.269	39	>75% Grass cover, Good, HSG A
0.430	61	Weighted Average
0.269		62.56% Pervious Area
0.161		37.44% Impervious Area

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

Subcatchment 2S: WS-2

Hydrograph



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Type III 24-hr WQV Rainfall=1.00"

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Summary for Subcatchment 4S: WS-4

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

[45] Hint: Runoff=Zero

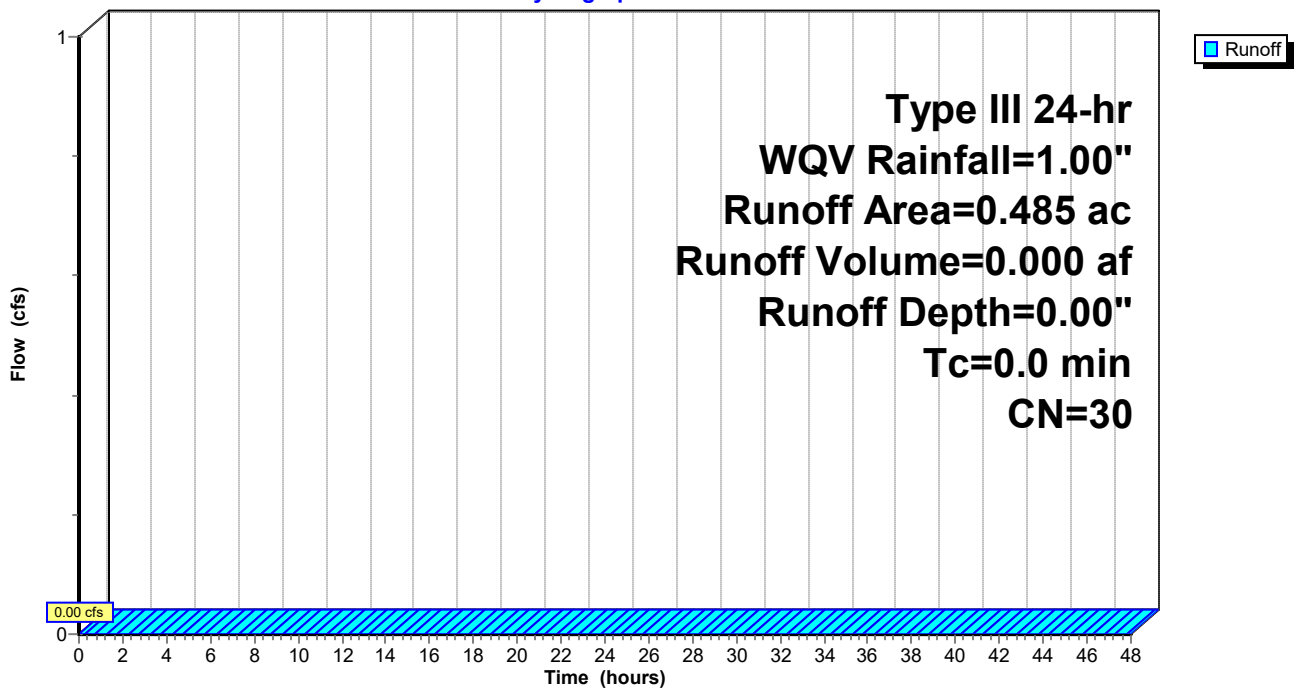
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link 1L : Seekonk River

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr WQV Rainfall=1.00"

Area (ac)	CN	Description
0.485	30	Woods, Good, HSG A
0.485		100.00% Pervious Area

Subcatchment 4S: WS-4

Hydrograph



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Type III 24-hr WQV Rainfall=1.00"

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Summary for Pond 1P: CULTEC

Inflow Area = 1.101 ac, 100.00% Impervious, Inflow Depth = 0.79" for WQV event
 Inflow = 0.96 cfs @ 12.09 hrs, Volume= 0.073 af
 Outflow = 0.30 cfs @ 12.40 hrs, Volume= 0.073 af, Atten= 69%, Lag= 19.0 min
 Discarded = 0.30 cfs @ 12.40 hrs, Volume= 0.073 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 16.45' @ 12.40 hrs Surf.Area= 0.033 ac Storage= 0.013 af

Plug-Flow detention time= 9.4 min calculated for 0.073 af (100% of inflow)
 Center-of-Mass det. time= 9.4 min (797.3 - 787.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	15.75'	0.026 af	28.00'W x 52.00'L x 3.21'H Field A 0.107 af Overall - 0.042 af Embedded = 0.065 af x 40.0% Voids
#2A	16.25'	0.042 af	Cultec R-280HD x 42 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
#3B	17.00'	0.039 af	14.75'W x 143.00'L x 3.21'H Field B 0.155 af Overall - 0.059 af Embedded = 0.096 af x 40.0% Voids
#4B	17.50'	0.059 af	Cultec R-280HD x 60 Inside #3 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 3 rows
#5C	17.00'	0.030 af	28.00'W x 59.00'L x 3.21'H Field C 0.122 af Overall - 0.048 af Embedded = 0.074 af x 40.0% Voids
#6C	17.50'	0.048 af	Cultec R-280HD x 48 Inside #5 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
#7D	17.00'	0.026 af	28.00'W x 52.00'L x 3.21'H Field D 0.107 af Overall - 0.042 af Embedded = 0.065 af x 40.0% Voids
#8D	17.50'	0.042 af	Cultec R-280HD x 42 Inside #7 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
		0.311 af	Total Available Storage

Storage Group A created with Chamber Wizard
 Storage Group B created with Chamber Wizard
 Storage Group C created with Chamber Wizard
 Storage Group D created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	15.75'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 4.84'

Discarded OutFlow Max=0.30 cfs @ 12.40 hrs HW=16.45' (Free Discharge)
 ↑1=Exfiltration (Controls 0.30 cfs)

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Type III 24-hr WQV Rainfall=1.00"

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Pond 1P: CULTEC - Chamber Wizard Field A

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 6 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

7 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 50.00' Row Length +12.0" End Stone x 2 = 52.00' Base Length

6 Rows x 47.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 28.00' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

42 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 6 Rows = 1,821.5 cf Chamber Storage

4,671.3 cf Field - 1,821.5 cf Chambers = 2,849.8 cf Stone x 40.0% Voids = 1,139.9 cf Stone Storage

Chamber Storage + Stone Storage = 2,961.4 cf = 0.068 af

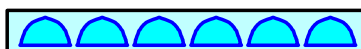
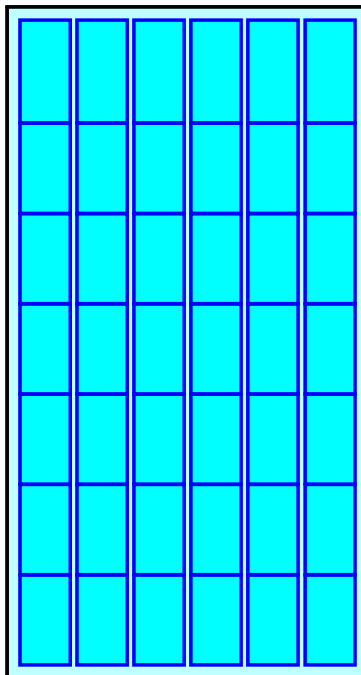
Overall Storage Efficiency = 63.4%

Overall System Size = 52.00' x 28.00' x 3.21'

42 Chambers

173.0 cy Field

105.5 cy Stone



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Pond 1P: CULTEC - Chamber Wizard Field B

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 3 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

20 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 141.00' Row Length +12.0" End Stone x 2 = 143.00' Base Length

3 Rows x 47.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 14.75' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

60 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 3 Rows = 2,568.4 cf Chamber Storage

6,767.2 cf Field - 2,568.4 cf Chambers = 4,198.8 cf Stone x 40.0% Voids = 1,679.5 cf Stone Storage

Chamber Storage + Stone Storage = 4,247.9 cf = 0.098 af

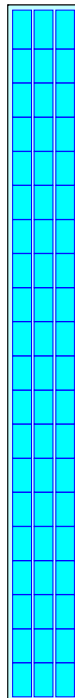
Overall Storage Efficiency = 62.8%

Overall System Size = 143.00' x 14.75' x 3.21'

60 Chambers

250.6 cy Field

155.5 cy Stone



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Pond 1P: CULTEC - Chamber Wizard Field C

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 6 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

8 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 57.00' Row Length +12.0" End Stone x 2 = 59.00' Base Length

6 Rows x 47.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 28.00' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

48 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 6 Rows = 2,076.5 cf Chamber Storage

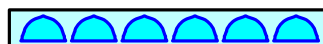
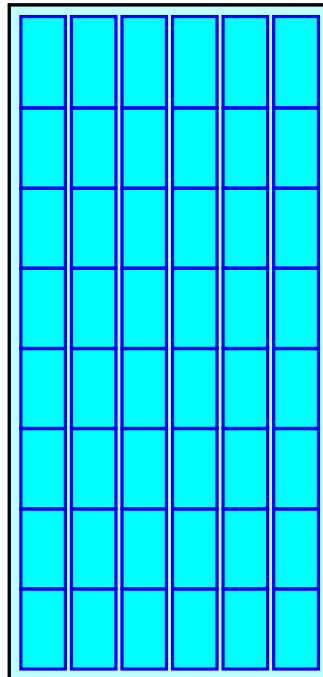
5,300.2 cf Field - 2,076.5 cf Chambers = 3,223.6 cf Stone x 40.0% Voids = 1,289.5 cf Stone Storage

Chamber Storage + Stone Storage = 3,366.0 cf = 0.077 af

Overall Storage Efficiency = 63.5%

Overall System Size = 59.00' x 28.00' x 3.21'

48 Chambers
196.3 cy Field
119.4 cy Stone



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Pond 1P: CULTEC - Chamber Wizard Field D

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD)

Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf

Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 6.07 sf x 6 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

7 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 50.00' Row Length +12.0" End Stone x 2 = 52.00' Base Length

6 Rows x 47.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 28.00' Base Width

6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

42 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 6 Rows = 1,821.5 cf Chamber Storage

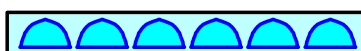
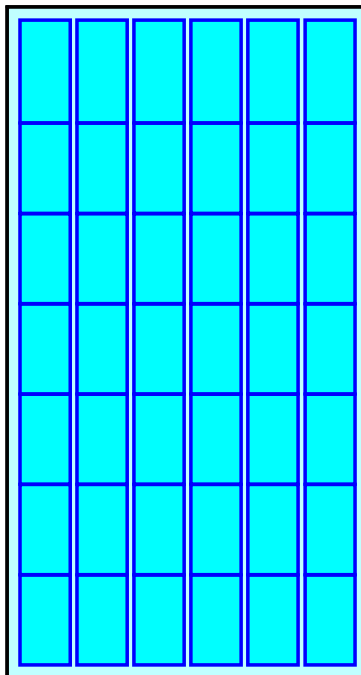
4,671.3 cf Field - 1,821.5 cf Chambers = 2,849.8 cf Stone x 40.0% Voids = 1,139.9 cf Stone Storage

Chamber Storage + Stone Storage = 2,961.4 cf = 0.068 af

Overall Storage Efficiency = 63.4%

Overall System Size = 52.00' x 28.00' x 3.21'

42 Chambers
173.0 cy Field
105.5 cy Stone



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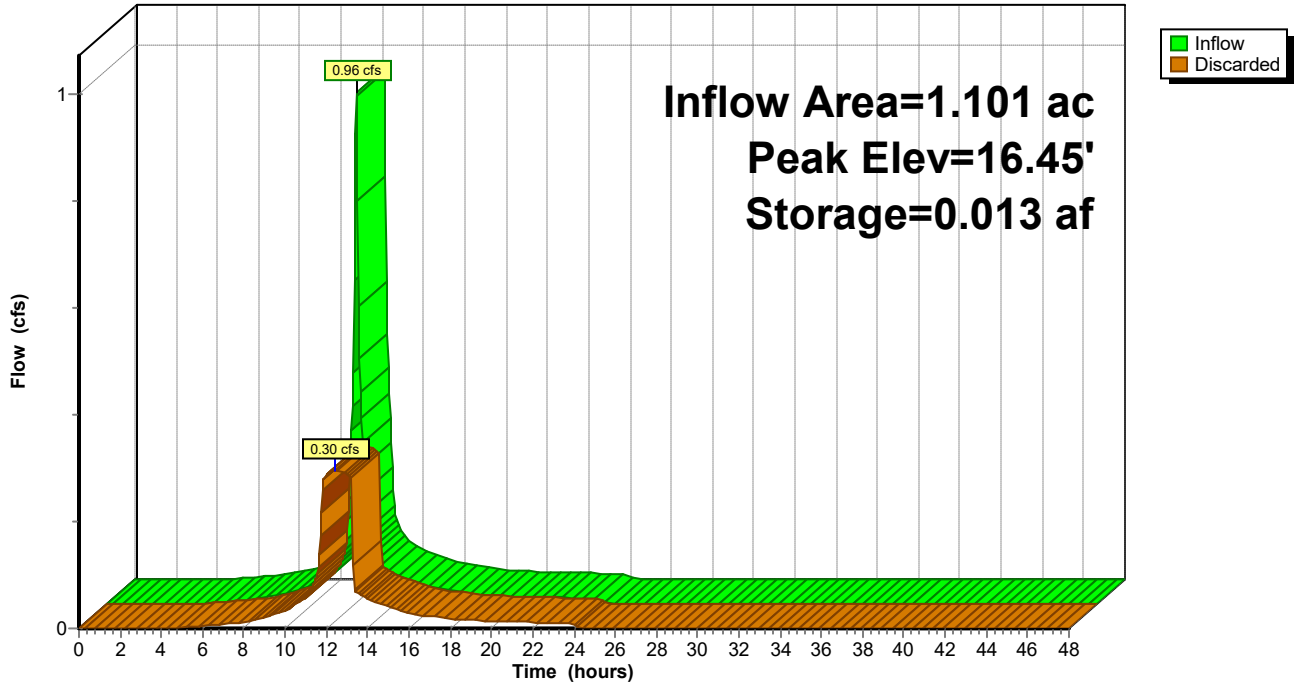
Type III 24-hr WQV Rainfall=1.00"

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Pond 1P: CULTEC

Hydrograph



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Summary for Pond 2P: Swale A

Inflow Area = 0.430 ac, 37.44% Impervious, Inflow Depth = 0.00" for WQV event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 1L : Seekonk River

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 19.00' @ 0.00 hrs Surf.Area= 0.017 ac Storage= 0.000 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	19.00'	0.052 af	1.50'W x 500.00'L x 1.00'H Prismaoid Z=3.0
Device	Routing	Invert	Outlet Devices
#1	Primary	19.75'	5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	19.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 5.00'

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=19.00' (Free Discharge)
↑**2=Exfiltration** (Passes 0.00 cfs of 0.14 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=19.00' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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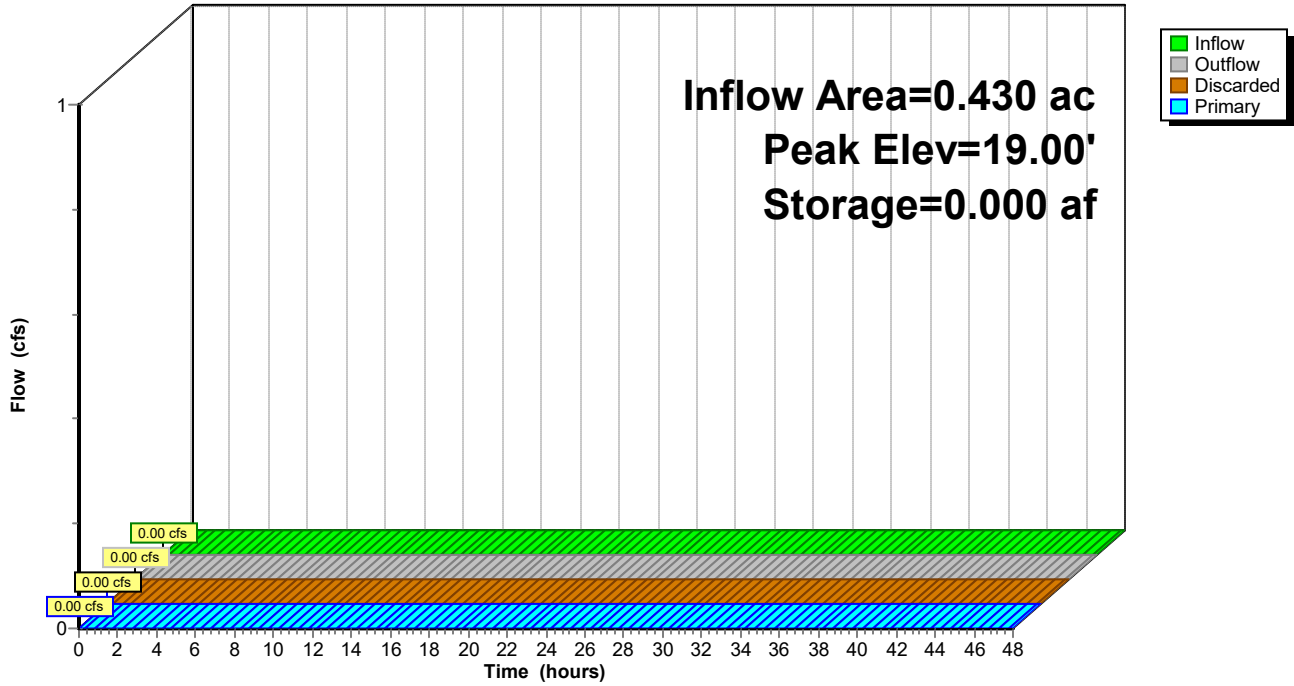
Type III 24-hr WQV Rainfall=1.00"

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Pond 2P: Swale A

Hydrograph



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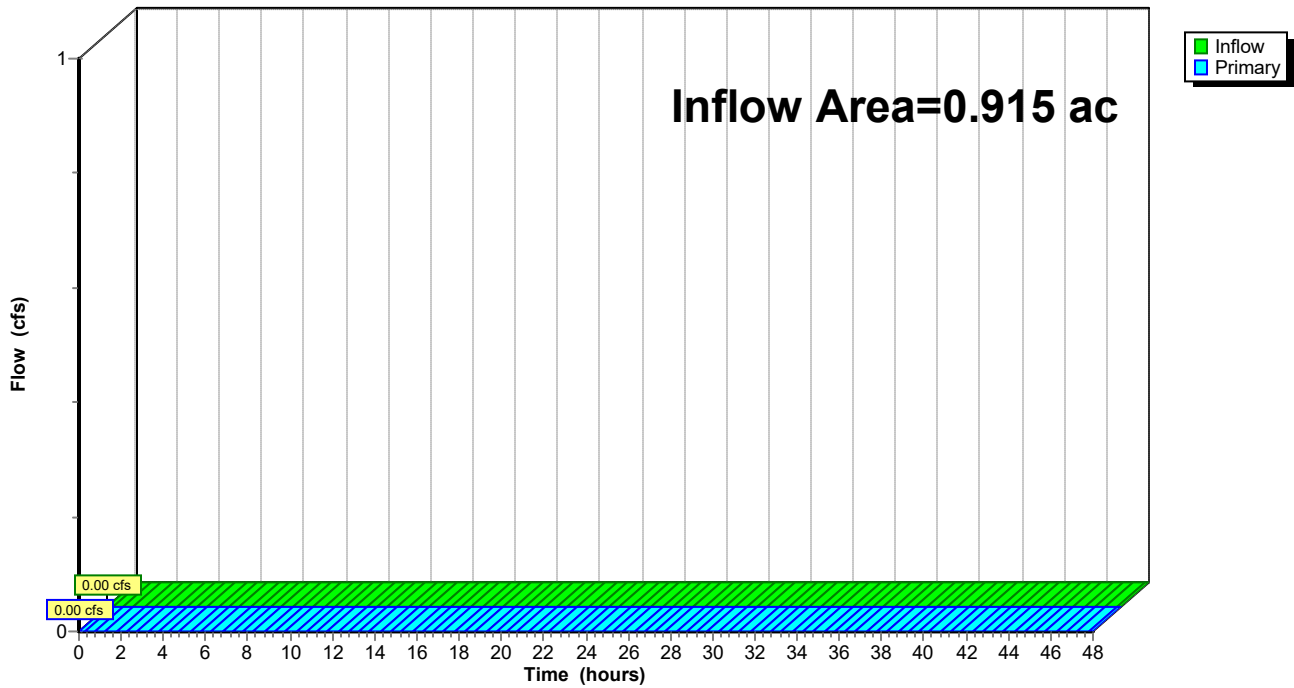
Summary for Link 1L: Seekonk River

Inflow Area = 0.915 ac, 17.60% Impervious, Inflow Depth = 0.00" for WQV event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

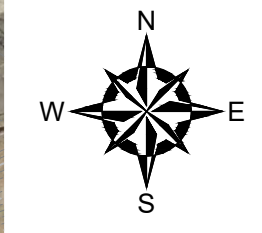
Link 1L: Seekonk River

Hydrograph





APPENDIX C
GEOTECHNICAL DATA



- REFERENCE NOTES:**
1. BASE MAP DEVELOPED FROM AN ELECTRONIC DRAWING FILE TITLED 7500-00-ECS.DWG, PREPARED BY GAROFALO, AND TRANSMITTED TO GZA ON 07-07-2025.
 2. AERIAL DATA PROVIDED FROM RIGIS IMAGERY FLOWN WINTER 2024.
 3. THE LOCATION OF GZA'S 2024 TEST BORINGS WERE APPROXIMATELY DETERMINED USING A LEICA ZENO 20 HANDHELD & AS-12 ANTENNA (MAST MOUNTED) WITH RTK CORRECTION ACCURACY OF 1 CM HORIZONTAL & 2 CM VERTICAL BY GZA PERSONNEL DURING SITE VISITS ON 11/15/2018, 2/14/2024, AND 2/6/2024.
 4. ELEVATIONS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

- LEGEND:**
- - - - - SITE BOUNDARY
 - - - - - EXISTING MINOR CONTOUR (1 FOOT INTERVAL)
 - - - - - EXISTING MAJOR CONTOUR (5 FOOT INTERVAL)
 - PROPOSED BUILDING OUTLINE

- ⊕ **B-2** OBSERVATION WELLS PERFORMED BY GZA DRILLING, INC., ON 3/4-3/6/1987 AND OBSERVED BY GZA PERSONNEL. OBSERVATION WELL B-1 NOT LOCATED DURING GZA SURVEY IN 2024.
- ⊕ **GZ-2** EXPLORATIONS PERFORMED BY HOFFMAN ENVIRONMENTAL SERVICES BETWEEN 11/8-11/9/2018 AND OBSERVED BY GZA PERSONNEL. OBSERVATION WELLS WERE INSTALLED IN GZ-2, GZ-3, GZ-6, GZ-7, AND GZ-9.
- EXPLORATIONS PERFORMED BY GEOLOGIC EARTH EXPLORATION, INC. ON 2/2 AND 2/5/2024 AND OBSERVED BY GZA PERSONNEL. OBSERVATION WELL INSTALLED IN GZ23-6.
- ⊕ **GZ23-1** APPROXIMATE LOCATION OF EXPLORATIONS PERFORMED BY EAST COAST DRILLING AND OBSERVED BY HALEY & ALDRICH, INC. DURING NOVEMBER 1987.
- ⊕ **B-103**
- (OW) GROUND WATER OBSERVATION WELL INSTALLED.



NO.	ISSUE/DESCRIPTION	BY	DATE

UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

**27 EAST RIVER STREET RESIDENCE
27 EAST RIVER STREET
PROVIDENCE, RHODE ISLAND**

EXPLORATION LOCATION PLAN

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com	PREPARED FOR: 27 EAST RIVER STREET, LLC
--	--

PROJ MGR: BC	REVIEWED BY: DRC	CONSULT REV: JJM	FIGURE 2
DESIGNED BY: BC	DRAWN BY: TRM	SCALE: AS NOTED	
DATE: AUGUST 2025	PROJECT NO. 03.0035228.00	REVISION NO. 0	

GEOPROBE LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

RS Acquisitions LLC
 27 East River St - Phase II ESA,
 Providence, Rhode Island

EXPLORATION NO.: GZ-01
 SHEET: 1 of 1
 PROJECT NO: 34519.01
 REVIEWED BY: M. Clark

Logged By: Rowan Hayes
Drilling Co.: Hoffman Environmental Services
Foreman: Sal

Geoprobe Location: See Plan
Ground Surface Elev. (ft.):
Final Geoprobe Depth (ft.): 15
Date Start - Finish: 11/8/2018 - 11/8/2018

H. Datum:
V. Datum:

Type of Rig: Geoprobe
Rig Model: 7822 DT
Drilling Method: Direct Push

Sampler Type:
Sampler O.D. (in.):
Sampler Length (in.):
Rock Core Size:

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
Not Measured				

Depth (ft)	Sample					Sample Description Modified Burmister	Remark	Elev. (ft.)	Stratum Description	Depth (ft.)
	No.	Depth (ft.)	Pen. (in)	Rec. (in)	PID (PPM)					
2	S-1	0.0-5.0	60	36	0.7	S-1 : Top 10": Brown TOPSOIL Next 9": Gray CONCRETE or BRICK Next 9": Black/dark brown, fine to coarse SAND, trace Silt Bottom 8": Light gray, fine SAND, trace Gravel, trace Silt	1		TOPSOIL/ Fill	1
					0.5				CONCRETE	2
									SAND	5
6	S-2	5.0-10.0	60	30	0.5	S-2 : Light gray, fine SAND, little Silt				
10	S-3	10.0-15.0	60	29	0.6	S-3 : Light gray, fine SAND, little Silt			FINE SAND	
16						End of exploration at 15 feet.	2			15

REMARKS

1 - The headspace of soil samples was screened for Total Volatile Organic Compounds (TVOCs) using an Ion Science Tiger LT photoionization detector equipped with a 10.6 eV lamp. ND indicates non-detected reading below the instrument's detection of approximately 1 ppm.
 2 - End of exploration at ±15'.

Field Screening performed with PID equipped with a 10.6 eV lamp calibrated to a 100 ppm isobutylene standard. See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

GZ-01

GEOPROBE LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

RS Acquisitions LLC
 27 East River St - Phase II ESA,
 Providence, Rhode Island

EXPLORATION NO.: GZ-03
SHEET: 1 of 1
PROJECT NO: 34519.01
REVIEWED BY:

Logged By: Rowan Hayes
Drilling Co.: Hoffman Environmental Services
Foreman: Sal

Geoprobe Location: See Plan
Ground Surface Elev. (ft.):
Final Geoprobe Depth (ft.): 25
Date Start - Finish: 11/8/2018 - 11/8/2018

H. Datum:
V. Datum:

Type of Rig: Geoprobe
Rig Model: 7822 DT
Drilling Method: Direct Push

Sampler Type:
Sampler O.D. (in.):
Sampler Length (in.):
Rock Core Size:

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/8/18	11:35		18	

Depth (ft)	Sample					Sample Description Modified Burmister	Remark	Elev. (ft.)	Stratum Description	Depth (ft.)	Equipment Installed
	No.	Depth (ft.)	Pen. (in.)	Rec. (in.)	PID (ppm)						
5	S-1	0.0-5.0	60	32	0.3	S-1 : Top 3": Brown Topsoil Middle 9": Black/dark brown, fine to coarse SAND, little fine Gravel, trace Silt Bottom 20": Light grey, fine to coarse SAND, trace Gravel, trace Silt	1		0.5	0.5	2" PVC
	S-2	5.0-10.0	60	36	0.3				11	11	
15	S-3	10.0-15.0	60	33	0.2	S-3 : Top 15": Light Grey, fine to coarse SAND, trace Silt, trace fine Gravel Bottom 18": Light grey, fine SAND, trace Silt	2		15	15	Well Screen
	S-4	15.0-20.0	60	46	0.2				16	16	
20	S-5	20.0-25.0	60	60	0.3	S-5 : Light grey, silty CLAY, wet	3		20	20	
									25	25	
25						End of exploration at 25 feet.	4		25	25	
30											
35											

REMARKS

- 1 - The headspace of soil samples was screened for Total Volatile Organic Compounds (TVOCs) using an Ion Science Tiger LT photoionization detector equipped with a 10.6 eV lamp. ND indicates non-detected reading below the instrument's detection of approximately 1 ppm.
- 2 - GW observed at approximately 18' ft bgs.
- 3 - Observation well installed (2"PVC) at 25 feet, screen installed from 25 feet to 15 feet.
- 4 - End of Exploration at 25 feet.

Field Screening performed with PID equipped with a 10.6 eV lamp calibrated to a 100 ppm isobutylene standard. See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

GZ-03

GEOPROBE LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

RS Acquisitions LLC
 27 East River St - Phase II ESA,
 Providence, Rhode Island

EXPLORATION NO.: GZ-04
 SHEET: 1 of 1
 PROJECT NO: 34519.01
 REVIEWED BY: M. Clark

Logged By: Rowan Hayes
 Drilling Co.: Hoffman Environmental Services
 Foreman: Sal

Geoprobe Location: See Plan
 Ground Surface Elev. (ft.):
 Final Geoprobe Depth (ft.): 30
 Date Start - Finish: 11/9/2018 - 11/9/2018

H. Datum:
 V. Datum:

Type of Rig: Geoprobe
 Rig Model: 7822 DT
 Drilling Method: Direct Push

Sampler Type:
 Sampler O.D. (in.):
 Sampler Length (in.):
 Rock Core Size:

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/9/18	08:15		14.5	

Depth (ft)	Sample					Sample Description Modified Burmister	Remark	Elev. (ft.)	Stratum Description	Depth (ft.)
	No.	Depth (ft.)	Pen. (in)	Rec. (in)	PID (PPM)					
5	S-1	0.0-5.0	60	6	0.3	S-1 : Brown topsoil	1		TOPSOIL	5
	S-2	5.0-10.0	60	45	0.4 0.4	S-2 : Top 10": Light grey, fine to coarse SAND, trace Gravel, trace Silt Bottom 35": Light grey, fine SAND, little Silt				6
10	S-3	10.0-15.0	60	44	0.3	S-3 : Light grey, fine SAND, little Silt	2		FINE SAND	
15	S-4	15.0-20.0	60	60	0.3	S-4 : Light grey, fine SAND, trace Silt, wet				
20	S-5	20.0-25.0	60	60	0.3	S-5 : Top 46": Light grey, fine SAND, trace Silt, wet Bottom 14": Light grey, silty CLAY, wet				24
25	S-6	25.0-30.0	60	60	0.4	S-6 : Light grey, silty CLAY, wet	3		SILTY CLAY	30
30						End of exploration at 30 feet.				
35										

REMARKS

1 - The headspace of soil samples was screened for Total Volatile Organic Compounds (TVOCs) using an Ion Science Tiger LT photoionization detector equipped with a 10.6 eV lamp. ND indicates non-detected reading below the instrument's detection of approximately 1 ppm.
 2 - GW observed at approximately 14.5' ft bgs.
 3 - End of exploration at 30 feet.

Field Screening performed with PID equipped with a 10.6 eV lamp calibrated to a 100 ppm isobutylene standard. See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

GZ-04

GEOPROBE LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

RS Acquisitions LLC
 27 East River St - Phase II ESA,
 Providence, Rhode Island

EXPLORATION NO.: GZ-05
SHEET: 1 of 1
PROJECT NO: 34519.01
REVIEWED BY: M. Clark

Logged By: Rowan Hayes
Drilling Co.: Hoffman Environmental Services
Foreman: Sal

Geoprobe Location: See Plan
Ground Surface Elev. (ft.):
Final Geoprobe Depth (ft.): 30
Date Start - Finish: 11/9/2018 - 11/9/2018

H. Datum:
V. Datum:

Type of Rig: Geoprobe
Rig Model: 7822 DT
Drilling Method: Direct Push

Sampler Type:
Sampler O.D. (in.):
Sampler Length (in.):
Rock Core Size:

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/9/18	09:30		23.5	

Depth (ft)	Sample					Sample Description Modified Burmister	Remark	Elev. (ft.)	Stratum Description	Depth (ft.)
	No.	Depth (ft.)	Pen. (in)	Rec. (in)	PID (PPM)					
5	S-1	0.0-5.0	60	21	0.2	S-1 : Top 5": Brown topsoil Middle 10": Brown, fine to coarse SAND, trace Gravel, trace Silt, trace Organics Bottom 6": Dark brown/ black, fine to coarse SAND, little fine Gravel, trace Silt	1		TOPSOIL	1.5
	S-2	5.0-10.0	60	34	0.3 0.2	S-2 : Top 6": Dark brown/ black, fine to coarse SAND, little fine Gravel, trace Silt Bottom 24": Light grey, fine SAND, trace Silt			SAND	8
10	S-3	10.0-15.0	60	51	0.4 0.3 0.2	S-3 : Top 6": Light grey, fine SAND, trace Silt Middle 11": Dark brown/ black, fine to coarse SAND, little fine Gravel, trace Silt, trace Organics Bottom 34": Light grey, fine SAND, little Silt	2		FINE SAND	20
	S-4	15.0-20.0	60	60	0.2	S-4 : Light grey, fine SAND, trace Silt				27
20	S-5	20.0-25.0	60	60	0.1 0.2	S-5 : Top 41": Dark grey, silty CLAY Bottom 19": Light grey, fine SAND, trace Silt, wet	3			30
	S-6	25.0-30.0	60	60	0.2 0.2	S-6 : Top 20": Light grey, silty CLAY, wet Bottom 40": Light grey, fine SAND, trace Silt, wet				
30						End of exploration at 30 feet.	3			

REMARKS

1 - The headspace of soil samples was screened for Total Volatile Organic Compounds (TVOCs) using an Ion Science Tiger LT photoionization detector equipped with a 10.6 eV lamp. ND indicates non-detected reading below the instrument's detection of approximately 1 ppm.
 2 - GW observed at approximately 23.5' feet bgs.
 3 - End of exploration at 30 feet

Field Screening performed with PID equipped with a 10.6 eV lamp calibrated to a 100 ppm isobutylene standard. See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

GZ-05

GZA TEMPLATE GEOPROBE: 12/4/2018; 2:49:00 PM

GEOPROBE LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

RS Acquisitions LLC
 27 East River St - Phase II ESA,
 Providence, Rhode Island

EXPLORATION NO.: GZ-07
SHEET: 1 of 1
PROJECT NO: 34519.01
REVIEWED BY:

Logged By: Rowan Hayes
Drilling Co.: Hoffman Environmental Services
Foreman: Sal

Geoprobe Location: See Plan
Ground Surface Elev. (ft.):
Final Geoprobe Depth (ft.): 25
Date Start - Finish: 11/9/2018 - 11/9/2018

H. Datum:
V. Datum:

Type of Rig: Geoprobe
Rig Model: 7822 DT
Drilling Method: Direct Push

Sampler Type:
Sampler O.D. (in.):
Sampler Length (in.):
Rock Core Size:

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/9/18	14:00		19	

Depth (ft)	Sample				PID (ppm)	Sample Description Modified Burmister	Remark	Elev. (ft.)	Stratum Description	Equipment Installed
	No.	Depth (ft.)	Pen. (in.)	Rec. (in.)						
5	S-1	0.0-5.0	60	24		S-1 : Top 3": Brown TOPSOIL/GRASS Middle 7": Grey CONCRETE Next 7": Black, fine to coarse SAND, little Gravel, trace Silt Bottom 7": Dark grey, fine to coarse SAND, little Gravel, trace Silt, wet	1			
					0.1					
					0.2					
	S-2	5.0-10.0	60	12	0.3	S-2 : Top 5": Dark grey , fine to coarse SAND, some Gravel, trace Silt Middle 3": Grey, fine to coarse SAND and fine GRAVEL, trace Silt Bottom 4": Light grey, White, crushed rock				
					0.2					
10					0.1					
	S-3	10.0-15.0	60	30	0.2	S-3 : Top 7": Dark brown/ black, fine to coarse SAND and fine GRAVEL, trace Silt Next 6": Light grey/ white crushed rock Next 7": Grey, coarse SAND, some Gravel, little fine to medium SAND, trace Silt Next 5": Light grey/ white crushed stone, Bottom 4": Grey, coarse SAND, some Gravel, little fine to medium SAND, trace Silt	2			
					0.2					
				0.1						
15					0.1					
	S-4	15.0-20.0	60	20	0.2	S-4 : Top 7": Grey, fine to coarse SAND, little Gravel, trace Silt Middle 7": Light grey, fine to coarse SAND and fine GRAVEL, trace Silt Bottom 6": Dark grey, medium to coarse SAND, little Gravel, little Silt, trace, fine Sand, wet	3			
					0.2					
				0.3						
20					123.1					
	S-5	20.0-25.0	60	10		S-5 : Dark grey, medium to coarse SAND, little Gravel, little Silt, trace fine Sand, petroleum-like odor, wet	4			
25						End of exploration at 25 feet.				
30										

REMARKS

- 1 - The headspace of soil samples was screened for Total Volatile Organic Compounds (TVOCs) using an Ion Science Tiger LT photoionization detector equipped with a 10.6 eV lamp. ND indicates non-detected reading below the instrument's detection of approximately 1 ppm.
- 2 - GW observed at approximately 19' feet bgs.
- 3 - Observation well installed (2" PVC) at 25 feet, screen installed from 25 feet to 15 feet.
- 4 - End of exploration at 25 feet.

Field Screening performed with PID equipped with a 10.6 eV lamp calibrated to a 100 ppm isobutylene standard. See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

GZ-07

GEOPROBE LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

RS Acquisitions LLC
27 East River St - Phase II ESA,
Providence, Rhode Island

EXPLORATION NO.: GZ-08
SHEET: 1 of 1
PROJECT NO: 34519.01
REVIEWED BY: M. Clark

Logged By: Rowan Hayes
Drilling Co.: Hoffman Environmental Services
Foreman: Sal

Geoprobe Location: See Plan
Ground Surface Elev. (ft.):
Final Geoprobe Depth (ft.): 30
Date Start - Finish: 11/9/2018 - 11/9/2018

H. Datum:
V. Datum:

Type of Rig: Geoprobe
Rig Model: 7822 DT
Drilling Method: Direct Push

Sampler Type:
Sampler O.D. (in.):
Sampler Length (in.):
Rock Core Size:

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/9/18	16:20		26	

Depth (ft)	Sample					Sample Description Modified Burmister	Remark	Elev. (ft.)	Stratum Description	Depth (ft.)
	No.	Depth (ft.)	Pen. (in)	Rec. (in)	PID (PPM)					
5	S-1	0.0-5.0	60	26	0.1 0.1 0.1	S-1 : Top 6": Brown TOPSOIL Middle 10": Dark grey, SILT, trace Organics Bottom 10": Olive grey, SILT	1		TOPSOIL	1.6
	S-2	5.0-10.0	60	60	0.2	S-2 : Olive grey, SILT				
	S-3	10.0-15.0	60	51	0.1	S-3 : Olive grey, SILT, thin silty Clay layers				SILT
15	S-4	15.0-20.0	60	60	0.3 0.1 0.1	S-4 : Top 20": Olive grey, SILT, thin silty CLAY layers Middle 36": Olive grey, SILT Bottom 14": Olive grey, clayey, SILT				
20	S-5	20.0-25.0	60	60	0.1	S-5 : Dark grey, fine SAND, some Silt				20
25	S-6	25.0-30.0	60	60	0.4	S-6 : Dark grey, SILT, little fine Sand, thin silty Clay layers	2			25
										26
30							3		SILT	
						End of exploration at 30 feet.	4			30
35										

REMARKS

- 1 - The headspace of soil samples was screened for Total Volatile Organic Compounds (TVOCs) using an Ion Science Tiger LT photoionization detector equipped with a 10.6 eV lamp. ND indicates non-detected reading below the instrument's detection of approximately 1 ppm.
- 2 - GW observed at approximately 26' feet bgs.
- 3 - Unable to install observation well due to casing refusal.
- 4 - End of exploration at 30 feet.

Field Screening performed with PID equipped with a 10.6 eV lamp calibrated to a 100 ppm isobutylene standard. See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

GZ-08

GEOPROBE LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

RS Acquisitions LLC
 27 East River St - Phase II ESA,
 Providence, Rhode Island

EXPLORATION NO.: GZ-09
SHEET: 1 of 1
PROJECT NO: 34519.01
REVIEWED BY: M. Clark

Logged By: Rowan Hayes
Drilling Co.: Hoffman Environmental Services
Foreman: Sal

Geoprobe Location: See Plan
Ground Surface Elev. (ft.):
Final Geoprobe Depth (ft.): 30
Date Start - Finish: 11/12/2018 - 11/12/2018

H. Datum:
V. Datum:

Type of Rig: Geoprobe
Rig Model: 7822 DT
Drilling Method: Direct Push

Sampler Type:
Sampler O.D. (in.):
Sampler Length (in.):
Rock Core Size:

Groundwater Depth (ft.)				
Date	Time	Stab. Time	Water	Casing
11/12/18	09:22		24	

Depth (ft)	Sample					Sample Description Modified Burmister	Remark	Elev. (ft.)	Stratum Description	Depth (ft.)
	No.	Depth (ft.)	Pen. (in)	Rec. (in)	PID (PPM)					
5							1			
10										
15										
20										
25							2			24
30							3			
35							4			

REMARKS

- 1 - Observation well (2" PVC) installed to 30' using 3/4" auger. Sand set to 10 feet bentonite 1 ft up to 17 ft cutting for backfill. Screen installed from 30 feet to 20 feet.
- 2 - GW observed at approximately 24 feet bgs.
- 3 - End of exploration at 30 feet.
- 4 - No soil samples collected

Field Screening performed with PID equipped with a 10.6 eV lamp calibrated to a 100 ppm isobutylene standard. See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

GZ-09

GEOPROBE LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

RS Acquisitions LLC
 27 East River St - Phase II ESA,
 Providence, Rhode Island

EXPLORATION NO.: GZ-10
SHEET: 1 of 1
PROJECT NO: 34519.01
REVIEWED BY: M. Clark

Logged By: Rowan Hayes
Drilling Co.: Hoffman Environmental Services
Foreman: Sal

Geoprobe Location: See Plan
Ground Surface Elev. (ft.):
Final Geoprobe Depth (ft.): 10
Date Start - Finish: 11/12/2018 - 11/12/2018

H. Datum:
V. Datum:

Type of Rig: Geoprobe
Rig Model: 7822 DT
Drilling Method: Direct Push

Sampler Type:
Sampler O.D. (in.):
Sampler Length (in.):
Rock Core Size:

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
Not Measured				

Depth (ft)	Sample					Sample Description Modified Burmister	Remark	Elev. (ft.)	Stratum Description	Depth (ft.)
	No.	Depth (ft.)	Pen. (in)	Rec. (in)	PID (PPM)					
5	S-1	0.0-5.0	60	26	0.0	S-1 : Top 9": Grey CONCRETE Bottom 17": Dark brown/ black, medium to coarse SAND, some Gravel, little fine Sand, trace Silt, thin silty Clay layer at top, trace Concrete	1		CONCRETE	1.5
10	S-2	5.0-10.0	60	42	0.1	S-2 : Dark grey/ grey, fine to coarse SAND, some fine Gravel, trace Silt, trace Concrete	2		FILL	10
15						End of exploration at 10 feet.				
20										
25										
30										

REMARKS

1 - The headspace of soil samples was screened for Total Volatile Organic Compounds (TVOCs) using an Ion Science Tiger LT photoionization detector equipped with a 10.6 eV lamp. ND indicates non-detected reading below the instrument's detection of approximately 1 ppm.
 2 - End of exploration at 10 feet bgs.

Field Screening performed with PID equipped with a 10.6 eV lamp calibrated to a 100 ppm isobutylene standard. See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

GZ-10

GEOPROBE LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

RS Acquisitions LLC
 27 East River St - Phase II ESA,
 Providence, Rhode Island

EXPLORATION NO.: GZ-11
 SHEET: 1 of 1
 PROJECT NO: 34519.01
 REVIEWED BY: M. Clark

Logged By: Rowan Hayes
Drilling Co.: Hoffman Environmental Services
Foreman: Sal

Geoprobe Location: See Plan
Ground Surface Elev. (ft.):
Final Geoprobe Depth (ft.): 10
Date Start - Finish: 11/12/2018 - 11/12/2018

H. Datum:
V. Datum:

Type of Rig: Geoprobe
Rig Model: 7822 DT
Drilling Method: Direct Push

Sampler Type:
Sampler O.D. (in.):
Sampler Length (in.):
Rock Core Size:

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
Not Measured				

Depth (ft)	Sample					Sample Description Modified Burmister	Remark	Elev. (ft.)	Stratum Description	Depth (ft.)
	No.	Depth (ft.)	Pen. (in)	Rec. (in)	PID (PPM)					
5	S-1	0.0-5.0	60	36	0.4	S-1 : Top 9": Grey CONCRETE Bottom 27": Dark grey, fine to coarse SAND, some Gravel, trace Silt, trace Concrete	1		CONCRETE	1.5
10	S-2	5.0-10.0	60	44	0.5	S-2 : Dark grey/ grey, fine to coarse SAND, some Gravel, trace Silt, trace Concrete	2		FILL	10
15						End of exploration at 10 feet.				
20										
25										
30										

REMARKS

1 - The headspace of soil samples was screened for Total Volatile Organic Compounds (TVOCs) using an Ion Science Tiger LT photoionization detector equipped with a 10.6 eV lamp. ND indicates non-detected reading below the instrument's detection of approximately 1 ppm.
 2 - End of exploration at 10' feet bgs.

Field Screening performed with PID equipped with a 10.6 eV lamp calibrated to a 100 ppm isobutylene standard. See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

GZ-11

GEOPROBE LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

RS Acquisitions LLC
 27 East River St - Phase II ESA,
 Providence, Rhode Island

EXPLORATION NO.: GZ-12
 SHEET: 1 of 1
 PROJECT NO: 34519.01
 REVIEWED BY: M. Clark

Logged By: Rowan Hayes
Drilling Co.: Hoffman Environmental Services
Foreman: Sal

Geoprobe Location: See Plan
Ground Surface Elev. (ft.):
Final Geoprobe Depth (ft.): 10
Date Start - Finish: 11/12/2018 - 11/12/2018

H. Datum:
V. Datum:

Type of Rig: Geoprobe
Rig Model: 7822 DT
Drilling Method: Direct Push

Sampler Type:
Sampler O.D. (in.):
Sampler Length (in.):
Rock Core Size:

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
Not Measured				

Depth (ft)	Sample					Sample Description Modified Burmister	Remark	Elev. (ft.)	Stratum Description	Depth (ft.)
	No.	Depth (ft.)	Pen. (in)	Rec. (in)	PID (PPM)					
5	S-1	0.0-5.0	60	40	0.3 3.0	S-1 : Top 4": Brown TOPSOIL Next 32": Dark grey, fine to coarse SAND, little Gravel, trace Silt Bottom 4": Black stained, fine to coarse SAND, petroleum like odor	1		TOPSOIL	1.5
									FILL	5.5
10	S-2	5.0-10.0	60	30	0.7 0.2	S-2 : Top 7": Dark grey/ black, fine to coarse SAND, little Gravel, trace Silt Bottom 29": Dark grey, fine SAND, trace Silt	2		FINE SAND	10
15						End of exploration at 10 feet.				
20										
25										
30										

REMARKS

1 - The headspace of soil samples was screened for Total Volatile Organic Compounds (TVOCs) using an Ion Science Tiger LT photoionization detector equipped with a 10.6 eV lamp. ND indicates non-detected reading below the instrument's detection of approximately 1 ppm.
 2 - End of Exploration at 10' feet bgs.

Field Screening performed with PID equipped with a 10.6 eV lamp calibrated to a 100 ppm isobutylene standard. See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

GZ-12

GEOPROBE LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

RS Acquisitions LLC
 27 East River St - Phase II ESA,
 Providence, Rhode Island

EXPLORATION NO.: GZ-13
SHEET: 1 of 1
PROJECT NO: 34519.01
REVIEWED BY: M. Clark

Logged By: Rowan Hayes
Drilling Co.: Hoffman Environmental Services
Foreman: Sal

Geoprobe Location: See Plan
Ground Surface Elev. (ft.):
Final Geoprobe Depth (ft.): 10
Date Start - Finish: 11/12/2018 - 11/12/2018

H. Datum:
V. Datum:

Type of Rig: Geoprobe
Rig Model: 7822 DT
Drilling Method: Direct Push

Sampler Type:
Sampler O.D. (in.):
Sampler Length (in.):
Rock Core Size:

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
Not Measured				

Depth (ft)	Sample					Sample Description Modified Burmister	Remark	Elev. (ft.)	Stratum Description	Depth (ft.)
	No.	Depth (ft.)	Pen. (in)	Rec. (in)	PID (PPM)					
5	S-1	0.0-5.0	60	43	0.4	S-1 : Top 7": CONCRETE	1		CONCRETE	1.5
					0.3	Next 4": Black/ dark brown, fine to coarse SAND and fine GRAVEL, trace Silt, trace Concrete				
					0.3	Next 5": CONCRETE				
					0.3	Next 4": Black/ dark brown, fine to coarse SAND and fine GRAVEL, trace Silt, trace Concrete				
10	S-2	5.0-10.0	60	34	0.3	Bottom 23": Dark grey/ grey, fine to coarse SAND, some Gravel, trace Silt	2		FILL	10
					0.3	S-2 : Top 25": Dark grey, fine to coarse SAND, some Gravel, trace Silt				
						Middle 3": CONCRETE				
						Bottom 16": Dark grey, fine to coarse SAND, some Gravel, trace Silt				
						End of exploration at 10 feet.				

REMARKS
 1 - The headspace of soil samples was screened for Total Volatile Organic Compounds (TVOCs) using an Ion Science Tiger LT photoionization detector equipped with a 10.6 eV lamp. ND indicates non-detected reading below the instrument's detection of approximately 1 ppm.
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Field Screening performed with PID equipped with a 10.6 eV lamp calibrated to a 100 ppm isobutylene standard. See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

GZ-13

