

HYDRAULIC / HYDROLOGIC CALCULATIONS

**Site Plan
Main Street
Upton, Massachusetts**

Lobisser Construction

Prepared By:

**D&L Design Group, Inc.
115 Water Street
Milford, Ma 01757**

**September 5, 2023
Revised 1/8/24
Revised 2/20/24
Revised 3/25/24**



TABLE OF CONTENTS

Cover Page

Table of Contents

Drainage Summary

Stormwater Management Calculations

Standard #2 Peak Discharge Rates

Standard #3 Loss of Annual Recharge

Standard #4 80% TSS Removal

Standard #9 Operation & Maintenance Plan

Appendices

Inspection Report During Construction

Inspection Reports After Construction

Soil Maps & Soil Logs

Hydrocad Files

Pre-Development Diagram

Post- Development Diagram

DRAINAGE SUMMARY

D&L Design Group Inc. is pleased to provide the following Hydraulic / Hydrologic analysis for the proposed site plan for Lobisser Construction. The proposed project is located at 0 Main Street, between 51 and 45 Main Street Upton Massachusetts. The existing site consists of 6.75 acres of undisturbed wooded area. The hydrologic conditions were analyzed using TR-55 and HydroCAD® for the 2, 10, 25 and 100 year storm events utilizing Technical Paper 40, 24 hour Rainfall events.

Project site consists of the constructing 4 story apartment building, driveway to access Main Street and parking areas around the proposed building. The project will also consist of the construction of three parking garages as shown on the site plan. The installation of proposed sewer main and pump station and an 8" water main loop to service the apartment building. The project will consist of proposed grading the site so all runoff generated from the proposed development can be collected and treated and mitigated before discharging the runoff toward the existing wetlands located on the site or before it leaves the parcel. The project as designed conforms to the Massachusetts DEP Stormwater Management Policy.

EXISTING CONDITIONS:

The project is located on Main Street between 51 and 45 Main Street in Upton Ma. The parcel is 6.75 acres in size. The site wooded and has not been disturbed. There is an existing wetland that is located in the middle of the site as well as in the east portion of the site closest to School Street. The parcel slopes from the north to the east and the south.

For the purpose of the analysis of the effect on the parcel toward the existing wetlands to the south and the property line to the east toward School Street. The site was analyzed as two watersheds. In the Pre-Development Condition, Subcatchment 1 represents the tributary area of the property that flows to the south property line toward Main Street and the wetlands located there. Subcatchment 2 represents the tributary area of the property that flows to the east property line toward School Street and the wetlands located there.

According to the online USGS soil survey, the analyzed area consists of soils with "C" hydrologic ratings. Per the soil testing performed on the site for the proposed project the soil classification and characteristics of the soil has been confirmed. All soil testing was witnessed by the Upton Conservation Agent.

PROPOSED CONDITIONS:

The proposed condition of the site will consist of a grass area around the driveway and parking areas as well as the proposed apartment building and parking garages as shown on the plans. The area left undisturbed will be woodland area adjacent to the wetlands and the middle of the site. The proposed drainage system will consist of catch basins and drain manholes located within the project to collect and direct the runoff into a forebays and infiltration basins. The infiltration basins will then discharge into a small settling basin with a level spreaders that will create a sheet flow and discharge into the 30 foot no disturb area. The site will also use proposed recharge at the propose building location that will collect and direct the runoff into underground basin.

In order to analyze the surface water flows, the site was divided into multiple Subcatchments, Pond and a Reaches

In summary, the peak rates of runoff were compared under pre-development and post-development conditions for analysis of the 2 year, 10 year, 25 year and 100 year storm events. The following is a **Peak Discharge Summary Table**:

Design Point Analysis:

Watershed		Design Event			
		2 Year	10 Year	25 Year	100 Year
Pre-Development	IP#1E	4.43/0.321	10.19/0.710	14.16/0.985	20.54/1.435
	IP#2E	4.30/0.341	10.14/0.766	14.21/1.069	20.77/1.567
	IP#3E	0.52/0.037	1.23/0.083	1.73/0.116	2.52/0.171
Post Development	IP#1P	2.89/0.288	8.51/0.702	12.39/0.982	20.11/1.435
	IP#2P	1.83/0.322	4.85/0.76976	6.79/1.069	16.29/1.567
	IP#3P	0.52/0.037	1.12/0.076	1.52/0.103	2.14/0.146

DEP Stormwater Management Standards:

Standard #1: The proposed changes will not cause erosion in adjacent water of the Commonwealth, as BMP measures are proposed in accordance with the design requirements of the Stormwater Management handbook. The Erosion & Sedimentation Control Plan provides for the installation of siltation barriers, temporary basins, temporary construction entrances and outlines intermediary measures to control runoff during construction and after construction.

Standard #2: The proposed development peak discharge rates for the total off-site flow are less than or equal to pre-development discharge rates for the 2 year, 10 year, 25 year, and 100 year storm events for the design points analyzed. Attached calculations show how the site mitigates the increased flow rates due to surface changes from the site development.

Standard #3: The proposed project proposes all roof runoff to be infiltrated into the ground. Recharge will also be accomplished along the grass swale located along the driveway. The existing settling basin will be monitored throughout the construction to ensure that the runoff depths are designed to drain in under 72 hours as required by the Policy.

STANDARD #3 –LOSS OF ANNUAL RECHARGE

The site is developed. Recharge Basins at Duplexes are constructed for recharge following the Stormwater Regulations. Soils were found to be Class A permeability.

The table below shows the required and provided recharge volumes for the project. As shown, the proposed condition exceeds the minimum requirement for the additional impervious areas.

Recharge Volume Summary

Soil Type	Recharge Factor (in. runoff)	Existing Impervious Area (sf)	Additional Impervious Area (sf)	Min. Req. Recharge Volume (cf)
A	0.60	0	0	0
B	0.35	0	0	0
C	0.25	0	86,790	1,808
D	0.10	0	0	0
Total Required				1,808

Standard #3 Only Applies to Additional Impervious

Provided Recharge Volume (cf)			
Basin 1	2,605		
Basin 2	1,176		
Basin 3	0		
Basin 4	7,840		
Total Provided			16,137

Recharge Volume Calculation:

$$R_v = F \times I$$

R_v = Required Recharge Volume

F = Recharge Factor

I = Total Impervious Area (Proposed)

$$R_v = (0.25'') / (1' / 12'') \times 86,790 \text{ s.f.} = 1,808 \text{ cf (Required)}$$

Provided Infiltration is 16,137cf taken from Stage Storage Worksheet

STAGE-STORAGE WORKSHEET					
DATE: 2/19/2024		CLIENT: lobisser			
PROJECT NUMBER: J-10		6 ALCULATED BY: PML			
BASIN NUMBER: 1		CHECKED BY:			
LOCATION: Basin 3					
ELEVATION	AREA	AVERAGE AREA	VERTICAL INTERVAL	VOLUME INCREMENTAL	VOLUME CUMULATIVE
(FEET)	(FT ²)	(FT ²)	(FT)	(FT ³)	(FT ³)
324.0	3312	offset			0
325.0	3312	3312	1	3312	3312

STAGE-STORAGE WORKSHEET

DATE: 2/19/2024	CLIENT: Iobisser
PROJECT NUMBER: J-10	6 CALCULATED BY: PML
BASIN NUMBER: 1	CHECKED BY:
LOCATION: Basin 3	

ELEVATION	AREA	AVERAGE	VERTICAL	VOLUME	VOLUME
(FEET)	(FT ²)	AREA	INTERVAL	INCREMENTAL	CUMULATIVE
		(FT ²)	(FT)	(FT ³)	(FT ³)
330.0	725	offset			0
332.0	1099	912	2	1824	1824

STAGE-STORAGE WORKSHEET					
DATE: 2/19/2024			CLIENT: Iobisser		
PROJECT NUMBER: J-10			6 ALCULATED BY: PML		
BASIN NUMBER: 1			CHECKED BY:		
LOCATION: Basin2					
ELEVATION	AREA	AVERAGE AREA	VERTICAL INTERVAL	VOLUME INCREMENTAL	VOLUME CUMULATIVE
(FEET)	(FT ²)	(FT ²)	(FT)	(FT ³)	(FT ³)
324.0	895				0
325.0	1456	1176	1	1176	1176

STAGE-STORAGE WORKSHEET

DATE: 2/19/2024	CLIENT: Iobisser
PROJECT NUMBER: J-10	6 CALCULATED BY: PML
BASIN NUMBER: 1	CHECKED BY:
LOCATION: Basin 1	

ELEVATION	AREA	AVERAGE AREA	VERTICAL INTERVAL	VOLUME INCREMENTAL	VOLUME CUMULATIVE
(FEET)	(FT ²)	(FT ²)	(FT)	(FT ³)	(FT ³)
322.0	551				0
324.5	1533	1042	3	2605	2605

Drawdown Calculation:

Pond #1

$$Time_{drawdown} = \frac{R_v}{(K)(Bottom\ Area)}$$

Rv = Storage Volume (2605 s.f.)(volume below invert)

K = Saturated (0.27 in/hour)

Bottom Area = Bottom Area of Recharge Structure (1,184 s.f.)

2605 c.f./ (0.27 in/hour)(1inch/12foot)(1533 s.f.) = 21 hours

Pond #2

$$Time_{drawdown} = \frac{R_v}{(K)(Bottom\ Area)}$$

Rv = Storage Volume (1176 s.f.)(volume below invert)

K = Saturated 0.27 in/hour)

Bottom Area = Bottom Area of Recharge Structure (1456 s.f.)

1176 c.f./ (0.27 in/hour)(1inch/12foot)(1,456 s.f.) =36 hours

Pond #3

$$Time_{drawdown} = \frac{R_v}{(K)(Bottom\ Area)}$$

Rv = Storage Volume (1,824 s.f.)(volume below invert)

K = Saturated 0.27 in/hour)

Bottom Area = Bottom Area of Recharge structure (1,250 s.f.) = 39 hours

1,824 c.f./ (0.27 in/hour)(1inch/12foot)(1,250 s.f.) =65 hours

Pond #4

$$Time_{drawdown} = \frac{R_v}{(K)(Bottom\ Area)}$$

Where:

Rv = Storage Volume (3,312 s.f.)(below invert)

K = Saturated 0.27in/hour)

3,312 c.f./ (0.27 in/hour)(1inch/12foot)(3,312 s.f.) = 44 hours

STANDARD #4- 80% TSS REMOVAL

REQUIRED WATER QUALITY VOLUME:

ESTIMATED PROPOSED NEW IMPERVOUS AREA= 86,790 S.F.

Water Quality Volume		
Required Treatment Volume	1.0	Inches Over Impervious Areas
Watershed Series	Paved Area	Water Quality Volume
P-1 (pavement)	32,428	2,703
P-2	27,755	2,303
P-3	4,207	350
P-4	22,700	7,840

The design of the drainage system is such that the site is routed through a series of treatment BMP's meeting the Standard. The attached TSS worksheets show the water treatment prior to the existing basin located on. No bypass is designed of the BMP's reducing the WQV.

Water Quality Volume Calculation:

P-1 (Basin 1)

$$Wv = F \times I$$

Wv = Required Water Quality Volume

F = Water Factor

I = Total Impervious Area

$$Rv = (1'')/(1'12'') \times 32,428 \text{ s.f.} = 2,703 \text{ cf (Required)}$$

Provided 2,826 c.f.

P-2(Basin 2)

$$Wv = F \times I$$

Wv = Required Water Quality Volume

F = Water Factor

$$Rv = (1'')/(1'12'') \times 27,755 \text{ s.f.} = 2,303 \text{ cf (Required)}$$

Provided 2,330 c.f.

P-3(Basin 3)

$$Wv = F \times I$$

Wv = Required Water Quality Volume

F = Water Factor

$$Rv = (1'')/(1'12'') \times 4,207 \text{ s.f.} = 350 \text{ cf (Required)}$$

Provided 2,228 c.f.

P-4(Basin 4)

$$Wv = F \times I$$

Wv = Required Water Quality Volume

F = Water Factor

$$Rv = (1'')/(1'12'') \times 22,700 \text{ s.f.} = 1,891 \text{ cf (Required) Provided 7,840 c.f.}$$

INSTRUCTIONS:

- 1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
- 2. Select BMP from Drop Down Menu
- 3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated Mar. 4, 2003

Location:

BMP ¹	C TSS Removal Rate ¹	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Sediment Forebay	0.25	0.75	0.19	0.56
Infiltration Basin	0.00	0.86	0.00	0.86
Sediment Forebay	0.25	0.11	0.03	0.08
	0.00	0.00	0.00	0.00

Separate Form Needs to
be Completed for Each
Outlet or BMP Train

Total TSS Removal =

Project:

Prepared By:

Date:

*Equals remaining load from previous BMP (E)
which enters the BMP

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: **basin2**

B BMP ¹	C TSS Removal Rate ¹	D Starting TSS Load ²	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Sediment Forebay	0.25	0.75	0.19	0.56
Infiltration Basin	0.80	0.56	0.45	0.11
Sediment Forebay	0.25	0.11	0.03	0.08
	0.00	0.00	0.00	0.00

**TSS Removal
Calculation Worksheet**

Total TSS Removal =

Separate Form Needs to
be Completed for Each
Outlet or BMP Train

82%

Project:

Prepared By:

Date:

1-18
pmi
1/8/2024

¹Equals remaining load from previous BMP (E)
which enters the BMP

Non-automated TSS Calculation Sheet

must be used if Proprietary BMP Proposed

1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Basin3 Entrance

B	C	D	E	F
BMP ¹	TSS Removal Rate ¹	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Stormceptor 900	0.80	0.75	0.60	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15

TSS Removal Calculation Worksheet

Total TSS Removal =

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project:	138
Prepared By:	pml
Date:	2/19/2024

*Equals remaining load from previous BMP (E) which enters the BMP

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Basin 4 (Roof Only)

B BMP ¹	C TSS Removal Rate ¹	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Roof Runoff only	0.00	1.00	0.00	1.00
	0.00	1.00	0.00	1.00
	0.00	1.00	0.00	1.00
	0.00	1.00	0.00	1.00
	0.00	1.00	0.00	1.00

**TSS Removal
Calculation Worksheet**

Separate Form Needs to
be Completed for Each
Outlet or BMP Train

Total TSS Removal =

0%

Project:	16
Prepared By:	pml
Date:	2/19/2024

*Equals remaining load from previous BMP (E)
which enters the BMP

Standard #4: Over 80% TSS shall occur based on the BMP measurements provided. The treatment train varies for each section. TSS worksheets are provided in the report for each treatment train in the site.

Standard #5: The proposed development will not generate higher potential pollutant loads and therefore will not require additional BMP practices.

Standard #6: The proposed project is not near a critical area.

Standard #7: The proposed project is not a redevelopment project.

Standard #8: Erosion and sediment control measures are proposed as part of the proposed project.

Standard #9: An Operation & Maintenance plan is provided within this document

Standard #10: This project does not propose any illicit discharges.

STANDARD #9- OPERATION & MAINTENANCE

OPERATION & MAINTENANCE PLAN:

CURRENT OWNER & RESPONSIBLE PARTY:

Lobisser & Ferreira Construction (Contractor shall be responsible during construction)

FUTURE OWNER & RESPONSIBLE PARTY:

Lobisser & Ferreira Construction

DURING CONSTRUCTION:

SILT FENCE BARRIER:

The silt fence barrier shall be installed prior to construction.

During construction the contractor shall inspect the silt fence barrier on a weekly basis and after any significant rainstorm resulting in greater than 0.5" of rainfall. The barrier shall be inspected for any breaches or disturbed silt fence and repaired immediately.

After construction the barrier shall be maintained as stated above until all new areas are vegetated.

After construction these duties shall transfer to the property owner.

CONSTRUCTION ENTRANCE APRONS:

Construction aprons shall be installed to protect Tractor Supply Parking Lot and Route 9. The construction entrance apron shall be installed prior to commencement of construction and shall be inspected weekly. The construction entrance apron shall be replaced when debris becomes noticeable on the existing pavement surfaces leading to and from the construction site.

SLOPE STABILIZATION:

The slope stabilization controls shall be installed immediately upon obtaining final grades as shown on the project plans. Slopes in the swale area shall be stabilized according to the details provided. All 3:1 slopes established on-site shall be loamed and seeded as soon as weather

permits. Any 2:1 slopes established shall be covered with slope stabilization fabric, then loamed and seeded as soon as weather permits. Areas in failure shall be re-graded to final grade and stabilized as necessary.

TEMPORARY BASINS:

The temporary basins shall be inspected immediately after storm events and cleaned to remove sediment build-up. Outfalls shall be inspected for erosion or scouring. Additional rip rap shall be added as required to minimize erosion.

OUTLET CONTROL STRUCTURE:

Outlet control structures at basins have temporary stone or other filtration device installed around inlet to prevent sediment deposits. Sediment shall be removed when accumulation exceeds 1" depth on paved surfaces.

CHECK DAMS:

Check Dams shall be inspected weekly and after rainfall in excess of 0.5". Accumulated sediment shall be removed when depth exceeds 3" on the upstream side of the dam. Stone or fabric shall be replaced when evidence of clogging is present.

CONSTRUCTION COMPLETION:

The entire stormwater management system shall be inspected upon completion of construction. Portions of the system containing sediment shall be cleaned and all sediment properly removed.

AFTER CONSTRUCTION:

SEDIMENT BASIN:

Sediment Basins shall be visually inspected monthly for accumulation of debris, slope failure, or stone displacement. Slopes shall be mowed quarterly. Bottom shall be swept, vacuumed of accumulated debris semi-annually.

CATCH BASIN & DROP INLET:

At a minimum, the catch basins shall be inspected and cleaned on a quarterly basis. It is preferred that collection of accumulated sediment shall be accomplished by means of vacuum pumping and not by means of a clamshell bucket. Disposal of accumulated sediment shall be performed in accordance with applicable local, state, and federal guidelines and regulations.

GRASS SWALES & INFILTRATION BASIN:

Inspect infiltration basin after major storm events (>3.0 inches) to verify stabilization and infiltration. Mow slopes, berms quarterly. Removed accumulated clippings from infiltration stone. Inspect basin semi-annually for the following:

- Signs of differential settlement
- Cracking
- Erosion
- Leakage in embankments
- Tree growth on embankments
- Condition of rip rap
- Sediment accumulation
- Turf health.

LONG TERM POLLUTION PREVENTION PLAN

The following are the material management practices that shall be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.

Good Housekeeping: The following good housekeeping practices will be followed on site during the construction project and continued upon completion of the construction activities.

1. A concerted effort shall be made to store only enough product required to complete a particular task.
2. All materials stored on site shall be stored in a neat and orderly fashion in their appropriate containers and, if possible, under a roof or other secure enclosure.
3. Products shall be kept in their original containers with the original manufacture's label.
4. Substances shall not be mixed with one another unless recommended by the manufacturer.
5. Whenever possible, all of a product shall be used up before disposing of the container.
6. Manufacture's recommendations for proper use and disposal shall be followed.
7. The site superintendent shall inspect daily to ensure proper use and disposal of materials on site.

Hazardous Products: The following practices are intended to reduce the risks associated with hazardous materials.

1. Products shall be kept in original containers unless they are not re-sealable.
2. Where feasible, the original label and material safety data shall be retained, whereas they contain important product information.
3. If surplus product must be disposed of, follow manufacturers or local and State recommended methods for proper disposal.

Product Specific Practices: The following product-specific practices shall be followed on site:
Petroleum Products:

1. All on site vehicles shall be monitored for leaks and receive regular preventative maintenance to reduce the risk of leakage.
2. Petroleum products shall be stored in tightly sealed containers which are clearly labeled.
3. Petroleum Products shall be stored in compliance with Fire Marshall regulations.

Bituminous Concrete:

Any bituminous concrete or asphalt substances used on site shall be applied according to the manufacturer's recommendations.

Fertilizers:

Fertilizers shall be applied in the minimum amounts recommended by the manufacturer. Once applied, fertilizers shall be worked into the soil to limit exposure to stormwater. Storage shall be in a covered shed or trailer. The contents of any partially-used bags of fertilizer shall be transferred to a sealable plastic bag or bin to avoid spills

Paints:

1. All containers shall be tightly sealed and stored when not required for use.
2. Excess paint shall not be discharged into any catch basin, drain manhole or any portion of the stormwater management system.
3. Excess paint shall be properly disposed of according to manufacturer's recommendations or State and local regulations.

Concrete Trucks:

Concrete trucks shall not be allowed to wash out or discharge surplus concrete or drum wash water on site.

SPILL CONTROL PRACTICES

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices shall be followed for spill prevention and cleanup:

1. Manufacturer's recommended methods for cleanup shall be readily available at the onsite trailer, and site personnel shall be made aware of the procedures and the location of the information.
2. Materials and equipment necessary for spill clean up shall be kept in the material storage area on site. Equipment and materials shall include, but not be limited to, brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust and plastic and metal trash containers specifically for this purpose.
3. All spills shall be cleaned up immediately after discovery.
4. The spill area shall be kept well ventilated, and personnel shall wear appropriate protective clothing to prevent injury from contact with hazardous substance.
5. Spills of toxic or hazardous material shall be reported to the appropriate State and/or local authority in accordance with local and/or State regulations.
6. The spill prevention plan shall be adjusted to include measures to prevent a particular type of spill from reoccurring and instructions on how to clean up the spill if there is another occurrence. A description of the spill, what caused it, and the clean up measures shall also be included.
7. The "Manager" shall be the spill prevention and cleanup coordinator. The "Manager" shall designate at least three other site personnel who will be trained in the spill control practices identified above.

ILLCIT DISCHARGE COMPLIANCE STATEMENT

SITE ADDRESS: 47 Main Street, Upton Massachusetts
OWNER: Lobbiser Building Corp.
PLAN REFERENCE: DRAINAGE & UTILITIES PLAN PREPARED BY D&L Design Group, Inc.
DATE: December 29, 2023

As required by Standard 10 of the Massachusetts Stormwater Standards, I, the undersigned, being the authorized owner/responsible party of the above referenced property do hereby certify that no illicit discharges exist on the site and that the stormwater management system, as shown on the above referenced plan, does not contain or permit any illicit discharges to enter the stormwater management system. Furthermore discharges from interior building drains or plumbing within the buildings are prohibited. Illicit discharges do not include discharges from the following activities or facilities: firefighting, water line flushing, landscape irrigation, uncontaminated groundwater, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean residential buildings without detergents.

The pollution prevention plan measures to implements in this project to prevent illicit discharges to the stormwater management system, including wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease, include:

1. Identifying the responsible personnel for the implementation of an effective Illicit Discharge Detection and Elimination [IDDE] program.
2. Identify potential sources of Illicit Discharges.
3. Implement the Spill Prevention and Control Plan contained in the property Stormwater Pollution Prevention Plan [SWPPP].

Further, I certify that the stormwater management system as shown on the referenced plan will be maintained in accordance with the conditions of the Long Term Pollution Prevention Plan.

NAME: Kevin Lobbiser
SIGNED: 
DATE: December 29, 2023

STORMWATER MANAGEMENT CHECKLIST



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☒ No disturbances to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☐ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
 - ☐ Credit 1
 - ☐ Credit 2
 - ☐ Credit 3
- ☒ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☒ Grass Channel
- ☐ Green Roof
- ☐ Other (describe):

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

- ☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flows and stormwater discharge is to a wetland subject to coastal flooding.
- ☒ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- ☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

- ☒ Soil Analysis provided.
- ☒ Required Recharge Volume calculation provided.
- ☐ Required Recharge volume reduced through use of the LID site Design Credits.
- ☐ Sizing the Infiltration, BMPs is based on the following method: Check the method used.
 - ☐ Static
 - ☐ Simple Dynamic
 - ☐ Dynamic Field¹
- ☐ Runoff from all impervious areas at the site discharging to the Infiltration BMP.
- ☒ Runoff from all impervious areas at the site is not discharging to the Infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the Infiltration BMPs is sufficient to generate the required recharge volume.
- ☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- ☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume only to the maximum extent practicable for the following reason:
 - ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
 - ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
 - ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
 - ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- ☒ Calculations showing that the Infiltration BMPs will drain in 72 hours are provided.
- ☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 60% TSS removal is required prior to discharge to Infiltration BMP if Dynamic Field method is used.



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

- ☒ The Infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- ☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
 - Provisions for storing materials and waste products inside or under cover;
 - Vehicle washing controls;
 - Requirements for routine inspections and maintenance of stormwater BMPs;
 - Spill prevention and response plans;
 - Provisions for maintenance of lawns, gardens, and other landscaped areas;
 - Requirements for storage and use of fertilizers, herbicides, and pesticides;
 - Pet waste management provisions;
 - Provisions for operation and management of septic systems;
 - Provisions for solid waste management;
 - Snow disposal and plowing plans relative to Wetland Resource Areas;
 - Winter Road Salt and/or Sand Use and Storage restrictions;
 - Street sweeping schedules;
 - Provisions for prevention of illicit discharges to the stormwater management system;
 - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
 - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
 - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- ☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
 - ☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
 - ☐ is within the Zone II or Interim Wetland Protection Area
 - ☐ is near or to other critical areas
 - ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
 - ☐ involves runoff from land uses with higher potential pollutant loads.
 - ☒ The Required Water Quality Volume is reduced through use of the LID site Design Credits.
 - ☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- ☒ The BMP is sized (and calculations provided) based on:
 - ☒ The 1/4" or 1" Water Quality Volume or
 - ☒ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- ☒ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the proprietary BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- ☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- ☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- ☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted *prior* to the discharge of stormwater to the post-construction stormwater BMPs.
- ☐ The NPDES Multi-Sector General Permit does *not* cover the land use.
- ☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- ☐ All exposure has been eliminated.
- ☐ All exposure has *not* been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- ☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

- ☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- ☐ Critical areas and BMPs are identified in the Stormwater Report.



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

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

- ☐ The project is subject to the Stormwater Management Standards only to the maximum extent practicable at a:
- ☐ Limited Project
 - ☐ Small Residential Projects: 3-9 single family houses or 3-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
 - ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
 - ☐ Marine and/or backyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
 - ☐ Bike Path and/or Foot Path
 - ☐ Redevelopment Project
 - ☐ Redevelopment portion of mix of new and redevelopment.
- ☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- ☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

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

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
 - Construction Period Operation and Maintenance Plan;
 - Names of Persons or Entity Responsible for Plan Compliance;
 - Construction Period Pollution Prevention Measures;
 - Erosion and Sedimentation Control Plan Drawings;
 - Detail drawings and specifications for erosion control BMPs, including silt calculations;
 - Vegetation Planning;
 - Site Development Plan;
 - Construction Sequencing Plan;
 - Sequencing of Erosion and Sedimentation Controls;
 - Operation and Maintenance of Erosion and Sedimentation Controls;
 - Inspection Schedule;
 - Maintenance Schedule;
 - Inspection and Maintenance Log Form.
- ☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



**Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program**

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- ☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has not been included in the Stormwater Report but will be submitted before land disturbance begins.
- ☐ The project is not covered by a NPDES Construction General Permit.
- ☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- ☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

- ☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - ☒ Name of the stormwater management system owners;
 - ☒ Party responsible for operation and maintenance;
 - ☒ Schedule for implementation of routine and non-routine maintenance tasks;
 - ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
 - ☐ Description and delineation of public safety features;
 - ☒ Estimated operation and maintenance budget; and
 - ☒ Operation and Maintenance Log Form.
- ☐ The responsible party is not the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
 - ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
 - ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

- ☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- ☒ An Illicit Discharge Compliance Statement is attached;
- ☐ NO Illicit Discharge Compliance Statement is attached but will be submitted prior to the discharge of any stormwater to post-construction BMPs.

APPENDICES:

Soil Logs and Soil Map Information

Inspection & Maintenance Logs During Construction

Inspection & Maintenance Logs After Construction

Hydrocad Files

Pre-Development Watershed Map

Post-Development Watershed Map



Commonwealth of Massachusetts
City/Town of Upton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Lodestar Building Corp.
Owner Name
47 West Street
Street Address
Upton
City

MA
State

Maple St
01508
Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair
2. Soil Survey Available? ☒ Yes ☐ No If yes:

Soils
Soil Name

Glacial Till

Soil Parent material

Soil Limitations
Reg. Limitations

3. Surficial Geological Report Available? ☐ Yes ☒ No If yes:

Description of Geological Map Unit:

4. Flood Risk Insurance Map Within a regulatory boundary? ☐ Yes ☒ No

5. Within a velocity zone? ☐ Yes ☒ No

6. Within a mapped Wetland Area? ☐ Yes ☒ No

7. Current Water Resource Conditions (USGS):

August 2023
Month/Day/Year

If yes, Massachusetts Wetland Data Layer:

Range: ☒ Above Normal

Wetland Type
☐ Normal ☐ Below Normal

8. Other reference revision:

NRCS
Source

315B
Soil Map Unit

Year Published/Source

Map Unit



County of Mono
City of Upton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: 10-11

Depth: 10' 0"

Soils: SCS

Time: 10 am

Clear: 78

Latitude: 37° 45' N

Longitude: 118° 15' W

1. Land Use: wooded
(e.g., residential, agricultural, forest, wetland, etc.)

Vegetation: wooded

Soils: SCS
Surface Barriers (e.g., cracks, stones, boulders, etc.): None

Description of Location:

2. Soil Parent Material: Granite Tuff

Region: Central

Point of Interest: Location on map (e.g., lat, lon, etc.)

3. Disturbance from: Open Water Body no no no

Disturbance from: no no no

Weather: 50 no

4. Unsatiable Materials Present: ☐ Yes ☒ No

Drinking Water Well: no no no

Other: no no

5. Groundwater Observed: ☒ Yes ☐ No

If yes: 0.02 Depth: Weighting no no

0.72 Depth: Standing Water no no

Soil Log

Depth (ft)	Soil Texture (e.g., clay, silt, sand)	Soil Moisture Color (e.g., brown, black)	Rock/Gravel Content (%)	Depth	Color	Percent	Gravel	Gravel Content (%)	Soil Structure (e.g., blocky, crumbly)	Other
0-12	A	SL	10YR4/4	N/A				N/A		Dir-H10
12-21	B	SL	10YR4/3	N/A				N/A		
21-72	C	C.S.	2.5YR4/4	N/A				N/A	30	
0-10	A	SL	10YR4/4	N/A						Dir-H11
10-20	B	SL	10YR4/3	N/A						
20-72	C	C.S.	2.5YR4/4	N/A					35	

Additional Notes:



Commonwealth of Massachusetts
City/Town of Upton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: 2 Hole # 2 Date 8/3/23 Time 10 Weather Clear 78 Longitude 4
Level Use: Woodland (e.g., woodland, agricultural field, wetland, etc.) Vegetation Wooded Surface Slopes (e.g., antdike, stream, boundary, etc.) Slope (%) 4
Description of Location: _____ Ridge Location _____ Position on Landscape (SU, SL, SA, PG, TB)
2. Soil Parent Material: Glacial Till _____
3. Distances from: Open Water Body n/a feet Drainage Way n/a feet Wetlands 30 feet
Property Line 40 feet Drilling Water Well n/a feet Other _____ feet
4. Unsatiable Materials Present: ☐ Yes ☒ No If Yes: ☐ Detailed Soil ☐ FR Material ☐ Weathered/Fractured Rock ☐ Bedrock
5. Groundwater Observed: ☐ Yes ☒ No If Yes: _____ Depth Measuring from PG _____ Depth Standing Water in Hole _____

Depth (ft)	Soil Horizon A-layer	Soil Texture (USDA)	Soil Matrix Color-Match (Munsell)	Protestionable Features Depth Color Percent	Causes of Problems % by Volume Gravel Cobble & Stones	Soil Structure	Soil Consolidation (Metric)	Other
0-10	A	SL	10YR4/4	N/A				DT40
10-34	B	SL	10YR4/6	N/A				
34-64	C1	ML	10YR5/6	N/A	25			
64-84	C2	LS	2.5YR/4	N/A	35			

Additional Notes:



Commonwealth of Massachusetts
City/Town of Upton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

- ☒ Depth observed standing water in observation hole
- ☒ Depth varying from side of observation hole
- ☐ Depth to soil microbiologic features (measures)
- ☐ Depth to estimated seasonal high groundwater (S_h) (USGS methodology)

Index Well Number

Reading Date

S_h = S_h - E_s x (OW_h - OW_u) / (OW_h - OW_l)

Obs. Hole Water

S_h

S_u

OW_h

OW_u

OW_l

S_u

2. Estimated Depth to High Groundwater: _____ inches

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

- a. Does at least the level of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

☒ Yes ☐ No

- b. If yes, at what depth was it observed (indicate A and O horizons)?

- c. If no, at what depth was impermeable material observed?

Upper boundary:

SD

Lower boundary:

72+

Upper boundary:

inches

Lower boundary:

inches

Obs. Hole #2

inches

inches

inches

inches

Obs. Hole #1011

972 inches

989 inches

inches

inches



Commonwealth of Massachusetts
City/Town of Upton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluation and that the relevant analysis has been performed by me or a subcontractor with the required training, experience and equipment described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator

Project Number SEP1302

Typed or Printed Name of Soil Evaluator / Licensee #

Henry O'Connell

Name of Approving Authority (Name)

8/3/23
Date

2025
Expiration

Date of License

Upton Conservation Agent

Approving Authority

Notes: In accordance with 310 CMR 15.01(2) this form must be submitted to the approving authority within 60 days of the date of this testing, and to the designer and the property owner with [Bioscience Test Form 11](#).

Field Diagrams: Use this area for field diagrams.



Commonwealth of Massachusetts
City/Town of Upton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Lotisear Building Corp
Owner Name
47 Main Street
Street Address
Upton
City

MA
State

Map/Lot #
01568
Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Soil Survey Available? ☒ Yes ☐ No If yes:

Soils
Soil Name

Soil Limitations

NRCS
Source

3158
Soil Map Unit

Glacial Till

Soil Parent material

Ridge
Landform

3. Surficial Geological Report Available? ☐ Yes ☒ No If yes:

If yes:

Year Published/Source

Map Unit

Description of Geologic Map Unit:

4. Flood Risk Insurance Map Within a regulatory boundary? ☐ Yes ☒ No

5. Within a velocity zone? ☐ Yes ☒ No

6. Within a Mapped Wetland Area? ☐ Yes ☒ No If yes, Massachusetts Wetland Data Layer:

7. Current Water Resource Conditions (USGS): August 2023 Normal Day Year Range: ☒ Above Normal

Wetland Type
☐ Normal ☐ Below Normal

8. Other references reviewed:



Commonwealth of Massachusetts
City/Town of Upton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Geomembrane Hole Number: SSB-2023

Hole #

8/3/23

10 am

Clear 78

Latitude

Longitude

1. Land Use wooded
(e.g. wooded, agricultural field, vacant lot, etc.)

wooded
Vegetation

wooded
Surface Drainage (e.g., ripples, erosion, treeholes, etc.)

Depth (ft)

Description of Location

2. Soil Parent Material: Other TM

Rocky

Fracture of Parent

Fracture on Landscape (e.g., S1, S2, R1, R2)

3. Disturbance from:

Open Water Body

no feet

Disturbance Way no feet

Weathered no feet

Property Lines

no feet

Drinking Water Well no feet

Other no feet

4. Unsanitary Materials Present: ☐ Yes ☒ No

Yes

☐ Disturbed Soil

☐ No Disturbed

☐ Unsanitary/Unsanitary Rock

☐ Bedrock

5. Groundwater Contaminant: ☒ Yes ☐ No

Yes: 400 Depth Warning from PT

Depth Warning Water in Hole

Soil Log

Depth (ft)	Soil Texture (e.g., clay)	Soil Texture (e.g., sand)	Soil Moisture Color (e.g., yellow)	Rock Fragments Depth	Color	Parent	Event	Current Fragments S, V, Volume C, Volume S, Volume	Soil Structure (e.g., blocky)	Other
0-20	A	SL	10YR4/4	N/A				N/A		Disturb
20-30	B	SL	10YR4/3	N/A				N/A		
30-40	C	LS	2.5Y6/4	30"	10YR6/3	25	25			
40-50	A	SL	10YR4/4	N/A						Disturb
50-60	B	SL	10YR4/3	N/A						
60-70	C	LS	2.5Y6/4	N/A						

Additional Notes:



Commonwealth of Massachusetts
City/Town of Upton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: 768 Date: 8/3/23 Time: 10 CLEAR 78 Weather: some Length: 4
1. Land Use: Wooded (e.g., woodland, agricultural field, waste lot, etc.) Vegetation: Wooded Surface Skums (e.g., cinders, stones, boulders, etc.) Stumps (3)

Description of Location:

2. Soil Parent Material: Glacial Till

3. Disturbance from: Open Water Body 100 feet

4. Unusually: Wetlands Present ☐ Yes ☒ No Yes ☐ No Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No

Soil Log

Depth (ft)	Soil Horizon	Soil Texture (ASTM)	Soil Matrix Color-Munsell (Planned)	Depth	Color	Remarks/Soil Features	Gravel % by Volume	Gravel Size	Soil Strength	Soil Consistency (ASTM)	Color
0-10	A	SL	10YR4/4	N/A							Dark
10-32	B	SL	10YR4/6	N/A							Dark
32-60	C	LS	5Y7/2	41"	10YR5/6	25					
0-10	A	SL	10YR4/4	N/A							
10-32	B	SL	10YR4/6	N/A							
32-70	C1	LS	5Y7/2	39	10YR4/6	25					

Additional Notes:



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

1. Method Used:

- | Method Used: | Obs. Hole #568 | Obs. Hole #726 |
|---|------------------------|------------------------|
| ☒ Depth observed standing water in close-woven hole | <u>480</u> inches | <u>5246</u> inches |
| ☒ Depth measuring from side of close-woven hole | <u>480</u> inches | <u>5246</u> inches |
| ☒ Depth to root metamorphic features (gneisses) | <u>300</u> inches | <u>4120</u> inches |
| ☐ Depth to adjusted seaward high groundwater (SW) (USGS methodology) | <u> </u> inches | <u> </u> inches |

THE VMA Awards

NOTES

800-854-6666 • 1-800-854-6666 • 1-800-854-6666

Obituary

go

Q

ONLINE

Q

50

2. Estimated Demand to High Capacity Utilization

Depth of Penetration: Material

1. Depth of Naturally Occurring Petroleum Material

- | | Upper boundary: | Lower boundary: |
|---|-----------------|-----------------|
| a. Does at least four tent of naturally occurring percolis material exist in all areas observed throughout the area proposed for the well system? | | |
| b. If yes, at what depth was it observed (provide A and O thickness)? | 30
feet | 72+
inches |
| c. If no, at what depth was it observed? | Upper boundary: | Lower boundary: |
| d. Yes ☒ No ☐ | | |



Upper boundary:

3

Lower boundary:

72

Upper boundary:

Abstract

Letter to the Editor

11



Commonwealth of Massachusetts
City/Town of Upton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, experience and expertise described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator

Peter Lavada SEP1332

Typed or Printed Name of Soil Evaluator / License #

Mary Overholt

Name of Approving Authority Witness

8/3/23

Date

2025

Expiration Date of License

Upton Conservation Agent

Approving Authority

Notes: In accordance with 310 CMR 15.016(2) this form must be submitted to the approving authority within 60 days of the date of soil testing, and to the designer and the property owner with [Appendix 1 to Form 12](#).

Field Diagrams: Use this area for field diagrams:



Commonwealth of Massachusetts
City/Town of Upton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Lobster Building Corp
Owner Name
47 Main Street
Street Address
Upton
City

MA
State

Maple
01528
Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Soil Survey Available? ☒ Yes ☐ No If yes:

Soils
Soil Series

Soil Landmark

NRCS
Source

3183
Soil Map Unit

3. Suitable Geological Report Available? ☐ Yes ☒ No If yes:

Geological TB
Soil Parent material

Rock
Landmark

Year Published/Source

Map Unit

Description of Geologic Map Unit:

4. Flood Plain Insurance Map Within a regulatory boundary? ☐ Yes ☒ No

5. Within a wetland zone? ☐ Yes ☒ No

6. Within a Shaded Wetland Area? ☐ Yes ☒ No If yes, MassGIS Wetland Data Layer:

7. Current Wetland Resources Corridors (USGS): August 2023 Range: ☒ Above Normal

Wetland Type
☐ Normal ☐ Below Normal

8. Other references reviewed:



Commonwealth of Massachusetts
City/Town of Upton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Reviews (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: 182-2023

Page 8

8/2/23

10 am

Color 7B

Latitude

Longitude: 4

1. Land Use

woodland

(e.g., woodland, agricultural field, vacant lot, etc.)

wooded
Vegetation

Surface Structure (e.g., cobble, stones, boulders, etc.)

Steps (ft)

Description of Location

2. Soil Parent Material: Gravel T11

Ridge
Landform

Front of Parcel
Position on Landscape (N, S, E, W, NE, SE, SW, NW)

3. Disturbed Area

Open Water Body

N/A

Drainage Way (ft)

Wetlands (ft)

Property Line

70 feet

Drinking Water Well (ft)

Other (ft)

4. Unsatiable Moisture Present: ☐ Yes ☒ No

7 Year

☐ Disturbed Soil ☐ Fill Material

☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No

If Yes: 20728 Depth Measuring from PG

Depth Standing Water in Hole

Soil Log

Depth (ft)	Soil Horizon Layer	Soil Texture (USDA)	Soil Profile Color (Munsell)	Rock (Munsell)	Depth	Color	Percent	Gravel	Other	Soil Structure (USDA)	Soil Consistency (USDA)	Other
0-10	A	SL	10YR4/4	N/A	N/A	N/A	N/A	N/A	DN101			
10-20	B	SL	10YR4/6	N/A	N/A	N/A	N/A	N/A				
20-30	C	LB	2.5Y6/4	35	10YR5/6	25	25	25				
0-12	A	SL	10YR4/4	N/A					DN122			
12-20	B	SL	10YR4/6	28	10YR5/6	25	N/A	N/A				
20-72	C	LB	2.5Y6/4	N/A								

Additional Notes:



Commonwealth of Massachusetts
City/Town of Upton

Form 11 - Soil Sulfatability Assessment for On-Site Sewage Disposal

C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: 324

Wetland
(e.g., wetland, agricultural field, wasteland, etc.)

1. Land Use: Woodland
Vegetation: Wooded

Description of Location: -

2. Soil Parent Material: Glacial Till

3. Distances from: Open Water Body 116 feet

Property Line 40 feet

4. Unsatiable

Wastable Present: ☐ Yes ☒ No

5. Gravel/pebble Content: ☒ Yes ☐ No

Ride
Location

Drainage Way 116 feet

Drinking Water Well 116 feet

Position on Landscape (SU, S1, S2, P3, T3)

Wetlands 70 feet

Other: -

Wastable Fractured Rock ☐ Badrock

If yes: 30' / 40' Depth Warning from P1

Depth Starting Water in Hole

Soil Log

General Fragments
% by Volume

Gravel
Cobbles &
Stones

Soil Structure

Soil
Consolidation
(rated)

Other

Depth (ft)	Soil Horizon Layer	Soil Texture: (MWD)	Soil Moisture (MWD)	Depth	Color	Percent	Gravel	Soil Structure	Soil Consolidation (rated)	Other
0-12	A	SL	10YR4/4	N/A						DR4/3
12-28	B	SL	10YR4/6	2'	10YR5/6	25				
28-72	C	LS	2.5Y5/4	N/A						
0-10	A	SL	10YR4/4	N/A						DR4/4
10-21	B	SL	10YR4/6	N/A						
21-41	C1	LS	5Y5/2	28	10YR5/6	25				
41-65	C2	LS	2.5Y5/4							

Additional Notes:



Commonwealth of Massachusetts
City/Town of Upton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

- ☐ Depth observed standing water in observation hole
- ☒ Depth measured from edge of observation hole
- ☒ Depth to soil redoximorphic features (mottles)
- ☐ Depth to saturated gravelly high groundwater (G_h) (USGS methodology)

Index Well Number: _____

Flowing Date: _____

$$S_h = S_u - PR \times (OW_u - OW_{min}) / OW_{max}$$

Obs. Highwater: _____ S_u _____ S_h _____

OW_u _____

OW_{min} _____

OW_{max} _____

S_u _____

2. Estimated Depth to High Groundwater: _____ inches

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

- a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil application system?

☒ Yes ☐ No

- b. If yes, at what depth was it observed (sand, silt A and O horizons)?

- c. If no, at what depth was impervious material observed?

Upper boundary: _____

24 inches

Lower boundary: _____

72+ inches

inches

Lower boundary: _____

inches



Commonwealth of Massachusetts
City/Town of Upton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me or in concert with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator

Peter Laroia SEP1332

Typed or Printed Name of Soil Evaluator / License #

Melny Overholt

Name of Approving Authority / Version

8/3/23

Date

2025

Expiration Date of License

Upton Conservation Agent

Approving Authority

Notes: In accordance with 310 CMR 15.01(2) this form must be submitted to the approving authority within 60 days of the date of said testing, and to the designer and the property owner with [Appendix Tool Form 12](#).

Field Diagrams: Use this area for field diagrams

Red Map - Worcester County, Massachusetts, Southern Part
(SAK STREET - PROJECT)



Map Scale: 1:250,000 (1 inch = 2.5 miles)
 Map projection: UTM Zone 18N
 Data source: USGS National Wetlands Inventory
 Date: 1/1/2000

National Wetlands
 Inventory Service

Web Red Survey
 National Cooperative Red Survey

7/10/2003
 Page 1 of 1

[illegible]

- [illegible]

MAP INFORMATION

The self savings that surprise your AIG costs dropped at \$100,000.

Warnings: End tags may not be valid at the end.

Management is vague beyond the ends of supplying our needs, subcontracting to the staff of supplying and ensuring of all the phenomena. The scope is not clear the great scope of controlling with that, should have been shown at a more del. del. del.

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

Source of tips: Michael Rousman, Connecticut Garden Web Staff Bureau URL:

Geometric system: With Minimax (p. 1000)

Maps from the Web 2.0 Strategy are based on the Web 2.0 Master 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 produced from the USDA-NASC certified date as of the vintage 04/05 listed below.

Ed-Survey Area Waukegan County, Minnesota, Southern
Part

Harvey Allen Davis Version 10, May 9, 2000

Full map sets are limited (see special orders) for map numbers 1000, 1001 or 1002.

Detailed aerial images were photographed May 25, 2000–June 2, 2000.

The silhouette or other form upon 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 soil boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Area in AOI	Percent of AOI
78A	Waltham fine sandy loam, 0 to 3 percent slopes, extremely stony	3.9	7.1%
805B	Montauk fine sandy loam, 3 to 8 percent slopes	5.1	9.2%
806C	Montauk fine sandy loam, 3 to 15 percent slopes	3.2	5.8%
808B	Montauk fine sandy loam, 0 to 3 percent slopes, extremely stony	17.1	31.0%
815B	Salisbury fine sandy loam, 3 to 8 percent slopes	12.1	22.1%
817B	Salisbury fine sandy loam, 3 to 8 percent slopes, extremely stony	1.2	2.2%
483B	Garden fine sandy loam, 3 to 8 percent slopes	10.9	19.9%
483C	Garden fine sandy loam, 3 to 15 percent slopes	0.3	0.5%
483D	Garden fine sandy loam, 3 to 15 percent slopes, extremely stony	1.1	2.1%
Totals for Area of Interest		55.9	100.0%

Worcester County, Massachusetts, Southern Part

302B—Montauk fine sandy loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2n80z

Elevation: 30 to 1,120 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 55 to 65 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Montauk, extremely stony, and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of
the map unit.

Description of Montauk, Extremely Stony

Setting

Landform: Ground moraine, drumfins, recessional moraine, hills

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Convex

Parent material: Coarse-loamy over sandy lodgment till derived
from gneiss, granite, and/or schist

Typical profile

O₁ - 0 to 2 inches: moderately decomposed plant material

A - 2 to 8 inches: fine sandy loam

Bw1 - 8 to 28 inches: fine sandy loam

Bw2 - 28 to 36 inches: sandy loam

2Cd - 36 to 74 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 8 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 20 to 48 inches to dense material

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (K_{sat}): Very low
to moderately high (0.00 to 1.42 in/hr)

Depth to water table: About 18 to 37 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: C

Ecological site: F144AY007CT - Well Drained Dense Till Uplands

Hydro soil rating: No

Minor Components

Beltsville, extremely stony

Percent of map unit: 8 percent

Landform: Ground moraine, hills, drumlins

Landform position (two-dimensional): Summit, backslope, footslope

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Convex

Hydro soil rating: No

Canter, extremely stony

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Convex

Hydro soil rating: No

Ridesbury, extremely stony

Percent of map unit: 2 percent

Landform: Depressions, ground moraine, hills, drainageways

Landform position (two-dimensional): Footslope, toeslope

Landform position (three-dimensional): Head slope, base slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydro soil rating: Yes

Data Source Information

Soil Survey Area: Worcester County, Massachusetts, Southern Part

Survey Area Date: Version 18, Sep 8, 2022

Worcester County, Massachusetts, Southern Part

318B—Scituate fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 68e9

Elevation: 200 to 600 feet

Mean annual precipitation: 32 to 50 inches

Mean annual air temperature: 45 to 60 degrees F

Frost-free period: 145 to 240 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Scituate and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of
the mapunit.

Description of Scituate

Setting

Landform: Hills

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Concave

Parent material: Friable coarse-loamy soilan deposits over dense
sandy lodgment till derived from granite and gneiss

Typical profile

H1 - 0 to 4 inches: sandy loam

H2 - 4 to 16 inches: gravelly sandy loam

H3 - 16 to 30 inches: loamy sand

H4 - 30 to 60 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 20 to 30 inches to dense material

Drainage class: Moderately well drained

Runoff class: High

Capacity of the most limiting layer to transmit water

(Ksat): Moderately low to moderately high (0.05 to 0.20 in/hr)

Depth to water table: About 17 to 30 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C

Ecological site: F144AY037M4 - Moist Dense Till Uplands

Map Unit Description: Silty fine sandy loam, 8 to 3 percent slopes—Worcester County,
Massachusetts, Southern Part

MAIN STREET - SOIL INFO

Hydro soil rating: No

Minor Components

Montauk

Percent of map unit: 15 percent

Hydro soil rating: No

Ridgely

Percent of map unit: 5 percent

Landform: Depressions

Hydro soil rating: Yes

Data Source Information

Soil Survey Area: Worcester County, Massachusetts, Southern Part

Survey Area Date: Version 15, Sep 9, 2022



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

7/13/2023
Page 2 of 2

Hydrocad Files

I-10

WEEKLY
Inspection and Maintenance Log
DURING CONSTRUCTION

FOR: Main St.
& After 1.0" Rain

<u>Components</u>	<u>Date</u>
<u>Erosion Control - Weekly</u> Comments during insp.	
Note corrective measures performed & Date	
<u>On Site Pavement Sweeping - as Needed</u> Comments during insp.	
Note corrective measures performed & date	
<u>Silt Fence & Composite Sock - Monthly</u> Comments during insp.	
Note corrective measures performed & date	
<u>Temporary Basin Area as Needed</u> Comments during insp.	
Note corrective measures performed & date	
<u>Construction Entrance as Needed</u> Comments during insp.	
Note corrective measures performed & date	
<u>Inspector</u>	<u>Title</u> <u>Date</u>
<u>Address</u>	<u>Tele</u>

J-10

**WEEKLY
Inspection and Maintenance Log
DURING CONSTRUCTION**

**FOR: Main St.
& After 1.0" Rain**

Comments	Date
Notify Cons. Comm. Issues affecting Reserves Areas Comments during insp.	
Note corrective measures performed & date	
Silt of Public (Charlton Road) Streets - Daily Comments during insp.	
Note corrective measures performed & date	
Stockpile Materials Ring with Composites Sock - Weekly Comments during insp.	
Note corrective measures performed & date	
Any Spill Fuel, Chemical- Daily Comments during insp.	
Note corrective measures performed & date	
Temporary Ground Cover Area - Weekly Comments during insp.	
Note corrective measures performed & date	
Temporary Stone at Access Drive as Needed Comments during insp.	
Note corrective measures performed & date	
Inspector	Title Date
Address	Tel#

J-10

WEEKLY
Inspection and Maintenance Log
DURING CONSTRUCTION

FOR: Main St.
& After 1.0" Rain

Components

Date

Lawn Area / Mulch Area

Erosion. Washouts

Comments during insp.

Note corrective measures

performed & date

Storm Approaches at Outfalls Exit

as Needed

Comments during insp.

Note corrective measures

performed & date

Forebay

as Needed

Comments during insp.

Note corrective measures

performed & date

Illicit Drainage

Discharge

Comments during insp.

Note corrective measures

performed & date

Comments during insp.

Note corrective measures

performed & date

Inspector

Title

Date

Address

Tel#

J-016

**Inspection and Maintenance Log
AFTER CONSTRUCTION**

**FOR: Main Street
& After 3.0" Rain**

Component	Date
Basin#1 - twice a year Comments during insp.	
Note corrective measures performed & Date	
Basin#2 - twice a year Comments during insp.	
Note corrective measures performed & date	
Forebay#1 - twice a year Comments during insp.	
Note corrective measures performed & date	
Forebay#2 - twice a year Comments during insp.	
Note corrective measures performed & date	
Catch Basins - 8 inches of sediment or twice a year Comments during insp.	
Note corrective measures performed & date	
Inspector	Title
Address	Tel#

J-016

**Inspection and Maintenance Log
AFTER CONSTRUCTION**

**FOR: Main Street
& After 3.0" Rain**

Components

Date

Outlet Control Structure #1

-3 inches of sediment or twice a year

Comments during insp.

**Note corrective measures
performed & date**

Outlet Control Structure #2

Twice a year

Comments during insp.

**Note corrective measures
performed & date**

Basin #3

-four times a year

Comments during insp.

**Note corrective measures
performed & date**

Level Spreader Basin 1

-Twice a year

Comments during insp.

**Note corrective measures
performed & date**

Level Spreader Basin 2

-Twice a year

Comments during insp.

**Note corrective measures
performed & date**

All Flared end sections and rip rap aprons

- twice a year

Comments during insp.

**Note corrective measures
performed & date**

Inspector

Title

Date

Comments

Date

47 Main Street, Upton Ma Project# J-016

Riprap Stone Sizing – Drainage Outfalls

Method – ARS Rock Chutes (Slopes 2%-40%)

Reference: National Engineering Handbook, TS14C-8

#1-Rock Apron- Basin#1 (HvdroCAD)

Slope = 0.02 ft/ft

q (100-yr) = 5.62 cfs

$$D_{50} = 12(1.923qS^{1.5})^{0.529} \\ = D_{50} = 12(1.923 \times 5.62 \times 0.02^{1.5})^{0.529}$$

D₅₀ = 3" required

D₅₀ = 8" provided

$$L = (1.8 (Q-5)/D^{1.5} + 10) = \\ = (1.8 (5.62-5)/0.02^{1.5} + 10) 10.0 \text{ feet}$$

$$W1 = 3D = 3(1.25') = 3.75 \text{ feet}$$

$$W2 = 3D + 0.7L = 3(1.25) + 0.7(10) = 12 \text{ feet}$$

#2-Rock Apron- Basin#2 (HvdroCAD)

Slope = 0.029 ft/ft

q (100-yr) 4.56 cfs

$$D_{50} = 12(1.923qS^{1.5})^{0.529} \\ = D_{50} = 12(1.923 \times 4.56 \times 0.029^{1.5})^{0.529}$$

D₅₀ = 4" required

D₅₀ = 8" provided

$$L = (1.8 (Q-5)/D^{1.5} + 10) = \\ = (1.8 (4.56-5)/0.029^{1.5} + 10) 10 \text{ feet}$$

$$W1 = 3D = 3(1.25') = 3.75 \text{ feet}$$

$$W2 = 3D + 0.7L = 3(1.25) + 0.7(10) = 12 \text{ feet}$$

#3-Rock Apron- Basin#3

Slope = 0.01 ft/ft

q (100-yr) 4.92 cfs

$$D_{50} = 12(1.923qS^{1.5})^{0.529} \\ = D_{50} = 12(1.923 \times 4.92 \times 0.01^{1.5})^{0.529}$$

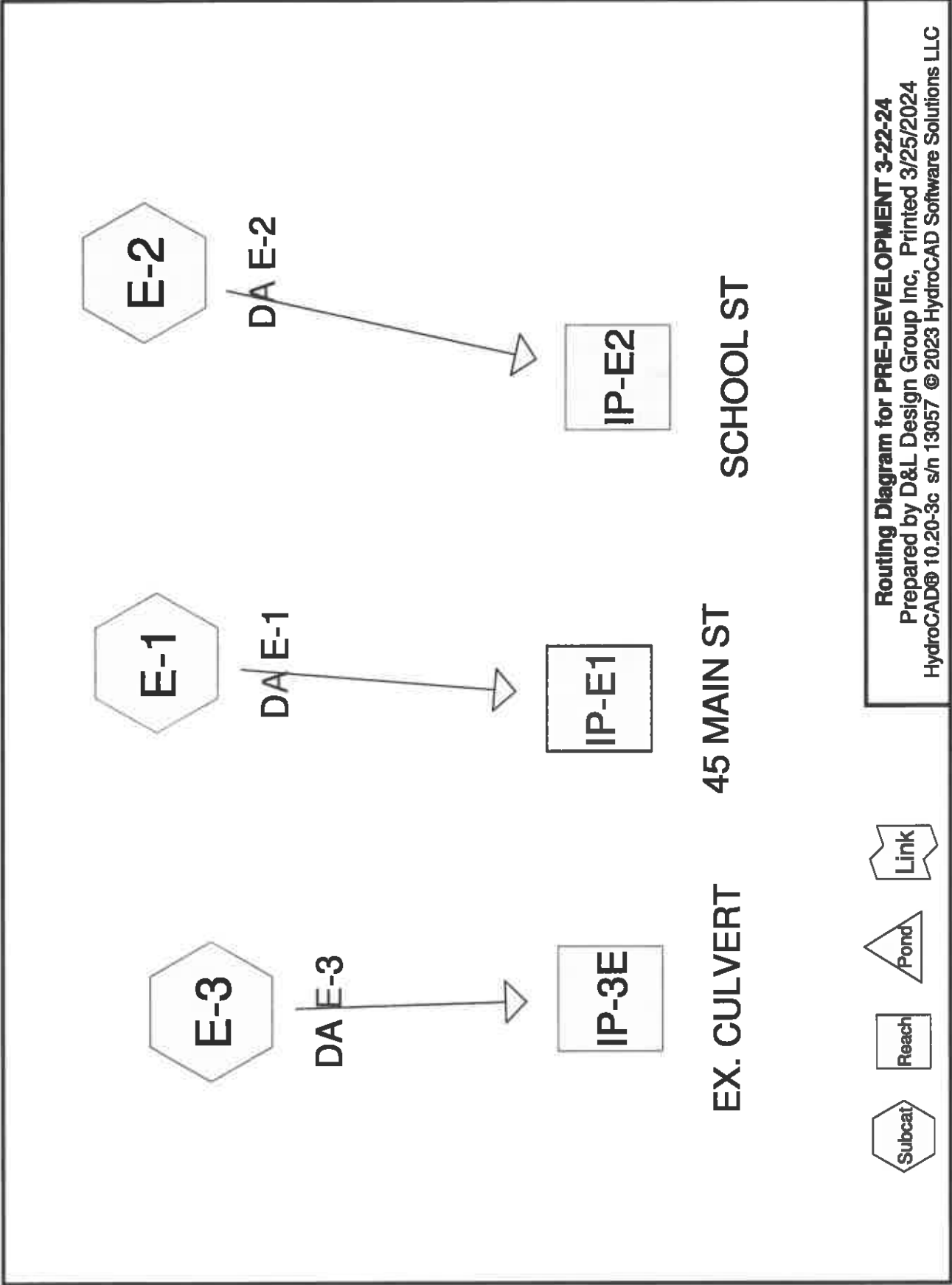
D₅₀ = 4" required

D₅₀ = 8" provided

$$L = (1.8 (Q-5)/D^{1.5} + 10) = \\ = (1.8 (4.92-5)/0.01^{1.5} + 10) = 10 \text{ feet}$$

$$W1 = 3D = 3(1') = 3 \text{ feet}$$

$$W2 = 3D + 0.7L = 3(1) + 0.7(10) 10.0 \text{ feet}$$



PRE-DEVELOPMENT 3-22-24

Prepared by D&L Design Group Inc

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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2YR	Type III 24-hr		Default	24.00	1	3.39	2
2	10YR	Type III 24-hr		Default	24.00	1	5.11	2
3	25YR	Type III 24-hr		Default	24.00	1	6.19	2
4	100YR	Type III 24-hr		Default	24.00	1	7.85	2

PRE-DEVELOPMENT 3-22-24

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.660	74	>75% Grass cover, Good, HSG C (E-1, E-2, E-3)
0.278	98	Paved parking, HSG C (E-1, E-2)
7.128	70	Woods, Good, HSG C (E-1, E-2, E-3)
9.067	72	TOTAL AREA

PRE-DEVELOPMENT 3-22-24

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
9.067	HSG C	E-1, E-2, E-3
0.000	HSG D	
0.000	Other	
9.067		TOTAL AREA

PRE-DEVELOPMENT 3-22-24

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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
0.000	0.000	1.660	0.000	0.000	1.660	>75% Grass cover, Good	E-1, E-2, E-3
0.000	0.000	0.278	0.000	0.000	0.278	Paved parking	E-1, E-2
0.000	0.000	7.128	0.000	0.000	7.128	Woods, Good	E-1, E-2, E-3
0.000	0.000	9.067	0.000	0.000	9.067	TOTAL AREA	

PRE-DEVELOPMENT 3-22-24

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Type III 24-hr 2YR Rainfall=3.39"

Printed 3/25/2024

Page 6

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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 E-1: DA E-1

Runoff Area=175,987 sf 4.02% Impervious Runoff Depth>0.95"
Flow Length=560' Tc=7.1 min CN=72 Runoff=4.43 cfs 0.321 af

Subcatchment E-2: DA E-2

Runoff Area=197,469 sf 2.56% Impervious Runoff Depth>0.90"
Flow Length=470' Tc=9.3 min CN=71 Runoff=4.30 cfs 0.341 af

Subcatchment E-3: DA E-3

Runoff Area=21,482 sf 0.00% Impervious Runoff Depth>0.90"
Tc=6.0 min CN=71 Runoff=0.52 cfs 0.037 af

Reach IP-3E: EX. CULVERT

Inflow=0.52 cfs 0.037 af
Outflow=0.52 cfs 0.037 af

Reach IP-E1: 45 MAIN ST

Inflow=4.43 cfs 0.321 af
Outflow=4.43 cfs 0.321 af

Reach IP-E2: SCHOOL ST

Inflow=4.30 cfs 0.341 af
Outflow=4.30 cfs 0.341 af

Total Runoff Area = 9.067 ac Runoff Volume = 0.699 af Average Runoff Depth = 0.93"
96.93% Pervious = 8.788 ac 3.07% Impervious = 0.278 ac

PRE-DEVELOPMENT 3-22-24

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Type III 24-hr 2YR Rainfall=3.39"

Printed 3/25/2024

Page 7

Summary for Subcatchment E-1: DA E-1

Runoff = 4.43 cfs @ 12.11 hrs, Volume= 0.321 af, Depth> 0.95"
Routed to Reach IP-E1 : 45 MAIN ST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR Rainfall=3.39"

Area (sf)	CN	Description
7,074	98	Paved parking, HSG C
35,876	74	>75% Grass cover, Good, HSG C
133,037	70	Woods, Good, HSG C
175,987	72	Weighted Average
168,913		95.98% Pervious Area
7,074		4.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	40	0.0550	3.78		Shallow Concentrated Flow, TRAVEL PATH A TO B Unpaved Kv= 16.1 fps
0.5	110	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C Unpaved Kv= 16.1 fps
6.4	410	0.0450	1.06		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
7.1	560	Total			

PRE-DEVELOPMENT 3-22-24

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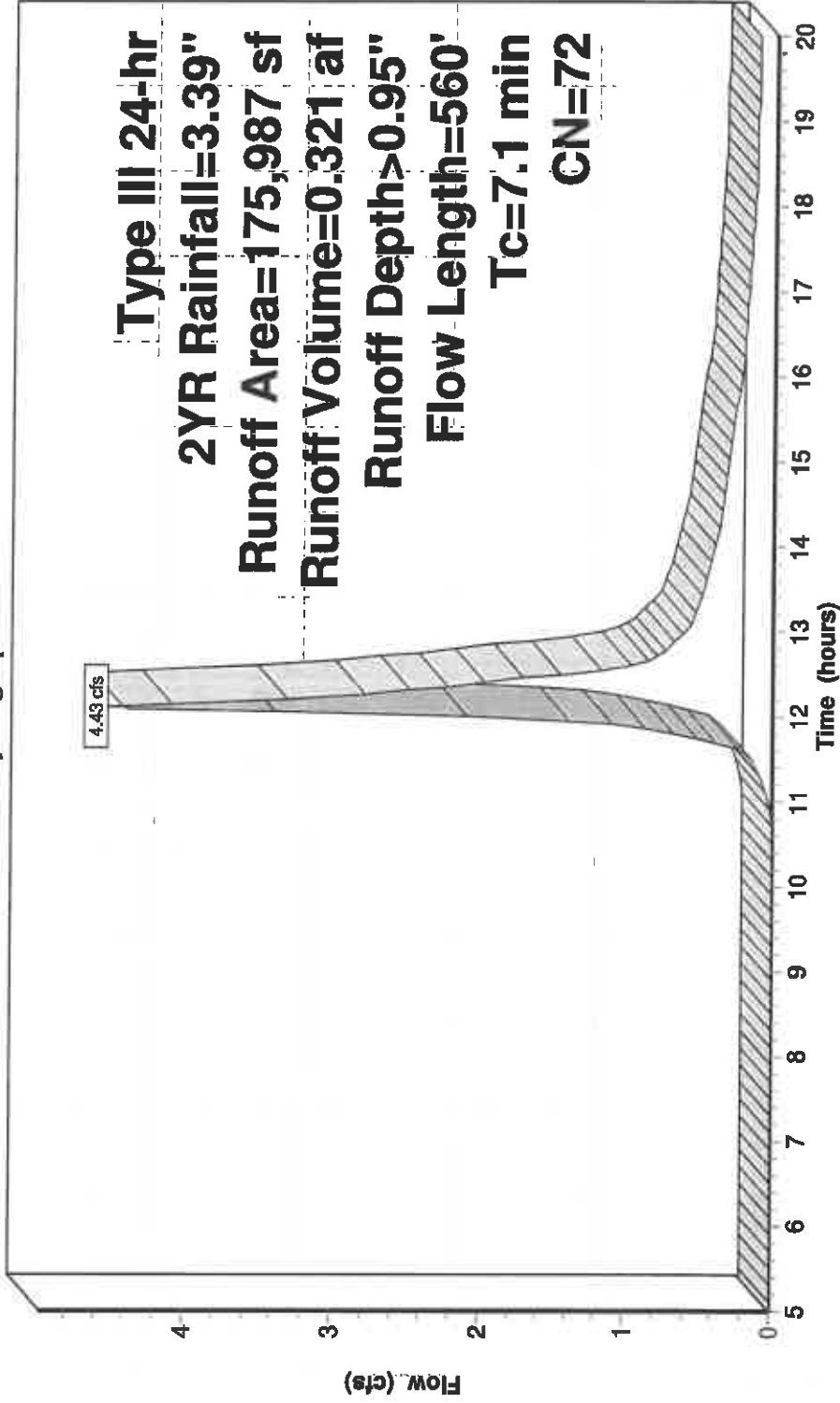
Type III 24-hr 2YR Rainfall=3.39"

Printed 3/25/2024

Page 8

Subcatchment E-1: DA E-1

Hydrograph



PRE-DEVELOPMENT 3-22-24

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Type III 24-hr 2YR Rainfall=3.39"

Printed 3/25/2024

Page 9

Summary for Subcatchment E-2: DA E-2

Runoff = 4.30 cfs @ 12.15 hrs, Volume= 0.341 af, Depth> 0.90"
Routed to Reach IP-E2 : SCHOOL ST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR Rainfall=3.39"

Area (sf)	CN	Description
5,057	98	Paved parking, HSG C
30,786	74	>75% Grass cover, Good, HSG C
161,626	70	Woods, Good, HSG C
197,469	71	Weighted Average
192,412		97.44% Pervious Area
5,057		2.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	40	0.0450	0.20		Sheet Flow, TRAVEL PATH A TO B Grass: Short n= 0.150 P2= 3.20"
0.4	80	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C Unpaved Kv= 16.1 fps
2.9	225	0.0650	1.27		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
2.6	125	0.0250	0.79		Shallow Concentrated Flow, TARVEL PATH D TO E Woodland Kv= 5.0 fps
9.3	470	Total			

PRE-DEVELOPMENT 3-22-24

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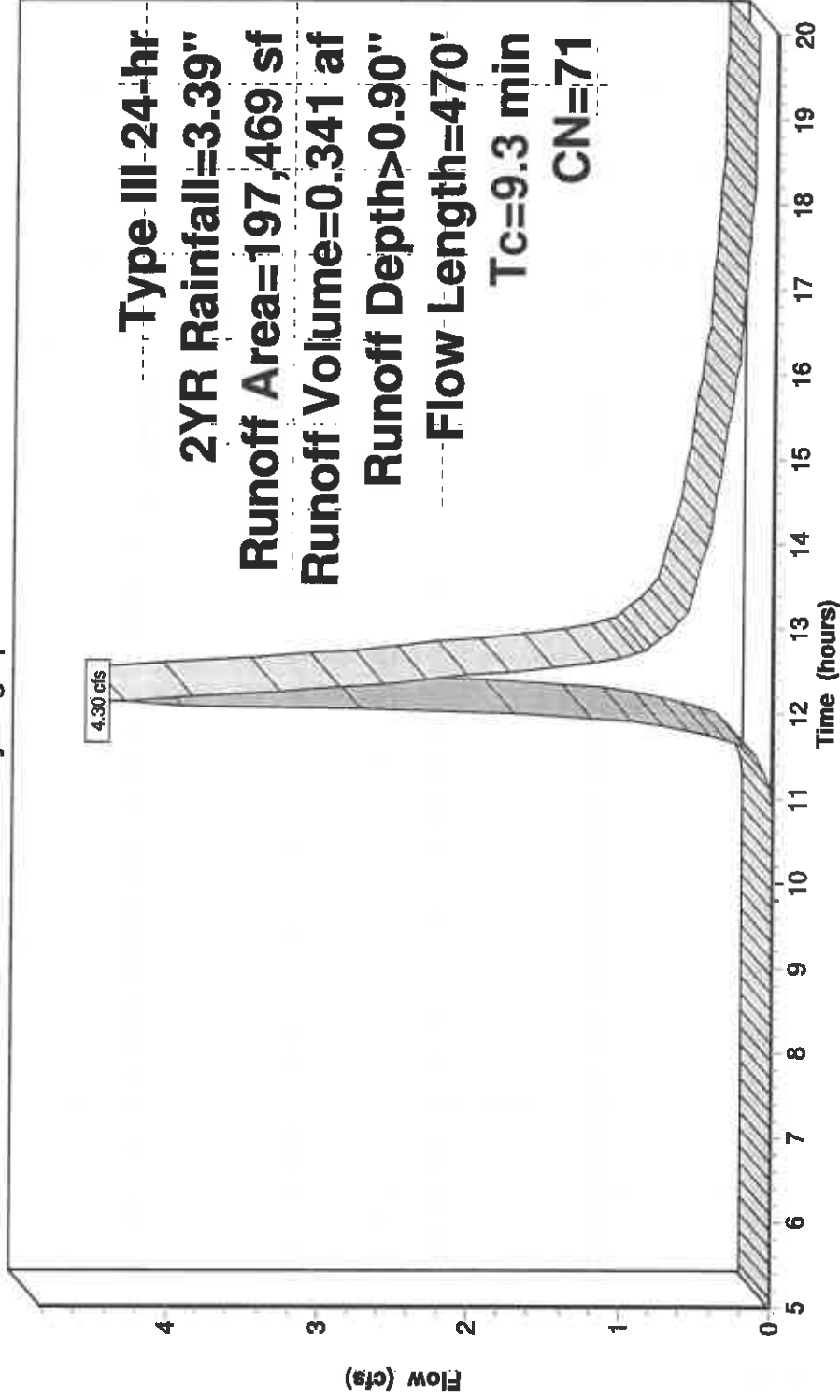
Type III 24-hr 2YR Rainfall=3.39"

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Page 10

Subcatchment E-2: DA E-2

Hydrograph



PRE-DEVELOPMENT 3-22-24

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Type III 24-hr 2YR Rainfall=3.39"

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Page 11

Summary for Subcatchment E-3: DA E-3

Runoff = 0.52 cfs @ 12.10 hrs, Volume= 0.037 af, Depth> 0.90"
Routed to Reach IP-3E : EX. CULVERT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR Rainfall=3.39"

Area (sf)	CN	Description
15,851	70	Woods, Good, HSG C
5,631	74	>75% Grass cover, Good, HSG C
21,482	71	Weighted Average
21,482		100.00% Pervious Area

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

PRE-DEVELOPMENT 3-22-24

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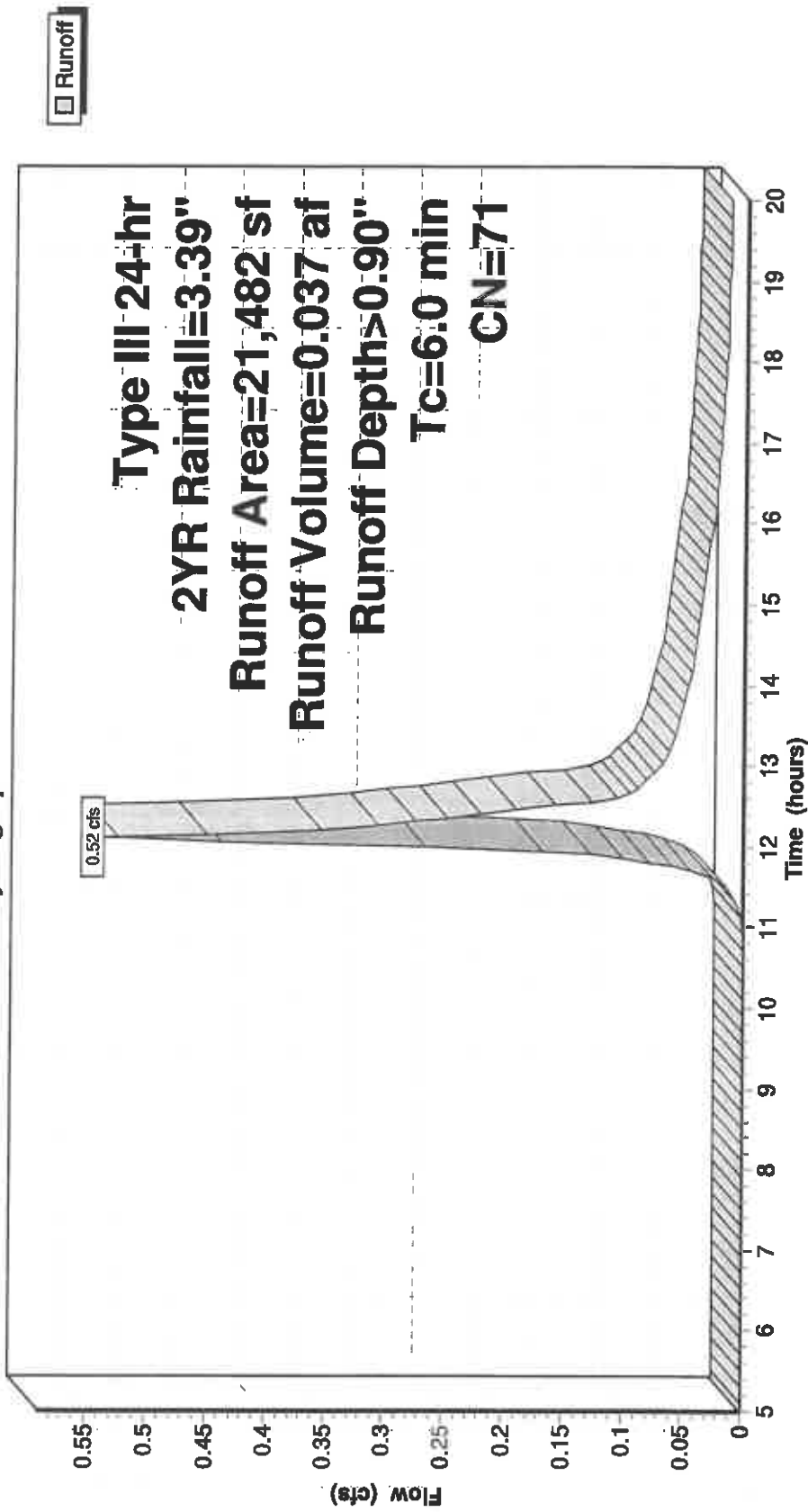
Type III 24-hr 2YR Rainfall=3.39"

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Page 12

Subcatchment E-3: DA E-3

Hydrograph



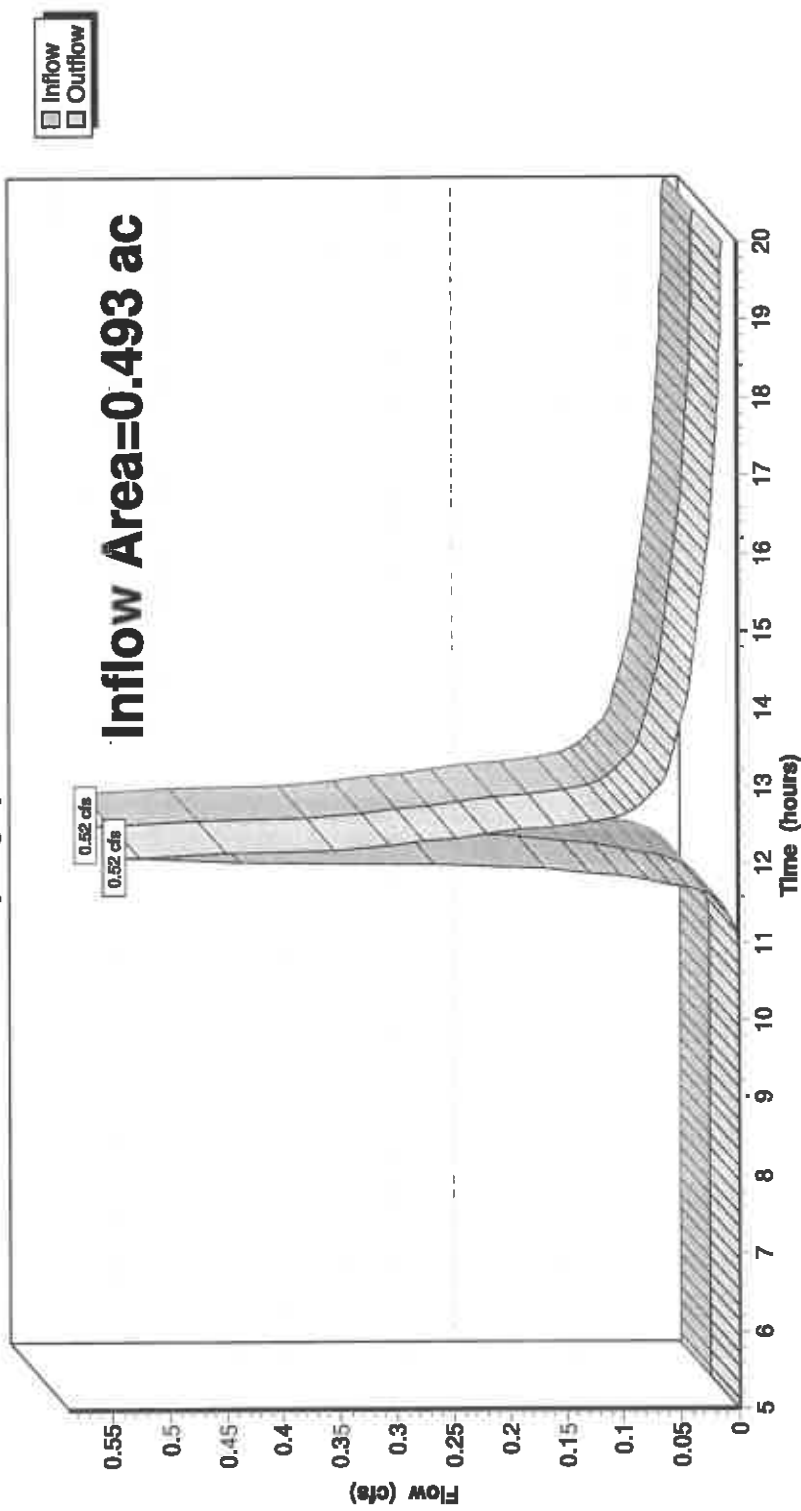
Summary for Reach IP-3E: EX. CULVERT

Inflow Area = 0.493 ac, 0.00% Impervious, Inflow Depth > 0.90" for 2YR event
Inflow = 0.52 cfs @ 12.10 hrs, Volume= 0.037 af
Outflow = 0.52 cfs @ 12.10 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-3E: EX. CULVERT

Hydrograph



PRE-DEVELOPMENT 3-22-24

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Type III 24-hr 2YR Rainfall=3.39"

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Page 14

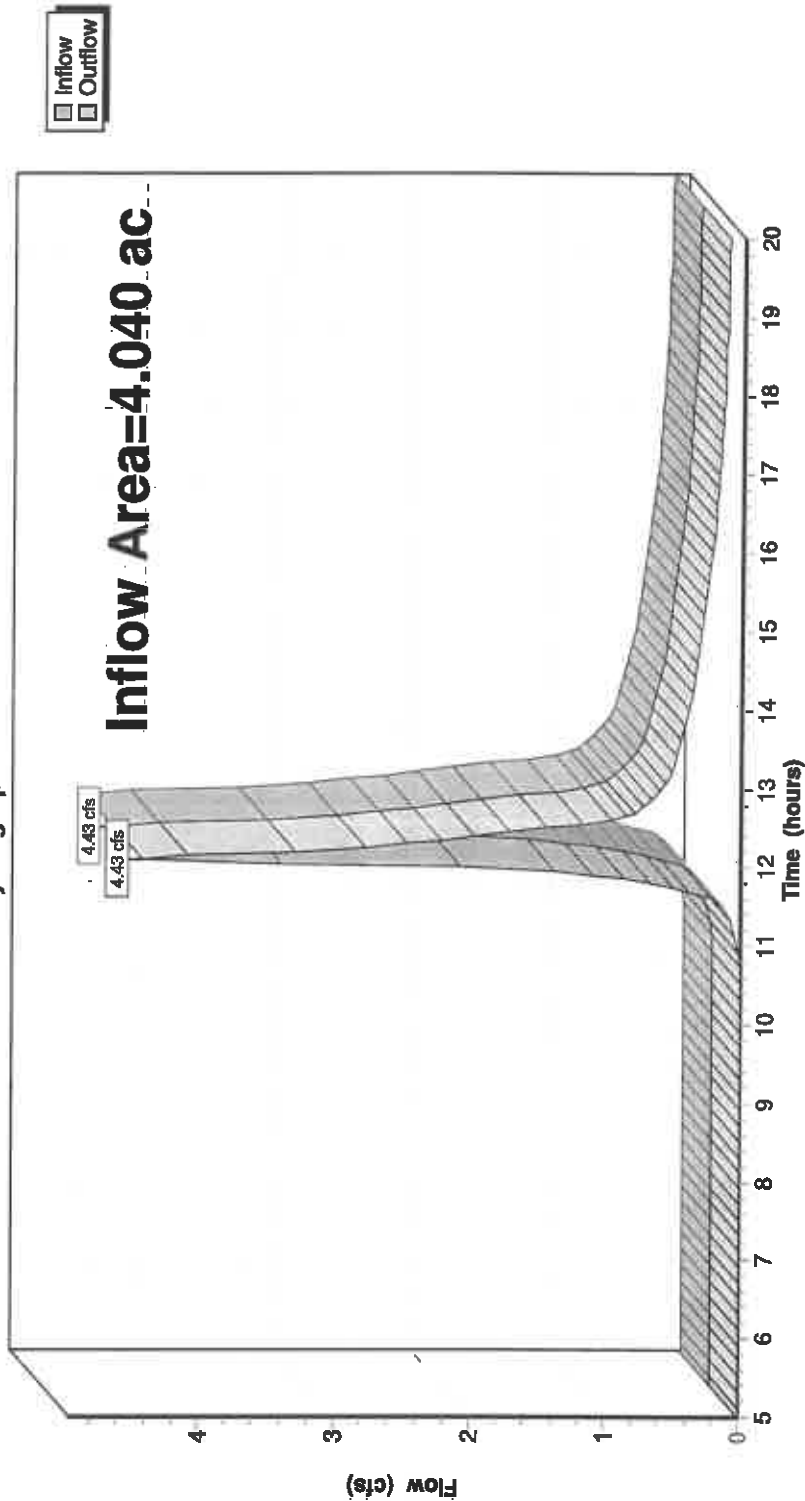
Summary for Reach IP-E1: 45 MAIN ST

Inflow Area = 4.040 ac, 4.02% Impervious, Inflow Depth > 0.95" for 2YR event
Inflow = 4.43 cfs @ 12.11 hrs, Volume= 0.321 af
Outflow = 4.43 cfs @ 12.11 hrs, Volume= 0.321 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-E1: 45 MAIN ST

Hydrograph



PRE-DEVELOPMENT 3-22-24

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Type III 24-hr 2YR Rainfall=3.39"

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Page 15

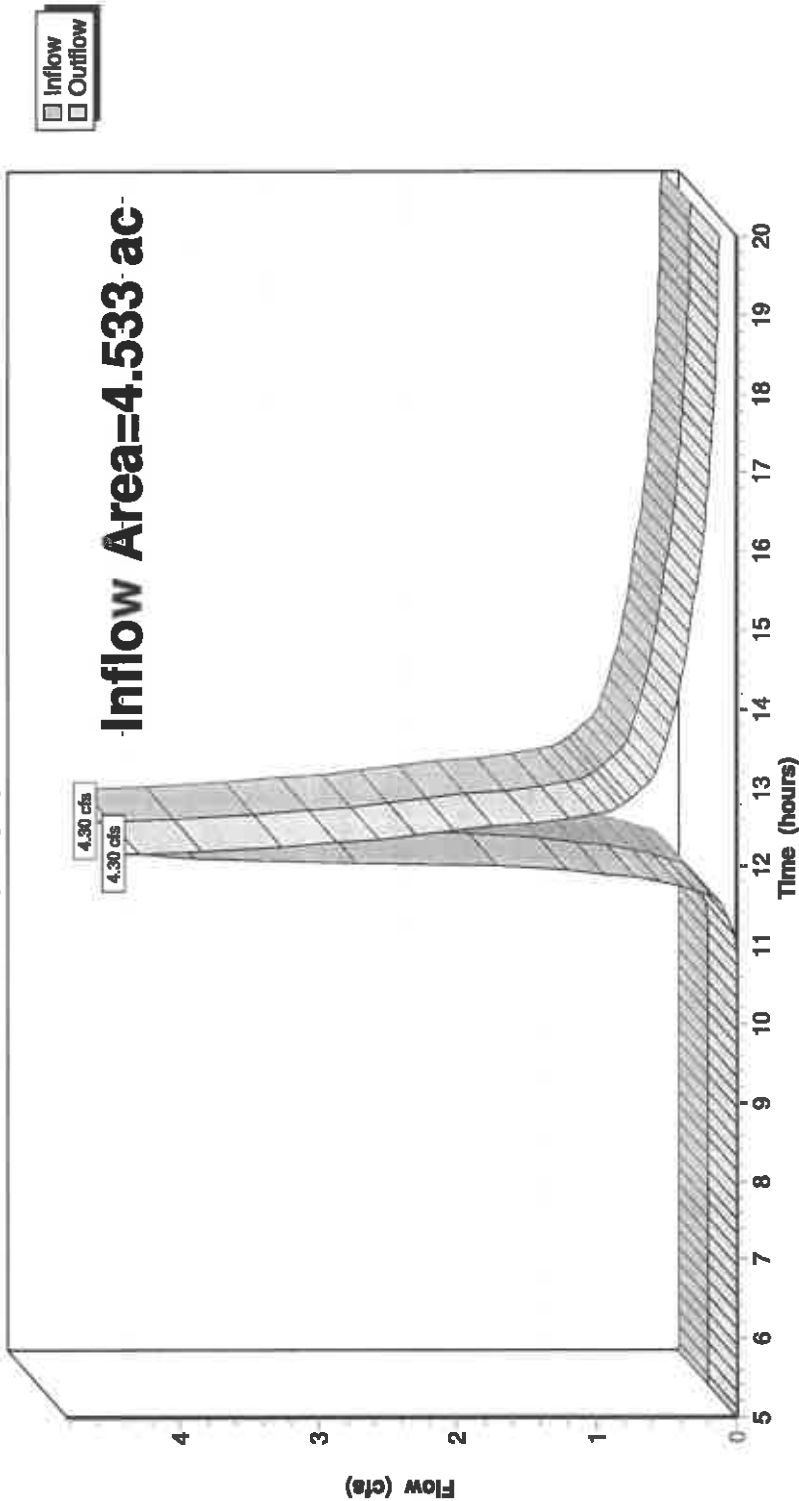
Summary for Reach IP-E2: SCHOOL ST

Inflow Area =	4.533 ac,	2.56% Impervious,	Inflow Depth > 0.90"	for 2YR event
Inflow =	4.30 cfs @	12.15 hrs,	Volume=	0.341 af
Outflow =	4.30 cfs @	12.15 hrs,	Volume=	0.341 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-E2: SCHOOL ST

Hydrograph



PRE-DEVELOPMENT 3-22-24

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Type III 24-hr 10YR Rainfall=5.11"

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Page 16

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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 E-1: DA E-1

Runoff Area=175,987 sf 4.02% Impervious Runoff Depth>2.11"
Flow Length=560' Tc=7.1 min CN=72 Runoff=10.19 cfs 0.710 af

Subcatchment E-2: DA E-2

Runoff Area=197,469 sf 2.56% Impervious Runoff Depth>2.03"
Flow Length=470' Tc=9.3 min CN=71 Runoff=10.14 cfs 0.766 af

Subcatchment E-3: DA E-3

Runoff Area=21,482 sf 0.00% Impervious Runoff Depth>2.03"
Tc=6.0 min CN=71 Runoff=1.23 cfs 0.083 af

Reach IP-3E: EX. CULVERT

Inflow=1.23 cfs 0.083 af
Outflow=1.23 cfs 0.083 af

Reach IP-E1: 45 MAIN ST

Inflow=10.19 cfs 0.710 af
Outflow=10.19 cfs 0.710 af

Reach IP-E2: SCHOOL ST

Inflow=10.14 cfs 0.766 af
Outflow=10.14 cfs 0.766 af

Total Runoff Area = 9.067 ac Runoff Volume = 1.560 af Average Runoff Depth = 2.06"
96.93% Pervious = 8.788 ac 3.07% Impervious = 0.278 ac

PRE-DEVELOPMENT 3-22-24

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Type III 24-hr 10YR Rainfall=5.11"

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Page 17

Summary for Subcatchment E-1: DA E-1

Runoff = 10.19 cfs @ 12.11 hrs, Volume= 0.710 af, Depth> 2.11"
Routed to Reach IP-E1 : 45 MAIN ST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=5.11"

Area (sf)	CN	Description
7,074	98	Paved parking, HSG C
35,876	74	>75% Grass cover, Good, HSG C
133,037	70	Woods, Good, HSG C
175,987	72	Weighted Average
168,913		95.98% Pervious Area
7,074		4.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	40	0.0550	3.78		Shallow Concentrated Flow, TRAVEL PATH A TO B Unpaved Kv= 16.1 fps
0.5	110	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C Unpaved Kv= 16.1 fps
6.4	410	0.0450	1.06		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
7.1	560	Total			

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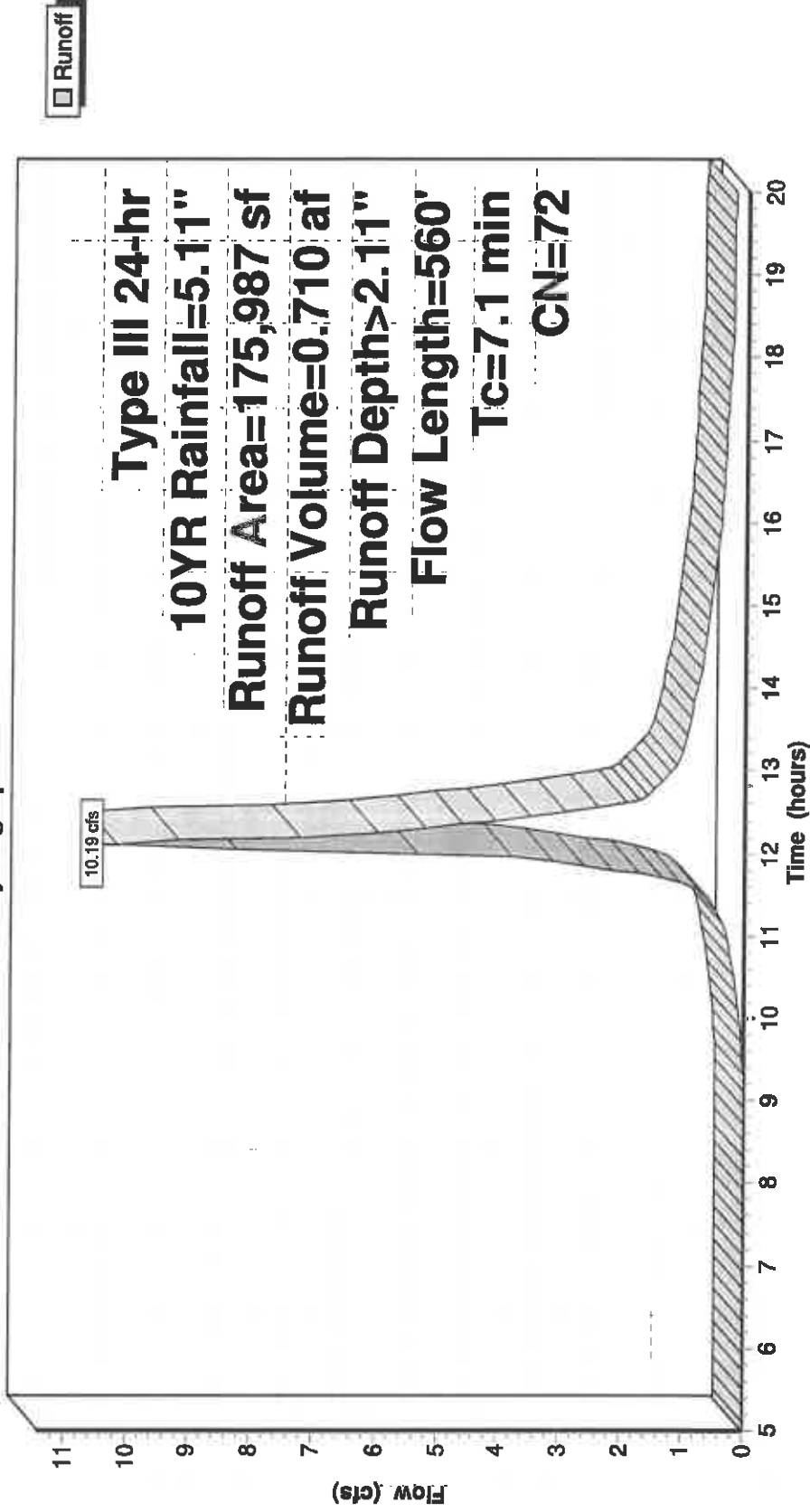
Type III 24-hr 10YR Rainfall=5.11"

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Page 18

Subcatchment E-1: DA E-1

Hydrograph



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Type III 24-hr 10YR Rainfall=5.11"

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Page 19

Summary for Subcatchment E-2: DA E-2

Runoff = 10.14 cfs @ 12.14 hrs, Volume= 0.766 af, Depth> 2.03"
Routed to Reach IP-E2 : SCHOOL ST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=5.11"

Area (sf)	CN	Description
5,057	98	Paved parking, HSG C
30,786	74	>75% Grass cover, Good, HSG C
161,626	70	Woods, Good, HSG C
197,469	71	Weighted Average
192,412		97.44% Pervious Area
5,057		2.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	40	0.0450	0.20		Sheet Flow, TRAVEL PATH A TO B Grass: Short n= 0.150 P2= 3.20"
0.4	80	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C Unpaved Kv= 16.1 fps
2.9	225	0.0650	1.27		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
2.6	125	0.0250	0.79		Shallow Concentrated Flow, TARVEL PATH D TO E Woodland Kv= 5.0 fps
9.3	470	Total			

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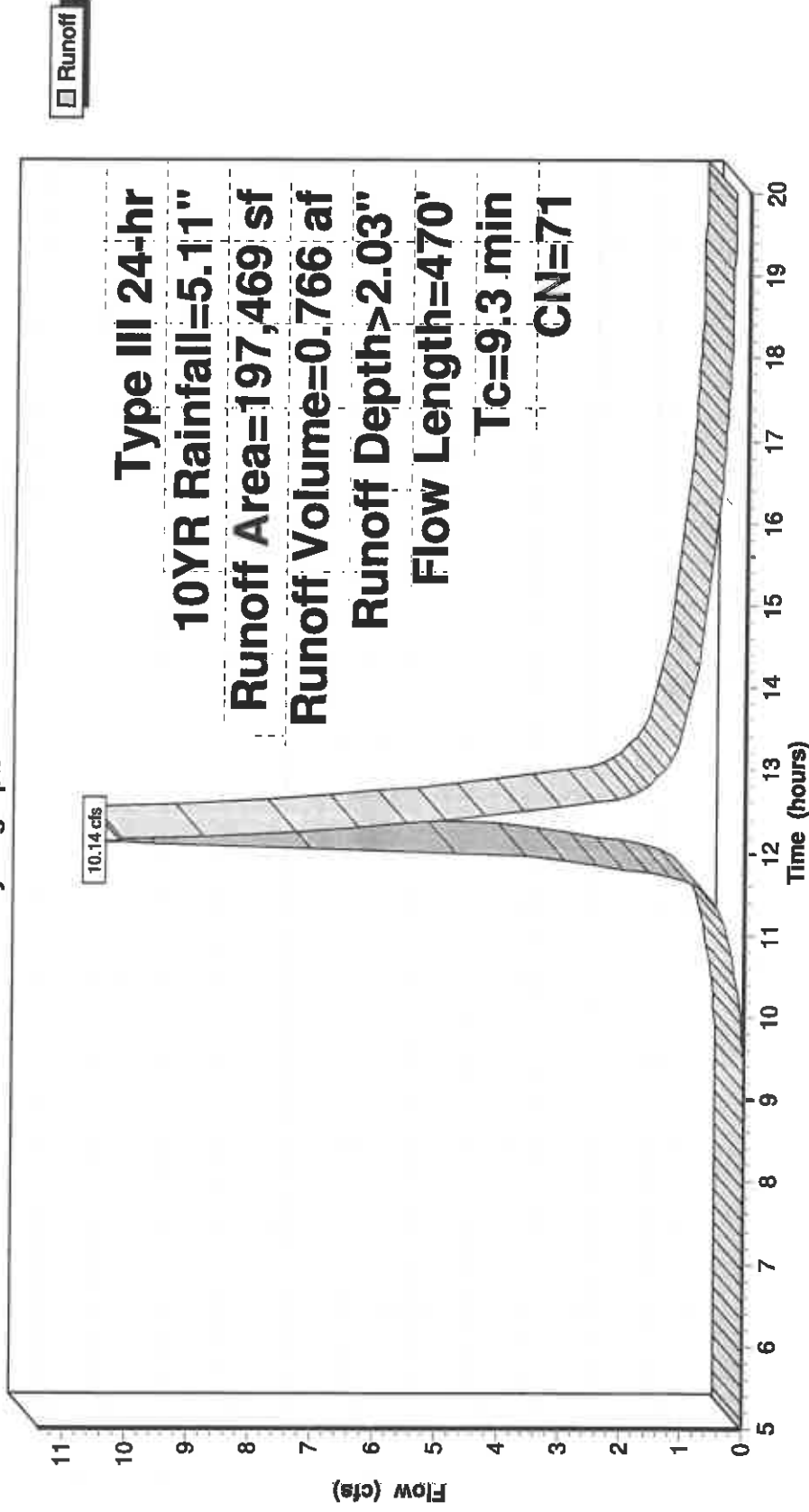
Type III 24-hr 10YR Rainfall=5.11"

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Page 20

Subcatchment E-2: DA E-2

Hydrograph



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Type III 24-hr 10YR Rainfall=5.11"

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Page 21

Summary for Subcatchment E-3: DA E-3

Runoff = 1.23 cfs @ 12.10 hrs, Volume= 0.083 af, Depth> 2.03"
Routed to Reach IP-3E : EX. CULVERT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=5.11"

Area (sf)	CN	Description
15,851	70	Woods, Good, HSG C
5,631	74	>75% Grass cover, Good, HSG C
21,482	71	Weighted Average
21,482		100.00% Pervious Area

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

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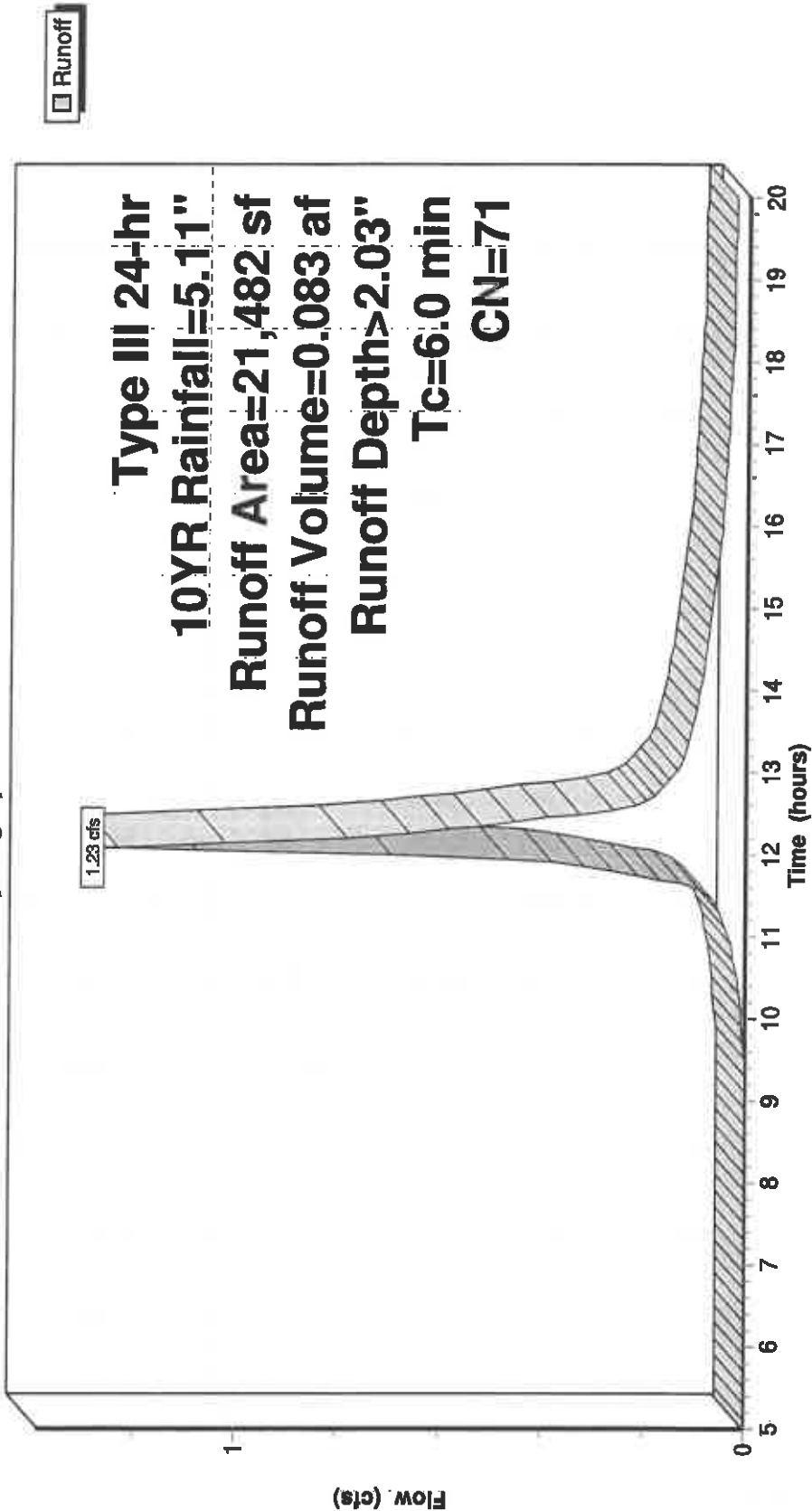
Type III 24-hr 10YR Rainfall=5.11"

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Page 22

Subcatchment E-3: DA E-3

Hydrograph



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Page 23

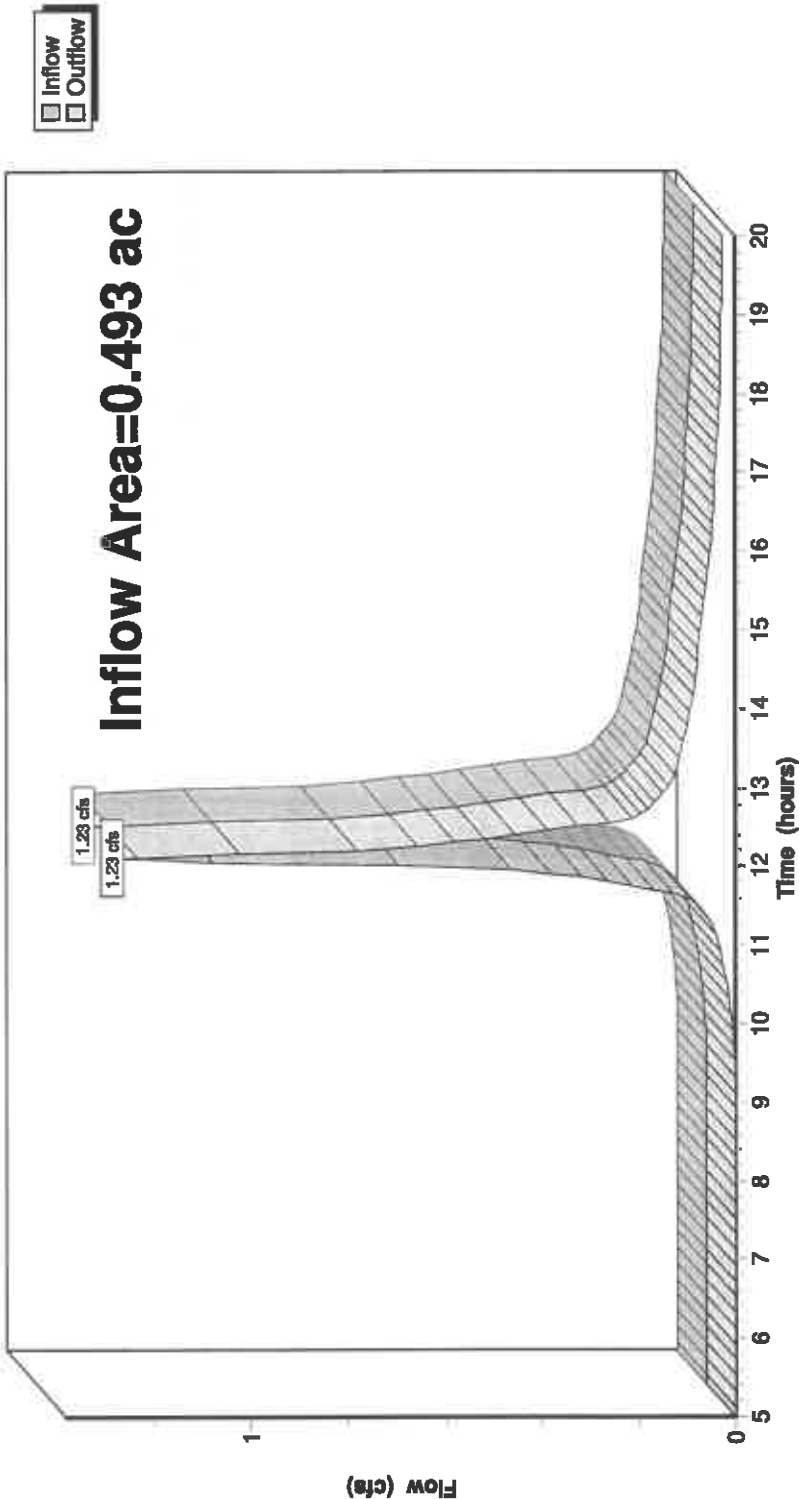
Summary for Reach IP-3E: EX. CULVERT

Inflow Area = 0.493 ac, 0.00% Impervious, Inflow Depth > 2.03" for 10YR event
Inflow = 1.23 cfs @ 12.10 hrs, Volume= 0.083 af
Outflow = 1.23 cfs @ 12.10 hrs, Volume= 0.083 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-3E: EX. CULVERT

Hydrograph



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Type III 24-hr 10YR Rainfall=5.11"

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Page 24

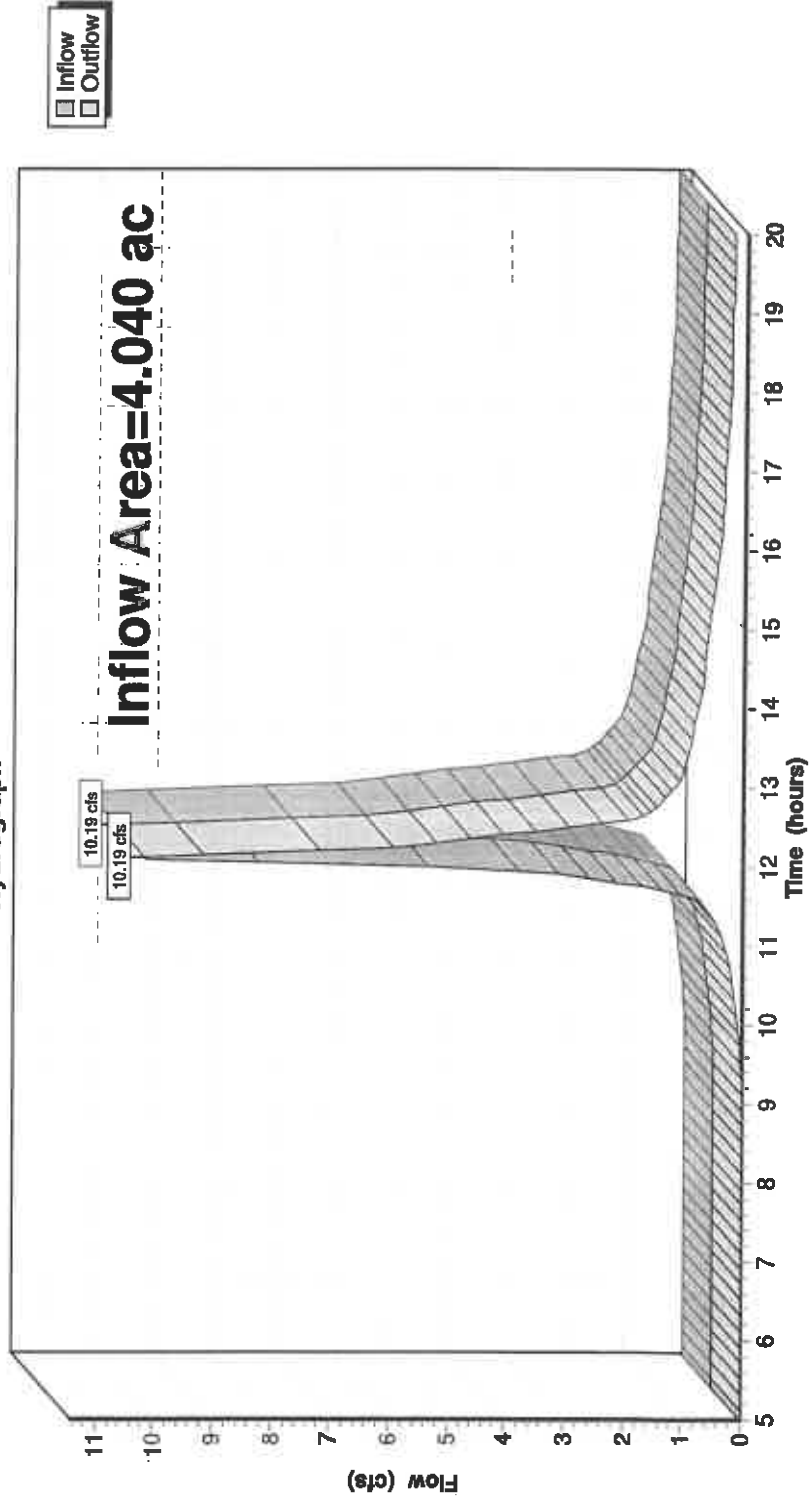
Summary for Reach IP-E1: 45 MAIN ST

Inflow Area = 4.040 ac, 4.02% Impervious, Inflow Depth > 2.11" for 10YR event
Inflow = 10.19 cfs @ 12.11 hrs, Volume= 0.710 af
Outflow = 10.19 cfs @ 12.11 hrs, Volume= 0.710 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-E1: 45 MAIN ST

Hydrograph



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Type III 24-hr 10YR Rainfall=5.11"

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Page 25

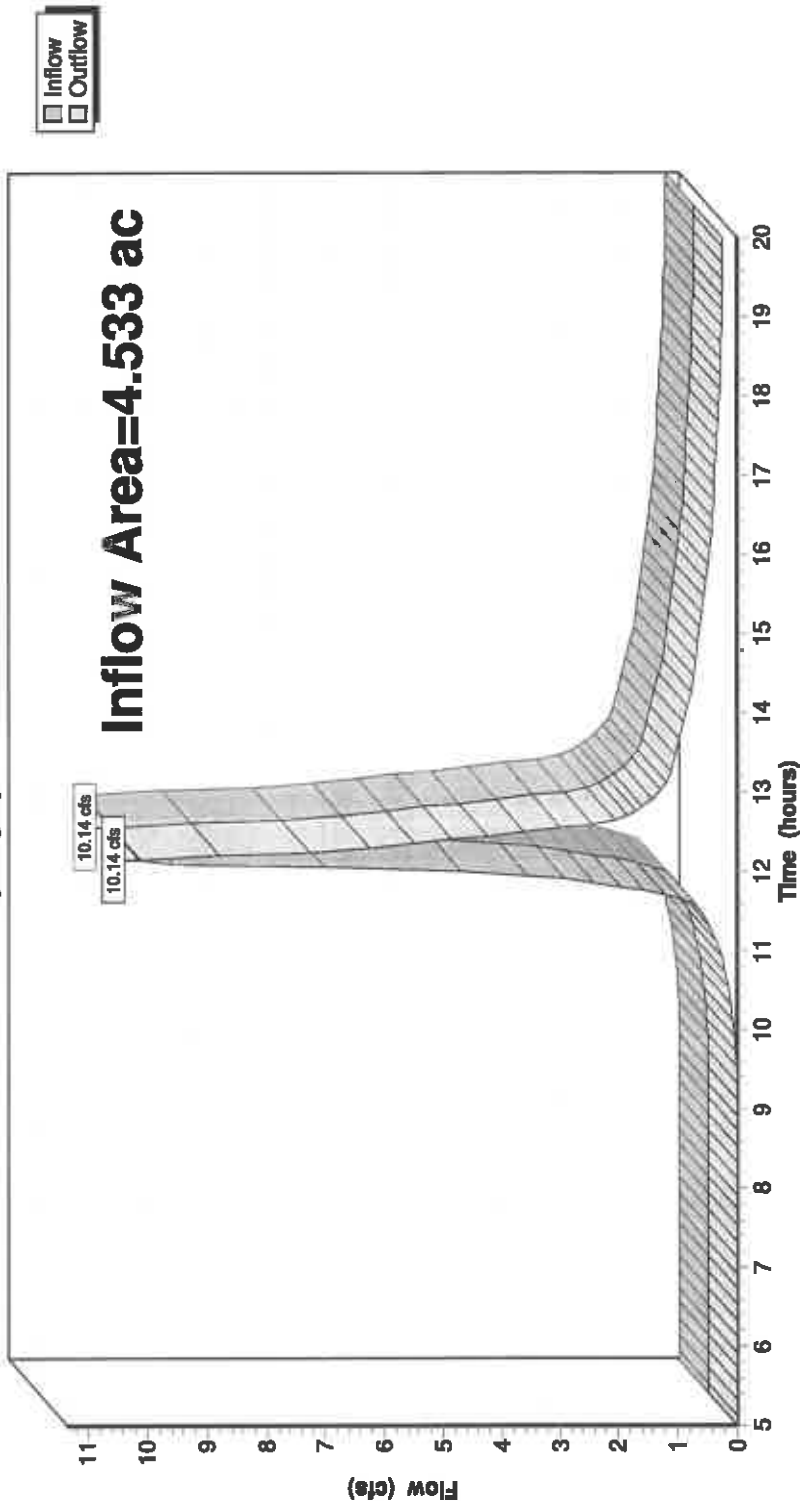
Summary for Reach IP-E2: SCHOOL ST

Inflow Area =	4.533 ac,	2.56% Impervious,	Inflow Depth > 2.03"	for 10YR event
Inflow =	10.14 cfs @	12.14 hrs,	Volume=	0.766 af
Outflow =	10.14 cfs @	12.14 hrs,	Volume=	0.766 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-E2: SCHOOL ST

Hydrograph



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Type III 24-hr 25YR Rainfall=6.19"

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Page 26

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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 E-1: DA E-1

Runoff Area=175,987 sf 4.02% Impervious Runoff Depth>2.93"
Flow Length=560' Tc=7.1 min CN=72 Runoff=14.16 cfs 0.985 af

Subcatchment E-2: DA E-2

Runoff Area=197,469 sf 2.56% Impervious Runoff Depth>2.83"
Flow Length=470' Tc=9.3 min CN=71 Runoff=14.21 cfs 1.069 af

Subcatchment E-3: DA E-3

Runoff Area=21,482 sf 0.00% Impervious Runoff Depth>2.83"
Tc=6.0 min CN=71 Runoff=1.73 cfs 0.116 af

Reach IP-3E: EX. CULVERT

Inflow=1.73 cfs 0.116 af
Outflow=1.73 cfs 0.116 af

Reach IP-E1: 45 MAIN ST

Inflow=14.16 cfs 0.985 af
Outflow=14.16 cfs 0.985 af

Reach IP-E2: SCHOOL ST

Inflow=14.21 cfs 1.069 af
Outflow=14.21 cfs 1.069 af

Total Runoff Area = 9.067 ac Runoff Volume = 2.170 af Average Runoff Depth = 2.87"
96.93% Pervious = 8.788 ac 3.07% Impervious = 0.278 ac

Summary for Subcatchment E-1: DA E-1

Runoff = 14.16 cfs @ 12.11 hrs, Volume= 0.985 af, Depth> 2.93"
 Routed to Reach IP-E1 : 45 MAIN ST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25YR Rainfall=6.19"

Area (sf)	CN	Description
7,074	98	Paved parking, HSG C
35,876	74	>75% Grass cover, Good, HSG C
133,037	70	Woods, Good, HSG C
175,987	72	Weighted Average
168,913		95.98% Pervious Area
7,074		4.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	40	0.0550	3.78		Shallow Concentrated Flow, TRAVEL PATH A TO B Unpaved Kv= 16.1 fps
0.5	110	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C Unpaved Kv= 16.1 fps
6.4	410	0.0450	1.06		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
7.1	560	Total			

PRE-DEVELOPMENT 3-22-24

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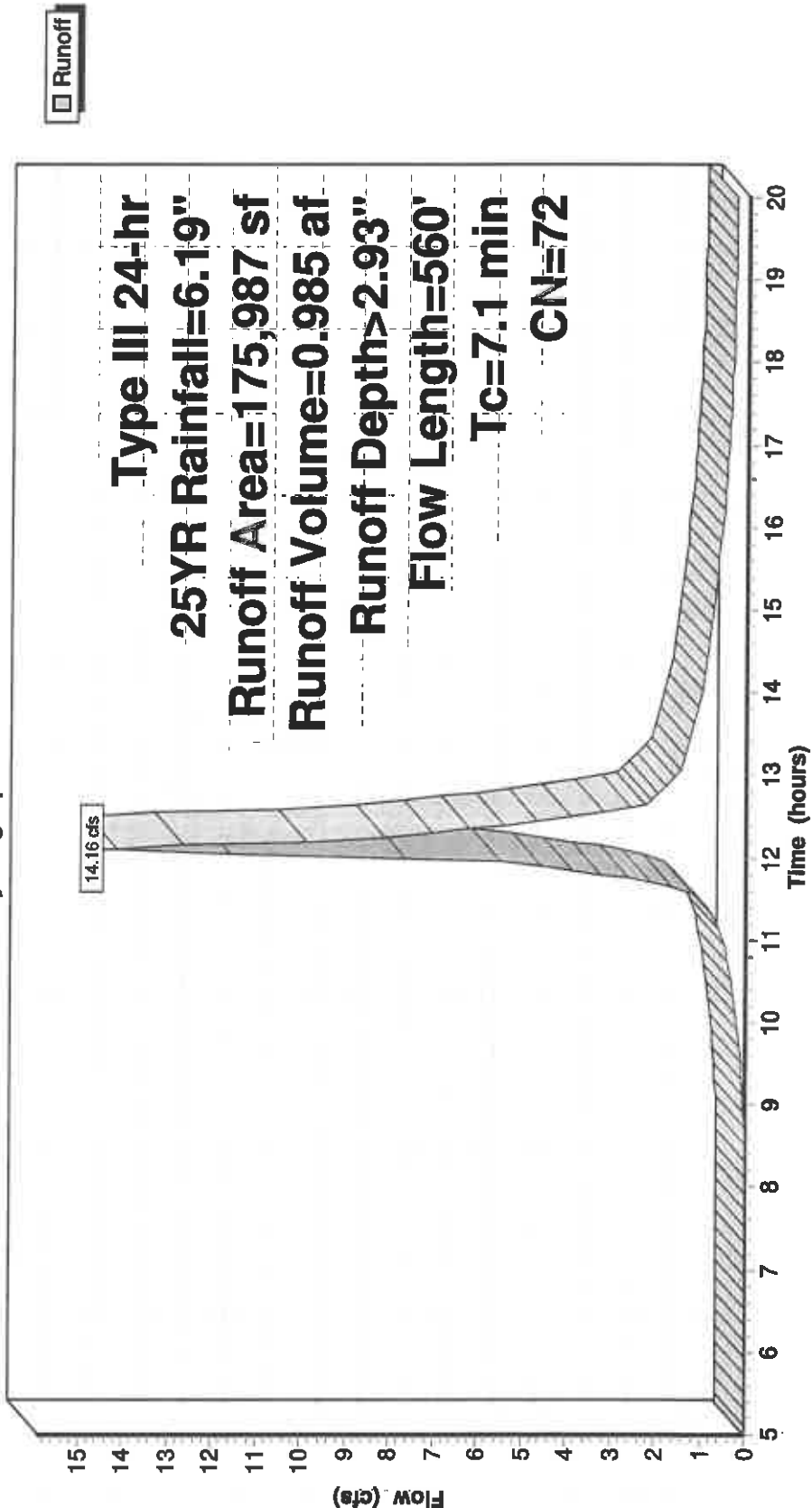
Type III 24-hr 25YR Rainfall=6.19"

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Page 28

Subcatchment E-1: DA E-1

Hydrograph



PRE-DEVELOPMENT 3-22-24

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Type III 24-hr 25YR Rainfall=6.19"

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Page 29

Summary for Subcatchment E-2: DA E-2

Runoff = 14.21 cfs @ 12.14 hrs, Volume= 1.069 af, Depth= 2.83"
Routed to Reach IP-E2 : SCHOOL ST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=6.19"

Area (sf)	CN	Description
5,057	98	Paved parking, HSG C
30,786	74	>75% Grass cover, Good, HSG C
161,626	70	Woods, Good, HSG C
197,469	71	Weighted Average
192,412		97.44% Pervious Area
5,057		2.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	40	0.0450	0.20		Sheet Flow, TRAVEL PATH A TO B Grass: Short n= 0.150 P2= 3.20"
0.4	80	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C Unpaved Kv= 16.1 fps
2.9	225	0.0650	1.27		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
2.6	125	0.0250	0.79		Shallow Concentrated Flow, TRAVEL PATH D TO E Woodland Kv= 5.0 fps
9.3	470	Total			

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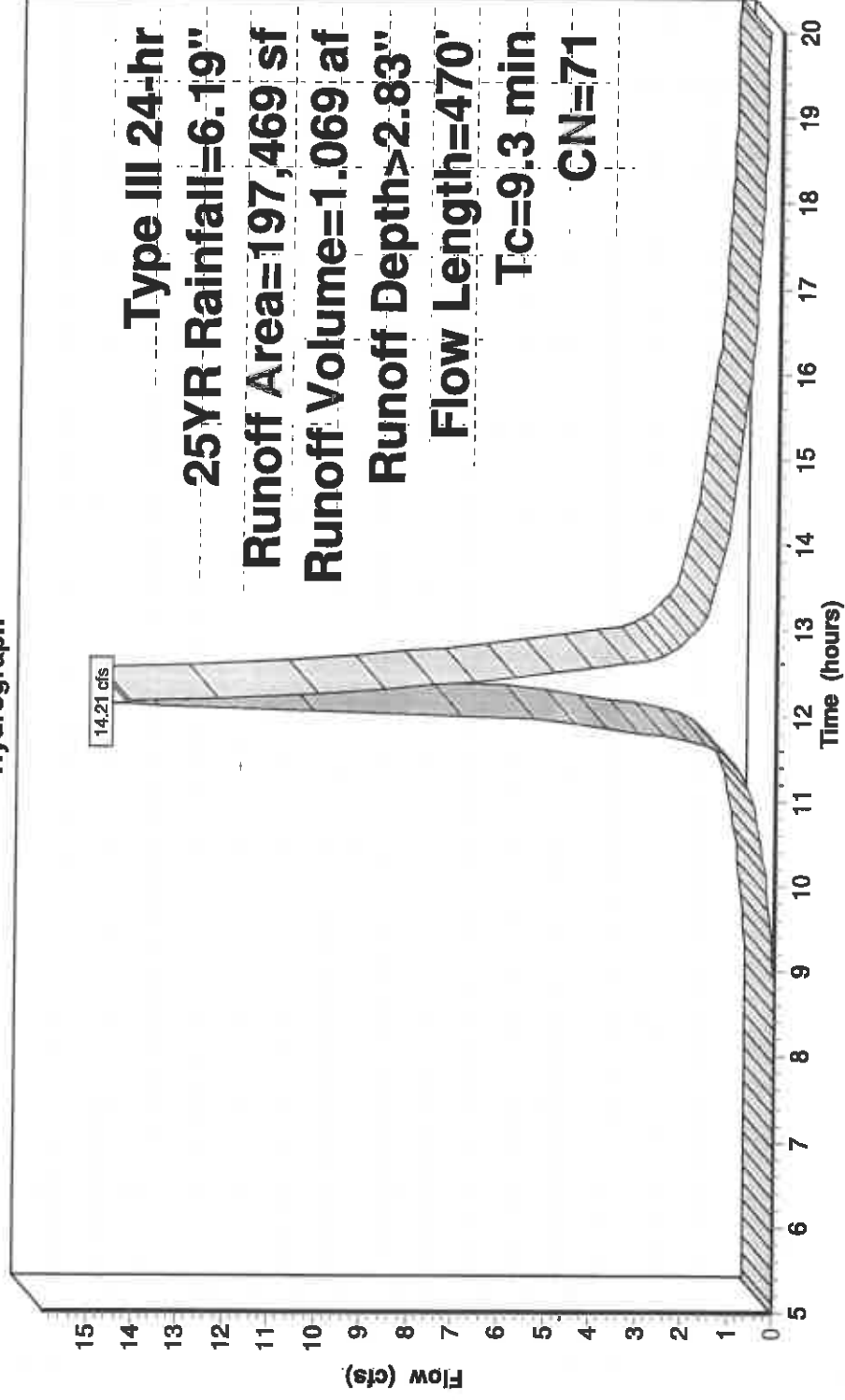
Type III 24-hr 25YR Rainfall=6.19"

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Page 30

Subcatchment E-2: DA E-2

Hydrograph



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Type III 24-hr 25YR Rainfall=6.19"

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Page 31

Summary for Subcatchment E-3: DA E-3

Runoff = 1.73 cfs @ 12.09 hrs, Volume= 0.116 af, Depth> 2.83"
Routed to Reach IP-3E : EX. CULVERT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=6.19"

Area (sf)	CN	Description
15,851	70	Woods, Good, HSG C
5,631	74	>75% Grass cover, Good, HSG C

21,482 71 Weighted Average
21,482 100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					

Direct Entry, TRAVEL TIME

PRE-DEVELOPMENT 3-22-24

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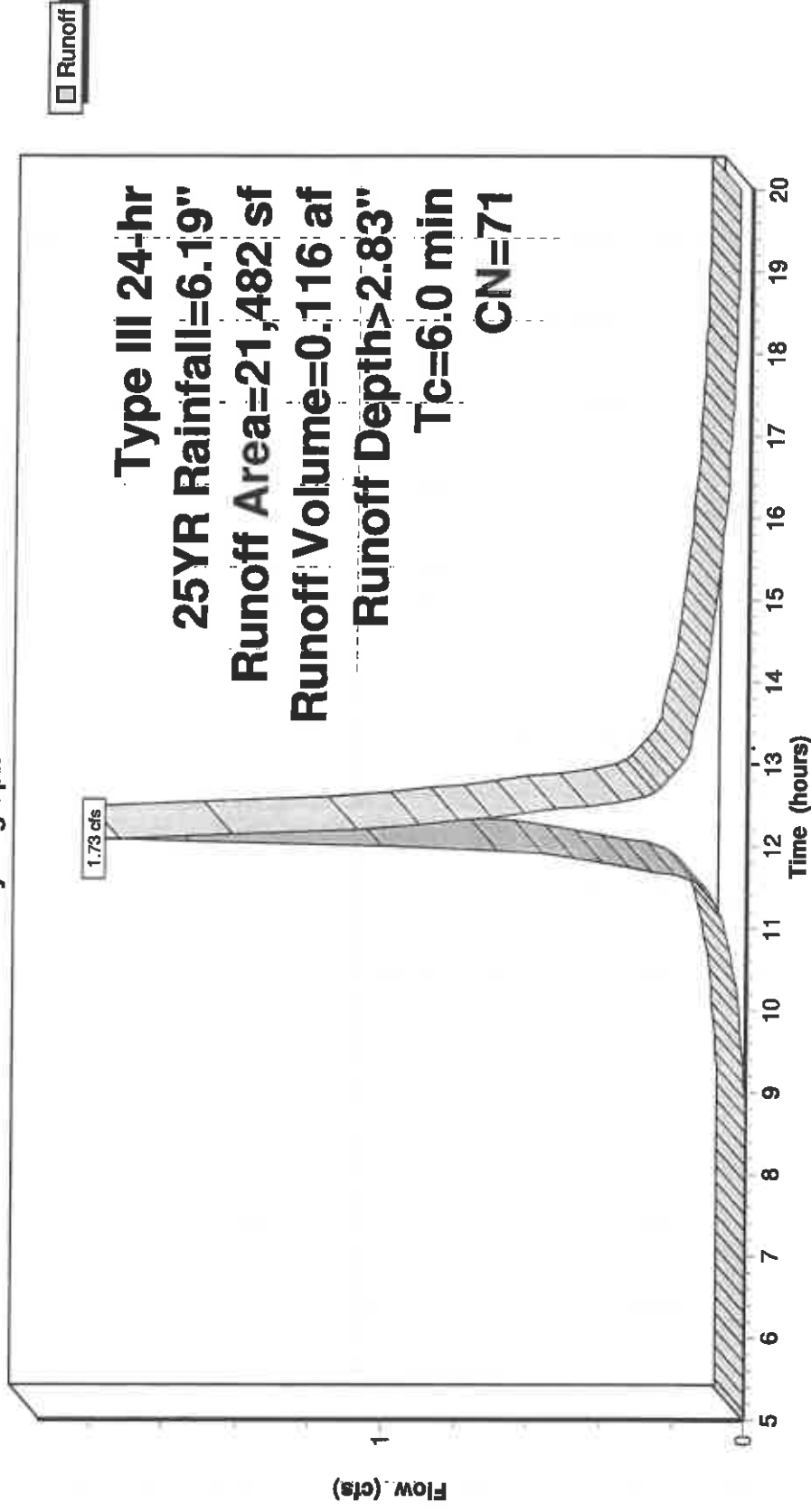
Type III 24-hr 25YR Rainfall=6.19"

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Page 32

Subcatchment E-3: DA E-3

Hydrograph



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Type III 24-hr 25YR Rainfall=6.19"

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Page 33

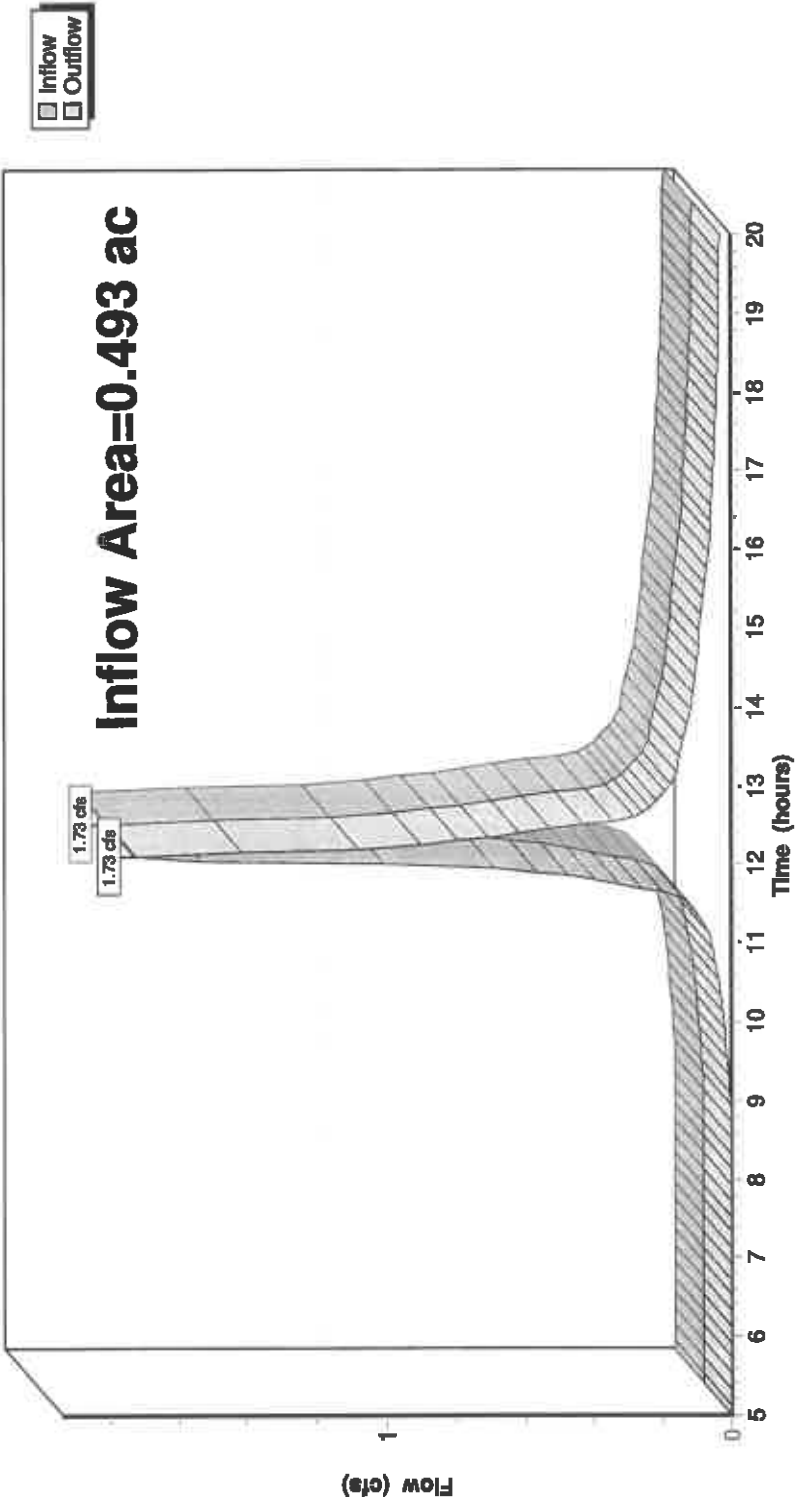
Summary for Reach IP-3E: EX. CULVERT

Inflow Area = 0.493 ac, 0.00% Impervious, Inflow Depth > 2.83" for 25YR event
Inflow = 1.73 cfs @ 12.09 hrs, Volume= 0.116 af
Outflow = 1.73 cfs @ 12.09 hrs, Volume= 0.116 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-3E: EX. CULVERT

Hydrograph



PRE-DEVELOPMENT 3-22-24

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Type III 24-hr 25YR Rainfall=6.19"

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Page 34

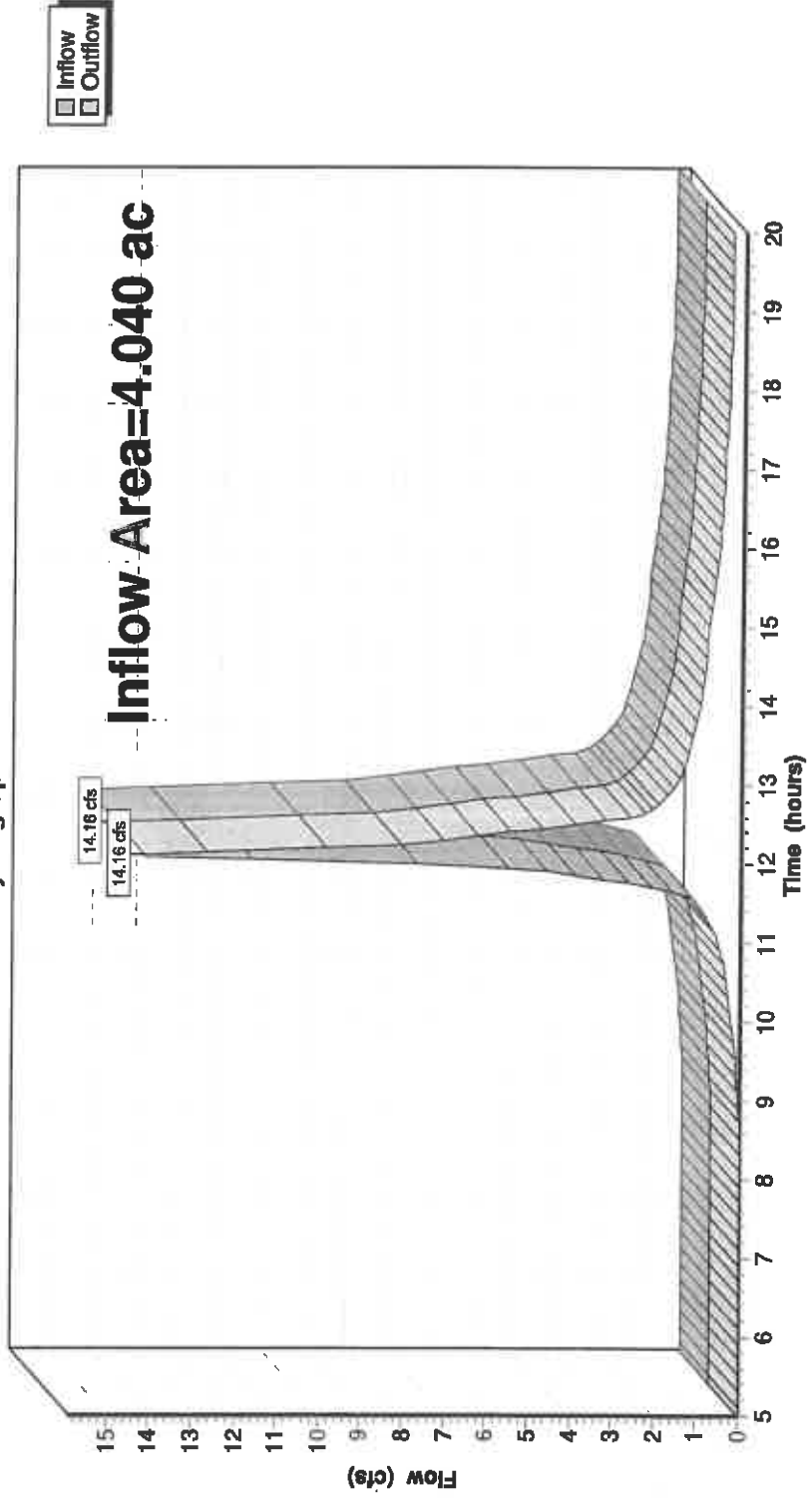
Summary for Reach IP-E1: 45 MAIN ST

Inflow Area = 4.040 ac, 4.02% Impervious, Inflow Depth > 2.93" for 25YR event
Inflow = 14.16 cfs @ 12.11 hrs, Volume= 0.985 af
Outflow = 14.16 cfs @ 12.11 hrs, Volume= 0.985 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-E1: 45 MAIN ST

Hydrograph



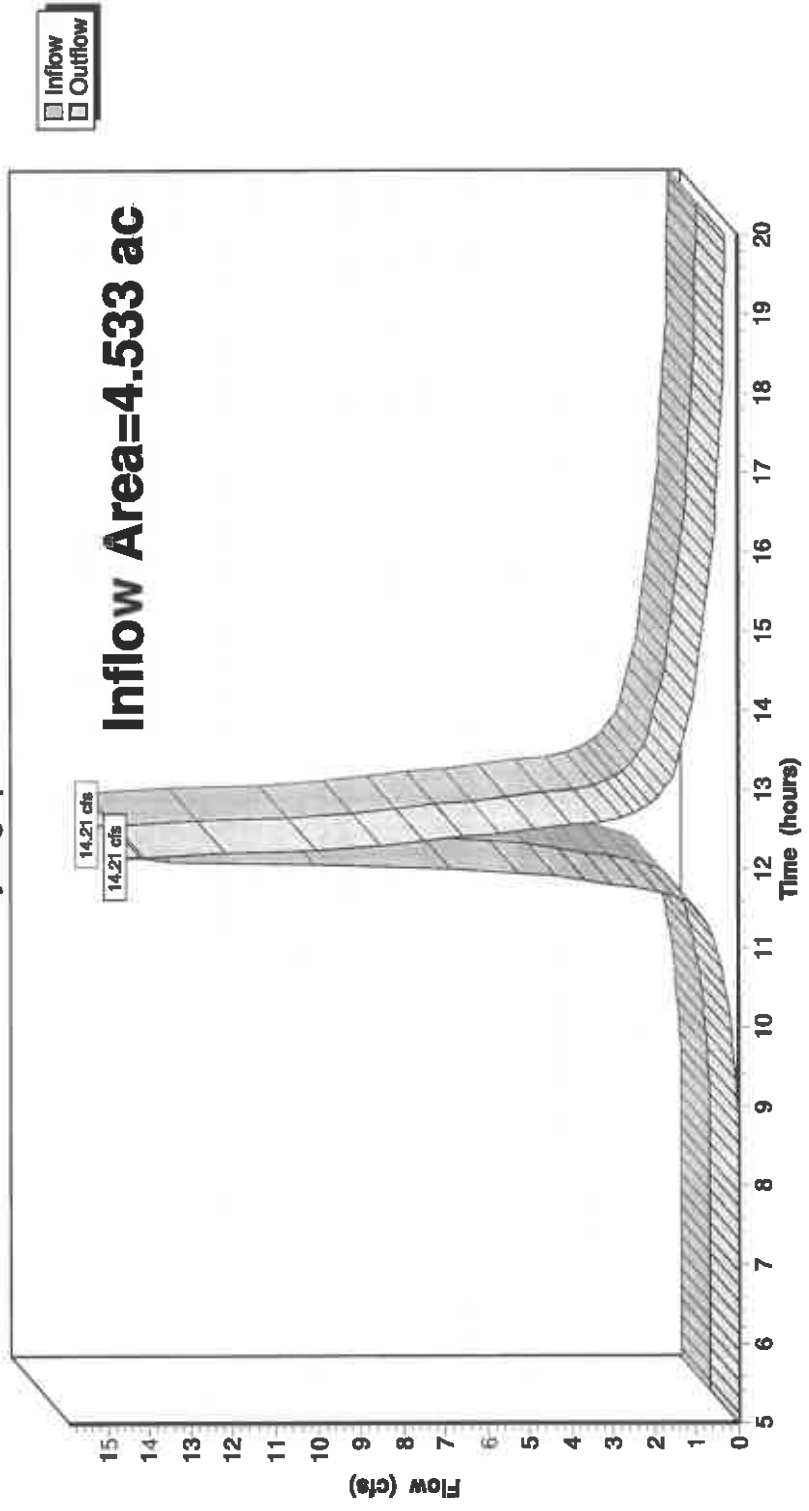
Summary for Reach IP-E2: SCHOOL ST

Inflow Area = 4.533 ac, 2.56% Impervious, Inflow Depth > 2.83" for 25YR event
Inflow = 14.21 cfs @ 12.14 hrs, Volume= 1.069 af
Outflow = 14.21 cfs @ 12.14 hrs, Volume= 1.069 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-E2: SCHOOL ST

Hydrograph



PRE-DEVELOPMENT 3-22-24

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Type III 24-hr 100YR Rainfall=7.85"

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Page 36

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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 E-1: DA E-1

Runoff Area=175,987 sf 4.02% Impervious Runoff Depth>4.26"
Flow Length=560' Tc=7.1 min CN=72 Runoff=20.54 cfs 1.435 af

Subcatchment E-2: DA E-2

Runoff Area=197,469 sf 2.56% Impervious Runoff Depth>4.15"
Flow Length=470' Tc=9.3 min CN=71 Runoff=20.77 cfs 1.567 af

Subcatchment E-3: DA E-3

Runoff Area=21,482 sf 0.00% Impervious Runoff Depth>4.15"
Tc=6.0 min CN=71 Runoff=2.52 cfs 0.171 af

Reach IP-3E: EX. CULVERT

Inflow=2.52 cfs 0.171 af
Outflow=2.52 cfs 0.171 af

Reach IP-E1: 45 MAIN ST

Inflow=20.54 cfs 1.435 af
Outflow=20.54 cfs 1.435 af

Reach IP-E2: SCHOOL ST

Inflow=20.77 cfs 1.567 af
Outflow=20.77 cfs 1.567 af

Total Runoff Area = 9.067 ac Runoff Volume = 3.173 af Average Runoff Depth = 4.20"
96.93% Pervious = 8.788 ac 3.07% Impervious = 0.278 ac

PRE-DEVELOPMENT 3-22-24

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Type III 24-hr 100YR Rainfall=7.85"

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Page 37

Summary for Subcatchment E-1: DA E-1

Runoff = 20.54 cfs @ 12.10 hrs, Volume= 1.435 af, Depth> 4.26"
Routed to Reach IP-E1 : 45 MAIN ST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR Rainfall=7.85"

Area (sf)	CN	Description
7,074	98	Paved parking, HSG C
35,876	74	>75% Grass cover, Good, HSG C
133,037	70	Woods, Good, HSG C
175,987	72	Weighted Average
168,913		95.98% Pervious Area
7,074		4.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	40	0.0550	3.78		Shallow Concentrated Flow, TRAVEL PATH A TO B Unpaved Kv= 16.1 fps
0.5	110	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C Unpaved Kv= 16.1 fps
6.4	410	0.0450	1.06		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
7.1	560	Total			

PRE-DEVELOPMENT 3-22-24

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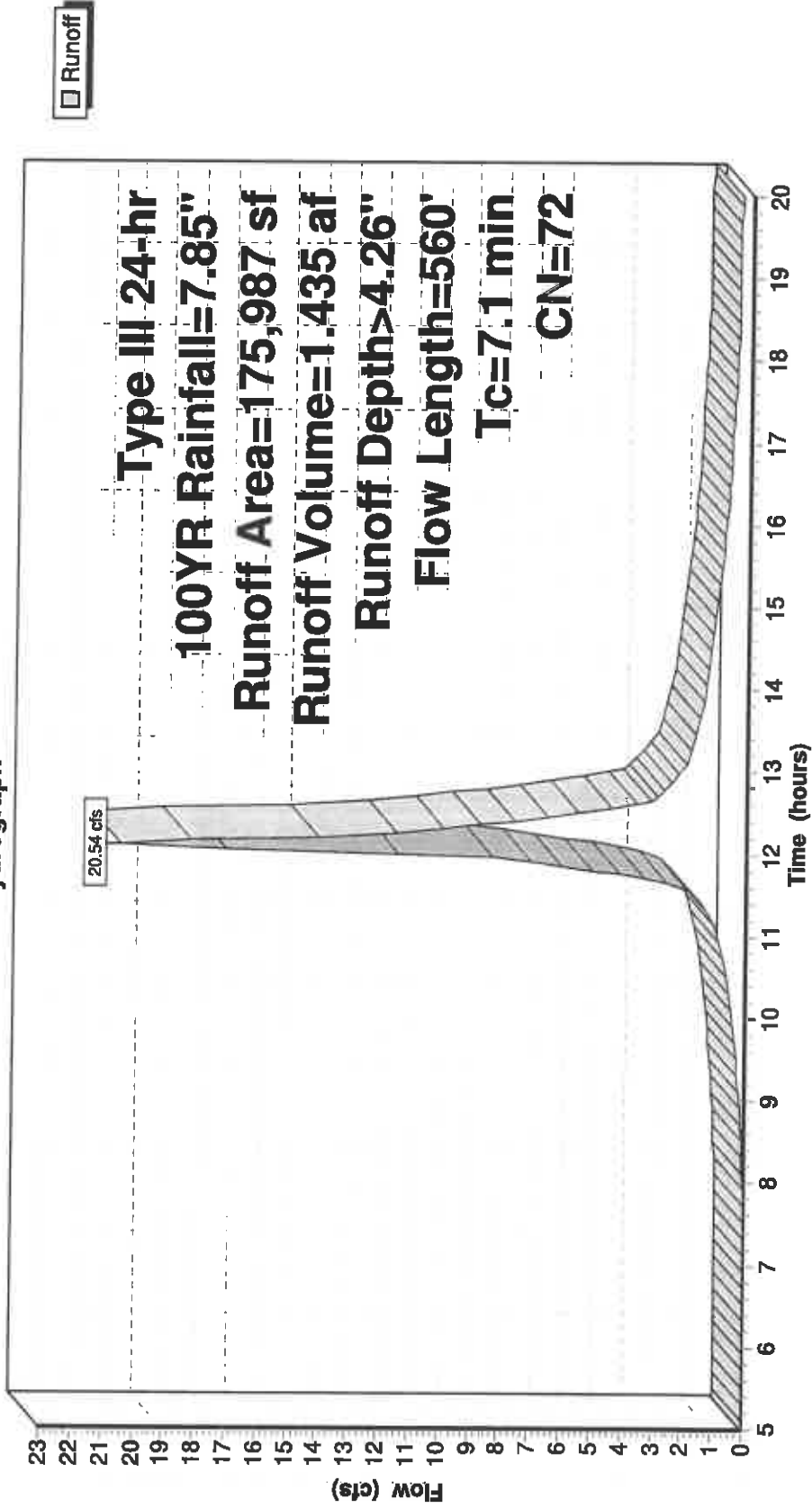
Type III 24-hr 100YR Rainfall=7.85"

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Page 38

Subcatchment E-1: DA E-1

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Type III 24-hr 100YR Rainfall=7.85"

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Page 39

Summary for Subcatchment E-2: DA E-2

Runoff = 20.77 cfs @ 12.13 hrs, Volume= 1.567 af, Depth> 4.15"
Routed to Reach IP-E2 : SCHOOL ST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR Rainfall=7.85"

Area (sf)	CN	Description
5,057	98	Paved parking, HSG C
30,786	74	>75% Grass cover, Good, HSG C
161,626	70	Woods, Good, HSG C
197,469	71	Weighted Average
192,412		97.44% Pervious Area
5,057		2.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	40	0.0450	0.20		Sheet Flow, TRAVEL PATH A TO B Grass: Short n= 0.150 P2= 3.20"
0.4	80	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C Unpaved Kv= 16.1 fps
2.9	225	0.0650	1.27		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
2.6	125	0.0250	0.79		Shallow Concentrated Flow, TARVEL PATH D TO E Woodland Kv= 5.0 fps
9.3	470	Total			

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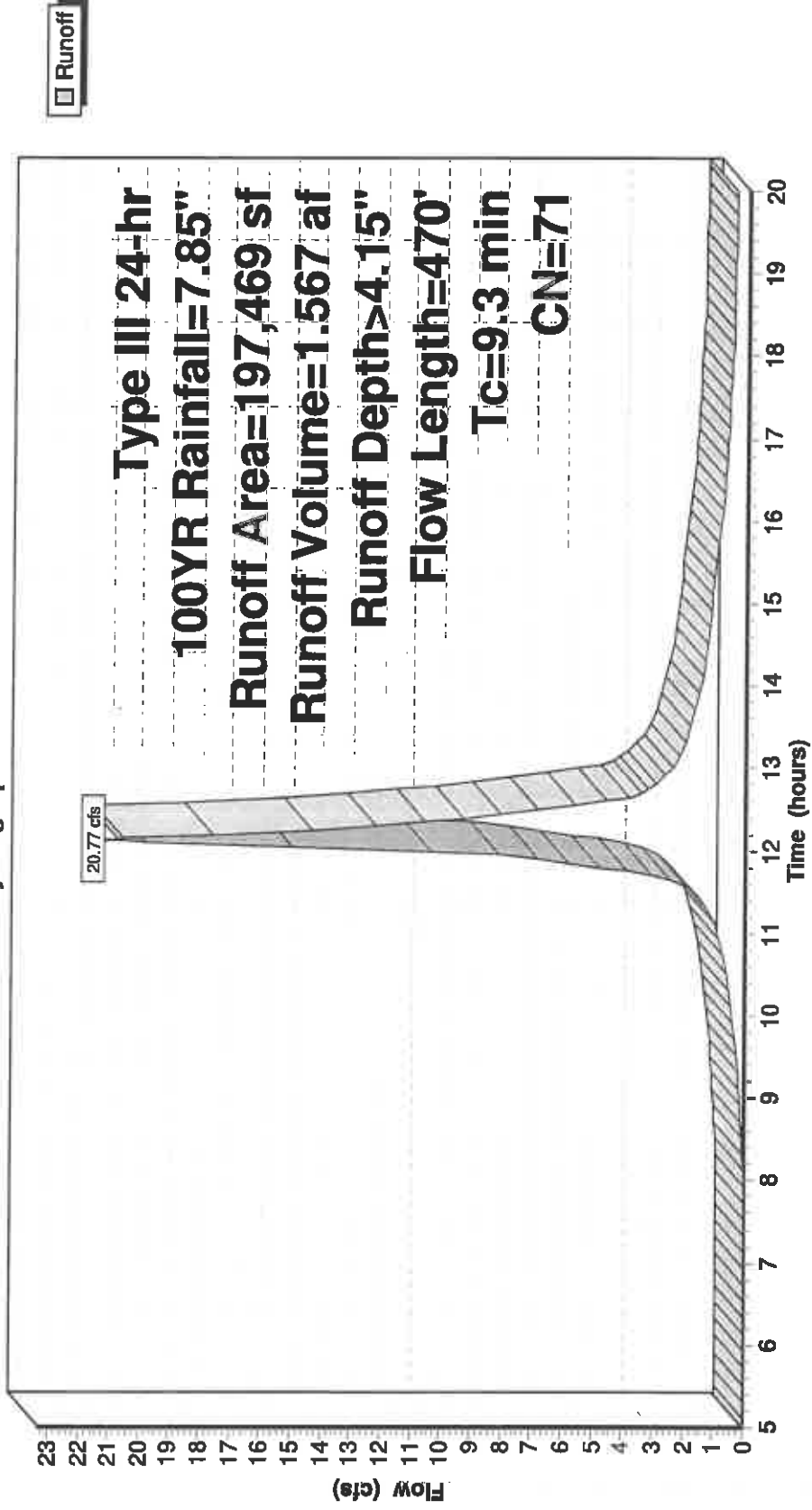
Type III 24-hr 100YR Rainfall=7.85"

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Page 40

Subcatchment E-2: DA E-2

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Type III 24-hr 100YR Rainfall=7.85"

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Page 41

Summary for Subcatchment E-3: DA E-3

Runoff = 2.52 cfs @ 12.09 hrs, Volume= 0.171 af, Depth> 4.15"
Routed to Reach IP-3E : EX. CULVERT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR Rainfall=7.85"

Area (sf)	CN	Description
15,851	70	Woods, Good, HSG C
5,631	74	>75% Grass cover, Good, HSG C
21,482	71	Weighted Average
21,482		100.00% Pervious Area

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

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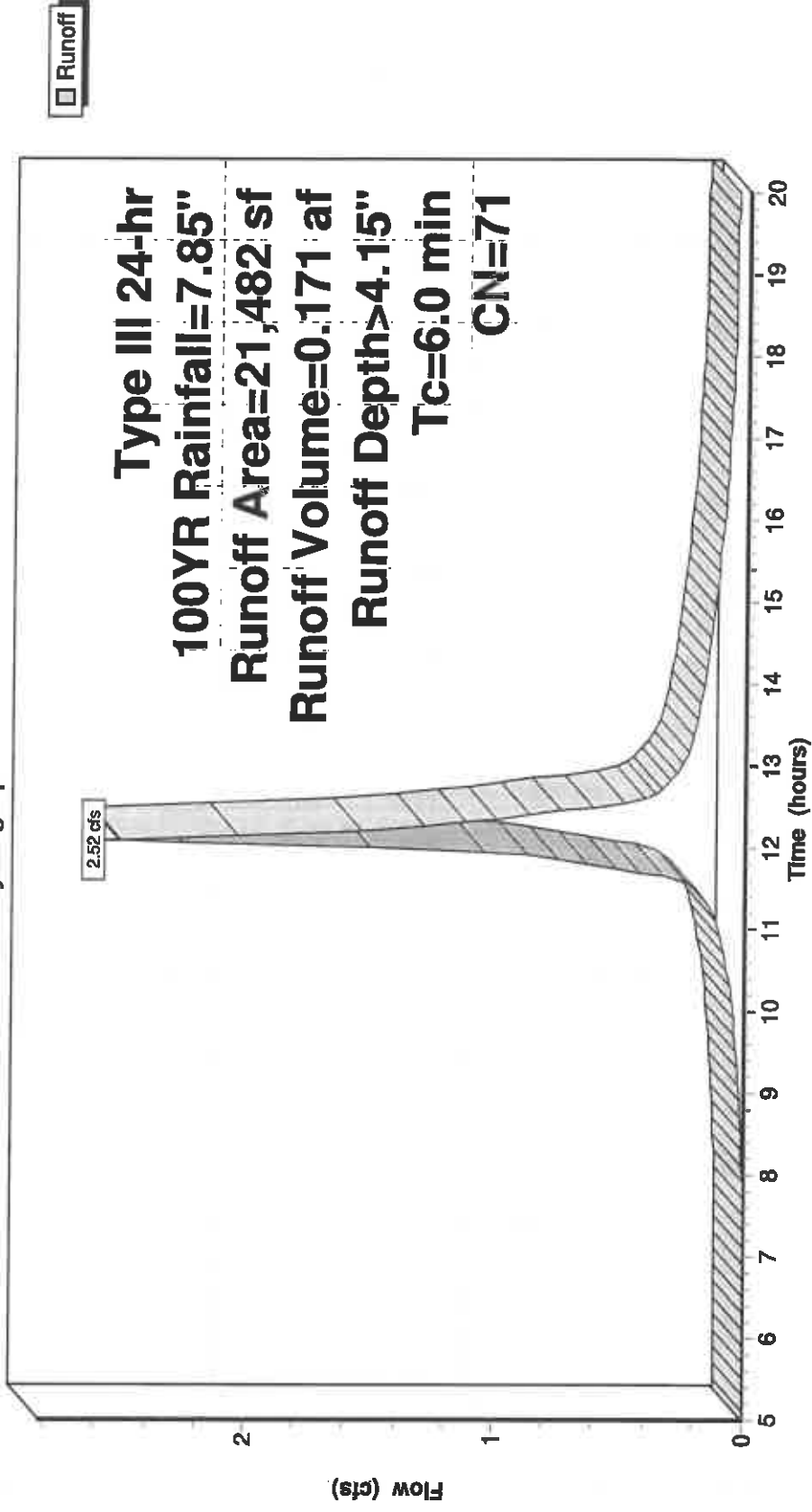
Type III 24-hr 100YR Rainfall=7.85"

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Page 42

Subcatchment E-3: DA E-3

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Type III 24-hr 100YR Rainfall=7.85"

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Page 43

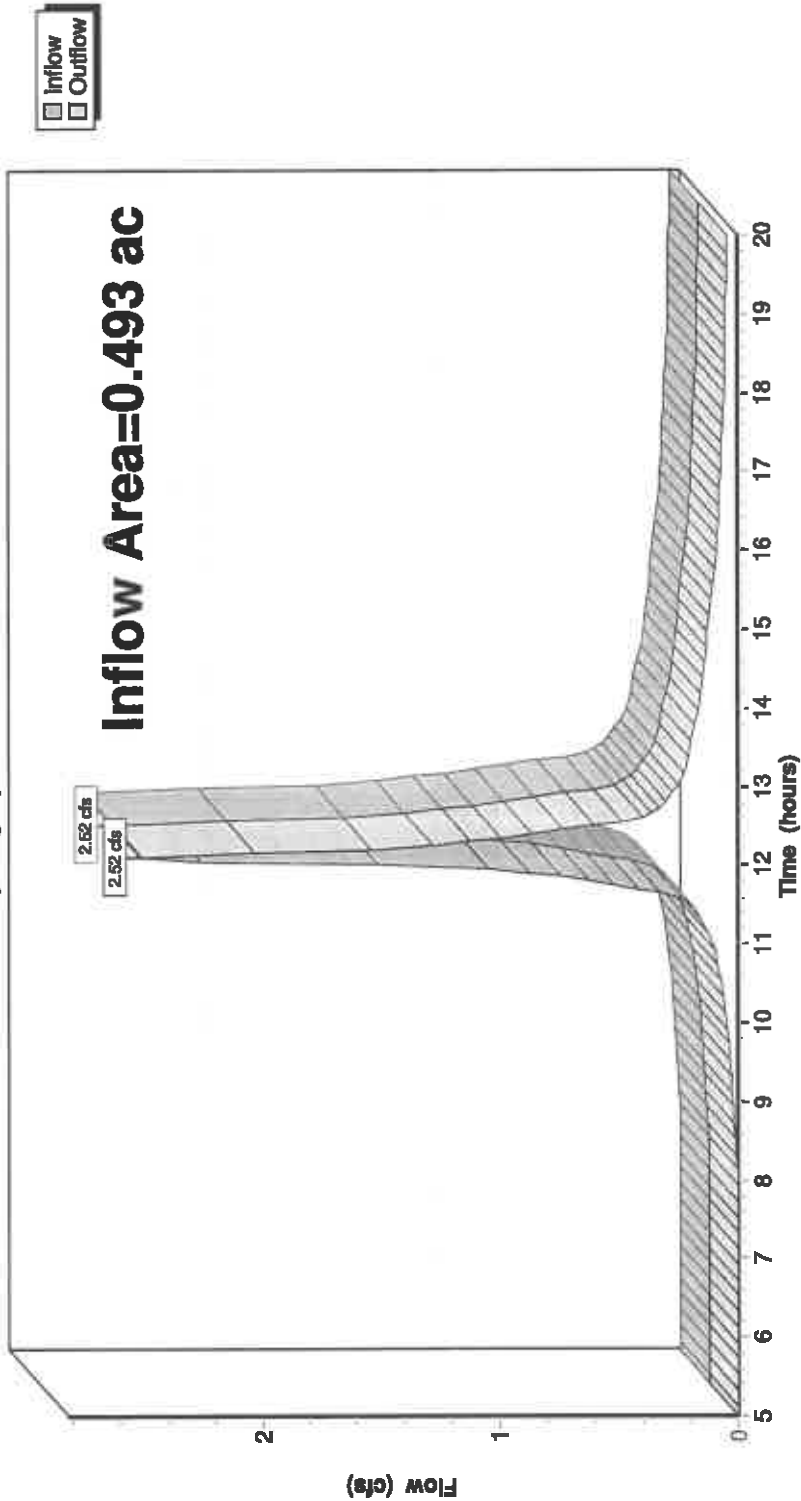
Summary for Reach IP-3E: EX. CULVERT

Inflow Area =	0.493 ac,	0.00% Impervious,	Inflow Depth > 4.15"	for 100YR event
Inflow =	2.52 cfs @	12.09 hrs,	Volume=	0.171 af
Outflow =	2.52 cfs @	12.09 hrs,	Volume=	0.171 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-3E: EX. CULVERT

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Type III 24-hr 100YR Rainfall=7.85"

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Page 44

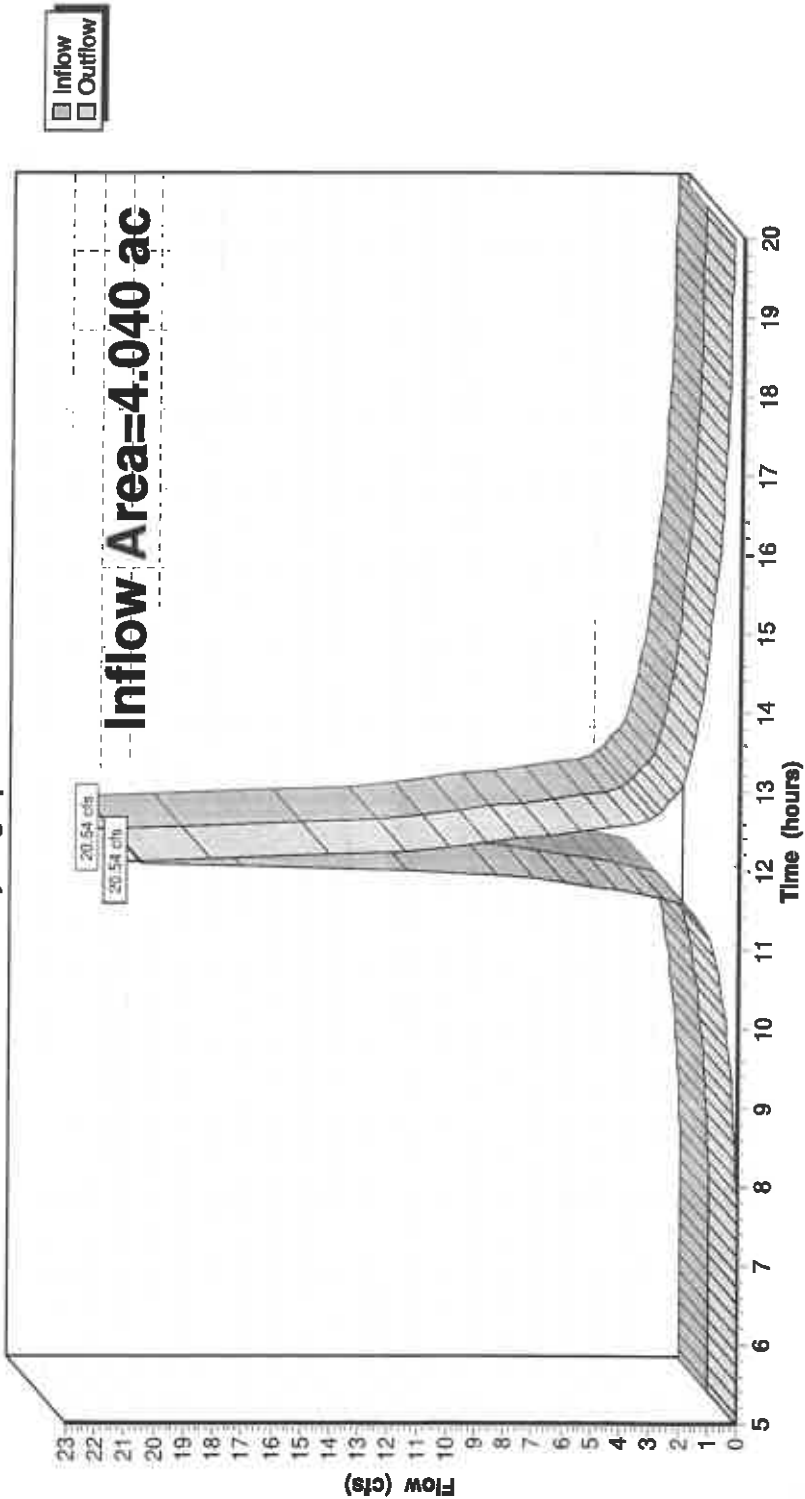
Summary for Reach IP-E1: 45 MAIN ST

Inflow Area = 4.040 ac, 4.02% Impervious, Inflow Depth > 4.26" for 100YR event
Inflow = 20.54 cfs @ 12.10 hrs, Volume= 1.435 af
Outflow = 20.54 cfs @ 12.10 hrs, Volume= 1.435 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+ Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-E1: 45 MAIN ST

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Type III 24-hr 100YR Rainfall=7.85"

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Page 45

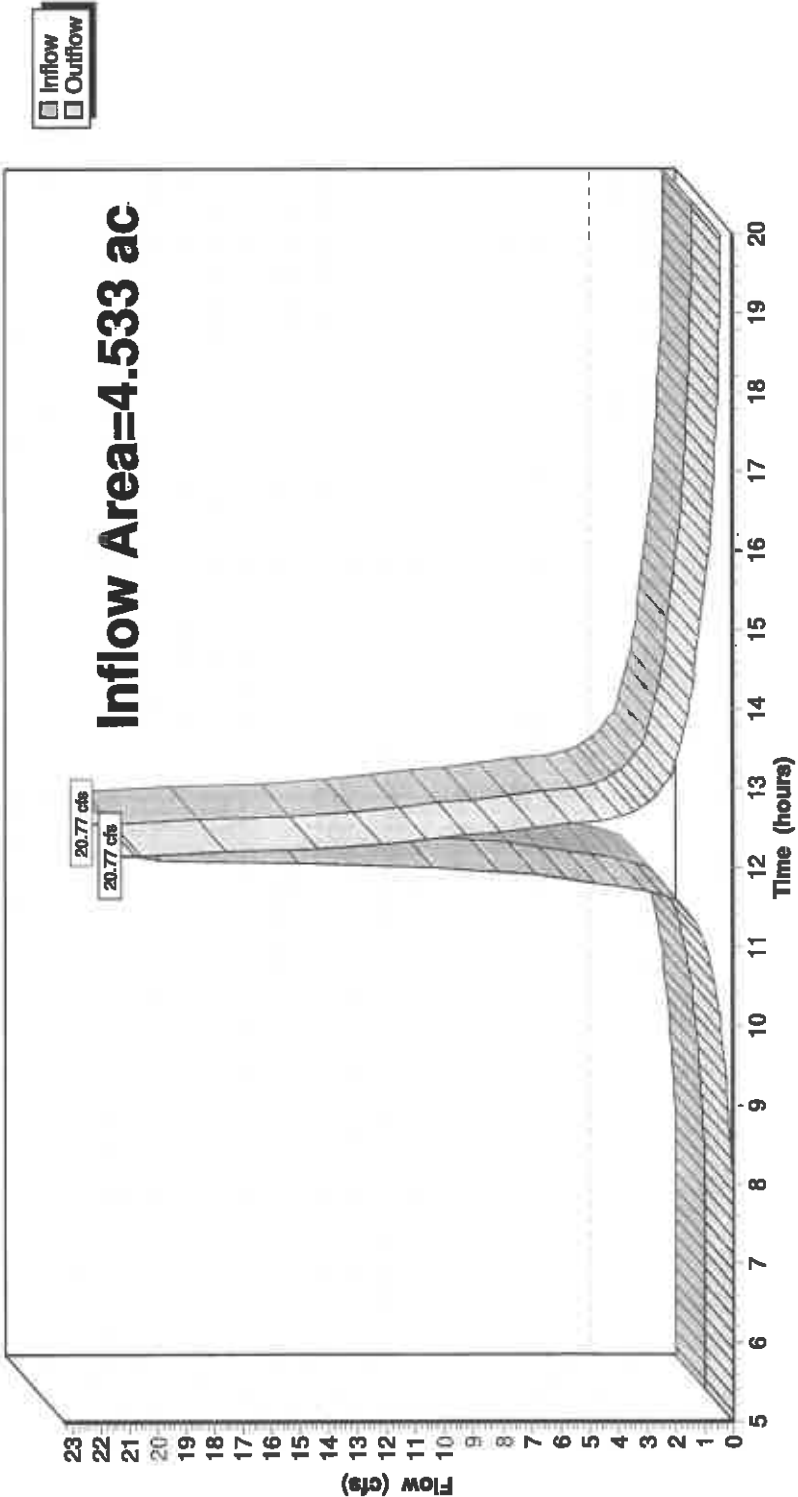
Summary for Reach IP-E2: SCHOOL ST

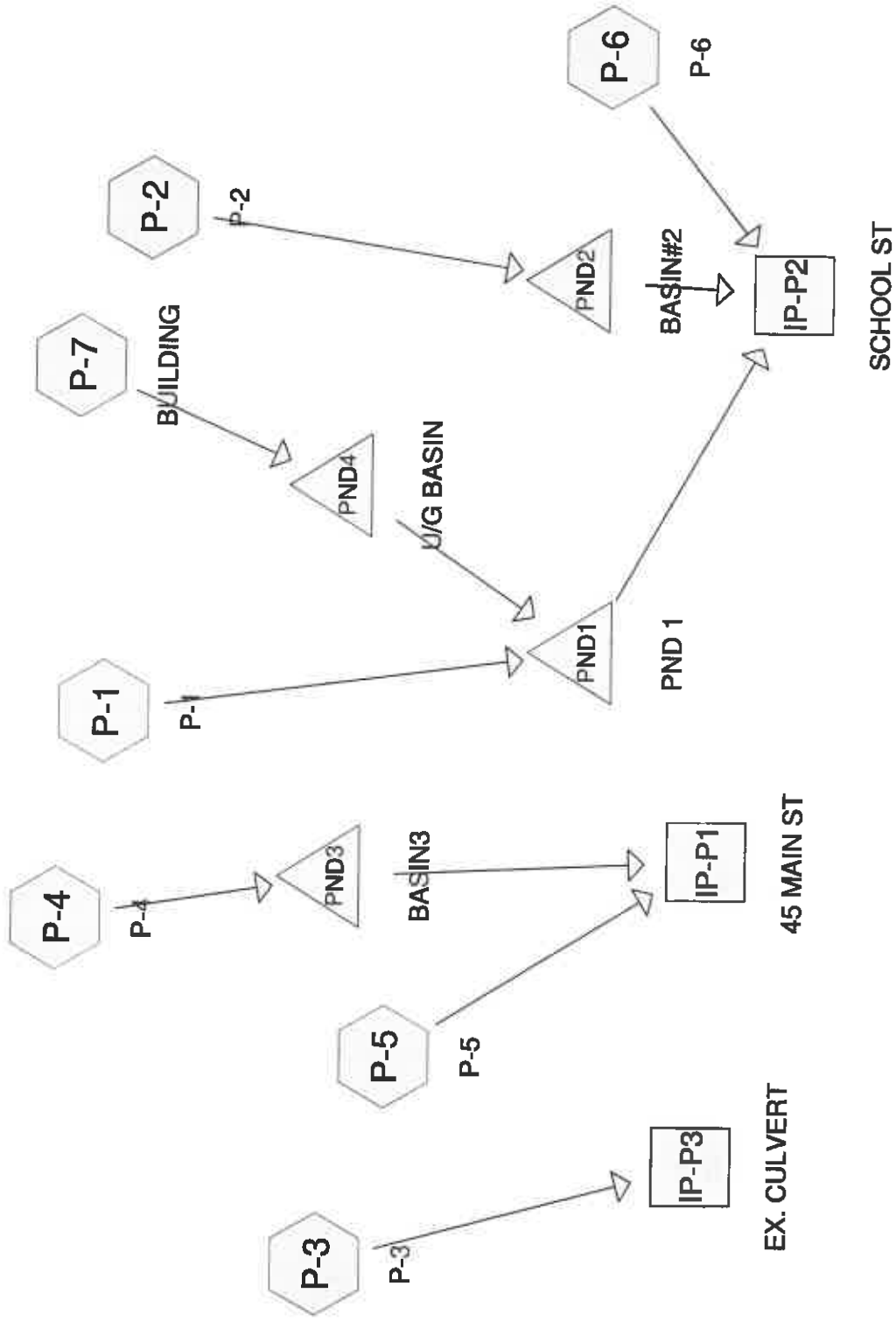
Inflow Area = 4.533 ac, 2.56% Impervious, Inflow Depth > 4.15" for 100YR event
Inflow = 20.77 cfs @ 12.13 hrs, Volume= 1.567 af
Outflow = 20.77 cfs @ 12.13 hrs, Volume= 1.567 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

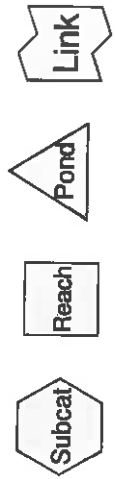
Reach IP-E2: SCHOOL ST

Hydrograph





Routing Diagram for POST DEVELOPMENT 3-22-24
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POST DEVELOPMENT 3-22-24

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Page 2

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2YR	Type III 24-hr		Default	24.00	1	3.39	2
2	10YR	Type III 24-hr		Default	24.00	1	5.11	2
3	25YR	Type III 24-hr		Default	24.00	1	6.19	2
4	100YR	Type III 24-hr		Default	24.00	1	7.85	2

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Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.341	74	>75% Grass cover, Good, HSG C (P-1, P-2, P-3, P-4, P-6)
1.540	98	Paved parking, HSG C (P-1, P-2, P-3, P-4)
0.514	98	Roofs, HSG C (P-7)
6.766	70	Woods, Good, HSG C (P-1, P-2, P-3, P-4, P-5, P-6)
11.160	76	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
11.160	HSG C	P-1, P-2, P-3, P-4, P-5, P-6, P-7
0.000	HSG D	
0.000	Other	
11.160		TOTAL AREA

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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
0.000	0.000	2.341	0.000	0.000	2.341	>75% Grass cover, Good	P-1, P-2, P-3, P-4, P-6
0.000	0.000	1.540	0.000	0.000	1.540	Paved parking	P-1, P-2, P-3, P-4
0.000	0.000	0.514	0.000	0.000	0.514	Roofs	P-7
0.000	0.000	6.766	0.000	0.000	6.766	Woods, Good	P-1, P-2, P-3, P-4, P-5, P-6
0.000	0.000	11.160	0.000	0.000	11.160	TOTAL AREA	

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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	P-1	0.00	0.00	288.0	0.0250	0.010	0.0	18.0	0.0	P-1
2	P-4	0.00	0.00	250.0	0.0250	0.010	0.0	15.0	0.0	P-4

POST DEVELOPMENT 3-22-24

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Type III 24-hr 2YR Rainfall=3.39"

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Page 7

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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 P-1: P-1

Runoff Area=81,268 sf 39.90% Impervious Runoff Depth>1.57"
Flow Length=618' Tc=7.1 min CN=82 Runoff=3.51 cfs 0.244 af

Subcatchment P-2: P-2

Runoff Area=82,391 sf 33.69% Impervious Runoff Depth>1.50"
Flow Length=330' Tc=7.1 min CN=81 Runoff=3.40 cfs 0.237 af

Subcatchment P-3: P-3

Runoff Area=16,235 sf 16.61% Impervious Runoff Depth>1.18"
Tc=6.0 min CN=76 Runoff=0.54 cfs 0.037 af

Subcatchment P-4: P-4

Runoff Area=56,906 sf 7.39% Impervious Runoff Depth>1.06"
Flow Length=505' Tc=5.9 min CN=74 Runoff=1.69 cfs 0.116 af

Subcatchment P-5: P-5

Runoff Area=145,259 sf 0.00% Impervious Runoff Depth>0.85"
Tc=10.0 min CN=70 Runoff=2.89 cfs 0.236 af

Subcatchment P-6: P-6

Runoff Area=81,691 sf 0.00% Impervious Runoff Depth>0.90"
Flow Length=429' Slope=0.0450 ' Tc=8.1 min CN=71 Runoff=1.83 cfs 0.141 af

Subcatchment P-7: BUILDING

Runoff Area=22,400 sf 100.00% Impervious Runoff Depth>2.95"
Tc=6.0 min CN=98 Runoff=1.65 cfs 0.126 af

Reach IP-P1: 45 MAIN ST

Inflow=2.89 cfs 0.288 af
Outflow=2.89 cfs 0.288 af

Reach IP-P2: SCHOOL ST

Inflow=1.83 cfs 0.322 af
Outflow=1.83 cfs 0.322 af

Reach IP-P3: EX. CULVERT

Inflow=0.52 cfs 0.037 af
Outflow=0.52 cfs 0.037 af

Pond PND1: PND 1

Peak Elev=325.16' Storage=6,110 cf Inflow=3.51 cfs 0.244 af
Discarded=0.02 cfs 0.013 af Primary=0.29 cfs 0.122 af Outflow=0.31 cfs 0.135 af

POST DEVELOPMENT 3-22-24

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Type III 24-hr 2YR Rainfall=3.39"

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Page 8

Pond PND2: BASIN#2

Discarded=0.03 cfs Peak Elev=325.95' Storage=7,304 cf Inflow=3.40 cfs 0.237 af
Primary=0.10 cfs Outflow=0.12 cfs 0.079 af

Pond PND3: BASIN3

Discarded=0.01 cfs Peak Elev=332.41' Storage=2,727 cf Inflow=1.69 cfs 0.116 af
Primary=0.18 cfs Outflow=0.18 cfs 0.057 af

Pond PND4: U/G BASIN

Discarded=0.02 cfs Peak Elev=326.31' Storage=4,374 cf Inflow=1.65 cfs 0.126 af
Primary=0.00 cfs Outflow=0.02 cfs 0.026 af

Total Runoff Area = 11.160 ac Runoff Volume = 1.137 af Average Runoff Depth = 1.22"
81.59% Pervious = 9.106 ac 18.41% Impervious = 2.054 ac

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Type III 24-hr 2YR Rainfall=3.39"

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Page 9

Summary for Subcatchment P-1: P-1

Runoff = 3.51 cfs @ 12.11 hrs, Volume= 0.244 af, Depth> 1.57"
Routed to Pond PND1 : PND 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type: III 24-hr 2YR Rainfall=3.39"

Area (s/)		CN	Description
32,428	98		Paved parking, HSG C
26,882	74		>75% Grass cover, Good, HSG C
21,958	70		Woods, Good, HSG C
81,268	82		Weighted Average
48,840			60.10% Pervious Area
32,428			39.90% Impervious Area
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)
4.1	50	0.0450	0.20
0.4	80	0.0450	3.42
1.6	100	0.0450	1.06
0.6	100	0.0200	2.87
0.4	288	0.0250	12.22
7.1	618	Total	

Sheet Flow, TRAVEL PATH A TO B
Grass: Short n= 0.150 P2= 3.20"
Shallow Concentrated Flow, TRAVEL PATH B TO C
Unpaved Kv= 16.1 fps
Shallow Concentrated Flow, TARVEL PATH C TO D
Woodland Kv= 5.0 fps
Shallow Concentrated Flow, TARVEL PATH D TO E
Paved Kv= 20.3 fps
Pipe Channel, TARVEL PATH E TO F
18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
n= 0.010

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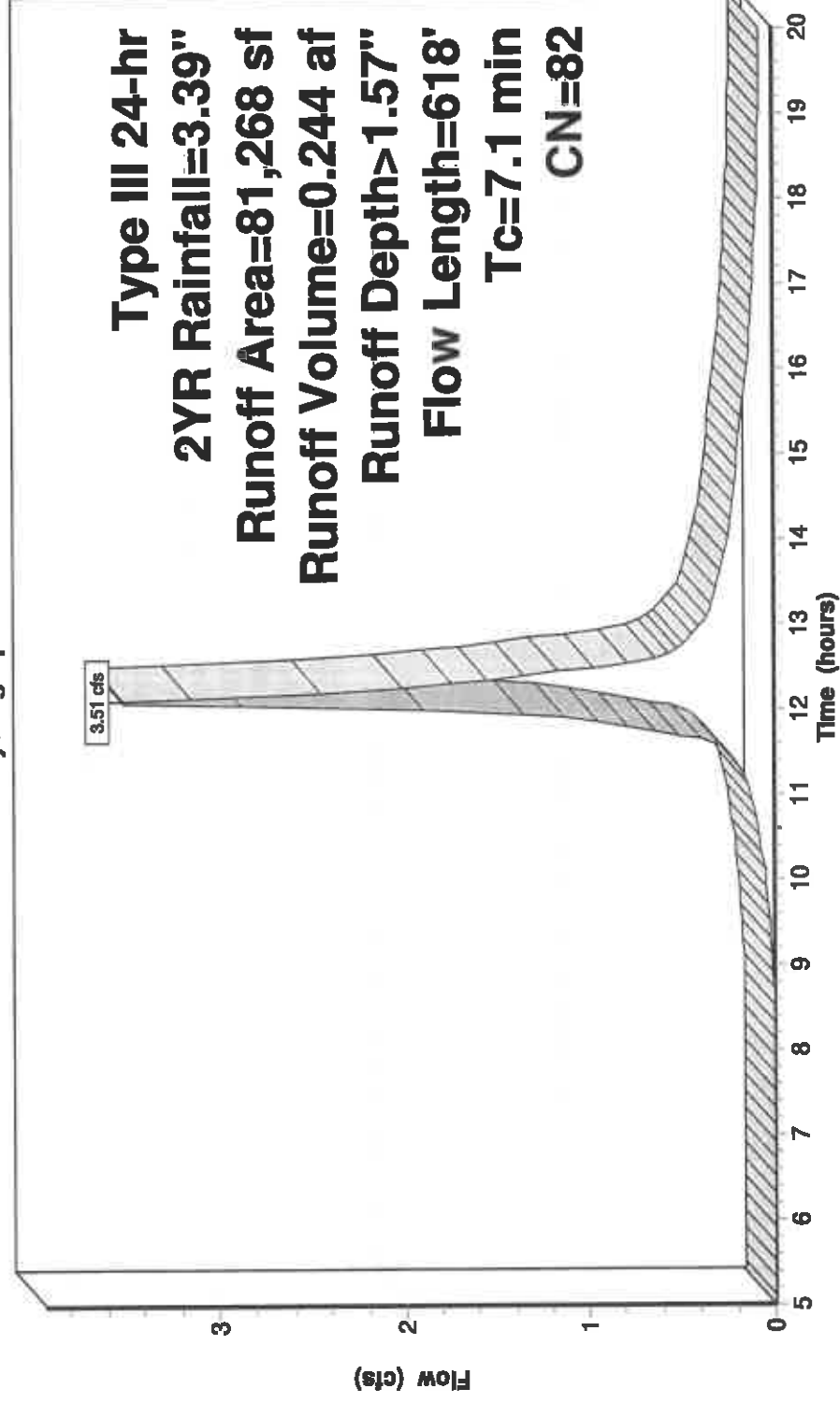
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Page 10

Subcatchment P-1: P-1

Hydrograph



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Type III 24-hr 2YR Rainfall=3.39"

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Page 11

Summary for Subcatchment P-2: P-2

Runoff = 3.40 cfs @ 12.11 hrs, Volume= 0.237 af, Depth> 1.50"
Routed to Pond PND2 : BASIN#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR Rainfall=3.39"

Area (sf)	CN	Description
27,755	98	Paved parking, HSG C
34,256	74	>75% Grass cover, Good, HSG C
20,380	70	Woods, Good, HSG C
82,391	81	Weighted Average
54,636		66.31% Pervious Area
27,755		33.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	50	0.0450	0.19		Sheet Flow, TRAVEL PATH A TO B
					Cultivated: Residue>20% n= 0.170 P2= 3.20"
0.7	135	0.0450	3.42		Shallow Concentrated Flow, TARVEL PATH B TO C
					Unpaved Kv= 16.1 fps
1.9	145	0.0650	1.27		Shallow Concentrated Flow, TRAVEL PATH C TO D
					Woodland Kv= 5.0 fps
7.1	330	Total			

POST DEVELOPMENT 3-22-24

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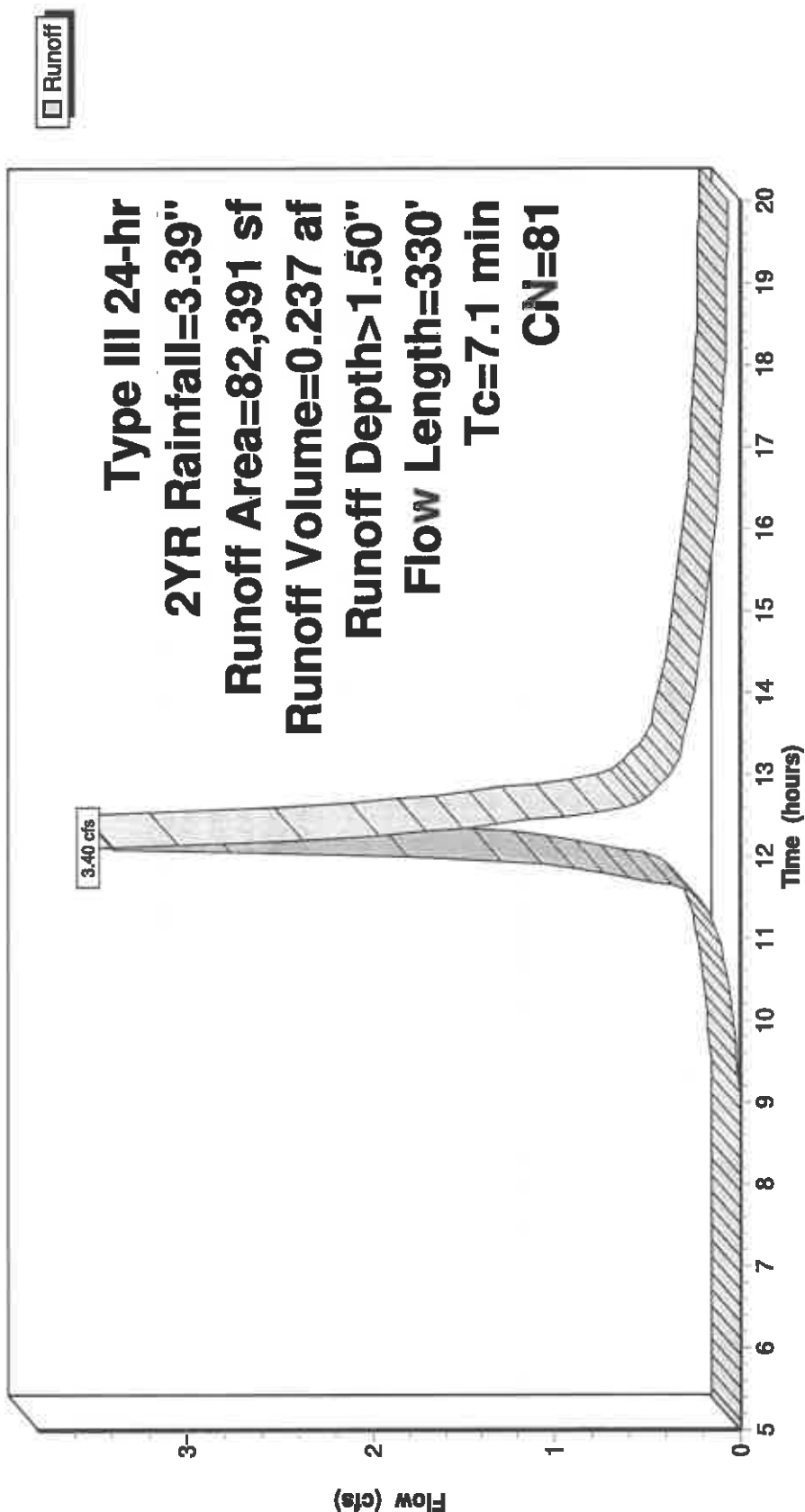
Type III 24-hr 2YR Rainfall=3.39"

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Page 12

Subcatchment P-2: P-2

Hydrograph



Summary for Subcatchment P-3: P-3

Runoff = 0.54 cfs @ 12.10 hrs, Volume= 0.037 af, Depth> 1.18"
 Routed to Reach IP-P3 : EX. CULVERT

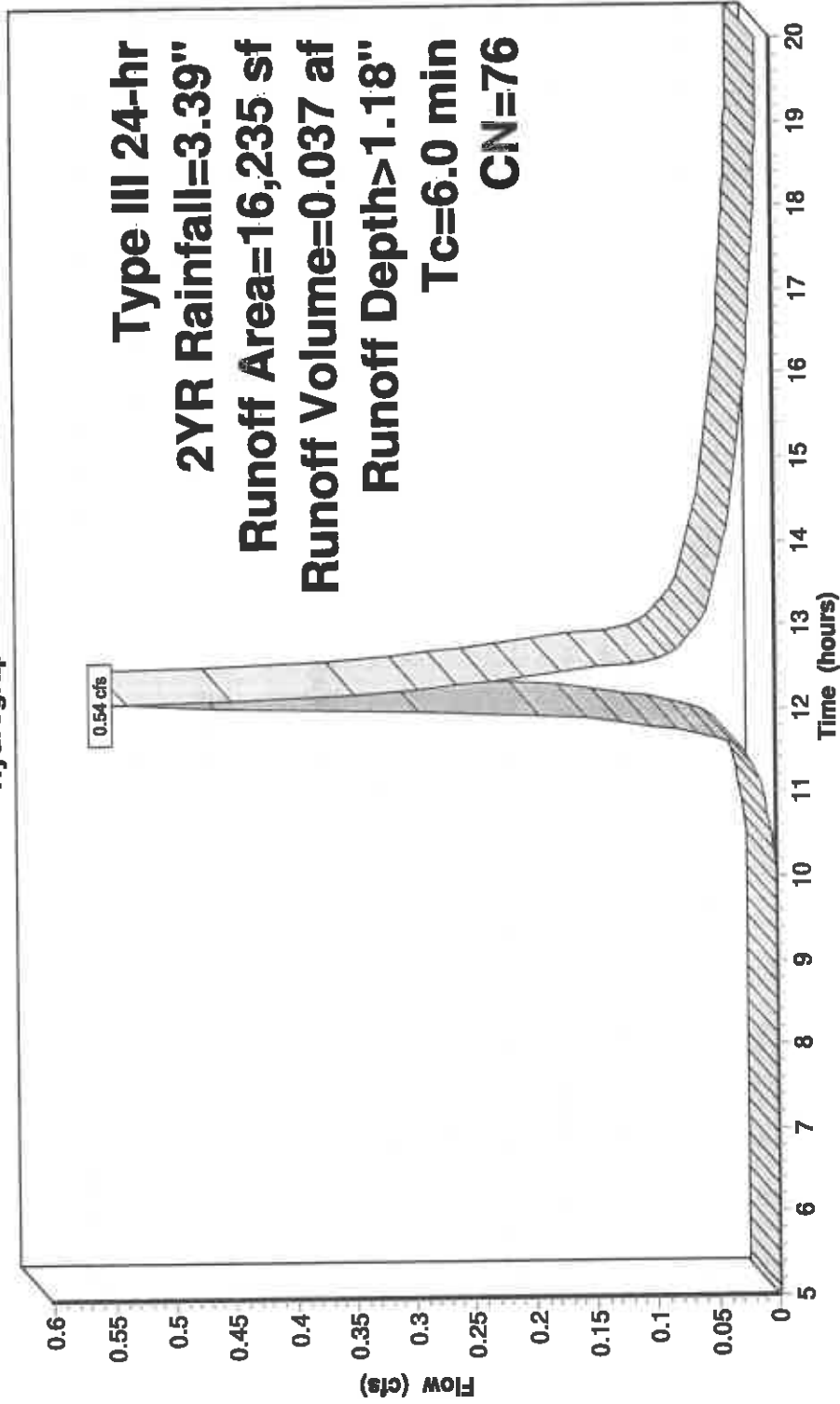
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2YR Rainfall=3.39"

Area (sf)	CN	Description
2,696	98	Paved parking, HSG C
5,650	74	>75% Grass cover, Good, HSG C
7,889	70	Woods, Good, HSG C
16,235	76	Weighted Average
13,539		83.39% Pervious Area
2,696		16.61% Impervious Area

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

Subcatchment P-3: P-3

Hydrograph



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Type III 24-hr 2YR Rainfall=3.39"

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Page 15

Summary for Subcatchment P-4: P-4

Runoff = 1.69 cfs @ 12.10 hrs, Volume= 0.116 af, Depth> 1.06"
Routed to Pond PND3 : BASIN3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR Rainfall=3.39"

Area (sf)	CN	Description
4,207	98	Paved parking, HSG C
22,144	74	>75% Grass cover, Good, HSG C
30,555	70	Woods, Good, HSG C
56,906	74	Weighted Average
52,699		92.61% Pervious Area
4,207		7.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	50	0.0350	0.19		Sheet Flow, TRAVEL PATH A TO B Grass: Short n= 0.150 P2= 3.20"
0.4	80	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C Unpaved Kv= 16.1 fps
0.5	100	0.4500	3.35		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
0.1	25	0.0250	3.21		Shallow Concentrated Flow, TRAVEL PATH D TO E Paved Kv= 20.3 fps
0.4	250	0.0250	10.82	13.28	Pipe Channel, TRAVEL PATH F TO E 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.010
5.9	505	Total			

POST DEVELOPMENT 3-22-24

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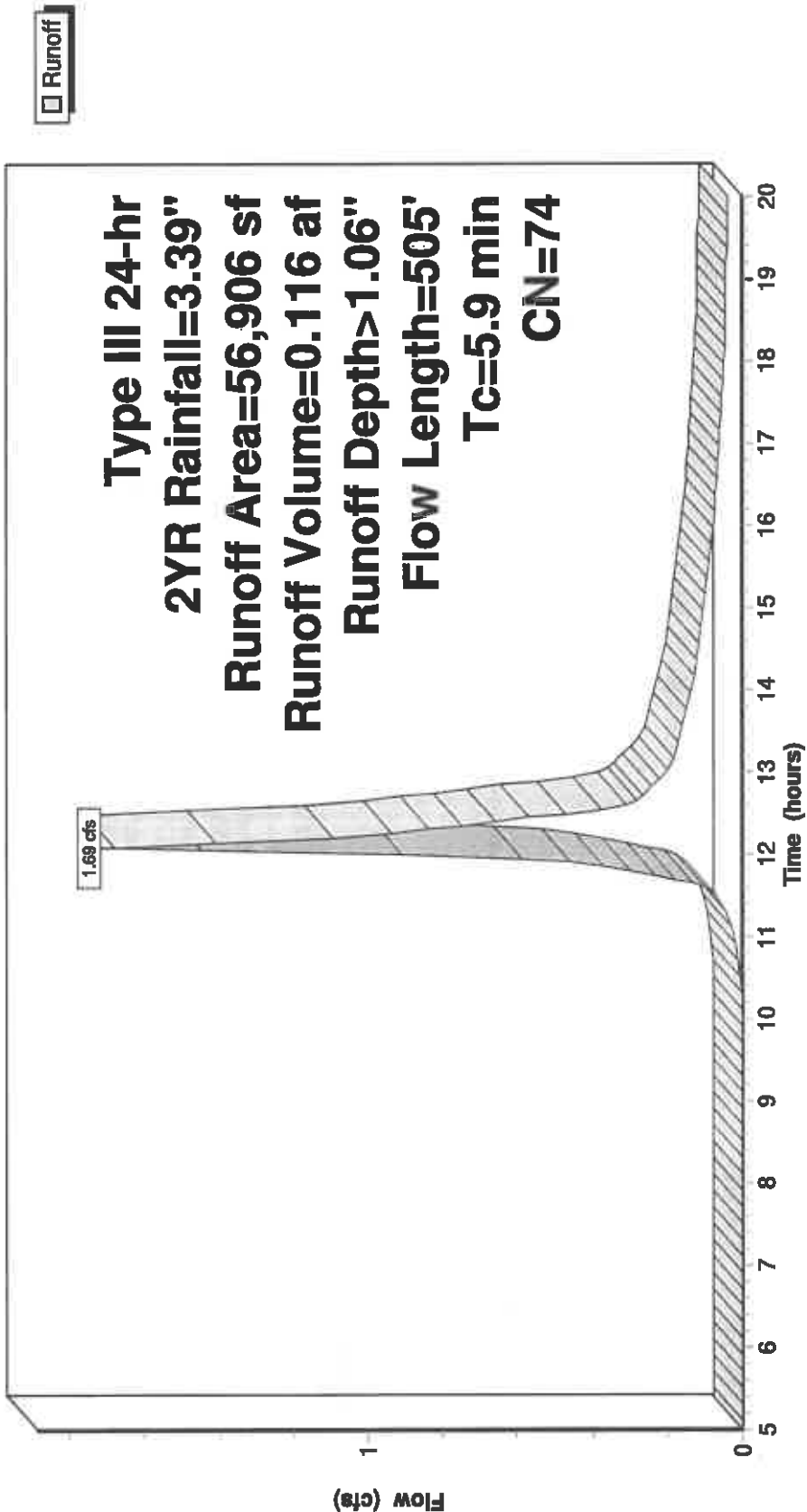
Type III 24-hr 2YR Rainfall=3.39"

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Page 16

Subcatchment P-4: P-4

Hydrograph



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Type III 24-hr 2YR Rainfall=3.39"

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Page 17

Summary for Subcatchment P-5: P-5

Runoff = 2.89 cfs @ 12.16 hrs, Volume= 0.236 af, Depth> 0.85"
 Routed to Reach IP-P1 : 45 MAIN ST

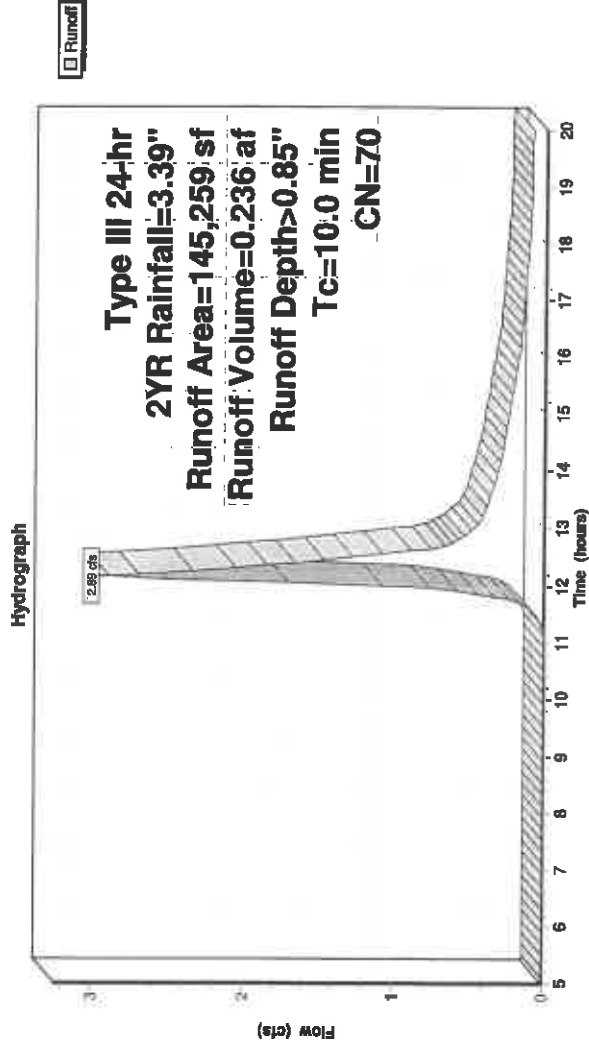
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2YR Rainfall=3.39"

Area (sf)	CN	Description
145,259	70	Woods, Good, HSG C
145,259	100.00%	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					

Direct Entry, TRAVEL PATH

Subcatchment P-5: P-5



Summary for Subcatchment P-6: P-6

Runoff = 1.83 cfs @ 12.13 hrs, Volume= 0.141 af, Depth> 0.90"
 Routed to Reach IP-P2 : SCHOOL ST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2YR Rainfall=3.39"

Area (sf)		CN	Description
13,023	74	>75% Grass cover, Good, HSG C	
68,668	70	Woods, Good, HSG C	
81,691	71	Weighted Average	
81,691		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0450	0.20		Sheet Flow, TRAVEL PATH A TO B Grass: Short n= 0.150 P2= 3.20"
0.9	184	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C Unpaved Kv= 16.1 fps
3.1	195	0.0450	1.06		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
8.1	429	Total			

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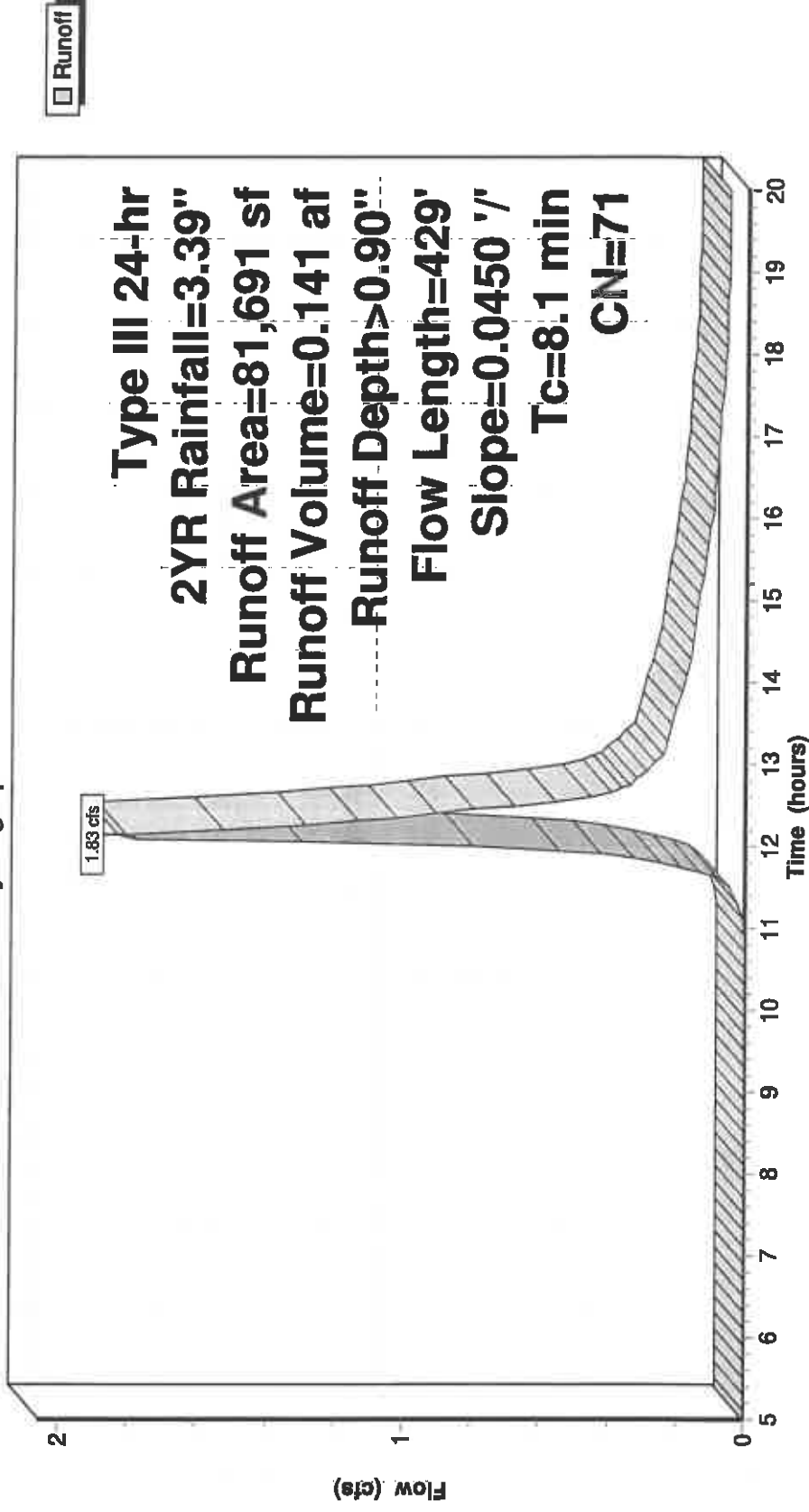
Type III 24-hr 2YR Rainfall=3.39"

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Page 19

Subcatchment P-6: P-6

Hydrograph



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Type III 24-hr 2YR Rainfall=3.39"

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Page 20

Summary for Subcatchment P-7: BUILDING

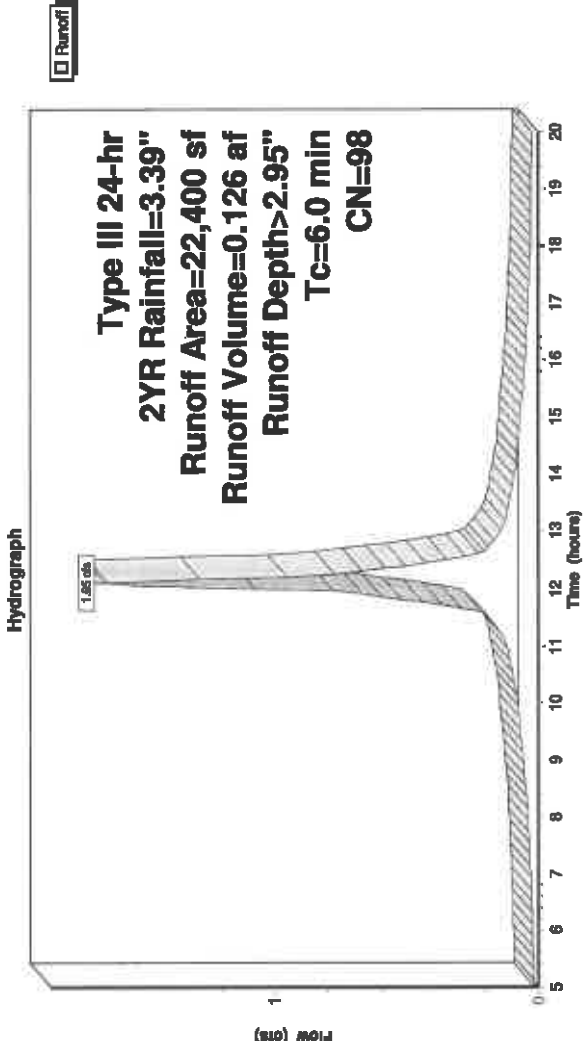
Runoff = 1.65 cfs @ 12.09 hrs, Volume= 0.126 af, Depth> 2.95"
Routed to Pond PND4 : U/G BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR Rainfall=3.39"

Area (sf)	CN	Description
22,400	98	Roofs, HSG C
22,400	100.00%	Impervious Area

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

Subcatchment P-7: BUILDING



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Type III 24-hr 2YR Rainfall=3.39"

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Page 21

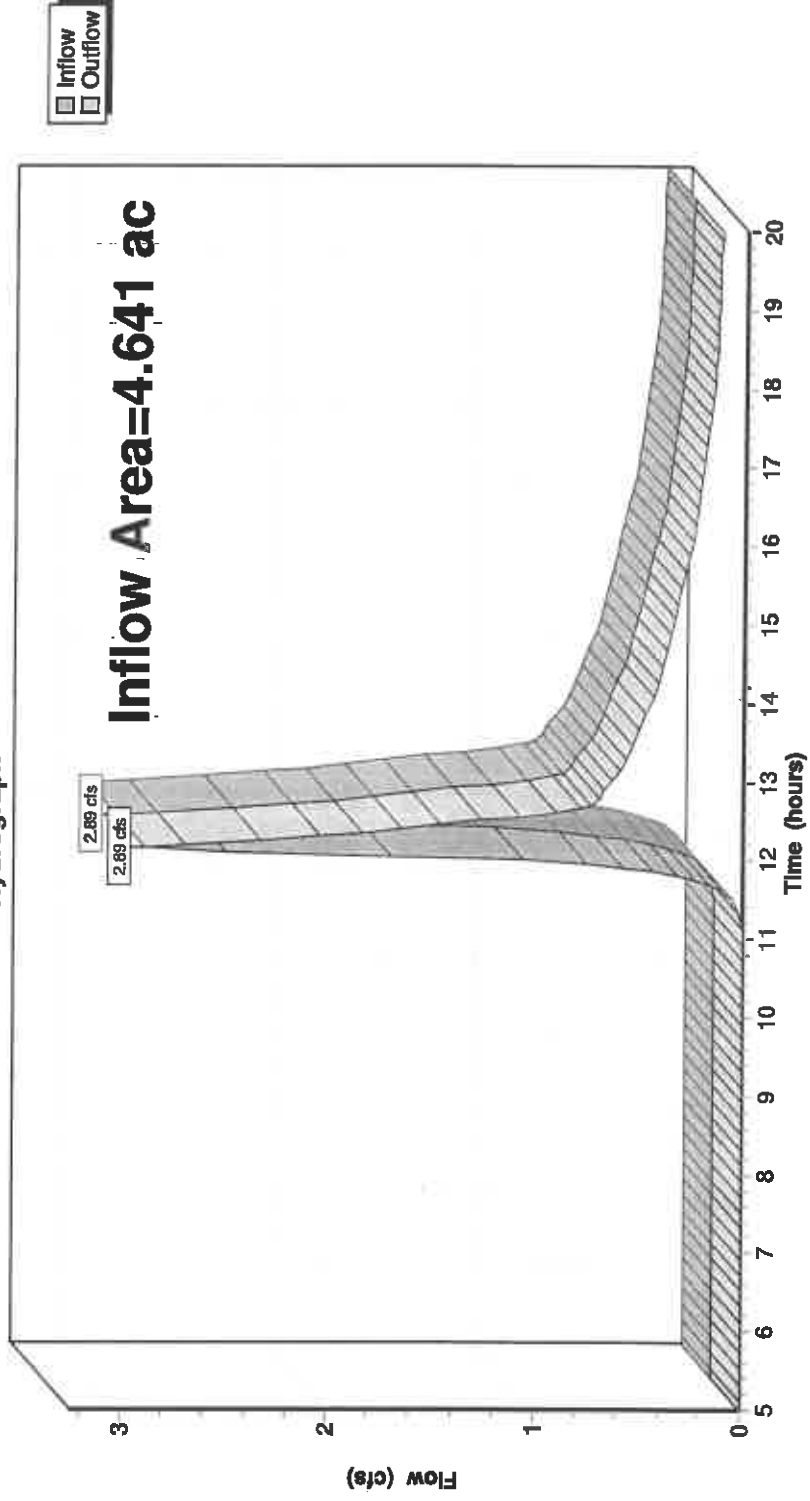
Summary for Reach IP-P1: 45 MAIN ST

Inflow Area = 4.641 ac, 2.08% Impervious, Inflow Depth > 0.74" for 2YR event
Inflow = 2.89 cfs @ 12.16 hrs, Volume= 0.288 af
Outflow = 2.89 cfs @ 12.16 hrs, Volume= 0.288 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-P1: 45 MAIN ST

Hydrograph



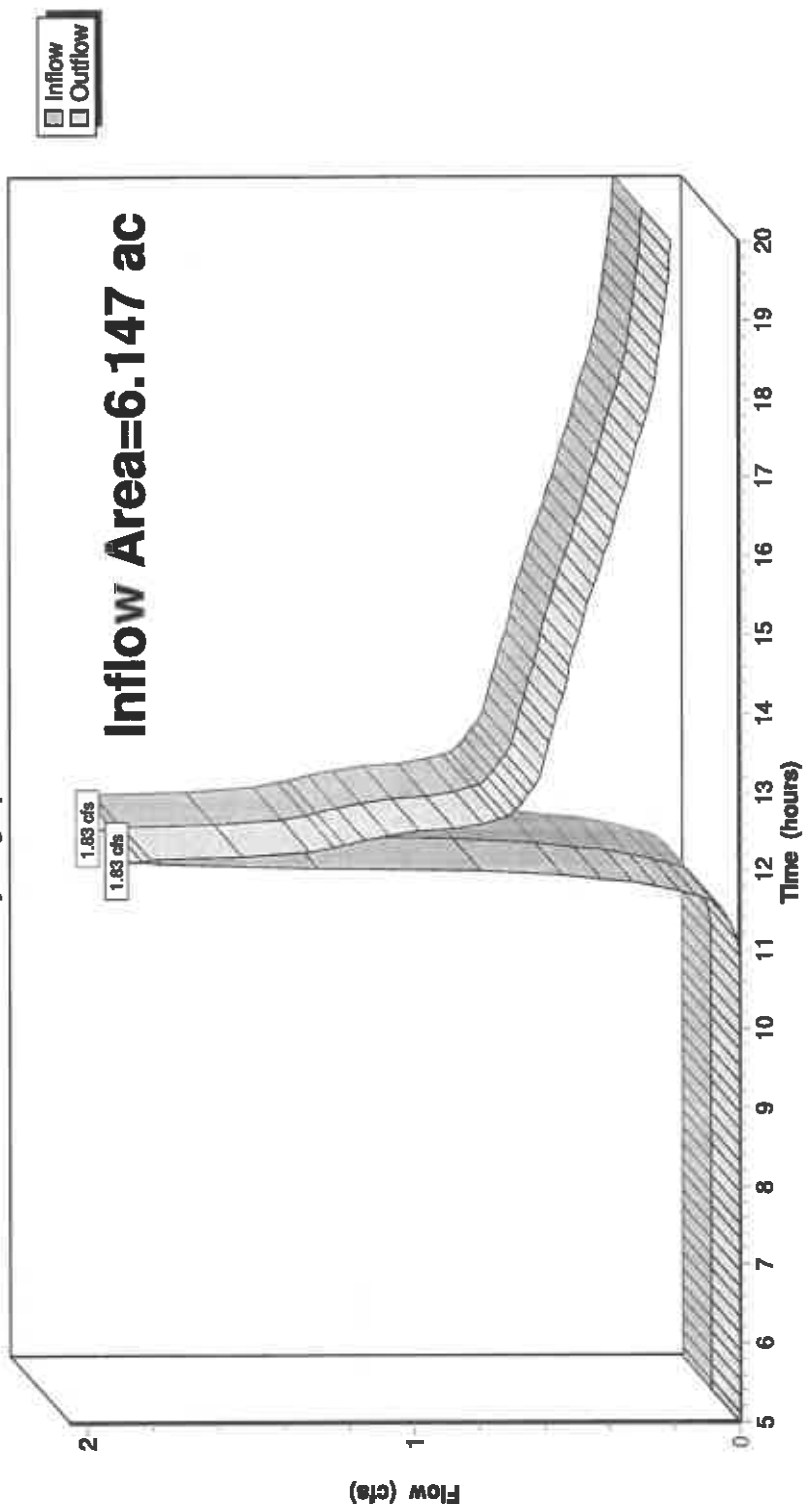
Summary for Reach IP-P2: SCHOOL ST

Inflow Area =	6.147 ac, 30.84% Impervious, Inflow Depth > 0.63" for 2YR event
Inflow =	1.83 cfs @ 12.13 hrs, Volume= 0.322 af
Outflow =	1.83 cfs @ 12.13 hrs, Volume= 0.322 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+ Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-P2: SCHOOL ST

Hydrograph



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Type III 24-hr 2YR Rainfall=3.39"

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Page 23

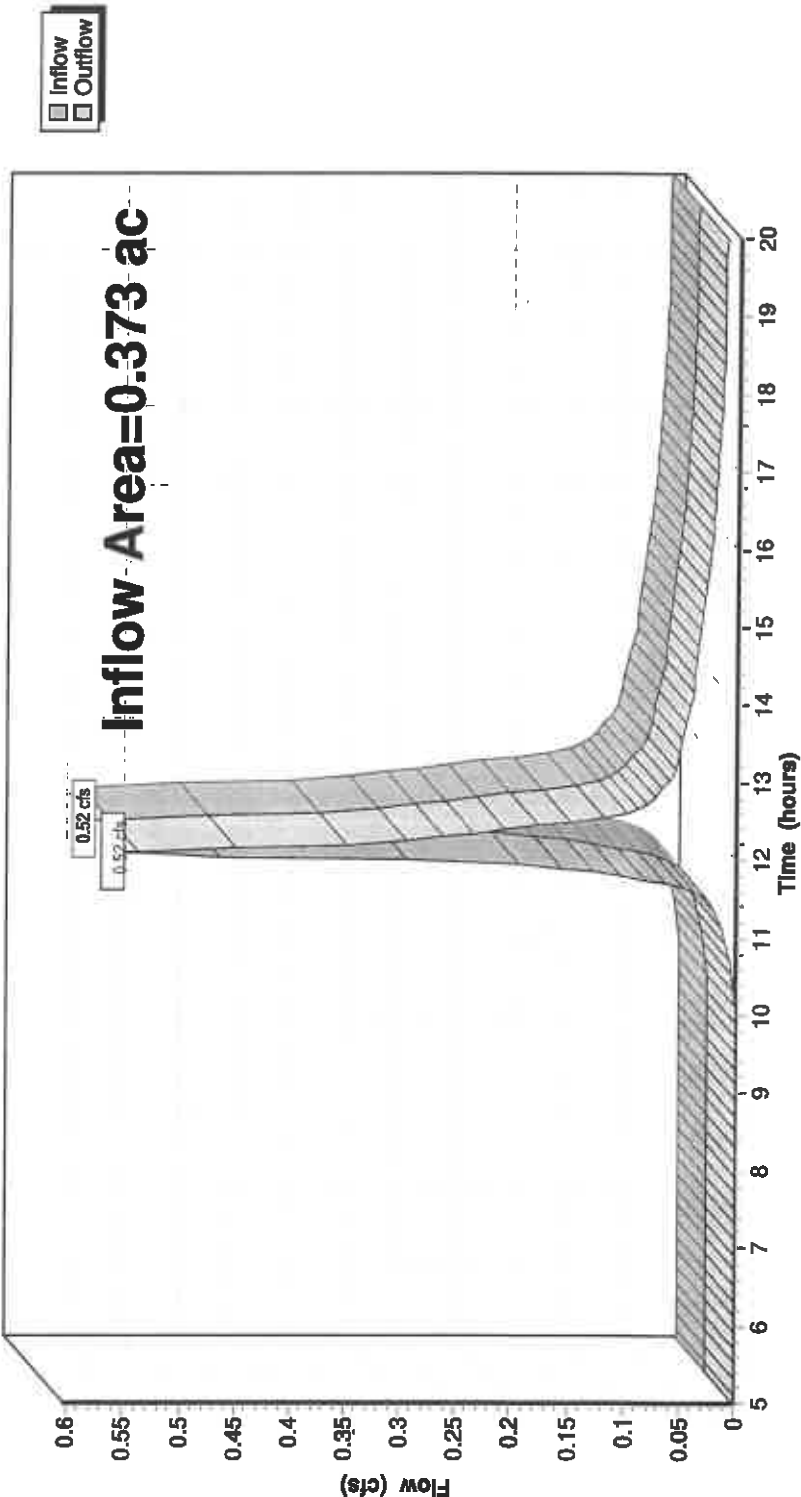
Summary for Reach IP-P3: EX. CULVERT

Inflow Area = 0.373 ac, 16.61% Impervious, Inflow Depth > 1.18" for 2YR event
Inflow = 0.52 cfs @ 12.10 hrs, Volume= 0.037 af
Outflow = 0.52 cfs @ 12.10 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-P3: EX. CULVERT

Hydrograph



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Type III 24-hr 2YR Rainfall=3.39"

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Page 24

Summary for Pond PND1: PND 1

Inflow Area = 2.380 ac, 52.89% Impervious, Inflow Depth > 1.23" for 2YR event
Inflow = 3.51 cfs @ 12.11 hrs, Volume= 0.244 af
Outflow = 0.31 cfs @ 13.42 hrs, Volume= 0.135 af, Atten= 91%, Lag= 78.6 min
Discarded = 0.02 cfs @ 13.42 hrs, Volume= 0.013 af
Primary = 0.29 cfs @ 13.42 hrs, Volume= 0.122 af
Routed to Reach IP-P2 : SCHOOL ST

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 325.16' @ 13.42 hrs Surf.Area= 2,979 sf Storage= 6,110 cf

Plug-Flow detention time= 199.4 min calculated for 0.135 af (55% of inflow)
Center-of-Mass det. time= 120.1 min (917.4 - 797.3)

Volume Invert Avail.Storage Storage Description

#1 322.00' 23,430 cf Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
322.00	1,030	0	0
324.00	2,125	3,155	3,155
326.00	3,600	5,725	8,880
328.00	5,300	8,900	17,780
329.00	6,000	5,650	23,430

Device Routing Invert Outlet Devices

Device	Routing	Invert	Outlet Devices
#1	Discarded	322.00'	0.270 In/hr Exfiltration over Surface area
#2	Primary	324.50'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	326.50'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	327.50'	15.0' 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

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Type III 24-hr 2YR Rainfall=3.39"

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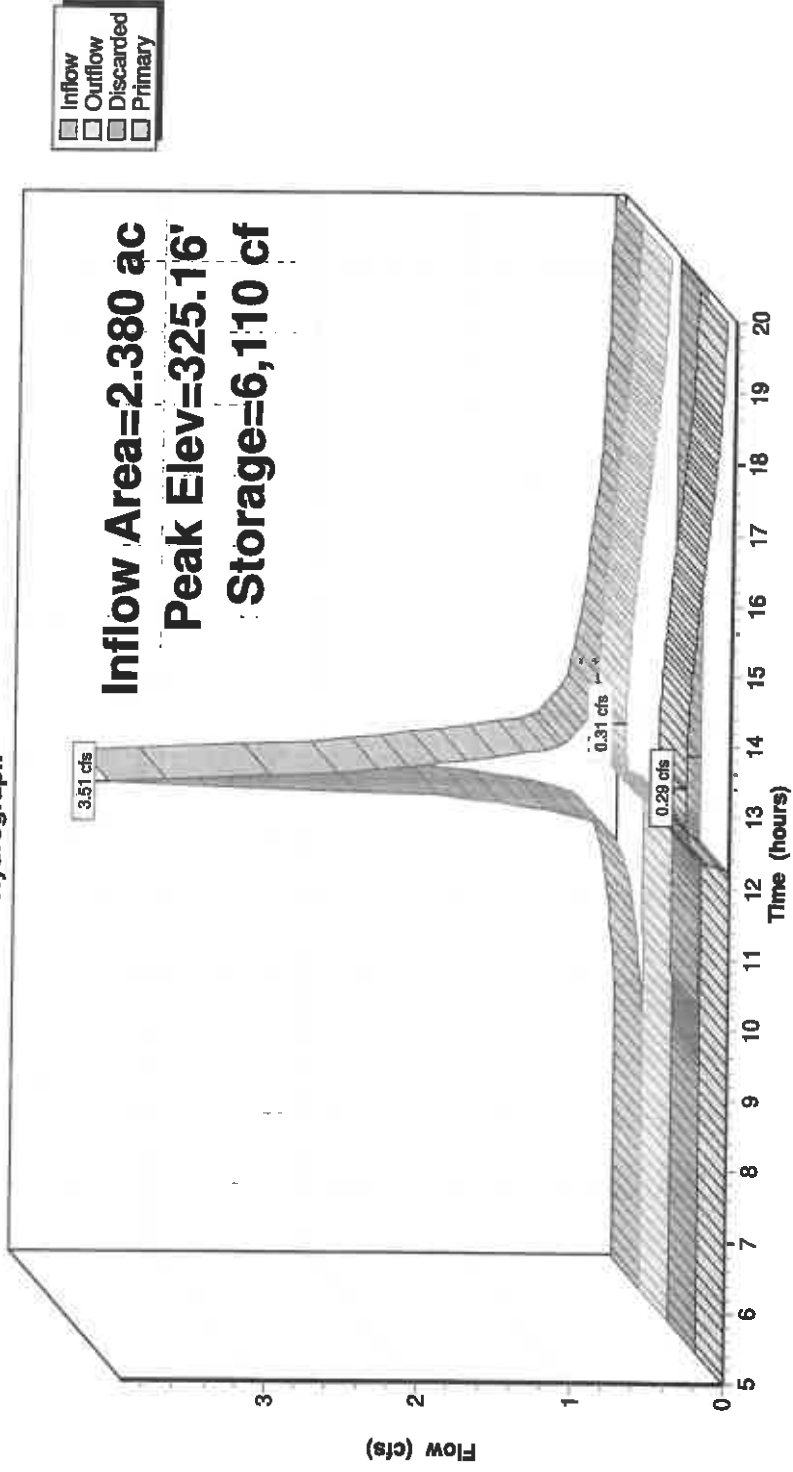
Page 25

Discarded OutFlow Max=0.02 cfs @ 13.42 hrs HW=325.16' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.29 cfs @ 13.42 hrs HW=325.16' (Free Discharge)
2=Orifice/Grate (Orifice Controls 0.29 cfs @ 3.37 fps)
3=Orifice/Grate (Controls 0.00 cfs)
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PND1: PND 1

Hydrograph



		0.270 in/hr	Exfiltration over Surface area
#1	Discarded	324.00'	
#2	Primary	325.00'	2.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	327.30'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	328.00'	15.0' long x 1.0' breadth Broad-Crested Rectangular Weir

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Type III 24-hr 2YR Rainfall=3.39"

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Page 27

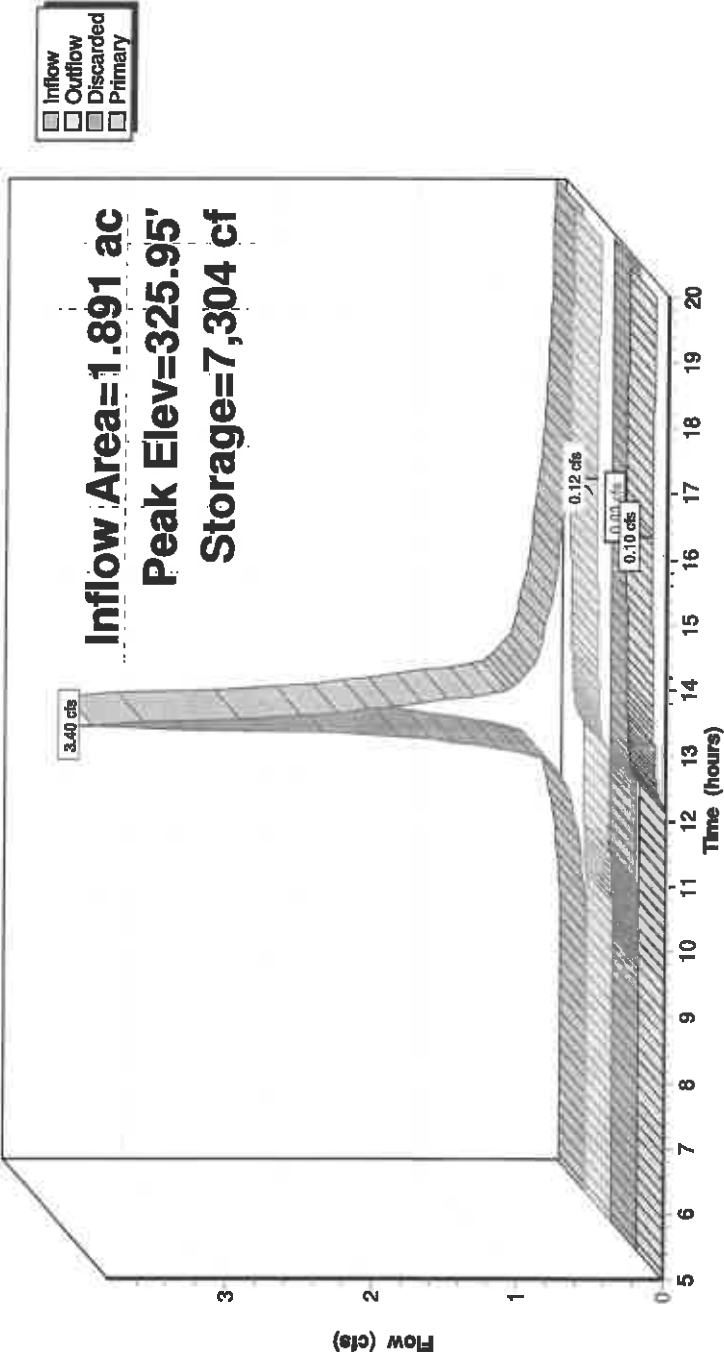
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.03 cfs @ 16.34 hrs HW=325.95' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.10 cfs @ 16.34 hrs HW=325.95' (Free Discharge)
2=Orifice/Grate (Orifice Controls 0.10 cfs @ 4.48 fps)
3=Orifice/Grate (Controls 0.00 cfs)
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PND2: BASIN#2

Hydrograph



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Type III 24-hr 2YR Rainfall=3.39"

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Page 28

Summary for Pond PND3: BASIN3

Inflow Area = 1.306 ac, 7.39% Impervious, Inflow Depth > 1.06" for 2YR event
Inflow = 1.69 cfs @ 12.10 hrs, Volume= 0.116 af
Outflow = 0.18 cfs @ 13.15 hrs, Volume= 0.057 af, Atten= 89%, Lag= 63.0 min
Discarded = 0.01 cfs @ 13.15 hrs, Volume= 0.006 af
Primary = 0.18 cfs @ 13.15 hrs, Volume= 0.051 af
Routed to Reach IP-P1 : 45 MAIN ST

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 332.41' @ 13.15 hrs Surf.Area= 1,420 sf Storage= 2,727 cf

Plug-Flow detention time= 191.8 min calculated for 0.057 af (49% of inflow)
Center-of-Mass det. time= 103.0 min (918.6 - 815.6)

Volume				Storage Description		
#1	Invert	Avail.Storage	7,937 cf	Custom Stage Data (Prismatic) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)			
330.00	925	0	0			
332.00	1,250	2,175	2,175			
334.00	2,070	3,320	5,495			
335.00	2,814	2,442	7,937			

Device	Routing	Invert	Outlet Devices
#1	Discarded	330.00'	0.270 In/hr Exfiltration over Surface area
#2	Primary	332.20'	10.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	334.00'	20.0' long x 0.5' breadth Broad-Crested Rectangular Weir
		Head (feet)	0.20 0.40 0.60 0.80 1.00
		Coef. (English)	2.80 2.92 3.08 3.30 3.32

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Type III 24-hr 2YR Rainfall=3.39"

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Page 29

Discarded OutFlow Max=0.01 cfs @ 13.15 hrs HW=332.41' (Free Discharge)

1=Exfiltration (Exfiltration Controls 0.01 cfs)

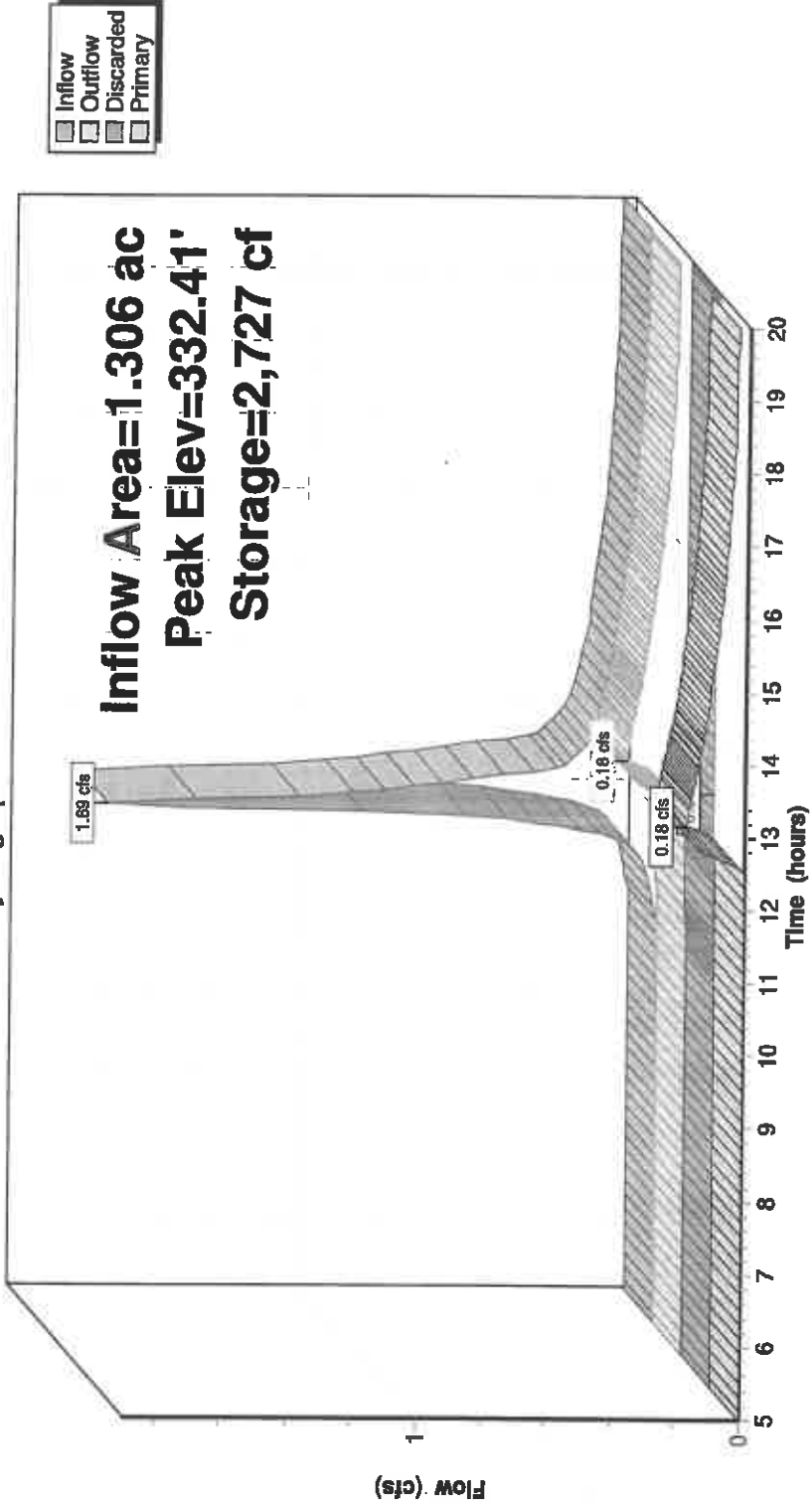
Primary OutFlow Max=0.17 cfs @ 13.15 hrs HW=332.41' (Free Discharge)

2=Orifice/Grate (Orifice Controls 0.17 cfs @ 1.57 fps)

3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PND3: BASIN3

Hydrograph



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Type III 24-hr 2YR Rainfall=3.39"

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Page 30

Summary for Pond PND4: U/G BASIN

Inflow Area = 0.514 ac, 100.00% Impervious, Inflow Depth > 2.95" for 2YR event
Inflow = 1.65 cfs @ 12.09 hrs, Volume= 0.126 af
Outflow = 0.02 cfs @ 7.70 hrs, Volume= 0.026 af, Atten= 99%, Lag= 0.0 min
Discarded = 0.02 cfs @ 7.70 hrs, Volume= 0.026 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond PND1 : PND 1

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 326.31' @ 20.00 hrs Surf.Area= 3,637 sf Storage= 4,374 cf

Plug-Flow detention time= 241.4 min calculated for 0.026 af (20% of inflow)
Center-of-Mass det. time= 48.9 min (786.9 - 738.0)

Volume	Invert	Avail.Storage	Storage Description
#1	325.00'	2,587 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 12,739 cf Overall - 6,270 cf Embedded = 6,468 cf x 40.0% Voids
#2	325.00'	6,270 cf	Cultec R-330XLHD x 120 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		8,857 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
325.00	3,673	0	0
325.50	3,637	1,828	1,828
328.00	3,637	9,093	10,920
328.50	3,637	1,819	12,739

Device	Routing	Invert	Outlet Devices
#1	Discarded	325.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	326.50'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

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Type III 24-hr 2YR Rainfall=3.39"

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Page 31

Discarded OutFlow Max=0.02 cfs @ 7.70 hrs HW=325.04' (Free Discharge)

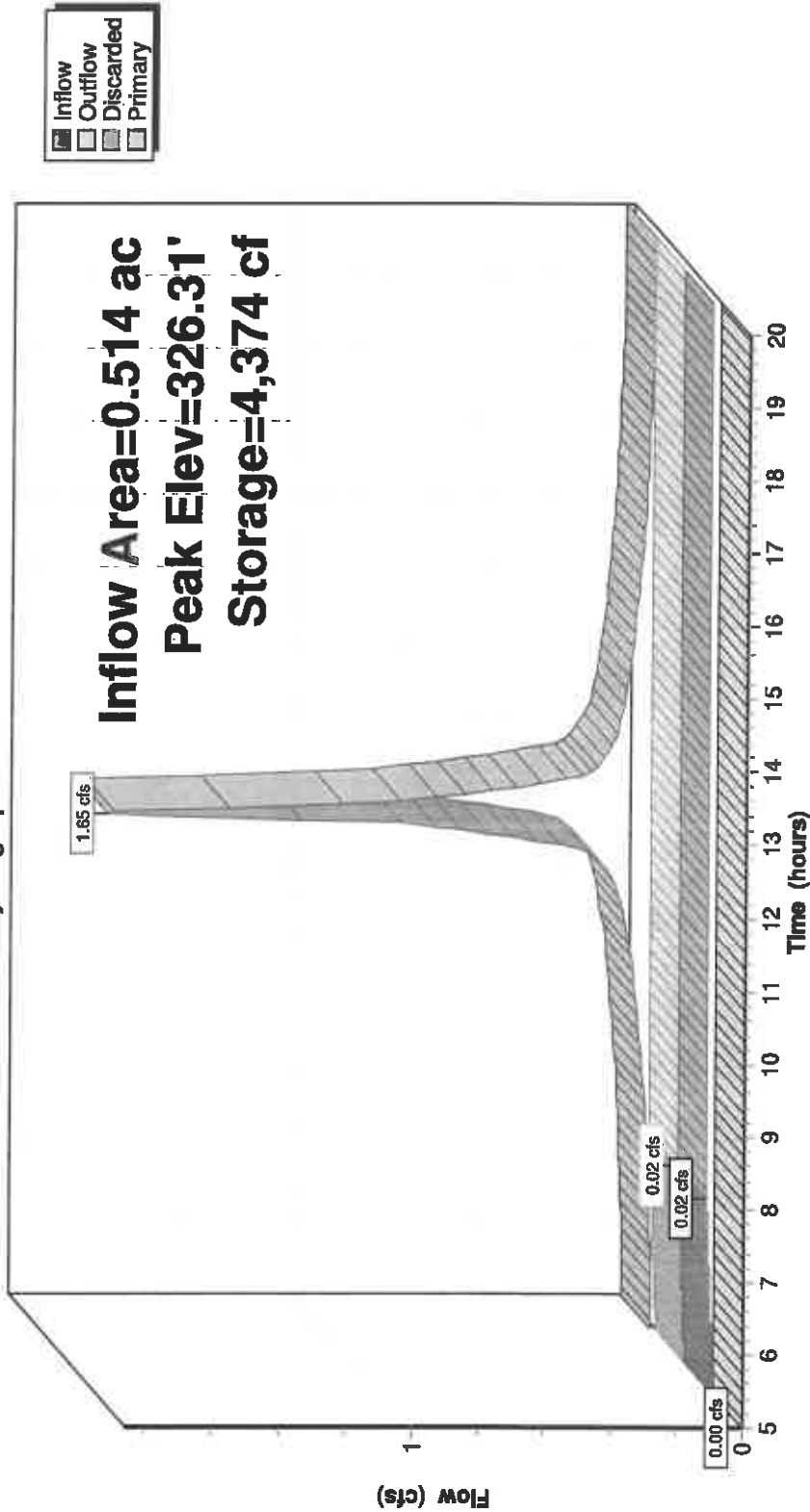
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=325.00' (Free Discharge)

2=Orifice/Grate (Controls 0.00 cfs)

Pond PND4: U/G BASIN

Hydrograph



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Type III 24-hr 10YR Rainfall=5.11"

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Page 32

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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 P-1: P-1

Runoff Area=81,268 sf 39.90% Impervious Runoff Depth>2.98"
Flow Length=618' Tc=7.1 min CN=82 Runoff=6.59 cfs 0.463 af

Subcatchment P-2: P-2

Runoff Area=82,391 sf 33.69% Impervious Runoff Depth>2.88"
Flow Length=330' Tc=7.1 min CN=81 Runoff=6.49 cfs 0.455 af

Subcatchment P-3: P-3

Runoff Area=16,235 sf 16.61% Impervious Runoff Depth>2.44"
Tc=6.0 min CN=76 Runoff=1.12 cfs 0.076 af

Subcatchment P-4: P-4

Runoff Area=56,906 sf 7.39% Impervious Runoff Depth>2.27"
Flow Length=505' Tc=5.9 min CN=74 Runoff=3.68 cfs 0.248 af

Subcatchment P-5: P-5

Runoff Area=145,259 sf 0.00% Impervious Runoff Depth>1.95"
Tc=10.0 min CN=70 Runoff=7.03 cfs 0.542 af

Subcatchment P-6: P-6

Runoff Area=81,691 sf 0.00% Impervious Runoff Depth>2.03"
Flow Length=429' Slope=0.0450 '/' Tc=8.1 min CN=71 Runoff=4.38 cfs 0.317 af

Subcatchment P-7: BUILDING

Runoff Area=22,400 sf 100.00% Impervious Runoff Depth>4.52"
Tc=6.0 min CN=98 Runoff=2.51 cfs 0.194 af

Reach IP-P1: 45 MAIN ST

Inflow=8.51 cfs 0.722 af
Outflow=8.51 cfs 0.722 af

Reach IP-P2: SCHOOL ST

Inflow=4.85 cfs 0.766 af
Outflow=4.85 cfs 0.766 af

Reach IP-P3: EX. CULVERT

Inflow=1.12 cfs 0.076 af
Outflow=1.12 cfs 0.076 af

Pond PND1: PND 1

Peak Elev=326.71' Storage=11,647 cf Inflow=6.59 cfs 0.509 af
Discarded=0.03 cfs 0.018 af Primary=0.69 cfs 0.345 af Outflow=0.72 cfs 0.363 af

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Type III 24-hr 10YR Rainfall=5.11"

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Page 33

Pond PND2: BASIN#2

Discarded=0.03 cfs 0.025 af Peak Elev=327.51' Storage=14,172 cf Inflow=6.49 cfs 0.455 af
Primary=0.26 cfs 0.127 af Outflow=0.28 cfs 0.152 af

Pond PND3: BASIN3

Discarded=0.01 cfs 0.007 af Peak Elev=333.07' Storage=3,744 cf Inflow=3.68 cfs 0.248 af
Primary=1.76 cfs 0.181 af Outflow=1.77 cfs 0.188 af

Pond PND4: U/G BASIN

Discarded=0.02 cfs 0.027 af Peak Elev=326.76' Storage=5,738 cf Inflow=2.51 cfs 0.194 af
Primary=0.13 cfs 0.046 af Outflow=0.15 cfs 0.073 af

Total Runoff Area = 11.160 ac Runoff Volume = 2.293 af Average Runoff Depth = 2.47"
81.59% Pervious = 9.106 ac 18.41% Impervious = 2.054 ac

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Type III 24-hr 10YR Rainfall=5.11"

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Page 34

Summary for Subcatchment P-1: P-1

Runoff = 6.59 cfs @ 12.10 hrs, Volume= 0.463 af, Depth> 2.98"
Routed to Pond PND1 : PND 1

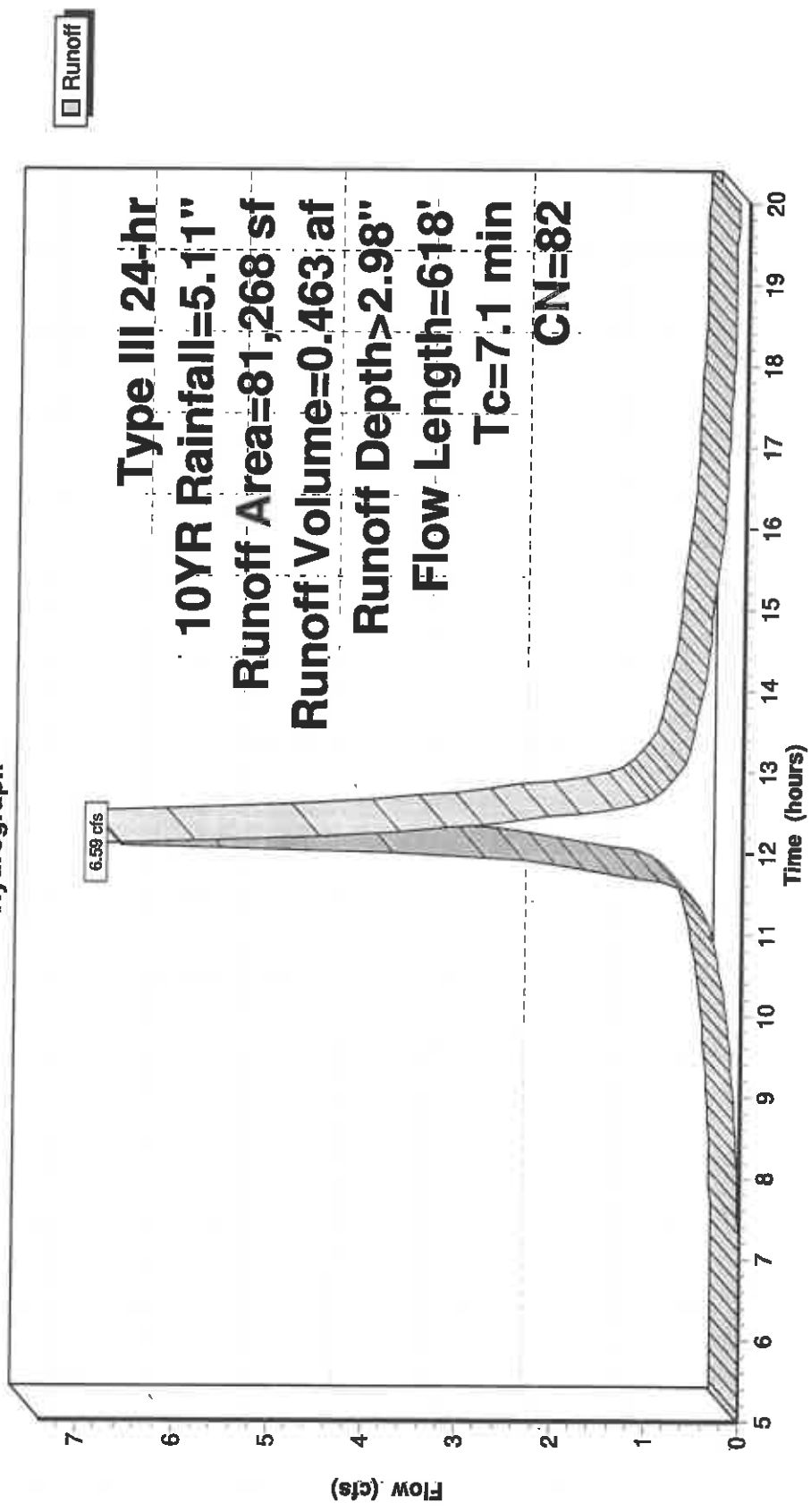
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=5.11"

Area (sf)	CN	Description
32,428	98	Paved parking, HSG C
26,882	74	>75% Grass cover, Good, HSG C
21,958	70	Woods, Good, HSG C
81,268	82	Weighted Average
48,840		60.10% Pervious Area
32,428		39.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0450	0.20		Sheet Flow, TRAVEL PATH A TO B Grass: Short n= 0.150 P2= 3.20"
0.4	80	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C Unpaved Kv= 16.1 fps
1.6	100	0.0450	1.06		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
0.6	100	0.0200	2.87		Shallow Concentrated Flow, TRAVEL PATH D TO E Paved Kv= 20.3 fps
0.4	288	0.0250	12.22	21.59	Pipe Channel, TRAVEL PATH E TO F 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.010
7.1	618	Total			

Subcatchment P-1: P-1

Hydrograph



Summary for Subcatchment P-2: P-2

Runoff = 6.49 cfs @ 12.10 hrs, Volume= 0.455 af, Depth> 2.88"
 Routed to Pond PND2 : BASIN#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10YR Rainfall=5.11"

Area (sf)	CN	Description
27,755	98	Paved parking, HSG C
34,256	74	>75% Grass cover, Good, HSG C
20,380	70	Woods, Good, HSG C
82,391	81	Weighted Average
54,636		66.31% Pervious Area
27,755		33.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	50	0.0450	0.19		Sheet Flow, TRAVEL PATH A TO B Cultivated: Residue>20% n= 0.170 P2= 3.20"
0.7	135	0.0450	3.42		Shallow Concentrated Flow, TARVEL PATH B TO C Unpaved Kv= 16.1 fps
1.9	145	0.0650	1.27		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
7.1	330	Total			

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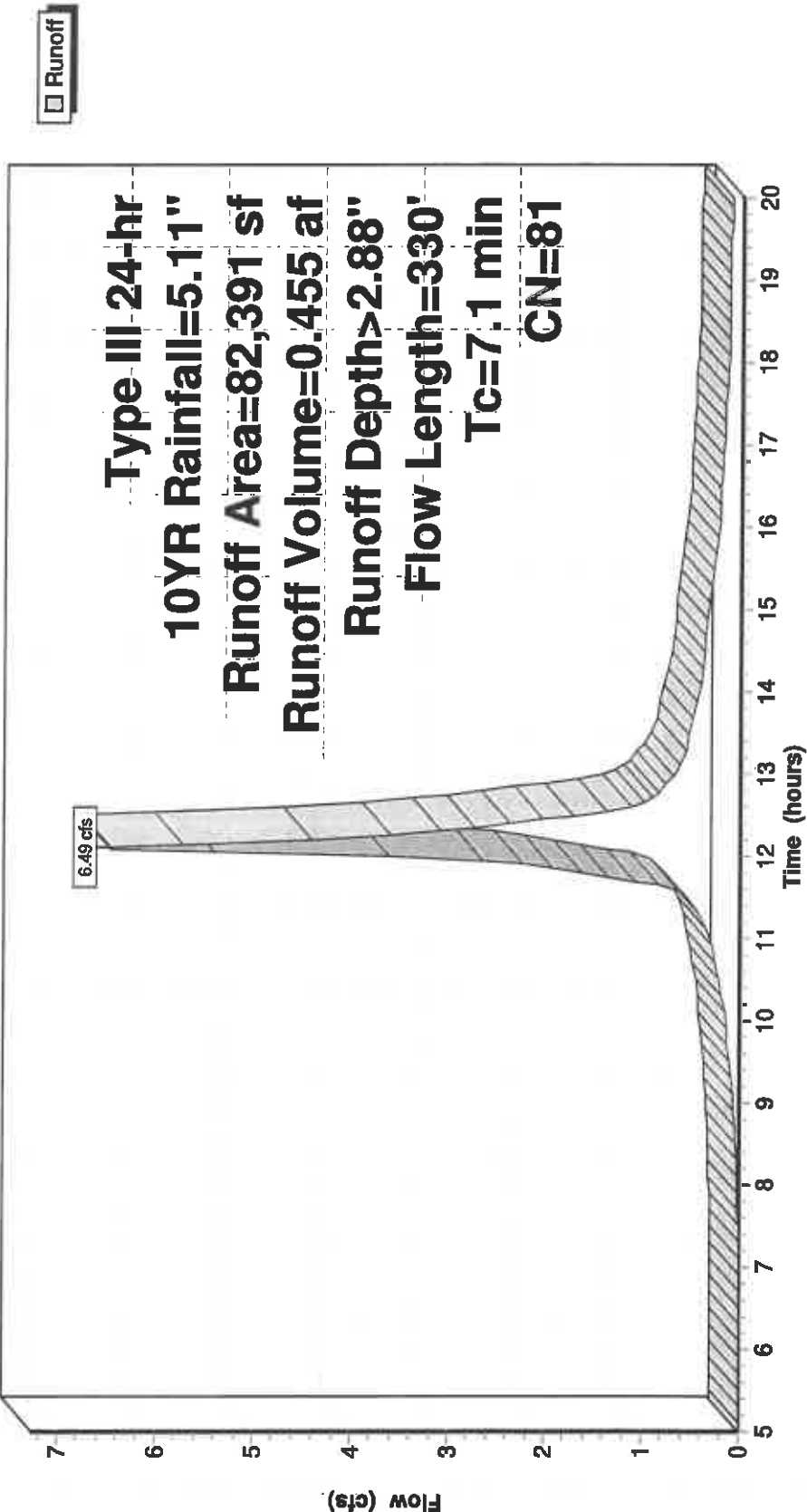
Type III 24-hr 10YR Rainfall=5.11"

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Page 37

Subcatchment P-2: P-2

Hydrograph



Summary for Subcatchment P-3: P-3

Runoff = 1.12 cfs @ 12.09 hrs, Volume= 0.076 af, Depth> 2.44"
 Routed to Reach IP-P3 : EX. CULVERT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10YR Rainfall=5.11"

Area (sf)	CN	Description
2,696	98	Paved parking, HSG C
5,650	74	>75% Grass cover, Good, HSG C
7,889	70	Woods, Good, HSG C
16,235	76	Weighted Average
13,539		83.39% Pervious Area
2,696		16.61% Impervious Area

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

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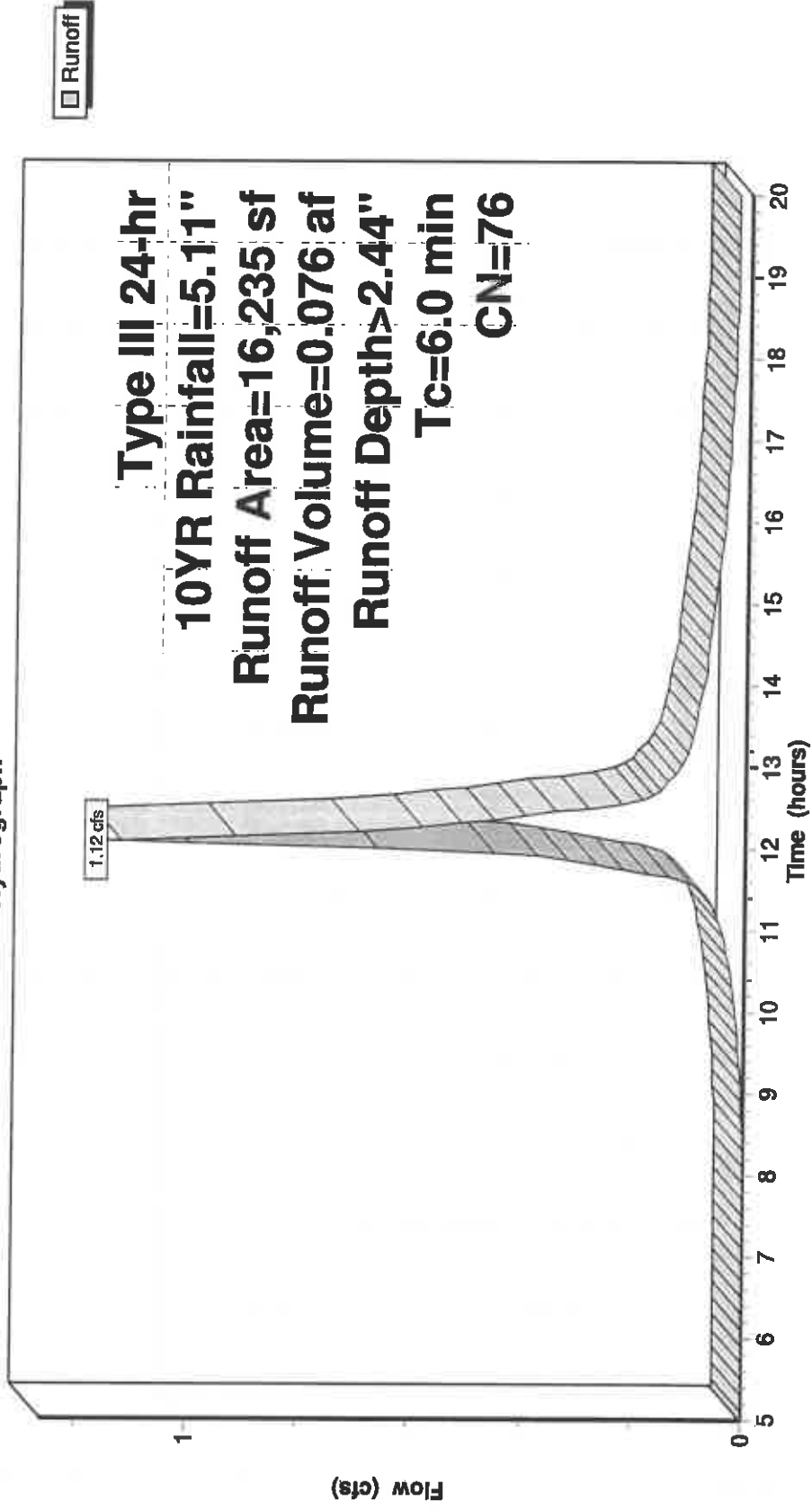
Type III 24-hr 10YR Rainfall=5.11"

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Page 39

Subcatchment P-3: P-3

Hydrograph



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Type III 24-hr 10YR Rainfall=5.11"

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Page 40

Summary for Subcatchment P-4: P-4

Runoff = 3.68 cfs @ 12.09 hrs, Volume= 0.248 af, Depth> 2.27"
Routed to Pond PND3 : BASIN3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=5.11"

Area (sf)	CN	Description
4,207	98	Paved parking, HSG C
22,144	74	>75% Grass cover, Good, HSG C
30,555	70	Woods, Good, HSG C
56,906	74	Weighted Average
52,699		92.61% Pervious Area
4,207		7.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	50	0.0350	0.19		Sheet Flow, TRAVEL PATH A TO B Grass: Short n= 0.150 P2= 3.20"
0.4	80	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C Unpaved Kv= 16.1 fps
0.5	100	0.4500	3.35		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
0.1	25	0.0250	3.21		Shallow Concentrated Flow, TRAVEL PATH D TO E Paved Kv= 20.3 fps
0.4	250	0.0250	10.82	13.28	Pipe Channel, TRAVEL PATH F TO E 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.010
5.9	505	Total			

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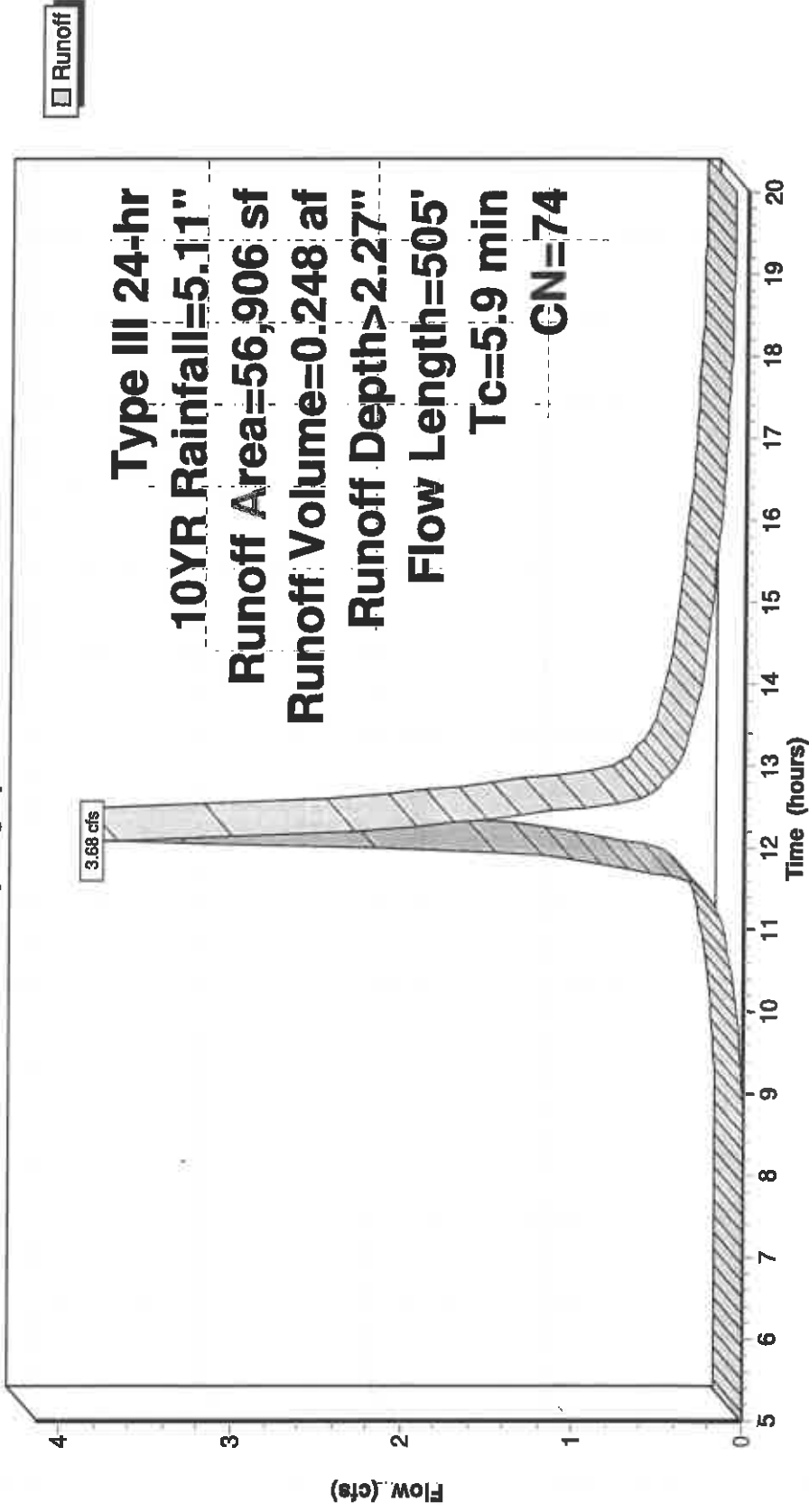
Type III 24-hr 10YR Rainfall=5.11"

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Page 41

Subcatchment P-4: P-4

Hydrograph



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Type III 24-hr 10YR Rainfall=5.11"

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Page 42

Summary for Subcatchment P-5: P-5

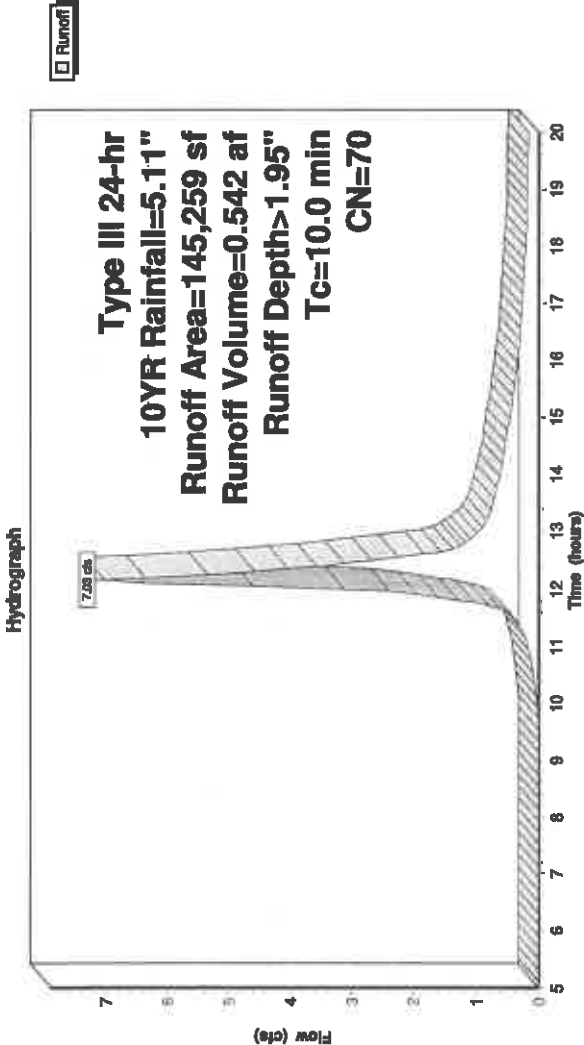
Runoff = 7.03 cfs @ 12.15 hrs, Volume= 0.542 af, Depth> 1.95"
Routed to Reach IP-P1 : 45 MAIN ST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=5.11"

Area (sf)	CN	Description
145,259	70	Woods, Good, HSG C
145,259	100.00%	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, TRAVEL PATH

Subcatchment P-5: P-5



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Type III 24-hr 10YR Rainfall=5.11"

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Page 43

Summary for Subcatchment P-6: P-6

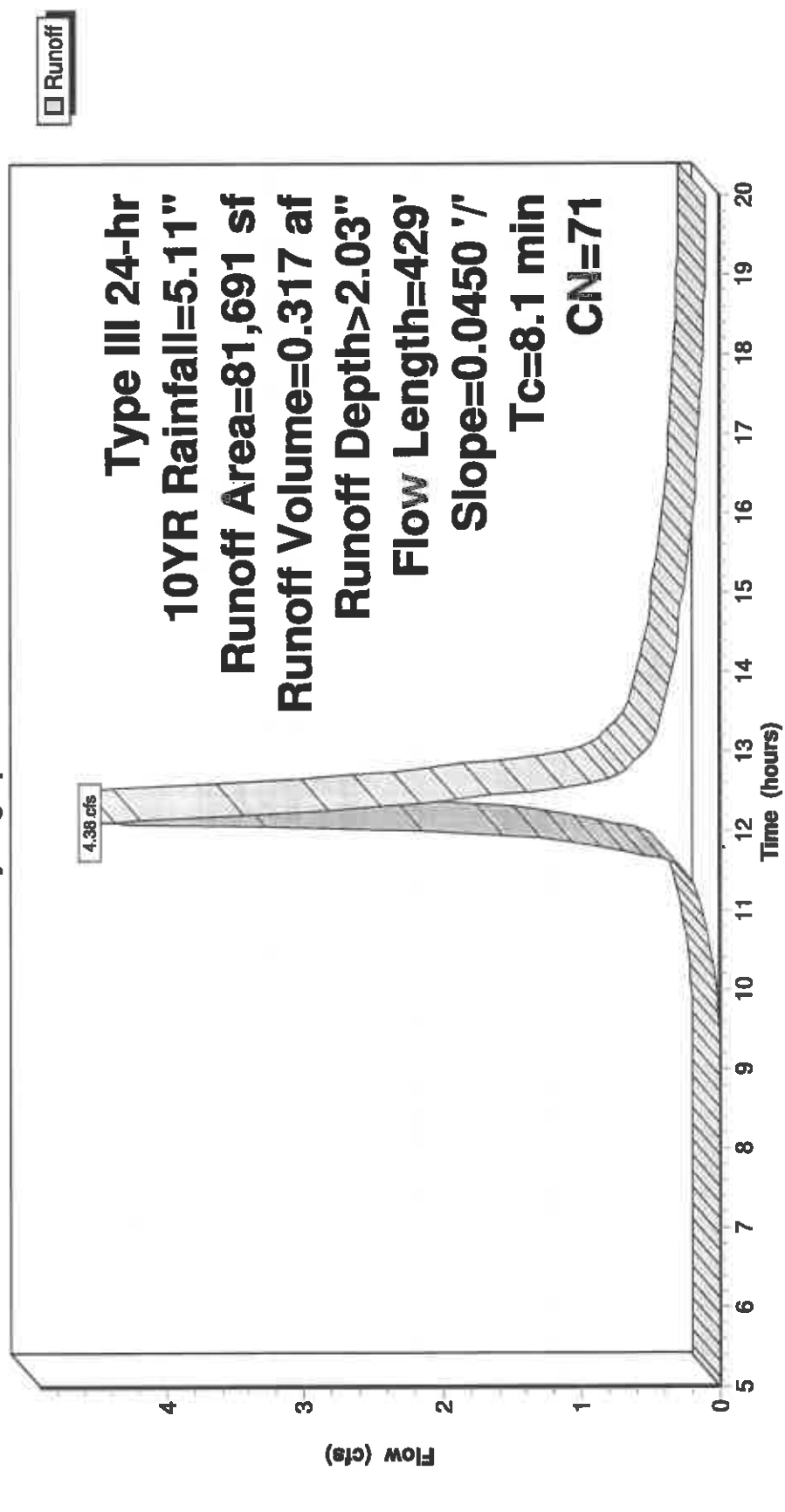
Runoff = 4.38 cfs @ 12.12 hrs, Volume= 0.317 af, Depth> 2.03"
Routed to Reach IP-P2 : SCHOOL ST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=5.11"

Area (sf)				CN	Description
13,023				74	>75% Grass cover, Good, HSG C
68,668				70	Woods, Good, HSG C
81,691				71	Weighted Average
81,691					100.00% Pervious Area
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0450	0.20		Sheet Flow, TRAVEL PATH A TO B Grass: Short n= 0.150 P2= 3.20"
0.9	184	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C Unpaved Kv= 16.1 fps
3.1	195	0.0450	1.06		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
8.1	429	Total			

Subcatchment P-6: P-6

Hydrograph



Summary for Subcatchment P-7: BUILDING

Runoff = 2.51 cfs @ 12.09 hrs, Volume= 0.194 af, Depth> 4.52"
 Routed to Pond PND4 : U/G BASIN

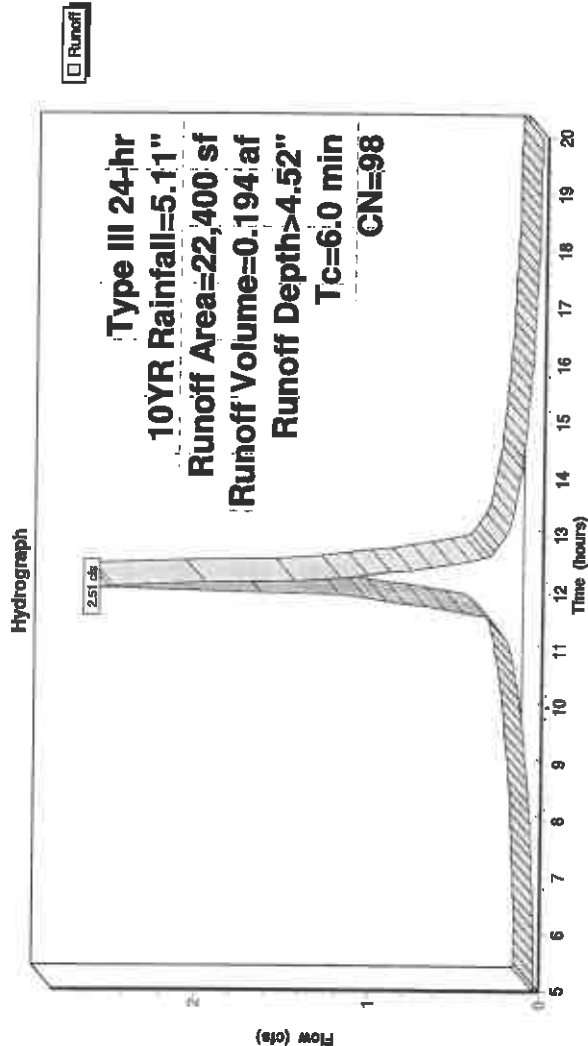
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10YR Rainfall=5.11"

Area (sf)	CN	Description
22,400	98	Roofs, HSG C
22,400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					

Direct Entry, TRAVEL PATH

Subcatchment P-7: BUILDING



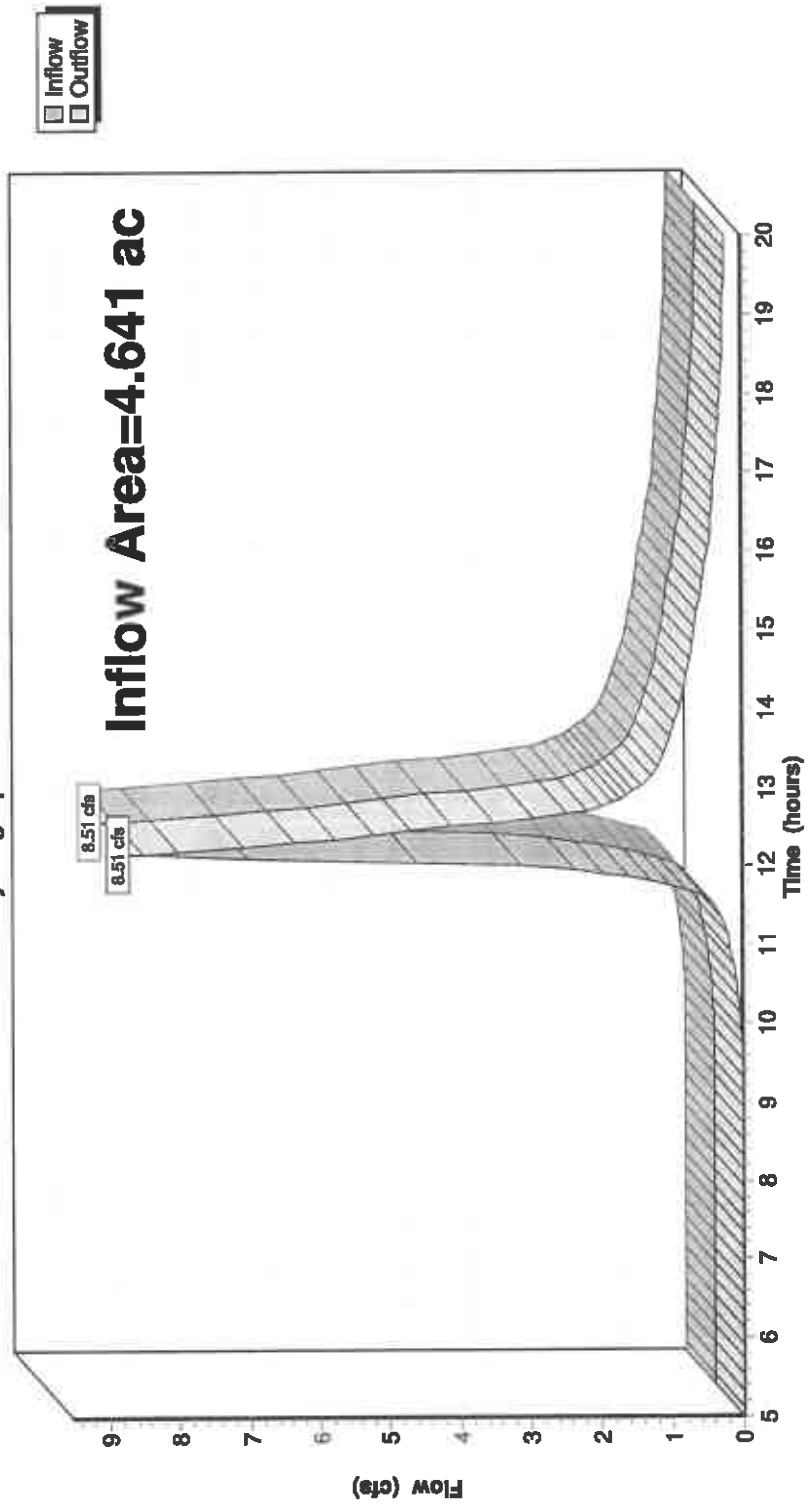
Summary for Reach IP-P1: 45 MAIN ST

Inflow Area =	4.641 ac,	2.08% Impervious,	Inflow Depth > 1.87" for 10YR event
Inflow =	8.51 cfs @	12.16 hrs,	Volume= 0.722 af
Outflow =	8.51 cfs @	12.16 hrs,	Volume= 0.722 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-P1: 45 MAIN ST

Hydrograph



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Type III 24-hr 10YR Rainfall=5.11"

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Page 47

Summary for Reach IP-P2: SCHOOL ST

Inflow Area = 6.147 ac, 30.84% Impervious, Inflow Depth > 1.54" for 10YR event

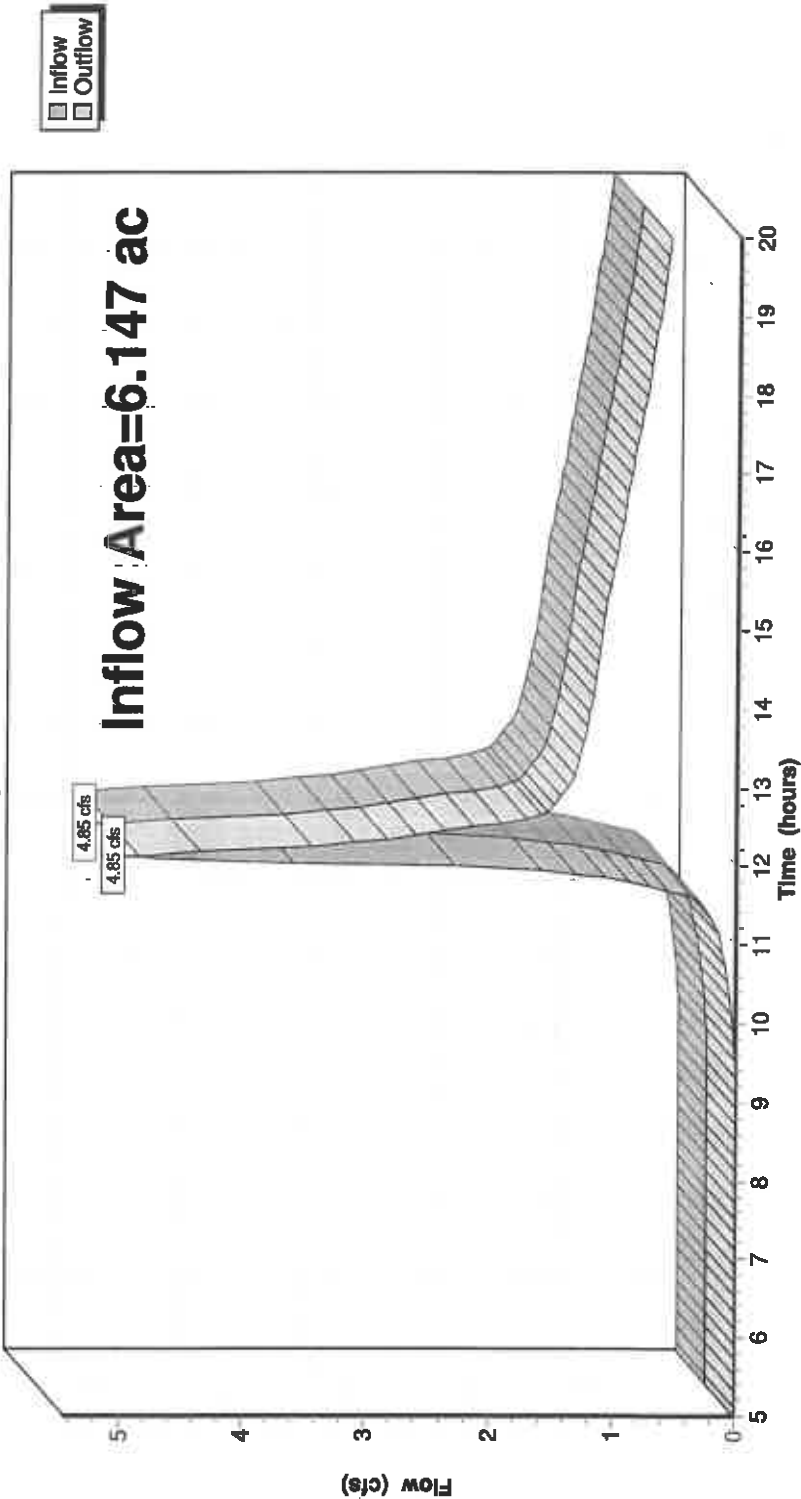
Inflow = 4.85 cfs @ 12.12 hrs, Volume= 0.766 af

Outflow = 4.85 cfs @ 12.12 hrs, Volume= 0.766 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+ Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-P2: SCHOOL ST

Hydrograph



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Page 48

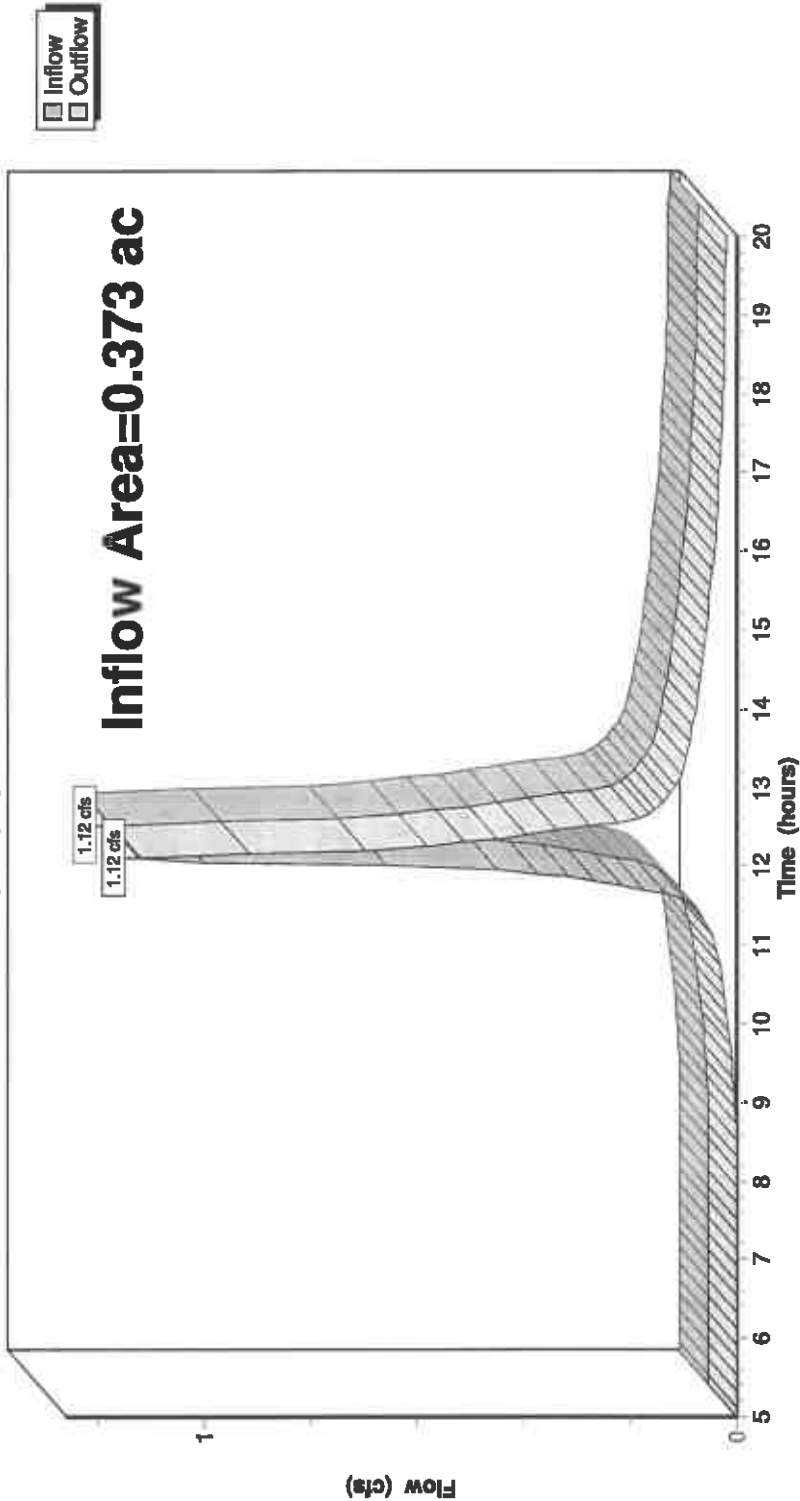
Summary for Reach IP-P3: EX. CULVERT

Inflow Area = 0.373 ac, 16.61% Impervious, Inflow Depth > 2.44" for 10YR event
Inflow = 1.12 cfs @ 12.09 hrs, Volume= 0.076 af
Outflow = 1.12 cfs @ 12.09 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-P3: EX. CULVERT

Hydrograph



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Type III 24-hr 10YR Rainfall=5.11"

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Page 49

Summary for Pond PND1: PND 1

Inflow Area = 2.380 ac, 52.89% Impervious, Inflow Depth > 2.56" for 10YR event
Inflow = 6.59 cfs @ 12.10 hrs, Volume= 0.509 af
Outflow = 0.72 cfs @ 13.12 hrs, Volume= 0.363 af, Atten= 89%, Lag= 61.2 min
Discarded = 0.03 cfs @ 13.12 hrs, Volume= 0.018 af
Primary = 0.69 cfs @ 13.12 hrs, Volume= 0.345 af
Routed to Reach IP-P2 : SCHOOL ST

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 326.71' @ 13.12 hrs Surf.Area= 4,203 sf Storage= 11,647 cf

Plug-Flow detention time= 209.1 min calculated for 0.362 af (71% of inflow)
Center-of-Mass det. time= 140.5 min (935.4 - 794.9)

Volume Invert Avail.Storage Storage Description #1 322.00' 23,430 cf Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
322.00	1,030	0	0
324.00	2,125	3,155	3,155
326.00	3,600	5,725	8,880
328.00	5,300	8,900	17,780
329.00	6,000	5,650	23,430

Device Routing Invert Outlet Devices

Device	Routing	Invert	Outlet Devices
#1	Discarded	322.00'	0.270 In/hr Exfiltration over Surface area
#2	Primary	324.50'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	326.50'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	327.50'	15.0' 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

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Discarded OutFlow Max=0.03 cfs @ 13.12 hrs HW=326.71' (Free Discharge)

1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.69 cfs @ 13.12 hrs HW=326.71' (Free Discharge)

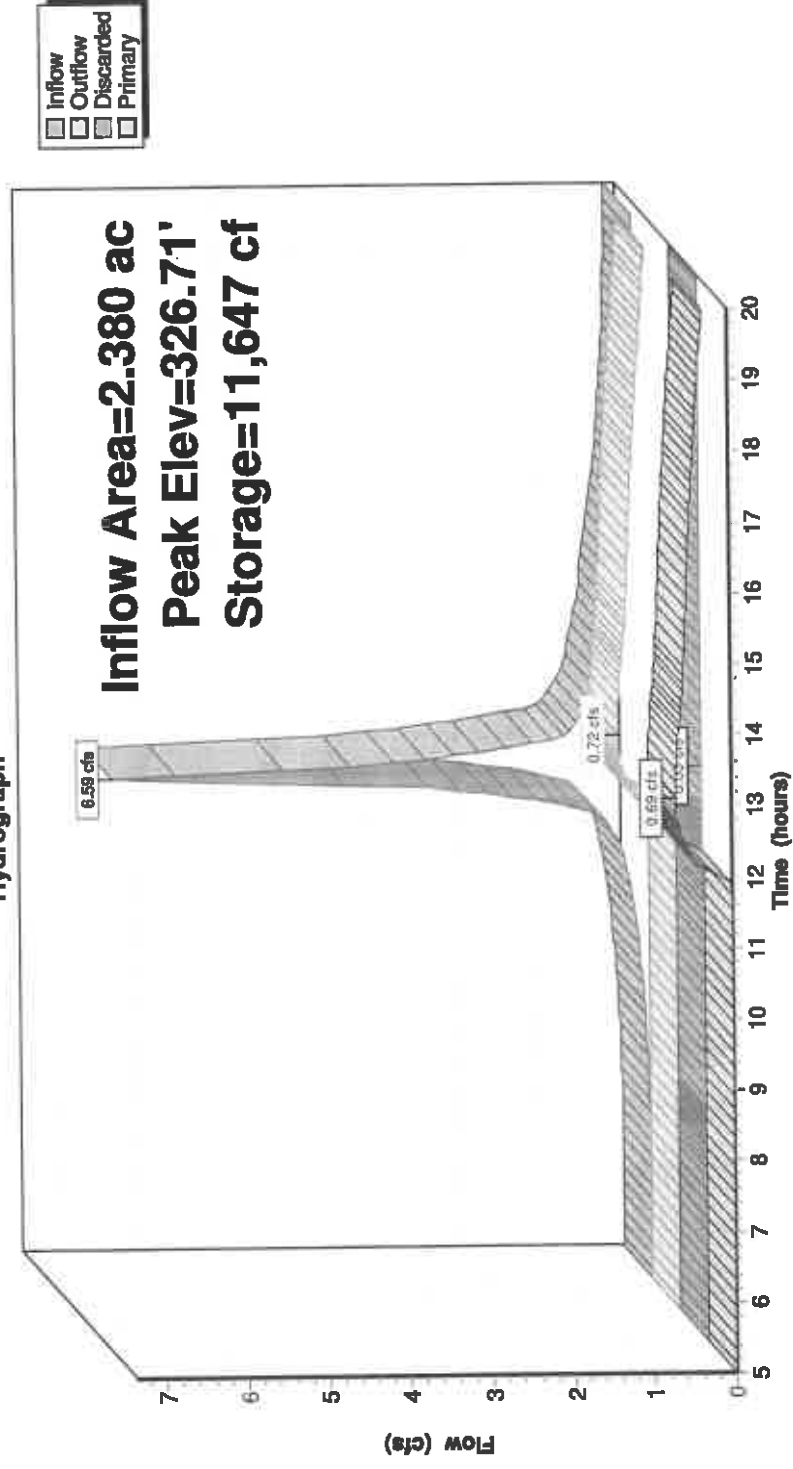
↑-2=Office/Grate (Office Controls 0.60 cfs @ 6.88 fps)

3-Office/Grate (Orifice Controls 0.09 cfs @ 1.56 fps)

4-Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PND1: PND 1

Hydrograph



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Type III 24-hr 10YR Rainfall=5.11"

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Page 51

Summary for Pond PND2: BASIN#2

Inflow Area = 1.891 ac, 33.69% Impervious, Inflow Depth > 2.88" for 10YR event
Inflow = 6.49 cfs @ 12.10 hrs, Volume= 0.455 af
Outflow = 0.28 cfs @ 15.43 hrs, Volume= 0.152 af, Atten= 96%, Lag= 199.3 min
Discarded = 0.03 cfs @ 15.43 hrs, Volume= 0.025 af
Primary = 0.26 cfs @ 15.43 hrs, Volume= 0.127 af
Routed to Reach IP-P2 : SCHOOL ST

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 327.51' @ 15.43 hrs Surf.Area= 4,581 sf Storage= 14,172 cf

Plug-Flow detention time= 260.7 min calculated for 0.152 af (33% of inflow)
Center-of-Mass det. time= 165.1 min (950.0 - 784.9)

Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	20,173 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 21,436 cf Overall - 1,263 cf Embedded = 20,173 cf
#2	324.00'	1,263 cf	Cultec R-330XLHD x 24 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		21,436 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
324.00	3,312	0	0
326.00	4,212	7,524	7,524
328.00	4,700	8,912	16,436
329.00	5,300	5,000	21,436

Device	Routing	Invert	Outlet Devices
#1	Discarded	324.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	325.00'	2.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	327.30'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	328.00'	15.0' long x 1.0' breadth Broad-Crested Rectangular Weir

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Page 52

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

Discarded OutFlow Max=0.03 cfs @ 15.43 hrs HW=327.51' (Free Discharge)

1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.26 cfs @ 15.43 hrs HW=327.51' (Free Discharge)

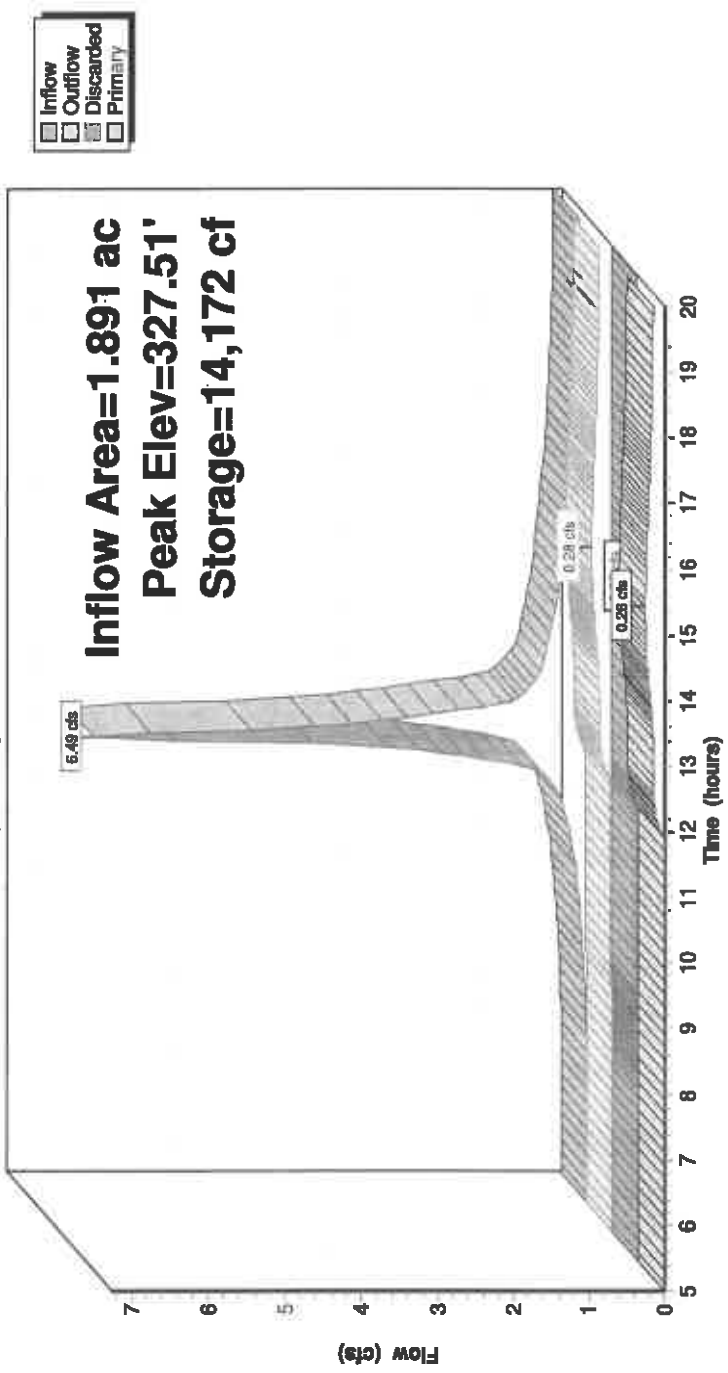
2=Orifice/Grate (Orifice Controls 0.16 cfs @ 7.50 fps)

3=Orifice/Grate (Orifice Controls 0.09 cfs @ 1.57 fps)

4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PND2: BASIN#2

Hydrograph



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Type III 24-hr 10YR Rainfall=5.11"

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Page 53

Summary for Pond PND3: BASIN3

Inflow Area = 1.306 ac, 7.39% Impervious, Inflow Depth > 2.27" for 10YR event
Inflow = 3.68 cfs @ 12.09 hrs, Volume= 0.248 af
Outflow = 1.77 cfs @ 12.28 hrs, Volume= 0.188 af, Atten= 52%, Lag= 11.4 min
Discarded = 0.01 cfs @ 12.28 hrs, Volume= 0.007 af
Primary = 1.76 cfs @ 12.28 hrs, Volume= 0.181 af
Routed to Reach IP-P1 : 45 MAIN ST

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 333.07' @ 12.28 hrs Surf.Area= 1,688 sf Storage= 3,744 cf

Plug-Flow detention time= 101.6 min calculated for 0.187 af (76% of inflow)
Center-of-Mass det. time= 42.0 min (840.6 - 798.6)

Volume Invert Avail.Storage Storage Description

#1 330.00' 7,937 cf Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
330.00	925	0	0
332.00	1,250	2,175	2,175
334.00	2,070	3,320	5,495
335.00	2,814	2,442	7,937

Device Routing Invert Outlet Devices

#1 Discarded	330.00'	0.270 in/hr Exfiltration over Surface area
#2 Primary	332.20'	10.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3 Primary	334.00'	20.0' long x 0.5' breadth Broad-Crested Rectangular Weir
		Head (feet) 0.20 0.40 0.60 0.80 1.00
		Coef. (English) 2.80 2.92 3.08 3.30 3.32

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Type III 24-hr 10YR Rainfall=5.11"

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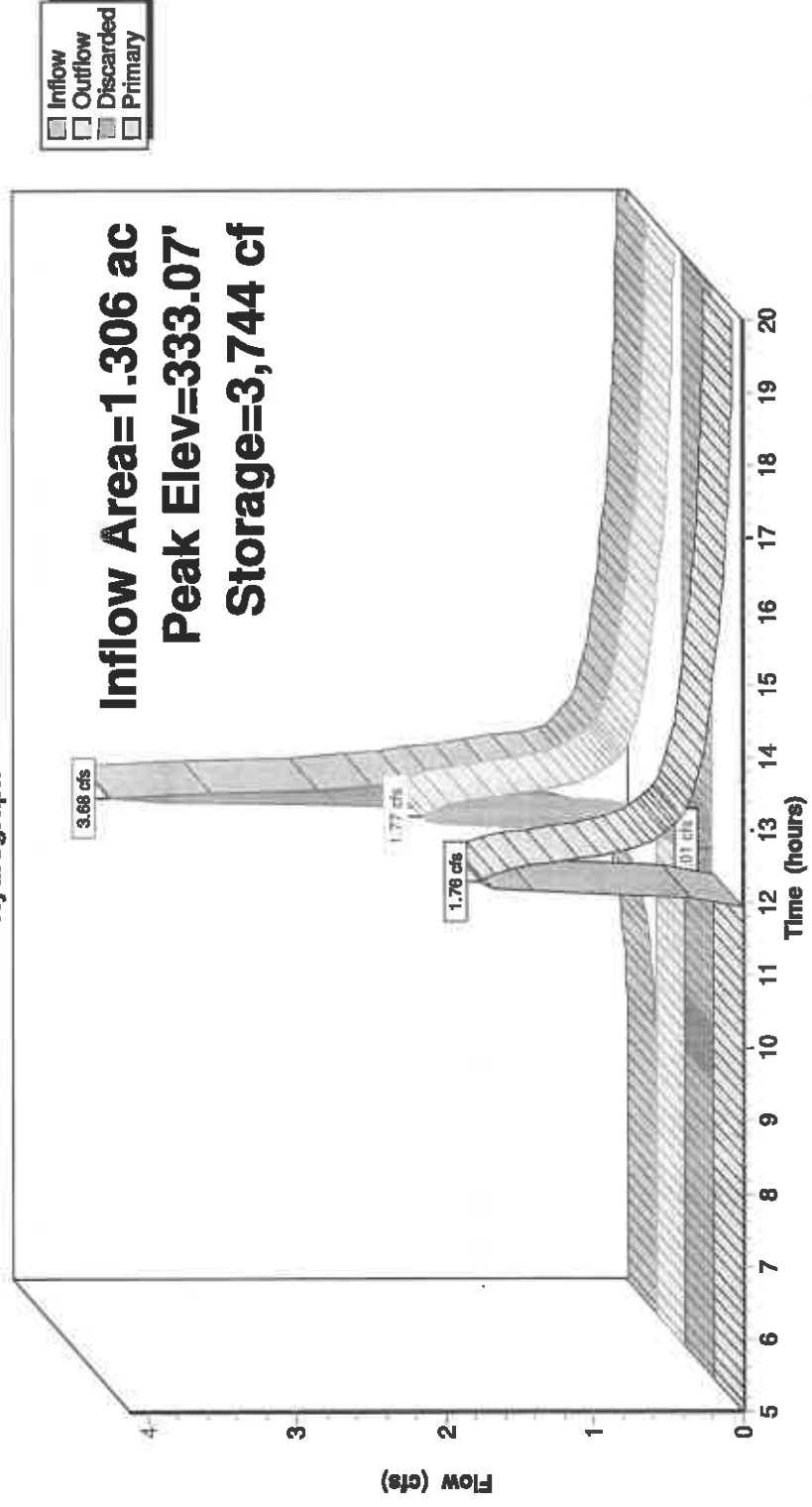
Page 54

Discarded OutFlow Max=0.01 cfs @ 12.28 hrs HW=333.07' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.76 cfs @ 12.28 hrs HW=333.07' (Free Discharge)
2=Orifice/Grate (Orifice Controls 1.76 cfs @ 3.23 fps)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PND3: BASIN3

Hydrograph



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Type III 24-hr 10YR Rainfall=5.11"

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Page 55

Summary for Pond PND4: U/G BASIN

Inflow Area = 0.514 ac, 100.00% Impervious, Inflow Depth > 4.52" for 10YR event
Inflow = 2.51 cfs @ 12.09 hrs, Volume= 0.194 af
Outflow = 0.15 cfs @ 13.73 hrs, Volume= 0.073 af, Atten= 94%, Lag= 98.8 min
Discarded = 0.02 cfs @ 6.55 hrs, Volume= 0.027 af
Primary = 0.13 cfs @ 13.73 hrs, Volume= 0.046 af
Routed to Pond PND1 : PND 1

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 326.76' @ 13.73 hrs Surf.Area= 3,637 sf Storage= 5,738 cf

Plug-Flow detention time= 251.7 min calculated for 0.073 af (38% of inflow)
Center-of-Mass det. time= 128.5 min (863.5 - 735.0)

Volume	Invert	Avail.Storage	Storage Description
#1	325.00'	2,587 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 12,739 cf Overall - 6,270 cf Embedded = 6,468 cf x 40.0% Voids
#2	325.00'	6,270 cf	Cultec R-330XLHD x 120 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		8,857 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
325.00	3,673	0	0
325.50	3,637	1,828	1,828
328.00	3,637	9,093	10,920
328.50	3,637	1,819	12,739

Device	Routing	Invert	Outlet Devices
#1	Discarded	325.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	326.50'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

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Type III 24-hr 10YR Rainfall=5.11"

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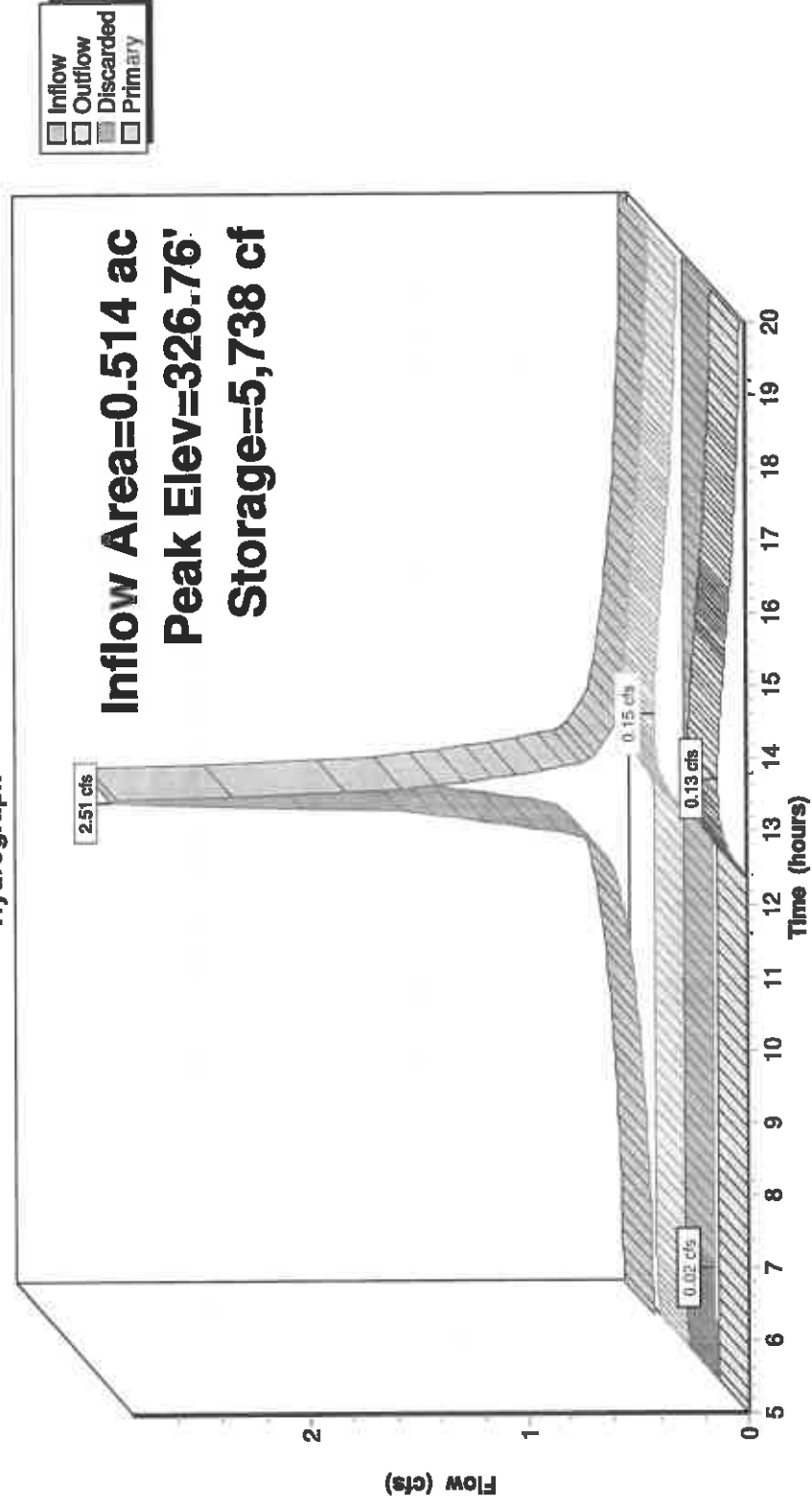
Page 56

Discarded OutFlow Max=0.02 cfs @ 6.55 hrs HW=325.04' (Free Discharge)
↑
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.13 cfs @ 13.73 hrs HW=326.76' (Free Discharge)
↑
2=Orifice/Grate (Orifice Controls 0.13 cfs @ 1.75 fps)

Pond PND4: U/G BASIN

Hydrograph



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Type III 24-hr 25YR Rainfall=6.19"

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Page 57

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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 P-1: P-1

Runoff Area=81,268 sf 39.90% Impervious Runoff Depth>3.91"
Flow Length=618' Tc=7.1 min CN=82 Runoff=8.57 cfs 0.608 af

Subcatchment P-2: P-2

Runoff Area=82,391 sf 33.69% Impervious Runoff Depth>3.81"
Flow Length=330' Tc=7.1 min CN=81 Runoff=8.49 cfs 0.600 af

Subcatchment P-3: P-3

Runoff Area=16,235 sf 16.61% Impervious Runoff Depth>3.31"
Tc=6.0 min CN=76 Runoff=1.52 cfs 0.103 af

Subcatchment P-4: P-4

Runoff Area=56,906 sf 7.39% Impervious Runoff Depth>3.12"
Flow Length=505' Tc=5.9 min CN=74 Runoff=5.04 cfs 0.339 af

Subcatchment P-5: P-5

Runoff Area=145,259 sf 0.00% Impervious Runoff Depth>2.74"
Tc=10.0 min CN=70 Runoff=9.93 cfs 0.760 af

Subcatchment P-6: P-6

Runoff Area=81,691 sf 0.00% Impervious Runoff Depth>2.83"
Flow Length=429' Slope=0.0450 '/' Tc=8.1 min CN=71 Runoff=6.14 cfs 0.442 af

Subcatchment P-7: BUILDING

Runoff Area=22,400 sf 100.00% Impervious Runoff Depth>5.50"
Tc=6.0 min CN=98 Runoff=3.05 cfs 0.236 af

Reach IP-P1: 45 MAIN ST

Inflow=12.39 cfs 0.982 af
Outflow=12.39 cfs 0.982 af

Reach IP-P2: SCHOOL ST

Inflow=6.79 cfs 1.069 af
Outflow=6.79 cfs 1.069 af

Reach IP-P3: EX. CULVERT

Inflow=1.52 cfs 0.103 af
Outflow=1.52 cfs 0.103 af

Pond PND1: PND 1

Peak Elev=327.51' Storage=15,275 cf Inflow=8.57 cfs 0.695 af
Discarded=0.03 cfs 0.021 af Primary=1.15 cfs 0.499 af Outflow=1.18 cfs 0.520 af

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Type III 24-hr 25YR Rainfall=6.19"

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Page 58

Pond PND2: BASIN#2

Peak Elev=328.02' Storage=16,530 cf Inflow=8.49 cfs 0.600 af
Discarded=0.03 cfs 0.027 af Primary=0.67 cfs 0.259 af Outflow=0.70 cfs 0.286 af

Pond PND3: BASIN3

Peak Elev=333.61' Storage=4,715 cf Inflow=5.04 cfs 0.339 af
Discarded=0.01 cfs 0.008 af Primary=2.61 cfs 0.271 af Outflow=2.63 cfs 0.279 af

Pond PND4: U/G BASIN

Peak Elev=327.06' Storage=6,531 cf Inflow=3.05 cfs 0.236 af
Discarded=0.02 cfs 0.027 af Primary=0.26 cfs 0.086 af Outflow=0.29 cfs 0.114 af

Total Runoff Area = 11.160 ac Runoff Volume = 3.089 af Average Runoff Depth = 3.32"
81.59% Pervious = 9.106 ac 18.41% Impervious = 2.054 ac

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Page 59

Summary for Subcatchment P-1: P-1

Runoff = 8.57 cfs @ 12.10 hrs, Volume= 0.608 af, Depth> 3.91"
Routed to Pond PND1 : PND 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=6.19"

Area (sf)	CN	Description
32,428	98	Paved parking, HSG C
26,882	74	>75% Grass cover, Good, HSG C
21,958	70	Woods, Good, HSG C
81,268	82	Weighted Average
48,840		60.10% Pervious Area
32,428		39.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0450	0.20		Sheet Flow, TRAVEL PATH A TO B Grass: Short n= 0.150 P2= 3.20"
0.4	80	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C Unpaved Kv= 16.1 fps
1.6	100	0.0450	1.06		Shallow Concentrated Flow, TARVEL PATH C TO D Woodland Kv= 5.0 fps
0.6	100	0.0200	2.87		Shallow Concentrated Flow, TARVEL PATH D TO E Paved Kv= 20.3 fps
0.4	288	0.0250	12.22	21.59	Pipe Channel, TARVEL PATH E TO F 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.010
7.1	618	Total			

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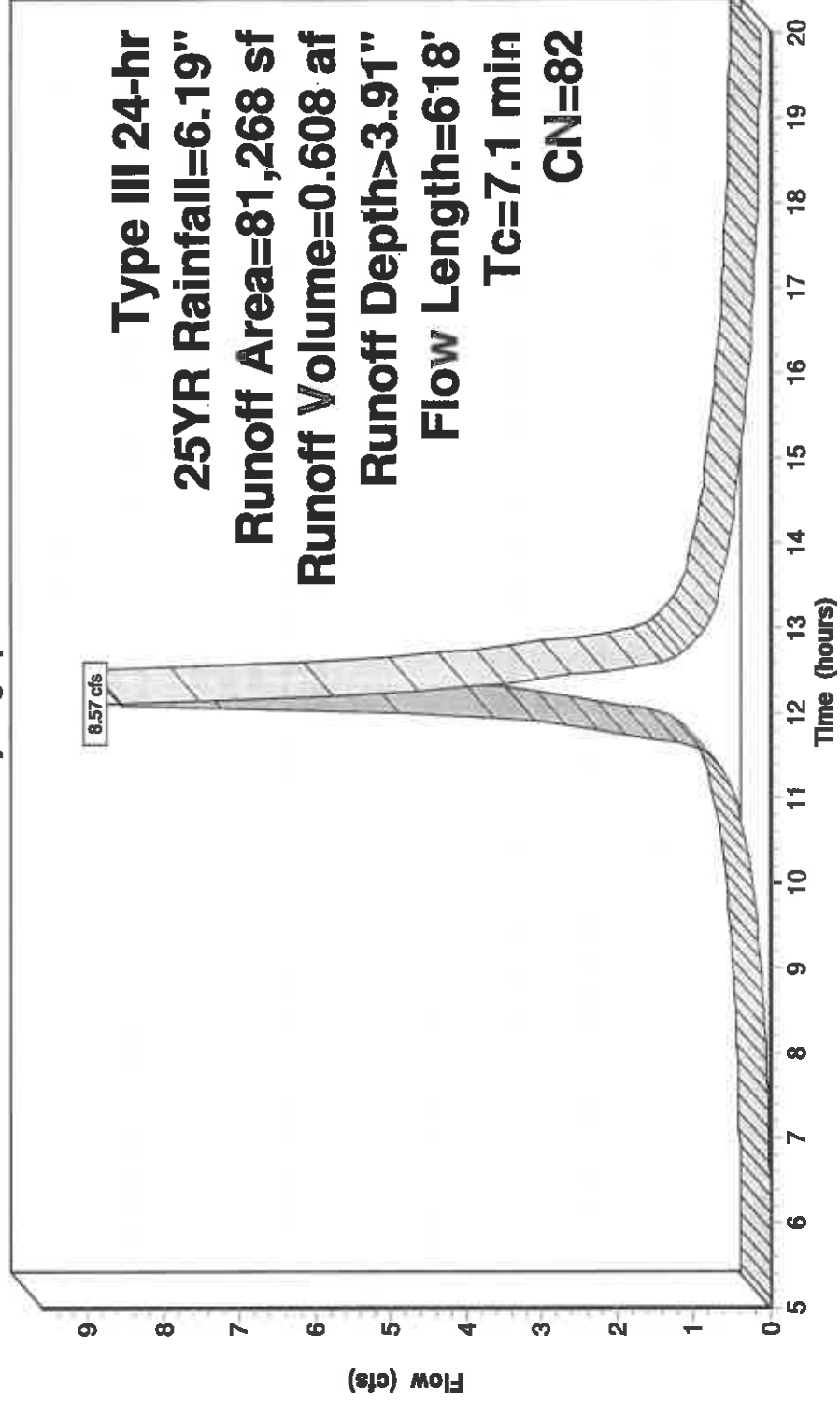
Type III 24-hr 25YR Rainfall=6.19"

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Page 60

Subcatchment P-1: P-1

Hydrograph



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Type III 24-hr 25YR Rainfall=6.19"

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Page 61

Summary for Subcatchment P-2: P-2

Runoff = 8.49 cfs @ 12.10 hrs, Volume= 0.600 af, Depth> 3.81"
Routed to Pond PND2 : BASIN#2

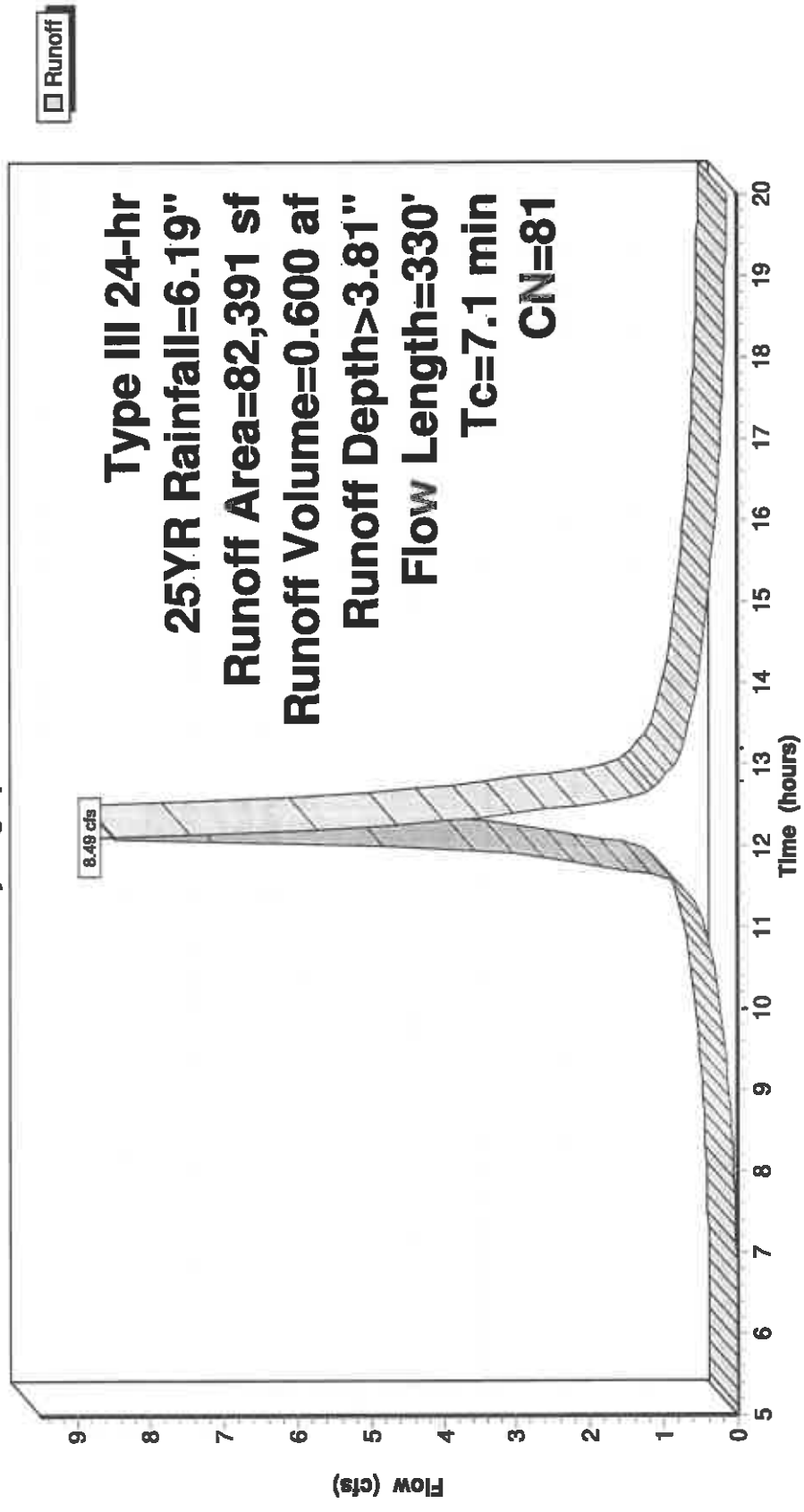
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=6.19"

Area (sf)	CN	Description
27,755	98	Paved parking, HSG C
34,256	74	>75% Grass cover, Good, HSG C
20,380	70	Woods, Good, HSG C
82,391	81	Weighted Average
54,636		66.31% Pervious Area
27,755		33.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	50	0.0450	0.19		Sheet Flow, TRAVEL PATH A TO B Cultivated: Residue>20% n= 0.170 P2= 3.20"
0.7	135	0.0450	3.42		Shallow Concentrated Flow, TARVEL PATH B TO C Unpaved Kv= 16.1 fps
1.9	145	0.0650	1.27		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
7.1	330	Total			

Subcatchment P-2: P-2

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Page 63

Summary for Subcatchment P-3: P-3

Runoff = 1.52 cfs @ 12.09 hrs, Volume= 0.103 af, Depth> 3.31"
Routed to Reach IP-P3 : EX. CULVERT

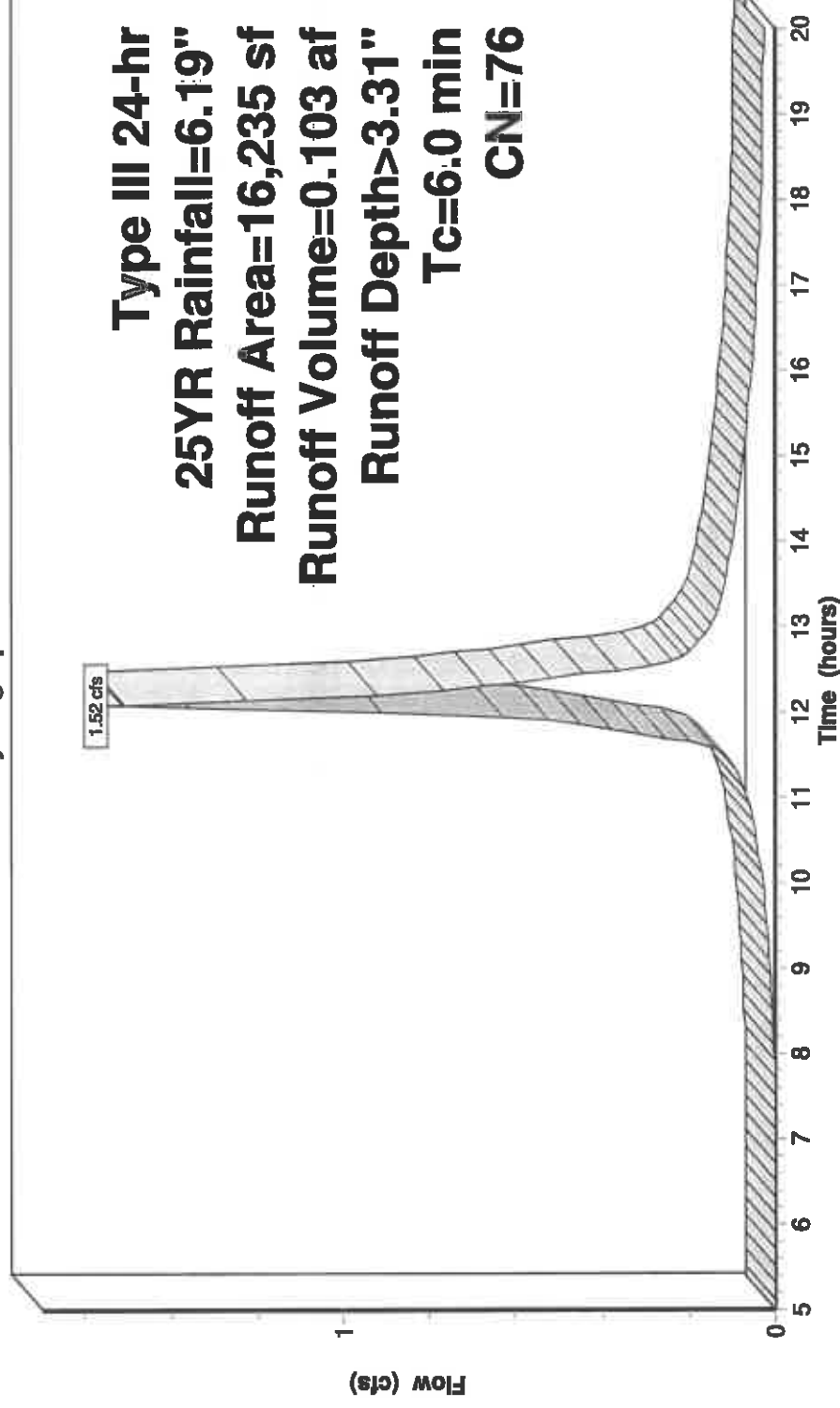
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=6.19"

Area (sf)	CN	Description
2,696	98	Paved parking, HSG C
5,650	74	>75% Grass cover, Good, HSG C
7,889	70	Woods, Good, HSG C
16,235	76	Weighted Average
13,539		83.39% Pervious Area
2,696		16.61% Impervious Area
Tc (min)	Length (feet)	Slope (ft/ft) Velocity (ft/sec) Capacity (cfs) Description

Direct Entry, TRAVEL PATH

Subcatchment P-3: P-3

Hydrograph



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Type III 24-hr 25YR Rainfall=6.19"

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Page 65

Summary for Subcatchment P-4: P-4

Runoff = 5.04 cfs @ 12.09 hrs, Volume= 0.339 af, Depth> 3.12"
Routed to Pond PND3 : BASIN3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type-III 24-hr 25YR Rainfall=6.19"

Area (sf)	CN	Description
4,207	98	Paved parking, HSG C
22,144	74	>75% Grass cover, Good, HSG C
30,555	70	Woods, Good, HSG C
56,906	74	Weighted Average
52,699		92.61% Pervious Area
4,207		7.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	50	0.0350	0.19		Sheet Flow, TRAVEL PATH A TO B Grass: Short n= 0.150 P2= 3.20"
0.4	80	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C Unpaved Kv= 16.1 fps
0.5	100	0.4500	3.35		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
0.1	25	0.0250	3.21		Shallow Concentrated Flow, TARVEL PATH D TO E Paved Kv= 20.3 fps
0.4	250	0.0250	10.82	13.28	Pipe Channel, TRAVEL PATH F TO E 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.010
5.9	505	Total			

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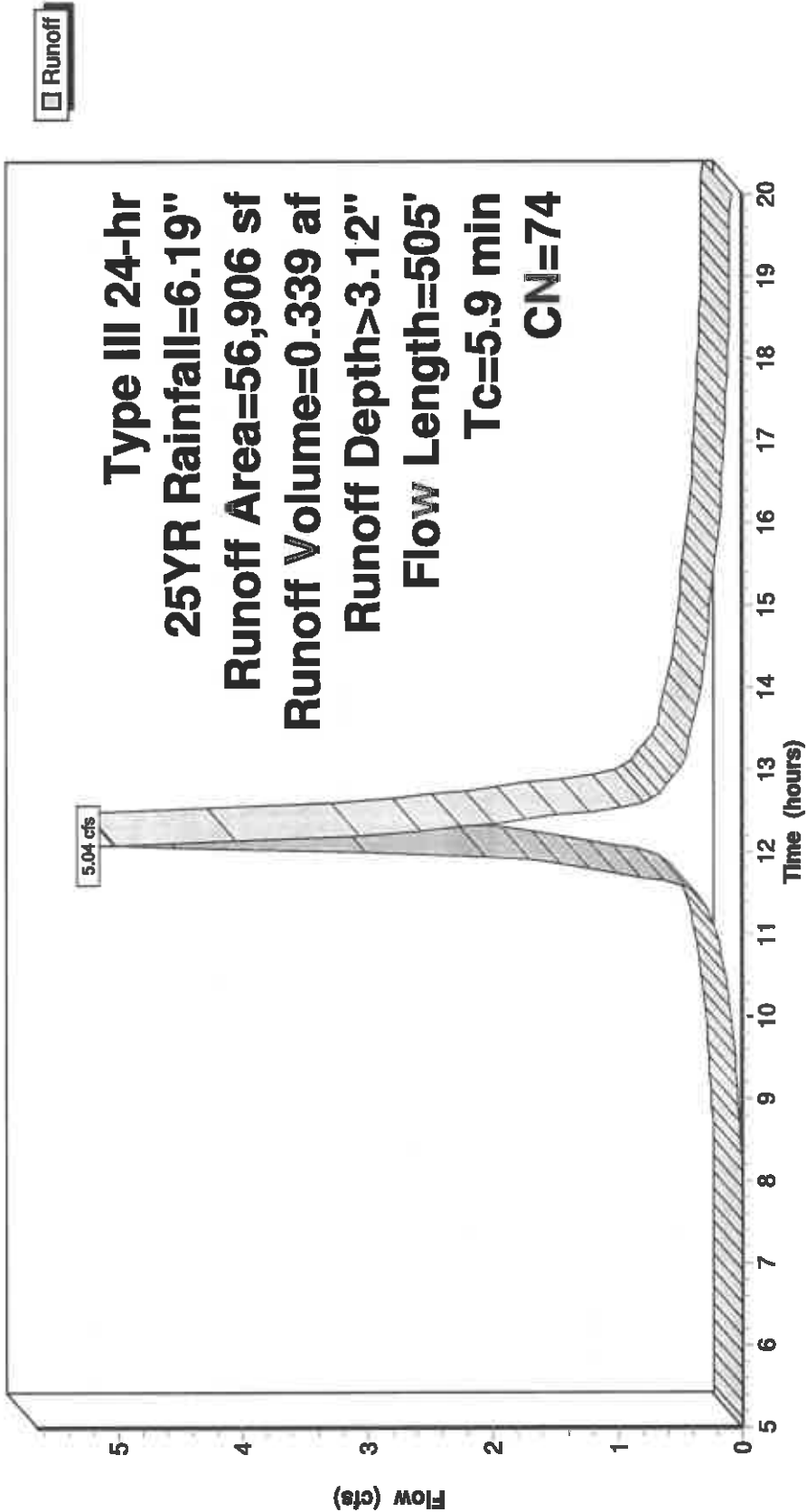
Type III 24-hr 25YR Rainfall=6.19"

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Page 66

Subcatchment P-4: P-4

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Page 67

Summary for Subcatchment P-5: P-5

Runoff = 9.93 cfs @ 12.15 hrs, Volume= 0.760 af, Depth> 2.74"
Routed to Reach IP-P1 : 45 MAIN ST

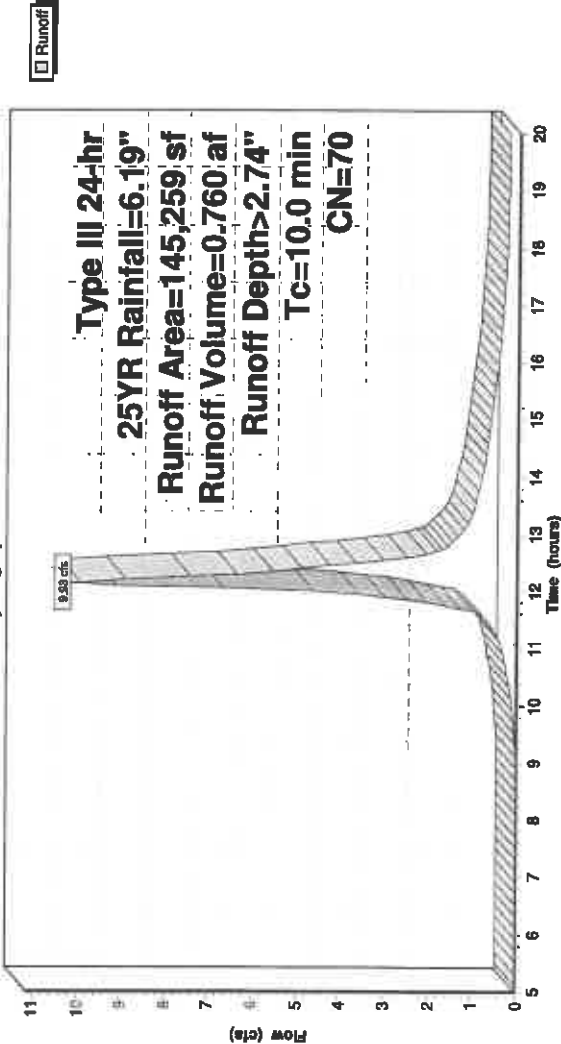
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=6.19"

Area (sf) CN Description			
145,259	70	Woods, Good	HSG C
145,259	100.00%	Pervious Area	
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec) Capacity (cfs) Description
10.0			

Direct Entry, TRAVEL PATH

Subcatchment P-5: P-5

Hydrograph



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Type III 24-hr 25YR Rainfall=6.19"

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Page 68

Summary for Subcatchment P-6: P-6

Runoff = 6.14 cfs @ 12.12 hrs, Volume= 0.442 af, Depth> 2.83"
Routed to Reach IP-P2 : SCHOOL ST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=6.19"

Area (sf)	CN	Description
13,023	74	>75% Grass cover, Good, HSG C
68,668	70	Woods, Good, HSG C
81,691	71	Weighted Average
81,691		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0450	0.20		Sheet Flow, TRAVEL PATH A TO B Grass: Short n= 0.150 P2= 3.20"
0.9	184	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C Unpaved Kv= 16.1 fps
3.1	195	0.0450	1.06		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
8.1	429	Total			

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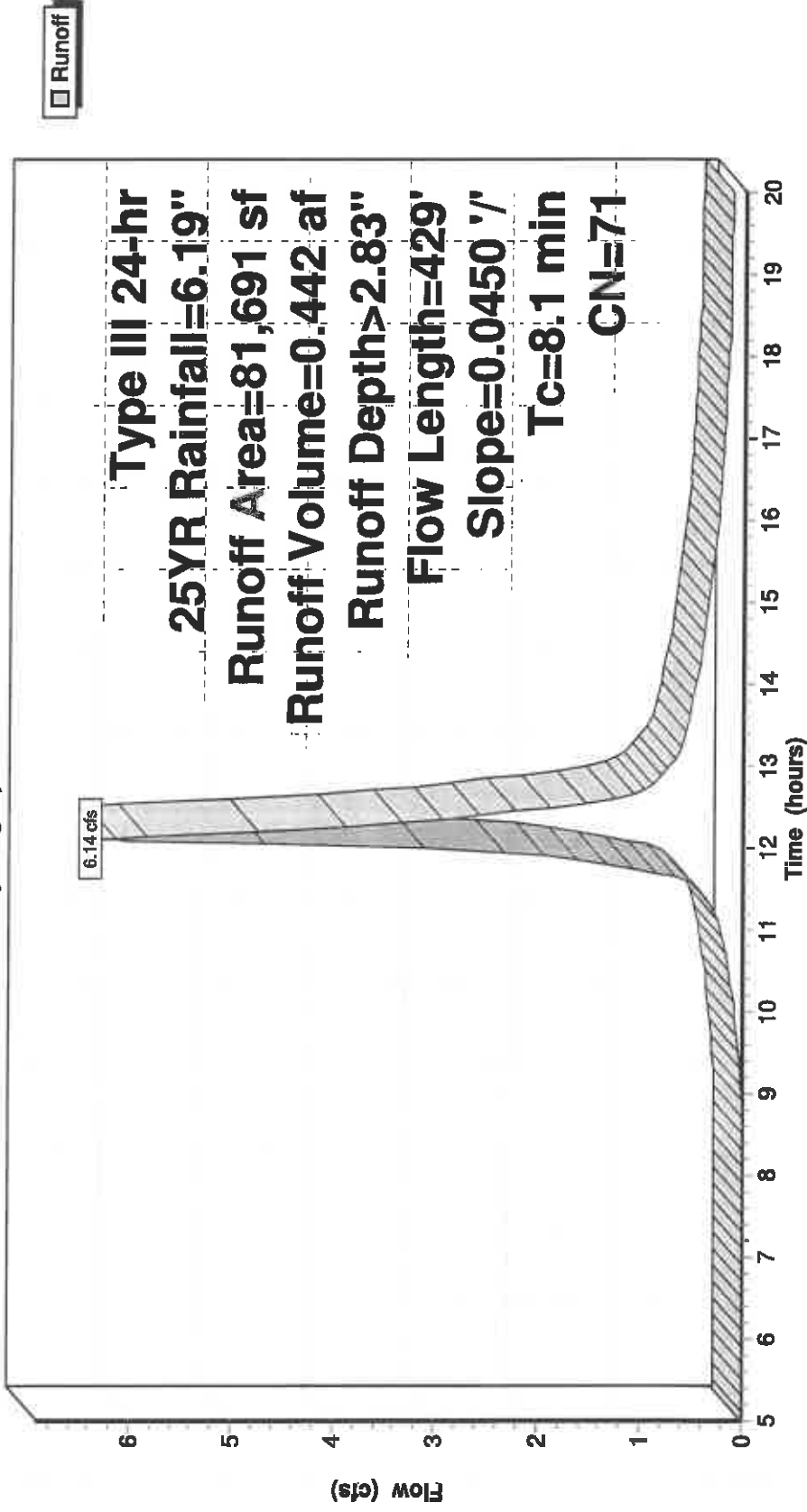
Type III 24-hr 25YR Rainfall=6.19"

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Page 69

Subcatchment P-6: P-6

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Page 70

Summary for Subcatchment P-7: BUILDING

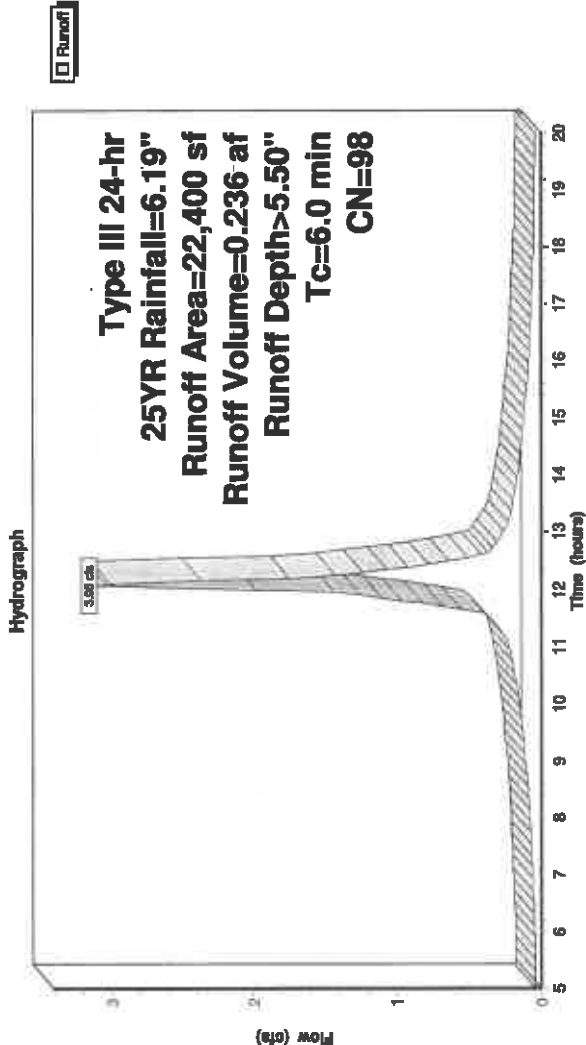
Runoff = 3.05 cfs @ 12.09 hrs, Volume= 0.236 af, Depth> 5.50"
Routed to Pond PND4 : U/G BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=6.19"

Area (sf)	CN	Description
22,400	98	Roofs, HSG C
22,400		100.00% Impervious Area

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

Subcatchment P-7: BUILDING



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Type III 24-hr 25YR Rainfall=6.19"

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Page 71

Summary for Reach IP-P1: 45 MAIN ST

Inflow Area = 4.641 ac, 2.08% Impervious, Inflow Depth > 2.67" for 25YR event

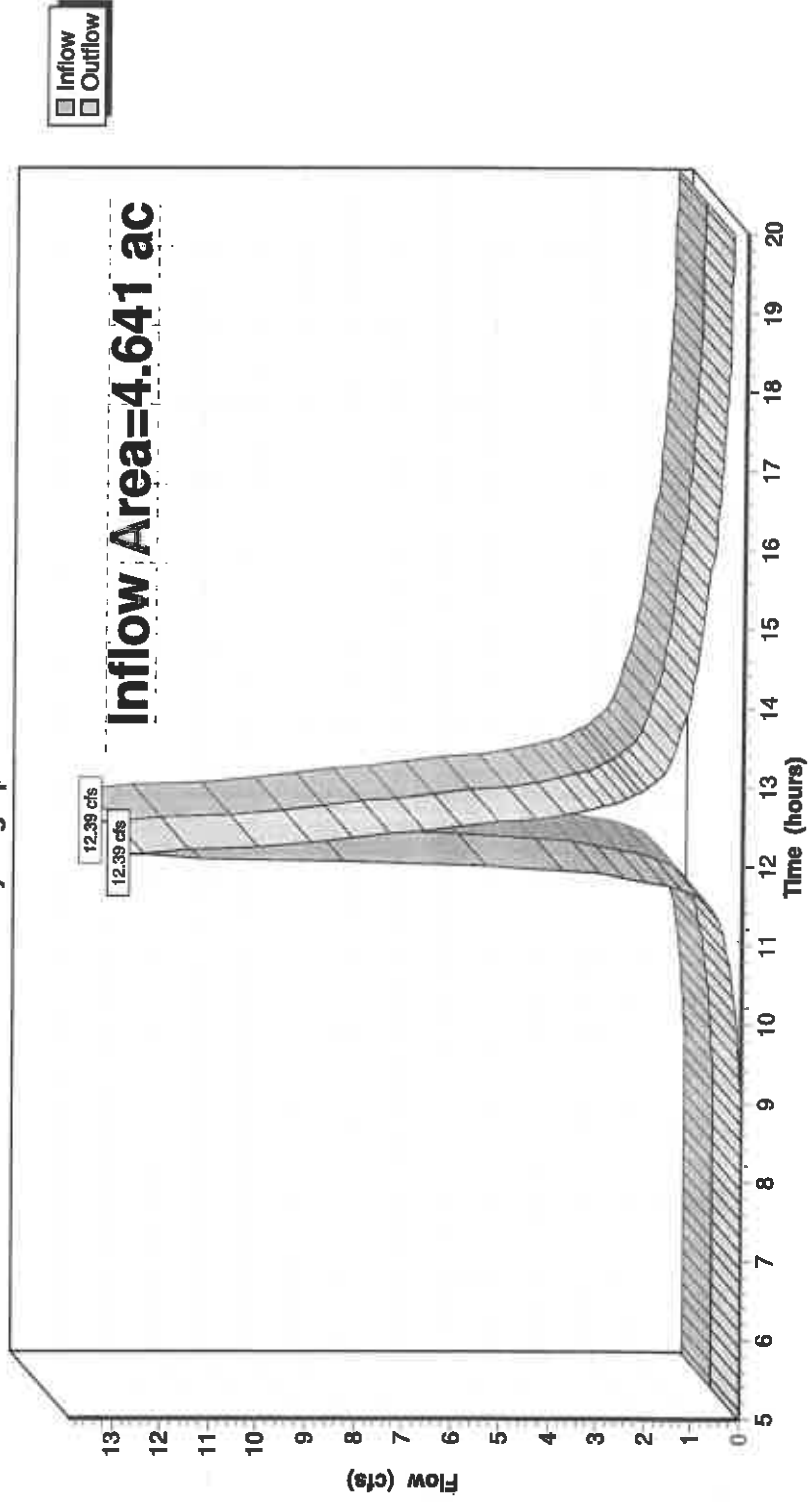
Inflow = 12.39 cfs @ 12.15 hrs, Volume= 0.982 af

Outflow = 12.39 cfs @ 12.15 hrs, Volume= 0.982 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-P1: 45 MAIN ST

Hydrograph



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Type III 24-hr 25YR Rainfall=6.19"

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Page 72

Summary for Reach IP-P2: SCHOOL ST

Inflow Area = 6.147 ac, 30.84% Impervious, Inflow Depth > 2.34" for 25YR event

Inflow = 6.79 cfs @ 12.12 hrs, Volume= 1.069 af

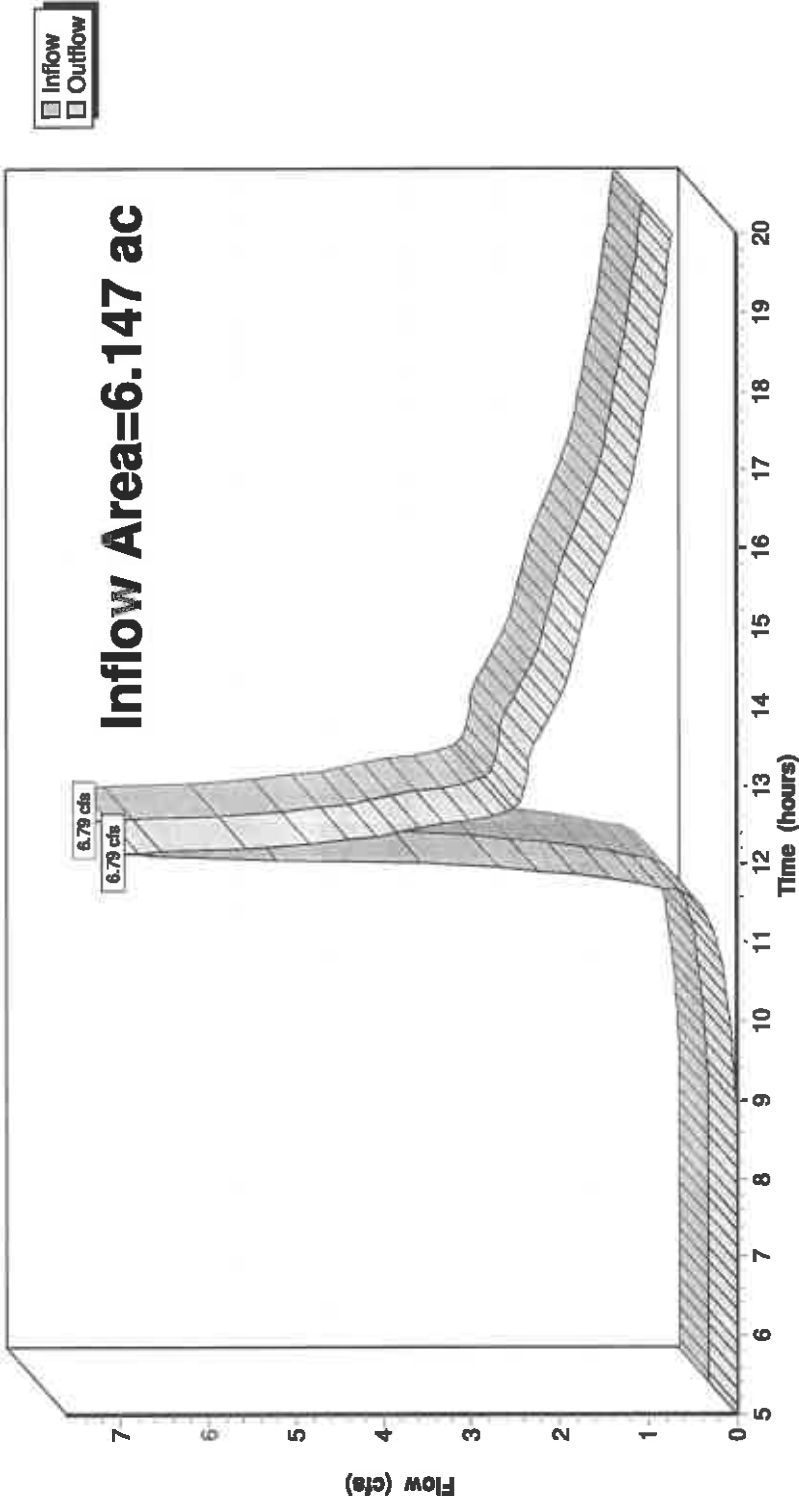
Outflow = 6.79 cfs @ 12.12 hrs, Volume= 1.069 af, Atten= 0%, Lag= 0.0

min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-P2: SCHOOL ST

Hydrograph



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Page 73

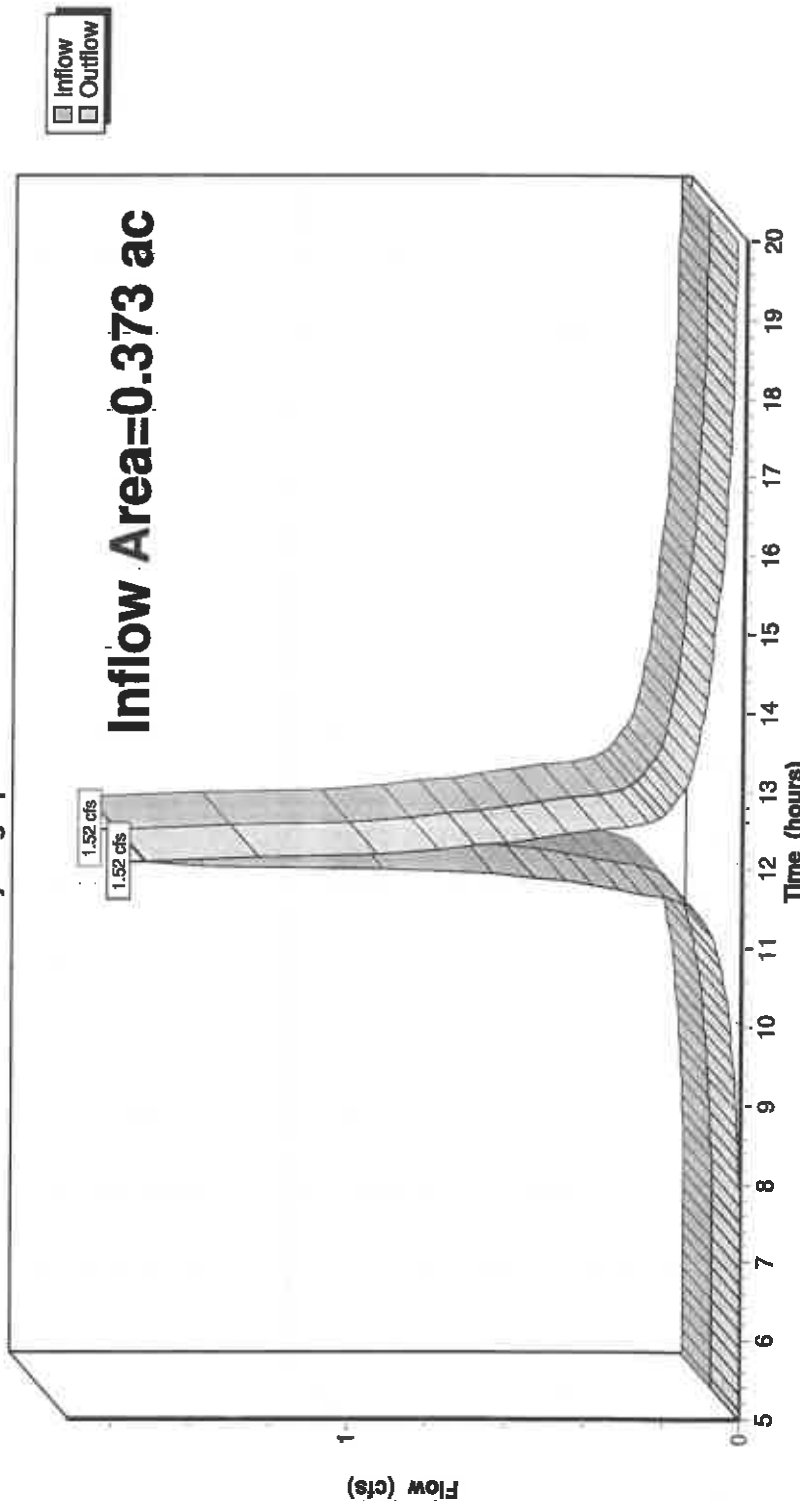
Summary for Reach IP-P3: EX. CULVERT

Inflow Area = 0.373 ac, 16.61% Impervious, Inflow Depth > 3.31" for 25YR event
Inflow = 1.52 cfs @ 12.09 hrs, Volume= 0.103 af
Outflow = 1.52 cfs @ 12.09 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-P3: EX. CULVERT

Hydrograph



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Page 74

Summary for Pond PND1: PND 1

Inflow Area = 2.380 ac, 52.89% Impervious, Inflow Depth > 3.50" for 25YR event
Inflow = 8.57 cfs @ 12.10 hrs, Volume= 0.695 af
Outflow = 1.18 cfs @ 12.93 hrs, Volume= 0.520 af, Atten= 86%, Lag= 49.8 min
Discarded = 0.03 cfs @ 12.93 hrs, Volume= 0.021 af
Primary = 1.15 cfs @ 12.93 hrs, Volume= 0.499 af
Routed to Reach IP-P2 : SCHOOL ST

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 327.51' @ 12.93 hrs Surf.Area= 4,882 sf Storage= 15,275 cf

Plug-Flow detention time= 190.7 min calculated for 0.518 af (75% of inflow)
Center-of-Mass det. time= 128.2 min (918.3 - 790.2)

Volume	Invert	Avail.Storage	Storage Description
#1	322.00'	23,430 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
322.00	1,030	0	0
324.00	2,125	3,155	3,155
326.00	3,600	5,725	8,880
328.00	5,300	8,900	17,780
329.00	6,000	5,650	23,430

Device	Routing	Invert	Outlet Devices
#1	Discarded	322.00'	0.270 In/hr Exfiltration over Surface area
#2	Primary	324.50'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	326.50'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	327.50'	15.0' 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

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Page 75

Discarded OutFlow Max=0.03 cfs @ 12.93 hrs HW=327.51' (Free Discharge)

1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=1.12 cfs @ 12.93 hrs HW=327.51' (Free Discharge)

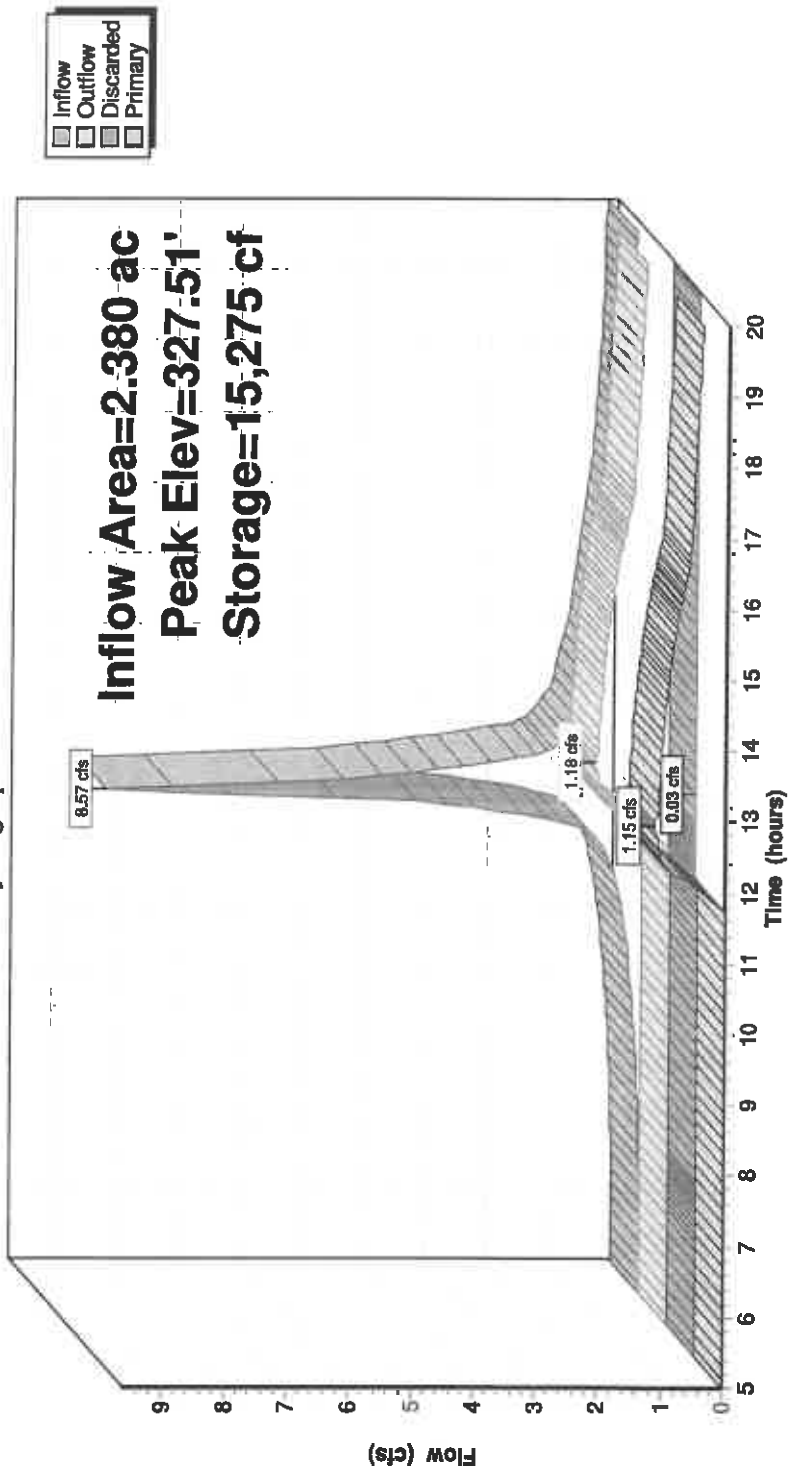
2=Orifice/Grate (Orifice Controls 0.71 cfs @ 8.12 fps)

3=Orifice/Grate (Orifice Controls 0.39 cfs @ 4.42 fps)

4=Broad-Crested Rectangular Weir (Weir Controls 0.03 cfs @ 0.24 fps)

Pond PND1: PND 1

Hydrograph



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Page 76

Summary for Pond PND2: BASIN#2

Inflow Area = 1.891 ac, 33.69% Impervious, Inflow Depth > 3.81" for 25YR event
Inflow = 8.49 cfs @ 12.10 hrs, Volume= 0.600 af
Outflow = 0.70 cfs @ 13.32 hrs, Volume= 0.286 af, Atten= 92%, Lag= 72.9 min
Discarded = 0.03 cfs @ 13.32 hrs, Volume= 0.027 af
Primary = 0.67 cfs @ 13.32 hrs, Volume= 0.259 af
Routed to Reach IP-P2 : SCHOOL ST

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 328.02' @ 13.32 hrs Surf.Area= 4,712 sf Storage= 16,530 cf

Plug-Flow detention time= 230.1 min calculated for 0.286 af (48% of inflow)
Center-of-Mass det. time= 145.6 min (924.0 - 778.4)

Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	20,173 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 21,436 cf Overall - 1,263 cf Embedded = 20,173 cf
#2	324.00'	1,263 cf	Cultec R-330XLHD x 24 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		21,436 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
324.00	3,312	0	0
326.00	4,212	7,524	7,524
328.00	4,700	8,912	16,436
329.00	5,300	5,000	21,436

Device	Routing	Invert	Outlet Devices
#1	Discarded	324.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	325.00'	2.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	327.30'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	328.00'	15.0' long x 1.0' breadth Broad-Crested Rectangular Weir

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Page 77

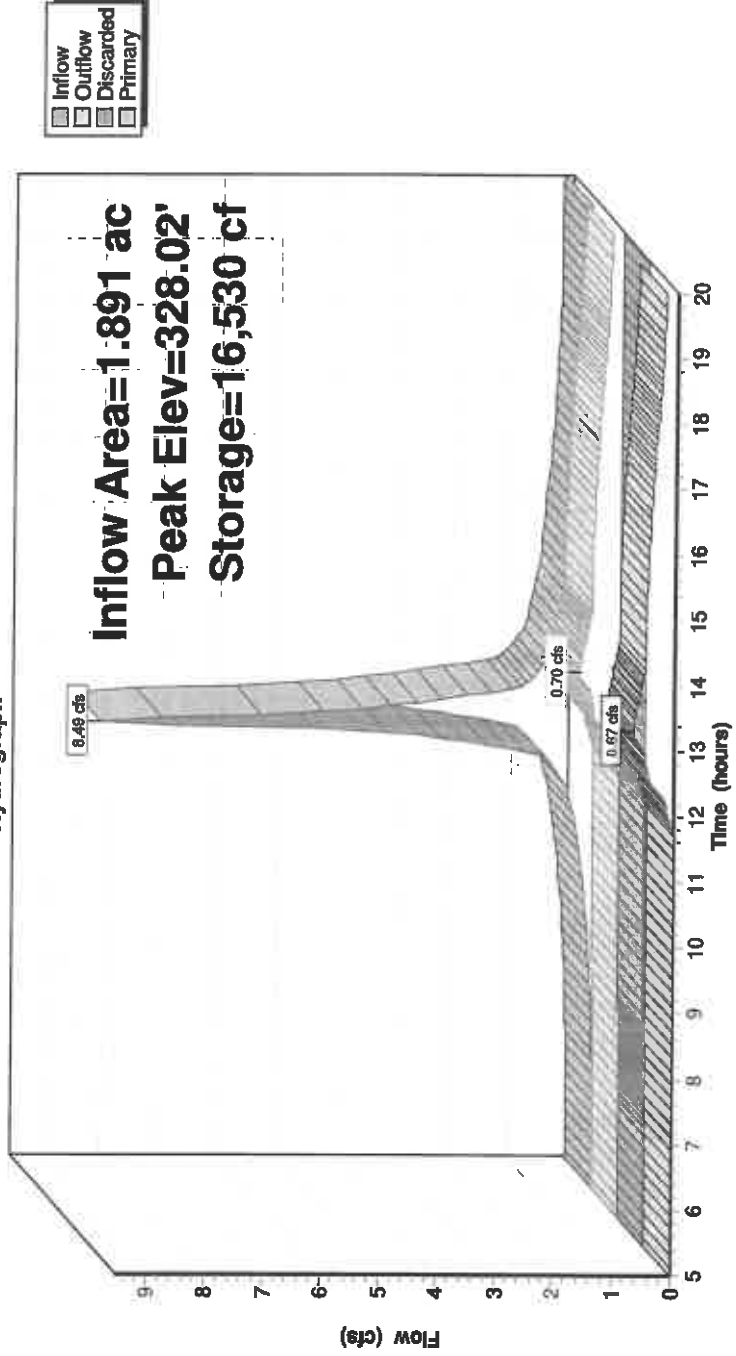
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.03 cfs @ 13.32 hrs HW=328.02' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.61 cfs @ 13.32 hrs HW=328.02' (Free Discharge)
2=Orifice/Grate (Orifice Controls 0.18 cfs @ 8.25 fps)
3=Orifice/Grate (Orifice Controls 0.31 cfs @ 3.58 fps)
4=Broad-Crested Rectangular Weir (Weir Controls 0.11 cfs @ 0.38 fps)

Pond PND2: BASIN#2

Hydrograph



Summary for Pond PND3: BASIN3

Inflow Area = 1.306 ac, 7.39% Impervious, Inflow Depth > 3.12" for 25YR event
 Inflow = 5.04 cfs @ 12.09 hrs, Volume= 0.339 af
 Outflow = 2.63 cfs @ 12.25 hrs, Volume= 0.279 af, Atten= 48%, Lag= 9.4 min
 Discarded = 0.01 cfs @ 12.25 hrs, Volume= 0.008 af
 Primary = 2.61 cfs @ 12.25 hrs, Volume= 0.271 af
 Routed to Reach IP-P1 : 45 MAIN ST

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 333.61' @ 12.25 hrs Surf.Area= 1,909 sf Storage= 4,715 cf

Plug-Flow detention time= 83.6 min calculated for 0.278 af (82% of inflow)
 Center-of-Mass det. time= 34.9 min (826.4 - 791.5)

Volume	Invert	Avail.Storage	Storage Description
#1	330.00'	7,937 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
330.00	925	0	0
332.00	1,250	2,175	2,175
334.00	2,070	3,320	5,495
335.00	2,814	2,442	7,937

Device	Routing	Invert	Outlet Devices
#1	Discarded	330.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	332.20'	10.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	334.00'	20.0' long x 0.5' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00
			Coef. (English) 2.80 2.92 3.08 3.30 3.32

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Page 79

Discarded OutFlow Max=0.01 cfs @ 12.25 hrs HW=333.61' (Free Discharge)

1=Exfiltration (Exfiltration Controls 0.01 cfs)

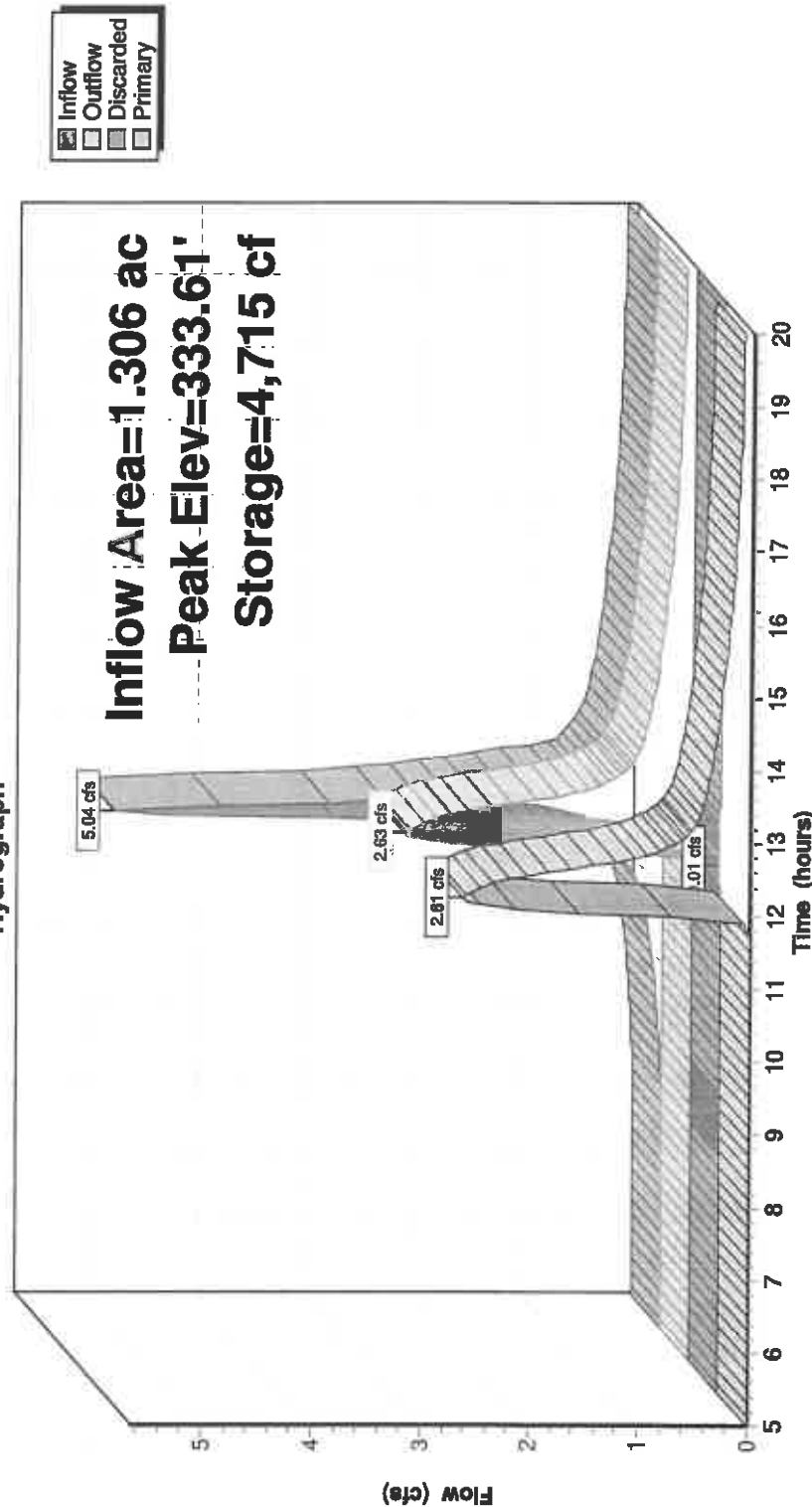
Primary OutFlow Max=2.61 cfs @ 12.25 hrs HW=333.61' (Free Discharge)

2=Orifice/Grate (Orifice Controls 2.61 cfs @ 4.79 fps)

3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PND3: BASIN3

Hydrograph



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Page 80

Summary for Pond PND4: U/G BASIN

Inflow Area = 0.514 ac, 100.00% Impervious, Inflow Depth > 5.50" for 25YR event
Inflow = 3.05 cfs @ 12.09 hrs, Volume= 0.236 af
Outflow = 0.29 cfs @ 12.91 hrs, Volume= 0.114 af, Atten= 91%, Lag= 49.6 min
Discarded = 0.02 cfs @ 6.15 hrs, Volume= 0.027 af
Primary = 0.26 cfs @ 12.91 hrs, Volume= 0.086 af
Routed to Pond PND1 : PND 1

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 327.06' @ 12.91 hrs Surf.Area= 3,637 sf Storage= 6,531 cf

Plug-Flow detention time= 225.0 min calculated for 0.114 af (48% of inflow)
Center-of-Mass det. time= 124.9 min (858.9 - 734.0)

Volume	Invert	Avail.Storage	Storage Description
#1	325.00'	2,587 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 12,739 cf Overall - 6,270 cf Embedded = 6,468 cf x 40.0% Voids
#2	325.00'	6,270 cf	Cultec R-330XLHD x 120 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		8,857 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
325.00	3,673	0	0
325.50	3,637	1,828	1,828
328.00	3,637	9,093	10,920
328.50	3,637	1,819	12,739

Device	Routing	Invert	Outlet Devices
#1	Discarded	325.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	326.50'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

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Page 81

Discarded OutFlow Max=0.02 cfs @ 6.15 hrs HW=325.04' (Free Discharge)

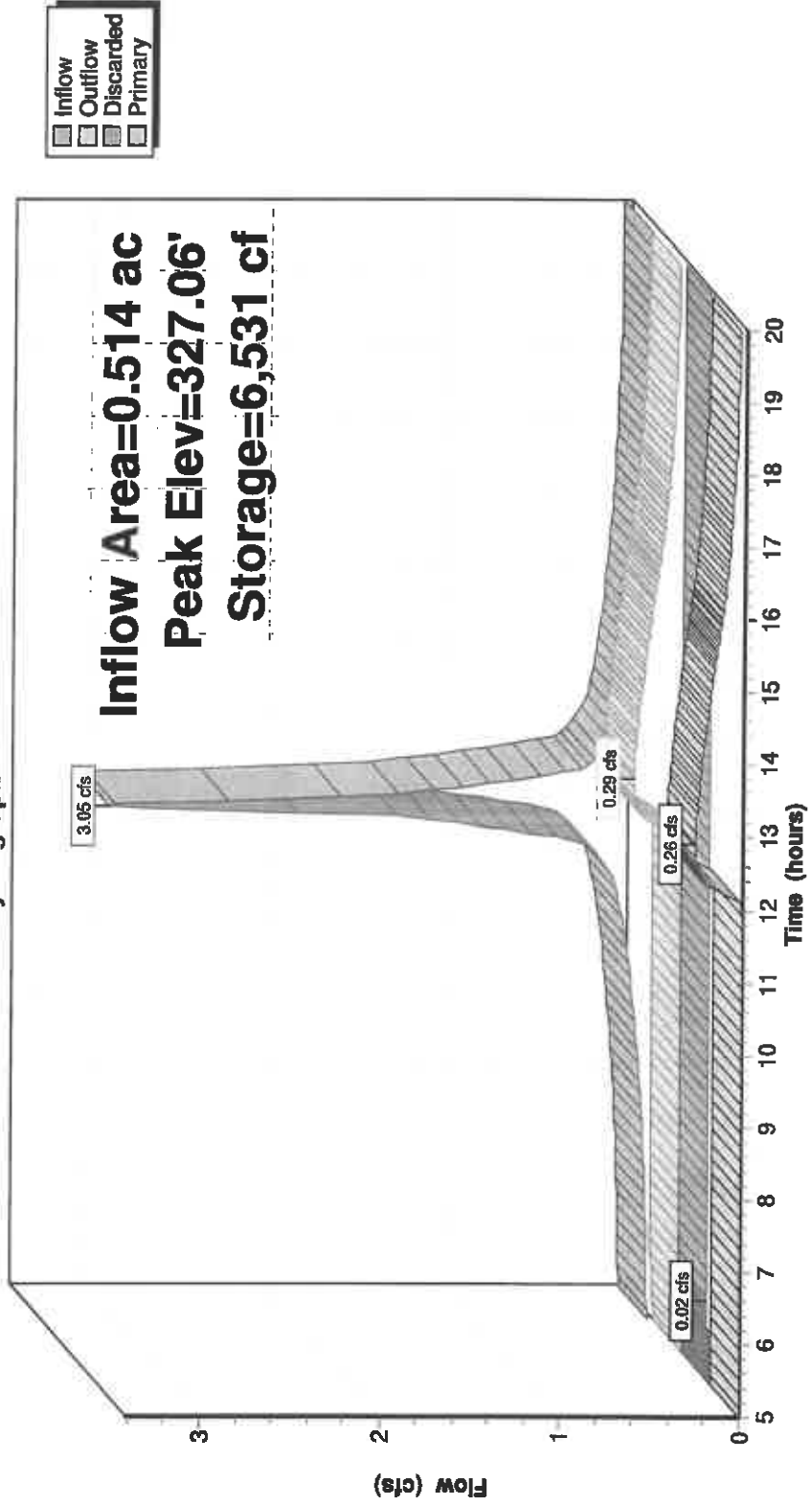
1-1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.26 cfs @ 12.91 hrs HW=327.06' (Free Discharge)

2-2=Orifice/Grate (Orifice Controls 0.26 cfs @ 3.03 fps)

Pond PND4: U/G BASIN

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Page 82

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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 P-1: P-1	Runoff Area=81,268 sf 39.90% Impervious Runoff Depth>5.39" Flow Length=618' Tc=7.1 min CN=82 Runoff=11.63 cfs 0.838 af
Subcatchment P-2: P-2	Runoff Area=82,391 sf 33.69% Impervious Runoff Depth>5.28" Flow Length=330' Tc=7.1 min CN=81 Runoff=11.59 cfs 0.832 af
Subcatchment P-3: P-3	Runoff Area=16,235 sf 16.61% Impervious Runoff Depth>4.71" Tc=6.0 min CN=76 Runoff=2.14 cfs 0.146 af
Subcatchment P-4: P-4	Runoff Area=56,906 sf 7.39% Impervious Runoff Depth>4.49" Flow Length=505' Tc=5.9 min CN=74 Runoff=7.19 cfs 0.488 af
Subcatchment P-5: P-5	Runoff Area=145,259 sf 0.00% Impervious Runoff Depth>4.04" Tc=10.0 min CN=70 Runoff=14.64 cfs 1.122 af
Subcatchment P-6: P-6	Runoff Area=81,691 sf 0.00% Impervious Runoff Depth>4.15" Flow Length=429' Slope=0.0450 '/' Tc=8.1 min CN=71 Runoff=8.98 cfs 0.649 af
Subcatchment P-7: BUILDING	Runoff Area=22,400 sf 100.00% Impervious Runoff Depth>7.01" Tc=6.0 min CN=98 Runoff=3.87 cfs 0.300 af
Reach IP-P1: 45 MAIN ST	Inflow=20.11 cfs 1.435 af Outflow=20.11 cfs 1.435 af
Reach IP-P2: SCHOOL ST	Inflow=16.29 cfs 1.567 af Outflow=16.29 cfs 1.567 af
Reach IP-P3: EX. CULVERT	Inflow=2.14 cfs 0.146 af Outflow=2.14 cfs 0.146 af
Pond PND1: PND 1	Peak Elev=327.76' Storage=16,522 cf Inflow=11.81 cfs 0.987 af Discarded=0.03 cfs 0.024 af Primary=6.47 cfs 0.760 af Outflow=6.50 cfs 0.783 af

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Type III 24-hr 100YR Rainfall=7.85"

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Page 83

Pond PND2: BASIN#2

Discarded=0.03 cfs Peak Elev=328.24' Storage=17,589 cf Inflow=11.59 cfs 0.832 af
Primary=5.37 cfs 0.478 af Outflow=5.40 cfs 0.508 af

Pond PND3: BASIN3

Discarded=0.01 cfs Peak Elev=334.13' Storage=5,778 cf Inflow=7.19 cfs 0.488 af
Primary=5.60 cfs 0.419 af Outflow=5.62 cfs 0.427 af

Pond PND4: U/G BASIN

Discarded=0.02 cfs Peak Elev=327.94' Storage=8,045 cf Inflow=3.87 cfs 0.300 af
Primary=0.47 cfs 0.149 af Outflow=0.50 cfs 0.177 af

Total Runoff Area = 11.160 ac Runoff Volume = 4.375 af Average Runoff Depth = 4.70"
81.59% Pervious = 9.106 ac 18.41% Impervious = 2.054 ac

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Type III 24-hr 100YR Rainfall=7.85"

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Page 84

Summary for Subcatchment P-1: P-1

Runoff = 11.63 cfs @ 12.10 hrs, Volume= 0.838 af, Depth> 5.39"
Routed to Pond PND1 : PND 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR Rainfall=7.85"

Area (sf)	CN	Description
32,428	98	Paved parking, HSG C
26,882	74	>75% Grass cover, Good, HSG C
21,958	70	Woods, Good, HSG C
81,268	82	Weighted Average
48,840		60.10% Pervious Area
32,428		39.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0450	0.20		Sheet Flow, TRAVEL PATH A TO B
					Grass: Short n= 0.150 P2= 3.20"
0.4	80	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C
					Unpaved Kv= 16.1 fps
1.6	100	0.0450	1.06		Shallow Concentrated Flow, TARVEL PATH C TO D
					Woodland Kv= 5.0 fps
0.6	100	0.0200	2.87		Shallow Concentrated Flow, TARVEL PATH D TO E
					Paved Kv= 20.3 fps
0.4	288	0.0250	12.22	21.59	Pipe Channel, TARVEL PATH E TO F
					18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
					n= 0.010
7.1	618	Total			

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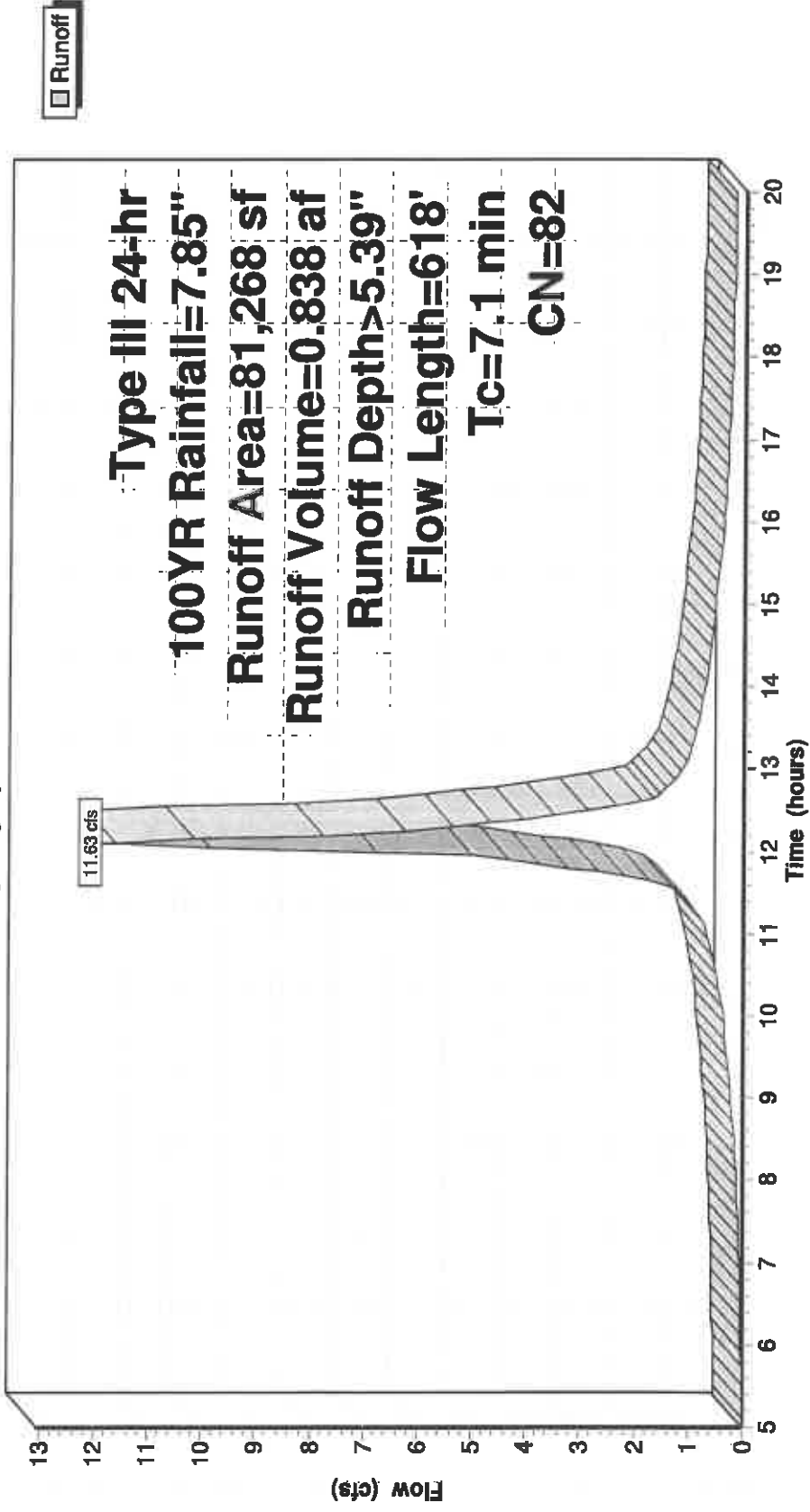
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Page 85

Subcatchment P-1: P-1

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Page 86

Summary for Subcatchment P-2: P-2

Runoff = 11.59 cfs @ 12.10 hrs, Volume= 0.832 af, Depth> 5.28"
Routed to Pond PND2 : BASIN#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR Rainfall=7.85"

Area (sf)	CN	Description
27,755	98	Paved parking, HSG C
34,256	74	>75% Grass cover, Good, HSG C
20,380	70	Woods, Good, HSG C
82,391	81	Weighted Average
54,636		66.31% Pervious Area
27,755		33.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	50	0.0450	0.19		Sheet Flow, TRAVEL PATH A TO B
					Cultivated: Residue>20% n= 0.170 P2= 3.20"
0.7	135	0.0450	3.42		Shallow Concentrated Flow, TARVEL PATH B TO C
					Unpaved Kv= 16.1 fps
1.9	145	0.0650	1.27		Shallow Concentrated Flow, TRAVEL PATH C TO D
					Woodland Kv= 5.0 fps
7.1	330	Total			

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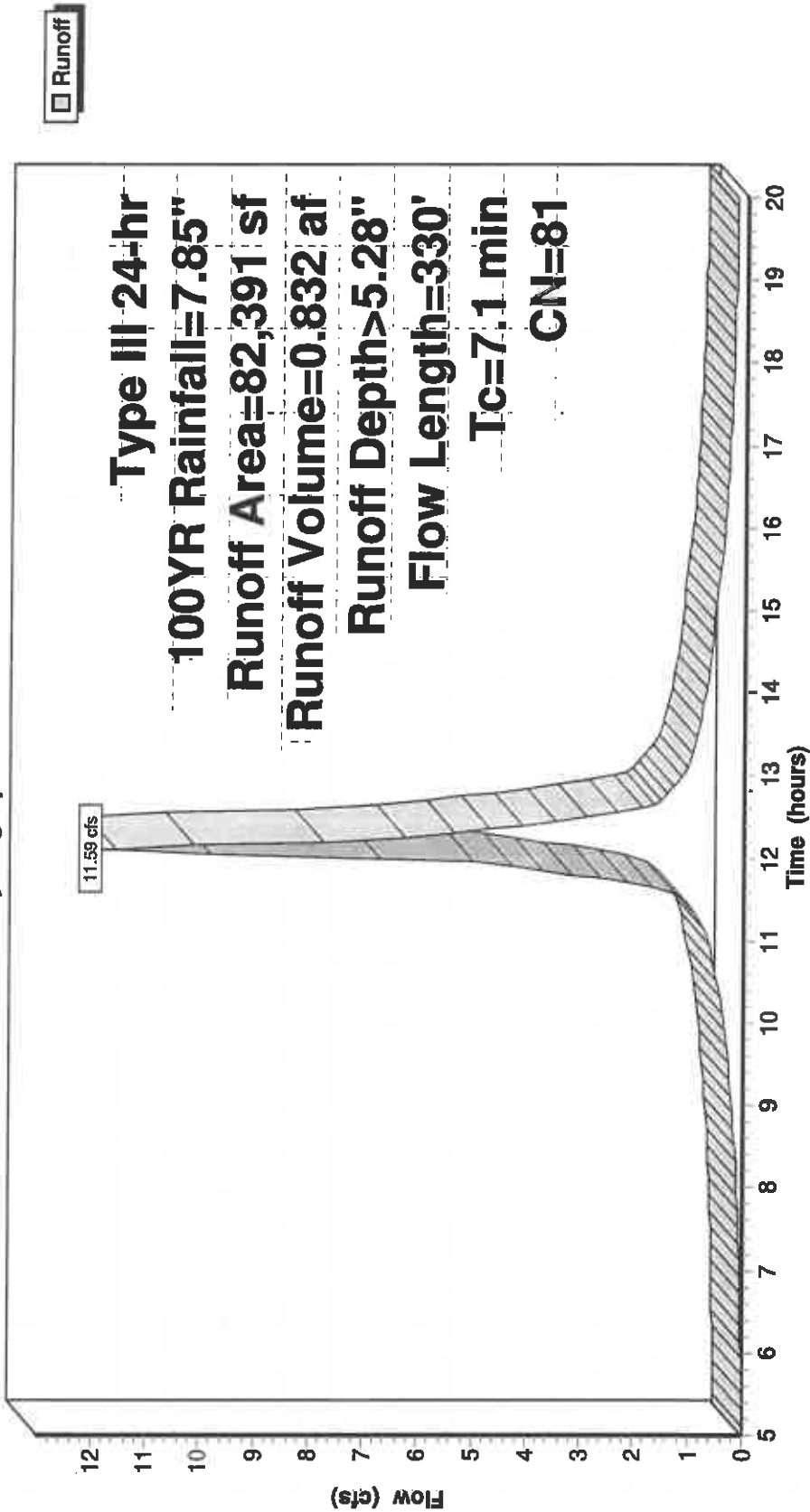
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Page 87

Subcatchment P-2: P-2

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Page 88

Summary for Subcatchment P-3: P-3

Runoff = 2.14 cfs @ 12.09 hrs, Volume= 0.146 af, Depth> 4.71"
Routed to Reach IP-P3 : EX. CULVERT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR Rainfall=7.85"

Area (sf)	CN	Description
2,696	98	Paved parking, HSG C
5,650	74	>75% Grass cover, Good, HSG C
7,889	70	Woods, Good, HSG C
16,235	76	Weighted Average
13,539		83.39% Pervious Area
2,696		16.61% Impervious Area

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

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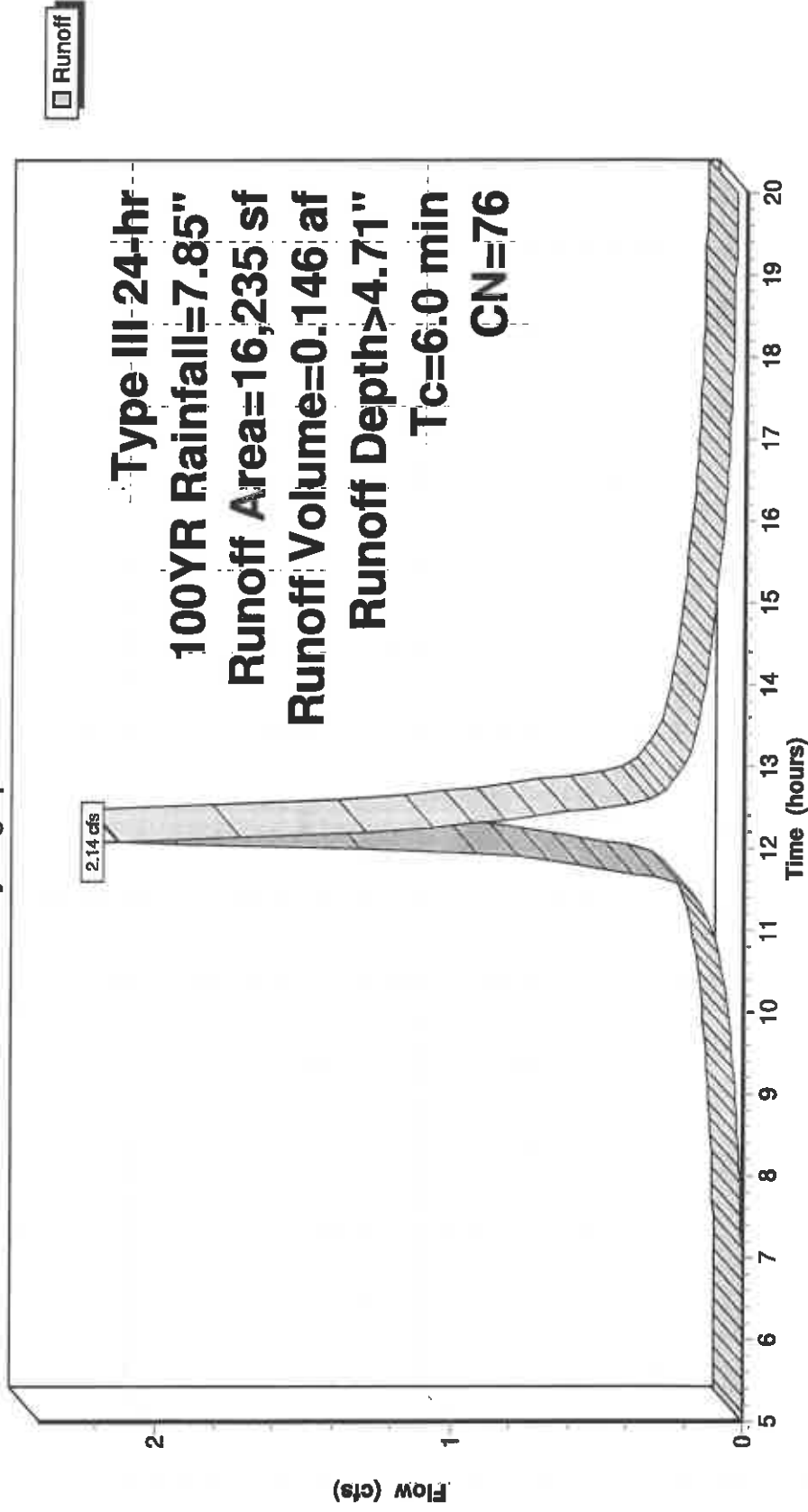
Type III 24-hr 100YR Rainfall=7.85"

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Page 89

Subcatchment P-3: P-3

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Type III 24-hr 100YR Rainfall=7.85"

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Page 90

Summary for Subcatchment P-4: P-4

Runoff = 7.19 cfs @ 12.09 hrs, Volume= 0.488 af, Depth> 4.49"
Routed to Pond PND3 : BASIN3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR Rainfall=7.85"

Area (sf)	CN	Description
4,207	98	Paved parking, HSG C
22,144	74	>75% Grass cover, Good, HSG C
30,555	70	Woods, Good, HSG C
56,906	74	Weighted Average
52,699		92.61% Pervious Area
4,207		7.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	50	0.0350	0.19		Sheet Flow, TRAVEL PATH A TO B Grass: Short n= 0.150 P2= 3.20"
0.4	80	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C Unpaved Kv= 16.1 fps
0.5	100	0.4500	3.35		Shallow Concentrated Flow, TRAVEL PATH C TO D Woodland Kv= 5.0 fps
0.1	25	0.0250	3.21		Shallow Concentrated Flow, TARVEL PATH D TO E Paved Kv= 20.3 fps
0.4	250	0.0250	10.82	13.28	Pipe Channel, TRAVEL PATH F TO E 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.010
5.9	505	Total			

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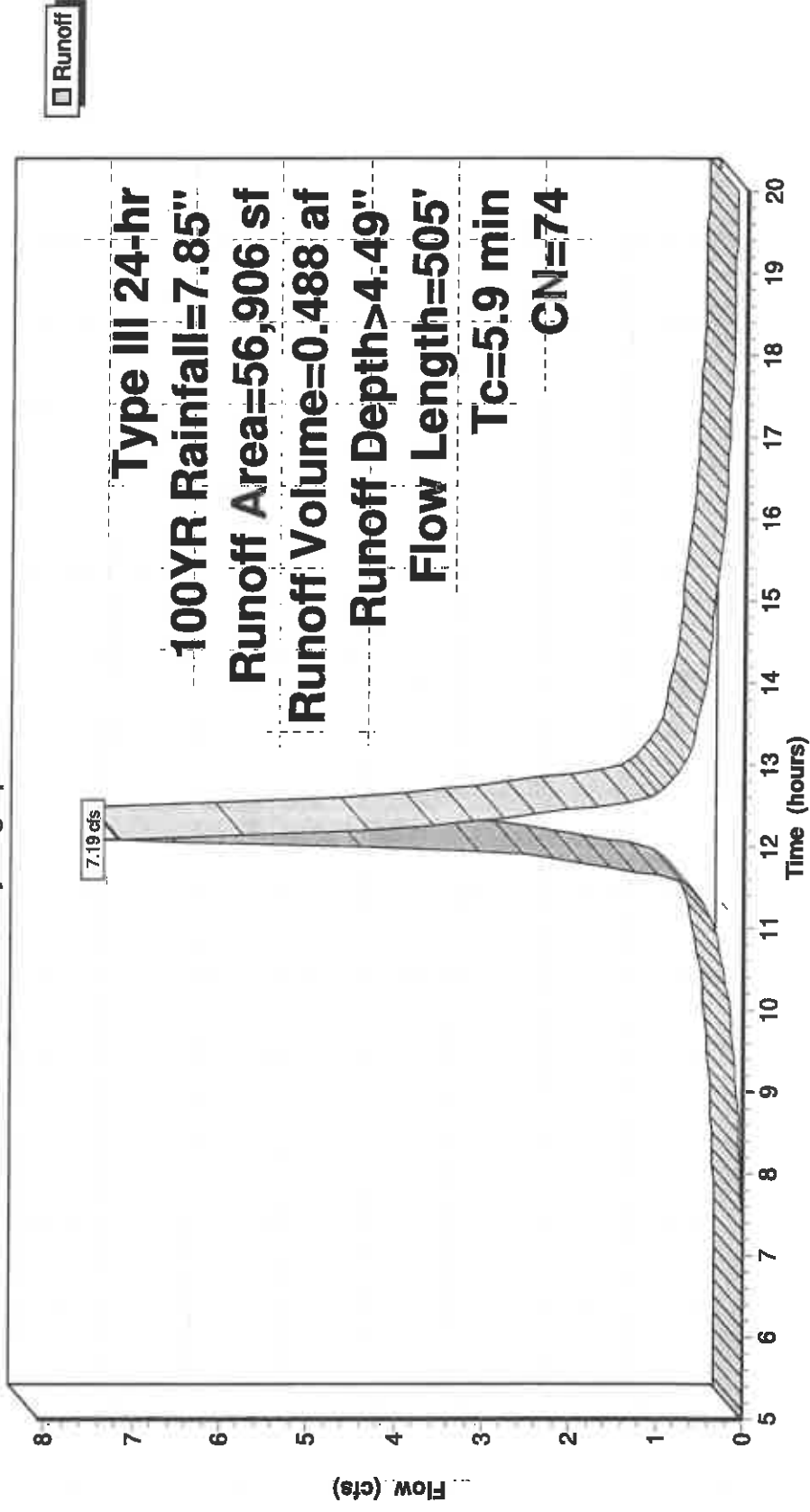
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Page 91

Subcatchment P-4: P-4

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Page 92

Summary for Subcatchment P-5: P-5

Runoff = 14.64 cfs @ 12.14 hrs, Volume= 1.122 af, Depth> 4.04"
Routed to Reach IP-P1 : 45 MAIN ST

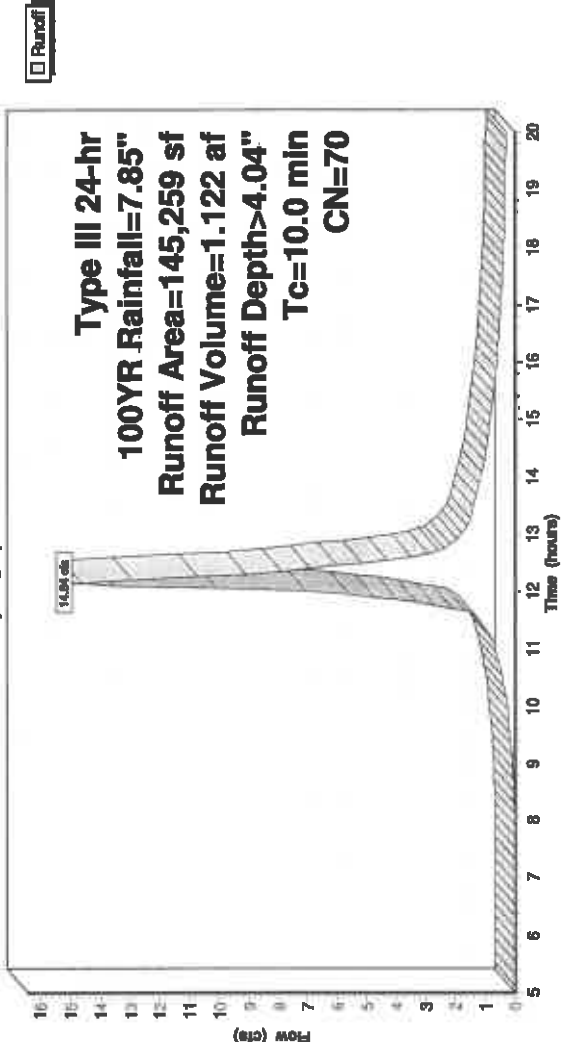
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR Rainfall=7.85"

Area (sf)	CN	Description
145,259	70	Woods, Good, HSG C
145,259	100.00%	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, TRAVEL PATH

Subcatchment P-5: P-5

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Page 93

Summary for Subcatchment P-6: P-6

Runoff = 8.98 cfs @ 12.12 hrs, Volume= 0.649 af, Depth> 4.15"
Routed to Reach IP-P2 : SCHOOL ST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR Rainfall=7.85"

Area (sf)		CN	Description		
13,023	74	>75% Grass cover, Good, HSG C			
68,668	70	Woods, Good, HSG C			
81,691	71	Weighted Average			
81,691		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0450	0.20		Sheet Flow, TRAVEL PATH A TO B
					Grass: Short n= 0.150 P2= 3.20"
0.9	184	0.0450	3.42		Shallow Concentrated Flow, TRAVEL PATH B TO C
					Unpaved Kv= 16.1 fps
3.1	195	0.0450	1.06		Shallow Concentrated Flow, TRAVEL PATH C TO D
					Woodland Kv= 5.0 fps
8.1	429	Total			

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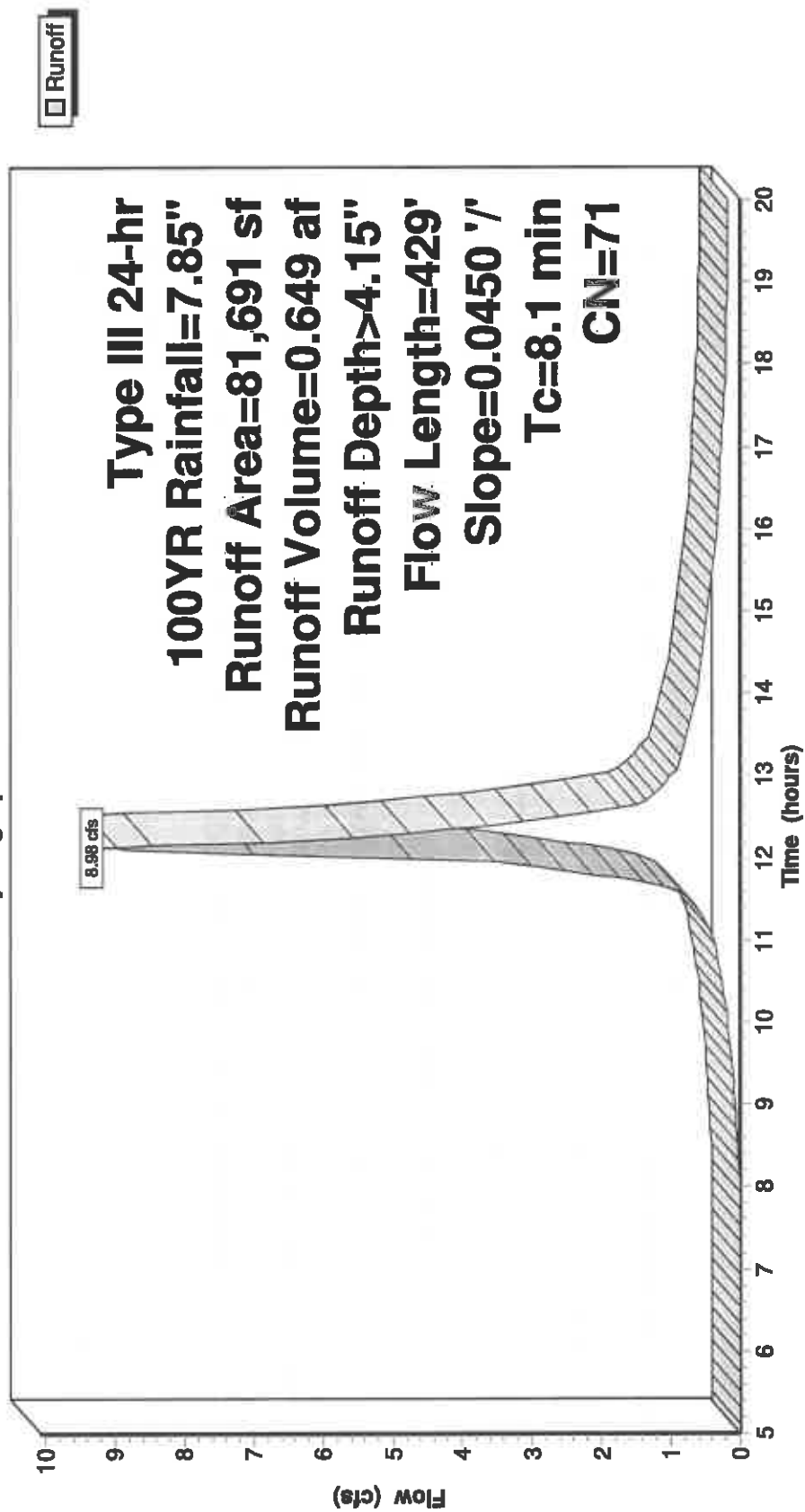
Type III 24-hr 100YR Rainfall=7.85"

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Page 94

Subcatchment P-6: P-6

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Page 95

Summary for Subcatchment P-7: BUILDING

Runoff = 3.87 cfs @ 12.09 hrs, Volume= 0.300 af, Depth> 7.01"
Routed to Pond PND4 : U/G BASIN

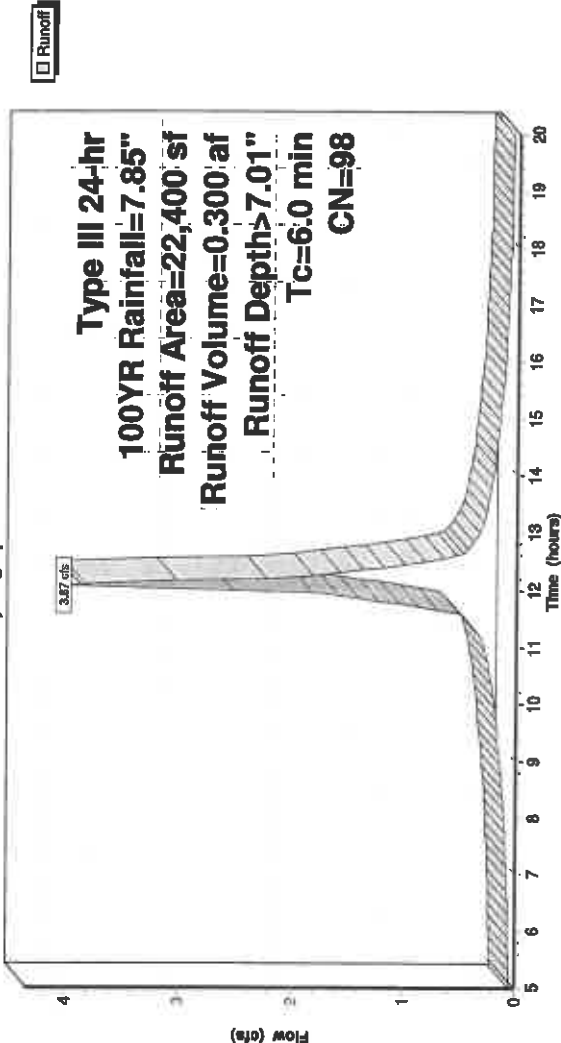
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR Rainfall=7.85"

Area (sf)	CN	Description
22,400	98	Roofs, HSG C
22,400	100.00%	Impervious Area

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

Subcatchment P-7: BUILDING

Hydrograph



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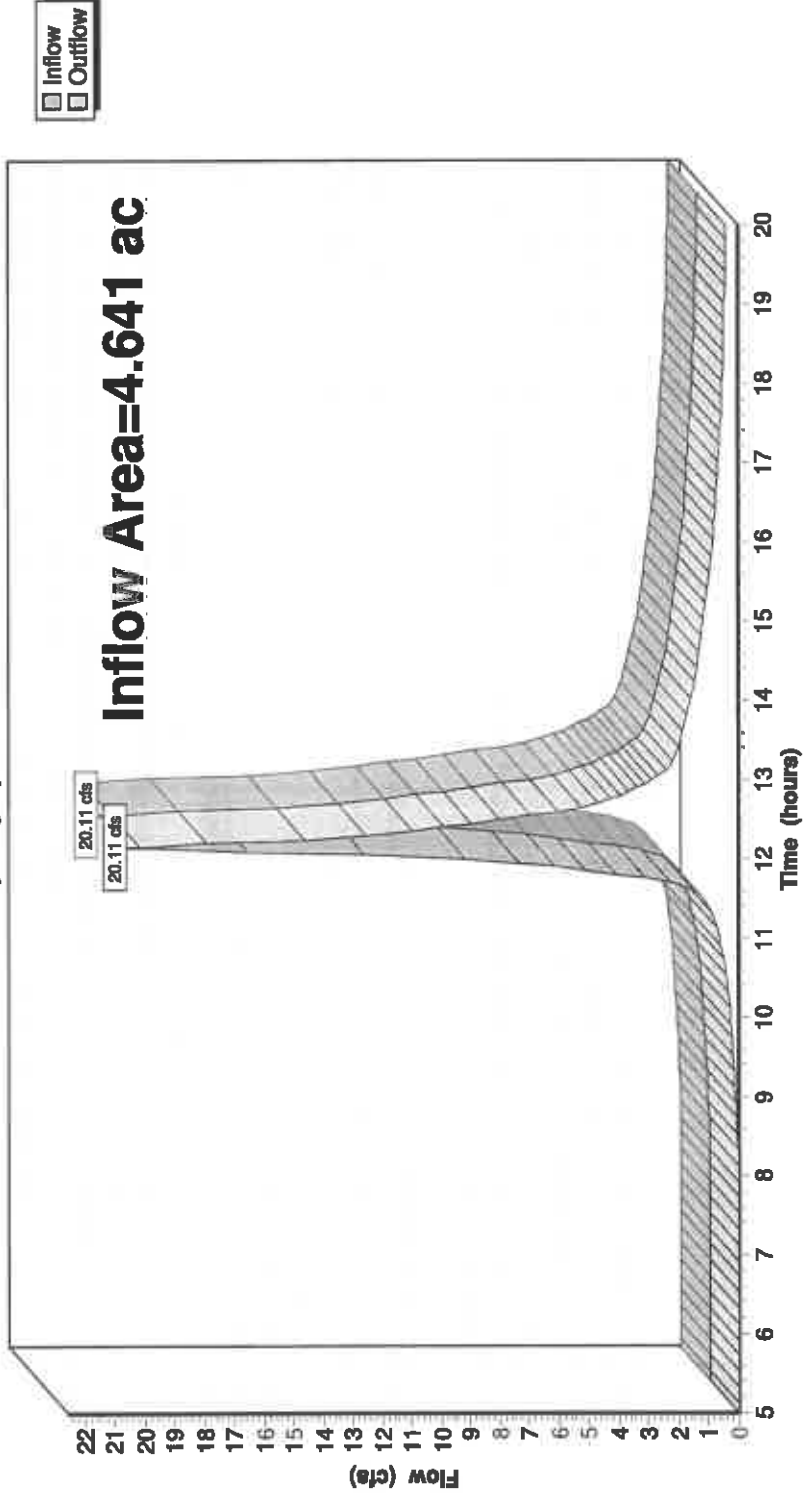
Page 96

Summary for Reach IP-P1: 45 MAIN ST

Inflow Area = 4.641 ac, 2.08% Impervious, Inflow Depth > 3.98" for 100YR event
Inflow = 20.11 cfs @ 12.16 hrs, Volume= 1.435 af
Outflow = 20.11 cfs @ 12.16 hrs, Volume= 1.435 af, Atten= 0%, Lag= 0.0 min
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-P1: 45 MAIN ST

Hydrograph



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Page 97

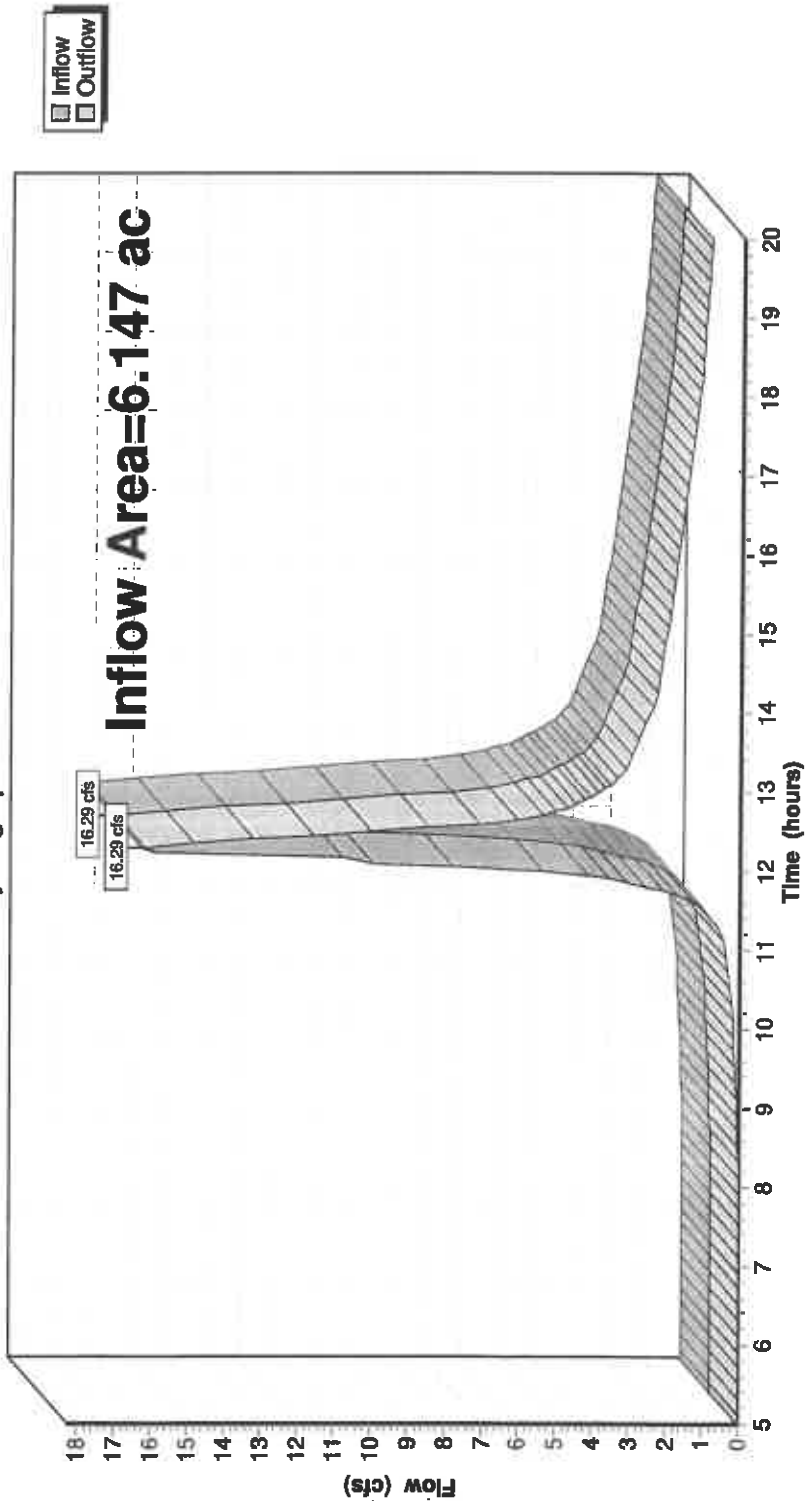
Summary for Reach IP-P2: SCHOOL ST

Inflow Area = 6.147 ac, 30.84% Impervious, Inflow Depth > 3.68" for 100YR event
Inflow = 16.29 cfs @ 12.28 hrs, Volume= 1.567 af
Outflow = 16.29 cfs @ 12.28 hrs, Volume= 1.567 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-P2: SCHOOL ST

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Page 98

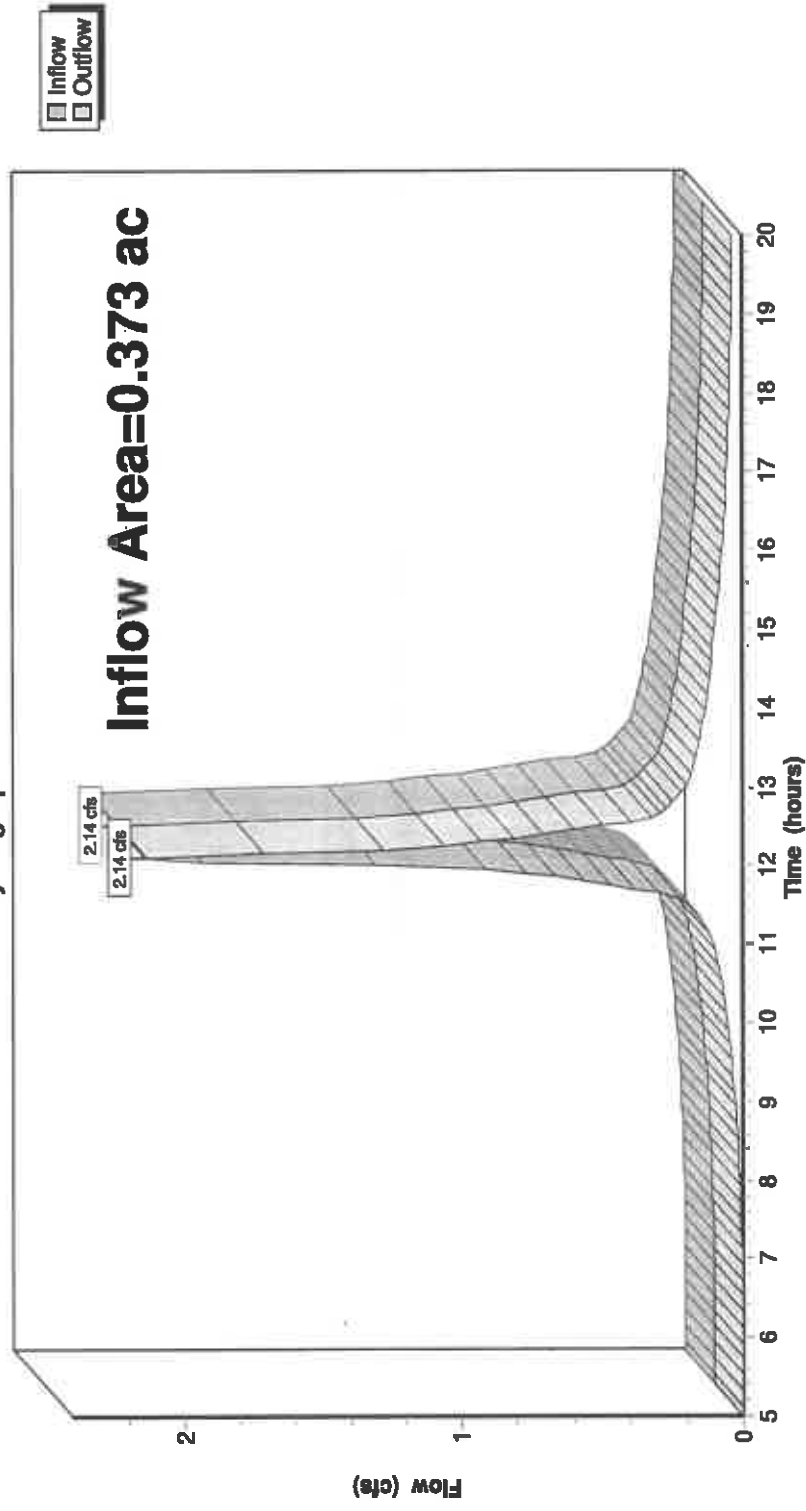
Summary for Reach IP-P3: EX. CULVERT

Inflow Area =	0.373 ac, 16.61% Impervious, Inflow Depth > 4.71" for 100YR event
Inflow =	2.14 cfs @ 12.09 hrs, Volume= 0.146 af
Outflow =	2.14 cfs @ 12.09 hrs, Volume= 0.146 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach IP-P3: EX. CULVERT

Hydrograph



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Page 99

Summary for Pond PND1: PND 1

Inflow Area = 2.380 ac, 52.89% Impervious, Inflow Depth > 4.98" for 100YR event
Inflow = 11.81 cfs @ 12.10 hrs, Volume= 0.987 af
Outflow = 6.50 cfs @ 12.27 hrs, Volume= 0.783 af, Atten= 45%, Lag= 10.2 min
Discarded = 0.03 cfs @ 12.27 hrs, Volume= 0.024 af
Primary = 6.47 cfs @ 12.27 hrs, Volume= 0.760 af
Routed to Reach IP-P2 : SCHOOL ST

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 327.76' @ 12.27 hrs Surf.Area= 5,094 sf Storage= 16,522 cf

Plug-Flow detention time= 149.6 min calculated for 0.781 af (79% of inflow)
Center-of-Mass det. time= 94.4 min (879.9 - 785.5)

Volume Invert Avail.Storage Storage Description

#1	322.00'	23,430 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
----	---------	-----------	--

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
322.00	1,030	0	0
324.00	2,125	3,155	3,155
326.00	3,600	5,725	8,880
328.00	5,300	8,900	17,780
329.00	6,000	5,650	23,430

Device Routing Invert Outlet Devices

#1	Discarded	322.00'	0.270 In/hr Exfiltration over Surface area
#2	Primary	324.50'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	326.50'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	327.50'	15.0' 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

POST DEVELOPMENT 3-22-24

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Type III 24-hr 100YR Rainfall=7.85"

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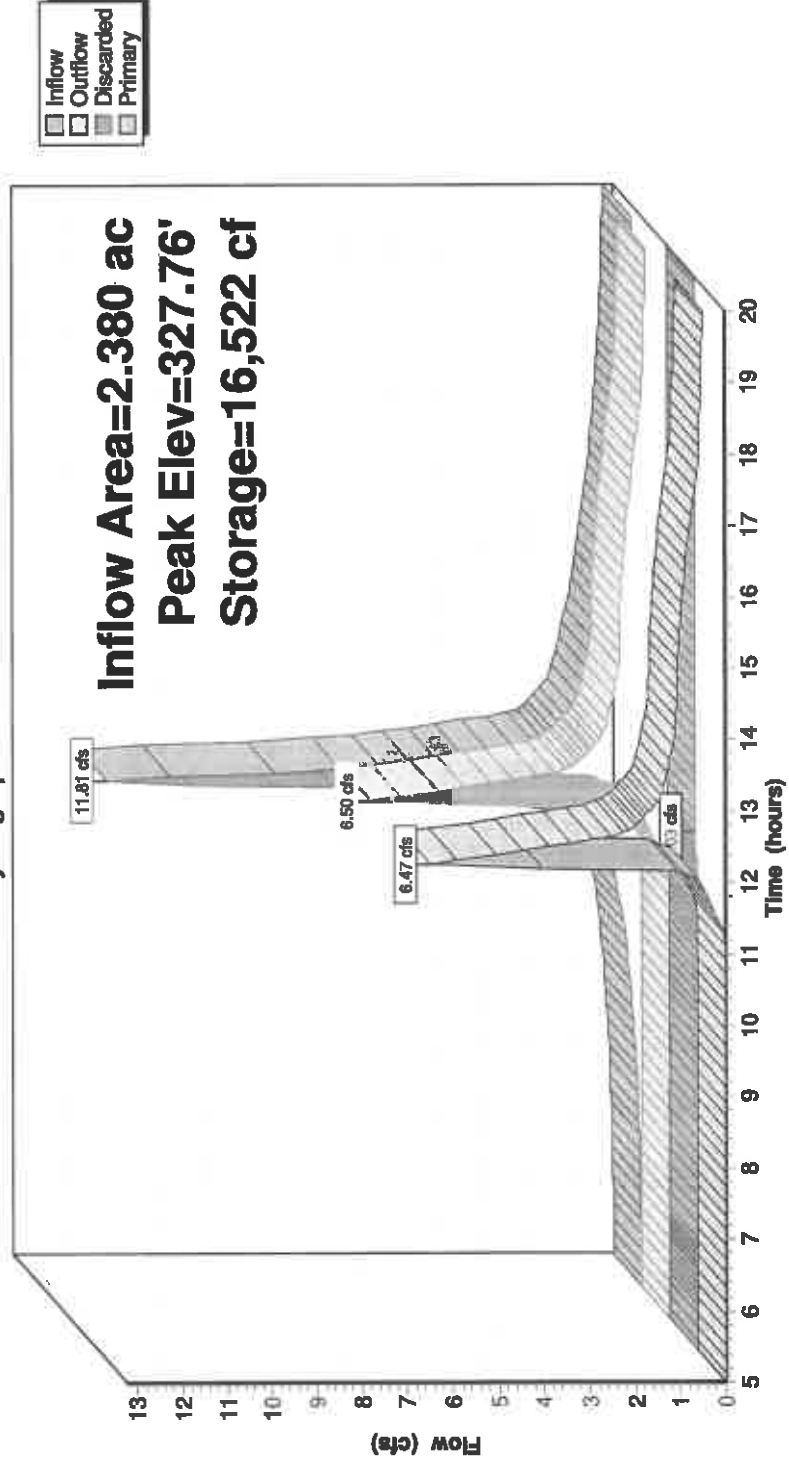
Page 100

Discarded OutFlow Max=0.03 cfs @ 12.27 hrs HW=327.75' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=6.17 cfs @ 12.27 hrs HW=327.75' (Free Discharge)
2=Orifice/Grate (Orifice Controls 0.74 cfs @ 8.45 fps)
3=Orifice/Grate (Orifice Controls 0.44 cfs @ 5.01 fps)
4=Broad-Crested Rectangular Weir (Weir Controls 5.00 cfs @ 1.34 fps)

Pond PND1: PND 1

Hydrograph



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Page 101

Summary for Pond PND2: BASIN#2

Inflow Area = 1.891 ac, 33.69% Impervious, Inflow Depth > 5.28" for 100YR event
Inflow = 11.59 cfs @ 12.10 hrs, Volume= 0.832 af
Outflow = 5.40 cfs @ 12.32 hrs, Volume= 0.508 af, Atten= 53%, Lag= 12.8 min
Discarded = 0.03 cfs @ 12.32 hrs, Volume= 0.029 af
Primary = 5.37 cfs @ 12.32 hrs, Volume= 0.478 af
Routed to Reach IP-P2 : SCHOOL ST

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 328.24' @ 12.32 hrs Surf.Area= 4,845 sf Storage= 17,589 cf

Plug-Flow detention time= 169.4 min calculated for 0.508 af (61% of inflow)
Center-of-Mass det. time= 95.2 min (865.8 - 770.6)

Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	20,173 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 21,436 cf Overall - 1,263 cf Embedded = 20,173 cf
#2	324.00'	1,263 cf	Cultec R-330XLHD x 24 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

21,436 cf Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
324.00	3,312	0	0
326.00	4,212	7,524	7,524
328.00	4,700	8,912	16,436
329.00	5,300	5,000	21,436

Device	Routing	Invert	Outlet Devices
#1	Discarded	324.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	325.00'	2.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	327.30'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	328.00'	15.0' long x 1.0' breadth Broad-Crested Rectangular Weir

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Page 102

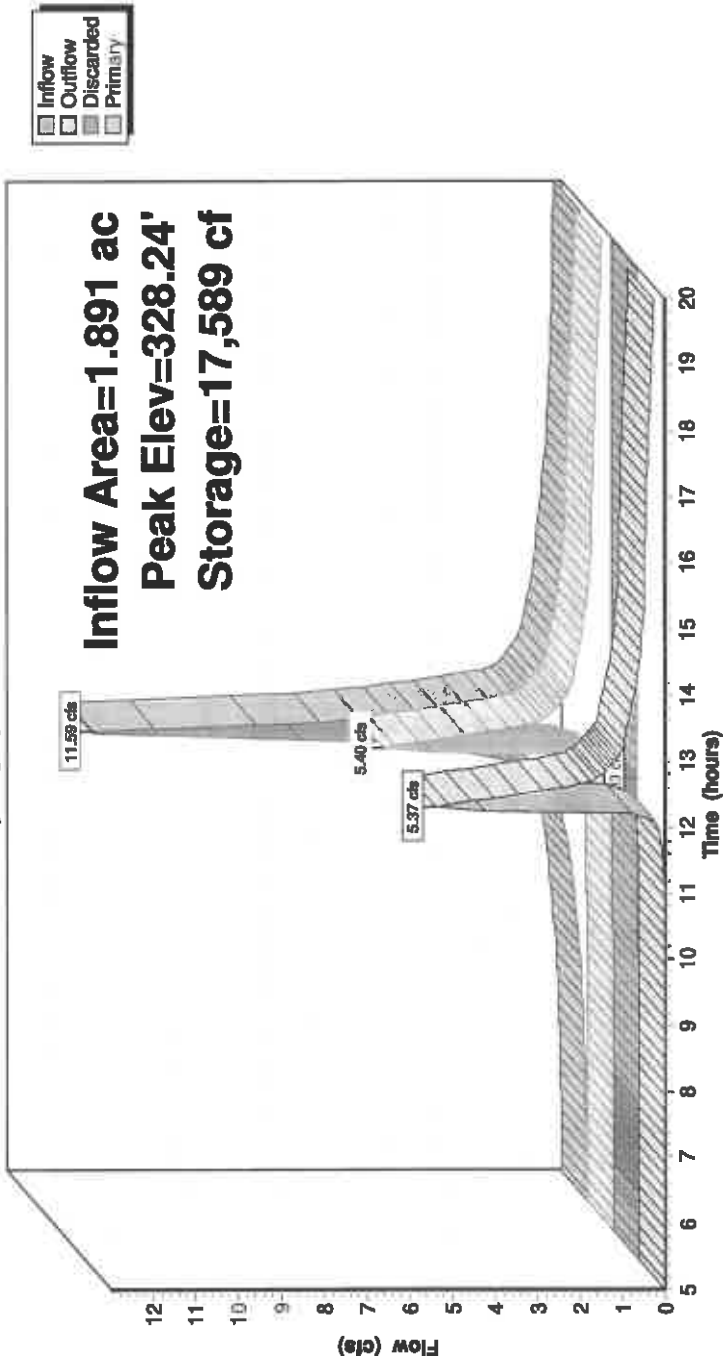
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.03 cfs @ 12.32 hrs HW=328.24' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=5.21 cfs @ 12.32 hrs HW=328.24' (Free Discharge)
2=Orifice/Grate (Orifice Controls 0.19 cfs @ 8.55 fps)
3=Orifice/Grate (Orifice Controls 0.37 cfs @ 4.22 fps)
4=Broad-Crested Rectangular Weir (Weir Controls 4.65 cfs @ 1.31 fps)

Pond PND2: BASIN#2

Hydrograph



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Page 103

Summary for Pond PND3: BASIN3

Inflow Area = 1.306 ac, 7.39% Impervious, Inflow Depth > 4.49" for 100YR event
Inflow = 7.19 cfs @ 12.09 hrs, Volume= 0.488 af
Outflow = 5.62 cfs @ 12.17 hrs, Volume= 0.427 af, Atten= 22%, Lag= 4.6 min
Discarded = 0.01 cfs @ 12.17 hrs, Volume= 0.009 af
Primary = 5.60 cfs @ 12.17 hrs, Volume= 0.419 af
Routed to Reach IP-P1 : 45 MAIN ST

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 334.13' @ 12.17 hrs Surf.Area= 2,169 sf Storage= 5,778 cf

Plug-Flow detention time= 69.3 min calculated for 0.427 af (87% of inflow)
Center-of-Mass det. time= 30.7 min (813.8 - 783.1)

Volume Invert Avail.Storage Storage Description

#1 330.00' 7,937 cf Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
330.00	925	0	0
332.00	1,250	2,175	2,175
334.00	2,070	3,320	5,495
335.00	2,814	2,442	7,937

Device Routing Invert Outlet Devices

#1	Discarded	330.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	332.20'	10.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	334.00'	20.0' long x 0.5' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00
			Coef. (English) 2.80 2.92 3.08 3.30 3.32

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Page 104

Discarded OutFlow Max=0.01 cfs @ 12.17 hrs HW=334.11' (Free Discharge)

1=Exfiltration (Exfiltration Controls 0.01 cfs)

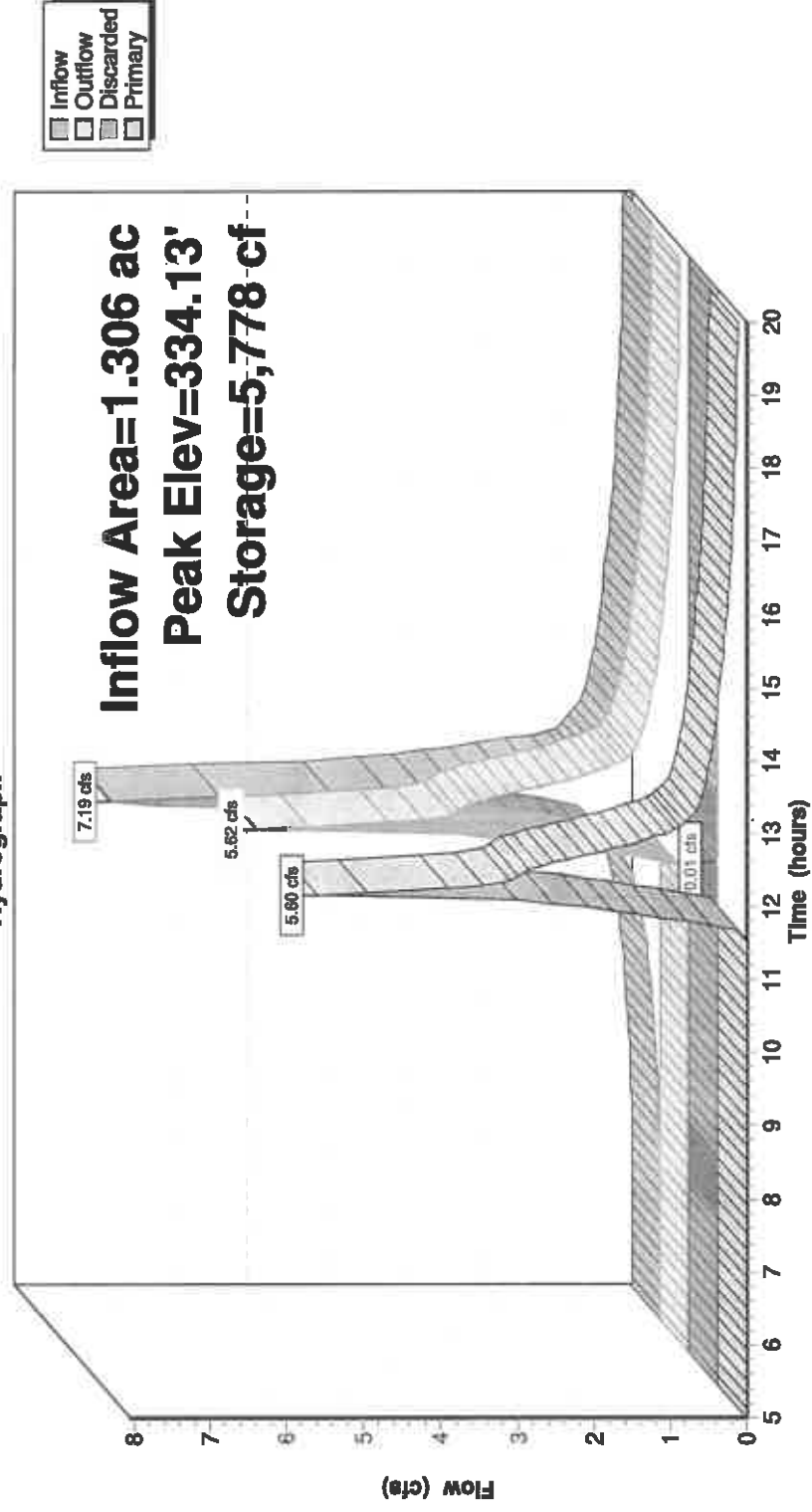
Primary OutFlow Max=5.25 cfs @ 12.17 hrs HW=334.11' (Free Discharge)

2=Orifice/Grate (Orifice Controls 3.21 cfs @ 5.88 fps)

3=Broad-Crested Rectangular Weir (Weir Controls 2.04 cfs @ 0.93 fps)

Pond PND3: BASIN3

Hydrograph



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Page 105

Summary for Pond PND4: U/G BASIN

Inflow Area = 0.514 ac, 100.00% Impervious, Inflow Depth > 7.01" for 100YR event
Inflow = 3.87 cfs @ 12.09 hrs, Volume= 0.300 af
Outflow = 0.50 cfs @ 12.63 hrs, Volume= 0.177 af, Atten= 87%, Lag= 32.7 min
Discarded = 0.02 cfs @ 5.80 hrs, Volume= 0.028 af
Primary = 0.47 cfs @ 12.63 hrs, Volume= 0.149 af
Routed to Pond PND1 : PND 1

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 327.94' @ 12.63 hrs Surf.Area= 3,637 sf Storage= 8,045 cf

Plug-Flow detention time= 212.5 min calculated for 0.176 af (59% of inflow)
Center-of-Mass det. time= 129.0 min (862.1 - 733.1)

Volume Invert Avail.Storage Storage Description

#1.	325.00'	2,587 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#2	325.00'	6,270 cf	12,739 cf Overall - 6,270 cf Embedded = 6,468 cf x 40.0% Voids
			Cultec R-330XLHD x 120 Inside #1
			Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
			Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
			Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		8,857 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
325.00	3,673	0	0
325.50	3,637	1,828	1,828
328.00	3,637	9,093	10,920
328.50	3,637	1,819	12,739

Device Routing Invert Outlet Devices

#1 Discarded	325.00'	0.270 in/hr Exfiltration over Surface area
#2 Primary	326.50'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

POST DEVELOPMENT 3-22-24

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Page 106

Discarded OutFlow Max=0.02 cfs @ 5.80 hrs HW=325.04' (Free Discharge)
└─1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.47 cfs @ 12.63 hrs HW=327.94' (Free Discharge)
└─2=Orifice/Grate (Orifice Controls 0.47 cfs @ 5.44 fps)

Pond PND4: U/G BASIN

Hydrograph

