CARMINA WOOD
DESIGN

ENGINEER'S REPORT

for

Car Dealership
6766 Transit Road
Town of Amherst, Erie County, New York

Prepared for

West Herr Automotive Group

6766 Transit Road
Amherst, NY

Prepared by

Carmina Wood Design

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August 2026
Revised October 2026



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Section 1 – Location & Description

This redevelopment project consists of the construction of a 17,350 sf car dealership located at 6766 Transit Road in the Town of Amherst. Construction will also include on-site utility improvements, stormwater management, site landscaping, site lighting and associated parking. The existing site consists of foundation remains (from a previous restaurant & banquet facility) and an existing parking lot. Both will be removed as part of the redevelopment. The site is zoned GB – General Business District. The overall acreage and area of disturbance of the site is 2.16 acres.

See Attachment A for Site Location Map.

Section 2 – Water System

An existing 8" ECWA DIP water main is located along the west side of Transit Road. The water service for the proposed building will be tapped off the existing 8" main and consist of a 4" PVC fire service and 2" type "k" copper domestic service. A 4" RPZ and 2" RPZ and meter will be provided inside the building. Drainage due to testing or failure will be to the outside grade and nearest drainage inlet. Water inside the buildings will be used for typical bathroom and janitorial uses.

Domestic Summary:

Peak Operating Demand:	0.99 gpm
Water Main:	8"
Static Pressure:	44 psi (from ECWA flow test)
Friction Loss:	0.00 psi
Elevation Loss:	1.73 psi
Meter & RPZ Loss:	13 psi
Pressure at RPZ and meter:	29.3 psi

Fire Summary:

Peak Operating Demand:	1,000 gpm
Water Main:	8"
Static Pressure:	44 psi (from ECWA flow test)
Friction Loss:	14.74 psi
Elevation Loss:	1.73 psi
RPZ Loss:	12 psi
Pressure at RPZ:	26.2 psi

Repairs to all devices will be made during off hours; dual backflow preventers are not required. The site is not located in a 100-year flood plain.

Disinfection of the water service following installation will be continuous feed, according to AWWA C-651, latest revision.

See Attachment B for Sanitary Sewer & Water Calculations.

Section 3 – Sanitary Sewer Service

An existing 6" Town of Amherst sanitary sewer main is located along the south side of Harding Road and dead ends at a manhole located on the west property line of the project site. The proposed sanitary sewer service for the dealership will exit the west side of the building and connect to the existing manhole. The service will consist of approximately 100 LF of 6" SDR-35 PVC at a minimum slope of 1.0%. A separate grease line will discharge to a 1,500 gallon oil-water separator before connecting to the sanitary sewer lateral.

Design Parameters:
Car Dealership: 30 employees x 15 gpd/employee = 450 gpd

The hydraulic loading rates per "Design Standard for Wastewater Treatment Works" 2014, NYSDEC.

See Attachment B for Sanitary Sewer & Water Calculations

Section 4 – Storm Sewer Service

Stormwater runoff on the existing site sheet drains toward the center of the parking lot where it is collected by existing catch basins. Stormwater is conveyed westerly and connects to the storm sewer system along Transit Road via two (2) separate connections to catch basins.

Stormwater runoff from the proposed development area for this site will also discharge to the existing storm sewer system along Transit Road. Runoff on the east side of the site will utilize the two existing connections to the Transit Road storm sewer system, while the majority of the site will be conveyed north to an existing catch basin along Freeman Road. This storm sewer system along Freeman Road ties directly to the Transit Road system. The proposed hydrology for the development will consist of a combination of overland sheet flow and pipe channel flow. The storm sewer system for this site will consist of 8"-18" HDPE pipes connected by a series of catch basins. To meet NYSDEC water quality requirements, the northern connection to Freeman Road will connect to a treatment structure before connecting to the catch basin along Freeman Road. Since the proposed conditions result in a reduction of runoff from the site, no detention is required to meet NYSDEC water quantity requirements.

Design Criteria
Storm pipes: 10-year storm
Detention: Comparison of the existing 1-year vs. the proposed 1-year runoff.
Comparison of the existing 10-year vs. the proposed 10-year runoff.
Comparison of the existing 25-year vs. the proposed 10-year runoff.
Comparison of the existing 100-year vs. the proposed 100-year runoff.

Stormwater Runoff Summary:

To Detention:

Event	Prop. Runoff (cfs)	Elevation (ft)	Storage (cf)
1-yr	2.22	699.39	1,876
10-yr	3.95	700.01	2,711
25-yr	4.70	700.40	3,176
100-yr	6.25	701.58	4,186

Total Site:

Event	Ex. Runoff (cfs)	Prop. Runoff (cfs)
1-yr	4.09	3.04
10-yr	7.88	5.70
25-yr	9.96	7.07
100-yr	14.05	9.55

See Attachment C for Storm Water Calculations.

Section 5 – Erosion Control Summary

Stabilization Practices
Stabilization practices for this site include:

A. Land clearing activities shall be done only in areas where earthwork will be performed and shall progress as earthwork is needed.
B. Use of stabilization fabric for all slopes having a slope greater than 1V:3H.
C. Permanent seeding and planting of all unpaved areas using the hydromulching grass seeding technique.
D. Mulching exposed areas.
E. Frequent watering to minimize wind erosion during construction.

Structural Practices
Structural practices for this site include:

A. Inlet protection using a method detailed in the Construction Documents
B. Perimeter protection using temporary silt fence
C. Temporary stone wash off areas
D. Stabilized Construction Entrance

Sequence of Major Activities

The Contractor will be responsible for implementing the following erosion control and storm water management control measures. The Contractor may designate these tasks to certain subcontractors as he sees fit, but the ultimate responsibility for implementing these controls and ensuring their proper functioning remains with the Contractor. The order of activities will be as follows:

A. Install perimeter silt fences in the locations shown on the Demo & Erosion Control Plan sheet.
B. Remove existing pavement and foundation remains as shown on the Demo & Erosion Control Plan sheet.
C. Commence site grading.
D. Disturbed areas of the site where construction activity has ceased for more than 14 days shall be temporarily seeded and watered.
E. Construction of building.
F. Installation of proposed utilities.
G. Finalize pavement subgrade preparation.
H. Construct all curb, drainage inlets, storm sewer pipes and storm sewer manholes, as shown on the plans. Install temporary inlet protection at the locations of all new inlets.
I. Dust control.
J. Remove inlet protection around inlets and manholes no more than 48 hours prior to placing stabilized base course.
K. Install base material as required for pavement.
L. Carry out final grading and seeding and planting.
M. Clean storm system following construction.
N. Remove silt fencing only after all paving is complete and exposed surfaces are stabilized.

Section 6 – Geotechnical Items

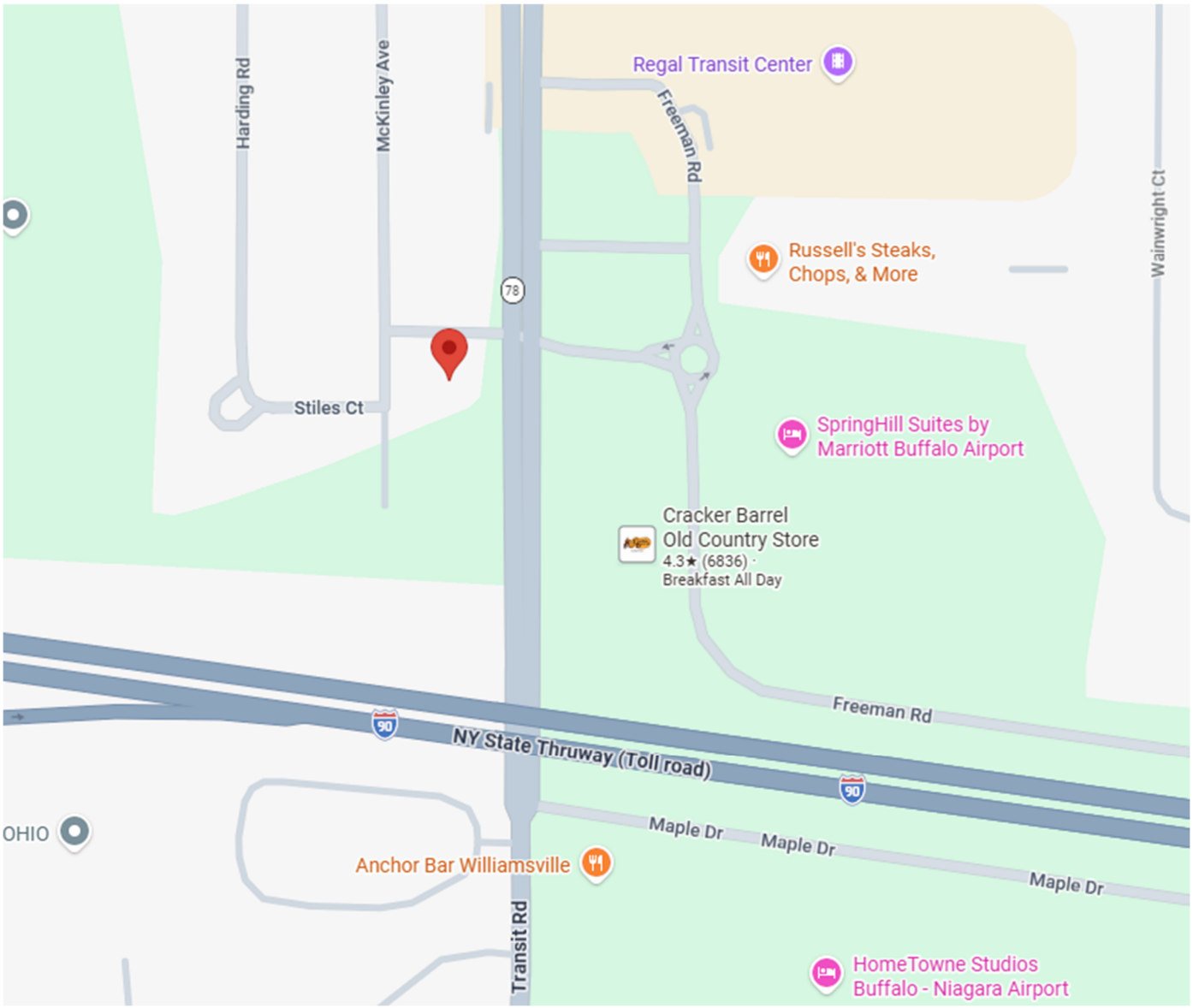
According to the USDA Web Soil Survey, the onsite soil is made up of Cosad loamy fine sand and Wassaic silt loam. These soil groups are categorized under hydrologic soil groups C and C/D and will have a slow infiltration rate when thoroughly wet.

See Attachment D for Soil Information.

Attachment A

Site Location Map

Site Location Map



Attachment B

Sanitary Sewer & Water Demand Calculations

CARMINA WOOD DESIGN
80 Silo City Row, Suite 100
BUFFALO, NEW YORK, 14203
(716) 842-3165
FAX (716) 842-0263

Project No.: 26-4120 Date: 8/26/2026
Project Name: Car Dealership
Project Address: 6766 Transit Road - Town of Amherst
Subject: Sanitary Sewage & Domestic Water Demand Calcs
Sheet: 1 of 1

Sanitary Sewage Demand Calculations:

Car Dealership:

30 employees @ 15.0 gpd/employee = 450 gpd

Total Demand = 450 gpd

Water Demand Calculations (Domestic):

Car Dealership:

450 gpd x 1.1 = 495 gpd *use 110% of sewage demand

*use 1.8 peaking factor (AWWA standard) and assume an 15 hour day

495 gpd x 1day/15hr x 1hr/60min = 0.55 gpm

0.55 gpm x 1.8 = 0.99 gpm Q_{peak}

Headlosses:

Q_{peak} = 0.99 gpm
Pipe = 4 inch PVC C = 140
Length = 73 LF (approx. distance from main to RPZ and meter)

$$H_L = \frac{10.44\ L\ Q^{1.85}}{C^{1.85}\ D^{4.866}} = \frac{10.44(73)(0.99)^{1.85}}{(140)^{1.85}\ (4)^{4.866}} = 0.00 \text{ ft} = 0.00 \text{ psi}$$

Δ elev = 4 ft = 1.73 psi *RPZ is located inside hotbox
Loss through meter = 1 psi
Loss through RPZ = 12 psi
Total Losses = 14.7 psi
Static Pressure = 44 psi
Residual pressure following RPZ = 44 - 14.7 = 29.3 psi (available at after RPZ and meter)

Water Demand Calculations (Fire):

Plaza Redevelopment:

Q= 1,000 gpm

Headlosses:

Q_{peak} = 500.00 gpm
Pipe = 4 inch PVC C = 140
Length = 73 LF (approx. distance from main to RPZ and meter)

$$H_L = \frac{10.44\ L\ Q^{1.85}}{C^{1.85}\ D^{4.866}} = \frac{10.44(73)(1000)^{1.85}}{(140)^{1.85}\ (4)^{4.866}} = 9.44 \text{ ft} = 4.09 \text{ psi}$$

Δ elev = 4 ft = 1.73 psi *RPZ is located inside building
Loss through RPZ = 12 psi
Total Losses = 17.8 psi
Static Pressure = 44 psi
Residual pressure following RPZ = 44 - 28.5 = 26.2 psi (available at after RPZ and meter)

Hydrant FLow Test

Print Date: **10/05/2026**

Residual Hydrant: L08B18B Test Date/Time: 8/23/2022 14:20

Location.....: **6800 TRANSIT RD 3RD HYD S/O WEHRLE DR**
TOWN OF AMHERST

Size of Main/Branch: **8"/6"** Fire District: **22031 MAIN TRANSIT FD 14** Water District: **315 AMHERST DISTRICT 15C**

Performed By: **MES/CDB** Comments: **HYDRANT FLOW TEST REQUESTED BY MORGAN TOLLARD**
EMAIL: MORGAN.TOLLARD@EXCELENGINEER.COM

CW #70800

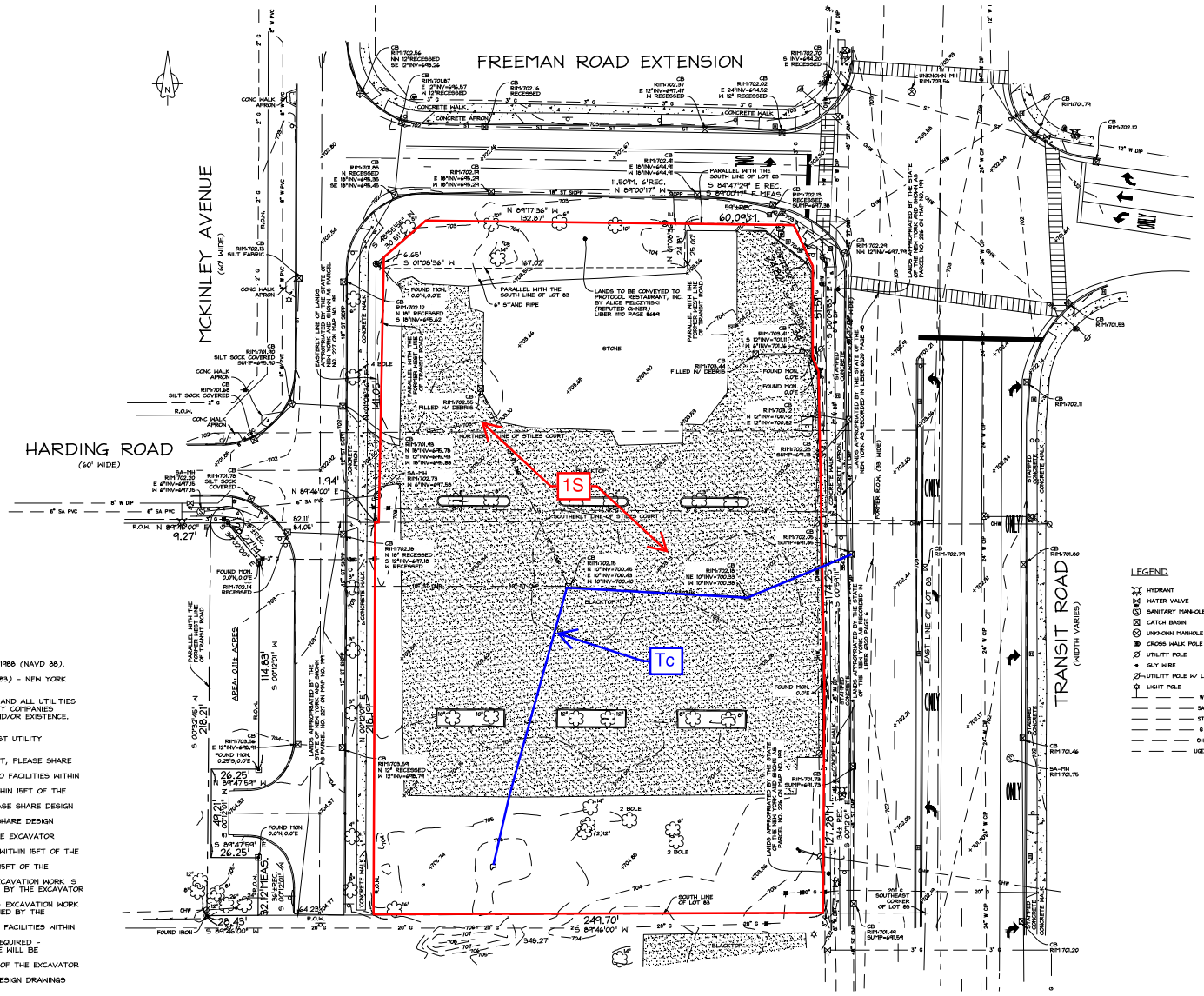
Dischrge Coef: **090** Elvtn Usgs(ft): Static(psi): **44** Residual(psi): **36** Required Residual Pressure(psi): **20**
Gallons Used..: **3,780** Total Flow(gpm): **1,256** Flow at Reqd Resid Pressure: **2,273**

Flow Hydrants:

Flow Hyd	Location	Main/Brnch	Nzle	Size	Pitot	Flow	Comments
L08 B26	**TRANSIT RD**	**8"/6"**	1:	**2.50**	**14.0**	**628**	
	1ST HYD S/O FREEMAN RD		2:	**2.50**	**14.0**	**628**	
			3:			Total Flow: **1,256**	

Attachment C

Storm Water Calculations



NOTES

1. ELEVATIONS ARE BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
2. HORIZONTAL DATUM REFERENCES THE NORTH AMERICAN DATUM 1983 (NAD 83) - NEW YORK STATE PLANE WEST ZONE.
3. THE LOCATION OF ANY UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE AND ALL UTILITIES MAY NOT BE SHOWN. PRIOR TO ANY CONSTRUCTION ACTIVITIES, ALL UTILITY COMPANIES SHOULD BE NOTIFIED IN ORDER TO VERIFY OR AMEND THEIR LOCATIONS AND/OR EXISTENCE. FOR ASSISTANCE CALL UFPO AT 1-800-962-7962.
4. UDIGNY.ORG DESIGN TICKET NO. 06256-002-332 WAS SUBMITTED TO REQUEST UTILITY RECORDS:

- CHARTER COM NORTHEAST WESTERN NY: HAS RESPONDED, DESIGN CONFLICT, PLEASE SHARE DESIGN DRAWINGS WITH THEIR ENGINEERING DEPT.
- ERIE COUNTY DIVISION OF SEWER MANAGEMENT: HAS RESPONDED, CLEAR NO FACILITIES WITHIN 15FT OF THE EXCAVATOR DEFINED WORK AREA.
- G4S SECURE INTEGRATION LLC: HAS RESPONDED, CLEAR NO FACILITIES WITHIN 15FT OF THE EXCAVATOR DEFINED WORK AREA.
- ERIE COUNTY WATER AUTHORITY: HAS RESPONDED, DESIGN CONFLICT, PLEASE SHARE DESIGN DRAWINGS WITH THEIR ENGINEERING DEPT. DRAWN HERON.
- NATIONAL FUEL GAS / NFG-119: HAS RESPONDED, DESIGN CONFLICT, PLEASE SHARE DESIGN DRAWINGS WITH THEIR ENGINEERING DEPT. DRAWN HERON.
- NATIONAL GRID: HAS RESPONDED, CLEAR NO FACILITIES WITHIN 15FT OF THE EXCAVATOR DEFINED WORK AREA. ALL AERIAL LINES.
- NYS DOT BUFFALO REGION 5 TMC: HAS RESPONDED, CLEAR NO FACILITIES WITHIN 15FT OF THE EXCAVATOR DEFINED WORK AREA. ALL AERIAL LINES.
- NYS THRUWAY AUTHORITY: HAS RESPONDED, CLEAR NO FACILITIES WITHIN 15FT OF THE EXCAVATOR DEFINED WORK AREA. ALL AERIAL LINES.
- NYSEG LANCASTER ELECTRIC: HAS RESPONDED, NO LOCATE REQUIRED - EXCAVATION WORK IS BEING PERFORMED FOR THE FACILITY OWNER. LOCATE WILL BE PERFORMED BY THE EXCAVATOR PER CONTRACTUAL AGREEMENT.
- TOWN OF AMHERST ST LIGHTING: HAS RESPONDED, NO LOCATE REQUIRED - EXCAVATION WORK IS BEING PERFORMED FOR THE FACILITY OWNER. LOCATE WILL BE PERFORMED BY THE EXCAVATOR PER CONTRACTUAL AGREEMENT.
- TOWN OF CHEEKTOWAGA HIGHWAY & SANITARY: HAS RESPONDED, CLEAR NO FACILITIES WITHIN 15FT OF THE EXCAVATOR DEFINED WORK AREA.
- TOWN OF CHEEKTOWAGA STREET LIGHTING: HAS RESPONDED, NO LOCATE REQUIRED - EXCAVATION WORK IS BEING PERFORMED FOR THE FACILITY OWNER. LOCATE WILL BE PERFORMED BY THE EXCAVATOR PER CONTRACTUAL AGREEMENT.
- TOWN OF LANCASTER: HAS RESPONDED, CLEAR NO FACILITIES WITHIN 15FT OF THE EXCAVATOR DEFINED WORK AREA.
- VERIZON / BUFFALO: HAS RESPONDED, DESIGN CONFLICT, PLEASE SHARE DESIGN DRAWINGS WITH THEIR ENGINEERING DEPT.

Existing Drainage Map

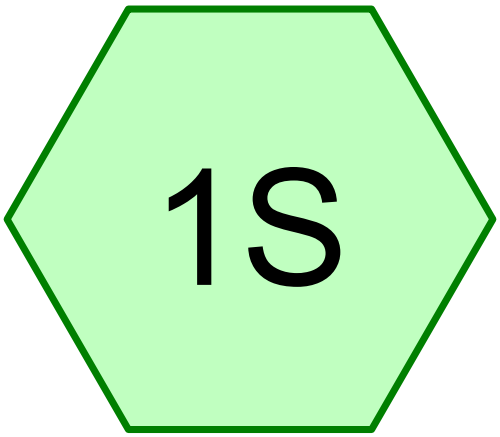
THIS SURVEY IS NOT VALID WITH AN AFFIDAVIT OF NO CHANGE
NO MONUMENTS SET OR FOUND AT PROPERTY CORNERS UNLESS NOTED HEREON.
This survey was prepared without the benefit of an abstract of title and is subject to any state of facts that may be revealed by an examination of such.
Any unauthorized alterations or additions to any survey, drawing, design, specification, plan or report is a violation of section 7209, provision 2 of the New York State Education Law.

3556 Lake Shore Road, Suite 500, Buffalo, NY 14219
p (716) 827-6000 f (716) 270-6091 www.nussclarke.com

NUSSBAUMER & CLARKE, INC. ENGINEERS AND SURVEYORS EST. 1931

TOPOGRAPHIC SURVEY
6766 Transit Road
Part of Lot 83, Township 11, Range 7
Holland Land Company's Survey
Town of Amherst
County of Erie, State of New York
Date of Survey: 07/06/2026
Scale : 1" = 30'
Project No. : 15J2-0803A

MEMBER



Existing

Subcat Reach Pond Link

Routing Diagram for 26-4120 storm calcs - Existing
Prepared by Carmina Wood Design, Printed 10/16/2026
HydroCAD® 10.20-8a s/n 05019 © 2025 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	Type II 24-hr		Default	24.00	1	1.87	2
2	10-Year	Type II 24-hr		Default	24.00	1	3.14	2
3	25-Year	Type II 24-hr		Default	24.00	1	3.84	2
4	100-Year	Type II 24-hr		Default	24.00	1	5.23	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
25,900	80	>75% Grass cover, Good, HSG D (1S)
12,317	96	Gravel surface, HSG D (1S)
55,916	98	Paved parking, HSG D (1S)
94,133	**93**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
0	HSG C	
94,133	HSG D	1S
0	Other	
94,133		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Su Nu
0	0	0	25,900	0	25,900	>75% Grass cover, Good	
0	0	0	12,317	0	12,317	Gravel surface	
0	0	0	55,916	0	55,916	Paved parking	
0	**0**	**0**	**94,133**	**0**	**94,133**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	1S	0.00	0.00	155.0	0.0050	0.025	0.0	10.0	0.0	

Time span=0.50-70.00 hrs, dt=0.04 hrs, 1739 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Runoff Area=94,133 sf 59.40% Impervious Runoff Depth=1.20"
Flow Length=313' Tc=8.4 min CN=93 Runoff=4.09 cfs 9,381 cf

Total Runoff Area = 94,133 sf Runoff Volume = 9,381 cf Average Runoff Depth = 1.20"
40.60% Pervious = 38,217 sf 59.40% Impervious = 55,916 sf

Summary for Subcatchment 1S: Existing

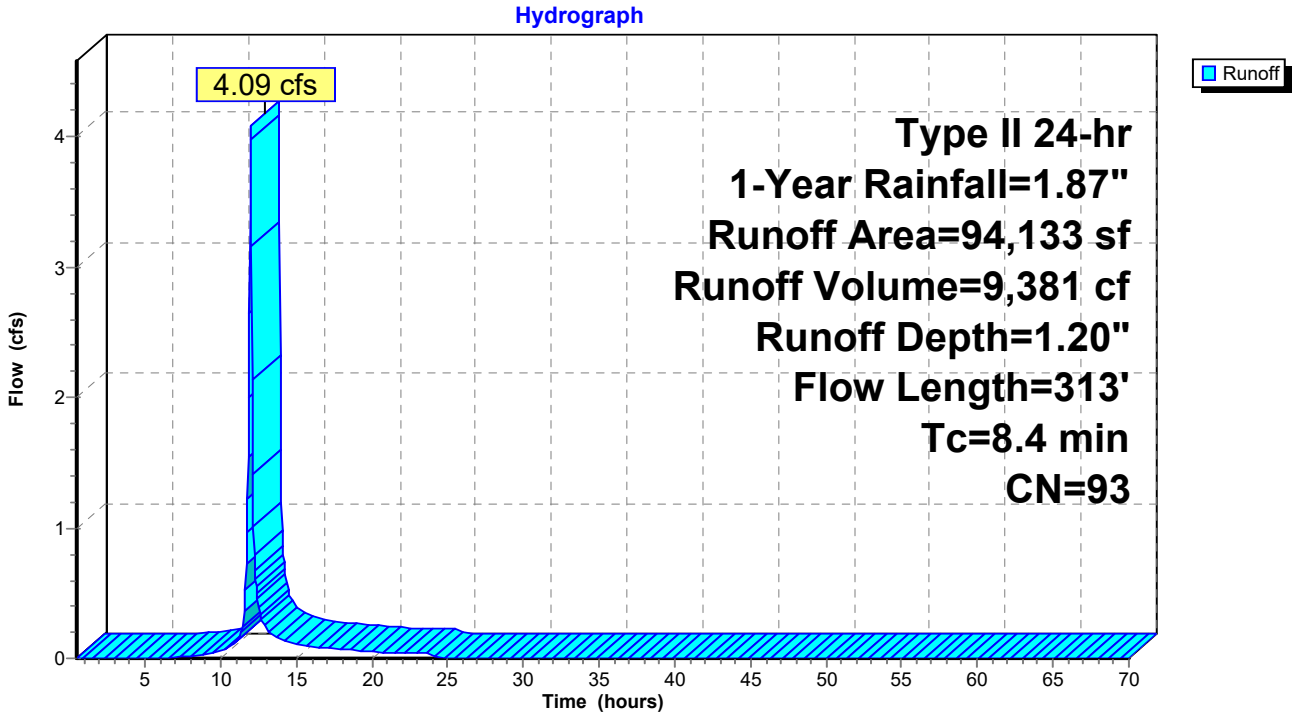
Runoff = 4.09 cfs @ 12.00 hrs, Volume= 9,381 cf, Depth= 1.20"
Routed to nonexistent node 6L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=1.87"

Area (sf)	CN	Description
55,916	98	Paved parking, HSG D
12,317	96	Gravel surface, HSG D
25,900	80	>75% Grass cover, Good, HSG D
94,133	93	Weighted Average
38,217		40.60% Pervious Area
55,916		59.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	37	0.0430	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.50"
1.0	63	0.0160	1.01		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.3	58	0.0270	3.34		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	155	0.0050	1.48	0.81	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.025 Corrugated metal
8.4	313	Total			

Subcatchment 1S: Existing



Time span=0.50-70.00 hrs, dt=0.04 hrs, 1739 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Runoff Area=94,133 sf 59.40% Impervious Runoff Depth=2.39"
Flow Length=313' Tc=8.4 min CN=93 Runoff=7.88 cfs 18,734 cf

Total Runoff Area = 94,133 sf Runoff Volume = 18,734 cf Average Runoff Depth = 2.39"
40.60% Pervious = 38,217 sf 59.40% Impervious = 55,916 sf

Summary for Subcatchment 1S: Existing

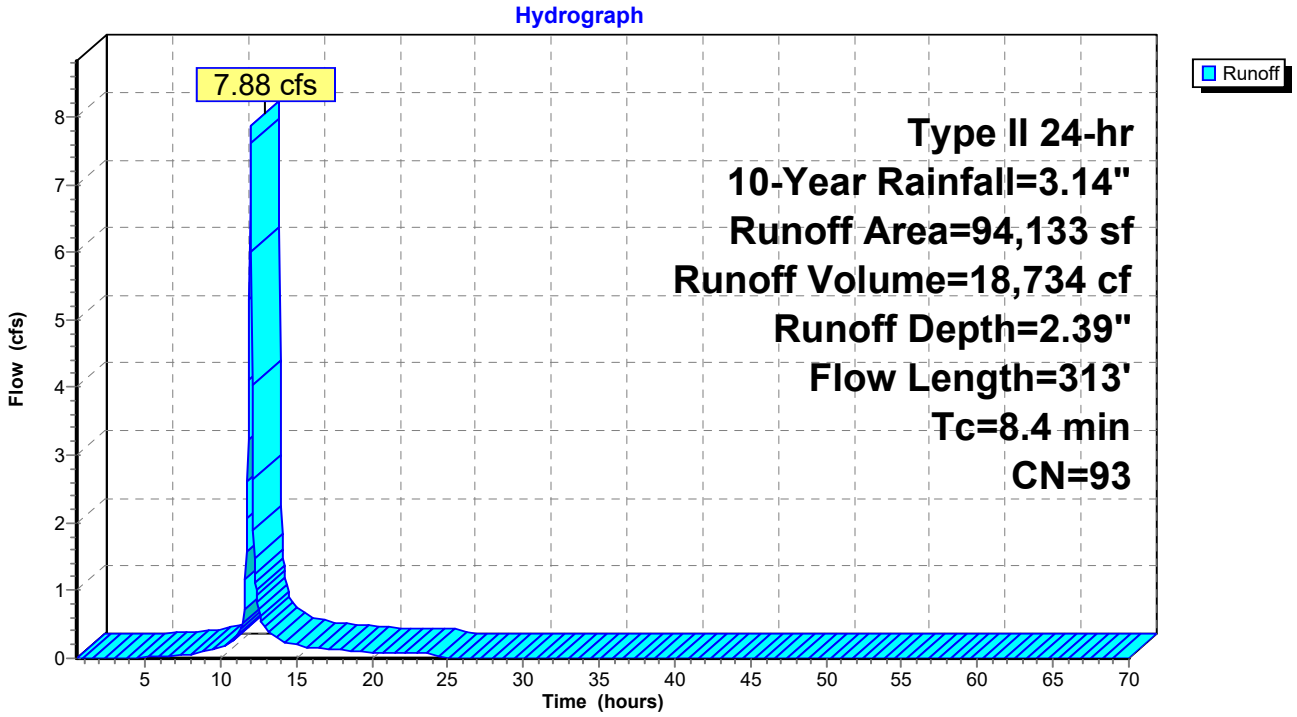
Runoff = 7.88 cfs @ 11.99 hrs, Volume= 18,734 cf, Depth= 2.39"
Routed to nonexistent node 6L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=3.14"

Area (sf)	CN	Description
55,916	98	Paved parking, HSG D
12,317	96	Gravel surface, HSG D
25,900	80	>75% Grass cover, Good, HSG D
94,133	93	Weighted Average
38,217		40.60% Pervious Area
55,916		59.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	37	0.0430	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.50"
1.0	63	0.0160	1.01		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.3	58	0.0270	3.34		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	155	0.0050	1.48	0.81	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.025 Corrugated metal
8.4	313	Total			

Subcatchment 1S: Existing



Time span=0.50-70.00 hrs, dt=0.04 hrs, 1739 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Runoff Area=94,133 sf 59.40% Impervious Runoff Depth=3.06"
Flow Length=313' Tc=8.4 min CN=93 Runoff=9.96 cfs 24,038 cf

Total Runoff Area = 94,133 sf Runoff Volume = 24,038 cf Average Runoff Depth = 3.06"
40.60% Pervious = 38,217 sf 59.40% Impervious = 55,916 sf

Summary for Subcatchment 1S: Existing

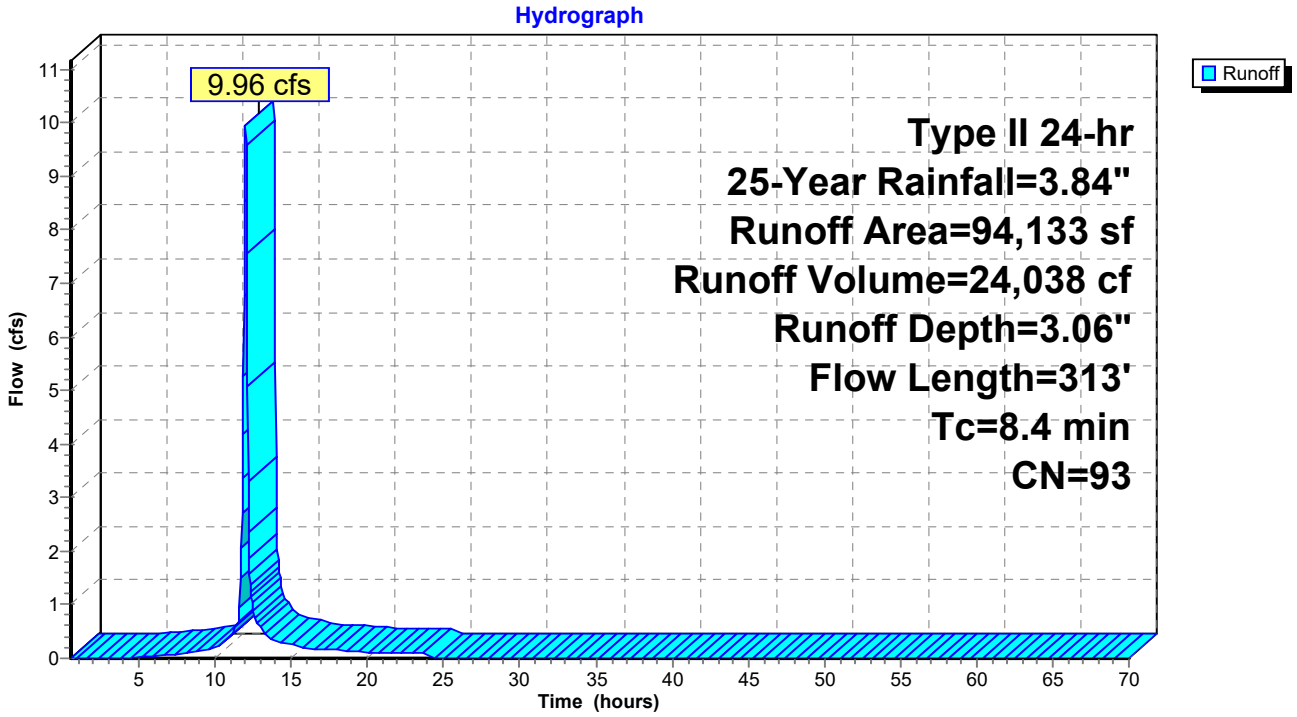
Runoff = 9.96 cfs @ 11.99 hrs, Volume= 24,038 cf, Depth= 3.06"
Routed to nonexistent node 6L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 25-Year Rainfall=3.84"

Area (sf)	CN	Description
55,916	98	Paved parking, HSG D
12,317	96	Gravel surface, HSG D
25,900	80	>75% Grass cover, Good, HSG D
94,133	93	Weighted Average
38,217		40.60% Pervious Area
55,916		59.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	37	0.0430	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.50"
1.0	63	0.0160	1.01		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.3	58	0.0270	3.34		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	155	0.0050	1.48	0.81	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.025 Corrugated metal
8.4	313	Total			

Subcatchment 1S: Existing



Time span=0.50-70.00 hrs, dt=0.04 hrs, 1739 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Runoff Area=94,133 sf 59.40% Impervious Runoff Depth=4.42"
Flow Length=313' Tc=8.4 min CN=93 Runoff=14.05 cfs 34,703 cf

Total Runoff Area = 94,133 sf Runoff Volume = 34,703 cf Average Runoff Depth = 4.42"
40.60% Pervious = 38,217 sf 59.40% Impervious = 55,916 sf

Summary for Subcatchment 1S: Existing

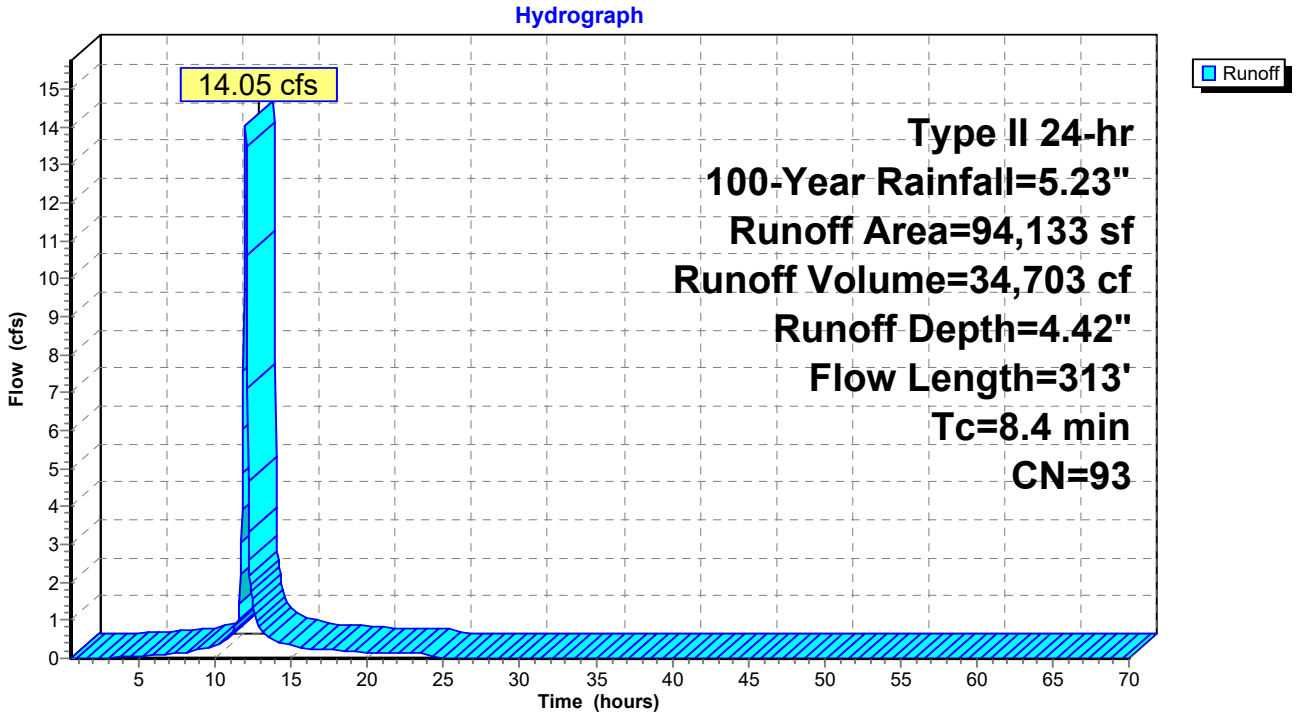
Runoff = 14.05 cfs @ 11.99 hrs, Volume= 34,703 cf, Depth= 4.42"
Routed to nonexistent node 6L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=5.23"

Area (sf)	CN	Description
55,916	98	Paved parking, HSG D
12,317	96	Gravel surface, HSG D
25,900	80	>75% Grass cover, Good, HSG D
94,133	93	Weighted Average
38,217		40.60% Pervious Area
55,916		59.40% Impervious Area

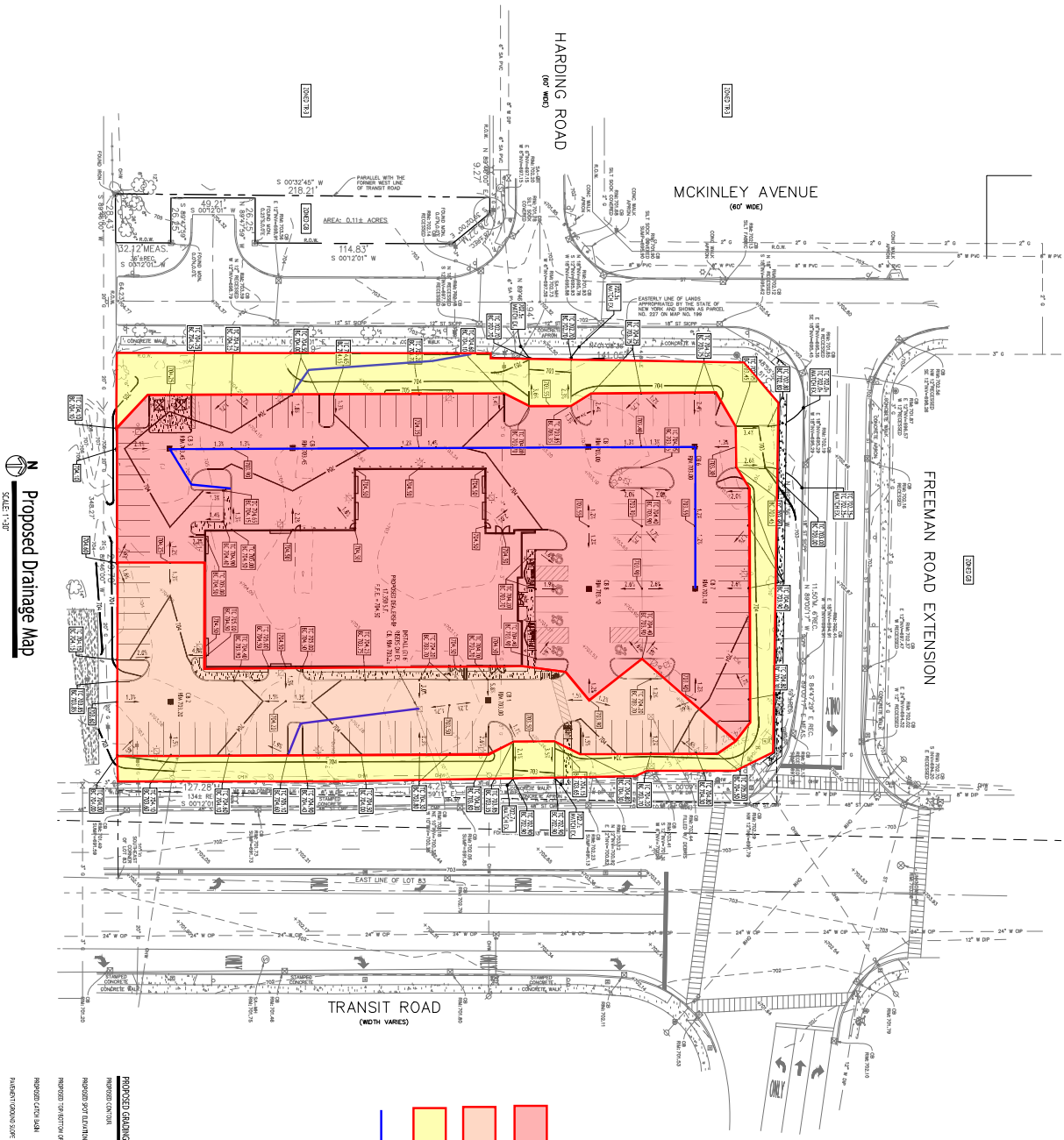
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	37	0.0430	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.50"
1.0	63	0.0160	1.01		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.3	58	0.0270	3.34		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	155	0.0050	1.48	0.81	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.025 Corrugated metal
8.4	313	Total			

Subcatchment 1S: Existing



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N
Proposed Drainage Map
SCALE: 1"=30'

PROPOSED GRADING LEGEND

- PROPOSED CONTOUR — 101 —
- PROPOSED SPOT ELEVATION 100.80
- PROPOSED TOP/BOTTOM OF CURB ELEV. TC 100.30 / BC 100.00
- PROPOSED CATCH BASIN CB
- PAVEMENT GRADING SLOPE
- PROPOSED AREA DRAIN AD
- PROPOSED MANHOLE MH

time of concentration

3S Proposed - direct offsite

2S Proposed - to Transit Road sewer

1S Proposed - to detention

NOTE: BOUNDARY AND TOPOGRAPHIC INFORMATION PROVIDED BY OTHERS. CARMINA WOOD DESIGN ASSUMES NO RESPONSIBILITY FOR ITS ACCURACY.

TOWN OF AMHERST APPROVAL BOX:

DRAWING NAME: Proposed Drainage Map

Date: 8.27.26
Drawn By: MW
Scale: As Noted
DRAWING NO.

Project No: 26-4120

REVISIONS:

No.	Description	Date

Car Dealership

6766 Transit Road
Amherst, New York

CARMINAWOOD DESIGN
Buffalo | Utica | Greensboro

Project Name: Car Dealership - 6766 Transit Road
Job Number: 26-4120
Re: Storm Sewer Pipe Sizing Calculations
Calculated By: AJP **Date:** 08/25/26

STORM SEWER PIPE SIZING CALCULATIONS																
INLET &	TRIBUTARY		RUNOFF	INLET	TIME OF	INTENSITY	RUNOFF Q		PIPE DESIGN					PIPE FLOW	
STORM SEWER	AREA (A)		COEFF.	TIME	CONCEN.	i (10-yr)	DIRECT	SUM	DIA	S		V	Q	L	TIME
LOCATION	(sq ft)	(acres)	C	(min)	(total-min)	(in/hr)	(cfs)	(cfs)	(in)	(ft/ft)	n	(fps)	(cfs)	(ft)	(min)
Ex. CB 1	3193	0.07	0.83	5.7	5.7	5.30	0.32	**0.32**							
to									6	0.0040	0.013	1.81	**0.36**	25	0.2
Transit Road															
CB 2	8173	0.19	0.87	4.7	4.7	5.40	0.88	**0.88**							
to									10	0.0020	0.013	1.80	**0.98**	145	1.3
Ex. CB 2															
CB 1	3636	0.08	0.83	5.1	5.1	5.40	0.37	**0.37**							
to									8	0.0030	0.013	1.90	**0.66**	40	0.4
Ex. CB 2	4895	0.11	0.84	3.1	5.5	5.30	0.50	**1.76**							
to									10	0.0070	0.013	3.37	**1.84**	59	0.3
Transit Road															
Roof Leader	17343	0.40	0.90			4.80	1.72	**1.72**							
to									12	0.0030	0.013	2.49	**1.96**	39	0.3
CB 8	6139	0.14	0.85	7.1	7.1	4.90	0.59	**2.31**							
to									12	0.0050	0.013	3.22	**2.52**	62	0.3
CB 7															
CB 3	6097	0.14	0.85	6.5	6.5	5.10	0.61	**0.61**							
to									8	0.0030	0.013	1.90	**0.66**	72	0.6
CB 4	7330	0.17	0.89	5.7	7.1	4.90	0.73	**1.34**							
to									10	0.0040	0.013	2.55	**1.39**	172	1.1
CB 5	8601	0.20	0.86	6.2	8.2	4.70	0.80	**2.13**							
to									12	0.0040	0.013	2.88	**2.26**	62	0.4
CB 6	4378	0.10	0.83	4.6	8.6	4.60	0.38	**2.52**							
to									15	0.0020	0.013	2.36	**2.90**	83	0.6
CB 7	6319	0.15	0.88	4.4	4.4	4.60	0.59	**3.11**							
to									18	0.0030	0.013	3.26	**5.77**	46	0.2
Underground Detention															

New York State Department of Environmental Conservation (NYSDEC)
Water Quality Volume (WQv) & Water Quality Peak Flow (Qp) Calculation Worksheet

Project: Proposed Car Dealership
Location: 6766 Transit Road, Amherst, NY
Date: 8/26/26
Revised: -

TR-55 AND TR-20 RAINFALL DISTRIBUTION TYPE=		**II = (USER INPUT VALUE)**		
($R=I_a/P$) $C_i=A*R^2+B*R+C$		**A**	**B**	**C**
Coefficients for unit peak discharge equation	C_0	-2.2349	0.4759	2.5273
Coefficients for unit peak discharge equation	C_1	1.5555	-0.7081	-0.5584
Coefficients for unit peak discharge equation	C_2	0.6041	0.0437	-0.1761

INPUT CRITERIA:	**ABBREVIATION**	**UNITS**	**TRIBUTARY (TREATED) AREA PDA**	
TOTAL DEVELOPED (GREATER OF DISTURBED OR TRIBUTARY) AREA	**A**	**acres**	2.16	**= (USER INPUT VALUE)**
IMPERVIOUS SURFACE AREA	**I**	**acres**	1.70	**= (USER INPUT VALUE)**
NYSDEC 90% RAINFALL EVENT NUMBER (1)	**P**	**inches**	1.00	**= (USER INPUT VALUE)**
TIME OF CONCENTRATION	T_c	**hours**	0.16	**= (USER INPUT VALUE)**

CALCULATIONS:

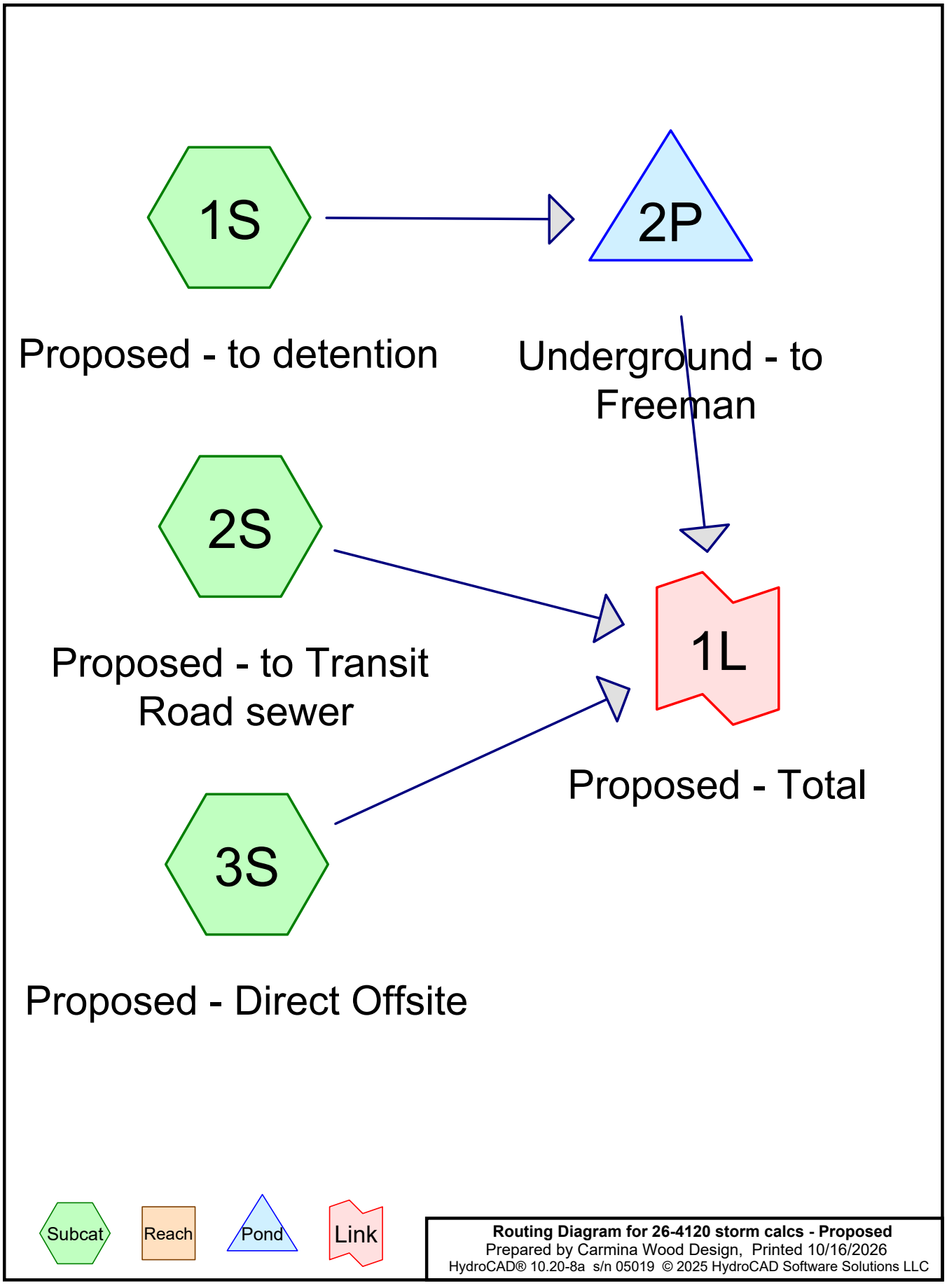
WATER QUALITY VOLUME *(2)(3)*

STORMWATER MANAGEMENT PRACTICES			Treatment Structure	**= (USER INPUT VALUE)**
REQUIRED WATER QUALITY VOLUME $WQ_v=3630*P(0.05*A+0.9*I)$	WQ_v	**acres-ft**	**0.136**	
REQUIRED WATER QUALITY VOLUME (100% FOR NEW DEVELOPMENT)	WQ_v	**cu. ft.**	**5,946**	
REQUIRED REDEVELOPMENT WATER QUALITY VOLUME (75%)	WQ_v	**cu. ft.**	**4,459**	
REQUIRED PRETREATMENT WATER QUALITY VOLUME (25%)	WQ_v	**cu. ft.**	**1,486**	
PROVIDED WQv VOLUME	WQ_v	**cu. ft.**		**= (USER INPUT VALUE)**

WATER QUALITY PEAK FLOW *(4)*

RUNOFF VOLUME $Q=WQ_v/(A*3600)$	**Q**	**inches**	0.76	
$CN=1000/(10+5*P+10*Q-10(Q^2+1.25*Q*P)^{½})$	CN		97.63	
CN ROUNDED	CN		98	
CN < or = 98	**CN**		98	
INITIAL ABSTRACTION ($I_a=200/CN-2$)	I_a	**inches**	0.04	
RATIO $R=I_a/P$	**R**		0.04	
$C_0 = A*R^2+B*R+C$	C_0		2.54	
$C_1 = A*R^2+B*R+C$	C_1		-0.58	
$C_2 = A*R^2+B*R+C$	C_2		-0.17	
UNIT PEAK DISCHARDGE $qu=10^(C_0+C_1*Log(T_c)+C_2*(log(T_c))^2)$	q_u	**cfs/mi^2/in**	791.74	
REQUIRED NEW DEVELOPMENT WATER QUALITY PEAK FLOW $Q_p=qu*A*Q/640$ (100%)	Q_p	**cfs**	**2.03**	
REQUIRED REDEVELOPMENT WATER QUALITY PEAK FLOW (75%)	Q_p	**cfs**	**1.52**	
PROVIDED WATER QUALITY PEAK FLOW	Q_pP	**cfs**	**0.00**	**= (USER INPUT VALUE)**
MARKETED PEAK TREATMENT FLOW		**cfs**	**0.00**	**= (USER INPUT VALUE)**
VERIFIED DESIGN (100% FLOW RATE) PER NYSDEC		**cfs**	**0.00**	**= (USER INPUT VALUE)**
WATER QUALITY UNIT PRODUCT AND MODEL		**each**	**0.00**	**= (USER INPUT VALUE)**

References:
(1) Refer to Section 4.2 Water Quality Volume (WQv) Figure 4.1 "90% Rainfall in New York State" in the New York State Stormwater Design Manual, last revised August 2015.
(2) Refer to Section 4.2 for Water Quality Volume (WQv) calculations in the New York State Stormwater Design Manual, last revised August 2010.
(3) Refer to Section 9.2.1 "Sizing Criteria" for Water Quality Volume (WQv) calculations for Redevelopment Projects in the New York State Stormwater Design Manual, last revised August 2015.
(4) Refer to Appendix B.2 "Water Quality Peak Flow Calculation" in the New York State Stormwater Design Manual, last revised August 2015.



Routing Diagram for 26-4120 storm calcs - Proposed
Prepared by Carmina Wood Design, Printed 10/16/2026
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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	Type II 24-hr		Default	24.00	1	1.87	2
2	10-Year	Type II 24-hr		Default	24.00	1	3.14	2
3	25-Year	Type II 24-hr		Default	24.00	1	3.84	2
4	100-Year	Type II 24-hr		Default	24.00	1	5.23	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
20,061	80	>75% Grass cover, Good, HSG D (1S, 2S, 3S)
896	98	Concrete sidewalk, HSG D (2S)
786	98	Concrete, HSG D (1S)
55,039	98	Paved parking, HSG D (1S, 2S, 3S)
17,350	98	Roofs, HSG D (1S)
94,132	**94**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
0	HSG C	
94,132	HSG D	1S, 2S, 3S
0	Other	
94,132		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Su Nu
0	0	0	20,061	0	20,061	>75% Grass cover, Good	
0	0	0	786	0	786	Concrete	
0	0	0	896	0	896	Concrete sidewalk	
0	0	0	55,039	0	55,039	Paved parking	
0	0	0	17,350	0	17,350	Roofs	
0	**0**	**0**	**94,132**	**0**	**94,132**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	1S	0.00	0.00	72.0	0.0030	0.013	0.0	8.0	0.0	
2	1S	0.00	0.00	172.0	0.0040	0.013	0.0	10.0	0.0	
3	1S	0.00	0.00	62.0	0.0040	0.013	0.0	12.0	0.0	
4	1S	0.00	0.00	83.0	0.0020	0.013	0.0	15.0	0.0	
5	1S	0.00	0.00	15.0	0.0030	0.013	0.0	18.0	0.0	
6	2S	0.00	0.00	73.0	0.0030	0.013	0.0	8.0	0.0	
7	2S	0.00	0.00	73.0	0.0050	0.013	0.0	8.0	0.0	
8	2P	698.35	698.30	10.0	0.0050	0.013	0.0	12.0	0.0	

Time span=0.50-70.00 hrs, dt=0.04 hrs, 1739 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Proposed - to detention Runoff Area=58,536 sf 96.01% Impervious Runoff Depth=1.54"
Flow Length=452' Tc=9.3 min CN=97 Runoff=3.00 cfs 7,532 cf

Subcatchment2S: Proposed - to Transit Runoff Area=17,673 sf 90.76% Impervious Runoff Depth=1.45"
Flow Length=186' Tc=6.8 min CN=96 Runoff=0.94 cfs 2,134 cf

Subcatchment3S: Proposed - Direct Runoff Area=17,923 sf 10.22% Impervious Runoff Depth=0.56"
Flow Length=100' Slope=0.0160 '/' Tc=17.7 min CN=82 Runoff=0.26 cfs 843 cf

Pond 2P: Underground - to Freeman Peak Elev=699.39' Storage=1,876 cf Inflow=3.00 cfs 7,532 cf
12.0" Round Culvert n=0.013 L=10.0' S=0.0050 '/' Outflow=2.22 cfs 7,172 cf

Link 1L: Proposed - Total Inflow=3.04 cfs 10,149 cf
Primary=3.04 cfs 10,149 cf

Total Runoff Area = 94,132 sf Runoff Volume = 10,509 cf Average Runoff Depth = 1.34"
21.31% Pervious = 20,061 sf 78.69% Impervious = 74,071 sf

Summary for Subcatchment 1S: Proposed - to detention

[47] Hint: Peak is 454% of capacity of segment #3
[47] Hint: Peak is 217% of capacity of segment #4
[47] Hint: Peak is 133% of capacity of segment #5
[47] Hint: Peak is 104% of capacity of segment #6

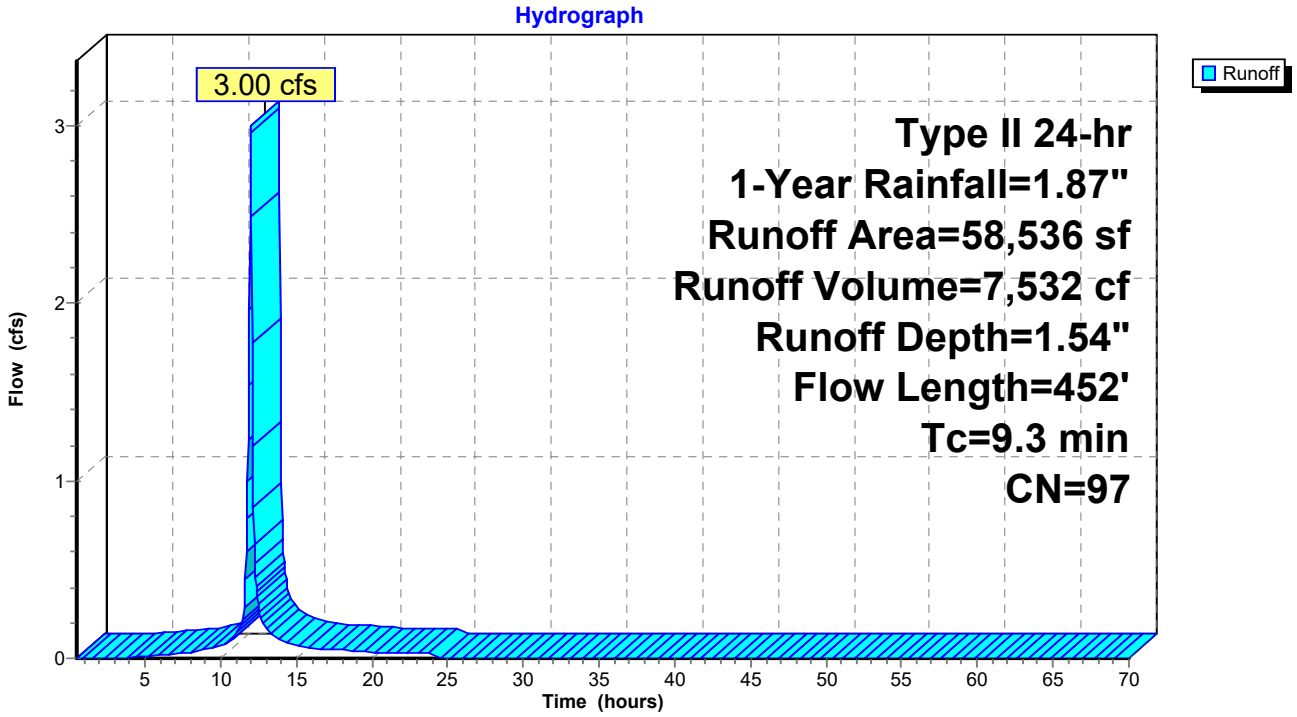
Runoff = 3.00 cfs @ 12.00 hrs, Volume= 7,532 cf, Depth= 1.54"
Routed to Pond 2P : Underground - to Freeman

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=1.87"

	Area (sf)	CN	Description
	17,350	98	Roofs, HSG D
	38,063	98	Paved parking, HSG D
*	786	98	Concrete, HSG D
	2,337	80	>75% Grass cover, Good, HSG D
	58,536	97	Weighted Average
	2,337		3.99% Pervious Area
	56,199		96.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	23	0.0130	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.50"
0.6	25	0.0120	0.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.6	72	0.0030	1.90	0.66	**Pipe Channel,** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
1.1	172	0.0040	2.54	1.39	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.013 Corrugated PE, smooth interior
0.4	62	0.0040	2.87	2.25	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.6	83	0.0020	2.35	2.89	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.1	15	0.0030	3.26	5.75	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
9.3	452	Total			

Subcatchment 1S: Proposed - to detention



Summary for Subcatchment 2S: Proposed - to Transit Road sewer

[47] Hint: Peak is 143% of capacity of segment #3
[47] Hint: Peak is 111% of capacity of segment #4

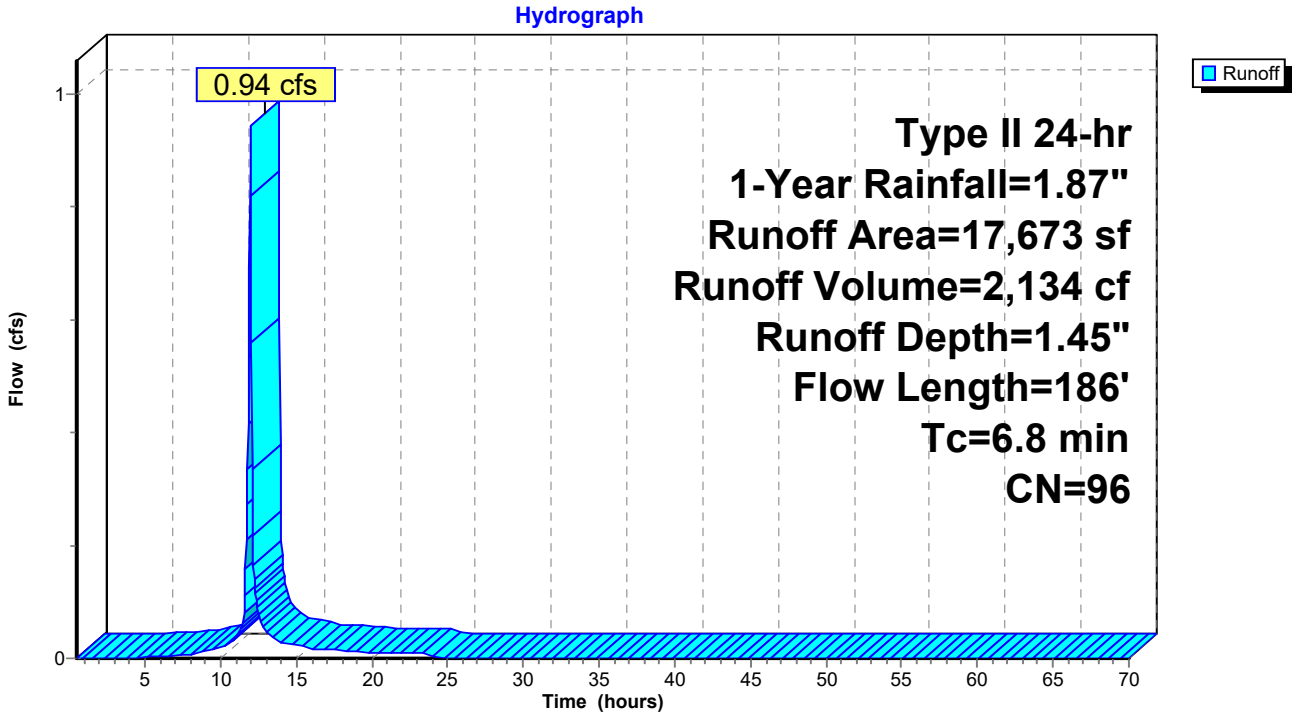
Runoff = 0.94 cfs @ 11.98 hrs, Volume= 2,134 cf, Depth= 1.45"
Routed to Link 1L : Proposed - Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=1.87"

	Area (sf)	CN	Description
	15,144	98	Paved parking, HSG D
*	896	98	Concrete sidewalk, HSG D
	1,633	80	>75% Grass cover, Good, HSG D
	17,673	96	Weighted Average
	1,633		9.24% Pervious Area
	16,040		90.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	17	0.0100	0.05		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.50"
0.5	23	0.0130	0.76		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.6	73	0.0030	1.90	0.66	**Pipe Channel,** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
0.5	73	0.0050	2.45	0.85	**Pipe Channel,** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
6.8	186	Total			

Subcatchment 2S: Proposed - to Transit Road sewer



Summary for Subcatchment 3S: Proposed - Direct Offsite

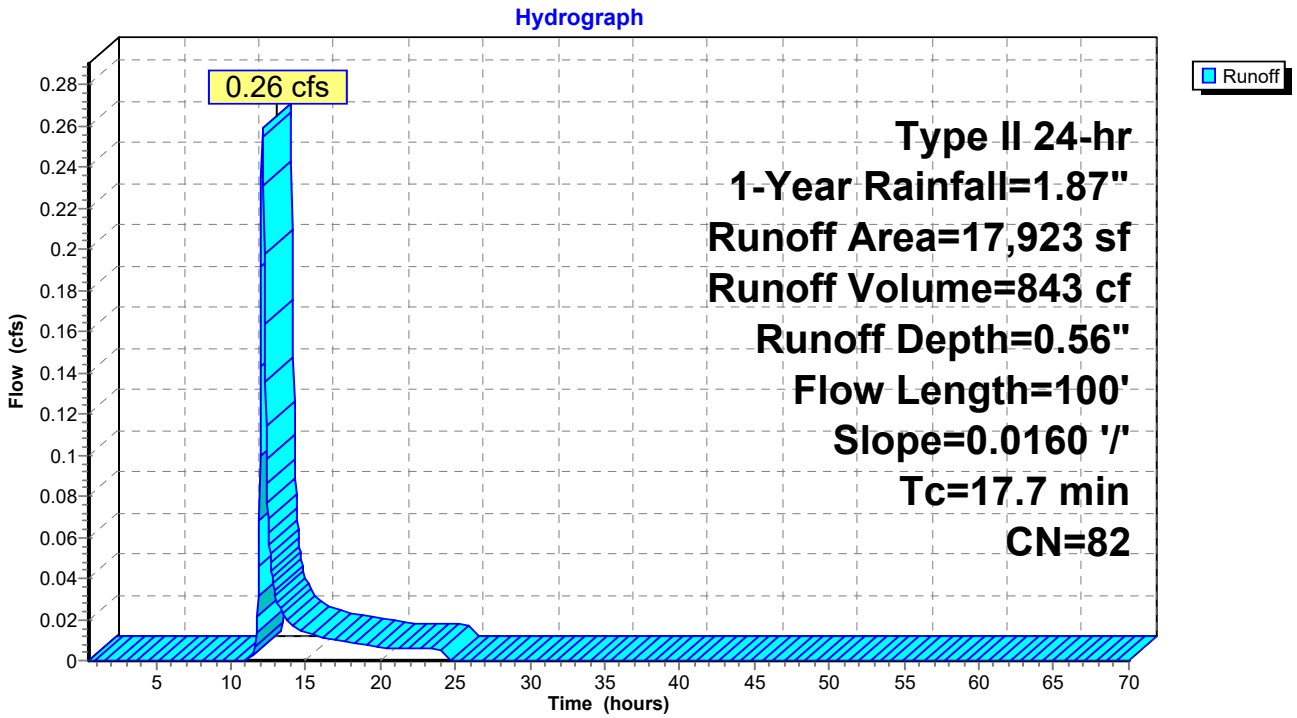
Runoff = 0.26 cfs @ 12.12 hrs, Volume= 843 cf, Depth= 0.56"
Routed to Link 1L : Proposed - Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=1.87"

Area (sf)	CN	Description
1,832	98	Paved parking, HSG D
16,091	80	>75% Grass cover, Good, HSG D
17,923	82	Weighted Average
16,091		89.78% Pervious Area
1,832		10.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0160	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.50"

Subcatchment 3S: Proposed - Direct Offsite



Summary for Pond 2P: Underground - to Freeman

Inflow Area = 58,536 sf, 96.01% Impervious, Inflow Depth = 1.54" for 1-Year event
Inflow = 3.00 cfs @ 12.00 hrs, Volume= 7,532 cf
Outflow = 2.22 cfs @ 12.08 hrs, Volume= 7,172 cf, Atten= 26%, Lag= 4.4 min
Primary = 2.22 cfs @ 12.08 hrs, Volume= 7,172 cf
Routed to Link 1L : Proposed - Total

Routing by Stor-Ind method, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Peak Elev= 699.39' @ 12.08 hrs Surf.Area= 1,797 sf Storage= 1,876 cf

Plug-Flow detention time= 84.3 min calculated for 7,172 cf (95% of inflow)
Center-of-Mass det. time= 55.9 min (836.8 - 780.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	697.85'	1,691 cf	**55.75'W x 32.23'L x 3.75'H Field A** 6,739 cf Overall - 2,511 cf Embedded = 4,228 cf x 40.0% Voids
#2A	698.35'	2,511 cf	**ADS_StormTech SC-800 +Cap** x 48 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 48 Chambers in 12 Rows Cap Storage= 3.4 cf x 2 x 12 rows = 82.1 cf
		4,202 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	698.35'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 698.35' / 698.30' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.19 cfs @ 12.08 hrs HW=699.38' (Free Discharge)
1=Culvert (Barrel Controls 2.19 cfs @ 3.37 fps)

Pond 2P: Underground - to Freeman - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-800 +Cap (ADS StormTech®SC-800 with cap volume)
Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf
Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap
Cap Storage= 3.4 cf x 2 x 12 rows = 82.1 cf

51.0" Wide + 3.0" Spacing = 54.0" C-C Row Spacing

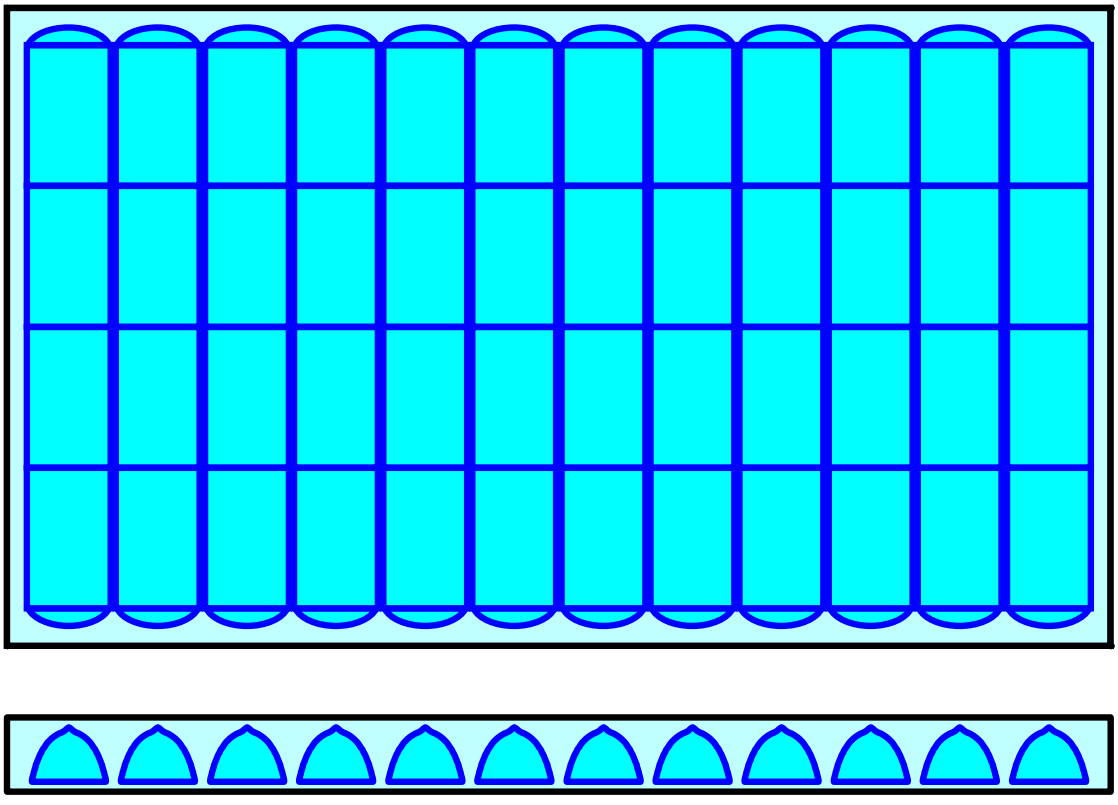
4 Chambers/Row x 7.12' Long +0.88' Cap Length x 2 = 30.23' Row Length +12.0" End Stone x 2 = 32.23' Base Length
12 Rows x 51.0" Wide + 3.0" Spacing x 11 + 12.0" Side Stone x 2 = 55.75' Base Width
6.0" Stone Base + 33.0" Chamber Height + 6.0" Stone Cover = 3.75' Field Height

48 Chambers x 50.6 cf + 3.4 cf Cap Volume x 2 x 12 Rows = 2,510.5 cf Chamber Storage

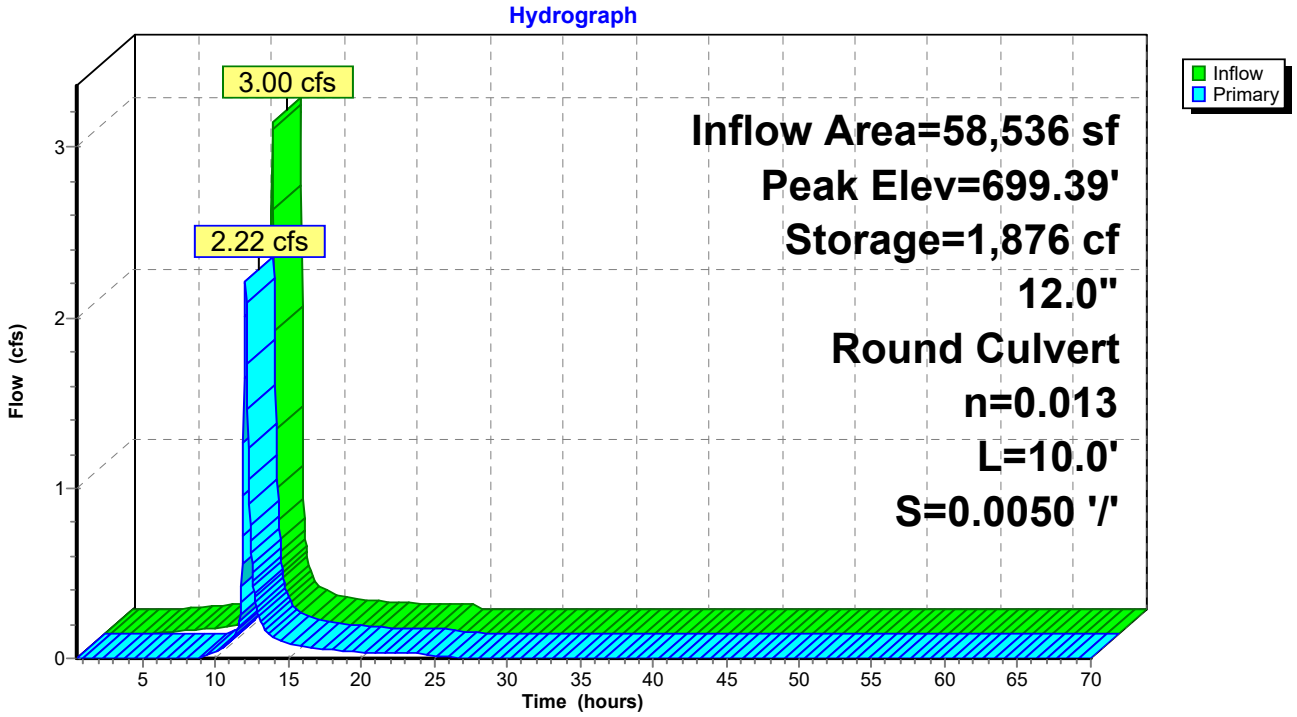
6,738.8 cf Field - 2,510.5 cf Chambers = 4,228.3 cf Stone x 40.0% Voids = 1,691.3 cf Stone Storage

Chamber Storage + Stone Storage = 4,201.8 cf = 0.096 af
Overall Storage Efficiency = 62.4%
Overall System Size = 32.23' x 55.75' x 3.75'

48 Chambers
249.6 cy Field
156.6 cy Stone



Pond 2P: Underground - to Freeman

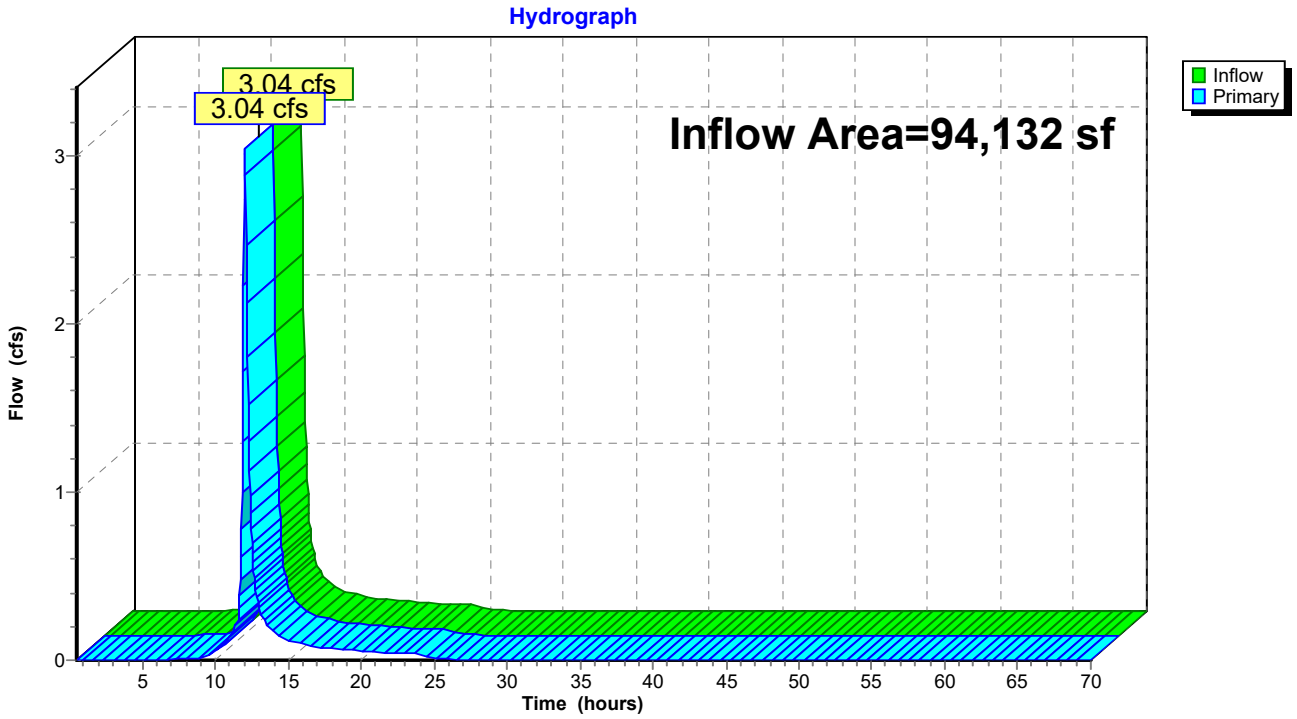


Summary for Link 1L: Proposed - Total

Inflow Area = 94,132 sf, 78.69% Impervious, Inflow Depth = 1.29" for 1-Year event
Inflow = 3.04 cfs @ 12.04 hrs, Volume= 10,149 cf
Primary = 3.04 cfs @ 12.04 hrs, Volume= 10,149 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs

Link 1L: Proposed - Total



Time span=0.50-70.00 hrs, dt=0.04 hrs, 1739 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Proposed - to detention Runoff Area=58,536 sf 96.01% Impervious Runoff Depth=2.80"
Flow Length=452' Tc=9.3 min CN=97 Runoff=5.25 cfs 13,644 cf

Subcatchment2S: Proposed - to Transit Runoff Area=17,673 sf 90.76% Impervious Runoff Depth=2.69"
Flow Length=186' Tc=6.8 min CN=96 Runoff=1.68 cfs 3,962 cf

Subcatchment3S: Proposed - Direct Runoff Area=17,923 sf 10.22% Impervious Runoff Depth=1.49"
Flow Length=100' Slope=0.0160 '/' Tc=17.7 min CN=82 Runoff=0.73 cfs 2,225 cf

Pond 2P: Underground - to Freeman Peak Elev=700.01' Storage=2,711 cf Inflow=5.25 cfs 13,644 cf
12.0" Round Culvert n=0.013 L=10.0' S=0.0050 '/' Outflow=3.95 cfs 13,285 cf

Link 1L: Proposed - Total Inflow=5.70 cfs 19,472 cf
Primary=5.70 cfs 19,472 cf

Total Runoff Area = 94,132 sf Runoff Volume = 19,831 cf Average Runoff Depth = 2.53"
21.31% Pervious = 20,061 sf 78.69% Impervious = 74,071 sf

Summary for Subcatchment 1S: Proposed - to detention

[47] Hint: Peak is 793% of capacity of segment #3
[47] Hint: Peak is 379% of capacity of segment #4
[47] Hint: Peak is 233% of capacity of segment #5
[47] Hint: Peak is 182% of capacity of segment #6

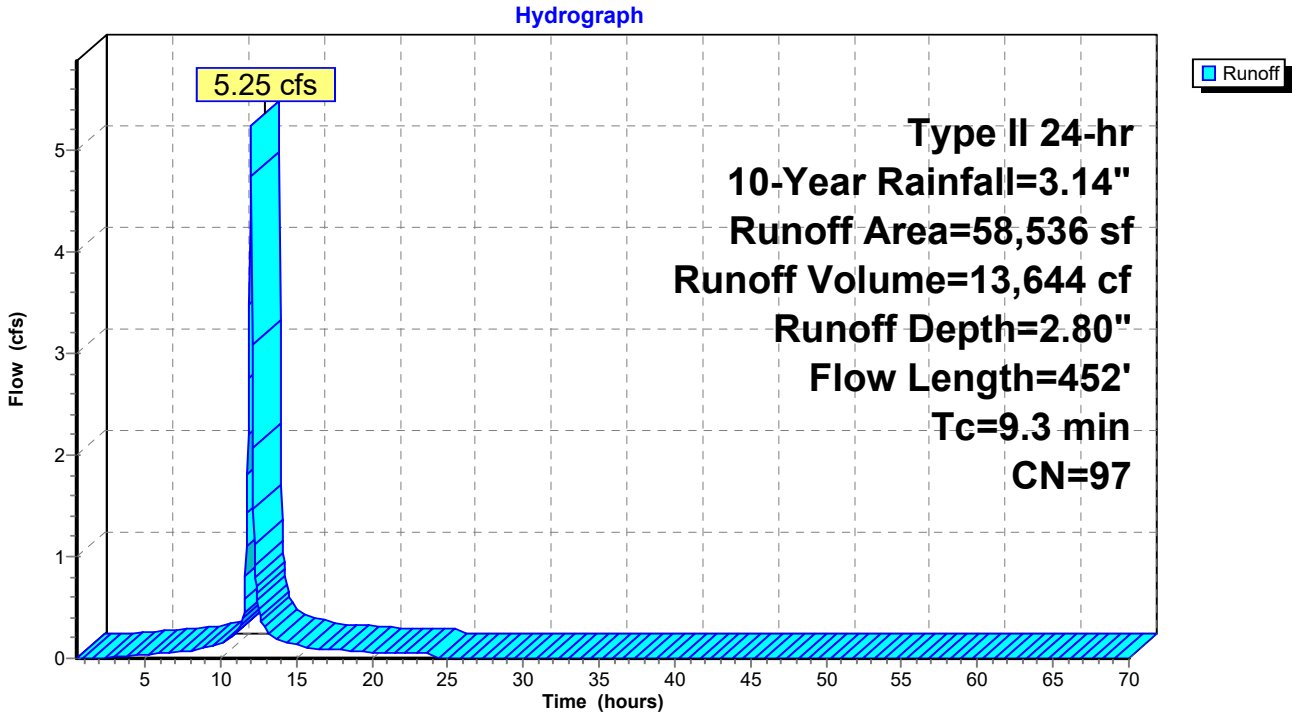
Runoff = 5.25 cfs @ 12.00 hrs, Volume= 13,644 cf, Depth= 2.80"
Routed to Pond 2P : Underground - to Freeman

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=3.14"

	Area (sf)	CN	Description
	17,350	98	Roofs, HSG D
	38,063	98	Paved parking, HSG D
*	786	98	Concrete, HSG D
	2,337	80	>75% Grass cover, Good, HSG D
	58,536	97	Weighted Average
	2,337		3.99% Pervious Area
	56,199		96.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	23	0.0130	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.50"
0.6	25	0.0120	0.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.6	72	0.0030	1.90	0.66	**Pipe Channel,** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
1.1	172	0.0040	2.54	1.39	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.013 Corrugated PE, smooth interior
0.4	62	0.0040	2.87	2.25	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.6	83	0.0020	2.35	2.89	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.1	15	0.0030	3.26	5.75	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
9.3	452	Total			

Subcatchment 1S: Proposed - to detention



Summary for Subcatchment 2S: Proposed - to Transit Road sewer

[47] Hint: Peak is 255% of capacity of segment #3
[47] Hint: Peak is 197% of capacity of segment #4

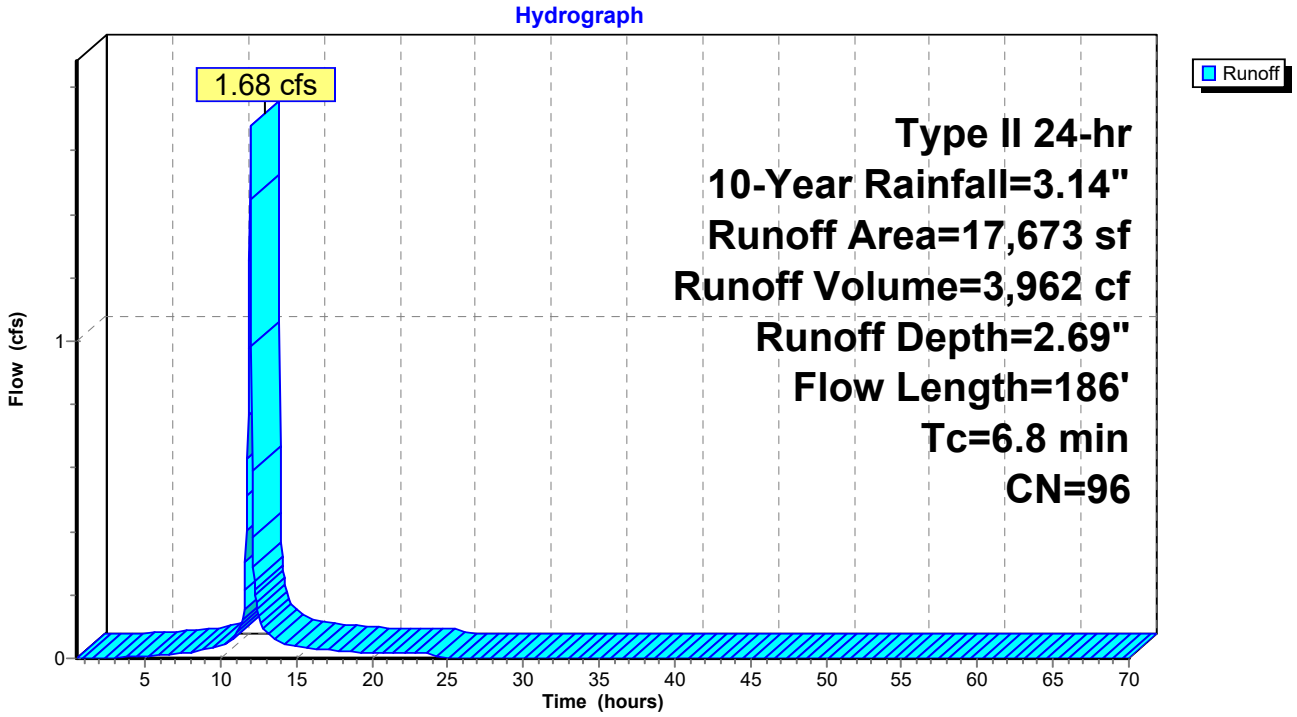
Runoff = 1.68 cfs @ 11.97 hrs, Volume= 3,962 cf, Depth= 2.69"
Routed to Link 1L : Proposed - Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=3.14"

	Area (sf)	CN	Description
	15,144	98	Paved parking, HSG D
*	896	98	Concrete sidewalk, HSG D
	1,633	80	>75% Grass cover, Good, HSG D
	17,673	96	Weighted Average
	1,633		9.24% Pervious Area
	16,040		90.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	17	0.0100	0.05		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.50"
0.5	23	0.0130	0.76		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.6	73	0.0030	1.90	0.66	**Pipe Channel,** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
0.5	73	0.0050	2.45	0.85	**Pipe Channel,** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
6.8	186	Total			

Subcatchment 2S: Proposed - to Transit Road sewer



Summary for Subcatchment 3S: Proposed - Direct Offsite

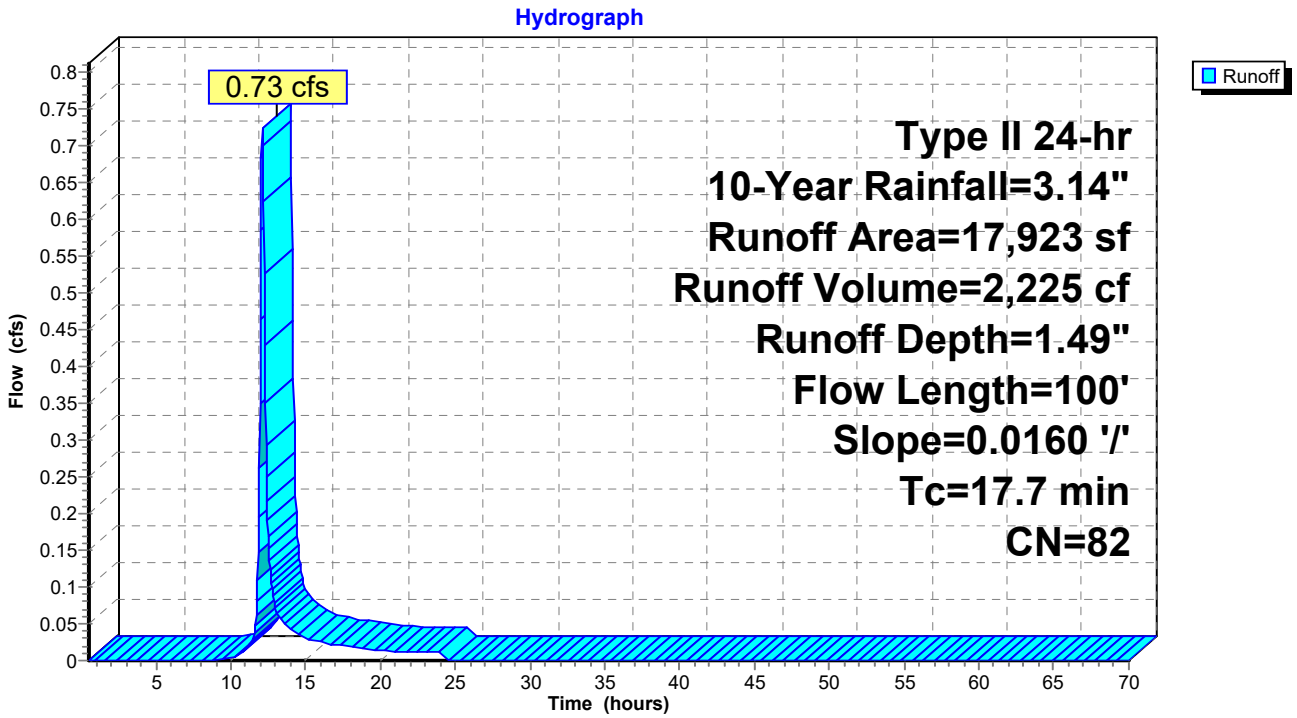
Runoff = 0.73 cfs @ 12.10 hrs, Volume= 2,225 cf, Depth= 1.49"
Routed to Link 1L : Proposed - Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=3.14"

Area (sf)	CN	Description
1,832	98	Paved parking, HSG D
16,091	80	>75% Grass cover, Good, HSG D
17,923	82	Weighted Average
16,091		89.78% Pervious Area
1,832		10.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0160	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.50"

Subcatchment 3S: Proposed - Direct Offsite



Summary for Pond 2P: Underground - to Freeman

Inflow Area = 58,536 sf, 96.01% Impervious, Inflow Depth = 2.80" for 10-Year event
Inflow = 5.25 cfs @ 12.00 hrs, Volume= 13,644 cf
Outflow = 3.95 cfs @ 12.07 hrs, Volume= 13,285 cf, Atten= 25%, Lag= 4.3 min
Primary = 3.95 cfs @ 12.07 hrs, Volume= 13,285 cf
Routed to Link 1L : Proposed - Total

Routing by Stor-Ind method, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Peak Elev= 700.01' @ 12.07 hrs Surf.Area= 1,797 sf Storage= 2,711 cf

Plug-Flow detention time= 59.6 min calculated for 13,285 cf (97% of inflow)
Center-of-Mass det. time= 42.6 min (808.5 - 765.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	697.85'	1,691 cf	**55.75'W x 32.23'L x 3.75'H Field A** 6,739 cf Overall - 2,511 cf Embedded = 4,228 cf x 40.0% Voids
#2A	698.35'	2,511 cf	**ADS_StormTech SC-800 +Cap** x 48 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 48 Chambers in 12 Rows Cap Storage= 3.4 cf x 2 x 12 rows = 82.1 cf
		4,202 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	698.35'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 698.35' / 698.30' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.91 cfs @ 12.07 hrs HW=700.00' (Free Discharge)
1=Culvert (Barrel Controls 3.91 cfs @ 4.98 fps)

Pond 2P: Underground - to Freeman - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-800 +Cap (ADS StormTech®SC-800 with cap volume)
Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf
Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap
Cap Storage= 3.4 cf x 2 x 12 rows = 82.1 cf

51.0" Wide + 3.0" Spacing = 54.0" C-C Row Spacing

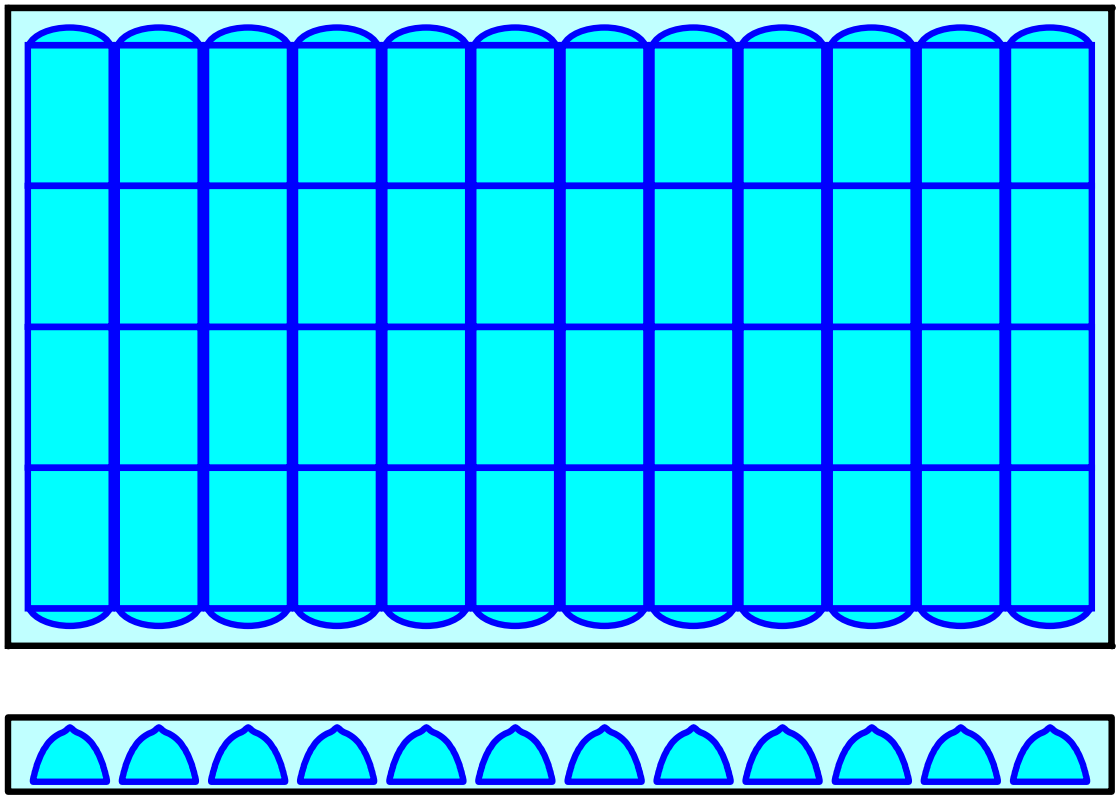
4 Chambers/Row x 7.12' Long +0.88' Cap Length x 2 = 30.23' Row Length +12.0" End Stone x 2 = 32.23' Base Length
12 Rows x 51.0" Wide + 3.0" Spacing x 11 + 12.0" Side Stone x 2 = 55.75' Base Width
6.0" Stone Base + 33.0" Chamber Height + 6.0" Stone Cover = 3.75' Field Height

48 Chambers x 50.6 cf + 3.4 cf Cap Volume x 2 x 12 Rows = 2,510.5 cf Chamber Storage

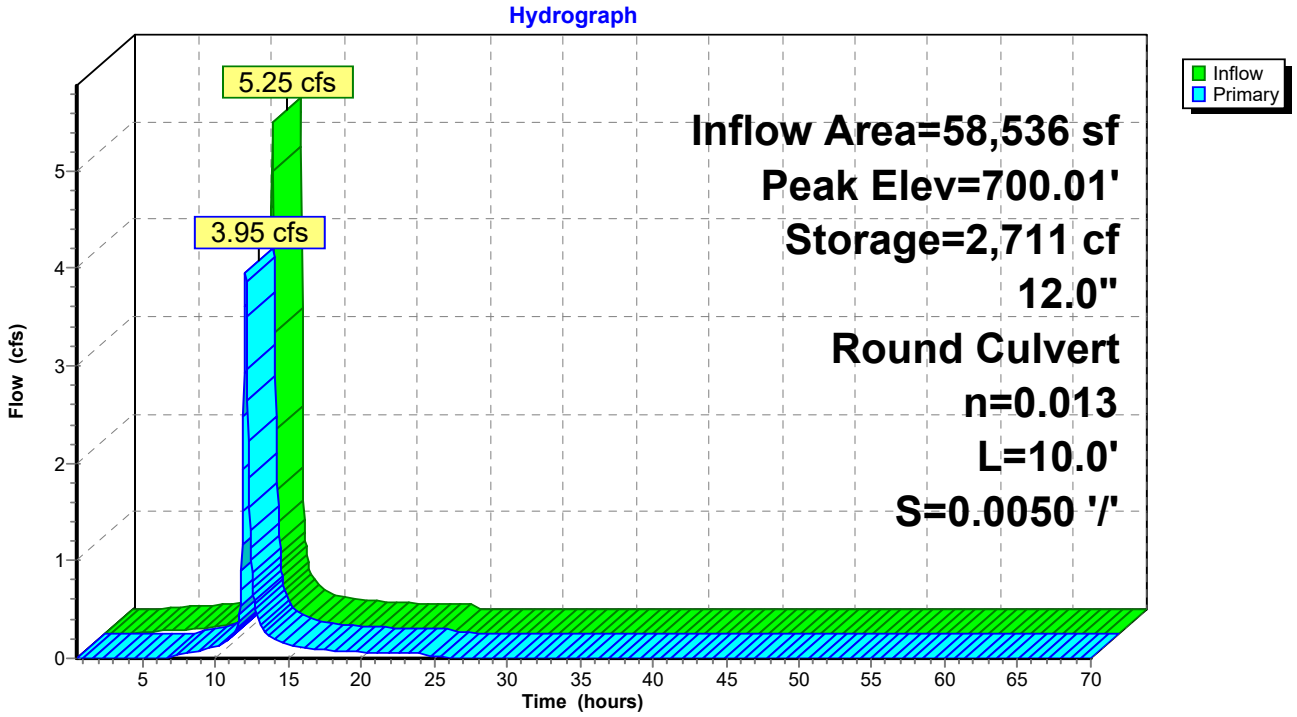
6,738.8 cf Field - 2,510.5 cf Chambers = 4,228.3 cf Stone x 40.0% Voids = 1,691.3 cf Stone Storage

Chamber Storage + Stone Storage = 4,201.8 cf = 0.096 af
Overall Storage Efficiency = 62.4%
Overall System Size = 32.23' x 55.75' x 3.75'

48 Chambers
249.6 cy Field
156.6 cy Stone



Pond 2P: Underground - to Freeman

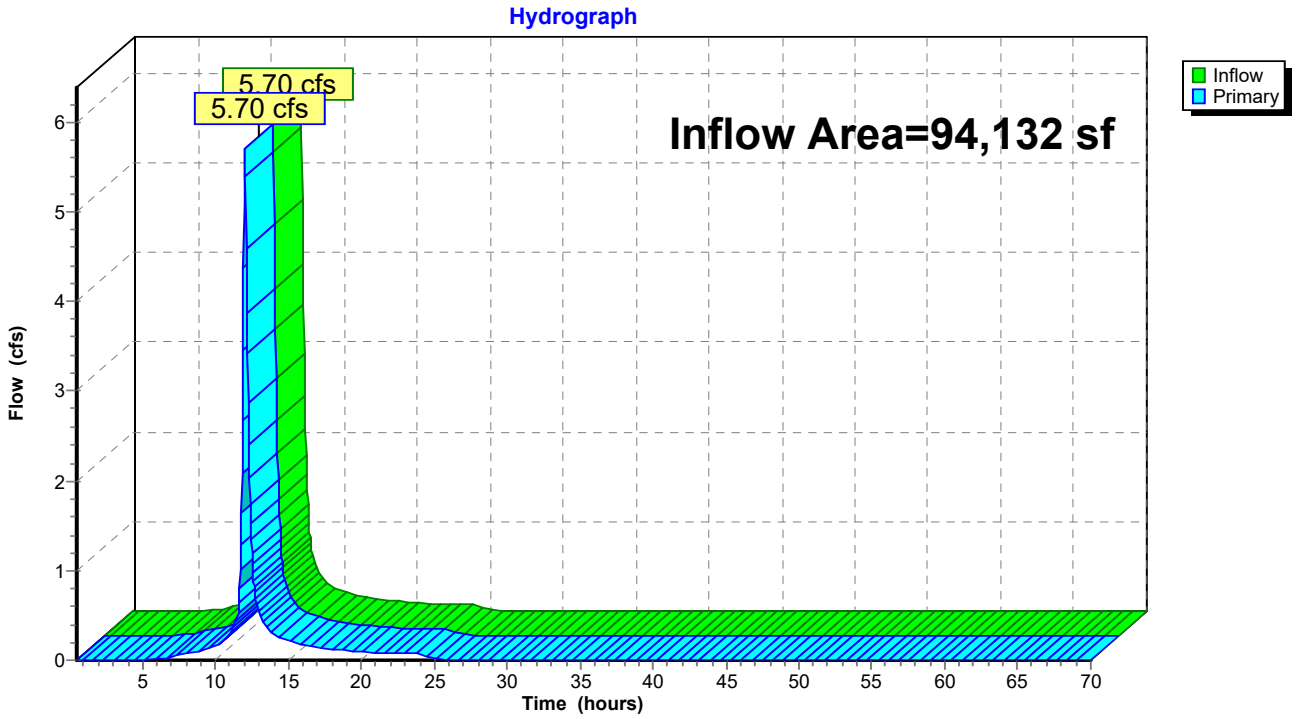


Summary for Link 1L: Proposed - Total

Inflow Area = 94,132 sf, 78.69% Impervious, Inflow Depth = 2.48" for 10-Year event
Inflow = 5.70 cfs @ 12.04 hrs, Volume= 19,472 cf
Primary = 5.70 cfs @ 12.04 hrs, Volume= 19,472 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs

Link 1L: Proposed - Total



Time span=0.50-70.00 hrs, dt=0.04 hrs, 1739 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Proposed - to detention Runoff Area=58,536 sf 96.01% Impervious Runoff Depth=3.49"
Flow Length=452' Tc=9.3 min CN=97 Runoff=6.47 cfs 17,035 cf

Subcatchment2S: Proposed - to Transit Runoff Area=17,673 sf 90.76% Impervious Runoff Depth=3.38"
Flow Length=186' Tc=6.8 min CN=96 Runoff=2.09 cfs 4,980 cf

Subcatchment3S: Proposed - Direct Runoff Area=17,923 sf 10.22% Impervious Runoff Depth=2.07"
Flow Length=100' Slope=0.0160 '/' Tc=17.7 min CN=82 Runoff=1.01 cfs 3,087 cf

Pond 2P: Underground - to Freeman Peak Elev=700.40' Storage=3,176 cf Inflow=6.47 cfs 17,035 cf
12.0" Round Culvert n=0.013 L=10.0' S=0.0050 '/' Outflow=4.70 cfs 16,676 cf

Link 1L: Proposed - Total Inflow=7.07 cfs 24,743 cf
Primary=7.07 cfs 24,743 cf

Total Runoff Area = 94,132 sf Runoff Volume = 25,103 cf Average Runoff Depth = 3.20"
21.31% Pervious = 20,061 sf 78.69% Impervious = 74,071 sf

Summary for Subcatchment 1S: Proposed - to detention

[47] Hint: Peak is 978% of capacity of segment #3
[47] Hint: Peak is 467% of capacity of segment #4
[47] Hint: Peak is 287% of capacity of segment #5
[47] Hint: Peak is 224% of capacity of segment #6
[47] Hint: Peak is 112% of capacity of segment #7

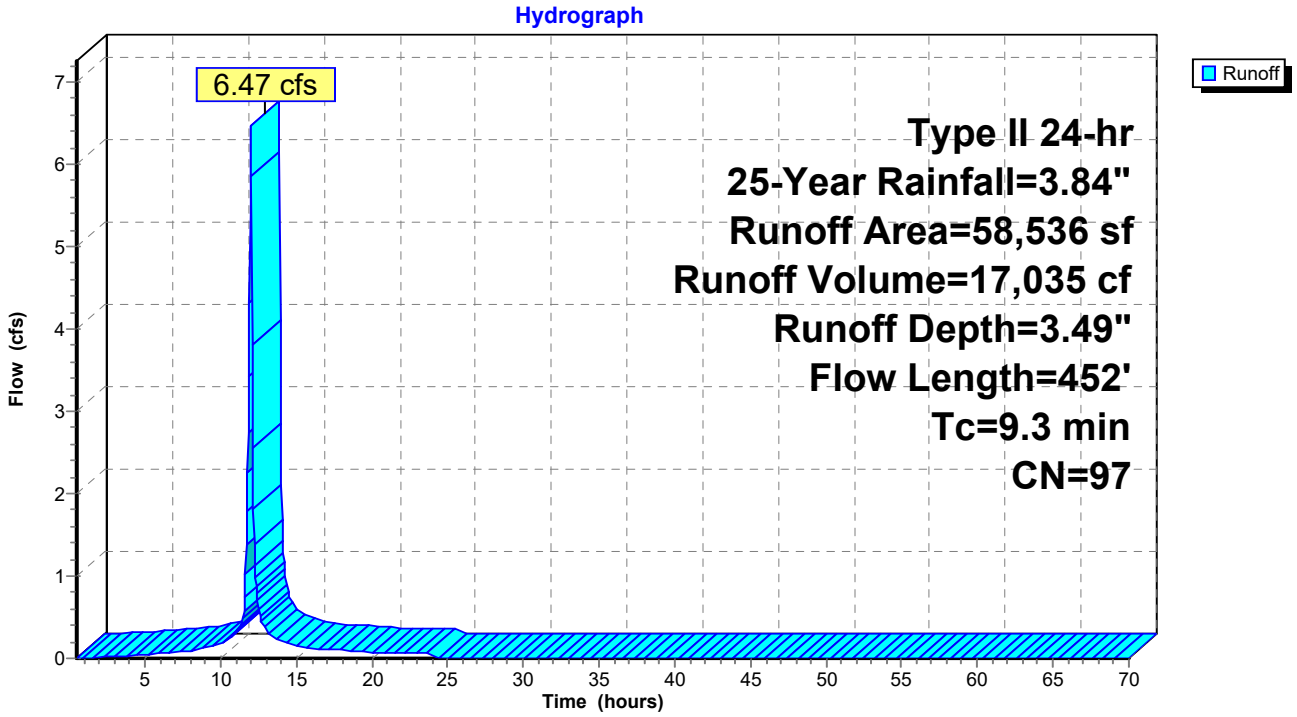
Runoff = 6.47 cfs @ 12.00 hrs, Volume= 17,035 cf, Depth= 3.49"
Routed to Pond 2P : Underground - to Freeman

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 25-Year Rainfall=3.84"

	Area (sf)	CN	Description
	17,350	98	Roofs, HSG D
	38,063	98	Paved parking, HSG D
*	786	98	Concrete, HSG D
	2,337	80	>75% Grass cover, Good, HSG D
	58,536	97	Weighted Average
	2,337		3.99% Pervious Area
	56,199		96.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	23	0.0130	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.50"
0.6	25	0.0120	0.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.6	72	0.0030	1.90	0.66	**Pipe Channel,** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
1.1	172	0.0040	2.54	1.39	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.013 Corrugated PE, smooth interior
0.4	62	0.0040	2.87	2.25	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.6	83	0.0020	2.35	2.89	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.1	15	0.0030	3.26	5.75	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
9.3	452	Total			

Subcatchment 1S: Proposed - to detention



Summary for Subcatchment 2S: Proposed - to Transit Road sewer

[47] Hint: Peak is 315% of capacity of segment #3
[47] Hint: Peak is 244% of capacity of segment #4

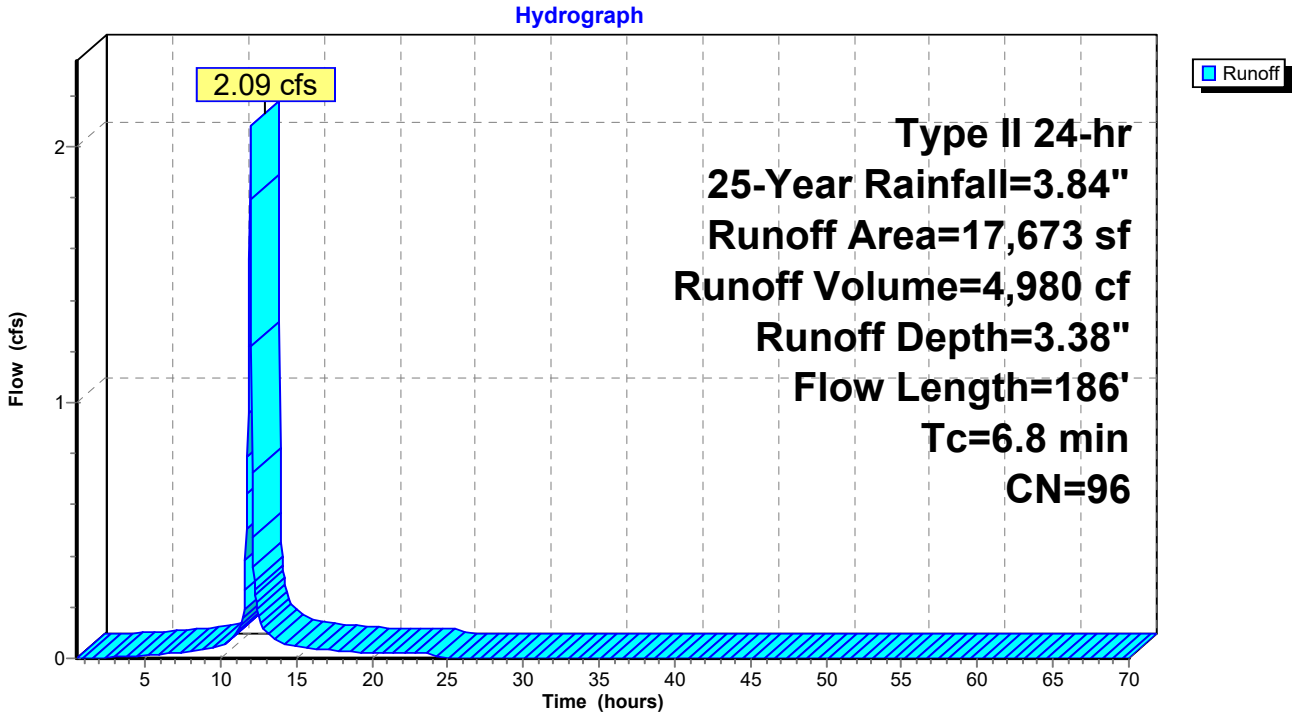
Runoff = 2.09 cfs @ 11.97 hrs, Volume= 4,980 cf, Depth= 3.38"
Routed to Link 1L : Proposed - Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 25-Year Rainfall=3.84"

	Area (sf)	CN	Description
	15,144	98	Paved parking, HSG D
*	896	98	Concrete sidewalk, HSG D
	1,633	80	>75% Grass cover, Good, HSG D
	17,673	96	Weighted Average
	1,633		9.24% Pervious Area
	16,040		90.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	17	0.0100	0.05		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.50"
0.5	23	0.0130	0.76		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.6	73	0.0030	1.90	0.66	**Pipe Channel,** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
0.5	73	0.0050	2.45	0.85	**Pipe Channel,** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
6.8	186	Total			

Subcatchment 2S: Proposed - to Transit Road sewer



Summary for Subcatchment 3S: Proposed - Direct Offsite

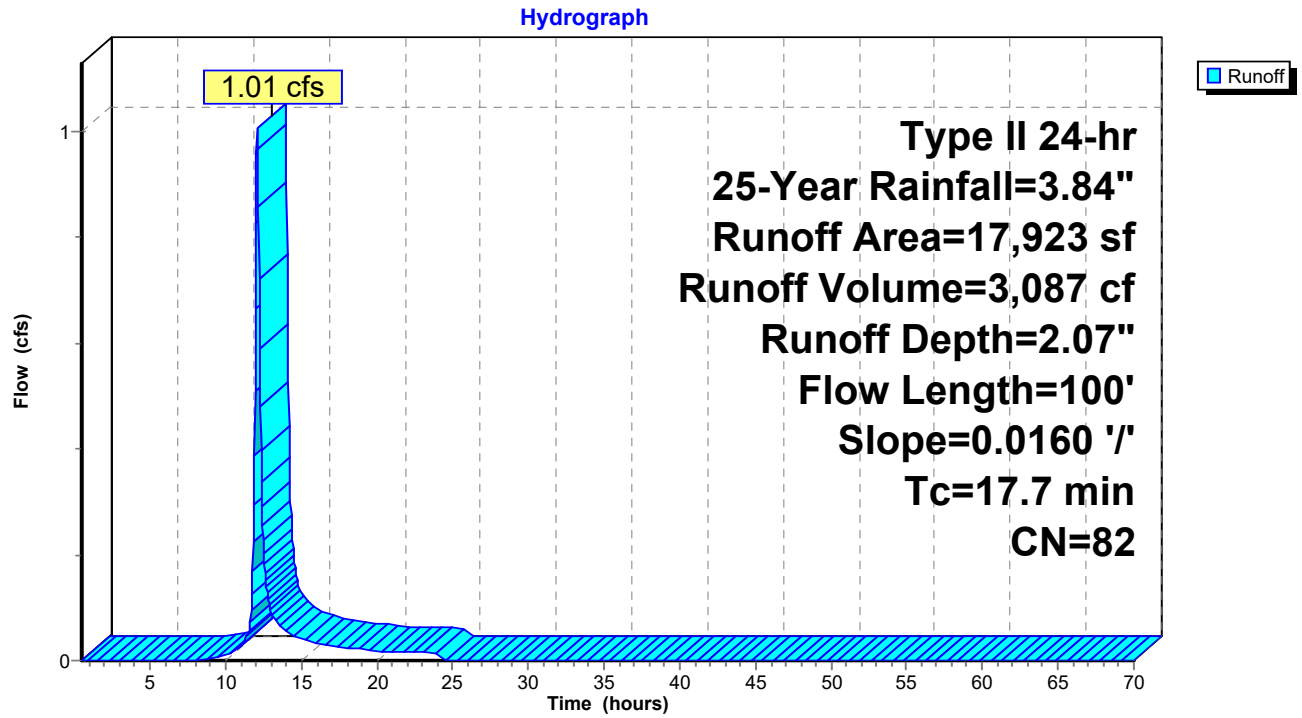
Runoff = 1.01 cfs @ 12.10 hrs, Volume= 3,087 cf, Depth= 2.07"
Routed to Link 1L : Proposed - Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 25-Year Rainfall=3.84"

Area (sf)	CN	Description
1,832	98	Paved parking, HSG D
16,091	80	>75% Grass cover, Good, HSG D
17,923	82	Weighted Average
16,091		89.78% Pervious Area
1,832		10.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0160	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.50"

Subcatchment 3S: Proposed - Direct Offsite



Summary for Pond 2P: Underground - to Freeman

Inflow Area = 58,536 sf, 96.01% Impervious, Inflow Depth = 3.49" for 25-Year event
Inflow = 6.47 cfs @ 12.00 hrs, Volume= 17,035 cf
Outflow = 4.70 cfs @ 12.08 hrs, Volume= 16,676 cf, Atten= 27%, Lag= 4.5 min
Primary = 4.70 cfs @ 12.08 hrs, Volume= 16,676 cf
Routed to Link 1L : Proposed - Total

Routing by Stor-Ind method, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Peak Elev= 700.40' @ 12.08 hrs Surf.Area= 1,797 sf Storage= 3,176 cf

Plug-Flow detention time= 52.3 min calculated for 16,676 cf (98% of inflow)
Center-of-Mass det. time= 38.3 min (799.2 - 760.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	697.85'	1,691 cf	**55.75'W x 32.23'L x 3.75'H Field A** 6,739 cf Overall - 2,511 cf Embedded = 4,228 cf x 40.0% Voids
#2A	698.35'	2,511 cf	**ADS_StormTech SC-800 +Cap** x 48 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 48 Chambers in 12 Rows Cap Storage= 3.4 cf x 2 x 12 rows = 82.1 cf
		4,202 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	698.35'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 698.35' / 698.30' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.67 cfs @ 12.08 hrs HW=700.37' (Free Discharge)
1=Culvert (Inlet Controls 4.67 cfs @ 5.95 fps)

Pond 2P: Underground - to Freeman - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-800 +Cap (ADS StormTech®SC-800 with cap volume)
Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf
Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap
Cap Storage= 3.4 cf x 2 x 12 rows = 82.1 cf

51.0" Wide + 3.0" Spacing = 54.0" C-C Row Spacing

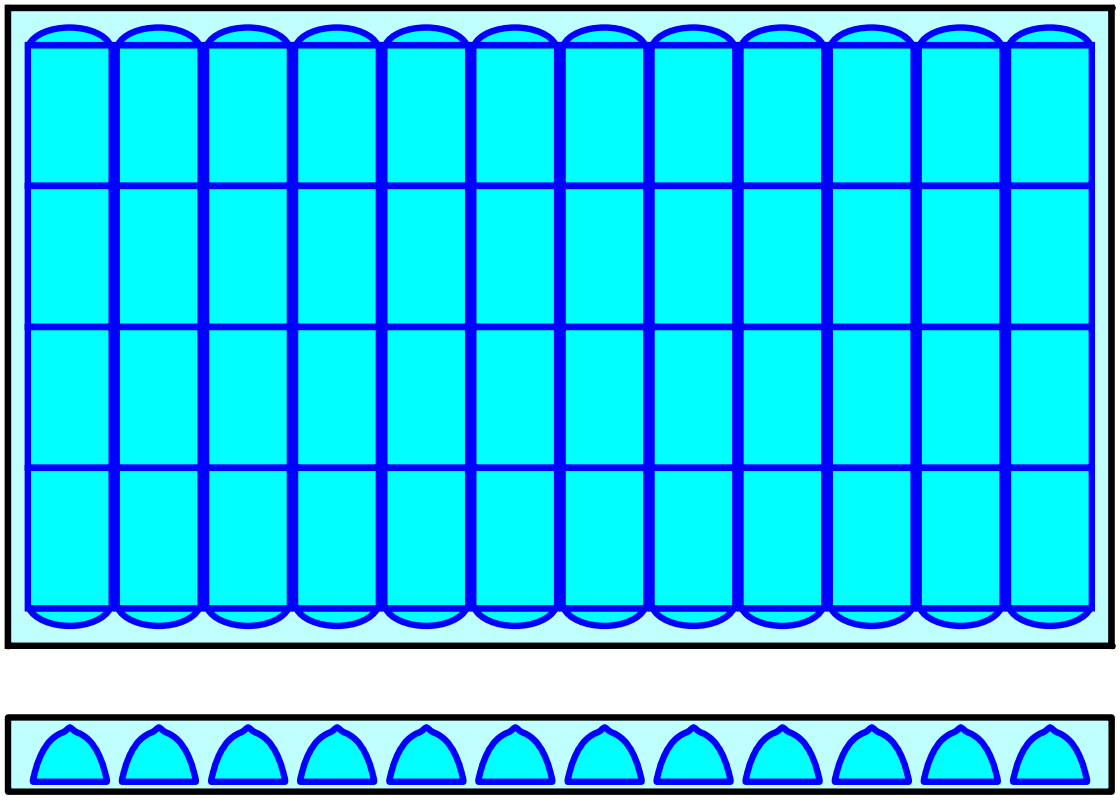
4 Chambers/Row x 7.12' Long +0.88' Cap Length x 2 = 30.23' Row Length +12.0" End Stone x 2 = 32.23' Base Length
12 Rows x 51.0" Wide + 3.0" Spacing x 11 + 12.0" Side Stone x 2 = 55.75' Base Width
6.0" Stone Base + 33.0" Chamber Height + 6.0" Stone Cover = 3.75' Field Height

48 Chambers x 50.6 cf + 3.4 cf Cap Volume x 2 x 12 Rows = 2,510.5 cf Chamber Storage

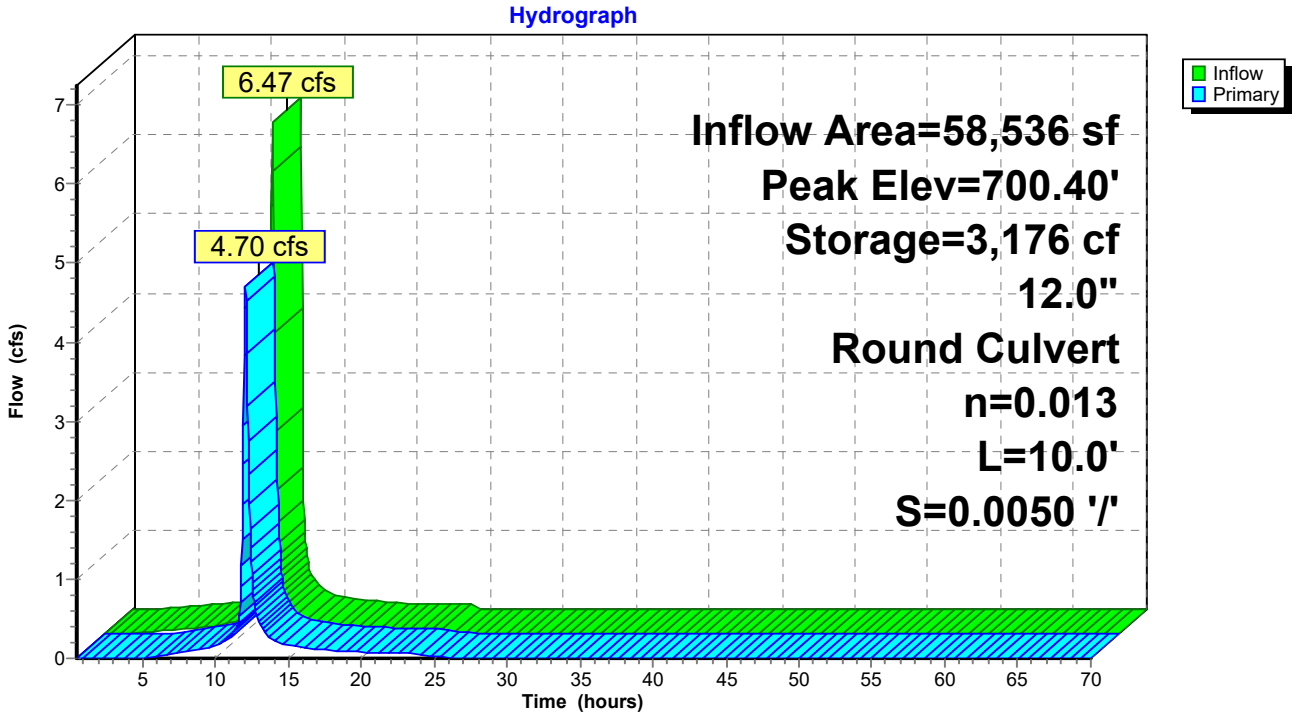
6,738.8 cf Field - 2,510.5 cf Chambers = 4,228.3 cf Stone x 40.0% Voids = 1,691.3 cf Stone Storage

Chamber Storage + Stone Storage = 4,201.8 cf = 0.096 af
Overall Storage Efficiency = 62.4%
Overall System Size = 32.23' x 55.75' x 3.75'

48 Chambers
249.6 cy Field
156.6 cy Stone



Pond 2P: Underground - to Freeman

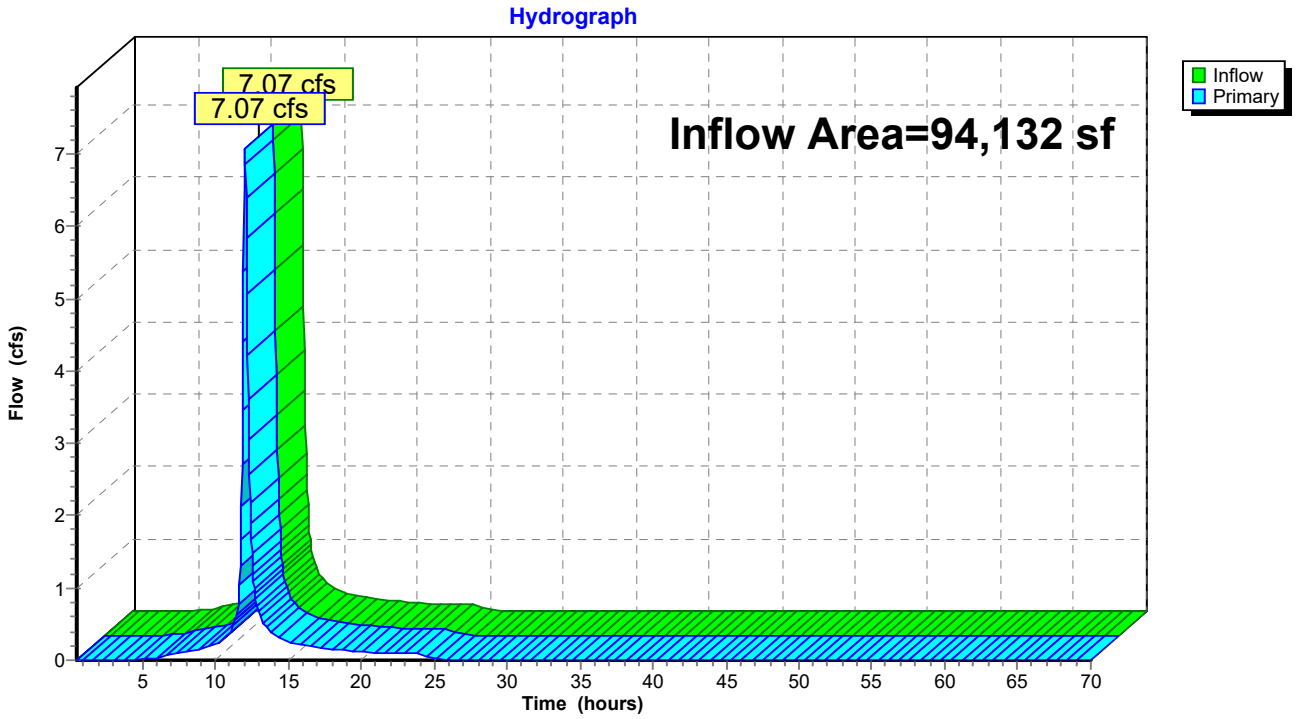


Summary for Link 1L: Proposed - Total

Inflow Area = 94,132 sf, 78.69% Impervious, Inflow Depth = 3.15" for 25-Year event
Inflow = 7.07 cfs @ 12.03 hrs, Volume= 24,743 cf
Primary = 7.07 cfs @ 12.03 hrs, Volume= 24,743 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs

Link 1L: Proposed - Total



Time span=0.50-70.00 hrs, dt=0.04 hrs, 1739 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Proposed - to detention Runoff Area=58,536 sf 96.01% Impervious Runoff Depth=4.88"
Flow Length=452' Tc=9.3 min CN=97 Runoff=8.89 cfs 23,787 cf

Subcatchment2S: Proposed - to Transit Runoff Area=17,673 sf 90.76% Impervious Runoff Depth=4.76"
Flow Length=186' Tc=6.8 min CN=96 Runoff=2.88 cfs 7,012 cf

Subcatchment3S: Proposed - Direct Runoff Area=17,923 sf 10.22% Impervious Runoff Depth=3.29"
Flow Length=100' Slope=0.0160 '/' Tc=17.7 min CN=82 Runoff=1.60 cfs 4,907 cf

Pond 2P: Underground - to Freeman Peak Elev=701.58' Storage=4,186 cf Inflow=8.89 cfs 23,787 cf
12.0" Round Culvert n=0.013 L=10.0' S=0.0050 '/' Outflow=6.25 cfs 23,427 cf

Link 1L: Proposed - Total Inflow=9.55 cfs 35,347 cf
Primary=9.55 cfs 35,347 cf

Total Runoff Area = 94,132 sf Runoff Volume = 35,706 cf Average Runoff Depth = 4.55"
21.31% Pervious = 20,061 sf 78.69% Impervious = 74,071 sf

Summary for Subcatchment 1S: Proposed - to detention

[47] Hint: Peak is 1343% of capacity of segment #3
[47] Hint: Peak is 641% of capacity of segment #4
[47] Hint: Peak is 394% of capacity of segment #5
[47] Hint: Peak is 308% of capacity of segment #6
[47] Hint: Peak is 154% of capacity of segment #7

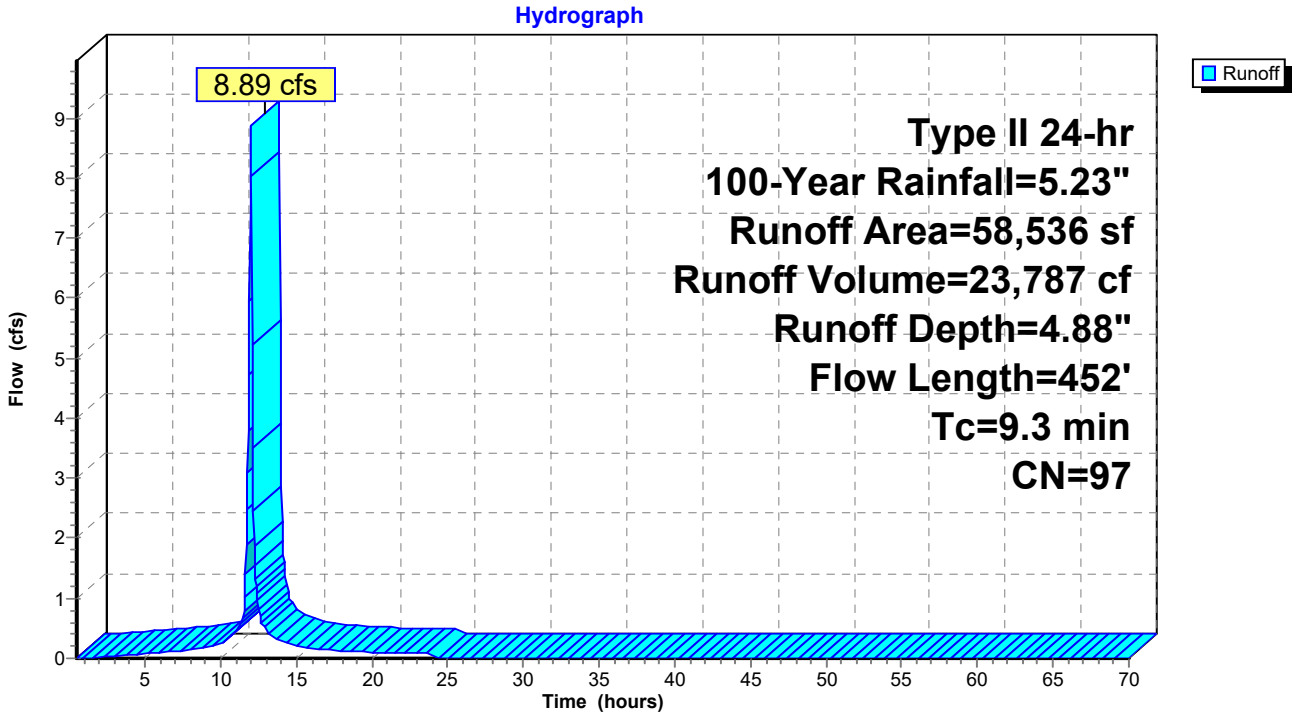
Runoff = 8.89 cfs @ 12.00 hrs, Volume= 23,787 cf, Depth= 4.88"
Routed to Pond 2P : Underground - to Freeman

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=5.23"

	Area (sf)	CN	Description
	17,350	98	Roofs, HSG D
	38,063	98	Paved parking, HSG D
*	786	98	Concrete, HSG D
	2,337	80	>75% Grass cover, Good, HSG D
	58,536	97	Weighted Average
	2,337		3.99% Pervious Area
	56,199		96.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	23	0.0130	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.50"
0.6	25	0.0120	0.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.6	72	0.0030	1.90	0.66	**Pipe Channel,** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
1.1	172	0.0040	2.54	1.39	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.013 Corrugated PE, smooth interior
0.4	62	0.0040	2.87	2.25	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.6	83	0.0020	2.35	2.89	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.1	15	0.0030	3.26	5.75	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
9.3	452	Total			

Subcatchment 1S: Proposed - to detention



Summary for Subcatchment 2S: Proposed - to Transit Road sewer

[47] Hint: Peak is 435% of capacity of segment #3
[47] Hint: Peak is 337% of capacity of segment #4

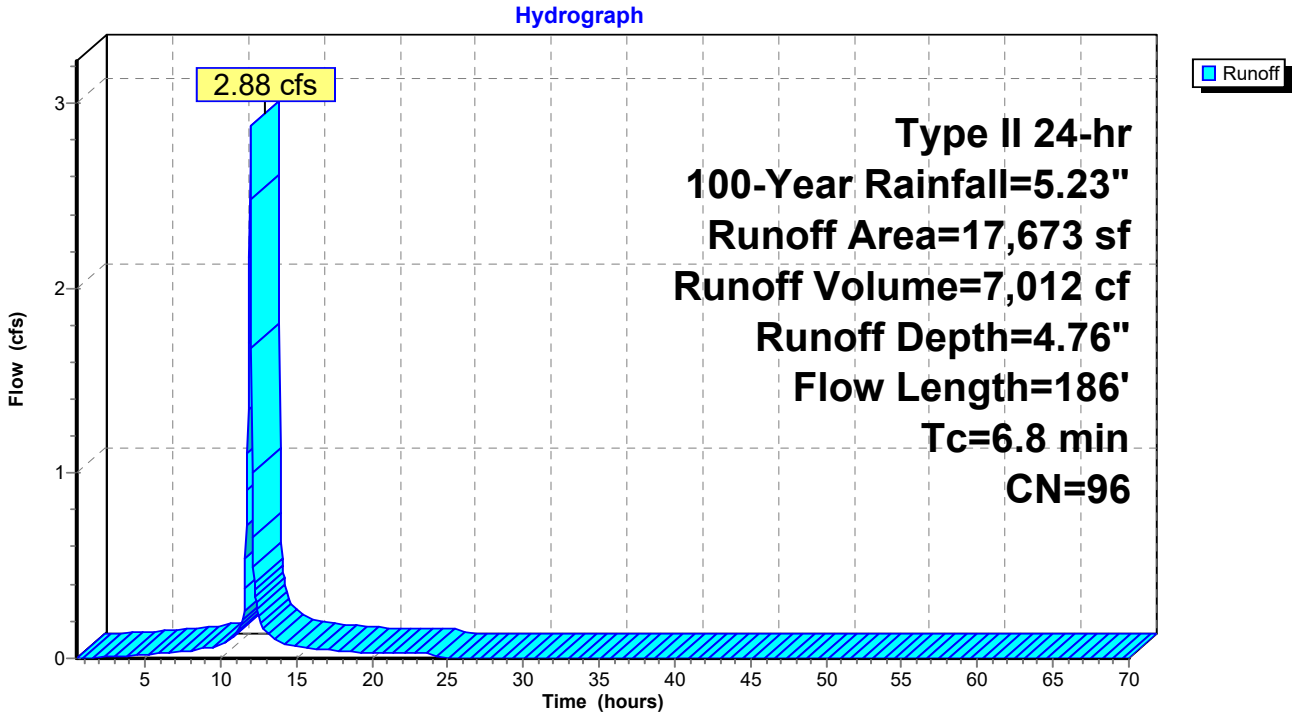
Runoff = 2.88 cfs @ 11.97 hrs, Volume= 7,012 cf, Depth= 4.76"
Routed to Link 1L : Proposed - Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=5.23"

	Area (sf)	CN	Description
	15,144	98	Paved parking, HSG D
*	896	98	Concrete sidewalk, HSG D
	1,633	80	>75% Grass cover, Good, HSG D
	17,673	96	Weighted Average
	1,633		9.24% Pervious Area
	16,040		90.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	17	0.0100	0.05		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.50"
0.5	23	0.0130	0.76		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.6	73	0.0030	1.90	0.66	**Pipe Channel,** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
0.5	73	0.0050	2.45	0.85	**Pipe Channel,** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
6.8	186	Total			

Subcatchment 2S: Proposed - to Transit Road sewer



Summary for Subcatchment 3S: Proposed - Direct Offsite

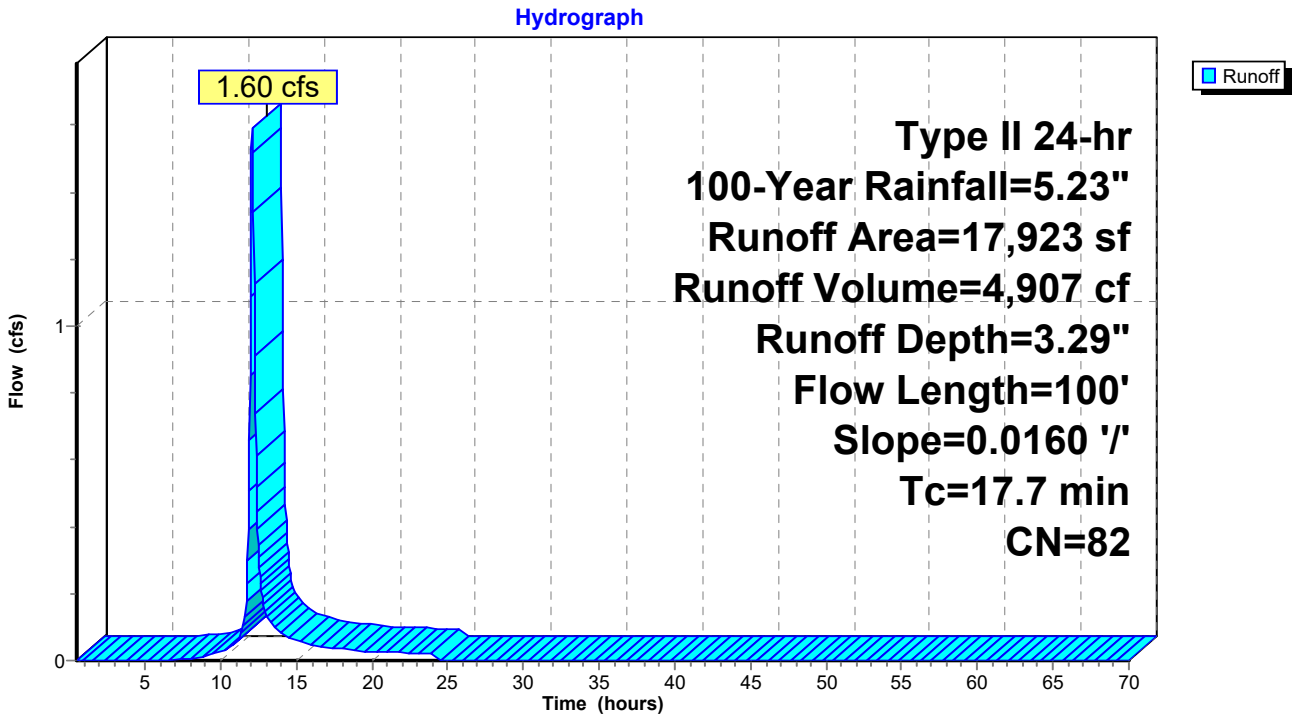
Runoff = 1.60 cfs @ 12.10 hrs, Volume= 4,907 cf, Depth= 3.29"
Routed to Link 1L : Proposed - Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=5.23"

Area (sf)	CN	Description
1,832	98	Paved parking, HSG D
16,091	80	>75% Grass cover, Good, HSG D
17,923	82	Weighted Average
16,091		89.78% Pervious Area
1,832		10.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0160	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.50"

Subcatchment 3S: Proposed - Direct Offsite



Summary for Pond 2P: Underground - to Freeman

Inflow Area = 58,536 sf, 96.01% Impervious, Inflow Depth = 4.88" for 100-Year event
Inflow = 8.89 cfs @ 12.00 hrs, Volume= 23,787 cf
Outflow = 6.25 cfs @ 12.08 hrs, Volume= 23,427 cf, Atten= 30%, Lag= 4.8 min
Primary = 6.25 cfs @ 12.08 hrs, Volume= 23,427 cf
Routed to Link 1L : Proposed - Total

Routing by Stor-Ind method, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs
Peak Elev= 701.58' @ 12.08 hrs Surf.Area= 1,797 sf Storage= 4,186 cf

Plug-Flow detention time= 42.0 min calculated for 23,414 cf (98% of inflow)
Center-of-Mass det. time= 32.6 min (786.6 - 754.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	697.85'	1,691 cf	**55.75'W x 32.23'L x 3.75'H Field A** 6,739 cf Overall - 2,511 cf Embedded = 4,228 cf x 40.0% Voids
#2A	698.35'	2,511 cf	**ADS_StormTech SC-800 +Cap** x 48 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 48 Chambers in 12 Rows Cap Storage= 3.4 cf x 2 x 12 rows = 82.1 cf
		4,202 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	698.35'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 698.35' / 698.30' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=6.20 cfs @ 12.08 hrs HW=701.54' (Free Discharge)
1=Culvert (Inlet Controls 6.20 cfs @ 7.89 fps)

Pond 2P: Underground - to Freeman - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-800 +Cap (ADS StormTech®SC-800 with cap volume)
Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf
Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap
Cap Storage= 3.4 cf x 2 x 12 rows = 82.1 cf

51.0" Wide + 3.0" Spacing = 54.0" C-C Row Spacing

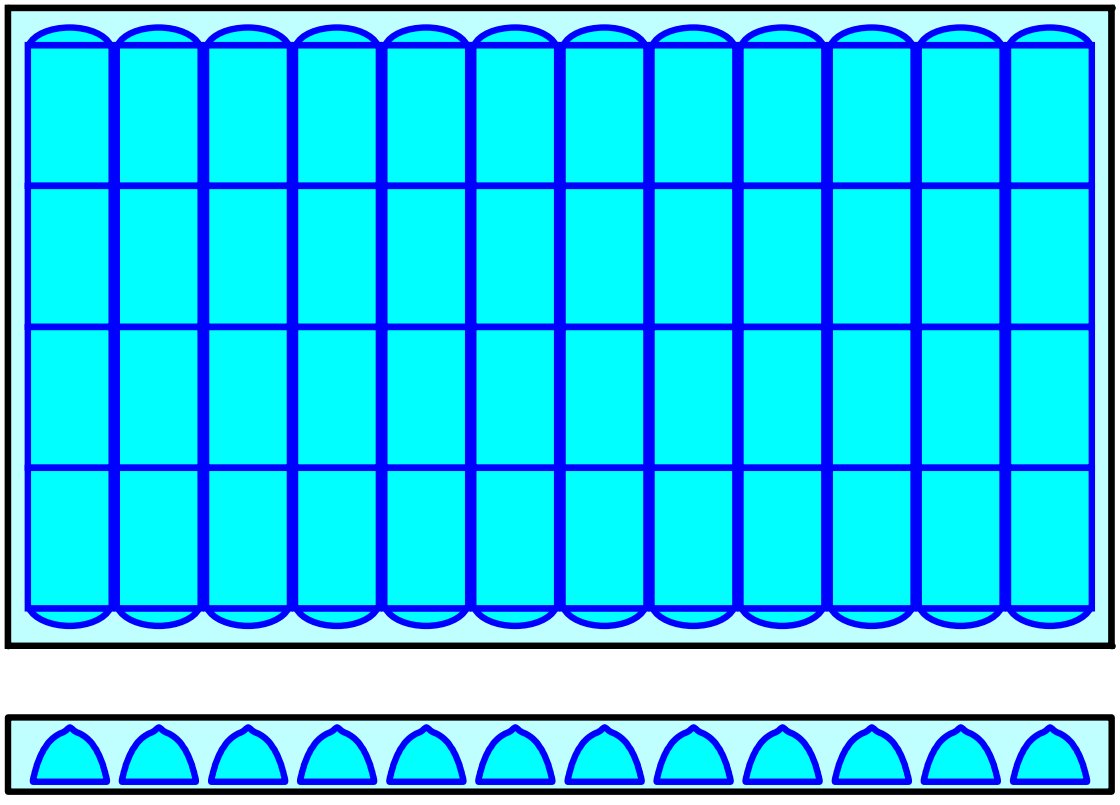
4 Chambers/Row x 7.12' Long +0.88' Cap Length x 2 = 30.23' Row Length +12.0" End Stone x 2 = 32.23' Base Length
12 Rows x 51.0" Wide + 3.0" Spacing x 11 + 12.0" Side Stone x 2 = 55.75' Base Width
6.0" Stone Base + 33.0" Chamber Height + 6.0" Stone Cover = 3.75' Field Height

48 Chambers x 50.6 cf + 3.4 cf Cap Volume x 2 x 12 Rows = 2,510.5 cf Chamber Storage

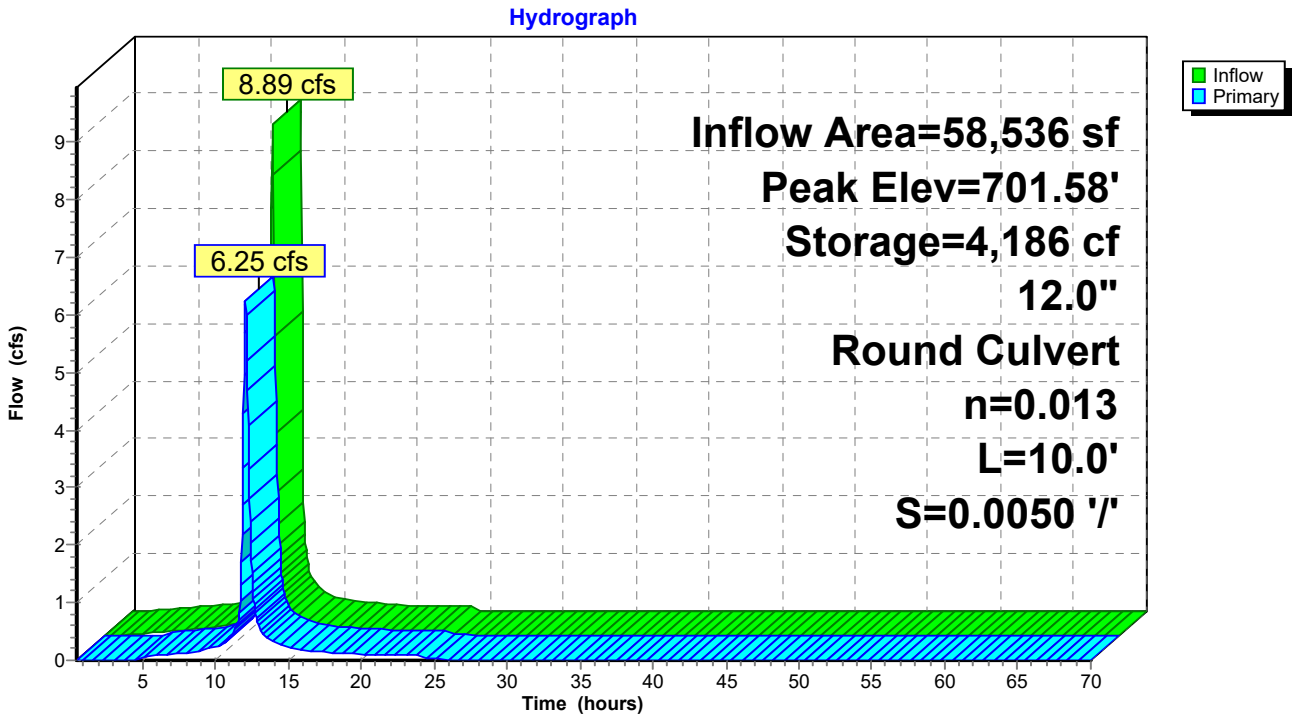
6,738.8 cf Field - 2,510.5 cf Chambers = 4,228.3 cf Stone x 40.0% Voids = 1,691.3 cf Stone Storage

Chamber Storage + Stone Storage = 4,201.8 cf = 0.096 af
Overall Storage Efficiency = 62.4%
Overall System Size = 32.23' x 55.75' x 3.75'

48 Chambers
249.6 cy Field
156.6 cy Stone



Pond 2P: Underground - to Freeman

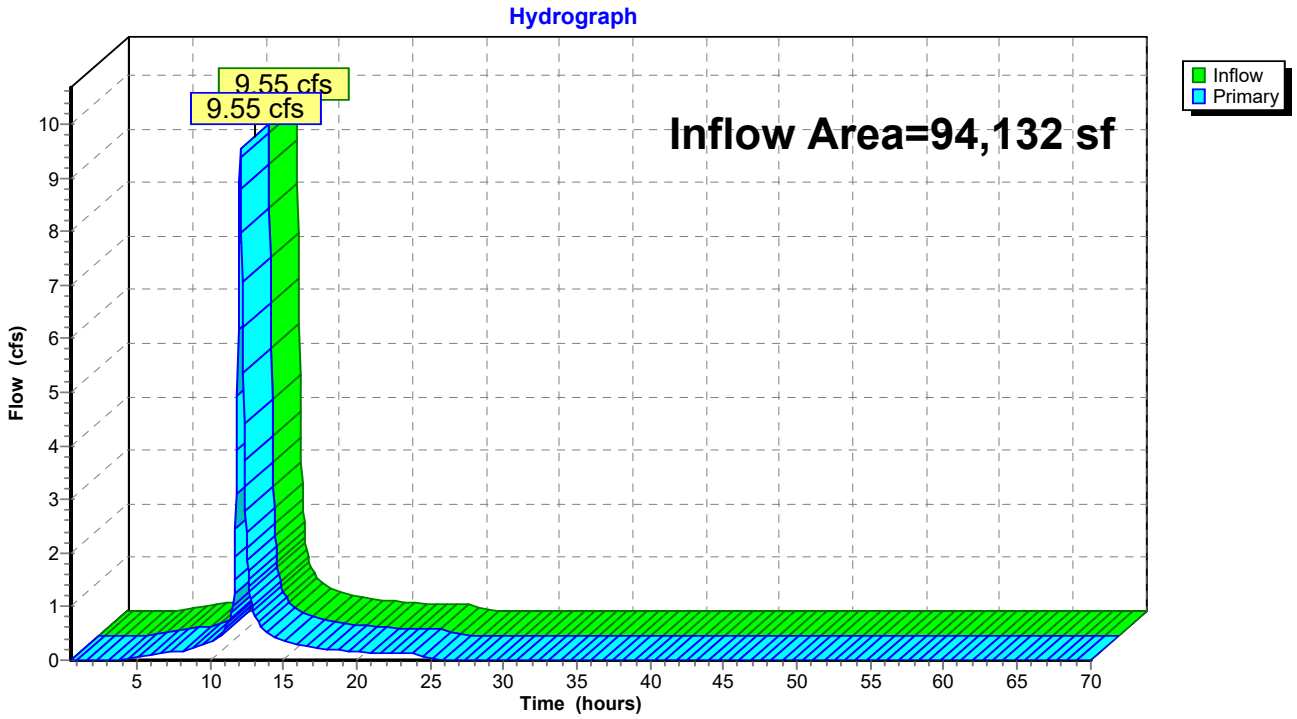


Summary for Link 1L: Proposed - Total

Inflow Area = 94,132 sf, 78.69% Impervious, Inflow Depth = 4.51" for 100-Year event
Inflow = 9.55 cfs @ 12.03 hrs, Volume= 35,347 cf
Primary = 9.55 cfs @ 12.03 hrs, Volume= 35,347 cf, Atten= 0%, Lag= 0.0 min

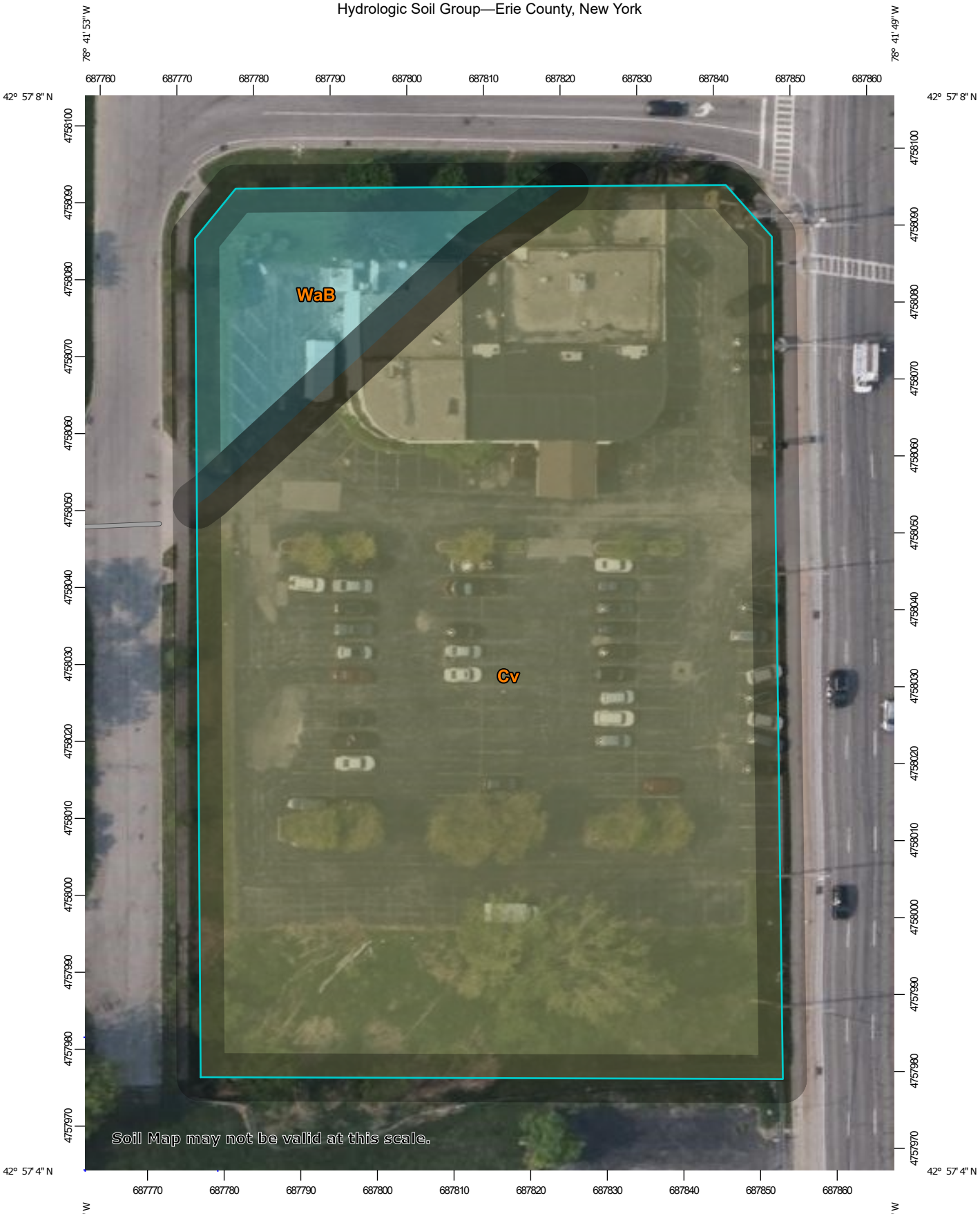
Primary outflow = Inflow, Time Span= 0.50-70.02 hrs, dt= 0.04 hrs

Link 1L: Proposed - Total



Attachment D

Soil Information



Map Scale: 1:680 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 30 60 120 180

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

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

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

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

Soil Survey Area: Erie County, New York
Survey Area Data: Version 25, Sep 4, 2025

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

Date(s) aerial images were photographed: May 13, 2023—May 27, 2023

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Cv	Cosad loamy fine sand	C/D	1.9	89.3%
WaB	Wassaic silt loam, 3 to 8 percent slopes	C	0.2	10.7%
Totals for Area of Interest			**2.2**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher