

PRELIMINARY DRAINAGE CONCEPT REPORT

FOR
Hawks Ridge, LLC
Tentative Parcel Map No. 19685
Town of Yucca Valley, California
County of San Bernardino

January 13, 2016

Prepared by:



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Job No. PDB032800

Prepared for:
Hawks Ridge LLC
1322 Sunset Drive
Hermosa Beach, CA 90254

PREPARED UNDER THE SUPERVISION OF:
NV5, INC.

A handwritten signature in blue ink, appearing to read 'William H. Warner', written over a horizontal line.

WILLIAM H. WARNER, P.E., R.C.E. 23256

1/13/16
DATE

Introduction

The purpose of this concept report is to describe the existing drainage conditions and those which are proposed following development of the project.

The project site consists of an area of approximately 61 acres of vacant land which will be divided into four parcels ranging in size from approximately 1 to 10 acres, in addition to a 48 acre Remainder Parcel. One single-family home is proposed to be constructed on each of the four smaller parcels. The homes may be constructed in up to four phases.

Setting and Study Requirements

Proposed parcels 1 through 4 front on the west side of Fairway Drive, which will be improved by widening the existing asphalt paving and constructing curbs and gutters and sidewalk along that frontage. Fairway Drive slopes down to the south at approximately 13%, and presently conveys water from a portion of the subject site to Pinon Creek. Pinon Creek, which is designated as PO1 on the Town of Yucca Valley Master Plan of Drainage, conveys flows easterly to Hawks Landing Golf Course.

The portion of the site which includes parcels 1 through 4 includes undisturbed terrain which slopes up from Fairway Drive towards the west at gradients which range between 12% and approximately 30%. The proposed building pads lie adjacent to Fairway Drive, where the gradient of the terrain is between 12% - 15%.

The southerly portion of proposed parcel 1 is occupied by FEMA Flood Zone 'A'. The home which is proposed on parcel 1 will be constructed to the north of that flood zone, as will the other three homes. The home on parcel 1 will be constructed at least 70 feet from the north bank of Pinon Creek; no improvements to Pinon Creek are proposed.

Portions of each of the four home site parcels receive drainage from approximately 40 acres of the foothills which lie to the west. Low walls, berms and swales will divert drainage around the pads, then direct them near to their present outlet at Fairway Drive. The enclosed calculations indicate the approximate pre-development runoff from the upstream area. The conceptual grading plan shows protection against scour at the base of the walls and driveways which will be subject to erosion from those flows. The final grading plan will depict any necessary additional details and scour protection requirements.

At the final grading plan stage, pre-development peak runoff values for the 100-year, 1 hour storm frequency will be determined for the offsite and future project site using the Rational Method during the preparation of the final grading and drainage studies for the project. Pre-development and post-development peak flow rates for the 100-year, 24 hour storm frequency will also be determined for the project site using the Unit Hydrograph Method at that time.

Land Use and Zoning

Land Use Zoning classification for this vacant site are “R-L-2.5” and “R-L-1”.

Flood Insurance Rate Maps (FIRM)

The site is located in Zones X and A of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), San Bernardino County, California and incorporated areas panel 8855 of 9400 with map number 06071C8855H dated August 28, 2008.

Mitigation of Nuisance Water

Nuisance (onsite) flows shall be conveyed through swales, valley and/or ribbon gutters. Private, onsite retention basins will receive a portion of the flows from the impervious improvements, in accordance with Town requirements.

Recommendations

The following recommendations have been provided to facilitate safety, both public and private, for the proposed commercial development.

1. Proposed finished floor elevations for the development shall be determined by the Final Drainage Study for the onsite conditions.
2. A Final Drainage study shall address substantial modification or changes for the offsite and onsite conditions.
3. The proposed homes will be constructed outside of FEMA Flood Zone ‘A’.
4. The final drainage study shall substantiate that no grading is proposed which will adversely affect the existing FEMA Flood Zone location or base flood elevation.
5. Scour protection and adequate freeboard will be required at the structures to be constructed to protect the homes.
6. Drainage easements will be required on parcels 1, 2 and 3 to accept stormwater runoff from upstream parcels.

Conclusions

Development of the project will be accomplished in a manner which will maintain historical downstream flow patterns. The development should not adversely impact surrounding or downstream properties and the effects of post-development incremental increase flows shall be discussed in the Final Drainage Study for the onsite development.

DRAINAGE PATH FLOW SUMMARY

From Manning's Formula

Drainage Area # DA#	Parcel #	Bulked Q ₁₀₀ , cfs	W _o Flow Width, Ft.	Slope, ft/ft	d = y _a , ft.	v, ft/sec	D, ft.
1	4	46	50	0.12	0.14	7	0.3
2	4	16	50	0.17	0.1	7	0.2
3	3	4	20	0.17	0.1	7	0.2
4	2	10	20	0.16	0.1	6	0.2
5	4	148	50	0.12	0.3	11	0.6
5+1	4	194	50	0.12	0.4	14	0.8

Notes:

- n = 0.020 (clean earth channel)
- d from Mannings open channel flow, = y_a for scour depth calculation
- Q = Q₁₀₀ + bulking, assumed @ 30%
- Flow width assumed maximum for alluvial condition
- D = max. flow depth for flow width = 2 x d for minimum wall height calculation (wall height = D + 1' (min))
- See conceptual grading plan for wall heights and scour protection

SCOUR DEPTH CALCULATION SUMMARY

Drainage Area # DA#	Bulked Q_{100} , cfs	Parcel #	Projected structure length W_o , ft. (1)	Flow depth = y_a , ft. (2)	* Scour depth, $d = y_s =$ $y_a [1.3 (W_o / y_a)^{0.48}]$, ft. (3)
1	46	4	120	0.14	4.7
2	16	4	55	0.1	2.7
3	4	3	54	0.1	2.7
4	10	2	65	0.1	2.9
5	148	4	67	0.3	5.2
5+1	194	4	67	0.4	6.0

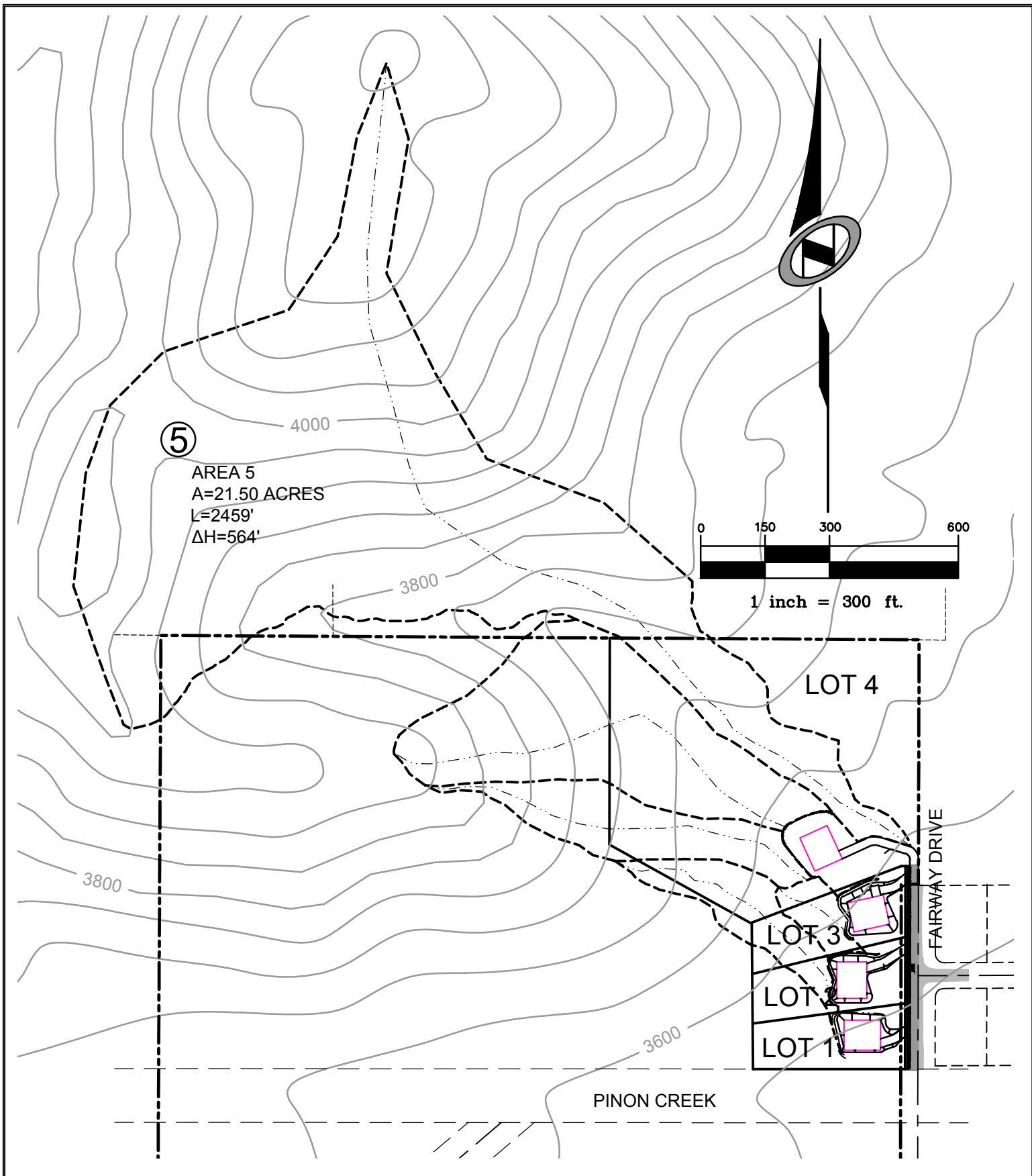
Where,

y_s = scour depth *

y_a = depth of flow, from drainage path flow summary

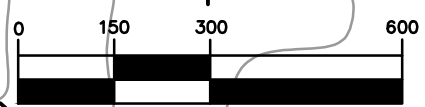
W_o = length of structure
normal to flow from DA exhibits

- (1) From Drainage Area Exhibits
- (2) From Drainage Path Flow Summary
- (3) From modified Laursen equation for estimating local scour



⑤

AREA 5
 A=21.50 ACRES
 L=2459'
 ΔH=564'



1 inch = 300 ft.

LOT 4

LOT 3

LOT 2

LOT 1

FAIRWAY DRIVE

PINON CREEK

NV5

HAWKS RIDGE
 DRAINAGE AREA 5

SHEET NUMBER

5

OF 5 SHEETS

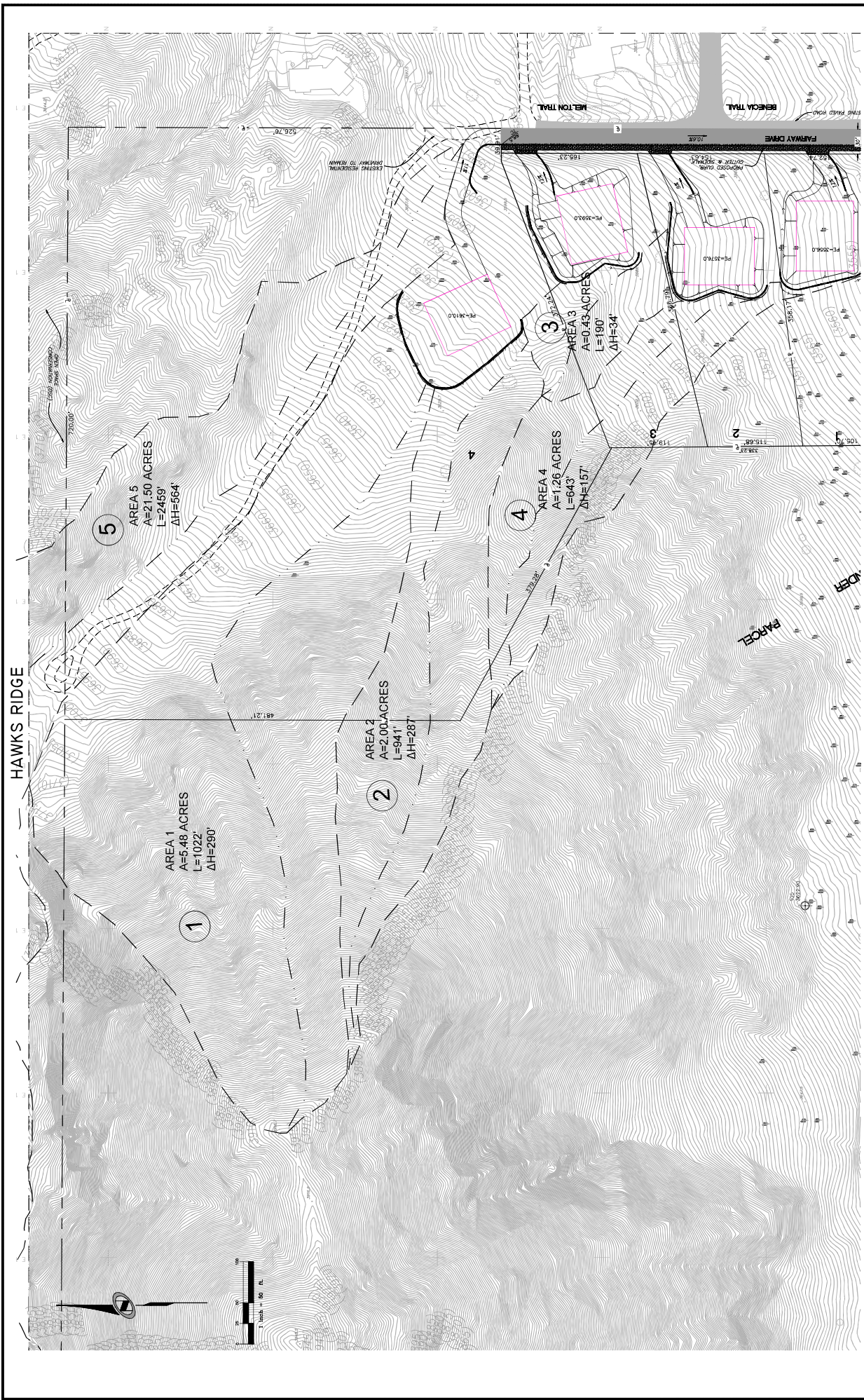
73-185 HIGHWAY 111, SUITE A
 760.341.3101 TEL 760.341.5999 FAX

PALM DESERT, CA 92260
 WWW.NOLTE.COM

PREPARED FOR: HAWKS RIDGE, LLC

DATE SUBMITTED: JAN. 2016

JOB NUMBER
 PDB032800



BENCH MARK:
 TOP OF COUNTY SURVEYORS MONUMENT AT THE
 INTERSECTION OF 34TH AVENUE AND COLBY BLVD.
 ELEVATION: 1577.24' NAVD 83

NO.	DATE	INITIALS	REVISIONS

THIS PLAN PREPARED BY
NVS
 NORTHERN VERMONT SURVEYORS
 766 S.W. 300 TEL: 763-241-8999 FAX: 763-241-1021 WWW.NVS.COM
 PREPARED UNDER THE SUPERVISION OF
 R.C.E. No. 2,355, EXP. 02/31/19 DATE

NVS
 NORTHERN VERMONT SURVEYORS

TOWN OF YUCCA VALLEY
HAWKS RIDGE
 DRAINAGE AREA MAP

SHEET 1
 OF 1 SHEETS
 DRAWING NO.
 PROJECT NO.

DRAINAGE AREA EXHIBIT 2/3

AREA 4
A=1.26 ACRES

4

DA 2

DA 1

DA 5

3

PE=3610.0

W₀=55'

W₀=120'

W₀=67'

312.24'

12%

11%

EXISTING RESIDE DRIVEWAY TO RE

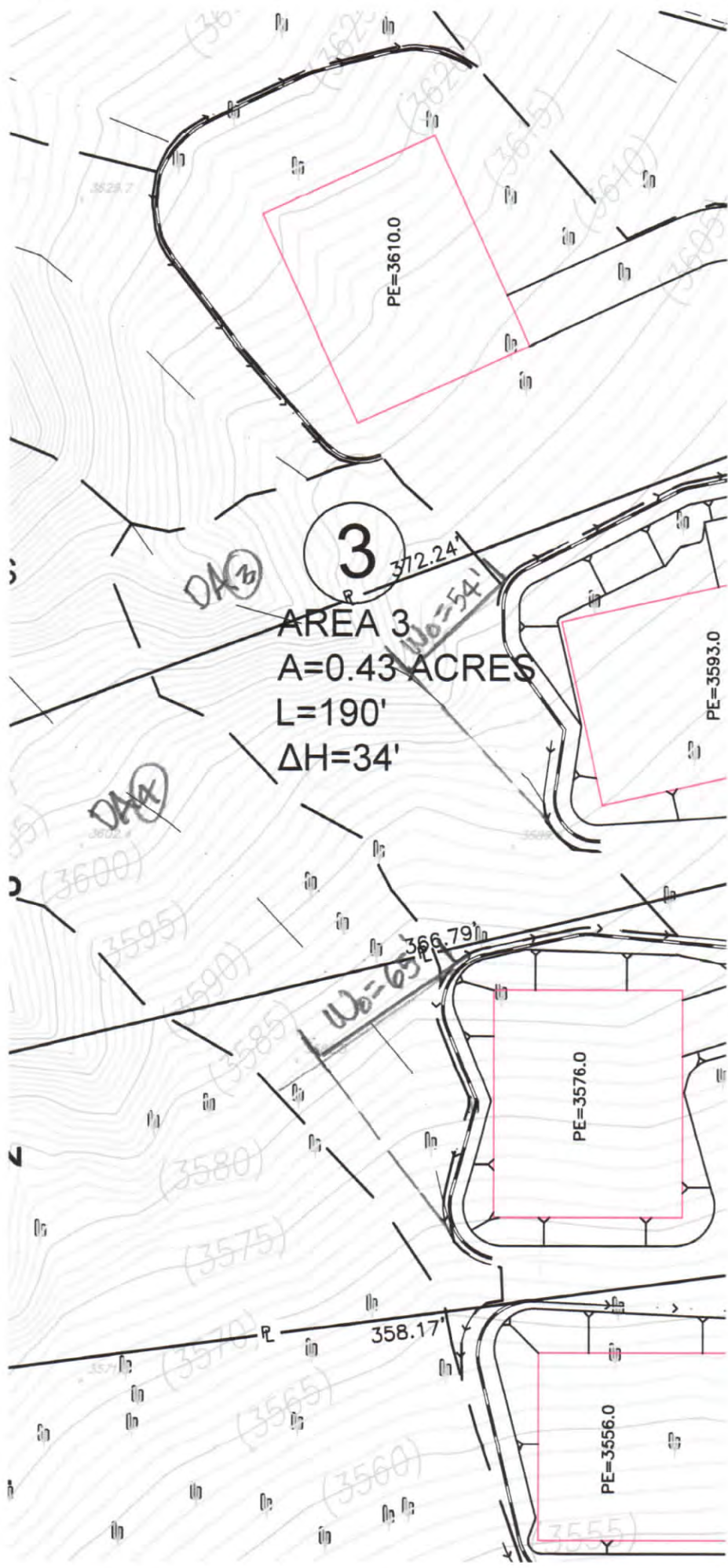
FAIRWAY AVE

TRAIL

N
1"=60'



DRAINAGE
AREA
EXHIBIT 3/3



1" = 60'

DA # 1

Other Calculators

- [Air Flow Conversion Calculator](#)
- [Atmospheric Calculator](#)
- [Block Wall Calculator](#)
- [Concrete Column Calculator](#)
- [Concrete Volume Calculator](#)
- [Energy Conversion Calculator](#)
- [Isentropic Flow Relations Calculator](#)
- [Laser Real Time Unit Converter](#)
- [Normal Flow Relations Calculator](#)
- [Oblique Flow Relations Calculator](#)
- [Open-channel Flow Calculator](#)
- [Properties of Welds Treated as Lines Calculator](#)
- [Shaft Speed Calculator](#)
- [Torque Transmitted by Clutch Calculator](#)
- [Water Pump Engineering](#)
- [Back to ENGINEERING.com](#)

Open-Channel Flow

This calculator uses Chézy and Manning's formula to calculate the wetted perimeter, hydraulic radius, flow area, Chézy coefficient and flow velocity.

For experimental values of Manning's n factor, [click here](#)

Required Information

Enter the Slope: Enter the Channel Top Width (ft):

Enter the Channel Bottom Width (ft): Enter the Channel Height (ft):

Enter the Flow Depth (ft): Enter the n value:

Results

The wetted perimeter is ft The flow is ft³/s

The flow area is ft² The flow is gal/min

The hydraulic radius is ft The velocity is ft/s

The C value is

eFunda Links

- [Unit Conversion](#)
- [Financial Calculators](#)
- [Engineering Design Aids](#)
- [Mechanical Formulas](#)
- [Mathematics](#)

DA #2

Other Calculators

- ➔ [Air Flow Conversion Calculator](#)
- ➔ [Atmospheric Calculator](#)
- ➔ [Block Wall Calculator](#)
- ➔ [Concrete Column Calculator](#)
- ➔ [Concrete Volume Calculator](#)
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Required Information

Enter the Slope:	<input type="text" value=".17"/>	Enter the Channel Top Width (ft):	<input type="text" value="50"/>
Enter the Channel Bottom Width (ft):	<input type="text" value="50"/>	Enter the Channel Height (ft):	<input type="text" value=".1"/>
Enter the Flow Depth (ft):	<input type="text" value=".1"/>	Enter the n value:	<input type="text" value=".02"/>

Results

The wetted perimeter is <input type="text" value="50.2"/> ft	The flow is <input type="text" value="33.0010"/> ft ³ /s
The flow area is <input type="text" value="5"/> ft ²	The flow is <input type="text" value="14810.88"/> gal/min
The hydraulic radius is <input type="text" value="0.09996"/> ft	The velocity is <input type="text" value="6.60021"/> ft/s
The C value is <input type="text" value="50.7225"/>	

Calculate	Reset
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- ➔ [Engineering Design Aids](#)
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- ➔ [Mathematics](#)

DA#3

Other Calculators

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- ↓ Back to ENGINEERING.com

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Required Information

Enter the Slope: Enter the Channel Top Width (ft):

Enter the Channel Bottom Width (ft): Enter the Channel Height (ft):

Enter the Flow Depth (ft): Enter the n value:

Results

The wetted perimeter is ft The flow is ft³/s

The flow area is ft² The flow is gal/min

The hydraulic radius is ft The velocity is ft/s

The C value is

eFunda Links

- ↓ Unit Conversion
- ↓ Financial Calculators
- ↓ Engineering Design Aids
- ↓ Mechanical Formulas
- ↓ Mathematics

DA #4

Other Calculators

- ➔ [Air Flow Conversion Calculator](#)
- ➔ [Atmospheric Calculator](#)
- ➔ [Block Wall Calculator](#)
- ➔ [Concrete Column Calculator](#)
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This calculator uses Chézy and Manning's formula to calculate the wetted perimeter, hydraulic radius, flow area, Chézy coefficient and flow velocity.

For experimental values of Manning's n factor, [click here](#)

Required Information

Enter the Slope: Enter the Channel Top Width (ft):

Enter the Channel Bottom Width (ft): Enter the Channel Height (ft):

Enter the Flow Depth (ft): Enter the n value:

Results

The wetted perimeter is ft The flow is ft³/s

The flow area is ft² The flow is gal/min

The hydraulic radius is ft The velocity is ft/s

The C value is

eFunda Links

- ➔ [Unit Conversion](#)
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Open-Channel Flow

This calculator uses Chézy and Manning's formula to calculate the wetted perimeter, hydraulic radius, flow area, Chézy coefficient and flow velocity.

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Required Information

Enter the Slope:	<input type="text" value=".12"/>	Enter the Channel Top Width (ft):	<input type="text" value="50"/>
Enter the Channel Bottom Width (ft):	<input type="text" value="50"/>	Enter the Channel Height (ft):	<input type="text" value=".3"/>
Enter the Flow Depth (ft):	<input type="text" value=".3"/>	Enter the n value:	<input type="text" value=".02"/>

Results

The wetted perimeter is ft The flow is ft³/s
 The flow area is ft² The flow is gal/min
 The hydraulic radius is ft The velocity is ft/s
 The C value is

<input type="button" value="Calculate"/>	<input type="button" value="Reset"/>
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- ↓ Unit Conversion
- ↓ Financial Calculators
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- ↓ Mathematics

DA's 5+1

Other Calculators

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Required Information

Enter the Slope:	<input type="text" value=".12"/>	Enter the Channel Top Width (ft):	<input type="text" value="50"/>
Enter the Channel Bottom Width (ft):	<input type="text" value="50"/>	Enter the Channel Height (ft):	<input type="text" value=".4"/>
Enter the Flow Depth (ft):	<input type="text" value=".4"/>	Enter the n value:	<input type="text" value=".02"/>

Results

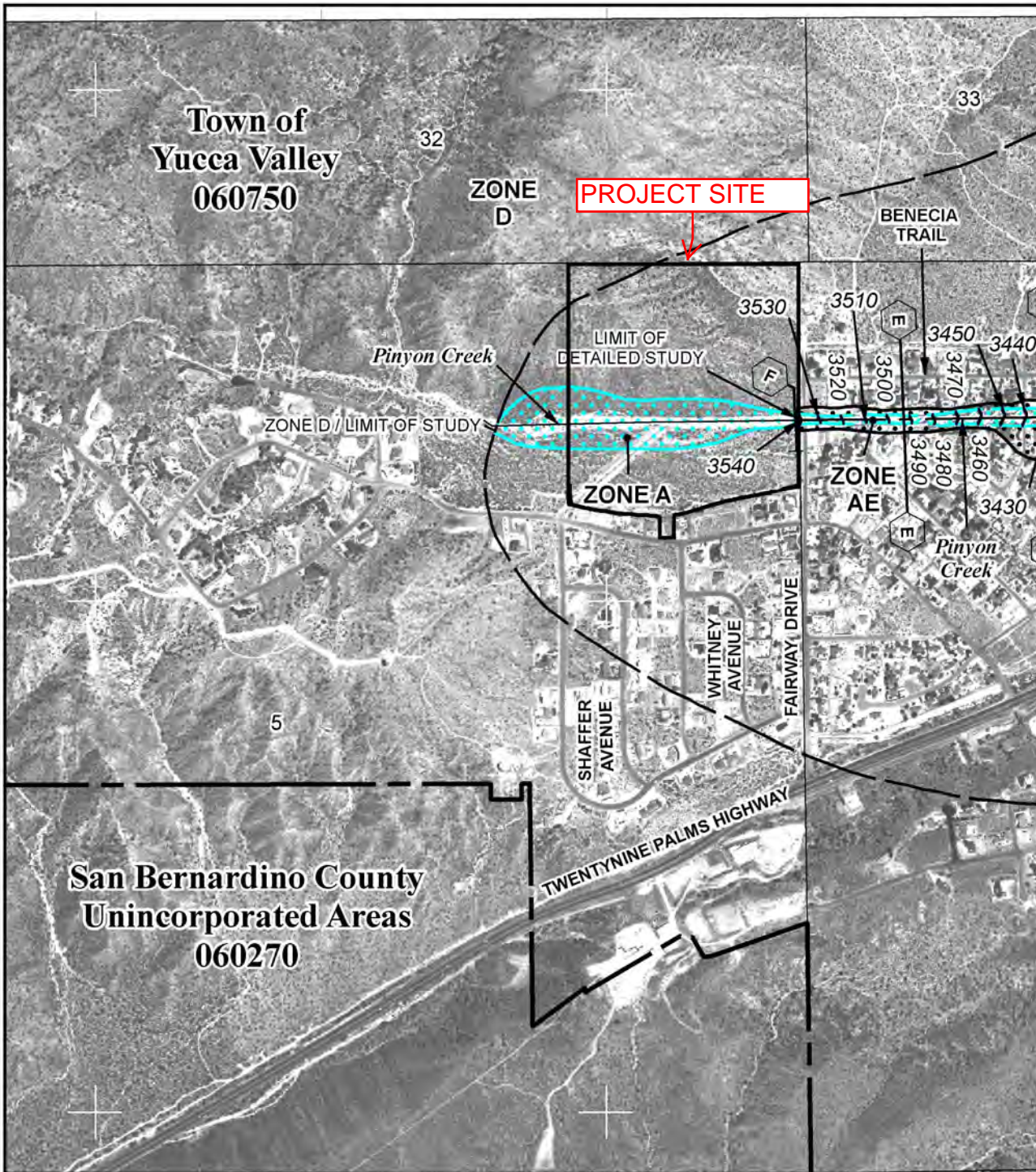
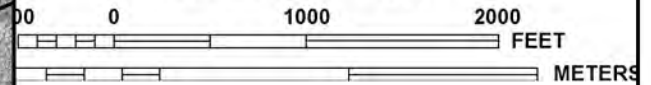
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 The flow area is ft² The flow is gal/min
 The hydraulic radius is ft The velocity is ft/s
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MAP SCALE 1" = 1000'



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 8855H

FIRM
FLOOD INSURANCE RATE MAP

SAN BERNARDINO COUNTY, CALIFORNIA AND INCORPORATED AREAS
PANEL 8855 OF 9400

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
SAN BERNARDINO COUNTY	060270	8855	H
YUCCA VALLEY, TOWN OF	060750	8855	H

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER
06071C8855H

MAP REVISED
AUGUST 28, 2008

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



NOAA Atlas 14, Volume 6, Version 2
 Location name: Yucca Valley, California, US*
 Latitude: 34.1180°, Longitude: -116.4792°
 Elevation: 3620 ft*
 * source: Google Maps



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerals](#)

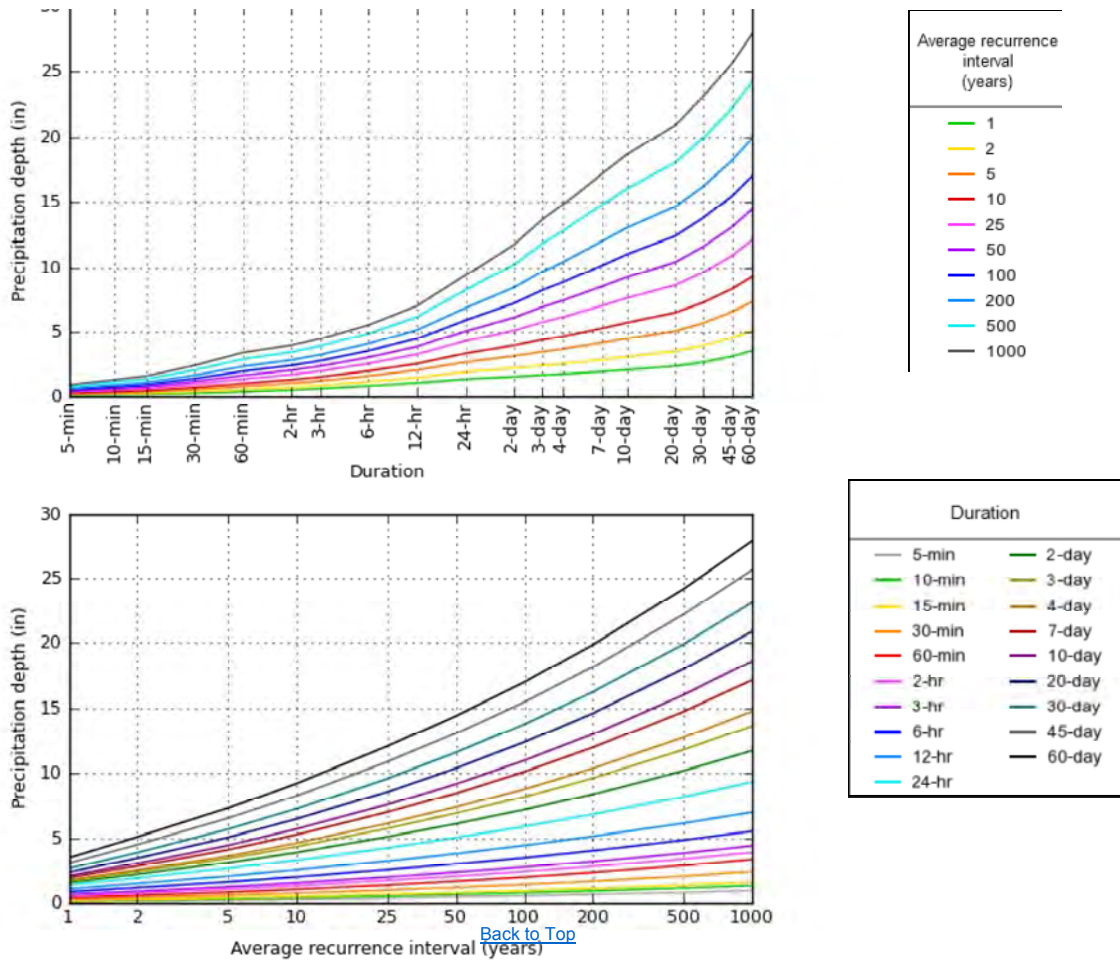
PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.100 (0.083-0.122)	0.145 (0.120-0.177)	0.210 (0.174-0.257)	0.269 (0.220-0.332)	0.358 (0.283-0.456)	0.434 (0.337-0.565)	0.519 (0.393-0.693)	0.616 (0.454-0.846)	0.764 (0.540-1.09)	0.897 (0.612-1.33)
10-min	0.143 (0.119-0.174)	0.208 (0.172-0.254)	0.302 (0.249-0.369)	0.386 (0.316-0.476)	0.513 (0.406-0.654)	0.622 (0.482-0.810)	0.744 (0.563-0.993)	0.883 (0.650-1.21)	1.10 (0.774-1.57)	1.29 (0.878-1.91)
15-min	0.173 (0.143-0.211)	0.251 (0.208-0.307)	0.365 (0.301-0.446)	0.466 (0.382-0.575)	0.620 (0.491-0.791)	0.752 (0.583-0.980)	0.900 (0.681-1.20)	1.07 (0.786-1.47)	1.33 (0.936-1.90)	1.56 (1.06-2.30)
30-min	0.262 (0.217-0.320)	0.381 (0.315-0.465)	0.553 (0.456-0.677)	0.707 (0.579-0.873)	0.941 (0.745-1.20)	1.14 (0.885-1.49)	1.37 (1.03-1.82)	1.62 (1.19-2.22)	2.01 (1.42-2.88)	2.36 (1.61-3.49)
60-min	0.371 (0.307-0.452)	0.538 (0.445-0.657)	0.781 (0.645-0.956)	0.999 (0.818-1.23)	1.33 (1.05-1.70)	1.61 (1.25-2.10)	1.93 (1.46-2.57)	2.29 (1.68-3.14)	2.84 (2.00-4.06)	3.33 (2.27-4.94)
2-hr	0.511 (0.424-0.624)	0.719 (0.595-0.878)	1.02 (0.839-1.24)	1.28 (1.05-1.58)	1.67 (1.32-2.13)	2.00 (1.55-2.61)	2.36 (1.79-3.16)	2.77 (2.04-3.80)	3.37 (2.38-4.83)	3.89 (2.66-5.77)
3-hr	0.612 (0.507-0.746)	0.851 (0.704-1.04)	1.19 (0.983-1.46)	1.49 (1.22-1.84)	1.93 (1.53-2.47)	2.31 (1.79-3.00)	2.71 (2.05-3.62)	3.16 (2.33-4.34)	3.83 (2.71-5.48)	4.40 (3.00-6.52)
6-hr	0.816 (0.676-0.995)	1.13 (0.932-1.38)	1.56 (1.29-1.91)	1.95 (1.59-2.40)	2.50 (1.98-3.19)	2.97 (2.30-3.87)	3.47 (2.63-4.63)	4.02 (2.96-5.52)	4.83 (3.41-6.91)	5.51 (3.76-8.16)
12-hr	1.04 (0.863-1.27)	1.44 (1.20-1.76)	2.01 (1.66-2.46)	2.50 (2.04-3.08)	3.21 (2.54-4.09)	3.79 (2.94-4.94)	4.43 (3.35-5.91)	5.12 (3.77-7.03)	6.13 (4.33-8.77)	6.98 (4.76-10.3)
24-hr	1.33 (1.18-1.53)	1.87 (1.65-2.15)	2.62 (2.31-3.03)	3.27 (2.87-3.81)	4.23 (3.58-5.09)	5.02 (4.17-6.17)	5.88 (4.76-7.39)	6.82 (5.38-8.82)	8.19 (6.21-11.0)	9.35 (6.85-13.0)
2-day	1.51 (1.34-1.74)	2.16 (1.91-2.49)	3.07 (2.71-3.56)	3.88 (3.40-4.53)	5.08 (4.31-6.12)	6.09 (5.05-7.48)	7.18 (5.82-9.04)	8.40 (6.62-10.9)	10.2 (7.72-13.7)	11.7 (8.58-16.3)
3-day	1.63 (1.45-1.88)	2.36 (2.09-2.73)	3.41 (3.01-3.94)	4.34 (3.80-5.05)	5.73 (4.85-6.89)	6.90 (5.73-8.48)	8.19 (6.64-10.3)	9.64 (7.61-12.5)	11.8 (8.93-15.9)	13.6 (9.98-19.0)
4-day	1.70 (1.51-1.96)	2.48 (2.20-2.86)	3.60 (3.18-4.17)	4.60 (4.03-5.37)	6.11 (5.18-7.35)	7.39 (6.13-9.08)	8.80 (7.13-11.1)	10.4 (8.19-13.4)	12.7 (9.65-17.2)	14.8 (10.8-20.6)
7-day	1.90 (1.68-2.18)	2.80 (2.47-3.22)	4.09 (3.61-4.73)	5.25 (4.59-6.12)	6.99 (5.92-8.41)	8.47 (7.04-10.4)	10.1 (8.20-12.7)	12.0 (9.44-15.5)	14.7 (11.2-19.9)	17.1 (12.5-23.9)
10-day	2.04 (1.80-2.34)	3.02 (2.67-3.48)	4.43 (3.91-5.12)	5.69 (4.98-6.63)	7.58 (6.42-9.12)	9.19 (7.63-11.3)	11.0 (8.90-13.8)	13.0 (10.3-16.8)	16.0 (12.1-21.6)	18.6 (13.6-25.9)
20-day	2.31 (2.05-2.66)	3.44 (3.04-3.96)	5.04 (4.45-5.82)	6.46 (5.66-7.53)	8.58 (7.27-10.3)	10.4 (8.62-12.8)	12.4 (10.0-15.6)	14.6 (11.5-18.9)	18.0 (13.6-24.2)	20.9 (15.3-29.1)
30-day	2.61 (2.31-3.00)	3.88 (3.43-4.47)	5.67 (5.01-6.56)	7.25 (6.35-8.45)	9.60 (8.13-11.6)	11.6 (9.62-14.2)	13.8 (11.2-17.3)	16.2 (12.8-21.0)	19.9 (15.1-26.8)	23.1 (16.9-32.2)
45-day	3.04 (2.70-3.50)	4.49 (3.97-5.18)	6.51 (5.75-7.53)	8.28 (7.25-9.65)	10.9 (9.22-13.1)	13.1 (10.8-16.0)	15.5 (12.5-19.5)	18.2 (14.3-23.5)	22.2 (16.8-29.9)	25.6 (18.8-35.7)
60-day	3.47 (3.07-4.00)	5.08 (4.49-5.85)	7.30 (6.44-8.44)	9.23 (8.08-10.8)	12.1 (10.2-14.5)	14.4 (12.0-17.7)	17.0 (13.8-21.4)	19.9 (15.7-25.7)	24.2 (18.3-32.6)	27.9 (20.4-38.8)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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PF graphical



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Maps & aerials

NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Mon Aug 10 18:29:37 2015

Small scale terrain





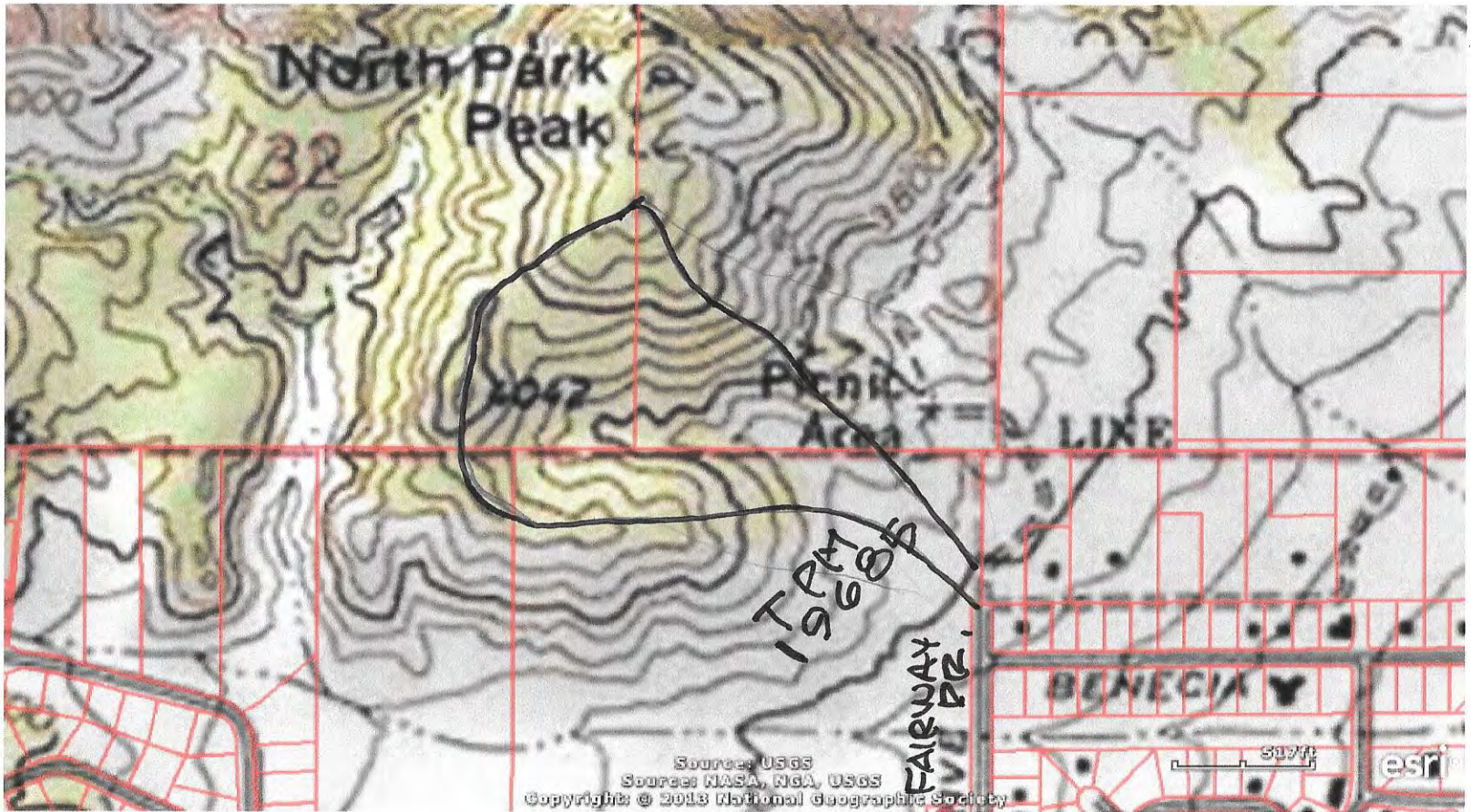
Large scale aerial



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22



TPX
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Source: USGS

Source: NASA, NGA, USGS

82ft

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Computing Scour

by Craig Fischenich¹ and Mark Landers²

February 2000

Complexity	Value as a Design Tool	Cost																		
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OVERVIEW

Scour is the removal of soil particles by flowing water. While the entrainment of upland soils from overland runoff is included in this definition, scour on river systems generally refers to the removal of material from the bed and banks of the river from streamflow.

PLANNING

Total scour on a river is composed of three components 1) general scour, 2) contraction scour, and 3) local scour. In general, the components are additive when addressing scour on the streambed.

General Scour: Lowering of streambed elevation (also called bed degradation) over long reaches due to head cuts and changes in hydrology controls (such as dams, sediment discharge, or river geomorphology) is termed general scour. General scour often occurs during the passage of a flood, but is sometimes masked because sediments deposit to the original lines and grades on the falling stage of the hydrograph. General scour involves the removal of material from the bed and banks across all or most of the width of a channel. This type of scour may be natural or man-induced and requires geomorphic and sedimentation analyses to quantify. Analytical tools such as HEC-6 are helpful in evaluating long-term general scour.

Contraction Scour: The scour that results from the acceleration of the flow due to a contraction, such as a bridge, is called contraction scour. This type of scour also occurs in areas where revetments are placed such that they reduce the overall width of the stream segment. Contraction scour is generally limited to the length of the contraction, and perhaps a short distance up- and downstream, whereas general scour tends to occur over longer reaches.

Laursen's Equation (1960), given below, is often used to predict the depth of scour in the contracted section. For a long contraction, Laursen's Equation will overestimate the depth of scour at the upstream end of the contraction or if the contraction is the result of bridge abutments and piers. But at this time, it is the best equation available. Note that the Manning n ratio can be significant in cases where sand bed channels have variable bed forms (e.g. a dune bed in the uncontracted reach and a plain bed, washed out dunes or antidunes in the contracted reach).

$$\frac{y_c}{y_a} = \left(\frac{Q_c}{Q_a}\right)^{6/7} \left(\frac{W_a}{W_c}\right)^A \left(\frac{n_c}{n_a}\right)^B \quad (1)$$

and

$$y_s = y_c - y_a \quad (2)$$

where

¹ USAE Research and Development Center, Environmental Laboratory, 3909 Halls Ferry Rd., Vicksburg, MS 39180

² USGS, 3039 Arwiler Road, Suite 130, Atlanta, GA 30360

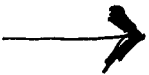
- y_s = scour depth (ft)
- y_a = average depth in the main reach (ft)
- y_c = average depth in the contracted section (ft)
- W_a = width of the main reach (ft)
- W_c = width of the contracted section (ft)
- Q_a = flow in the main reach (cfs)
- Q_c = flow in the contracted section (cfs)
- n_a = Manning n for main reach ($s/ft^{1/3}$)
- n_c = Manning n for contracted section ($s/ft^{1/3}$)

A and B are dimensionless transport coefficients from the following:

V^*/ω	A	B
<0.5	0.59	0.07
1.0	0.64	0.21
>2.0	0.69	0.37

where

- V^* = shear velocity (ft/s), given by $(gyS_r)^{0.5}$
- ω = fall velocity of the D_{50} of bed material (ft/s)



Local Scour: The scour that occurs at a pier, abutment, erosion control device, or other structure obstructing the flow is called local scour. These obstructions cause flow acceleration and create vortexes that remove the surrounding sediments. Generally, depths of local scour are much larger than general or contraction scour depths, often by a factor of ten. Local scour can affect the stability of structures such as riprap revetments and lead to failures if measures are not taken to address the scour.

Factors that affect local scour include:

- 1) Width of the obstruction.
- 2) Projection length of the obstruction into the flow.
- 3) Length of the obstruction.
- 4) Depth of flow.
- 5) Velocity of the approach flow.
- 6) Size of the bed material.
- 7) Angle of the approach flow (angle of attack).
- 8) Shape of the obstruction.
- 9) Bed configuration.
- 10) Ice formation or jams.
- 11) Debris.

Width of obstruction has a direct effect on the depth of scour. Thus, the wider the obstruction, the deeper the scour. Though not addressed by most empirical relations, the ratio of obstruction width to channel width is probably a better measure of scour potential than is the obstruction width alone.

Projected length of an obstruction into the stream affects the depth of scour. With an increase in the projected length of an abutment into the flow, there is an increase in scour. However, there is a limit on the increase in scour depth with an increase in length. This limit is reached when the ratio of projected length into the stream to the depth of the approaching flow is about 25 (U.S. Federal Highway Administration 1990).

The streamwise length of a structure has no appreciable effect on scour depth for straight sections; however, when the structure is at an angle to the flow, the length has a very large effect. At the same angle of attack, doubling the length of a structure increases scour depth by as much as 33 percent. Some equations take the length factor into account by using the ratio of structure length to depth of flow or structure width and the angle of attack of the flow to the structure. Others use the projected area of the structure to the flow in their equations.

An increase in flow depth can increase scour depth by a factor of 2 or larger. For bridge abutments, the increase is from 1.1 to 2.15, depending on the shape of the abutment. Scour depth also increases with the velocity of the approach flow.

Size of the bed material affects scour depth, though the effect is generally a function of the time exposed to erosive flows. In other words, sediment size may not affect the ultimate or maximum scour but only the time it takes to reach it. Large particles in the bed material such as cobbles or boulders may armor plate the scour hole.

The angle of attack of the flow to an obstruction has a large effect on local scour, as does the shape of the structure. Structures angled such that they cause flow convergence

increase scour, whereas structures angled such that they cause divergence of flow lines generally decrease scour. Streamlining structures reduces the strength of the horseshoe and wake vortices, effectively reducing ultimate scour depths.

In streams with sand bed material, the shape of the bed (bed configuration) affects the turbulence and flow velocity, which in turn affect the depth of scour. Ice and debris can increase both the local and general (contraction) scour. The magnitude of the increase is still largely undetermined. Debris can be taken into account in the scour equations by estimating the amount of flow blockage (decrease in width) in the equations for contraction scour.

Two simple relations for estimating local scour depths along structures follow. Both have been modified by this author from research conducted by others. The first is based upon Laursen's (1980) approach for scour at a bridge abutment and the second upon Froehlich's (1987) equations for live-bed scour at bridge crossings. Guidance for computing local scour at the toe of a riprap revetment is also given in EM 1110-2-1601 (USACE 1991). These techniques are based on empirical approaches and have high standard errors of estimates. Relations presented in EM 1110-2-1601 are applicable to bendways where the ratio of the maximum to minimum flow depths is between 1.0 and 3.0, and where the radius of curvature is from 2.0 to 10 times the top width of the channel. The Modified Laursen equation is applicable to cases where the scour depth is less than four times the flow depth and where the encroachment (length of the structure projected normal to the flow) is less than seven times the flow depth. Froehlich's equations were based upon 170 live-bed scour measurements primarily in sand-bed streams. The relations presented below are forms of the Laursen and Froehlich equations modified by the authors based upon observed scour depths in sand- and gravel-bed streams.

Modified Laursen:



$$\frac{y_s}{y_a} = 1.3 \left(\frac{W_o}{y_a} \right)^{0.48} \quad (3)$$

Modified Froehlich:

$$\frac{y_s}{y_a} = 2 \left(\frac{\theta}{90} \right)^{0.13} \left(\frac{W_o}{y_a} \right)^{0.43} F_r^{0.61} + 1.0 \quad (4)$$

where

y_s = scour depth (ft) below the water surface

y_a = depth of flow at the structure (ft)

W_o = length of structure projected normal to flow (ft)

θ = angle of embankment to flow (deg.)

F_r = Froude number of flow upstream of abutment

The modified Laursen equation is based on sediment transport relations. It gives maximum scour and implicitly includes contraction scour. FOR THIS EQUATION, DO NOT ADD CONTRACTION SCOUR TO OBTAIN TOTAL SCOUR AT THE STRUCTURE OR IN THE SECTION. The modified Froehlich equation does not include contraction scour, but does include a safety factor (+1.0) that effectively accounts for contraction scour in most cases. Values computed from either method should be increased by $y_a/6$ for sand bed streams if dunes are the expected bed form.

DESIGN

When designing a riprap section to stabilize a streambank, scour can be determined in one of two ways: 1) excavating to the maximum scour depth and placing the stone section to this elevation, or 2) increasing the volume of material in the toe section to provide a launching apron that will fill and armor the scour hole. Preference is generally given to option 2 because of ease of construction, cost, and environmental impacts associated with excavation of the streambed.

The volume of material added to the toe section must be sufficient to armor to the ultimate depth of scour. The authors use a somewhat conservative approach that assumes that the side slope in the scour hole is 1:2 and that the requisite thickness of the launched armor layer should be twice the D_{100} of the riprap gradation. Thus, the volume of stone in the toe section per ft of bankline is given by:

$$Vol = \frac{D_{100} \sqrt{5(Y_s)^2}}{13.5} \quad (5)$$

where

- Vol = The volume of riprap required (cy)
- D_{100} = The largest size of stone in the riprap (ft)
- Y_s = the estimated scour depth (ft) below the bed ($y_s - y_a$)

APPLICABILITY AND LIMITATIONS

Techniques described in this technical note are based in part on empirical measurement of scour in the laboratory and field. As such, they are limited in applicability to the range of conditions for which the data were collected. Computed values for scour depth should be field-verified through observation of scour hole depths in the project reach. Maximum scour depth is often difficult to determine due to subsequent deposition of sediments during the hydrograph recession. Therefore, the use of scour chains or other measures of maximum scour depth is advocated.

ACKNOWLEDGEMENT

Research presented in this technical note was developed under the U.S. Army Corps of Engineers Ecosystem Management and Restoration Research Program. Technical reviews were provided by Messrs. E.A. (Tony) Dardeau, Jr., and Jerry L. Miller of the Environmental Laboratory, and Dr. Stephen L. Maynard of the Coastal and Hydraulics Laboratory.

POINT OF CONTACT

This technical note was written by Dr. Craig Fischenich, Environmental Laboratory, U.S. Army Engineer Research and Development Center (ERDC), and Mr. Mark Landers, U.S. Geological Service. For additional information, contact Dr. Craig Fischenich, (601-634-3449, fischec@wes.army.mil), or the manager of the Ecosystem Management and Restoration Research Program, Dr. Russell F. Theriot (601-634-2733, therior@wes.army.mil). This technical note should be cited as follows:

Fischenich, C., and Landers, M. (1999). "Computing scour," *EMRRP Technical Notes Collection* (ERDC TN-EMRRP-SR-05), U.S. Army Engineer Research and Development Center, Vicksburg, MS. www.wes.army.mil/el/emrrp

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Sladden Engineering

450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Gradation

ASTM C117 & C136

Project Number: 544-15196

November 13, 2015

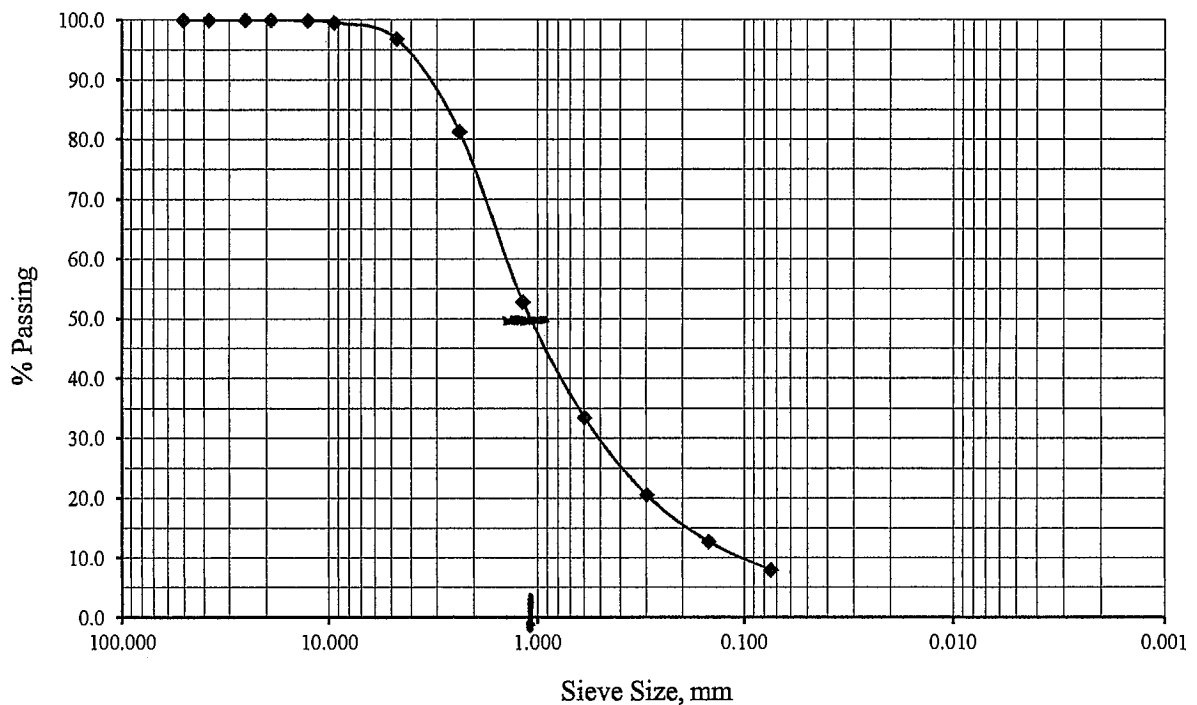
Project Name: Hawks Landing

Lab ID Number: LN6-15640

Sample ID: Native, D50 = 1.1 mm

Soil Classification: SW-SM

Sieve Size, in	Sieve Size, mm	Percent Passing
2"	50.8	100.0
1 1/2"	38.1	100.0
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	99.9
3/8"	9.53	99.6
#4	4.75	96.9
#8	2.36	81.4
#16	1.18 1.09mm	52.9 50%
#30	0.60	33.5
#50	0.30	20.6
#100	0.15	12.8
#200	0.075	8.0





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Manning's Roughness Coefficient

Manning's roughness coefficient values for some common materials

Manning's roughness coefficient values are used in the Manning's formula for flow calculation in open flow channels. Coefficients for some common used surface materials can be found in the table below:

Surface Material	Manning's Roughness Coefficient - n -
Asbestos cement	0.011
Asphalt	0.016
Brass	0.011
Brick	0.015
Canvas	0.012
Cast-iron, new	0.012
Clay tile	0.014
Concrete - steel forms	0.011
Concrete (Cement) - finished	0.012
Concrete - wooden forms	0.015
Concrete - centrifugally spun	0.013
Copper	0.011
Corrugated metal	0.022
Earth, smooth	0.018
Earth channel - clean	0.022
Earth channel - gravelly	0.025
Earth channel - weedy	0.030
Earth channel - stony, cobbles	0.035
Floodplains - pasture, farmland	0.035
Floodplains - light brush	0.050
Floodplains - heavy brush	0.075
Floodplains - trees	0.15
Galvanized iron	0.016
Glass	0.010
Gravel, firm	0.023
Lead	0.011
Masonry	0.025
Metal - corrugated	0.022
Natural streams - clean and straight	0.030
Natural streams - major rivers	0.035
Natural streams - sluggish with deep pools	0.040
Natural channels, very poor condition	0.060
Plastic	0.009
Polyethylene PE - Corrugated with smooth inner walls	0.009 - 0.015
Polyethylene PE - Corrugated with corrugated inner walls	0.018 - 0.025
Polyvinyl Chloride PVC - with smooth inner walls	0.009 - 0.011
Rubble Masonry	0.017
Steel - Coal-tar enamel	0.010
Steel - smooth	0.012
Steel - New unlined	0.011
Steel - Riveted	0.019
Vitrified Sewer	0.013 - 0.015
Wood - planed	0.012
Wood - unplanned	0.013

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Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2012, Version 7.1

Study date 01/18/16

+++++

San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6296

HAWK RIDGE - AREA 1
100-YR - 24-HOUR
EXISTING OFF SITE HYDROLOGY

Storm Event Year = 100

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Rainfall data for year	Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
10	5.48	1	1.00
2	5.48	6	1.13
2	5.48	24	1.87
100	5.48	1	1.93
100	5.48	6	3.47
100	5.48	24	5.88

+++++

***** Area-averaged max loss rate, Fm *****

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SCS curve No. (AMCII)	SCS curve NO. (AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
66.0	66.0	5.48	1.000	0.593	1.000	0.593

Area-averaged adjusted loss rate Fm (In/Hr) = 0.593

***** Area-Averaged low loss rate fraction, Yb *****

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
5.48	1.000	66.0	66.0	5.15	0.400

Area-averaged catchment yield fraction, Y = 0.400

Area-averaged low loss fraction, Yb = 0.600

User entry of time of concentration = 0.089 (hours)

+++++

Watershed area = 5.48(Ac.)

Catchment Lag time = 0.071 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 116.7788

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.593(In/Hr)

Average low loss rate fraction (Yb) = 0.600 (decimal)

FOOTHILL S-Graph Selected

Computed peak 5-minute rainfall = 0.916(In)

Computed peak 30-minute rainfall = 1.568(In)

Specified peak 1-hour rainfall = 1.930(In)

Computed peak 3-hour rainfall = 2.765(In)

Specified peak 6-hour rainfall = 3.470(In)

Specified peak 24-hour rainfall = 5.880(In)

Rainfall depth area reduction factors:

Using a total area of 5.48(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000	Adjusted rainfall = 0.916(In)
30-minute factor = 1.000	Adjusted rainfall = 1.567(In)
1-hour factor = 1.000	Adjusted rainfall = 1.930(In)
3-hour factor = 1.000	Adjusted rainfall = 2.765(In)
6-hour factor = 1.000	Adjusted rainfall = 3.470(In)
24-hour factor = 1.000	Adjusted rainfall = 5.880(In)

Unit Hydrograph

+++++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
-----------------	-----------------------	-------------------------

(K = 66.27 (CFS))

1	20.316	13.464
2	76.457	37.206
3	92.393	10.561
4	97.802	3.585
5	99.144	0.890
6	100.000	0.567

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.9156	0.9156
2	1.1272	0.2116
3	1.2730	0.1458
4	1.3877	0.1147

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5	1. 4838	0. 0961
6	1. 5672	0. 0834
7	1. 6414	0. 0742
8	1. 7085	0. 0671
9	1. 7700	0. 0614
10	1. 8268	0. 0568
11	1. 8798	0. 0530
12	1. 9295	0. 0497
13	1. 9808	0. 0513
14	2. 0294	0. 0487
15	2. 0758	0. 0464
16	2. 1202	0. 0444
17	2. 1627	0. 0425
18	2. 2036	0. 0409
19	2. 2430	0. 0394
20	2. 2810	0. 0380
21	2. 3178	0. 0368
22	2. 3534	0. 0356
23	2. 3879	0. 0345
24	2. 4214	0. 0335
25	2. 4540	0. 0326
26	2. 4857	0. 0317
27	2. 5167	0. 0309
28	2. 5468	0. 0302
29	2. 5763	0. 0294
30	2. 6050	0. 0288
31	2. 6332	0. 0281
32	2. 6607	0. 0275
33	2. 6877	0. 0270
34	2. 7141	0. 0264
35	2. 7400	0. 0259
36	2. 7654	0. 0254
37	2. 7903	0. 0249
38	2. 8148	0. 0245
39	2. 8388	0. 0240
40	2. 8625	0. 0236
41	2. 8857	0. 0232
42	2. 9085	0. 0229
43	2. 9310	0. 0225
44	2. 9532	0. 0221
45	2. 9750	0. 0218
46	2. 9965	0. 0215
47	3. 0177	0. 0212
48	3. 0385	0. 0209
49	3. 0591	0. 0206
50	3. 0794	0. 0203
51	3. 0995	0. 0200
52	3. 1192	0. 0198
53	3. 1387	0. 0195
54	3. 1580	0. 0193
55	3. 1770	0. 0190
56	3. 1958	0. 0188
57	3. 2144	0. 0186
58	3. 2328	0. 0184
59	3. 2509	0. 0181
60	3. 2689	0. 0179
61	3. 2866	0. 0177
62	3. 3041	0. 0175
63	3. 3215	0. 0174
64	3. 3387	0. 0172
65	3. 3557	0. 0170
66	3. 3725	0. 0168
67	3. 3891	0. 0166

		pdb03281. out
68	3. 4056	0. 0165
69	3. 4219	0. 0163
70	3. 4381	0. 0162
71	3. 4541	0. 0160
72	3. 4699	0. 0159
73	3. 4882	0. 0183
74	3. 5063	0. 0181
75	3. 5243	0. 0180
76	3. 5421	0. 0178
77	3. 5597	0. 0177
78	3. 5772	0. 0175
79	3. 5946	0. 0174
80	3. 6119	0. 0172
81	3. 6290	0. 0171
82	3. 6459	0. 0170
83	3. 6628	0. 0169
84	3. 6795	0. 0167
85	3. 6961	0. 0166
86	3. 7126	0. 0165
87	3. 7290	0. 0164
88	3. 7452	0. 0162
89	3. 7614	0. 0161
90	3. 7774	0. 0160
91	3. 7933	0. 0159
92	3. 8091	0. 0158
93	3. 8248	0. 0157
94	3. 8404	0. 0156
95	3. 8559	0. 0155
96	3. 8713	0. 0154
97	3. 8866	0. 0153
98	3. 9018	0. 0152
99	3. 9169	0. 0151
100	3. 9319	0. 0150
101	3. 9468	0. 0149
102	3. 9616	0. 0148
103	3. 9763	0. 0147
104	3. 9910	0. 0146
105	4. 0055	0. 0146
106	4. 0200	0. 0145
107	4. 0344	0. 0144
108	4. 0487	0. 0143
109	4. 0629	0. 0142
110	4. 0771	0. 0141
111	4. 0911	0. 0141
112	4. 1051	0. 0140
113	4. 1190	0. 0139
114	4. 1328	0. 0138
115	4. 1466	0. 0138
116	4. 1603	0. 0137
117	4. 1739	0. 0136
118	4. 1874	0. 0135
119	4. 2009	0. 0135
120	4. 2143	0. 0134
121	4. 2276	0. 0133
122	4. 2409	0. 0133
123	4. 2541	0. 0132
124	4. 2672	0. 0131
125	4. 2802	0. 0131
126	4. 2932	0. 0130
127	4. 3062	0. 0129
128	4. 3190	0. 0129
129	4. 3318	0. 0128
130	4. 3446	0. 0127

pdb03281. out

131	4. 3573	0. 0127
132	4. 3699	0. 0126
133	4. 3825	0. 0126
134	4. 3950	0. 0125
135	4. 4074	0. 0124
136	4. 4198	0. 0124
137	4. 4322	0. 0123
138	4. 4444	0. 0123
139	4. 4567	0. 0122
140	4. 4688	0. 0122
141	4. 4809	0. 0121
142	4. 4930	0. 0121
143	4. 5050	0. 0120
144	4. 5170	0. 0120
145	4. 5289	0. 0119
146	4. 5407	0. 0119
147	4. 5526	0. 0118
148	4. 5643	0. 0118
149	4. 5760	0. 0117
150	4. 5877	0. 0117
151	4. 5993	0. 0116
152	4. 6109	0. 0116
153	4. 6224	0. 0115
154	4. 6338	0. 0115
155	4. 6453	0. 0114
156	4. 6566	0. 0114
157	4. 6680	0. 0113
158	4. 6793	0. 0113
159	4. 6905	0. 0112
160	4. 7017	0. 0112
161	4. 7129	0. 0112
162	4. 7240	0. 0111
163	4. 7351	0. 0111
164	4. 7461	0. 0110
165	4. 7571	0. 0110
166	4. 7680	0. 0109
167	4. 7789	0. 0109
168	4. 7898	0. 0109
169	4. 8006	0. 0108
170	4. 8114	0. 0108
171	4. 8222	0. 0107
172	4. 8329	0. 0107
173	4. 8435	0. 0107
174	4. 8542	0. 0106
175	4. 8648	0. 0106
176	4. 8753	0. 0106
177	4. 8859	0. 0105
178	4. 8963	0. 0105
179	4. 9068	0. 0104
180	4. 9172	0. 0104
181	4. 9276	0. 0104
182	4. 9379	0. 0103
183	4. 9482	0. 0103
184	4. 9585	0. 0103
185	4. 9687	0. 0102
186	4. 9789	0. 0102
187	4. 9891	0. 0102
188	4. 9992	0. 0101
189	5. 0093	0. 0101
190	5. 0194	0. 0101
191	5. 0294	0. 0100
192	5. 0394	0. 0100
193	5. 0494	0. 0100

pdb03281. out

194	5. 0593	0. 0099
195	5. 0692	0. 0099
196	5. 0791	0. 0099
197	5. 0890	0. 0098
198	5. 0988	0. 0098
199	5. 1085	0. 0098
200	5. 1183	0. 0098
201	5. 1280	0. 0097
202	5. 1377	0. 0097
203	5. 1474	0. 0097
204	5. 1570	0. 0096
205	5. 1666	0. 0096
206	5. 1762	0. 0096
207	5. 1857	0. 0095
208	5. 1952	0. 0095
209	5. 2047	0. 0095
210	5. 2142	0. 0095
211	5. 2236	0. 0094
212	5. 2330	0. 0094
213	5. 2424	0. 0094
214	5. 2518	0. 0094
215	5. 2611	0. 0093
216	5. 2704	0. 0093
217	5. 2796	0. 0093
218	5. 2889	0. 0092
219	5. 2981	0. 0092
220	5. 3073	0. 0092
221	5. 3165	0. 0092
222	5. 3256	0. 0091
223	5. 3347	0. 0091
224	5. 3438	0. 0091
225	5. 3529	0. 0091
226	5. 3619	0. 0090
227	5. 3709	0. 0090
228	5. 3799	0. 0090
229	5. 3889	0. 0090
230	5. 3978	0. 0089
231	5. 4067	0. 0089
232	5. 4156	0. 0089
233	5. 4245	0. 0089
234	5. 4333	0. 0088
235	5. 4422	0. 0088
236	5. 4510	0. 0088
237	5. 4597	0. 0088
238	5. 4685	0. 0088
239	5. 4772	0. 0087
240	5. 4859	0. 0087
241	5. 4946	0. 0087
242	5. 5033	0. 0087
243	5. 5119	0. 0086
244	5. 5205	0. 0086
245	5. 5291	0. 0086
246	5. 5377	0. 0086
247	5. 5463	0. 0086
248	5. 5548	0. 0085
249	5. 5633	0. 0085
250	5. 5718	0. 0085
251	5. 5803	0. 0085
252	5. 5887	0. 0084
253	5. 5971	0. 0084
254	5. 6055	0. 0084
255	5. 6139	0. 0084
256	5. 6223	0. 0084

pdb03281. out

257	5. 6306	0. 0083
258	5. 6390	0. 0083
259	5. 6473	0. 0083
260	5. 6556	0. 0083
261	5. 6638	0. 0083
262	5. 6721	0. 0082
263	5. 6803	0. 0082
264	5. 6885	0. 0082
265	5. 6967	0. 0082
266	5. 7049	0. 0082
267	5. 7130	0. 0081
268	5. 7211	0. 0081
269	5. 7293	0. 0081
270	5. 7373	0. 0081
271	5. 7454	0. 0081
272	5. 7535	0. 0081
273	5. 7615	0. 0080
274	5. 7695	0. 0080
275	5. 7775	0. 0080
276	5. 7855	0. 0080
277	5. 7935	0. 0080
278	5. 8014	0. 0079
279	5. 8094	0. 0079
280	5. 8173	0. 0079
281	5. 8252	0. 0079
282	5. 8331	0. 0079
283	5. 8409	0. 0079
284	5. 8488	0. 0078
285	5. 8566	0. 0078
286	5. 8644	0. 0078
287	5. 8722	0. 0078
288	5. 8800	0. 0078

Unit Period (number)	Unit Rainfall (In)	Unit Soil - Loss (In)	Effective Rainfall (In)
1	0. 0078	0. 0047	0. 0031
2	0. 0078	0. 0047	0. 0031
3	0. 0078	0. 0047	0. 0031
4	0. 0078	0. 0047	0. 0031
5	0. 0079	0. 0047	0. 0032
6	0. 0079	0. 0047	0. 0032
7	0. 0079	0. 0048	0. 0032
8	0. 0079	0. 0048	0. 0032
9	0. 0080	0. 0048	0. 0032
10	0. 0080	0. 0048	0. 0032
11	0. 0080	0. 0048	0. 0032
12	0. 0081	0. 0048	0. 0032
13	0. 0081	0. 0049	0. 0032
14	0. 0081	0. 0049	0. 0032
15	0. 0081	0. 0049	0. 0033
16	0. 0082	0. 0049	0. 0033
17	0. 0082	0. 0049	0. 0033
18	0. 0082	0. 0049	0. 0033
19	0. 0083	0. 0050	0. 0033
20	0. 0083	0. 0050	0. 0033
21	0. 0083	0. 0050	0. 0033
22	0. 0083	0. 0050	0. 0033
23	0. 0084	0. 0050	0. 0034
24	0. 0084	0. 0050	0. 0034
25	0. 0084	0. 0051	0. 0034
26	0. 0085	0. 0051	0. 0034

pdb03281. out

27	0. 0085	0. 0051	0. 0034
28	0. 0085	0. 0051	0. 0034
29	0. 0086	0. 0051	0. 0034
30	0. 0086	0. 0052	0. 0034
31	0. 0086	0. 0052	0. 0035
32	0. 0087	0. 0052	0. 0035
33	0. 0087	0. 0052	0. 0035
34	0. 0087	0. 0052	0. 0035
35	0. 0088	0. 0053	0. 0035
36	0. 0088	0. 0053	0. 0035
37	0. 0088	0. 0053	0. 0035
38	0. 0089	0. 0053	0. 0035
39	0. 0089	0. 0054	0. 0036
40	0. 0089	0. 0054	0. 0036
41	0. 0090	0. 0054	0. 0036
42	0. 0090	0. 0054	0. 0036
43	0. 0091	0. 0054	0. 0036
44	0. 0091	0. 0055	0. 0036
45	0. 0091	0. 0055	0. 0037
46	0. 0092	0. 0055	0. 0037
47	0. 0092	0. 0055	0. 0037
48	0. 0092	0. 0055	0. 0037
49	0. 0093	0. 0056	0. 0037
50	0. 0093	0. 0056	0. 0037
51	0. 0094	0. 0056	0. 0038
52	0. 0094	0. 0056	0. 0038
53	0. 0095	0. 0057	0. 0038
54	0. 0095	0. 0057	0. 0038
55	0. 0095	0. 0057	0. 0038
56	0. 0096	0. 0057	0. 0038
57	0. 0096	0. 0058	0. 0039
58	0. 0097	0. 0058	0. 0039
59	0. 0097	0. 0058	0. 0039
60	0. 0098	0. 0059	0. 0039
61	0. 0098	0. 0059	0. 0039
62	0. 0098	0. 0059	0. 0039
63	0. 0099	0. 0059	0. 0040
64	0. 0099	0. 0060	0. 0040
65	0. 0100	0. 0060	0. 0040
66	0. 0100	0. 0060	0. 0040
67	0. 0101	0. 0061	0. 0040
68	0. 0101	0. 0061	0. 0041
69	0. 0102	0. 0061	0. 0041
70	0. 0102	0. 0061	0. 0041
71	0. 0103	0. 0062	0. 0041
72	0. 0103	0. 0062	0. 0041
73	0. 0104	0. 0062	0. 0042
74	0. 0104	0. 0063	0. 0042
75	0. 0105	0. 0063	0. 0042
76	0. 0106	0. 0063	0. 0042
77	0. 0106	0. 0064	0. 0043
78	0. 0107	0. 0064	0. 0043
79	0. 0107	0. 0064	0. 0043
80	0. 0108	0. 0065	0. 0043
81	0. 0109	0. 0065	0. 0043
82	0. 0109	0. 0065	0. 0044
83	0. 0110	0. 0066	0. 0044
84	0. 0110	0. 0066	0. 0044
85	0. 0111	0. 0067	0. 0044
86	0. 0112	0. 0067	0. 0045
87	0. 0112	0. 0067	0. 0045
88	0. 0113	0. 0068	0. 0045
89	0. 0114	0. 0068	0. 0046

pdb03281. out

90	0. 0114	0. 0069	0. 0046
91	0. 0115	0. 0069	0. 0046
92	0. 0116	0. 0069	0. 0046
93	0. 0117	0. 0070	0. 0047
94	0. 0117	0. 0070	0. 0047
95	0. 0118	0. 0071	0. 0047
96	0. 0119	0. 0071	0. 0047
97	0. 0120	0. 0072	0. 0048
98	0. 0120	0. 0072	0. 0048
99	0. 0121	0. 0073	0. 0048
100	0. 0122	0. 0073	0. 0049
101	0. 0123	0. 0074	0. 0049
102	0. 0123	0. 0074	0. 0049
103	0. 0124	0. 0075	0. 0050
104	0. 0125	0. 0075	0. 0050
105	0. 0126	0. 0076	0. 0050
106	0. 0127	0. 0076	0. 0051
107	0. 0128	0. 0077	0. 0051
108	0. 0129	0. 0077	0. 0051
109	0. 0130	0. 0078	0. 0052
110	0. 0131	0. 0078	0. 0052
111	0. 0132	0. 0079	0. 0053
112	0. 0133	0. 0080	0. 0053
113	0. 0134	0. 0080	0. 0054
114	0. 0135	0. 0081	0. 0054
115	0. 0136	0. 0082	0. 0054
116	0. 0137	0. 0082	0. 0055
117	0. 0138	0. 0083	0. 0055
118	0. 0139	0. 0083	0. 0056
119	0. 0141	0. 0084	0. 0056
120	0. 0141	0. 0085	0. 0057
121	0. 0143	0. 0086	0. 0057
122	0. 0144	0. 0086	0. 0058
123	0. 0146	0. 0087	0. 0058
124	0. 0146	0. 0088	0. 0059
125	0. 0148	0. 0089	0. 0059
126	0. 0149	0. 0089	0. 0060
127	0. 0151	0. 0091	0. 0060
128	0. 0152	0. 0091	0. 0061
129	0. 0154	0. 0092	0. 0062
130	0. 0155	0. 0093	0. 0062
131	0. 0157	0. 0094	0. 0063
132	0. 0158	0. 0095	0. 0063
133	0. 0160	0. 0096	0. 0064
134	0. 0161	0. 0097	0. 0065
135	0. 0164	0. 0098	0. 0065
136	0. 0165	0. 0099	0. 0066
137	0. 0167	0. 0100	0. 0067
138	0. 0169	0. 0101	0. 0067
139	0. 0171	0. 0103	0. 0068
140	0. 0172	0. 0103	0. 0069
141	0. 0175	0. 0105	0. 0070
142	0. 0177	0. 0106	0. 0071
143	0. 0180	0. 0108	0. 0072
144	0. 0181	0. 0109	0. 0072
145	0. 0159	0. 0095	0. 0063
146	0. 0160	0. 0096	0. 0064
147	0. 0163	0. 0098	0. 0065
148	0. 0165	0. 0099	0. 0066
149	0. 0168	0. 0101	0. 0067
150	0. 0170	0. 0102	0. 0068
151	0. 0174	0. 0104	0. 0069
152	0. 0175	0. 0105	0. 0070

pdb03281. out

153	0. 0179	0. 0108	0. 0072
154	0. 0181	0. 0109	0. 0073
155	0. 0186	0. 0111	0. 0074
156	0. 0188	0. 0113	0. 0075
157	0. 0193	0. 0116	0. 0077
158	0. 0195	0. 0117	0. 0078
159	0. 0200	0. 0120	0. 0080
160	0. 0203	0. 0122	0. 0081
161	0. 0209	0. 0125	0. 0083
162	0. 0212	0. 0127	0. 0085
163	0. 0218	0. 0131	0. 0087
164	0. 0221	0. 0133	0. 0089
165	0. 0229	0. 0137	0. 0091
166	0. 0232	0. 0139	0. 0093
167	0. 0240	0. 0144	0. 0096
168	0. 0245	0. 0147	0. 0098
169	0. 0254	0. 0152	0. 0102
170	0. 0259	0. 0155	0. 0104
171	0. 0270	0. 0162	0. 0108
172	0. 0275	0. 0165	0. 0110
173	0. 0288	0. 0173	0. 0115
174	0. 0294	0. 0177	0. 0118
175	0. 0309	0. 0186	0. 0124
176	0. 0317	0. 0190	0. 0127
177	0. 0335	0. 0201	0. 0134
178	0. 0345	0. 0207	0. 0138
179	0. 0368	0. 0221	0. 0147
180	0. 0380	0. 0228	0. 0152
181	0. 0409	0. 0245	0. 0163
182	0. 0425	0. 0255	0. 0170
183	0. 0464	0. 0278	0. 0186
184	0. 0487	0. 0292	0. 0195
185	0. 0497	0. 0298	0. 0199
186	0. 0530	0. 0318	0. 0212
187	0. 0614	0. 0369	0. 0246
188	0. 0671	0. 0403	0. 0268
189	0. 0834	0. 0494	0. 0340
190	0. 0961	0. 0494	0. 0466
191	0. 1458	0. 0494	0. 0964
192	0. 2116	0. 0494	0. 1622
193	0. 9156	0. 0494	0. 8661
194	0. 1147	0. 0494	0. 0653
195	0. 0742	0. 0445	0. 0297
196	0. 0568	0. 0341	0. 0227
197	0. 0513	0. 0308	0. 0205
198	0. 0444	0. 0266	0. 0177
199	0. 0394	0. 0236	0. 0157
200	0. 0356	0. 0214	0. 0142
201	0. 0326	0. 0196	0. 0130
202	0. 0302	0. 0181	0. 0121
203	0. 0281	0. 0169	0. 0113
204	0. 0264	0. 0159	0. 0106
205	0. 0249	0. 0150	0. 0100
206	0. 0236	0. 0142	0. 0095
207	0. 0225	0. 0135	0. 0090
208	0. 0215	0. 0129	0. 0086
209	0. 0206	0. 0124	0. 0082
210	0. 0198	0. 0119	0. 0079
211	0. 0190	0. 0114	0. 0076
212	0. 0184	0. 0110	0. 0073
213	0. 0177	0. 0106	0. 0071
214	0. 0172	0. 0103	0. 0069
215	0. 0166	0. 0100	0. 0067

pdb03281. out

216	0. 0162	0. 0097	0. 0065
217	0. 0183	0. 0110	0. 0073
218	0. 0178	0. 0107	0. 0071
219	0. 0174	0. 0104	0. 0070
220	0. 0170	0. 0102	0. 0068
221	0. 0166	0. 0100	0. 0066
222	0. 0162	0. 0098	0. 0065
223	0. 0159	0. 0095	0. 0064
224	0. 0156	0. 0094	0. 0062
225	0. 0153	0. 0092	0. 0061
226	0. 0150	0. 0090	0. 0060
227	0. 0147	0. 0088	0. 0059
228	0. 0145	0. 0087	0. 0058
229	0. 0142	0. 0085	0. 0057
230	0. 0140	0. 0084	0. 0056
231	0. 0138	0. 0083	0. 0055
232	0. 0135	0. 0081	0. 0054
233	0. 0133	0. 0080	0. 0053
234	0. 0131	0. 0079	0. 0052
235	0. 0129	0. 0078	0. 0052
236	0. 0127	0. 0076	0. 0051
237	0. 0126	0. 0075	0. 0050
238	0. 0124	0. 0074	0. 0050
239	0. 0122	0. 0073	0. 0049
240	0. 0121	0. 0072	0. 0048
241	0. 0119	0. 0071	0. 0048
242	0. 0118	0. 0071	0. 0047
243	0. 0116	0. 0070	0. 0046
244	0. 0115	0. 0069	0. 0046
245	0. 0113	0. 0068	0. 0045
246	0. 0112	0. 0067	0. 0045
247	0. 0111	0. 0066	0. 0044
248	0. 0109	0. 0066	0. 0044
249	0. 0108	0. 0065	0. 0043
250	0. 0107	0. 0064	0. 0043
251	0. 0106	0. 0064	0. 0042
252	0. 0105	0. 0063	0. 0042
253	0. 0104	0. 0062	0. 0041
254	0. 0103	0. 0062	0. 0041
255	0. 0102	0. 0061	0. 0041
256	0. 0101	0. 0060	0. 0040
257	0. 0100	0. 0060	0. 0040
258	0. 0099	0. 0059	0. 0039
259	0. 0098	0. 0059	0. 0039
260	0. 0097	0. 0058	0. 0039
261	0. 0096	0. 0058	0. 0038
262	0. 0095	0. 0057	0. 0038
263	0. 0094	0. 0057	0. 0038
264	0. 0094	0. 0056	0. 0037
265	0. 0093	0. 0056	0. 0037
266	0. 0092	0. 0055	0. 0037
267	0. 0091	0. 0055	0. 0036
268	0. 0090	0. 0054	0. 0036
269	0. 0090	0. 0054	0. 0036
270	0. 0089	0. 0053	0. 0036
271	0. 0088	0. 0053	0. 0035
272	0. 0088	0. 0053	0. 0035
273	0. 0087	0. 0052	0. 0035
274	0. 0086	0. 0052	0. 0034
275	0. 0086	0. 0051	0. 0034
276	0. 0085	0. 0051	0. 0034
277	0. 0084	0. 0051	0. 0034
278	0. 0084	0. 0050	0. 0033

pdb03281. out

279	0.0083	0.0050	0.0033
280	0.0082	0.0049	0.0033
281	0.0082	0.0049	0.0033
282	0.0081	0.0049	0.0033
283	0.0081	0.0048	0.0032
284	0.0080	0.0048	0.0032
285	0.0080	0.0048	0.0032
286	0.0079	0.0047	0.0032
287	0.0079	0.0047	0.0031
288	0.0078	0.0047	0.0031

 Total soil rain loss = 2.88(In)
 Total effective rainfall = 3.00(In)
 Peak flow rate in flood hydrograph = 35.22(CFS)

+++++

24 - H O U R S T O R M
 R u n o f f H y d r o g r a p h

 Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac. Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0003		0.04	Q				
0+10	0.0014		0.16	Q				
0+15	0.0027		0.19	Q				
0+20	0.0041		0.20	Q				
0+25	0.0055		0.21	Q				
0+30	0.0069		0.21	Q				
0+35	0.0084		0.21	Q				
0+40	0.0098		0.21	Q				
0+45	0.0113		0.21	Q				
0+50	0.0127		0.21	Q				
0+55	0.0142		0.21	Q				
1+ 0	0.0157		0.21	Q				
1+ 5	0.0171		0.21	Q				
1+10	0.0186		0.21	Q				
1+15	0.0201		0.22	Q				
1+20	0.0216		0.22	Q				
1+25	0.0231		0.22	Q				
1+30	0.0246		0.22	Q				
1+35	0.0261		0.22	Q				
1+40	0.0276		0.22	Q				
1+45	0.0291		0.22	Q				
1+50	0.0306		0.22	Q				
1+55	0.0321		0.22	Q				
2+ 0	0.0337		0.22	Q				
2+ 5	0.0352		0.22	QV				
2+10	0.0367		0.22	QV				
2+15	0.0383		0.22	QV				
2+20	0.0398		0.23	QV				
2+25	0.0414		0.23	QV				
2+30	0.0430		0.23	QV				
2+35	0.0445		0.23	QV				
2+40	0.0461		0.23	QV				
2+45	0.0477		0.23	QV				
2+50	0.0493		0.23	QV				
2+55	0.0509		0.23	QV				
3+ 0	0.0525		0.23	QV				
3+ 5	0.0541		0.23	QV				
3+10	0.0557		0.23	QV				

3+15	0. 0573	0. 24	QV
3+20	0. 0589	0. 24	QV
3+25	0. 0606	0. 24	QV
3+30	0. 0622	0. 24	QV
3+35	0. 0638	0. 24	QV
3+40	0. 0655	0. 24	QV
3+45	0. 0672	0. 24	QV
3+50	0. 0688	0. 24	Q V
3+55	0. 0705	0. 24	Q V
4+ 0	0. 0722	0. 24	Q V
4+ 5	0. 0739	0. 24	Q V
4+10	0. 0756	0. 25	Q V
4+15	0. 0773	0. 25	Q V
4+20	0. 0790	0. 25	Q V
4+25	0. 0807	0. 25	Q V
4+30	0. 0824	0. 25	Q V
4+35	0. 0841	0. 25	Q V
4+40	0. 0859	0. 25	Q V
4+45	0. 0876	0. 25	Q V
4+50	0. 0894	0. 26	Q V
4+55	0. 0911	0. 26	Q V
5+ 0	0. 0929	0. 26	Q V
5+ 5	0. 0947	0. 26	Q V
5+10	0. 0965	0. 26	Q V
5+15	0. 0983	0. 26	Q V
5+20	0. 1001	0. 26	Q V
5+25	0. 1019	0. 26	Q V
5+30	0. 1037	0. 26	Q V
5+35	0. 1056	0. 27	Q V
5+40	0. 1074	0. 27	Q V
5+45	0. 1093	0. 27	Q V
5+50	0. 1111	0. 27	Q V
5+55	0. 1130	0. 27	Q V
6+ 0	0. 1149	0. 27	Q V
6+ 5	0. 1167	0. 27	Q V
6+10	0. 1186	0. 28	Q V
6+15	0. 1206	0. 28	Q V
6+20	0. 1225	0. 28	Q V
6+25	0. 1244	0. 28	Q V
6+30	0. 1263	0. 28	Q V
6+35	0. 1283	0. 28	Q V
6+40	0. 1302	0. 28	Q V
6+45	0. 1322	0. 29	Q V
6+50	0. 1342	0. 29	Q V
6+55	0. 1362	0. 29	Q V
7+ 0	0. 1382	0. 29	Q V
7+ 5	0. 1402	0. 29	Q V
7+10	0. 1422	0. 29	Q V
7+15	0. 1443	0. 30	Q V
7+20	0. 1463	0. 30	Q V
7+25	0. 1484	0. 30	Q V
7+30	0. 1504	0. 30	Q V
7+35	0. 1525	0. 30	Q V
7+40	0. 1546	0. 30	Q V
7+45	0. 1567	0. 31	Q V
7+50	0. 1589	0. 31	Q V
7+55	0. 1610	0. 31	Q V
8+ 0	0. 1632	0. 31	Q V
8+ 5	0. 1653	0. 31	Q V
8+10	0. 1675	0. 32	Q V
8+15	0. 1697	0. 32	Q V
8+20	0. 1719	0. 32	Q V
8+25	0. 1741	0. 32	Q V

8+30	0. 1764	0. 32	Q	V
8+35	0. 1786	0. 33	Q	V
8+40	0. 1809	0. 33	Q	V
8+45	0. 1832	0. 33	Q	V
8+50	0. 1855	0. 33	Q	V
8+55	0. 1878	0. 34	Q	V
9+ 0	0. 1901	0. 34	Q	V
9+ 5	0. 1925	0. 34	Q	V
9+10	0. 1948	0. 34	Q	V
9+15	0. 1972	0. 35	Q	V
9+20	0. 1996	0. 35	Q	V
9+25	0. 2020	0. 35	Q	V
9+30	0. 2045	0. 35	Q	V
9+35	0. 2069	0. 36	Q	V
9+40	0. 2094	0. 36	Q	V
9+45	0. 2119	0. 36	Q	V
9+50	0. 2144	0. 37	Q	V
9+55	0. 2170	0. 37	Q	V
10+ 0	0. 2195	0. 37	Q	V
10+ 5	0. 2221	0. 37	Q	V
10+10	0. 2247	0. 38	Q	V
10+15	0. 2273	0. 38	Q	V
10+20	0. 2300	0. 38	Q	V
10+25	0. 2327	0. 39	Q	V
10+30	0. 2354	0. 39	Q	V
10+35	0. 2381	0. 40	Q	V
10+40	0. 2408	0. 40	Q	V
10+45	0. 2436	0. 40	Q	V
10+50	0. 2464	0. 41	Q	V
10+55	0. 2492	0. 41	Q	V
11+ 0	0. 2521	0. 42	Q	V
11+ 5	0. 2550	0. 42	Q	V
11+10	0. 2579	0. 42	Q	V
11+15	0. 2609	0. 43	Q	V
11+20	0. 2638	0. 43	Q	V
11+25	0. 2668	0. 44	Q	V
11+30	0. 2699	0. 44	Q	V
11+35	0. 2730	0. 45	Q	V
11+40	0. 2761	0. 45	Q	V
11+45	0. 2792	0. 46	Q	V
11+50	0. 2824	0. 46	Q	V
11+55	0. 2856	0. 47	Q	V
12+ 0	0. 2889	0. 47	Q	V
12+ 5	0. 2921	0. 47	Q	V
12+10	0. 2951	0. 43	Q	V
12+15	0. 2981	0. 43	Q	V
12+20	0. 3010	0. 43	Q	V
12+25	0. 3041	0. 44	Q	V
12+30	0. 3071	0. 44	Q	V
12+35	0. 3102	0. 45	Q	V
12+40	0. 3134	0. 46	Q	V
12+45	0. 3166	0. 47	Q	V
12+50	0. 3198	0. 47	Q	V
12+55	0. 3231	0. 48	Q	V
13+ 0	0. 3265	0. 49	Q	V
13+ 5	0. 3300	0. 50	Q	V
13+10	0. 3335	0. 51	Q	V
13+15	0. 3370	0. 52	Q	V
13+20	0. 3407	0. 53	Q	V
13+25	0. 3444	0. 54	Q	V
13+30	0. 3482	0. 55	Q	V
13+35	0. 3520	0. 56	Q	V
13+40	0. 3560	0. 57	Q	V

13+45	0. 3600	0. 59	Q	V			
13+50	0. 3642	0. 60	Q	V			
13+55	0. 3684	0. 62	Q	V			
14+ 0	0. 3728	0. 63	Q	V			
14+ 5	0. 3772	0. 65	Q	V			
14+10	0. 3819	0. 67	Q	V			
14+15	0. 3866	0. 69	Q	V			
14+20	0. 3915	0. 71	Q	V			
14+25	0. 3965	0. 73	Q	V			
14+30	0. 4017	0. 76	Q	V			
14+35	0. 4071	0. 78	Q	V			
14+40	0. 4127	0. 81	Q	V			
14+45	0. 4185	0. 84	Q	V			
14+50	0. 4245	0. 88	Q	V			
14+55	0. 4309	0. 92	Q	V			
15+ 0	0. 4375	0. 96	Q	V			
15+ 5	0. 4444	1. 01	Q	V			
15+10	0. 4518	1. 07	Q	V			
15+15	0. 4596	1. 13	Q	V			
15+20	0. 4680	1. 21	Q	V			
15+25	0. 4767	1. 27	Q	V			
15+30	0. 4858	1. 32	Q	V			
15+35	0. 4956	1. 43	Q	V			
15+40	0. 5067	1. 60	Q	V			
15+45	0. 5192	1. 82	Q	V			
15+50	0. 5350	2. 29	Q	V			
15+55	0. 5592	3. 52	Q	V			
16+ 0	0. 6035	6. 42	Q	V			
16+ 5	0. 7338	18. 93	Q	V			
16+10	0. 9764	35. 22	Q	V			
16+15	1. 0637	12. 67	Q	V			
16+20	1. 1009	5. 40	Q	V			
16+25	1. 1183	2. 53	Q	V			
16+30	1. 1314	1. 90	Q	V			
16+35	1. 1399	1. 23	Q	V			
16+40	1. 1473	1. 08	Q	V			
16+45	1. 1539	0. 97	Q	V			
16+50	1. 1600	0. 88	Q	V			
16+55	1. 1656	0. 81	Q	V			
17+ 0	1. 1708	0. 76	Q	V			
17+ 5	1. 1757	0. 71	Q	V			
17+10	1. 1803	0. 67	Q	V			
17+15	1. 1847	0. 63	Q	V			
17+20	1. 1888	0. 60	Q	V			
17+25	1. 1928	0. 57	Q	V			
17+30	1. 1965	0. 55	Q	V			
17+35	1. 2002	0. 53	Q	V			
17+40	1. 2037	0. 51	Q	V			
17+45	1. 2071	0. 49	Q	V			
17+50	1. 2103	0. 47	Q	V			
17+55	1. 2135	0. 46	Q	V			
18+ 0	1. 2165	0. 44	Q	V			
18+ 5	1. 2196	0. 44	Q	V			
18+10	1. 2228	0. 47	Q	V			
18+15	1. 2260	0. 47	Q	V			
18+20	1. 2292	0. 46	Q	V			
18+25	1. 2323	0. 45	Q	V			
18+30	1. 2354	0. 44	Q	V			
18+35	1. 2383	0. 43	Q	V			
18+40	1. 2413	0. 42	Q	V			
18+45	1. 2441	0. 41	Q	V			
18+50	1. 2469	0. 41	Q	V			
18+55	1. 2497	0. 40	Q	V			

19+ 0	1. 2524	0. 39	Q	V
19+ 5	1. 2550	0. 38	Q	V
19+10	1. 2576	0. 38	Q	V
19+15	1. 2602	0. 37	Q	V
19+20	1. 2627	0. 37	Q	V
19+25	1. 2652	0. 36	Q	V
19+30	1. 2676	0. 35	Q	V
19+35	1. 2700	0. 35	Q	V
19+40	1. 2724	0. 34	Q	V
19+45	1. 2747	0. 34	Q	V
19+50	1. 2770	0. 33	Q	V
19+55	1. 2793	0. 33	Q	V
20+ 0	1. 2815	0. 32	Q	V
20+ 5	1. 2837	0. 32	Q	V
20+10	1. 2859	0. 32	Q	V
20+15	1. 2880	0. 31	Q	V
20+20	1. 2902	0. 31	Q	V
20+25	1. 2923	0. 30	Q	V
20+30	1. 2943	0. 30	Q	V
20+35	1. 2964	0. 30	Q	V
20+40	1. 2984	0. 29	Q	V
20+45	1. 3004	0. 29	Q	V
20+50	1. 3024	0. 29	Q	V
20+55	1. 3043	0. 28	Q	V
21+ 0	1. 3063	0. 28	Q	V
21+ 5	1. 3082	0. 28	Q	V
21+10	1. 3101	0. 28	Q	V
21+15	1. 3120	0. 27	Q	V
21+20	1. 3138	0. 27	Q	V
21+25	1. 3157	0. 27	Q	V
21+30	1. 3175	0. 26	Q	V
21+35	1. 3193	0. 26	Q	V
21+40	1. 3211	0. 26	Q	V
21+45	1. 3229	0. 26	Q	V
21+50	1. 3246	0. 25	Q	V
21+55	1. 3264	0. 25	Q	V
22+ 0	1. 3281	0. 25	Q	V
22+ 5	1. 3298	0. 25	Q	V
22+10	1. 3315	0. 25	Q	V
22+15	1. 3332	0. 24	Q	V
22+20	1. 3348	0. 24	Q	V
22+25	1. 3365	0. 24	Q	V
22+30	1. 3381	0. 24	Q	V
22+35	1. 3397	0. 24	Q	V
22+40	1. 3414	0. 23	Q	V
22+45	1. 3430	0. 23	Q	V
22+50	1. 3445	0. 23	Q	V
22+55	1. 3461	0. 23	Q	V
23+ 0	1. 3477	0. 23	Q	V
23+ 5	1. 3492	0. 23	Q	V
23+10	1. 3508	0. 22	Q	V
23+15	1. 3523	0. 22	Q	V
23+20	1. 3538	0. 22	Q	V
23+25	1. 3553	0. 22	Q	V
23+30	1. 3568	0. 22	Q	V
23+35	1. 3583	0. 22	Q	V
23+40	1. 3598	0. 21	Q	V
23+45	1. 3612	0. 21	Q	V
23+50	1. 3627	0. 21	Q	V
23+55	1. 3641	0. 21	Q	V
24+ 0	1. 3656	0. 21	Q	V
24+ 5	1. 3667	0. 17	Q	V
24+10	1. 3671	0. 05	Q	V

			pdb03281. out				V
24+15	1. 3672	0. 02	Q				
24+20	1. 3672	0. 00	Q				V
24+25	1. 3672	0. 00	Q				V

Unit Hydrograph Analysis

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Study date 01/18/16

San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6296

HAWK RIDGE - AREA 2
100-YR - 24-HOUR
EXISTING OFF SITE HYDROLOGY

Storm Event Year = 100

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

	Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10	2.00	1	1.00
Rainfall data for year 2	2.00	6	1.13
Rainfall data for year 2	2.00	24	1.87
Rainfall data for year 100	2.00	1	1.93
Rainfall data for year 100	2.00	6	3.47
Rainfall data for year 100	2.00	24	5.88

***** Area-averaged max loss rate, Fm *****

PDB03282. out

SCS curve No. (AMCII)	SCS curve NO. (AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
66.0	66.0	2.00	1.000	0.593	1.000	0.593

Area-averaged adjusted loss rate Fm (In/Hr) = 0.593

***** Area-Averaged low loss rate fraction, Yb *****

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
2.00	1.000	66.0	66.0	5.15	0.400

Area-averaged catchment yield fraction, Y = 0.400

Area-averaged low loss fraction, Yb = 0.600

User entry of time of concentration = 0.123 (hours)

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Watershed area = 2.00(Ac.)

Catchment Lag time = 0.098 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 84.6883

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.593(In/Hr)

Average low loss rate fraction (Yb) = 0.600 (decimal)

FOOTHILL S-Graph Selected

Computed peak 5-minute rainfall = 0.916(In)

Computed peak 30-minute rainfall = 1.568(In)

Specified peak 1-hour rainfall = 1.930(In)

Computed peak 3-hour rainfall = 2.765(In)

Specified peak 6-hour rainfall = 3.470(In)

Specified peak 24-hour rainfall = 5.880(In)

Rainfall depth area reduction factors:

Using a total area of 2.00(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000	Adjusted rainfall = 0.916(In)
30-minute factor = 1.000	Adjusted rainfall = 1.568(In)
1-hour factor = 1.000	Adjusted rainfall = 1.930(In)
3-hour factor = 1.000	Adjusted rainfall = 2.765(In)
6-hour factor = 1.000	Adjusted rainfall = 3.470(In)
24-hour factor = 1.000	Adjusted rainfall = 5.880(In)

Unit Hydrograph

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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
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(K = 24.19 (CFS))

1	10.010	2.421
2	61.068	12.350
3	83.735	5.483
4	92.912	2.220
5	97.220	1.042
6	98.648	0.345
7	99.324	0.164
8	99.830	0.122
9	100.000	0.041

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.9157	0.9157

PDB03282. out

2	1. 1274	0. 2117
3	1. 2732	0. 1458
4	1. 3880	0. 1148
5	1. 4841	0. 0961
6	1. 5675	0. 0834
7	1. 6417	0. 0742
8	1. 7088	0. 0671
9	1. 7703	0. 0615
10	1. 8271	0. 0568
11	1. 8801	0. 0530
12	1. 9298	0. 0497
13	1. 9811	0. 0513
14	2. 0297	0. 0487
15	2. 0761	0. 0464
16	2. 1205	0. 0443
17	2. 1630	0. 0425
18	2. 2039	0. 0409
19	2. 2432	0. 0394
20	2. 2812	0. 0380
21	2. 3180	0. 0367
22	2. 3535	0. 0356
23	2. 3881	0. 0345
24	2. 4216	0. 0335
25	2. 4542	0. 0326
26	2. 4859	0. 0317
27	2. 5168	0. 0309
28	2. 5470	0. 0302
29	2. 5764	0. 0294
30	2. 6052	0. 0288
31	2. 6333	0. 0281
32	2. 6608	0. 0275
33	2. 6878	0. 0269
34	2. 7142	0. 0264
35	2. 7400	0. 0259
36	2. 7654	0. 0254
37	2. 7904	0. 0249
38	2. 8148	0. 0245
39	2. 8389	0. 0240
40	2. 8625	0. 0236
41	2. 8857	0. 0232
42	2. 9086	0. 0229
43	2. 9311	0. 0225
44	2. 9532	0. 0221
45	2. 9751	0. 0218
46	2. 9965	0. 0215
47	3. 0177	0. 0212
48	3. 0386	0. 0209
49	3. 0592	0. 0206
50	3. 0795	0. 0203
51	3. 0995	0. 0200
52	3. 1193	0. 0198
53	3. 1388	0. 0195
54	3. 1581	0. 0193
55	3. 1771	0. 0190
56	3. 1959	0. 0188
57	3. 2145	0. 0186
58	3. 2328	0. 0184
59	3. 2510	0. 0181
60	3. 2689	0. 0179
61	3. 2866	0. 0177
62	3. 3042	0. 0175
63	3. 3215	0. 0174
64	3. 3387	0. 0172

PDB03282. out

65	3. 3557	0. 0170
66	3. 3725	0. 0168
67	3. 3892	0. 0166
68	3. 4056	0. 0165
69	3. 4220	0. 0163
70	3. 4381	0. 0162
71	3. 4541	0. 0160
72	3. 4700	0. 0159
73	3. 4882	0. 0183
74	3. 5063	0. 0181
75	3. 5243	0. 0180
76	3. 5421	0. 0178
77	3. 5598	0. 0177
78	3. 5773	0. 0175
79	3. 5946	0. 0174
80	3. 6119	0. 0172
81	3. 6290	0. 0171
82	3. 6460	0. 0170
83	3. 6628	0. 0169
84	3. 6796	0. 0167
85	3. 6962	0. 0166
86	3. 7126	0. 0165
87	3. 7290	0. 0164
88	3. 7453	0. 0162
89	3. 7614	0. 0161
90	3. 7774	0. 0160
91	3. 7933	0. 0159
92	3. 8091	0. 0158
93	3. 8248	0. 0157
94	3. 8404	0. 0156
95	3. 8559	0. 0155
96	3. 8713	0. 0154
97	3. 8866	0. 0153
98	3. 9018	0. 0152
99	3. 9169	0. 0151
100	3. 9319	0. 0150
101	3. 9468	0. 0149
102	3. 9616	0. 0148
103	3. 9764	0. 0147
104	3. 9910	0. 0146
105	4. 0056	0. 0146
106	4. 0200	0. 0145
107	4. 0344	0. 0144
108	4. 0487	0. 0143
109	4. 0630	0. 0142
110	4. 0771	0. 0141
111	4. 0912	0. 0141
112	4. 1051	0. 0140
113	4. 1190	0. 0139
114	4. 1329	0. 0138
115	4. 1466	0. 0138
116	4. 1603	0. 0137
117	4. 1739	0. 0136
118	4. 1875	0. 0135
119	4. 2009	0. 0135
120	4. 2143	0. 0134
121	4. 2276	0. 0133
122	4. 2409	0. 0133
123	4. 2541	0. 0132
124	4. 2672	0. 0131
125	4. 2803	0. 0131
126	4. 2933	0. 0130
127	4. 3062	0. 0129

PDB03282. out

128	4. 3191	0. 0129
129	4. 3319	0. 0128
130	4. 3446	0. 0127
131	4. 3573	0. 0127
132	4. 3699	0. 0126
133	4. 3825	0. 0126
134	4. 3950	0. 0125
135	4. 4075	0. 0124
136	4. 4199	0. 0124
137	4. 4322	0. 0123
138	4. 4445	0. 0123
139	4. 4567	0. 0122
140	4. 4689	0. 0122
141	4. 4810	0. 0121
142	4. 4930	0. 0121
143	4. 5051	0. 0120
144	4. 5170	0. 0120
145	4. 5289	0. 0119
146	4. 5408	0. 0119
147	4. 5526	0. 0118
148	4. 5643	0. 0118
149	4. 5761	0. 0117
150	4. 5877	0. 0117
151	4. 5993	0. 0116
152	4. 6109	0. 0116
153	4. 6224	0. 0115
154	4. 6339	0. 0115
155	4. 6453	0. 0114
156	4. 6567	0. 0114
157	4. 6680	0. 0113
158	4. 6793	0. 0113
159	4. 6905	0. 0112
160	4. 7018	0. 0112
161	4. 7129	0. 0112
162	4. 7240	0. 0111
163	4. 7351	0. 0111
164	4. 7461	0. 0110
165	4. 7571	0. 0110
166	4. 7681	0. 0109
167	4. 7790	0. 0109
168	4. 7898	0. 0109
169	4. 8007	0. 0108
170	4. 8115	0. 0108
171	4. 8222	0. 0107
172	4. 8329	0. 0107
173	4. 8436	0. 0107
174	4. 8542	0. 0106
175	4. 8648	0. 0106
176	4. 8754	0. 0106
177	4. 8859	0. 0105
178	4. 8964	0. 0105
179	4. 9068	0. 0104
180	4. 9172	0. 0104
181	4. 9276	0. 0104
182	4. 9379	0. 0103
183	4. 9482	0. 0103
184	4. 9585	0. 0103
185	4. 9688	0. 0102
186	4. 9790	0. 0102
187	4. 9891	0. 0102
188	4. 9993	0. 0101
189	5. 0094	0. 0101
190	5. 0194	0. 0101

PDB03282. out

191	5. 0295	0. 0100
192	5. 0395	0. 0100
193	5. 0494	0. 0100
194	5. 0594	0. 0099
195	5. 0693	0. 0099
196	5. 0791	0. 0099
197	5. 0890	0. 0098
198	5. 0988	0. 0098
199	5. 1086	0. 0098
200	5. 1183	0. 0098
201	5. 1281	0. 0097
202	5. 1377	0. 0097
203	5. 1474	0. 0097
204	5. 1570	0. 0096
205	5. 1666	0. 0096
206	5. 1762	0. 0096
207	5. 1858	0. 0095
208	5. 1953	0. 0095
209	5. 2048	0. 0095
210	5. 2142	0. 0095
211	5. 2237	0. 0094
212	5. 2331	0. 0094
213	5. 2424	0. 0094
214	5. 2518	0. 0094
215	5. 2611	0. 0093
216	5. 2704	0. 0093
217	5. 2797	0. 0093
218	5. 2889	0. 0092
219	5. 2981	0. 0092
220	5. 3073	0. 0092
221	5. 3165	0. 0092
222	5. 3256	0. 0091
223	5. 3347	0. 0091
224	5. 3438	0. 0091
225	5. 3529	0. 0091
226	5. 3619	0. 0090
227	5. 3710	0. 0090
228	5. 3799	0. 0090
229	5. 3889	0. 0090
230	5. 3978	0. 0089
231	5. 4068	0. 0089
232	5. 4157	0. 0089
233	5. 4245	0. 0089
234	5. 4334	0. 0088
235	5. 4422	0. 0088
236	5. 4510	0. 0088
237	5. 4598	0. 0088
238	5. 4685	0. 0088
239	5. 4772	0. 0087
240	5. 4860	0. 0087
241	5. 4946	0. 0087
242	5. 5033	0. 0087
243	5. 5119	0. 0086
244	5. 5206	0. 0086
245	5. 5292	0. 0086
246	5. 5377	0. 0086
247	5. 5463	0. 0086
248	5. 5548	0. 0085
249	5. 5633	0. 0085
250	5. 5718	0. 0085
251	5. 5803	0. 0085
252	5. 5887	0. 0084
253	5. 5972	0. 0084

PDB03282. out

254	5. 6056	0. 0084
255	5. 6140	0. 0084
256	5. 6223	0. 0084
257	5. 6307	0. 0083
258	5. 6390	0. 0083
259	5. 6473	0. 0083
260	5. 6556	0. 0083
261	5. 6638	0. 0083
262	5. 6721	0. 0082
263	5. 6803	0. 0082
264	5. 6885	0. 0082
265	5. 6967	0. 0082
266	5. 7049	0. 0082
267	5. 7130	0. 0081
268	5. 7212	0. 0081
269	5. 7293	0. 0081
270	5. 7374	0. 0081
271	5. 7454	0. 0081
272	5. 7535	0. 0081
273	5. 7615	0. 0080
274	5. 7696	0. 0080
275	5. 7776	0. 0080
276	5. 7855	0. 0080
277	5. 7935	0. 0080
278	5. 8015	0. 0079
279	5. 8094	0. 0079
280	5. 8173	0. 0079
281	5. 8252	0. 0079
282	5. 8331	0. 0079
283	5. 8409	0. 0079
284	5. 8488	0. 0078
285	5. 8566	0. 0078
286	5. 8644	0. 0078
287	5. 8722	0. 0078
288	5. 8800	0. 0078

Unit Period (number)	Unit Rainfall (In)	Unit Soil - Loss (In)	Effective Rainfall (In)
1	0. 0078	0. 0047	0. 0031
2	0. 0078	0. 0047	0. 0031
3	0. 0078	0. 0047	0. 0031
4	0. 0078	0. 0047	0. 0031
5	0. 0079	0. 0047	0. 0032
6	0. 0079	0. 0047	0. 0032
7	0. 0079	0. 0048	0. 0032
8	0. 0079	0. 0048	0. 0032
9	0. 0080	0. 0048	0. 0032
10	0. 0080	0. 0048	0. 0032
11	0. 0080	0. 0048	0. 0032
12	0. 0081	0. 0048	0. 0032
13	0. 0081	0. 0049	0. 0032
14	0. 0081	0. 0049	0. 0032
15	0. 0081	0. 0049	0. 0033
16	0. 0082	0. 0049	0. 0033
17	0. 0082	0. 0049	0. 0033
18	0. 0082	0. 0049	0. 0033
19	0. 0083	0. 0050	0. 0033
20	0. 0083	0. 0050	0. 0033
21	0. 0083	0. 0050	0. 0033
22	0. 0083	0. 0050	0. 0033
23	0. 0084	0. 0050	0. 0034

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24	0. 0084	0. 0050	0. 0034
25	0. 0084	0. 0051	0. 0034
26	0. 0085	0. 0051	0. 0034
27	0. 0085	0. 0051	0. 0034
28	0. 0085	0. 0051	0. 0034
29	0. 0086	0. 0051	0. 0034
30	0. 0086	0. 0052	0. 0034
31	0. 0086	0. 0052	0. 0035
32	0. 0087	0. 0052	0. 0035
33	0. 0087	0. 0052	0. 0035
34	0. 0087	0. 0052	0. 0035
35	0. 0088	0. 0053	0. 0035
36	0. 0088	0. 0053	0. 0035
37	0. 0088	0. 0053	0. 0035
38	0. 0089	0. 0053	0. 0035
39	0. 0089	0. 0054	0. 0036
40	0. 0089	0. 0054	0. 0036
41	0. 0090	0. 0054	0. 0036
42	0. 0090	0. 0054	0. 0036
43	0. 0091	0. 0054	0. 0036
44	0. 0091	0. 0055	0. 0036
45	0. 0091	0. 0055	0. 0037
46	0. 0092	0. 0055	0. 0037
47	0. 0092	0. 0055	0. 0037
48	0. 0092	0. 0055	0. 0037
49	0. 0093	0. 0056	0. 0037
50	0. 0093	0. 0056	0. 0037
51	0. 0094	0. 0056	0. 0038
52	0. 0094	0. 0056	0. 0038
53	0. 0095	0. 0057	0. 0038
54	0. 0095	0. 0057	0. 0038
55	0. 0095	0. 0057	0. 0038
56	0. 0096	0. 0057	0. 0038
57	0. 0096	0. 0058	0. 0039
58	0. 0097	0. 0058	0. 0039
59	0. 0097	0. 0058	0. 0039
60	0. 0098	0. 0059	0. 0039
61	0. 0098	0. 0059	0. 0039
62	0. 0098	0. 0059	0. 0039
63	0. 0099	0. 0059	0. 0040
64	0. 0099	0. 0060	0. 0040
65	0. 0100	0. 0060	0. 0040
66	0. 0100	0. 0060	0. 0040
67	0. 0101	0. 0061	0. 0040
68	0. 0101	0. 0061	0. 0041
69	0. 0102	0. 0061	0. 0041
70	0. 0102	0. 0061	0. 0041
71	0. 0103	0. 0062	0. 0041
72	0. 0103	0. 0062	0. 0041
73	0. 0104	0. 0062	0. 0042
74	0. 0104	0. 0063	0. 0042
75	0. 0105	0. 0063	0. 0042
76	0. 0106	0. 0063	0. 0042
77	0. 0106	0. 0064	0. 0043
78	0. 0107	0. 0064	0. 0043
79	0. 0107	0. 0064	0. 0043
80	0. 0108	0. 0065	0. 0043
81	0. 0109	0. 0065	0. 0043
82	0. 0109	0. 0065	0. 0044
83	0. 0110	0. 0066	0. 0044
84	0. 0110	0. 0066	0. 0044
85	0. 0111	0. 0067	0. 0044
86	0. 0112	0. 0067	0. 0045

PDB03282. out

87	0. 0112	0. 0067	0. 0045
88	0. 0113	0. 0068	0. 0045
89	0. 0114	0. 0068	0. 0046
90	0. 0114	0. 0069	0. 0046
91	0. 0115	0. 0069	0. 0046
92	0. 0116	0. 0069	0. 0046
93	0. 0117	0. 0070	0. 0047
94	0. 0117	0. 0070	0. 0047
95	0. 0118	0. 0071	0. 0047
96	0. 0119	0. 0071	0. 0047
97	0. 0120	0. 0072	0. 0048
98	0. 0120	0. 0072	0. 0048
99	0. 0121	0. 0073	0. 0048
100	0. 0122	0. 0073	0. 0049
101	0. 0123	0. 0074	0. 0049
102	0. 0123	0. 0074	0. 0049
103	0. 0124	0. 0075	0. 0050
104	0. 0125	0. 0075	0. 0050
105	0. 0126	0. 0076	0. 0050
106	0. 0127	0. 0076	0. 0051
107	0. 0128	0. 0077	0. 0051
108	0. 0129	0. 0077	0. 0051
109	0. 0130	0. 0078	0. 0052
110	0. 0131	0. 0078	0. 0052
111	0. 0132	0. 0079	0. 0053
112	0. 0133	0. 0080	0. 0053
113	0. 0134	0. 0080	0. 0054
114	0. 0135	0. 0081	0. 0054
115	0. 0136	0. 0082	0. 0054
116	0. 0137	0. 0082	0. 0055
117	0. 0138	0. 0083	0. 0055
118	0. 0139	0. 0083	0. 0056
119	0. 0141	0. 0084	0. 0056
120	0. 0141	0. 0085	0. 0057
121	0. 0143	0. 0086	0. 0057
122	0. 0144	0. 0086	0. 0058
123	0. 0146	0. 0087	0. 0058
124	0. 0146	0. 0088	0. 0059
125	0. 0148	0. 0089	0. 0059
126	0. 0149	0. 0089	0. 0060
127	0. 0151	0. 0091	0. 0060
128	0. 0152	0. 0091	0. 0061
129	0. 0154	0. 0092	0. 0062
130	0. 0155	0. 0093	0. 0062
131	0. 0157	0. 0094	0. 0063
132	0. 0158	0. 0095	0. 0063
133	0. 0160	0. 0096	0. 0064
134	0. 0161	0. 0097	0. 0065
135	0. 0164	0. 0098	0. 0065
136	0. 0165	0. 0099	0. 0066
137	0. 0167	0. 0100	0. 0067
138	0. 0169	0. 0101	0. 0067
139	0. 0171	0. 0103	0. 0068
140	0. 0172	0. 0103	0. 0069
141	0. 0175	0. 0105	0. 0070
142	0. 0177	0. 0106	0. 0071
143	0. 0180	0. 0108	0. 0072
144	0. 0181	0. 0109	0. 0072
145	0. 0159	0. 0095	0. 0063
146	0. 0160	0. 0096	0. 0064
147	0. 0163	0. 0098	0. 0065
148	0. 0165	0. 0099	0. 0066
149	0. 0168	0. 0101	0. 0067

PDB03282. out

150	0. 0170	0. 0102	0. 0068
151	0. 0174	0. 0104	0. 0069
152	0. 0175	0. 0105	0. 0070
153	0. 0179	0. 0108	0. 0072
154	0. 0181	0. 0109	0. 0073
155	0. 0186	0. 0111	0. 0074
156	0. 0188	0. 0113	0. 0075
157	0. 0193	0. 0116	0. 0077
158	0. 0195	0. 0117	0. 0078
159	0. 0200	0. 0120	0. 0080
160	0. 0203	0. 0122	0. 0081
161	0. 0209	0. 0125	0. 0083
162	0. 0212	0. 0127	0. 0085
163	0. 0218	0. 0131	0. 0087
164	0. 0221	0. 0133	0. 0089
165	0. 0229	0. 0137	0. 0091
166	0. 0232	0. 0139	0. 0093
167	0. 0240	0. 0144	0. 0096
168	0. 0245	0. 0147	0. 0098
169	0. 0254	0. 0152	0. 0102
170	0. 0259	0. 0155	0. 0104
171	0. 0269	0. 0162	0. 0108
172	0. 0275	0. 0165	0. 0110
173	0. 0288	0. 0173	0. 0115
174	0. 0294	0. 0177	0. 0118
175	0. 0309	0. 0186	0. 0124
176	0. 0317	0. 0190	0. 0127
177	0. 0335	0. 0201	0. 0134
178	0. 0345	0. 0207	0. 0138
179	0. 0367	0. 0220	0. 0147
180	0. 0380	0. 0228	0. 0152
181	0. 0409	0. 0245	0. 0163
182	0. 0425	0. 0255	0. 0170
183	0. 0464	0. 0278	0. 0186
184	0. 0487	0. 0292	0. 0195
185	0. 0497	0. 0298	0. 0199
186	0. 0530	0. 0318	0. 0212
187	0. 0615	0. 0369	0. 0246
188	0. 0671	0. 0403	0. 0268
189	0. 0834	0. 0494	0. 0340
190	0. 0961	0. 0494	0. 0467
191	0. 1458	0. 0494	0. 0964
192	0. 2117	0. 0494	0. 1622
193	0. 9157	0. 0494	0. 8663
194	0. 1148	0. 0494	0. 0653
195	0. 0742	0. 0445	0. 0297
196	0. 0568	0. 0341	0. 0227
197	0. 0513	0. 0308	0. 0205
198	0. 0443	0. 0266	0. 0177
199	0. 0394	0. 0236	0. 0157
200	0. 0356	0. 0214	0. 0142
201	0. 0326	0. 0196	0. 0130
202	0. 0302	0. 0181	0. 0121
203	0. 0281	0. 0169	0. 0112
204	0. 0264	0. 0158	0. 0106
205	0. 0249	0. 0150	0. 0100
206	0. 0236	0. 0142	0. 0095
207	0. 0225	0. 0135	0. 0090
208	0. 0215	0. 0129	0. 0086
209	0. 0206	0. 0124	0. 0082
210	0. 0198	0. 0119	0. 0079
211	0. 0190	0. 0114	0. 0076
212	0. 0184	0. 0110	0. 0073

PDB03282. out

213	0. 0177	0. 0106	0. 0071
214	0. 0172	0. 0103	0. 0069
215	0. 0166	0. 0100	0. 0067
216	0. 0162	0. 0097	0. 0065
217	0. 0183	0. 0110	0. 0073
218	0. 0178	0. 0107	0. 0071
219	0. 0174	0. 0104	0. 0070
220	0. 0170	0. 0102	0. 0068
221	0. 0166	0. 0100	0. 0066
222	0. 0162	0. 0098	0. 0065
223	0. 0159	0. 0095	0. 0064
224	0. 0156	0. 0094	0. 0062
225	0. 0153	0. 0092	0. 0061
226	0. 0150	0. 0090	0. 0060
227	0. 0147	0. 0088	0. 0059
228	0. 0145	0. 0087	0. 0058
229	0. 0142	0. 0085	0. 0057
230	0. 0140	0. 0084	0. 0056
231	0. 0138	0. 0083	0. 0055
232	0. 0135	0. 0081	0. 0054
233	0. 0133	0. 0080	0. 0053
234	0. 0131	0. 0079	0. 0052
235	0. 0129	0. 0078	0. 0052
236	0. 0127	0. 0076	0. 0051
237	0. 0126	0. 0075	0. 0050
238	0. 0124	0. 0074	0. 0050
239	0. 0122	0. 0073	0. 0049
240	0. 0121	0. 0072	0. 0048
241	0. 0119	0. 0071	0. 0048
242	0. 0118	0. 0071	0. 0047
243	0. 0116	0. 0070	0. 0046
244	0. 0115	0. 0069	0. 0046
245	0. 0113	0. 0068	0. 0045
246	0. 0112	0. 0067	0. 0045
247	0. 0111	0. 0066	0. 0044
248	0. 0109	0. 0066	0. 0044
249	0. 0108	0. 0065	0. 0043
250	0. 0107	0. 0064	0. 0043
251	0. 0106	0. 0064	0. 0042
252	0. 0105	0. 0063	0. 0042
253	0. 0104	0. 0062	0. 0041
254	0. 0103	0. 0062	0. 0041
255	0. 0102	0. 0061	0. 0041
256	0. 0101	0. 0060	0. 0040
257	0. 0100	0. 0060	0. 0040
258	0. 0099	0. 0059	0. 0039
259	0. 0098	0. 0059	0. 0039
260	0. 0097	0. 0058	0. 0039
261	0. 0096	0. 0058	0. 0038
262	0. 0095	0. 0057	0. 0038
263	0. 0094	0. 0057	0. 0038
264	0. 0094	0. 0056	0. 0037
265	0. 0093	0. 0056	0. 0037
266	0. 0092	0. 0055	0. 0037
267	0. 0091	0. 0055	0. 0036
268	0. 0090	0. 0054	0. 0036
269	0. 0090	0. 0054	0. 0036
270	0. 0089	0. 0053	0. 0036
271	0. 0088	0. 0053	0. 0035
272	0. 0088	0. 0053	0. 0035
273	0. 0087	0. 0052	0. 0035
274	0. 0086	0. 0052	0. 0034
275	0. 0086	0. 0051	0. 0034

PDB03282. out

276	0.0085	0.0051	0.0034
277	0.0084	0.0051	0.0034
278	0.0084	0.0050	0.0033
279	0.0083	0.0050	0.0033
280	0.0082	0.0049	0.0033
281	0.0082	0.0049	0.0033
282	0.0081	0.0049	0.0033
283	0.0081	0.0048	0.0032
284	0.0080	0.0048	0.0032
285	0.0080	0.0048	0.0032
286	0.0079	0.0047	0.0032
287	0.0079	0.0047	0.0031
288	0.0078	0.0047	0.0031

 Total soil rain loss = 2.88(In)
 Total effective rainfall = 3.00(In)
 Peak flow rate in flood hydrograph = 12.03(CFS)

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24 - H O U R S T O R M
 R u n o f f H y d r o g r a p h

 Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac. Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0001		0.01	Q				
0+10	0.0004		0.05	Q				
0+15	0.0008		0.06	Q				
0+20	0.0013		0.07	Q				
0+25	0.0018		0.07	Q				
0+30	0.0023		0.08	Q				
0+35	0.0028		0.08	Q				
0+40	0.0034		0.08	Q				
0+45	0.0039		0.08	Q				
0+50	0.0044		0.08	Q				
0+55	0.0050		0.08	Q				
1+ 0	0.0055		0.08	Q				
1+ 5	0.0060		0.08	Q				
1+10	0.0066		0.08	Q				
1+15	0.0071		0.08	Q				
1+20	0.0076		0.08	Q				
1+25	0.0082		0.08	Q				
1+30	0.0087		0.08	Q				
1+35	0.0093		0.08	Q				
1+40	0.0098		0.08	Q				
1+45	0.0104		0.08	Q				
1+50	0.0109		0.08	Q				
1+55	0.0115		0.08	Q				
2+ 0	0.0120		0.08	Q				
2+ 5	0.0126		0.08	QV				
2+10	0.0132		0.08	QV				
2+15	0.0137		0.08	QV				
2+20	0.0143		0.08	QV				
2+25	0.0149		0.08	QV				
2+30	0.0154		0.08	QV				
2+35	0.0160		0.08	QV				
2+40	0.0166		0.08	QV				
2+45	0.0172		0.08	QV				
2+50	0.0177		0.08	QV				
2+55	0.0183		0.08	QV				

3+ 0	0. 0189	0. 08	QV
3+ 5	0. 0195	0. 08	QV
3+10	0. 0201	0. 09	QV
3+15	0. 0207	0. 09	QV
3+20	0. 0212	0. 09	QV
3+25	0. 0218	0. 09	QV
3+30	0. 0224	0. 09	QV
3+35	0. 0230	0. 09	QV
3+40	0. 0236	0. 09	QV
3+45	0. 0242	0. 09	QV
3+50	0. 0249	0. 09	QV
3+55	0. 0255	0. 09	Q V
4+ 0	0. 0261	0. 09	Q V
4+ 5	0. 0267	0. 09	Q V
4+10	0. 0273	0. 09	Q V
4+15	0. 0279	0. 09	Q V
4+20	0. 0286	0. 09	Q V
4+25	0. 0292	0. 09	Q V
4+30	0. 0298	0. 09	Q V
4+35	0. 0304	0. 09	Q V
4+40	0. 0311	0. 09	Q V
4+45	0. 0317	0. 09	Q V
4+50	0. 0323	0. 09	Q V
4+55	0. 0330	0. 09	Q V
5+ 0	0. 0336	0. 09	Q V
5+ 5	0. 0343	0. 09	Q V
5+10	0. 0349	0. 09	Q V
5+15	0. 0356	0. 10	Q V
5+20	0. 0362	0. 10	Q V
5+25	0. 0369	0. 10	Q V
5+30	0. 0376	0. 10	Q V
5+35	0. 0382	0. 10	Q V
5+40	0. 0389	0. 10	Q V
5+45	0. 0396	0. 10	Q V
5+50	0. 0403	0. 10	Q V
5+55	0. 0409	0. 10	Q V
6+ 0	0. 0416	0. 10	Q V
6+ 5	0. 0423	0. 10	Q V
6+10	0. 0430	0. 10	Q V
6+15	0. 0437	0. 10	Q V
6+20	0. 0444	0. 10	Q V
6+25	0. 0451	0. 10	Q V
6+30	0. 0458	0. 10	Q V
6+35	0. 0465	0. 10	Q V
6+40	0. 0472	0. 10	Q V
6+45	0. 0479	0. 10	Q V
6+50	0. 0487	0. 10	Q V
6+55	0. 0494	0. 11	Q V
7+ 0	0. 0501	0. 11	Q V
7+ 5	0. 0508	0. 11	Q V
7+10	0. 0516	0. 11	Q V
7+15	0. 0523	0. 11	Q V
7+20	0. 0531	0. 11	Q V
7+25	0. 0538	0. 11	Q V
7+30	0. 0546	0. 11	Q V
7+35	0. 0553	0. 11	Q V
7+40	0. 0561	0. 11	Q V
7+45	0. 0569	0. 11	Q V
7+50	0. 0576	0. 11	Q V
7+55	0. 0584	0. 11	Q V
8+ 0	0. 0592	0. 11	Q V
8+ 5	0. 0600	0. 11	Q V
8+10	0. 0608	0. 12	Q V

8+15	0. 0616	0. 12	Q	V
8+20	0. 0624	0. 12	Q	V
8+25	0. 0632	0. 12	Q	V
8+30	0. 0640	0. 12	Q	V
8+35	0. 0648	0. 12	Q	V
8+40	0. 0657	0. 12	Q	V
8+45	0. 0665	0. 12	Q	V
8+50	0. 0673	0. 12	Q	V
8+55	0. 0682	0. 12	Q	V
9+ 0	0. 0690	0. 12	Q	V
9+ 5	0. 0699	0. 12	Q	V
9+10	0. 0707	0. 13	Q	V
9+15	0. 0716	0. 13	Q	V
9+20	0. 0725	0. 13	Q	V
9+25	0. 0734	0. 13	Q	V
9+30	0. 0742	0. 13	Q	V
9+35	0. 0751	0. 13	Q	V
9+40	0. 0760	0. 13	Q	V
9+45	0. 0769	0. 13	Q	V
9+50	0. 0779	0. 13	Q	V
9+55	0. 0788	0. 13	Q	V
10+ 0	0. 0797	0. 14	Q	V
10+ 5	0. 0807	0. 14	Q	V
10+10	0. 0816	0. 14	Q	V
10+15	0. 0826	0. 14	Q	V
10+20	0. 0835	0. 14	Q	V
10+25	0. 0845	0. 14	Q	V
10+30	0. 0855	0. 14	Q	V
10+35	0. 0865	0. 14	Q	V
10+40	0. 0875	0. 15	Q	V
10+45	0. 0885	0. 15	Q	V
10+50	0. 0895	0. 15	Q	V
10+55	0. 0905	0. 15	Q	V
11+ 0	0. 0916	0. 15	Q	V
11+ 5	0. 0926	0. 15	Q	V
11+10	0. 0937	0. 15	Q	V
11+15	0. 0947	0. 16	Q	V
11+20	0. 0958	0. 16	Q	V
11+25	0. 0969	0. 16	Q	V
11+30	0. 0980	0. 16	Q	V
11+35	0. 0991	0. 16	Q	V
11+40	0. 1003	0. 16	Q	V
11+45	0. 1014	0. 17	Q	V
11+50	0. 1026	0. 17	Q	V
11+55	0. 1037	0. 17	Q	V
12+ 0	0. 1049	0. 17	Q	V
12+ 5	0. 1061	0. 17	Q	V
12+10	0. 1072	0. 16	Q	V
12+15	0. 1083	0. 16	Q	V
12+20	0. 1094	0. 16	Q	V
12+25	0. 1105	0. 16	Q	V
12+30	0. 1116	0. 16	Q	V
12+35	0. 1127	0. 16	Q	V
12+40	0. 1139	0. 17	Q	V
12+45	0. 1150	0. 17	Q	V
12+50	0. 1162	0. 17	Q	V
12+55	0. 1174	0. 17	Q	V
13+ 0	0. 1186	0. 18	Q	V
13+ 5	0. 1199	0. 18	Q	V
13+10	0. 1211	0. 18	Q	V
13+15	0. 1224	0. 19	Q	V
13+20	0. 1238	0. 19	Q	V
13+25	0. 1251	0. 19	Q	V

13+30	0. 1265	0. 20	Q	V			
13+35	0. 1279	0. 20	Q	V			
13+40	0. 1293	0. 21	Q	V			
13+45	0. 1308	0. 21	Q	V			
13+50	0. 1323	0. 22	Q	V			
13+55	0. 1338	0. 22	Q	V			
14+ 0	0. 1354	0. 23	Q	V			
14+ 5	0. 1370	0. 23	Q	V			
14+10	0. 1386	0. 24	Q	V			
14+15	0. 1403	0. 25	Q	V			
14+20	0. 1421	0. 26	Q	V			
14+25	0. 1439	0. 26	Q	V			
14+30	0. 1458	0. 27	Q	V			
14+35	0. 1477	0. 28	Q	V			
14+40	0. 1497	0. 29	Q	V			
14+45	0. 1518	0. 30	Q	V			
14+50	0. 1540	0. 32	Q	V			
14+55	0. 1563	0. 33	Q	V			
15+ 0	0. 1586	0. 34	Q	V			
15+ 5	0. 1611	0. 36	Q	V			
15+10	0. 1637	0. 38	Q	V			
15+15	0. 1665	0. 40	Q	V			
15+20	0. 1695	0. 43	Q	V			
15+25	0. 1726	0. 45	Q	V			
15+30	0. 1759	0. 47	Q	V			
15+35	0. 1793	0. 50	Q	V			
15+40	0. 1832	0. 56	Q	V			
15+45	0. 1875	0. 63	Q	V			
15+50	0. 1928	0. 77	Q	V			
15+55	0. 2004	1. 09	Q	V			
16+ 0	0. 2139	1. 96	Q	V			
16+ 5	0. 2468	4. 78	Q	V			
16+10	0. 3297	12. 03	Q	V			
16+15	0. 3718	6. 11	Q	V			
16+20	0. 3919	2. 92	Q	V			
16+25	0. 4030	1. 62	Q	V			
16+30	0. 4092	0. 89	Q	V			
16+35	0. 4136	0. 64	Q	V			
16+40	0. 4172	0. 53	Q	V			
16+45	0. 4200	0. 41	Q	V			
16+50	0. 4224	0. 34	Q	V			
16+55	0. 4245	0. 31	Q	V			
17+ 0	0. 4265	0. 29	Q	V			
17+ 5	0. 4283	0. 27	Q	V			
17+10	0. 4300	0. 25	Q	V			
17+15	0. 4317	0. 24	Q	V			
17+20	0. 4332	0. 22	Q	V			
17+25	0. 4347	0. 21	Q	V			
17+30	0. 4361	0. 20	Q	V			
17+35	0. 4375	0. 20	Q	V			
17+40	0. 4388	0. 19	Q	V			
17+45	0. 4400	0. 18	Q	V			
17+50	0. 4412	0. 18	Q	V			
17+55	0. 4424	0. 17	Q	V			
18+ 0	0. 4435	0. 16	Q	V			
18+ 5	0. 4446	0. 16	Q	V			
18+10	0. 4458	0. 17	Q	V			
18+15	0. 4470	0. 17	Q	V			
18+20	0. 4481	0. 17	Q	V			
18+25	0. 4493	0. 17	Q	V			
18+30	0. 4504	0. 16	Q	V			
18+35	0. 4515	0. 16	Q	V			
18+40	0. 4526	0. 16	Q	V			

18+45	0. 4536	0. 15	Q	V
18+50	0. 4547	0. 15	Q	V
18+55	0. 4557	0. 15	Q	V
19+ 0	0. 4567	0. 14	Q	V
19+ 5	0. 4576	0. 14	Q	V
19+10	0. 4586	0. 14	Q	V
19+15	0. 4595	0. 14	Q	V
19+20	0. 4605	0. 13	Q	V
19+25	0. 4614	0. 13	Q	V
19+30	0. 4623	0. 13	Q	V
19+35	0. 4631	0. 13	Q	V
19+40	0. 4640	0. 13	Q	V
19+45	0. 4649	0. 12	Q	V
19+50	0. 4657	0. 12	Q	V
19+55	0. 4666	0. 12	Q	V
20+ 0	0. 4674	0. 12	Q	V
20+ 5	0. 4682	0. 12	Q	V
20+10	0. 4690	0. 12	Q	V
20+15	0. 4698	0. 11	Q	V
20+20	0. 4706	0. 11	Q	V
20+25	0. 4713	0. 11	Q	V
20+30	0. 4721	0. 11	Q	V
20+35	0. 4728	0. 11	Q	V
20+40	0. 4736	0. 11	Q	V
20+45	0. 4743	0. 11	Q	V
20+50	0. 4750	0. 11	Q	V
20+55	0. 4758	0. 10	Q	V
21+ 0	0. 4765	0. 10	Q	V
21+ 5	0. 4772	0. 10	Q	V
21+10	0. 4779	0. 10	Q	V
21+15	0. 4785	0. 10	Q	V
21+20	0. 4792	0. 10	Q	V
21+25	0. 4799	0. 10	Q	V
21+30	0. 4806	0. 10	Q	V
21+35	0. 4812	0. 10	Q	V
21+40	0. 4819	0. 10	Q	V
21+45	0. 4825	0. 09	Q	V
21+50	0. 4832	0. 09	Q	V
21+55	0. 4838	0. 09	Q	V
22+ 0	0. 4845	0. 09	Q	V
22+ 5	0. 4851	0. 09	Q	V
22+10	0. 4857	0. 09	Q	V
22+15	0. 4863	0. 09	Q	V
22+20	0. 4869	0. 09	Q	V
22+25	0. 4875	0. 09	Q	V
22+30	0. 4881	0. 09	Q	V
22+35	0. 4887	0. 09	Q	V
22+40	0. 4893	0. 09	Q	V
22+45	0. 4899	0. 09	Q	V
22+50	0. 4905	0. 08	Q	V
22+55	0. 4911	0. 08	Q	V
23+ 0	0. 4916	0. 08	Q	V
23+ 5	0. 4922	0. 08	Q	V
23+10	0. 4928	0. 08	Q	V
23+15	0. 4933	0. 08	Q	V
23+20	0. 4939	0. 08	Q	V
23+25	0. 4944	0. 08	Q	V
23+30	0. 4950	0. 08	Q	V
23+35	0. 4955	0. 08	Q	V
23+40	0. 4961	0. 08	Q	V
23+45	0. 4966	0. 08	Q	V
23+50	0. 4971	0. 08	Q	V
23+55	0. 4977	0. 08	Q	V

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24+ 0	0. 4982	0. 08	Q				V
24+ 5	0. 4987	0. 07	Q				V
24+10	0. 4989	0. 03	Q				V
24+15	0. 4989	0. 01	Q				V
24+20	0. 4990	0. 01	Q				V
24+25	0. 4990	0. 00	Q				V
24+30	0. 4990	0. 00	Q				V
24+35	0. 4990	0. 00	Q				V
24+40	0. 4990	0. 00	Q				V

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Unit Hydrograph Analysis

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Study date 01/18/16

San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6296

HAWK RIDGE - AREA 3
100-YEAR 24-HOUR
EXISTING OFF SITE HYDROLOGY

Storm Event Year = 100

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Rainfall data for year	Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
10	0.43	1	1.00
2	0.43	6	1.13
2	0.43	24	1.87
100	0.43	1	1.93
100	0.43	6	3.47
100	0.43	24	5.88

***** Area-averaged max loss rate, Fm *****

SCS curve No. (AMCII)	SCS curve NO. (AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
66.0	66.0	0.43	1.000	0.593	1.000	0.593

Area-averaged adjusted loss rate Fm (In/Hr) = 0.593

***** Area-Averaged low loss rate fraction, Yb *****

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
0.43	1.000	66.0	66.0	5.15	0.400

Area-averaged catchment yield fraction, Y = 0.400

Area-averaged low loss fraction, Yb = 0.600

User entry of time of concentration = 0.069 (hours)

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Watershed area = 0.43(Ac.)

Catchment Lag time = 0.055 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 150.9662

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.593(In/Hr)

Average low loss rate fraction (Yb) = 0.600 (decimal)

FOOTHILL S-Graph Selected

Computed peak 5-minute rainfall = 0.916(In)

Computed peak 30-minute rainfall = 1.568(In)

Specified peak 1-hour rainfall = 1.930(In)

Computed peak 3-hour rainfall = 2.765(In)

Specified peak 6-hour rainfall = 3.470(In)

Specified peak 24-hour rainfall = 5.880(In)

Rainfall depth area reduction factors:

Using a total area of 0.43(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000	Adjusted rainfall = 0.916(In)
30-minute factor = 1.000	Adjusted rainfall = 1.568(In)
1-hour factor = 1.000	Adjusted rainfall = 1.930(In)
3-hour factor = 1.000	Adjusted rainfall = 2.765(In)
6-hour factor = 1.000	Adjusted rainfall = 3.470(In)
24-hour factor = 1.000	Adjusted rainfall = 5.880(In)

Unit Hydrograph

+++++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
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(K = 5.20 (CFS))

1	30.812	1.602
2	85.067	2.821
3	96.818	0.611
4	99.160	0.122
5	100.000	0.044

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.9158	0.9158
2	1.1275	0.2117
3	1.2733	0.1458
4	1.3881	0.1148
5	1.4842	0.0961

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6	1. 5676	0. 0834
7	1. 6418	0. 0742
8	1. 7089	0. 0671
9	1. 7704	0. 0615
10	1. 8272	0. 0569
11	1. 8802	0. 0530
12	1. 9300	0. 0497
13	1. 9812	0. 0512
14	2. 0299	0. 0487
15	2. 0762	0. 0464
16	2. 1206	0. 0443
17	2. 1631	0. 0425
18	2. 2040	0. 0409
19	2. 2433	0. 0394
20	2. 2813	0. 0380
21	2. 3181	0. 0367
22	2. 3536	0. 0356
23	2. 3881	0. 0345
24	2. 4217	0. 0335
25	2. 4542	0. 0326
26	2. 4860	0. 0317
27	2. 5169	0. 0309
28	2. 5470	0. 0301
29	2. 5765	0. 0294
30	2. 6052	0. 0288
31	2. 6333	0. 0281
32	2. 6609	0. 0275
33	2. 6878	0. 0269
34	2. 7142	0. 0264
35	2. 7401	0. 0259
36	2. 7655	0. 0254
37	2. 7904	0. 0249
38	2. 8149	0. 0245
39	2. 8389	0. 0240
40	2. 8625	0. 0236
41	2. 8858	0. 0232
42	2. 9086	0. 0229
43	2. 9311	0. 0225
44	2. 9533	0. 0221
45	2. 9751	0. 0218
46	2. 9966	0. 0215
47	3. 0177	0. 0212
48	3. 0386	0. 0209
49	3. 0592	0. 0206
50	3. 0795	0. 0203
51	3. 0995	0. 0200
52	3. 1193	0. 0198
53	3. 1388	0. 0195
54	3. 1581	0. 0193
55	3. 1771	0. 0190
56	3. 1959	0. 0188
57	3. 2145	0. 0186
58	3. 2328	0. 0184
59	3. 2510	0. 0181
60	3. 2689	0. 0179
61	3. 2867	0. 0177
62	3. 3042	0. 0175
63	3. 3216	0. 0174
64	3. 3387	0. 0172
65	3. 3557	0. 0170
66	3. 3725	0. 0168
67	3. 3892	0. 0166
68	3. 4057	0. 0165

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69	3. 4220	0. 0163
70	3. 4381	0. 0162
71	3. 4541	0. 0160
72	3. 4700	0. 0159
73	3. 4883	0. 0183
74	3. 5064	0. 0181
75	3. 5243	0. 0180
76	3. 5421	0. 0178
77	3. 5598	0. 0177
78	3. 5773	0. 0175
79	3. 5947	0. 0174
80	3. 6119	0. 0172
81	3. 6290	0. 0171
82	3. 6460	0. 0170
83	3. 6629	0. 0169
84	3. 6796	0. 0167
85	3. 6962	0. 0166
86	3. 7127	0. 0165
87	3. 7290	0. 0164
88	3. 7453	0. 0162
89	3. 7614	0. 0161
90	3. 7774	0. 0160
91	3. 7934	0. 0159
92	3. 8092	0. 0158
93	3. 8249	0. 0157
94	3. 8405	0. 0156
95	3. 8559	0. 0155
96	3. 8713	0. 0154
97	3. 8866	0. 0153
98	3. 9018	0. 0152
99	3. 9169	0. 0151
100	3. 9319	0. 0150
101	3. 9468	0. 0149
102	3. 9617	0. 0148
103	3. 9764	0. 0147
104	3. 9910	0. 0146
105	4. 0056	0. 0146
106	4. 0201	0. 0145
107	4. 0344	0. 0144
108	4. 0488	0. 0143
109	4. 0630	0. 0142
110	4. 0771	0. 0141
111	4. 0912	0. 0141
112	4. 1052	0. 0140
113	4. 1191	0. 0139
114	4. 1329	0. 0138
115	4. 1466	0. 0138
116	4. 1603	0. 0137
117	4. 1739	0. 0136
118	4. 1875	0. 0135
119	4. 2009	0. 0135
120	4. 2143	0. 0134
121	4. 2277	0. 0133
122	4. 2409	0. 0133
123	4. 2541	0. 0132
124	4. 2672	0. 0131
125	4. 2803	0. 0131
126	4. 2933	0. 0130
127	4. 3062	0. 0129
128	4. 3191	0. 0129
129	4. 3319	0. 0128
130	4. 3446	0. 0127
131	4. 3573	0. 0127

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132	4. 3700	0. 0126
133	4. 3825	0. 0126
134	4. 3950	0. 0125
135	4. 4075	0. 0124
136	4. 4199	0. 0124
137	4. 4322	0. 0123
138	4. 4445	0. 0123
139	4. 4567	0. 0122
140	4. 4689	0. 0122
141	4. 4810	0. 0121
142	4. 4931	0. 0121
143	4. 5051	0. 0120
144	4. 5170	0. 0120
145	4. 5289	0. 0119
146	4. 5408	0. 0119
147	4. 5526	0. 0118
148	4. 5644	0. 0118
149	4. 5761	0. 0117
150	4. 5877	0. 0117
151	4. 5993	0. 0116
152	4. 6109	0. 0116
153	4. 6224	0. 0115
154	4. 6339	0. 0115
155	4. 6453	0. 0114
156	4. 6567	0. 0114
157	4. 6680	0. 0113
158	4. 6793	0. 0113
159	4. 6906	0. 0112
160	4. 7018	0. 0112
161	4. 7129	0. 0112
162	4. 7240	0. 0111
163	4. 7351	0. 0111
164	4. 7461	0. 0110
165	4. 7571	0. 0110
166	4. 7681	0. 0109
167	4. 7790	0. 0109
168	4. 7899	0. 0109
169	4. 8007	0. 0108
170	4. 8115	0. 0108
171	4. 8222	0. 0107
172	4. 8329	0. 0107
173	4. 8436	0. 0107
174	4. 8542	0. 0106
175	4. 8648	0. 0106
176	4. 8754	0. 0106
177	4. 8859	0. 0105
178	4. 8964	0. 0105
179	4. 9068	0. 0104
180	4. 9172	0. 0104
181	4. 9276	0. 0104
182	4. 9380	0. 0103
183	4. 9483	0. 0103
184	4. 9585	0. 0103
185	4. 9688	0. 0102
186	4. 9790	0. 0102
187	4. 9891	0. 0102
188	4. 9993	0. 0101
189	5. 0094	0. 0101
190	5. 0194	0. 0101
191	5. 0295	0. 0100
192	5. 0395	0. 0100
193	5. 0494	0. 0100
194	5. 0594	0. 0099

PDB03283. out

195	5. 0693	0. 0099
196	5. 0792	0. 0099
197	5. 0890	0. 0098
198	5. 0988	0. 0098
199	5. 1086	0. 0098
200	5. 1183	0. 0098
201	5. 1281	0. 0097
202	5. 1378	0. 0097
203	5. 1474	0. 0097
204	5. 1571	0. 0096
205	5. 1667	0. 0096
206	5. 1762	0. 0096
207	5. 1858	0. 0095
208	5. 1953	0. 0095
209	5. 2048	0. 0095
210	5. 2142	0. 0095
211	5. 2237	0. 0094
212	5. 2331	0. 0094
213	5. 2425	0. 0094
214	5. 2518	0. 0093
215	5. 2611	0. 0093
216	5. 2704	0. 0093
217	5. 2797	0. 0093
218	5. 2889	0. 0092
219	5. 2982	0. 0092
220	5. 3073	0. 0092
221	5. 3165	0. 0092
222	5. 3256	0. 0091
223	5. 3348	0. 0091
224	5. 3438	0. 0091
225	5. 3529	0. 0091
226	5. 3619	0. 0090
227	5. 3710	0. 0090
228	5. 3800	0. 0090
229	5. 3889	0. 0090
230	5. 3979	0. 0089
231	5. 4068	0. 0089
232	5. 4157	0. 0089
233	5. 4245	0. 0089
234	5. 4334	0. 0088
235	5. 4422	0. 0088
236	5. 4510	0. 0088
237	5. 4598	0. 0088
238	5. 4685	0. 0088
239	5. 4773	0. 0087
240	5. 4860	0. 0087
241	5. 4947	0. 0087
242	5. 5033	0. 0087
243	5. 5120	0. 0086
244	5. 5206	0. 0086
245	5. 5292	0. 0086
246	5. 5377	0. 0086
247	5. 5463	0. 0086
248	5. 5548	0. 0085
249	5. 5633	0. 0085
250	5. 5718	0. 0085
251	5. 5803	0. 0085
252	5. 5887	0. 0084
253	5. 5972	0. 0084
254	5. 6056	0. 0084
255	5. 6140	0. 0084
256	5. 6223	0. 0084
257	5. 6307	0. 0083

PDB03283. out

258	5. 6390	0. 0083
259	5. 6473	0. 0083
260	5. 6556	0. 0083
261	5. 6639	0. 0083
262	5. 6721	0. 0082
263	5. 6803	0. 0082
264	5. 6885	0. 0082
265	5. 6967	0. 0082
266	5. 7049	0. 0082
267	5. 7130	0. 0081
268	5. 7212	0. 0081
269	5. 7293	0. 0081
270	5. 7374	0. 0081
271	5. 7455	0. 0081
272	5. 7535	0. 0081
273	5. 7616	0. 0080
274	5. 7696	0. 0080
275	5. 7776	0. 0080
276	5. 7856	0. 0080
277	5. 7935	0. 0080
278	5. 8015	0. 0079
279	5. 8094	0. 0079
280	5. 8173	0. 0079
281	5. 8252	0. 0079
282	5. 8331	0. 0079
283	5. 8409	0. 0079
284	5. 8488	0. 0078
285	5. 8566	0. 0078
286	5. 8644	0. 0078
287	5. 8722	0. 0078
288	5. 8800	0. 0078

Unit Period (number)	Unit Rainfall (In)	Unit Soil - Loss (In)	Effective Rainfall (In)
1	0. 0078	0. 0047	0. 0031
2	0. 0078	0. 0047	0. 0031
3	0. 0078	0. 0047	0. 0031
4	0. 0078	0. 0047	0. 0031
5	0. 0079	0. 0047	0. 0032
6	0. 0079	0. 0047	0. 0032
7	0. 0079	0. 0048	0. 0032
8	0. 0079	0. 0048	0. 0032
9	0. 0080	0. 0048	0. 0032
10	0. 0080	0. 0048	0. 0032
11	0. 0080	0. 0048	0. 0032
12	0. 0081	0. 0048	0. 0032
13	0. 0081	0. 0049	0. 0032
14	0. 0081	0. 0049	0. 0032
15	0. 0081	0. 0049	0. 0033
16	0. 0082	0. 0049	0. 0033
17	0. 0082	0. 0049	0. 0033
18	0. 0082	0. 0049	0. 0033
19	0. 0083	0. 0050	0. 0033
20	0. 0083	0. 0050	0. 0033
21	0. 0083	0. 0050	0. 0033
22	0. 0083	0. 0050	0. 0033
23	0. 0084	0. 0050	0. 0034
24	0. 0084	0. 0050	0. 0034
25	0. 0084	0. 0051	0. 0034
26	0. 0085	0. 0051	0. 0034
27	0. 0085	0. 0051	0. 0034

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28	0. 0085	0. 0051	0. 0034
29	0. 0086	0. 0051	0. 0034
30	0. 0086	0. 0052	0. 0034
31	0. 0086	0. 0052	0. 0035
32	0. 0087	0. 0052	0. 0035
33	0. 0087	0. 0052	0. 0035
34	0. 0087	0. 0052	0. 0035
35	0. 0088	0. 0053	0. 0035
36	0. 0088	0. 0053	0. 0035
37	0. 0088	0. 0053	0. 0035
38	0. 0089	0. 0053	0. 0035
39	0. 0089	0. 0054	0. 0036
40	0. 0089	0. 0054	0. 0036
41	0. 0090	0. 0054	0. 0036
42	0. 0090	0. 0054	0. 0036
43	0. 0091	0. 0054	0. 0036
44	0. 0091	0. 0055	0. 0036
45	0. 0091	0. 0055	0. 0037
46	0. 0092	0. 0055	0. 0037
47	0. 0092	0. 0055	0. 0037
48	0. 0092	0. 0055	0. 0037
49	0. 0093	0. 0056	0. 0037
50	0. 0093	0. 0056	0. 0037
51	0. 0094	0. 0056	0. 0038
52	0. 0094	0. 0056	0. 0038
53	0. 0095	0. 0057	0. 0038
54	0. 0095	0. 0057	0. 0038
55	0. 0095	0. 0057	0. 0038
56	0. 0096	0. 0057	0. 0038
57	0. 0096	0. 0058	0. 0039
58	0. 0097	0. 0058	0. 0039
59	0. 0097	0. 0058	0. 0039
60	0. 0098	0. 0059	0. 0039
61	0. 0098	0. 0059	0. 0039
62	0. 0098	0. 0059	0. 0039
63	0. 0099	0. 0059	0. 0040
64	0. 0099	0. 0060	0. 0040
65	0. 0100	0. 0060	0. 0040
66	0. 0100	0. 0060	0. 0040
67	0. 0101	0. 0061	0. 0040
68	0. 0101	0. 0061	0. 0041
69	0. 0102	0. 0061	0. 0041
70	0. 0102	0. 0061	0. 0041
71	0. 0103	0. 0062	0. 0041
72	0. 0103	0. 0062	0. 0041
73	0. 0104	0. 0062	0. 0042
74	0. 0104	0. 0063	0. 0042
75	0. 0105	0. 0063	0. 0042
76	0. 0106	0. 0063	0. 0042
77	0. 0106	0. 0064	0. 0043
78	0. 0107	0. 0064	0. 0043
79	0. 0107	0. 0064	0. 0043
80	0. 0108	0. 0065	0. 0043
81	0. 0109	0. 0065	0. 0043
82	0. 0109	0. 0065	0. 0044
83	0. 0110	0. 0066	0. 0044
84	0. 0110	0. 0066	0. 0044
85	0. 0111	0. 0067	0. 0044
86	0. 0112	0. 0067	0. 0045
87	0. 0112	0. 0067	0. 0045
88	0. 0113	0. 0068	0. 0045
89	0. 0114	0. 0068	0. 0046
90	0. 0114	0. 0069	0. 0046

PDB03283. out

91	0. 0115	0. 0069	0. 0046
92	0. 0116	0. 0069	0. 0046
93	0. 0117	0. 0070	0. 0047
94	0. 0117	0. 0070	0. 0047
95	0. 0118	0. 0071	0. 0047
96	0. 0119	0. 0071	0. 0047
97	0. 0120	0. 0072	0. 0048
98	0. 0120	0. 0072	0. 0048
99	0. 0121	0. 0073	0. 0048
100	0. 0122	0. 0073	0. 0049
101	0. 0123	0. 0074	0. 0049
102	0. 0123	0. 0074	0. 0049
103	0. 0124	0. 0075	0. 0050
104	0. 0125	0. 0075	0. 0050
105	0. 0126	0. 0076	0. 0050
106	0. 0127	0. 0076	0. 0051
107	0. 0128	0. 0077	0. 0051
108	0. 0129	0. 0077	0. 0051
109	0. 0130	0. 0078	0. 0052
110	0. 0131	0. 0078	0. 0052
111	0. 0132	0. 0079	0. 0053
112	0. 0133	0. 0080	0. 0053
113	0. 0134	0. 0080	0. 0054
114	0. 0135	0. 0081	0. 0054
115	0. 0136	0. 0082	0. 0054
116	0. 0137	0. 0082	0. 0055
117	0. 0138	0. 0083	0. 0055
118	0. 0139	0. 0083	0. 0056
119	0. 0141	0. 0084	0. 0056
120	0. 0141	0. 0085	0. 0057
121	0. 0143	0. 0086	0. 0057
122	0. 0144	0. 0086	0. 0058
123	0. 0146	0. 0087	0. 0058
124	0. 0146	0. 0088	0. 0059
125	0. 0148	0. 0089	0. 0059
126	0. 0149	0. 0089	0. 0060
127	0. 0151	0. 0091	0. 0060
128	0. 0152	0. 0091	0. 0061
129	0. 0154	0. 0092	0. 0062
130	0. 0155	0. 0093	0. 0062
131	0. 0157	0. 0094	0. 0063
132	0. 0158	0. 0095	0. 0063
133	0. 0160	0. 0096	0. 0064
134	0. 0161	0. 0097	0. 0065
135	0. 0164	0. 0098	0. 0065
136	0. 0165	0. 0099	0. 0066
137	0. 0167	0. 0100	0. 0067
138	0. 0169	0. 0101	0. 0067
139	0. 0171	0. 0103	0. 0068
140	0. 0172	0. 0103	0. 0069
141	0. 0175	0. 0105	0. 0070
142	0. 0177	0. 0106	0. 0071
143	0. 0180	0. 0108	0. 0072
144	0. 0181	0. 0109	0. 0072
145	0. 0159	0. 0095	0. 0063
146	0. 0160	0. 0096	0. 0064
147	0. 0163	0. 0098	0. 0065
148	0. 0165	0. 0099	0. 0066
149	0. 0168	0. 0101	0. 0067
150	0. 0170	0. 0102	0. 0068
151	0. 0174	0. 0104	0. 0069
152	0. 0175	0. 0105	0. 0070
153	0. 0179	0. 0108	0. 0072

PDB03283. out

154	0. 0181	0. 0109	0. 0073
155	0. 0186	0. 0111	0. 0074
156	0. 0188	0. 0113	0. 0075
157	0. 0193	0. 0116	0. 0077
158	0. 0195	0. 0117	0. 0078
159	0. 0200	0. 0120	0. 0080
160	0. 0203	0. 0122	0. 0081
161	0. 0209	0. 0125	0. 0083
162	0. 0212	0. 0127	0. 0085
163	0. 0218	0. 0131	0. 0087
164	0. 0221	0. 0133	0. 0089
165	0. 0229	0. 0137	0. 0091
166	0. 0232	0. 0139	0. 0093
167	0. 0240	0. 0144	0. 0096
168	0. 0245	0. 0147	0. 0098
169	0. 0254	0. 0152	0. 0102
170	0. 0259	0. 0155	0. 0104
171	0. 0269	0. 0162	0. 0108
172	0. 0275	0. 0165	0. 0110
173	0. 0288	0. 0173	0. 0115
174	0. 0294	0. 0177	0. 0118
175	0. 0309	0. 0185	0. 0124
176	0. 0317	0. 0190	0. 0127
177	0. 0335	0. 0201	0. 0134
178	0. 0345	0. 0207	0. 0138
179	0. 0367	0. 0220	0. 0147
180	0. 0380	0. 0228	0. 0152
181	0. 0409	0. 0245	0. 0163
182	0. 0425	0. 0255	0. 0170
183	0. 0464	0. 0278	0. 0185
184	0. 0487	0. 0292	0. 0195
185	0. 0497	0. 0298	0. 0199
186	0. 0530	0. 0318	0. 0212
187	0. 0615	0. 0369	0. 0246
188	0. 0671	0. 0403	0. 0268
189	0. 0834	0. 0494	0. 0340
190	0. 0961	0. 0494	0. 0467
191	0. 1458	0. 0494	0. 0964
192	0. 2117	0. 0494	0. 1622
193	0. 9158	0. 0494	0. 8663
194	0. 1148	0. 0494	0. 0653
195	0. 0742	0. 0445	0. 0297
196	0. 0569	0. 0341	0. 0227
197	0. 0512	0. 0308	0. 0205
198	0. 0443	0. 0266	0. 0177
199	0. 0394	0. 0236	0. 0157
200	0. 0356	0. 0213	0. 0142
201	0. 0326	0. 0196	0. 0130
202	0. 0301	0. 0181	0. 0121
203	0. 0281	0. 0169	0. 0112
204	0. 0264	0. 0158	0. 0106
205	0. 0249	0. 0150	0. 0100
206	0. 0236	0. 0142	0. 0095
207	0. 0225	0. 0135	0. 0090
208	0. 0215	0. 0129	0. 0086
209	0. 0206	0. 0124	0. 0082
210	0. 0198	0. 0119	0. 0079
211	0. 0190	0. 0114	0. 0076
212	0. 0184	0. 0110	0. 0073
213	0. 0177	0. 0106	0. 0071
214	0. 0172	0. 0103	0. 0069
215	0. 0166	0. 0100	0. 0067
216	0. 0162	0. 0097	0. 0065

PDB03283. out

217	0. 0183	0. 0110	0. 0073
218	0. 0178	0. 0107	0. 0071
219	0. 0174	0. 0104	0. 0070
220	0. 0170	0. 0102	0. 0068
221	0. 0166	0. 0100	0. 0066
222	0. 0162	0. 0098	0. 0065
223	0. 0159	0. 0095	0. 0064
224	0. 0156	0. 0094	0. 0062
225	0. 0153	0. 0092	0. 0061
226	0. 0150	0. 0090	0. 0060
227	0. 0147	0. 0088	0. 0059
228	0. 0145	0. 0087	0. 0058
229	0. 0142	0. 0085	0. 0057
230	0. 0140	0. 0084	0. 0056
231	0. 0138	0. 0083	0. 0055
232	0. 0135	0. 0081	0. 0054
233	0. 0133	0. 0080	0. 0053
234	0. 0131	0. 0079	0. 0052
235	0. 0129	0. 0078	0. 0052
236	0. 0127	0. 0076	0. 0051
237	0. 0126	0. 0075	0. 0050
238	0. 0124	0. 0074	0. 0050
239	0. 0122	0. 0073	0. 0049
240	0. 0121	0. 0072	0. 0048
241	0. 0119	0. 0071	0. 0048
242	0. 0118	0. 0071	0. 0047
243	0. 0116	0. 0070	0. 0046
244	0. 0115	0. 0069	0. 0046
245	0. 0113	0. 0068	0. 0045
246	0. 0112	0. 0067	0. 0045
247	0. 0111	0. 0066	0. 0044
248	0. 0109	0. 0066	0. 0044
249	0. 0108	0. 0065	0. 0043
250	0. 0107	0. 0064	0. 0043
251	0. 0106	0. 0064	0. 0042
252	0. 0105	0. 0063	0. 0042
253	0. 0104	0. 0062	0. 0041
254	0. 0103	0. 0062	0. 0041
255	0. 0102	0. 0061	0. 0041
256	0. 0101	0. 0060	0. 0040
257	0. 0100	0. 0060	0. 0040
258	0. 0099	0. 0059	0. 0039
259	0. 0098	0. 0059	0. 0039
260	0. 0097	0. 0058	0. 0039
261	0. 0096	0. 0058	0. 0038
262	0. 0095	0. 0057	0. 0038
263	0. 0094	0. 0057	0. 0038
264	0. 0093	0. 0056	0. 0037
265	0. 0093	0. 0056	0. 0037
266	0. 0092	0. 0055	0. 0037
267	0. 0091	0. 0055	0. 0036
268	0. 0090	0. 0054	0. 0036
269	0. 0090	0. 0054	0. 0036
270	0. 0089	0. 0053	0. 0036
271	0. 0088	0. 0053	0. 0035
272	0. 0088	0. 0053	0. 0035
273	0. 0087	0. 0052	0. 0035
274	0. 0086	0. 0052	0. 0034
275	0. 0086	0. 0051	0. 0034
276	0. 0085	0. 0051	0. 0034
277	0. 0084	0. 0051	0. 0034
278	0. 0084	0. 0050	0. 0033
279	0. 0083	0. 0050	0. 0033

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280	0.0082	0.0049	0.0033
281	0.0082	0.0049	0.0033
282	0.0081	0.0049	0.0033
283	0.0081	0.0048	0.0032
284	0.0080	0.0048	0.0032
285	0.0080	0.0048	0.0032
286	0.0079	0.0047	0.0032
287	0.0079	0.0047	0.0031
288	0.0078	0.0047	0.0031

 Total soil rain loss = 2.88(In)
 Total effective rainfall = 3.00(In)
 Peak flow rate in flood hydrograph = 2.66(CFS)

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24 - H O U R S T O R M
 R u n o f f H y d r o g r a p h

 Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac. Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000		0.00	Q				
0+10	0.0001		0.01	Q				
0+15	0.0002		0.02	Q				
0+20	0.0003		0.02	Q				
0+25	0.0005		0.02	Q				
0+30	0.0006		0.02	Q				
0+35	0.0007		0.02	Q				
0+40	0.0008		0.02	Q				
0+45	0.0009		0.02	Q				
0+50	0.0010		0.02	Q				
0+55	0.0011		0.02	Q				
1+ 0	0.0013		0.02	Q				
1+ 5	0.0014		0.02	Q				
1+10	0.0015		0.02	Q				
1+15	0.0016		0.02	Q				
1+20	0.0017		0.02	Q				
1+25	0.0018		0.02	Q				
1+30	0.0020		0.02	Q				
1+35	0.0021		0.02	Q				
1+40	0.0022		0.02	Q				
1+45	0.0023		0.02	Q				
1+50	0.0024		0.02	Q				
1+55	0.0026		0.02	Q				
2+ 0	0.0027		0.02	Q				
2+ 5	0.0028		0.02	QV				
2+10	0.0029		0.02	QV				
2+15	0.0030		0.02	QV				
2+20	0.0032		0.02	QV				
2+25	0.0033		0.02	QV				
2+30	0.0034		0.02	QV				
2+35	0.0035		0.02	QV				
2+40	0.0036		0.02	QV				
2+45	0.0038		0.02	QV				
2+50	0.0039		0.02	QV				
2+55	0.0040		0.02	QV				
3+ 0	0.0041		0.02	QV				
3+ 5	0.0043		0.02	QV				
3+10	0.0044		0.02	QV				
3+15	0.0045		0.02	QV				

3+20	0. 0047	0. 02	QV
3+25	0. 0048	0. 02	QV
3+30	0. 0049	0. 02	QV
3+35	0. 0050	0. 02	QV
3+40	0. 0052	0. 02	QV
3+45	0. 0053	0. 02	QV
3+50	0. 0054	0. 02	Q V
3+55	0. 0056	0. 02	Q V
4+ 0	0. 0057	0. 02	Q V
4+ 5	0. 0058	0. 02	Q V
4+10	0. 0060	0. 02	Q V
4+15	0. 0061	0. 02	Q V
4+20	0. 0062	0. 02	Q V
4+25	0. 0064	0. 02	Q V
4+30	0. 0065	0. 02	Q V
4+35	0. 0066	0. 02	Q V
4+40	0. 0068	0. 02	Q V
4+45	0. 0069	0. 02	Q V
4+50	0. 0070	0. 02	Q V
4+55	0. 0072	0. 02	Q V
5+ 0	0. 0073	0. 02	Q V
5+ 5	0. 0075	0. 02	Q V
5+10	0. 0076	0. 02	Q V
5+15	0. 0077	0. 02	Q V
5+20	0. 0079	0. 02	Q V
5+25	0. 0080	0. 02	Q V
5+30	0. 0082	0. 02	Q V
5+35	0. 0083	0. 02	Q V
5+40	0. 0085	0. 02	Q V
5+45	0. 0086	0. 02	Q V
5+50	0. 0088	0. 02	Q V
5+55	0. 0089	0. 02	Q V
6+ 0	0. 0091	0. 02	Q V
6+ 5	0. 0092	0. 02	Q V
6+10	0. 0093	0. 02	Q V
6+15	0. 0095	0. 02	Q V
6+20	0. 0096	0. 02	Q V
6+25	0. 0098	0. 02	Q V
6+30	0. 0100	0. 02	Q V
6+35	0. 0101	0. 02	Q V
6+40	0. 0103	0. 02	Q V
6+45	0. 0104	0. 02	Q V
6+50	0. 0106	0. 02	Q V
6+55	0. 0107	0. 02	Q V
7+ 0	0. 0109	0. 02	Q V
7+ 5	0. 0110	0. 02	Q V
7+10	0. 0112	0. 02	Q V
7+15	0. 0114	0. 02	Q V
7+20	0. 0115	0. 02	Q V
7+25	0. 0117	0. 02	Q V
7+30	0. 0118	0. 02	Q V
7+35	0. 0120	0. 02	Q V
7+40	0. 0122	0. 02	Q V
7+45	0. 0123	0. 02	Q V
7+50	0. 0125	0. 02	Q V
7+55	0. 0127	0. 02	Q V
8+ 0	0. 0128	0. 02	Q V
8+ 5	0. 0130	0. 02	Q V
8+10	0. 0132	0. 02	Q V
8+15	0. 0134	0. 03	Q V
8+20	0. 0135	0. 03	Q V
8+25	0. 0137	0. 03	Q V
8+30	0. 0139	0. 03	Q V

8+35	0. 0141	0. 03	Q	V
8+40	0. 0142	0. 03	Q	V
8+45	0. 0144	0. 03	Q	V
8+50	0. 0146	0. 03	Q	V
8+55	0. 0148	0. 03	Q	V
9+ 0	0. 0150	0. 03	Q	V
9+ 5	0. 0151	0. 03	Q	V
9+10	0. 0153	0. 03	Q	V
9+15	0. 0155	0. 03	Q	V
9+20	0. 0157	0. 03	Q	V
9+25	0. 0159	0. 03	Q	V
9+30	0. 0161	0. 03	Q	V
9+35	0. 0163	0. 03	Q	V
9+40	0. 0165	0. 03	Q	V
9+45	0. 0167	0. 03	Q	V
9+50	0. 0169	0. 03	Q	V
9+55	0. 0171	0. 03	Q	V
10+ 0	0. 0173	0. 03	Q	V
10+ 5	0. 0175	0. 03	Q	V
10+10	0. 0177	0. 03	Q	V
10+15	0. 0179	0. 03	Q	V
10+20	0. 0181	0. 03	Q	V
10+25	0. 0183	0. 03	Q	V
10+30	0. 0185	0. 03	Q	V
10+35	0. 0187	0. 03	Q	V
10+40	0. 0190	0. 03	Q	V
10+45	0. 0192	0. 03	Q	V
10+50	0. 0194	0. 03	Q	V
10+55	0. 0196	0. 03	Q	V
11+ 0	0. 0198	0. 03	Q	V
11+ 5	0. 0201	0. 03	Q	V
11+10	0. 0203	0. 03	Q	V
11+15	0. 0205	0. 03	Q	V
11+20	0. 0208	0. 03	Q	V
11+25	0. 0210	0. 03	Q	V
11+30	0. 0212	0. 03	Q	V
11+35	0. 0215	0. 04	Q	V
11+40	0. 0217	0. 04	Q	V
11+45	0. 0220	0. 04	Q	V
11+50	0. 0222	0. 04	Q	V
11+55	0. 0225	0. 04	Q	V
12+ 0	0. 0227	0. 04	Q	V
12+ 5	0. 0230	0. 04	Q	V
12+10	0. 0232	0. 03	Q	V
12+15	0. 0234	0. 03	Q	V
12+20	0. 0237	0. 03	Q	V
12+25	0. 0239	0. 03	Q	V
12+30	0. 0242	0. 03	Q	V
12+35	0. 0244	0. 04	Q	V
12+40	0. 0247	0. 04	Q	V
12+45	0. 0249	0. 04	Q	V
12+50	0. 0252	0. 04	Q	V
12+55	0. 0254	0. 04	Q	V
13+ 0	0. 0257	0. 04	Q	V
13+ 5	0. 0260	0. 04	Q	V
13+10	0. 0262	0. 04	Q	V
13+15	0. 0265	0. 04	Q	V
13+20	0. 0268	0. 04	Q	V
13+25	0. 0271	0. 04	Q	V
13+30	0. 0274	0. 04	Q	V
13+35	0. 0277	0. 04	Q	V
13+40	0. 0280	0. 05	Q	V
13+45	0. 0283	0. 05	Q	V

13+50	0. 0287	0. 05	Q	V			
13+55	0. 0290	0. 05	Q	V			
14+ 0	0. 0293	0. 05	Q	V			
14+ 5	0. 0297	0. 05	Q	V			
14+10	0. 0301	0. 05	Q	V			
14+15	0. 0304	0. 05	Q	V			
14+20	0. 0308	0. 06	Q	V			
14+25	0. 0312	0. 06	Q	V			
14+30	0. 0316	0. 06	Q	V			
14+35	0. 0321	0. 06	Q	V			
14+40	0. 0325	0. 06	Q	V			
14+45	0. 0330	0. 07	Q	V			
14+50	0. 0334	0. 07	Q	V			
14+55	0. 0339	0. 07	Q	V			
15+ 0	0. 0345	0. 08	Q	V			
15+ 5	0. 0350	0. 08	Q	V			
15+10	0. 0356	0. 09	Q	V			
15+15	0. 0362	0. 09	Q	V			
15+20	0. 0369	0. 10	Q	V			
15+25	0. 0376	0. 10	Q	V			
15+30	0. 0383	0. 10	Q	V			
15+35	0. 0391	0. 11	Q	V			
15+40	0. 0400	0. 13	Q	V			
15+45	0. 0410	0. 15	Q	V			
15+50	0. 0423	0. 19	Q	V			
15+55	0. 0445	0. 31	Q	V			
16+ 0	0. 0484	0. 57	Q	V			
16+ 5	0. 0615	1. 91	Q	V			
16+10	0. 0799	2. 66	Q	V			
16+15	0. 0853	0. 79	Q	V			
16+20	0. 0871	0. 27	Q	V			
16+25	0. 0883	0. 16	Q	V			
16+30	0. 0890	0. 11	Q	V			
16+35	0. 0896	0. 09	Q	V			
16+40	0. 0902	0. 08	Q	V			
16+45	0. 0907	0. 07	Q	V			
16+50	0. 0912	0. 07	Q	V			
16+55	0. 0916	0. 06	Q	V			
17+ 0	0. 0920	0. 06	Q	V			
17+ 5	0. 0924	0. 05	Q	V			
17+10	0. 0927	0. 05	Q	V			
17+15	0. 0931	0. 05	Q	V			
17+20	0. 0934	0. 05	Q	V			
17+25	0. 0937	0. 04	Q	V			
17+30	0. 0940	0. 04	Q	V			
17+35	0. 0943	0. 04	Q	V			
17+40	0. 0945	0. 04	Q	V			
17+45	0. 0948	0. 04	Q	V			
17+50	0. 0950	0. 04	Q	V			
17+55	0. 0953	0. 04	Q	V			
18+ 0	0. 0955	0. 03	Q	V			
18+ 5	0. 0958	0. 04	Q	V			
18+10	0. 0960	0. 04	Q	V			
18+15	0. 0963	0. 04	Q	V			
18+20	0. 0965	0. 04	Q	V			
18+25	0. 0968	0. 04	Q	V			
18+30	0. 0970	0. 03	Q	V			
18+35	0. 0972	0. 03	Q	V			
18+40	0. 0975	0. 03	Q	V			
18+45	0. 0977	0. 03	Q	V			
18+50	0. 0979	0. 03	Q	V			
18+55	0. 0981	0. 03	Q	V			
19+ 0	0. 0983	0. 03	Q	V			

19+ 5	0. 0985	0. 03	Q	V
19+10	0. 0987	0. 03	Q	V
19+15	0. 0989	0. 03	Q	V
19+20	0. 0991	0. 03	Q	V
19+25	0. 0993	0. 03	Q	V
19+30	0. 0995	0. 03	Q	V
19+35	0. 0997	0. 03	Q	V
19+40	0. 0999	0. 03	Q	V
19+45	0. 1001	0. 03	Q	V
19+50	0. 1003	0. 03	Q	V
19+55	0. 1004	0. 03	Q	V
20+ 0	0. 1006	0. 03	Q	V
20+ 5	0. 1008	0. 03	Q	V
20+10	0. 1010	0. 02	Q	V
20+15	0. 1011	0. 02	Q	V
20+20	0. 1013	0. 02	Q	V
20+25	0. 1015	0. 02	Q	V
20+30	0. 1016	0. 02	Q	V
20+35	0. 1018	0. 02	Q	V
20+40	0. 1019	0. 02	Q	V
20+45	0. 1021	0. 02	Q	V
20+50	0. 1022	0. 02	Q	V
20+55	0. 1024	0. 02	Q	V
21+ 0	0. 1025	0. 02	Q	V
21+ 5	0. 1027	0. 02	Q	V
21+10	0. 1028	0. 02	Q	V
21+15	0. 1030	0. 02	Q	V
21+20	0. 1031	0. 02	Q	V
21+25	0. 1033	0. 02	Q	V
21+30	0. 1034	0. 02	Q	V
21+35	0. 1036	0. 02	Q	V
21+40	0. 1037	0. 02	Q	V
21+45	0. 1038	0. 02	Q	V
21+50	0. 1040	0. 02	Q	V
21+55	0. 1041	0. 02	Q	V
22+ 0	0. 1043	0. 02	Q	V
22+ 5	0. 1044	0. 02	Q	V
22+10	0. 1045	0. 02	Q	V
22+15	0. 1047	0. 02	Q	V
22+20	0. 1048	0. 02	Q	V
22+25	0. 1049	0. 02	Q	V
22+30	0. 1050	0. 02	Q	V
22+35	0. 1052	0. 02	Q	V
22+40	0. 1053	0. 02	Q	V
22+45	0. 1054	0. 02	Q	V
22+50	0. 1055	0. 02	Q	V
22+55	0. 1057	0. 02	Q	V
23+ 0	0. 1058	0. 02	Q	V
23+ 5	0. 1059	0. 02	Q	V
23+10	0. 1060	0. 02	Q	V
23+15	0. 1062	0. 02	Q	V
23+20	0. 1063	0. 02	Q	V
23+25	0. 1064	0. 02	Q	V
23+30	0. 1065	0. 02	Q	V
23+35	0. 1066	0. 02	Q	V
23+40	0. 1067	0. 02	Q	V
23+45	0. 1069	0. 02	Q	V
23+50	0. 1070	0. 02	Q	V
23+55	0. 1071	0. 02	Q	V
24+ 0	0. 1072	0. 02	Q	V
24+ 5	0. 1073	0. 01	Q	V
24+10	0. 1073	0. 00	Q	V
24+15	0. 1073	0. 00	Q	V

24+20 0. 1073 0. 00 Q PDB03283. out | | | V|

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Unit Hydrograph Analysis

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Study date 01/18/16

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6296

HAWK RIDGE - AREA 4
100-YR - 24-HOUR
EXISTING OFF SITE HYDROLOGY

Storm Event Year = 100

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Rainfall data for year	Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
10	1.26	1	1.00
2	1.26	6	1.13
2	1.26	24	1.87
100	1.26	1	1.93
100	1.26	6	3.47
100	1.26	24	5.88

+++++

***** Area-averaged max loss rate, Fm *****

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SCS curve No. (AMCII)	SCS curve NO. (AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
66.0	66.0	1.26	1.000	0.593	1.000	0.593

Area-averaged adjusted loss rate Fm (In/Hr) = 0.593

***** Area-Averaged low loss rate fraction, Yb *****

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
1.26	1.000	66.0	66.0	5.15	0.400

Area-averaged catchment yield fraction, Y = 0.400

Area-averaged low loss fraction, Yb = 0.600

User entry of time of concentration = 0.111 (hours)

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Watershed area = 1.26(Ac.)

Catchment Lag time = 0.089 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 93.8438

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.593(In/Hr)

Average low loss rate fraction (Yb) = 0.600 (decimal)

FOOTHILL S-Graph Selected

Computed peak 5-minute rainfall = 0.916(In)

Computed peak 30-minute rainfall = 1.568(In)

Specified peak 1-hour rainfall = 1.930(In)

Computed peak 3-hour rainfall = 2.765(In)

Specified peak 6-hour rainfall = 3.470(In)

Specified peak 24-hour rainfall = 5.880(In)

Rainfall depth area reduction factors:

Using a total area of 1.26(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.916(In)

30-minute factor = 1.000 Adjusted rainfall = 1.568(In)

1-hour factor = 1.000 Adjusted rainfall = 1.930(In)

3-hour factor = 1.000 Adjusted rainfall = 2.765(In)

6-hour factor = 1.000 Adjusted rainfall = 3.470(In)

24-hour factor = 1.000 Adjusted rainfall = 5.880(In)

Unit Hydrograph

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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
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(K = 15.24 (CFS))

1	12.357	1.883
2	67.085	8.339
3	86.812	3.006
4	94.948	1.240
5	98.112	0.482
6	99.078	0.147
7	99.710	0.096
8	100.000	0.044

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
------------------	-----------------------------	--------------------

1	0.9158	0.9158
2	1.1274	0.2117

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3	1. 2732	0. 1458
4	1. 3880	0. 1148
5	1. 4841	0. 0961
6	1. 5676	0. 0834
7	1. 6417	0. 0742
8	1. 7089	0. 0671
9	1. 7703	0. 0615
10	1. 8272	0. 0569
11	1. 8802	0. 0530
12	1. 9299	0. 0497
13	1. 9811	0. 0513
14	2. 0298	0. 0487
15	2. 0762	0. 0464
16	2. 1205	0. 0443
17	2. 1630	0. 0425
18	2. 2039	0. 0409
19	2. 2433	0. 0394
20	2. 2813	0. 0380
21	2. 3180	0. 0367
22	2. 3536	0. 0356
23	2. 3881	0. 0345
24	2. 4216	0. 0335
25	2. 4542	0. 0326
26	2. 4859	0. 0317
27	2. 5168	0. 0309
28	2. 5470	0. 0302
29	2. 5764	0. 0294
30	2. 6052	0. 0288
31	2. 6333	0. 0281
32	2. 6608	0. 0275
33	2. 6878	0. 0269
34	2. 7142	0. 0264
35	2. 7401	0. 0259
36	2. 7655	0. 0254
37	2. 7904	0. 0249
38	2. 8148	0. 0245
39	2. 8389	0. 0240
40	2. 8625	0. 0236
41	2. 8858	0. 0232
42	2. 9086	0. 0229
43	2. 9311	0. 0225
44	2. 9533	0. 0221
45	2. 9751	0. 0218
46	2. 9966	0. 0215
47	3. 0177	0. 0212
48	3. 0386	0. 0209
49	3. 0592	0. 0206
50	3. 0795	0. 0203
51	3. 0995	0. 0200
52	3. 1193	0. 0198
53	3. 1388	0. 0195
54	3. 1581	0. 0193
55	3. 1771	0. 0190
56	3. 1959	0. 0188
57	3. 2145	0. 0186
58	3. 2328	0. 0184
59	3. 2510	0. 0181
60	3. 2689	0. 0179
61	3. 2866	0. 0177
62	3. 3042	0. 0175
63	3. 3215	0. 0174
64	3. 3387	0. 0172
65	3. 3557	0. 0170

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66	3. 3725	0. 0168
67	3. 3892	0. 0166
68	3. 4057	0. 0165
69	3. 4220	0. 0163
70	3. 4381	0. 0162
71	3. 4541	0. 0160
72	3. 4700	0. 0159
73	3. 4882	0. 0183
74	3. 5063	0. 0181
75	3. 5243	0. 0180
76	3. 5421	0. 0178
77	3. 5598	0. 0177
78	3. 5773	0. 0175
79	3. 5947	0. 0174
80	3. 6119	0. 0172
81	3. 6290	0. 0171
82	3. 6460	0. 0170
83	3. 6628	0. 0169
84	3. 6796	0. 0167
85	3. 6962	0. 0166
86	3. 7127	0. 0165
87	3. 7290	0. 0164
88	3. 7453	0. 0162
89	3. 7614	0. 0161
90	3. 7774	0. 0160
91	3. 7933	0. 0159
92	3. 8091	0. 0158
93	3. 8248	0. 0157
94	3. 8404	0. 0156
95	3. 8559	0. 0155
96	3. 8713	0. 0154
97	3. 8866	0. 0153
98	3. 9018	0. 0152
99	3. 9169	0. 0151
100	3. 9319	0. 0150
101	3. 9468	0. 0149
102	3. 9617	0. 0148
103	3. 9764	0. 0147
104	3. 9910	0. 0146
105	4. 0056	0. 0146
106	4. 0201	0. 0145
107	4. 0344	0. 0144
108	4. 0487	0. 0143
109	4. 0630	0. 0142
110	4. 0771	0. 0141
111	4. 0912	0. 0141
112	4. 1052	0. 0140
113	4. 1191	0. 0139
114	4. 1329	0. 0138
115	4. 1466	0. 0138
116	4. 1603	0. 0137
117	4. 1739	0. 0136
118	4. 1875	0. 0135
119	4. 2009	0. 0135
120	4. 2143	0. 0134
121	4. 2277	0. 0133
122	4. 2409	0. 0133
123	4. 2541	0. 0132
124	4. 2672	0. 0131
125	4. 2803	0. 0131
126	4. 2933	0. 0130
127	4. 3062	0. 0129
128	4. 3191	0. 0129

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129	4. 3319	0. 0128
130	4. 3446	0. 0127
131	4. 3573	0. 0127
132	4. 3699	0. 0126
133	4. 3825	0. 0126
134	4. 3950	0. 0125
135	4. 4075	0. 0124
136	4. 4199	0. 0124
137	4. 4322	0. 0123
138	4. 4445	0. 0123
139	4. 4567	0. 0122
140	4. 4689	0. 0122
141	4. 4810	0. 0121
142	4. 4931	0. 0121
143	4. 5051	0. 0120
144	4. 5170	0. 0120
145	4. 5289	0. 0119
146	4. 5408	0. 0119
147	4. 5526	0. 0118
148	4. 5644	0. 0118
149	4. 5761	0. 0117
150	4. 5877	0. 0117
151	4. 5993	0. 0116
152	4. 6109	0. 0116
153	4. 6224	0. 0115
154	4. 6339	0. 0115
155	4. 6453	0. 0114
156	4. 6567	0. 0114
157	4. 6680	0. 0113
158	4. 6793	0. 0113
159	4. 6906	0. 0112
160	4. 7018	0. 0112
161	4. 7129	0. 0112
162	4. 7240	0. 0111
163	4. 7351	0. 0111
164	4. 7461	0. 0110
165	4. 7571	0. 0110
166	4. 7681	0. 0109
167	4. 7790	0. 0109
168	4. 7898	0. 0109
169	4. 8007	0. 0108
170	4. 8115	0. 0108
171	4. 8222	0. 0107
172	4. 8329	0. 0107
173	4. 8436	0. 0107
174	4. 8542	0. 0106
175	4. 8648	0. 0106
176	4. 8754	0. 0106
177	4. 8859	0. 0105
178	4. 8964	0. 0105
179	4. 9068	0. 0104
180	4. 9172	0. 0104
181	4. 9276	0. 0104
182	4. 9379	0. 0103
183	4. 9483	0. 0103
184	4. 9585	0. 0103
185	4. 9688	0. 0102
186	4. 9790	0. 0102
187	4. 9891	0. 0102
188	4. 9993	0. 0101
189	5. 0094	0. 0101
190	5. 0194	0. 0101
191	5. 0295	0. 0100

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192	5. 0395	0. 0100
193	5. 0494	0. 0100
194	5. 0594	0. 0099
195	5. 0693	0. 0099
196	5. 0791	0. 0099
197	5. 0890	0. 0098
198	5. 0988	0. 0098
199	5. 1086	0. 0098
200	5. 1183	0. 0098
201	5. 1281	0. 0097
202	5. 1377	0. 0097
203	5. 1474	0. 0097
204	5. 1570	0. 0096
205	5. 1666	0. 0096
206	5. 1762	0. 0096
207	5. 1858	0. 0095
208	5. 1953	0. 0095
209	5. 2048	0. 0095
210	5. 2142	0. 0095
211	5. 2237	0. 0094
212	5. 2331	0. 0094
213	5. 2424	0. 0094
214	5. 2518	0. 0094
215	5. 2611	0. 0093
216	5. 2704	0. 0093
217	5. 2797	0. 0093
218	5. 2889	0. 0092
219	5. 2981	0. 0092
220	5. 3073	0. 0092
221	5. 3165	0. 0092
222	5. 3256	0. 0091
223	5. 3348	0. 0091
224	5. 3438	0. 0091
225	5. 3529	0. 0091
226	5. 3619	0. 0090
227	5. 3710	0. 0090
228	5. 3799	0. 0090
229	5. 3889	0. 0090
230	5. 3979	0. 0089
231	5. 4068	0. 0089
232	5. 4157	0. 0089
233	5. 4245	0. 0089
234	5. 4334	0. 0088
235	5. 4422	0. 0088
236	5. 4510	0. 0088
237	5. 4598	0. 0088
238	5. 4685	0. 0088
239	5. 4773	0. 0087
240	5. 4860	0. 0087
241	5. 4946	0. 0087
242	5. 5033	0. 0087
243	5. 5120	0. 0086
244	5. 5206	0. 0086
245	5. 5292	0. 0086
246	5. 5377	0. 0086
247	5. 5463	0. 0086
248	5. 5548	0. 0085
249	5. 5633	0. 0085
250	5. 5718	0. 0085
251	5. 5803	0. 0085
252	5. 5887	0. 0084
253	5. 5972	0. 0084
254	5. 6056	0. 0084

PDB03284. out

255	5. 6140	0. 0084
256	5. 6223	0. 0084
257	5. 6307	0. 0083
258	5. 6390	0. 0083
259	5. 6473	0. 0083
260	5. 6556	0. 0083
261	5. 6639	0. 0083
262	5. 6721	0. 0082
263	5. 6803	0. 0082
264	5. 6885	0. 0082
265	5. 6967	0. 0082
266	5. 7049	0. 0082
267	5. 7130	0. 0081
268	5. 7212	0. 0081
269	5. 7293	0. 0081
270	5. 7374	0. 0081
271	5. 7455	0. 0081
272	5. 7535	0. 0081
273	5. 7615	0. 0080
274	5. 7696	0. 0080
275	5. 7776	0. 0080
276	5. 7856	0. 0080
277	5. 7935	0. 0080
278	5. 8015	0. 0079
279	5. 8094	0. 0079
280	5. 8173	0. 0079
281	5. 8252	0. 0079
282	5. 8331	0. 0079
283	5. 8409	0. 0079
284	5. 8488	0. 0078
285	5. 8566	0. 0078
286	5. 8644	0. 0078
287	5. 8722	0. 0078
288	5. 8800	0. 0078

Unit Period (number)	Unit Rainfall (In)	Unit Soil - Loss (In)	Effective Rainfall (In)
1	0. 0078	0. 0047	0. 0031
2	0. 0078	0. 0047	0. 0031
3	0. 0078	0. 0047	0. 0031
4	0. 0078	0. 0047	0. 0031
5	0. 0079	0. 0047	0. 0032
6	0. 0079	0. 0047	0. 0032
7	0. 0079	0. 0048	0. 0032
8	0. 0079	0. 0048	0. 0032
9	0. 0080	0. 0048	0. 0032
10	0. 0080	0. 0048	0. 0032
11	0. 0080	0. 0048	0. 0032
12	0. 0081	0. 0048	0. 0032
13	0. 0081	0. 0049	0. 0032
14	0. 0081	0. 0049	0. 0032
15	0. 0081	0. 0049	0. 0033
16	0. 0082	0. 0049	0. 0033
17	0. 0082	0. 0049	0. 0033
18	0. 0082	0. 0049	0. 0033
19	0. 0083	0. 0050	0. 0033
20	0. 0083	0. 0050	0. 0033
21	0. 0083	0. 0050	0. 0033
22	0. 0083	0. 0050	0. 0033
23	0. 0084	0. 0050	0. 0034
24	0. 0084	0. 0050	0. 0034

PDB03284. out

25	0. 0084	0. 0051	0. 0034
26	0. 0085	0. 0051	0. 0034
27	0. 0085	0. 0051	0. 0034
28	0. 0085	0. 0051	0. 0034
29	0. 0086	0. 0051	0. 0034
30	0. 0086	0. 0052	0. 0034
31	0. 0086	0. 0052	0. 0035
32	0. 0087	0. 0052	0. 0035
33	0. 0087	0. 0052	0. 0035
34	0. 0087	0. 0052	0. 0035
35	0. 0088	0. 0053	0. 0035
36	0. 0088	0. 0053	0. 0035
37	0. 0088	0. 0053	0. 0035
38	0. 0089	0. 0053	0. 0035
39	0. 0089	0. 0054	0. 0036
40	0. 0089	0. 0054	0. 0036
41	0. 0090	0. 0054	0. 0036
42	0. 0090	0. 0054	0. 0036
43	0. 0091	0. 0054	0. 0036
44	0. 0091	0. 0055	0. 0036
45	0. 0091	0. 0055	0. 0037
46	0. 0092	0. 0055	0. 0037
47	0. 0092	0. 0055	0. 0037
48	0. 0092	0. 0055	0. 0037
49	0. 0093	0. 0056	0. 0037
50	0. 0093	0. 0056	0. 0037
51	0. 0094	0. 0056	0. 0038
52	0. 0094	0. 0056	0. 0038
53	0. 0095	0. 0057	0. 0038
54	0. 0095	0. 0057	0. 0038
55	0. 0095	0. 0057	0. 0038
56	0. 0096	0. 0057	0. 0038
57	0. 0096	0. 0058	0. 0039
58	0. 0097	0. 0058	0. 0039
59	0. 0097	0. 0058	0. 0039
60	0. 0098	0. 0059	0. 0039
61	0. 0098	0. 0059	0. 0039
62	0. 0098	0. 0059	0. 0039
63	0. 0099	0. 0059	0. 0040
64	0. 0099	0. 0060	0. 0040
65	0. 0100	0. 0060	0. 0040
66	0. 0100	0. 0060	0. 0040
67	0. 0101	0. 0061	0. 0040
68	0. 0101	0. 0061	0. 0041
69	0. 0102	0. 0061	0. 0041
70	0. 0102	0. 0061	0. 0041
71	0. 0103	0. 0062	0. 0041
72	0. 0103	0. 0062	0. 0041
73	0. 0104	0. 0062	0. 0042
74	0. 0104	0. 0063	0. 0042
75	0. 0105	0. 0063	0. 0042
76	0. 0106	0. 0063	0. 0042
77	0. 0106	0. 0064	0. 0043
78	0. 0107	0. 0064	0. 0043
79	0. 0107	0. 0064	0. 0043
80	0. 0108	0. 0065	0. 0043
81	0. 0109	0. 0065	0. 0043
82	0. 0109	0. 0065	0. 0044
83	0. 0110	0. 0066	0. 0044
84	0. 0110	0. 0066	0. 0044
85	0. 0111	0. 0067	0. 0044
86	0. 0112	0. 0067	0. 0045
87	0. 0112	0. 0067	0. 0045

PDB03284. out

88	0. 0113	0. 0068	0. 0045
89	0. 0114	0. 0068	0. 0046
90	0. 0114	0. 0069	0. 0046
91	0. 0115	0. 0069	0. 0046
92	0. 0116	0. 0069	0. 0046
93	0. 0117	0. 0070	0. 0047
94	0. 0117	0. 0070	0. 0047
95	0. 0118	0. 0071	0. 0047
96	0. 0119	0. 0071	0. 0047
97	0. 0120	0. 0072	0. 0048
98	0. 0120	0. 0072	0. 0048
99	0. 0121	0. 0073	0. 0048
100	0. 0122	0. 0073	0. 0049
101	0. 0123	0. 0074	0. 0049
102	0. 0123	0. 0074	0. 0049
103	0. 0124	0. 0075	0. 0050
104	0. 0125	0. 0075	0. 0050
105	0. 0126	0. 0076	0. 0050
106	0. 0127	0. 0076	0. 0051
107	0. 0128	0. 0077	0. 0051
108	0. 0129	0. 0077	0. 0051
109	0. 0130	0. 0078	0. 0052
110	0. 0131	0. 0078	0. 0052
111	0. 0132	0. 0079	0. 0053
112	0. 0133	0. 0080	0. 0053
113	0. 0134	0. 0080	0. 0054
114	0. 0135	0. 0081	0. 0054
115	0. 0136	0. 0082	0. 0054
116	0. 0137	0. 0082	0. 0055
117	0. 0138	0. 0083	0. 0055
118	0. 0139	0. 0083	0. 0056
119	0. 0141	0. 0084	0. 0056
120	0. 0141	0. 0085	0. 0057
121	0. 0143	0. 0086	0. 0057
122	0. 0144	0. 0086	0. 0058
123	0. 0146	0. 0087	0. 0058
124	0. 0146	0. 0088	0. 0059
125	0. 0148	0. 0089	0. 0059
126	0. 0149	0. 0089	0. 0060
127	0. 0151	0. 0091	0. 0060
128	0. 0152	0. 0091	0. 0061
129	0. 0154	0. 0092	0. 0062
130	0. 0155	0. 0093	0. 0062
131	0. 0157	0. 0094	0. 0063
132	0. 0158	0. 0095	0. 0063
133	0. 0160	0. 0096	0. 0064
134	0. 0161	0. 0097	0. 0065
135	0. 0164	0. 0098	0. 0065
136	0. 0165	0. 0099	0. 0066
137	0. 0167	0. 0100	0. 0067
138	0. 0169	0. 0101	0. 0067
139	0. 0171	0. 0103	0. 0068
140	0. 0172	0. 0103	0. 0069
141	0. 0175	0. 0105	0. 0070
142	0. 0177	0. 0106	0. 0071
143	0. 0180	0. 0108	0. 0072
144	0. 0181	0. 0109	0. 0072
145	0. 0159	0. 0095	0. 0063
146	0. 0160	0. 0096	0. 0064
147	0. 0163	0. 0098	0. 0065
148	0. 0165	0. 0099	0. 0066
149	0. 0168	0. 0101	0. 0067
150	0. 0170	0. 0102	0. 0068

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151	0. 0174	0. 0104	0. 0069
152	0. 0175	0. 0105	0. 0070
153	0. 0179	0. 0108	0. 0072
154	0. 0181	0. 0109	0. 0073
155	0. 0186	0. 0111	0. 0074
156	0. 0188	0. 0113	0. 0075
157	0. 0193	0. 0116	0. 0077
158	0. 0195	0. 0117	0. 0078
159	0. 0200	0. 0120	0. 0080
160	0. 0203	0. 0122	0. 0081
161	0. 0209	0. 0125	0. 0083
162	0. 0212	0. 0127	0. 0085
163	0. 0218	0. 0131	0. 0087
164	0. 0221	0. 0133	0. 0089
165	0. 0229	0. 0137	0. 0091
166	0. 0232	0. 0139	0. 0093
167	0. 0240	0. 0144	0. 0096
168	0. 0245	0. 0147	0. 0098
169	0. 0254	0. 0152	0. 0102
170	0. 0259	0. 0155	0. 0104
171	0. 0269	0. 0162	0. 0108
172	0. 0275	0. 0165	0. 0110
173	0. 0288	0. 0173	0. 0115
174	0. 0294	0. 0177	0. 0118
175	0. 0309	0. 0185	0. 0124
176	0. 0317	0. 0190	0. 0127
177	0. 0335	0. 0201	0. 0134
178	0. 0345	0. 0207	0. 0138
179	0. 0367	0. 0220	0. 0147
180	0. 0380	0. 0228	0. 0152
181	0. 0409	0. 0245	0. 0163
182	0. 0425	0. 0255	0. 0170
183	0. 0464	0. 0278	0. 0185
184	0. 0487	0. 0292	0. 0195
185	0. 0497	0. 0298	0. 0199
186	0. 0530	0. 0318	0. 0212
187	0. 0615	0. 0369	0. 0246
188	0. 0671	0. 0403	0. 0268
189	0. 0834	0. 0494	0. 0340
190	0. 0961	0. 0494	0. 0467
191	0. 1458	0. 0494	0. 0964
192	0. 2117	0. 0494	0. 1622
193	0. 9158	0. 0494	0. 8663
194	0. 1148	0. 0494	0. 0653
195	0. 0742	0. 0445	0. 0297
196	0. 0569	0. 0341	0. 0227
197	0. 0513	0. 0308	0. 0205
198	0. 0443	0. 0266	0. 0177
199	0. 0394	0. 0236	0. 0157
200	0. 0356	0. 0214	0. 0142
201	0. 0326	0. 0196	0. 0130
202	0. 0302	0. 0181	0. 0121
203	0. 0281	0. 0169	0. 0112
204	0. 0264	0. 0158	0. 0106
205	0. 0249	0. 0150	0. 0100
206	0. 0236	0. 0142	0. 0095
207	0. 0225	0. 0135	0. 0090
208	0. 0215	0. 0129	0. 0086
209	0. 0206	0. 0124	0. 0082
210	0. 0198	0. 0119	0. 0079
211	0. 0190	0. 0114	0. 0076
212	0. 0184	0. 0110	0. 0073
213	0. 0177	0. 0106	0. 0071

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214	0. 0172	0. 0103	0. 0069
215	0. 0166	0. 0100	0. 0067
216	0. 0162	0. 0097	0. 0065
217	0. 0183	0. 0110	0. 0073
218	0. 0178	0. 0107	0. 0071
219	0. 0174	0. 0104	0. 0070
220	0. 0170	0. 0102	0. 0068
221	0. 0166	0. 0100	0. 0066
222	0. 0162	0. 0098	0. 0065
223	0. 0159	0. 0095	0. 0064
224	0. 0156	0. 0094	0. 0062
225	0. 0153	0. 0092	0. 0061
226	0. 0150	0. 0090	0. 0060
227	0. 0147	0. 0088	0. 0059
228	0. 0145	0. 0087	0. 0058
229	0. 0142	0. 0085	0. 0057
230	0. 0140	0. 0084	0. 0056
231	0. 0138	0. 0083	0. 0055
232	0. 0135	0. 0081	0. 0054
233	0. 0133	0. 0080	0. 0053
234	0. 0131	0. 0079	0. 0052
235	0. 0129	0. 0078	0. 0052
236	0. 0127	0. 0076	0. 0051
237	0. 0126	0. 0075	0. 0050
238	0. 0124	0. 0074	0. 0050
239	0. 0122	0. 0073	0. 0049
240	0. 0121	0. 0072	0. 0048
241	0. 0119	0. 0071	0. 0048
242	0. 0118	0. 0071	0. 0047
243	0. 0116	0. 0070	0. 0046
244	0. 0115	0. 0069	0. 0046
245	0. 0113	0. 0068	0. 0045
246	0. 0112	0. 0067	0. 0045
247	0. 0111	0. 0066	0. 0044
248	0. 0109	0. 0066	0. 0044
249	0. 0108	0. 0065	0. 0043
250	0. 0107	0. 0064	0. 0043
251	0. 0106	0. 0064	0. 0042
252	0. 0105	0. 0063	0. 0042
253	0. 0104	0. 0062	0. 0041
254	0. 0103	0. 0062	0. 0041
255	0. 0102	0. 0061	0. 0041
256	0. 0101	0. 0060	0. 0040
257	0. 0100	0. 0060	0. 0040
258	0. 0099	0. 0059	0. 0039
259	0. 0098	0. 0059	0. 0039
260	0. 0097	0. 0058	0. 0039
261	0. 0096	0. 0058	0. 0038
262	0. 0095	0. 0057	0. 0038
263	0. 0094	0. 0057	0. 0038
264	0. 0094	0. 0056	0. 0037
265	0. 0093	0. 0056	0. 0037
266	0. 0092	0. 0055	0. 0037
267	0. 0091	0. 0055	0. 0036
268	0. 0090	0. 0054	0. 0036
269	0. 0090	0. 0054	0. 0036
270	0. 0089	0. 0053	0. 0036
271	0. 0088	0. 0053	0. 0035
272	0. 0088	0. 0053	0. 0035
273	0. 0087	0. 0052	0. 0035
274	0. 0086	0. 0052	0. 0034
275	0. 0086	0. 0051	0. 0034
276	0. 0085	0. 0051	0. 0034

PDB03284. out

277	0.0084	0.0051	0.0034
278	0.0084	0.0050	0.0033
279	0.0083	0.0050	0.0033
280	0.0082	0.0049	0.0033
281	0.0082	0.0049	0.0033
282	0.0081	0.0049	0.0033
283	0.0081	0.0048	0.0032
284	0.0080	0.0048	0.0032
285	0.0080	0.0048	0.0032
286	0.0079	0.0047	0.0032
287	0.0079	0.0047	0.0031
288	0.0078	0.0047	0.0031

 Total soil rain loss = 2.88(In)
 Total effective rainfall = 3.00(In)
 Peak flow rate in flood hydrograph = 7.99(CFS)

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24 - H O U R S T O R M
 R u n o f f H y d r o g r a p h

 Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac. Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.01	Q				
0+10	0.0003	0.03	Q				
0+15	0.0005	0.04	Q				
0+20	0.0009	0.05	Q				
0+25	0.0012	0.05	Q				
0+30	0.0015	0.05	Q				
0+35	0.0018	0.05	Q				
0+40	0.0022	0.05	Q				
0+45	0.0025	0.05	Q				
0+50	0.0028	0.05	Q				
0+55	0.0032	0.05	Q				
1+ 0	0.0035	0.05	Q				
1+ 5	0.0038	0.05	Q				
1+10	0.0042	0.05	Q				
1+15	0.0045	0.05	Q				
1+20	0.0049	0.05	Q				
1+25	0.0052	0.05	Q				
1+30	0.0056	0.05	Q				
1+35	0.0059	0.05	Q				
1+40	0.0062	0.05	Q				
1+45	0.0066	0.05	Q				
1+50	0.0069	0.05	Q				
1+55	0.0073	0.05	Q				
2+ 0	0.0076	0.05	Q				
2+ 5	0.0080	0.05	QV				
2+10	0.0083	0.05	QV				
2+15	0.0087	0.05	QV				
2+20	0.0091	0.05	QV				
2+25	0.0094	0.05	QV				
2+30	0.0098	0.05	QV				
2+35	0.0101	0.05	QV				
2+40	0.0105	0.05	QV				
2+45	0.0109	0.05	QV				
2+50	0.0112	0.05	QV				
2+55	0.0116	0.05	QV				
3+ 0	0.0120	0.05	QV				

3+ 5	0. 0123	0. 05	QV
3+10	0. 0127	0. 05	QV
3+15	0. 0131	0. 05	QV
3+20	0. 0134	0. 05	QV
3+25	0. 0138	0. 05	QV
3+30	0. 0142	0. 05	QV
3+35	0. 0146	0. 05	QV
3+40	0. 0150	0. 06	QV
3+45	0. 0153	0. 06	QV
3+50	0. 0157	0. 06	QV
3+55	0. 0161	0. 06	Q V
4+ 0	0. 0165	0. 06	Q V
4+ 5	0. 0169	0. 06	Q V
4+10	0. 0173	0. 06	Q V
4+15	0. 0177	0. 06	Q V
4+20	0. 0180	0. 06	Q V
4+25	0. 0184	0. 06	Q V
4+30	0. 0188	0. 06	Q V
4+35	0. 0192	0. 06	Q V
4+40	0. 0196	0. 06	Q V
4+45	0. 0200	0. 06	Q V
4+50	0. 0204	0. 06	Q V
4+55	0. 0208	0. 06	Q V
5+ 0	0. 0213	0. 06	Q V
5+ 5	0. 0217	0. 06	Q V
5+10	0. 0221	0. 06	Q V
5+15	0. 0225	0. 06	Q V
5+20	0. 0229	0. 06	Q V
5+25	0. 0233	0. 06	Q V
5+30	0. 0237	0. 06	Q V
5+35	0. 0242	0. 06	Q V
5+40	0. 0246	0. 06	Q V
5+45	0. 0250	0. 06	Q V
5+50	0. 0254	0. 06	Q V
5+55	0. 0259	0. 06	Q V
6+ 0	0. 0263	0. 06	Q V
6+ 5	0. 0267	0. 06	Q V
6+10	0. 0272	0. 06	Q V
6+15	0. 0276	0. 06	Q V
6+20	0. 0280	0. 06	Q V
6+25	0. 0285	0. 06	Q V
6+30	0. 0289	0. 06	Q V
6+35	0. 0294	0. 06	Q V
6+40	0. 0298	0. 07	Q V
6+45	0. 0303	0. 07	Q V
6+50	0. 0307	0. 07	Q V
6+55	0. 0312	0. 07	Q V
7+ 0	0. 0316	0. 07	Q V
7+ 5	0. 0321	0. 07	Q V
7+10	0. 0326	0. 07	Q V
7+15	0. 0330	0. 07	Q V
7+20	0. 0335	0. 07	Q V
7+25	0. 0340	0. 07	Q V
7+30	0. 0345	0. 07	Q V
7+35	0. 0349	0. 07	Q V
7+40	0. 0354	0. 07	Q V
7+45	0. 0359	0. 07	Q V
7+50	0. 0364	0. 07	Q V
7+55	0. 0369	0. 07	Q V
8+ 0	0. 0374	0. 07	Q V
8+ 5	0. 0379	0. 07	Q V
8+10	0. 0384	0. 07	Q V
8+15	0. 0389	0. 07	Q V

8+20	0. 0394	0. 07	Q	V
8+25	0. 0399	0. 07	Q	V
8+30	0. 0404	0. 07	Q	V
8+35	0. 0409	0. 08	Q	V
8+40	0. 0414	0. 08	Q	V
8+45	0. 0420	0. 08	Q	V
8+50	0. 0425	0. 08	Q	V
8+55	0. 0430	0. 08	Q	V
9+ 0	0. 0436	0. 08	Q	V
9+ 5	0. 0441	0. 08	Q	V
9+10	0. 0446	0. 08	Q	V
9+15	0. 0452	0. 08	Q	V
9+20	0. 0457	0. 08	Q	V
9+25	0. 0463	0. 08	Q	V
9+30	0. 0469	0. 08	Q	V
9+35	0. 0474	0. 08	Q	V
9+40	0. 0480	0. 08	Q	V
9+45	0. 0486	0. 08	Q	V
9+50	0. 0491	0. 08	Q	V
9+55	0. 0497	0. 08	Q	V
10+ 0	0. 0503	0. 09	Q	V
10+ 5	0. 0509	0. 09	Q	V
10+10	0. 0515	0. 09	Q	V
10+15	0. 0521	0. 09	Q	V
10+20	0. 0527	0. 09	Q	V
10+25	0. 0533	0. 09	Q	V
10+30	0. 0539	0. 09	Q	V
10+35	0. 0546	0. 09	Q	V
10+40	0. 0552	0. 09	Q	V
10+45	0. 0558	0. 09	Q	V
10+50	0. 0565	0. 09	Q	V
10+55	0. 0571	0. 09	Q	V
11+ 0	0. 0578	0. 10	Q	V
11+ 5	0. 0584	0. 10	Q	V
11+10	0. 0591	0. 10	Q	V
11+15	0. 0598	0. 10	Q	V
11+20	0. 0605	0. 10	Q	V
11+25	0. 0612	0. 10	Q	V
11+30	0. 0619	0. 10	Q	V
11+35	0. 0626	0. 10	Q	V
11+40	0. 0633	0. 10	Q	V
11+45	0. 0640	0. 10	Q	V
11+50	0. 0647	0. 11	Q	V
11+55	0. 0655	0. 11	Q	V
12+ 0	0. 0662	0. 11	Q	V
12+ 5	0. 0670	0. 11	Q	V
12+10	0. 0677	0. 10	Q	V
12+15	0. 0683	0. 10	Q	V
12+20	0. 0690	0. 10	Q	V
12+25	0. 0697	0. 10	Q	V
12+30	0. 0704	0. 10	Q	V
12+35	0. 0711	0. 10	Q	V
12+40	0. 0718	0. 10	Q	V
12+45	0. 0726	0. 11	Q	V
12+50	0. 0733	0. 11	Q	V
12+55	0. 0741	0. 11	Q	V
13+ 0	0. 0749	0. 11	Q	V
13+ 5	0. 0756	0. 11	Q	V
13+10	0. 0764	0. 12	Q	V
13+15	0. 0773	0. 12	Q	V
13+20	0. 0781	0. 12	Q	V
13+25	0. 0789	0. 12	Q	V
13+30	0. 0798	0. 13	Q	V

13+35	0. 0807	0. 13	Q	V			
13+40	0. 0816	0. 13	Q	V			
13+45	0. 0825	0. 13	Q	V			
13+50	0. 0835	0. 14	Q	V			
13+55	0. 0844	0. 14	Q	V			
14+ 0	0. 0854	0. 14	Q	V			
14+ 5	0. 0865	0. 15	Q	V			
14+10	0. 0875	0. 15	Q	V			
14+15	0. 0886	0. 16	Q	V			
14+20	0. 0897	0. 16	Q	V			
14+25	0. 0908	0. 17	Q	V			
14+30	0. 0920	0. 17	Q	V			
14+35	0. 0933	0. 18	Q	V			
14+40	0. 0945	0. 18	Q	V			
14+45	0. 0958	0. 19	Q	V			
14+50	0. 0972	0. 20	Q	V			
14+55	0. 0987	0. 21	Q	V			
15+ 0	0. 1002	0. 22	Q	V			
15+ 5	0. 1017	0. 23	Q	V			
15+10	0. 1034	0. 24	Q	V			
15+15	0. 1052	0. 26	Q	V			
15+20	0. 1071	0. 27	Q	V			
15+25	0. 1090	0. 29	Q	V			
15+30	0. 1111	0. 30	Q	V			
15+35	0. 1133	0. 32	Q	V			
15+40	0. 1158	0. 36	Q	V			
15+45	0. 1186	0. 40	Q	V			
15+50	0. 1220	0. 50	Q	V			
15+55	0. 1270	0. 72	Q	V			
16+ 0	0. 1360	1. 31	Q	V			
16+ 5	0. 1591	3. 36	Q	V			
16+10	0. 2141	7. 99	Q	V			
16+15	0. 2380	3. 46	Q	V			
16+20	0. 2494	1. 66	Q	V			
16+25	0. 2553	0. 85	Q	V			
16+30	0. 2586	0. 49	Q	V			
16+35	0. 2613	0. 38	Q	V			
16+40	0. 2633	0. 30	Q	V			
16+45	0. 2649	0. 23	Q	V			
16+50	0. 2663	0. 21	Q	V			
16+55	0. 2677	0. 19	Q	V			
17+ 0	0. 2689	0. 18	Q	V			
17+ 5	0. 2700	0. 17	Q	V			
17+10	0. 2711	0. 16	Q	V			
17+15	0. 2721	0. 15	Q	V			
17+20	0. 2731	0. 14	Q	V			
17+25	0. 2740	0. 13	Q	V			
17+30	0. 2749	0. 13	Q	V			
17+35	0. 2757	0. 12	Q	V			
17+40	0. 2766	0. 12	Q	V			
17+45	0. 2773	0. 11	Q	V			
17+50	0. 2781	0. 11	Q	V			
17+55	0. 2788	0. 11	Q	V			
18+ 0	0. 2795	0. 10	Q	V			
18+ 5	0. 2802	0. 10	Q	V			
18+10	0. 2810	0. 11	Q	V			
18+15	0. 2817	0. 11	Q	V			
18+20	0. 2824	0. 11	Q	V			
18+25	0. 2832	0. 10	Q	V			
18+30	0. 2839	0. 10	Q	V			
18+35	0. 2846	0. 10	Q	V			
18+40	0. 2852	0. 10	Q	V			
18+45	0. 2859	0. 10	Q	V			

18+50	0. 2865	0. 09	Q	V
18+55	0. 2872	0. 09	Q	V
19+ 0	0. 2878	0. 09	Q	V
19+ 5	0. 2884	0. 09	Q	V
19+10	0. 2890	0. 09	Q	V
19+15	0. 2896	0. 09	Q	V
19+20	0. 2902	0. 08	Q	V
19+25	0. 2908	0. 08	Q	V
19+30	0. 2913	0. 08	Q	V
19+35	0. 2919	0. 08	Q	V
19+40	0. 2924	0. 08	Q	V
19+45	0. 2930	0. 08	Q	V
19+50	0. 2935	0. 08	Q	V
19+55	0. 2940	0. 08	Q	V
20+ 0	0. 2945	0. 07	Q	V
20+ 5	0. 2950	0. 07	Q	V
20+10	0. 2955	0. 07	Q	V
20+15	0. 2960	0. 07	Q	V
20+20	0. 2965	0. 07	Q	V
20+25	0. 2970	0. 07	Q	V
20+30	0. 2975	0. 07	Q	V
20+35	0. 2980	0. 07	Q	V
20+40	0. 2984	0. 07	Q	V
20+45	0. 2989	0. 07	Q	V
20+50	0. 2993	0. 07	Q	V
20+55	0. 2998	0. 07	Q	V
21+ 0	0. 3002	0. 06	Q	V
21+ 5	0. 3007	0. 06	Q	V
21+10	0. 3011	0. 06	Q	V
21+15	0. 3016	0. 06	Q	V
21+20	0. 3020	0. 06	Q	V
21+25	0. 3024	0. 06	Q	V
21+30	0. 3028	0. 06	Q	V
21+35	0. 3032	0. 06	Q	V
21+40	0. 3037	0. 06	Q	V
21+45	0. 3041	0. 06	Q	V
21+50	0. 3045	0. 06	Q	V
21+55	0. 3049	0. 06	Q	V
22+ 0	0. 3053	0. 06	Q	V
22+ 5	0. 3057	0. 06	Q	V
22+10	0. 3061	0. 06	Q	V
22+15	0. 3064	0. 06	Q	V
22+20	0. 3068	0. 06	Q	V
22+25	0. 3072	0. 06	Q	V
22+30	0. 3076	0. 05	Q	V
22+35	0. 3080	0. 05	Q	V
22+40	0. 3083	0. 05	Q	V
22+45	0. 3087	0. 05	Q	V
22+50	0. 3091	0. 05	Q	V
22+55	0. 3094	0. 05	Q	V
23+ 0	0. 3098	0. 05	Q	V
23+ 5	0. 3101	0. 05	Q	V
23+10	0. 3105	0. 05	Q	V
23+15	0. 3109	0. 05	Q	V
23+20	0. 3112	0. 05	Q	V
23+25	0. 3115	0. 05	Q	V
23+30	0. 3119	0. 05	Q	V
23+35	0. 3122	0. 05	Q	V
23+40	0. 3126	0. 05	Q	V
23+45	0. 3129	0. 05	Q	V
23+50	0. 3132	0. 05	Q	V
23+55	0. 3136	0. 05	Q	V
24+ 0	0. 3139	0. 05	Q	V

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24+ 5	0. 3142	0. 04	Q				V
24+10	0. 3143	0. 02	Q				V
24+15	0. 3144	0. 01	Q				V
24+20	0. 3144	0. 00	Q				V
24+25	0. 3144	0. 00	Q				V
24+30	0. 3144	0. 00	Q				V
24+35	0. 3144	0. 00	Q				V

PDB03285. out

Unit Hydrograph Analysis

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Study date 01/18/16

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6296

HAWK RIDGE - AREA 5
100-YEAR - 24-HOUR
EXISTING OFF SITE HYDROLOGY

Storm Event Year = 100

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Rainfall data for year	Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
10	26.05	1	1.00
2	26.05	6	1.13
2	26.05	24	1.87
100	26.05	1	1.93
100	26.05	6	3.47
100	26.05	24	5.88

+++++

***** Area-averaged max loss rate, Fm *****

PDB03285. out

SCS curve No. (AMCII)	SCS curve NO. (AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
66.0	66.0	26.05	1.000	0.593	1.000	0.593

Area-averaged adjusted loss rate Fm (In/Hr) = 0.593

***** Area-Averaged low loss rate fraction, Yb *****

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
26.05	1.000	66.0	66.0	5.15	0.400

Area-averaged catchment yield fraction, Y = 0.400

Area-averaged low loss fraction, Yb = 0.600

User entry of time of concentration = 0.173 (hours)

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Watershed area = 26.05(Ac.)

Catchment Lag time = 0.138 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 60.2119

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.593(In/Hr)

Average low loss rate fraction (Yb) = 0.600 (decimal)

FOOTHILL S-Graph Selected

Computed peak 5-minute rainfall = 0.916(In)

Computed peak 30-minute rainfall = 1.568(In)

Specified peak 1-hour rainfall = 1.930(In)

Computed peak 3-hour rainfall = 2.765(In)

Specified peak 6-hour rainfall = 3.470(In)

Specified peak 24-hour rainfall = 5.880(In)

Rainfall depth area reduction factors:

Using a total area of 26.05(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999	Adjusted rainfall = 0.915(In)
30-minute factor = 0.999	Adjusted rainfall = 1.566(In)
1-hour factor = 0.999	Adjusted rainfall = 1.928(In)
3-hour factor = 1.000	Adjusted rainfall = 2.765(In)
6-hour factor = 1.000	Adjusted rainfall = 3.470(In)
24-hour factor = 1.000	Adjusted rainfall = 5.880(In)

Unit Hydrograph

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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
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(K = 315.04 (CFS))

1	5.621	17.710
2	37.466	100.323
3	71.419	106.967
4	83.772	38.918
5	90.904	22.470
6	95.211	13.568
7	97.578	7.457
8	98.502	2.911
9	99.060	1.756
10	99.477	1.315
11	99.826	1.101
12	100.000	0.547

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Peak Number	Unit Adjusted mass (In)	Unit rainfall (In)
1	0.9147	0.9147
2	1.1261	0.2114
3	1.2718	0.1457
4	1.3864	0.1146
5	1.4824	0.0960
6	1.5657	0.0833
7	1.6398	0.0741
8	1.7069	0.0670
9	1.7683	0.0614
10	1.8250	0.0568
11	1.8780	0.0529
12	1.9276	0.0497
13	1.9790	0.0513
14	2.0277	0.0488
15	2.0742	0.0465
16	2.1186	0.0444
17	2.1612	0.0426
18	2.2022	0.0409
19	2.2416	0.0394
20	2.2797	0.0381
21	2.3165	0.0368
22	2.3522	0.0357
23	2.3868	0.0346
24	2.4204	0.0336
25	2.4530	0.0327
26	2.4848	0.0318
27	2.5158	0.0310
28	2.5460	0.0302
29	2.5755	0.0295
30	2.6044	0.0288
31	2.6326	0.0282
32	2.6601	0.0276
33	2.6872	0.0270
34	2.7136	0.0265
35	2.7396	0.0260
36	2.7650	0.0255
37	2.7900	0.0249
38	2.8144	0.0245
39	2.8385	0.0240
40	2.8621	0.0236
41	2.8854	0.0232
42	2.9082	0.0229
43	2.9307	0.0225
44	2.9529	0.0221
45	2.9747	0.0218
46	2.9962	0.0215
47	3.0174	0.0212
48	3.0382	0.0209
49	3.0588	0.0206
50	3.0791	0.0203
51	3.0992	0.0200
52	3.1189	0.0198
53	3.1385	0.0195
54	3.1577	0.0193
55	3.1768	0.0190
56	3.1956	0.0188
57	3.2141	0.0186
58	3.2325	0.0184
59	3.2507	0.0181
60	3.2686	0.0179
61	3.2863	0.0177

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62	3. 3039	0. 0175
63	3. 3212	0. 0174
64	3. 3384	0. 0172
65	3. 3554	0. 0170
66	3. 3722	0. 0168
67	3. 3889	0. 0166
68	3. 4054	0. 0165
69	3. 4217	0. 0163
70	3. 4379	0. 0162
71	3. 4539	0. 0160
72	3. 4697	0. 0159
73	3. 4880	0. 0183
74	3. 5061	0. 0181
75	3. 5240	0. 0180
76	3. 5418	0. 0178
77	3. 5595	0. 0177
78	3. 5770	0. 0175
79	3. 5944	0. 0174
80	3. 6116	0. 0172
81	3. 6287	0. 0171
82	3. 6457	0. 0170
83	3. 6626	0. 0169
84	3. 6793	0. 0167
85	3. 6959	0. 0166
86	3. 7124	0. 0165
87	3. 7288	0. 0164
88	3. 7450	0. 0162
89	3. 7611	0. 0161
90	3. 7772	0. 0160
91	3. 7931	0. 0159
92	3. 8089	0. 0158
93	3. 8246	0. 0157
94	3. 8402	0. 0156
95	3. 8557	0. 0155
96	3. 8711	0. 0154
97	3. 8864	0. 0153
98	3. 9016	0. 0152
99	3. 9167	0. 0151
100	3. 9317	0. 0150
101	3. 9466	0. 0149
102	3. 9614	0. 0148
103	3. 9761	0. 0147
104	3. 9908	0. 0146
105	4. 0053	0. 0146
106	4. 0198	0. 0145
107	4. 0342	0. 0144
108	4. 0485	0. 0143
109	4. 0627	0. 0142
110	4. 0768	0. 0141
111	4. 0909	0. 0141
112	4. 1049	0. 0140
113	4. 1188	0. 0139
114	4. 1326	0. 0138
115	4. 1464	0. 0138
116	4. 1601	0. 0137
117	4. 1737	0. 0136
118	4. 1872	0. 0135
119	4. 2007	0. 0135
120	4. 2141	0. 0134
121	4. 2274	0. 0133
122	4. 2407	0. 0133
123	4. 2539	0. 0132
124	4. 2670	0. 0131

PDB03285. out

125	4. 2800	0. 0131
126	4. 2930	0. 0130
127	4. 3060	0. 0129
128	4. 3188	0. 0129
129	4. 3316	0. 0128
130	4. 3444	0. 0127
131	4. 3571	0. 0127
132	4. 3697	0. 0126
133	4. 3823	0. 0126
134	4. 3948	0. 0125
135	4. 4072	0. 0124
136	4. 4196	0. 0124
137	4. 4319	0. 0123
138	4. 4442	0. 0123
139	4. 4565	0. 0122
140	4. 4686	0. 0122
141	4. 4807	0. 0121
142	4. 4928	0. 0121
143	4. 5048	0. 0120
144	4. 5168	0. 0120
145	4. 5287	0. 0119
146	4. 5405	0. 0119
147	4. 5524	0. 0118
148	4. 5641	0. 0118
149	4. 5758	0. 0117
150	4. 5875	0. 0117
151	4. 5991	0. 0116
152	4. 6107	0. 0116
153	4. 6222	0. 0115
154	4. 6336	0. 0115
155	4. 6451	0. 0114
156	4. 6564	0. 0114
157	4. 6678	0. 0113
158	4. 6791	0. 0113
159	4. 6903	0. 0112
160	4. 7015	0. 0112
161	4. 7127	0. 0112
162	4. 7238	0. 0111
163	4. 7349	0. 0111
164	4. 7459	0. 0110
165	4. 7569	0. 0110
166	4. 7678	0. 0109
167	4. 7787	0. 0109
168	4. 7896	0. 0109
169	4. 8004	0. 0108
170	4. 8112	0. 0108
171	4. 8220	0. 0107
172	4. 8327	0. 0107
173	4. 8434	0. 0107
174	4. 8540	0. 0106
175	4. 8646	0. 0106
176	4. 8751	0. 0106
177	4. 8857	0. 0105
178	4. 8961	0. 0105
179	4. 9066	0. 0104
180	4. 9170	0. 0104
181	4. 9274	0. 0104
182	4. 9377	0. 0103
183	4. 9480	0. 0103
184	4. 9583	0. 0103
185	4. 9685	0. 0102
186	4. 9787	0. 0102
187	4. 9889	0. 0102

PDB03285. out

188	4. 9990	0. 0101
189	5. 0091	0. 0101
190	5. 0192	0. 0101
191	5. 0292	0. 0100
192	5. 0392	0. 0100
193	5. 0492	0. 0100
194	5. 0591	0. 0099
195	5. 0691	0. 0099
196	5. 0789	0. 0099
197	5. 0888	0. 0098
198	5. 0986	0. 0098
199	5. 1084	0. 0098
200	5. 1181	0. 0098
201	5. 1278	0. 0097
202	5. 1375	0. 0097
203	5. 1472	0. 0097
204	5. 1568	0. 0096
205	5. 1664	0. 0096
206	5. 1760	0. 0096
207	5. 1855	0. 0095
208	5. 1951	0. 0095
209	5. 2046	0. 0095
210	5. 2140	0. 0095
211	5. 2234	0. 0094
212	5. 2329	0. 0094
213	5. 2422	0. 0094
214	5. 2516	0. 0094
215	5. 2609	0. 0093
216	5. 2702	0. 0093
217	5. 2795	0. 0093
218	5. 2887	0. 0092
219	5. 2979	0. 0092
220	5. 3071	0. 0092
221	5. 3163	0. 0092
222	5. 3254	0. 0091
223	5. 3345	0. 0091
224	5. 3436	0. 0091
225	5. 3527	0. 0091
226	5. 3617	0. 0090
227	5. 3707	0. 0090
228	5. 3797	0. 0090
229	5. 3887	0. 0090
230	5. 3976	0. 0089
231	5. 4066	0. 0089
232	5. 4155	0. 0089
233	5. 4243	0. 0089
234	5. 4332	0. 0088
235	5. 4420	0. 0088
236	5. 4508	0. 0088
237	5. 4596	0. 0088
238	5. 4683	0. 0088
239	5. 4771	0. 0087
240	5. 4858	0. 0087
241	5. 4944	0. 0087
242	5. 5031	0. 0087
243	5. 5117	0. 0086
244	5. 5204	0. 0086
245	5. 5290	0. 0086
246	5. 5375	0. 0086
247	5. 5461	0. 0086
248	5. 5546	0. 0085
249	5. 5631	0. 0085
250	5. 5716	0. 0085

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251	5. 5801	0. 0085
252	5. 5885	0. 0084
253	5. 5970	0. 0084
254	5. 6054	0. 0084
255	5. 6138	0. 0084
256	5. 6221	0. 0084
257	5. 6305	0. 0083
258	5. 6388	0. 0083
259	5. 6471	0. 0083
260	5. 6554	0. 0083
261	5. 6637	0. 0083
262	5. 6719	0. 0082
263	5. 6801	0. 0082
264	5. 6883	0. 0082
265	5. 6965	0. 0082
266	5. 7047	0. 0082
267	5. 7128	0. 0082
268	5. 7210	0. 0081
269	5. 7291	0. 0081
270	5. 7372	0. 0081
271	5. 7453	0. 0081
272	5. 7533	0. 0081
273	5. 7614	0. 0080
274	5. 7694	0. 0080
275	5. 7774	0. 0080
276	5. 7854	0. 0080
277	5. 7933	0. 0080
278	5. 8013	0. 0079
279	5. 8092	0. 0079
280	5. 8171	0. 0079
281	5. 8250	0. 0079
282	5. 8329	0. 0079
283	5. 8408	0. 0079
284	5. 8486	0. 0078
285	5. 8564	0. 0078
286	5. 8642	0. 0078
287	5. 8720	0. 0078
288	5. 8798	0. 0078

Unit Period (number)	Unit Rainfall (In)	Unit Soil - Loss (In)	Effective Rainfall (In)
1	0. 0078	0. 0047	0. 0031
2	0. 0078	0. 0047	0. 0031
3	0. 0078	0. 0047	0. 0031
4	0. 0078	0. 0047	0. 0031
5	0. 0079	0. 0047	0. 0032
6	0. 0079	0. 0047	0. 0032
7	0. 0079	0. 0048	0. 0032
8	0. 0079	0. 0048	0. 0032
9	0. 0080	0. 0048	0. 0032
10	0. 0080	0. 0048	0. 0032
11	0. 0080	0. 0048	0. 0032
12	0. 0081	0. 0048	0. 0032
13	0. 0081	0. 0049	0. 0032
14	0. 0081	0. 0049	0. 0032
15	0. 0082	0. 0049	0. 0033
16	0. 0082	0. 0049	0. 0033
17	0. 0082	0. 0049	0. 0033
18	0. 0082	0. 0049	0. 0033
19	0. 0083	0. 0050	0. 0033
20	0. 0083	0. 0050	0. 0033

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21	0. 0083	0. 0050	0. 0033
22	0. 0083	0. 0050	0. 0033
23	0. 0084	0. 0050	0. 0034
24	0. 0084	0. 0050	0. 0034
25	0. 0084	0. 0051	0. 0034
26	0. 0085	0. 0051	0. 0034
27	0. 0085	0. 0051	0. 0034
28	0. 0085	0. 0051	0. 0034
29	0. 0086	0. 0051	0. 0034
30	0. 0086	0. 0052	0. 0034
31	0. 0086	0. 0052	0. 0035
32	0. 0087	0. 0052	0. 0035
33	0. 0087	0. 0052	0. 0035
34	0. 0087	0. 0052	0. 0035
35	0. 0088	0. 0053	0. 0035
36	0. 0088	0. 0053	0. 0035
37	0. 0088	0. 0053	0. 0035
38	0. 0089	0. 0053	0. 0035
39	0. 0089	0. 0054	0. 0036
40	0. 0089	0. 0054	0. 0036
41	0. 0090	0. 0054	0. 0036
42	0. 0090	0. 0054	0. 0036
43	0. 0091	0. 0054	0. 0036
44	0. 0091	0. 0055	0. 0036
45	0. 0091	0. 0055	0. 0037
46	0. 0092	0. 0055	0. 0037
47	0. 0092	0. 0055	0. 0037
48	0. 0092	0. 0055	0. 0037
49	0. 0093	0. 0056	0. 0037
50	0. 0093	0. 0056	0. 0037
51	0. 0094	0. 0056	0. 0038
52	0. 0094	0. 0056	0. 0038
53	0. 0095	0. 0057	0. 0038
54	0. 0095	0. 0057	0. 0038
55	0. 0095	0. 0057	0. 0038
56	0. 0096	0. 0057	0. 0038
57	0. 0096	0. 0058	0. 0039
58	0. 0097	0. 0058	0. 0039
59	0. 0097	0. 0058	0. 0039
60	0. 0098	0. 0059	0. 0039
61	0. 0098	0. 0059	0. 0039
62	0. 0098	0. 0059	0. 0039
63	0. 0099	0. 0059	0. 0040
64	0. 0099	0. 0060	0. 0040
65	0. 0100	0. 0060	0. 0040
66	0. 0100	0. 0060	0. 0040
67	0. 0101	0. 0061	0. 0040
68	0. 0101	0. 0061	0. 0041
69	0. 0102	0. 0061	0. 0041
70	0. 0102	0. 0061	0. 0041
71	0. 0103	0. 0062	0. 0041
72	0. 0103	0. 0062	0. 0041
73	0. 0104	0. 0062	0. 0042
74	0. 0104	0. 0063	0. 0042
75	0. 0105	0. 0063	0. 0042
76	0. 0106	0. 0063	0. 0042
77	0. 0106	0. 0064	0. 0043
78	0. 0107	0. 0064	0. 0043
79	0. 0107	0. 0064	0. 0043
80	0. 0108	0. 0065	0. 0043
81	0. 0109	0. 0065	0. 0043
82	0. 0109	0. 0065	0. 0044
83	0. 0110	0. 0066	0. 0044

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84	0. 0110	0. 0066	0. 0044
85	0. 0111	0. 0067	0. 0044
86	0. 0112	0. 0067	0. 0045
87	0. 0112	0. 0067	0. 0045
88	0. 0113	0. 0068	0. 0045
89	0. 0114	0. 0068	0. 0046
90	0. 0114	0. 0069	0. 0046
91	0. 0115	0. 0069	0. 0046
92	0. 0116	0. 0069	0. 0046
93	0. 0117	0. 0070	0. 0047
94	0. 0117	0. 0070	0. 0047
95	0. 0118	0. 0071	0. 0047
96	0. 0119	0. 0071	0. 0047
97	0. 0120	0. 0072	0. 0048
98	0. 0120	0. 0072	0. 0048
99	0. 0121	0. 0073	0. 0048
100	0. 0122	0. 0073	0. 0049
101	0. 0123	0. 0074	0. 0049
102	0. 0123	0. 0074	0. 0049
103	0. 0124	0. 0075	0. 0050
104	0. 0125	0. 0075	0. 0050
105	0. 0126	0. 0076	0. 0050
106	0. 0127	0. 0076	0. 0051
107	0. 0128	0. 0077	0. 0051
108	0. 0129	0. 0077	0. 0051
109	0. 0130	0. 0078	0. 0052
110	0. 0131	0. 0078	0. 0052
111	0. 0132	0. 0079	0. 0053
112	0. 0133	0. 0080	0. 0053
113	0. 0134	0. 0080	0. 0054
114	0. 0135	0. 0081	0. 0054
115	0. 0136	0. 0082	0. 0054
116	0. 0137	0. 0082	0. 0055
117	0. 0138	0. 0083	0. 0055
118	0. 0139	0. 0083	0. 0056
119	0. 0141	0. 0084	0. 0056
120	0. 0141	0. 0085	0. 0057
121	0. 0143	0. 0086	0. 0057
122	0. 0144	0. 0086	0. 0058
123	0. 0146	0. 0087	0. 0058
124	0. 0146	0. 0088	0. 0059
125	0. 0148	0. 0089	0. 0059
126	0. 0149	0. 0089	0. 0060
127	0. 0151	0. 0091	0. 0060
128	0. 0152	0. 0091	0. 0061
129	0. 0154	0. 0092	0. 0062
130	0. 0155	0. 0093	0. 0062
131	0. 0157	0. 0094	0. 0063
132	0. 0158	0. 0095	0. 0063
133	0. 0160	0. 0096	0. 0064
134	0. 0161	0. 0097	0. 0065
135	0. 0164	0. 0098	0. 0065
136	0. 0165	0. 0099	0. 0066
137	0. 0167	0. 0100	0. 0067
138	0. 0169	0. 0101	0. 0067
139	0. 0171	0. 0103	0. 0068
140	0. 0172	0. 0103	0. 0069
141	0. 0175	0. 0105	0. 0070
142	0. 0177	0. 0106	0. 0071
143	0. 0180	0. 0108	0. 0072
144	0. 0181	0. 0109	0. 0072
145	0. 0159	0. 0095	0. 0063
146	0. 0160	0. 0096	0. 0064

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147	0. 0163	0. 0098	0. 0065
148	0. 0165	0. 0099	0. 0066
149	0. 0168	0. 0101	0. 0067
150	0. 0170	0. 0102	0. 0068
151	0. 0174	0. 0104	0. 0069
152	0. 0175	0. 0105	0. 0070
153	0. 0179	0. 0108	0. 0072
154	0. 0181	0. 0109	0. 0073
155	0. 0186	0. 0111	0. 0074
156	0. 0188	0. 0113	0. 0075
157	0. 0193	0. 0116	0. 0077
158	0. 0195	0. 0117	0. 0078
159	0. 0200	0. 0120	0. 0080
160	0. 0203	0. 0122	0. 0081
161	0. 0209	0. 0125	0. 0083
162	0. 0212	0. 0127	0. 0085
163	0. 0218	0. 0131	0. 0087
164	0. 0221	0. 0133	0. 0089
165	0. 0229	0. 0137	0. 0091
166	0. 0232	0. 0139	0. 0093
167	0. 0240	0. 0144	0. 0096
168	0. 0245	0. 0147	0. 0098
169	0. 0255	0. 0153	0. 0102
170	0. 0260	0. 0156	0. 0104
171	0. 0270	0. 0162	0. 0108
172	0. 0276	0. 0166	0. 0110
173	0. 0288	0. 0173	0. 0115
174	0. 0295	0. 0177	0. 0118
175	0. 0310	0. 0186	0. 0124
176	0. 0318	0. 0191	0. 0127
177	0. 0336	0. 0202	0. 0134
178	0. 0346	0. 0208	0. 0138
179	0. 0368	0. 0221	0. 0147
180	0. 0381	0. 0228	0. 0152
181	0. 0409	0. 0246	0. 0164
182	0. 0426	0. 0256	0. 0170
183	0. 0465	0. 0279	0. 0186
184	0. 0488	0. 0293	0. 0195
185	0. 0497	0. 0298	0. 0199
186	0. 0529	0. 0318	0. 0212
187	0. 0614	0. 0368	0. 0246
188	0. 0670	0. 0402	0. 0268
189	0. 0833	0. 0494	0. 0339
190	0. 0960	0. 0494	0. 0465
191	0. 1457	0. 0494	0. 0962
192	0. 2114	0. 0494	0. 1620
193	0. 9147	0. 0494	0. 8652
194	0. 1146	0. 0494	0. 0652
195	0. 0741	0. 0445	0. 0296
196	0. 0568	0. 0341	0. 0227
197	0. 0513	0. 0308	0. 0205
198	0. 0444	0. 0267	0. 0178
199	0. 0394	0. 0237	0. 0158
200	0. 0357	0. 0214	0. 0143
201	0. 0327	0. 0196	0. 0131
202	0. 0302	0. 0181	0. 0121
203	0. 0282	0. 0169	0. 0113
204	0. 0265	0. 0159	0. 0106
205	0. 0249	0. 0150	0. 0100
206	0. 0236	0. 0142	0. 0095
207	0. 0225	0. 0135	0. 0090
208	0. 0215	0. 0129	0. 0086
209	0. 0206	0. 0124	0. 0082

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210	0. 0198	0. 0119	0. 0079
211	0. 0190	0. 0114	0. 0076
212	0. 0184	0. 0110	0. 0073
213	0. 0177	0. 0106	0. 0071
214	0. 0172	0. 0103	0. 0069
215	0. 0166	0. 0100	0. 0067
216	0. 0162	0. 0097	0. 0065
217	0. 0183	0. 0110	0. 0073
218	0. 0178	0. 0107	0. 0071
219	0. 0174	0. 0104	0. 0070
220	0. 0170	0. 0102	0. 0068
221	0. 0166	0. 0100	0. 0066
222	0. 0162	0. 0098	0. 0065
223	0. 0159	0. 0095	0. 0064
224	0. 0156	0. 0094	0. 0062
225	0. 0153	0. 0092	0. 0061
226	0. 0150	0. 0090	0. 0060
227	0. 0147	0. 0088	0. 0059
228	0. 0145	0. 0087	0. 0058
229	0. 0142	0. 0085	0. 0057
230	0. 0140	0. 0084	0. 0056
231	0. 0138	0. 0083	0. 0055
232	0. 0135	0. 0081	0. 0054
233	0. 0133	0. 0080	0. 0053
234	0. 0131	0. 0079	0. 0052
235	0. 0129	0. 0078	0. 0052
236	0. 0127	0. 0076	0. 0051
237	0. 0126	0. 0075	0. 0050
238	0. 0124	0. 0074	0. 0050
239	0. 0122	0. 0073	0. 0049
240	0. 0121	0. 0072	0. 0048
241	0. 0119	0. 0071	0. 0048
242	0. 0118	0. 0071	0. 0047
243	0. 0116	0. 0070	0. 0046
244	0. 0115	0. 0069	0. 0046
245	0. 0113	0. 0068	0. 0045
246	0. 0112	0. 0067	0. 0045
247	0. 0111	0. 0066	0. 0044
248	0. 0109	0. 0066	0. 0044
249	0. 0108	0. 0065	0. 0043
250	0. 0107	0. 0064	0. 0043
251	0. 0106	0. 0064	0. 0042
252	0. 0105	0. 0063	0. 0042
253	0. 0104	0. 0062	0. 0041
254	0. 0103	0. 0062	0. 0041
255	0. 0102	0. 0061	0. 0041
256	0. 0101	0. 0060	0. 0040
257	0. 0100	0. 0060	0. 0040
258	0. 0099	0. 0059	0. 0039
259	0. 0098	0. 0059	0. 0039
260	0. 0097	0. 0058	0. 0039
261	0. 0096	0. 0058	0. 0038
262	0. 0095	0. 0057	0. 0038
263	0. 0094	0. 0057	0. 0038
264	0. 0094	0. 0056	0. 0037
265	0. 0093	0. 0056	0. 0037
266	0. 0092	0. 0055	0. 0037
267	0. 0091	0. 0055	0. 0036
268	0. 0090	0. 0054	0. 0036
269	0. 0090	0. 0054	0. 0036
270	0. 0089	0. 0053	0. 0036
271	0. 0088	0. 0053	0. 0035
272	0. 0088	0. 0053	0. 0035

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273	0.0087	0.0052	0.0035
274	0.0086	0.0052	0.0034
275	0.0086	0.0051	0.0034
276	0.0085	0.0051	0.0034
277	0.0084	0.0051	0.0034
278	0.0084	0.0050	0.0033
279	0.0083	0.0050	0.0033
280	0.0082	0.0049	0.0033
281	0.0082	0.0049	0.0033
282	0.0081	0.0049	0.0033
283	0.0081	0.0048	0.0032
284	0.0080	0.0048	0.0032
285	0.0080	0.0048	0.0032
286	0.0079	0.0047	0.0032
287	0.0079	0.0047	0.0031
288	0.0078	0.0047	0.0031

 Total soil rain loss = 2.89(In)
 Total effective rainfall = 2.99(In)
 Peak flow rate in flood hydrograph = 110.90(CFS)

+++++
 24 - H O U R S T O R M
 R u n o f f H y d r o g r a p h

 Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac. Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0004		0.06	Q				
0+10	0.0029		0.37	Q				
0+15	0.0077		0.70	Q				
0+20	0.0134		0.82	Q				
0+25	0.0196		0.90	Q				
0+30	0.0261		0.94	Q				
0+35	0.0327		0.97	Q				
0+40	0.0395		0.98	Q				
0+45	0.0463		0.99	Q				
0+50	0.0532		1.00	Q				
0+55	0.0601		1.00	Q				
1+ 0	0.0670		1.01	Q				
1+ 5	0.0740		1.01	Q				
1+10	0.0810		1.02	Q				
1+15	0.0880		1.02	Q				
1+20	0.0950		1.02	Q				
1+25	0.1021		1.03	Q				
1+30	0.1092		1.03	Q				
1+35	0.1163		1.03	Q				
1+40	0.1234		1.04	Q				
1+45	0.1306		1.04	Q				
1+50	0.1378		1.04	Q				
1+55	0.1450		1.05	Q				
2+ 0	0.1522		1.05	Q				
2+ 5	0.1595		1.06	Q				
2+10	0.1668		1.06	QV				
2+15	0.1741		1.06	QV				
2+20	0.1815		1.07	QV				
2+25	0.1888		1.07	QV				
2+30	0.1962		1.07	QV				
2+35	0.2037		1.08	QV				
2+40	0.2111		1.08	QV				

2+45	0. 2186	1. 09	QV
2+50	0. 2261	1. 09	QV
2+55	0. 2337	1. 10	QV
3+ 0	0. 2413	1. 10	QV
3+ 5	0. 2489	1. 10	QV
3+10	0. 2565	1. 11	QV
3+15	0. 2642	1. 11	QV
3+20	0. 2719	1. 12	QV
3+25	0. 2796	1. 12	QV
3+30	0. 2873	1. 13	QV
3+35	0. 2951	1. 13	QV
3+40	0. 3030	1. 14	QV
3+45	0. 3108	1. 14	QV
3+50	0. 3187	1. 15	QV
3+55	0. 3266	1. 15	Q V
4+ 0	0. 3346	1. 15	Q V
4+ 5	0. 3426	1. 16	Q V
4+10	0. 3506	1. 16	Q V
4+15	0. 3586	1. 17	Q V
4+20	0. 3667	1. 17	Q V
4+25	0. 3748	1. 18	Q V
4+30	0. 3830	1. 18	Q V
4+35	0. 3912	1. 19	Q V
4+40	0. 3994	1. 20	Q V
4+45	0. 4077	1. 20	Q V
4+50	0. 4160	1. 21	Q V
4+55	0. 4244	1. 21	Q V
5+ 0	0. 4327	1. 22	Q V
5+ 5	0. 4412	1. 22	Q V
5+10	0. 4496	1. 23	Q V
5+15	0. 4581	1. 23	Q V
5+20	0. 4667	1. 24	Q V
5+25	0. 4752	1. 25	Q V
5+30	0. 4839	1. 25	Q V
5+35	0. 4925	1. 26	Q V
5+40	0. 5012	1. 26	Q V
5+45	0. 5100	1. 27	Q V
5+50	0. 5188	1. 28	Q V
5+55	0. 5276	1. 28	Q V
6+ 0	0. 5365	1. 29	Q V
6+ 5	0. 5454	1. 30	Q V
6+10	0. 5544	1. 30	Q V
6+15	0. 5634	1. 31	Q V
6+20	0. 5725	1. 32	Q V
6+25	0. 5816	1. 32	Q V
6+30	0. 5907	1. 33	Q V
6+35	0. 6000	1. 34	Q V
6+40	0. 6092	1. 34	Q V
6+45	0. 6185	1. 35	Q V
6+50	0. 6279	1. 36	Q V
6+55	0. 6373	1. 37	Q V
7+ 0	0. 6468	1. 37	Q V
7+ 5	0. 6563	1. 38	Q V
7+10	0. 6658	1. 39	Q V
7+15	0. 6755	1. 40	Q V
7+20	0. 6852	1. 41	Q V
7+25	0. 6949	1. 41	Q V
7+30	0. 7047	1. 42	Q V
7+35	0. 7145	1. 43	Q V
7+40	0. 7245	1. 44	Q V
7+45	0. 7344	1. 45	Q V
7+50	0. 7445	1. 46	Q V
7+55	0. 7546	1. 47	Q V

8+ 0	0. 7647	1. 48	Q	V
8+ 5	0. 7749	1. 48	Q	V
8+10	0. 7852	1. 49	Q	V
8+15	0. 7956	1. 50	Q	V
8+20	0. 8060	1. 51	Q	V
8+25	0. 8165	1. 52	Q	V
8+30	0. 8271	1. 53	Q	V
8+35	0. 8377	1. 54	Q	V
8+40	0. 8484	1. 55	Q	V
8+45	0. 8592	1. 56	Q	V
8+50	0. 8700	1. 58	Q	V
8+55	0. 8809	1. 59	Q	V
9+ 0	0. 8920	1. 60	Q	V
9+ 5	0. 9030	1. 61	Q	V
9+10	0. 9142	1. 62	Q	V
9+15	0. 9254	1. 63	Q	V
9+20	0. 9368	1. 65	Q	V
9+25	0. 9482	1. 66	Q	V
9+30	0. 9597	1. 67	Q	V
9+35	0. 9713	1. 68	Q	V
9+40	0. 9830	1. 70	Q	V
9+45	0. 9948	1. 71	Q	V
9+50	1. 0066	1. 72	Q	V
9+55	1. 0186	1. 74	Q	V
10+ 0	1. 0307	1. 75	Q	V
10+ 5	1. 0428	1. 77	Q	V
10+10	1. 0551	1. 78	Q	V
10+15	1. 0675	1. 80	Q	V
10+20	1. 0800	1. 81	Q	V
10+25	1. 0925	1. 83	Q	V
10+30	1. 1052	1. 84	Q	V
10+35	1. 1181	1. 86	Q	V
10+40	1. 1310	1. 88	Q	V
10+45	1. 1441	1. 90	Q	V
10+50	1. 1573	1. 91	Q	V
10+55	1. 1706	1. 93	Q	V
11+ 0	1. 1840	1. 95	Q	V
11+ 5	1. 1976	1. 97	Q	V
11+10	1. 2113	1. 99	Q	V
11+15	1. 2252	2. 01	Q	V
11+20	1. 2392	2. 03	Q	V
11+25	1. 2533	2. 05	Q	V
11+30	1. 2676	2. 08	Q	V
11+35	1. 2821	2. 10	Q	V
11+40	1. 2967	2. 12	Q	V
11+45	1. 3115	2. 15	Q	V
11+50	1. 3264	2. 17	Q	V
11+55	1. 3416	2. 20	Q	V
12+ 0	1. 3569	2. 23	Q	V
12+ 5	1. 3723	2. 23	Q	V
12+10	1. 3872	2. 16	Q	V
12+15	1. 4015	2. 08	Q	V
12+20	1. 4157	2. 07	Q	V
12+25	1. 4300	2. 08	Q	V
12+30	1. 4444	2. 09	Q	V
12+35	1. 4590	2. 12	Q	V
12+40	1. 4738	2. 15	Q	V
12+45	1. 4888	2. 18	Q	V
12+50	1. 5040	2. 21	Q	V
12+55	1. 5195	2. 25	Q	V
13+ 0	1. 5353	2. 29	Q	V
13+ 5	1. 5513	2. 33	Q	V
13+10	1. 5676	2. 37	Q	V

13+15	1. 5843	2. 41	Q	V				
13+20	1. 6012	2. 46	Q	V				
13+25	1. 6185	2. 51	Q	V				
13+30	1. 6361	2. 56	Q	V				
13+35	1. 6541	2. 61	Q	V				
13+40	1. 6725	2. 67	Q	V				
13+45	1. 6913	2. 73	Q	V				
13+50	1. 7105	2. 79	Q	V				
13+55	1. 7302	2. 86	Q	V				
14+ 0	1. 7504	2. 93	Q	V				
14+ 5	1. 7711	3. 01	Q	V				
14+10	1. 7924	3. 09	Q	V				
14+15	1. 8143	3. 18	Q	V				
14+20	1. 8368	3. 27	Q	V				
14+25	1. 8601	3. 37	Q	V				
14+30	1. 8840	3. 48	Q	V				
14+35	1. 9088	3. 60	Q	V				
14+40	1. 9345	3. 73	Q	V				
14+45	1. 9611	3. 86	Q	V				
14+50	1. 9888	4. 02	Q	V				
14+55	2. 0176	4. 19	Q	V				
15+ 0	2. 0477	4. 38	Q	V				
15+ 5	2. 0793	4. 58	Q	V				
15+10	2. 1125	4. 82	Q	V				
15+15	2. 1476	5. 09	Q	V				
15+20	2. 1849	5. 41	Q	V				
15+25	2. 2245	5. 74	Q	V				
15+30	2. 2658	6. 00	Q	V				
15+35	2. 3093	6. 32	Q	V				
15+40	2. 3569	6. 91	Q	V				
15+45	2. 4100	7. 71	Q	V				
15+50	2. 4725	9. 07	Q	V				
15+55	2. 5563	12. 17	Q	V				
16+ 0	2. 6944	20. 06	Q	V				
16+ 5	3. 0053	45. 14	Q	V				
16+10	3. 7691	110. 90	Q	V				
16+15	4. 5208	109. 15	Q	V				
16+20	4. 8619	49. 53	Q	V				
16+25	5. 0752	30. 98	Q	V				
16+30	5. 2186	20. 82	Q	V				
16+35	5. 3143	13. 90	Q	V				
16+40	5. 3759	8. 93	Q	V				
16+45	5. 4246	7. 08	Q	V				
16+50	5. 4665	6. 08	Q	V				
16+55	5. 5034	5. 36	Q	V				
17+ 0	5. 5342	4. 47	Q	V				
17+ 5	5. 5597	3. 71	Q	V				
17+10	5. 5834	3. 44	Q	V				
17+15	5. 6057	3. 23	Q	V				
17+20	5. 6267	3. 05	Q	V				
17+25	5. 6466	2. 89	Q	V				
17+30	5. 6656	2. 76	Q	V				
17+35	5. 6838	2. 64	Q	V				
17+40	5. 7012	2. 53	Q	V				
17+45	5. 7179	2. 43	Q	V				
17+50	5. 7340	2. 34	Q	V				
17+55	5. 7496	2. 26	Q	V				
18+ 0	5. 7647	2. 19	Q	V				
18+ 5	5. 7794	2. 14	Q	V				
18+10	5. 7944	2. 18	Q	V				
18+15	5. 8097	2. 22	Q	V				
18+20	5. 8249	2. 21	Q	V				
18+25	5. 8399	2. 18	Q	V				

18+30	5. 8546	2. 14	Q	V
18+35	5. 8691	2. 10	Q	V
18+40	5. 8832	2. 06	Q	V
18+45	5. 8971	2. 01	Q	V
18+50	5. 9107	1. 97	Q	V
18+55	5. 9240	1. 94	Q	V
19+ 0	5. 9371	1. 90	Q	V
19+ 5	5. 9500	1. 87	Q	V
19+10	5. 9626	1. 83	Q	V
19+15	5. 9750	1. 80	Q	V
19+20	5. 9872	1. 77	Q	V
19+25	5. 9992	1. 74	Q	V
19+30	6. 0110	1. 71	Q	V
19+35	6. 0226	1. 69	Q	V
19+40	6. 0340	1. 66	Q	V
19+45	6. 0453	1. 64	Q	V
19+50	6. 0564	1. 61	Q	V
19+55	6. 0673	1. 59	Q	V
20+ 0	6. 0781	1. 57	Q	V
20+ 5	6. 0888	1. 55	Q	V
20+10	6. 0993	1. 53	Q	V
20+15	6. 1096	1. 51	Q	V
20+20	6. 1199	1. 49	Q	V
20+25	6. 1300	1. 47	Q	V
20+30	6. 1400	1. 45	Q	V
20+35	6. 1498	1. 43	Q	V
20+40	6. 1596	1. 42	Q	V
20+45	6. 1692	1. 40	Q	V
20+50	6. 1788	1. 38	Q	V
20+55	6. 1882	1. 37	Q	V
21+ 0	6. 1975	1. 35	Q	V
21+ 5	6. 2067	1. 34	Q	V
21+10	6. 2158	1. 32	Q	V
21+15	6. 2249	1. 31	Q	V
21+20	6. 2338	1. 30	Q	V
21+25	6. 2426	1. 28	Q	V
21+30	6. 2514	1. 27	Q	V
21+35	6. 2601	1. 26	Q	V
21+40	6. 2687	1. 25	Q	V
21+45	6. 2772	1. 24	Q	V
21+50	6. 2856	1. 22	Q	V
21+55	6. 2940	1. 21	Q	V
22+ 0	6. 3022	1. 20	Q	V
22+ 5	6. 3104	1. 19	Q	V
22+10	6. 3186	1. 18	Q	V
22+15	6. 3266	1. 17	Q	V
22+20	6. 3346	1. 16	Q	V
22+25	6. 3425	1. 15	Q	V
22+30	6. 3504	1. 14	Q	V
22+35	6. 3582	1. 13	Q	V
22+40	6. 3659	1. 12	Q	V
22+45	6. 3736	1. 11	Q	V
22+50	6. 3812	1. 10	Q	V
22+55	6. 3888	1. 10	Q	V
23+ 0	6. 3963	1. 09	Q	V
23+ 5	6. 4037	1. 08	Q	V
23+10	6. 4111	1. 07	Q	V
23+15	6. 4184	1. 06	Q	V
23+20	6. 4257	1. 06	Q	V
23+25	6. 4329	1. 05	Q	V
23+30	6. 4401	1. 04	Q	V
23+35	6. 4472	1. 03	Q	V
23+40	6. 4542	1. 03	Q	V

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23+45	6. 4613	1. 02	Q				V
23+50	6. 4682	1. 01	Q				V
23+55	6. 4752	1. 01	Q				V
24+ 0	6. 4820	1. 00	Q				V
24+ 5	6. 4885	0. 94	Q				V
24+10	6. 4928	0. 62	Q				V
24+15	6. 4947	0. 28	Q				V
24+20	6. 4958	0. 16	Q				V
24+25	6. 4964	0. 09	Q				V
24+30	6. 4968	0. 05	Q				V
24+35	6. 4969	0. 02	Q				V
24+40	6. 4970	0. 01	Q				V
24+45	6. 4971	0. 01	Q				V
24+50	6. 4971	0. 01	Q				V
24+55	6. 4971	0. 00	Q				V
